BM-89D/89T

SERVICE MANUAL

US Model
Canadian Model
AEP Model
UK Model

For the informations about the hand control unit (HU-80) supplied with BM-89D and the hoot control unit (FS-85) supplied with BM-89T, please refer to the HU-80 or FS-85 service manuals previously issued respectively.

Model Name Using Similar Mechanism	BM-88
Tape Transport Mechanism Type	MB-89

SPECIFICATIONS

Recording system
4-track 2-channel monaural
(L channel for electronic index signals, R channel for sound signals)
Tape speed
4.8 cm/s (1⅞ in./s), 2.4 cm/s (15⁄16 in./s)
Fast winding time
Approx. 2 min. 20 sec. with Sony cassette DC-90
Frequency response
200–5,000 Hz (at 2.4 cm/s)
200–8,000 Hz (at 4.8 cm/s)
Speaker
Approx. 5.7 cm (2¼ inches) dia.
Power output
350 mW (at 10% distortion)
Input
TELEPHONE PICKUP (minijack)
Sensitivity 0.2 mV
Input impedance 10 kilohms

Output
EARPHONE (minijack)
for 8–300-ohm earphones
CONTROL UNIT connector
for hand control unit or foot control unit

Power requirements
9 V DC
DC IN 9 V jack accepts the supplied AC power adaptor for use on
120 V AC, 60 Hz (US, Canadian)
220 V AC, 50 Hz (AEP)
240 V AC, 50 Hz (UK)
Power consumption
14 W (US, Canadian) (with the supplied AC power adaptor)
13 W (AEP, UK)
Dimensions
Approx. 200 x 70 x 245 mm (w/h/d) (7⅞ x 2⅞ x 9¾ inches)
including projecting parts and controls
Mass
Approx. 1.2 kg (2 lb 11 oz)
Accessories supplied
AC power adaptor (1)
Hand control unit (1, BM-89D only)
Cradle for the hand control unit (1, BM-89D only)
Foot control unit (1, BM-89T only)
Earphone (1, BM-89T only)

Design and specifications are subject to change without notice.

DICTATOR/TRANSCRIBER

SONY

Differences between BM-89D and BM-89T in supplied accessories

Accessory \ Model	BM-89D	BM-89T
Hand Control Unit	Supplied	Not supplied
Cradle of Hand Control Unit	Supplied	Not supplied
Foot Control Unit	Not supplied	Supplied
Earphone	Not supplied	Supplied

TABLE OF CONTENTS

SAFETY-RELATED COMPONENT WARNING!!

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

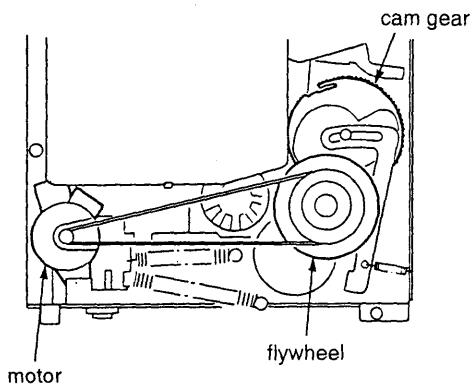
ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

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

SECTION 1
SERVICE NOTES

[NOTES ON REPAIRING]

1. STANDBY ON (S101) Switch
   The STANDBY ON switch is not a switch for turning ON/OFF the power source. Pay attention when repairing that the electricity is turned on even if the STANDBY ON switch is turned off.
   - The states when turnig off the STANDBY ON switch are as follows.
     a. LCD (ND901) display will be turned off.
     b. Motors (M901, 902) will be stopped.
     c. Plungers (PM901 to 903) will be turned off.
     The above items from a to c are controlled by the microcomputer which makes the pin ㉘ of IC112 (microcomputer) become Low level.
2. IC Link (PS101)
   Attention should be paid when repairing because the IC link is cut if the circuit is shortened by mistake.
3. Crack of Flywheel Gear and Cam Gear
   Do not turn the flywheel counterclockwise.
   The flywheel gear and cam gear may be crack when turn the flywheel counterclockwise.



[LCD CHECK METHOD]

This unit has LCD all lighting mode to check LCD.

1. In order to perform LCD all lighting,
   - Without inserting a cassette, press the three buttons of RESET, ERASE, SCAN at the same time.
     LCD is all lighting.
2. In order to release LCD all lighting,
   - Insert a cassette, or turn off the STANDBY ON switch once.

SECTION 2
GENERAL

This section is extracted from BM-77T/ 89D/89T instruction manual.

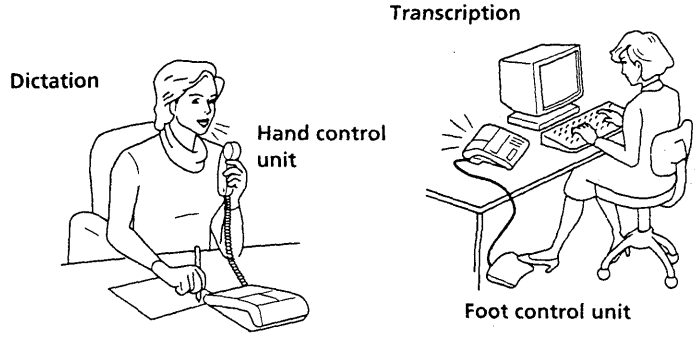
Features

As a dictator

- The hand control unit remotely controls the BM-89.
- Dual electronic indexing function signals—"LTR" (end of letter) and "SEC" (special instructions to secretary) signals—can be recorded on a tape during dictating, recording of telephone calls, listening or in the stop mode.
- The end of the last recorded segment on the tape can easily be located using the record-end function.
- Alarm sound and indication on the display window informs recording error.
- Recording of telephone calls can be performed with the use of the optional TL-4 telephone recording adaptor.
- With the use of the optional DE-45, DE-36 or MDR-U10M earphones, you can monitor the sound with the desired sound level during recording.

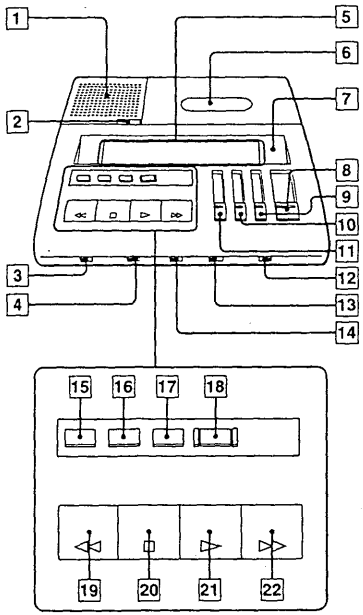
As a transcriber

- The foot control unit allows you to move the tape without using your hands.
- The scanning function allows easy display of the total recorded time of dictation in minutes, the number of documents and instructions recorded on the tape.
- Auto-stop function quickly accesses instructions and documents.
- DPC (Digital Pitch Control) allows you to increase or decrease the playback tape speed within the range of approximately -30% to +80%
- Auto backspace function with the REVERSE TIME control makes transcribing easy by enabling the reviewing of the last recorded words each time listening is resumed.
- Two tape speeds (4.8 cm/sec. and 2.4 cm/sec.) can be selected according to the user's needs.
- Rapid erasing function with ERASE and REW buttons.
- The Electronic "Index OFF" mode allows you to transcribe a cassette which was not recorded using a Sony Professional Dictating Machine.



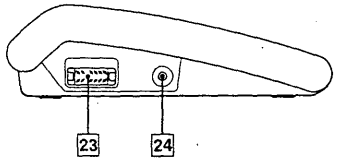
Location and Function of Controls

For details, refer to the pages indicated in ( ).



1 Built-in speaker
2 Eject button
Press to eject the cassette. The digital counter is reset to 00 0.0M0.0M every time the cassette is ejected.
3 POWER switch
4 SPEAKER selector (BM-89 only) (18)
5 Display window (28)
6 Cassette holder
7 REC (record)/ERASE lamp (8, 20)
8 VOLUME control
9 TONE control
10 REVERSE TIME control (17)
11 SPEED control (16)
12 TAPE SPEED selector (12)
13 SPEED CONTROL selector (16, 17)
OFF/ON/DPC (BM-89)
OFF/ON (BM-77)
14 AUTO STOP selector (16)
15 SCAN button (15)
16 TEL REC (telephone recording) button (BM-89 only) (21)
17 ● ERASE button (20)
18 RESET button (9, 10)
19 ◄◄ REW (rewind)
20 ■ STOP
21 ► LISTEN
22 ►► FF (fast forwad)

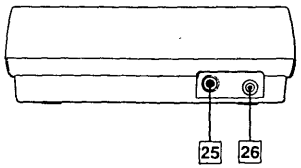
Left side



Left side

23 CONTROL UNIT connector (6)
24 EARPHONE jack (12, 18)

Rear

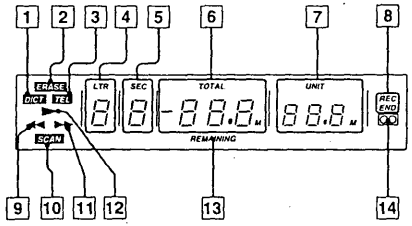


Rear

25 TELEPHONE PICKUP jack (BM-89 only) (21)
26 DC IN 9 V (6)

Continued on next page.

Display Window



1 DICT (dictation) indicator
Displayed during recording
2 ERASE indicator
Displayed while the cassette is being erased.
3 TEL (telephone) recording indicator
Displayed during recording of telephone calls.
4 LTR (letter) counter
End of letter counter
Displays the number of end-of-letter signals (i.e. the number of documents) recorded.
5 SEC (secretary) counter
Special instructions for secretary counter
Displays the number of special-instructions-for-secretary signals recorded.
6 TOTAL (time/tape) counter
Displays time or tape length of the recorded documents. The time counter and the tape counter is switched by pressing the RESET button for more than two seconds.
Time counter indicates the approximate time of the recorded documents.
Tape counter indicates the tape length of the recorded documents.
7 UNIT (time) counter
Displays the time of each recorded document, i.e. displays the approximate recorded time of a dictation, from the portion where the LTR signal is recorded to the portion where the next LTR signal is recorded.
8 REC END indicator (BM-89 only)
Blinks for approx. three seconds when the recording end portion is detected and disappears.
9 ◄◄ (rewind) indicator
Displayed while the cassette is being rewound.
10 SCAN indicator
Appears when the SCAN button is pressed. While SCAN is displayed, REMAINING is also displayed. In this case, the display window indicates the remaining time of the recorded documents, remaining numbers of recorded LTR and SEC signals and the remaining time of the actual document.
This disappears with a long beep tone when the tape reaches the tape top.
11 ►► (fast forward) indicator
Displayed while the tape is advanced rapidly.
12 ► (listen) indicator
Displayed during playback.
13 REMAINING indicator
Appears when the SCAN button is pressed. **While REMAINING is displayed,** recordings of dictation, telephone calls, LTR signals and SEC signals cannot be made. If the function selector is set to DICT or TEL REC (BM-89 only), LTR or SEC button is pressed, REMAINING blinks and a beep tone is heard.
The numbers on the digital counter (LTR, SEC, TOTAL and UNIT) indicate the remaining number of the LTR signals and the SEC signals, remaining amount of dictations (TOTAL) and remaining time of the actual document while the unit is in playback, fast forward or rewind mode.
To clear the REMAINING mark, press RESET or the eject button.
14 ⌧ (cassette) indicator
Displayed while cassette is inserted.
The indicator blinks in the following cases:
- The button is pressed when no cassette is inserted or when the cassette's safety tabs have been removed.
- About 3 minutes before reaching the end of the tape. (During dictating or recording of telephone call) (BM-89 only)
- End of tape or the tape is torn.

Notes

- It may be difficult to read the liquid crystal counter display due to the watching angle.
- If you play back a music cassette or a cassette which was recorded using a Sony Professiona Dictating Machine, set the unit to the Electronic "Index ON" mode. (See page 19.)

Operation Flow Chart

For details, refer to the pages in ( ).

: Necessary step : Optional step

Dictation (BM-89D)

- Connect the AC power adaptor to the unit and to an AC outlet (6).
- Connect the hand control unit (6).
- Set POWER to ON.
- Insert a cassette (7).
- If the counter is not reset to zero, press RESET (9).
- Set TAPE SPEED.
- Set the function selector of the hand control unit to DICT.
  Speak into the microphone.
- Record the SEC signal before giving instructions to the secretary (10).
- Quick review playback and correct the dictated material.
  Keep the function selector of the hand control unit pressed down toward B. SPACE to rewind the tape until the desired point on the tape is reached. Release the selector and playback of the dictation begins. When the reviewing is completed, set the function selector to DICT to proceed with dictation.
- Record the LTR signal at the end of each document (10).
- Check the recorded material with the use of the DPC function (17) when the recording is completed. Then, find the end of the last recorded portion with the use of the record-end function (12).

- Set the function selector of the hand control unit to STOP.
- Press the eject button to remove the cassette.
- Hand the cassette to your secretary or transcriptionist.

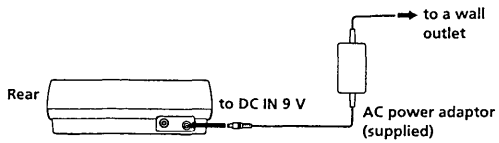
Transcription (BM-77T/89T)

- Disconnect the hand control unit.
- Connect the foot control unit (6).
- Set POWER to ON.
- Insert the cassette (7).
- Set SPEAKER to BUILT-IN (BM-89 only) (18) or connect earphones.
- Set AUTO STOP to OFF (16).
- Set TAPE SPEED (12).
- Press SCAN.
  When the tape reaches the beginning of the dictated material, a beep tone is heard and the unit automatically shuts off (15).
- Keep the right side of the pedal depressed.
  (When the foot control unit is connected.) (18)
  or
  Set the function selector of the hand control unit to LISTEN.
  (When the hand control unit is connected.) (18)
  or
  Press LISTEN.
  (When the BM-77/89 is used for operation.) (18)
- Adjust VOLUME and TONE.
- Adjust the starting point for playback with the use of REVERSE TIME. (When the foot control unit is used.) (BM-89)
  Set SPEED CONTROL to DPC or ON and adjust SPEED. (BM-77)
  Set SPEED CONTROL to ON and adjust SPEED. (16)
- After transcribing, stop the tape.
  Release the pedal. (When the foot control unit is used.) (18)
  or
  Set the function selector to STOP. (When the hand control unit is used.) (18)
  or
  Press STOP. (When LISTEN on the BM-77/89 is pressed to play back the tape.) (18)
- Erase the tape (20).

Power Connection

Note on the AC power adaptor
Use only the AC power adaptor supplied. Do not use any other AC power adaptor.

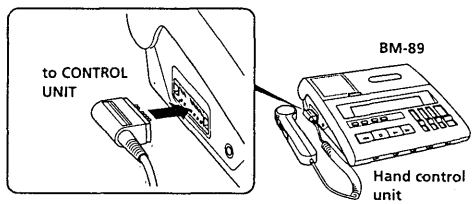
Porarity of the plug



Setting Up the Unit

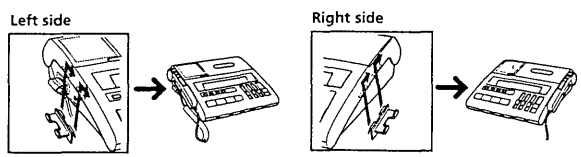
Connecting the Hand Control Unit (supplied with the BM-89D only)

For operation, refer to "Dictation" on page 8.



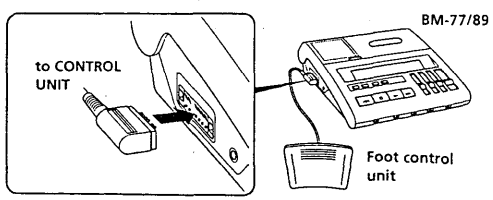
Attaching the cradle

Attach the cradle to the left or right side of the unit. Place the hand control unit on the cradle while not in use. Insert the cradle into the slots and slide to secure it.



Connecting the Foot Control Unit (supplied with the BM-77T/89T only)

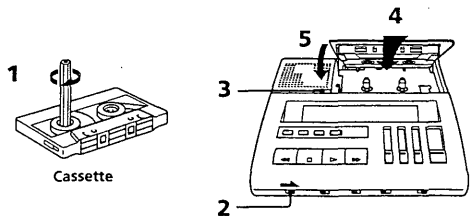
For operation, refer to "Transcription" on page 14.



Notes on cassettes

- Any standard cassette can be used, but the optional Sony leaderless cassette DC-60 or DC-90 is recommended. The use of the chromium dioxide or metal type of cassette is not advisable.
- Choose a cassette of suitable length. Recording time of each side of these cassettes (at 4.8 cm/s) is as follows:
  DC-60 : Approx. 30 minutes
  DC-90 : Approx. 45 minutes
- We do not recommend the use of cassettes with a running time of longer than 90 minutes.
- The letter A on the Sony cassette is embossed to help you distinguish that side of the cassette in a dimly lit area.

Cassette Insertion



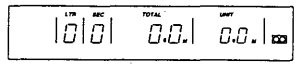
1 **Take up any slack in the tape.**

2 **Set POWER to ON.**

3 **Press the eject button to open the cassette holder.**

4 **Insert a cassette into the cassette holder with the side to be recorded on or played back facing upward.**

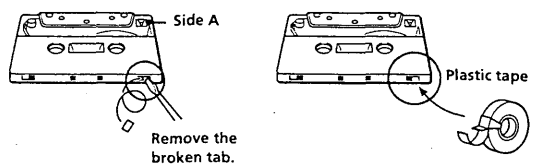
5 **Close the cassette holder.**
The digital counter displays zero and ⌧ appears.



To prevent accidental erasure

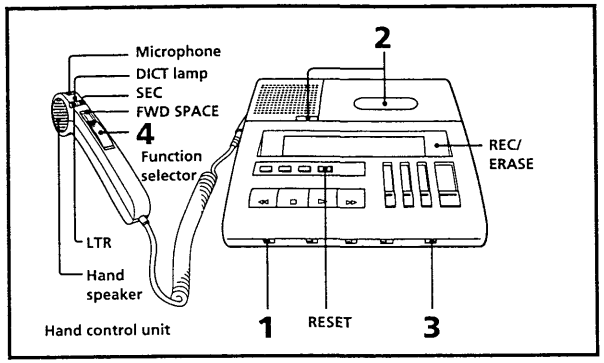
When the BM-89 is operated in record mode, previous recordings are automatically erased.
For this reason, cassettes incorporate a safety device to prevent accidental erasure.
When the small tabs at the rear of a cassette are broken out, an interlock on the BM-89 will be activated preventing recording.

- **To protect side A recording,** break out the tab of that side.
- **To protect side B recording,** break out the tab of that side.
  When the cassette is installed for telephone recording with the tabs broken out, the TEL REC button does not operate.
  When the cassette is installed for dictating with the tabs broken out, recording cannot be attempted, but the alarm sound is heard.
- **To reuse a cassette for recording after the tabs have been removed,** simply cover each slot with a small piece of plastic tape. Do not stick any material on any part of the cassette except the circled portions, as shown.



Dictation (BM-89 only)

You need the BM-89D or, if your model is BM-89T, the hand control unit.
To use the unit as a dictating machine, connect the hand control unit.
For connection, see page 6.

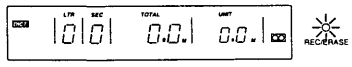


1 **Set POWER to ON.**

2 **Insert a cassette.** (See page 7.)

3 **Set TAPE SPEED to the desired tape speed, 4.8 or 2.4 (cm/sec.).**

4 **Set the function selector to DICT.**
Recording starts. Speak into the microphone. DICT appears on the display window. The DICT lamp on the hand control unit lights up and REC/ERASE lamp on the BM-89 blinks when the microphone picks up sound.



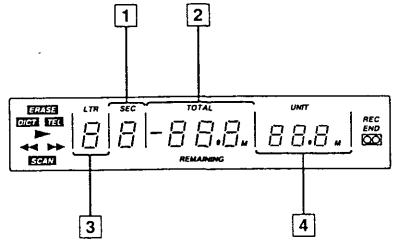
To stop the tape

Set the function selector to STOP.

Note
Keep the hand control unit away from the BM-89 during recording. If not, noise may be recorded.

Notes
- The time counters are normally within plus or minus two minutes of the actual time when using a DC-90 cassette.
- In case a cassette other than DC-60 and DC-90 is used, the time counter reading may differ to a larger extent from the actual time.
- The tape counter is switched to the time counter when the SCAN button is pressed.
- The numbers on the digital counter are memorized even when the POWER switch is turned off.

Digital Counter While Dictating



[1] The number of instructions recorded increases by one every time SEC is pressed.
When the SEC button is pressed, the number blinks for about 3 seconds and then stops blinking.
[2] Time counter: Total recorded time of dictation in minutes.
Tape counter: Numerical reference for recording and listening.
To switch the counter to time or tape indication, keep the RESET button pressed for more than two seconds.
[3] The number of documents recorded increases by one every time LTR is pressed.
When the LTR button is pressed, the number blinks for about 3 seconds and then stops blinking.
[4] Recorded time of each document in minutes.

To set the digital counter to zero

We recommend that you press the RESET button before starting dictation. Keep the RESET button pressed for more than 0.5 second to reset the LTR (document), SEC (special instruction), TOTAL (time/tape) and UNIT (time) counters to zero.

Continued on next page.

Dictation (BM-89 only) (continued)

To reset the TOTAL (time/tape) counter to zero tape counter

When the RESET button is pressed for more than 2 seconds in the tape stop mode, the TOTAL (time/tape) counter changes to 000 and functions as a tape counter.

To reset the TOTAL (time/tape) counter to zero time counter

Keep the RESET button pressed for more than 2 seconds in the tape stop mode. The TOTAL (time/tape) counter changes to 0.0M and functions as a time counter

The TOTAL (time/tape) counter and the UNIT time counter indicate the approximate time of the recorded material.

Convenient Functions

To record LTR (letter) and SEC (secretary) signals

You can record electronic index signals on the tape while the unit is set in recording (dictation), telephone recording, stop or playback (with the hand control unit) mode.

LTR (letter=end of document) signal: Record at the end of each document.
SEC (secretary=special instructions to secretary) signal: Record before giving instructions to the secretary.

When the AUTO STOP function (see page 16) is activated (AUTO STOP: ON), the tape automatically stops at each index signal when it is rewound, rapidly advanced or scanned. Documents and instructions can be located without the user's having to listen to the entire tape.

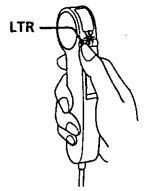
- **Before dictating, press RESET** to reset the counters to zero.

Notes

- The LTR or the SEC signal should be recorded with the intervals of more than 6 seconds.
- Playback sound is muted when either the LTR or SEC button is pressed.
- If either the LTR or SEC button is pressed while turning on the SPEED CONTROL selector, the tape will run at normal tape speed.
- While playing back, if either the LTR or SEC button is pressed to record the index signal on the previously recorded LTR or SEC signal by mistake, a beep tone is heard and the index signal cannot be recorded.

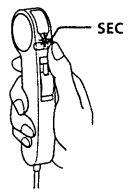
To record the LTR signal

Press LTR on the hand control unit.
Each time the button is pressed, the number on the LTR (document) counter increases by one. The number of the UNIT counter is cleared. (0.0M)



To record the SEC signal

Press SEC on the hand control unit.
Each time the button is pressed, the number on the SEC (special instruction) counter increases by one.



When the LTR or SEC signal is recorded, the number on the counter blinks and then lights up. Up to nine signals each can be recorded on each side of a cassette. If more than nine signals are recorded, "E" appears in the counter display.

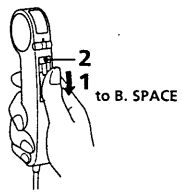
Continued on next page.

Dictation (BM-89 only) (continued)

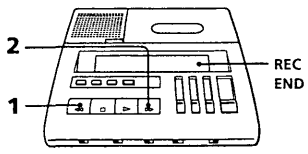
Record-end function

You can easily find the end of the last recorded segment on the tape. This function enables you to continue recording from the point where you left off.

Hand control unit



BM-89



1 Rewind the tape a little.

2 Press ▶▶ FF (FWD SPACE).

The tape will rapidly advance and stop at the end of the last recorded segment. At the end of the last recording, a long beep tone is heard and REC END blinks for approx. 3 seconds on the display window and then, disappears.
If the unit is set in record mode by mistake, immediately stop the recording. The record-end function does not operate if the recorded material is shorter than a second.

Note
Once the cassette is ejected or the POWER switch is set to STANDBY, the record-end memory is cleared and the record-end function does not operate.

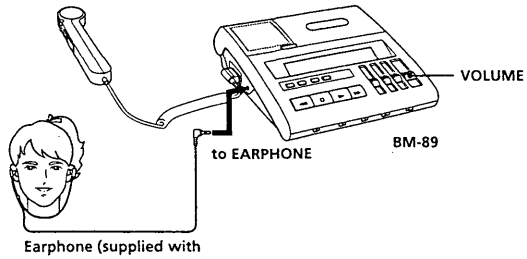
Recording time

Possible recording times of each side of cassettes are as follows.

Cassette	TAPE SPEED selector	
	4.8	2.4
Sony DC-60	30 minutes	60 minutes
Sony DC-90	45 minutes	90 minutes

Monitoring while dictating

The recording can be monitored through earphones. Connect a Sony DE-45, DE-36 or MDR-U10M earphones (not supplied) to the EARPHONE jack located on the left side of the unit. Adjust VOLUME if required.



Earphone (supplied with BM-89T only)

Tips for More Efficient Dictation

Before you start dictation
- Organize your thoughts.
- Make notes or an outline of what you want to dictate.
- Check that the cassette is erased. (See page 20.)

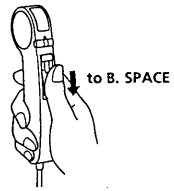
When you dictate
- Identify yourself. (Name, department, phone number)
- Indicate the type of dictation. (Memo, letter, etc.)
- Give transcribing instructions. (Type of stationery, number of copies and who they are for, envelopes, etc.)
- Specify distribution. (Names, addresses, etc.)

During dictation
- Relax and speak clearly, at normal speed.
- Short sentences are best.
- Include punctuation.
- Spell difficult or unusual words.
- Correct your mistakes. (Review and redictate, or use SEC signal to alert the transcriptionist of changes or corrections.)
- At the end of each document, record an LTR signal.

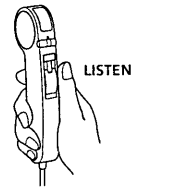
Quick reviewing (playback)/correcting the dictated material

You can easily listen to the dictated material and correct it if required.

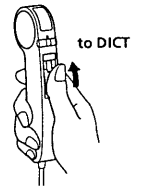
1 Keep the function selector of the hand control unit pressed down toward B. SPACE to rewind the tape.



2 Release the selector. Playback of the dictation begins.

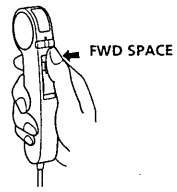


3 When the reviewing is completed, set the function selector to DICT to proceed with the dictation.



For fast winding of the tape

Keep the FWD SPACE button of the hand control unit pressed until the desired portion is reached.

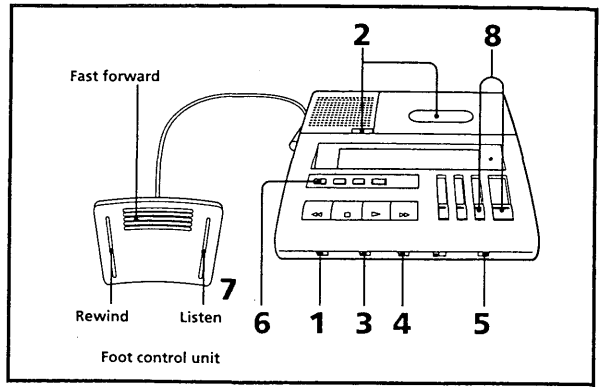


When you have finished dictating

Hand the cassette to your secretary without rewinding the tape.

Transcription

You need the BM-77T/89T or, if your model is BM-89D, the foot control unit.
To use the unit as a transcribing machine, connect the foot control unit.
For connection, see page 6.



Tips on Transcription
- Before typing, check the recorded time of the dictation and the number of LTR and SEC signals recorded on the cassette using the SCAN function.
- Erase the tape when transcription is finished.

Notes
- To stop scanning, press STOP.
- When the AUTO STOP switch is set to ON, the tape automatically stops at each electronic index signal previously recorded on the tape while scanning. This is convenient to locate the beginning of each document or special instruction.
- To restart scanning after it is stopped at the electronic index signal, press the SCAN or REW button.

1 **Set POWER to ON.**

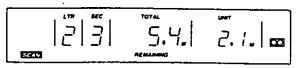
2 **Insert a cassette.** (See page 7.)

3 **Set SPEAKER to BUILT-IN. (BM-89 only)**

4 **Set AUTO STOP to OFF.** (See page 16.)

5 **Set TAPE SPEED to the same tape speed as that used for recording (dictation).**

6 **To check the recorded material by using the SCAN function, press SCAN for a second.**
SCAN and REMAINING appear on the display and the tape starts to be rewound. When the tape is completely rewound, a beep is heard and the unit automatically shuts off. As to the digital counter, see page 15.



7 **Keep the right side of the foot control unit pedal depressed to listen to the tape.**

8 **Adjust VOLUME and TONE.**

Notes on the time counter
While REMAINING is displayed (in scanning mode or in rewind mode after scanning) and the unit is stopped automatically when the LTR signal is detected, the number on the UNIT counter will be reset to 0.0M after blinking for about 3 seconds to read the amount of the document.

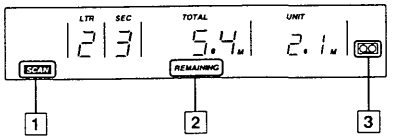
To stop the tape
Release the pedal.

To rewind the tape
Keep the left side of the foot control unit pedal depressed.

To rapidly advance the tape
Keep the center top of the foot control unit pedal depressed.

Digital Counter While Scanning

To use the SCAN function, press the SCAN button for a second. When the tape reaches the beginning of the dictated material, a beep tone is heard and the unit automatically shuts off. When the tape is completely rewound, the total dictated time and the recorded time of the first document are displayed. The numbers of documents and special instructions recorded on the tape are also displayed on the display window.



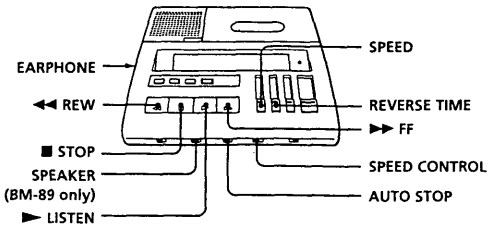
1 SCAN indicator
Disappears when the unit shuts off.
2 REMAINING indicator
While REMAINING is displayed, the numbers on the display window indicate the amount of tape left. This is convenient to know the remaining amount of dictation when transcribing.
While REMAINING is displayed, dictating, telephone recording and recording of LTR and SEC signals cannot be performed.
Press RESET or the eject button. REMAINING will disappear.
3 (cassette) indicator
When the tape reaches the tape top, this mark blinks while a long beep tone is heard and then lights up.

The above example of the counter indicates that the cassette has 2 documents and 3 special instructions. Total recorded time of the dictation is approx. 5.4 minutes and the recorded time of the first document is approx. 2.1 minutes.

Scan-top function
When the tape is advanced rapidly (in fast forward mode after scanning) while REMAINING is displayed, the tape will stop automatically at the portion from which the scanning was started. In this case, a beep tone is heard and the – (minus) mark on the TOTAL counter blinks for about 3 seconds and then stops blinking.

Continued on next page.

Convenient Functions



AUTO STOP function

With the AUTO STOP function, recorded documents and instructions can be located without the user's having to listen to the entire tape.

This function activates only in rewind, fast forward or scanning mode.

When the AUTO STOP switch is set to ON, the tape automatically stops at each electronic index signal previously recorded on the tape. (See "To record LTR and SEC signals" on page 10.)

- **When the LTR signal is detected,** the LTR document counter number increases or decreases and blinks for approximately 3 seconds, and a beep tone is heard. The tape stops automatically. The UNIT counter is set to 0.0M or indicates the recorded time of the next document.
- **When the SEC signal is detected,** the special instruction counter number increases or decreases and blinks for approximately 3 seconds, and a beep tone is heard. The tape stops automatically.

When the AUTO STOP switch is set to OFF, the numbers on the LTR (document) and SEC (special instruction) counters increase or decrease and blink when an LTR or SEC signal is detected, but the tape does not stop.

Note
The tape does not stop at the LTR or the SEC signal even if the AUTO STOP switch is set to ON while the FF or REW button is continuously depressed.

Speed control function (BM-77 only)

Set the SPEED CONTROL selector* to ON to adjust the SPEED control. The tape can be played back at a speed faster or slower than normal. Set the SPEED CONTROL selector to OFF to transcribe the dictated material at the normal speed.

* Tape speed can be changed in the range of approximately –20% to +80% with the use of the SPEED control.

DPC (Digital Pitch Control) and speed control function (BM-89 only)

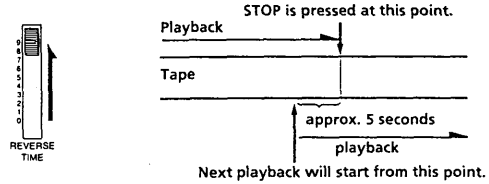
You can make the sound more comprehensible when changing the tape speed. Set the SPEED CONTROL selector* to DPC so that the pitch does not change, even when the tape is played back at high or low speed by the SPEED control.
Set the SPEED CONTROL selector to ON to adjust the speed only by the SPEED control.
When the SPEED CONTROL selector is set to OFF, the tape moves at the normal speed regardless of the position of the SPEED control.

* Tape speed can be changed in the range of approximately –30% to +80% with the use of the SPEED control.

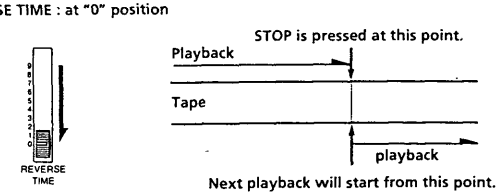
Auto backspace function

This control operates only when the foot control unit is connected.
With the use of the REVERSE TIME control, the tape is rewound a little each time it is stopped. Then, the last few recorded words can be reviewed when you resume listening. Adjust the REVERSE TIME control to determine the length of tape to be rewound.
At "9" position, the tape is rewound so that the dictated material can be reviewed for about 5 seconds. At "0" position, the tape stops without being rewound at all.
Set the REVERSE TIME control to the desired position and keep the right side of the pedal depressed to listen to the tape.

REVERSE TIME : at "9" position



REVERSE TIME : at "0" position



Continued on next page.

Transcription (continued)

Notes
- When the button is pressed while detecting the index signal during playback, the switching time of the operation modes may be delayed.
- When a music cassette or a monaural cassette is played back or wound rapidly (in fast forward or rewind mode), the switching time of the operation modes may be delayed. In this case, set the unit to the Electronic "Index OFF" mode. (See page 19.)

Notes
- E-INDEX signal of the Sony conventional models BM-18, BM-23 and so on corresponds to the LTR signal of the model BM-77 and BM-89.
- LTR/SEC signals and E-INDEX signal do not correspond to the cue signals used for consumer type tape recorder.

Tape transport operation

To	BM-77 BM-89	Hand control unit (BM-89 only)	Foot control unit
Rewind	Press ◄◄ REW.	Keep the function selector pressed down toward B.SPACE.	Keep the left side of the pedal depressed.
Stop	Press ■ STOP.	Set the function selector to STOP.	Release the pedal.
Listen	Press ► LISTEN.	Set the function selector to LISTEN.	Keep the right side of the pedal depressed.
Fast forward	Press ►► FF.	Keep the FWD SPACE button pressed.	Keep the top center of the pedal depressed.

Private listening

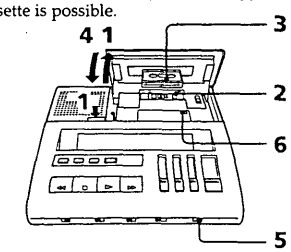
Connect a Sony DE-45, DE-36 or MDR-U10M earphones (not supplied) to the EARPHONE jack.
The sound will be heard through the earphones and speaker sound will be disconnected.

Selecting the speaker (BM-89 only)

You can listen to the dictated material through the built-in speaker or the speaker on the hand control unit by switching the SPEAKER selector to BUILT-IN (built-in speaker) or HAND (speaker on the hand control unit).

Transcribing a Microcassette (BM-77 only)

With Sony MA-50 microcassette adaptor (not supplied) , transcription from a microcassette is possible.



Notes
- While using the MA-50, the counters do not work.
- Turn off the MA-50 when it is inserted or removed from the unit, or when the microcassette is wound rapidly (in fast forward or rewind mode).
- As to the insertion and removal of microcassette, refer to the instruction manual of the MA-50.

1 Press the eject button to open the cassette compartment and press the cassette holder in the direction of the arrow to further open the compartment.

2 Install the MA-50 microcassette adaptor in the cassette compartment.
For details, refer to the instruction manual of the MA-50.

3 Insert a microcassette in the MA-50.

4 Close the cassette holder firmly toward the MA-50.

5 Set TAPE SPEED of the BM-77 to 4.8.

6 Set the tape speed of the MA-50 to 2.4 or 1.2. Turn on the MA-50.

Notes
- In the Electronic "Index OFF" mode
  - the LTR or the SEC signal is not recorded even if you press the LTR or SEC button.
  - the AUTO STOP function does not work even if the AUTO STOP switch is set to "ON".
- If you play back in the Electronic "Index ON" mode and the cassette is either a music cassette or one which was not recorded using a Sony Professional Dictating Machine (BM-18, 21, 23, 75, 80, 88, 89 etc.), neither the operation buttons, the counters nor the auto backspace function will work correctly.

When the MA-50 is not used

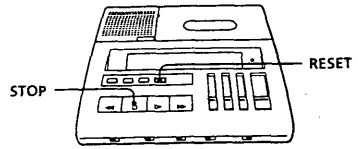
Remove it.

To remove the MA-50

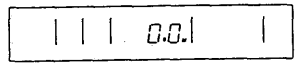
Lift it up.

Transcribing a Cassette Recorded with a Dictator Other Than Sony's

If you transcribe a cassette which was not recorded using a Sony Professional Dictating Machine, set the unit to the Electronic "Index OFF" mode.



In the tape stop mode, keep both RESET and STOP pressed for more than 2 seconds.
Only the TOTAL counter is displayed and the number is reset to "0". The unit is in the Electronic "Index OFF" mode.



To return the unit to the Electronic "Index ON" mode

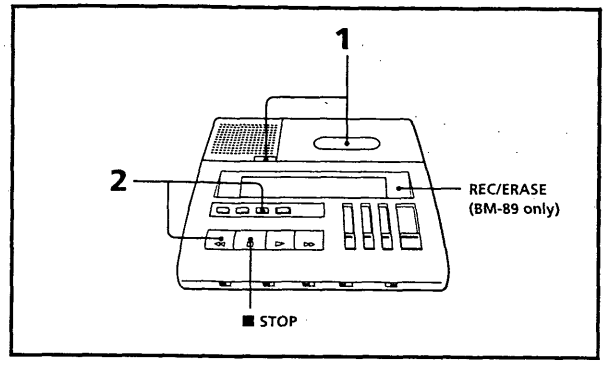
Change the mode by following the procedure above.

To switch the counter to time or tape indication

See page 9.

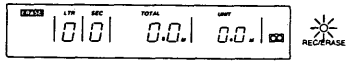
Erasing

The recording can be erased rapidly.



1 **Insert the cassette with the side to be erased up.** (See page 7).
Be sure not to rewind the tape after transcribing. The end portion of the dictated material to be erased should be positioned at the recording head.

2 **Keep ERASE pressed and then press ◀◀ REW.**
The REC/ERASE lamp lights up (BM-89 only) and ERASE appears on the display window.
The portion of the tape being rewound is erased.



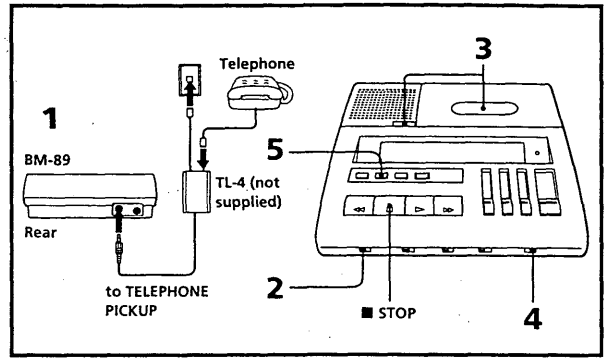
To stop the tape
Press ■ STOP.

Tip
For easier and quicker erasure of the entire cassette, use Sony BE-9H cassette eraser (not supplied).

Telephone Recording (BM-89 only)

To record telephone conversation, connect the optional the TL-4* telephone recording adaptor to the TELEPHONE PICKUP jack. For further details, refer to the instruction manual of the telephone recording adaptor.

* The TL-4 cannot be used on some telephones.



At the beginning of telephone recording
LTR signal is automatically recorded.
While the LTR signal is being recorded (for about 3 seconds), the unit cannot be stopped even though the STOP button is pressed.

During telephone recording
Only the LTR, SEC and STOP buttons are operative.

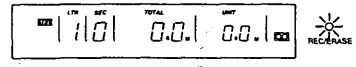
1 **Connect the TL-4 (not supplied) to the unit.**

2 **Set POWER to ON.**

3 **Insert a cassette.** (See page 7.)

4 **Set TAPE SPEED to the desired tape speed.**

5 **Keep TEL REC pressed for more than a second.**
Telephone recording begins. REC/ERASE lamp blinks and TEL appears on the display window.



To stop the tape
Press ■ STOP.

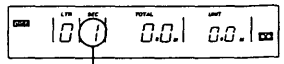
Example of Dictation and Transcription

Example of Dictation (BM-89 only)

Set the function selector of the hand control unit to DICT.

↓

Press SEC.



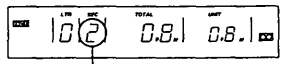
Blinks for approx. 3 seconds and stops blinking.

"This is a letter. Type it up and send it by express."
"Today's date is July 4, 1994.
This letter is for Mr. Alan R. Jefferson
Pyrene House, Sunbury on Thames,
Middlesex, TW16 7AT, U.K.

Dear Sir,
We received your order for"

↓

Press SEC.



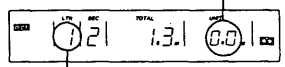
Blinks for approx. 3 seconds and stops blinking.

"under line
POI-L-5049-D3581", "quantity 270,000 today.
Shipment can be made within two weeks by Air.
Please accept our thanks for your order.
Faithfully yours,
John S. Smith
Sales Manager
U.K.G. Ltd."

↓

Press LTR.

This number is reset to 0.0 when the LTR button is pressed and increases until the LTR button is pressed again.



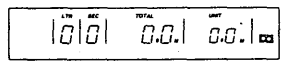
Blinks for approx. 3 seconds and stops blinking.

↓

Set the function selector of the hand control unit to STOP.

Example of Transcription

Insert the cassette.



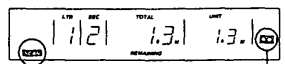
↓

Set AUTO STOP to OFF.

↓

Press SCAN.

The unit automatically shuts off when the tape reaches the tape top.
The counter indicates the total amount of dictation.



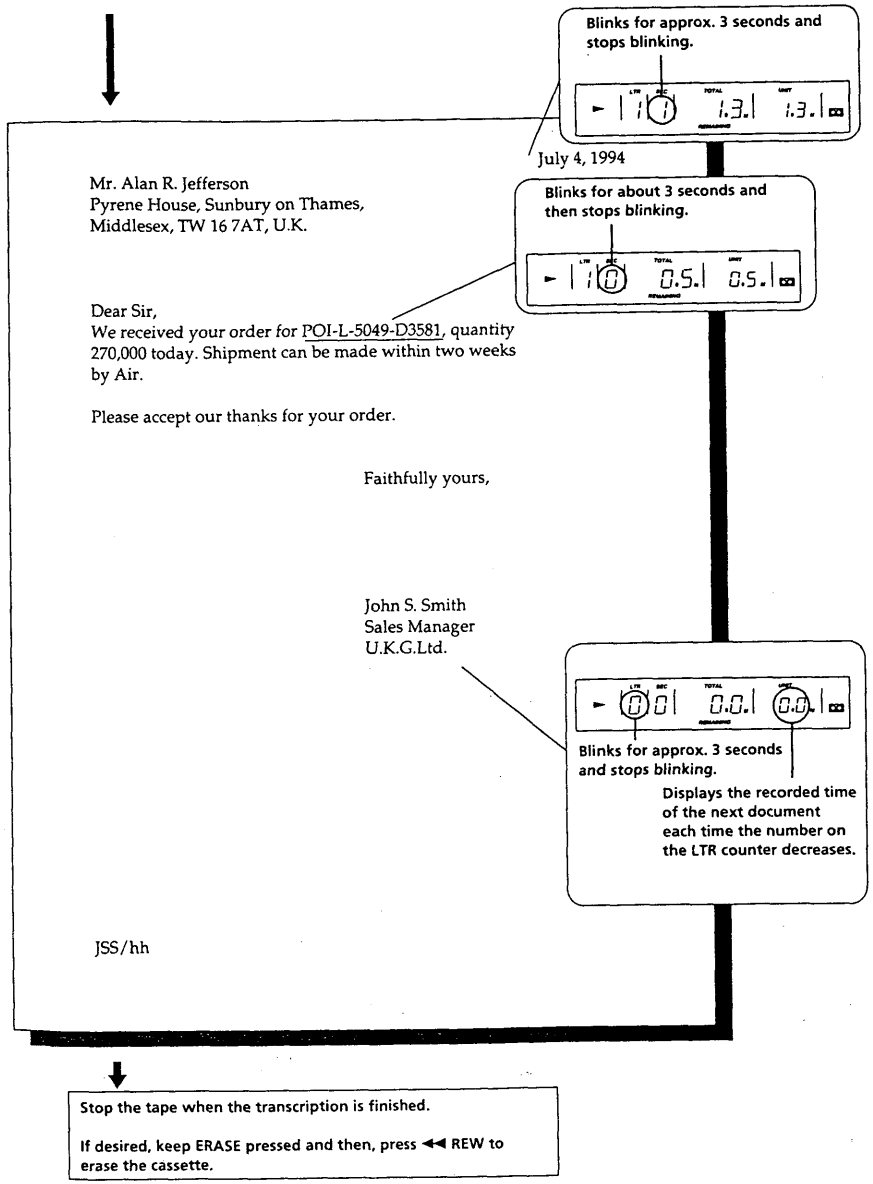
When the tape reaches the beginning, SCAN disappears and the ⊡ blinks for about 3 seconds and then stops blinking.

↓

Keep the right side of the foot control unit pedal depressed.

Tape playback starts.

↓



↓

Stop the tape when the transcription is finished.

If desired, keep ERASE pressed and then, press ◄◄ REW to erase the cassette.

Alarm system

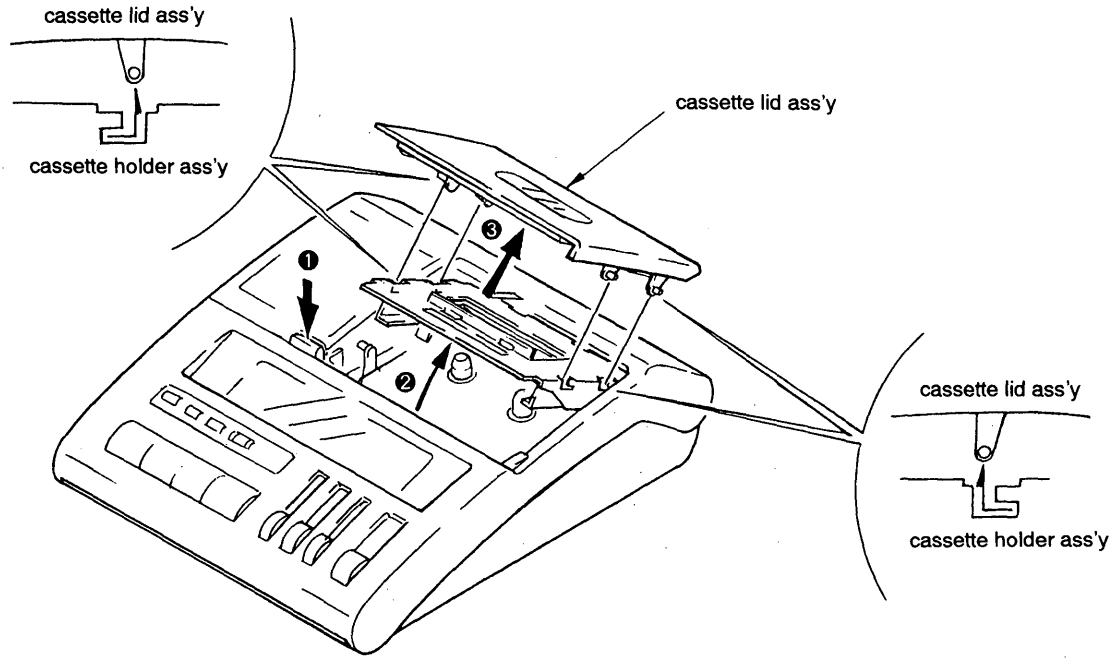
An alarm sounds and an indication appears on the display window in the following situations.

Alarm system	Situation	To release alarm system
When you press a button. → A beep is heard and ⌧ blinks.	• No cassette is inserted. • The cassette's safety tabs have been removed.	First, release the button, then • Insert a cassette. • Insert a new cassette or cover the safety slot.
The unit shuts off. → A beep is heard and ⌧ blinks.	• End of tape • The tape is torn.	• Rewind the tape. • Insert a new cassette.
When you press a button. → A beep is heard and REMAINING blinks.	• When you attempt to record while REMAINING is displayed. (BM-89 only)	• Clear the REMAINING mark by pressing the RESET or eject button.
While recording. → Beeps are heard and ⌧ blinks until the unit shuts off at the end of tape.	• Approx. 3 minutes before the unit shuts off at the end of tape while recording. (BM-89 only)	• Press ► LISTEN to stop alarm sound. • Stop recording and insert a new cassette.
The unit shuts off during FF mode. → A beep sounds and REC END blinks.	• End of recording. (BM-89 only)	• The REC END disappears and alarm stops automatically when about 3 seconds have passed.
→ "E" appears.	• The number of LTR or SEC signal exceeds 9.	• Do not press LTR or SEC button more than 9 times.
The unit shuts off during FF mode. → The – (minus) mark on the TOTAL counter blinks. A beep is heard.	• While REMAINING is displayed, the unit is rapidly advanced and automatically stopped at the portion from which the scanning was started.	• The minus mark stops blinking and lights up automatically when about 3 seconds have passed.
The unit shuts off. → A beep is heard and number of LTR or SEC blinks.	• Either LTR or SEC are detected while the tape is wound rapidly (in fast forward, rewind or scanning mode) and the AUTO STOP switch is set to ON.	• The number of LTR or SEC stops blinking and lights up automatically when about 3 seconds have passed.
Either the LTR or SEC buttons are pressed while playing back the tape. → A beep is heard.	• Either the LTR or SEC signals are detected on the tape. (BM-89 only)	• Release the button. • Play back the tape continuously for more than 6 seconds and then, press the button again.

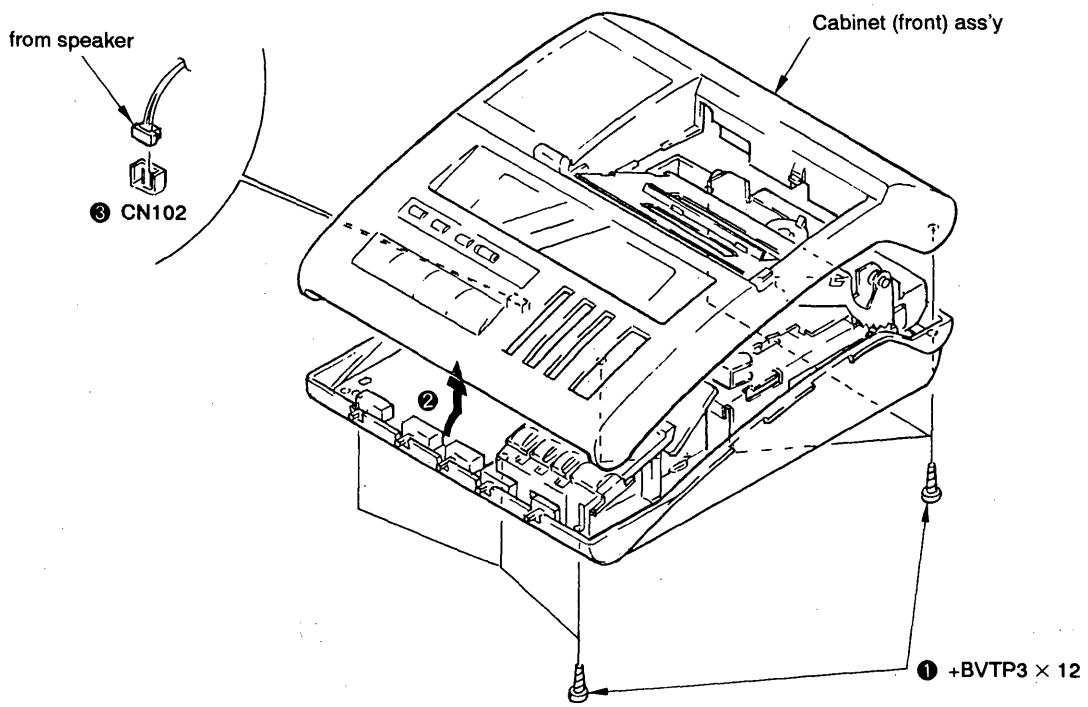
SECTION 3
DISASSEMBLY

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

CASSETTE LID ASS'Y



CABINET (FRONT) ASS'Y



SECTION 4
MECHANICAL ADJUSTMENTS

PRECAUTION

1. Clean the following parts with a denatured alcohol-moistened swab:
   record/playback head — pinch roller
   erase head — rubber belts
   capstan
2. Demagnetize the record/playback head with a head demagentizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the parts adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage unless otherwise noted.

Torque Measurement

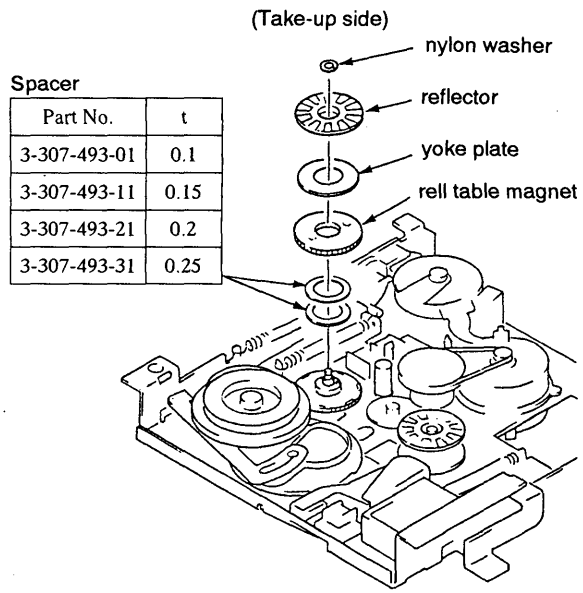
Mode	Cassette type torque meter	Meter reading
Forward	CQ-102C	20 – 45 g•cm (0.28 – 0.62 oz•inch)
Fast Forward Rewind	CQ-201B	80 – 200 g•cm (1.12 – 2.78 oz•inch)
Back Tension	CQ-102C	1 – 4 g•cm (0.014 – 0.055 oz•inch)

Tape Tension Measurement

Cassette type tension meter	Meter reading
CQ-403A	100 – 170 g (3.6 – 5.9 oz)

Foward Torque Adjustment
Mode: Foward

Cassette type torque meter	torque	Procedure
CQ-102C	20 – 45 g•cm (0.28 – 0.62 oz•inch)	Adjust the forward torque by replace the spacer showwn in below chart.

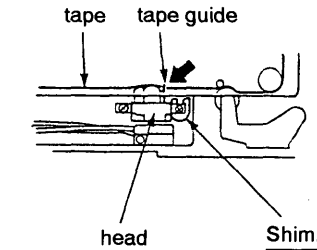


Spacer

Part No.	t
3-307-493-01	0.1
3-307-493-11	0.15
3-307-493-21	0.2
3-307-493-31	0.25

Head Height Adjustment
Procedure:

1. Insert the mirror cassette (CQ-009C).
2. In playback mode and viewing from the front, confirm that there is no tape curl and tape twise at shown by arrows.
3. If there is tape curl or tape twist, adjust the head height to eliminate them using head height adjustment shim.



Shim, head height adjustment

Part No.	t
3-578-138-01	0.1
3-578-138-11	0.2

After the adjustment, be sure to adjust record/playback head azimuth.

SECTION 5
ELECTRICAL ADJUSTMENTS

PRECAUTION

1. Switches and controls should be set to the positions as follows unless otherwise specified.

- Switch positions

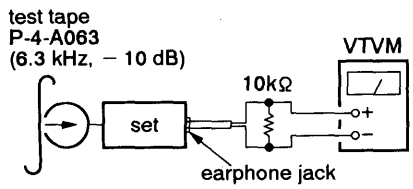
STANDBY ON switch	:ON
AUTO STOP switch	:ON
SPEAKER switch	:BUILT-IN
TONE control	:max. (H)
VOLUME control	:mechanical mid
SPEED CONTROL switch	:OFF
TAPE SPEED switch	:4.8
REVERSE TIME control	:0

2. Standard Input Level:
   TLEPHONE PICKUP jack : 300 Ω 0.77 mV (− 60dB)
3. Standard Output Level
   Speaker: 8 Ω 0.775 V (0dB)
4. Refer to page 19 for the adjustment location.

Record/playback Head Azimuth Adjustment

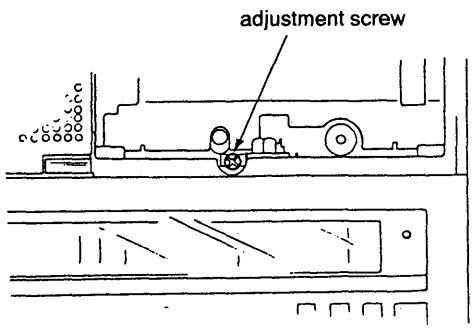
Procedure:

1. Mode: Playback (LISTEN)



2. Turn the adjustment screw to obtain the maximum reading on VTVM. Adjustment should be finished with the screw in tightening direction.
3. After the adjustment, lock the adjustment screw with suitable locking compound.

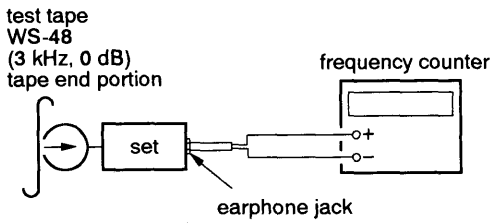
Adjustment Location: Record/playback head



Tape Speed Adjustment

Setup:

Mode: Playback (LISTEN)



Procedure:

1. SPEED CONTROL switch: OFF
   TAPE SPEED switch: 2.4
   Adjust RV601 to obtain a 1515 Hz frequency reading.
2. SPEED CONTROL switch: OFF
   TAPE SPEED switch: 4.8
   Adjust RV602 to obtain a 3030 Hz frequency reading.
3. SPEED CONTROL switch: ON
   TAPE SPEED switch: 4.8
   VSC SPEED control: max. (+)
   Adjust RV603 to obtain a 5700^{+50}_{0} Hz frequency reading.

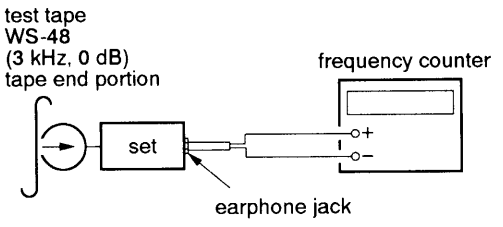
Adjutment Location: Servo board

DPC Adjustment

Setup:

Mode: Playback (LISTEN)

Tape speed adjustment should be done.



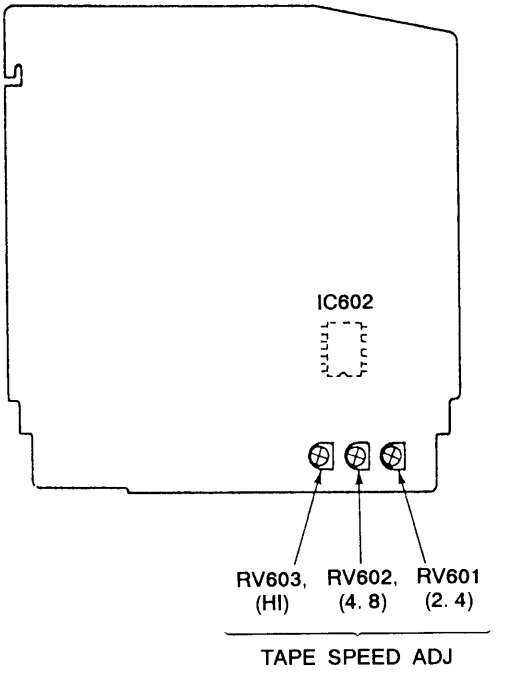
Procedure:

1. SPEED CONTROL switch :DPC
   TAPE SPEED switch :4.8
   SPEED knob switch :(−) Minimum
   Press S116 (TEST switch). Adjust RV302 so that the reading on frequency counter goes 2,910 Hz.
2. SPEED CONTROL switch :DPC
   TAPE SPEED switch :4.8
   SPEED knob switch :(+) Maximum
   Confirm the reading on frequency counter goes 2,940 ± 70 Hz.
3. When the specification is satisfied in the above chacks, adjustment is over. When it is out of order, adjust below.
   SPEED CONTROL switch :DPC
   TAPE SPEED switch :4.8
   SPEED knob :(+) Maximum
   Adjust RV302 so that the reading or frequency counter goes 2,940 Hz.
4. SPEED CONTROL switch :DPC
   TAPE SPEED switch :4.8
   SPEED knob :(−) Minimum
   Confirm the reading on frequency counter goes 2,910 ± 70 Hz.
5. When the specification is satisfied in the above checks, adjustment is over. When it is out of orden adjust in the order below.
   On checking item 2, the reading on frequency counter is more than 2,940 ± 70 Hz: Solder-bridge DPC land (HI).
   On checking item 2, the reading on frequency counter is less than 2,940 ± 70 Hz: Solder-bridge DPC land (Low)
   After solder-bridge, adust 1 to 4 again.

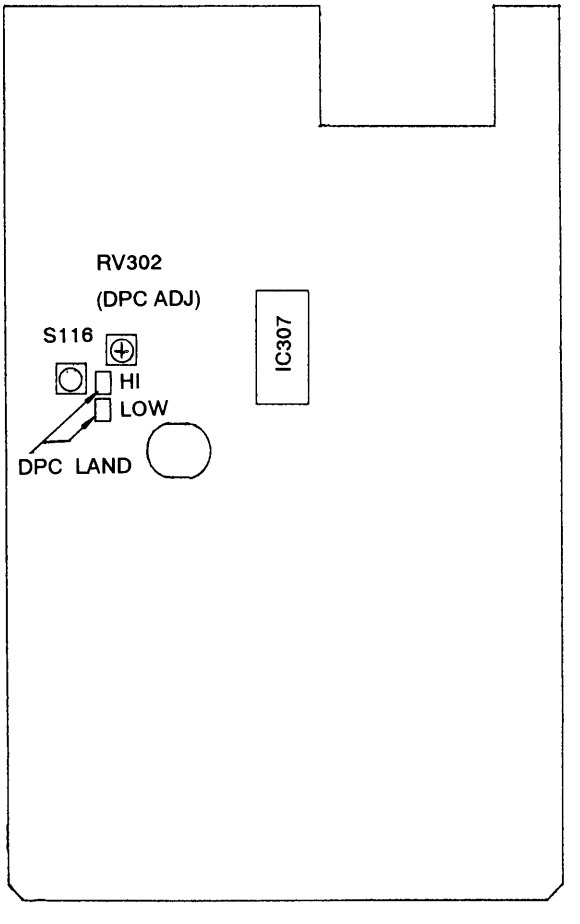
Adjustment Location: Main board.

• Adjustment Location

SERVO BOARD (Component Side)

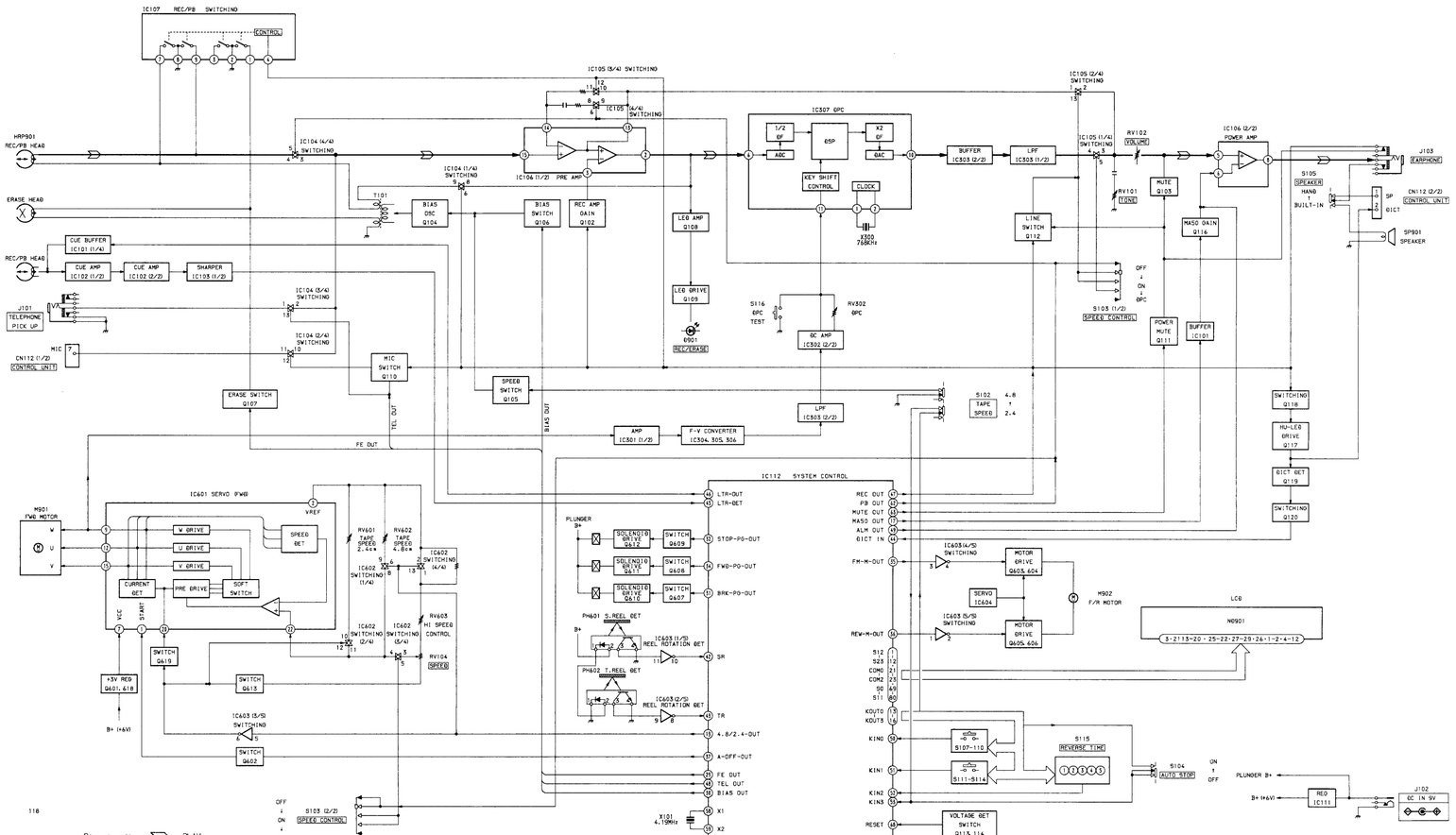


MAIN BOARD (Component Side)



SECTION 6
DIAGRAMS

6-1. BLOCK DIAGRAM



6-2. PRINTED WIRING BOARDS • See page 32 for Semiconductor Lead Layouts.

• Semiconductor Location

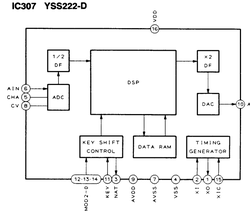
Ref. No.	Location	Ref. No.	Location
D103	C-13	Q102	D-13
D104	H-9	Q103	D-13
D105	F-8	Q104	E-8
D106	D-2	Q105	E-8
D107	H-14	Q106	E-8
D108	E-5	Q107	E-9
D109	I-4	Q108	H-8
D110	E-2	Q109	H-8
D111	I-2	Q110	G-7
D112	F-4	Q111	F-8
D113	E-4	Q112	F-9
D114	E-4	Q113	I-3
D115	H-13	Q114	I-3
D116	C-13	Q116	E-13
D117	I-14	Q117	J-12
D301	E-10	Q118	J-12
D302	G-11	Q119	I-12
D601	H-23	Q120	I-12
D604	G-26	Q601	H-23
D605	J-22	Q602	I-23
D606	F-26	Q603	F-23
D901	I-17	Q604	F-23
		Q605	G-22
IC101	C-7	Q606	F-22
IC102	C-9	Q607	H-26
IC103	C-10	Q608	H-22
IC104	D-10	Q609	H-26
IC105	E-10	Q610	G-26
IC106	D-12	Q611	H-22
IC107	D-9	Q612	G-26
IC111	I-15	Q613	H-26
IC112	G-4	Q618	H-23
IC301	H-11	Q619	I-23
IC302	G-10		
IC303	G-12		
IC304	H-11		
IC305	H-12		
IC306	F-13		
IC307	F-10		
IC601	I-23		
IC602	G-25		
IC603	I-25		
IC604	H-24		

Note on Printed Wiring Board:

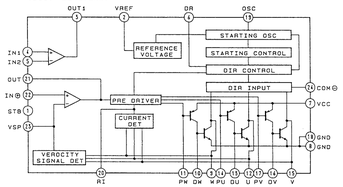
- ⊖ : Through hole.
- (shaded) : Pattern of the rear side.
- (shaded) : Pattern from the side which enables seeing.
- [o–o]s on servo board are jumper resistors JR601 to JR664.

• IC Block Diagrams

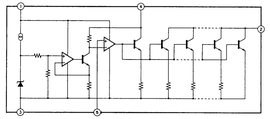
IC307 YSS222-D



IC601 LB1672MN

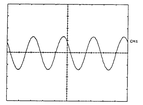


IC604 LA5523

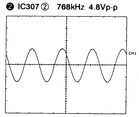


• Waveforms

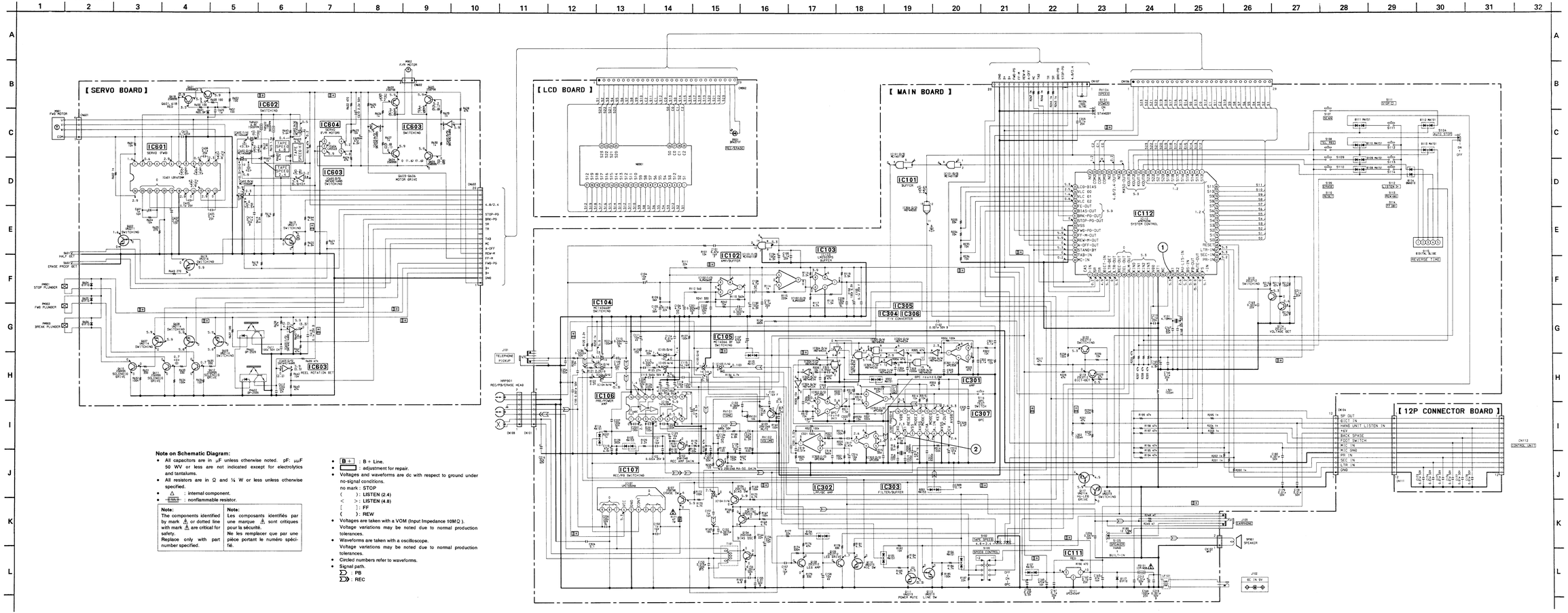
❶ IC112㉘ 4.194MH, 4Vp-p



❷ IC307② 768KHz 4.8Vp-p



6-3. SCHEMATIC DIAGRAM



Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.
- △ : internal component.
- ⚠ : nonflammable resistor.

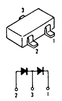
Note:	Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

- B+ : B + Line.
- [ ] : adjustment for repair.
- Voltages and waveforms are dc with respect to ground under no-signal conditions.
  no mark : STOP
  ( ) : LISTEN (2.4)
  < > : LISTEN (4.8)
  [ ] : FF
  { } : REW
- Voltages are taken with a VOM (Input Impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ▷ : PB
  ▷▷ : REC

• Semiconductor Lead Layouts

LA5523

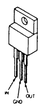
1SS226



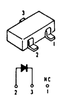
μPC1330HA

D1F10

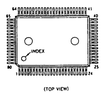
μPC2406HF



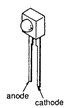
RD3.3M-B1



μPD75308GF-B21-3B9

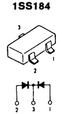


BR4371F



2SB798-DL
2SD999-CLCK

1SS184



6-4. MICROCOMPUTER μPD75308GF-B21-3B9 (IC112) PIN FUNCTION

Pin No.	Pin Name	Usage	Voltage, Remarks
1	S12	LCD segment output	
2	S13	LCD segment output	
3	S14	LCD segment output	
4	S15	LCD segment output	
5	S16	LCD segment output	
6	S17	LCD segment output	
7	S18	LCD segment output	
8	S19	LCD segment output	
9	S20	LCD segment output	
10	S21	LCD segment output	
11	S22	LCD segment output	
12	S23	LCD segment output	
13	KOUT 0	Key scan output	
14	KOUT 1	Key scan output	
15	KOUT 2	Key scan output	
16	KOUT 3	Key scan output	
17	MA50-OUT	Amplifier gain control output at MA-50 (micro cassette adaptor)	When using MA-50 : 5.3V When using the other : 0.1V
18	——	Not used	Open
19	4.8/2.4-OUT	Tape speed control output	At LISTEN of 4.8cm/s : 5.3V At the other : 0.2V
20	——	Not used	Open
21	COM 0	LCD common output	
22	COM 1	LCD common output	
23	COM 2	LCD common output	
24	——	Not used	Open
25	LCD-BIAS	Output for LCD outer resistance	5.3V
26	V_{LCD0}	Power source for LCD drive	2.4V
27	V_{LCD1}	Power source for LCD drive	1.6V
28	V_{LCD2}	Power source for LCD drive	0.8V
29	FE-OUT	Fast-Erase control output	At Fast-Erase : 0V At the other : 5.9V
30	BIAS-OUT	BIAS control output	At DICT, TEL-REC : 0V At the other : 5.9V
31	BRK-PG-OUT	Brake plunger output	Normal : 6.0V STOP from FF/REW : FF/REW → STOP, 0V, 60ms
32	STOP-PG-OUT	Stop plunger output	Normal : 0V STOP from FWD : FWD → STOP, 6V, 60ms
33	VSS	GND	0V
34	FWD-PG-OUT	FWD plunger output	At FWD : 5.9V At the other : 0V
35	FF-M-OUT	FF/REW motor output	Pin ㉟ : At motor FF 0V, At motor REW 5.9V, At the other 5.9V
36	REW-M-OUT		Pin ㊱ : At motor FF 5.9V, At motor REW 0V, At the other 5.9V
37	A-OFF-OUT	Motor Auto-off output	Motor Auto-off (no cassette or after three minutes after STOP) : 1.9V At the other : 0V
38	STAND-BY	Standby switch input	ON : 5.3V STAND-BY : 0V

Pin No.	Pin Name	Usage	Voltage, Remarks
39	TAB-IN	TAB (erase proof) detection switch input	Cassette with TAB : 0V, cassette without TAB : 5.3V
40	MC-IN	MA-50 (micro cassette adaptor) or cassette half detection switch input	Cassette or with MA-50 : 0V, without a cassette and without MA-50 : 5.3V
41	CAS-IN	Cassette detection switch input	With a cassette : 0V, without a cassette : 5.3V
42	SR	S reel signal input	Leaf switch of the mechanism deck
43	TR	T reel signal input	
44	DICT-IN	HU-DICT key input	At DICT key input of the hand control unit (HU-80) : 0V At the other : 5.3V
45	LTR-DET	LTR/SEC signal input	Count the rectangular pulse with the microcomputer At LISTEN : LTR 60 to 160Hz, SEC 800 to 2000Hz At FF/REW : LTR 600 to 4800Hz, SEC 8kHz to 60kHz
46	LTR-OUT	LTR/SEC signal output	At LTR oscillating : 5.3V Output 80Hz for three seconds. At SEC oscillating : 5.3V Output 1kHz for three seconds. At the other : 5.3V
47	REC-OUT	DICT, TEL-REC control output	At DICT, TEL-REC : 5.0V At the other : 0V
48	TEL-OUT	TEL-REC control output	At TEL-REC : 5.3V At the other : 0V
49	ALM-OUT	Alarm output	At alarm oscillating : 5.3V 2.05kHz
50	KIN 0	key scan input	
51	KIN 1	key scan input	
52	KIN 2	key scan input	
53	KIN 3	key scan input	
54	VDD	Positive power source terminal of the microcomputer	5.3V
55	——	Not used	Connect to VSS
56	——	Not used	Open
57	NC	Not used	Connect to VDD
58	X 1	Input for clock oscillation	5Vp-p 4.19MHz
59	X 2	Input for clock oscillation	5.5Vp-p 4.19MHz
60	HU-LIS-IN	HU-LISTEN key input	At LISTEN key-in of the hand control unit (HU-80) : 0.8V At the other : 5.3V
61	BS-IN	HU-BS key input	At BS key in of the hand control unit (HU-80) : 0.8V At the other : 5.3V
62	PB-OUT	Playback control output	At LISTEN : 5.3V At the other : 0V
63	MUTE-OUT	Amplifier mute output	At LISTEN, DICT, TEL-REC : 5.3V At the other : 0V
64	FS-IN	HU-FS key input	At FS key input of the hand control unit (HU-80) : 0.1V At the other : 5.3V
65	PR-IN	Foot switch LISTEN key input	At LISTEN key input of the foot control unit (FS-75) : 0.1V At the other : 5.3V
66	SEC-IN	HU-SEC key input	At SEC key input of the hand control unit (HU-80) : 0.1V At the other : 5.3V

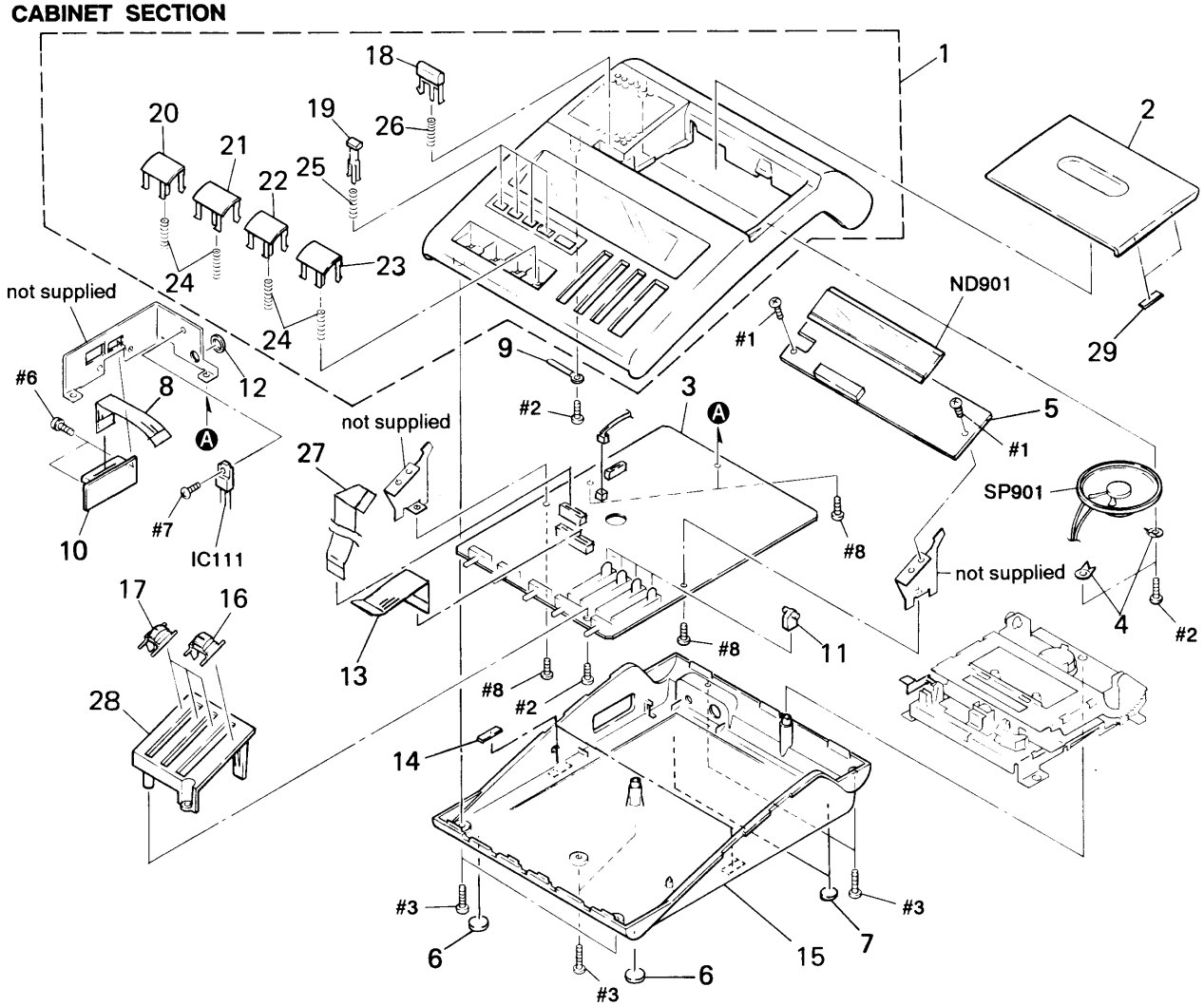
Pin No.	Pin Name	Usage	Voltage, Remarks
67	LTR-IN	HU-LTR key input	At LTR key input of the hand control unit (HU-80) : 0.1V At the other : 5.3V
68	RESET	Microcomputer•reset input	Normal : 5.3V
69	S 0	LCD segment output	
70	S 1	LCD segment output	
71	S 2	LCD segment output	
72	S 3	LCD segment output	
73	S 4	LCD segment output	
74	S 5	LCD segment output	
75	S 6	LCD segment output	
76	S 7	LCD segment output	
77	S 8	LCD segment output	
78	S 9	LCD segment output	
79	S 10	LCD segment output	
80	S 11	LCD segment output	

SECTION 7
EXPLODED VIEWS

NOTE:

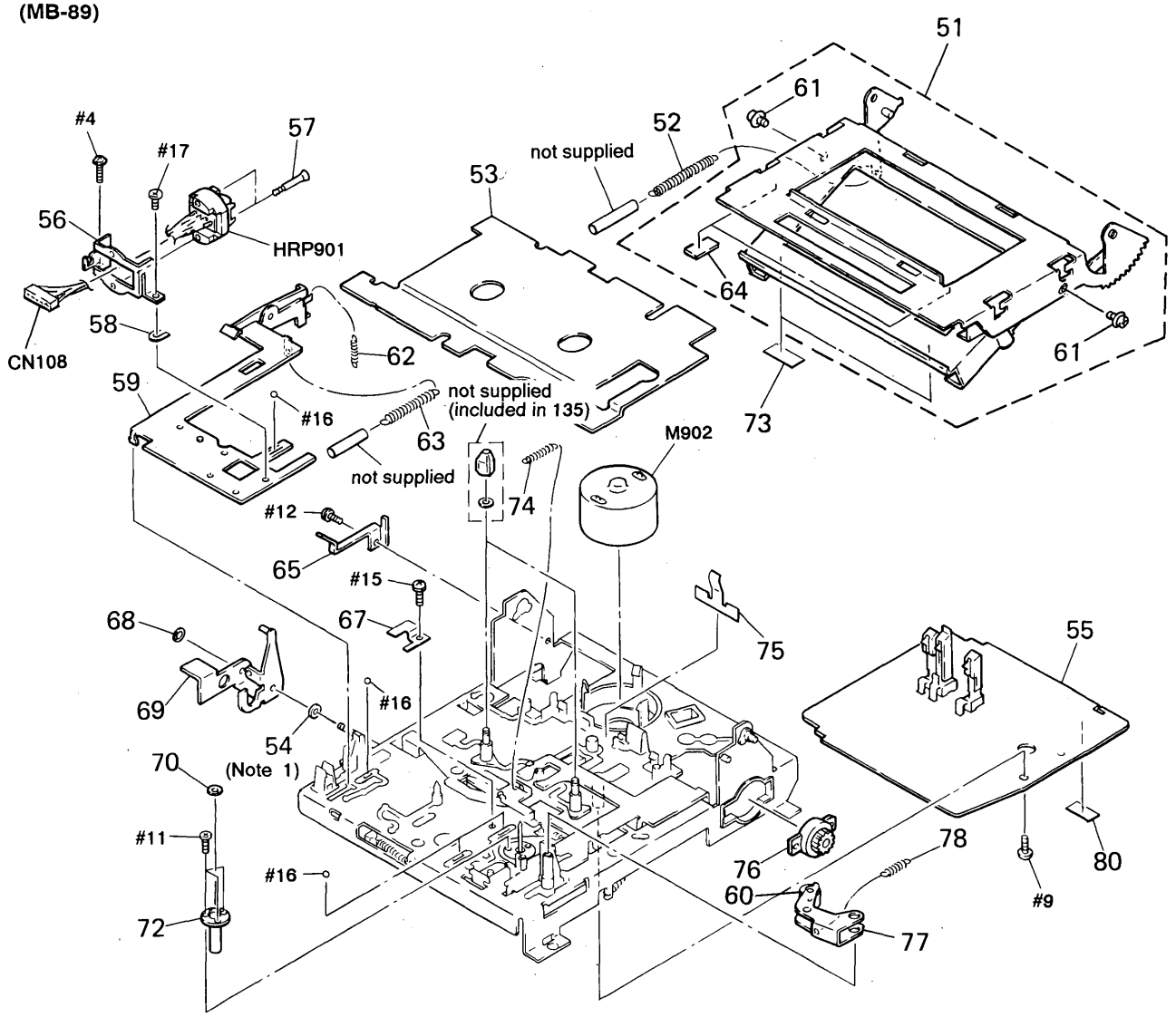
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ ↑
  Parts Color Cabinet's Color
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of the electrical parts list.

(1) CABINET SECTION



Ref. No.	Part No.	Description	Remark
1	X-3369-542-1	CABINET (FRONT) ASSY	
2	X-3323-532-1	LID ASSY, CASSETTE	
* 3	A-3061-051-A	MAIN BOARD, COMPLETE	
4	3-845-110-00	RETAINER, SPEAKER	
* 5	1-633-748-11	LCD BOARD	
6	3-329-013-01	FOOT, RUBBER	
7	3-343-250-01	CUSHION	
8	1-769-324-11	WIRE (FLAT TYPE) (FFC) (12 CORE)	
* 9	3-701-822-01	HOLDER, WIRE	
* 10	1-655-181-11	12P CONNECTOR BOARD	
* 11	3-323-679-01	BUSHING	
* 12	3-323-680-01	COVER, JACK	
13	1-769-326-11	WIRE (FLAT TYPE) (FFC) (29 CORE)	
14	3-831-441-XX	CUSHION	
15	X-3323-537-1	CABINET (REAR) ASSY	
16	X-3323-535-1	KNOB (VOL) ASSY	
17	X-3323-536-1	KNOB (TONE) ASSY	
18	3-323-693-01	BUTTON (EJECT)	
19	3-323-695-01	BUTTON (RESET/ERASE/TEL REC/SCAN)	
20	3-323-698-01	BUTTON (MD) (REW)	
21	3-323-697-01	BUTTON (STOP)	
22	3-323-698-11	BUTTON (MD) (LISTEN)	
23	3-323-698-21	BUTTON (MD) (FF)	
24	3-323-696-01	SPRING, COMPRESSION	
25	3-323-694-01	SPRING, COMPRESSION	
26	3-323-692-01	SPRING, COMPRESSION	
27	1-769-325-11	WIRE (FLAT TYPE) (FFC) (20 CORE)	
28	3-359-104-01	GUIDE, KNOB	
29	3-363-245-01	CUSHION	
IC111	8-759-148-79	IC uPC2406HF	
ND901	1-808-961-21	DISPLAY PANEL, LIQUID CRYSTAL	
SP901	1-503-616-11	SPEAKER	

(2) MECHANISM DECK SECTION (1)
(MB-89)

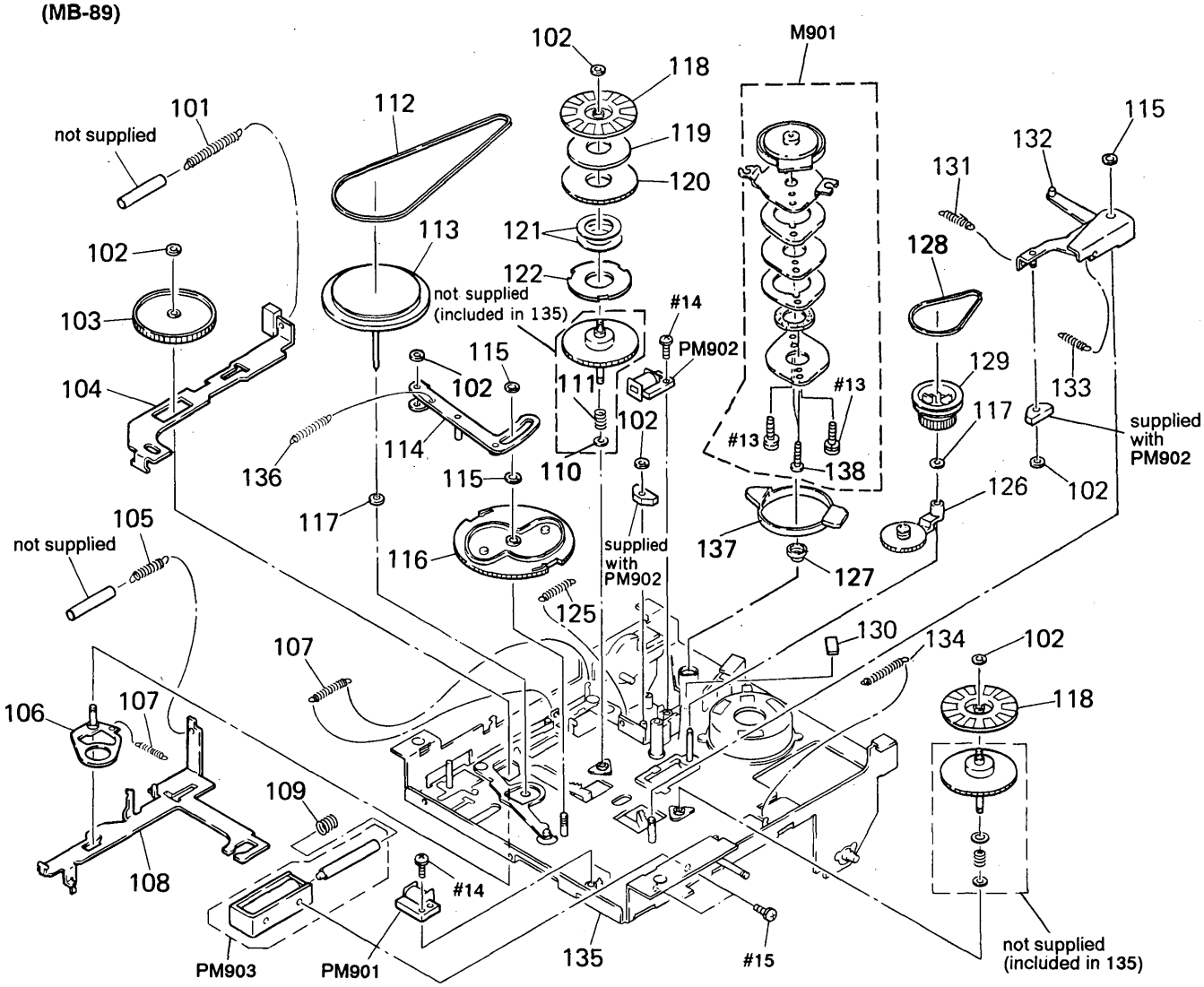


Note 1:
No. 54 has not been used production.

Ref. No.	Part No.	Description	Remark
51	X-3323-552-1	HOLDER ASSY, CASSETTE	
52	3-359-163-01	SPRING, TENSION	
53	3-359-159-01	PANEL (REEL)	
54	3-701-439-01	WASHER	
* 55	A-3016-636-A	SERVO BOARD, COMPLETE	
* 56	3-359-144-01	HOLDER (HEAD)	
57	4-920-347-01	SCREW, HEAD	
58	3-578-138-01	SHIM (T=0.1)	
58	3-578-138-11	SHIM (T=0.2)	
* 59	X-3369-906-1	CHASSIS ASSY, HEAD	
60	3-578-143-11	PINCH ROLLER	
61	3-318-201-01	SCREW (B) (1.4X3), TAPPING	
62	3-921-785-01	SPRING, TENSION	
63	3-583-501-00	SPRING, TENSION	
* 64	2-387-601-01	CUSHION, RUBBER	
* 65	3-359-126-01	SPRING (CASSETTE HOLDER)	

Ref. No.	Part No.	Description	Remark
67	3-323-520-01	SPRING	
68	3-307-948-01	WASHER, NYLON	
* 69	X-3323-551-1	LEVER (EJECT) ASSY	
70	3-325-698-01	RING, RETAINING	
72	3-359-152-01	BEARING, CAPSTAN	
73	3-363-246-01	CUSHION (CH)	
74	3-305-902-00	SPRING, TENSION	
75	3-359-125-01	SPRING (CASSETTE RETAINER)	
76	3-343-248-01	DAMPER (P), SMALL	
77	X-3323-550-1	PINCH LEVER ASSY	
78	3-359-164-01	SPRING, TENSION	
80	4-017-441-01	CUSHION (B)	
CN108	1-569-200-11	HOUSING, CONNECTOR 7P	
HRP901	1-500-200-11	HEAD, MAGNETIC (R/P)	
M902	X-3362-206-1	MOTOR (F/R) ASSY	

(3) MECHANISM DECK SECTION (2)
(MB-89)



Ref. No.	Part No.	Description	Remark
101	3-359-161-01	SPRING, TENSION	
102	3-307-948-01	WASHER, NYLON	
103	3-362-606-01	GEAR (FWD IDLER)	
* 104	X-3323-544-1	PLATE ASSY, FUNCTION, FWD	
105	3-359-162-01	SPRING, TENSION	
106	X-3323-501-1	LEVER ASSY, F.I	
107	3-509-127-00	SPRING, TENSION	
* 108	3-359-153-01	LEVER (FWD)	
109	3-359-160-01	SPRING, COMPRESSION	
110	3-356-713-01	WASHER	
111	3-323-519-01	SPRING, COMPRESSION	
112	3-359-158-01	BELT (FWD)	
113	X-3362-056-1	FLYWHEEL ASSY	
* 114	X-3323-545-1	ARM (FWD DRIVING) ASSY	
115	3-307-948-21	WASHER, NYLON	
116	3-359-154-01	GEAR (CAM)	
117	3-701-437-01	WASHER	
118	3-359-155-01	REFLECTOR	
119	3-307-313-00	PLATE, YOKE	
120	3-307-953-00	MAGNET, REEL TABLE	
121	3-307-493-01	SPACER (T=0.1)	
121	3-307-493-11	SPACER (T=0.15)	
121	3-307-493-21	SPACER (T=0.2)	
121	3-307-493-31	SPACER (T=0.25)	
122	3-561-827-00	PLATE (A), HYSTERESIS	
125	3-309-031-00	SPRING, TENSION	
126	X-3323-547-1	GEAR (F/R) ASSY	
* 127	3-362-434-01	CUSHION (M2)	
128	3-379-468-01	BELT (F/R)	
129	3-359-156-01	IDLER (F/R)	
130	3-831-441-XX	CUSHION	
131	3-533-223-00	SPRING, TENSION	
* 132	X-3323-543-1	PLATE ASSY, FUNCTION, STOP	
133	3-542-649-00	SPRING, TENSION	
134	3-642-490-00	SPRING, TENSION	
135	A-3035-282-A	CHASSIS ASSY	
136	3-555-212-00	SPRING, TENSION	
* 137	3-362-433-01	CUSHION (M)	
138	3-727-902-01	SCREW (M1.4), SPECIAL	
M901	X-3369-458-1	MOTOR (FWD) ASSY	
PM901	1-454-459-31	SOLENOID, PLUNGER (STOP PLUNGER)	
PM902	1-454-459-21	SOLENOID, PLUNGER (FWD PLUNGER)	
PM903	1-454-509-11	SOLENOID, PLUNGER (BREAK PLUNGER)	

SECTION 8
ELECTRICAL PARTS LIST

12P CONNECTOR | **LCD** | **MAIN**

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

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

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

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

Ref. No.	Part No.	Description			Remark
*	1-655-181-11	12P CONNECTOR BOARD			
		**********			
		< CAPACITOR >			
C173	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C174	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C175	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C176	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C177	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C178	1-164-232-11	CERAMIC CHIP	0.01uF		50V
		< CONNECTOR >			
CN111	1-568-855-11	SOCKET, CONNECTOR 12P			
* CN112	1-561-533-00	SOCKET, CONNECTOR 12P (CONTROL UNIT)			
**********					
*	1-633-748-11	LCD BOARD			
		*********			
	2-389-320-01	CUSHION (LCD)			
		< CONNECTOR >			
* CN902	1-568-871-11	SOCKET, CONNECTOR 29P			
		< DIODE >			
D901	8-719-984-02	LED BR4371F (REC/ERASE)			
		< FLUORESCENT INDICATOR >			
ND901	1-808-961-21	DISPLAY PANEL, LIQUID CRYSTAL			
**********					
*	A-3061-051-A	MAIN BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C101	1-162-637-11	CERAMIC CHIP	0.47uF		16V
C102	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C104	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C105	1-124-903-11	ELECT	1uF	20%	50V
C106	1-135-151-21	TANTALUM CHIP	4.7uF	20%	4V
C107	1-163-014-00	CERAMIC CHIP	0.0027uF	10%	50V
C108	1-135-151-21	TANTALUM CHIP	4.7uF	20%	4V
C109	1-135-192-21	TANTAL. CHIP	0.47uF	20%	20V
C110	1-162-625-11	CERAMIC CHIP	0.0047uF	5%	50V
C111	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C112	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C113	1-163-006-11	CERAMIC CHIP	560PF	10%	50V
C114	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C115	1-162-638-11	CERAMIC CHIP	1uF		16V
C116	1-124-584-00	ELECT	100uF	20%	6.3V
C117	1-124-584-00	ELECT	100uF	20%	6.3V
C118	1-124-584-00	ELECT	100uF	20%	6.3V
C119	1-126-154-11	ELECT	47uF	20%	6.3V
C121	1-162-638-11	CERAMIC CHIP	1uF		16V
C122	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C123	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C124	1-126-154-11	ELECT	47uF	20%	6.3V
C125	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C126	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C127	1-163-007-11	CERAMIC CHIP	680PF	10%	50V
C128	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C129	1-124-584-00	ELECT	100uF	20%	6.3V
C130	1-164-157-11	CERAMIC CHIP	0.068uF	10%	25V
C131	1-162-638-11	CERAMIC CHIP	1uF		16V
C150	1-162-638-11	CERAMIC CHIP	1uF		16V
C151	1-162-638-11	CERAMIC CHIP	1uF		16V
C152	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V
C153	1-106-371-00	MYLAR	0.015uF	5%	200V
C154	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C155	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C156	1-124-234-00	ELECT	22uF	20%	16V
C157	1-162-638-11	CERAMIC CHIP	1uF		16V
C158	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C159	1-104-905-11	DOUBLE LAYERS	0.22F		5.5V
C160	1-126-103-11	ELECT	470uF	20%	16V
C161	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C162	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C163	1-124-589-11	ELECT	47uF	20%	16V
C164	1-124-557-11	ELECT	1000uF	20%	25V
C165	1-124-584-00	ELECT	100uF	20%	6.3V

MAIN

Ref. No.	Part No.	Description		Remark	
C166	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C167	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C168	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C169	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C179	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C180	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C181	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C190	1-124-584-00	ELECT	100uF	20%	6.3V
C191	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C192	1-124-584-00	ELECT	100uF	20%	6.3V
C193	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C194	1-124-443-00	ELECT	100uF	20%	10V
C195	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C196	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C197	1-126-103-11	ELECT	470uF	20%	16V
C199	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C201	1-163-018-00	CERAMIC CHIP	0.0056uF	5%	50V
C202	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C203	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C204	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C206	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C207	1-163-181-00	CERAMIC CHIP	100PF	5%	50V
C208	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C209	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C210	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C211	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C212	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C213	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C216	1-124-916-11	ELECT	22uF	20%	63V
C250	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C251	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C252	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C253	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C254	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C290	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C301	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C302	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C303	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C304	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C305	1-164-343-11	CERAMIC CHIP	0.056uF	10%	25V
C306	1-164-157-11	CERAMIC CHIP	0.068uF	10%	25V
C307	1-164-346-11	CERAMIC CHIP	1uF		16V
C308	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C310	1-124-589-11	ELECT	47uF	20%	16V
C311	1-130-477-00	MYLAR	0.0033uF	5%	50V
C312	1-162-637-11	CERAMIC CHIP	0.47uF		16V
C313	1-163-181-00	CERAMIC CHIP	100PF	5%	50V
C314	1-163-181-00	CERAMIC CHIP	100PF	5%	50V
C315	1-163-239-11	CERAMIC CHIP	33PF	5%	50V

Ref. No.	Part No.	Description		Remark	
C316	1-124-261-00	ELECT	10uF	20%	50V
C317	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C318	1-163-006-11	CERAMIC CHIP	560PF	10%	50V
C319	1-164-232-11	CERAMIC CHIP	0.01uF	10%	100V
C320	1-164-346-11	CERAMIC CHIP	1uF		16V
C321	1-163-006-11	CERAMIC CHIP	560PF	10%	50V
C323	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C324	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C325	1-164-346-11	CERAMIC CHIP	1uF		16V
C328	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C329	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C331	1-164-222-11	CERAMIC CHIP	0.22uF		25V

< CONNECTOR >

CN101	1-506-472-11	PIN, CONNECTOR	7P
* CN102	1-564-001-11	PIN, CONNECTOR	2P
* CN104	1-568-831-11	SOCKET, CONNECTOR	12P
* CN106	1-568-844-11	SOCKET, CONNECTOR	29P
* CN107	1-568-837-11	SOCKET, CONNECTOR	20P

< DIODE >

D103	8-719-800-76	DIODE	1SS226
D104	8-719-801-78	DIODE	1SS184
D105	8-719-801-78	DIODE	1SS184
D106	8-719-801-78	DIODE	1SS184
D107	8-719-801-78	DIODE	1SS184
D108	8-719-801-78	DIODE	1SS184
D109	8-719-801-78	DIODE	1SS184
D110	8-719-801-78	DIODE	1SS184
D111	8-719-801-78	DIODE	1SS184
D112	8-719-801-78	DIODE	1SS184
D113	8-719-801-78	DIODE	1SS184
D114	8-719-940-45	DIODE	DWA010
D115	8-719-801-78	DIODE	1SS184
D116	8-719-801-78	DIODE	1SS184
D117	8-719-510-38	DIODE	D1F10
D301	8-719-800-76	DIODE	1SS226
D302	8-719-801-78	DIODE	1SS184

< IC >

IC101	8-759-008-79	IC	MC14011BF
IC102	8-759-745-64	IC	NJM4560M
IC103	8-759-925-05	IC	LM2903PS
IC104	8-759-008-67	IC	MC14066BF
IC105	8-759-008-67	IC	MC14066BF
IC106	8-759-230-04	IC	TA7628HP
IC107	8-759-143-54	IC	uPC1330HA
IC111	8-759-148-79	IC	uPC2406HF

Ref. No.	Part No.	Description			Remark
IC112	8-759-154-58	IC uPD75308GF-B21-3B9			
IC301	8-759-100-94	IC uPC358G2			
IC302	8-759-100-94	IC uPC358G2			
IC303	8-759-100-94	IC uPC358G2			
IC304	8-759-925-74	IC SN74HC04ANS			
IC305	8-759-256-59	IC HD74HC00FPEL			
IC306	8-759-256-59	IC HD74HC00FPEL			
IC307	8-759-291-97	IC YSS222-D			
		< JACK >			
J101	1-566-891-21	JACK (TELEPHON PICKUP)			
J102	1-568-727-31	JACK, DC (DC IN 9V)			
J103	1-566-891-21	JACK (EARPHONE)			
		< JUMPER RESISTOR >			
JR1	1-216-295-00	CONDCTOR CHIP	0	5% 1/10W	
		< COIL >			
L301	1-410-979-11	INDUCTOR	100uH		
L302	1-410-979-11	INDUCTOR	100uH		
		< LINE FILTER >			
LF101	1-424-361-11	FILTER, LINE			
		< IC LINK >			
⚠PS101	1-532-675-21	LINK, IC			
		< TRANSISTOR >			
Q102	8-729-800-37	TRANSISTOR	2SD1048-X7		
Q103	8-729-800-37	TRANSISTOR	2SD1048-X7		
Q104	8-729-800-37	TRANSISTOR	2SD1048-X7		
Q105	8-729-216-22	TRANSISTOR	2SA1162-G		
Q106	8-729-216-22	TRANSISTOR	2SA1162-G		
Q107	8-729-101-07	TRANSISTOR	2SB798-DL		
Q108	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q109	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q110	8-729-421-19	TRANSISTOR	UN2213		
Q111	8-729-421-19	TRANSISTOR	UN2213		
Q112	8-729-421-19	TRANSISTOR	UN2213		
Q113	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q114	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q116	8-729-800-37	TRANSISTOR	2SD1048-X7		
Q117	8-729-901-46	TRANSISTOR	DTA114YK		
Q118	8-729-421-19	TRANSISTOR	UN2213		
Q119	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q120	8-729-230-49	TRANSISTOR	2SC2712-YG		

Ref. No.	Part No.	Description			Remark
		< RESISTOR >			
R101	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R108	1-216-117-00	METAL CHIP	680K	5% 1/10W	
R109	1-216-091-00	METAL CHIP	56K	5% 1/10W	
R110	1-216-081-00	METAL CHIP	22K	5% 1/10W	
R111	1-216-081-00	METAL CHIP	22K	5% 1/10W	
R112	1-216-043-00	METAL CHIP	560	5% 1/10W	
R113	1-216-115-00	METAL CHIP	560K	5% 1/10W	
R114	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R115	1-216-105-00	METAL CHIP	220K	5% 1/10W	
R116	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R117	1-216-065-00	METAL CHIP	4.7K	5% 1/10W	
R118	1-216-053-00	METAL CHIP	1.5K	5% 1/10W	
R119	1-216-063-00	METAL CHIP	3.9K	5% 1/10W	
R120	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R121	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R122	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R123	1-216-029-00	METAL CHIP	150	5% 1/10W	
R124	1-216-085-00	METAL CHIP	33K	5% 1/10W	
R125	1-216-083-00	METAL CHIP	27K	5% 1/10W	
R126	1-216-105-00	METAL CHIP	220K	5% 1/10W	
R127	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R128	1-216-111-00	METAL CHIP	390K	5% 1/10W	
R129	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R131	1-216-043-00	METAL CHIP	560	5% 1/10W	
R132	1-216-061-00	METAL CHIP	3.3K	5% 1/10W	
R133	1-216-065-00	METAL CHIP	4.7K	5% 1/10W	
R134	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R135	1-216-089-00	METAL CHIP	47K	5% 1/10W	
R136	1-216-065-00	METAL CHIP	4.7K	5% 1/10W	
R137	1-216-027-00	METAL CHIP	120	5% 1/10W	
R138	1-216-069-00	METAL CHIP	6.8K	5% 1/10W	
R139	1-216-037-00	METAL CHIP	330	5% 1/10W	
R140	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R163	1-216-079-00	METAL CHIP	18K	5% 1/10W	
R164	1-216-081-00	METAL CHIP	22K	5% 1/10W	
R165	1-216-311-00	METAL CHIP	6.8	5% 1/10W	
R166	1-216-023-00	METAL CHIP	82	5% 1/10W	
R167	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R168	1-216-065-00	METAL CHIP	4.7K	5% 1/10W	
R169	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R170	1-216-065-00	METAL CHIP	4.7K	5% 1/10W	
⚠R171	1-215-861-00	METAL OXIDE	47	5% 1W	F
R172	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R173	1-216-065-00	METAL CHIP	4.7K	5% 1/10W	
R174	1-216-109-00	METAL CHIP	330K	5% 1/10W	
R176	1-216-089-00	METAL CHIP	47K	5% 1/10W	
R177	1-216-081-00	METAL CHIP	22K	5% 1/10W	

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

MAIN

Ref. No.	Part No.	Description			Remark
R178	1-216-039-00	METAL CHIP	390	5%	1/10W
R179	1-216-037-00	METAL CHIP	330	5%	1/10W
R181	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R182	1-216-073-00	METAL CHIP	10K	5%	1/10W
R183	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R184	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R185	1-216-097-00	METAL CHIP	100K	5%	1/10W
R186	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R187	1-216-081-00	METAL CHIP	22K	5%	1/10W
R189	1-216-152-00	METAL GLAZE	12	5%	1/8W
R190	1-216-041-00	METAL CHIP	470	5%	1/10W
R194	1-216-089-00	METAL CHIP	47K	5%	1/10W
R195	1-216-089-00	METAL CHIP	47K	5%	1/10W
R196	1-216-089-00	METAL CHIP	47K	5%	1/10W
R197	1-216-089-00	METAL CHIP	47K	5%	1/10W
R198	1-216-089-00	METAL CHIP	47K	5%	1/10W
R199	1-216-089-00	METAL CHIP	47K	5%	1/10W
R200	1-216-049-00	METAL CHIP	1K	5%	1/10W
R201	1-216-049-00	METAL CHIP	1K	5%	1/10W
R202	1-216-049-00	METAL CHIP	1K	5%	1/10W
R203	1-216-049-00	METAL CHIP	1K	5%	1/10W
R204	1-216-049-00	METAL CHIP	1K	5%	1/10W
R205	1-216-049-00	METAL CHIP	1K	5%	1/10W
R206	1-216-089-00	METAL CHIP	47K	5%	1/10W
R207	1-216-089-00	METAL CHIP	47K	5%	1/10W
R208	1-216-089-00	METAL CHIP	47K	5%	1/10W
R209	1-216-089-00	METAL CHIP	47K	5%	1/10W
R210	1-216-081-00	METAL CHIP	22K	5%	1/10W
R211	1-216-089-00	METAL CHIP	47K	5%	1/10W
R212	1-216-097-00	METAL CHIP	100K	5%	1/10W
R213	1-216-080-00	METAL CHIP	20K	5%	1/10W
R217	1-216-089-00	METAL CHIP	47K	5%	1/10W
R221	1-216-097-00	METAL CHIP	100K	5%	1/10W
R225	1-216-027-00	METAL CHIP	120	5%	1/10W
R226	1-216-097-00	METAL CHIP	100K	5%	1/10W
R227	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R228	1-216-089-00	METAL CHIP	47K	5%	1/10W
R229	1-216-089-00	METAL CHIP	47K	5%	1/10W
R230	1-216-105-00	METAL CHIP	220K	5%	1/10W
R231	1-216-089-00	METAL CHIP	47K	5%	1/10W
R232	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R233	1-216-085-00	METAL CHIP	33K	5%	1/10W
R234	1-216-073-00	METAL CHIP	10K	5%	1/10W
R235	1-216-073-00	METAL CHIP	10K	5%	1/10W
R236	1-216-073-00	METAL CHIP	10K	5%	1/10W
R237	1-216-049-00	METAL CHIP	1K	5%	1/10W
R238	1-216-097-00	METAL CHIP	100K	5%	1/10W
R239	1-216-073-00	METAL CHIP	10K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R241	1-216-037-00	METAL CHIP	330	5%	1/10W
R242	1-216-077-00	METAL CHIP	15K	5%	1/10W
R243	1-216-049-00	METAL CHIP	1K	5%	1/10W
R244	1-216-049-00	METAL CHIP	1K	5%	1/10W
R246	1-216-049-00	METAL CHIP	1K	5%	1/10W
R247	1-216-049-00	METAL CHIP	1K	5%	1/10W
R248	1-216-017-00	METAL CHIP	47	5%	1/10W
R249	1-216-017-00	METAL CHIP	47	5%	1/10W
R250	1-216-049-00	METAL CHIP	1K	5%	1/10W
R290	1-216-073-00	METAL CHIP	10K	5%	1/10W
R301	1-216-073-00	METAL CHIP	10K	5%	1/10W
R302	1-216-073-00	METAL CHIP	10K	5%	1/10W
R303	1-216-041-00	METAL CHIP	470	5%	1/10W
R304	1-216-097-00	METAL CHIP	100K	5%	1/10W
R305	1-216-089-00	METAL CHIP	47K	5%	1/10W
R306	1-216-089-00	METAL CHIP	47K	5%	1/10W
R307	1-216-089-00	METAL CHIP	47K	5%	1/10W
R308	1-216-073-00	METAL CHIP	10K	5%	1/10W
R309	1-216-077-00	METAL CHIP	15K	5%	1/10W
R310	1-216-077-00	METAL CHIP	15K	5%	1/10W
R311	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R312	1-216-077-00	METAL CHIP	15K	5%	1/10W
R313	1-216-073-00	METAL CHIP	10K	5%	1/10W
R314	1-216-073-00	METAL CHIP	10K	5%	1/10W
R315	1-216-073-00	METAL CHIP	10K	5%	1/10W
R316	1-216-097-00	METAL CHIP	100K	5%	1/10W
R317	1-216-121-00	METAL CHIP	1M	5%	1/10W
R318	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R319	1-216-097-00	METAL CHIP	100K	5%	1/10W
R320	1-216-097-00	METAL CHIP	100K	5%	1/10W
R321	1-216-097-00	METAL CHIP	100K	5%	1/10W
R322	1-216-097-00	METAL CHIP	100K	5%	1/10W
R323	1-216-097-00	METAL CHIP	100K	5%	1/10W
R325	1-216-081-00	METAL CHIP	22K	5%	1/10W
R330	1-216-076-00	METAL CHIP	13K	5%	1/10W
R331	1-216-109-00	METAL CHIP	330K	5%	1/10W
R332	1-216-107-00	METAL CHIP	270K	5%	1/10W
R350	1-216-089-00	METAL CHIP	47K	5%	1/10W

< VARIABLE RESISTOR >

RV101	1-230-564-11	RES, VAR, SLIDE 10K (TONE)
RV102	1-230-564-11	RES, VAR, SLIDE 10K (VOLUME)
RV104	1-237-364-11	RES, VAR, SLIDE 100K (SPEED)
RV302	1-238-601-11	RES, ADJ, CARBON 22K

Ref. No.	Part No.	Description			Remark
		< SWITCH >			
S101	1-572-251-11	SWITCH, SLIDE (POWER)			
S102	1-572-251-11	SWITCH, SLIDE (TAPE SPEED)			
S103	1-571-212-11	SWITCH, SLIDE (SPEED CONTROL)			
S104	1-572-251-11	SWITCH, SLIDE (AUTO STOP)			
S105	1-572-251-11	SWITCH, SLIDE (SPEAKER)			
S107	1-571-760-11	SWITCH, KEY BOARD (SCAN)			
S108	1-571-760-11	SWITCH, KEY BOARD (TEL REC)			
S109	1-571-760-11	SWITCH, KEY BOARD (ERASE)			
S110	1-571-760-11	SWITCH, KEY BOARD (RESET)			
S111	1-571-760-11	SWITCH, KEY BOARD (STOP □)			
S112	1-571-760-11	SWITCH, KEY BOARD (LISTEN ▷)			
S113	1-571-760-11	SWITCH, KEY BOARD (REW ◁◁)			
S114	1-571-760-11	SWITCH, KEY BOARD (FF ▷▷)			
S115	1-570-361-11	SWITCH, SLIDE (DIGITAL CORD)			(REVERSE TIME)
S116	1-571-760-11	SWITCH, KEY BOARD (DPC TEST)			
		< TRANSFORMER >			
T101	1-433-364-11	TRANSFORMER, BIAS OSCILLATION			
		< VIBRATOR >			
X101	1-577-273-11	OSCILLATOR, CERAMIC (4.19MHz)			
X300	1-760-521-11	VIBRATOR, CERAMIC (768KHz)			
**********					
*	A-3016-636-A	SERVO BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C601	1-135-091-00	TANTAL. CHIP	1uF	20%	16V
C602	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C603	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C605	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C608	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C609	1-126-154-11	ELECT	47uF	20%	6.3V
C610	1-124-257-00	ELECT	2.2uF	20%	50V
C611	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C612	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C613	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C614	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C615	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C620	1-164-346-11	CERAMIC CHIP	1uF		16V
		< CONNECTOR >			
CN601	1-506-469-11	PIN, CONNECTOR 4P			
* CN602	1-564-001-11	PIN, CONNECTOR 2P			
* CN603	1-568-863-11	SOCKET, CONNECTOR 20P			

Ref. No.	Part No.	Description			Remark
		< DIODE >			
D601	8-719-105-45	DIODE	RD3.3M-B1		
D604	8-719-510-38	DIODE	D1F10		
D605	8-719-510-38	DIODE	D1F10		
D606	8-719-510-38	DIODE	D1F10		
		< IC >			
IC601	8-759-057-29	IC	LB1672NM		
IC602	8-759-008-67	IC	MC14066BF		
IC603	8-759-925-80	IC	SN74HC14ANS		
IC604	8-759-801-12	IC	LA5523		
		< JUMPER RESISTOR >			
JR601-JR664					
	1-216-296-00	METAL CHIP	0	5%	1/8W
		< PHOTO INTERRUPTER >			
PH601	8-719-939-23	DIODE	GP-2S09-C		
PH602	8-719-939-23	DIODE	GP-2S09-C		
		< TRANSISTOR >			
Q601	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q602	8-729-421-22	TRANSISTOR	UN2211		
Q603	8-729-101-07	TRANSISTOR	2SB798-DL		
Q604	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q605	8-729-101-07	TRANSISTOR	2SB798-DL		
Q606	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q607	8-729-901-46	TRANSISTOR	DTA114YK		
Q608	8-729-901-46	TRANSISTOR	DTA114YK		
Q609	8-729-901-46	TRANSISTOR	DTA114YK		
Q610	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q611	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q612	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q613	8-729-421-22	TRANSISTOR	UN2211		
Q618	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q619	8-729-424-67	TRANSISTOR	UN2216		
		< RESISTOR >			
R601	1-216-073-00	METAL CHIP	10K	5%	1/10W
R602	1-216-049-00	METAL CHIP	1K	5%	1/10W
R603	1-216-025-00	METAL CHIP	100	5%	1/10W
R604	1-216-073-00	METAL CHIP	10K	5%	1/10W
R605	1-216-035-00	METAL CHIP	270	5%	1/10W
R612	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R613	1-216-060-00	METAL GLAZE	3K	5%	1/10W
R615	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R616	1-216-076-00	METAL CHIP	13K	5%	1/10W
R618	1-216-089-00	METAL CHIP	47K	5%	1/10W

SERVO

Ref. No.	Part No.	Description			Remark
R619	1-216-089-00	METAL CHIP	47K	5%	1/10W
R620	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R621	1-216-073-00	METAL CHIP	10K	5%	1/10W
R622	1-216-041-00	METAL CHIP	470	5%	1/10W
R623	1-216-073-00	METAL CHIP	10K	5%	1/10W
R624	1-216-089-00	METAL CHIP	47K	5%	1/10W
R625	1-216-089-00	METAL CHIP	47K	5%	1/10W
R626	1-216-049-00	METAL CHIP	1K	5%	1/10W
R627	1-216-049-00	METAL CHIP	1K	5%	1/10W
R628	1-216-089-00	METAL CHIP	47K	5%	1/10W
R629	1-216-049-00	METAL CHIP	1K	5%	1/10W
R630	1-216-049-00	METAL CHIP	1K	5%	1/10W
R631	1-216-037-00	METAL CHIP	330	5%	1/10W
R632	1-216-097-00	METAL CHIP	100K	5%	1/10W
R633	1-216-037-00	METAL CHIP	330	5%	1/10W
R634	1-216-097-00	METAL CHIP	100K	5%	1/10W
R635	1-216-037-00	METAL CHIP	330	5%	1/10W
R636	1-216-025-00	METAL CHIP	100	5%	1/10W
R637	1-216-031-00	METAL CHIP	180	5%	1/10W
R638	1-216-089-00	METAL CHIP	47K	5%	1/10W
R639	1-216-089-00	METAL CHIP	47K	5%	1/10W
R640	1-216-073-00	METAL CHIP	10K	5%	1/10W
R641	1-216-089-00	METAL CHIP	47K	5%	1/10W
R642	1-216-073-00	METAL CHIP	10K	5%	1/10W
R643	1-216-089-00	METAL CHIP	47K	5%	1/10W
R644	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R645	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R648	1-216-037-00	METAL CHIP	330	5%	1/10W
R649	1-216-035-00	METAL CHIP	270	5%	1/10W
R650	1-216-025-00	METAL CHIP	100	5%	1/10W
R651	1-216-025-00	METAL CHIP	100	5%	1/10W
R652	1-216-025-00	METAL CHIP	100	5%	1/10W

< VARIABLE RESISTOR >

RV601	1-237-602-11	RES, ADJ, METAL GRAZE 1K
RV602	1-237-604-11	RES, ADJ, METAL GRAZE 4.7K
RV603	1-237-604-11	RES, ADJ, METAL GRAZE 4.7K

< SWITCH >

S601	1-572-248-11	SWITCH, LEAF (HALF DET)
S602	1-571-281-11	SWITCH, LEAF (ERASE PROOF DET)

< THERMISTOR(POSITIVE) >

THP601	1-809-132-11	THERMISTOR (POSITIVE)
THP602	1-809-133-11	THERMISTOR (POSITIVE)

****

Ref. No.	Part No.	Description	Remark
		MISCELLANEOUS	
		**********	
8	1-769-324-11	WIRE (FLAT TYPE) (FFC) (12 CORE)	
13	1-769-326-11	WIRE (FLAT TYPE) (FFC) (29 CORE)	
27	1-769-325-11	WIRE (FLAT TYPE) (FFC) (20 CORE)	
CN108	1-569-200-11	HOUSING, CONNECTOR 7P	
HRP901	1-500-200-11	HEAD, MAGNETIC (R/P)	
M901	X-3369-458-1	MOTOR (FWD) ASSY	
M902	X-3362-206-1	MOTOR (F/R) ASSY	
PM901	1-454-459-31	SOLENOID, PLUNGER (STOP PLUNGER)	
PM902	1-454-459-21	SOLENOID, PLUNGER (FWD PLUNGER)	
PM903	1-454-509-11	SOLENOID, PLUNGER (BREAK PLUNGER)	
SP901	1-503-616-11	SPEAKER	

****

ACCESSORIES & PACKING MATERIALS

****

⚠	1-465-393-11	ADAPTOR, AC (US, Canadian)
⚠	1-465-428-21	ADAPTOR, AC (UK)
⚠	1-465-429-21	ADAPTOR, AC (AEP)
	3-798-145-11	MANUAL, INSTRUCTION (ENGLISH, FRENCH, GERMAN, SPANISH, DUTCH) (Canadian, AEP, UK)
	3-798-145-21	MANUAL, INSTRUCTION (ENGLISH) (US)
	3-922-452-01	CUSHION (L)
	3-922-453-01	CUSHION (R)
	3-922-454-01	INDIVIDUAL CARTON (89D)
	3-922-457-01	INDIVIDUAL CARTON (89T)
	X-2184-302-1	CRADLE (89D)

****

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

Ref. No.	Part No.	Description	Remark

****
HARDWARE LIST
****

#1	7-682-647-01	SCREW +PS 3X6	
#2	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
#3	7-685-648-79	SCREW +BVTP 3X12 TYPE2 N-S	
#4	7-621-771-06	SCREW, LOCK	
#5	7-627-553-27	SCREW, PRECISION +P 2X2.5	
#6	7-621-770-XX	SCREW +P 2.6X8	
#7	7-682-548-04	SCREW +B 3X8	
#8	7-685-871-01	SCREW +BVTT 3X6 (S)	
#9	7-685-133-19	SCREW +BTP 2.6X6 TYPE2 N-S	
#10	7-624-190-81	STOP RING 2, TYPE-CS	
#11	7-627-551-58	SCREW, PRECISION +P 1.4X3	
#12	7-628-253-05	SCREW +PS 2X4	
#13	7-628-253-30	SCREW +PS 2X8	
#14	7-628-253-40	SCREW +PS 2X10	
#15	7-628-253-95	SCREW +PS 2.6X4	
#16	7-671-111-11	STEEL, BOUL 1.5MM	
#17	7-627-553-27	+P 2X2.5	

English
94K0526-1
Printed in Japan

Sony Corporation
Consumer A&V Products Company
Personal A&V Products Div.

9-959-896-11

Published by Home A&V Products Div.
***Quality Engineering* Dept.**

BM-89D/89T

SONY
SERVICE MANUAL

US Model
Canadian Model
AEP Model
UK Model

CORRECTION-1

Correct your service manual as shown below.

☛ : **indicates corrected portion.**

Page	INCORRECT			CORRECT	
	Ref.No.	Part No.	Description	Part No.	Description
36	13	1-769-326-11	WIRE (FLAT TYPE)(FFC)(29 CORE)	1-769-325-11 ☛	WIRE (FLAT TYPE)(FFC)(29 CORE)
	27	1-769-325-11	WIRE (FLAT TYPE)(FFC)(20 CORE)	1-769-326-11 ☛	WIRE (FLAT TYPE)(FFC)(20 CORE)

(ENG-95007)

Sony Corporation
Consumer A&V Products Company
Personal A&V Products Div.

English
95F0522-1D
Printed in Japan

Published by Home A&V Products Div. Quality Engineering Dept.

9-959-896-91