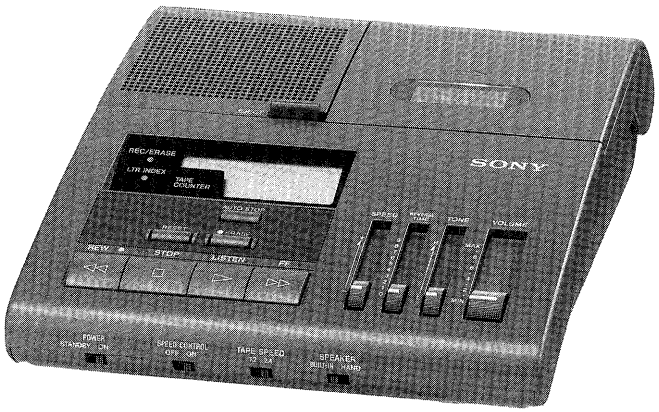
BM-845D

SERVICE MANUAL

US Model



- Concerning the hand control unit (HU-80), please refer to the Service Manual (9-955-746-11) and supplement-1 (9-955-746-82) previously issued.

Model Name Using Similar Mechanism	BM-850
Tape Transport Mechanism Type	MB-850

SPECIFICATIONS

Tape
(MICROCASSETTE)™ (normal position type)
Recording system
4-track 2-channel monaural
(L channel for electronic index signals, R channel for sound signals)
Tape speed
2.4 cm/s (15/16 in./s), 1.2 cm/s (15/32 in./s)
Fast winding time
Approx. 1 min. 50 sec. (2.4 cm/s) with Sony microcassette MC-60BM
Frequency response
200 – 4,000 Hz (at 1.2 cm/s)
200 – 6,000 Hz (at 2.4 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
Power consumption
14 W (with the supplied AC power adaptor)
Dimensions
Approx. 200 x 70.5 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)
Cradle for the hand control unit (1)

Design and specifications are subject to change without notice.

MICROCASSETTE DICTATOR/TRANSCRIBER

SONY®

MICROFILM

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.

SECTION 1
SERVICING NOTES

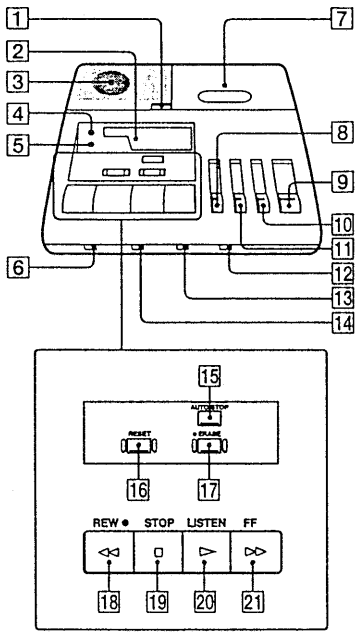
[NOTES FOR REPAIRING]

1. POWER (S101) Switch.
   The Power switch is not a switch for turn off the power source. Pay attention when repairing that the electricity is turned on even if the POWER switch is turned STANDBY position.
   - The states when turn STANDBY position of the POWER switch are as follows.
     a. LCD (ND901) display will be turned off.
     b. Motors (M901, 902) will be stopped.
     c. Plungers (PM901, 902) will be turned off.
     d. Any key input will be ignored.

   The above items from "a" to "d" are controlled by the microcomputer which makes the pin ㊳ of IC109 (microcomputer) become Low Level.

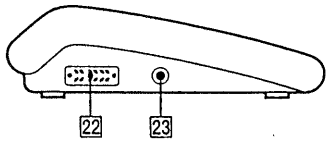
Location and Function of Controls

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



1 Eject button
Press to eject the cassette.
2 Display window (Back cover)
3 Built-in speaker
4 REC (record)/ERASE lamp (8, 15)
5 LTR (letter) lamp (9)
6 POWER switch
7 Cassette holder
8 SPEED control (13)
9 VOLUME control
10 TONE control
11 REVERSE TIME control (14)
12 SPEAKER selector (14)
13 TAPE SPEED selector (12)
14 SPEED CONTROL switch (13)
15 AUTO STOP button (13)
16 RESET button (9)
17 ● ERASE button (15)
18 ◄◄ REW (rewind)
19 ■ STOP
20 ► LISTEN
21 ►► FF (fast forwad)

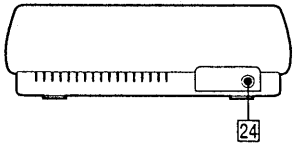
Left side



Left side

22 CONTROL UNIT connector (6)
23 EARPHONE jack (10, 14)

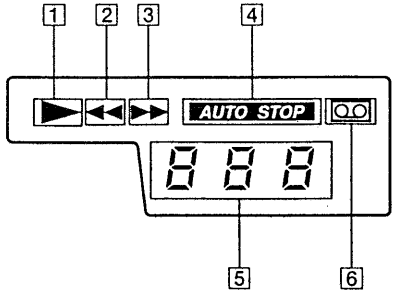
Rear



Rear

24 DC IN 9 V (6)

Display Window



1 ► indicator
Displayed while the tape is being transported in the forward direction.
2 ◄◄ (rewind) indicator
Displayed while the cassette is being rewound.
3 ►► (fast forward) indicator
Displayed while the tape is advanced rapidly.
4 AUTO STOP indicator
Displayed when the AUTO STOP button is pressed (AUTO STOP function is on).
5 Tape counter
6 (cassette) indicator
Normally this indicator is not displayed. However, the indicator blinks in the following cases:
- One of the LTR and ERASE buttons is pressed or the function selector is set to DICT when no cassette is inserted or when the cassette's safety tabs have been removed.
- A tape reaches the end.
- A tape is torn while being rewound.

Notes

- It may be difficult to read the liquid crystal counter display due to the watching angle.
- If you play back a cassette which was not recorded using a Sony Professional Dictating Machine, press AUTO STOP to make AUTO STOP disappaear (AUTO STOP function is off) (see page 13).

This section is extracted from instruction manual.

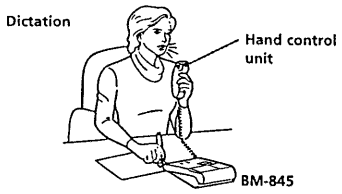
About This Manual

The instructions in this manual are for the BM-845D. The main unit is the BM-845. You can use the BM-845D as a dictator since the BM-845D is supplied with accessories for dictating. You can also use the BM-845D as a transcriber if you buy the accessories for transcribing such as the foot control unit (not supplied).

Features

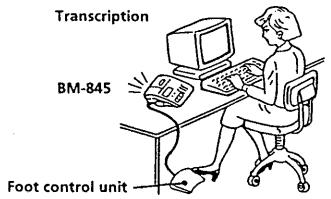
As a dictator

- The hand control unit remotely controls the BM-845.
- The electronic indexing function signal—"LTR" (end of letter) signal—can be recorded on a tape during dictating, listening or in the stop mode.
- The REC/ERASE lamp for checking that the recording or erasing is done.
- Alarm sound and indication on the display window informs recording error.
- With the use of the DE-45 or MDR-U10M earphones (not supplied), you can monitor the sound with the desired sound level during recording.



As a transcriber

- The foot control unit (not supplied) allows you to move the tape without using your hands.
- Auto-stop function quickly accesses instructions and documents.
- 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 (2.4 cm/sec. and 1.2 cm/sec.) can be selected according to the user's needs.
- Rapid erasing function with ERASE and REW buttons.
- The index signals which were recorded using a Sony Professional Dictating Machine are used in the AUTO STOP mode.



Operation Flow Chart

For details, refer to the pages in ( ).

[ ] : Necessary step [- -] : Optional step

Dictation

- 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).
- Set TAPE SPEED.
- Press RESET to set the digital counter to zero.
- Set the function selector of the hand control unit to DICT. Speak into the microphone.
- [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 (9).]

- 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

Disconnect the hand control unit.

Connect the foot control unit (not supplied) (6).

Set POWER to ON.

Insert the cassette (7).

Set SPEAKER to BUILT-IN or connect earphones.

Press AUTO STOP to make the **AUTO STOP** indication disappear (13).

Set TAPE SPEED.

Press REW.
When the tape reaches the beginning of the dictated material, a beep tone is heard and the unit automatically shuts off (12).

Press RESET to set the digital counter to zero.

Keep the right side of the pedal depressed.
(When the foot control unit (not supplied) is connected.) (14)
or
Set the function selector of the hand control unit to LISTEN.
(When the hand control unit is connected.) (14)
or
Press LISTEN.
(When the BM-845 is used for operation.) (14)

Adjust VOLUME and TONE.

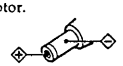
Adjust the starting point for playback with the use of REVERSE TIME. (When the foot control unit is used.)
Set SPEED CONTROL to ON and adjust SPEED.

After transcribing, stop the tape.
Release the pedal. (When the foot control unit (not supplied) is used.) (14)
or
Set the function selector to STOP. (When the hand control unit is used.) (14)
or
Press STOP. (When LISTEN on the BM-845 is pressed to play back the tape.) (14)

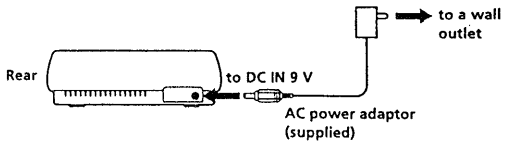
Erase the tape (15).

Power Connection

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



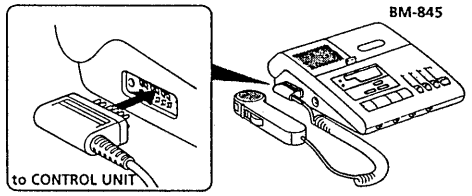
Porarity of the plug



Setting Up the Unit

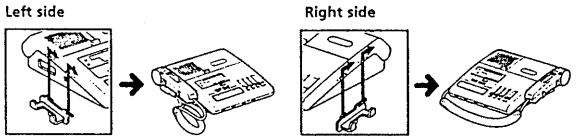
Connecting the Hand Control Unit

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



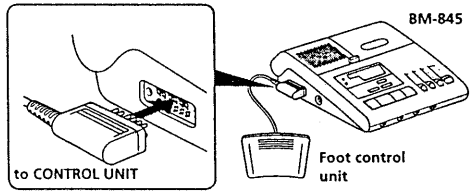
Attaching the cradle

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.

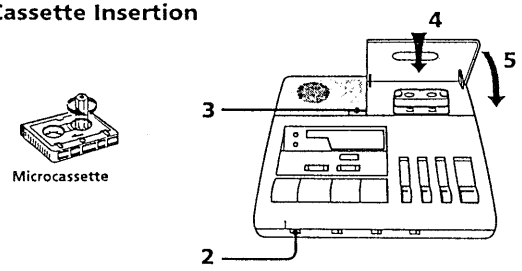


Connecting the Foot Control Unit (not supplied)

For operation, refer to "Transcription" on page 12.



Cassette Insertion



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

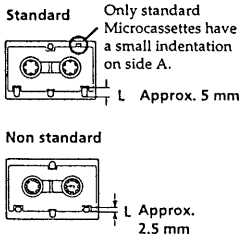
2 **Set POWER to ON.**

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.**
Push the cassette into the holder completely.

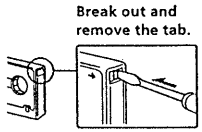
5 **Close the cassette holder.**

This unit uses only standard Microcassettes.
Non standard cassettes cannot be used because their "L" dimension (see illustration) is different.

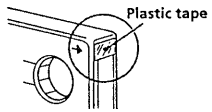


Notes on the Microcassette

To protect cassettes from accidental erasure
When a recording is made, the previous recording is automatically erased.
To prevent erasure, break the cassette tabs.

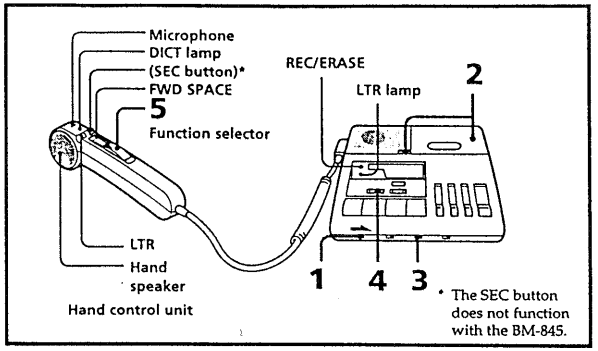


To reuse a cassette
To record on a cassette with removed tabs, cover each slot with a piece of plastic tape.



Dictation

To use the unit as a dictating machine, connect the hand control unit.
For connection, see page 6.



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 15.)

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.
- At the end of each document, record an LTR signal.

Note
Keep the hand control unit away from the BM-845 during recording. Otherwise, noise may be recorded.

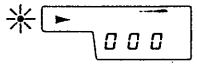
1 **Set POWER to ON.**

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

3 **Set TAPE SPEED to the desired tape speed, 2.4 or 1.2 (cm/sec.).**

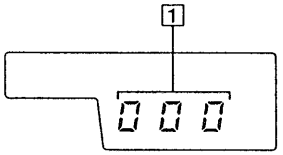
4 **Press RESET to set the digital counter to zero.**

5 **Set the function selector to DICT.**
Recording starts. Speak into the microphone. ► appears on the display window. The DICT lamp on the hand control unit lights up and REC/ERASE lamp on the BM-845 blinks when the microphone picks up sound.



To stop the tape
Set the function selector to STOP.

Digital Counter While Dictating



1 Tape counter: Numerical reference for recording and listening.

To set the digital counter to zero

We recommend that you press the RESET button before starting dictation. Keep the RESET button pressed for about one second to reset the tape counters to zero.

Note
- The numbers on the digital counter are memorized even when the POWER switch is set to STANDBY or a cassette is being removed.

Convenient Functions

LTR (letter) signal

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

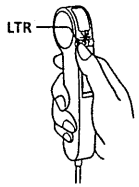
LTR (letter=end of document) signal: Record at the end of each document.

When the AUTO STOP function (see page 13) is activated (AUTO STOP: ON), the tape automatically stops at each index signal when it is rewound or rapidly advanced. Documents can be located without the user's having to listen to the entire tape.

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

To record the LTR signal

Press LTR on the hand control unit.
Each time the button is pressed, the LTR lamp on the BM-845 lights up for about three seconds.



Notes
- The LTR signal should be recorded with the intervals of more than 6 seconds.
- Playback sound is muted while the LTR signal is recorded. However, the recorded material will be protected.
- While the LTR signal is being recorded with the SPEED CONTROL selector set to ON, the tape will run at normal tape speed.

Recording time

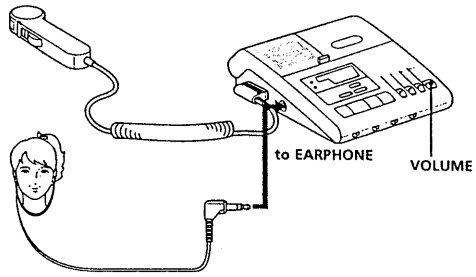
Select the desired tape speed for recording with the use of the TAPE SPEED selector.
2.4 cm: For optimum sound (recommended for normal use)
A 60-minute recording can be made using both sides of the MC-60BM Microcassette.
1.2 cm: For longer recording time
A 120-minute recording can be made using both sides of the MC-60BM Microcassette.

Continued on next page.

Dictation (continued)

Monitoring while dictating

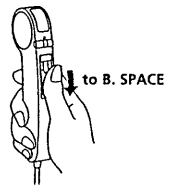
The recording can be monitored through earphones. Connect a Sony DE-45 or MDR-U10M earphones (not supplied) to the EARPHONE jack located on the left side of the unit. Adjust VOLUME if required.



Quick reviewing (playback)/correcting the dictated material

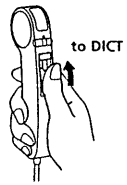
You can easily listen to the dictated material and correct it if required.

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



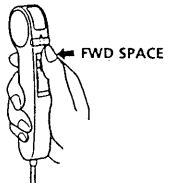
2 Release the selector. Playback of the dictation begins.

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.

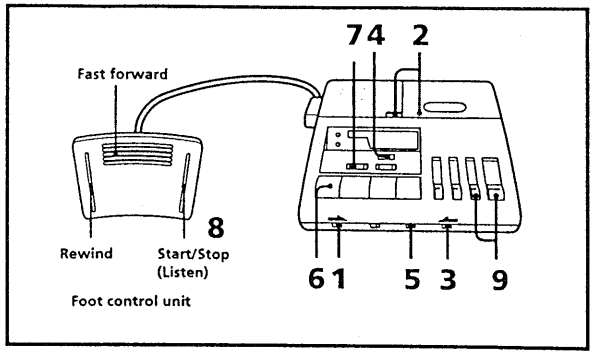


When you have finished dictating

Hand the cassette to your secretary without rewinding the tape.

Transcription

To use the unit as a transcribing machine, connect the foot control unit (not supplied).
For connection, see page 6.



Tip on Transcription

Erase the tape when transcription is finished.

Notes

If you play back in the AUTO STOP mode and the cassette was not recorded using a Sony Professional Dictating Machine (BM-531, 560, 570, 577, 820, 845, 850, 880, 890, etc.),

- an audio signal may be detected as an electronic index signal during fast foward or rewind and the unit will automatically stop with a beep.
- the auto back space function may not operate correctly.
- the switching time of the operation modes during fast forward or rewind may be delayed.

1 **Set POWER to ON.**

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

3 **Set SPEAKER to BUILT-IN.**

4 **Press AUTO STOP to make AUTO STOP disappear (AUTO STOP function is off).** (See page 13.)

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

6 **Press REW to rewind the tape.**
When the tape is completely rewound, a beep is heard and the unit automatically shuts off.

7 **Press RESET to set the digital counters to zero.**

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

9 **Adjust VOLUME and TONE.**

To stop the tape

Release the pedal.

To rewind the tape

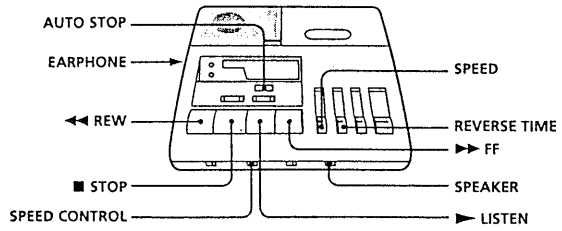
Keep the left side of the foot control unit pedal depressed.

To rapidly advance the tape

Keep the center top of the foot control unit pedal depressed.

Convenient Functions

You can use some convenient functions if you dictate using the BM-845 or Sony other models which can record electronic index signal, or if you play back a tape which was recorded with electronic index signal.



AUTO STOP function

This function is useful when you use the tape on which the LTR signal is recorded using the BM-845 or electronic index signal is recorded using other Sony Professional Dictation Machine.
With the AUTO STOP function, recorded documents can be located without the user's having to listen to the entire tape.

This function activates only in rewind or fast forward mode.

When the AUTO STOP button is pressed, AUTO STOP appears on the display window and the tape automatically stops at each LTR signal previously recorded on the tape. (See "LTR (letter) signal" on page 9.)

When the AUTO STOP function is off, the tape does not stop even if the electronic index signals have been previously recorded.

Controlling the speed

Set the SPEED CONTROL switch* to ON to adjust the speed only by the SPEED control. The tape can be played back at higher or lower speed than normal.
When the SPEED CONTROL switch 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 about –10% to +50% with the use of the SPEED control.

Continued on next page.

Notes
- The tape does not stop at the LTR signal even if the AUTO STOP function is on while the FF or REW button is continuously pressed.
- When AUTO STOP is displayed, the tape automatically stops at each electronic index signal (LTR, SEC or E-INDEX) previously recorded on the tape with the Sony Professional Dictation Machine (BM-577, 850, 890, etc.); however, the unit does not recognize the difference between the LTR and SEC signals.

Notes
- E-INDEX signal of the Sony conventional models BM-577 and so on corresponds to the LTR signal of the model BM-845.
- LTR, SEC and E-INDEX signal do not correspond to the cue signals used for consumer type tape recorder.

Transcription (continued)

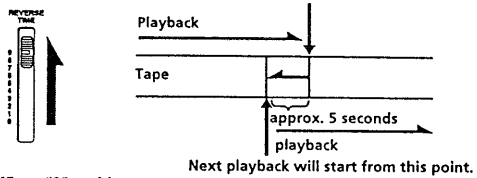
Note
- If the LTR or SEC signal is detected while the tape is being rewound with this function, the length of the reverse time may be longer than the setting you have selected.

Auto backspace function

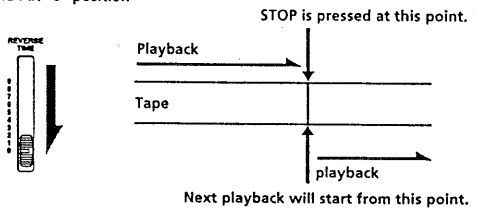
This control operates only when the foot control unit is connected.
With the use of the REVERSE TIME control, the tape is rewound a little each time it is stopped. Then, the last few recorded words can be reviewed when you resume listening. Adjust the REVERSE TIME control to determine the length of tape 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.

* Measured at some point near the middle of the tape. The reverse time will vary in accordance with the remaining length of the tape.

REVERSE TIME : at "9" position



REVERSE TIME : at "0" position



Tape transport operation

To	BM-845	Hand control unit	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

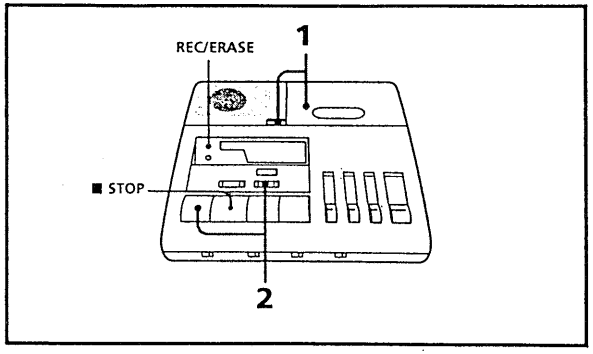
Connect a Sony DE-45 or MDR-U10M earphones (not supplied) to the EARPHONE jack. The sound will be heard through the earphones and speaker sound will be disconnected.

Selecting the speaker

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 or HAND.

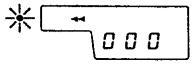
Erasing

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 and ◄◄ appears on the display window.
The portion of the tape being rewound is erased.



To stop the tape
Press ■ STOP.

Example of Dictation and Transcription

Example of Dictation

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

↓

Press LTR. — **LTR lamp lights for approx. 3 seconds.**

"This is a letter. Type it up and send it by express."
"Today's date is July 4, 1996.
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 LTR. — **LTR lamp lights for approx. 3 seconds.**

"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. — **LTR lamp lights for approx. 3 seconds.**

↓

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

Example of Transcription

Insert the cassette.

↓

Press AUTO STOP to make AUTO STOP disappear.

↓

Press REW to rewind the tape.

The unit automatically shuts off when the tape reaches the tape top.

↓

Press RESET to set the digital counter to zero.

↓

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.

Troubleshooting Guide

Should any problem occur, conduct the following simple tests to determine whether or not servicing is required. If the problem persists after you have conducted these tests, consult the nearest Sony Dictation Systems dealer.

The unit does not operate.
- The AC power adaptor is not plugged into a wall outlet.
- The POWER switch is set to STANDBY.

No sound from the built-in speaker
- The SPEAKER selector is set to HAND.
- The VOLUME control is set in the MIN position.
- An earphone is plugged in.
- The cassette is not inserted properly.

The tape speed is too fast or too slow.
- The TAPE SPEED selector is set incorrectly.
- The SPEED control is set incorrectly.
- The SPEED CONTROL switch is set to ON.

The tape stops in the rewind or fast forward mode and the alarm sounds.
- The entire tape has been wound.
- The AUTO STOP switch is activated and a tape with electronic index signal recorded is used.
- If the BM-845 is used as a transcriber while **AUTO STOP** is displayed and a tape which was recorded with a dictator other than Sony's is used , the BM-845 will detect an audio signal as an electronic index signal and the tape will automatically stop in the rewind or fast forward mode. Be sure to turn off the AUTO STOP function (see page 12).

Recording functions (Dict, Erase, LTR) do not activate.
- The tape is completely rewound.
- The cassette tabs have been removed.

The hand control unit or the foot control unit does not operate.
- The plug is not connected to the CONTROL UNIT connector firmly.
- The BM-845 is operated with the tape operation buttons on the BM-845. Press STOP and proceed with the operation on the hand control unit or the foot control unit.

Sound dropouts, loss of high frequency sounds, or excessive noise
- The heads are dirty. See "Maintenance".

Erasing is unsatisfactory.
- The erase head is dirty. See "Maintenance".

The reverse time of the auto backspace function is not correct.
- A cassette which was not recorded using a Sony Professional Dictating Machine (BM-531, 560, 570, 577, 820, 845, 850, 880, 890 etc.) is played back in the AUTO STOP mode (see page 12).
- The reverse time of the auto backspace function may become longer when the LTR or SEC signal is detected on the tape.

The switching time of the operation modes is delayed.
- When a cassette which was not recorded using a Sony Professional Dictating Machine (BM-531, 560, 570, 577, 820, 845, 850, 880, 890 etc.) is rewound or fast forward in the AUTO STOP mode, the switching time to other operation modes is delayed (see page 12).

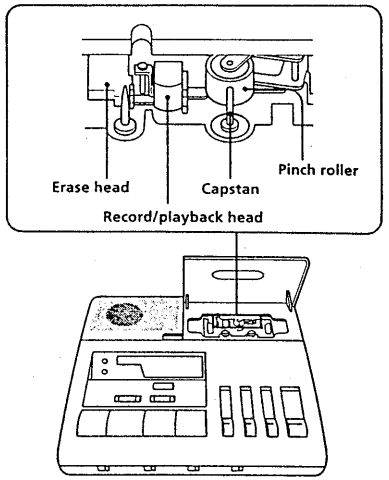
AUTO STOP does not appear even if you press the AUTO STOP button.
- Remove the AC power adaptor from the AC outlet for more than 5 seconds, and then, connect the adaptor again.

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.	• When you put the hand control unit in the dictating mode during the FF, REW or ERASE mode.	• To start recording, put the BM-845 in the stop mode first and then start recording.
The unit shuts off. → A beep is heard in the AUTO STOP mode during the FF or REW mode.	• The LTR or SEC signal is detected.	

Maintenance



Cleaning the heads

To produce optimum sound, clean the tape heads after every 10 hours of use.
First, disconnect the AC power adaptor. Press EJECT to open the cassette compartment lid. Moisten a cotton swab or a soft cloth with alcohol, and wipe the parts shown on the left.

Cleaning the cabinet

Clean the cabinet with a soft cloth slightly moistened with a mild detergent solution. Never use strong solvents, such as thinner or benzine, since they may damage the finish.

SECTION 3
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 demagnetizer.
3. Do not use a magnetized screwdriver for the adjustment.
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

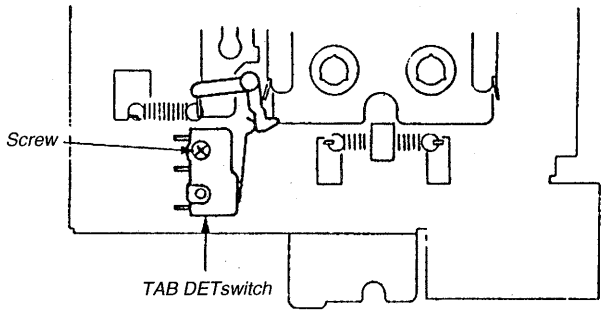
Mode	Micro cassette type torque meter	Meter Reading
Forward	CQ-103M	5 to 16g•cm (0.07 to 0.222 oz•inch)
Fast Forward Rewind	CQ-201M	35 to 100g•cm (0.49 to 1.38 oz•inch)

Tape Tension Measurement

Micro cassette type tension meter	Meter Reading
CQ-403M	more than 30g (more than 1.06 oz)

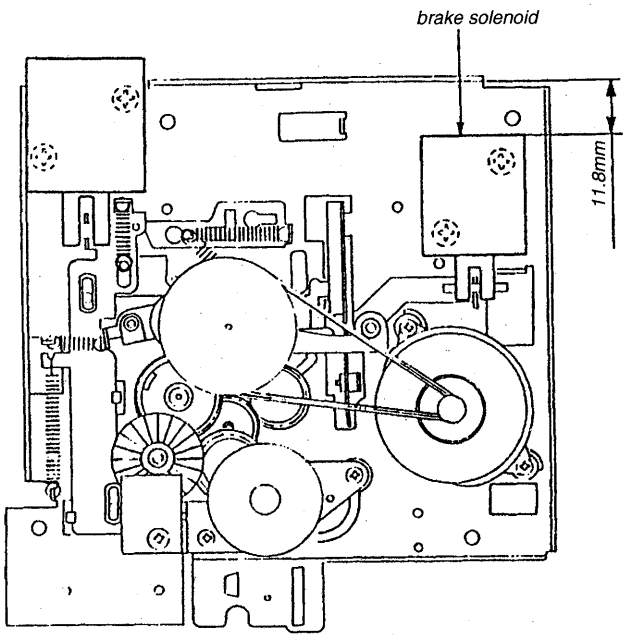
TAB DET Switch Position

Adjust the screw for following position.
When inserting the cassette with the tab ..... ON
When inserting the cassette without the tab..... OFF



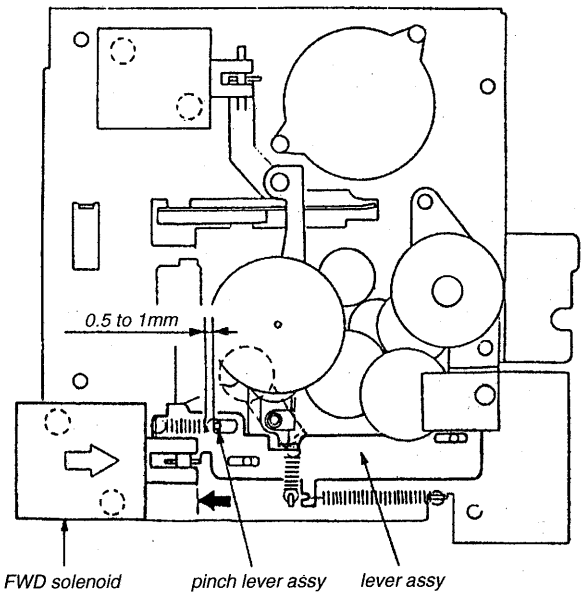
Brake Solenoid Position Adjustment

Adjust the screw so that clearance between the brake solenoid and the chassis is approximately 11.8mm as illustrated.



FWD Solenoid Position Adjustment

1. When pulling FWD solenoid fully with the hand, adjust the FWD solenoid installing screw so that clearance between pinch lever assy and lever assy is approximately 0.5 to 1mm.
2. After adjustment, confirm that the pinch roller press against the capstan in FWD mode.



SECTION 4
ELECTRICAL ADJUSTMENTS

PRECAUTION

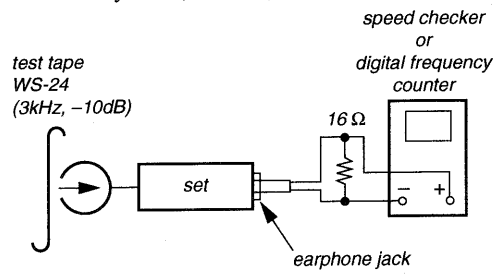
1. Demagnetize the record/playback head with a head demagnetizer.
2. Do not use a magnetized screwdriver for the adjustment.
3. After the parts adjustments, apply suitable locking compound to the parts adjusted.
4. The adjustments should be performed with the rated power supply voltage unless otherwise noted.
5. The adjustments should be performed in the order given in this service manual. (As a rule, playback circuit adjustment should be completed before performing recording circuit adjustment.)
6. Switches and controls should be set as follows unless otherwise specified.

POWER switch	: ON
SPEED CONTROL switch	: ONFF
AUTO STOP switch	: Light off the AUTO STOP display on LCD
SPEAKER switch	: BUILT-IN
TONE control	: max. (H)
TAPE SPEED switch	: 2.4

Tape Speed Adjustment

Setup :

Mode : Playback (LISTEN)



Procedure :

1. SPEED CONTROL switch : OFF
   TAPE SPEED switch : 2.4
   Adjust RV105 for specified reading on speed checker or digital frequency counter.

Adjustment Values :

Speed checker	Digital frequency counter
0 to +1%	3,000 to 3,030Hz

2. SPEED CONTROL switch : OFF
   TAPE SPEED switch : 1.2
   Adjust RV104 for specified reading on speed checker or digital frequency counter.

- Perform 2.4cm/s normal speed adjustment before 1.2m/s normal speed adjustment.

Adjustment Values :

Speed checker	Digital frequency counter
0 to +1%	1,500 to 1,515Hz

3-1. SPEED CONTROL switch : ON
   TAPE SPEED switch : 2.4
   SPEED control : max. (H)
   Adjust RV106 for specified reading on speed checker or digital frequency counter.

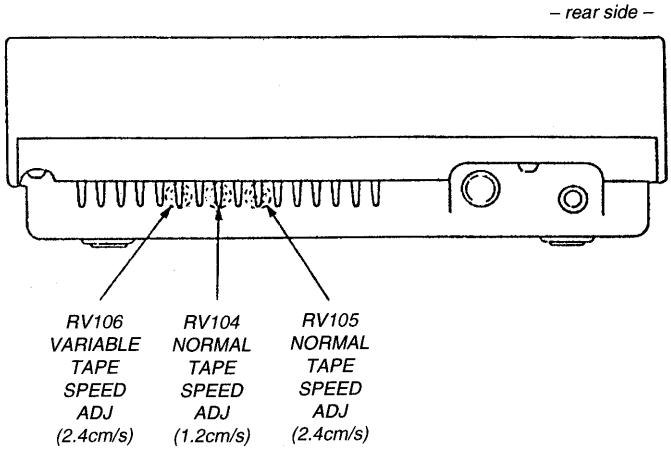
Adjustment Values :

Speed checker	Digital frequency counter
+63.3 to +66.7%	4,900 to 5,000Hz

3-2. Confirm that the reading on digital frequency counter is specification value as shown below.

SPEED control (RV103)	TAPE SPEED (S113)	Frequency counter
max.	2.4cm	more than 4,500Hz
	1.2cm	more than 2,250Hz
min.	2.4cm	less than 2,700Hz
	1.2cm	less than 1,350Hz

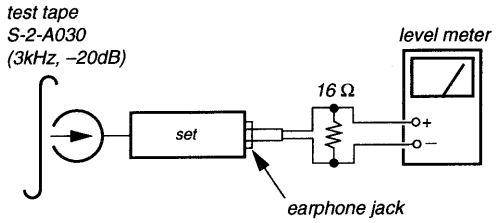
Adjustment Location : Main board



Record/playback Head Azimuth Adjustment

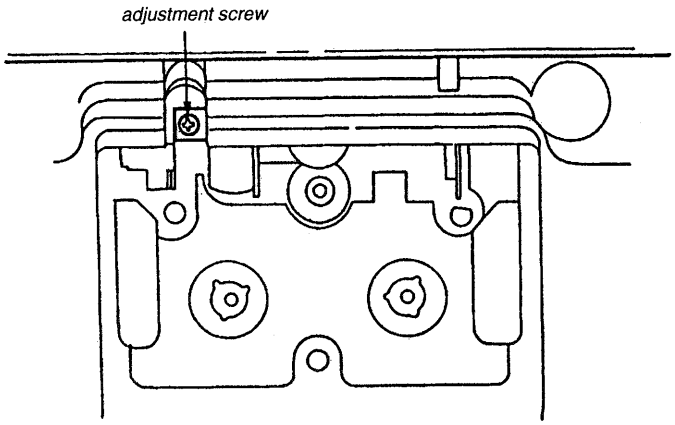
Procedure :

1. Mode : Playback (LISTEN)



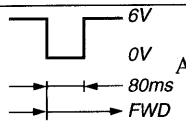
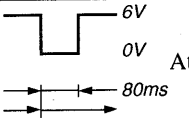
2. Turn the adjustment screw to obtain the maximum reading on level meter.
   Adjustment should be finished with the screw in tightening direction.
3. After the adjustment, lock the adjustment screw with suitable locking compound.

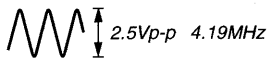
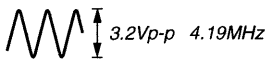
Adjustment Location : Record/playback head



SECTION 5
EXPLANATION OF IC TERMINALS

IC109 μPD75308GF-K63-3B9 (SYSTEM CONTROL)

Pin No.	Pin Name	I/O	Description	Voltage, Remarks
1	S12	–	Not used.	Open
2	S13	–	Not used.	Open
3	S14	–	Not used.	Open
4	S15	O	LCD segment output.	
5	S16	O	LCD segment output.	
6	S17	O	LCD segment output.	
7	S18	O	LCD segment output.	
8	S19	O	LCD segment output.	
9	S20	O	LCD segment output.	
10	S21	O	LCD segment output.	
11	S22	O	LCD segment output.	
12	S23	O	LCD segment output.	
13	KOUT 0	O	Key scan output.	3.9V
14	KOUT 1	O	Key scan output.	3.9V
15	KOUT 2	O	Key scan output.	3.9V
16	KOUT 3	O	Key scan output.	3.2V
17	——	–	Not used.	Open
18	HU-MIC-OUT	O	HU-MIC output.	At DICT : 5.2V At the other : 0V
19	TEL-MIC-OUT	–	Not used.	Open
20	——	–	Not used.	Open
21	COM 0	O	LCD common output.	
22	COM 1	O	LCD common output.	
23	COM 2	O	LCD common output.	
24	——	–	Not used.	Open
25	LCD-BIAS	–	Output for LCD outer resistance.	5.4V
26	V_{LCD0}	–	Power source for LCD drive.	2.8V
27	V_{LCD1}	–	Power source for LCD drive.	1.9V
28	V_{LCD2}	–	Power source for LCD drive.	1V
29	$\overline{\text{ERASE}}$-OUT	O	Erase control output.	At Fast-Erase and DICT : 0V At the other : 6.1V
30	$\overline{\text{BIAS}}$-OUT	O	Bias control output.	At DICT : 0V At the other : 6.1V
31	$\overline{\text{FWD}}$-PG-OUT	O	FWD solenoid output.	At FWD : 0V At the other : 6.1V
32	$\overline{\text{FWD}}$-PG-$\overline{\text{KICK}}$-OUT	O	FWD solenoid kick output	In an instant of FWD :  At the other : 6V *At the other mode*
33	VSS	–	GND.	0V
34	$\overline{\text{BRK}}$-PG-OUT	O	Brake solenoid output.	Finish the FF/REW :  At the other : 6V *FF/REW mode* *At the other mode*
35	$\overline{\text{REW}}$-MOTOR-OUT	O	REW-motor-output.	At REW : 0V At the other : 6.1V
36	$\overline{\text{FF}}$-MOTOR-OUT	O	FF-motor-output.	At FF : 0V At the other : 6.1V

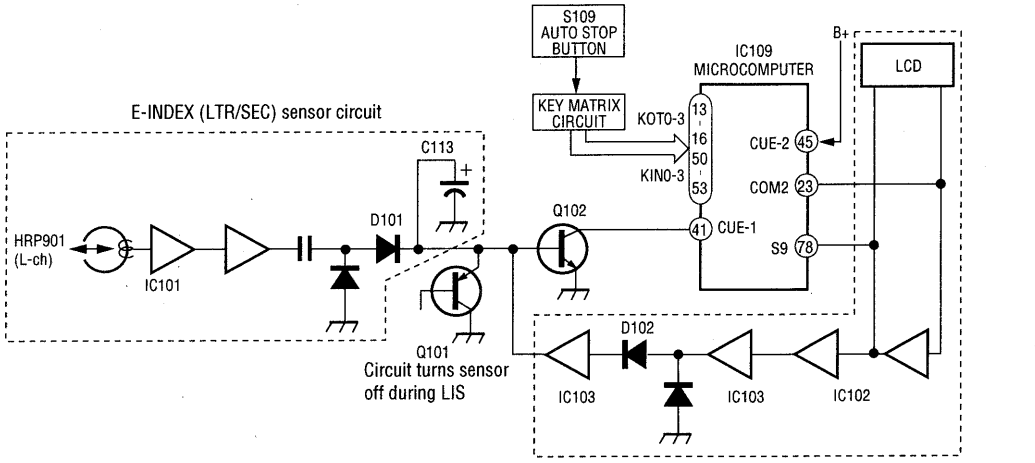
Pin No.	Pin Name	I/O	Description	Voltage, Remarks
37	A-OFF-OUT	O	Motor Auto-off output.	Motor Auto-off (after three minutes after STOP) : 2.1V At the other : 0V
38	POWER SW-IN	I	POWER switch input.	At ON : 5.4V At STANDBY : 0V
39	$\overline{\text{TAB-IN}}$	I	TAB (erase proof) detection switch input.	Cassette with TAB : 0V Cassette without TAB 5.4V
40	——	–	Not used.	Open
41	CUE-1-IN	I	CUE-1 input.	Refer to page 17 for LTR / SEC Detection.
42	EAR-J-IN	I	EAR JACK input.	With a EARPHONE plug : 5.4V Without a EARPHONE plug 0V
43	TR	I	T reel signal input.	Refer to page 20 for Detection of T Reel.
44	$\overline{\text{DICT-IN}}$	I	HU-DICT key input.	At DICT key input of the hand control unit (HU-80) : 0V At the other : 5.3V
45	CUE-2-IN	–	Not used.	Connected to VDD.
46	LTR-OUT	O	LTR signal output.	At LTR oscillating :  5.4V Output 20Hz for three seconds. At SEC oscillating :  5.4V Output 750Hz for three seconds. At other : 5.4V
47	REC-OUT	O	DICT control output.	At DICT, TEL-REC, LTR : 5.4V At the other : 0V"
48	HU-LED-OUT	O	HU-LED control output.	At DICT : 5.4V At the other : 0V
49	ALM-OUT	O	Alarm output.	At alarm oscillating :  5.4V 2.05kHz
50	KIN 0	I	Key scan input	5.3V
51	KIN 1	I	Key scan input	5.4V
52	KIN 2	I	Key scan input	5.2V
53	KIN 3	I	Key scan input	5.2V
54	VDD	–	Positive power source terminal of the microcomputer.	5.4V
55	TEL-J-IN	–	Not used.	Connect to ground.
56	XT2	–	Not used.	Open
57	NC	–	Not used.	Connected to VDD
58	X1	I	MAIN clock oscillator.	 2.5Vp-p 4.19MHz
59	X2	O	MAIN clock oscillator.	 3.2Vp-p 4.19MHz
60	$\overline{\text{HU-LIS-IN}}$	I	HU-LISTEN key input.	At LISTEN key in of the hand control unit (HU-80) : 0.1V At the other : 5.4V
61	$\overline{\text{BS-IN}}$	I	HU-BS key input.	At BS key in of the hand control unit (HU-80) : 0V At the other : 5.4V
62	PB-OUT	O	Playback control output.	At LISTEN : 5.4V At the other : 0V
63	$\overline{\text{MUTE-OUT}}$	O	Amplifier mute output.	At LISTEN : 5.4V With a EARPHONE at DICT : 5.4V At the other : 0V
64	$\overline{\text{FS-IN}}$	I	HU-FS key input.	At FS key input of the hand control unit (HU-80) : 0V At the other : 5.4V
65	$\overline{\text{PR-IN}}$	I	Foot switch LISTEN key input.	At LISTEN key input of the foot control unit (FS-75) : 0.1V At the other : 5.4V
66	$\overline{\text{SEC-IN}}$	I	HU-SEC key input.	At SEC key input of the hand control unit (HU-80) : 0.1V At the other : 5.4V

Pin No.	Pin Name	I/O	Description	Voltage, Remarks
67	$\overline{\text{LTR-IN}}$	I	HU-LTR key input.	At LTR key input of the hand control unit (HU-80) : 0.1V At the other : 5.4V
68	$\overline{\text{RESET}}$	I	Microcomputer reset input.	Normal : 5.4V RESET : 0V
69	S0	–	Not used.	Open
70	S1	–	Not used.	Open
71	S2	–	Not used.	Open
72	S3	–	Not used.	Open
73	S4	–	Not used.	Open
74	S5	–	Not used.	Open
75	S6	–	Not used.	Open
76	S7	–	Not used.	Open
77	S8	–	Not used.	Open
78	S9	O	LCD segment output.	
79	S10	–	Not used.	Open
80	S11	–	Not used.	Open

SECTION 6
CIRCUIT DESCRIPTION

● LTR/SEC Detection

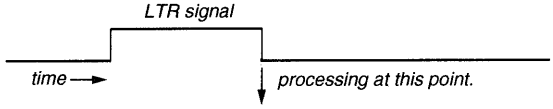
1. Detection Circuit
   - This unit has an E-INDEX (LTR/SEC) sensor to provide an Auto stop function.
     The following occurs when LTR/SEC is detected in FF or REW while the message "AUTO STOP " appears on the LCD.
     CUE-2 : H (normal operation)
     CUE-1 : L
     Microcomputer : Shuts off mechanical operation and sounds an alarm.



Cicuit turns sensor on and off and "AUTO STOP" display on LCD functions simultaneously. (Sensor ON during "AUTO STOP" display.)

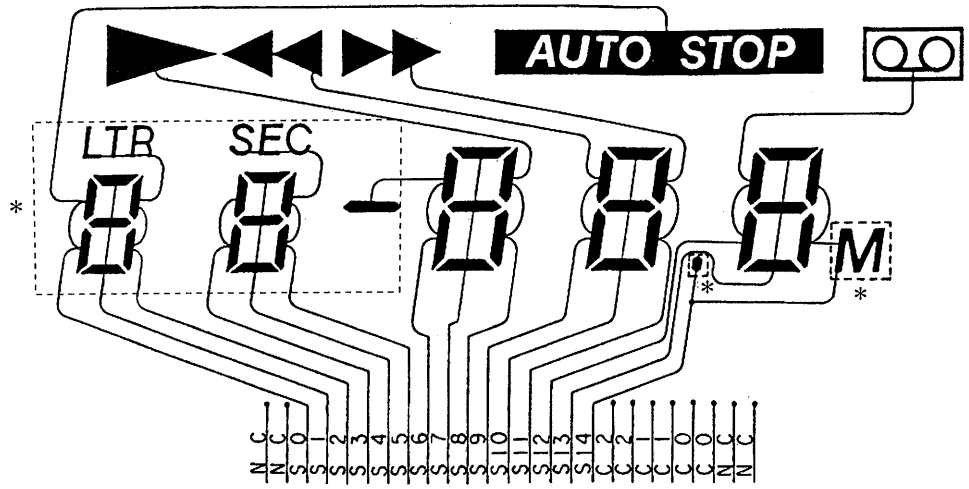
2. After discrimination, LTR/SEC processing will be perfomed when the LTR/SEC signal disappears.

ex.)

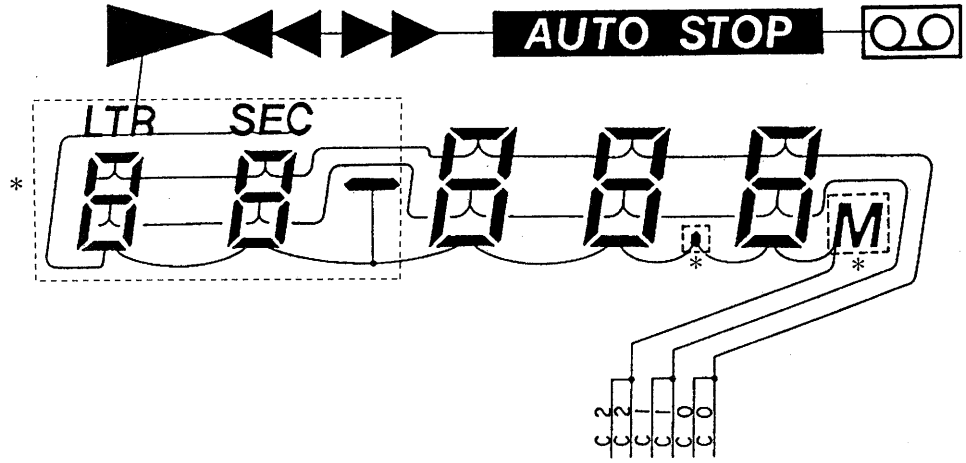


● **LCD (ND901) Connection Diagram**

SEGMENT



COMMON

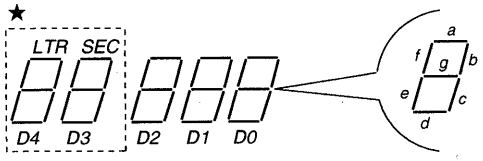


Note)

∗ : For BM-845D, these segments are not used.

• LCD Display Map

* Segment output



IC109 Pin No.	Pin Name #	COM 0	COM 1	COM 2
12	S23 (S14)	Counter D0-b	Counter D0-c	" ● " (dot) and "M"
11	S22 (S13)	Counter D0-a	Counter D0-g	Counter D0-d
10	S21 (S12)	Counter D0-f	Counter D0-e	📼
9	S20 (S11)	Counter D1-b	Counter D1-c	▶▶ (FF)
8	S19 (S10)	Counter D1-a	Counter D1-g	Counter D1-d
7	S18 (S9)	Counter D1-f	Counter D1-e	◀◀ (REW)
6	S17 (S8)	Counter D2-b	Counter D2-c	▶ (FWD)
5	S16 (S7)	Counter D2-a	Counter D2-g	Counter D2-d
4	S15 (S6)	Counter D2-f	Counter D2-e	▬ (minus sign)
★3	S14 (S5)	Counter D3-b	Counter D3-c	"SEC"
★2	S13 (S4)	Counter D3-a	Counter D3-g	Counter D3-d
★1	S12 (S3)	Counter D3-f	Counter D3-d	(not used)
★80	S11 (S2)	Counter D4-b	Counter D4-c	"LTR"
★79	S10 (S1)	Counter D4-a	Counter D4-g	Counter D4-d
78	S9 (S0)	Counter D4-f	Counter D4-e	"AUTO STOP"

★ For BM-845D, these segments are not used.
The segment name parenthesis represents that of ND901.

• Key-scan • Matrix

The pin No. and the pin name stand for those of the microcomputer (IC109).

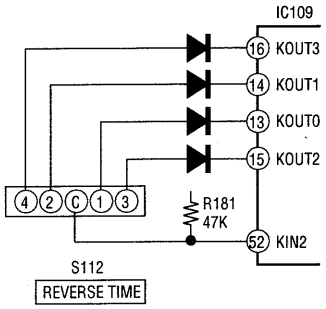
Input \ Output		(Pin No.) 13	14	15	16
		(Pin Name) KOUT 0	KOUT 1	KOUT 2	KOUT 3
(Pin No.) 50	(Pin Name) KIN 0	RESET (S111)	ERASE (S110)	Not used	Not used
51	KIN 1	FF (S107)	REW (S106)	LISTEN (S105)	STOP (S104)
52	KIN 2	REVERSE TIME			
		(Pin ① of S112)	(Pin ② of S112)	(Pin ③ of S112)	(Pin ④ of S112)
53	KIN 3	Not used	Not used	AUTO STOP (S109)	TAPE SPEED 1.2/2.4 (S113)

- Hard is controlled by Low active (Low is input with turning on each switch).
- TAPE SPEED is 2.4cm/s at Low.

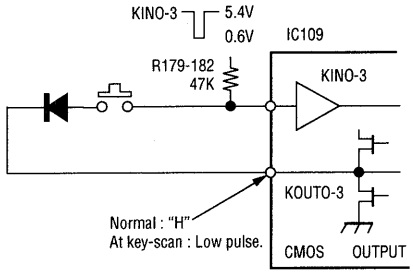
Refer to the following figure for the key matrix of S112.

S112 Position ○ : ON

	0	1	2	3	4	5	6	7	8	9
Between C and 1		○		○		○		○		○
Between C and 2			○	○			○	○		
Between C and 3					○	○	○	○		
Between C and 4									○	○



Key-scan is controlled by Low active.



● Detection of T Reel

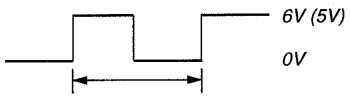
Pin ② of IC111 (Pin ㊸ of IC109) : T reel

Waveform condition :

- Tape MC-60 is used.
- The period is different by the tape position.
- ( ) : Voltage of IC109 port.

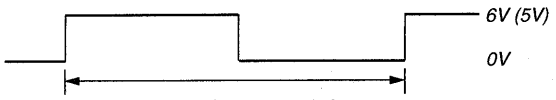
FWD :

T reel at the tape TOP :



At 2.4cm/s : approx. 75ms
At 1.2cm/s : approx. 150ms

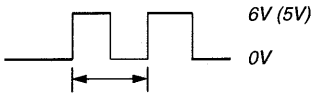
T reel at the tape END :



At 2.4cm/s : approx. 170ms
At 1.2cm/s : approx. 340ms

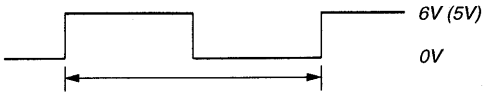
REW :

T reel at the tape TOP :



At 2.4cm/s : approx. 3ms
At 1.2cm/s : approx. 6ms

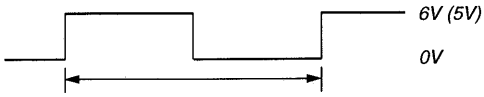
T reel at the tape END :



At 2.4cm/s : approx. 13ms
At 1.2cm/s : approx. 26ms

FF :

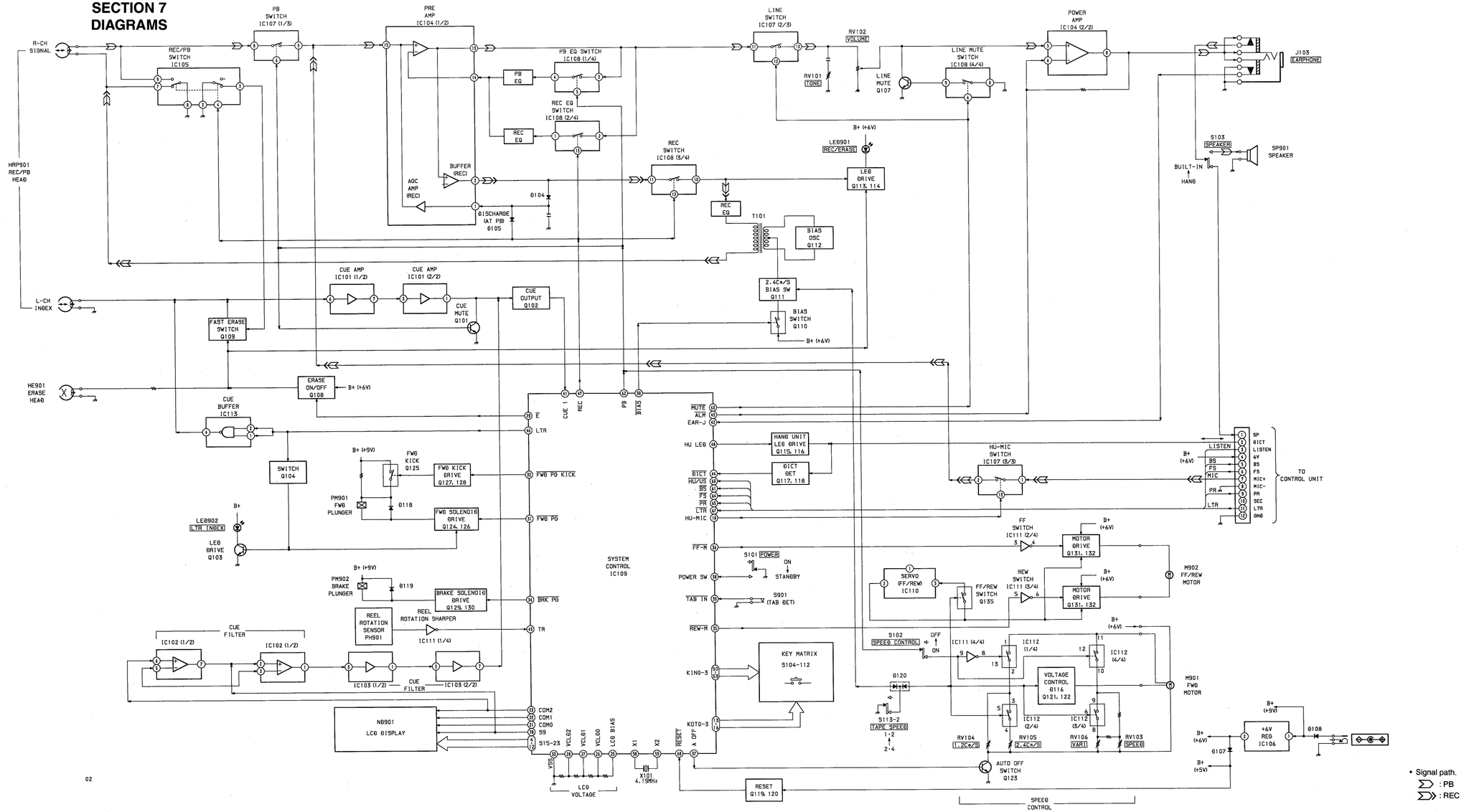
Nearly constant regardless of the tape position :



At 2.4cm/s : approx. 6.5ms
At 1.2cm/s : approx. 13ms

SECTION 7
DIAGRAMS

7-1. BLOCK DIAGRAM



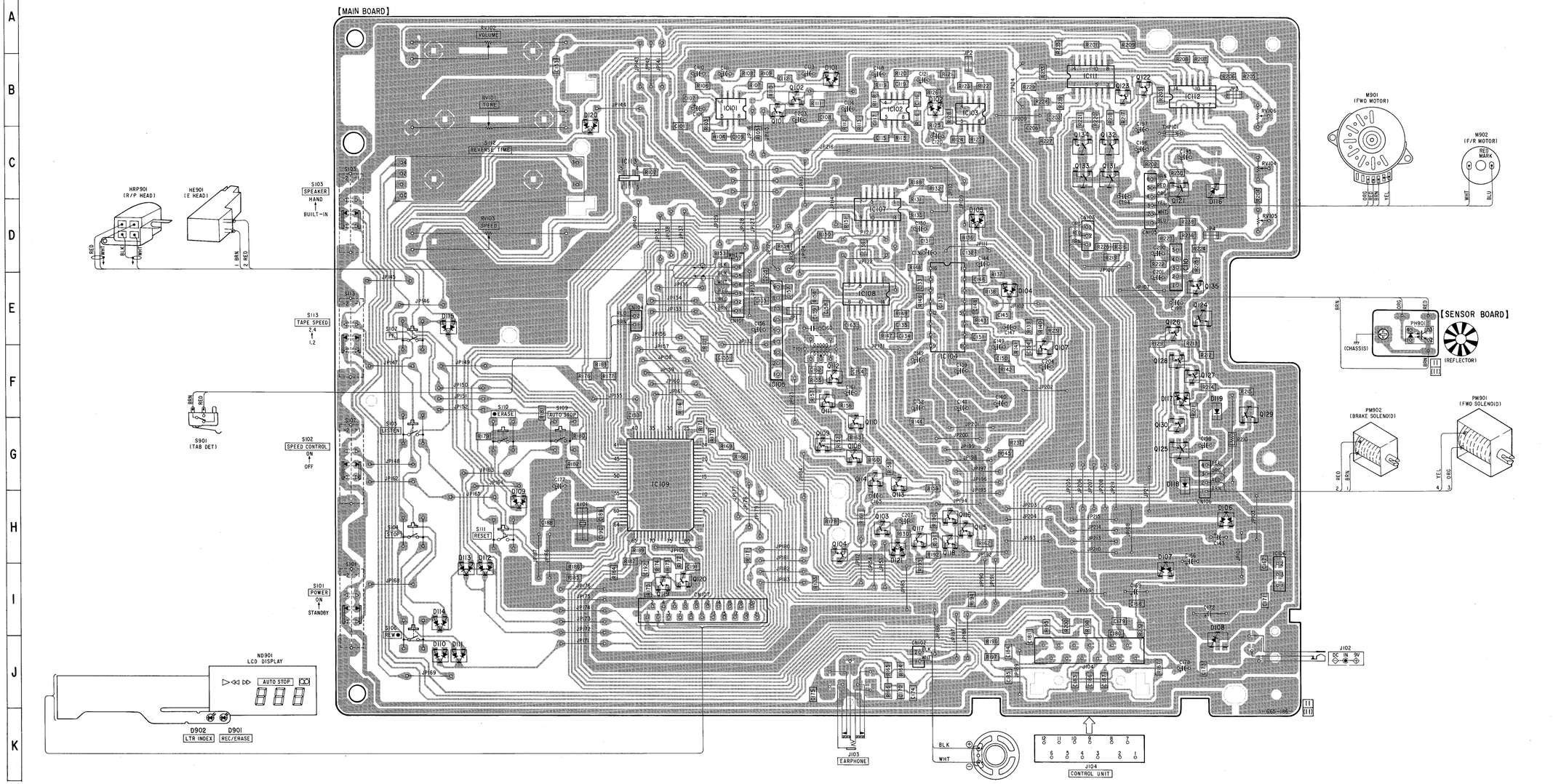
7-2. PRINTED WIRING BOARDS

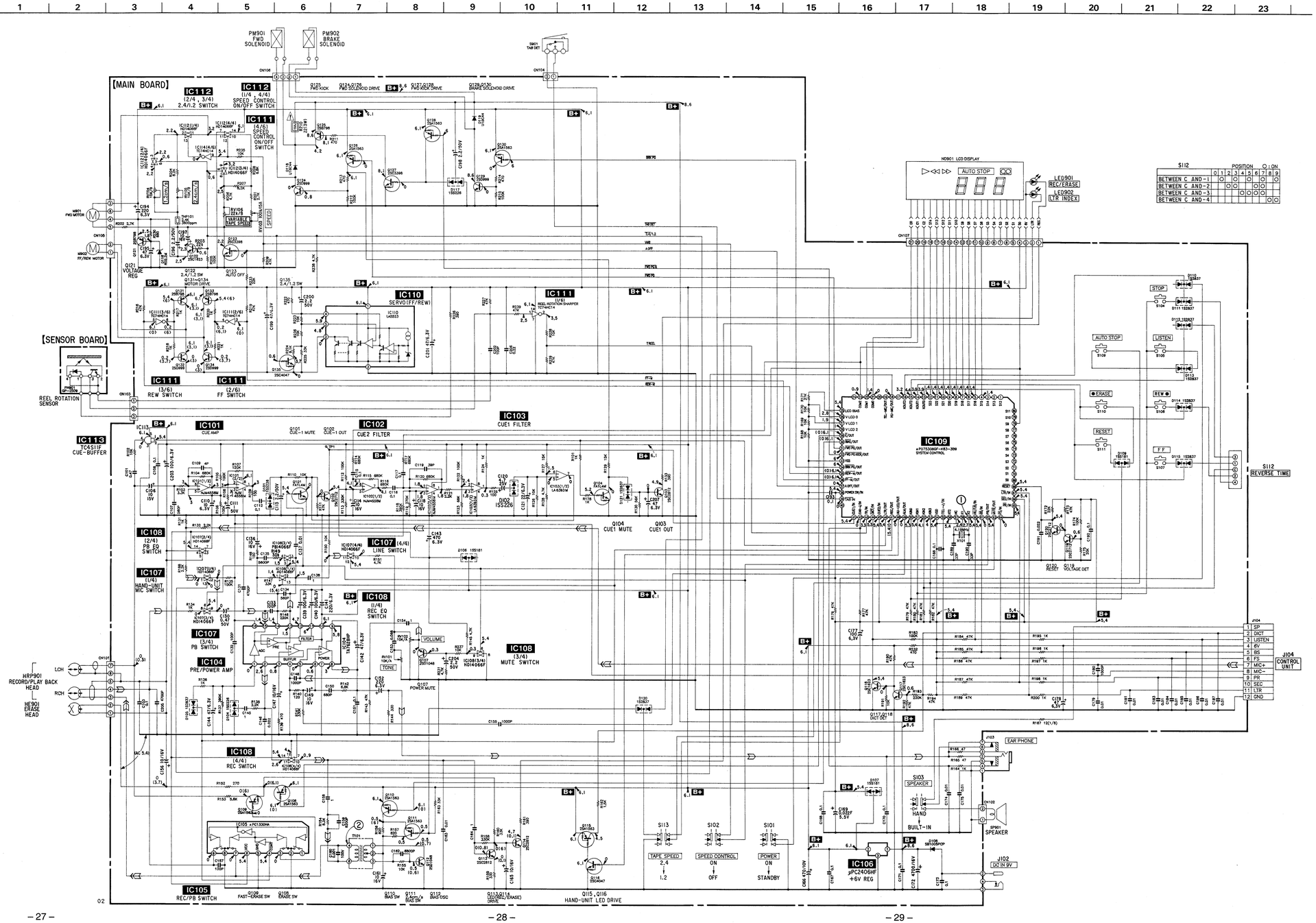
● SEMICONDUCTOR LOCATION

Ref. No.	Location	Ref. No.	Location
D101	B-12	PH901	E-20
D102	B-13		
D104	E-14		
D105	D-14	Q101	B-11
D106	H-17	Q102	B-11
		Q103	H-12
D107	H-16	Q104	H-12
D108	I-17	Q107	F-15
D109	H-7		
D110	J-6	Q108	G-12
		Q109	G-12
D111	J-6	Q110	G-12
D112	I-7	Q111	F-12
D113	I-7	Q112	F-12
D114	I-6		
D115	E-6	Q113	G-13
		Q114	G-12
D116	C-17	Q115	H-13
D117	F-16	Q116	H-13
D118	G-16	Q117	H-13
D119	F-17		
D120	B-8	Q118	H-13
		Q119	I-9
D121	H-13	Q120	I-10
D901	K-3	Q121	C-16
D902	K-3	Q122	B-16
		Q123	B-16
IC101	B-10	Q124	E-17
IC102	B-12	Q125	G-16
IC103	B-14	Q126	E-16
IC104	E-13	Q127	F-17
IC105	F-11		
		Q128	E-16
IC106	H-18	Q129	F-17
IC107	D-12	Q130	G-16
IC108	E-12	Q131	C-15
IC109	G-9	Q132	C-15
IC110	D-16		
		Q133	C-15
IC111	B-15	Q134	C-15
IC112	B-17	Q135	E-17
IC113	C-9		

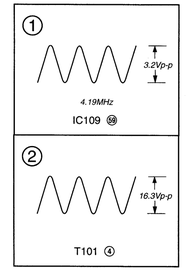
Note:

- ○— : parts extracted from the component side.
- ▒▒ : Pattern on the side which is seen.





● WAVEFORMS



Note :

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

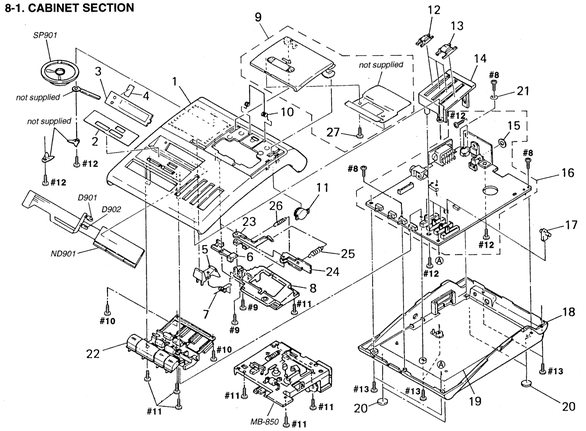
Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- B+ : B+ Line
- ▭ : adjustment for repair.
- Power voltage is dc 9V and fed with regulated dc power supply from external power voltage jack (J102).
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark : LISTEN
  ( ) : REC/ERASE
  〈 〉 : FF, REW ON
- 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

SECTION 8
EXPLODED VIEWS

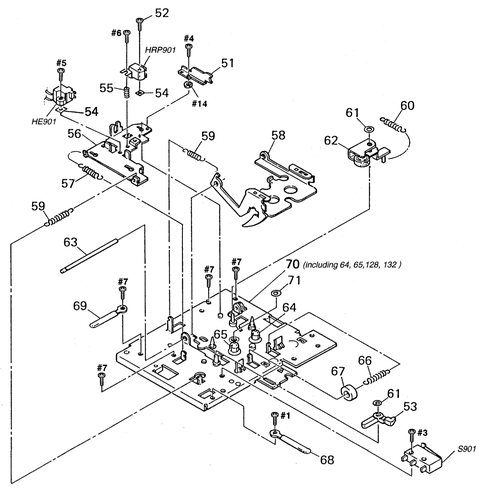
NOTE :
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked " * "are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the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

8-1. CABINET SECTION



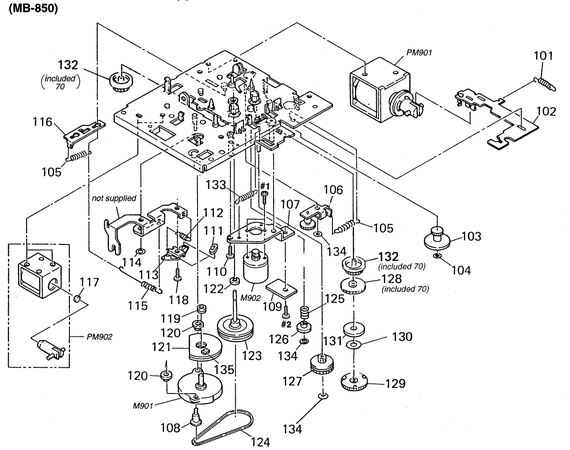
Ref. No.	Part No.	Description	Remark
1	3-389-207-31	CABINET (UPPER)	
2	3-012-990-01	PANEL	
3	3-905-965-01	WINDOW, LCD	
4	3-906-000-01	ILLUMINATOR	
5	3-905-966-01	BUTTON (EJECT)	
6	3-905-962-01	LEVER, CASSETTE LID LOCK	
7	3-905-982-01	SPRING (EJECT), TORSION	
8	3-907-827-01	BLIND, MD	
9	A-3042-240-A	LID (CASSETTE) COMPLETE ASSY	
10	3-905-999-01	SPRING (CASSETTE LID), TORSION	
11	3-343-248-01	DAMPER (P), SMALL	
12	X-3323-536-1	KNOB (TONE) ASSY	
13	X-3323-535-1	KNOB (VOL) ASSY	
14	3-359-104-01	GUIDE, KNOB	
* 15	3-323-680-01	COVER, JACK	
* 16	A-3016-927-A	MAIN BOARD, COMPLETE	
* 17	3-323-679-01	BUSHING	
18	3-389-208-21	CABINET (LOWER)	
19	3-389-247-01	PAPER, SHIELD	
20	3-343-250-01	CUSHION	
21	7-623-205-22	SW2, TYPE2	
22	3-905-980-01	BUTTON BLOCK	
23	3-907-828-01	ARM (EJECT) (A)	
24	3-907-829-01	ARM (EJECT) (B)	
25	3-907-830-01	SPRING, TENSION	
26	3-907-831-01	SPRING, TENSION	
27	3-318-201-01	SCREW (B) (1.4X3), TAPPING	
D901	8-719-984-02	LED BR4371F (REC/ERASE)	
D902	8-719-984-02	LED BR4371F (LTR INDEX)	
ND901	1-810-090-11	DISPLAY PANEL, LIQUID CRYSTAL	
SP901	1-544-282-11	SPEAKER	

8-2. MECHANISM DECK SECTION (1) (MB-850)



Ref. No.	Part No.	Description	Remark
* 51	3-353-957-01	GUIDE, TAPE	
52	3-318-201-01	SCREW (B) (1.4X3), TAPPING	
* 53	3-335-167-01	LEVER, ERASING PROTECTION	
54	3-578-138-01	SHIM (t=0.1mm)	
54	3-578-138-11	SHIM (t=0.2mm)	
54	3-578-138-21	SHIM (t=0.3mm)	
55	3-375-311-01	SPRING, COMPRESSION	
* 56	X-3367-465-1	BASE ASSY, HEAD	
57	3-353-964-01	SPRING, TENSION	
58	X-3335-109-1	HOLDER COMPLETE ASSY, CASSETTE	
59	3-907-842-01	SPRING, TENSION	
60	3-353-953-01	SPRING, TENSION	
61	3-578-242-11	WASHER	
62	X-3353-906-1	PINCH LEVER ASSY	
* 63	3-353-960-01	PIN, PARALLEL	
64	X-3335-103-2	CLAW ASSY, T REEL	
65	X-3335-104-1	CLAW ASSY, S REEL	
66	3-353-956-01	SPRING, TENSION	
* 67	3-335-116-01	ROLLER, EMP	
* 68	2-277-426-01	CLAMP	
* 69	3-701-822-01	HOLDER, WIRE	
* 70	X-3367-463-1	CHASSIS ASSY, MECHANICAL	
71	3-570-615-02	POLY-WASHER (DIA.1.2)	
HE901	1-543-899-11	HEAD, MAGNETIC (ERASE)	
HRP901	1-543-725-11	HEAD (RECORD/PLAYBACK)	
S901	1-554-385-00	SWITCH, MICRO (TAPE DET)	

8-3. MECHANISM DECK SECTION (2) (MB-850)



Ref. No.	Part No.	Description	Remark
101	3-353-954-01	SPRING, TENSION	
* 102	X-3353-908-1	LEVER ASSY, PLAY	
103	X-3367-464-1	GEAR (REFLECTOR) ASSY	
104	3-701-436-11	WASHER, 1.6 POLYETHYLENE	
105	3-353-955-01	SPRING, TENSION	
106	X-3353-907-1	GEAR ASSY, IDLER	
* 107	3-907-849-01	BRACKET (FR MOTOR)	
108	3-353-961-01	SCREW (M1.4), STEP	
* 109	1-650-105-11	SENSOR BOARD	
110	3-342-759-41	SCREW (B1.7X4), TAPPING	
111	3-905-985-01	RUBBER, BRAKE	
112	3-907-846-01	SPRING, TENSION	
113	3-907-844-01	SHOE, BRAKE	
114	3-907-840-01	WASHER	
115	3-907-847-01	SPRING, TENSION	
* 116	3-353-950-01	LEVER (SAFETY)	
117	3-323-645-01	STOPPER	
118	3-907-845-01	SCREW, STEP	
119	3-353-972-01	RUBBER, BUSHING	
* 120	3-335-208-01	CUSHION, MOTOR	
* 121	3-375-326-01	PLATE, MOTOR	
122	3-701-436-01	WASHER, 1.6	
123	X-3353-910-1	WHEEL ASSY, CAPSTAN	
124	3-554-106-00	BELT	
125	3-335-230-01	SPRING, COMPRESSION	
126	3-335-121-01	GEAR, FR	
127	X-3335-135-1	LIMITER ASSY, FR	
128	X-3367-471-1	LIMITER (A) ASSY, FWD	
129	X-3335-107-1	LIMITER (B) ASSY, FWD	
130	3-335-123-01	SPACER (M) (t=0.1mm)	
130	3-335-123-11	SPACER (M) (t=0.2mm)	
130	3-335-123-21	SPACER (M) (t=0.3mm)	
131	3-335-126-01	PLATE, MAGNET	
132	3-907-857-01	GEAR (REEL)	
133	3-907-848-01	SPRING, TENSION	
134	3-321-394-01	WASHER	
135	2-389-320-01	CUSHION, MOTOR	
M901	1-541-332-11	MOTOR (NBL-32R) (FWD MOTOR)	
M902	X-3367-201-1	MOTOR (F/R) ASSY (F/R MOTOR)	
PM901	1-454-604-11	SOLENOID, PLUNGER (FWD)	
PM902	1-454-662-11	SOLENOID, PLUNGER (BRAKE)	

SECTION 9
ELECTRICAL PARTS LIST

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, -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.... : µ A.... , uPA.... : µ PA....
  uPB.... : µ PB.... , uPC.... : µ PC....
  uPD.... : µ PD....
- CAPACITORS
  uF : µ F
- COILS
  uH : µ H

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

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

Ref. No.	Part No.	Description			Remark
*	A-3016-927-A	MAIN BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C101	1-162-637-11	CERAMIC CHIP	0.47uF		16V
C103	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C106	1-126-157-11	ELECT	10uF	20%	16V
C107	1-163-135-00	CERAMIC CHIP	560PF	5%	50V
C108	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C109	1-163-087-00	CERAMIC CHIP	4PF		50V
C110	1-124-584-00	ELECT	100uF	20%	10V
C111	1-126-160-11	ELECT	1uF	20%	50V
C112	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C113	1-124-257-00	ELECT	2.2uF	20%	50V
C114	1-126-157-11	ELECT	10uF	20%	16V
C115	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C116	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C117	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C118	1-126-157-11	ELECT	10uF	20%	16V
C119	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C120	1-124-259-11	ELECT	4.7uF	20%	50V
C121	1-126-153-11	ELECT	22uF	20%	6.3V
C130	1-124-465-00	ELECT	0.47uF	20%	50V
C131	1-162-625-11	CERAMIC CHIP	0.0047uF	5%	50V
C132	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C133	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C134	1-163-135-00	CERAMIC CHIP	560PF	5%	50V
C135	1-163-018-00	CERAMIC CHIP	0.0056uF	5%	50V
C136	1-126-157-11	ELECT	10uF	20%	16V
C137	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C138	1-162-638-11	CERAMIC CHIP	1uF		16V
C139	1-124-584-00	ELECT	100uF	20%	10V
C140	1-124-584-00	ELECT	100uF	20%	10V
C141	1-124-635-00	ELECT	220uF	20%	6.3V
C142	1-126-154-11	ELECT	47uF	20%	6.3V
C143	1-126-941-11	ELECT	470uF	20%	6.3V
C144	1-126-154-11	ELECT	47uF	20%	6.3V
C145	1-162-638-11	CERAMIC CHIP	1uF		16V
C146	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C147	1-126-157-11	ELECT	10uF	20%	16V
C148	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C149	1-126-157-11	ELECT	10uF	20%	16V
C150	1-163-007-11	CERAMIC CHIP	680PF	10%	50V
C151	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C152	1-124-635-00	ELECT	220uF	20%	6.3V
C153	1-164-157-11	CERAMIC CHIP	0.068uF	10%	25V
C154	1-162-638-11	CERAMIC CHIP	1uF		16V
C155	1-163-205-00	CERAMIC CHIP	0.001uF	5%	50V
C156	1-126-157-11	ELECT	10uF	20%	16V
C157	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C158	1-162-638-11	CERAMIC CHIP	1uF		16V
C159	1-163-020-00	CERAMIC CHIP	0.0082uF	10%	50V
C160	1-106-343-00	MYLAR	1000PF	5%	200V
C161	1-126-157-11	ELECT	10uF	20%	16V
C162	1-163-019-00	CERAMIC CHIP	0.0068uF	10%	50V
C163	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C164	1-162-638-11	CERAMIC CHIP	1uF		16V
C165	1-126-157-11	ELECT	10uF	20%	16V
C166	1-124-472-11	ELECT	470uF	20%	10V
C167	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C168	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C169	1-125-691-11	CAPACITOR	0.022F	0	5.5V
C170	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C171	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C172	1-124-898-11	ELECT	4700uF	20%	16V
C173	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C174	1-163-059-91	CERAMIC CHIP	0.01uF	10%	50V
C175	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C177	1-124-584-00	ELECT	100uF	20%	10V
C178	1-126-154-11	ELECT	47uF	20%	6.3V
C179	1-163-059-91	CERAMIC CHIP	0.01uF	10%	50V
C180	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C181	1-163-059-91	CERAMIC CHIP	0.01uF	10%	50V
C183	1-163-059-91	CERAMIC CHIP	0.01uF	10%	50V

Ref. No.	Part No.	Description			Remark
C184	1-163-059-91	CERAMIC CHIP	0.01uF	10%	50V
C185	1-163-059-91	CERAMIC CHIP	0.01uF	10%	50V
C186	1-163-059-91	CERAMIC CHIP	0.01uF	10%	50V
C187	1-163-059-91	CERAMIC CHIP	0.01uF	10%	50V
C188	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C189	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C190	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C191	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C192	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C193	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C194	1-124-635-00	ELECT	220uF	20%	6.3V
C195	1-126-154-11	ELECT	47uF	20%	6.3V
C196	1-124-257-00	ELECT	2.2uF	20%	50V
C197	1-126-157-11	ELECT	10uF	20%	16V
C198	1-124-257-00	ELECT	2.2uF	20%	50V
C199	1-126-154-11	ELECT	47uF	20%	6.3V
C200	1-124-257-00	ELECT	2.2uF	20%	50V
C201	1-126-154-11	ELECT	47uF	20%	6.3V
C202	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C203	1-124-584-00	ELECT	100uF	20%	10V
C204	1-124-257-00	ELECT	2.2uF	20%	50V
C205	1-162-625-11	CERAMIC CHIP	0.0047uF	5%	50V
C206	1-163-081-00	CERAMIC CHIP	0.22uF		25V
C207	1-126-154-11	ELECT	47uF	20%	6.3V
		< CONNECTOR >			
CN101	1-506-472-11	PIN, CONNECTOR 7P			
CN102	1-506-467-11	PIN, CONNECTOR 2P			
CN103	1-564-002-11	PIN, CONNECTOR 3P			
CN104	1-506-467-11	PIN, CONNECTOR 2P			
* CN105	1-564-005-11	PIN, CONNECTOR 6P			
CN106	1-506-469-11	PIN, CONNECTOR 4P			
CN107	1-563-598-11	CONNECTOR, FLEXIBLE 21P			
		< DIODE >			
D101	8-719-914-42	DIODE DA204K			
D102	8-719-914-42	DIODE DA204K			
D104	8-719-914-42	DIODE DA204K			
D105	8-719-914-43	DIODE DAN202K			
D106	8-719-820-05	DIODE 1SS181			
D107	8-719-820-05	DIODE 1SS181			
D108	8-719-938-78	DIODE SB10-05PCP			
D109	8-719-820-05	DIODE 1SS181			
D110	8-719-914-43	DIODE DAN202K			
D111	8-719-914-43	DIODE DAN202K			
D112	8-719-914-43	DIODE DAN202K			
D113	8-719-914-43	DIODE DAN202K			
D114	8-719-914-43	DIODE DAN202K			
D115	8-719-914-43	DIODE DAN202K			
D116	8-719-045-99	DIODE RD2.2M-T1B			
D117	8-719-914-42	DIODE DA204K			
D118	8-719-019-00	DIODE U1GC44			

Ref. No.	Part No.	Description	Remark
D119	8-719-019-00	DIODE U1GC44	
D120	8-719-914-43	DIODE DAN202K	
D121	8-719-914-43	DIODE DAN202K	
		< IC >	
IC101	8-759-100-96	IC UPC4558G2	
IC102	8-759-100-96	IC UPC4558G2	
IC103	8-759-821-33	IC LA6393M	
IC104	8-759-230-04	IC TA7628HP	
IC105	8-759-143-54	IC UPC1330HA	
IC106	8-759-390-48	IC UPC2406AHF	
IC107	8-759-008-67	IC MC14066BF	
IC108	8-759-008-67	IC MC14066BF	
IC109	8-759-188-57	IC UPD75308GF-K63-3B9	
IC110	8-759-801-12	IC LA5523	
IC111	8-759-232-16	IC TC74HC14AF-TP1	
IC112	8-759-008-67	IC MC14066BF	
IC113	8-759-209-69	IC TC4S11F	
		< JACK >	
J102	1-568-727-31	JACK, DC (DC IN 9V)	
J103	1-566-891-21	JACK (EARPHONE)	
		< CONNECTOR >	
J104	1-750-568-11	SOCKET, CONNECTOR	
		< JUMPER RESISTOR >	
JP1	1-216-296-00	METAL CHIP 0 5% 1/8W	
JP2	1-216-296-00	METAL CHIP 0 5% 1/8W	
JP3	1-216-296-00	METAL CHIP 0 5% 1/8W	
JP4	1-216-296-00	METAL CHIP 0 5% 1/8W	
		< TRANSISTOR >	
Q101	8-729-112-97	TRANSISTOR FA1L4M-L31	
Q102	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q103	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q104	8-729-112-97	TRANSISTOR FA1L4M-L31	
Q107	8-729-800-37	TRANSISTOR 2SD1048-X7	
Q108	8-729-901-46	TRANSISTOR DTA114YK	
Q109	8-729-901-46	TRANSISTOR DTA114YK	
Q110	8-729-901-46	TRANSISTOR DTA114YK	
Q111	8-729-901-46	TRANSISTOR DTA114YK	
Q112	8-729-800-37	TRANSISTOR 2SD1048-X7	
Q113	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q114	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q115	8-729-901-46	TRANSISTOR DTA114YK	
Q116	8-729-900-52	TRANSISTOR DTC114YK	
Q117	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q118	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q119	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q120	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q121	8-729-101-07	TRANSISTOR 2SB798-DL	

MAIN

Ref. No.	Part No.	Description			Remark
Q122	8-729-120-28	TRANSISTOR	2SC1623-L5L6		
Q123	8-729-900-53	TRANSISTOR	DTC114EK		
Q124	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q125	8-729-101-07	TRANSISTOR	2SB798-DL		
Q126	8-729-901-46	TRANSISTOR	DTA114YK		
Q127	8-729-900-53	TRANSISTOR	DTC114EK		
Q128	8-729-901-46	TRANSISTOR	DTA114YK		
Q129	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q130	8-729-901-46	TRANSISTOR	DTA114YK		
Q131	8-729-101-07	TRANSISTOR	2SB798-DL		
Q132	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q133	8-729-101-07	TRANSISTOR	2SB798-DL		
Q134	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q135	8-729-900-52	TRANSISTOR	DTC114YK		
		< RESISTOR >			
R101	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R102	1-216-073-00	METAL CHIP	10K	5%	1/10W
R103	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R104	1-216-117-00	METAL CHIP	680K	5%	1/10W
R105	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R106	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R107	1-216-099-00	METAL CHIP	120K	5%	1/10W
R108	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R109	1-216-025-00	METAL GLAZE	100	5%	1/10W
R110	1-216-073-00	METAL CHIP	10K	5%	1/10W
R111	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R112	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R113	1-216-109-00	METAL CHIP	330K	5%	1/10W
R114	1-216-117-00	METAL CHIP	680K	5%	1/10W
R115	1-216-117-00	METAL CHIP	680K	5%	1/10W
R116	1-216-117-00	METAL CHIP	680K	5%	1/10W
R117	1-216-117-00	METAL CHIP	680K	5%	1/10W
R118	1-216-111-00	METAL GLAZE	390K	5%	1/10W
R119	1-216-107-00	METAL CHIP	270K	5%	1/10W
R120	1-216-117-00	METAL CHIP	680K	5%	1/10W
R121	1-216-206-00	METAL GLAZE	2.2K	5%	1/8W
R122	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R123	1-216-093-00	METAL CHIP	68K	5%	1/10W
R124	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R125	1-216-025-00	METAL GLAZE	100	5%	1/10W
R126	1-216-073-00	METAL CHIP	10K	5%	1/10W
R127	1-216-077-00	METAL CHIP	15K	5%	1/10W
R128	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R129	1-216-077-00	METAL CHIP	15K	5%	1/10W
R130	1-216-091-00	METAL CHIP	56K	5%	1/10W
R131	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R132	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R133	1-216-039-00	METAL CHIP	390	5%	1/10W
R134	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R135	1-216-097-00	METAL GLAZE	100K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R136	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R137	1-216-111-00	METAL GLAZE	390K	5%	1/10W
R138	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R139	1-216-041-00	METAL CHIP	470	5%	1/10W
R140	1-216-027-00	METAL CHIP	120	5%	1/10W
R141	1-216-109-00	METAL CHIP	330K	5%	1/10W
R142	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R143	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R144	1-216-037-00	METAL CHIP	330	5%	1/10W
R145	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R146	1-216-105-00	METAL GLAZE	220K	5%	1/10W
R147	1-216-085-00	METAL CHIP	33K	5%	1/10W
R148	1-216-029-00	METAL CHIP	150	5%	1/10W
R149	1-216-084-00	METAL CHIP	30K	5%	1/10W
R150	1-216-073-00	METAL CHIP	10K	5%	1/10W
R151	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R152	1-216-184-00	METAL GLAZE	270	5%	1/8W
R153	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R154	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R155	1-216-073-00	METAL CHIP	10K	5%	1/10W
R156	1-216-047-00	METAL GLAZE	820	5%	1/10W
R157	1-216-047-00	METAL GLAZE	820	5%	1/10W
R158	1-216-109-00	METAL CHIP	330K	5%	1/10W
R159	1-216-037-00	METAL CHIP	330	5%	1/10W
R160	1-216-085-00	METAL CHIP	33K	5%	1/10W
R161	1-216-188-00	METAL GLAZE	390	5%	1/8W
R162	1-216-202-00	METAL GLAZE	1.5K	5%	1/8W
R163	1-216-085-00	METAL CHIP	33K	5%	1/10W
R164	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R165	1-216-017-00	METAL GLAZE	47	5%	1/10W
R166	1-216-017-00	METAL GLAZE	47	5%	1/10W
R167	1-216-152-11	METAL GLAZE	12	5%	1/8W
R168	1-216-073-00	METAL CHIP	10K	5%	1/10W
R169	1-216-073-00	METAL CHIP	10K	5%	1/10W
R170	1-216-073-00	METAL CHIP	10K	5%	1/10W
R171	1-216-083-00	METAL CHIP	27K	5%	1/10W
R172	1-216-081-00	METAL CHIP	22K	5%	1/10W
R173	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R174	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R175	1-216-080-00	METAL CHIP	20K	5%	1/10W
R176	1-216-238-91	METAL GLAZE	47K	5%	1/8W
R177	1-216-238-91	METAL GLAZE	47K	5%	1/8W
R178	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R179	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R180	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R181	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R182	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R183	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R184	1-216-238-91	METAL GLAZE	47K	5%	1/8W
R185	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R186	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R187	1-216-089-91	METAL GLAZE	47K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R188	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R189	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R190	1-216-238-91	METAL GLAZE	47K	5%	1/8W
R191	1-216-073-00	METAL CHIP	10K	5%	1/10W
R192	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R193	1-216-254-00	METAL GLAZE	220K	5%	1/8W
R194	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R195	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R196	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R197	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R198	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R200	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R201	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R202	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R203	1-216-230-00	METAL GLAZE	22K	5%	1/8W
R204	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R205	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R206	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R207	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R208	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R209	1-216-089-91	METAL GLAZE	47K	5%	1/10W
⚠R210	1-215-907-11	METAL OXIDE	22	5%	3W F
R211	1-216-041-00	METAL CHIP	470	5%	1/10W
R212	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R213	1-216-190-00	METAL GLAZE	470	5%	1/8W
R214	1-216-190-00	METAL GLAZE	470	5%	1/8W
R215	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R216	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R217	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R218	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R219	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R220	1-216-198-00	METAL GLAZE	1K	5%	1/8W
R221	1-216-198-00	METAL GLAZE	1K	5%	1/8W
R222	1-216-041-00	METAL CHIP	470	5%	1/10W
R223	1-216-073-00	METAL CHIP	10K	5%	1/10W
R224	1-216-072-00	METAL CHIP	9.1K	5%	1/10W
R225	1-216-085-00	METAL CHIP	33K	5%	1/10W
R226	1-216-039-00	METAL CHIP	390	5%	1/10W
R227	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R228	1-216-222-00	METAL GLAZE	10K	5%	1/8W
R229	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R230	1-216-045-00	METAL CHIP	680	5%	1/10W
R231	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R232	1-216-041-00	METAL CHIP	470	5%	1/10W
R233	1-216-081-00	METAL CHIP	22K	5%	1/10W
R235	1-216-073-00	METAL CHIP	10K	5%	1/10W
R236	1-216-222-00	METAL GLAZE	10K	5%	1/8W
R237	1-216-073-00	METAL CHIP	10K	5%	1/10W
R238	1-216-214-00	METAL GLAZE	4.7K	5%	1/8W
R239	1-216-089-91	METAL GLAZE	47K	5%	1/10W

Ref. No.	Part No.	Description	Remark
		< VARIABLE RESISTOR >	
RV101	1-230-564-11	RES, VAR, SLIDE 10K (TONE)	
RV102	1-230-564-11	RES, VAR, SLIDE 10K (VOLUME)	
RV103	1-237-364-11	RES, VAR, SLIDE 100K (SPEED)	
RV104	1-230-496-11	RES, ADJ, CARBON 10K (1.2cm/s)	
RV105	1-230-496-11	RES, ADJ, CARBON 10K (2.4cm/s)	
RV106	1-230-497-11	RES, ADJ, CARBON 20K	(VARIABLE TAPE SPEED)
		< SWITCH >	
S101	1-572-251-11	SWITCH, SLIDE (POWER)	
S102	1-572-251-11	SWITCH, SLIDE (SPEED CONTROL)	
S103	1-572-251-11	SWITCH, SLIDE (SPEAKER)	
S104	1-554-303-21	SWITCH, TACTILE (STOP)	
S105	1-554-303-21	SWITCH, TACTILE (LISTEN)	
S106	1-554-303-21	SWITCH, TACTILE (REW ●)	
S107	1-554-303-21	SWITCH, TACTILE (FF)	
S109	1-554-303-21	SWITCH, TACTILE (AUTO STOP)	
S110	1-554-303-21	SWITCH, TACTILE (● ERASE)	
S111	1-554-303-21	SWITCH, TACTILE (RESET)	
S112	1-570-361-11	SWITCH, SLIDE (DIGITAL CORD)	(REVERSE TIME)
S113	1-572-251-11	SWITCH, SLIDE (TAPE SPEED)	
		< TRANSFORMER >	
T101	1-433-251-00	TRANSFORMER, BIAS OSCILLATOR	
		< THERMISTOR >	
THP101	1-810-371-11	THERMISTOR, POSITIVE	
		< VIBRATOR >	
X101	1-577-273-11	OSCILLATOR, CERAMIC (4.19MHz)	
**********			
*	1-650-105-11	SENSOR BOARD	
		**********	
		< PHOTO INTERRUPTER >	
PH901	8-719-939-23	PHOTO INTERRUPTER GP-2S09-C	
**********			
		MISCELLANEOUSE	
		**********	
D901	8-719-984-02	LED BR4371F (REC/ERASE)	
D902	8-719-984-02	LED BR4371F (LTR INDEX)	
HE901	1-543-899-11	HEAD, MAGNETIC (ERASE)	
HRP901	1-543-725-11	HEAD (RECORD/PLAYBACK)	
M901	1-541-332-11	MOTOR (NBL-32R) (FWD MOTOR)	
M902	X-3367-201-1	MOTOR (F/R) ASSY (F/R MOTOR)	
ND901	1-810-090-11	DISPLAY PANEL, LIQUID CRYSTAL	
PM901	1-454-604-11	SOLENOID, PLUNGER (FWD)	

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

Ref. No.	Part No.	Description	Remark
PM902	1-454-662-11	SOLENOID, PLUNGER (BRAKE)	
S901	1-554-385-00	SWITCH, MICRO (TAPE DET)	
SP901	1-544-282-11	SPEAKER	

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ACCESSORIES & PACKING MATERIALS
****

⚠	1-465-393-11	ADAPTOR, AC	
	3-859-341-11	MANUAL, INSTRUCTION (ENGLISH)	
*	3-922-452-01	CUSHION (L)	
*	3-922-453-01	CUSHION (R)	
	X-2184-302-1	CRADLE	

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****
HARDWARE LIST
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#1	7-621-255-15	SCREW +P 2X3
#2	7-685-851-04	SCREW +BVTT 2X4 (S)
#3	7-621-257-55	SCREW +P 2.3X8
#4	7-627-552-18	SCREW,PRECISION +P 1.7X1.6
#5	7-627-552-48	SCREW,PRECISION +P 1.7X4
#6	7-627-552-97	SCREW,PRECISION +P 1.7X6
#7	7-682-946-09	SCREW +PSW 3X5
#8	7-685-104-19	SCREW +P 2X6 TYPE2 NON-SLIT
#9	7-685-133-19	SCREW +P 2.6X6 TYPE2
#10	7-685-134-19	SCREW +P 2.6X8 TYPE2 NON-SLIT
#11	7-685-135-19	SCREW +P 2.6X10 TYPE2 NON-SLIT
#12	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S
#13	7-685-648-79	SCREW +BVTP 3X12 TYPE2 N-S
#14	7-688-001-03	W 2, SMALL

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Replace only with part number specified.

97A027011-1
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Published by Quality Engineering Dept. (Shibaura)