SLV-640HF/733HF/733HFCS/733HFMX/733HFPA/740HF/740HFPX /741HF/780HF/781HF/940HF/940HFCS/940HFMX/940HFPX

RMT-V154C/V158/V161/V162/V164B

SERVICE MANUAL

SLV-640HF/740HF/740HFPX/741HF/780HF/781HF/940HF/940HFPX

US Model

Canadian Model

SLV-640HF/740HF/741HF/780HF/940HF

Mexican Model

SLV-733HFMX/940HFMX

Panama Model

SLV-733HFPA

Chilean Model

SLV-733HFCS/940HFCS

Tourist Model

SLV-733HF

Photo: SLV-940HF/RMT-V158

Remote commander is available as a unit.
See page 5-1 for repair parts.

VHS Hi-Fi VCR*Plus+*

H MECHANISM

• Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT IV(H MECHA) for MECHANICAL ADJUSTMENTS. (9-973-623-11)

SPECIFICATIONS

System

Format
VHS NTSC standard

Video recording system
Rotary two-head helical scanning FM system

Video signal
NTSC color, EIA standards

Tape speed
SP: 33.35 mm/s (1 3/8 inches/s)
EP: 11.11 mm/s (7/16 inches/s)
LP: 16.67 mm/s (11/16 inches/s), playback only

Maximum recording/playback time
8 hrs. in EP mode (with T-160 tape)

Fast-forward and rewind time
Approx. 3 min (with T-120 tape)

Tuner section

Channel coverage
VHF 2 to 13
UHF 14 to 69
CATV A-8 to A-1, A to W, W+1 to W+84

Antenna
75-ohm antenna terminal for VHF/UHF

Inputs and outputs

LINE IN 1 and 2
VIDEO IN, phono jack (1 each)
Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO IN, phono jack (2 each)
Input level: −7.5 dBs (0 dBs = 0.775 Vrms)
Input impedance: more than 47 kilohms

LINE OUT
VIDEO OUT, phono jack (1)
Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO OUT, phono jack (2)
Standard output: −7.5 dBs
Load impedance: 47 kilohms
Output impedance: less than 10 kilohms

CONTROL S IN
Mini jack (1)

CABLE BOX CONTROL (CONTROL S OUT)
Mini jack (plug in power) (1)

Timer section

Clock
Quartz locked

Timer indication
12-hour cycle

Timer setting
Only for recording 8 programs in one month at max.

Power back-up
Built-in self-charging capacitor
Back-up duration:
up to three hours at one time (*for SLV-940HF/940HF PX*)
up to one hour at one time (*for SLV-940HF CS/940HF MX*)

General

Power requirements
120 V AC, 60 Hz
(*for SLV-640HF/940HF MX*)
110 V AC to 240 V AC, 50/60 Hz
(*for SLV-940HF CS/940HF PX*)

Power consumption
27 W (max.) (*for SLV-940HF*)
24 W (max.) (*for SLV-940HF CS/940HF MX/940HF PX*)

Operating temperature
5°C to 40°C (41°F to 104°F)

— continued on next page —

MICROFILM

VIDEO CASSETTE RECORDER

SONY®

Storage temperature
-20°C to 60°C (–4°F to 140°F)

Dimensions
Approx. 430 × 103 × 323 mm (w/h/d)
Approx. (17 × 4 × 12 ¾ inches) including projecting parts and controls

Weight
Approx. 5.2 kg (11 lb 7 oz)

Supplied accessories

Remote commander (1)
Size AA (R6) batteries (2)
75-ohm coaxial cable with F-type connectors (1)
AC power cord (1)
Audio/video cable (3 phono to 3 phono) (1)
Cable Mouse (cable box controller) (1)
Plug adaptor (1)
(SLV-940HF CS/940HF PX only)

Design and specifications are subject to change without notice.

The remote commander used for each model is as follows.

- RMT-V154C : SLV-640HF
- RMT-V162 : SLV-740UF/740HFPX/741HF
- RMT-V164B : SLV-733HF/733HPCS/733HFMX/733HFPA
- RMT-V161 : SLV-780HF/781HF
- RMT-V158 : SLV-940HF/940HPCS/940HFMX/940HFPX

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
6. Check the B+ voltage to see it is at the values specified.
7. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

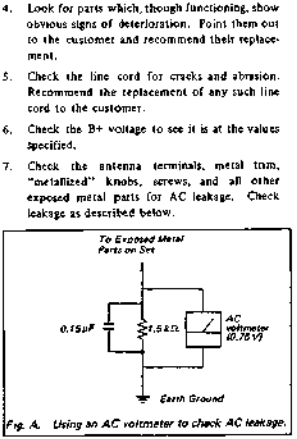


Fig. A. Using an AC voltmeter to check AC leakage.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microamperes). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

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.

TABLE OF CONTENTS

SERVICE NOTE

1. REMOVAL OF DRUM ASSEMBLY

1) Remove the screw ① (P3×8).
2) Remove the shaft ground assembly ②.
3) Remove three screws ③ (P3×6).
4) Remove the drum assembly④.

Note : When attaching the drum assembly, be careful not to blur the contacting surface with fingerprint or like.

When attaching the shaft ground assembly, be careful not apply force to the spring section of it.

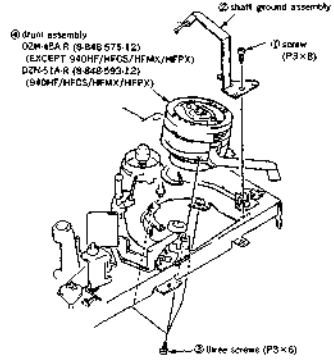


Fig.1.

2. UPPER DRUM REPLACEMENT

2-1. Removal of Upper Drum

1) Remove the screw ① (P3×8).
2) Remove the shaft ground assembly ②.
3) Completely remove the rotary upper drum board and desolder the soldering indicated by the arrows. (16 points)
4) Remove the screws ③ (PSW 3×8) and take out the rotary upper drum assembly in the direction of arrow. (See Fig. 3.)

If it is difficult, remove by shaking the rotary upper drum gradually.

Note : If the drum can not be removed,check wheather the solders have been removed or not again.

2-2. Mounting Upper Drum

1) Mount the rotary upper drum assembly by aligning marked ⇔ with marked ⇒ of rotary transformer board (lower drum) so that the screw holes of both upper and lower drums match.

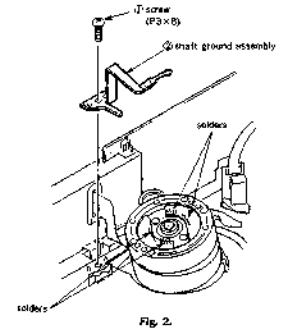


Fig. 2.

Note : When inserting the rotary upper drum assembly into the lower drum, be careful not to blur the contacting surface with fingerprint or like.

2) If it is difficult, mount the upper drum by shaking it gradually.

Note : Be careful not to damage the head.
Make sure that the upper drum is tightly inserted.

3) Tighten two screws ③ (PSW3×8).

Note : Temporary tighten two screws. After making sure that upper drum is tightly inserted, tighten the screws.

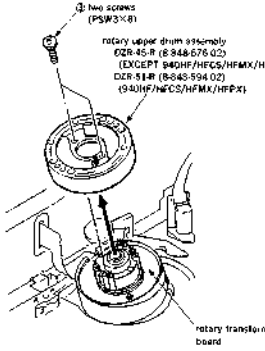


Fig. 3.

4) Solder 16 points on the rotary upper drum board (See Fig. 2.)
5) Fix the shaft ground assembly ② using the screw ① (P3 - 8) so that the protrusion of the shaft ground assembly end contacts the center of the drum shaft. (See Fig. 2.)
Note: When attaching the shaft ground assembly, be careful not to apply force to the spring section of it.
6) Tighten the screw ① (P3×8).

3. PERIODIC CHECK AND REPLACEMENT

In order to obtain the best performance from this unit and make full use of its capabilities, and to extend the life of the unit and tapes, it is recommended that the following periodic checks and maintenance be performed.

- The following must be done *after every repair* regardless of how many hours the user has operated the machine.

3-1. CLEANING OF ROTATING HEAD DISK ASSEMBLY

1) Press a chamois cloth (Jig Ref. No. J-9) which has been dipped in cleaning fluid (Jig Ref. No. J-8) lightly against the rotating drum assembly, then do the cleaning by slowly rotating the rotating head disk by hand. (Never try to clean by using the motor to turn it.)
2) Never try to clean by moving the chamois cloth at a vertical) angle to the head tip. There is a very great danger of damaging the head tip if this is done.

3-2. CLEANING OF THE TAPE MOVEMENT SYSTEM

1) Clean the surfaces which the tape contacts during its movement (tape guide, drum assembly surface, capstan, pinch roller, etc.) with a chamois cloth that has been dipped in cleaning fluid.

3-3. CLEANING THE DRIVE SYSTEM

1) Clean the driving parts with a cloth that been dipped in cleaning fluid.

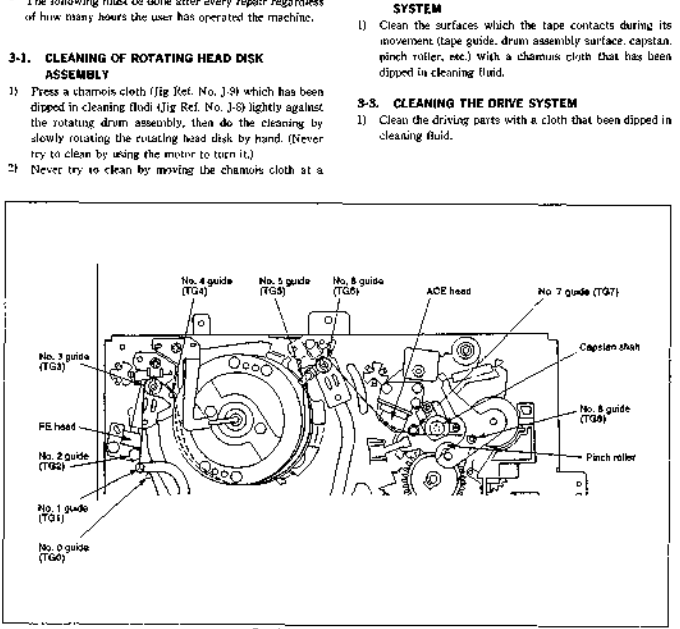


Fig. 4. Parts requiring cleaning

SECTION 1
GENERAL

This section is extracted from SLV-940HF instruction manual.

Welcome!

Thank you for purchasing the Sony Video Cassette Recorder (VCR). Here are some of the features you'll enjoy with your VCR:

- Easy Set Up feature that sets up the clock, cable box control and preset channels easily using the EASY SET UP button
- Auto Clock™ Set feature that sets and adjusts the time and date automatically
- Cable box control that allows your VCR to control channel selection on most brands of cable boxes
- VCR Plus+* system that lets you quickly and easily preset the VCR to record programs
- Adaptive Picture Control (APC) that automatically optimizes recording and playback performance
- Remote commander that features multi-brand TV control
- Flying erase head that allows clean, precise editing with less noise

* VCR Plus+ and PlusCode are trademarks of Gemstar Development Corporation. VCR Plus+ system is manufactured under license from Gemstar Development Corporation.

Getting Started

Step 1: Unpacking

Check that you have the following items:

- Remote commander

- Size AA (R6) batteries

- Audio/video cable (3-phono to 3-phono)

- Cable Mouse (cable box controller)

- 75-ohm coaxial cable with F-type connectors

- AC power cord (SLV-940HF/840HF MX) (SLV-940HF CS/940HF PX)

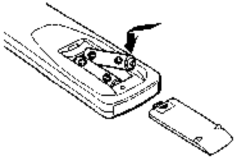
- Plug adapter (SLV-940HF CS/940HF PX only)

Step 2: Setting up the remote commander

Notes
- With normal use, the batteries should last for approximately three to six months.
- If you do not use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery with an old one.
- Do not use different types of batteries.

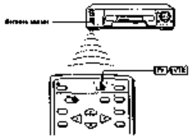
Inserting the batteries

Insert two size AA (R6) batteries by matching the + and – on the batteries to the diagram inside the battery compartment.



Using the remote commander

You can use this remote commander to operate this VCR and a Sony TV. To operate the VCR, set the COMMAND MODE switch on the remote commander to the VCR to VTR3. To operate the TV, set the switch to any of other positions. The POWER, VOL +/–, CH +/–, TV/VTR, channel number, ENTER, DISPLAY and AUDIO MONITOR buttons on the remote commander can be used to operate your TV.



To operate	Set TV / VTR to
the VCR	VTR and point at the remote sensor on the VCR
a Sony TV	TV and point at the remote sensor on the TV

Notes
- If the TV uses a different remote control system from the one programmed to work with the VCR, you cannot control your TV with the remote commander.
- If you enter a new code number, the code number previously entered will be erased.
- When you replace the batteries of the remote commander, the code number automatically resets to 1 (Sony). Reset the appropriate code number.

Controlling other TVs with the remote commander

The remote commander is preprogrammed to control non-Sony TVs. If your TV is listed in the table below, set the appropriate manufacturer's code number.

1 Set TV / VTR on the top of the remote commander to TV.
2 Press and hold down EXECUTE, and then enter your TV's code number(s) using the number buttons. Press the ENTER button. Then release EXECUTE.

Code numbers are listed below.
Now you can use the POWER, VOL +/–, CH +/– and TV/VTR buttons to control your TV. To operate the VCR, reset TV / VTR to VTR.

Code numbers of controllable TVs
If more than one code number is listed, try entering them one at a time until you find the one that works with your TV.

Manufacturer	Code number	Manufacturer	Code number
Sony	1	Philco	3, 4
Akai	4	Philips	5
AOC	4	Pioneer	16
Centurion	12	Portland	3
Coronado	3	Quasar	6, 18
Curtis-Mathes	12	Radio Shack	5, 14
Daytron	12	RCA	4, 10
Fisher	11	Sampo	12
General Electric	6, 10	Sanyo	11
Hitachi	2, 3	Scott	12
JC Penney	4, 12	Sears	7, 10, 11
JVC	9	Sharp	3, 5, 18
KMC	3	Sylvania	5, 12
Magnavox	3, 5, 12	Teknika	3, 8, 14
Marantz	4, 13	Toshiba	7
MGA/Mitsubishi	4, 12, 13, 17	Wards	3, 4, 12
NEC	4, 12	Yorx	12
Panasonic	6, 18	Zenith	15

Step 3: Hookups

Caution
Connections between the VCR's VHF/UHF connector and the antenna terminals of the TV receiver should be made only as shown in the following instructions. Failure to do so may result in operation that violates the regulations of the Federal Communications Commission regarding the use and operation of RF devices. Never connect the output of the VCR to an antenna or cable simultaneously (parallel antenna and VCR connections at the antenna terminals of your receiver).

Note to CATV system installer
This reminder is provided to call the CATV system installer's attention to Article 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

Selecting the best hookup option

Before you can use your VCR for the first time, you need to connect it to your TV and set it up to receive programs for viewing and recording. This section explains how to hook up and set up your VCR so that you can start enjoying it right away. There are, however, many types of TVs available and many ways in which your TV can be hooked up. For these reasons, this manual describes several ways your VCR can be connected.

To hook up your VCR so that it works best for you, first scan through the table below. Then use the accompanying diagrams and procedures on the following pages to set up your VCR.

If you have	Use	Refer to
TV that has audio/video inputs	Audio/video (A/V) hookup, then follow one of the hookups below	Page 9
Cable box that is compatible with the VCR's cable box control feature	Hookup 1	Page 10
No cable box or incompatible cable box with only a few scrambled channels	Hookup 2	Page 12
Antenna only, no cable TV	Hookup 3	Page 14
Incompatible cable box with many scrambled channels	Hookup 4	Page 16
Incompatible cable box, with only a few scrambled channels, using an A/B switch	Hookup 5	Page 18

After you've completed the connections, follow the instructions for setup including VCR Plus+ setup. During setup, if you need more details of the procedure described, page numbers are provided where you can find complete, step-by-step instructions.

After you've completed the setup, you're ready to use your VCR. Procedures differ depending on the hookup you used. For an overview, refer to "Quick Reference to Using the VCR" on the back cover.

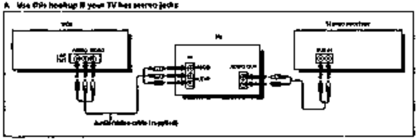
Before you get started
- Turn off the power to all equipment.
- Do not connect the AC power cords until all of the connections are completed.
- Be sure you make connections firmly. Loose connections may cause picture distortion.
- If your TV doesn't match any of the examples provided, see your nearest Sony dealer or qualified technician.

Audio/video (A/V) hookup

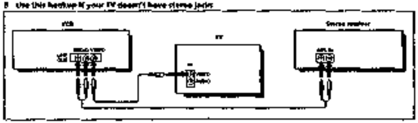
If your TV has audio/video (A/V) input jacks, you will get a better picture and sound if you hook up your VCR using these connections. In addition, for a true "home theater" experience, you should connect the audio outputs of your VCR or TV to your stereo system. If your TV doesn't have A/V inputs, see the following pages for antenna or cable hookups.

If you're planning to use your VCR only to play back pictures and movies, you're finished setting up the VCR after you've made these connections. If you want to record off-air or off your cable TV system, complete these connections first, and then go to the following pages for antenna or cable hookups.

A Use this hookup if your TV has stereo jacks



B Use this hookup if your TV doesn't have stereo jacks



A/V hookup: VCR setup

After you've connected your TV and completed antenna or cable hookup, use the following procedure to set up the VCR.

For details, see page [illegible].

Note
[illegible]

Hookup 1

Using cable box control

Recommended use

This hookup is recommended for most cable systems with cable boxes. It allows the VCR's cable box control feature to control the channel on the cable box, simplifying the recording process. You should use this hookup if you have a cable box, especially if your cable system scrambles all or most channels. A list of compatible cable boxes is on page 29.

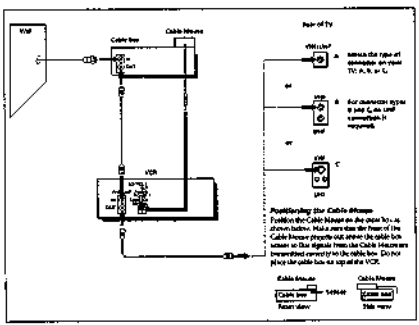
What you can and can't do with this hookup

When you can do:

- Record any channel using the VCR's cable box control feature to select channels on the cable box

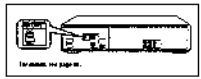
When you can't do:

- Record with the cable box turned off
- Record one channel while watching another channel



Hookup 1: VCR setup

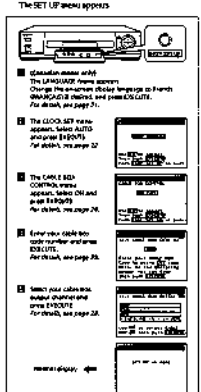
1 Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel.
If you made A/V connections (from page 8), you can skip this step.



For details, see page 28.

2 Turn on your cable box.

3 Press EASY SET UP on the VCR.
The SET UP menu appears.

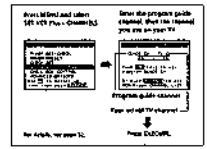


If your cable box is not compatible, check with your cable company to see if they can provide a compatible cable box. If not, use Hookup 2 if you have only a few scrambled channels or Hookup 4 if you have many scrambled channels.

Hookup 1: VCR Plus+ channel setup

1 Find the VCR Plus+ Channel Listing in your program guide. For details on the VCR Plus+ Channel Listing, see page 24.

2 If the channels in the program guide are different from the channels that you actually receive on your TV, set the channels that are different as follows.



Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn on the VCR. After that, whenever you turn off the VCR, it checks if the clock displays the correct time. If not, it adjusts the clock automatically. Make sure to leave the cable box on. The VCR sets the clock by picking up a time signal that's provided by some TV channels. With the automatic clock setting feature, you don't have to set the clock or even adjust to Daylight Saving Time.
If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see pages 32–34.

You are now ready to use your VCR

A Quick reference of operations is provided on the back cover to help you quickly enjoy the basic functions. These procedures differ slightly depending on the hookup used. Make a note of which hookup you used (Hookup 1 is set up), so you can always follow the correct instructions.

Getting Started

1-4

Hookup 2

No cable box
or
Incompatible cable box with only a few scrambled channels

Recommended use

Use this hookup if you do not have a cable box. Also use this hookup if your cable company cannot supply a cable box that is compatible with the VCR's cable box control feature, and your cable system scrambles only a few channels.

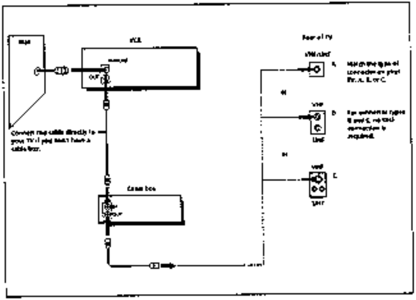
What you can and can't do with this hookup

What you can do

- Record any unscrambled channel by selecting the channel on the VCR

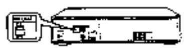
What you can't do

- Record scrambled channels that require a cable box



Hookup 2: VCR setup

1 Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel.
If you made A/V connections (from page 9), you can skip this step.



For details, see page 9.

2 Press EASY SET UP on the VCR.
The SET UP menu appears.

1 (Canadian model only)
The LANGUAGE menu appears.
Change the on-screen display language to French (FRANÇAIS) if desired, and press EXECUTE.
For details, see page 21.

2 The CLOCK SET menu appears. Select AUTO and press EXECUTE.
For details, see page 22.

3 The CABLE BOX CONTROL menu appears. Select OFF and press EXECUTE.
For details, see page 28.

4 The TUNER PRESET menu appears. Set ANTENNA/CABLE to CABLE and press EXECUTE.
For details, see page 25.

5 The AUTO PRESET runs.
For details, see page 25.

normal display

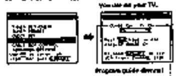
Hookup 2: VCR Plus+ channel setup

1 Find the VCR Plus+ Channel Listing in your program guide. For details on the VCR Plus+ Channel Listing, see page 31.

2 If the channels in the program guide are different from the channels that you actually use on your TV, set the channels that are different as follows.

Press MENU and select SET VCR Plus+ CHANNEL(S).

Enter the program guide channel, then the channel you use on your TV.



Program guide channel

Your actual TV channel

For details, see page 31.

Press EXECUTE.

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks if the clock displays the current time. If not, it adjusts the clock automatically. Make sure to leave the cable box on.
The VCR sets the clock by picking up a time signal that's provided by some TV channels. With the automatic clock setting feature you don't have to set the clock or even adjust to Daylight Saving Time.
If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see pages 22–24.

You are now ready to use your VCR

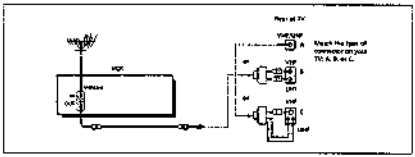
A Quick reference to operations is provided on the back cover to help you quickly enjoy the basic functions. These procedures differ slightly depending on the hookup used. Make a note of which hookup you used (Hookup 2) so that you can always follow the correct instructions.

Hookup 3

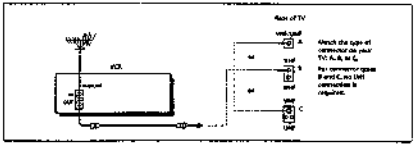
Make the following connections if you're using an antenna (if you don't have cable TV).

Antenna hookup

A Use this hookup if you're using:
- VHF/UHF antenna (you get channels 2–13 and channels 14 and higher)
- UHF-only antenna (you get channels 14 and higher)
- separate VHF and UHF antennas



B Use this hookup if you're using a VHF-only antenna (you get channels 2–13 only)

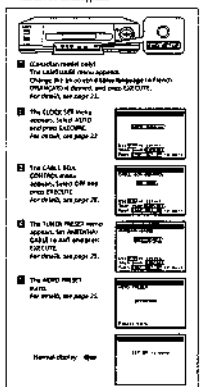


If you started connect your antenna cable to the VCR already
If your antenna cable is a flat cable (300-ohm twin lead cable), attach an external antenna connector (not supplied) so that you can connect the cable to the VHF/UHF IN connector. If you have separate cables for VHF and UHF antennas, you may use a U/V band mixer (not supplied). For details, see page 58.

Hookup 3: VCR setup

1 Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel.
If you made A/V connections (see page 9), you can skip this step.

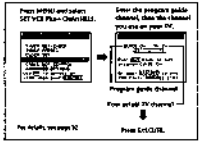
2 Press EASY SET UP on the VCR.
The SET UP menu appears.



Hookup 3: VCR Plus+ channel setup

1 Find the VCR Plus+ Channel Listing in your program guide. For details on the VCR Plus+ Channel Listing, see page 31.

2 If the channels in the program guide are different from the channels that you actually use on your TV, set the channels that are different as follows.



For details, see page 32

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks if the clock displays the correct time. If not, it adjusts the clock automatically. Make sure to leave the cable box on. The VCR sets the clock by picking up a time signal that's provided by some TV channels. With the automatic clock setting, before you don't have to set the clock or even adjust for Daylight Saving Time. If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see pages 22–24.

You are now ready to use your VCR

A Quick Reference to operations is provided on the back cover to help you quickly enjoy the basic functions. These procedures differ slightly depending on the hookup used. Make a note of which hookup you used (Hookup 3) so that you can always follow the correct instructions.

Hookup 4

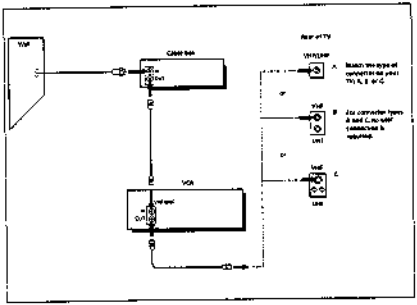
Incompatible cable box with many scrambled channels

Recommended use
Use this hookup if your cable company cannot supply a cable box that is compatible with the VCR's cable box control feature, and your cable system scrambles all, or most channels.

What you can and can't do with this hookup

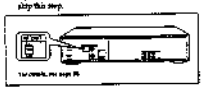
What you can do
- Record any channel by selecting the channel on the cable box

What you don't do
- Record with the cable box turned off
- Record one channel while watching another channel
- Record by selecting channels directly with the VCR



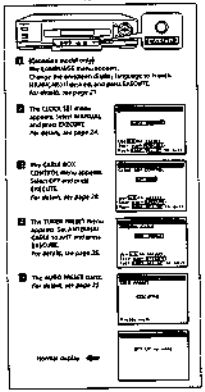
Hookup 4: VCR setup

1 Set the ZERO/UHF switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel.
If you made A/V connections (from page 9), you can skip this step.



2 Turn on your cable box.

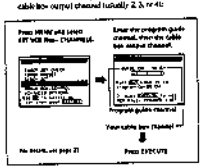
3 Press EASY SET UP on the VCR.
The SET UP menu appears.



Hookup 4: VCR Plus+ channel setup

1 Find the VCR Plus+ Channel Listing in your program guide. For details on the VCR Plus+ Channel Listing, see page 51.

2 Enter all the channels you want to record and the cable box output channel (usually 2 or 3).



Note
You have to set the channel manually on the cable box for each recording.

Automatic clock setting

Since the channels have to be selected manually on the cable box with this hookup, the Auto Clock Set feature will not function fully (page 23).
If you want to use the Auto Clock Set feature (when available), proceed as follows:

1 Tune the cable box to a channel that carries a time signal.

2 Leave the cable box on.

3 Turn on the Auto Clock Set feature.

4 Turn off the VCR.

You are now ready to use your VCR

A Quick reference to operations is provided on the back cover to help you quickly enjoy the basic functions. These procedures differ slightly depending on the hookup used. Make a note of which hookup you used (Hookup 1) so that you can always follow the correct instructions.

1-7

Hookup 5

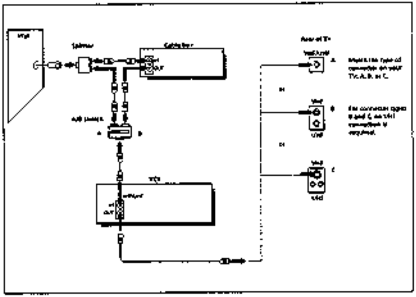
Incompatible cable box with only a few scrambled channels, using an A/B switch

Recommended use
By using an A/B switch (not supplied), this hookup allows you to record both scrambled and unscrambled channels conveniently. With the A/B switch set to position "A," you can record unscrambled channels by selecting channels directly with the VCR. You only use position "B" and the cable box to record a scrambled channel.

What you can and can't do with this hookup

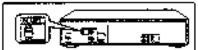
What you can do
- Record any unscrambled channel by selecting the channel on the VCR (the A/B switch is set to A)
- Record any scrambled channel by selecting the channel on the cable box (the A/B switch is set to B)

What you can't do
- Record one channel while watching another channel



Hookup 5: VCR setup

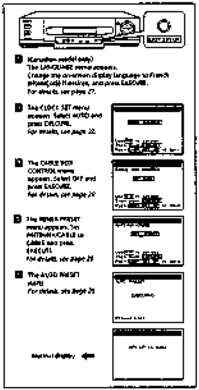
1 Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel.
If you made A/V connections (see page 9), you can skip this step.



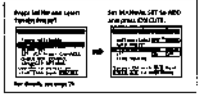
For details, see page 58.

2 Set the A/B switch to "A."

3 Press EASY SET UP on the VCR.
The SET UP menu appears.



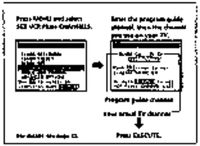
4 Tune the cable box output channel (usually 2, 3 or 4).



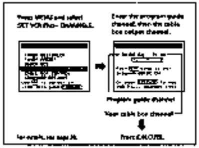
Hookup 5: VCR Plus+ channel setup

1 Find the VCR Plus+ Channel Listing in your program guide. For details on the VCR Plus+ Channel Listing, see page 31.

2 For unscrambled channels: If the channels in the program guide are different from the channels that you actually use on your TV, set the channels that are different as follows:



3 For scrambled channels, enter all the scrambled channels you want to record and the cable box output channel (usually 2, 3, or 4).



Hookup 5

Incompatible cable box with only a few scrambled channels, using an A/B switch (continued)

You are now ready to use your VCR

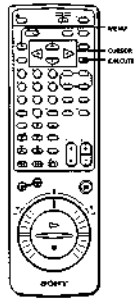
To record an unscrambled channel
1 Set the A/B switch to "A."
2 Select channels on the VCR.

To record a scrambled channel
1 Set the A/B switch to "B."
2 Select channels on the cable box (for details on the cable box, see page 32).

To watch TV
1 Turn off your VCR, or press the VCR/TV/VTR button until the VTR indicator in the display window goes off.
2 Set the A/B switch to "B."
3 Turn on your cable box.
4 Set the TV to the cable box output channel (usually 2, 3, or 4).
5 Set the cable box to the channel you want to watch.

Selecting a language

(Canadian model only)



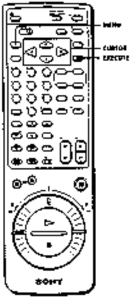
If you prefer French to English, you can change the on-screen display language.
When you set up your VCR for the first time, you can select the on-screen display language using the EASY SET UP button (pages 51, 53, 55, 57 and 59). You can also change the language using the menu.

1 **Press MENU.**
The main MENU appears on the TV screen.

2 **Press the CURSOR (↑/↓) buttons to move the cursor (▯) to LANGUAGE, then press EXECUTE.**
The LANGUAGE menu appears on the TV screen.

3 **Using the CURSOR (↑/↓) buttons, select ENGLISH or FRANÇAIS, then press EXECUTE.**

Setting the clock



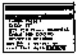
Notes
- The clock cannot be set automatically if you don't receive a channel that carries a time signal in your area. If so, set the clock manually (page 24).
- If there are only a few channels in your area that carry time signals, setting the clock automatically may take up to about 20 minutes. If nothing happens even after you wait about 20 minutes, set the clock manually.
- The menu disappears automatically if you don't proceed for more than a few minutes.

Set the time and date to use the timer feature for recording programs. When you set up your VCR for the first time, you can set the clock using the EASY SET UP button (pages 11, 13, 15, 17 and 18). You can also set the clock using the menu.

Using the Auto Clock Set feature

Some TV and cable channels have started to transmit time signals with their broadcasts. Your VCR can pick up this time signal to automatically set the clock. After completing the steps below, when you turn off the VCR, it will automatically search for a channel that carries a time signal and set the clock. The Auto Clock Set feature only works if a channel in your area is broadcasting a time signal. If broadcasters in your area are not yet sending time signals, set the time manually (page 24).

1 **Press MENU.**
The main MENU appears on the TV screen.

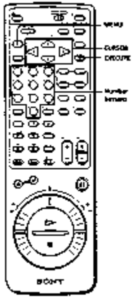


2 **Press the CURSOR (…) buttons to move the cursor (▶) to CLOCK SET, then press EXECUTE.**
The CLOCK SET menu appears on the TV screen.

3 **Press the CURSOR (…) buttons to select AUTO, then press EXECUTE.**
The AUTO CLOCK SET menu appears on the TV screen.

4 **Press the CURSOR (…) buttons to select FULL AUTO, then press EXECUTE.**

5 **To activate the Auto Clock Set function, turn the VCR off.**
The VCR automatically sets the clock.
The VCR automatically searches for a channel that carries a time signal and sets your time zone and daylight saving time (if applicable).
If your clock sets but displays the wrong time zone or daylight saving time, you can adjust these settings without running the Auto Clock Set feature (page 23).

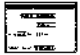


Note
- If you use both the cable box control feature and the Auto Clock Set feature, the VCR automatically changes channels on the cable box until a channel that carries a time signal is found whenever you turn off the VCR.
If you want to stop the search, change channels on the cable box with the channel buttons either on the VCR or on the remote commander.
If you don't receive a channel that carries a time signal in your area, using the Manual Clock Set stops the automatic channel search.
If the Auto Clock Set feature is not in use, the channel search is not performed.

If the clock is not activated

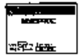
1 **Follow steps 1 to 3 in "Using the Auto Clock Set feature."**

2 **Press the CURSOR (…) buttons to select OPTIONS in the AUTO CLOCK SET menu, then press EXECUTE.**
The CLOCK SET CHANNEL menu appears.



3 **Press the CURSOR (…) buttons to select AUTO or MANUAL.**
- If you select AUTO:
The VCR automatically searches for a channel that carries a time signal.
- If you select MANUAL:
Set a channel that carries a time signal using the number buttons.
Use this option if you know the channel.
Most PBS member stations broadcast a time signal.
For the fastest response, set the VCR to your local PBS station.

4 **Press EXECUTE.**
The YOUR TIME ZONE AND DAYLIGHT SAVING TIME menu appears.

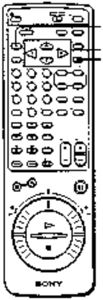


5 **Press the CURSOR (…) buttons to select AUTO or MANUAL.**
- If you select AUTO:
The VCR automatically sets your time zone and daylight saving time (if applicable).
- If you select MANUAL:
1 Press EXECUTE, then set the time zone of your area using the CURSOR (…) buttons.
2 Press EXECUTE, then select STANDARD TIME or DAYLIGHT SAVING TIME using the CURSOR (…) buttons.

6 **Press EXECUTE.**

7 **To activate the Auto Clock Set function, turn the VCR off.**

Setting the clock (continued)

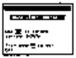


Using the Manual Clock Set

1 **Press MENU.**
The main MENU appears on the TV screen.

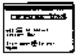
2 **Press the CURSOR (↑/↓) buttons to move the cursor (▶) to CLOCK SET, then press EXECUTE.**

3 **Press the CURSOR (←/→) buttons to select MANUAL, then press EXECUTE.**



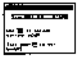
4 **Set the month using the CURSOR (↑/↓) buttons.**

5 **Press CURSOR → to highlight the day and set the day using the CURSOR (↑/↓) buttons.**
The day of the week is set automatically.

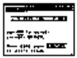


6 **Press CURSOR → to highlight the year and set the year using the CURSOR (↑/↓) buttons.**

7 **Press CURSOR → to highlight the hour and set the hour using the CURSOR (↑/↓) buttons.**



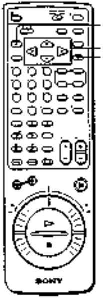
8 **Press CURSOR → to highlight the minutes and set the minutes using the CURSOR (↑/↓) buttons.**



9 **Press EXECUTE to start the clock.**

Presetting channels

(Skip this section if you are using cable box control.)



Tip
• When receiving a VHF, UHF or CATV channel, the display changes as follows each time you press the DISPLAY button.
Channel number, program name, and station (call letters) of the broadcast ...
Clock time, recording tape length, and time counter

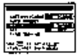
This VCR is capable of receiving VHF channels 2 to 13, UHF channels 14 to 69 and unscrambled CATV channels 1 to 125. First, we recommend that you preset the receivable channels in your area using automatic presetting. Then, if there are any unwanted channels, disable them manually. If you have decided which channels you wish to preset, set them directly using manual presetting.
When you set up your VCR for the first time, you can preset the channels using the EASY SET UP button (pages 11, 13, 15, 17 and 19). You can also preset the channels using the MENU.

Before you start...
- Turn on the VCR and the TV.
- Set the TV to the VCR channel (channel 3 or 4). If your TV is connected to the VCR using A/V connections, set the TV to video input.
- Press TV/VTR to display the VTR indicator in the VCR's display window.
- Press INPUT SELECT so that a channel number appears in the VCR's display window.

Presetting all receivable channels automatically

1 **Press MENU.**
The main MENU appears on the TV screen.

2 **Press the CURSOR (↑/↓) buttons to move the cursor (▶) to TUNER PRESET, then press EXECUTE.**
The TUNER PRESET menu appears on the TV screen.



3 **Press the CURSOR (↑/↓) buttons to move the cursor (▶) to ANTENNA/CABLE.**

4 **Select ANT or CABLE using the CURSOR (←/→) buttons.**
- To preset cable TV channels, select CABLE.
- To preset VHF and UHF channels, select ANT.

(continued)

Presetting channels (continued)

5 **Press the CURSOR (↑/↓) buttons to move the cursor (▯) to AUTO PRESET, then press EXECUTE.**
All receivable channels are preset in numerical sequence. When no more receivable channels can be found, presetting stops and the picture from the lowest numbered channel is displayed on the TV screen.

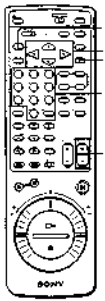
Presetting/disabling channels manually

1 **Display the TUNER PRESET menu.**
For instructions, follow steps 1 and 2 in "Presetting all receivable channels automatically."

2 **Select the channel to preset or disable.**
- To preset a channel, enter the channel number by pressing the number buttons then ENTER.
- To disable a channel, select the channel number by pressing CH +/–.

3 **Set MANUAL SET to ADD or ERASE, using the CURSOR (←/→) buttons:**
- To preset a channel, select ADD.
- To disable a channel, select ERASE.

4 **Repeat steps 2 and 3 to preset or disable channels as required, then press EXECUTE.**



Cable TV channel assignment

Cable TV systems use letters or numerals to designate channels. This VCR is designed to correspond with standard cable systems. The chart below shows the channel numbers on this VCR and the corresponding cable TV channels. Note that the channel number assignment shown in the chart may not correspond to the channel number used by your local cable company. Check with your local cable TV company for more information on the available channels.

Number on this VCR	1	2	3	...	12	13	14	15	16	17
Cable TV standard	A-2	2	3	...	13	14	15	5	6	7
	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	32	33	34	35	36	37	38	–	72	73	74	75	76	77	78
	S	T	U	V	W+1	W+2	W+3	...	W+36	W+37	A-5	A-4	A-3	A-2	A-1
	79	80	81	–	125	126									
	A-1	W+38	W+39	–	W+82	W+83									

If the picture is not clear

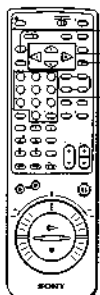
Normally, the Auto Fine Tuning (AFT) function automatically tunes in channels clearly. If, however, the picture of a channel is not clear, you may also use the manual tuning function.

1 **Display the TUNER PRESET menu.**
For instructions, follow page 1 and 2 in "Presetting all receivable channels automatically."

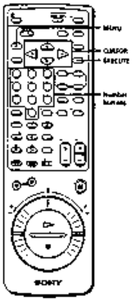
2 **Select the channel you want to fine-tune by pressing the number buttons and then ENTER.**

3 **Press the CURSOR (→) button to move the cursor (▯) to FINE TUNING.**
The fine tuning menu appears.

4 **Press the CURSOR (←/→) buttons to get a clearer picture, then press EXECUTE.**
Note that the AFT setting switches to OFF.



Setting up cable box control



Your VCR includes a cable box control feature which allows the VCR to control most brands of cable boxes via the Cable Mouse. With cable box control, the VCR controls channels on the cable box for timer recording. You can also use the VCR's remote commander to change channels on the cable box whenever the cable box is turned on or off if the VCR is turned off. To use cable box control, you need to connect the Cable Mouse (page 10) and set the code number and output channel.

This VCR is programmed with codes necessary to control channel selection on most brands of cable boxes at the time this VCR was manufactured. It is possible that new cable boxes may be introduced that cannot be controlled with this VCR's Cable Mouse. If you have a cable box that is incompatible with this VCR, contact your cable operator — they may be able to provide you with a compatible cable box.

When you set up your VCR for the first time, you can set up the cable box control using the EASY SET UP button (pages 11, 13, 15, 17 and 19). You can also set up by using the menu.

1 **Press MENU.**
The main MENU appears on the TV screen.

2 **Press the CURSOR (↑/↓) buttons to move the cursor (▷) to CABLE BOX CONTROL, then press EXECUTE.**
The CABLE BOX CONTROL menu appears.

3 **Press the CURSOR (←/→) buttons to select ON, then press EXECUTE.**

4 **Enter the cable box code number by pressing the number buttons, then press EXECUTE.**
Find your cable box code number from the chart on the following page.

5 **Select the output channel for cable box using the CURSOR (↑/↓) buttons, then press EXECUTE.**

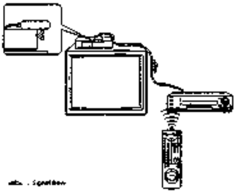
1-13

Cable box brands and the corresponding cable box code numbers
If more than one code number is listed, try entering them one by one until you come to the correct code for your equipment.

Cable box brand	Code numbers	Cable box brand	Code numbers	Cable box brand	Code numbers
ABC	015, 022, 036, 039, 277	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	Standard Components	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BBT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	TeleCaption	[illegible]
[illegible]	[illegible]	Philips	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]			[illegible]	[illegible]
[illegible]	[illegible]	Philips ECG	[illegible]	TFC	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	RCA	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GC Electronics	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GE	[illegible]	[illegible]	[illegible]	United Artists	[illegible]
GPC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	Universal	[illegible]
General Instrument	[illegible]	Scientific Atlanta	[illegible]		
[illegible]	[illegible]	Sharp	[illegible]	[illegible]	[illegible]
Hitachi	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jerrold	[illegible]	[illegible]	[illegible]		
		[illegible]	[illegible]	[illegible]	[illegible]
				Zenith	[illegible]

Setting up cable box control
(continued)

Tips for normal viewing



Note
- Make sure to turn off the VCR when you plug in or unplug the Cable Mouse. If you unplug the Cable Mouse and plug it in again, turn on the VCR before you use the cable box control feature. [illegible]

- Place the Cable Mouse so that it hangs over the cable box front.
- Position the cable box away from the VCR.
- Do not place the cable box on top of the VCR.
- Point the remote commander at the VCR, not at the cable box.

To check the cable box control setting
1. Press CH +/– on the remote commander. Does the channel indicator on the cable box change? (Point the remote commander at the VCR, not at the cable box.)
2. Press all 10 number buttons (0 to 9) on the remote commander. Does the channel indicator on the cable box change?

If the answer to both 1 and 2 is "yes," you have made the correct setting.

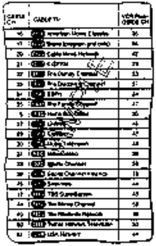
If you cannot get your VCR to control the cable box
- ✓ Check that the Cable Mouse is connected to the CABLE BOX CONTROL jack on the VCR.
- ✓ Check the position of the Cable Mouse.
- ✓ Place the cable box and VCR away from each other. Do not place the cable box on top of the VCR.
- ✓ Try the setup again making sure to use the correct control code. If the cable box still does not respond, you can try other codes.

If your cable box still does not operate with the Cable Mouse, contact your cable company to see if they can provide you with a compatible cable box.

Setting up VCR Plus+

Example of "PlusCode"

Example of "Channel Line-up Chart"



VCR Plus+ is a feature in Sony VCRs that simplifies the task of programming the VCR to make timer recordings.

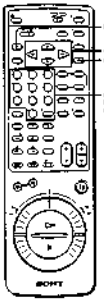
How VCR Plus+ works
Whenever you want to record a TV program, all you need to do is look up the program's "PlusCode," a number assigned to each program that's published in the TV section of most newspapers, cable TV listings, and even TV GUIDE magazine. Then, just enter the PlusCode of the program you want and the VCR is automatically programmed to record that show. It's that simple. With VCR Plus+, you no longer have to go through a lengthy and often repetitive procedure when you set start and stop times, channel numbers and dates. All this information is automatically sent to your VCR when you enter the program's PlusCode.

How to set up your VCR
Setting up your VCR involves coordinating the TV channel number (the number you turn to on your TV or VCR to watch a program) with the guide channel (the number that's assigned to that channel in your program guide). To get the guide channel numbers, find the "Channel Line-up Chart" in the program guide for your area that features VCR PlusCodes. It usually looks like the example to the left.

For each channel your VCR receives, use the Channel Line-up Chart to check that the channel numbers match. For example, if HBO is listed in the Channel Line-up Chart as channel 33 and your VCR receives HBO on channel 15, you need to coordinate those numbers using the following procedure. For channels in which the numbers are the same (for example, if your VCR receives HBO on channel 33, and the guide channel number is 33), you can skip this procedure.

(continued)

Setting up VCR Plus+ (continued)



1 Press **MENU**.
The main MENU appears on the TV screen.

2 Press the **CURSOR** (↑/↓) buttons to move the cursor (▯) to **SET VCR Plus+ CHANNELS**, then press **EXECUTE**.
The **SET VCR Plus+ CHANNELS** menu appears and the **GUIDE CH** column is highlighted.

3 Enter the channel number assigned in the program guide and press **ENTER**.
The TV CH column is highlighted.

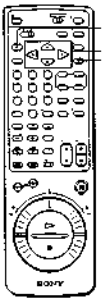
4
- If you made lookup 1, 2, or 3, enter the actual number on your TV (and VCR) and press **ENTER**.
- If you made lookup 4, enter the cable output channel (usually 2, 3, or 4) and press **ENTER**.
- If you made lookup 5, enter the actual number on your TV (and VCR) for an unscrambled channel and press **ENTER**. For a scrambled channel, enter the cable box output channel (usually 2, 3, or 4) and press **ENTER**.

5 Repeat steps 3 and 4 for each channel whose numbers don't match.

6 When you have set all channels, press **EXECUTE** to confirm your channel settings.

7 When you're finished, press **MENU** to exit.

Using the ADVANCED OPTIONS



The ADVANCED OPTIONS allows you to make a number of optional setup choices. For a list of menu choices, see the table on the following page.

1 Press **MENU**.
The setup MENU appears on the TV screen.

2 Press the **CURSOR** (↑/↓) buttons to move the cursor (▯) to **ADVANCED OPTIONS**, then press **EXECUTE**.
The ADVANCED OPTIONS menu appears on the TV screen.

3 Press the **CURSOR** (↑/↓) buttons to move the cursor (▯) to the desired menu choice.

4 Set the item to the desired setting using the **CURSOR** (←/→) buttons.

5 Press **EXECUTE** to return to the original screen.

Using the ADVANCED OPTIONS (continued)

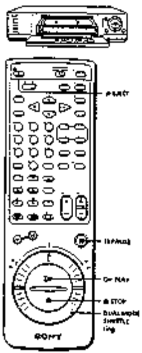
Menu choices

Initial settings are indicated in bold letters

Menu option	Set this option to
AUTO ANT SEL	• **ON** if your TV is connected only to VHF/UHF OUT on the VCR. To play a tape, set the TV to the VCR channel (channel 3 or 4). • OFF if your TV is connected to both VHF/UHF OUT and LINE OUT on the VCR. To play a tape, set the TV to the VCR input.
AUTO STEREO	• **ON** to receive stereo programs. • OFF to reduce noise on a stereo program. Although the sound may improve, the sound becomes monaural. For details, see page 48.
DIMMER	• ON to make the display window dim. • **OFF** to make it brighter.
AUDIO MIX	• ON to listen to the sound recorded on the hi-fi audio track and the normal audio track simultaneously. The AUDIO MONITOR button becomes inoperative. • **OFF** to select the sound using the AUDIO MONITOR button. For details, see page 51.
NORMAL AUDIO	• **MAIN** to record the main sound on both the hi-fi and normal audio tracks. • SAP to record the SAP (Second Audio Program) sound on the normal audio track. The main sound is recorded on the hi-fi audio track. For details, see page 40.
APC	• **ON** to activate the APC (Adaptive Picture Control) function, that improves recording and playback quality. • OFF to deactivate it. For details, see page 60.
CLOCK LAMP	• **ON** to illuminate the (position) of the dual mode shuttle ring and the buttons on the VCR which you can operate in the present condition, telling you what you can do with your VCR. • OFF to turn them off.
TAPE SELECT	T-120 or T-160 to select the length of the tape, allowing to display the remaining tape counter. For details, see page 38.

Basic Operations

Playing a tape



Tip
- For further information on searching and playback functions, see "Playing/searching at various speeds" on page 49.

Note
- Tapes recorded in LP mode can be played on this VCR, but the playback picture quality is not guaranteed than normal SP and EP speed.

This section shows you how to play back a videotape.

1 Turn on your TV and tune it to the VCR.
- If the TV is connected to the VCR using the audio/video cable, set the TV to video input.
- If the TV is connected to the VCR using only the antenna cable, set the TV to the channel for the VCR.

2 Open the drop down panel and insert a tape.
The VCR turns on automatically. The tape starts playing automatically if the safety tab has been removed.

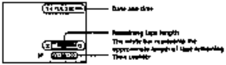
3 Press ▷ PLAY to start playing.
When the tape reaches the end, the VCR automatically rewinds it to the beginning. (The power remains on.)

Additional tasks

To	Press
Stop play	■ STOP
Pause play	॥ PAUSE
Resume play after pause	॥ PAUSE or ▷ PLAY
Search forward	Turn the DUAL MODE SHUTTLE (DMS) ring to ⊳ during playback
Search backward	Turn the DMS ring to ⊲ during playback
Fast-forward the tape	Turn the DMS ring to ▶▶ FF during stop
Rewind the tape	Turn the DMS ring to ◀◀ REW during stop
Eject the tape	▲ EJECT

Displaying the date and time, remaining tape length and time counter

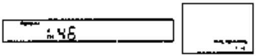
Press DISPLAY to turn the display on or off.



Notes
- When you insert a tape with a short tape length such as T-20, T-30 or a non-standard commercially available tape, the remaining tape length may not be correct.
- The display will not appear during pause mode or slow-motion playback.

Displaying the remaining tape counter

Press COUNTER/REMAIN to display the remaining tape counter in the display window. To display it on the TV screen, press DISPLAY to turn the display on, then press COUNTER/REMAIN. Each time you press COUNTER/REMAIN, the time counter and the remaining tape counter appear alternately.



When you use the tape with more than 2-hour recording, select "-120" or "-160" from the menu.

1 Press MENU and select ADVANCED OPTIONS.

2 Set TAPE SELECT to "-120" or "-160" using the CURSOR (↑/↓/←/→) buttons.

3 Press EXECUTE to store the setting.

Notes
- When a tape is inserted, the counter returns to "0H00M00S."
- The counter will not work on tape portions with no recording.

Using the time counter

At the point on a tape that you want to find later, press COUNTER RESET to reset the counter to "0H00M00S." When you rewind or advance the tape to this point, refer to the counter.

Notes
- When you play a tape recorded in monaural, the sound is heard in monaural regardless of the AUDIO MONITOR setting.
- To play a tape in stereo, you must use the A/V connection.
- If AUDIO MIX in the ADVANCED OPTIONS is set to ON, the AUDIO MONITOR button does not work.

Note
- If AUDIO MIX is set to ON, the AUDIO MONITOR button is disabled (inoperative).

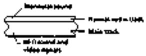
Playing stereo and bilingual programs

Press AUDIO MONITOR to select the desired sound. Each press of the button changes the display on the VCR.

To listen to a		VCR's display window
Stereo tape	Bilingual tape	
Stereo	Left and right channels	STEREO
Left channel	Left channel	L
Right channel	Right channel	R
Normal (non-Hi-Fi) audio track	Sound on normal audio track (SAP)	No indicator appears

How sound is recorded on a video tape

This VCR records sound onto two different tracks. High fidelity sound (usually stereo) is recorded onto the main track along with the picture. Monaural sound is recorded onto the normal audio track along the edge of the tape.



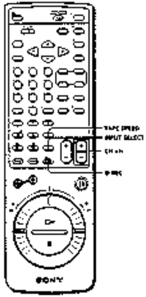
To listen to hi-fi and normal audio at the same time

1 Press MENU and select ADVANCED OPTIONS.

2 Set AUDIO MIX to ON using the CURSOR (↑/↓/←/→) buttons.
The AUDIO MONITOR button becomes inoperative, and the sound you hear is mixed.

3 Press EXECUTE to store the setting.
After playing the tape, reset AUDIO MIX to OFF.

Recording TV programs



Note
- If you insert a tape with its safety tab removed, the VCR starts playing. To record on this tape, cover the tab hole.

Tip
- To select channels, you can also use the number buttons on the remote commander. Enter the desired channel number using the number buttons, then press ENTER.

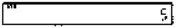
This section shows you how to record TV programs in the most basic way: manual recording. With manual recording, you start the VCR recording when the program begins, then stop it when the program ends. The VCR also provides the following ways of recording:
- Manually start recording, then stop it automatically—"Recording using the quick timer" (page 39)
- Automatically start and stop recording—"Recording TV programs using the timer" (page 42)
- Automatically start and stop recording just by entering the "Plus Code"—"Recording TV programs using VCR Plus+" (page 40)

1 Turn on your TV and tune it to the VCR.
- If the TV is connected to the VCR using the audio/video cable, set the TV to video input.
- If the TV is connected to the VCR using only the antenna cable, set the TV to the channel for the VCR.

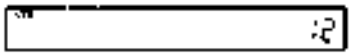
When using a cable box, turn it on.

2 Open the drop down panel and insert a tape with its safety tab in place.

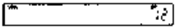
3 Press INPUT SELECT until a channel number appears in the VCR's display window.



4 Select the desired channel by pressing CH +/–.



5 Select the tape speed, SP or EP, by pressing TAPE SPEED.
See "To select tape speeds" on the following page.



6 Start recording by pressing ● REC.
When the tape reaches the end, the VCR automatically rewinds it to the beginning.

Tips
- To cut out an unwanted scene while recording, press ▮▮ PAUSE, turn the DUAL MODE SHUTTLE ring on the VCR to rewind the tape to the beginning of the unwanted scene, then press ▮▮ PAUSE to resume recording.
- The display appears on the TV screen indicating information about the tape, but the information will not be recorded on the tape.
- If you don't want to watch TV while recording, you can turn off the TV. When using a cable box, make sure to leave it on.

Notes
- If you've inserted a tape with its safety tab removed, the VCR ejects it when you press ● REC.

To stop recording
Press ■ STOP.

To select tape speeds
When recording, select either SP or EP. EP provides recording time three times as long as SP. However, SP provides better picture quality. You can mix SP and EP on the same tape. When playing back, the VCR automatically detects the tape speed. See the table below for the maximum recording/playback time at each speed.

Tape type	Maximum recording/playback time	
	SP	EP
T-160	2 hrs. 40 min.	8 hrs.
T-120	2 hrs.	6 hrs.
T-60	1 hr.	3 hrs.
T-30	30 min.	1 hr. 30 min.

Recording using the quick timer

The quick timer enables you to record for a specified period of time in intervals of 30 minutes. Once you specify the recording time, the VCR automatically stops recording. Before you begin, check that the clock is set correctly.

After you start recording, press QUICK TIMER until the desired duration appears in the display window. The TIMER indicator on the VCR lights up. Each press increases the recording duration in increments of 30 minutes as shown below.

0:30 → 1:00 → 1:30 → [illegible] → 10:30 → 11:00

The recording duration decreases minute by minute to 0:00, then the VCR turns off automatically.

To stop recording
Press ■ STOP.

To extend the recording duration while recording
Press QUICK TIMER until the desired duration appears in the display window.

Recording TV programs (continued)

Watching a TV program while recording another

You can watch a TV program and record another at the same time.

1 Press TV/VTR to turn off the VTR indicator in the display window.
2 If the TV is connected to the VCR using the audio/video cable, set the TV to TV input.
If the TV is connected to the VCR using only the antenna cable, skip this step.
3 Select the desired channel on the TV.

Recording stereo and bilingual programs

Stereo programs

This VCR automatically records stereo programs in stereo. When stereo programs are received, the STEREO indicator on the VCR lights up. If noise occurs while receiving a stereo program, record the program in monaural. Follow the steps below.

Bilingual programs

Normally, this VCR records main sound on both main and normal audio tracks. To record SAP (Second Audio Program)-sound on normal audio track, follow the steps below.

1 Press MENU and select ADVANCED OPTIONS.

2 • To record stereo programs in monaural:
Set AUTO STEREO to OFF using the CURSOR ↑/↓/←/→ buttons.

• To record SAP sound on normal audio track:
Set NORMAL AUDIO to SAP using the CURSOR ↑/↓/←/→ buttons.

3 Press EXECUTE to enter the setting.

Tip

• For information how the VCR records sound, see "How sound is recorded on a videotape" on page 57.

Note

• Set NORMAL AUDIO to MAIN when not recording SAP sound, or no sound is recorded on the normal audio track. If the sound recorded on the normal audio track and you play the tape on a mono VCR, you will only hear video—no audio—fully heard. However, you will receive half audio and video if you play back the tape on a mono VCR.

To monitor SAP sound while recording

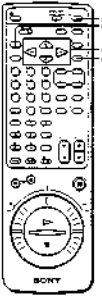
Press AUDIO MONITOR until the SAP indicator lights up in the display window.

Saving a recording

Video tapes have a safety tab to prevent against accidental recording. To prevent accidental erasure of a recording, break off the safety tab with a screwdriver or other tool. A tape with no safety tab removed ejects if you try to record on it.

To record on a tape with its safety tab removed, cover the tab hole with adhesive tape.

Recording TV programs using the timer



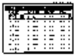
This section shows you how to let the VCR automatically start and stop recording TV programs. You can preset up to eight programs within a one month time frame. If VCR Plus+ is available in your area, see the section "Recording TV programs using VCR Plus+" on page 45 for easier timer recording.

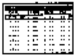
Before you start...

- Check that the clock is set correctly.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.
- Turn on your TV and tune in to the VCR. When using a cable box, turn it on.

1 **Press MENU and select TIMER SET/CHECK.**
If the clock needs to be set, "Please set the clock" appears on the screen and the VCR automatically enters the clock setting mode.

2 **Set the date to start recording.**
1 Press CURSOR ➡.
Make sure today's date is highlighted. If it isn't, reset the clock to the correct time.
2 Press CURSOR ⇕ to set the month and date.
The day of the week is set automatically.
To record the same program every day or the same day once a week, see "Daily/weekly recording" on page 44.





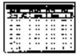
3 **Set the time to start recording.**
1 Press CURSOR ➡ to highlight the hour under "START," then press the CURSOR (⇧/⇩) buttons to set the hour.
2 Press CURSOR ➡ to highlight the minutes under "START," then press the CURSOR (⇧/⇩) buttons to set the minutes.

Tips
- To set the channel, you can also use CH +/– or number buttons.
- To record a video source from the LINE IN 1 or 2 jacks, press INPUT SELECT to display "L1" or "L2" in the VCR display window.
- When you set the cable box control to ON, you cannot select "L1" and "L2".

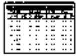
Tip
- To set the recording tape speed, you can also use TAPE SPEED.

Tip
- To change an incorrect setting before confirming it, press CURSOR ⬅ to highlight the item you want to change and reset it.

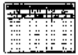
4 **Press CURSOR ➡, then set the time to stop recording in the same way.**



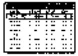
5 **Press CURSOR ➡, then press the CURSOR (⇧/⇩) buttons to select the channel you want to record.**
Only the channels preset in the VCR will appear. When using a cable box, the cable box channels appear.



6 **Press CURSOR ➡, then press the CURSOR (⇧/⇩) buttons to select the tape speed, SP or EP.**
See "To select tape speeds" on page 39.



7 **To confirm your program, press CURSOR ➡.**
All the settings stop being highlighted and the cursor ⇒ appears in the leftmost column.
To preset another timer setting, move the cursor to the next line using CURSOR ⇩ and repeat steps 2 to 7.



8 **After making the desired timer settings, press EXECUTE.**

9 **Press POWER to turn off the VCR.**
The TIMER indicator on the VCR lights up and the VCR stands by for recording.
When using a cable box, leave it on.
The VCR automatically turns on and starts recording at the preset start time, and turns off at the preset stop time.

To stop recording while recording
Press ■ STOP.

1-20

To use the VCR while recording
You can do the following tasks during timer recording:

To	Press
Reset the counter to "0H00M00S"	COUNTER RESET
Display tape information on the TV screen	DISPLAY
Check the timer settings	MENU and select TIMER SET/CHECK
Watch another TV program	TV/VTR (See "Watching a TV program while recording another" on page 46)

Using the VCR before timer recording begins

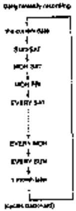
Press POWER to turn on the VCR. The TIMER indicator on the VCR goes off and the VCR is ready for use.

After using the VCR, turn off the VCR again to turn on the TIMER indicator on the VCR. When using a cable box, leave it on. Remember to turn off the VCR before the time you've set the VCR to start recording, or the timer setting will be cancelled.

Daily/weekly recording

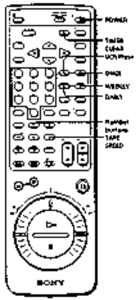
Daily recording records the same program every day of the week. Weekly recording records the same program on the same day, every week.

When you set the date to start recording in step 2 of "Recording TV programs using the timer," press CURSOR ↓ until the desired day appears. Each time you press the button, the indication changes as shown on the left.



1-21

Recording TV programs using VCR Plus+



Notes
- You cannot set VCR Plus+ in the following cases:
  - When the VCR is turned off
  - While recording using the one-touch timer
- The timer will not accept settings in the following cases:
  - When you select DAILY for a Saturday and Sunday program
  - When you select DAILY or WEEKLY for a program more than seven days ahead
- When you enter the PlusCode of a program that has already ended

This section shows you another way of timer recording: recording using VCR Plus+. This allows you to record TV programs more easily. Just enter the program's "PlusCode," and the VCR will automatically record the program. You can preset up to eight programs within a one month time frame.

Before you start...
- Check that the clock is set correctly.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.
- Turn on your TV and tune in to the VCR. When using a cable box, turn it on.

1 **Press VCR Plus+.**
If the clock needs to be set, "Please set the clock" appears on the screen and the VCR automatically enters the clock setting mode.

2 **Enter the desired program's PlusCode using the number buttons.**
If you make a mistake, press TIMER CLEAR and enter the PlusCode again.

3 **Select the tape speed, SP or EP, by pressing TAPE SPEED.**

4 **Press ONCE, DAILY or WEEKLY according to the following.**

To record the program	Press
Only once	ONCE
Monday to Friday at the same scheduled time	DAILY
Every week at the same scheduled time	WEEKLY

The recording information appears on the TV screen: date, program start and stop times, channel number and tape speed.
Check that the information is correct.
If it is not, press TIMER CLEAR to cancel.
To preset another timer setting, repeat steps 1 to 4.

(continued)

Recording TV programs using VCR Plus+ (continued)

5 **Press POWER to turn off the VCR.**
The TIMER indicator on the VCR lights up and the VCR stands by for recording. When using a cable box, leave it on. The VCR automatically turns on, records the program and turns off.

To stop recording while recording
Press ■ STOP.

To use the VCR while recording
You can do the following tasks while recording using VCR Plus+.

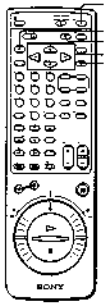
To	Press
Reset the counter to "0:00:00"	COUNTER RESET
Display time information on the TV screen	DISPLAY
Check the timer settings	MENU and select TIMER SET/CHECK
Watch another TV program	TV/VTR (See "Watching a TV program while recording another" on page 40.)

Using the VCR before recording begins

Press POWER to turn on the VCR. The TIMER indicator on the VCR goes off and the VCR is ready for use.

After using the VCR, turn off the VCR again to turn on the TIMER indicator on the VCR. When using a cable box, leave it on. Remember to reset the VCR to stand by for recording before the time you've set the VCR to start recording, or the timer setting will be cancelled.

Checking/changing/cancelling timer settings



This section shows you how to check, change and cancel the timer settings after you've stored them in the VCR.

Before you start...
• Turn on your TV and tune in to the VCR.

1 **Press POWER to turn on the VCR.**
The TIMER indicator on the VCR goes off.

2 **Press MENU and select TIMER SET/CHECK.**

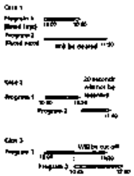
3 **Check the timer settings.**
• If you do not want to change or cancel the settings, press EXECUTE, then turn the VCR off to return to recording standby.
• If you want to change or cancel the settings, press the CURSOR ↑/↓ buttons to move the cursor (▮) to the setting you want to change or cancel.

4 **Change or cancel the timer settings.**
• To change the setting, press the CURSOR ←/→ buttons to highlight the item you want to change, and reset it using the CURSOR ↑/↓ buttons. Then, press CURSOR → to move the cursor to the leftmost column.
• To cancel the setting, press TIMER CLEAR.

5 **Press EXECUTE.**
The VCR returns to the original screen. When there are any other timer settings left in the TIMER SET/CHECK menu, turn off the VCR to return to recording standby.

To check the timer settings during timer recording
Press MENU and select TIMER SET/CHECK. After checking, press EXECUTE to turn off the display.

Checking/changing/cancelling timer settings (continued)



When the timer settings overlap

The VCR will not record overlapping programs. If any of your timer settings overlap, change the settings.

Case 1: If you preset two programs to start recording at the same time...

The program listed first in the TIMER SET/CHECK menu has priority over the other program. The timer setting of the lower priority program will be erased from the TIMER SET/CHECK menu when the first program begins recording.

Case 2: If you preset program 2 to start recording at the same time you preset program 1 to finish recording...

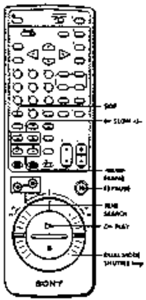
The last 20 seconds of program 1 will not be recorded because the VCR will enter recording pause for program 2 before program 1 is finished.

Case 3: If you preset program 2 to start recording before program 1 is finished recording...

Program 2 will start recording before program 1 has finished.

Additional Operations

Playing/searching at various speeds



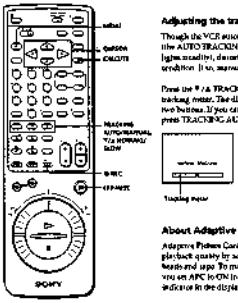
Tip
- Adjust the picture using the TRACKING NORMAL/SLOW STILL ADJUST buttons if:
  - Streaks appear while playing in slow motion.
  - Bands appear on the top or bottom while pausing.
  - The picture shakes while pausing.

Note
- Tapes recorded in LP mode can be played on this VCR, while playback picture quality in modes other than normal/special speeds is not guaranteed.

You can play back a tape at various speeds: high speed, slow motion, frame by frame and so on. These options are also useful for searching for a specific point during playback. The sound is muted during these operations.

Playback options	Operation	To resume normal playback
Playing at various speeds One fifth the normal speed Twice the normal speed High speed	During playback or pause, turn the DUAL MODE SHUTTLE ring right or left to 1/5 ×2 ◀◀ or ▶▶	Release the ring.
Fast-forwarding/Rewinding	During stop, turn the DUAL MODE SHUTTLE ring to ▶▶ FF or to ◀◀ REW and release	Press ▷ PLAY
Viewing the picture during fast-forward or rewind	During fast-forward, turn the DUAL MODE SHUTTLE ring to ▶▶ FF. During rewind, turn the ring to ◀◀ REW	To return to the previous mode, release the ring.
Locating in a high-speed picture	During playback or pause, press ⊳ SEARCH or ⊲ SEARCH. To change direction, press ◀◀ FRAME (backward) or ▶▶ FRAME (forward).	Press ▷ PLAY
Locating in a slow-motion picture	During playback or pause, press ▶ SLOW +/-. You can increase the playback speed with the + button and decrease the speed with the − button. To change direction, press ◀◀ FRAME (backward) or ▶▶ FRAME (forward).	Press ▷ PLAY
Playing frame by frame	During pause, press ▶▶ FRAME to advance the picture one frame or ◀◀ FRAME to reverse the picture one frame.	Press ▷ PLAY.
Skipping a scene	During playback, press SKIP. Pressing once skips about 30 seconds.	The VCR automatically resumes normal playback.
Rewind and automatically resume play	During stop, press ▷ PLAY on the VCR while holding the DUAL MODE SHUTTLE ring on the VCR at the ◀◀ position.	—

Adjusting the picture



The VCR automatically adjusts the picture for the best possible playback or recording. However, you find the automatic adjustments unsatisfactory, you can adjust the picture manually.

Adjusting the tracking

Though the VCR automatically adjusts the tracking when playing a tape (the AUTO TRACKING indicator flashes in the display window), slight inaccuracy, distortion may occur if the tape was recorded in poor condition. If so, manually adjust the tracking control.

Press the ▼/▲ TRACKING NORMAL/SLOW button(s) to display the tracking meter. The distortion should disappear as you press one of the two buttons. If you cannot get a clear picture with manual adjustment, press TRACKING AUTO/MANUAL to return to automatic adjustment.

Tracking meter

About Adaptive Picture Control (APC)

Adaptive Picture Control (APC) automatically improves recording and playback quality by adjusting the VCR to the condition of the video heads and tape. To maintain better picture quality, we recommend that you set APC to ON in the ADVANCED OPTIONS menu (with the APC indicator in the display window lit).

To use APC during playback

The APC function automatically works on all types of tapes, including rental tapes. You can play a tape using the APC function even if the tape was not recorded with it.

To use APC while recording

Whenever you insert a tape and then start recording, the VCR adjusts to the tape using the APC function (the APC indicator flashes rapidly). This adjustment is retained until the tape is ejected. There is a short delay before the VCR actually starts recording while the VCR analyzes the tape.

If you want to start recording precisely the first time you record, set the VCR to recording pause mode (the APC indicator flashes slowly) and press ● REC to let the VCR analyze the tape. When the APC indicator stops flashing, press II PAUSE to start recording. Recording begins immediately.

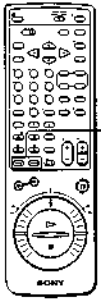
Note

- Auto tracking adjustment is not possible for tapes recorded in SP mode.

Notes

- Tapes recorded using the APC function may played normally on VCRs that do not have the APC function.
- If you set PAUSE to release recording after the APC indicator starts flashing, if you start recording before the APC indicator stops flashing, the APC function is cancelled.

Searching using the index function



The VCR automatically marks an index signal at the point where recording starts (with the exception of when you insert recording from recording pause). Use this as a reference to find the beginning of the recording. Since the index number indicates the relative position from the current position, specify how many index signals ahead or behind the specific index signal is from the current position. The VCR can search up to 99 index signals ahead or behind of the current position.

1 **Insert an indexed tape into the VCR.**

2 **Press the ◀◀/▶▶ INDEX SEARCH buttons repeatedly until the index number you want appears on the TV screen**

- To locate succeeding programs, press ▶▶ INDEX SEARCH.
- To locate preceding programs, press ◀◀ INDEX SEARCH.

The VCR starts searching and the index number on the TV screen counts down to zero. Playback starts automatically from that point.

Editing

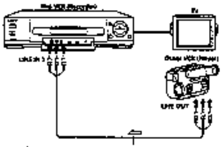
Editing with another VCR

Tips
- Make sure you connect the plugs to jacks of the same color.
- To connect the other VCR, you can use the LINE IN 2 jacks as well. In this case, press INPUT SELECT to display "L2" in the display window.
- If the other VCR is a monaural type, leave the red plugs unconnected.

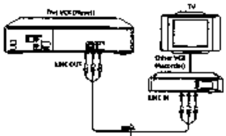
Note
- When connecting the VCRs, do not simultaneously connect the LINE IN and LINE OUT jacks on your VCR. A humming noise may occur if you do this.

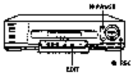
This section shows you how to edit to or from another VCR or camcorder. You can make a copy of a tape using this VCR for recording or playback.

How to hook up to record on this VCR



How to hook up to record to another VCR





Tips
- To release the VCRs from pause, use the II PAUSE buttons on the VCRs so that you can edit more properly.
- To cut out unwanted scenes while editing, press II PAUSE on this VCR when an unwanted scene begins. When it ends, press II PAUSE again to resume recording (Assemble Editing).

Operation (when recording on this VCR)

Before you start editing
- Press INPUT SELECT to display "L1" in the display window.
- Press TAPE SPEED on the remote commander to select the recording tape speed (SP/EP).
- On this VCR, set the EDIT switch to ON. If the other VCR has a similar switch, set it to ON as well.

1 **Insert a source tape with its safety tab removed into the other (playback) VCR. Search for the point to start playback and set it to playback pause.**

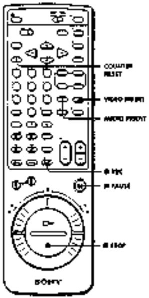
2 **Insert a tape into this (recording) VCR. Search for the point to start recording and press II PAUSE.**

3 **Press ● REC on this VCR and set it to recording pause.**

4 **To start editing, press the II PAUSE buttons on both VCRs to release the VCRs from pause.**
For best results, press the pause button on the other VCR just before pushing II PAUSE on this VCR.

To stop editing
Press the ■ STOP buttons on both VCRs.

Insert editing



Note
- You must be in playback pause mode before pressing an INSERT button. If you are in recording pause mode, you cannot use the insert function.

You can replace unwanted scenes with other scenes by recording pictures and/or sound over the recorded tape. With the video insert function, the original video and hi-fi sound are replaced while the original monaural sound is retained. With the audio insert function, the original monaural sound is replaced. The original video and hi-fi sound, however, are left intact.

Before you begin
- Follow the instructions on page 52 to hook up your VCRs. To insert sound using a stereo system, see "To hook up with a stereo system" on the next page.
- Press INPUT SELECT to display "L1" in the display window.

1 **Insert a source tape into the playback VCR or into the stereo system. Search for the point to start playback and set it to playback pause.**

2 **Insert the prerecorded tape into this (recording) VCR. Search for the end of the unwanted scene and press II PAUSE.**

3 **Press COUNTER RESET on this VCR to reset the counter to "0H00M00S."**

4 **Rewind the tape to the beginning of the unwanted scene.**
This VCR pauses.

5 **Press the INSERT buttons according to the following:**

To insert	Press	So that
Both picture and sound	INSERT AUDIO, then INSERT VIDEO	"A/V INSERT" appears on the TV screen, and "A/V INSERT" appears in the display window.
Picture only	INSERT VIDEO	"VIDEO INSERT" appears on the TV screen, and "V INSERT" appears in the display window.
Sound only	INSERT AUDIO	"A INSERT" appears in the display window.

6 **To start editing, simultaneously press the II PAUSE buttons on this VCR and on the other VCR or stereo system.**
When the counter of this VCR reaches "0H00M00S," editing stops automatically.

To stop editing
Press the ■ STOP buttons on this VCR and on the other VCR or stereo system.

To hook up with a stereo system
Connect LINE IN 2 AUDIO of this VCR and the audio out jacks of the stereo system, using the RK-C510HS audio cable (not supplied).
Display "LINE 2" on the TV screen using INPUT SELECT.

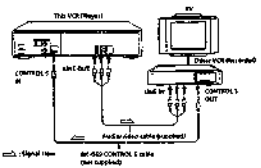
Synchronized editing

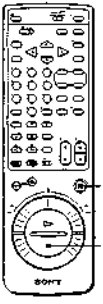
Notes
- The CABLE BOX CONTROL jack on this VCR outputs a signal to control the cable box, but does not output a control signal via synchronized editing.

If other VCR has a CONTROL S OUT jack for synchronized editing, connect the VCRs via the CONTROL S jacks. This additional connection lets you control both VCRs from one VCR for easier editing.

How to hook up via the CONTROL S jacks

The CONTROL S connection only enables you to pause and release pause.





Operation (when recording on the other VCR)

Before you start editing
- On this VCR, set the EDIT switch to ON. If the other VCR has a similar switch, set it to ON as well.

1 Insert a severed tape with its safety tab removed into this (playback) VCR. Search for the point to start playback and set it to playback pause.

2 Insert a tape into the other (recording) VCR. Search for the point to start recording and press II PAUSE.

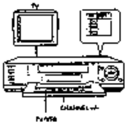
3 Press ● REC on the other VCR to pause for recording.

4 To start editing, press SYNCHRO EDIT on the other VCR.

5 At the point you want to stop recording, press SYNCHRO EDIT to stop editing.
Both VCRs return to pause.

To stop editing
Press the ■ STOP buttons on both VCRs.

Additional information
General setup information



Setting the RF unit

When connecting the VCR to the TV using only the antenna cable, you must set the RF UNIT switch on the rear of the VCR so that the TV can receive the correct signal from the VCR.
If you connect the VCR to the TV using the supplied audio/video cable, you can skip this step.

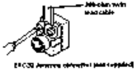
1 Set the RF UNIT switch on the rear of the VCR to CH3 or CH4, whichever channel is not used in your area. If both are used, set the switch to either channel.

2 Press POWER to turn on the VCR.

3 Press TV/VTR to turn on the VTR indicator in the VCR's display window.

4 Press CHANNEL +/– to display a channel number in the display window. Select an active channel number in your area.

5 Turn on your TV and set it to the channel you selected in step 1 (channel 3 or 4).
The selected TV channel broadcast appears on the TV screen. If the channels change when you press CHANNEL +/–, you have made the correct setting.
Whenever you use the VCR, set the TV to the channel selected in step 1.



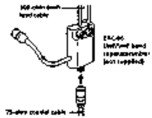
Attaching the external antenna connector

When using a 300-ohm twin lead cable for VHF/UHF antenna, use the EAC-32 antenna connector (not supplied) to connect the antenna to the VCR.

1 Loosen the screws on the antenna connector.

2 Wind the twin leads around the screws on the antenna connector.

3 Retighten the screws.



Attaching an UHF/VHF band mixer

When using both 75-ohm coaxial cable and 300-ohm twin lead cable for VHF/UHF antenna, use the EAC-66 UHF/VHF band separator/mixer (not supplied) to connect the antenna to the VCR.

1 Loosen the screws on the mixer.

2 Wind the twin leads around the screws on the mixer.

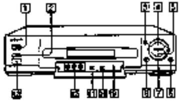
3 Retighten the screws.

4 Connect the 75-ohm coaxial cable to the mixer.

Index to parts and controls

Refer to the pages indicated in ( ) for details.

Front panel



1 POWER switch/indicator

2 ▲ EJECT button (33)

3 ❚❚ PAUSE button (35)

4 ▷ PLAY button (33)

5 ■ STOP button (33)

6 ● REC button (38)

7 DUAL MODE SHUTTLE ring (35, 49)

8 TIMER indicator (43)

9 EASY SET UP button (11)

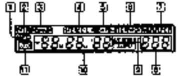
10 EDIT switch (53)

11 COMMAND MODE switch (6)

12 LINE IN 2 VIDEO/AUDIO L/R jacks (53)

13 Remote sensor

Display window



1 APC indicator (50)

2 VTR indicator (60)

3 REMAIN indicator (36)

4 STEREO L/R indicators (37)

5 SAP indicator (40)

6 AUTO TRACKING indicator (50)

7 Tape speed indicator (38)

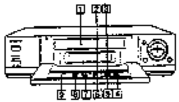
8 Line/channel indicator (38)

9 AV INSERT indicator (54)

10 Time counter/remaining time counter/clock (36)

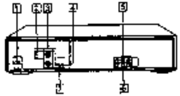
11 Tape indicator

Front cover, with cover opened



1 Tape compartment
2 QUICK TIMER button (30)
3 COUNTER RESET button (34)
4 VIDEO INSERT button (54)
5 AUDIO INSERT button (54)
6 TAPE SPEED SP/EP button (31)
7 CHANNEL +/– buttons (36)
8 INPUT SELECT button (38, 53)
9 TV/VTR button (60)

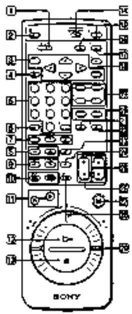
Rear panel



1 AC IN connector
2 RF UNIT switch (59)
3 VHF/UHF connectors (9, 13, 14, 16, 18)
4 CABLE BOX CONTROL (CONTROL S OUT) jack
5 LINE IN 2 AUDIO L/R/VIDEO jacks (52)
6 LINE OUT AUDIO L/R/VIDEO jacks (9, 52)
7 CONTROL S IN jack (56)

Index to parts and controls (continued)

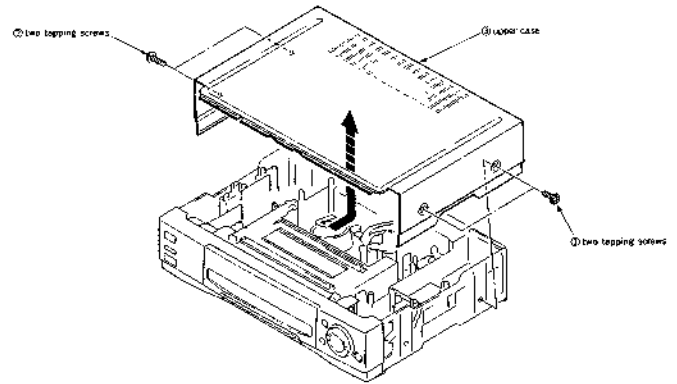
Remote commander



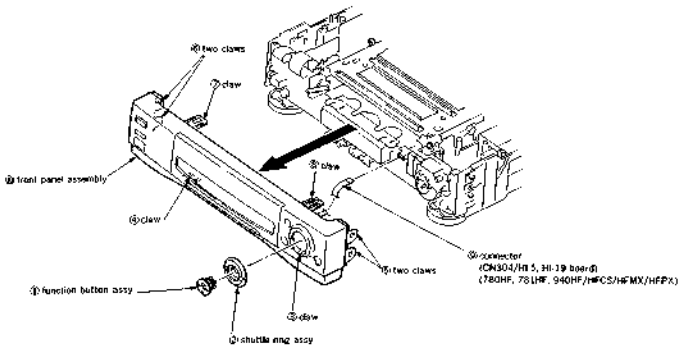
1 COMMAND MODE switch (6)
2 ≜ EJECT button (35)
3 Menu operation buttons (25)
MENU button
CURSOR ↑/↓/←/→ buttons
EXECUTE button
4 COUNTER RESET button (36)
5 Channel number buttons and ENTER button (34)
6 SKIP button (48)
7 TRACKING buttons (50)
▼/▲ NORMAL SLOW (STILL ADJUST) buttons
AUTO/MANUAL button
8 ▷ SLOW button (49)
9 ◁II/II▷ FRAME buttons (49)
10 ◁◁/▷▷ INDEX SEARCH buttons (51)
11 ◁◁/▷▷ SEARCH buttons (35)
12 ▷ PLAY button (35)
13 ■ STOP button (35)
14 TV/VTR remote control switch (6)
15 POWER button
16 TIMER CLEAR button (47)
17 TV/VTR button (60)
18 AUDIO MONITOR button (37)
19 VCR Plus+ buttons (45)
VCR Plus+ button
ONCE button
DAILY button
WEEKLY button
20 AUDIO/VIDEO INSERT buttons (54)
21 COUNTER/REMAIN button (36)
22 DISPLAY button (36)
23 TAPE SPEED button (38)
24 INPUT SELECT button (38, 53)
25 CH +/– buttons (38)
26 VOL +/– buttons (6)
27 II PAUSE button (35)
28 ● REC button (38)
29 DUAL MODE SHUTTLE ring (35, 49)

SECTION 2
DISASSEMBLY

2-1. REMOVAL OF UPPER CASE

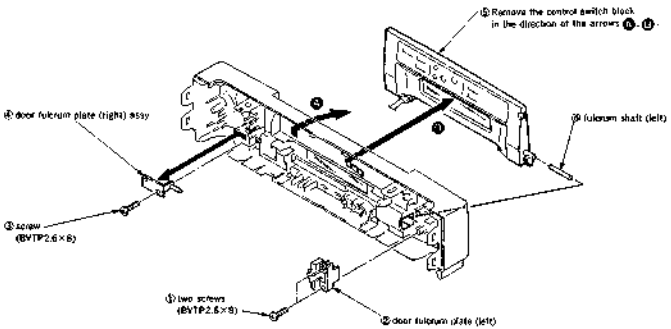


2-2. REMOVAL OF FRONT PANEL ASSEMBLY



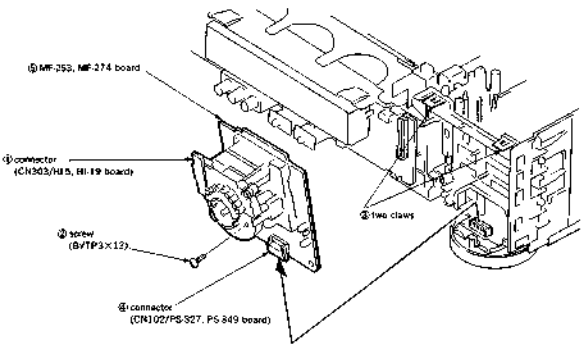
2-3. REMOVAL OF CONTROL SWITCH BLOCK

(780HF, 781HF, 940HF/HFCS/HFMX/HFPX)



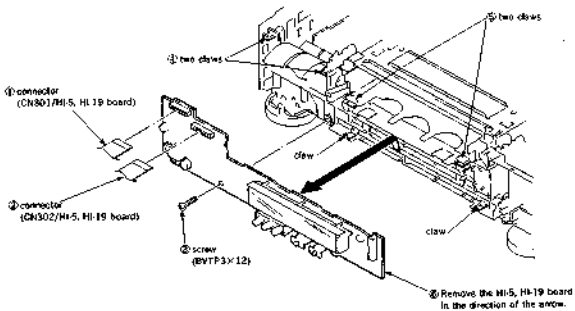
2-4. REMOVAL OF MF-253, MF-274 BOARD

(MF-253 BOARD : EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)
(MF-274 BOARD : 733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)

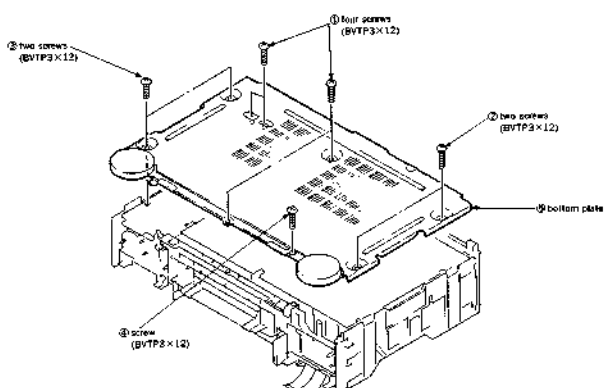


2-5. REMOVAL OF HI-5, HI-19 BOARD

(HI-5 BOARD : EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)
(HI-19 BOARD : 733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)

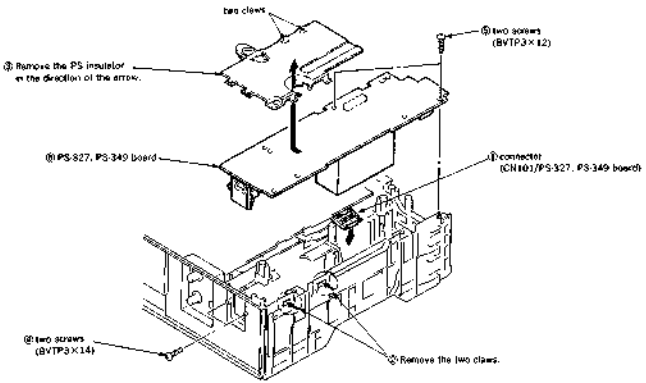


2-6. REMOVAL OF BOTTOM PLATE



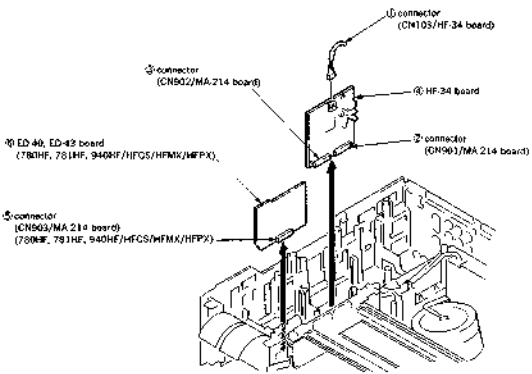
2-7. REMOVAL OF PS-327, PS-349 BOARD

(PS-327 BOARD : EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)
(PS-349 BOARD : 733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)



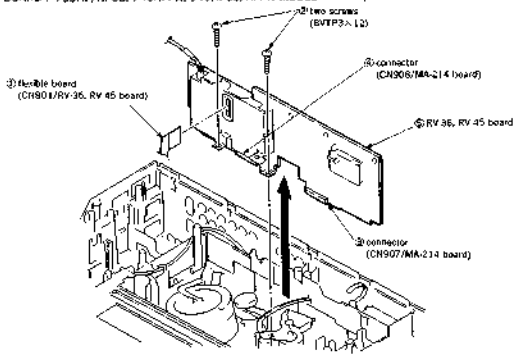
2-8. REMOVAL OF ED-40, ED-43 BOARD AND HF-34 BOARD

(ED-40 BOARD : 740HF, 741HF, 780HF, 781HF, 940HF/HFMX MODEL)
(ED-43 BOARD : 740HFPX, 940HFCS/HFPX MODEL)

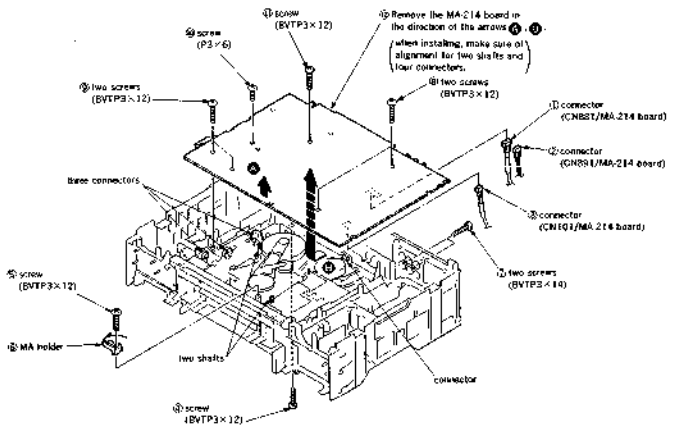


2-9. REMOVAL OF RV-36, RV-45 BOARD

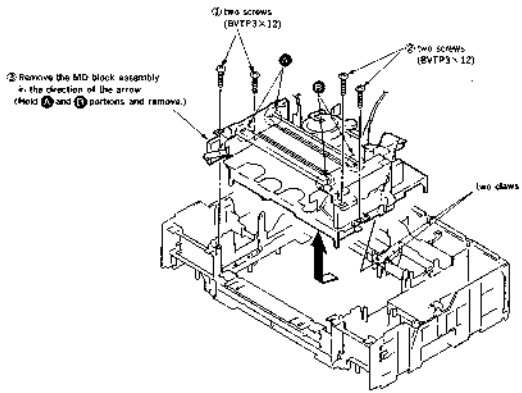
(RV-36 BOARD : EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)
(RV-45 BOARD : 733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL



2-10. REMOVAL OF MA-214 BOARD



2-11. REMOVAL OF MD BLOCK ASSEMBLY

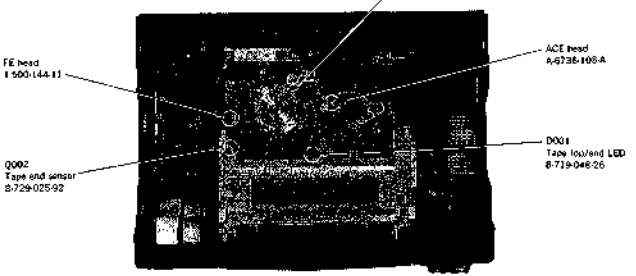


2-12. MECHANICAL (INTERNAL VIEWS

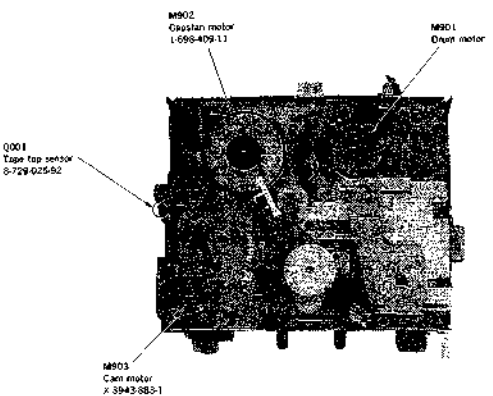
—Upper side—

M901

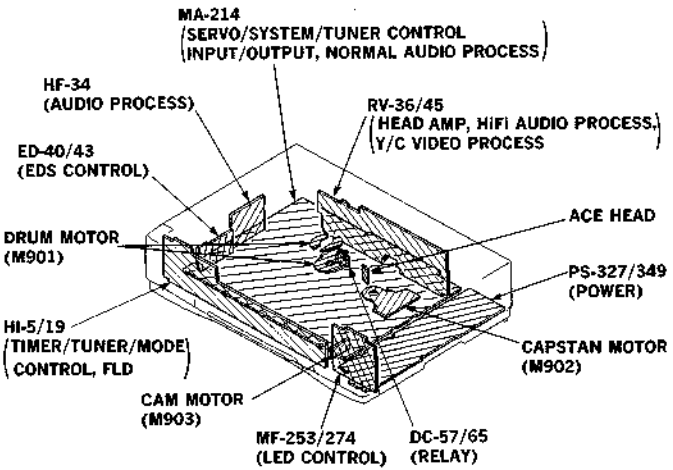
Drum assy	8-848-576-12 (DZH-45A-R) (EXCEPT 940HF/HFCS/HFMX/HFPX)
	8-848-593-12 (DZH-51A-R) (940HF/HFCS/HFMX/HFPX)
Rotary upper drum assy	8-848-576-02 (DZR-45-R) (EXCEPT 940HF/HFCS/HFMX/HFPX)
	8-848-590-02 (DZR-51-R) (940HF/HFCS/HFMX/HFPX)



—Lower side—



2-13. CIRCUIT BOARDS LOCATION

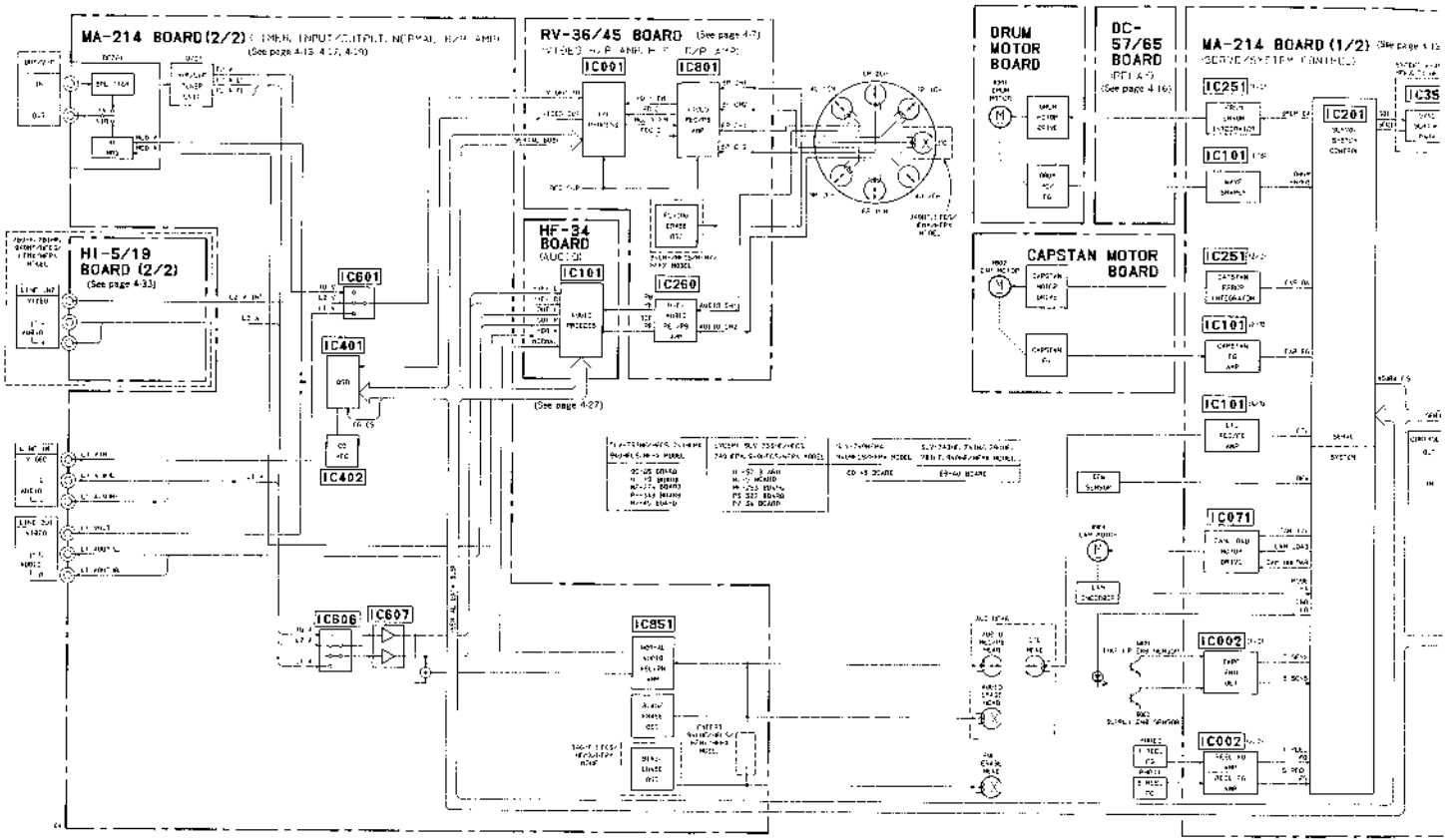


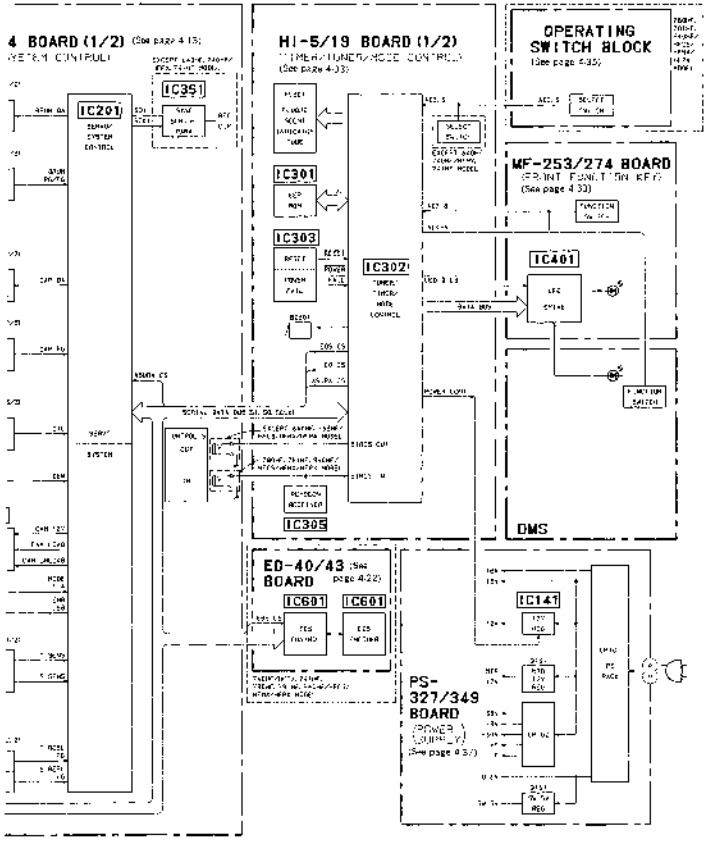
SLV-733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL	EXCEPT SLV-733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL	SLV-740HFPX, 940HFCS/HFPX MODEL	SLV-740HF, 741HF, 780HF, 781HF, 940HF/HFMX MODEL
DC-65 BOARD HI-19 BOARD MF-274 BOARD PS-349 BOARD RV-45 BOARD	DC-57 BOARD HI-5 BOARD MF-253 BOARD PS-327 BOARD RV-36 BOARD	ED-43 BOARD	ED-40 BOARD

SECTION 3
BLOCK DIAGRAMS

3-1. OVERALL BLOCK DIAGRAM

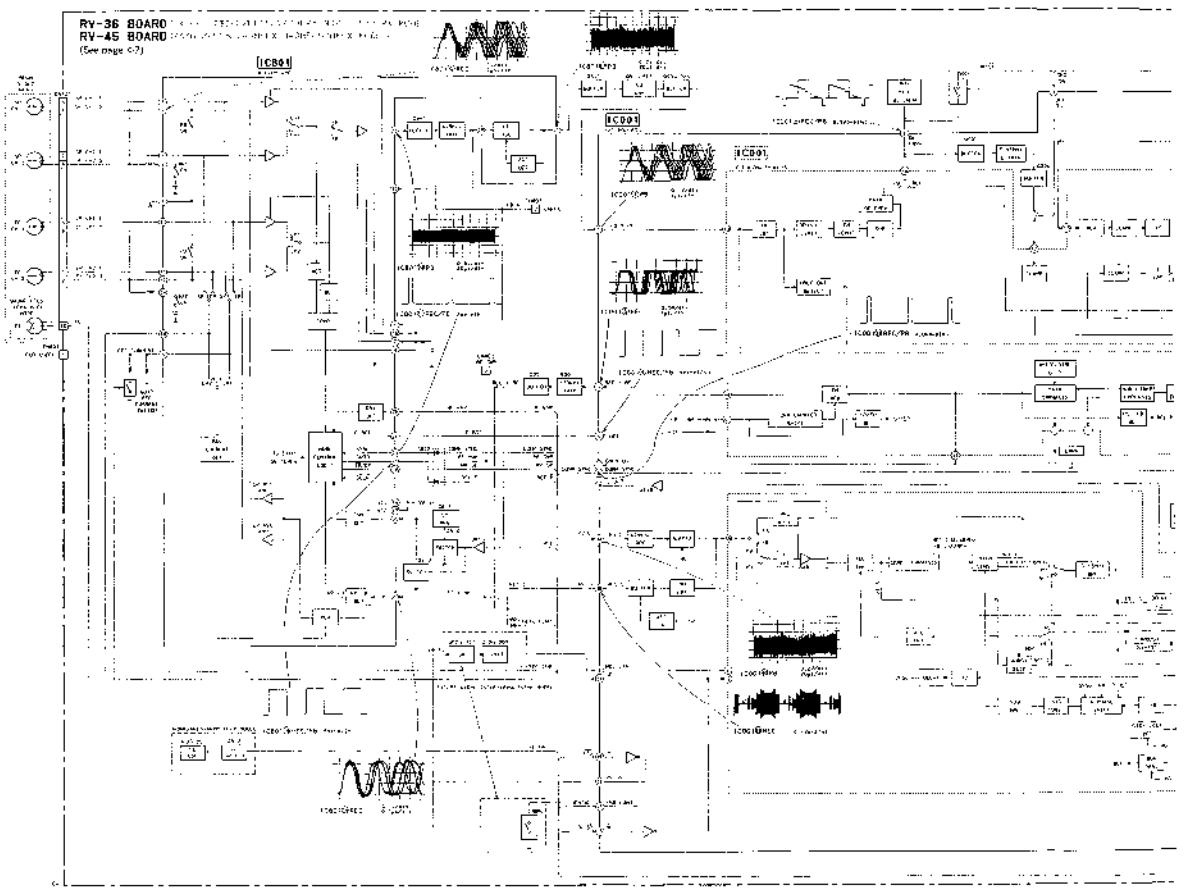
* The boards which signals only pass through may be omitted.

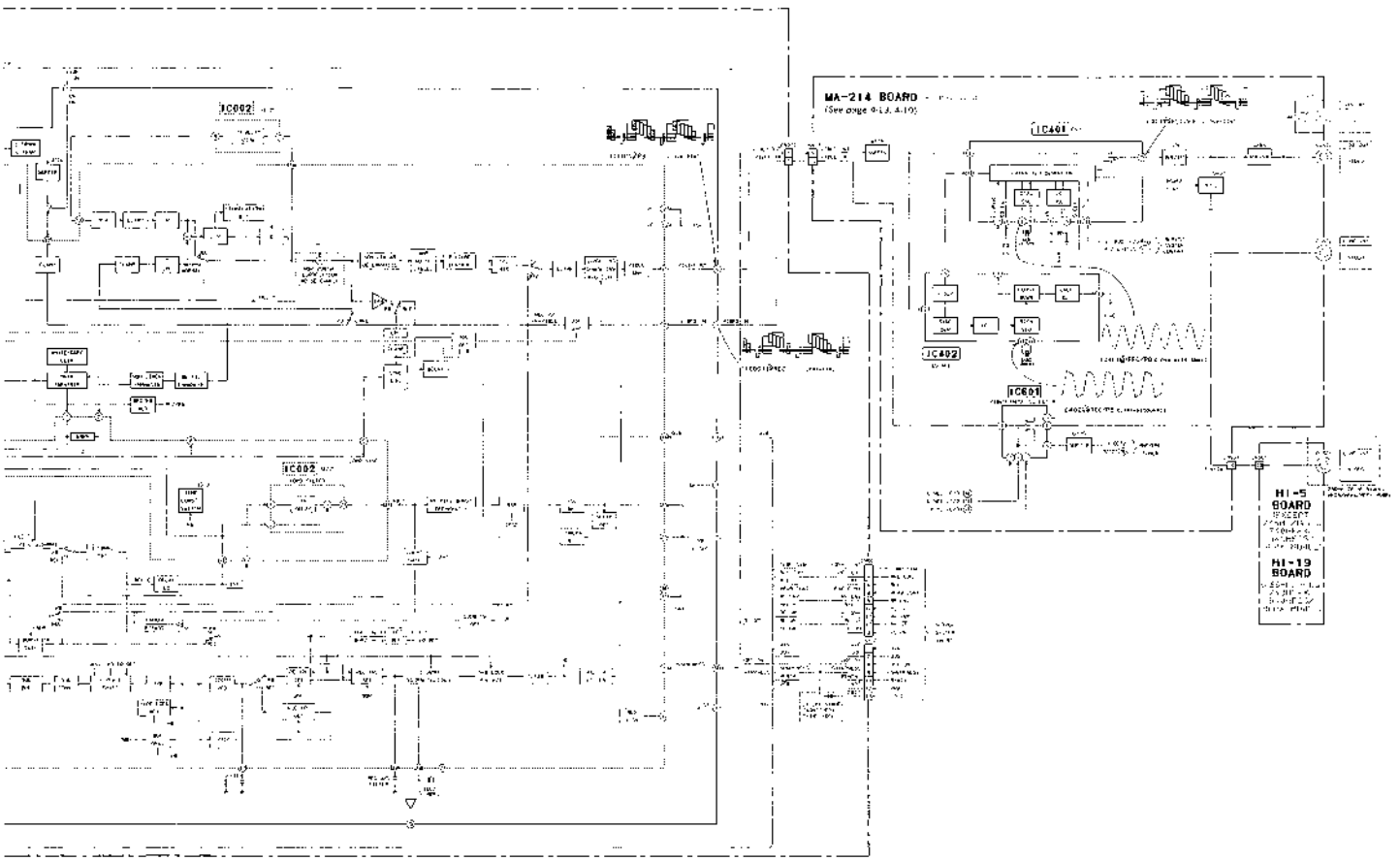



4 BOARD (1/2)
HI-5/19 BOARD (1/2)
OPERATING
SWITCH BLOCK
MF-253/274 BOARD
IC201
IC351
IC301
IC303
IC302
IC401
IC305
DMS
ED-40/43
BOARD
IC601
IC141
PS-
327/349
BOARD

3-2. VIDEO BLOCK DIAGRAM

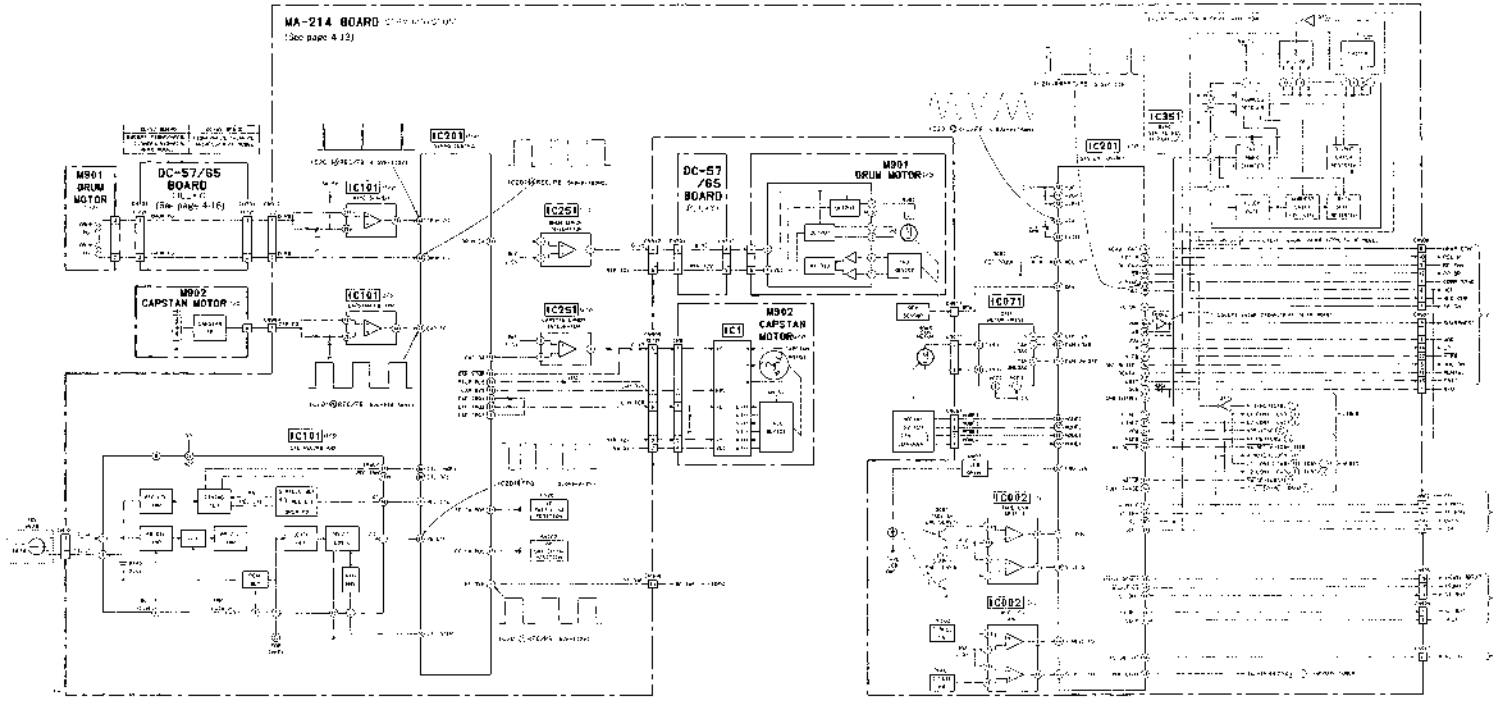
* The boards which signals only pass through may be omitted.




IC002
IC002
MA-214 BOARD
IC401
IC402
IC601
HI-5
BOARD
HI-19
BOARD

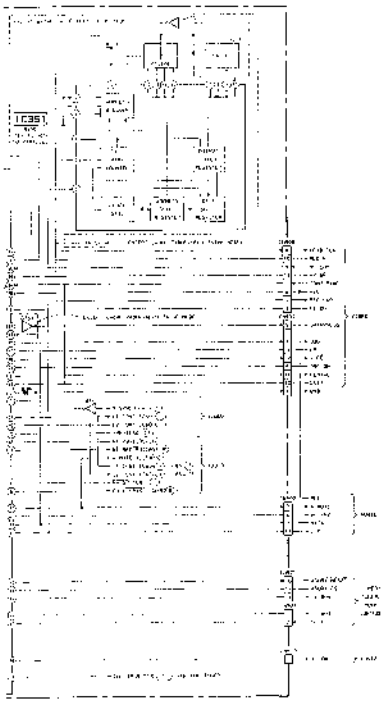
3-3. SERVO, SYSTEM CONTROL BLOCK DIAGRAM

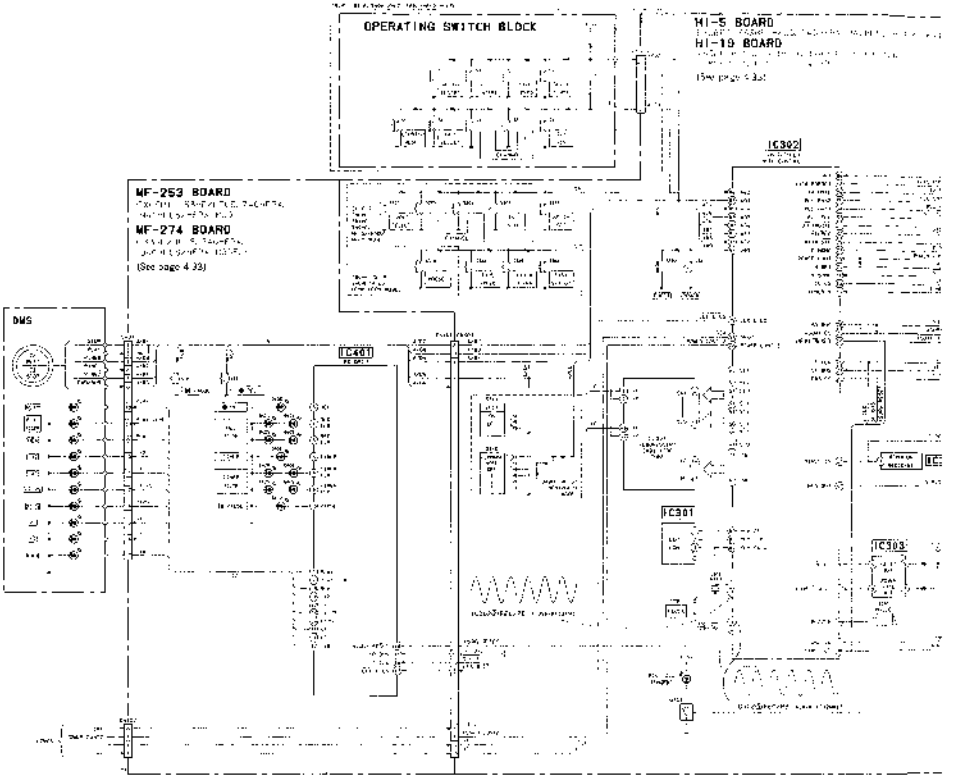
• The boards which signals only pass through may be omitted.



3-4. TIMER, TUNER, MODE CONTROL BLOCK DIAGRAM

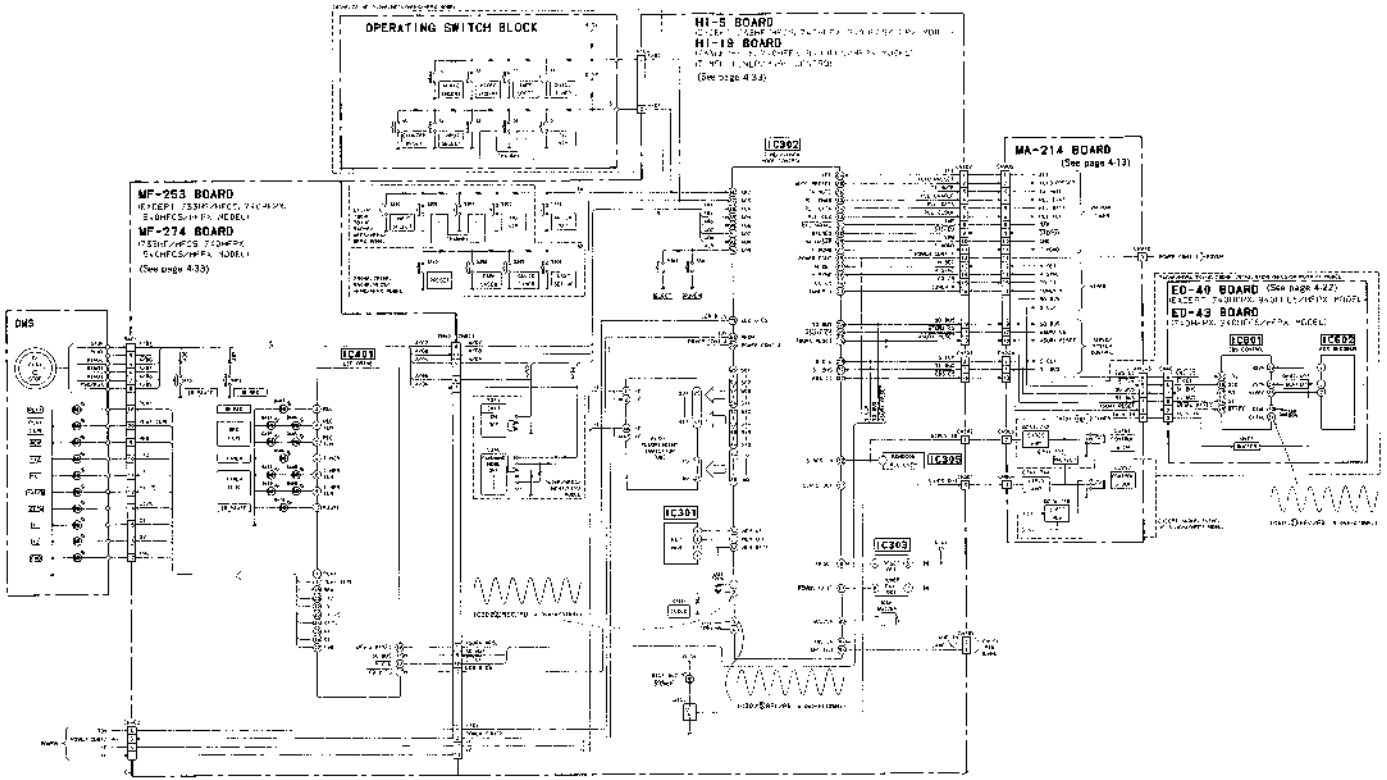
• The boards which signals only pass through may be omitted.





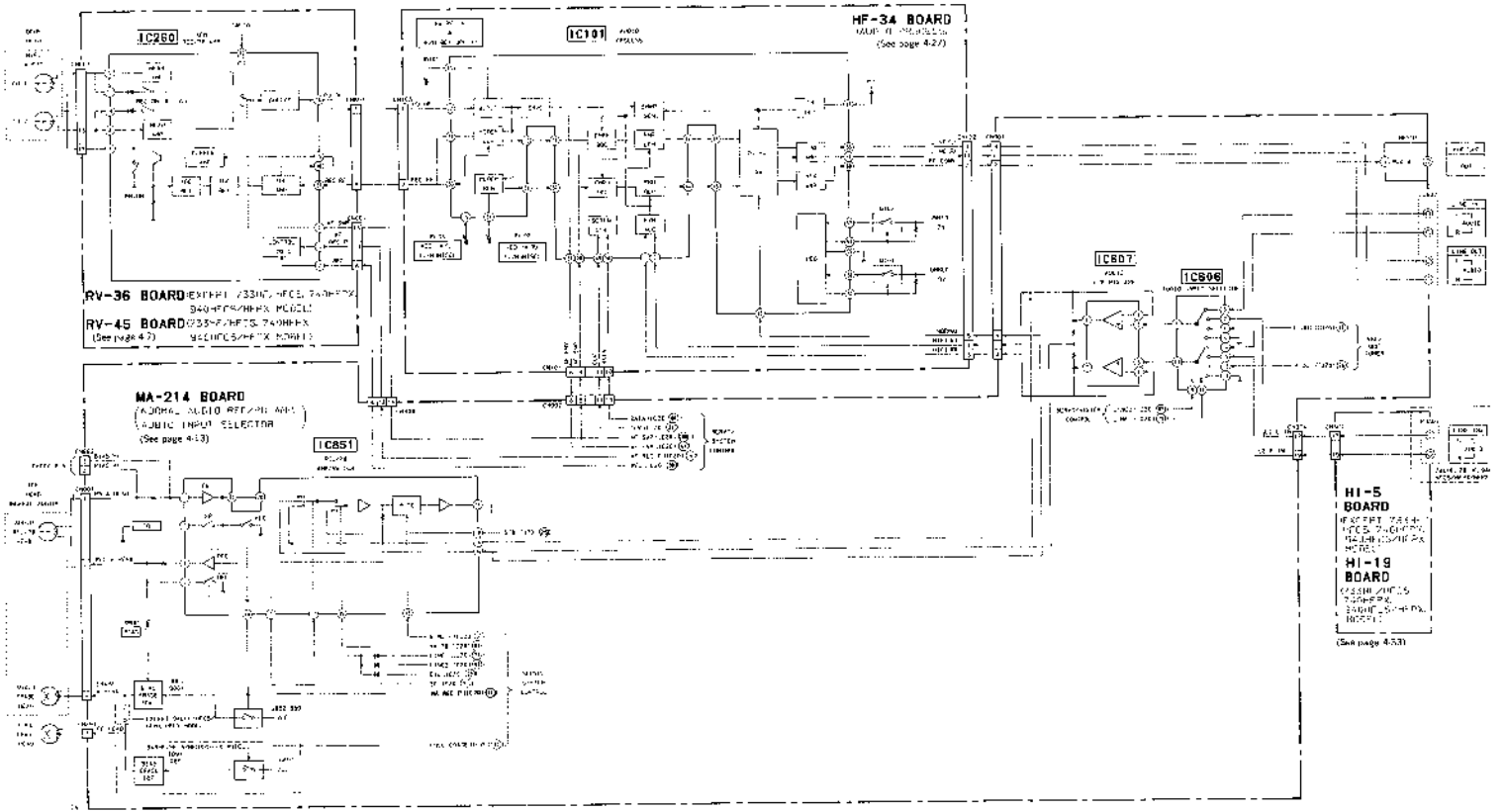
3-4. TIMER, TUNER, MODE CONTROL BLOCK DIAGRAM

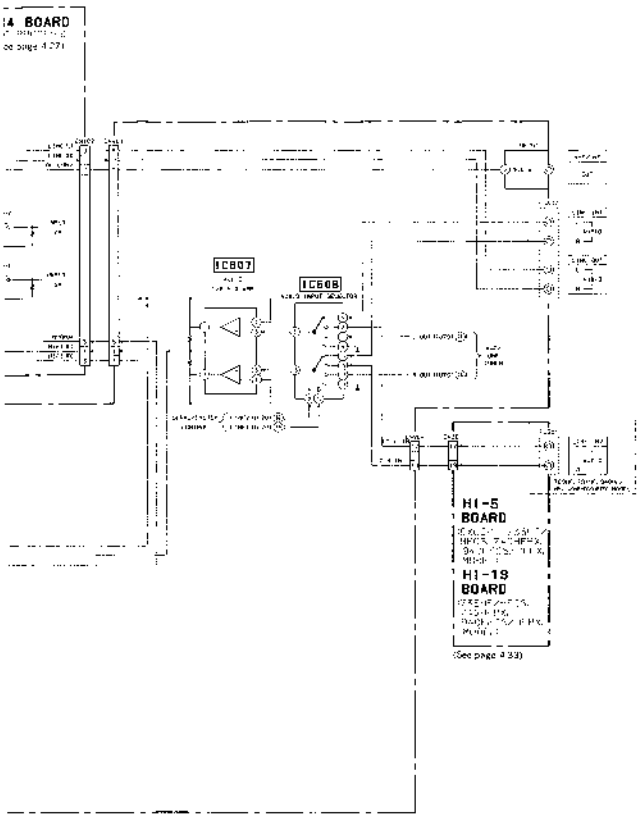
• The boards which signals only pass through may be omitted.



3-5. AUDIO BLOCK DIAGRAM

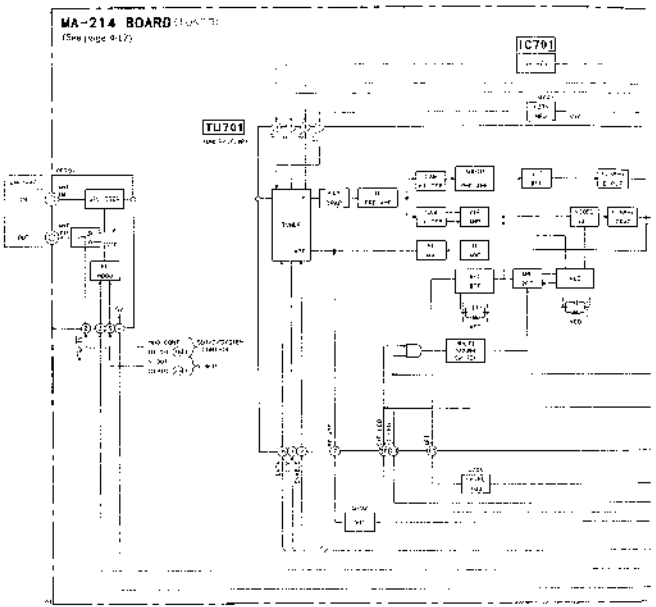
* The boards which signals only pass through may be omitted.





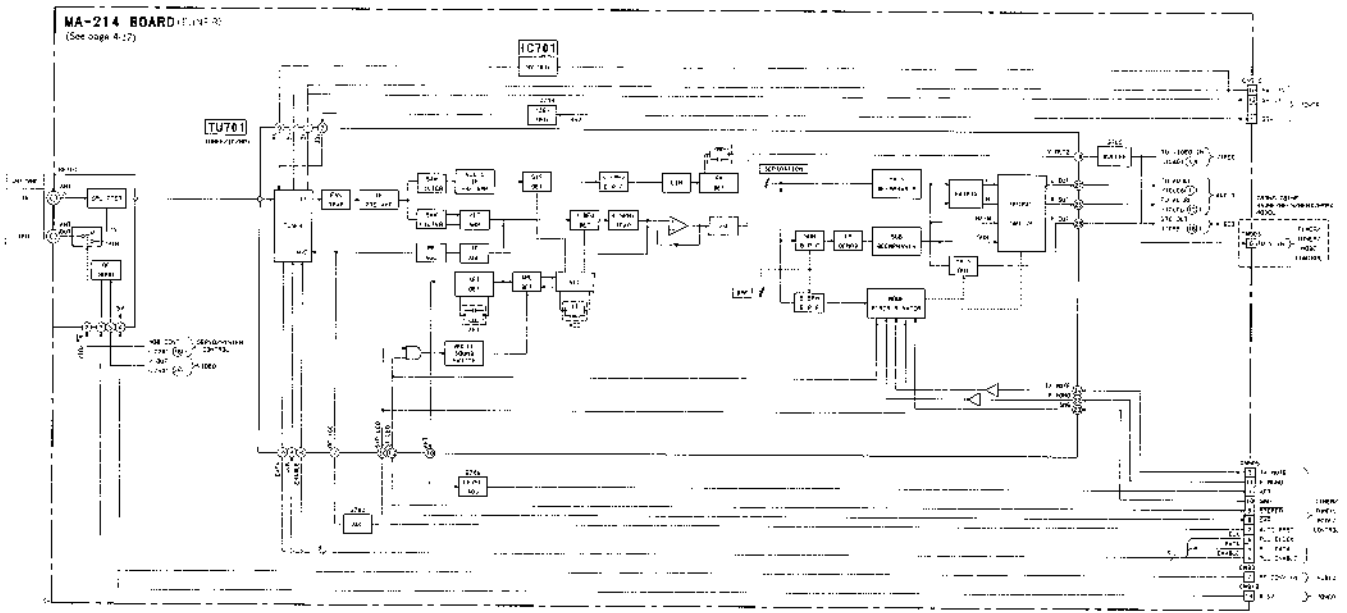
3-6. TUNER BLOCK DIAGRAM

• The boards which signals only pass through may be omitted.



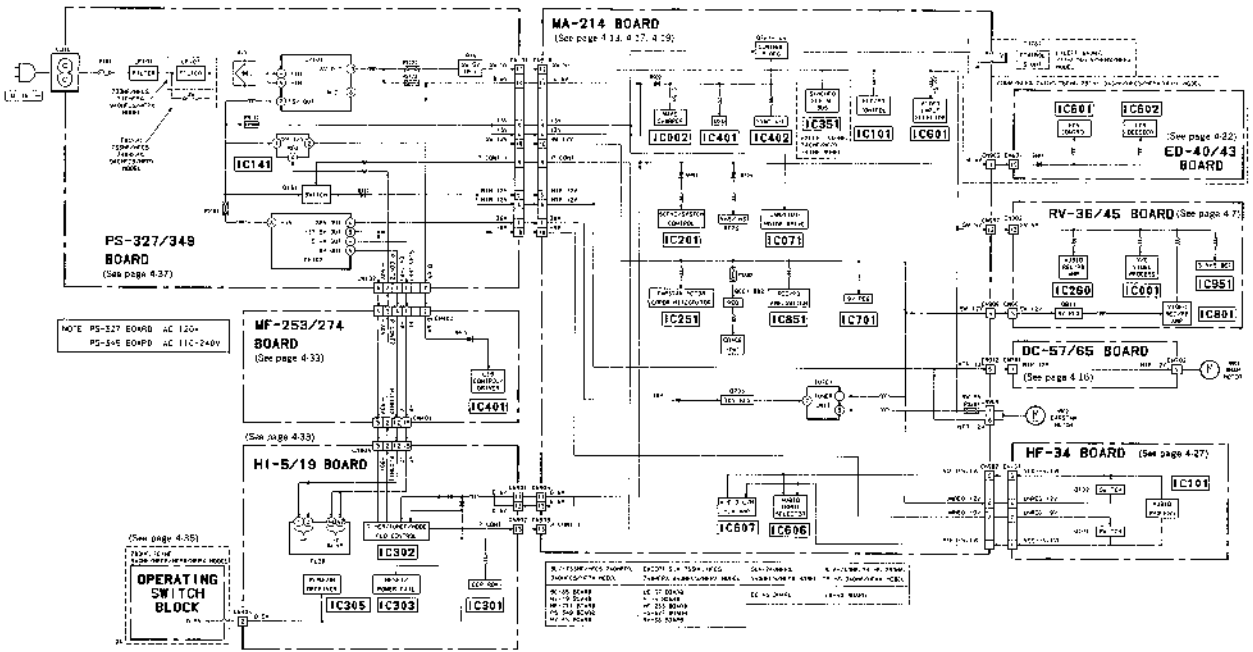
3-6. TUNER BLOCK DIAGRAM

• The boards which signals only pass through may be omitted.



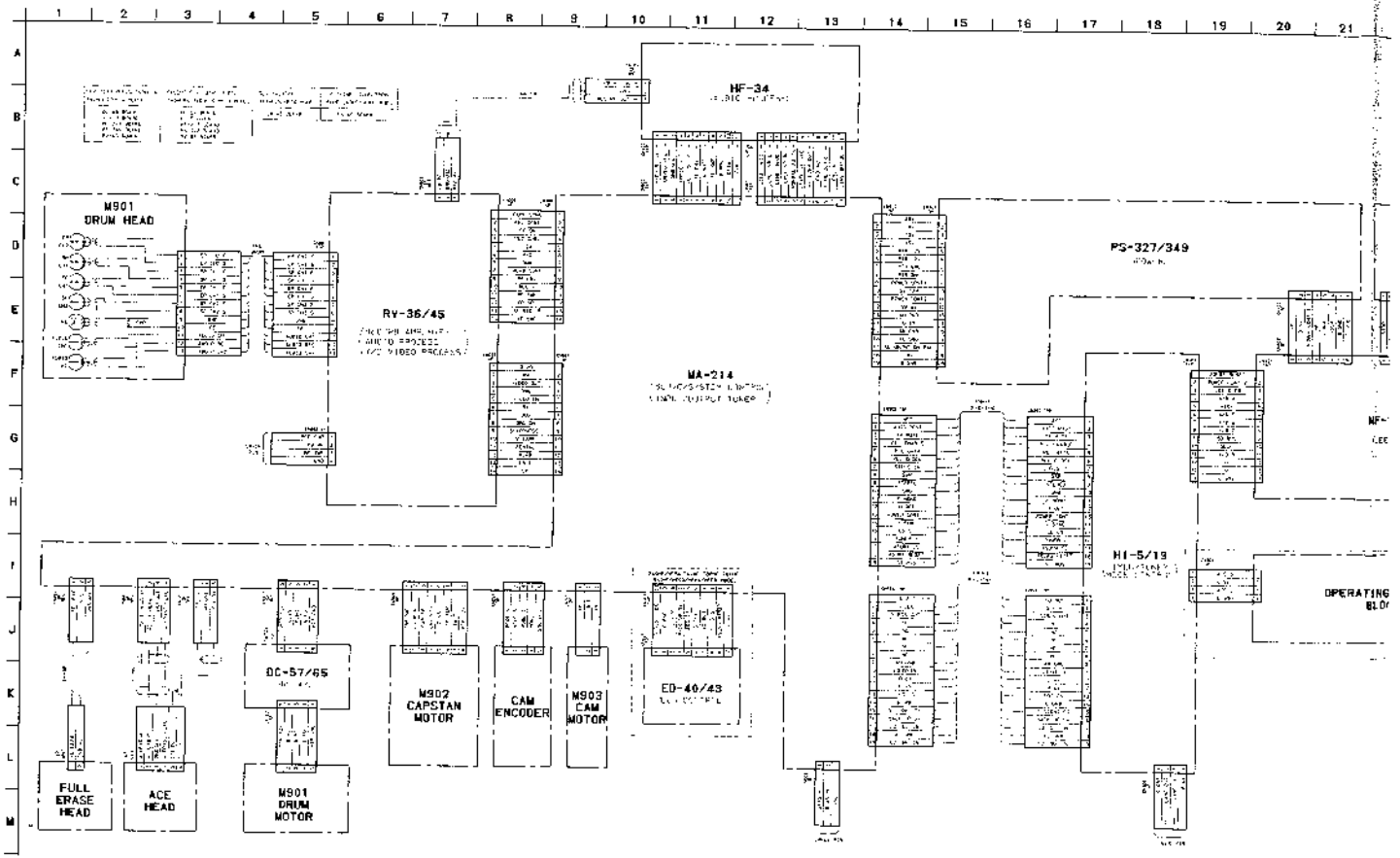
3-7. POWEOR BLOCK DIAGRAM

• The boards which signals only pass through may be omitted.



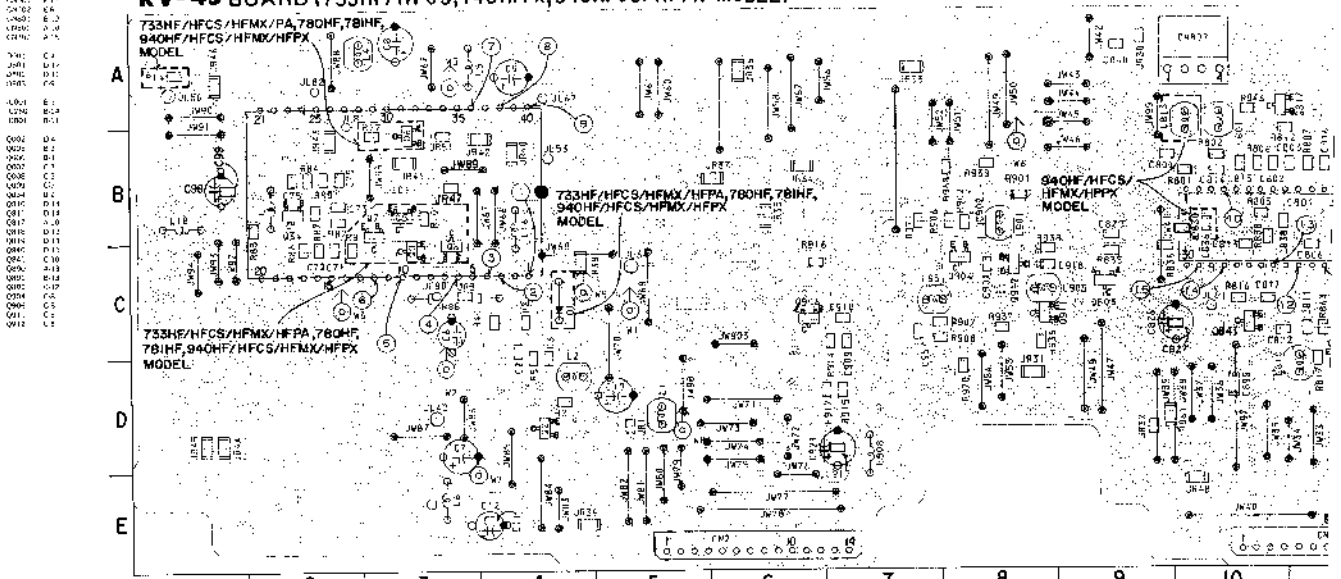
SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

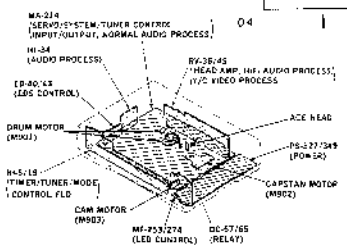
4-1. FRAME SCHEMATIC DIAGRAMS



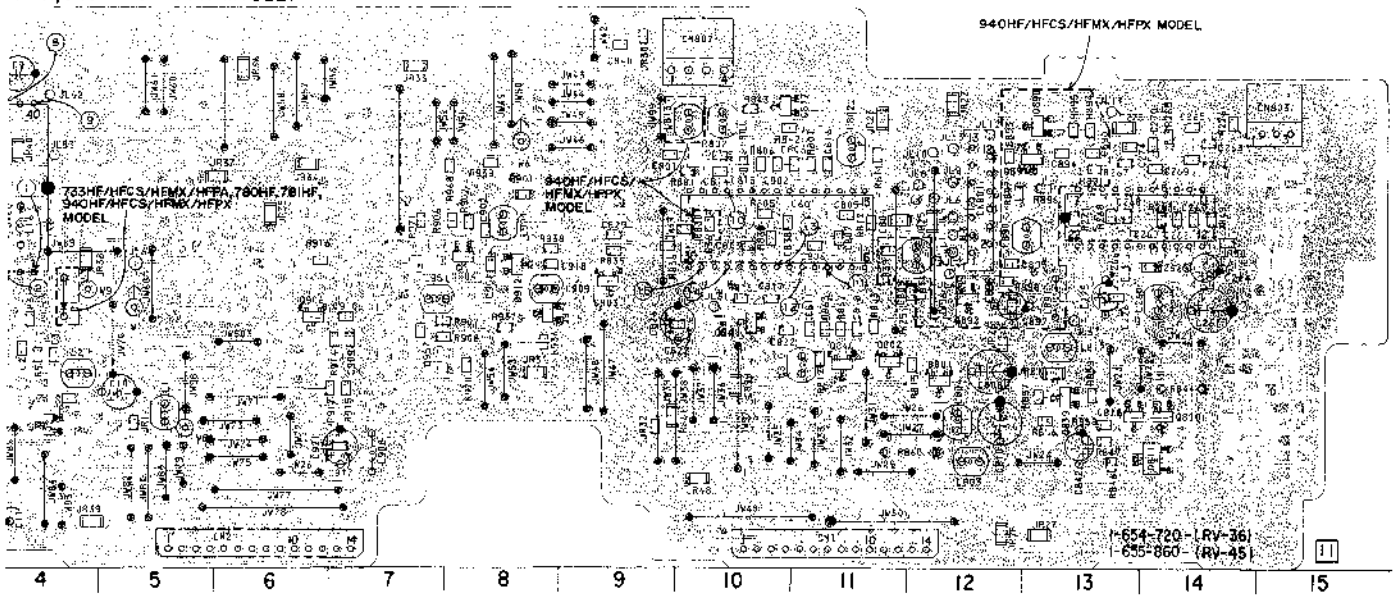
RV-36/45 (Y/C VIDEO PROCESS, HiFi AUDIO, HEAD AMP) PRINTED WIRING BOARD
Ref. No. RV-36 IS BOARD. 2000 series

RV-36 BOARD (EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)
RV-45 BOARD (733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)



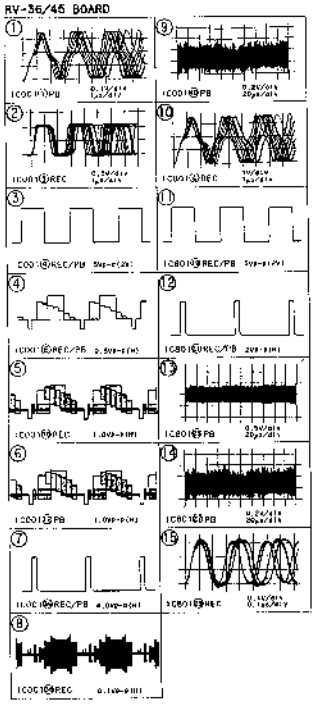


1FCS,740HFPX,940HFCS/HFPX MODEL)
HFPX,940HFCS/HFPX MODEL)



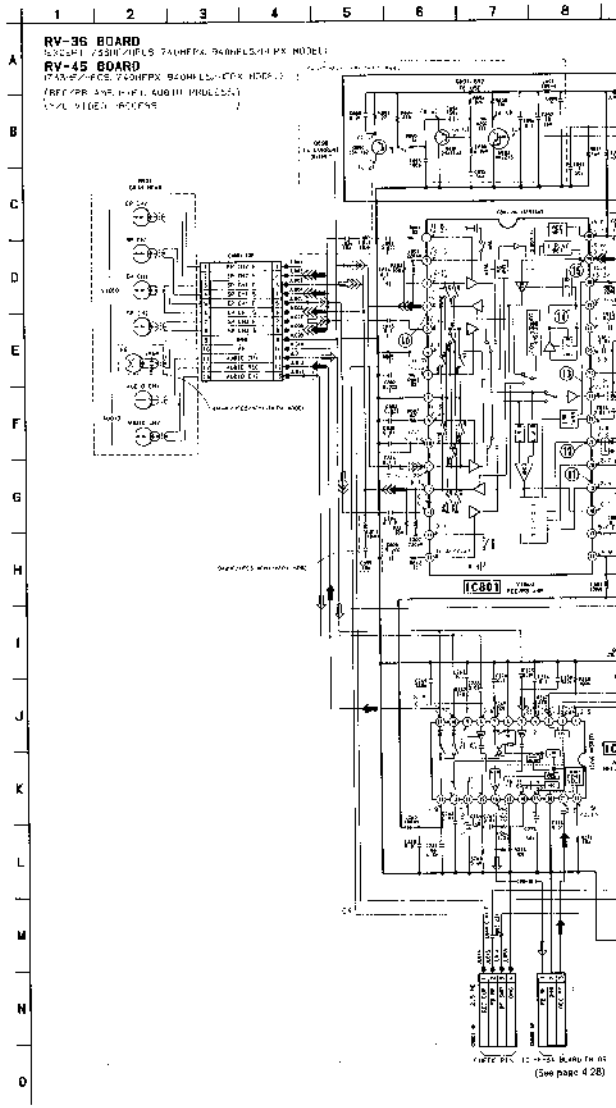
RV-36/45 (Y/C VIDEO PROCESS, HiFi AUIDO, HEAD AMP) SCHEMATIC DIAGRAM

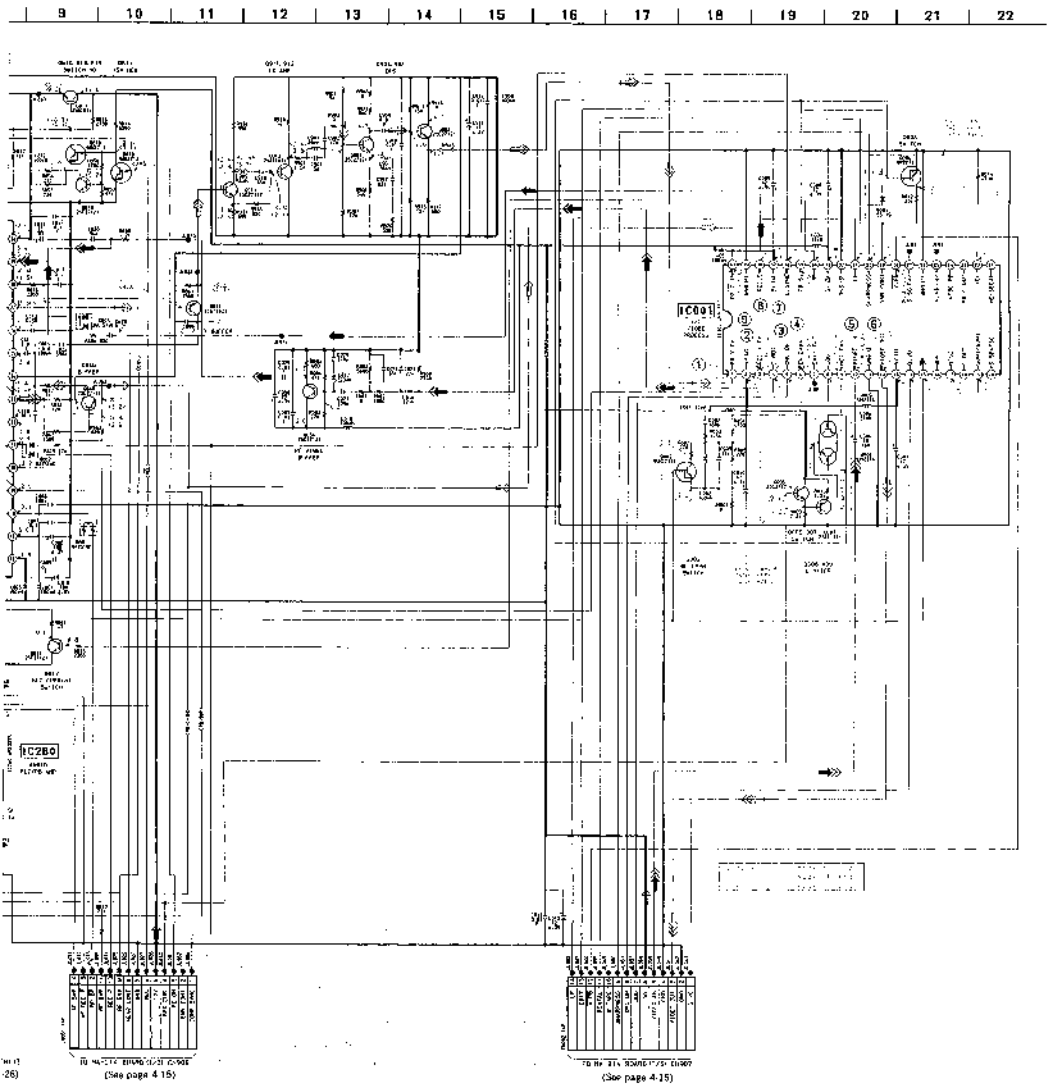
— Ref. No. RV-36/45 BOARD : 2,000 series —



▪ Signal path

	VIDEO Signal			AUDIO Signal
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡	➡
PB	⇨	⇨	⇨	⇨

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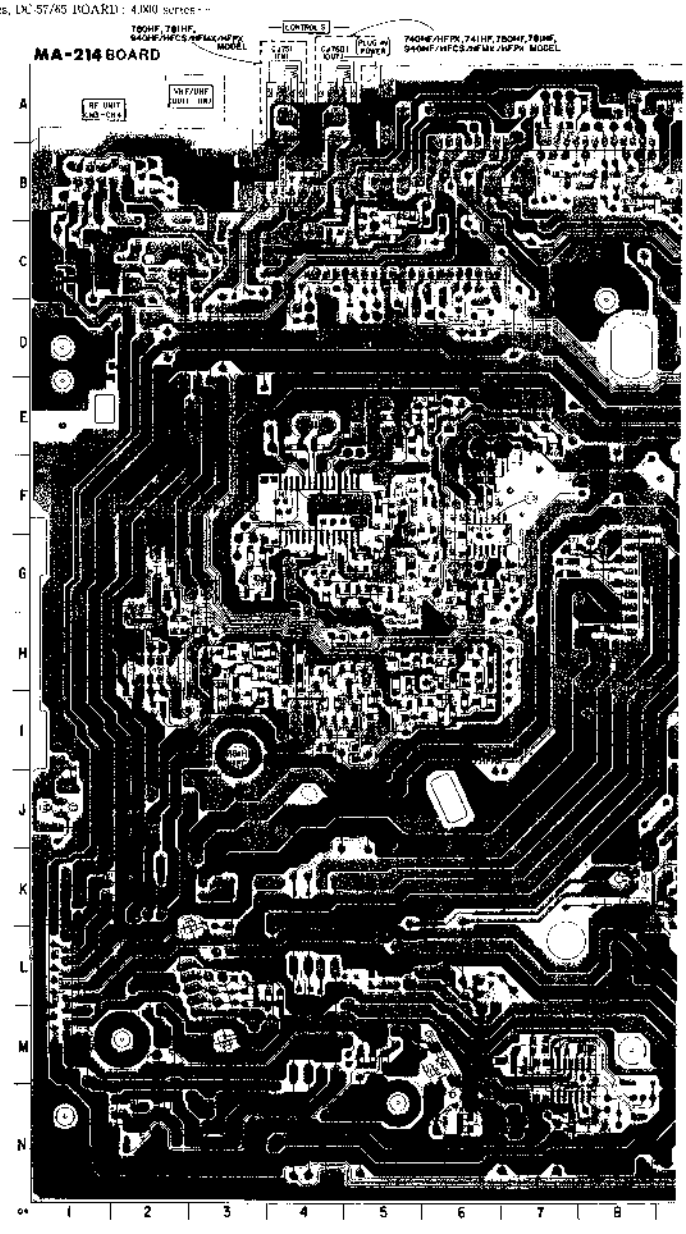
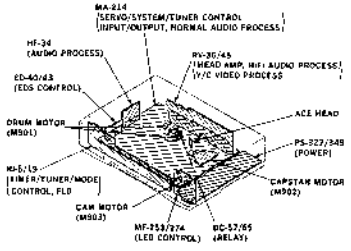
IC001
IC280
(See page 4-15)
(See page 4-15)

MA-214 (SERVO/SYSTEM CONTROL), DC-57/65 (RELAY) PRINTED WIRING BOARDS

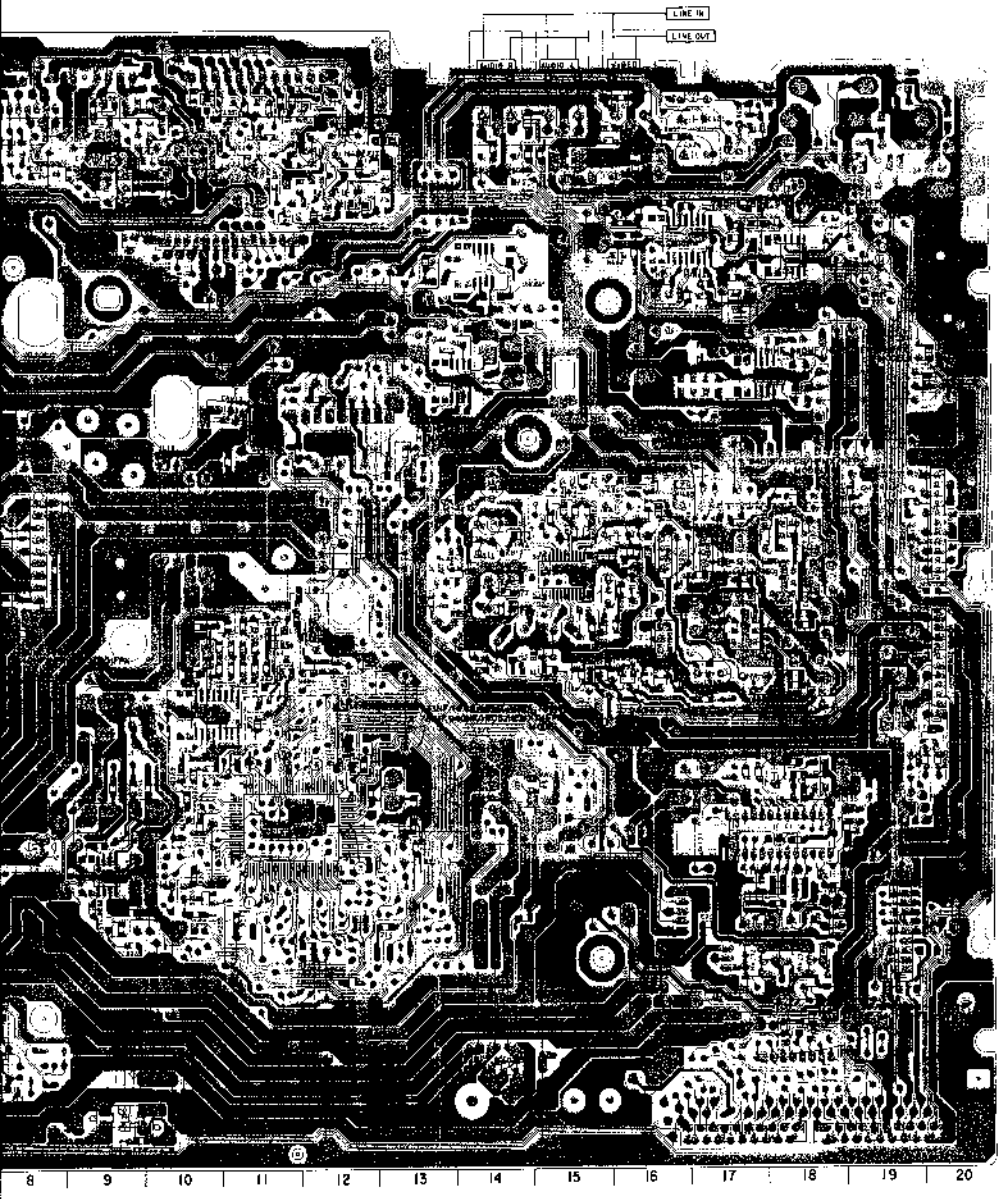
-- Ref. No. MA-214 BOARD : 1,000 series, DC-57/65 BOARD : 4,000 series --





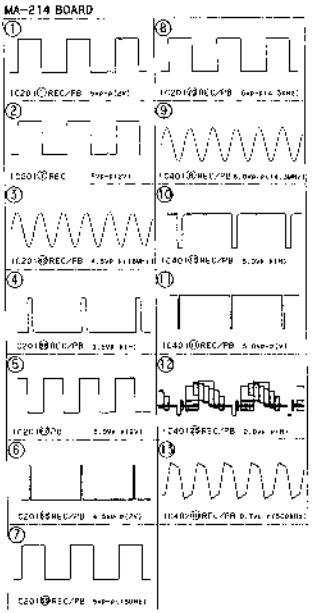
DC-57BOARD (EXCEPT 733HF/HFCS,740HFPX,940HFCS/HFPX MODEL)
DC-65BOARD (733HF/HFCS,740HFPX,940HFCS/HFPX MODEL)

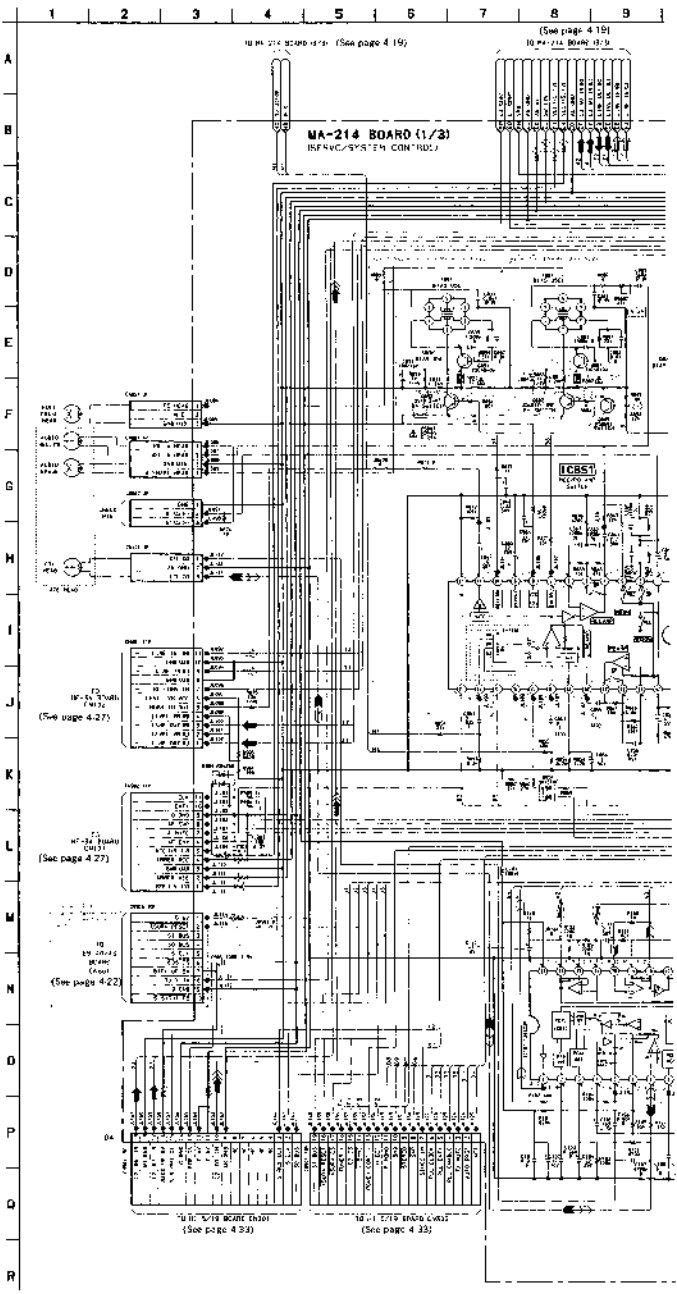
1-654-725-(DC-57)
1-655-865-(DC-65)



MA-214 (SERVO/SYSTEM CONTROL), DC-57/65 (RELAY) SCHEMATIC DIAGRAMS

– Ref. No. MA-214 BOARD : 1,000 series, DC-57/65 BOARD : 4,000 series –



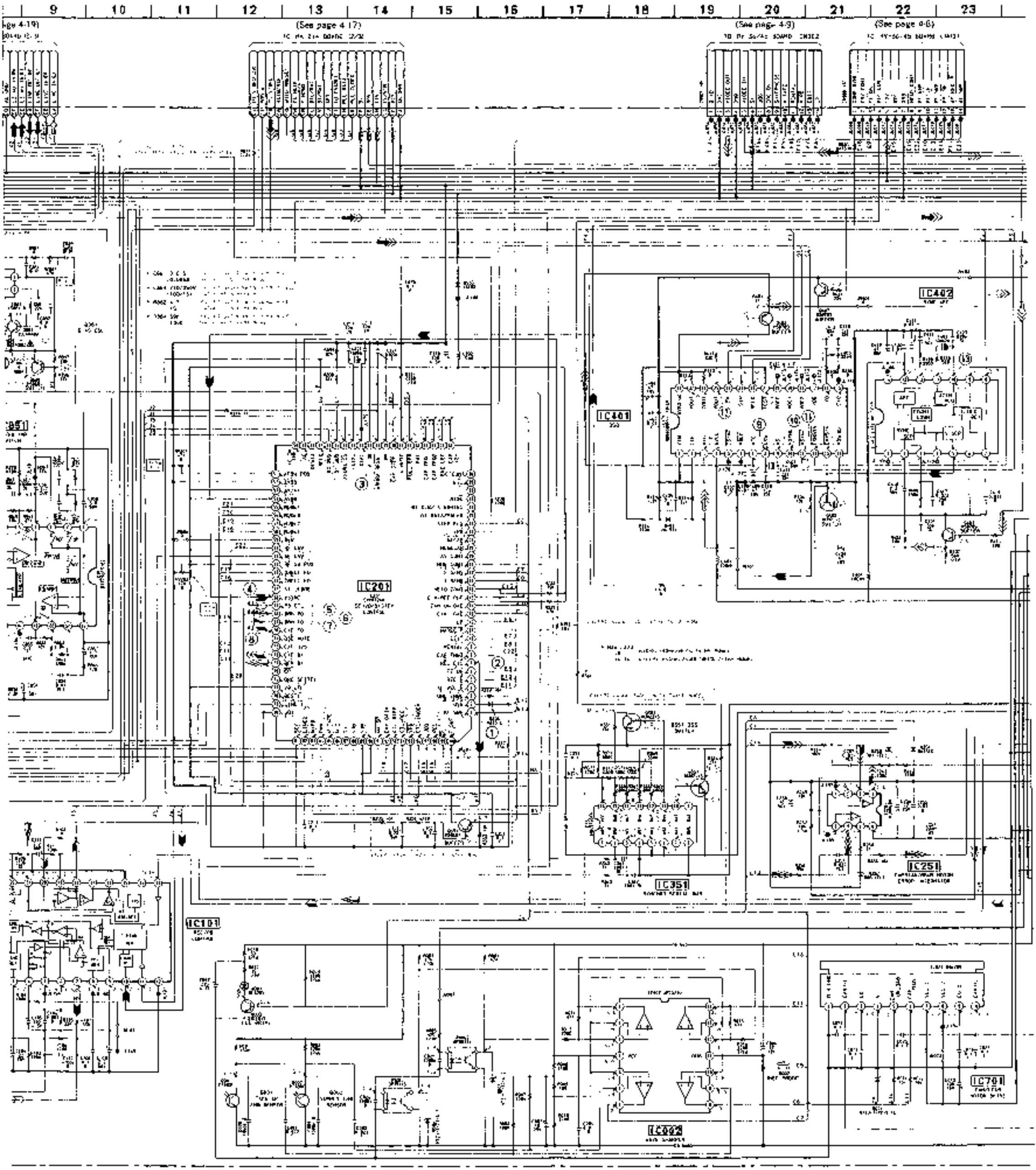


• Signal path

	VIDEO Signal			AUDIO Signal
	C-PB/PB4	Y	Y/C-PB/PB4	
REC			⇦	➡
PB			⇨	⇨

• Signal path

	REC	REC/PB	PB
		⇨	
		⇨	
		⇨	
		⇨	
		⇨	
Ref signal	➡		⇨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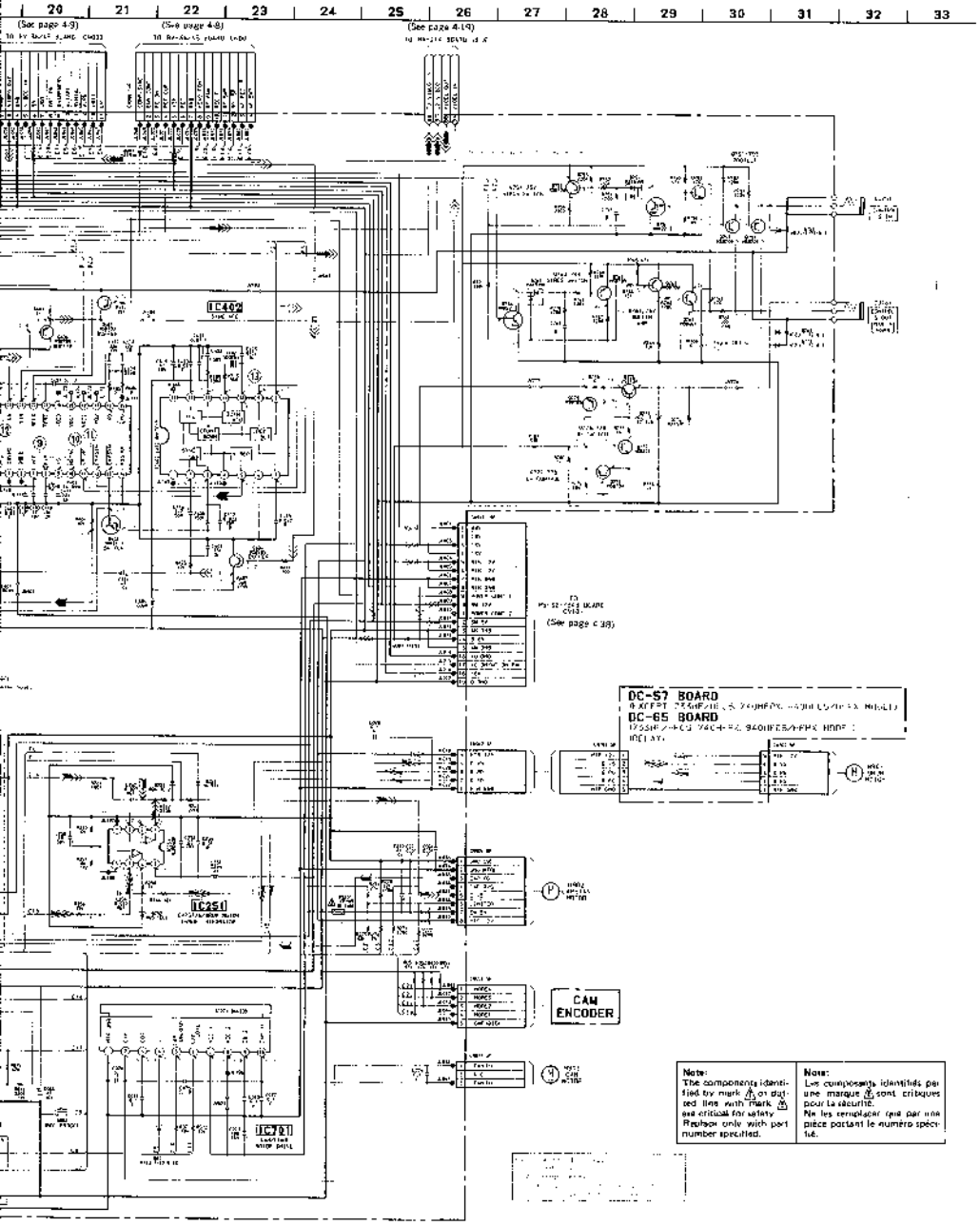
23
(See page 4-17)
(See page 4-9)
(See page 4-6)
IC201
IC401
IC402
IC351
IC251
IC101
IC701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29
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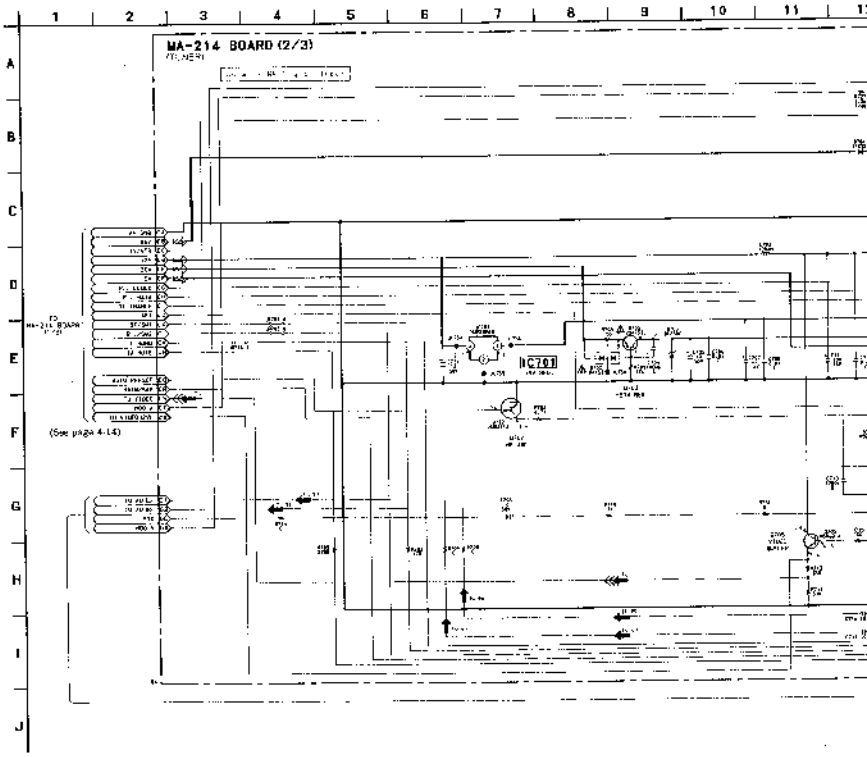
31
32
33
(See page 4-9)
(See page 4-8)
(See page 4-19)
IC402
IC251
IC701
DC-57 BOARD
DC-65 BOARD
CAM ENCODER
Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.
Note:
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

SLV-640HF/733HF/740HF/741HF/760HF/781HF/940HF SERIES

MA-214 (INPUT/OUTPUT, TUNER) SCHEMATIC DIAGRAM

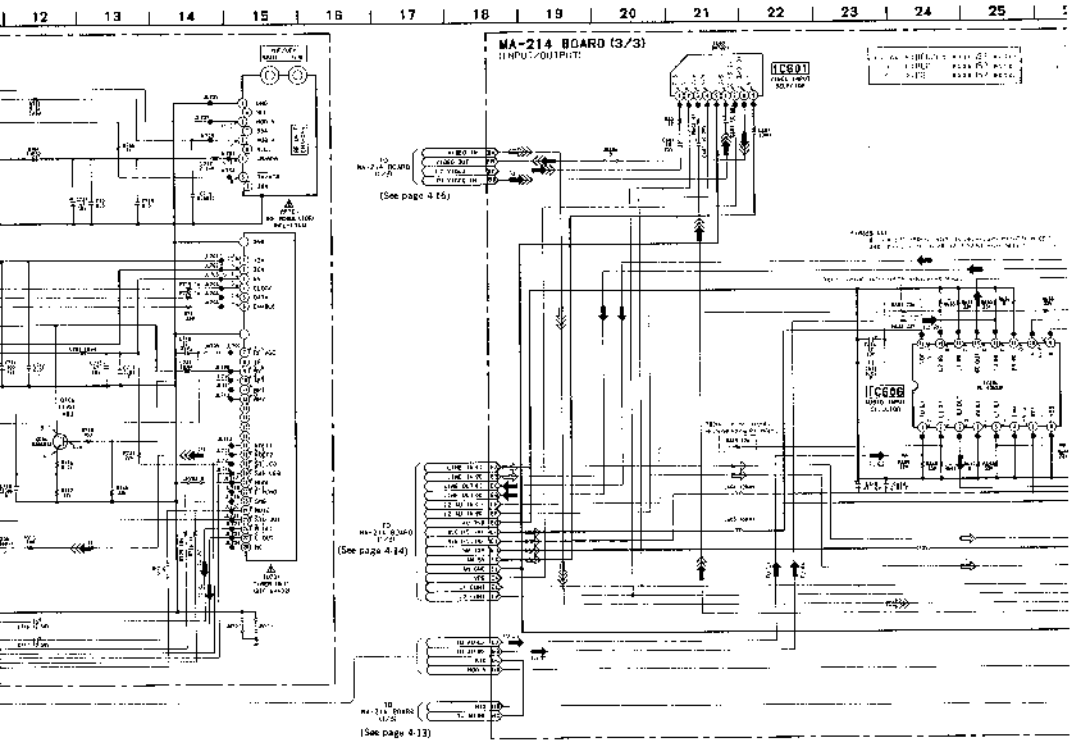
— Ref. No. MA-214 BOARD : 1400 series —

• Refer to page 4-10 for Printed Wiring Board.



• Signal path

	VIDEO Signal			AUDIO Signal
	CHROMA	Y	Y/CHROMA	
REC			➡	➡
PB			⇨	⇨


12
13
14
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16
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18
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21
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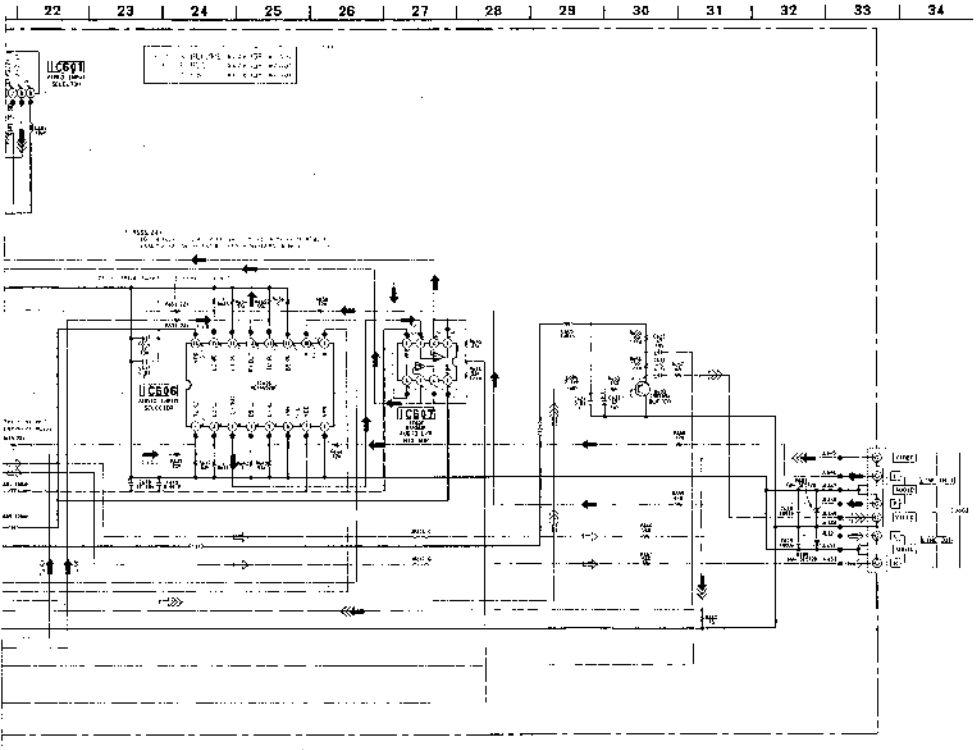
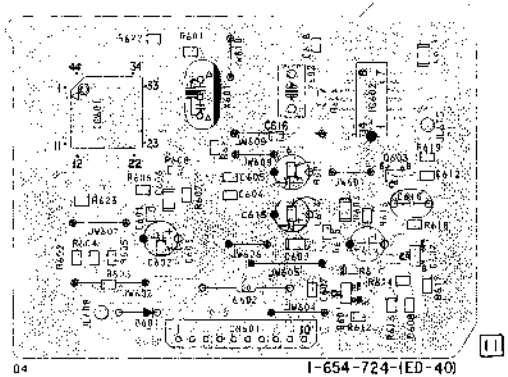
24
25
MA-214 BOARD (3/3)
INPUT/OUTPUT
IC601
IC606
(See page 4-16)
(See page 4-14)
(See page 4-13)



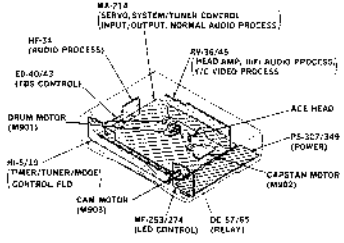
Note:	Nota:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

ED-40/43 (EDS CONTROL) PRINTED WIRING BOARD
– Ref. No. ED-40/43 BOARD : 3300 series –

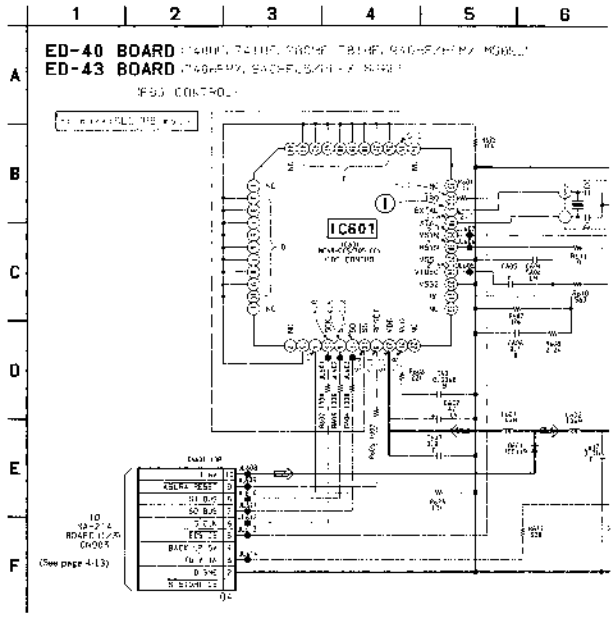
ED-40 BOARD (740HF, 741HF, 780HF, 781HF, 940HF/HFMX MODEL)
ED-43 BOARD (740HFPX, 940HFCS/HFPX MODEL)



I-654-724-(ED-40)
I-655-864-(ED-43)



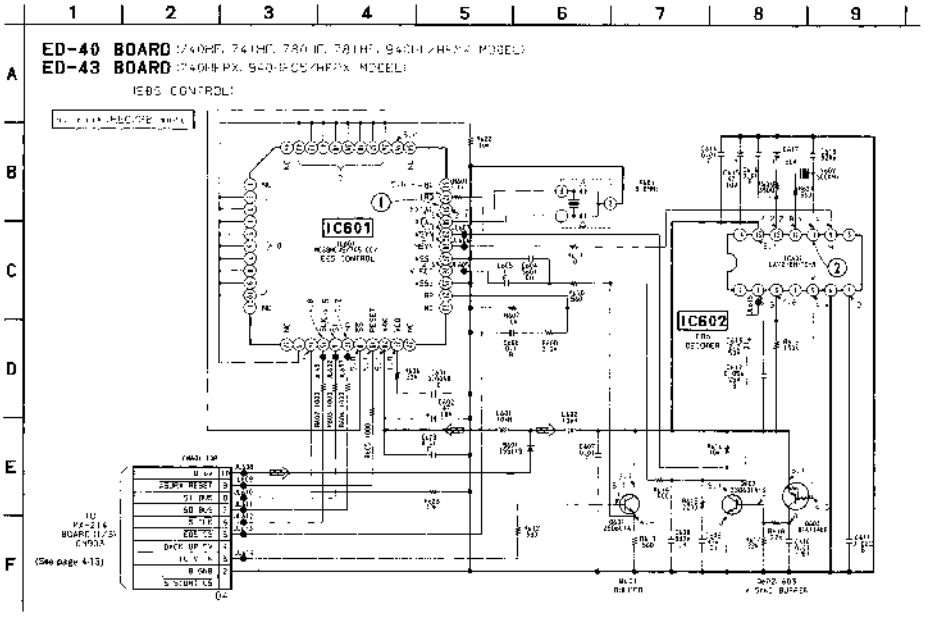
ED-40/43 (EDS CONTROL) SCHEMATIC DIAGRAM
– Ref. No. ED-40/43 BOARD : 3300 series –

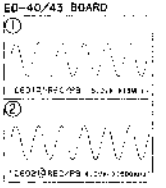


(FMX MODEL)

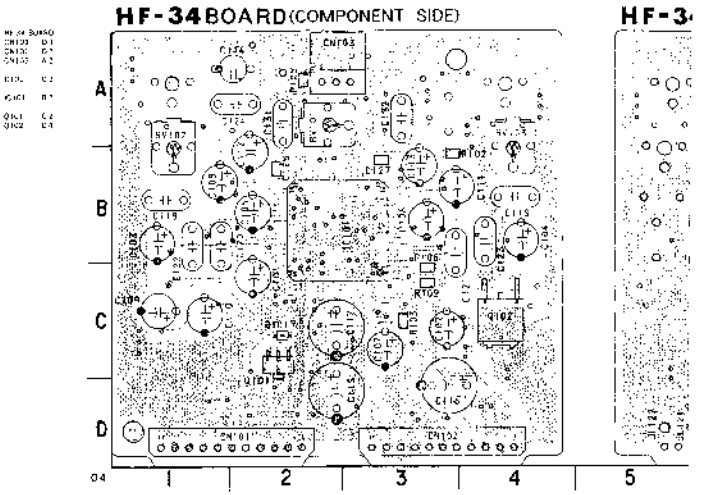
ED-40/43 (EDS CONTROL) SCHEMATIC DIAGRAM

- Ref. No. ED-40/43 BOARD : 3,000 series -

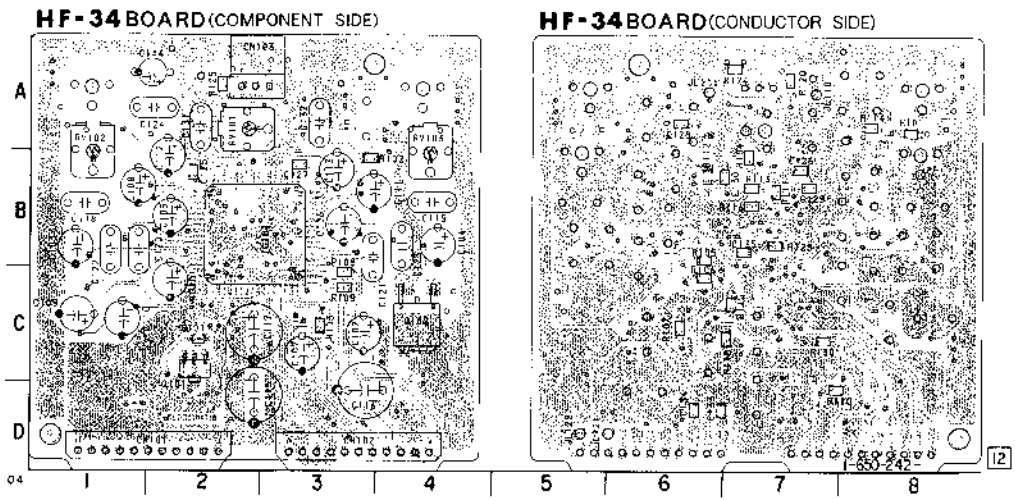


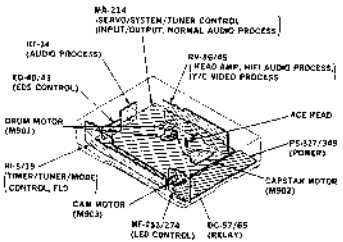


HF-34 (AUDIO PROCESS) PRINTED WIRING BOARD
— Ref. No. HF-34 BOARD : 1000 series



HF-34 (AUDIO PROCESS) PRINTED WIRING BOARD
- Ref. No. HF-34 BOARD : 4000 series

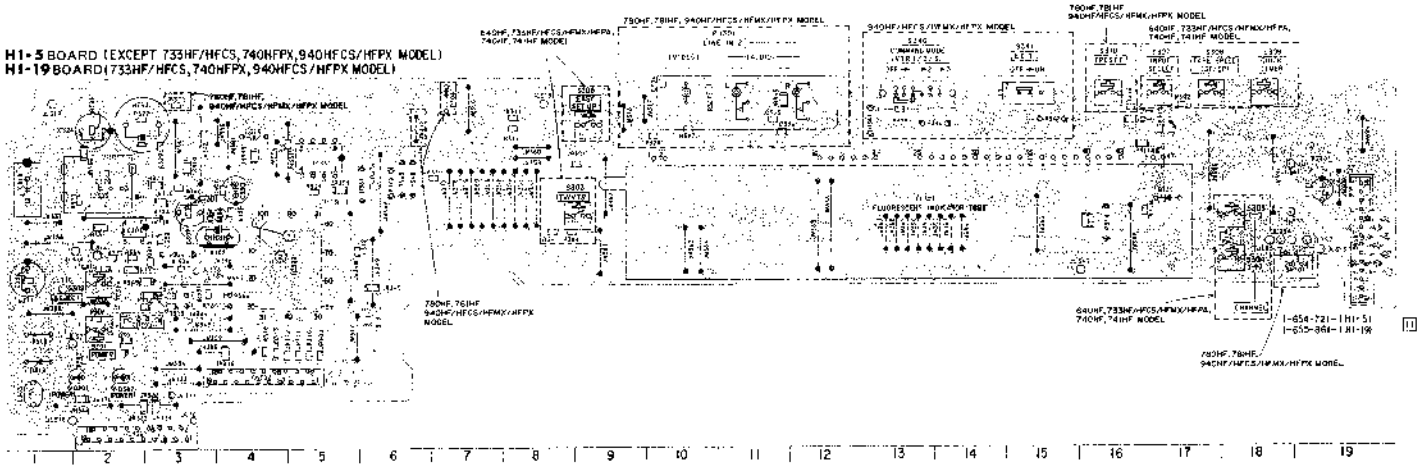


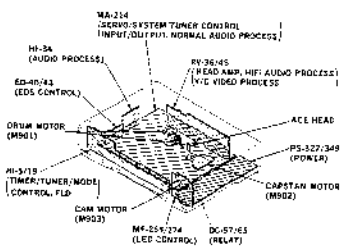


HF-5/19 (TIMER/TUNER/MODE CONTROL), MF-253/274 (LED CONTROL) PRINTED WIRING BOARDS

– Ref. No. HF-5/19 BOARD, MF-253/274 BOARD : See to page

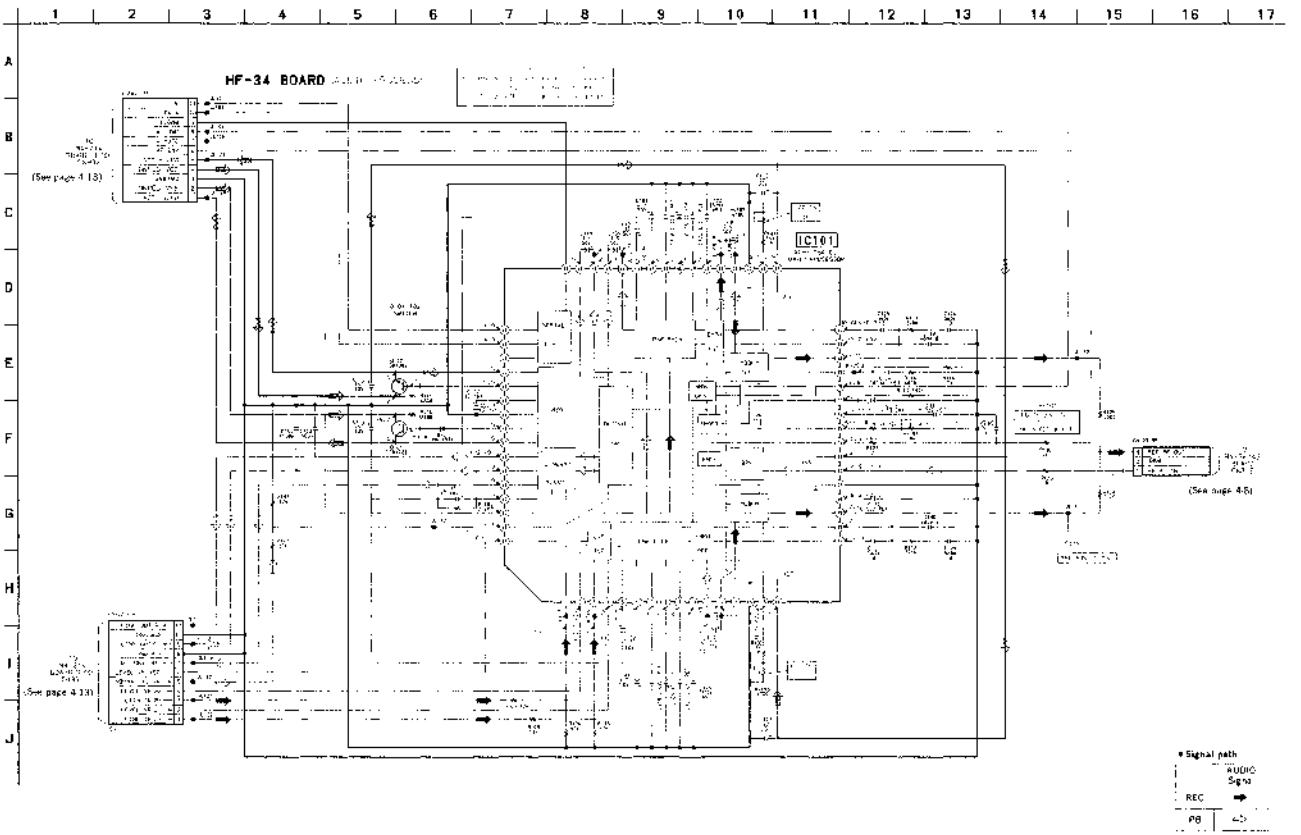
H1-5 BOARD (EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)
H1-19 BOARD (733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)



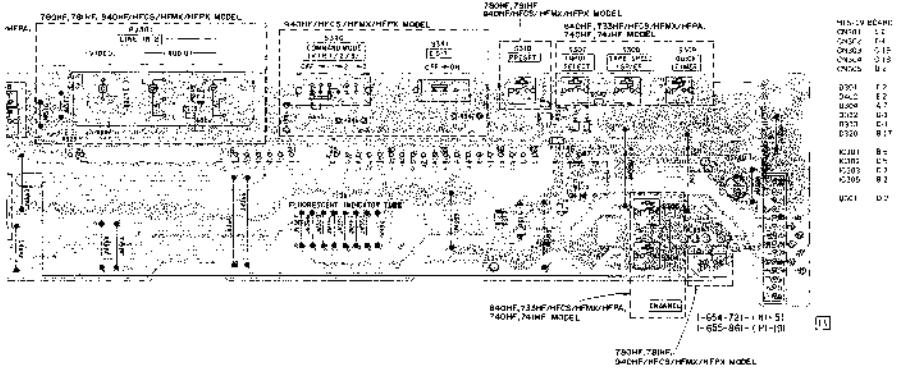


HF-34 (AUDIO PROCESS) SCHEMATIC DIAGRAM

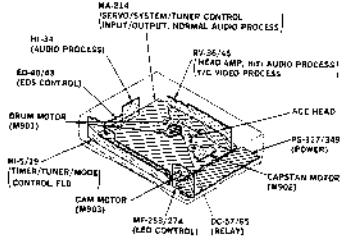
– Ref. No.: 1HF-31 BOARD : 4,000 series



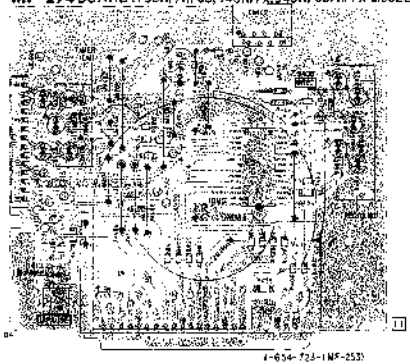
DS



9 10 11 12 13 14 15 16 17 18 19



MF-253 BOARD (EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)
MF-274 BOARD (733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)

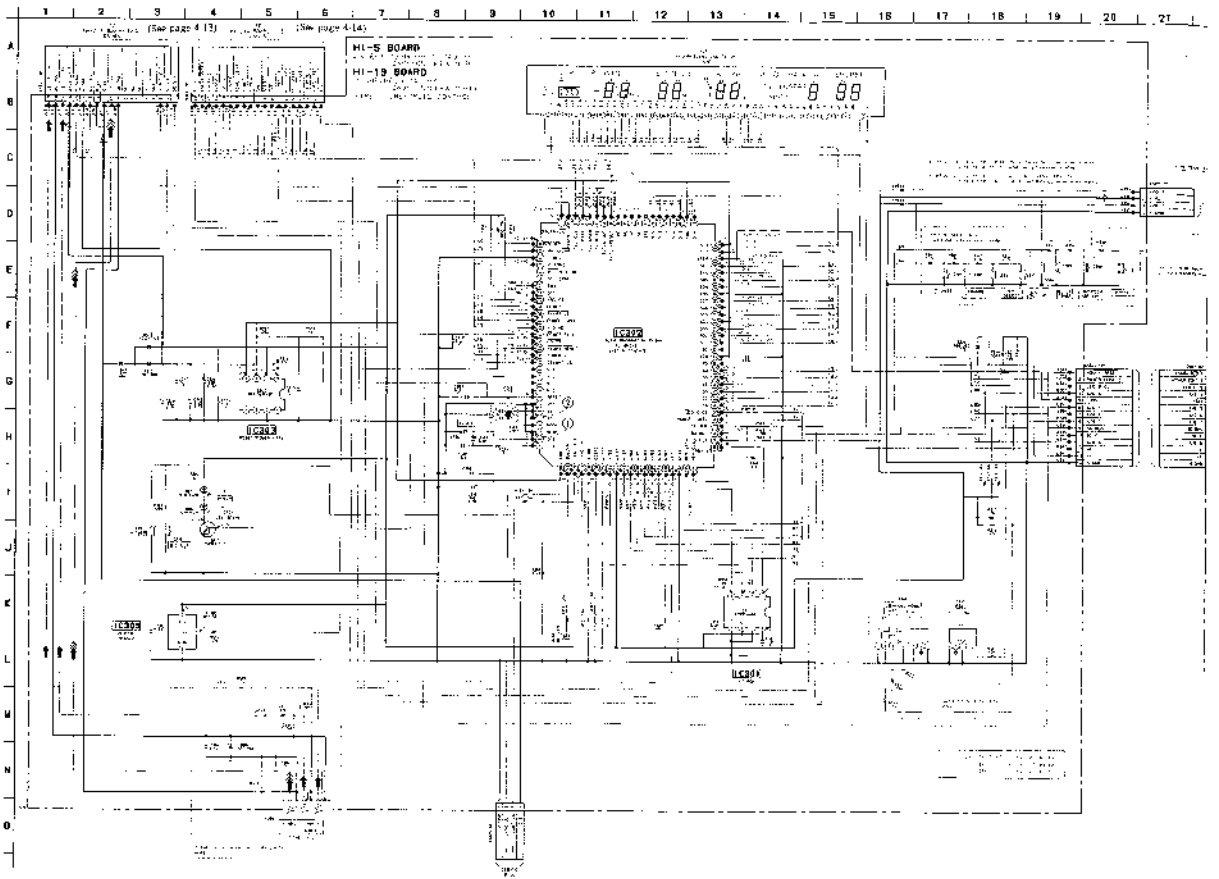


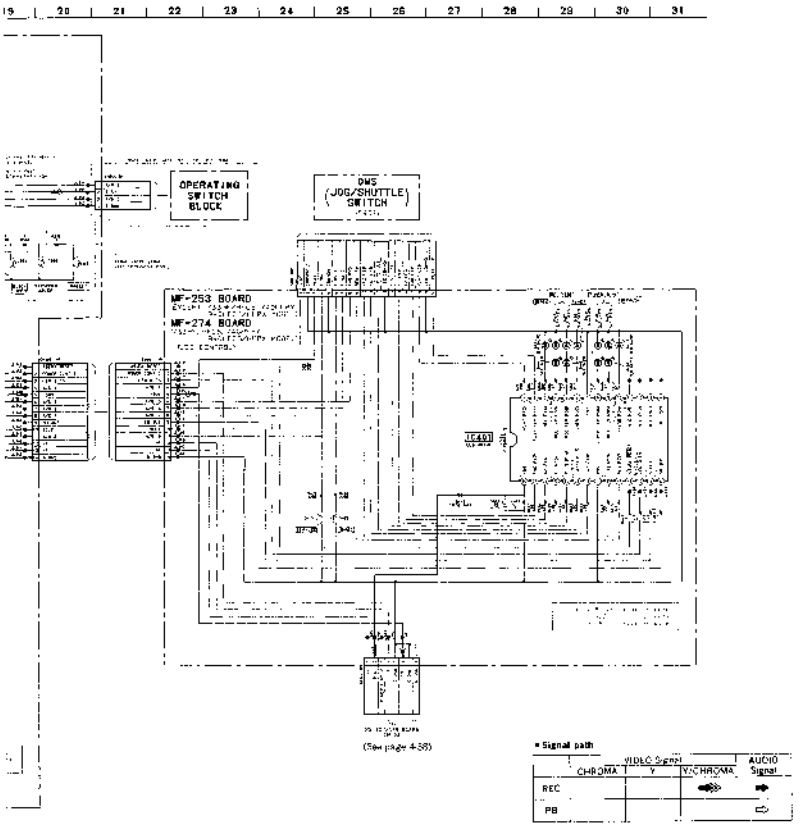
1-654-721-11 (MF-253)
1-655-863-11 (MF-274)

HI-5/19 BOARD

①

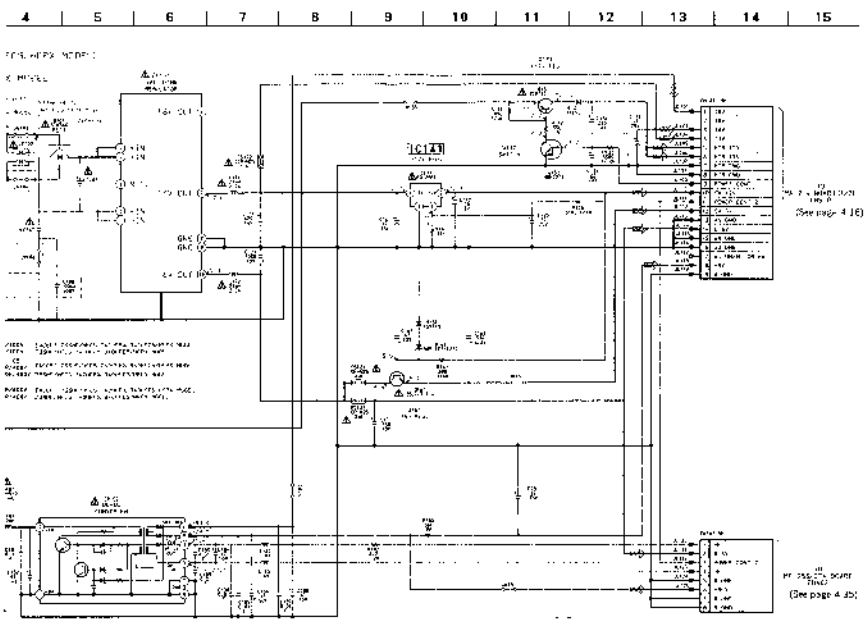
②





TIMER/TUNER/MODE, LED CONTROL

BOARD

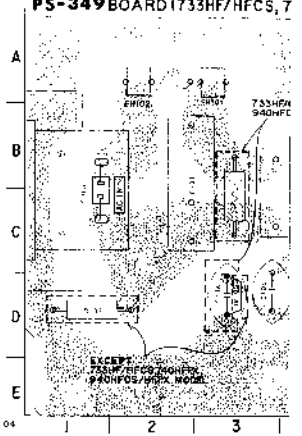


PS-327/349 (POWER) SCHEMATIC DIAGRAI

Ref. No. PS-327/349 BOARD : 2,000 series

PS-327 BOARD (EXCEPT 733HF/

PS-349 BOARD (733HF/HFCS, 7

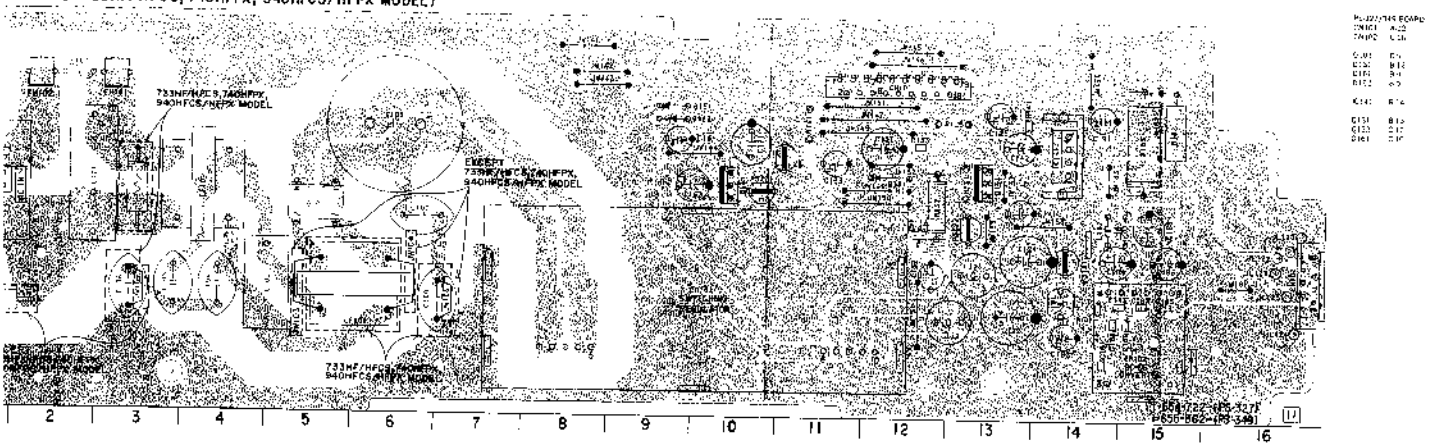


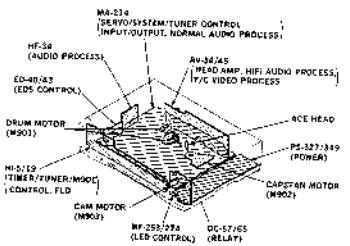
3 (POWER) SCHEMATIC DIAGRAM

PS-327/349 BOARD : 3,000 series

BOARD (EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)

BOARD (733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL)





SECTION 5
REPAIR PARTS LIST

5-1. EXPLODED VIEWS

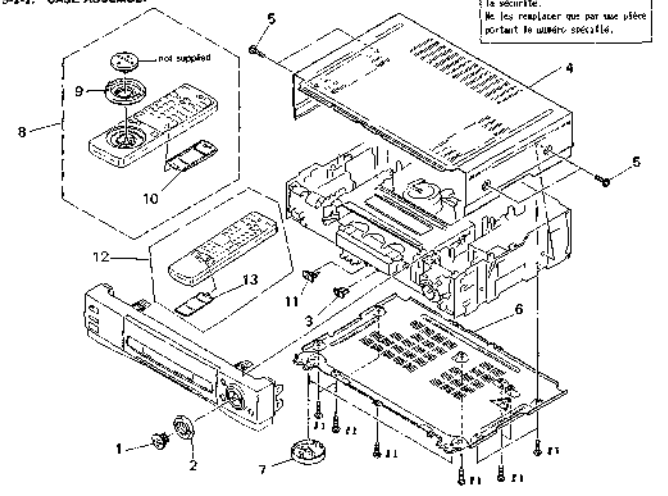
NOTE:

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

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.

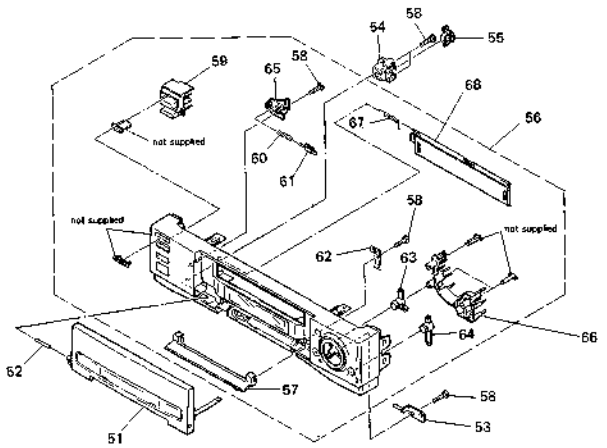
5-1-1. CASE ASSEMBLY



Ref.No.	Part No.	Description	Remark
1	X-3844-290-1	BUTTON ASSY, FUNCTION (640HF, 740HF/HPX, 780HF, 940HF/HFCS/HFWX/HFPX)	
1	X-3844-708-1	BUTTON ASSY, FUNCTION (733HF/HFCS/HFWX/HFPA, 741HF, 781HF)	
2	X-3844-285-1	RING ASSY, SHUTTLE (640HF, 740HF/HFPA, 780HF, 940HF/HFCS/HFWX/HFPX)	
2	X-3844-709-1	RING ASSY, SHUTTLE (733HF/HFCS/HFWX/HFPA, 741HF, 781HF)	
3	7-960-060-01	KNOB (SP), SLIDE (940HF/HFCS/HFWX/HFPX)	
* 4	1-960-969-01	CASE, UPPER (640HF, 740HF/HFPX, 780HF, 940HF/HFCS/HFWX/HFPX)	
* 4	3-960-058-11	CASE, UPPER (733HF/HFCS/HFWX/HFPA)	
* 4	3-960-060-21	CASE, UPPER (741HF, 781HF)	
5	3-710-901-11	SCREW, TAPPING	
* 6	3-964-061-01	PLATE, BOTTOM	
7	3-900-062-91	INSULATOR	
8	1-467-947-11	REMOTE COMMANDER (RM-V161) (780HF, 781HF)	
8	1-467-947-21	REMOTE COMMANDER (RMT-V164B) (733HF/HFCS/HFWX/HFPA)	
8	1-467-948-11	REMOTE COMMANDER (RMT-V159) (940HF/HFCS/HFWX/HFPX)	
8	1-467-951-11	REMOTE COMMANDER (RMT-V154C) (940HF)	
8	1-467-953-11	REMOTE COMMANDER (RMT-V162) (740HF/HPX, 741HF)	
9	3-959-543-11	RING, SHUTTLE (EXCEPT 640HF)	
10	3-706-817-01	COVER, BATTERY (EXCEPT 640HF)	
11	3-960-066-01	KNOB (SP), SLIDE (940HF/HFCS/HFWX/HFPX)	
12	1-467-951-11	REMOTE COMMANDER (RMT-V154C) (640HF)	
13	3-708-923-01	COVER, BATTERY (640HF)	

5-1-2. FRONT PANEL ASSEMBLY

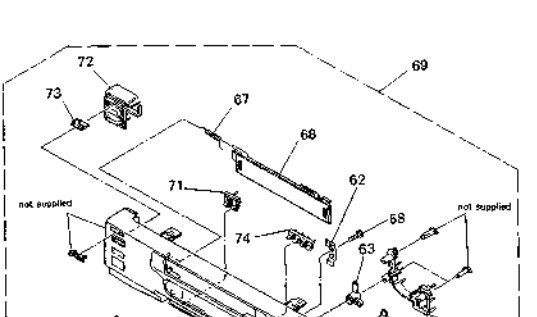
(SLV-780HF, 781HF, 940HF/HFCS/HFMX/HFPX MODEL)



Ref.No.	Part No.	Description	Remark
51	1-467-943-11	SWITCH BLOCK, CONTROL (940HF/HFCS/HFMX/HFPX)	
51	1-467-943-21	SWITCH BLOCK, CONTROL (780HF)	
51	1-473-020-11	SWITCH BLOCK, CONTROL (781HF)	
* 52	3-960-037-01	SHAFT (LEFT), FULCRUM	
53	X-3844-467-1	PLATE(RIGHT)ASSY, FULCRUM DOOR	
* 54	3-960-676-01	PLATE (LEFT), FULCRUM DOOR	
55	3-961-745-01	DAMPER, OIL	
56	X-3844-293-1	PANEL ASSY, FRONT (780HF)	
56	X-3844-700-1	PANEL ASSY, FRONT (940HF/HFCS/HFMX/HFPX)	
56	X-3844-701-1	PANEL ASSY, FRONT (781HF)	
57	3-960-063-01	DOOR, JACK (780HF)	
57	3-960-063-11	DOOR, JACK (940HF/HFCS/HFMX/HFPX)	
57	3-960-092-21	DOOR, JACK (781HF)	
58	4-921-277-41	SCREW (B2.6X8), TAPPING, BIND	

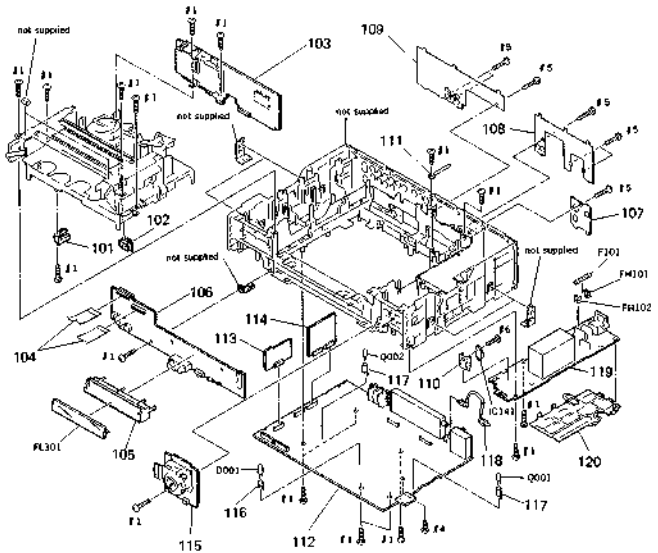
Ref.No.	Part No.	Description	Remark
59	3-957-389-01	BUTTON, POWER/EJECT (780HF, 940HF/HFCS/HFMX/HFPX)	
59	3-957-389-21	BUTTON, POWER/EJECT (781HF)	
60	3-957-388-01	SPRING, COMPRESSION	
61	3-944-584-01	CLAW, LOCK	
* 62	3-960-556-01	SPRING, DOOR LOCK	
* 63	3-960-090-01	LENS, TH ILLUMINATION	
* 64	3-960-089-01	LENS, REC ILLUMINATION	
* 65	3-957-540-01	HOLDER, LOCK CLAW	
* 66	3-960-086-01	BASE 4L), TR (780HF, 940HF/HFCS/HFMX/HFPX)	
* 66	3-960-088-11	BASE 4L), TR (781HF)	
67	3-953-432-01	SPRING (GE), FL	
68	3-960-094-01	DOOR, CASSETTE (780HF, 940HF/HFCS/HFMX/HFPX)	
68	3-960-094-71	DOOR, CASSETTE (781HF)	

(SLV-640HF, 733HF/HFCS/HFMX/HFPA, 740HF/HFPX, 741HF MODEL)



Ref.No.	Part No.	Description	Remark
58	4-921-277-41	SCREW (B2.6X8), TAPPING, BIND	
* 62	3-960-550-01	SPRING, DOOR LOCK	
* 63	3-960-080-01	LENS, TM ILLUMINATION	
* 64	3-960-089-01	LENS, REC ILLUMINATION	
67	3-959-432-01	SPRING (CD), PL	
68	3-960-094-41	DOOR, CASSETTE (733HF/HFCS/HFMX/HFPA, 740HF/HFPX)	
68	3-960-054-71	DOOR, CASSETTE (741HF)	
69	X-3944-287-1	PANEL ASSY, FRONT (740HF/HFPX)	
69	X-3944-704-1	PANEL ASSY, FRONT (741HF)	
69	X-3944-705-1	PANEL ASSY, FRONT (640HF)	
69	X-3944-708-1	PANEL ASSY, FRONT (733HF/HFCS/HFMX/HFPA)	
70	3-960-058-01	DOOR, JACK (640HF, 740HF/HFPX)	
70	3-960-052-21	DOOR, JACK (733HF/HFCS/HFMX/HFPA)	
70	3-960-055-31	DOOR, JACK (741HF)	
71	3-961-932-01	BUTTON, RF	
72	3-957-237-01	BUTTON, POWER/EJECT (640HF, 740HF/HFPX)	
72	3-957-237-11	BUTTON, POWER/EJECT (733HF/HFCS/HFMX/HFPA, 741HF)	
73	3-960-614-01	TAP, POWER BUTTON	
74	3-960-524-01	BUTTON, QUICK TIMER	
* 75	3-960-045-01	BASE, TM (640HF, 740HF/HFPX)	
* 75	3-960-049-11	BASE, TM (733HF/HFCS/HFMX/HFPA, 741HF)	

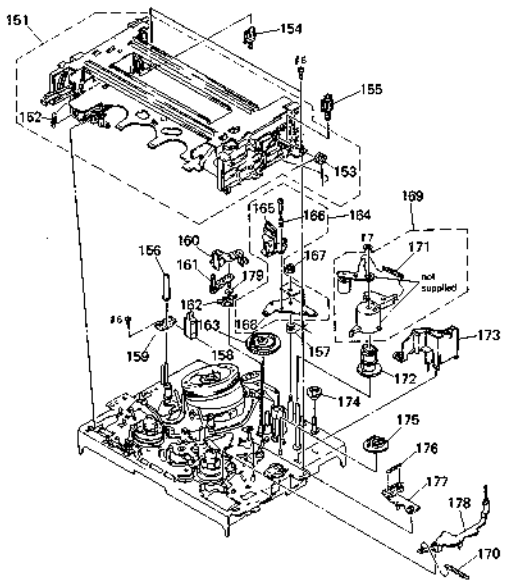
5-1-3. CHASSIS ASSEMBLY



Ref. No.	Part No.	Description	Remark
* 101	3-960-067-01	HOLDER, MA	
* 102	A-6794-032-A	AC-57 BOARD, COMPLETE (EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX)	
		AC-55 BOARD, COMPLETE (733HF/HFCS, 740HFPX, 940HFCS/HFPX)	
* 103	A-6782-426-A	RV-36 BOARD, COMPLETE (733HFMX/HFPA, 780HF, 781HF)	
		RV-45 BOARD, COMPLETE (733HF/HFCS)	
* 103	A-6782-431-A	RV-36 BOARD, COMPLETE (640HF, 740HF, 741HF)	
		RV-45 BOARD, COMPLETE (740HFPX)	
* 103	A-6782-436-A	RV-36 BOARD, COMPLETE (940HF/HFMX)	
		RV-45 BOARD, COMPLETE (940HFCS/HFPX)	
104	1-769-354-11	CABLE, FLEXIBLE FLAT (19CORE)	
* 105	3-960-060-01	HOLDER (A), FL	
* 106	A-6782-429-A	HI-5 BOARD, COMPLETE (733HFPA, 740HF:US, 741HF)	
* 106	A-6782-435-A	HI-5 BOARD, COMPLETE (940HF:US/HFMX)	
* 106	A-6782-412-A	HI-5 BOARD, COMPLETE (780HF:US, 781HF)	
* 106	A-6782-505-A	HI-19 BOARD, COMPLETE (740HFPX)	
* 106	A-6782-506-A	HI-19 BOARD, COMPLETE (733HF/HFCS)	
* 106	A-6782-507-A	HI-19 BOARD, COMPLETE (940HFCS/HFPX)	
* 106	A-6782-525-A	HI-5 BOARD, COMPLETE (640HF:US)	
* 106	A-6782-526-A	HI-5 BOARD, COMPLETE (640HF:Canadian)	
* 106	A-6782-527-A	HI-5 BOARD, COMPLETE (740HF:Canadian)	
* 106	A-6782-528-A	HI-5 BOARD, COMPLETE (733HFMX)	
* 106	A-6782-529-A	HI-5 BOARD, COMPLETE (780HF:Canadian)	
* 106	A-6782-530-A	HI-5 BOARD, COMPLETE (940HF:Canadian)	
* 107	3-960-059-01	PLATE (TC), ORNAMENTAL, HEAD JACK	
* 108	3-960-060-01	PLATE (PS), ORNAMENTAL, REAR JACK (780HF)	
* 108	3-960-060-11	PLATE (PS), ORNAMENTAL, REAR JACK (940HF)	
* 108	3-960-060-21	PLATE (PS), ORNAMENTAL, REAR JACK (940HFPX)	
* 108	3-960-060-31	PLATE (PS), ORNAMENTAL, REAR JACK (740HF)	
* 108	3-960-060-41	PLATE (PS), ORNAMENTAL, REAR JACK (740HFPX)	
* 108	3-960-060-51	PLATE (PS), ORNAMENTAL, REAR JACK (640HF)	
* 108	3-960-060-61	PLATE (PS), ORNAMENTAL, REAR JACK (781HF)	
* 108	3-960-060-71	PLATE (PS), ORNAMENTAL, REAR JACK (741HF)	
* 108	3-960-060-81	PLATE (PS), ORNAMENTAL, REAR JACK (940HFCS)	
* 108	3-960-060-91	PLATE (PS), ORNAMENTAL, REAR JACK (940HFMX)	
* 108	3-962-034-01	PLATE (PS), ORNAMENTAL, REAR JACK (733HFPA)	
* 108	3-962-034-11	PLATE (PS), ORNAMENTAL, REAR JACK (733HFCS)	
* 108	3-962-034-21	PLATE (PS), ORNAMENTAL, REAR JACK (733HFMX)	
* 108	3-962-034-91	PLATE (PS), ORNAMENTAL, REAR JACK (733HF)	
* 109	3-960-058-01	PLATE (JO), ORNAMENTAL, REAR JACK (780HF, 781HF, 940HF)	
* 109	3-960-058-11	PLATE (JO), ORNAMENTAL, REAR JACK (940HFCS/HFMX/HFPX)	
* 109	3-960-058-21	PLATE (JO), ORNAMENTAL, REAR JACK (640HF, 740HF, 741HF)	
* 109	3-960-058-31	PLATE (JO), ORNAMENTAL, REAR JACK (733HF/HFCS/HFMX/HFPA, 740HFPX)	
* 110	3-951-899-01	HEAT SINK	
111	3-703-397-01	STOPPER, WIRING	
* 112	A-6782-428-A	MA-214 BOARD, COMPLETE (780HF, 781HF)	
* 112	A-6782-432-A	MA-214 BOARD, COMPLETE (740HF/HFPX, 741HF)	
* 112	A-6782-434-A	MA-214 BOARD, COMPLETE (733HF/HFCS/HFMX/HFPA)	
* 112	A-6782-437-A	MA-214 BOARD, COMPLETE (940HF/HFCS/HFMX/HFPX)	
* 112	A-6782-438-A	MA-214 BOARD, COMPLETE (640HF)	
* 113	A-6782-425-A	ED-40 BOARD, COMPLETE (740HF/741HF, 780HF, 781HF, 940HF/HFMX)	
		ED-42 BOARD, COMPLETE (740HFPX, 940HFCS/HFPX)	
* 114	A-6721-580-A	HF-34 BOARD, COMPLETE	
* 115	A-6782-424-A	MF-253 BOARD, COMPLETE (780HF, 781HF, 940HF/HFMX)	
* 115	A-6782-430-A	MF-253 BOARD, COMPLETE (640HF, 733HFMX/HFPA, 740HF, 741HF)	
* 115	A-6782-501-A	MF-274 BOARD, COMPLETE (733HF/HFCS, 740HFPX)	
* 115	A-6782-502-A	MF-274 BOARD, COMPLETE (940HFCS/HFPX)	
* 116	3-960-274-01	SPACER, LED	
* 117	3-960-273-01	SPACER, TOP END	
118	1-555-110-00	CABLE, PIN	
* 119	A-6782-427-A	PS-327 BOARD, COMPLETE (EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX)	
* 119	A-6782-439-A	PS-349 BOARD, COMPLETE (733HF/HFCS, 740HFPX, 940HFCS/HFPX)	
* 120	3-960-066-01	INSULATOR, PS	
D901	8-719-046-26	DIODE GL528V1 (TAPE TOP/END)	
⚠F901	1-576-228-11	FUSE (H.B.C.) (250V/2A) (733HF/HFCS, 740HFPX, 940HFCS/HFPX)	
⚠F902	1-532-743-11	FUSE, GLASS CYLINDRICAL (DIA. 5) (125V/2A) (EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPA)	
FH101	1-533-293-11	FUSE HOLDER	
FH102	1-533-293-11	FUSE HOLDER	
FL301	1-517-385-11	TUBE, FLUORESCENT INDICATOR	
IC341	8-759-180-48	IC PQ12DE11	
Q001	8-729-025-92	PHOTO TRANSISTOR PT180F (TAPE TOP)	
Q002	8-729-025-92	PHOTO TRANSISTOR PT180F (TAPE END)	

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.

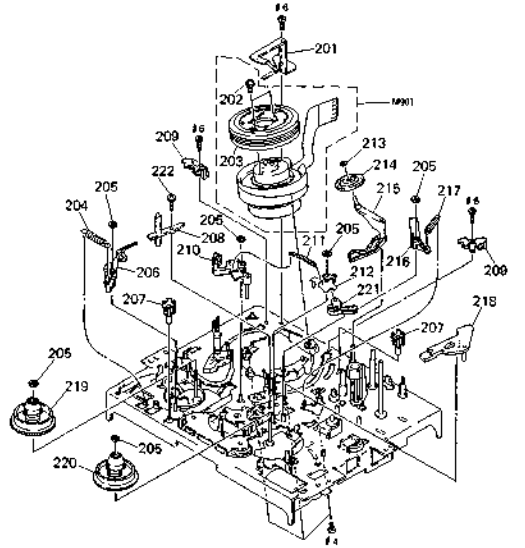
5-1-4. MECHANISM DECK ASSEMBLY 1



Ref. No.	Part No.	Description	Remark
151	A-6758-096-A PL BLOCK ASSY		
152	3-958-467-01 SPRING, TENSION COIL		
153	3-958-195-01 SPRING, TORSION		
154	3-960-215-01 PLATE, LIGHT GUIDE, END SENSOR		
155	3-960-216-01 PLATE, LIGHT GUIDE, TOP SENSOR		
156	X-3940-469-1 HOLDER ASSY, TG2		
157	3-958-437-01 SPRING, (AGC) TORSION COIL		
158	B-500-148-11 HEAD, FE		
159	3-959-841-01 HOLDER, FEH		
160	3-962-298-01 BRACKET, TG7 TAPE		
161	X-3944-797-1 TG8 ASSY		
162	3-958-421-01 HOLDER, TGE		
163	3-958-152-01 GEAR, TG8		
164	A-6776-109-A ACE BLOCK ASSY (INCLUDING AG-101 BOARD)		
165	1-506-465-11 PIN, CONNECTOR 6P		

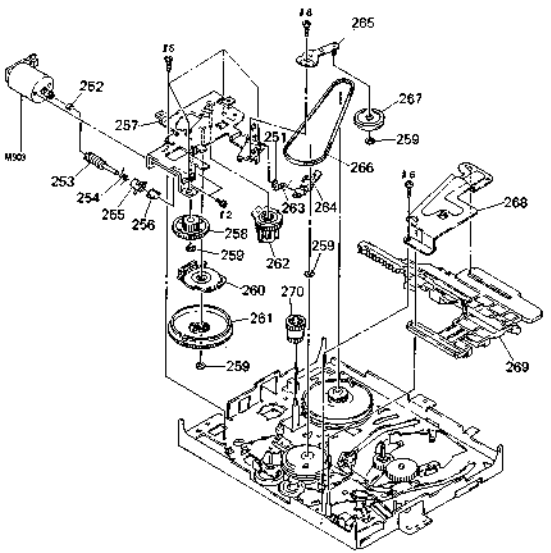
Ref No	Part No	Description	Remark
166	3-960-429-01 SPRING (ACE), COMPRESSION		
167	3-962-647-01 NUT, AC HEIGHT ADJUSTMENT		
168	3-958-491-01 BASE, ACE		
169	A-6740-072-A PRESS BLOCK ASSY, PINCH		
170	3-958-505-01 SPRING (SOFT BRAKE T), TENSION		
171	3-958-455-01 SPRING (PINCH), TENSION		
172	3-956-151-01 GEAR, ELEVATOR		
173	3-958-454-01 OPNER, LID		
174	3-958-501-01 SCREW, ACE ADJUSTMENT		
175	3-958-151-01 GEAR, PRESS		
176	3-958-462-01 SPRING (TU3 BRAKE), TENSION		
177	X-3943-885-1 VAN ASSY, RVS BRAKE		
178	X-3941-882-1 BRAKE (T) ASSY, SOFT		
179	3-701-436-11 WASHER, 2.5		

5-1-6. MECHANISM DECK ASSEMBLY 2



Ref.No.	Part No.	Description	Remark
201	X-3943-889-1	GROUND ASSY, SHAFT	
202	3-643-205-01	SCREW (PSW) 3X8	
203	8-848-576-02	DRUM ASSY, ROTARY UPPER (D2R-45-R) (EXCEPT 940HF/HFCS/HFMX/HFPX)	
203	8-848-594-02	DRUM ASSY, ROTARY UPPER (D2R-5E-R) (940HF/HFCS/HFMX/HFPX)	
204	3-958-443-01	SPRING, STRETCH COIL SPRING	
205	3-669-595-00	WASHER (2), STOPPER	
206	3-958-450-01	BRAKE (S), SOFT	
207	3-958-190-01	SHAFT, PC BOARD	
208	3-958-391-01	PLATE, LIGHT GUIDE, LED	
209	3-958-389-01	CATCHER	
210	X-3944-599-1	BRAKE (S) ASSY, MAIN	
211	3-958-517-01	SPRING, TENSIONCOIL	
212	X-3944-628-1	BRAKE (T) ASSY, MAIN	
213	3-321-393-01	WASHER, STOPPER	
214	X-3944-303-1	ROLLER ASSY, HC	
215	X-3943-890-1	ARM ASSY, HC	
216	3-960-139-01	ARM, NEUTRALITY	
217	3-958-505-01	SPRING, TENSION	
218	3-960-134-01	ARM, PENDULUM COMPULSION	
219	X-3943-902-1	TABLE, REEL (S) ASSY	
220	X-3943-903-1	TABLE, REEL (T) ASSY	
221	X-3944-548-1	CAP ASSY, MAIN BRAKE	
222	3-958-411-01	SCREW (PS 3X8)	
M901	8-848-575-12	DRUM ASSY (D2H-45A-R) (EXCEPT 940HF/HFCS/HFMX/HFPX)	
M901	8-848-593-12	DRUM ASSY (D2H-5JA-R) (940HF/HFCS/HFMX/HFPX)	

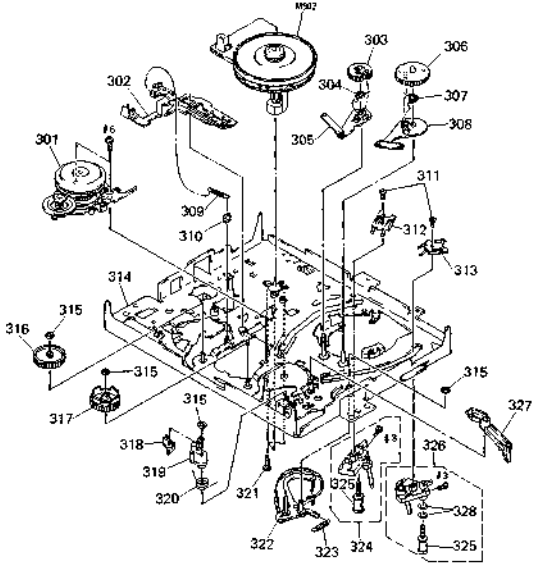
5-1-6. MECHANISM DECK ASSEMBLY 3



Ref.No.	Part No.	Description	Remark
251	3-701-439-01	WASHER	
252	3-959-800-01	BUSHING JOINT	
253	3-958-159-01	WORM	
254	3-958-160-01	SPRING, ONE-WAY	
255	3-958-160-01	PROPELLOR	
256	3-958-155-01	BEARING, CAM MOTOR	
* 257	X-3943-804-1	CHASSIS ASSY, CAM MOTOR	
258	3-958-157-01	WHEEL, WORM	
259	3-949-595-00	WASHER (2), STOPPER	
260	1-582-076-11	SWITCH, ROTARY	
261	3-958-161-01	GEAR, CAM	

Ref.No.	Part No.	Description	Remark
262	3-958-158-01	GEAR, FL DRIVING	
263	3-958-645-01	SPRING,TORSION(OIL (CAP BRAND)	
264	X-3943-816-1	BRAKE ASSY, CAP	
265	X-3943-819-1	ARM ASSY, TENSION VEHICLE	
266	3-958-361-01	BELT, TIMING	
267	3-958-648-01	WHEEL, TENSION	
* 268	3-959-703-01	RETAINER	
269	3-958-163-01	SLIDER, MAIN	
270	3-958-162-01	GEAR,UPPER/LOWER COMMUNICATION	
M909	X-3943-813-1	MOTOR ASSY, CAM	

5-1-7. MECHANISM CHASSIS ASSEMBLY 4



Ref.No.	Part No.	Description	Remark
301	A-6798-102-A	HOLDER ASSY	
302	X-3943-892-1	LEVER ASSY, TRIGGER	
303	3-958-485-01	GEAR (T), LOADING	
304	3-960-449-01	SPRING (T), TORSION COIL	
305	X-3943-901-1	LEVER (T) ASSY, LOADING	
306	3-958-476-01	GEAR (S), LOADING	
307	3-960-448-01	SPRING (S), TORSION COIL	
308	X-3943-890-1	LEVER (S) ASSY, LOADING	
309	3-958-529-01	SPRING (MOMENT), TENSION	
310	3-959-640-01	RUBBER, JOINT	
311	3-960-720-01	SCREW	
312	3-960-688-01	SPRING, LEAF (T), LOADING	
313	3-960-687-01	SPRING, LEAF (S), LOADING	
* 314	X-3943-924-1	CHASSIS ASSY, MECHANICAL	
315	3-469-595-00	WASHER (2), STOPPER	
316	3-962-960-01	GEAR (T-K), IDLER	
317	3-962-959-01	GEAR (S-K), IDLER	
318	3-958-524-01	CLAW, S WINDING	
319	3-958-532-01	ARM, S WINDING	
320	3-958-534-01	SPRING, TORSION	
321	3-960-272-01	SCREW (2.6)	
322	X-3943-896-1	RGJ ASSY	
323	3-958-492-01	SPRING (RGJ), TENSION COIL	
324	A-6750-314-A	T BLOCK ASSY, SHUTTLE	
325	8-1944-708-1	ROLLER ASSY, GUIDE	
326	A-6750-310-A	SHUTTLE (S) BLOCK ASSY	
327	3-958-501-01	ARM, FIXED RELEASE	
328	3-962-974-01	U-WING	
M902	1-698 604-11	MOTOR, DC (CAPSTAN)	

5-2. ELECTRICAL PARTS LIST

NOTE:
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX 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
*	A-6794-032-A	DC-57 BOARD, COMPLETE (EXCEPT 733MF/MFCS, 740MFPX, 940HFCS/HFPX)				
*	A-6794-032-A	DC-65 BOARD (733MF/MFCS, 740MFPX, 940HFCS/HFPX)				
		(Ref. No 4,000 series)				
		< CONNECTOR >				
* CN701	1-766-714-11	CONNECTOR, BOARD TO BOARD 5P				
* CN702	1-766-713-11	CONNECTOR, BOARD TO BOARD 5P				
*	A-6782-425-A	ED-40 BOARD, COMPLETE (740MF, 741MF, 780HF, 781HF, 940FF/BEAD) ED-43 BOARD, COMPLETE (740HFPX, 940HFCS/HFPX)				
		(Ref. No 3,000 series)				
		< CAPACITOR >				
C601	1-163-019-00	CERAMIC CHIP	0.0068uF	10%	50V	
C602	1-124-126-00	ELECT	47uF	20%	10V	
C603	1-163-031-11	CERAMIC CHIP	0.01uF		50V	
C604	1-163-135-00	CERAMIC CHIP	560PF	5%	50V	
C605	1-164-346-11	CERAMIC CHIP	1uF		16V	
C606	1-104-329-11	CERAMIC CHIP	0.1uF	10%	50V	
C607	1-163-091-11	CERAMIC CHIP	0.01uF		50V	
C608	1-163-263-11	CERAMIC CHIP	330PF	5%	50V	
C609	1-163-173-00	CERAMIC CHIP	47PF	5%	50V	
C610	1-137-370-11	FILM	0.01uF	5%	50V	
C611	1-163-063-00	CERAMIC CHIP	0.022uF	10%	50V	
C612	1-164-340-11	CERAMIC CHIP	0.056uF	10%	25V	
C613	1-124-925-11	ELECT	2.2uF	20%	100	
C614	1-163-031-11	CERAMIC CHIP	0.01uF		50V	
C615	1-124-126-00	ELECT	47uF	20%	10V	
C616	1-163-031-11	CERAMIC CHIP	0.01uF		50V	
C617	1-124-903-11	ELECT	1uF	20%	50V	
C618	1-163-139-00	CERAMIC CHIP	820PF	5%	50V	
		< CONNECTOR >				
CN601	1-766-719-11	CONNECTOR, BOARD TO BOARD 10P				
		< DIODE >				
D601	8-719-911-19	DIODE 1SS119-25				
		< IC >				
IC601	8-759-152-51	IC MC68HC05CCVFB-LSC861				
IC602	8-759-164-09	IC LA7218M				
		< JUMPER RESISTOR >				
JR603	1-216-296-00	METAL CHIP	0	5%	1/8W	
		< COIL >				
L602	1-410-509-11	INDUCTOR 10uH				
		< TRANSISTOR >				
Q601	8-729-010-25	TRANSISTOR MSD601-RT1				
Q602	8-729-010-25	TRANSISTOR MSD601-RT1				
Q603	8-729-901-06	TRANSISTOR DTA144EK				
		< RESISTOR >				
R601	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R602	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R603	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R604	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R605	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R606	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R607	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R608	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R610	1-216-043-91	METAL GLAZE	560	5%	1/10W	
R611	1-216-295-91	CONDUCTOR, CHIP (2012)				
R612	1-216-033-00	METAL CHIP	330	5%	1/10W	
R613	1-216-043-91	METAL GLAZE	560	5%	1/10W	
R614	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R615	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R616	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R617	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R618	1-216-081-00	METAL CHIP	22K	5%	1/10W	

Ref.No.	Part No.	Description			Remark
R619	1-216-101-00	METAL CHIP	150K	5%	1/10W
R620	1-216-043-00	METAL CHIP	2.4K	5%	1/10W
R621	1-216-043-91	METAL GLAZE	560	5%	1/10W
R622	1-216-073-00	METAL CHIP	10K	5%	1/16W
R623	1-216-073-00	METAL CHIP	10K	5%	1/10W

< VIBRATOR >

X601	1-579-125-11	VIBRATOR, CERAMIC (8.00MHz)	
X602	1-579-146-11	VIBRATOR, CERAMIC (5000kHz)	

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*	4-0721-586-A	HF-34 BOARD, COMPLETE	
		**********	
			(Ref. No 4,000 series)

< CAPACITOR >

C101	1-124-997-11	ELECT	10uF	20%	50V
C102	1-124-997-11	ELECT	10uF	20%	50V
C103	1-124-827-11	ELECT	4.7uF	20%	100V
C104	1-124-827-11	ELECT	4.7uF	20%	100V
C105	1-124-126-00	ELECT	47uF	20%	10V
C106	1-124-126-00	ELECT	47uF	20%	10V
C107	1-124-126-00	ELECT	47uF	20%	10V
C108	1-124-962-11	ELECT	1.0uF	20%	50V
C109	1-124-962-11	ELECT	1.0uF	20%	50V
C110	1-124-962-11	ELECT	1.0uF	20%	50V
C111	1-124-962-11	ELECT	1.0uF	20%	50V
C112	1-124-233-11	ELECT	22uF	20%	50V
C113	1-124-233-11	ELECT	22uF	20%	50V
C114	1-124-252-00	ELECT	0.33uF	20%	50V
C115	1-124-443-00	ELECT	100uF	20%	10V
C116	1-124-443-00	ELECT	100uF	20%	10V
C117	1-104-252-51	ELECT	33uF	20%	16V
C118	1-137-372-11	FILM	0.022uF	5%	50V
C119	1-137-372-11	FILM	0.022uF	5%	50V
C120	1-137-370-11	FILM	0.01uF	5%	50V
C121	1-137-370-11	FILM	0.01uF	5%	50V
C122	1-137-367-11	FILM	0.0033uF	5%	50V
C123	1-137-367-11	FILM	0.0039uF	2%	50V
C124	1-137-364-11	FILM	0.001uF	2%	50V
C125	1-163-006-11	CERAMIC CHIP	560PF	10%	50V
C126	1-163-006-11	CERAMIC CHIP	560PF	10%	50V
C127	1-163-006-11	CERAMIC CHIP	560PF	10%	50V
C128	1-163-006-11	CERAMIC CHIP	560PF	10%	50V
C129	1-163-007-11	CERAMIC CHIP	680PF	10%	50V
C130	1-163-007-11	CERAMIC CHIP	680PF	10%	50V
C131	1-137-372-11	FILM	0.022uF	5%	50V
C132	1-137-372-11	FILM	0.022uF	5%	50V
C133	1-163-145-00	CERAMIC CHIP	0.0015uF	5%	50V
C134	1-163-145-00	CERAMIC CHIP	0.0015uF	5%	50V
C135	1-163-038-91	CERAMIC CHIP	0.1uF		25V

< CONNECTOR >

* CN101	9-520-825-11	CONNECTOR, BOARD TO BOARD 13P
* CN102	9-520-825-11	CONNECTOR, BOARD TO BOARD 13P
* CN103	9-584-913-11	PIN, CONNECTOR 3P

< DIODE >

D101	8-719-404-46	DIODE	MA810

< IC >

IC101	8-759-108-81	IC	XL4H736K-VP

< TRANSISTOR >

Q101	8-729-804-43	TRANSISTOR	2SB1122-S
Q102	8-729-820-68	TRANSISTOR	2SD1808FA-3

< RESISTOR >

R101	8-209-806-13	METAL GLAZE	10K	0.50%	1/10W
R102	1-208-809-11	METAL GLAZE	13K	0.50%	1/10W
R103	1-216-085-00	METAL CHIP	27K	5%	1/10W
R104	1-216-081-00	METAL CHIP	22K	5%	1/10W
R105	1-216-089-00	METAL CHIP	47K	5%	1/10W
R106	1-216-089-00	METAL CHIP	47K	5%	1/10W
R107	1-216-083-00	METAL CHIP	27K	5%	1/10W
R108	1-216-075-00	METAL CHIP	12K	5%	1/10W
R109	1-216-075-00	METAL CHIP	12K	5%	1/10W
R110	1-218-057-00	METAL CHIP	2.2K	5%	1/10W
R111	1-216-105-91	METAL GLAZE	220K	5%	1/10W
R112	1-216-105-91	METAL GLAZE	220K	5%	1/10W
R113	1-216-109-00	METAL CHIP	330K	5%	1/10W
R114	1-216-065-00	METAL CHIP	6.8K	5%	1/10W
R115	1-216-065-00	METAL CHIP	6.8K	5%	1/10W
R116	1-216-037-00	METAL CHIP	150K	5%	1/10W
R118	1-216-133-00	METAL CHIP	2.2M	5%	1/10W
R120	1-216-295-91	CONDUCTOR, CHIP (2012)			
R121	1-216-295-91	CONDUCTOR, CHIP (2012)			
R124	1-216-096-00	METAL CHIP	5.1K	5%	1/10W
R125	1-216-049-00	METAL CHIP	1K	5%	1/10W
R130	1-216-049-00	METAL CHIP	1K	5%	1/10W

< VARIABLE RESISTOR >

RV101	1-241-754-11	RES, ADJ, CERMET 10K
RV102	1-241-757-11	RES, ADJ, CERMET 4.7K
RV103	1-241-757-11	RES, ADJ, CERMET 4.7K

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Ref. No	Part No	Description	Remark
*	A-6782-429-A	HI-5 BOARD, COMPLETE	(730HFPA, 740HF:US, 741HF)
*	A-6782-435-A	HI-5 BOARD, COMPLETE (940HF:US/HFMX)	
*	A-6782-442-A	HI-5 BOARD, COMPLETE (780HF:US, 781HF)	
*	A-6782-505-A	HI-19 BOARD, COMPLETE (740HFPX)	
*	A-6782-506-A	HI-19 BOARD, COMPLETE (730HF/HFCS)	
*	A-6782-507-A	HI-19 BOARD, COMPLETE (940HFCS/HFPX)	
*	A-6782-525-A	HI-5 BOARD, COMPLETE (640HF:US)	
*	A-6782-526-A	HI-5 BOARD, COMPLETE (640HF:Canadian)	
*	A-6782-527-A	HI-5 BOARD, COMPLETE (740HF:Canadian)	
*	A-6782-528-A	HI-5 BOARD, COMPLETE (730HFMX)	
*	A-6782-529-A	HI-5 BOARD, COMPLETE (780HF:Canadian)	
*	A-6782-530-A	HI-5 BOARD, COMPLETE (940HF:Canadian)	
		********************	(Ref. No 3,000 series)
*	3-960-068-01	HOLDER (A), FL	
		< BUZZER >	
BZ301	1-529-104-11	BUZZER, PIEZO ELECTRIC	
		< CAPACITOR >	
C302	1-164-346-11	CERAMIC CHIP 1uF	16V
C304	1-163-009-11	CERAMIC CHIP 0.001uF 10% (EXCEPT 640HF, 730HFMX/HFPA/740HF, 741HF)	50V
C305	1-163-009-11	CERAMIC CHIP 0.001uF 10% (EXCEPT 640HF, 730HFMX/HFPA/740HF, 741HF)	50V
C306	1-163-009-11	CERAMIC CHIP 0.001uF 10% (EXCEPT 640HF, 730HFMX/HFPA/740HF, 741HF)	50V
C307	1-163-239-11	CERAMIC CHIP 33PF 5%	50V
C309	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C310	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C311	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C312	1-164-346-11	CERAMIC CHIP 1uF	16V
C313	1-165-319-11	CERAMIC CHIP 0.1uF	50V
C314	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C315	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C316	1-128-057-11	ELECT 330uF 20%	6.3V
C317	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C318	1-125-705-11	CAP, DOUBLE LAYERS 0.22F	
C320	1-163-035-00	CERAMIC CHIP 0.047uF	50V
C321	1-124-261-00	ELECT 10uF 20%	50V
C325	1-126-154-11	ELECT 47uF 20%	6.3V
C330	1-124-584-00	ELECT 100uF 20%	10V
		< CONNECTOR >	
CN301	1-691-051-21	HOUSING, CONNECTOR 19P	
CN302	1-691-051-21	HOUSING, CONNECTOR 19P	
CN303	1-508-673-11	CONNECTOR, BOARD TO BOARD 14P	
CN304	1-695-038-21	PIN, CONNECTOR (PC BOARD) 4P (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
CN305	1-506-469-11	PIN, CONNECTOR 4P	
		< TRIMMER >	
CT301	1-141-442-91	TRIMMER, CERAMIC	
		< DIODE >	
D301	8-719-045-64	LED SLB-342MC-A-47 (POWER)	
D302	8-719-045-64	LED SLB-342MC-A-47 (POWER)	
D304	8-719-911-19	DIODE 1SS119-25 (EXCEPT 640HF, 730HFMX/HFPX, 740HF, 741HF)	
D312	8-719-911-19	DIODE 1SS119-25	
D313	8-719-200-82	DIODE 11ES2	
D320	8-719-110-08	DIODE RD6.2ES-B2	
		< FLUORESCENT INDICATOR >	
FL301	1-517-315-11	TUBE, FLUORESCENT INDICATOR	
		< IC >	
IC301	8-759-279-61	IC ST9JCS66BL	
IC302	8-759-266-09	IC MB89096PF-G-159-BND	
IC303	8-759-248-87	IC MN1256XF-BE	
IC305	1-466-833-11	IC RAY-CATCHER BLOCK, REMOCON	
		< JUMPER RESISTOR >	
JR301	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR305	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR309	1-216-296-00	METAL CHIP 0 5%	1/8W
JR310	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR311	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR312	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR313	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR318	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR330	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR331	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR332	1-216-295-91	CONDUCTOR, CHIP (2012) (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
JR333	1-216-296-00	METAL CHIP 0 5%	1/8W
JR334	1-216-296-00	METAL CHIP 0 5%	1/8W
JR335	1-216-296-00	METAL CHIP 0 5%	1/8W
JR336	1-216-296-00	METAL CHIP 0 5%	1/8W
JR337	1-216-296-00	METAL CHIP 0 5%	1/8W
JR338	1-216-296-00	METAL CHIP 0 5%	1/8W
JR339	1-216-296-00	METAL CHIP 0 5%	1/8W
JR340	1-216-296-00	METAL CHIP 0 5%	1/8W
JR341	1-216-296-00	METAL CHIP 0 5%	1/8W

Ref No.	Part No	Description	Remark
JR342	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR345	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR373	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR375	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR378	1-216-295-91	CONDUCTOR, CHIP (2012)	
		< COIL >	
L357	1-414-161-41	INDUCTOR 10uH	
L310	1-410-513-11	INDUCTOR 22uH	
		< JACK >	
PJ304	1-764-863-11	JACK, PIN (3P) (LINE IN 2) (780HF, 781HF)	
PJ391	1-766-863-21	JACK, PIN (3P) (LINE IN 2) (940HF/HFCS HFKX/HFPX)	
		< TRANSISTOR >	
Q301	8-729-421-19	TRANSISTOR UN2213	
		< RESISTOR >	
R310	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R302	1-216-020-00	METAL GLAZE 62 5% 1/10W	
R304	1-216-057-00	METAL CHIP 2.2K 5% 1/10W (640HF, 733HF/HFCS/HFKX/HFPX, 740HF/HFPX, 741HF)	
R305	1-216-061-00	METAL CHIP 3.3K 5% 1/10W (640HF, 733HF/HFCS/HFKX/HFPX, 740HF/HFPX, 741HF)	
R307	1-216-020-00	METAL CHIP 75 5% 1/10W (780HF, 781HF, 940HF/HFCS/HFKX/HFPX)	
R310	1-216-296-00	METAL CHIP 0 5% 1/8W	
R312	1-216-073-00	METAL CHIP 10K 5% 1/10W (640HF, 733HF/HFCS/HFKX/HFPX, 740HF/HFPX, 741HF)	
R313	1-216-113-00	METAL CHIP 470K 5% 1/10W (780HF, 781HF, 940HF/HFCS/HFKX/HFPX)	
R313	1-216-073-00	METAL CHIP 10K 5% 1/10W (640HF, 733HF/HFCS/HFKX/HFPX, 740HF/HFPX, 741HF)	
R313	1-216-113-00	METAL CHIP 470K 5% 1/10W (780HF, 781HF, 940HF/HFCS/HFKX/HFPX)	
R314	1-249-429-11	CARBON 10K 5% 1/4W	
R315	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R316	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R317	1-216-222-00	METAL GLAZE 10K 5% 1/8W	
R318	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R321	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R322	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R323	1-216-222-00	METAL GLAZE 10K 5% 1/8W	
R324	1-216-222-00	METAL GLAZE 10K 5% 1/8W	
R325	1-216-295-91	CONDUCTOR, CHIP (2012)	

Ref.No.	Part No.	Description	Remark
R326	1-249-425-11	CARBON 4.7K 5% 1/4W	F
R327	1-216-041-00	METAL CHIP 470 5% 1/10W (780HF, 781HF, 940HF/HFCS/HFKX/HFPX)	
R328	1-216-041-00	METAL CHIP 470 5% 1/10W (780HF, 781HF, 940HF/HFCS/HFKX/HFPX)	
R329	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R330	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R331	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R332	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R333	1-216-250-91	METAL GLAZE 1M 5% 1/8W	
R334	1-216-096-00	METAL CHIP 82K 5% 1/10W	
R336	1-216-057-00	METAL CHIP 2.2K 5% 1/10W (640HF, 733HF/HFCS/HFKX/HFPX, 740HF/HFPX, 741HF)	
R336	1-216-295-91	CONDUCTOR, CHIP (2012) (780HF, 781HF, 940HF/HFCS/HFKX/HFPX)	
R337	1-216-256-00	METAL GLAZE 2.2k 5% 1/8W (640HF, 733HF/HFCS/HFKX/HFPX, 740HF/HFPX, 741HF)	
R337	1-216-256-00	METAL CHIP 0 5% 1/8W (780HF, 781HF, 940HF/HFCS/HFKX/HFPX)	
R338	1-216-295-91	CONDUCTOR, CHIP (2012) (780HF, 781HF, 940HF/HFCS/HFKX/HFPX)	
R340	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R341	1-216-057-00	METAL CHIP 2.2K 5% 1/10W (640HF, 733HF/HFCS/HFKX/HFPX, 740HF/HFPX, 741HF)	
R342	1-216-045-00	METAL CHIP 4.7K 5% 1/10W (640HF, 733HF/HFCS/HFKX/HFPX, 740HF/HFPX, 741HF)	
R344	1-247-858-11	CARBON 10K 5% 1/4W (940HF/HFCS/HFKX/HFPX)	
R345	1-216-073-00	METAL CHIP 10K 5% 1/10W (940HF/HFCS/HFKX/HFPX)	
R346	1-249-413-11	CARBON 22k 5% 1/4W (940HF/HFCS/HFKX/HFPX)	
R347	1-247-850-11	CARBON 47K 5% 1/4W (940HF/HFCS/HFKX/HFPX)	
R348	1-249-437-11	CARBON 47K 5% 1/4W	
R349	1-216-222-00	METAL GLAZE 10K 5% 1/8W	
R350	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R351	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R360	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R361	1-249-417-11	CARBON 1K 5% 1/4W	F
R362	1-249-417-11	CARBON 1K 5% 1/4W	F
R363	1-249-417-11	CARBON 1K 5% 1/4W	F
R364	1-249-417-11	CARBON 1K 5% 1/4W	F
R365	1-249-417-11	CARBON 1K 5% 1/4W	F
		< SWITCH >	
S301	1-571-077-11	SWITCH, TACTILE (POWER)	

Ref.No.	Part No.	Description	Remark
S302	1-571-977-11	SWITCH, TACTIL (& EJECT)	
S303	1-571-977-11	SWITCH, TACTIL (TV/VTR) (640HF,733HF/HFCS/HFHX/HFPA, 740HF/HFPX,741HF)	
S304	1-571-977-11	SWITCH, TACTIL (+ (CHANNEL)) (640HF,733HF/HFCS/HFHX/HFPA, 740HF/HFPX,741HF)	
S305	1-571-977-11	SWITCH, TACTIL (- (CHANNEL)) (640HF,733HF/HFCS/HFHX/HFPA, 740HF/HFPX,741HF)	
S306	1-571-977-11	SWITCH, TACTIL (CLOCK SET UP) (640HF,733HF/HFCS/HFHX/HFPA, 740HF/HFPX,741HF)	
S307	1-571-977-11	SWITCH, TACTIL (INPUT SELECT) (640HF,733HF/HFCS/HFHX/HFPA, 740HF/HFPX,741HF)	
S308	1-571-977-11	SWITCH, TACTIL (CLOCK SPEED) (640HF,733HF/HFCS/HFHX/HFPA, 740HF/HFPX,741HF)	
S309	1-571-977-11	SWITCH, TACTIL (QUICK TIMER) (640HF,733HF/HFCS/HFHX/HFPA, 740HF/HFPX,741HF)	
S310	1-571-977-11	SWITCH, TACTIL (PRESET) (700HF,701HF, 940HF/HFCS/HFHX/HFPX)	
S201	1-762-171-11	SWITCH, SLIDE (COMMAND MODE) (940HF/HFCS/HFHX/HFPX)	
S101	1-572-508-11	SWITCH, SLIDE (EDIT) (940HF/HFCS/HFHX/ HFPX)	
		< VIBRATOR >	
X101	1-579-436-11	VIBRATOR, CRYSTAL (12MHz)	
X202	1-579-426-11	VIBRATOR, CERAMIC (12MHz)	

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*	A-6782-428-A	MA-214 BOARD, COMPLETE (733HF,741HF)	
*	A-6782-432-A	MA-214 BOARD, COMPLETE (700HF/HFPX,741HF)	
*	A-6782-414-A	MA-214 BOARD, COMPLETE (733HF/HFCS/HFHX/HFPA)	
*	A-6782-437-A	MA-214 BOARD, COMPLETE (940HF/HFCS/HFHX/HFPX)	
*	A-6782-438-A	MA-214 BOARD, COMPLETE (640HF) **********	
		(Ref No 1,000 series)	
*	3-980-270-01	SPACER, TOP END	
*	3-980-274-01	SPACER, RED	

< CAPACITOR >

C001	1-163-033-91	CERAMIC CHIP	0.022uF		50V
C002	1-163-033-91	CERAMIC CHIP	0.022uF		50V
C003	1-124-096-11	ELECT	10uF	20%	35V
C004	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C006	1-124-126-00	ELECT	47uF	20%	16V

Ref No	Part No	Description			Remark
C007	1-124-635-00	ELECT	220uF	20%	6.3V
C008	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C009	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C025	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C026	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C071	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C072	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C073	1-124-495-00	ELECT	100uF	20%	16V
C074	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C075	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C076	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C077	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C078	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C079	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C101	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C102	1-124-120-00	ELECT	47uF	20%	16V
C103	1-164-344-11	CERAMIC CHIP	0.068uF	10%	25V
C104	1-126-273-11	ELECT	22uF	20%	50V
C105	1-124-443-00	ELECT	100uF	20%	10V
C106	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C107	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C108	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C109	1-124-925-11	ELECT	2.2uF	20%	100V
C110	1-124-477-11	ELECT	47uF	20%	25V
C111	1-124-925-11	ELECT	2.2uF	20%	100V
C210	1-124-584-00	ELECT	100uF	20%	10V
C211	1-167-229-11	CERAMIC CHIP	12PF	5%	50V
C212	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C213	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C214	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C254	1-137-372-11	FILM	0.022uF	5%	50V
C255	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C256	1-124-249-00	ELECT	22uF	20%	25V
C257	1-137-441-11	FILM	0.027uF	5%	50V
C258	1-124-261-00	ELECT	10uF	20%	50V
C271	1-163-009-00	CERAMIC CHIP	0.01uF	10%	50V
C272	1-124-588-11	ELECT	47uF	20%	16V
C351	1-163-038-91	CERAMIC CHIP	0.1uF		25V
		(733HF/HFCS/HFHX/HFPA,700HF,731HF, 940HF/HFCS/HFHX/HFPX)			
C352	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
		(733HF/HFCS/HFHX/HFPA,700HF,731HF, 940HF/HFCS/HFHX/HFPX)			
C353	1-124-464-11	ELECT	0.22uF	20%	50V
		(733HF/HFCS/HFHX/HFPA,700HF,731HF, 940HF/HFCS/HFHX/HFPX)			
C354	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C355	1-167-219-00	CERAMIC CHIP	100PF	5%	50V
		(733HF/HFCS/HFHX/HFPA,700HF,701HF, 940HF/HFCS/HFHX/HFPX)			

Ref. No.	Part No.	Description			Remark
C362	1-163-117-00	CERAMIC CHIP (723HF/HFCS/HFHX/HFPA,760HF,781HF, 940HF/HFCS/HFHX/HFPX)	100PF	5%	50V
C404	1-163-005-00	CERAMIC CHIP	30PF	5%	50V
C402	1-163-038-11	CERAMIC CHIP	0.01uF		50V
C406	1-126-765-11	ELECT	33uF	20%	10V
C407	1-163-038-00	CERAMIC CHIP	0.01uF	10%	50V
C408	1-163-011-11	CERAMIC CHIP	0.04uF		50V
C409	1-126-785-11	ELECT	47uF	20%	10V
C410	1-165-227-11	CERAMIC CHIP	100F	0.5PF	63V
C411	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C412	1-163-239-11	CERAMIC CHIP	39PF	5%	50V
C413	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C416	1-124-257-00	ELECT	2.2uF	20%	50V
C417	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C418	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C419	1-124-126-00	ELECT	47uF	20%	10V
C420	1-163-001-11	CERAMIC CHIP	0.01uF		50V
C421	1-102-305-11	CERAMIC	0.01uF	20%	16V
C422	1-124-903-11	ELECT	1uF	20%	50V
C423	1-163-139-00	CERAMIC CHIP	820PF	5%	50V
C424	1-126-785-11	ELECT	47uF	20%	10V
C425	1-163-004-11	CERAMIC CHIP	0.1uF	10%	25V
C427	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C501	1-126-046-11	ELECT	10uF	20%	35V
C502	1-126-046-11	ELECT	10uF	20%	35V
C503	1-124-907-11	ELECT	10uF	20%	50V
C515	1-124-126-00	ELECT	47uF	20%	10V
C517	1-163-038-11	CERAMIC CHIP	0.01uF		50V
C518	1-124-124-00	ELECT	47uF	20%	10V
C519	1-163-038-11	CERAMIC CHIP	0.01uF		50V
C521	1-163-038-11	CERAMIC CHIP	0.01uF		50V
C522	1-124-437-11	ELECT	47uF	20%	25V
C523	1-124-126-00	ELECT	47uF	20%	10V
C524	1-124-472-11	ELECT	470uF	20%	10V
C525	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C529	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C703	1-124-284-00	ELECT	10uF	20%	50V
C701	1-163-001-11	CERAMIC CHIP	0.01uF	10%	50V
C705	1-124-281-00	ELECT	10uF	20%	50V
C706	1-163-031-11	CERAMIC CHIP	0.1uF		50V
C707	1-124-477-11	ELECT	47uF	20%	25V
C708	1-163-037-11	CERAMIC CHIP	0.01uF		50V
C710	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C711	1-126-161-11	ELECT	100uF	20%	16V
C712	1-163-023-11	CERAMIC CHIP	0.01uF		50V
C713	1-124-126-00	ELECT	47uF	20%	10V
C714	1-163-031-11	CERAMIC CHIP	0.1uF		50V
C716	1-124-261-00	ELECT	10uF	20%	50V

Ref. No	Part No.	Description			Remark
C717	1-124-261-00	ELECT	10uF	20%	50V
C718	1-124-243-00	ELECT	22uF	20%	35V
C719	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C721	1-163-031-11	CERAMIC CHIP	0.1uF		50V
C723	1-163-023-11	CERAMIC CHIP	0.01uF		50V
C724	1-124-261-00	ELECT	10uF	20%	50V
C727	1-124-589-11	ELECT	47uF	20%	16V
C751	1-107-662-11	CERAMIC CHIP (760HF,781HF,940HF/HFCS/HFHX/HFPX)	1uF	10%	16V
C751	1-107-662-11	CERAMIC CHIP (EXCEPT 940HF,723HF/HFCS/HFHX/HFPX)	1uF	10%	16V
C851	1-164-159-11	CERAMIC	0.1uF		50V
C853	1-164-159-11	CERAMIC	0.1uF		50V
C854	1-124-903-11	ELECT	1uF	20%	50V
C855	1-164-159-11	CERAMIC	0.1uF		50V
C856	1-107-370-11	FILM	0.01uF	5%	50V
C857	1-126-163-11	ELECT	4.7uF	20%	50V
C858	1-126-962-11	ELECT	1.5uF	20%	50V
C859	1-163-664-00	CERAMIC CHIP	0.0027uF	5%	50V
C860	1-163-643-00	CERAMIC CHIP	0.0012uF	5%	50V
C861	1-124-925-11	ELECT	2.2uF	20%	100V
C862	1-163-141-00	CERAMIC CHIP	0.003uF	5%	50V
C863	1-163-141-00	CERAMIC CHIP	0.003uF	5%	50V
C864	1-124-243-11	ELECT	22uF	20%	50V
C865	1-124-243-11	ELECT	22uF	20%	50V
C866	1-124-252-00	ELECT	0.33uF	20%	50V
C867	1-124-907-11	ELECT	10uF	20%	50V
C881	1-104-630-11	FILM (EXCEPT 940HF/HFCS/HFHX/HFPX)	0.015uF	5%	100V
C881	1-137-612-11	FILM (940HF/HFCS/HFHX/HFPX)	0.0068uF	5%	100V
C882	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C883	1-163-031-11	CERAMIC CHIP	0.001uF	10%	50V
C884	1-124-120-11	ELECT (EXCEPT 940HF/HFCS/HFPX)	220uF	20%	25V
C884	1-126-103-11	ELECT (940HF/HFCS/HFHX/HFPX)	100uF	20%	16V
C889	1-137-453-11	FILM	560PF	5%	100V
C891	1-104-097-11	FILM (940HF/HFCS/HFHX/HFPX)	0.047uF	5%	100V
C892	1-164-232-11	CERAMIC CHIP (940HF/HFCS/HFHX/HFPX)	0.01uF		50V
C893	1-163-011-11	CERAMIC CHIP (940HF/HFCS/HFHX/HFPX)	0.0015uF	10%	50V
C894	1-126-104-11	ELECT (940HF/HFCS/HFHX/HFPX)	100uF	20%	16V
C901	1-163 038-11	CERAMIC CHIP	0.01uF		50V
C902	1-124-443-00	ELECT	100uF	20%	10V
C904	1-163-007-91	CERAMIC CHIP	0.1uF		50V
C905	1-126-946-11	ELECT (EXCEPT 940HF,723HF/HFCS/HFHX/HFPX)	1800uF	20%	6.3V

Ref. No.	Part No.	Description	Remark
		< JACK >	
CJ602	1-764-222-11	JACK, PIN 6P (LINE IN L/LINE OUT)	
CJ751	1-566-822-21	JACK (CONTROL S (IN)) (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
CJ761	1-566-822-21	JACK (CONTROL S (OUT)) (EXCEPT 640HF, 733HF/HFCS/HFMX/HFPX)	
		< CONNECTOR >	
* CN051	1-766-537-11	CONNECTOR (HMD) 5P	
* CN071	1-766-716-11	CONNECTOR, BOARD TO BOARD 3P	
CN101	1-506-468-11	PIN, CONNECTOR 3P	
CN881	1-506-469-11	PIN, CONNECTOR 4P	
* CN882	1-560-891-00	PIN, CONNECTOR 3P	
CN891	1-506-468-11	PIN, CONNECTOR 3P	
* CN901	1-573-843-11	CONNECTOR, BOARD TO BOARD 11P	
* CN902	1-573-843-11	CONNECTOR, BOARD TO BOARD 11P	
* CN903	1-766-715-11	CONNECTOR, BOARD TO BOARD 14P (740HF/HFPX, 741HF, 780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
CN904	1-766-992-11	CONNECTOR, FFC/FPC (LIF) 19P	
CN905	1-766-992-11	CONNECTOR, FFC/FPC (LIF) 19P	
CN907	1-573-846-11	CONNECTOR, BOARD TO BOARD 14P	
CN908	1-573-846-11	CONNECTOR, BOARD TO BOARD 14P	
* CN909	1-766-538-11	CONNECTOR, BOARD TO BOARD 6P	
CN910	1-770-017-11	CONNECTOR, BOARD TO BOARD 19P	
* CN912	1-766-717-11	CONNECTOR, BOARD TO BOARD 5P	
		< DIODE >	
D001	8-719-048-26	LED GL526VL (TOP/END LED)	
D006	8-719-109-93	DIODE RD6.2ES-B2	
D007	8-719-109-93	DIODE RD6.2ES-B2	
D071	8-719-110-34	DIODE RD9.1ES-B3	
D206	8-719-801-43	DIODE 1SS193	
D251	8-719-801-43	DIODE 1SS193	
D252	8-719-101-50	DIODE RD5.1E-L2	
D253	8-719-101-47	DIODE RD4.7E-L2	
D402	8-719-801-48	DIODE 1SS193	
D604	8-719-109-75	DIODE RD4.3ES-B2	
D605	8-719-109-75	DIODE RD4.3ES-B2	
⚠D702	8-719-800-76	DIODE 1SS226	
D703	8-719-978-54	DIODE DTZ-TT11-30C	
D704	8-719-200-82	DIODE 11ES2	
D751	8-719-801-78	DIODE 1SS184 (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
D752	8-719-110-08	DIODE RD8.2ES-B2 (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
D761	8-719-801-78	DIODE 1SS184 (EXCEPT 640HF, 733HF/HFCS/HFMX/HFPX)	
D762	8-719-110-08	DIODE RD8.2ES-B2 (EXCEPT 640HF, 733HF/HFCS/HFMX/HFPX)	
D776	8-719-801-48	DIODE 1SS193 (EXCEPT 640HF, 733HF/HFCS/HFMX/HFPX)	
D777	8-719-109-51	DIODE HZS2.0ESB2 (EXCEPT 640HF, 733HF/HFCS/HFMX/HFPX)	
D778	8-719-110-08	DIODE RD8.2ES-B2 (EXCEPT 640HF, 733HF/HFCS/HFMX/HFPX)	
D851	8-719-801-78	DIODE 1SS184	
D901	8-719-801-48	DIODE 1SS193	
D902	8-719-200-82	DIODE 11ES2	
D903	8-719-200-82	DIODE 11ES2	
D904	8-719-991-75	DIODE RB425D	
		< IC >	
IC002	8-759-100-95	IC uPC3240Z	
IC071	8-759-294-26	IC BA6209-V2	
IC101	8-759-240-14	IC TA8623N	
IC201	8-752-853-58	IC CXP87240-051Q (EXCEPT 640HF, 733HF/HFCS/HFMX/HFPX)	
IC201	8-752-860-49	IC CXP87240-057Q (640HF/733HF/HFCS/HFMX/HFPX)	
IC251	8-759-702-02	IC NJM062M	
IC351	8-759-097-80	IC HD49783FP (EXCEPT 640HF, 740HF/HFPX, 741HF)	
IC401	8-759-288-96	IC MB9D089PF-118-EB	
IC402	8-759-164-09	IC LA7218M	
IC601	8-759-927-56	IC BA7021	
IC606	8-759-009-06	IC MC14052BF	
IC607	8-759-924-46	IC BA4560F	
IC701	8-759-701-59	IC NJM78M09FA	
IC851	8-759-248-92	IC BA7796FS-E2	
		< JUMPER RESISTOR >	
JR010	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR011	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR012	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR013	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR014	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR015	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR016	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR017	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR018	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR104	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR201	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR404	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR406	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR603	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR616	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR617	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR702	1-216-295-91	CONDUCTOR, CHIP (2012)	
JR703	1-216-295-91	CONDUCTOR, CHIP (2012)	

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Ref.No.	Part No.	Description	Remark
JR706	1-216-296-00	METAL CHIP 0 Ω 1/8W	
JR710	1-216-295-91	CONDUCTOR CHIP (2012)	
JR716	1-216-295-91	CONDUCTOR CHIP (2012)	
JR891	1-216-295-91	CONDUCTOR CHIP (2012) (EXCEPT 940HF/HFCS/HFMK/HFPX)	
JR901	1-216-295-91	CONDUCTOR CHIP(2012) (740HF/HFPX, 741HF, 750HF, 751HF, 940HF/HFCS/HFMK/HFPX)	
JR906	1-216-295-91	CONDUCTOR CHIP (2012)	

< COIL >

L101	1-410-482-31	INDUCTOR 100uH	
L202	1-410-470-11	INDUCTOR 10μH	
L251	1-410-513-11	INDUCTOR 22uH	
L401	1-410-482-31	INDUCTOR 100uH	
L403	1-408-974-21	INDUCTOR 22uH	
L404	1-410-482-31	INDUCTOR 100uH	
L601	1-410-509-11	INDUCTOR 10μH	
L603	1-410-482-31	INDUCTOR 100uH	
L604	1-410-482-31	INDUCTOR 100uH	
L605	1-410-482-31	INDUCTOR 100uH	
L606	1-410-501-11	INDUCTOR 2.2uH	
L701	1-414-263-41	INDUCTOR 10uH	
L702	1-414-180-31	INDUCTOR 100uH	
L703	1-414-263-41	INDUCTOR 10uH	
L712	1-410-501-11	INDUCTOR 2.2uH	
L851	1-410-482-31	INDUCTOR 100uH	
L881	1-410-497-11	INDUCTOR 1.2mH	
L891	1-410-497-11	INDUCTOR 1.2mH (940HF/HFCS/HFMK/HFPX)	

< PIN CABLE >

P701	1-566-110-00	CABLE, PIN	

< PHOTO INTERRUPTER >

PH001	8-749-010-19	PHOTO INTERRUPTER GP2S113	
PH002	8-749-010-20	PHOTO INTERRUPTER GP3S81C	

< IC LINK >

⚠PS201	1-532-727-11	LINK, IC 0.25A (TCP-NS)	
⚠PS301	1-532-727-11	LINK, IC 0.25A (SOT-N5)	

< TRANSISTOR >

Q101	8-729-025-92	PHOTO TRANSISTOR PT380F	
Q302	8-729-025-92	PHOTO TRANSISTOR PT380F	
Q403	8-729-284-53	TRANSISTOR 2SC1815-GR	
Q351	8-729-901-05	TRANSISTOR DTA144EK (EXCEPT 940HF, 940HF/HFMK, 741HF)	
Q353	8-729-421-19	TRANSISTOR UN2213 (EXCEPT 940HF, 740HF/HFPX, 741HF)	
Q354	8-729-010-25	TRANSISTOR MSD601-RT1 (EXCEPT 940HF, 740HF/HFPX, 741HF)	
Q402	8-729-901-05	TRANSISTOR DTA144EK	
Q404	8-729-010-05	TRANSISTOR MSB709-RT1	
Q416	8-729-010-05	TRANSISTOR MSB709-RT1	
Q417	8-729-010-05	TRANSISTOR MSB709-RT1	
Q693	8-729-010-05	TRANSISTOR MSB709-RT1	
Q702	8-729-421-19	TRANSISTOR UN2213	
⚠Q703	8-729-173-30	TRANSISTOR 2SA733-K	
Q715	8-729-010-25	TRANSISTOR MSD601-RT1	
Q706	8-729-010-25	TRANSISTOR MSD601-RT1	
Q751	8-729-421-19	TRANSISTOR UN2213 (750HF, 751HF, 940HF/HFCS/HFMK/HFPX)	
Q752	8-729-010-05	TRANSISTOR MSB709-RT1 (750HF, 751HF, 940HF/HFCS/HFMK/HFPX)	
Q761	8-729-010-25	TRANSISTOR MSD601-RT1 (EXCEPT 940HF, 750HF/HFCS/HFMK/HFPX)	
Q762	8-729-010-05	TRANSISTOR MSB709-RT1 (EXCEPT 940HF, 750HF/HFCS/HFMK/HFPX)	
Q763	8-729-010-05	TRANSISTOR MSB709-RT1 (EXCEPT 940HF, 750HF/HFCS/HFMK/HFPX)	
Q764	8-729-421-19	TRANSISTOR UN2213 (EXCEPT 940HF, 750HF/HFCS/HFMK/HFPX)	
Q776	8-729-140-07	TRANSISTOR 2SB714-Y (EXCEPT 940HF, 750HF/HFCS/HFMK/HFPX)	
Q777	8-729-010-25	TRANSISTOR MSD601-RT1 (EXCEPT 940HF, 750HF/HFCS/HFMK/HFPX)	
Q778	8-729-010-05	TRANSISTOR MSB709-RT1 (EXCEPT 940HF, 750HF/HFCS/HFMK/HFPX)	
Q779	8-729-010-05	TRANSISTOR MSB709-RT1 (EXCEPT 940HF, 750HF/HFCS/HFMK/HFPX)	
Q791	8-729-010-05	TRANSISTOR MSB709-RT1 (740HF, 751HF, 940HF/HFCS/HFMK/HFPX)	
Q792	8-729-010-05	TRANSISTOR MSB709-RT1 (750HF, 751HF, 940HF/HFCS/HFMK/HFPX)	
Q793	8-729-010-25	TRANSISTOR MSD601-RT1 (740HF, 751HF, 940HF/HFCS/HFMK/HFPX)	
Q831	8-729-012-24	TRANSISTOR 2SC4080-TL2-Q	
Q832	8-729-216-22	TRANSISTOR 2SA1162-Q	
Q838	8-729-010-25	TRANSISTOR MSD601-RT1	
Q851	8-729-012-24	TRANSISTOR 2SC4080-TL2-Q (940HF/HFCS/HFMK/HFPX)	
Q852	8-729-216-22	TRANSISTOR 2SA1162-Q (940HF/HFCS/HFMK/HFPX)	

< RESISTOR >

RD01	1-218-101-00	METAL CHIP	150K	5%	1/10W
RD02	1-247-881-00	CARBON	120K	5%	1/4W
RD03	1-249-437-11	CARBON	47K	5%	1/4W
RD04	1-218-089-00	METAL CHIP	47K	5%	1/10W
RD05	1-249-413-11	CARBON	470	5%	1/4W ?

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Ref. No.	Part No.	Description	Remark
R206	1-216-095-00	METAL CHIP 100K 5% 1/10W	
R207	1-216-097-00	METAL CHIP 150K 5% 1/10W	
R208	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R209	1-216-033-00	METAL CHIP 100 5% 1/10W	
R210	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R211	1-216-088-00	METAL CHIP 47K 5% 1/10W	
R212	1-216-053-00	METAL CHIP 2.2K 5% 1/10W	
R215	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R216	1-249-421-11	CARBON 2.2K 5% 1/4W F	
R217	1-249-400-11	CARBON 39 5% 1/4W F	
R218	1-249-400-11	CARBON 39 5% 1/4W F	
R219	1-249-421-11	CARBON 2.2K 5% 1/4W F	
R251	1-216-088-00	METAL CHIP 47K 5% 1/10W	
R252	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R253	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R254	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R271	1-216-072-00	METAL CHIP 10K 5% 1/10W	
R272	1-216-079-00	METAL CHIP 18K 5% 1/10W	
R101	1-216-119-00	METAL CHIP 620K 5% 1/10W	
R102	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R103	1-216-097-00	METAL CHIP 150K 5% 1/10W	
R104	1-216-097-00	METAL CHIP 150K 5% 1/10W	
R105	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R106	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R107	1-216-037-00	METAL CHIP 330 5% 1/10W	
R108	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R109	1-216-659-11	METAL CHIP 2.2K 0.5% 1/10W	
R110	1-216-651-11	METAL CHIP 1K 0.5% 1/10W	
R111	1-216-097-00	METAL CHIP 150K 5% 1/10W	
R126	1-216-659-11	METAL CHIP 2.2K 0.5% 1/10W	
R214	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R217	1-216-077-00	METAL CHIP 15K 5% 1/10W	
R218	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R219	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R224	1-249-421-11	CARBON 2.2K 5% 1/4W F	
R225	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R226	1-216-689-11	METAL CHIP 39K 0.5% 1/10W	
R256	1-216-689-11	METAL CHIP 39K 0.5% 1/10W	
R257	1-249-429-11	CARBON 10M 5% 1/4W	
R258	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R262	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R263	1-216-053-00	METAL CHIP 2.2K 5% 1/10W	
R264	1-216-105-91	METAL GLAZE 180K 5% 1/10W	
R265	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R266	1-216-079-00	METAL CHIP 18K 5% 1/10W	
R271	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R274	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R275	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R276	1-216-058-00	METAL GLAZE 2K 5% 1/10W	

Ref. No.	Part No.	Description	Remark
R277	1-216-063-00	METAL CHIP 3.3K 5% 1/10W	
R278	1-216-229-91	METAL GLAZE 12K 5% 1/8W	
R351	1-216-226-00	METAL GLAZE 15M 5% 1/8W (EXCEPT 540HF,740HF/HFPX,740HF)	
R352	1-216-073-00	METAL CHIP 10K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,740HF)	
R353	1-216-073-00	METAL CHIP 10K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,740HF)	
R354	1-216-065-00	METAL CHIP 4.7K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,740HF)	
R355	1-216-073-00	METAL CHIP 10K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,740HF)	
R361	1-216-065-00	METAL CHIP 4.7K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,740HF)	
R361	1-216-295-91	CONNECTOR, CHIP (2012) (540HF,740HF/HFPX,741HF)	
R362	1-216-049-00	METAL CHIP 1K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,741HF)	
R363	1-216-049-00	METAL CHIP 1K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,741HF)	
R364	1-216-232-00	METAL GLAZE 27K 5% 1/8W (EXCEPT 540HF,740HF/HFPX,741HF)	
R365	1-216-069-00	METAL CHIP 6.8K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,741HF)	
R366	1-216-069-00	METAL CHIP 6.8K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,741HF)	
R367	1-216-069-00	METAL CHIP 6.8K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,741HF)	
R368	1-216-069-00	METAL CHIP 6.8K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,741HF)	
R369	1-216-061-00	METAL CHIP 3.3K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,741HF)	
R370	1-216-061-00	METAL CHIP 3.3K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,741HF)	
R371	1-216-061-00	METAL CHIP 3.3K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,741HF)	
R372	1-216-069-00	METAL CHIP 6.8K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,741HF)	
R373	1-216-065-00	METAL CHIP 4.7K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,741HF)	
R373	1-216-295-91	CONNECTOR, CHIP (2012) (540HF,740HF/HFPX,741HF)	
R374	1-216-063-00	METAL CHIP 3.9K 5% 1/10W (EXCEPT 540HF,740HF/HFPX,741HF)	
R401	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R404	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R405	1-216-295-91	CONNECTOR, CHIP (2012)	
R406	1-216-295-91	CONNECTOR, CHIP (2012)	
R407	1-249-414-11	CARBON 560 5% 1/4W F	
R408	1-216-101-00	METAL CHIP 150K 5% 1/10W	
R409	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R410	1-216-043-91	METAL GLAZE 560 5% 1/10W	

Ref. No.	Part No.	Description	Remark
R411	1-216-025-00	METAL CHIP 100 5% 1/10W	
R412	1-216-295-91	CONDUCTOR, CHIP (2012)	
R413	1-216-295-91	CONDUCTOR, CHIP (2012)	
R414	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R415	1-216-051-00	METAL CHIP 1.2K 5% 1/10W	
R416	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R417	1-216-033-00	METAL CHIP 220 5% 1/10W	
R418	1-216-295-91	CONDUCTOR, CHIP (2012)	
R421	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R423	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R601	1-216-017-00	METAL CHIP 47 5% 1/10W	
R602	1-216-017-00	METAL CHIP 47 5% 1/10W	
R629	1-216-081-00	METAL CHIP 22K 5% 1/10W (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
R631	1-216-230-00	METAL GLAZE 22K 5% 1/8W (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
R632	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R633	1-216-085-00	METAL CHIP 33K 5% 1/10W (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
R633	1-216-295-91	CONDUCTOR, CHIP (2012) (640HF, 733HF/HFCS/HFMX/HFPA, 740HF/HFPX, 741HF)	
R634	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R635	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R636	1-216-295-91	CONDUCTOR, CHIP (2012)	
R638	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R639	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R640	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R641	1-216-085-00	METAL CHIP 33K 5% 1/10W (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
R641	1-216-295-91	CONDUCTOR, CHIP (2012) (640HF, 733HF/HFCS/HFMX/HFPA, 740HF/HFPX, 741HF)	
R642	1-216-295-91	CONDUCTOR, CHIP (2012)	
R643	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R644	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R645	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R646	1-249-435-11	CARBON 33K 5% 1/4W	
R653	1-216-037-00	METAL CHIP 330 5% 1/10W	
R655	1-249-408-11	CARBON 180 5% 1/4W	F
R656	1-247-813-31	CARBON 150 5% 1/4W	
R657	1-216-021-00	METAL CHIP 68 5% 1/10W	
R658	1-216-149-00	METAL GLAZE 470 5% 1/8W	
R659	1-216-041-00	METAL CHIP 470 5% 1/10W	
R660	1-216-043-91	METAL GLAZE 560 5% 1/10W	
R661	1-216-043-91	METAL GLAZE 560 5% 1/10W	
R662	1-216-022-00	METAL CHIP 75 5% 1/10W	
R702	1-216-041-00	METAL CHIP 470 5% 1/10W	
R703	1-216-295-91	CONDUCTOR, CHIP (2012)	
R704	1-216-295-91	CONDUCTOR, CHIP (2012)	
R705	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R706	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R708	1-216-025-00	METAL CHIP 100 5% 1/10W	
R709	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R710	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R713	1-216-037-00	METAL CHIP 330 5% 1/10W	
R714	1-216-037-00	METAL CHIP 330 5% 1/10W	
R715	1-216-025-00	METAL CHIP 100 5% 1/10W	
R716	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R717	1-216-075-00	METAL CHIP 12K 5% 1/10W	
R718	1-216-025-00	METAL CHIP 100 5% 1/10W	
R719	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R720	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R721	1-216-037-00	METAL CHIP 330 5% 1/10W	
R722	1-249-423-11	CARBON 3.3K 5% 1/4W	F
R725	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R726	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R733	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R736	1-249-417-11	CARBON 1K 5% 1/4W	F
R737	1-216-295-91	CONDUCTOR, CHIP (2012)	
R740	1-216-242-91	METAL GLAZE 68K 5% 1/8W	
R744	1-216-295-91	CONDUCTOR, CHIP (2012)	
R751	1-216-065-00	METAL CHIP 4.7K 5% 1/10W (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
R752	1-216-097-00	METAL CHIP 100K 5% 1/10W (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
R753	1-216-106-91	METAL GLAZE 220K 5% 1/10W (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
R754	1-216-057-00	METAL CHIP 2.2K 5% 1/10W (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
R761	1-247-807-31	CARBON 100 5% 1/4W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R762	1-216-041-00	METAL CHIP 470 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R763	1-216-065-00	METAL CHIP 4.7K 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R764	1-216-073-00	METAL CHIP 10K 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R765	1-216-089-00	METAL CHIP 47K 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R766	1-216-073-00	METAL CHIP 10K 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R767	1-216-057-00	METAL CHIP 2.2K 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R768	1-216-105-91	METAL GLAZE 220K 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R769	1-216-097-00	METAL CHIP 100K 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R770	1-216-065-00	METAL CHIP 4.7K 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R771	1-216-101-00	METAL CHIP 150K 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	

Ref. No.	Part No.	Description	Remark
R776	1-216-049-00	METAL CHIP 1K 5% 1/10W (EXCEPT 640HF,733HF/HFCS/HFMX,HFPA)	
R777	1-216-049-00	METAL CHIP 1K 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R778	1-216-003-00	METAL CHIP 10 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R779	1-216-073-00	METAL CHIP 10K 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R780	1-216-049-00	METAL CHIP 1K 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R781	1-216-105-00	METAL CHIP 330 5% 1/10W (EXCEPT 640HF, 733HF/HFCS/HFMX, HFPA)	
R781	1-216-097-00	METAL CHIP 100K 5% 1/10W (760HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
X782	1-216-093-00	METAL CHIP 10M 5% 1/10W (760HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
R783	1-216-089-00	METAL CHIP 47K 5% 1/10W (760HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
R784	1-216-073-00	METAL CHIP 10K 5% 1/10W (760HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
R850	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R852	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R855	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R856	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R857	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R858	1-216-129-00	METAL CHIP 2.2M 5% 1/10W	
C859	1-216-295-91	CONDUCTOR, CHIP (2012)	
C860	1-216-083-00	METAL CHIP 27K 5% 1/10W	
C861	1-216-073-00	METAL CHIP 10K 5% 1/10W	
C862	1-216-109-00	METAL CHIP 330K 5% 1/10W	
C863	1-216-069-00	METAL CHIP 6.8P 5% 1/10W	
R864	1-216-041-00	METAL CHIP 470 5% 1/10W	
R865	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R866	1-216-099-00	METAL CHIP 120K 5% 1/10W	
R867	1-216-075-00	METAL CHIP 12K 5% 1/10W	
R868	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R869	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R870	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R871	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R872	1-216-097-00	METAL CHIP 100K 5% 1/10W	
C873	1-216-295-91	CONDUCTOR, CHIP (2012)	
R875	1-249-430-11	CARBON 82K 5% 1/4W	
R876	1-216-001-00	METAL CHIP 10 5% 1/10W	
R877	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R881	1-216-081-00	METAL CHIP 22K 5% 1/10W	
⚠R882	1-249-349-11	CARBON 4.7 5% 1/4W F (EXCEPT 940HF/HFCS/HFMX/HFPX)	
⚠R882	1-249-395-11	CARBON 15 5% 1/4W F (940HF/HFCS/HFMX/HFPX)	
R883	1-249-417-11	CARBON 1K 5% 1/4W F	

Ref. No.	Part No.	Description	Remark
R884	1-216-040-11	METAL CHIP 39K 0.5% 1/10W (EXCEPT 940HF/HFCS/HFMX/HFPX)	
R884	1-216-097-00	METAL CHIP 100K 5% 1/10W (940HF/HFCS/HFMX/HFPX)	
R887	1-216-295-91	CONDUCTOR, CHIP (2012)	
R891	1-216-083-00	METAL CHIP 27K 5% 1/10W (940HF/HFCS/HFMX/HFPX)	
⚠R892	1-249-384-11	CARBON 12 5% 1/4W F (940HF/HFCS/HFMX/HFPX)	
R893	1-249-417-11	CARBON 1K 5% 1/4W F (940HF/HFCS/HFMX/HFPX)	
X894	1-216-097-00	METAL CHIP 100K 5% (940HF/HFCS/HFMX/HFPX)	1/10W
R896	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R897	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R898	1-216-105-00	METAL CHIP 33K 5% 1/10W	
R899	1-216-095-00	METAL CHIP 82K 5% 1/10W	
R903	1-208-690-11	METAL CHIP 5.6K 0.50% 1/16W	
R904	1-208-724-11	METAL CHIP 8.2K 0.50% 1/16W	
R905	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R906	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R911	1-216-057-00	METAL CHIP 2.2K 5% 1/10W (760HF/HFPX, 781HF, 780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
		< RF MODULATOR >	
⚠RF701	1-466-989-11	MODULATOR, RF	
		< VARIABLE RESISTOR >	
RV201	1-238-602-11	RES, ADJ, CARBON 47K	
RV202	1-238-602-11	RES, ADJ, CARBON 47K	
RV857	1-238-602-11	RES, ADJ, CARBON 47K	
		< SWITCH >	
S802	1-539-953-11	SWITCH, PUSH (1 KEY) (REC PROOF)	
		< TRANSFORMER >	
T881	1-423-413-11	TRANSFORMER, BIAS OSCILLATION (940HF/HFCS/HFMX/HFPX)	
T881	1-423-414-11	TRANSFORMER, BIAS OSCILLATION (EXCEPT 940HF/HFCS/HFMX/HFPX)	
T883	1-423-415-11	TRANSFORMER, BIAS OSCILLATION (940HF/HFCS/HFMX/HFPX)	
		< TUNER >	
⚠TU701	8-598-254-00	TUNER BEE-N6402	
		< VIBRATOR >	
X201	1-760-454-11	VIBRATOR, CRYSTAL (16MHz)	
X801	1-571-351-11	VIBRATOR, CRYSTAL (14.318MHz)	

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Ref. No.	Part No.	Description				Remark
X402	1-577-165-11	VIBRATOR, CERAMIC (500kHz)				

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Ref. No.	Part No.	Description
*	A-6782-424-A	MF-253 BOARD, COMPLETE (780HF, 781HF, 940HF/HFMX)
*	A-6782-430-A	MF-253 BOARD, COMPLETE (640HF, 733HF/HFMX/HFPA, 740HF, 741HF)
*	A-6782-501-A	MF-274 BOARD, COMPLETE (733HF/HFCS, 740HFPX)
*	A-6782-502-A	MF-274 BOARD, COMPLETE (940HFCS/HFPX)

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(Ref. No 1,000 series)

< CAPACITOR >

Ref. No.	Part No.	Description				
C401	1-163-038-91	CERAMIC CHIP	0.1uF			25V
C402	1-124-584-00	ELECT	100uF		20%	10V

< CONNECTOR >

Ref. No.	Part No.	Description
CN401	1-766-863-11	CONNECTOR, BOARD TO BOARD 14P
* CN402	1-695-822-11	CONNECTOR, BOARD TO BOARD 8P

< DIODE >

Ref. No.	Part No.	Description		
D403	8-719-045-62	LED	SLR-342YC-A-47	(● REC)
D404	8-719-045-63	LED	SLR-342YC-A-47	(● REC (ILMN))
D405	8-719-045-63	LED	SLR-342YC-A-47	(● REC (ILMN))
D406	8-719-045-62	LED	SLR-342YC-A-47	(TIMER)
D408	8-719-045-63	LED	SLR-342YC-A-47	(TIMER (ILMN))
D409	8-719-045-63	LED	SLR-342YC-A-47	(TIMER (ILMN))
D410	8-719-051-17	LED	SLR-342DCT31	(II PAUSE)
D415	8-719-200-82	DIODE	11ES2	
D424	8-719-045-63	LED	SLR-342YC-A-47	(REC (ILMN))
D425	8-719-045-63	LED	SLR-342YC-A-47	(REC (ILMN))
D428	8-719-045-63	LED	SLR-342YC-A-47	(TIMER (ILMN))
D429	8-719-045-63	LED	SLR-342YC-A-47	(TIMER (ILMN))

< IC >

Ref. No.	Part No.	Description	
IC401	8-752-315-96	IC	CXP2001M

< RESISTOR >

Ref. No.	Part No.	Description			
R401	1-216-032-00	METAL CHIP	200	5%	1/10W
R402	1-216-032-00	METAL CHIP	200	5%	1/10W
R403	1-216-032-00	METAL CHIP	200	5%	1/10W
R404	1-216-108-00	METAL GLAZE	47	5%	1/8W
R405	1-216-017-00	METAL CHIP	47	5%	1/10W
R406	1-216-032-00	METAL CHIP	200	5%	1/10W
R408	1-216-017-00	METAL CHIP	47	5%	1/10W
R409	1-216-017-00	METAL CHIP	47	5%	1/10W
R410	1-216-181-11	METAL GLAZE	200	5%	1/8W
R415	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R416	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R417	1-216-049-00	METAL CHIP	1K	5%	1/10W
R418	1-216-049-00	METAL CHIP	1K	5%	1/10W
R419	1-216-032-00	METAL CHIP	200	5%	1/10W
R420	1-216-032-00	METAL CHIP	200	5%	1/10W
R422	1-216-032-00	METAL CHIP	200	5%	1/10W
R423	1-216-032-00	METAL CHIP	200	5%	1/10W
R424	1-216-032-00	METAL CHIP	200	5%	1/10W
R425	1-216-032-00	METAL CHIP	200	5%	1/10W
R426	1-216-032-00	METAL CHIP	200	5%	1/10W
R427	1-216-032-00	METAL CHIP	200	5%	1/10W
R428	1-216-206-00	METAL GLAZE	2.2K	5%	1/8W
R429	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R430	1-216-057-00	METAL CHIP	2.2K	5%	1/10W

< SWITCH >

Ref. No.	Part No.	Description
S401	1-762-172-11	SWITCH, ROTARY (DMS) (640HF, 733HF/HFCS/HFMX/HFPA, 740HF/HFPX, 741HF)
S401	1-762-172-21	SWITCH, ROTARY (DMS) (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)
S403	1-571-977-11	SWITCH, TACTIL (● REC)
S410	1-571-977-11	SWITCH, TACTIL (II PAUSE)

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Ref. No.	Part No.	Description
*	A-6782-427-A	PS-327 BOARD, COMPLETE (EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX)
*	A-6782-439-A	PS-349 BOARD, COMPLETE (733HF/HFCS, 740HFPX, 940HFCS/HFPX)

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(Ref. No 1,000 series)

Ref. No.	Part No.	Description
*	3-351-893-01	HEAT SINK
	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3

< CAPACITOR >

Ref. No.	Part No.	Description			
⚠C101	1-104-703-31	FILM	0.1uF	20%	250V
⚠C102	1-104-705-11	FILM	0.1uF	20%	250V
⚠C103	1-107-401-11	ELECT	150uF	20%	200V
		(EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX)			
⚠C103	1-107-414-11	ELECT	220uF	20%	400V
		(733HF/HFCS, 740HFPX, 940HFCS/HFPX)			
⚠C104	1-161-740-00	CERAMIC	470PF	10%	400V
		(EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX)			
⚠C104	1-164-320-11	CERAMIC	0.001uF	10%	400V
		(733HF/HFCS, 740HFPX, 940HFCS/HFPX)			
⚠C105	1-161-740-00	CERAMIC	470PF	10%	400V
		(EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX)			
⚠C105	1-164-320-11	CERAMIC	0.001uF	10%	400V
		(733HF/HFCS, 740HFPX, 940HFCS/HFPX)			
⚠C106	1-164-320-11	CERAMIC	0.001uF	10%	400V
		(733HF/HFCS, 740HFPX, 940HFCS/HFPX)			
⚠C107	1-101-068-11	CERAMIC	0.0015uF	20%	400V
		(EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX)			

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Ref. No.	Part No.	Description	Remark
		< FUSE >	
△F101	1-532-743-11	FUSE, GLASS CYLINDRICAL (DIA.5) (2A/125V (EXCEPT 733HF/HFCS, 740HEPX, 940HFCS/HFPX)	
△T101	1-575-223-11	FUSE (H.B.C.) (T2AH/250V) 473HF/HFCS, 740HFPX, 940HFCS/HFPX)	
		<FUSE HOLDER>	
FH101	1-533-203-11	FUSE HOLDER	
FH102	1-533-203-11	FUSE HOLDER	
		< IC >	
△IC101	8-759-169-48	IC μPQ12RE11	
		< COIL >	
△L121	1-403-586-11	COIL, CHOKE 22uH	
△L122	1-403-586-11	COIL, CHOKE 22uH	
L181	1-400-409-00	INDUCTOR 10uH	
L182	1-414-942-11	INDUCTOR 1uH	
L183	1-414-942-11	INDUCTOR 1uH	
		< LINE FILTER >	
△LF101	1-409-976-11	FILTER, LINE	
△LF102	1-409-976-11	FILTER, LINE (733HF/HFCS, 740HEPX, 940HFCS/HFPX)	
		< IC LINK >	
△PS121	1-532-637-00	LINK, IC 1.0A (ICP-N25)	
△PS122	1-532-637-00	LINK, IC 1.0A (ICP-N25)	
△PS123	1-532-637-00	LINK, IC 1.0A (ICP-N25)	
△PS181	1-532-605-00	LINK, IC 0.4A (ICP-N10)	
		< TRANSISTOR >	
△Q130	8-729-140-90	TRANSISTOR 2SD938-D6	
Q132	8-729-421-22	TRANSISTOR UN2211	
△Q181	8-729-140-88	TRANSISTOR 2SD973-D6	
		< RESISTOR >	
△R101	1-214-947-00	METAL 1.2W 1% 1/2W (733HF/HFCS, 740HEPX, 940HFCS/HFPX)	
△R102	1-202-729-00	SOLID 4.8W 2% 1/2W (EXCEPT 733HF/HFCS, 740HEPX, 940HFCS/HFPX)	
R125	1-249-423-11	CARBON 3.3K 5% 1/4W F	
R131	1-249-413-11	CARBON 1K 5% 1/4W F	
R132	1-216-430-11	METAL OXIDE 39Ω 5% 1W F	
R171	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R141	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R161	1-249-412-11	CARBON 560 5% 1/4W F	
R162	1-249-428-11	CARBON 2.2 5% 1/2W F	

Ref. No.	Part No.	Description	Remark
△C107	1-164-320-11	CERAMIC 0.001uF 10% 400V (733HF/HFCS, 740HEPX, 940HFCS/HFPX)	
△C108	1-164-320-11	CERAMIC 0.001uF 10% 400V (733HF/HFCS, 740HEPX, 940HFCS/HFPX)	
C121	1-126-103-11	ELECT 470uF 20% 16V	
C122	1-124-479-11	ELECT 1000uF 20% 10V	
C125	1-126-213-11	ELECT 22uF 20% 50V	
C131	1-123-490-11	ELECT 220uF 20% 16V	
C132	1-126-233-11	ELECT 22uF 20% 50V	
C133	1-124-477-11	ELECT 47uF 20% 25V	
C141	1-124-477-11	ELECT 47uF 20% 25V	
C142	1-126-101-11	ELECT 100uF 20% 16V	
C161	1-124-126-00	ELECT 47uF 20% 10V	
C162	1-124-442-00	ELECT 330uF 20% 6.3V	
C171	1-124-604-00	ELECT 330uF 20% 10V	
C181	1-163-038-11	CERAMIC CHIP 0.01uF 50V	
C182	1-124-477-11	ELECT 47uF 20% 25V	
C183	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C184	1-124-910-11	ELECT 47uF 20% 50V	
C185	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C186	1-124-910-11	ELECT 47uF 20% 50V	
C187	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C188	1-124-910-11	ELECT 47uF 20% 50V	
C189	1-163-021-11	CERAMIC CHIP 0.01uF 50V	
C190	1-163-021-11	CERAMIC CHIP 0.01uF 50V	
C191	1-124-916-11	ELECT 22uF 20% 63V	
		< AC INLET >	
△CN101	1-251-134-11	INLET, AC (WITH FUSE) (AC IN~) (733HF/HFCS, 740HEPX, 940HFCS/HFPX)	
△CN103	1-251-135-11	INLET, AC (AC IN ~) (EXCEPT 733HF/HFCS, 740HEPX, 940HFCS/HFPX)	
		< CONNECTOR >	
CN101	1-770-019-11	CONNECTOR, BOARD TO BOARD 19P	
* CN102	1-695-823-11	CONNECTOR, BOARD TO BOARD 8P	
		< COMPOSITION CIRCUIT BLOCK >	
△CP101	1-415-895-11	POWER BLOCK (EXCEPT 733HF/HFCS, 740HEPX, 940HFCS/HFPX)	
△CP101	1-413-836-11	POWER BLOCK (733HF/HFCS, 740HEPX, 940HFCS/HFPX)	
△DP102	1-467-811-11	UNIT, DC-DC CONVERTER	
		< DIODE >	
△D101	8-719-510-06	DIODE S10D60	
D151	8-719-200-82	DIODE 1J3S2	
D161	8-719-911-19	DIODE 1SS184-25	
D162	8-719-109-85	DIODE RD5.1ES2	

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
R103	1-216-479-11	METAL OXIDE	560	5%	3W	F

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* A-6782-426-A RV-45 BOARD, COMPLETE (733HF/HFCS/HFMX/HFPX, 780HF, 781HF)

* A-6782-431-A RV-36 BOARD, COMPLETE (640HF, 740HF/HFPX, 741HF)

* A-6782-430-A RV-45 BOARD, COMPLETE (940HF/HFCS/HFMX/HFPX)

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(Ref. No 2,000 series)

< CAPACITOR >

Ref No.	Part No	Description	Value	Tol.	Voltage
C002	1-163-123-00	CERAMIC CHIP	180PF	5%	50V
C003	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C006	1-126-157-11	ELECT	10uF	20%	16V
C007	1-126-154-11	ELECT	47uF	20%	6.3V
C008	1-126-164-11	ELECT	47uF	20%	6.3V
C009	1-126-154-11	ELECT	47uF	20%	6.3V
C010	1-126-154-11	ELECT	47uF	20%	6.3V
C011	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C012	1-124-636-11	ELECT	22uF	20%	10V
C071	1-163-101-00	CERAMIC CHIP	22PF	5%	50V
C072	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C073	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C075	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C079	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C098	1-124-638-11	ELECT	22uF	20%	10V
C099	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C260	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C261	1-124-584-00	ELECT	100uF	20%	10V
C262	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C263	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C264	1-124-257-00	ELECT	2.2uF	20%	50V
C265	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C267	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C268	1-163-135-00	CERAMIC CHIP	560PF	5%	50V
C269	1-163-135-00	CERAMIC CHIP	560PF	5%	50V
C270	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C273	1-163-059-00	CERAMIC CHIP	0.01uF	10%	50V
C274	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C275	1-126-160-11	ELECT	1uF	20%	50V
C276	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C801	1-163-033-91	CERAMIC CHIP	0.022uF		50V
C802	1-163-033-91	CERAMIC CHIP	0.022uF		50V
C803	1-163-033-91	CERAMIC CHIP	0.022uF		50V
C804	1-163-077-91	CERAMIC CHIP	0.1uF		50V
C805	1-163-033-91	CERAMIC CHIP	0.022uF		50V
C806	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C807	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C808	1-124-584-00	ELECT	100uF	20%	10V
C809	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C810	1-124-584-00	ELECT	100uF	20%	10V
C811	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C813	1-164-336-11	CERAMIC CHIP	0.33uF		25V
C814	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C815	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C816	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C817	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C818	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C822	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C826	1-124-229-00	ELECT	33uF	20%	10V
C827	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C829	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C830	1-163-111-00	CERAMIC CHIP	56PF	5%	50V
C836	1-163-099-00	CERAMIC CHIP (940HF/HFCS/HFMX/HFPX)	18PF	5%	50V
C838	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C839	1-163-099-00	CERAMIC CHIP (940HF/HFCS/HFMX/HFPX)	18PF	5%	50V
C840	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C842	1-126-160-11	ELECT	1uF	20%	50V
C890	1-164-232-11	CERAMIC CHIP (940HF/HFCS/HFMX/HFPX)	0.01uF		50V
C893	1-163-251-11	CERAMIC CHIP (940HF/HFCS/HFMX/HFPX)	100PF	5%	50V
C894	1-163-121-00	CERAMIC CHIP (940HF/HFCS/HFMX/HFPX)	150PF	5%	50V
C895	1-163-245-11	CERAMIC CHIP (940HF/HFCS/HFMX/HFPX)	56PF	5%	50V
C896	1-163-038-91	CERAMIC CHIP (940HF/HFCS/HFMX/HFPX)	0.1uF		25V
C897	1-126-157-11	ELECT (940HF/HFCS/HFMX/HFPX)	10uF	20%	16V
C899	1-163-077-91	CERAMIC CHIP	0.1uF		50V
C901	1-163-088-00	CERAMIC CHIP	5PF		50V
C902	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C909	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C910	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C917	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C918	1-163-106-00	CERAMIC CHIP	35PF	5%	50V
C921	1-126-154-11	ELECT	47uF	20%	6.3V
C951	1-163-115-00	CERAMIC CHIP	82PF	5%	50V

< CONNECTOR >

Ref No.	Part No	Description
CN001	1-573-828-11	CONNECTOR, BOARD TO BOARD 14P
CN002	1-573-828-11	CONNECTOR, BOARD TO BOARD 14P
CN801	1-766-986-11	CONNECTOR, FFC/FPC (LIF) 13P
* CN802	1-564-029-00	PIN, CONNECTOR 4P
* CN803	1-564-013-11	PIN, CONNECTOR 5P

Ref No	Part No.	Description				Remark
		< DIODE >				
D0O1	8-719-911-19	DIODE	1SS119-25 (710HF/HFCS/HFMX/HFPX, 540HF, 760HF)			
D001	8-719-801-78	DIODE	1SS184			
D802	8-719-801-78	DIODE	1SS184			
D803	8-719-801-78	DIODE	1SS184			
		< IC >				
IC001	1-810-711-21	IC	YC MODULE, Z (NTSC) JPAL107			
IC260	8-759-055-49	IC	AN3227K			
IC801	8-759-261-78	IC	HA11A191ANT			
		< JUMPER RESISTOR				
JR001	1-216-295-91	CONDUCTOR, CHIP (2012)				
JR003	1-216-295-91	CONDUCTOR, CHIP (2012)				
JR021	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR022	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR023	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR025	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR026	1-216-295-91	CONDUCTOR, CHIP (2012)				
JR027	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR028	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR030	1-216-295-91	CONDUCTOR, CHIP (2012)				
JR031	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR032	1-216-295-91	CONDUCTOR, CHIP (2012)				
JR033	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR034	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR035	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR036	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR037	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR038	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR039	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR040	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR041	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR042	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR043	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR044	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR045	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR046	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR047	1-216-295-91	CONDUCTOR, CHIP (2012)				
JR048	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR049	1-216-295-91	CONDUCTOR, CHIP (2012)				
JR050	1-216-295-91	CONDUCTOR, CHIP (2012)				
JR051	1-216-295-91	CONDUCTOR, CHIP (2012)				
		< COIL >				
L001	1-408-976-21	INDUCTOR 33uH				
L002	1-408-982-21	INDUCTOR 100uH				
L004	1-408-976-21	INDUCTOR 33uH				
L005	1-410-521-11	INDUCTOR 100uH				
L006	1-410-514-11	INDUCTOR 27uH				
L006	1-410-513-11	INDUCTOR 22uH				
L0e7	1-410-525-11	INDUCTOR 220uH				
L098	1-410-521-11	INDUCTOR 100uH				
L260	1-408-982-21	INDUCTOR 100uH				
L801	1-408-948-00	INDUCTOR 220uH				
L802	1-408-948-00	INDUCTOR 220uH				
L803	1-408-982-21	INDUCTOR 100uH				
L804	1-408-982-21	INDUCTOR 100uH				
L810	1-408-985-21	INDUCTOR 180uH				
L812	1-408-982-21	INDUCTOR 100uH				
L813	1-408-970-21	INDUCTOR 10uH (940HF/HFCS/HFMX/HFPX)				
L814	1-408-970-21	INDUCTOR 10uH (940HF/HFCS/HFMX/HFPX)				
L890	1-408-963-21	INDUCTOR 6.8uH (940HF/HFCS/HFMX/HFPX)				
L891	1-410-521-11	INDUCTOR 100uH (940HF/HFCS/HFMX/HFPX)				
L901	1-408-977-21	INDUCTOR 39uH				
L908	1-410-521-11	INDUCTOR 100uH				
L909	1-408-979-21	INDUCTOR 56uH				
L961	1-408-971-21	INDUCTOR 12uH				
		< TRANSISTOR >				
Q002	8-729-421-19	TRANSISTOR	UN2213			
Q005	8-729-230-49	TRANSISTOR	2SC2712-YG (EXCEPT 640HF, 740HF/HFPX, 741HF)			
Q006	8-729-421-19	TRANSISTOR	UN2213 (730HF/HFCS/HFMX/ (EXCEPT 640HF, 740HF/HFPX, 741HF)			
Q007	8-729-216-21	TRANSISTOR	2SA1162-Y (730HF/HFCS/HFMX/ (EXCEPT 640HF, 740HF/HFPX, 741HF)			
Q008	8-729-424-67	TRANSISTOR	UN2216 (730HF/HFCS/HFMX/ (EXCEPT 640HF, 740HF/HFPX, 741HF)			
Q009	8-729-424-67	TRANSISTOR	UN2216 (730HF/HFCS/HFMX/ (EXCEPT 640HF, 740HF/HFPX, 741HF)			
Q036	8-729-230-49	TRANSISTOR	2SC2712-YG			
Q810	8-729-421-19	TRANSISTOR	UN2213			
Q811	8-729-921-12	TRANSISTOR	2SD1834			
Q817	8-729-230-49	TRANSISTOR	2SC2712-YG			
Q818	8-729-421-19	TRANSISTOR	UN2213			
Q819	8-729-230-49	TRANSISTOR	2SC2712-YG			
Q840	8-729-230-49	TRANSISTOR	2SC2712-YG			
Q841	8-729-216-21	TRANSISTOR	2SA1162-Y			
Q890	8-729-216-22	TRANSISTOR	2SA1162-G (940HF/HFCS/HFMX/HFPX)			
Q891	8-729-216-22	TRANSISTOR	2SA1162-G (940HF/HFCS/HFMX/HFPX)			
Q892	8-729-421-19	TRANSISTOR	UN2213 (940HF/HFCS/HFMX/HFPX)			
Q904	8-729-230-49	TRANSISTOR	2SC2712-YG			
Q906	8-729-230-49	TRANSISTOR	2SC2712-YG			

Ref.No	Part No.	Description			Remark
Q811	8-729-230-49	TRANSISTOR	2SC2712-Y6		
Q812	8-729-216-21	TRANSISTOR	2SA1162 Y		
		< RESISTOR >			
R002	1-216-025-00	METAL CHIP	270	5%	1/10W
R003	1-216-052-00	METAL CHIP	1.3K	5%	1/10W
R004	1-216-667-11	METAL CHIP	6.7K	0.5%	1/10W
R005	1-216-025-00	METAL CHIP	270	5%	1/10W
R009	1-216-659-11	METAL CHIP	2.2K	0.5%	1/10W
		(EXCEPT 640HE,740HE/HFPX,741HE)			
R010	1-216-659-11	METAL CHIP	2.2K	0.5%	1/10W
		(EXCEPT 640HE,740HE/HFPX,741HE)			
R012	1-216-055-00	METAL CHIP	820K	5%	1/10W
		(EXCEPT 640HE,740HE/HFPX,741HE)			
R014	1-216-113-00	METAL CHIP	470K	5%	1/10W
		(EXCEPT 640HE,740HE/HFPX,741HE)			
R082	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R083	1-216-063-00	METAL CHIP	27K	5%	1/10W
R084	1-216-061-00	METAL CHIP	47K	5%	1/10W
R085	1-216-045-00	METAL CHIP	680	5%	1/10W
R086	1-216-047-00	METAL CHIP	5.6K	5%	1/10W
R087	1-216-295-91	CONNECTOR, CHIP (2012)			
R088	1-249-421-11	CARBON	2.2K	5%	1/4W F
R262	1-216-035-00	METAL CHIP	330	5%	1/10W
R263	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R265	1-216-033-00	METAL CHIP	220	5%	1/10W
R266	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R267	1-216-035-00	METAL CHIP	270	5%	1/10W
R268	1-216-097-00	METAL CHIP	100K	5%	1/10W
R271	1-216-079-00	METAL CHIP	10K	5%	1/10W
R276	1-216-073-00	METAL CHIP	10Ω	5%	1/10W
R601	1-216-023-00	METAL CHIP	82	5%	1/10W
R602	1-216-037-00	METAL CHIP	330	5%	1/10W
R603	1-216-041-00	METAL CHIP	22K	5%	1/10W
R604	1-216-024-11	METAL CHIP	13	0.5%	1/10W
R606	1-216-023-00	METAL CHIP	82	5%	1/10W
R607	1-216-023-00	METAL CHIP	82	5%	1/10W
R611	1-216-037-00	METAL CHIP	330	5%	1/10W
R612	1-216-023-00	METAL CHIP	82	5%	1/10W
R613	1-216-041-00	METAL CHIP	22K	5%	1/10W
R616	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R617	1-216-049-00	METAL CHIP	1K	5%	1/10W
R635	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R636	1-216-047-00	METAL CHIP	820	5%	1/10W
R638	1-216-075-00	METAL CHIP	12K	5%	1/10W
R642	1-216-619-11	METAL CHIP	47	0.5%	1/10W
R643	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R644	1-249-423-11	CARBON	3.3K	5%	1/4W F
R646	1-216-059-00	METAL CHIP	3.3K	5%	1/10W

Ref.No.	Part No.	Description			Remark
R647	1-216-078-00	METAL GLAZE	15K	5%	1/10W
R656	1-216-033-00	METAL CHIP	220	5%	1/10W
R657	1-216-025-00	METAL CHIP	270	5%	1/10W
R658	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R659	1-216-081-00	METAL CHIP	47K	5%	1/10W
R660	1-249-433-11	CARBON	22K	5%	1/4W
R661	1-216-262-00	METAL GLAZE	1.5K	5%	1/10W
R662	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R663	1-216-047-00	METAL CHIP	820	5%	1/10W
R691	1-216-021-00	METAL CHIP	27	5%	1/10W
		(640HE/HFCS,HFKX/HFPX)			
R694	1-216-041-00	METAL CHIP	470	5%	1/10W
		(640HE/AECS/HFKX/HFPX)			
R695	1-216-054-00	METAL GLAZE	1.6K	5%	1/10W
		(640HE/AECS/HFKX/HFPX)			
R696	1-216-095-00	METAL CHIP	82K	5%	1/10W
		(640HE/AECS/HFKX/HFPX)			
R697	1-216-083-00	METAL CHIP	47K	5%	1/10W
		(640HE/AECS/HFKX/HFPX)			
R698	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
		(640HE/AECS/HFKX/HFPX)			
R701	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R702	1-216-295-91	CONNECTOR, CHIP (2012)			
R703	1-216-077-00	METAL CHIP	15K	5%	1/10W
R704	1-216-073-00	METAL CHIP	10K	5%	1/10W
R705	1-216-075-00	METAL CHIP	12K	5%	1/10W
R706	1-216-295-91	CONNECTOR, CHIP (2012)			
R707	1-216-045-00	METAL CHIP	680	5%	1/10W
R708	1-216-039-00	METAL CHIP	390	5%	1/10W
R709	1-216-039-00	METAL CHIP	390	5%	1/10W
R710	1-216-047-00	METAL CHIP	820	5%	1/10W
R711	1-216-049-00	METAL CHIP	1K	5%	1/10W
R712	1-216-295-91	CONNECTOR, CHIP (2012)			
R720	1-216-039-00	METAL CHIP	390	5%	1/10W
R721	1-216-038-00	METAL CHIP	360	5%	1/10W

Ref.No.	Part No.	Description	Remark
		MISCELLANEOUS	
		************	
51	1-467-943-11	SWITCH BLOCK, CONTROL (940HF, 940HFCS/MX/PX)	
51	1-467-941-21	SWITCH BLOCK, CONTROL (780HF)	
51	1-473-030-11	SWITCH BLOCK, CONTROL (781HF)	
104	1-769-354-11	CABLE, FLEXIBLE FLAT (19CORE)	
118	1-555-130-00	CABLE, PIN	
158	1-500-144-11	HEAD, FE	
165	1-506-485-11	PIN, CONNECTOR 6P	
203	8-848-576-02	DRUM ASSY, ROTARY UPPER (DZR-45-R) (EXCEPT 940HF/HFCS/HFMX/HFPX)	
203	8-848-594-02	DRUM ASSY, ROTARY UPPER (DZR-51-R) (940HF/HFCS/HFMX/HFPX)	
280	1-762-076-11	SWITCH, ROTARY	
M901	8-848-575-12	DRUM ASSY (DZR-45A-R) (EXCEPT 940HF/HFCS/HFMX/HFPX)	
M901	8-848-593-12	DRUM ASSY (DZR-51A-R) (940HF/HFCS/HFMX/HFPX)	
M903	X-3943-883-1	MOTOR ASSY, CAM	
M902	1-698-409-11	MOTOR, DC (CAPSTAN)	

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Ref.No.	Part No.	Description	Remark
		ACCESSORIES & PACKING MATERIALS	
		******************************	
	1-467-947-11	REMOTE COMMANDER (RMT-V161) (780HF, 781HF)	
	1-467-947-21	REMOTE COMMANDER (RMT-V164B) (733HF/HFCS/HFMX/HFPA)	
	1-467-948-11	REMOTE COMMANDER (RMT-V153) (940HF/HFCS/HFMX/HFPX)	
	1-467-951-11	REMOTE COMMANDER (RMT-V154C) (640HF)	
	1-467-953-11	REMOTE COMMANDER (RMT-V162) (740HF/HFPX, 741HF)	
	1-467-951-11	REMOTE COMMANDER (RMT-V154C) (640HF)	
	1-569-008-11	ADAPTER, CONVERSION 2P (733HF, HFCS, 740HFPX, 940HFCS/HFPX)	
⚠	1-575-131-11	CORD, POWER SUPPLY (733HF/HFCS, 740HFPX, 940HFCS/HFPX) (250V/2.5A)	
	1-575-334-11	CORD, CONNECTION	
	1-696-592-11	CORD, CONNECTION (NTSC)	
⚠	1-751-670-11	CORD, POWER (EXCEPT 733HF/HFCS, 740HFPX, 940HFCS/HFPX)	
	1-769-121-11	MOUSE, INTELLIGENT CABLE (740HF/HFPX, 741HF, 780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
*	1-769-397-11	WIRE, FLAT TYPE 14P	
	3-759-161-22	MANUAL, INSTRUCTION (740HF/HFPX, 741HF) (ENGLISH)	
	3-759-161-32	MANUAL, INSTRUCTION (740HF:Canadian, 741HF:Canadian) (FRENCH)	
	3-759-168-22	MANUAL, INSTRUCTION (780HF, 781HF) (ENGLISH)	
	3-759-168-32	MANUAL, INSTRUCTION (780HF:Canadian) (FRENCH)	
	3-759-979-12	MANUAL, INSTRUCTION (733HF/HFCS/HFMX/HFPA) (ENGLISH, SPANISH)	
	3-759-980-22	MANUAL, INSTRUCTION (940HF/HFCS/HFMX/HFPX) (ENGLISH)	
	3-759-980-32	MANUAL, INSTRUCTION (940HF:Canadian) (FRENCH)	
	3-759-980-42	MANUAL, INSTRUCTION (940HFCS/HFMX) (SPANISH)	
	3-759-981-22	MANUAL, INSTRUCTION (640HF) (ENGLISH)	
	3-759-981-32	MANUAL, INSTRUCTION (640HF:Canadian) (FRENCH)	
*	3-960-054-01	INDIVIDUAL CARTON (740HF/HFPX)	
*	3-960-055-01	CUSHION (UPPER) (640HF, 733HF/HFCS/HFMX/HFPA, 740HF/HFPX, 741HF)	
*	3-960-056-01	CUSHION (LOWER) (640HF, 733HF/HFCS/HFMX/HFPA, 740HF/HFPX, 741HF)	
*	3-960-081-01	INDIVIDUAL CARTON (780HF)	
*	3-960-082-01	CUSHION (UPPER) (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
*	3-960-083-01	CUSHION (LOWER) (780HF, 781HF, 940HF/HFCS/HFMX/HFPX)	
*	3-962-317-01	INDIVIDUAL CARTON (940HF/HFPX)	
*	3-962-318-01	INDIVIDUAL CARTON (781HF)	
*	3-962-319-01	INDIVIDUAL CARTON (940HFCS/HFMX)	
*	3-962-320-01	INDIVIDUAL CARTON (741HF)	
*	3-962-321-01	INDIVIDUAL CARTON (640HF)	
*	3-962-322-01	INDIVIDUAL CARTON (733HF/HFCS/HFMX/HFPA)	

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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	7-685-648-79	SCREW +BVTP 3X12 TYPE2 ET-1	
#2	7-682-045-01	SCREW +PS 3X8	
#3	7-624-255-15	SCREW +B 2X3	
#4	7-682-542-04	SCREW +P 3X6	
#5	7-685-645-79	SCREW +BVTP 3X14 TYPE2 ET-1	
#6	7-685-646-79	SCREW +BVTP 3X8 TYPE2 ET-1	
#7	7-624-106-04	STOP RING 3.0. TYPE -E	

6-1. SYSTEM CONTROL—VIDEO BLOCK INTERFACE (MA-214 BOARD IC201)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREADING	TAPE UNTHREADING	PB	PB PAUSE	SLOW	×2	PICTURE SEARCH CUE	PICTURE SEARCH REVIEW	REC	REC PAUSE
V FB	IC201㉖	O	H	H	H	H	H	L	L	L	L	L	L	H	H
RF SW P (SW30)	IC201㉑	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
Q V/D/Y MUTE	IC201㉒	O	L	L	L	L	L	*2	*3	*3	*3	*3	*3	L	L
HA SP	IC201㉓	O	*4	*4	*4	*4	*4	*5	*5	*5	*5	*5	*5	*4	*4
LP	IC201㉔	O	*8	*8	*8	*8	*8	*5	*5	*5	*5	*5	*5	*8	*8
REC P	IC201㉕	O	L	L	L	L	L	L	L	L	L	L	L	L	H
REC	IC201㉗	O	L	L	L	L	L	L	L	L	L	L	L	H	H
V SYNC	IC201㉘	I	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6
OSD MUTE	IC201㉙	O	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7
CTL REC	IC201㉚	O	L	L	L	L	L	L	L	L	L	L	L	H	L
NTSC	IC201㉛	O	L	L	L	L	L	L	L	L	L	L	L	L	L
JOG	IC201㉜	O	L	L	L	L	L	L	H	H	H	H	H	L	L
CRC SETTEI	IC201㉝	O	L	L	L	L	L	L	L	L	L	L	L	*9	*9

*1. 30(15.50)% duty pulse synchronizing with drum rotation.
*2. Normally "L" "H" when the video signal is not detected.
*3. V period "H" pulse.
*4. "L" in the SP mode. Selected according to the recording mode
*5. Selected according to the tape recording mode
*6. Composite sync signal (positive).
*7. "H" when menu screen or gray back screen.
*8. Selected by REC mode. "L" in the SP mode.
*9. "H" while APC is set.

Mode / Signal	SP	LP	EP
SPEED	L	H	H
EPES	L	L	H

6-2. SYSTEM CONTROL—SERVO PERIPHERAL CIRCUIT INTERFACE (MA-214 BOARD IC201)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREADING	TAPE UNTHREADING	PB	PB PAUSE	SLOW	×2	PICTURE SEARCH CUE	PICTURE SEARCH REVIEW	REC	REC PAUSE	PB INDEX WRT/ERS
REC CTL	IC201⑰	O	* L	* L	* L	* 1	* L	* H	*]	*]	*]	*]	*]	* L	*]	
CAP STOP	IC201⑱	O (O.D)	L	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	L	* 3	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	
STEP PLS	IC201⑲	O	L	L	L	L	L	L	L	* 2	L	L	L	L	L	
CTL REC	IC201⑤	O	L	L	L	L	L	L	L	L	L	L	L	L	L	H
CTL INDEX	IC201⑥	O	L	L	L	L	L	L	L	L	L	L	L	L	L	H
FB CTL	IC201⑫	I	H	* 6	* 6			* 1	H/L	* 2	* 6	* 6	* 6	* L	H	
DRUM PG	IC201⑭	I	* 4	* 7	* 7	* 5	* 5	* 7	* 7	* 7	* 7	* 7	* 7	* 7	* 7	
DRUM FG	IC201⑮	I	* 3	* 8	* 8	* 5	* 5	* 8	* 8	* 8	* 8	* 8	* 8	* 8	* 8	
CAP FG	IC201⑬	I	H/L	* 6	* 6	* 5	* 5	* 6	H/L	* 9	* 6	* 6	* 6	* 6	H/L	
CAP DA	IC201⑫	O	* 10	* 10	* 10	* 10	* 10	* 11	* 10	* 10	* 13	* 13	* 13	* 13	* 10	
DRUM DA	IC201⑨	O	* 12	* 12	* 12	* 12	* 12	* 12	* 12	* 12	* 12	* 12	* 12	* 12	* 12	
CTL STEP	IC201⑩	O	L	L	L	L	L	L	L	* 13	L	L	L	L	L	

* 1. 30Hz pulse.
* 2. Pulse in tape running.
* 3. Reverse logic pulse of STEP PLS.
* 4. "L" when drum rotation stops
* 5. Unstable period pulse.
* 6. Pulse of period proportionate to tape speed.
* 7. 30Hz pulse
* 8. 960Hz pulse.
* 9. Pulse in tape running.
* 10. Approx. 2 msec. period "H" or "L" pulse.
* 11. Approx. 1.5 msec. period "H" or "L" pulse.
* 12. Approx. 3 msec. period "H" or "L" pulse.
* 13 "H" in FWD direction and STEP drive.

6-3. SYSTEM CONTROL—MECHANISM BLOCK INTERFACE (MA-214 BOARD IC201)

Signal	Pin No.	I/O	EJECTED	CASSETTE LOADING	CASSETTE UNLOADING	TAPE THREADING	TAPE UNTHREADING	STOP	FF	REW	PB	PB PAUSE	SLOW	×2	PICTURE SEARCH CUE	PICTURE SEARCH REVIEW	REC	REC PAUSE
CAM LOAD	IC201㉑	O	L	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L
CAM UNLOAD	IC201㉒	O	L	L	H	L	H	L	L	L	L	L	L	L	L	L	L	L
CAM DV	IC201㉓	O		H	L	H	L											
MODE 1	IC201㉘	I	H	L	L	*1	*1	H	H	H	H	H	H	H	H	L	H	H
MODE 2	IC201㉙	I	L	L	L	*1	*1	L	L	L	H	H	H	H	H	H	H	H
MODE 3	IC201㉚	I	L	L	L	*1	*1	H	H	H	L	H	H	L	L	H	L	H
MODE 4	IC201㉛	I	L	H	H	*1	*1	H	L	L	L	L	L	L	L	L	L	L
REC PRF	IC201㉜	I	L	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
T REEL FG	IC201㉝	I	H/L	H/L	H/L	H/L	H/L	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
S REEL FG	IC201㉞	I	H/L	H/L	H/L	*3	*3	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
END LED	IC201㉟	O (O.D)	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	■4	*4	■4	*4	*4	*4
CAP TRQ 1	IC201㊱	O (O.D)											■1					
CAP TRQ 2	IC201㊲	O (O.D)										L	■1					L
CAP TRQ 3	IC201㊳	O (O.D)							H	H			●1		H	H		
CAP STOP	IC201㊴	O (O.D)	L	L	L	H	H	L	H	H	H	L	*5	H	H	H	H	L
CAP RVS	IC201㊵	O	H			L	H	H/L	L	H	L	L	L/*5	L	L	H	L	L
CAP DA	IC201㊶	O																
T SENS	IC201㊷	I	*6	*6	*6	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7
S SENS	IC201㊸	I	*6	*6	*6	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7

*1. Uncertainty
*2. "L" when the erasing protection tab is bent, "H" when not bent.
*3. Pulse of period proportionate to reel rotating speed.
*4. Approx. 2 msec. period "H" pulse.
*5. Pulse in tape running.
*6. "L" only in tape running and when CAP RVS is "H".
*7. Nomally "L", 2 msec. period "H" pulse when tape top or tape end is detected

6-4. SYSTEM CONTROL —SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE (MA-214 BOARD IC201)

Signal	Pin No.	I/O	I/O Level
ASURA RESET	IC201⑭	I	Normally "H". "L" when service interruption is detected or restored.
ASURA CS	IC201⑮	I	Chip select signal from the timer microprocessor. V period "L" pulse.
SI BUS	IC201⑯	I	Serial communication data from the timer microprocessor. V period "L" pulse
SO BUS	IC201⑰	O	Serial communication data to the timer microprocessor. V period "L" pulse.
S CLK	IC201⑱	I	Serial communication clock with the timer microprocessor. V period "L" pulse

6-5. SYSTEM CONTROL —AUDIO BLOCK INTERFACE (MA-214 BOARD IC201)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE LOADING	TAPE UNLOADING	PB	PB · PAUSE	SLOW	×2	PICTURE SEARCH CUE	PICTURE SEARCH REVIEW	REC	REC · PAUSE
AF ENVELOP	IC201⑧	I	AF RF envelope signal input pin for auto tracking.												
NA PB	IC201⑨	O	L	L	L	L	L	H	H	H	H	H	H	L	L
A MUTE	IC201⑩	O (O.D)	L	L	L	L	L	* 1	H	H	H	H	H	L	L
NA SP	IC201⑪	O	* 2	* 2	* 2	* 2	* 2	* 3	* 3	* 3	* 3	* 3	* 3	* 2	* 2
NA REC-P	IC201⑫	O	L	L	L	L	L	L	L	L	L	L	L	H	L
AF REC-P	IC201⑬	O	L	L	L	L	L	L	L	L	L	L	L	H	L
AF SW P	IC201⑭	O	* 1	* 1	* 1	* 1	* 1	* 1	* 1	* 1	* 1	* 1	* 1	* 1	* 1
AF SW POSITION	IC201⑮	I	Input pin for AF switching position adjustment.												
FULL ERS	IC201⑯	O (O.D)	H	H	H	H	H	H	H	H	H	H	H	L	H

* 1. 30Hz 50% duty pulse approximately 5 msec. delayed from RF SW P.
* 2. Selected according to SP/EP selector. "L" in the SP mode. "H" in the EP mode.
* 3. Selected according to the tape recording mode "L" in the SP mode. "H" in the EP mode

6-6. SYSTEM CONTROL—RF MODULATOR, INPUT SELECTION BLOCK (MA-214 BOARD IC201)

Signal	Pin No.	I/O	I/O Level		
			TUNER	LINE 1	LINE 2
LINE 1	IC201⑫	O	L	H	L
LINE 2	IC201⑬	O	L	L	H

6-7. SERVO/SYSTEM CONTROL MICROPROCESSOR CXP87240-057Q (MA-214 BOARD IC201) PORT FUNCTION DESCRIPTION

Pin No	Signal	I/O	Function
1	RF SWP	O	RF switching pulse
2	QVD	O	Fake VD.
3	OHD ENBL	O	Fake HD voltage level control
4	AF REC F	O	REF recording control.
5	REC F	O	Recording signal.
6	FE ON	O	Flying erase
7	REC CTL	I/O	REC CTL
8	CAP TRQ1	O	Capstan current control.
9	RENTAL	I/O	VKR control.
10	EINT	O	EDIT control
11	FA REC F	I/O	Normal audio recording mode H: recording mode
12	LP	O	H in LP mode.
13	CAMLOAD	I/O	Loading motor volume data com control
14	CAMUNLOAD	I/O	
15	C IN/REC PRE	O	Cassette IN and erasing protection tab detection switch input.
16	HEAD CONT	I/O	Head change control.
17	T SENS	I	Tape top sensor input.
18	S SENS	I	Tape end sensor input.
19	MOD CONT	O	Modulator power supply ON/OFF control
20	AV CONT	O	ON/OFF control (Not used: (open))
21	MF SECAM	I	H : MF SECAM IN-c used. (open))
22	SECAM	I	H : SECAM (Not used. (open))
23	VPB	O	Reverse VPB H : P-DEF.
24	STEP PLS	O	Step pulse, H: Capstan step driving.
25	PAL 60	O	H : HPSC on PAL TV. (Not used. (open))
26	358 NTSC	O	Tuner audio selection signal H : 3.58 XTAL (Not used. (open))
27	NTSC	O	(H : PAL (Not used. (open))
28	E TAPE	O	H : HG tape. (Not used. (open))
29	BJL	O	H output : BS 4chingual mode (Not used. (open))
30	C+CONT	O	CAM AL 6-control. (Not used. (open))
31	CAM 12V	O	CAM motor voltage change.
32	END LED	O	Top/end direction lamp lighting control.
33	CAP TRQ 2	O	Capstan current control signal 2 L : FF/REW to STOP.
34	CAP TRQ C	O	Capstan cut-out control signal L L : SLOW speed down.
35	PAL	O	H : PAL (Not used. (open))
36	FULL ERS	O	Full erase control. (Not used. (open))
37	A MUTE	O	Audio mute. H : mute.
38	CAP STOP	O	Capstan stop reversal. L: Capstan stop
39	MF	I	Fixed to L.

Pin No.	Signal	I/O	Function
40	ASURA RESET	I	System reset input.
41	VSS		GND
42	X OUT		System clock 16MHz
43	EXTAL		
44	ASURA CS	I	Chip select signal. (H: S/P board IC402)
45	SI BUS	I	
46	SO BUS	O	Serial communication signal.
47	S CLK	I	
48	DEST 2	I	Destination judge input. (Not used. (open))
49	AD	I	AD input for APC 2
50	AC ON LINE	O	AC ON LINE output.
51	APSW POS	I	Hi-Fi switching position adjustment.
52	A VSS		GND.
53	A VREF		AD port reference input. (UNSW 5V)
54	A VDD		UNSW 5V
55	MODE 4	I	Cam encoder data 4.
56	MODE 5	I	Cam encoder data 5.
57	MODE 2	I	Cam encoder data 2.
58	MODE 3	I	Cam encoder data 3.
59	DEW	I	Condensation sensor input "H" when condensation
60	RV ENV	I	Video playback signal envelope
61	AF ENV	I	Hi-Fi audio playback signal envelope.
62	MF SW POS	I	Video head switching position adjustment.
63	S REEL FG	I	S side reel FG input
64	T REEL FG	I	T side reel FG input.
65	NT JUDGE	I	4.43/3.58 judge input. (Not used. (open))
66	V SYNC	I	Composite sync input.
67	PB CTL	I	Servo CTL input
68	DRM FG	I	Drum FG input.
69	DRM FG	I	Drum FG input.
70	CAP FG	I	Capstan FG input
71	OSD MUTE	O	Video output mute signal. H.. Gray back. (Not used. (open))
72	CAP RVS	O	Capstan reverse control H : Reverse
73	CAP DA	O	Capstan D/A output.
74	DRM DA	O	Drum D/A output.
75	FP	O	L : FP (Not used. (open))
76	ORC SETTEI	O	H: ORC measure.
77	VD CTL	I	CTL counter input. (Fixed to "H".)
78	DEST 1	I	Destination judge input.

Pin No.	Signal	I/O	Function
79	LINE 1	O	Input selection control signal
80	SO 1	I/O	Expanded port data
81	CLK 1	I/O	Expanded port clock.
82	LINE 2	O	Input selection control signal
83	MAPB	O	Audio output control signal. H : Normal audio playback.
84	PWM	O	PWM output for APC8
85	W TAPE	I	H : Wrong tape.
86	N. C		Not used (open)
87	TX		Not used (open)
88	VSS		GND
89	VDD		ON SW 5V
90	VDD		ON SW 5V.
91	MA SP	O	For normal audio L : SP mode
92	ENV GAIN	O	Video envelope gain change.
93	CTL STEP	O	CTL amp STEP operation control
94	CTL REC	O	H : CTL write
95	V-FB	O	Video system playback mode reversal L : Playback.
96	CTL INDEX	O	Index control signal rewrite. H : Erase
97	JOG	O	H : JOG
98	REC	O	Head amplifier recording power supply
99	SP	O	L : SP mode.
100	AP SWP	O	AP selecting pulse

6-8. TIMER/TUNER CONTROL MICROPROCESSOR M38B96PF-G-159-BND (HI-5/19 BOARD IC302) PORT FUNCTION DESCRIPTION

Pin No.	Signal	I/O	Function
1	CL 1		Liquid crystal oscillation pin (32 KHz) (for clock)
2	CL 0		
3	MOD 0 (GND)		Operation mode specification pin (GND when used).
4	MOD 1 (GND)		
5	X 0		Liquid crystal oscillation pin (4 MHz) (for main)
6	X 1		
7	VSS		GND
8	RESET	I	Reset input pin
9—12	N. C.	O	Not used (open)
13	S SIGHT CS	O	S SIGHT chip select signal.
14	TUNER V	I	TUNER V Sync signal input
15	ASURA RESET	O	S/S nikcam IMA-214 board IC201 reset signal
16	CC CS	O	Character generator chip select signal IMA-204 board IC401
17	POWER FAIL	I	Power voltage drop detection pin.
18	V SYNC	I	V sync input.
19	POWER CONT	O	Main power supply control signal
20	ASURA CS	O	S/S nikcam chip select signal (IMA-214 board IC203)
21	H DET	I	H DET signal input.
22	EDS CS	O	EDS chip select signal (ED-40-48 board IC601)
23	SCL	I/O	I² BUS (clock) (I²C BUS clock)
24	SDA	I/O	I²C BUS (data)
25	NOT SYNC	I/O	Sync. detection error.
26	N C	E	Not used (open)
27	E MONO	O	Tuner audio select.
28	GMOD	I	Normally GND 5V : Connected to nikcam jig
29	MAIN/SAP	O	MAIN/SAP judge signal output.
30	STEREO	I/O	Stereo judge input.
31	SAP	I/O	MAIN/SAP judge input.
32	SIRCS IN	E	Remote control input.
33	PLL CLOCK	O	Tuner PLL clock.
34	PLL DATA	O	Tuner PLL data.
35	PLL ENABLE	O	Tuner chip select.
36	TA MUTE	O	Tuner audio mute
37	SIRCS OUT	O	SIRCS signal output.
38	A PRST	O	Tuner satellite) select signal for auto preset.
39—42	N C	O	Not used (open)
43—48	S20—S15	O	FDP segment 20—15.
49	VDD		D 5V
50—52	S14—S12	O	FDP segment 14—12

Pin No.	Signal	I/O	Function
53	VEDP		+30V.
54—57	S11—S8	O	FDP segment 11—8
58	VSS		GND
59—65	S7—S1	O	FDP segment 7—1.
66	IG	O	FDP grid 6
67	VDD		D 5V
68—74	IG—1G	O	FDP Grid 5—1.
75	LED D CS	O	LED driver chip select signal (MIF-233/271 board IC401)
76	POWER CONT 2	O	Tuner power supply control
77	SI BUS	I	Serial data input.
78	SO BUS	O	Serial data output.
79	S CLK	O	Serial communication clock
80	MEM CS	O	EEPROM CS. (HI-5/19 board IC301)
81	MEM CLK	O	EEPROM CLOCK.
82	MEM DATA	I/O	EEPROM DATA.
83	AVSS		GND.
84	AFT	I	Ground wave tuner AFT detection
85	AD 1	I	Not used.
87—91	A/D 3—A/D 7	I	Membrane key reading.
92	A/D0	I	D 5V
93	A/D1	I	Membrane key reading.
94	DEST 0	I	Destination discrimination.
95	DEST 2	I	
96	A/D 11	I	Membrane key reading
97	LANC IN	I	LANC input.
98	LANC OUT	O	LANC output.
99	BUZZER	O	Buzzer output/clock liquid crystal frequency division output
100	VDD		D 5V

SECTION 7
ADJUSTMENTS

7-1. MECHANICAL ADJUSTMENTS

For the procedures how to adjust and check the mechanism, as well as how to replace mechanical parts, refer to the VHS Mechanical Adjustment Manual IV (H MECHANISM) (9-973-623-11).

However, for the procedures how to set the Track Shift mode, refer to the following text.

7-2. ELECTRICAL ADJUSTMENTS

See the adjusting part location diagram from on page 7-10 for the adjustment.

SLV-733HF/HFCS, 740HFPX, 940HFCS/HFPX MODEL	DC-65 BOARD HI-19 BOARD MF-274 BOARD PS-349 BOARD RV-45 BOARD
EXCEPT SLV-733HF/HFCS, 740HFPX, 940HFCS/HFPX MODE	DC-57 BOARD HI-5 BOARD MF-253 BOARD PS-327 BOARD RV-36 BOARD
SLV-740HFPX, 940HFCS/HFPX MODEL	ED-43 BOARD
SLV-740HF, 741HF, 780HF, 781HF, 940HF/HFMX MODEL	ED-40 BOARD

2-1. PREPARATION BEFORE ADJUSTMENT

2-1-1. Equipment Required

The measuring instruments used for this alignment include:

[Instruments for Use]

1) Monitor TV
2) Oscilloscope, dual-trace, bandwidth of 30MHz or more, with delay mode (A probe 10 : 1 should be used unless otherwise specified.)
3) Frequency counter (8 columns or more)
4) NTSC pattern generator
5) Digital voltmeter
6) Audio level meter
7) Audio generator
8) Attenuator
9) Distortion rate meter
10) Sound dual multiplex signal generator
11) Alignment tape
   - Normal-VHS (KRV-51N2)
   Part No : 8-192-005-32
12) Extension cable
   ① HI-5/19 Board
   - HI-5/19 board CN301 → MA-214 board CN904
   - HI-5/19 board CN302 → MA-214 board CN905
   Part No : J-6090-053-A (19 pin)

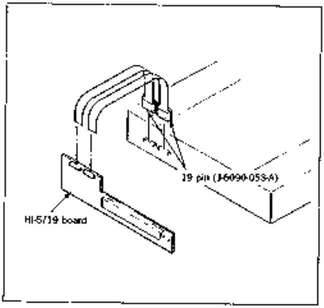


Fig. 7-2-1.

② RV-36/45 Board
- RV-36/45 board CN001 → MA-214 board CN906
- RV-36/45 board CN002 → MA-214 board CN907
Part No : J-6090-025-A (14 pin)
- RV-36/45 board CN801 → Drum Head flexible
Part No : J-6090-054-A (13 pin)

③ HF-34 Board
- HF-34 board CN101 → MA-214 board CN902
- HF-34 board CN102 → MA-214 board CN901
Part No : J-6090-047-A (11 pin)

④ ED-40/43 Board
- ED-40/43 board CN601 → MA-214 board CN903
Part No : J-6090-048-A (10 pin)

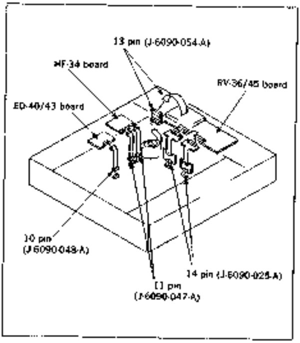


Fig. 7-2-2.

2-1-2. Equipment Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown is the following diagram.

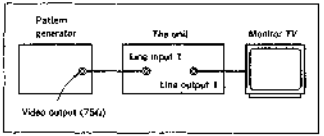


Fig. 7-2-3.

Unless otherwise specified, place the switches and controls of this unit in the following positions:

- CHANNEL switch ..... LINE 1
- TAPE SPEED (SP/EP) switch ..... SP

2-1-3. Check of Input Signal

Because the video signal obtained from the pattern generator is used as the adjustment signal for the adjustment, the video output signal is required to satisfy the specified value.

Connect the oscilloscope to the picture input terminal (terminal board). And check that the synchronizing signal amplitude of the video signal is approximately 0.3V, the amplitude of the picture part is approximately 0.7V, the amplitude of the burst signal is approximately 0.3V and is flat, and the ratio of level between the burst signal and the "red" signal is 0.30 : 0.66. The video signal (color bar) used for the adjustment is shown in the fig. 7-2-4.

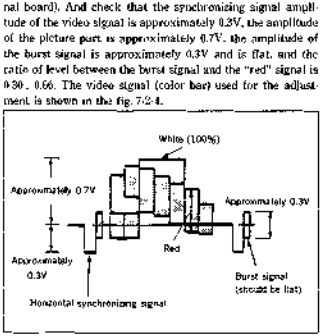


Fig. 7-2-4. Color bar signal of the pattern generator

2-1-4. Alignment Tape

- Contents of KRV-51N2 (Normal-VHS)

	Mode	Period	Video signal	Audio signal	
				Hi-Fi	Normal
1	SP	7 minutes	Color bar	400Hz	400Hz
2	SP	9 minutes	Mono scope	400Hz	400Hz
3	EP	7 minutes	Color bar	400Hz	400Hz
4	EP	3 minutes	Mono scope	400Hz	400Hz

2-1-5. Specified Input-output Level and the Impedance

LINE IN 1 and 2

VIDEO IN — Phono jack (1 each)
Input signal : 1 Vp-p, 75Ω, unbalanced, sync negative

AUDIO IN — Phono jack (2 each)
Input level : −7.5dBs (0 dBs=0.775 Vrms)
Input impedance : more than 47kΩ

LINE OUT

VIDEO OUT — Phono Jack (1)
Output signal : 1 Vp-p, 75Ω, unbalanced, sync negative

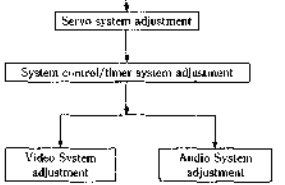
AUDIO OUT — Phono jack (2)
Standard output : −7.5dBs
Load impedance : 47kΩ
Output impedance : less than 10kΩ

CONTROL S IN — Minijack (1)

CABLE BOX CONTROL (CONTROL S OUT) — (plug in power)

2-1-6. Adjustment Procedures

Perform the adjustment following the procedures given below.



2-2. POWER SUPPLY CHECK

2-2-1. Output Voltage Check (PS-327/349 Board)

Mode	E-E
Measuring instrument	Digital voltmeter
38V check	
Measurement point	CN101 Pin ①
Specified value	38±3Vdc
13V check	
Measurement point	CN101 Pin ③④
Specified value	13±1Vdc
MTR 12V check	
Measurement point	CN101 Pin ⑤⑥
Specified value	12.0±1.0Vdc
SW 12V check	
Measurement point	CN101 Pin ⑨
Specified value	12.0±0.5Vdc
SW 5V check	
Measurement point	CN101 Pin ⑩
Specified value	5.0±0.5Vdc
D 5V check	
Measurement point	CN101 Pin ⑪
Specified value	5.0±0.5Vdc
−8V check	
Measurement point	CN101 Pin ⑫
Specified value	−13±2Vdc
D 6V check	
Measurement point	CN102 Pin ②
Specified value	5.9±0.5Vdc
−30V check	
Measurement point	CN102 Pin ⑥
Specified value	−29±3Vdc

2-3. SERVO SYSTEM ADJUSTMENT

2-3-1. RF Switching Position Adjustment (MA-214 Board)

[Adjustment Object]

To adjust the link of the Ach and Bch of the tape playback outputs.

To make the unit compatible with other tapes and units. If this specification is not satisfied, the link will appear on the screen and the screen will be disrupted, etc.

Mode	Playback (SP)
Signal	Alignment tape : KRV-51N2 SP color bar portion
Measurement point	CH1 : Video Line out terminal CH2 : CN802 pin ⑨ (RF SWP) (RV-36/45 board)
Measuring instrument	Oscilloscope
Adjustment element	RV202
Specified value	6.5±0.5H (410±32μsec)

[Adjustment Method]

1) Set TRACKING switch (Remote comander) to MANUAL ("Auto tracking" display will disappear on the display window indicator.)
2) Press the trackling buttons ▼ and ▲ and adjust the tracking position to the center.
3) Adjust to 410±32μsec (6.5±0.5H) using RV502.

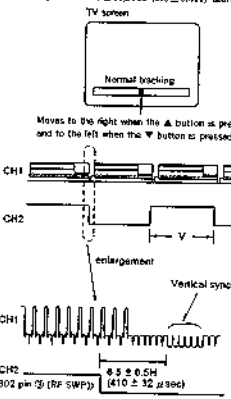


Fig. 7-2-5.

2-4. SYSTEM CONTROL/TIMER SYSTEM ADJUSTMENT

2-4-1. Clock Adjustment (H1-5/19 Board)

[Adjustment Object]

To raise the accuracy of the clock.
If the clock is not accurate, its error difference will gradually increase.

Measurement point	IC302 pin ⑭ (BUZZER OUT)
Measuring instrument	Frequency counter (Interval counter mode)
Measuring element	CT301
Specified value	0.1249995±0.0000005sec

Note : Do not adjust CT301 except when replacing IC302.

[Adjustment Method]

1) Connect 47kΩ resistor (J-219-487-11) between pin ⑨ of IC302 and ground. (This sets the adjustments mode.)
2) Connect the frequency counter as shown in the figure below.
3) Adjust the oscillation frequency to the specified value using CT301.
4) After this adjustment, remove the resistor.

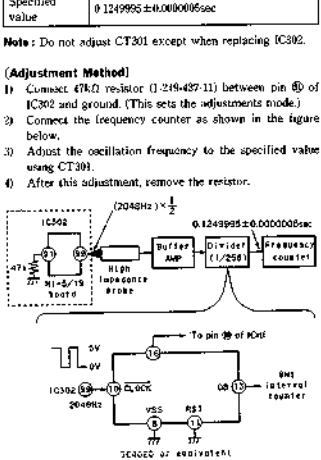


Fig. 7-2-6.

2-5. VIDEO SYSTEM ADJUSTMENT

For the video system adjustment, follow the adjustment procedures given below as a rule. The color bar video signal supplied from the pattern generator is used as the video input signal for the video system adjustment of the recording mode. Check that the signal satisfies the specified value designated in the "Check of input signal (Fig. 7-2-4).

[Adjustment Sequence]

1) X'tal OSC Check
2) SYNC AGC Check
3) White clip/Dark clip check
4) Y FM carrier frequency check
5) Playback Y Level check

2-5-1. X'tal OSC Check (RV-36/45 Board)

Mode	Playback
Signal	Alignment tape. Color bar portion
Measurement point	IC001 pin ⑫
Measuring instrument	Oscilloscope and Frequency counter
Specified value	3.579545±82Hz

Note : A frequency counter should be connected through a buffer amplifier (oscilloscope, etc.) having a high impedance and a low capacitance.

[Check Method]

1) Check that the oscillation frequency is 3.579545±82Hz and that the oscillation voltage is 450±200mVp-p.

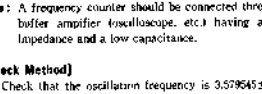


Fig. 7-2-7.

2-5-2. SYNC AGC Check (RV-36/45 Board)

Mode	E-E
Signal	Color bar
Measurement point	Video output terminal
Measuring instrument	Oscilloscope
Specified value	A = 2.01 ± 0.14Vp-p

[Check Method]

1) Check that the SYNC AGC level (A) satisfies the specified value.

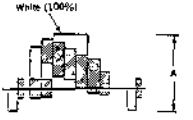


Fig. 7-2-8.

2-5-3. White Clip/Dark Clip Check (RV-36/45 Board)

Mode	E-E
Signal	Color bar
Measurement point	IC001 pin ⑦
Measuring instrument	Oscilloscope
Specified value	White clip : 190 ± 15% Dark clip : 52 ± 10%

[Check Method]

1) Check that the white clip level is 190 ± 15% to the white (100%) level
2) Check that the dark clip level is 52 ± 10% to the white (100%) level.

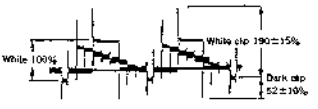


Fig. 7-2-9.

2-5-4. Y FM Carrier Frequency Check (RV-36/45 Board)

Mode	E-E
Signal	No-signal
Measurement point	Q34 Emitter
Measuring instrument	Frequency counter
Specified value	3.40 ± 0.18MHz

Note : A frequency counter should be connected through a buffer amplifier (oscilloscope, etc.) having a high impedance and a low capacitance.

[Check Method]

1) Check that the carrier frequency satisfies the specified value.

Fig. 7-2-10.

2-5-5. Playback Y Level Check (RV-36/45 Board)

Mode	Playback
Signal	Alignment tape - SP mode color bar portion
Measurement point	Video output terminal
Measuring instrument	Oscilloscope
Specified value	A = 1.96 ± 0.18Vp-p

[Check Method]

1) Check that the playback Y level satisfies the specified value.

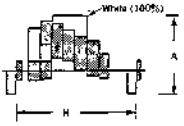


Fig. 7-2-11.

2-6. AUDIO SYSTEM ADJUSTMENT

- For the adjustment of the audio system, perform in the SP mode if there is no special notes. Use the alignment tape.
- Adjust both LCH and RCH.

[Connecting Instruments]

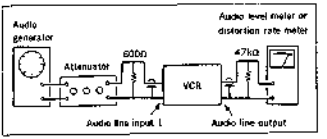


Fig. 7-2-12.

- **Hi-Fi Audio System Adjustment**

Perform the adjustment setting the switches and controls on the following positions if there is no special indications.

CHANNEL switch ..... LINE

AUDIO MONITOR ..... Stereo

[Adjustment Sequence]

1. VCO f_0 adjustment
2. Deviation adjustment
3. Band pass filter f_0 Adjustment
4. AF Switching pulse position adjustment

2-6-1. VCO I, Adjustment (HF-34 Board)

[Adjustment Object]

To attain HIFI audio compatibility.
If this specification is not satisfied, the sound will be distorted.

Mode	Recording
Signal	No-signal
Measuring instrument	Frequency counter
1.3MHz adjustment	
Measurement point	IC101 pin ⑱ (Lch RF) (JL111)
Adjustment element	RV103 (Lch)
Specified value	1300±1kHz
1.7MHz adjustment	
Measurement point	IC101 pin ⑰ (Rch RF) (JL110)
Adjustment element	RV102 (Rch)
Specified value	1700±1kHz

Note: Connect the frequency counter through the buffer amplifier (oscilloscope, etc) with high input resistance (1MΩ or more) and low capacity (10pF or less).

[Adjustment Method]

1) Connect the frequency counter with each measurement points.
2) Adjust with RV103 and RV102 so that the frequency satisfies each specified value.

2-6-2. Deviation Check (HF-34 Board)

Mode	Recording
Signal	400Hz, −12dBs: CN102 pin ⑪, ⑬
Measurement point	IC101 pin ⑱ (Lch) (JL111) IC101 pin ⑰ (Rch) (JL110)
Measuring instrument	Frequency counter
Specified value	50±5kHz

[Check Method]

1) Check that the frequency satisfies the specified value.

○ HF-34 Board (COMPONENT SIDE)

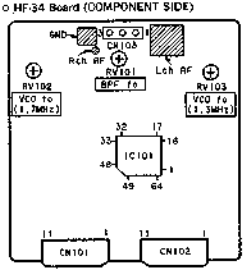


Fig. 7-2-13.

2-6-3. Band Pass Filter f_0 Adjustment (HF-34 board)

(Adjustment Object)

To separate the carrier accurately and ensure that the filter for cutting the video signal functions normally

If this specification is not satisfied, the sound will be distored.

Mode	Playback
Signal	1.505MHz, 200mVp-p · CN103 pin ①
Measurement point	IC101 pin ⑱ (Ech RF) (JL111) IC101 pin ⑳ (Rch RF) (JL110)
Measuring instrument	Oscilloscope
Adjustment element	RV101
Specified value	Adjust the A and B amplitudes to the same level. (A−B=±2mVp-p)

[Connection]

1) Disconnect CN103 of the HF-34 board and input the 1.505MHz and 200mVp-p sine wave from the signal generator to Pin ① of CN103.

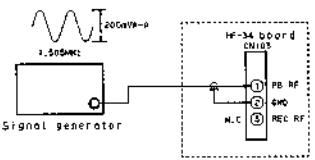


Fig. 7-2-14.

(Adjustment Method)

1) Rotate RV101 fully in the counterclockwise direction (◁) as seen from the component side.
2) Rotate RV101 slowly in the clockwise direction (▷) until the amplitudes of Pin ⑱ of IC101 and Pin ⑳ of IC101 become equal.

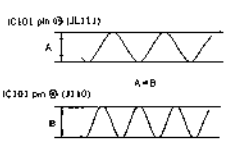


Fig. 7-2-15.

2-6-4. AF Switching Position Adjustment (MA-214 Board)

(Adjustment Object)

To adjust the link of the Ach and Bch of the tape playback outputs.

If this specification is not satisfied, the noise will increase and cracking sounds will be produced.

Mode	Playback
Signal	Alignment tape : Hi-Fi 400Hz portion
Measurement point	CH1 : IC101 pin ⑱ (Lch RF) (JL111) (HF-34 board) CH2 : CN802 pin ③ (RF SWP) (RV-35/45 board)
Measuring instrument	Oscilloscope
Adjustment element	RV201
Specified value	No dropouts in the RF signal

[Adjustment Method]

1) Set [TRACKING] switch (Remote comander) to MANUAL. ("Auto tracking" display will disappear on the display window indicator.)
2) Press tracking buttons [▼] and [▲] and adjust the tracking position to the center.
3) Adjust to the minimum specified value using RV501.

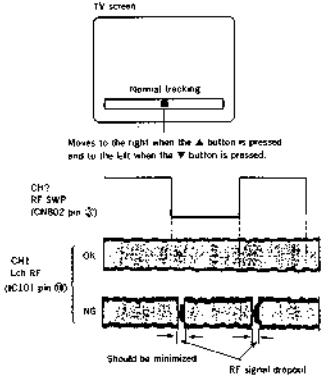


Fig. 7-2-16.

- **Normal Audio System Adjustment**

- Adjust in the SP mode if there is no special indications.
- Perform the adjustment setting the switch on the following positions.

CHANNEL switch ..... : LINE 1

AUDIO MONITOR switch ..... : NORMAL*1

*1 : No indicates on the display window indicator and monitor TV

[Adjustment Method]

1. ACE head adjustment. : Refer to the VHS mechanical adjustment manual IV
2. Recording bias adjustment
3. E-E output level check
4. Overall output level and distortion factor check
5. Overall noise level check

2-6-5. ACE Head Adjustment

Refer to the "VHS Mechanical adjustment manual IV" (9-973-623-11).

2-6-6. Recording Bias Adjustment (MA-214 Board)

Mode	Self-record playback
Signal	400Hz, −27.5dBs) Audio line in 1 7kHz, −27.5dBs ((L or R)
Measurement point	Audio line out (L or R)
Measuring instrument	Audio level meter
Adjustment element	RV887
Specified value	0±1dBs

[Adjustment Method]

1) Supply a signal of 400Hz, −27.5dBs to Audio Line Input
2) Connect the audio level meter to the Audio Line Output.
3) Adjust the attenuator so that the audio level meter will indicate −27.5dBs
4) Make recording in the SP mode.
5. Set an audio line input signal to 7kHz and make recording.
6) Playback a recorded portion, and measure output levels at 400Hz and 7kHz
7) Confirm that the 7kHz playback output levels within a range of the 400Hz playback output level 0±1dB. When it is out of this range, adjust RV887 and repeat the steps 1) through 7) above.

	Direction of Rotating RV887
400Hz level>7kHz level	Clockwise (CW)
400Hz level<7kHz level	Counterclockwise (CCW)

2-6-7. E-E Output Level Check

Mode	E-E
Signal	400Hz, −7.5dBs : Audio Line in 1
Measurement point	Audio line output terminal
Measuring instrument	Audio level meter
Specified value	−7.5±2dBs

[Checking Method]

1) Input signal of 400Hz and −7.5dBs to the L and R channel of the audio input at the same time.
2) Check that the audio output level is −7.5±2dBs.

2-6-8. Overall Output Level and Distortion Factor Check

Mode	Self-record playback
Signal	400Hz, −7.5dBs : Audio Line Input 1 terminals, left and right
Measurement point	Audio Line Output terminals, left and right
Measuring instrument	Audio level meter and Distortion meter
Specified value	Playback Level : −7.5±3dBs Distortion : 4.0% or less

[Check Method]

1) Record signal.
2) Playback the recorded portion.
3) Check that the output level is −7.5±3dBs.
4) Check that the distortion factor is 4.0% or less on the left and right side.

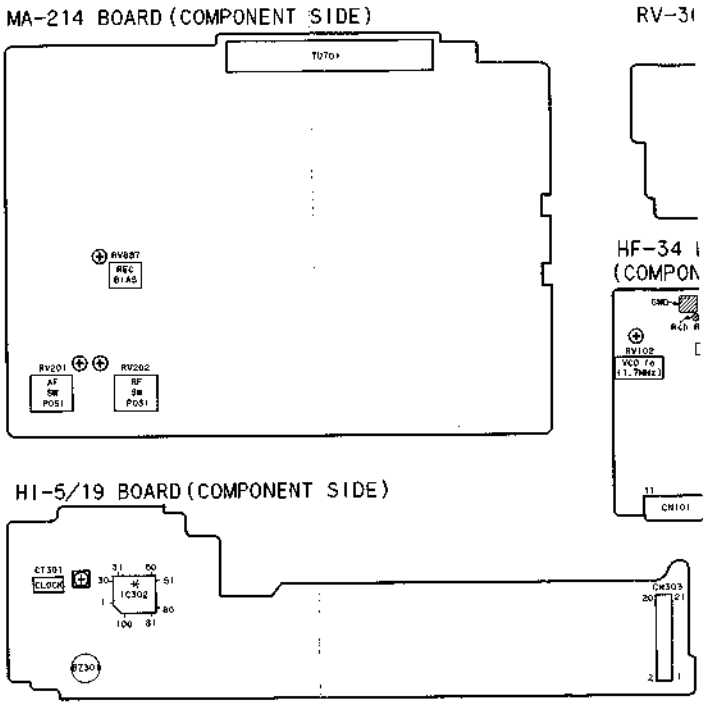
2-6-9. Overall Noise Level Check

Mode	Self-record playback
Signal	No signal (Insert a shorting plug into the Audio Line Input jacks, left and right.)
Measurement point	Audio Line Output terminals, left and right
Measuring instrument	Audio level meter
Specified value	Less than −46dBs

[Checking Method]

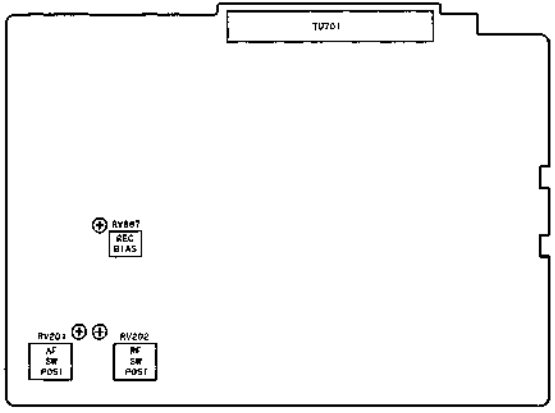
1) Record.
2) Playback recorded portion.
3) Check that noise level is −46dBs or less on the left side and right side.

2-7. ADJUSTMENT PARTS LOCATION DIAGRAM

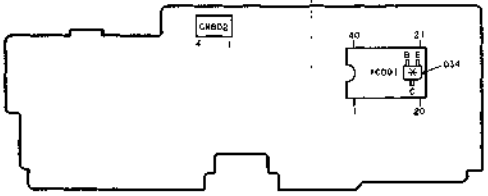


2-7. ADJUSTMENT PARTS LOCATION DIAGRAM

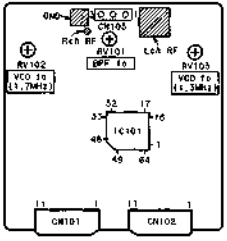
MA-214 BOARD (COMPONENT SIDE)



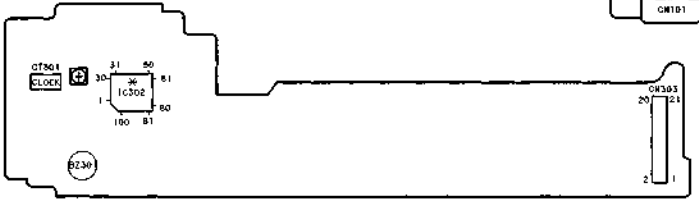
RV-36/45 BOARD (COMPONENT SIDE)



HF-34 BOARD (COMPONENT SIDE)



HI-5/19 BOARD (COMPONENT SIDE)



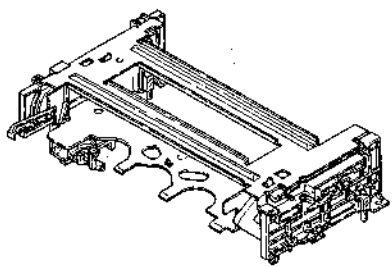
*Part on the conductor side.

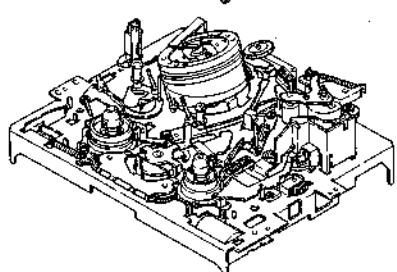
VHS MECHANICAL ADJUSTMENT MANUAL IV

V03056

H MECHANISM

Please use with the service manual.





VHS VIDEO CASSETTE RECORDER

SONY

MICROFILM

TABLE OF CONTENTS

1. PREPARATION FOR MECHANISM CHECK ADJUSTMENT AND REPLACEMENT

Refer to the service manual, "DISASSEMBLY" for removal of the cabinet and boards.

1-1. LOADING AND THREADING PROCEDURE WHEN THE POWER TURNS OFF (Fig. 1-1)

1-1-1. LOADING AND THREADING PROCEDURE WITH HANDS

1) Turn cam motor in the arrow ⓐ direction until loading and threading are end.

1-1-2. LOADING AND THREADING PROCEDURE WITH REGULATED DC POWER SUPPLY

1) Applying approx. +9 V (300 mA) to cam motor with regulated DC power supply makes it loading and threading.

Note: When loading and threading without cassette, claws are caught in four positions as following figure (in the order ① → ② → ③ → ④).
So release them with hands.

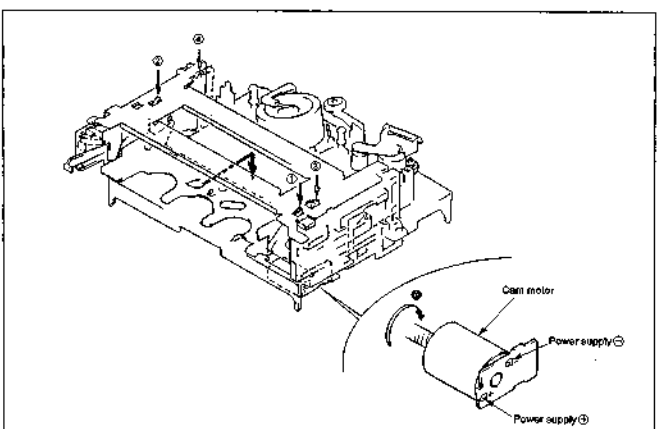


Fig. 1-1

1-2. UNLOADING AND UNTHREADING PROCEDURE WHEN THE POWER TURNS OFF (Figs. 1-2 and 1-3)

1-2-1. UNLOADING AND UNTHREADING PROCEDURE WITH HANDS

1) Turn cam motor in the arrow ⊕ direction until unthreading is end.
2) Turn capstan motor in the arrow ⊕ direction to take up tape in cassette.
3) Turn cam motor in the arrow ⊕ direction until unloading is end.

1-2-2. UNLOADING AND UNTHREADING PROCEDURE WITH REGULATED DC POWER SUPPLY

1) Apply approx. +9 V (300 mA) to contrary polarities of cam motor
2) Unthreading operation begins, tape guides return to their original positions (Unthreading operation is end but tape remains), then stop cam motor by turning power off

Note: When unloading begins and cassette lid is closed, turn cam motor in the arrow ⊕ direction to open tape guard.

3) Turn capstan motor in the arrow ⊕ direction to take up tape in cassette

Note: That tape is not caught at pinch roller. (Fig. 1-3)

4) Check that tape is not loosened completely, and apply approx. +9 V (300 mA) to contrary polarities of cam motor with regulated DC power supply. (Fig. 1-2)

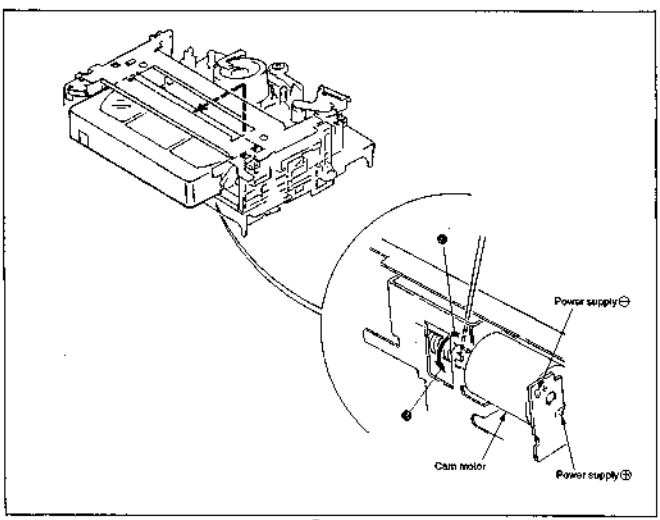


Fig. 1-2

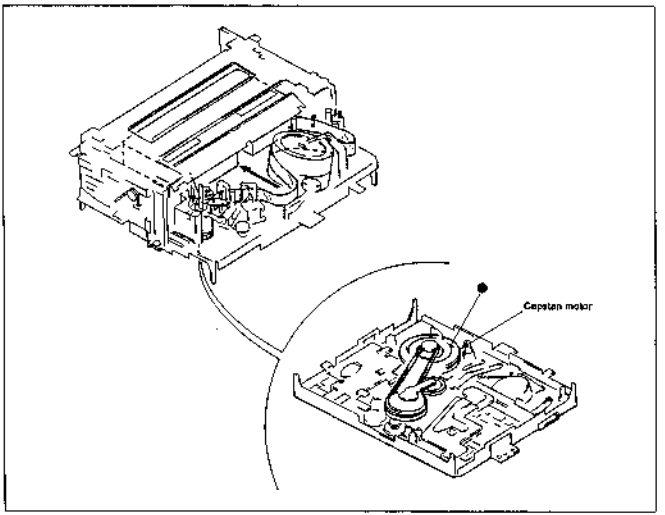


Fig. 1-3

1-3. HOW TO COMPLETE THREADING WITHOUT CASSETTE COMPARTMENT (Fig. 1-4)

Note 1: Put the FL block assembly removed the FL top plate on the bottom not to put dust or grease the top sensor and the end sensor luminous plates or not to scratch them. (Fig. A)

1) Pull out AC plug from wall outlet.
2) Shade near the end and top sensors with a black masking tape on the like.
3) Press cassette in/rec proof switch with a tip of screwdriver or the like.
4) Connect AC plug to wall outlet.
5) Release cassette in/rec proof switch by putting off a tip of screwdriver or the like.
   (At this time, power turns on, rewind operates for 10 seconds, after that power turns off.)

Note 2: In this condition, each mode can be set to video cassette recorder. (including recording mode)
However, fast forward should be done after rewinding for 15 seconds or more.

Note 3: After above mentioned operation, be sure to return the mode in the following order.

1) Remove the tape near the end and top sensors.
2) Pull out AC plug from wall outlet to reset the system control microcomputer.

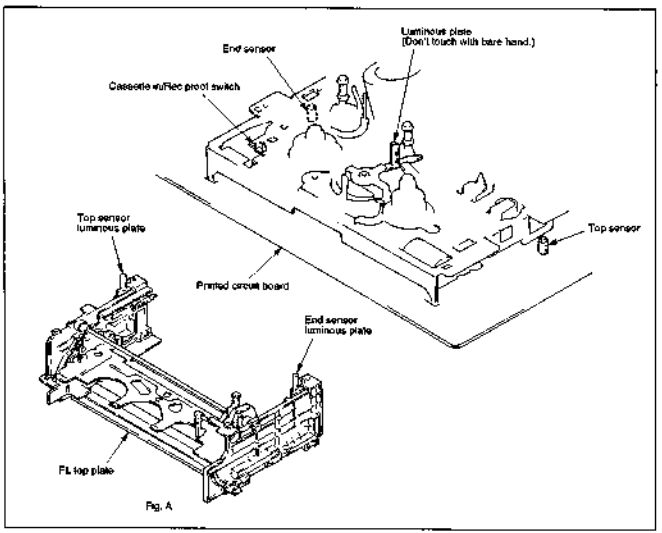


Fig. 1-4

2. PERIODIC CHECK AND REPLACEMENT

In order to obtain the best performance from this unit and make full use of its capabilities, and to extend the life of the unit and tapes, it is recommended that the following periodic checks and maintenance be performed.

* The following must be done after every repair regardless of how many hours the user has operated the machine.

2-1. CLEANING OF ROTATING HEAD DISK ASSEMBLY

1) Press a chamois cloth (Jig Ref. No. J-9) which has been dipped in cleaning fluid (Jig Ref. No. J-8) lightly against the rotating drum assembly, then do the cleaning by slowly rotating the rotating head disk by hand. (Never try to clean by using the motor to turn it.)
2) Never try to clean by moving the chamois cloth at a vertical angle to the head tip. There is a very great danger of damaging the head tip if this is done.

2-2. CLEANING OF THE TAPE MOVEMENT SYSTEM

1) Clean the surfaces which the tape contacts during its movement (tape guide, drum assembly surface, capstan, pinch roller, etc.) with a chamois cloth that has been dipped in cleaning fluid.

2-3. CLEANING THE DRIVE SYSTEM

1) Clean the driving parts with a cloth that been dipped in cleaning fluid.

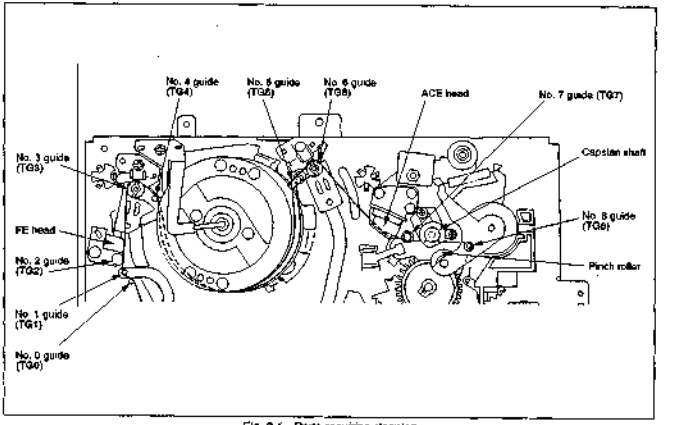


Fig. 2-1 Parts requiring cleaning

2-4. PERIODIC CHECK ITEMS

Perform the maintenance and check listed on the table below, according to users operating hours.

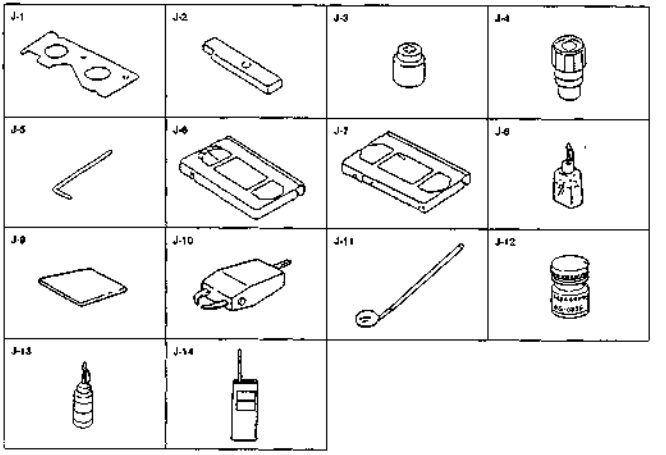
Maintenance & Check \ Operating Hours (H)		500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks
Tape Transportation System	Cleaning of tape transportation system	○	○	○	○	○	○	○	○	○	○	This cleaning must be done whenever a repair is made
	Cleaning and degaussing of ACE assembly	○	○	○	○	○	○	○	○	○	○	
	Cleaning & degaussing of upper drum assembly	○	○	○	○	○	○	○	○	○	○	The life of the head varies, depending on operational conditions and method.
Performance Confirmation	Abnormal sound	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace the section which caused abnormal sound.
	Measurement of FWD back tension	–	☆	–	☆	–	☆	–	☆	–	☆	Confirmation must be made according to 4-1-1. Specified value: adjust to 36 to 44 gram (when measured with torque cassette tape)
	Confirmation of brake system	–	☆	–	☆	–	☆	–	☆	–	☆	Confirmation must be made according to section
	Confirmation of record & playback functions	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Perform the confirmation whenever repair is made
	Measurement of forward torque	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust to 70 to 120 gram

○ Cleaning ☆ Confirmation

Note: On overhaul
When overhauling the unit, replace parts as indicated in the above table.

2-5. TOOLS AND FIXTURES REQUIRED FOR SERVICING

Ref No.	Name	Part No.	Garved Jig No.	Remarks
J-1	Master Plane	H-7099-279-H		Applicable to S-VHS
J-2	Reel Disk Height Jig	H-7099-038-H		
J-3	Torque Gauge Adapter	H-7099-035-H		
J-4	0.93 mm Torque Gauge	H-7099-039-H		
J-5	Hex. Wrench	H-7099-202-H		
J-6	Torque Measurement Cassette VHT-063S	J-6062-011-A		For FWD & back tension torque measurement
	Torque Measurement Cassette VHT-404S	J-6062-012-A		For CUE and review torque measurement.
J-7	Alignment Tape JVC-MH-1 (NTSC) 24HASF-2 (NTSC Hi-Fi) JVC-MH-2 (PAL) JVC-MH-4 (SECAM)	H-7099-046-H H-7099-153-H H-7099-052-H H-7099-053-H		
J-8	Cleaning Fluid	Y-2031-001-0	———	
J-9	Chamois Leather	2-034-697-00	———	
J-10	Head Demagnetizer	Widely available	———	Demagnetize video heads and audio heads.
J-11	Dental Mirror (With handle) Dental Mirror (Mirror)	J-6000-029-A J-6000-030-1	SL-5052	Tape path and tape traveling adjustments or checks.
J-12	FLOIL SG-655G	7-651-000-09		
J-13	Diamond Oil NT-68	7-661-018-18		
J-14	Screw Lock G (1401E)	7-432-114-11		



3. MAINLY MECHANICAL PARTS REPLACEMENT

Notes:

- Refer to the service manual. "DISASSEMBLY" for removal of the cabinet and boards.
- On mounting, while referring to notes on mounting perform reversely in the removal order.
- When replacing greased parts, grease them in the same way.
- Do not oil, grease or touch with bare hands the surfaces contacts tape of guides and brake shoes.
- Install gears to engage each other.
- Basically, disassembling and assembling should be done in the unthreading-end condition.

3-1. FL BLOCK ASSEMBLY (Fig. 3-1)

1) Remove screws ①.
2) Remove **FL** block assembly ② in the arrow ㉮ direction.

Note: Be careful not to damage claws on the bottom and front.

[Note on Mounting]

- First insert claws on the bottom and front not to damage.
- Engage FL slide plate to FL driving gear with slightly sliding FL slide plate. (Fig. A)
- Keep clean top sensor and end sensor luminous plates. (Refer to 1-3.)

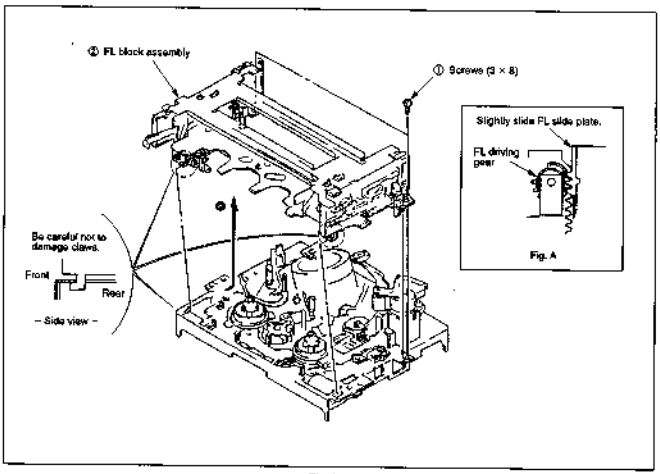


Fig. 3-1

3-2. DRUM ASSEMBLY (Fig. 3-2)

1) Remove screw ①.
2) Remove ground shaft assembly ② not to touch its tip with bare hand or tools.
3) Remove screws ③ to remove drum assembly ④.

[Note on Mounting]

- Don't touch head chips ⑤ and ground shaft assembly ② with bare hand or tools.
- Keep clean the surface contacts tape of drum assembly ④.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

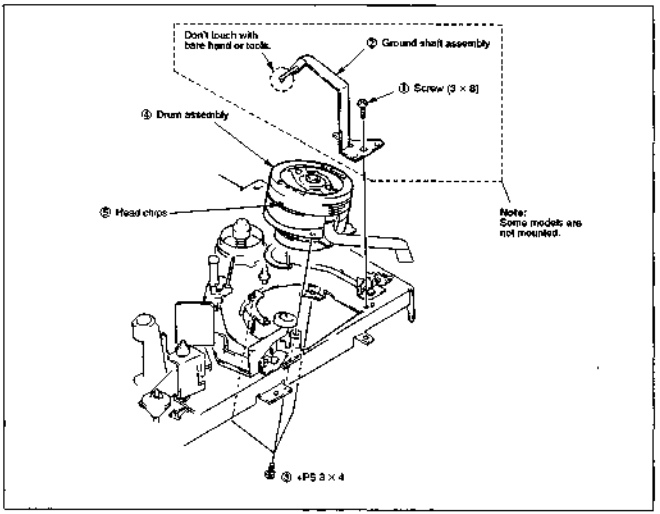


Fig. 3-2

3-3. TIMING BELT (Fig. 3-3)

1) Remove screw ① to remove tension vehicle arm assembly ②.
2) Remove timing belt ③.

[Note on Mounting]

• Tighten screw ① while pressing tension vehicle arm in the arrow ● direction.

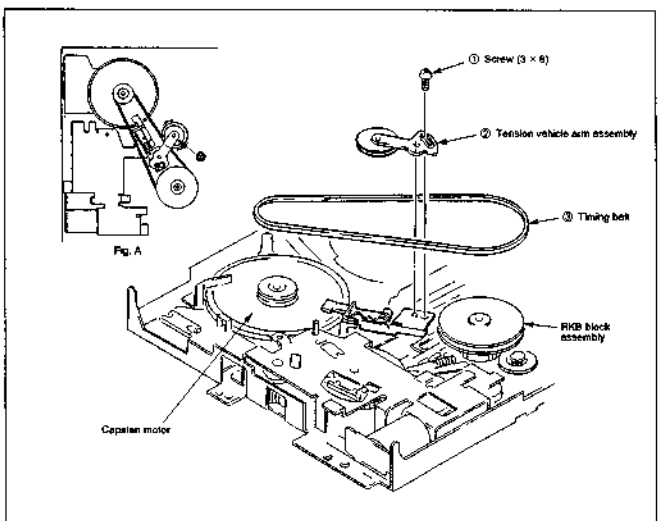


Fig. 3-3

3-4. CAP BRAKE ASSEMBLY (Fig. 3-4)

1) Remove tension vehicle arm assembly. (Refer to 3-3)
2) Remove torsion coil spring ① from portion ❹ to remove CAP brake assembly.

[Note on Mounting]

- Mount torsion coil spring ① to CAP brake assembly ② in the order ❹ and ❺. (Fig. A)
- Put the fulcrum of CAP brake assembly ② to CAP brake shaft ③ and the tip of torsion coil spring to ❻
- Don't touch brake shoe ❼ with bare hand.

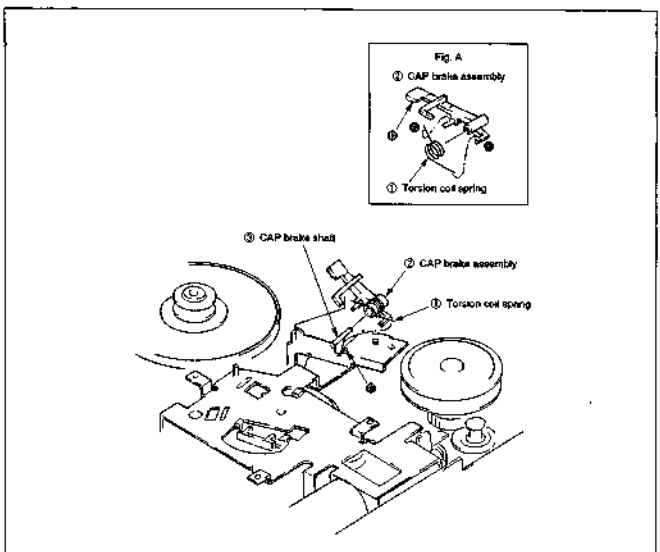


Fig. 3-4

3-5. TG2 ROLLER, FE HEAD ASSEMBLY (Fig. 3-5)

1) Remove claw ❹ to pull out TG2 roller ①.
2) Remove screw ② to pull out FE head assembly.

[Note on Mounting]

- Keep clean the surface contacts tape of TG2 roller ①

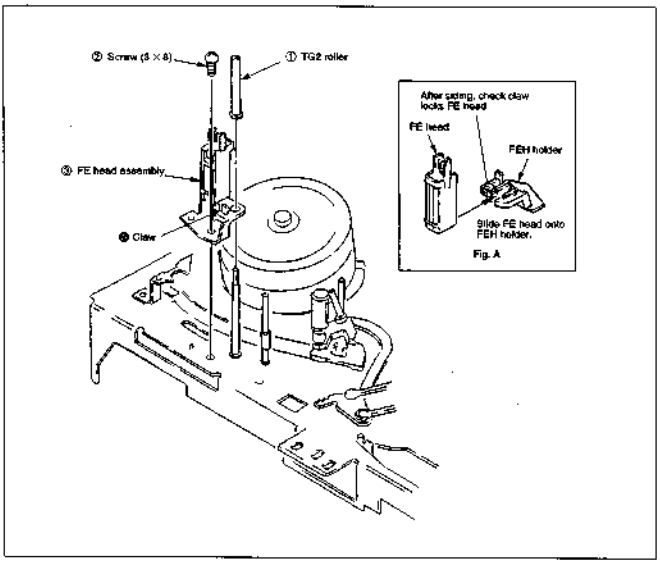


Fig. 3-5

3-6. PINCH PRESS BLOCK ASSEMBLY, ELEVATOR GEAR (Fig. 3-6)

1) Remove E ring ① to pull out pinch press block assembly ②.
2) Remove lid opener ③ by pressing claw ● in the arrow ● direction.
3) Pull out elevator gear ④.

[Note on Mounting]

- Apply grease FLOIL SG-055G (Jig. Ref. No. J-12) to ☆ marked portions.
- Be sure to match the phase ● between elevator gear ④ and press gear ⑤ on mounting elevator gear ④.

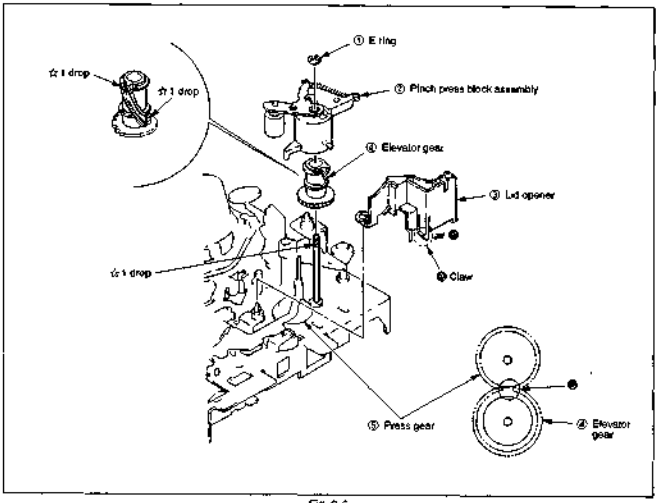


Fig. 3-6

3-7. ACE BLOCK ASSEMBLY (Fig. 3-7)

1) Move torsion coil spring (ACE) ① in the arrow ❷ direction.
2) Remove ACE adjustment screw ②.
3) Remove AC height adjustment nut ③ to pull out ACE block assembly ④.

[Note on Mounting]

- Keep clean the surface contacts tape of ACE block assembly ④.
- Be sure to hang torsion coil spring (ACE) ① in the arrow ❷ direction
- Set ACE adjustment screw ② to the height as shown in Fig. A.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.
- After adjustment apply Screw Lock G (1401B) (Jig Ref. No. J-14) at ☆ marked portion.

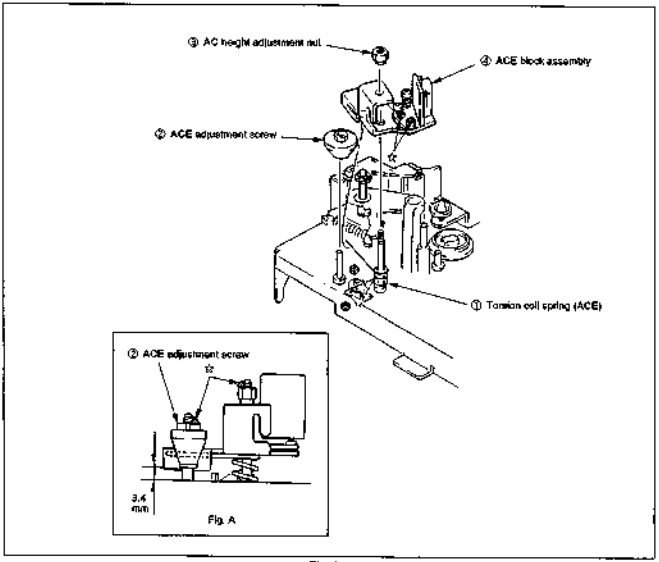


Fig. 3-7

3-8. TG3, TG6 GUIDE ROLLER ASSEMBLIES (Fig. 3-8)

1) Loosen screw ① and pull out TG3 guide roller assembly ② by turning it in the arrow ⓐ direction.
2) Loosen screw ③ and pull out TG6 guide roller assembly ④ by turning it in the arrow ⓑ direction.

[Note on Mounting]

- Keep clean the surface contacts tape of TG3 and TG6 guide roller assemblies ②, ④.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

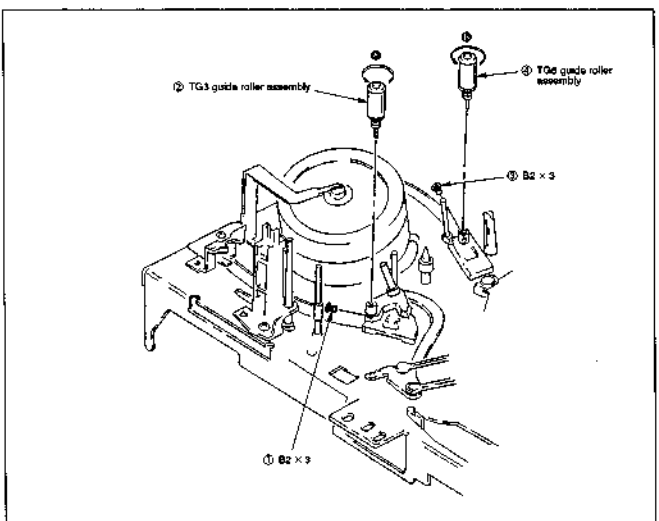


Fig. 3-8

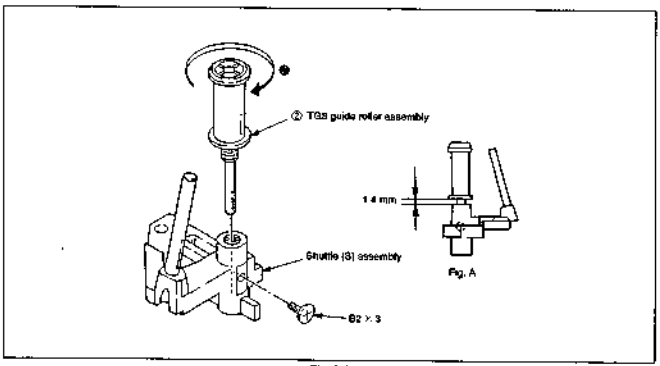


Fig. 3-9

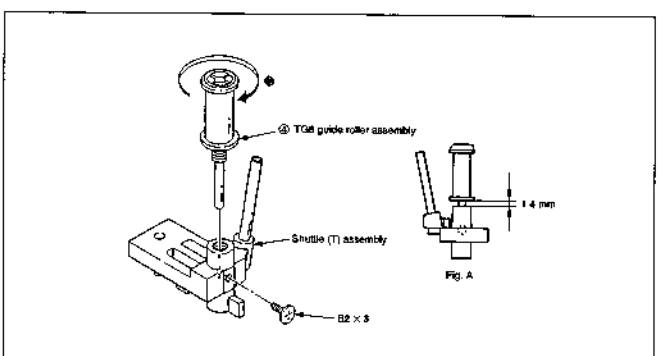


Fig. 3-10

3-9. CAPSTAN MOTOR (Fig. 3-11)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove screws ① to pull out capstan motor ②.

[Note on Mounting]

- Keep clean the surface contacts tape of capstan motor ②.
- On tightening screws ①, first tighten screw A temporarily, next tighten screws in the order B to C to A.

[Adjustment after Mounting]

- 4-1. Tape path adjustment

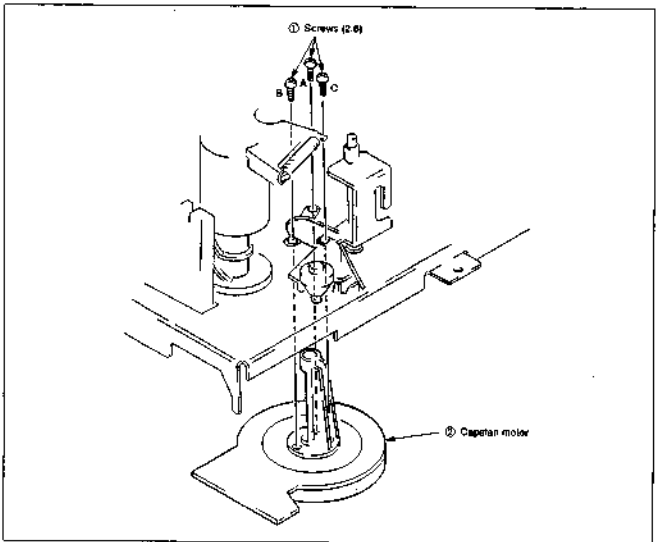


Fig. 3-11

3-10. MAIN BRAKE ASSEMBLIES S AND T (Fig. 3-12)

1) Remove tension spring ①.
2) Remove stopper washer (2) ② to remove neutrality arm ③.
3) Remove pendulum compulsion arm ④ and tension coil spring ⑤.
4) Remove stopper washer (2) ⑥ to remove main brake S assembly ⑦.
5) Remove stopper washer (2) ⑧ to remove main brake T assembly ⑨.

[Note on Mounting]

- Don't touch brake shoes ❼ and ❾ with bare hand.
- Apply FLOIL FG-055G (Jig Ref. No. J-12) to ☆ marked portions.

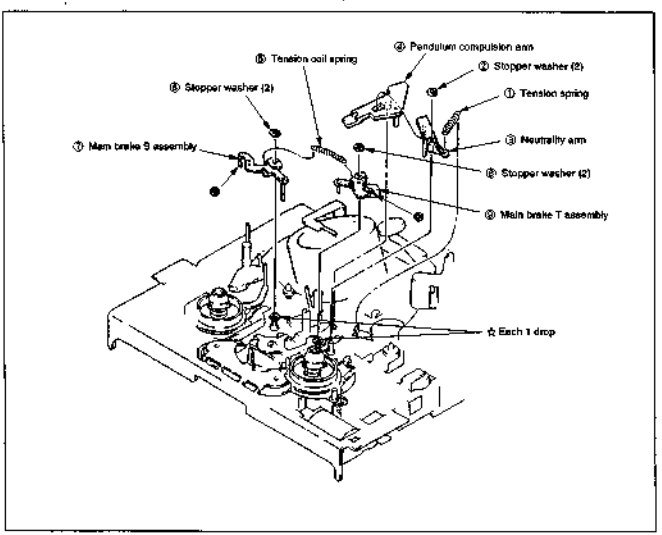


Fig. 3-12

3-11. SOFT BRAKE T ASSEMBLY (Fig. 3-13)

1) Remove pinch press block assembly. (Refer to 3-6.)
2) Remove lid opener ① carefully not to damage claw ⓐ.
3) Remove tension spring ② from side ⓑ to pull out soft brake T assembly ③.

[Note on Mounting]

- Don't touch brake shoes ⓒ with bare hand.

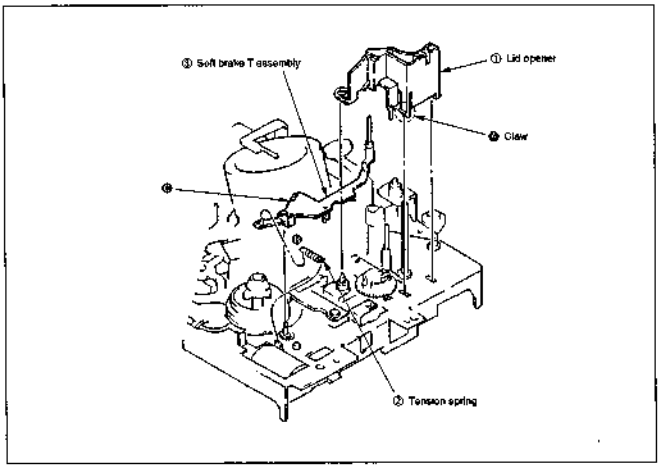


Fig. 3-13

3-12. RVS BRAKE ARM ASSEMBLY, REEL TABLE (T) ASSEMBLY (Fig. 3-14)

1) Remove main brake T assembly. (Refer to 3-10.)
2) Remove soft brake T assembly. (Refer to 3-11.)
3) Remove tension coil spring ① in the order ❽ to ❾.
4) Remove RVS brake arm assembly ②.
5) Remove stopper washer (2) ③ to pull out reel table (T) assembly ④.

[Note on Mounting]

- Apply one drop of Diamond Oil NT-68 (Jig Ref. No. J-13) to ☆ marked portion before mounting reel table (T) assembly ④. (Fig. A)
- Don't touch the hatched portion on reel table (T) assembly ④ and brake shoe ❽ of RVS brake arm assembly ② with bare hand.

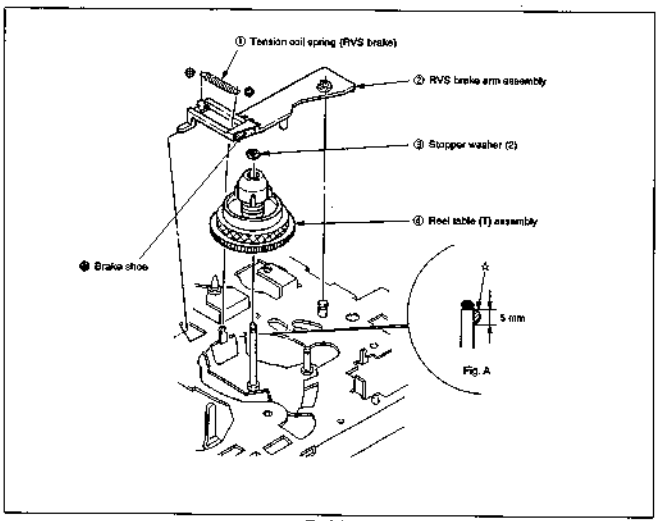


Fig. 3-14

3-13. TG8 ASSEMBLY (Fig. 3-15)

1) Remove TG8 retainer ① to pull out TG8 assembly ②.

[Note on Mounting]

- Apply FLOIL SG-055G (Jig Ref No. J-12) to ☆ marked portion.
- Keep clean the surface contacts tape of TG8 assembly ②.
- Be careful not to change the shape of TG8 retainer ①.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

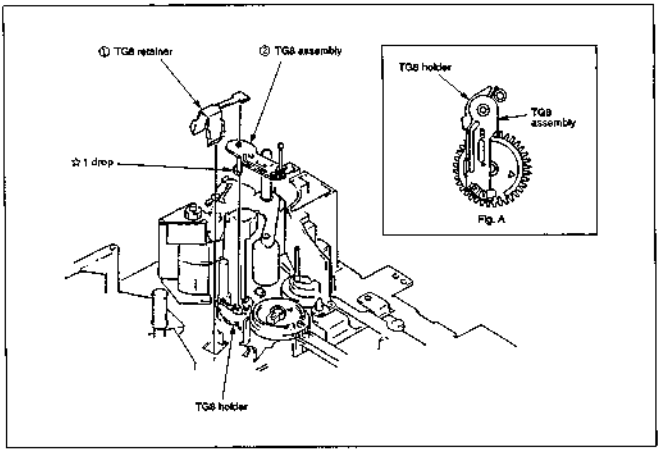


Fig. 3-15

3-14. TG8 HOLDER (Fig. 3-16)

1) Remove TG8 assembly. (Refer to 3-13)
2) Pull out TG8 holder ①.

[Note on Mounting]

- Be careful about the direction of TG8 holder ①. (● of Fig. A)

[Adjustment after Mounting]

- 4-1 Tape path adjustment.

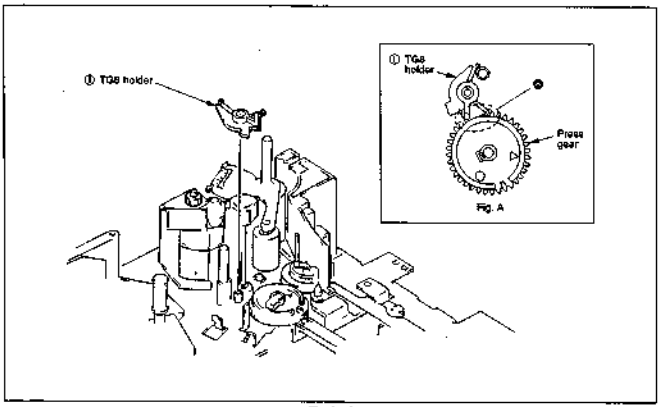


Fig. 3-16

3-15. TG8 AND PRESS GEARS (Fig. 3-17)

1) Remove pinch press block assembly. (Refer to 3-6.)
2) Remove soft brake T assembly. (Refer to 3-11.)
3) Remove TG8 assembly. (Refer to 3-13.)
4) Remove TG8 holder. (Refer to 3-14.)
5) Pull out TG8 gear ① or press gear ②.

[Note on Mounting]

- Adjust the holes on gears to the holes on chassis. (Fig. A)
- Adjust the arrows carved on gears each other. (Fig. A)

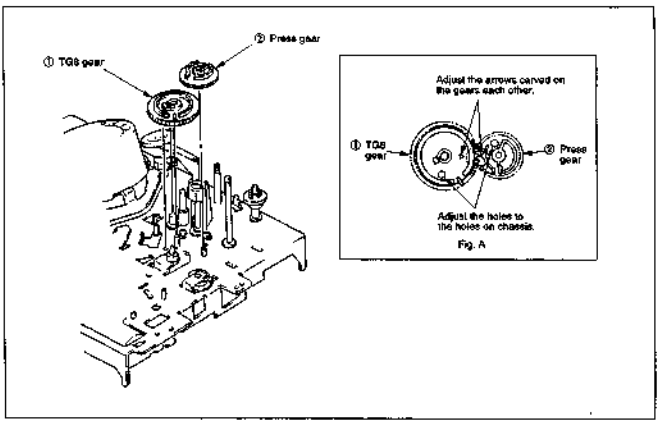


Fig. 3-17

3-16. CAM MOTOR CHASSIS BLOCK ASSEMBLY, UPPER/LOWER COMMUNICATION GEAR (Fig. 3-18)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove screws ① to remove cam motor chassis assembly ②.
4) Pull out upper/lower communication gear ③.

[Note on Mounting]

- First, check main slider ④ slides fully in the arrow ● direction.
- Set rotary encoder switch position to "E" seen from the window of cam motor chassis. (Fig. A)
- Tighten screws ① in the order ● to ● to ● to ●.

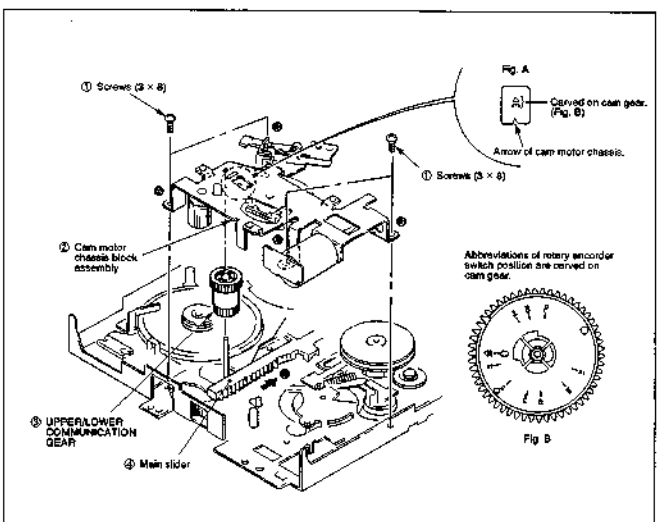


Fig. 3-18

3-17. ROTARY ENCODER SWITCH (Fig. 3-19)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove cam motor chassis block assembly (Refer to 3-15.) and turn upside on the bottom.
4) Remove stopper washer (2) ① to pull out worm wheel ②.
5) Remove stopper washer (2) ③ to pull out cam gear ④.
6) Pull out FL driving gear ⑤ and rotary encoder switch ⑥.

[Note on Mounting]

- Apply FLOIL SG-055G (Jig Ref. No. J-12) to ☆ marked portions. (Fig. 3-19, A)
- Adjust the hole ● to the hole on cam motor chassis. (Fig. B)
- Adjust the holes ● and ● to the hole on cam motor chassis. (Fig. C)

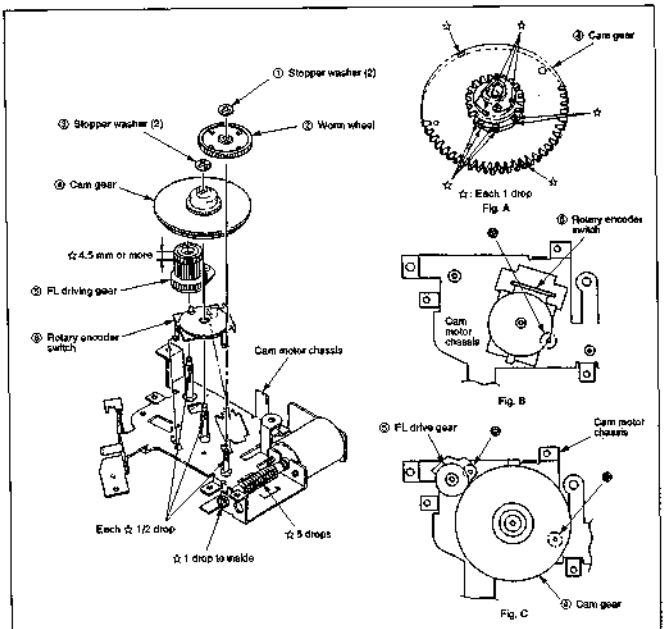


Fig. 3-19

3-18. MAIN SLIDER (Fig. 3-20)

1) .Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove cam motor chassis block assembly. (Refer to 3-16.)
4) Remove screw ① to remove retainer ②.
5) Pull out main slider ③.

[Note on Mounting]

- Apply FLOIL SG-655G (Jig Ref. No. J-12) as shown in Fig. A.
- At the last, slide main slider fully in the arrow ⓐ direction.

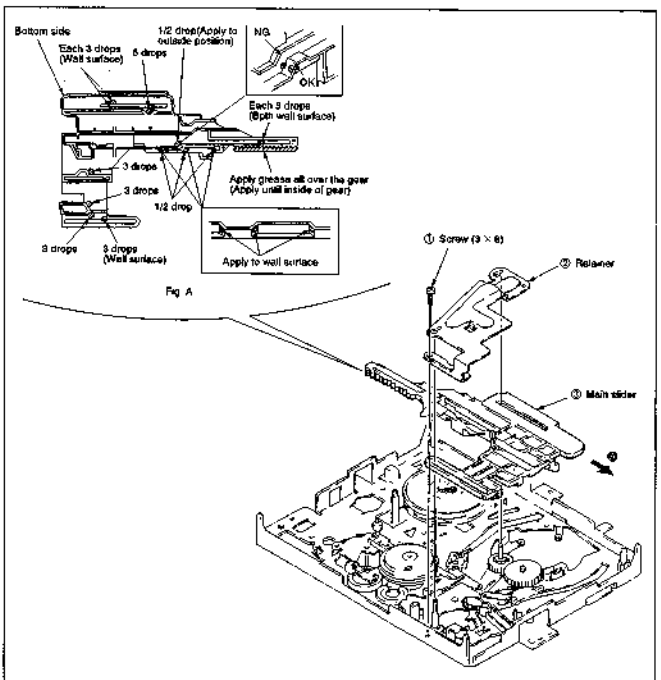


Fig. 3-20

3-19. SHUTTLE T BLOCK AND LOADING GEAR T BLOCK ASSEMBLIES (Fig. 3-21)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove cam motor chassis block assembly. (Refer to 3-16.)
4) Remove main slider. (Refer to 3-18.)
5) Remove screw ① to remove loading leaf (T) spring ② and shuttle T block assembly ③.
6) Pull out loading gear T block assembly ④.

[Note on Mounting]

- Adjust the phase ⓐ between loading gear (T) and loading gear (S). (Fig. A)
- Keep clean the surface contacts tape of shuttle T block assembly ③.

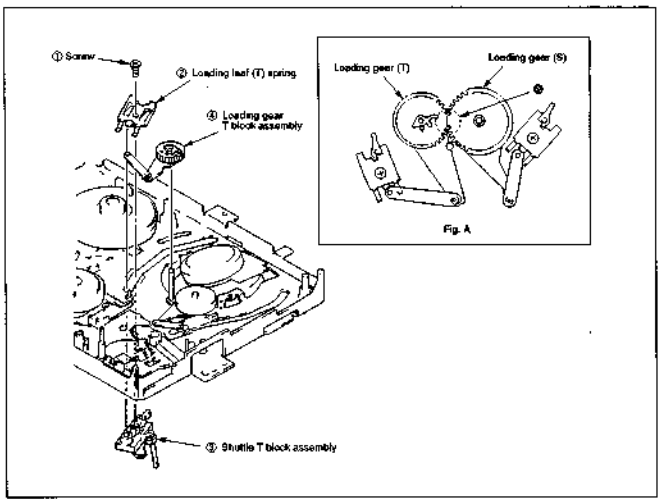


Fig. 3-21

3-20. SHUTTLE S BLOCK AND LOADING GEAR S BLOCK ASSEMBLIES (Fig. 3-22)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove cam motor chassis block assembly. (Refer to 3-16.)
4) Remove main slider. (Refer to 3-15.)
5) Remove screw ① to remove loading leaf (S) spring ② and shuttle S block assembly ③.
6) Pull out loading gear S block assembly ④.

[Note on Mounting]

- Adjust the phase ⊖ between loading gear (S) and loading gear (S). (Fig. A)
- Keep clean the surface contacts tape of shuttle S block assembly ③.

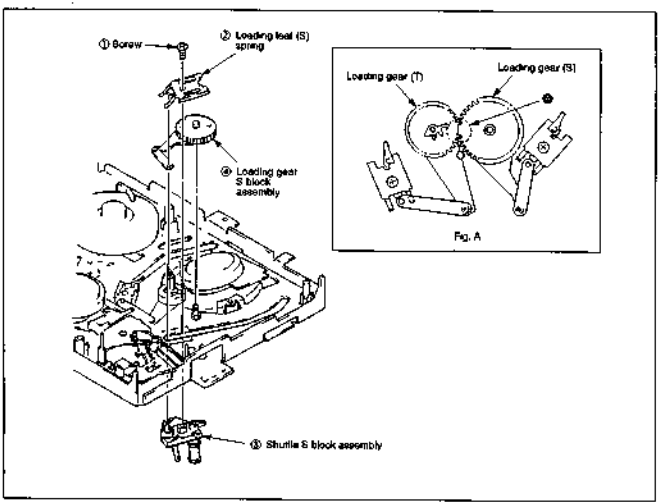


Fig. 3-22

3-21. REEL TABLE (S) ASSEMBLY (Fig. 3-23)

1) Remove tension spring ① from the chassis side.
2) Remove stopper washer (2) ② to pull out soft brake (S) ③.
3) Move TG1 band ④ over the reel table.
4) Remove stopper washer (2) ⑤.
5) While pressing main brake S assembly ⑥, pull out reel table (S) assembly ⑦.

[Note on Mounting]

- Apply one drop of Diamond Oil NT-68 (Jig Ref. No. J-13) to ☆ marked portion before mounting reel table (S) assembly ⑦. (Fig. A)
- Don't touch the hatched portion on reel table (S) assembly ⑦ with bare hand.

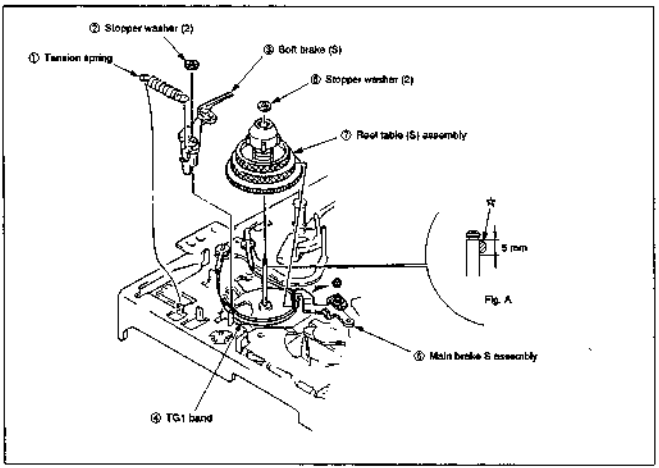


Fig. 3-23

3-22. TG1 ASSEMBLY (Fig. 3-24)

1) Set the mechanism to the loading-end condition referring to 1-1. (Cam gear indicates "LE". (Refer to Fig. A and B of Fig. 3-18.))
2) Remove tension spring ① in the order ❹ to ❷.
3) Remove stopper washer (2) ② to pull out TG1 assembly ③.

[Note on Mounting]

- Apply one drop of Diamond Oil NT-68 (Jig Ref. No. J-13) to ☆ marked portion.
- Keep clean the felt side of TG1 assembly

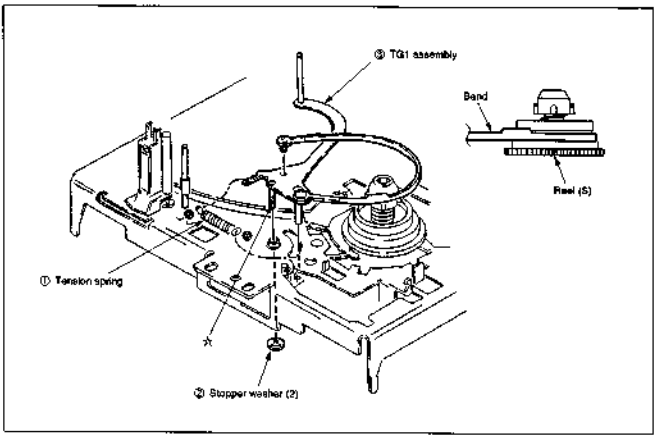


Fig. 3-24

3-23. S WINDING BLOCK ASSEMBLY (Fig. 3-25)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove cam motor chassis block assembly. (Refer to 3-16.)
4) Remove main slider. (Refer to 3-18.)
5) Remove stopper washer (2) ① to pull out S winding block assembly ②.
6) Remove torsion spring ③.

[Note on Mounting]

- At the last, hang torsion spring ③ to the position ❷.
- Apply FLOIL SG-955G (Jig Ref. No. J-12) to ☆ marked portions.

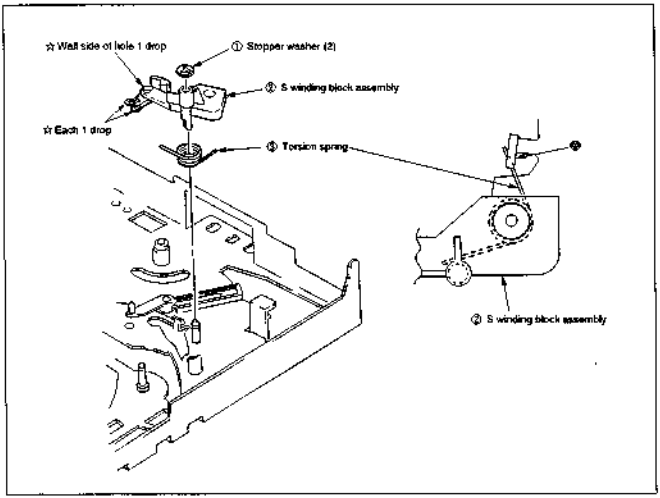


Fig. 3-25

3-24. TRIGGER LEVER AND RKB BLOCK ASSEMBLIES (Fig. 3-26)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove cam motor chassis block assembly. (Refer to 3-16.)
4) Remove main slider. (Refer to 3-18.)
5) Remove tension spring ① in the order ❶ to ❷ to remove trigger lever assembly ②.
6) Remove screws (3 × 8) ③ to remove RKB block assembly ④.

[Note on Mounting]

- Apply FLOIL SG-055G (Jig Ref. No. J-12) to ☆ marked positions on trigger lever assembly. (Fig. A)

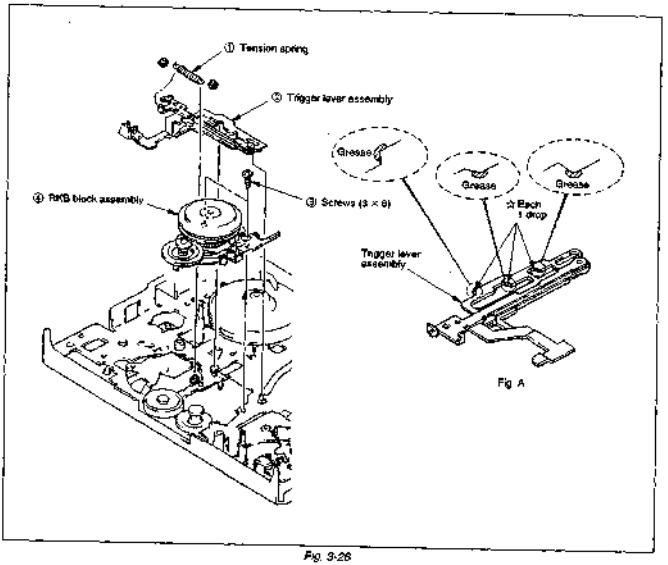


Fig. A

Fig. 3-26

4. ADJUSTMENT

4-1. TAPE PATH ADJUSTMENT

The "Tape path" refers to the route of the tape from the supply reel disk to the take-up reel disk via the video heads.
Each component part of the tape transport system particularly the surface of parts which make direct contact with the tape must always be kept clean, free of dust, oil, scratches and so forth
The tape path system is factory preadjusted, when parts of the tape transport system are replaced, be sure to make the required adjustments as precisely as possible in order to ensure stable tape transport.

4-1-1. TENSION REGULATOR (TG1) POSITION/ TENSION ADJUSTMENT (Fig. 4-1)

Purpose: stabilizes contact of the video head and the tape to maintain the tension of the tape so that it feeds at a constant level

• Position adjustment

Mode	Treading is completed without a cassette loaded
Adjustment locations	Eccentric pin of TG1 band assembly

[Adjustment Method]

1) Allow the unit to go through the threading procedure without a cassette loaded
2) Set the unit to play back, then turn the eccentric pin so that the tip of tension arm goes to the left side line carved on the mechanical chassis. (Fig. A)
3) After adjustment, go through the loading procedure once more without a cassette loaded, then check the position of the tension arm.

• Tension adjustment

Mode	Playback
Measuring instrument/tool	Torque cassete
Adjustment locations	Position for hooking the tension spring
Specified value	36 to 44 gr-cm

[Adjustment Method]

1) Playback the torque cassette.
2) Check that the center value deviation reading on the torque cassette meets with the standards.
3) When the reading is higher than the standards: Move the spring toward direction ②.
   When the reading is less than the standards: Move the spring toward direction ①.

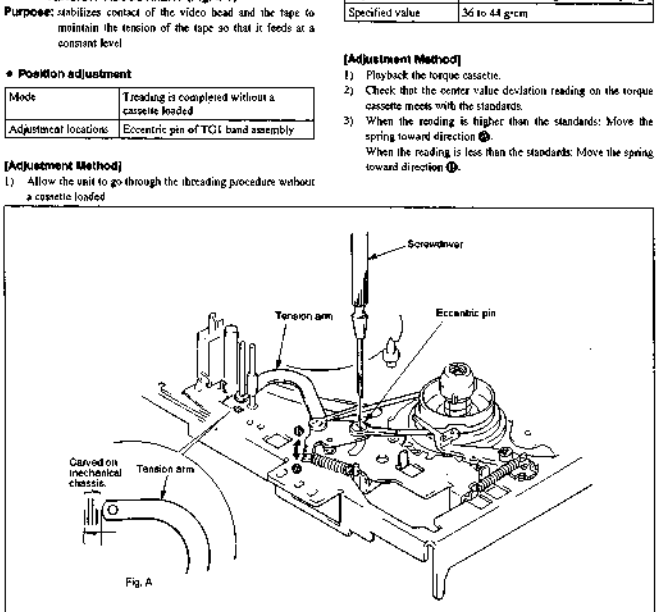


Fig. 4-1

4-1-2. TG8 GUIDE ROLLER HEIGHT ADJUSTMENT (Fig. 4-2)

Mode	Playback
Jig	Blank tape
Adjustment locations	Guide roller height adjustment screw
Specified value	0 to 0.1 mm

Procedure:

1) Set the tape, during CUE playing back, check the height from lower flange of TG7 to the running tape. (Fig. A)
2) During REV playing back, check the height from lower flange of TG7 to the running tape. (Fig. B)
3) When the difference between items 1) and 2) doesn't go to specified value, adjust by turning TG8 guide roller height adjustment screw.
4) Check the tape is creased or not between the capstan and TG8, adjust with TG8 guide roller height adjustment screw so that the tape is not creased during normal playback, CUE and REV.

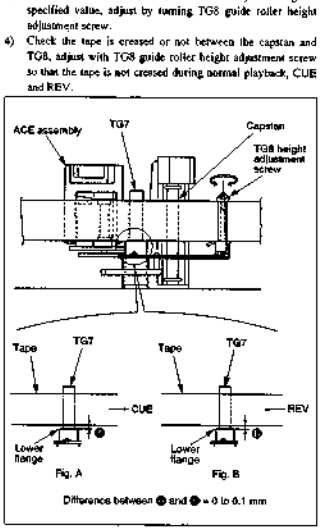


Fig. 4-2

4-1-3. HEIGHT ADJUSTMENT OF GUIDE ROLLERS NO. 3 AND NO. 6 (Fig. 4-3)

Mode	Playback
Signal	Alignment tape
Measuring instrument	Oscilloscope
Measuring point	CH-1: Connector PB RF pin for RF PC board check. CH-2: Connector RF SW P pin for RF PC board check.
Adjustment locations	Guide roller height adjuster screw

[Adjustment Method]

1) Tracking (playback) Turn off the auto tracking, then press the tracking buttons ▽ and △ simultaneously to set the tracking at the center position.
   (If adjustment is made after the drum is replaced, the tracking must be set at the max. RF output position.)
2) Height adjuster screw: Even out the RF output waveforms.
3) Press the tracking buttons (playback), ▽ and △ alternately.
4) Check that RF output drops the same amount at the front and rear edges.

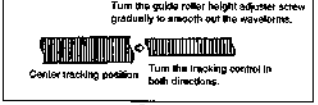


Fig. 4-3

4-1-4. ACE HEAD ASSEMBLY ADJUSTMENT (ROUGH ADJUSTMENT) (Figs. 4-4 and 4-5)

Purpose: Allows the tape to make even contact with the head for recording and playback of the specified track.

Mode	Playback
Tool	Blank tape
Adjustment locations	Height adjuster nut, Tilt adjuster screw

[Adjustment Method]

1) Mount the ACE head assembly. At this time, adjust the height so that the height of guide flange No. 7 matches the level of the lower edge of the control head.
2) Remove the adjustment tool and load a new tape, then set the unit for playback.
3) Check that the tape does not curl or rise up noticeably near the ACE head.
4) If the tape curls up or rises noticeably, readjust the tilt adjuster screw, the azimuth adjuster screw and the height adjuster nut
   (The height of the ACE head should be adjusted so that the lower edge of the tape is approx. 0.1 to 0.15 mm from the control head.)
5) Perform precision adjustment.

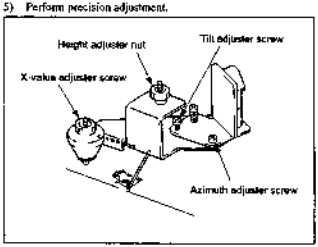


Fig. 4-4

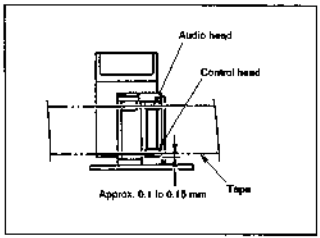


Fig. 4-5

4-1-5. ACE HEAD ASSEMBLY ADJUSTMENT (PRECISION ADJUSTMENT)

Mode	Playback
Signal	Alignment tape (1kHz track)
Measuring instrument	Oscilloscope
Measuring point	Audio output terminal
Adjustment locations	Azimuth adjuster screw, Height adjuster nut, Tilt adjuster screw

[Adjustment Method]

1) Adjust the tilt adjuster screw in the FWD or REV mode so that the lower flange of guide No. 7 does not curl up or rise.
2) Alternately adjust the azimuth adjuster screw, the height adjuster nut, and the tilt adjuster screw to maintain even audio output at maximum with minimum deviation.

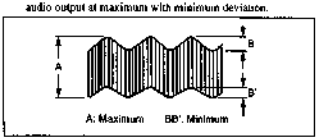


Fig. 4-6

4-1-6. X-VALUE ADJUSTMENT

Purpose: To obtain compatibility with other VTR.

Precaution: Be sure to perform the preset tracking adjustment before perform this adjustment (Refer to the Service Guide.)
Turn off the auto tracking and set the VTR for manual tracking mode.

Mode	Playback
Signal	Alignment tape
Measuring instrument	Oscilloscope
Measuring point	CH-1: Connector PB RF pin for RF PC board check. CH-2: Connector RF SW P pin for RF PC board check.
Adjustment locations	X-value adjuster screw

[Adjustment Method]

- **Adjustment by Hi-Fi alignment tape (NTSC only)**
  When the tracking is set at the center position (by pressing the ▽ and △ keys simultaneously), adjust the RF output to maximum.

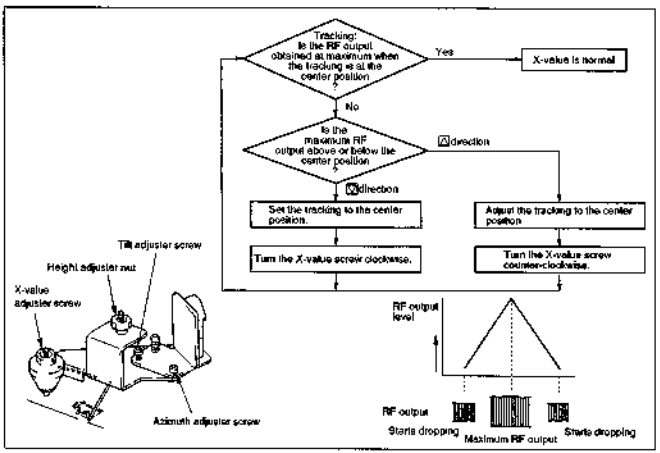


Fig. 4-7

- **Adjustment by alignment tape**

  Adjust the X-value adjuster screw so that maximum RF output is obtained and also that the RF output drops to the same position on pressing the respective ▽ and △ buttons while the tracking is set at the center position.

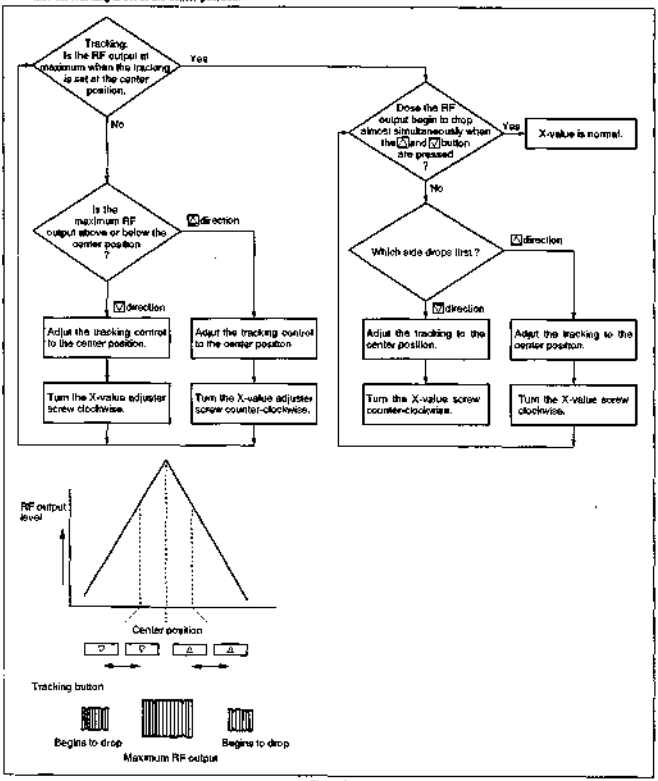


Fig. 4-8

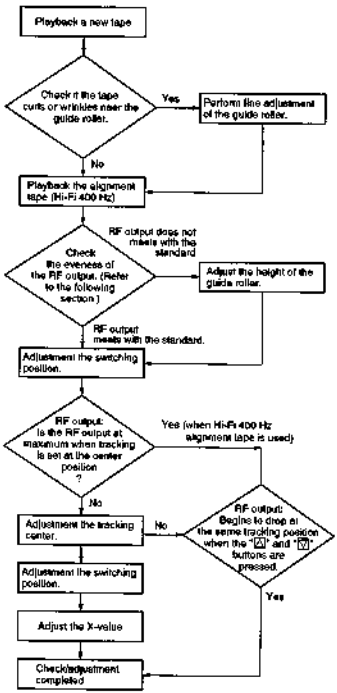
4-1-7. ADJUSTMENTS AFTER REPLACING THE DRUM (VIDEO HEAD)

Purpose: Co-relative height, X-value and other factors of the drum will deviate from those of the guide roller. If the drum is replaced properly, these deviations are extremely small.

Precaution: Turn off the auto tracking and set the manual tracking mode

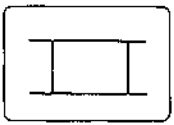
Mode	Playback
Signal	Alignment tape, blank tape
Measuring instrument	Oscilloscope
Measuring point	CH-1: Connector PB RF pin for RF PC board check. CH-2: Connector RF SW P pin for RF PC board check.
Adjustment locations	Guide roller (refer to 4-1-2, 4-1-3,) Switching position, Tracking preset, SP delay mono-multi (Refer to the Service Manual), X-value, (refer to 4-1-6,)

[Adjustment Method]

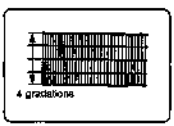


[Checking the evenness and fluctuation of the RF output]

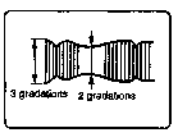
1) Set the RF output to the maximum level using the tracking buttons.



2) Perform fine adjustment of the voltage level range of the oscilloscope, then adjust the RF output deviation to within 4 gradations.



3) Press the tracking buttons and adjust the maximum amplitude of the RF output to within 3 gradations.
4) At this time, check if the minimum amplitude is more than 2 gradations.



5) Check that the RF output fluctuation between minimum and maximum levels is within 13%.

4-1-8. CHECKING THE TENSION AND TORQUE

Purpose: To check that the tension, torque and compression force of the tape take-up section and mobile sections to ensure smooth tape run and achieve standard VTR performance.

If the tape transport is not smooth or problems occur in relation to the tape transport speed, perform the following check.

Mode	Each operation mode without loading a cassette tape. (Refer to section 1-3.)
Measuring instrument	Torque gauge, Torque gauge adaptor

Item	VTR operation mode	Reel to be measured	Measurement value
Main brake torque	Stop	Supply and take-up reels	170 g·cm or more
Review torque	Review	Supply reel	180 ± 30 g·cm (using the torque cassette)
Take-up torque	Playback	Take-up reel	95 ± 25 g·cm (using the torque cassette)
Back tension torque	Playback	Take-up reel	33 to 44 g·cm (using the torque cassette)

[Check Method]

Measure the torque using the torque gauge and torque gauge adaptor with the torque gauge fixed.

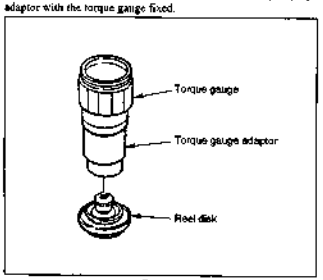


Fig. 4-9

VHS MECHANICAL ADJUSTMENT MANUAL IV

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

9-973-623-11

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

VHS MECHANICAL ADJUSTMENT MANUAL IV

SONY
SERVICE MANUAL

H MECHANISM

SUPPLEMENT-1

1. How to Use the Mode Selector II for Adjusting H Type Mechanism Assembly.
2. Adjusting Mechanism Using New Alignment Tape (KRV-52NE For NTSC).

File this supplement with the VHS mechanical adjustment (V).

TABLE OF CONTENTS

1. HOW TO USE THE MODE SELECTOR II FOR ADJUSTING H TYPE MECHANISM ASSEMBLY

1-1. OUTLINE

To activate the VHS system H type mechanism assembly using mode selector II (J-6082-282-A), use connector conversion jig (J-6090-052-A). By using the connector conversion jig, the following operations are possible.

- Loading and unloading action by the loading motor
- Reading of the current setting of the mode switch
- Normal and reverse rotation of the capstan motor

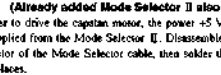
1-2. PREPARATION

1-2-1. ADDITION OF POWER SUPPLY CABLE (Already added Mode Selector II also available)

In order to drive the capstan motor, the power +5 V and +12 V are supplied from the Mode Selector II. Disassemble the D-SUB connector of the Mode Selector cable, then solder the following three places.

Supplied 3-pin cable	DSUB connector of the mode selector II	Voltage
Pin 1 (Red index)	Pin 20	+12 V
Pin 2	Pin 25	GND
Pin 3	Pin 24	+5 V

- Connector pin number assignment of the DSUB connector (From the soldering side)



- When connections are made, check that +5 V and +12 V are available at the 3-pin cable connector.

1-2-2. CHECKING THE SOFTWARE VERSION

Turn on the power of the mode selector II.

If the reading for the software version on the mode selector II is not 1.10 or higher, replace the New ROM (J-6082-314-A).

1-3. CONNECTION

1-3-1. CONNECTION BETWEEN THE CONNECTOR CONVERSION JIG AND THE MODE SELECTOR II (See Fig. 1-1)

Insert the connectors of the two 6-pin cables (one is white and the other is black) and the 3-pin cable from the mode selector II to the corresponding connectors on the connector conversion jig (J-6090-052-A).

1-3-2. CONNECTION BETWEEN THE CONNECTOR CONVERSION JIG AND THE H TYPE MECHANISM ASSEMBLY

With the power of the mode selector II turned off, insert the following three connectors to the corresponding connectors on the H type mechanism assembly.

- 3-pin connector for the loading motor
- 5-pin connector for the mode switch
- 8-pin connector for the capstan motor

Set the speed control for the minimum setting (fully counter-clockwise).

1-4. OPERATION

1-4-1. OPERATION OF THE LOADING MOTOR ON THE H TYPE MECHANISM ASSEMBLY

(1) Select the H type mechanism assembly setting on the mode selector II .

(2) After this, procedures are the same as those for the previous model types.
For the operating method, see pages 3 to 5 of "8 mm Video Mechanism Manual VI (TK Mechanism) Supplement-1".
For the loading method, see page 3 of "VHS Mechanical Adjustment Manual IV (H Mechanism)".

1-4-2. OPERATION OF THE CAPSTAN MOTOR ON THE H TYPE MECHANISM ASSEMBLY

(1) For the loading motor operation under Section 1-4-1, change the mode setting to the FF/REW mode with the mode switch.

(2) Turn the speed control gradually in clockwise direction, and the capstan motor starts rotating. To turn the capstan motor in desired rotating direction, change the FWD/RVS setting of the rotating direction switch.

1-5. PRECAUTIONS

- Turn the speed control only when necessary. Otherwise, hold the speed control turned at fully counterclockwise direction. If the power of the mode selector II is turned on with the speed control turned in clockwise direction, +12V power fails and the power of the mode selector II cannot be turned on.
- Although the connector conversion jig (J-6090-052-A) has rubber feet, do not make a short circuit on the bottom surface of the connector conversion jig via foreign conductive materials.

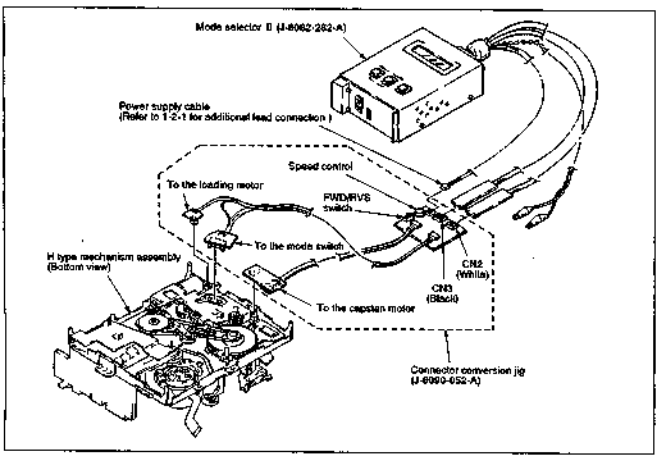

Mode selector II (J-6082-282-A)
Power supply cable
(Refer to 1-2-1 for additional lead connection)
Speed control
To the loading motor
FWD/RVS
switch
To the mode switch
H type mechanism assembly
(Bottom view)
CN2
(White)
CN3
(Black)
To the capstan motor
Connector conversion jig
(J-6090-052-A)

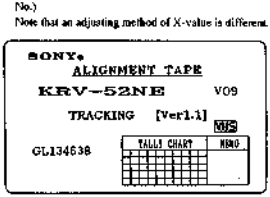
Fig. 1-1

2. ADJUSTING THE MECHANISM USING NEW ALIGNMENT TAPE (KRV-52NE for NTSC)

The conventional alignment tape (For NTSC) is now replaced with alignment tape KRV-52NE, and the following describes how to align the mechanism using the KRV-52NE. For details on the use of KRV-51N2 for each model, refer to the service manuals which will be issued in the future.

Name	Parts No.	Remarks
Alignment tape KRV-52NE for NTSC	8-192-605-41	For tape path, audio azimuth, and X-value adjustments
Alignment tape KRV-51N2 for NTSC	8-192-605-32	For electrical adjustments (RF, AF, and switching position) and operation check

Note: The KRV-52NE has or does not have Ver No. depending on new or old type as shown below. (New one has Ver No.)
Note that an adjusting method of X-value is different.



Contents:
KRV-52NE (NTSC)

Time	Video	Audio
20 min.	Recording only at 1 kHz, A-ch. EP mode RF skipping once per 5 frames	5 kHz full tracks

KRV-51N2 (NTSC)

Class	Mode	Time	Video	Audio (HiFi/Normal)
1	SP	7 min.	Color bar	400 Hz
2	SP	3 min.	Mono. scope	400 Hz
3	EP	7 min.	Color bar	400 Hz
4	EP	3 min.	Mono. scope	400 Hz

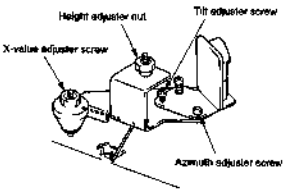
2-1. ADJUSTMENT USING ALIGNMENT TAPE (KRV-52NE for NTSC having no version No.)

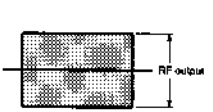
2-1-1. X-VALUE ADJUSTMENT (Using the tape having no version No.)

Purpose: To obtain compatibility with other VCRs.

Precaution: Before starting to adjust X-value, set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys, press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

Mode	Playback
Signal	Alignment tape KRV-52NE (For NTSC having no version No.)
Measuring instrument	Oscilloscope TIM/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH-1: Connector PB RF pin for RF PC board check CH-2: Connector RF SWP pin for RF PC board check
Adjustment locations	X-value adjuster screw

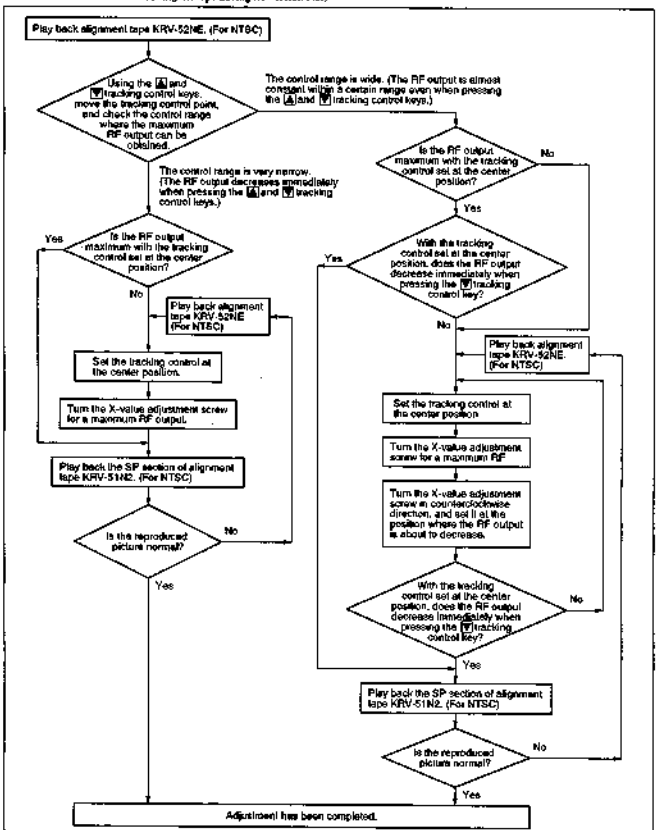




RF output shall be maximum at the center position of the tracking control

[Adjustment Method]
Set the tracking control at the center position. For the VCRs equipped with narrow gap video heads, set the X-value adjustment screw where a maximum RF output is obtained. For the VCRs equipped with wide gap video heads, set the X-value adjustment screw both where a maximum RF output is obtained and where the RF output decreases immediately when the ▼ tracking control key is pressed

X-VALUE ADJUSTMENT (Using the tape having no version No.)



When adjustment is complete, adjust the height of No. 3 and No. 6 guide rollers on page 10.

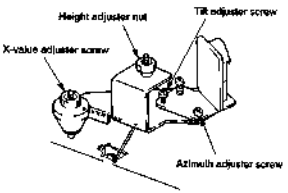
2-2. ADJUSTMENT USING ALIGNMENT TAPE (KRV-52NE for NTSC having the version No.)

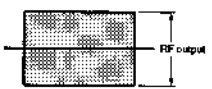
2-2-1. X-VALUE ADJUSTMENT (Using the tape having the version No.)

Purpose: To obtain compatibility with other VCRs.

Precaution: Before starting to adjust X-value, set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys, press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

Mode	Playback
Signal	Alignment tape KRV-52NE (For NTSC having the version No.)
Measuring instrument	Oscilloscope TIME/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH-1: Connector PB RF pin for RF PC board check CH-2: Connector RF SWP pin for RF PC board check
Adjustment locations	X-value adjuster screw



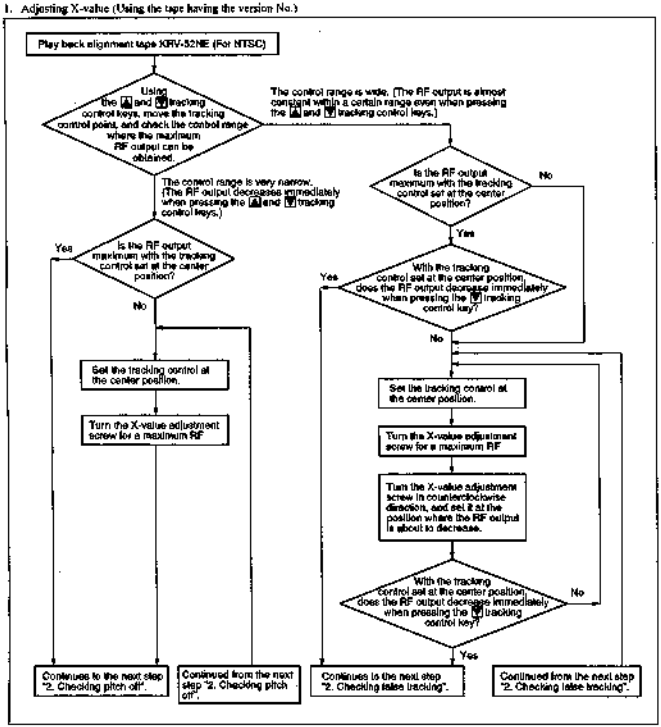


RF output shall be maximum at the center position of the tracking control.

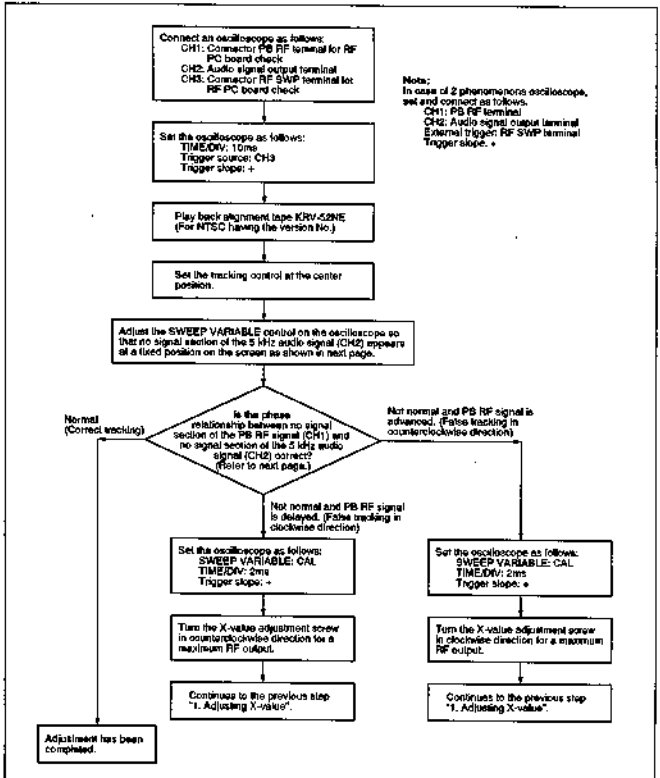
[Adjustment Method]

Set the tracking control at the center position. For the VCRs equipped with narrow gap video heads, set the X-value adjustment screw where a maximum RF output is obtained. For the VCRs equipped with wide gap video heads, set the X-value adjustment screw both where a maximum RF output is obtained and where the RF output decreases immediately when the ▼ tracking control key is pressed.

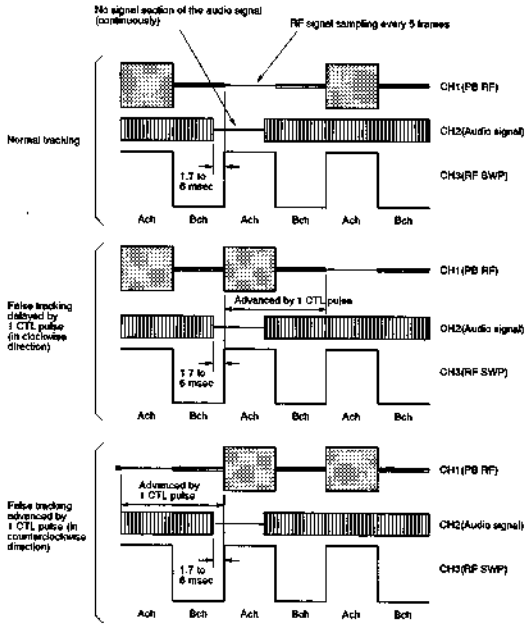
1. Adjusting X-value (Using the tape having the version No.)



2. Checking false tracking (Using the tape having the version No.)



Using the tape having the version No.



2-3. ADJUSTING THE MECHANISM USING ALIGNMENT TAPE (KRV-52NE for NTSC)

2-3-1. HEIGHT ADJUSTMENT OF GUIDE ROLLERS NO. 3 AND NO. 6

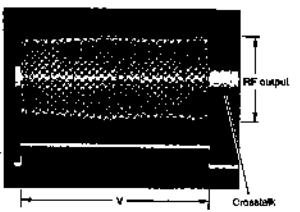
Mode	Playback
Signal	Alignment tape KRV-52NE (For NTSC)
Measuring instrument	Oscilloscope TIM/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH-1: Connector PB RF pin for RF PC board check CH-2: Connector RF SWP pin for RF PC board check
Adjustment locations	Height adjustment screw for No.3 tape guide roller Height adjustment screw for No.6 tape guide roller

[Adjustment Method]

The following adjustment shall be carried out after completed Section 2-1-1 "X-value adjustment and check".

1) Deactivate the automatic tracking control, and set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys, press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

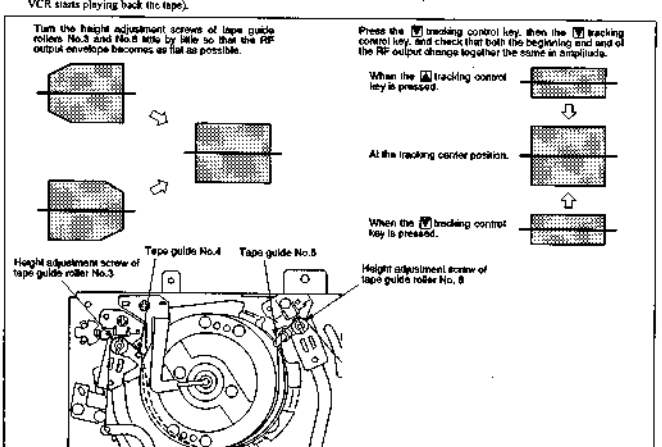
2) Check if the RF output changes in amplitude by pressing the tracking control key. The RF output should change periodically (changes from a minimum amplitude to a maximum amplitude, and to the minimum amplitude again).



3) Turn the height adjustment screws of tape guide rollers No.3 and No.6 so that the RF output envelope becomes as flat as possible.

4) Press the ▲ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.

5) Press the ▼ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.



2-3-2. ACE HEAD ASSEMBLY ADJUSTMENT (ROUGH ADJUSTMENT) (Figs. 2-1 and 2-2)

Purpose: Allows the tape to make even contact with the head for recording and playback of the specified track.

Mode	Playback
Jig	Blank tape
Adjustment locations	Height adjuster nut, Tilt adjuster screw

[Adjustment Method]

1) Mount the ACE head assembly. At this time, adjust the height so that the height of guide flange No. 7 matches the level of the lower edge of the control head.
2) Remove the adjustment tool and load a new tape, then set the unit for playback.
3) Check that the tape does not curl or rise up noticeably near the ACE head.
4) If the tape curls up or rises noticeably, readjust the tilt adjuster screw and the height adjuster nut.
   (The height of the ACE head should be adjusted so that the lower edge of the tape is approx. 0.1 to 0.15 mm from the control head.)
5) Perform precision adjustment.

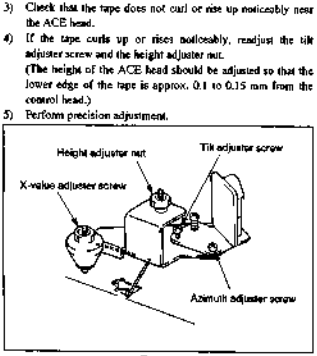


Fig. 2-1

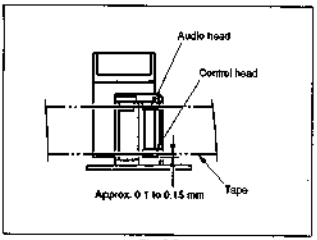


Fig. 2-2

2-3-3. ACE HEAD ASSEMBLY ADJUSTMENT (PRECISION ADJUSTMENT)

Mode	Playback
Signal	Alignment tape (KRV-52NE 5 kHz) (For NTSC)
Measuring instrument	Oscilloscope
Measuring point	Audio output terminal
Adjustment locations	Azimuth adjuster screw, Height adjuster nut, Tilt adjuster screw

[Adjustment Method]

1) Adjust the tilt adjuster screw in the FWD or REV mode so that the lower flange of guide No. 7 does not curl up or rise.
2) Alternately adjust the azimuth adjuster screw, the height adjuster nut, and the tilt adjuster screw to maintain even audio output at maximum with minimum deviation.

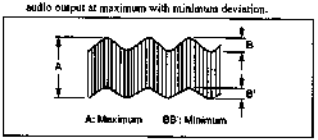


Fig. 2-3

2-3-4. ADJUSTMENTS AFTER REPLACING THE DRUM (VIDEO HEAD)

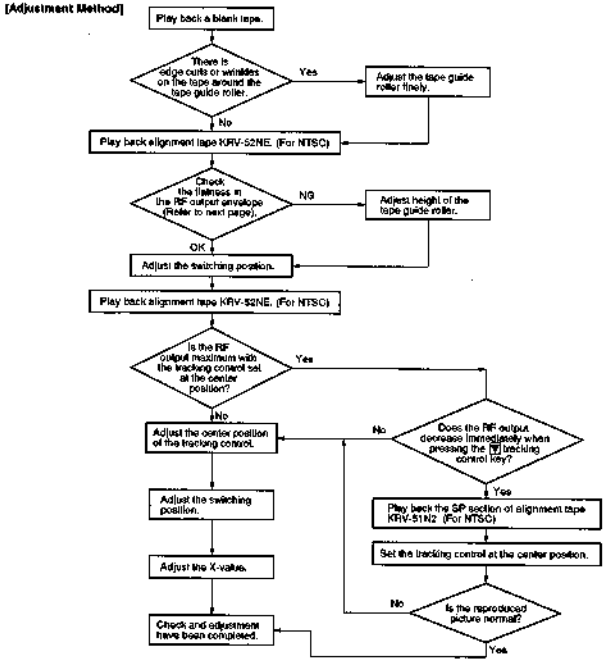
Purpose: Co-relative height, X-value and other factors of the drum will deviate from those of the guide roller. If the drum is replaced properly, these deviations are extremely small.

Note 1: Deactivate the automatic tracking control for setting the mechanism in manual tracking control mode.

Note 2: To set the tracking control at the center position, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

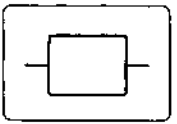
Mode	Playback
Signal	Alignment tape KRV-52NE (For NTSC), blank tape
Measuring instrument	Oscilloscope
Measuring point	CH-1: Connector PB RF pin for RF PC board check. CH-2: Connector RF SWP pin for RF PC board check.
Adjustment location	Guide roller (Refer to 2-3-1.) Switching position (Refer to the Service Manual) X-value (Refer to 2-1-1, 2-1-2.)

[Adjustment Method]

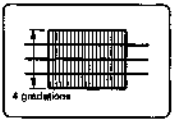


[Checking the evenness and fluctuation of the RF output]

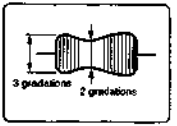
1) Set the RF output to the maximum level using the tracking buttons.



2) Perform fine adjustment of the voltage level range of the oscilloscope, then adjust the RF output deviation to within 4 gradations.



3) Press the tracking buttons and adjust the maximum amplitude of the RF output to within 3 gradations.
4) At this time, check if the minimum amplitude is more than 2 gradations.



5) Check that the RF output fluctuation between minimum and maximum levels is within 13%

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9-973-623-82

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Quality Engineering Dept.

VHS MECHANICAL ADJUSTMENT MANUAL IV

SONY
SERVICE MANUAL

H MECHANISM

SUPPLEMENT-2

File this supplement with the VHS mechanical adjustment IV and supplement-1.

TABLE OF CONTENTS

1. CORRECTION

In the VHS Mechanism Adjustment Manual IV (Supplement-1), an adjustment sequence was wrong, and it is corrected as follow;

1-1. Adjustment Sequence (VHS Mechanism Adjustment Manual IV (Supplement-1) Page 6 to 11)

(1) Adjustment of No. 3 and No. 6 guide roller height

Delete the "The following adjustment shall be carried out after completed Section 2-1-1 "X-value adjustment and check" under "Adjustment Method" on page 10.

(2) Adjustment of ACE head assembly

Note: In the adjustment of ACE head assembly (coarse adjustment and fine adjustment), if a azimuth, height and tilt were adjusted, again adjust the height of No. 3 and No. 6 guide rollers

(3) Adjustment of X value

MICROFILM

2. MODIFICATION

2-1. CHANGING THE RECORDED CONTENTS OF ALIGNMENT TAPE

KRV-52NE (NTSC) (Ver. 1.2)

Time	Video	Audio
20 min.	Recording only at 1 MHz, A-ch. EP mode RF skipping once per 5 frames	5 kHz → 4 kHz full tracks

2-2. TG2 ROLLER, FE HEAD ASSEMBLY (Refer to VHS Mechanical Adjustment Manual IV page14)

- The TG2 roller is provided with either of two types, fixed or straight. For the fixed type, section 3-5 is added.

3-5. TG2 ROLLER, FE HEAD ASSEMBLY (Fig. 3-5)

1) Remove screw ① to pull out FE head assembly ②.

[Note on Mounting]

- Keep clean the surface contacts tape of TG2 roller.

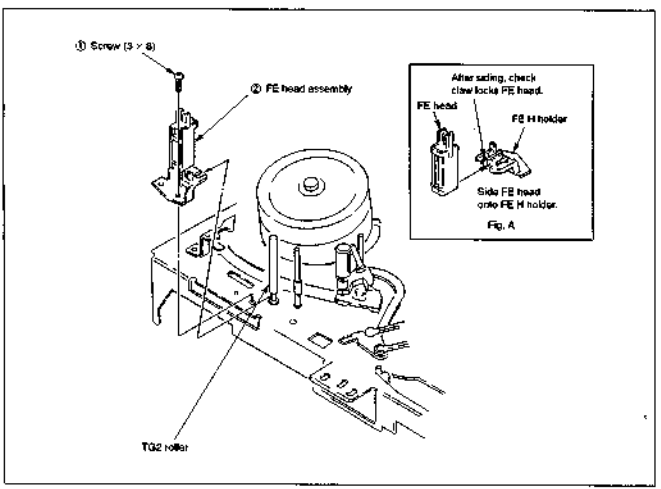

Fig. 3-5

2-3. TG3, TG6 GUIDE ROLLER ASSEMBLIES (Refer to VHS Mechanical Adjustment Manual IV page 17)

- There is another type in TG3 and TG6 guide roller assemblies, which is not attached with a screw (B2X3). For the screwless type, section 3-8 is added.

3-8. TG3, TG6 GUIDE ROLLER ASSEMBLIES (Fig. 3-8)

1) TG3 guide roller assembly ① by turning it in arrow ❶ direction.
2) Removal the spring ②.
3) TG6 guide roller assembly ③ by turning it in arrow ❷ direction.
4) Removal the spring ④.

[Note on Mounting]

- Keep clean the surface contacts tape of TG3 and TG6 guide roller assemblies ①, ③.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

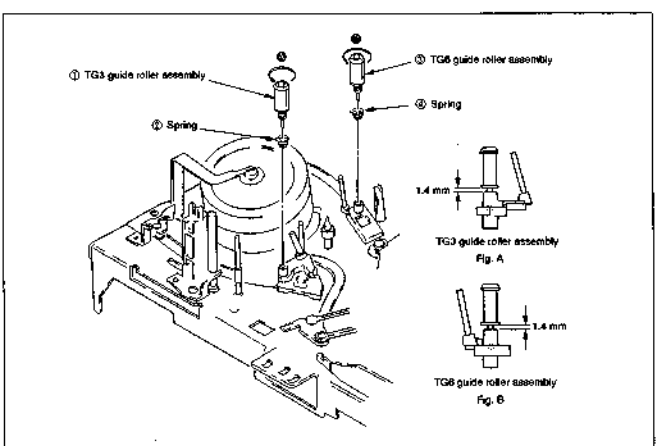

Fig. 3-8

2-4. TG8 ASSEMBLY
(Refer to VHS Mechanical Adjustment Manual IV page 23)

- As the shape of TG8 assembly was changed, Section 3-13 is changed.

▬ : Changed portion

3-13. TG8 ASSEMBLY (Fig. 3-15)

1) Remove TG7 tape retainer Ⓘ to pull out TG8 assembly ②.

[Note on Mounting]

- Apply FLOIL SG-055G (Jig Ref. No J-12) to ☆ marked portion
- Keep clean the surface contacts tape of TG8 assembly ②.
- Be careful not to change the shape of TG7 tape retainer Ⓘ.
- After attaching the TG7 tape retainer Ⓘ, check that side Ⓐ of Ⓘ is below side Ⓑ of the stepped-part of the TG7 shaft. (Fig. A)

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

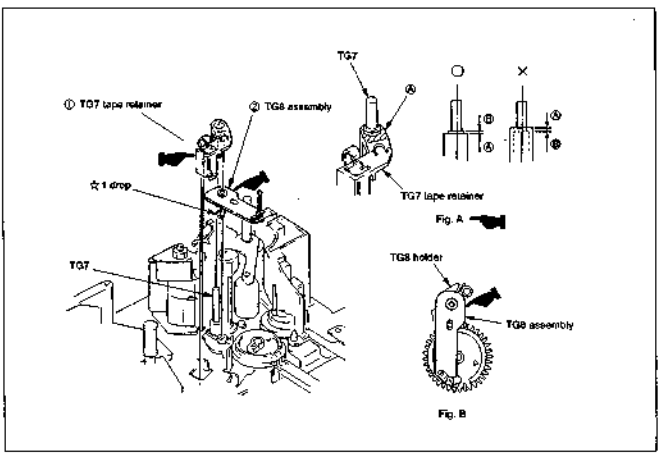

Fig. 3-15

2-5. TENSION REGULATOR (TG1) POSITION/ TENSION ADJUSTMENT (Refer to VHS Mechanical Adjustment Manual IV page 35)

- As the tension regulator position and tension adjustment were changed, the tension adjustment and Fig. 4-1 are changed.

▬ : Changed portion

• Tension adjustment

Mode	Playback
Measuring instrument/tool	Torque cassette
Adjustment locations	Position for hooking the tensed spring
Specified value	34 ± 4 g•cm

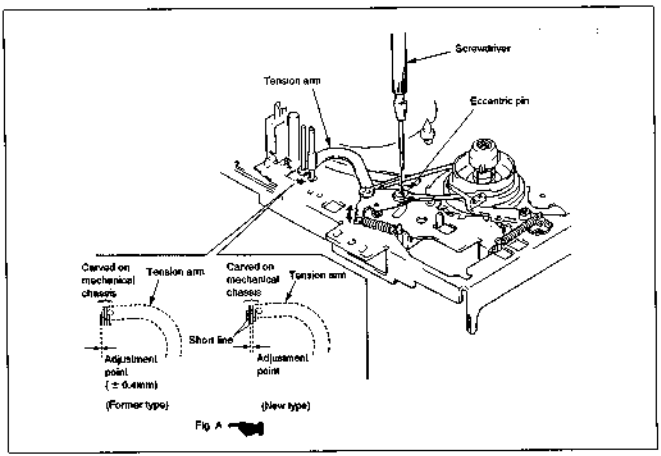

Fig. 4-1

2-6. TG6 GUIDE ROLLER HEIGHT ADJUSTMENT (Refer to VHS Mechanical Adjustment Manual IV page 36)

- As the use of TG8 height adjusting screw was cancelled, section 4-1-2 is changed.

4-1-2. TG7 TAPE PATH ADJUSTMENT (Fig. 4-2)

[Adjustment Method]

1) Load a tape, and playback the tape in the CUE mode, confirm the distance between lower flange of No. 7 guide roller and lower side of tape (Fig. A).
2) Then, feeding the tape in the REV mode, confirm the distance between lower flange of No. 7 guide roller and lower side of tape
3) If the tape height in the REV feed is higher that in the CUE playback (Fig. B), rotate the ACE head flapping adjust screw in the direction ⓐ so that a difference in tape height between CUE mode and REV mode becomes zero.
4) If the tape height in the REV feed is lower that in the CUE playback (Fig. C), rotate the ACE head flapping adjust screw in the direction ⓑ so that a difference in tape height between CUE mode and REV mode becomes zero.

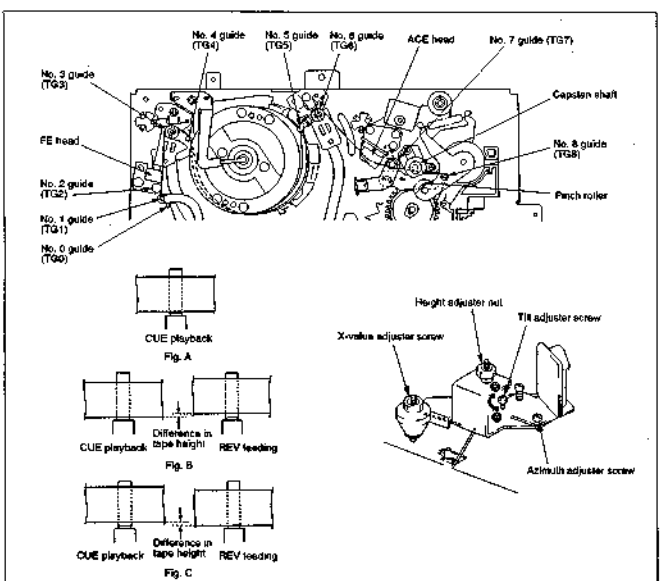

Fig. 4-2

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VHS MECHANICAL ADJUSTMENT MANUAL IV

SONY

H MECHANISM

SERVICE MANUAL

SUPPLEMENT-3

File this supplement with the VHS mechanical adjustment IV and supplement-1, 2.

Subject: Mechanism chassis assembly changed.
PAL alignment tape changed.

(SL-6000S0)

TABLE OF CONTENTS

1. MODIFICATION

1-1. PARTS REQUIRING CLEANING (Refer to VHS Mechanical Adjustment Manual IV page 7)

- Parts requiring a cleaning were changed in shape, and therefore, Fig. 2-1 for new type is added.

☛: Modificated portion

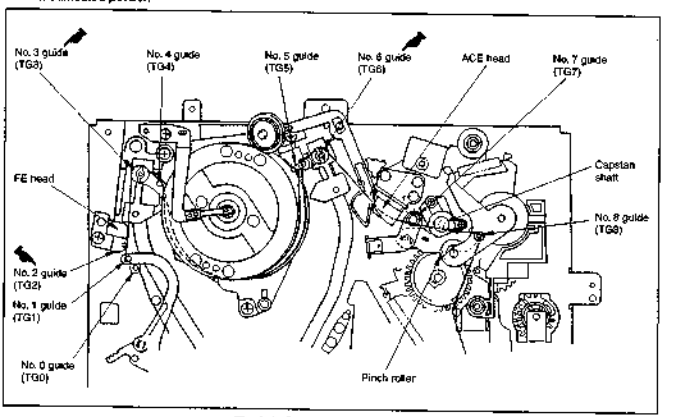


Fig. 2-1 Parts Requiring Cleaning

1-2. DRUM ASSEMBLY, DRUM BASE (Refer to VHS Mechanical Adjustment Manual IV page 11)

+ The ground shaft assembly was changed and the drum base was added, and therefore Section 3-2 for new type is added.

3-2. DRUM ASSEMBLY, DRUM BASE (Fig. 3-2)

1) Remove screw ①.
2) Remove ground shaft assembly ② not to touch its tip with bare hand or tools.
3) Remove screws ③ to remove drum assembly ④.
4) Remove screws ⑤ to remove drum base ⑥.

[Note on Mounting]

- Don't touch head chips and ground shaft assembly ② with bare hand or tools.
- Keep clean the surface contacts tape of drum assembly ④.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

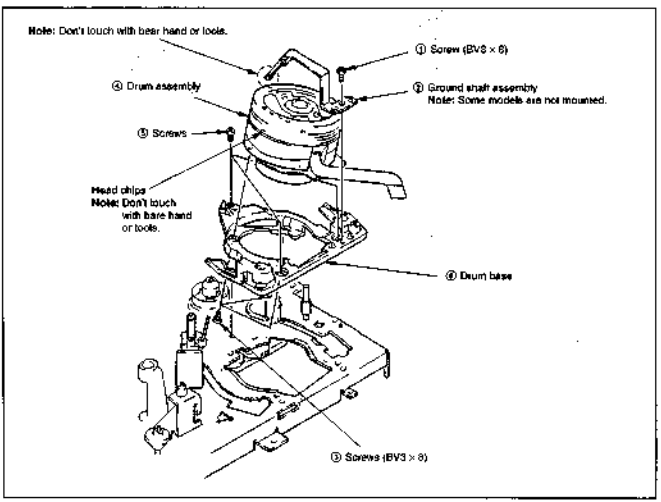


Fig. 3-2

1-3. TG2 ROLLER, FE HEAD ASSEMBLY (Refer to VHS Mechanical Adjustment Manual IV page 14)

- The TG2 roller was assembled in the FE head assembly, and therefore Section 3-5 for new type is added.

3-5. TG2 ROLLER, FE HEAD ASSEMBLY (Fig. 3-5)

1) Remove screw ①.
2) Pull out FE head assembly ②.

[Note on Mounting]

- Keep clean the surface contacts tape of TG2 roller.

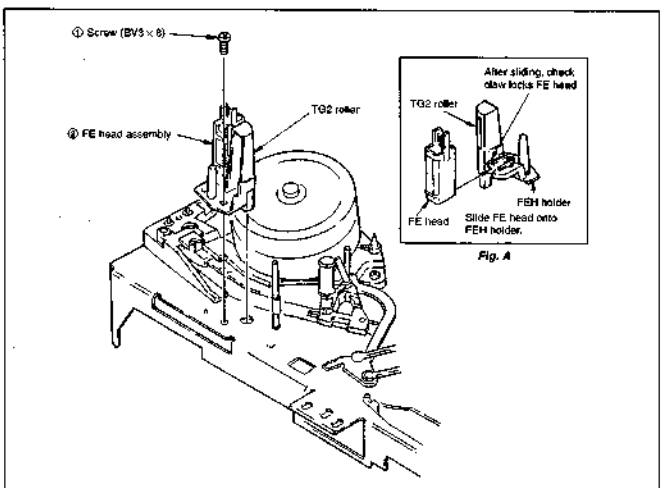


Fig. A

Fig. 3-5

1-4. TG3, TG6 GUIDE ROLLER ASSEMBLIES (Refer to VHS Mechanical Adjustment Manual IV page 17)

- The TG3 and TG6 guide roller assemblies were changed, and therefore Section 3-8 for new type is added.

3-8. TG3, TG6 GUIDE ROLLER ASSEMBLIES (Fig. 3-8)

1) TG3 guide roller assembly ① by turning it in the arrow ⓐ direction
2) Removal the spring ②.
3) TG6 guide roller assembly ③ by turning it in the arrow ⓑ direction.
4) Removal the spring ④.

[Note on Mounting]

- Keep clean the surface contacts tape of TG3 and TG6 guide roller assemblies ①, ③.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

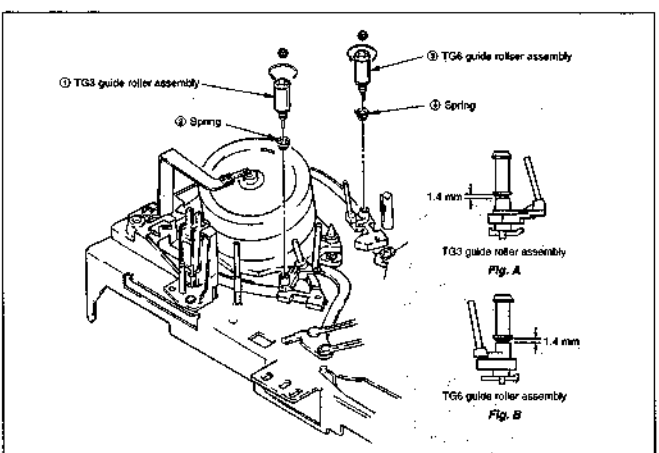


Fig. 3-8

1-5. SHUTTLE T BLOCK AND LOADING GEAR T BLOCK ASSEMBLIES (Refer to VHS Mechanical Adjustment Manual IV page 29)

- The shuttle T block and loading gear T block assemblies were changed, and therefore Section 3-19 for new type is added.

3-19. SHUTTLE T BLOCK AND LOADING GEAR T BLOCK ASSEMBLIES (Fig. 3-21)

1) Remove drum assembly and drum base. (Refer to 3-2.)
2) Remove timing belt. (Refer to 3-3.)
3) Remove CAP brake assembly. (Refer to 3-4.)
4) Remove cam motor chassis block assembly. (Refer to 3-18.)
5) Remove main slider. (Refer to 3-20.)
6) Sliding the shuttle T block assembly ① toward the direction ⓐ, remove it through the hole ⓑ.
7) Pull out loading gear T block assembly ②.

[Note on Mounting]

- Adjust the phase ⓒ between loading gear (T) and loading gear (S). (Fig. A)
- Keep clean the surface contacts tape of shuttle T block assembly ①.

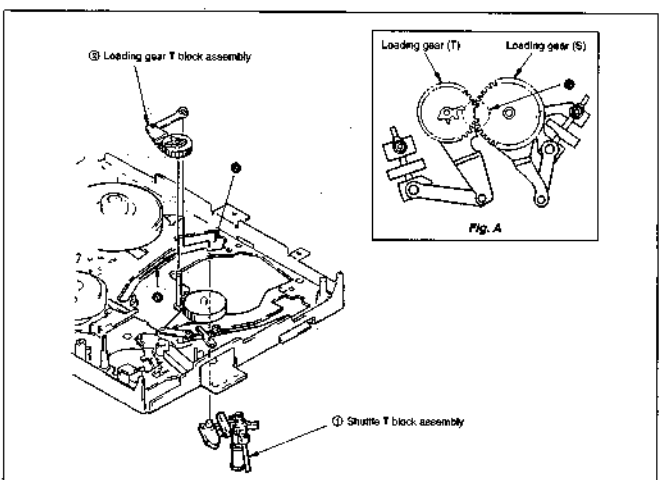


Fig. A

Fig. 3-21

1-6. SHUTTLE S BLOCK AND LOADING GEAR S BLOCK ASSEMBLIES (Refer to VHS Mechanical Adjustment Manual IV page 30)

- The shuttle S block and loading gear S block assemblies were changed, and therefore Section 3-20 for new type is added.

3-20. SHUTTLE S BLOCK AND LOADING GEAR S BLOCK ASSEMBLIES (Fig. 3-22)

1) Remove drum assembly and drum base. (Refer to 3-2.)
2) Remove timing belt. (Refer to 3-3.)
3) Remove CAP brake assembly. (Refer to 3-4.)
4) Remove cam motor chassis block assembly. (Refer to 3-18.)
5) Remove main slider. (Refer to 3-20.)
6) Sliding the shuttle S block assembly ① toward the direction ⓐ, remove it through the hole ⓑ.
7) Pull out loading gear S block assembly ⑤.

[Note on Mounting]

- Adjust the phase ⓒ between loading gear (S) and loading gear (S). (Fig. A)
- Keep clean the surface contacts tape of shuttle S block assembly ①.

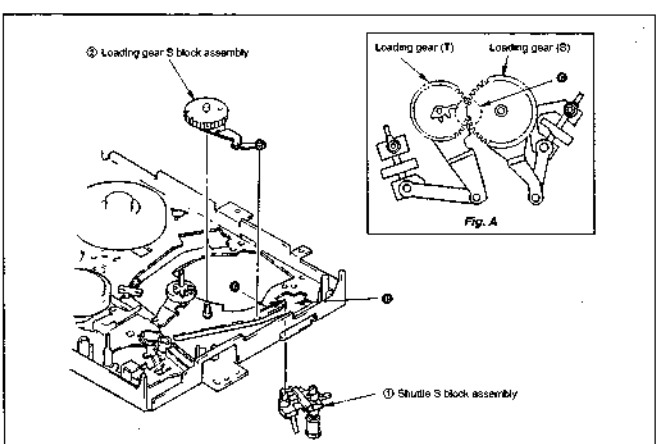


Fig. A

Fig. 3-22

2. ADJUSTING THE MECHANISM USING NEW ALIGNMENT TAPE (KRV-52PL for PAL)

The conventional alignment tape (For PAL) is now replaced with alignment tape KRV-52PL, and the following describes how to align the mechanism using the KRV-52PL. For details on the use of KRV-51P for each model, refer to the service manuals which will be issued in the future.

Name	Parts No.	Remarks
Alignment tape KRV-52PL for PAL	8-192-605-46	For tape path, audio azimuth, and X-value adjustments
Alignment tape KRV-51P for PAL	8-192-605-36	For electrical adjustments (RF, AF, and switching position) and operation check

Contents:
KRV-52PL (PAL)

Time	Video	Audio
20 min.	Recording only at 1 MHz, A-ch. EP mode RF skipping once per 5 frames	4 kHz full tracks

KRV-51P (PAL)

Class	Mode	Time	Video	Audio (HiFi/Normal)
1	SP	7 min.	Color bar	400 Hz
2	SP	3 min.	Mono scope	400 Hz
3	EP	7 min.	Color bar	400 Hz
4	EP	3 min.	Mono scope	400 Hz

2-1. HEIGHT ADJUSTMENT OF GUIDE ROLLERS NO. 3 AND NO. 6

Mode	Playback
Signal	Alignment tape KRV-52PL (For PAL)
Measuring instrument	Oscilloscope TIM/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH-1: Connector PB RF pin for RP PC board check CH-2: Connector RF SWP pin for RP PC board check
Adjustment locations	Height adjustment screw for No. 3 tape guide roller Height adjustment screw for No. 6 tape guide roller

[Adjustment Method]

1) Deactivate the automatic tracking control, and set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys, press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during theending operation (after a tape is inserted but before the VCR starts playing back the tape).
2) Turn the height adjustment screws of tape guide rollers No. 3 and No. 6 so that the RF output envelope becomes as flat as possible.
3) Press the ▲ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.
4) Press the ▼ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.

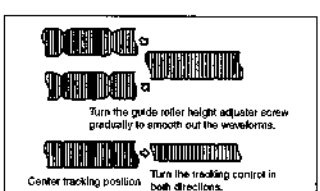


Fig. 2-1

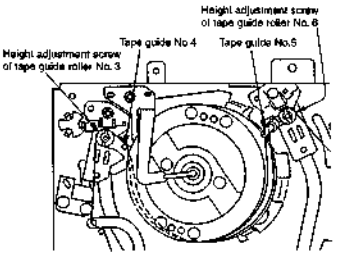


Fig. 2-2

2-2. ACE HEAD ASSEMBLY ADJUSTMENT (ROUGH ADJUSTMENT) (Figs. 2-3 and 2-4)

Purpose: Allows the tape to make even contract with the head for recording and playback of the specified track.

Mode	Playback
Jig	Blank tape
Adjustment locations	Height adjuster nut, Tilt adjuster screw

[Adjustment Method]

1) Mount the ACE head assembly. AT this time, adjust the height so that the height of guide flange No. 7 matches the level of the lower edge of the control head.
2) Remove the adjustment tool and load a new tape, then set the unit for playback.
3) Check that the tape does not curl or rise up noticeably near the ACE head.
4) If the tape curls up or rises noticeably, readjust the tilt adjuster screw and the height adjuster nut.
(The height of the ACE head should be adjusted so that the lower edge of the tape is approx. 0.1 to 0.15 mm from the control head.)
5) Perform precision adjustment.

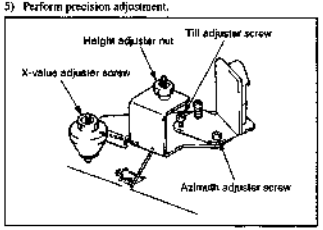


Fig. 2-3

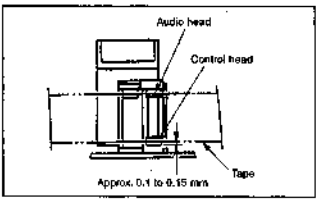


Fig. 2-4

2-3. ACE HEAD ASSEMBLY ADJUSTMENT (PRECISION ADJUSTMENT)

Mode	Playback
Signal	Alignment tape (KRV-52PL 4 kHz) (For PAL)
Measuring instrument	Oscilloscope
Measuring point	Audio output terminal
Adjustment locations	Azimuth adjuster screw, Height adjuster nut, Tilt adjuster screw

[Adjustment Method]

1) Adjust the tilt adjuster screw in the FWD or REV mode so that the lower flange of guide No. 7 does not curl up or rise.
2) Alternately adjust the azimuth adjuster screw, the height adjuster nut, and the tilt adjuster screw to maintain even audio output at maximum with minimum deviation.

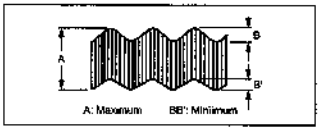


Fig. 2-5

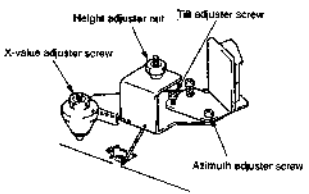
Note: In the adjustment of ACE head assembly (coarse adjustment and fine adjustment), if azimuth, height and tilt were adjusted, again adjust the height of No. 3 and No. 6 guide rollers.

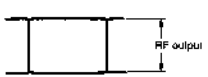
2-4. X-VALUE ADJUSTMENT

Purpose: To obtain compatibility with other VCRs.

Precaution: Before starting to adjust X-value, set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys, press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

Mode	Playback
Signal	Alignment tape KRV-52PL
Measuring instrument	Oscilloscope TIM/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH-1: Connector PB RF pin for RF PC board check CH-2: Connector RF SWP pin for RF PC board check
Adjustment locations	X-value adjuster screw





RF output shall be maximum at the center position of the tracking control.

Fig. 2-6

[Adjustment Method]

Set the tracking control at the center position. For the VCRs equipped with narrow gap video heads, set the X-value adjustment screw where a maximum RF output is obtained. For the VCRs equipped with wide gap video heads, set the X-value adjustment screw both where a maximum RF output is obtained and where the RF output decreases immediately when the ▼ tracking control key is pressed.

1. Adjusting X-value

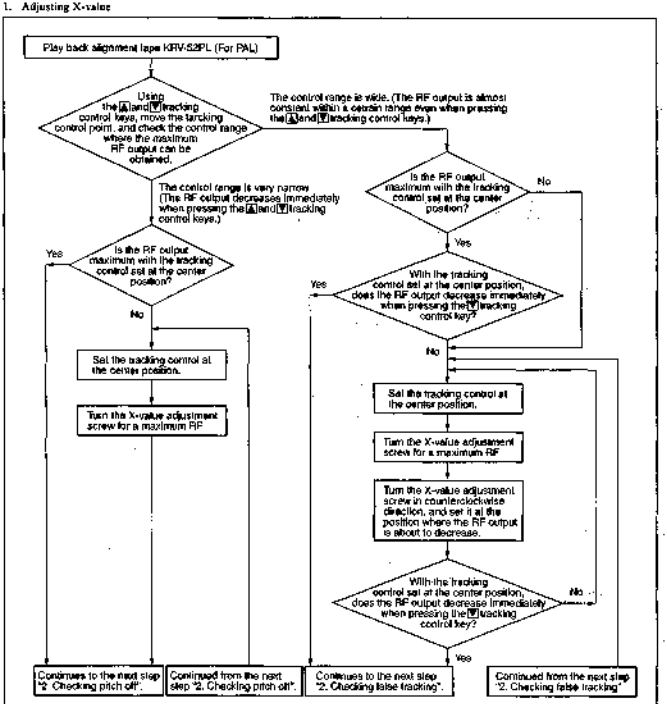


Fig. 2-7

2. Checking false tracking

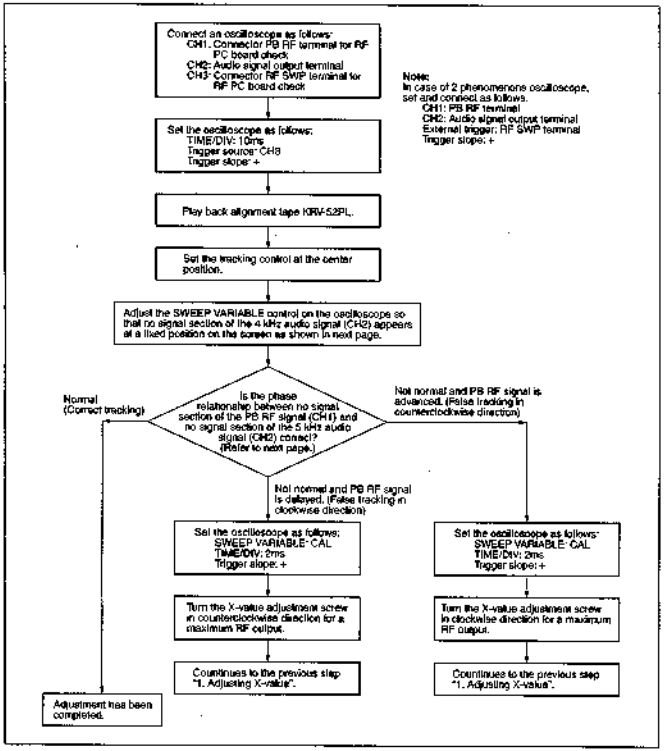


Fig. 2-8

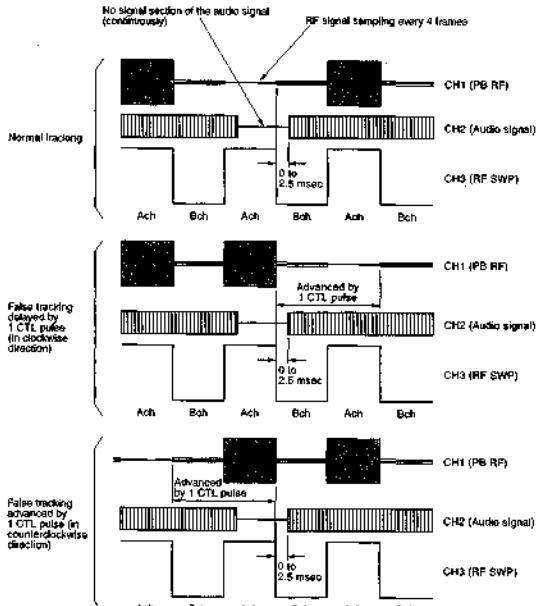

No signal section of the audio signal (continuously)
RF signal sampling every 4 frames
Normal tracking
CH1 (PB RF)
CH2 (Audio signal)
CH3 (RF SWP)
0 to 2.5 msec
Ach
Bch
False tracking delayed by 1 CTL pulse (in clockwise direction)
Advanced by 1 CTL pulse
False tracking advanced by 1 CTL pulse (in counterclockwise direction)

Fig. 2-9

2-5. ADJUSTMENT AFTER REPLACING THE DRUM (VIDEO HEAD)

Purpose: Co-relative height, X-value and other factors of the drum will deviate from those of the guide roller. If the drum is replaced properly, these deviations are extremely small.

Note 1: Deactivate the automatic tracking control for setting the mechanism in manual tracking control mode.

Note 2: To set the tracking control at the center position, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during the adjusting operation (after a tape is inserted but before the VCR starts playing back the tape)

Mode	Playback
Signal	Alignment tape KRV-52PL (For PAL), blank tape
Measuring instrument	Oscilloscope
Measuring point	CH-1: Connector PB RF pin for RF PC board check. CH-2: Connector RF SWP pin for RF PC board check.
Adjustment locations	Guide roller (Refer to 2-1.) Switching position (Refer to the Service Manual) X-value (Refer to 2-3.)

[Adjustment Method]

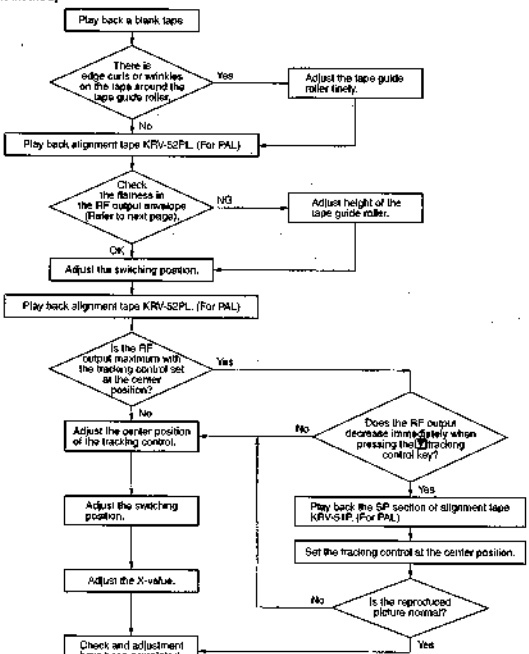
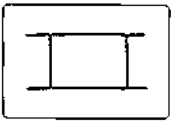


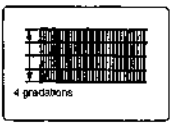
Fig. 2-10

[Checking the evenness and fluctuation of the RF output]

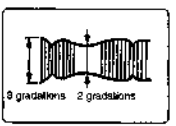
1) Set the RF output to the maximum level using the tracking buttons.



2) Perform fine adjustment of the voltage level range of the oscilloscope, then adjust the RF output deviation to within 4 gradations.



3) Press the tracking buttons and adjust the maximum amplitude of the RF output to within 3 gradations.
4) At this time, check if the minimum amplitude is more than 2 gradations.



5) Check that the RF output fluctuation between minimum and maximum levels is within 13%.

Fig. 2-11