JVC®

SERVICE MANUAL

HD CAMERA RECORDER

GY-HD100U/GY-HD100E
GY-HD101E

GY-HD101E is added only the DV input function to GY-HD100E.

Mini **DV**

HDV

Note
● **Lead free solder used in the board (material : Sn, Ag, In, Bi, melting point : 227 Centigrade)**

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

●Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▨) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape   3) Spacers   5) Barrier
   2) PVC tubing   4) Insulation sheets for transistors

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.
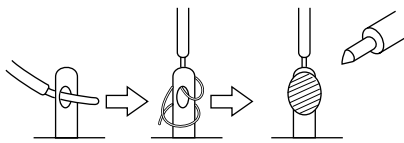
Fig.1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

Power cord
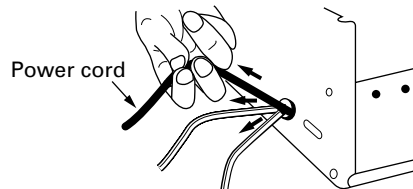
Fig.2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

    1) **Connector part number :** E03830-001
    2) **Required tool :** Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
           Important : Do not reuse a connector (discard it).
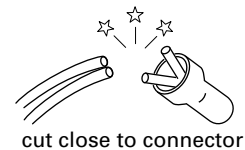
cut close to connector

Fig.3

       (2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

15 mm
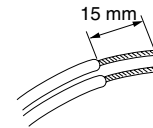
Fig.4

       (3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

Metal sleeve

Connector
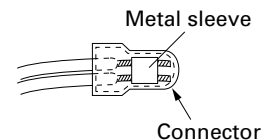
Fig.5

       (4) As shown in Fig.6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

Crimping tool
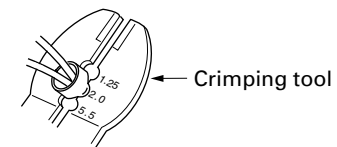
Fig.6

       (5) Check the four points noted in Fig.7.

Not easily pulled free   Crimped at approx. center of metal sleeve

Conductors extended

Wire insulation recessed more than 4 mm
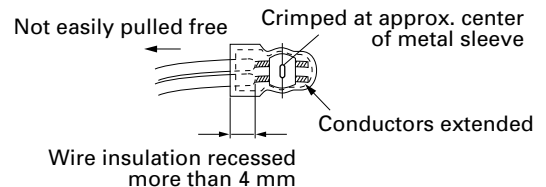
Fig.7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. Insulation resistance test
Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. Dielectric strength test
Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. Clearance distance
When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

Fig. 8
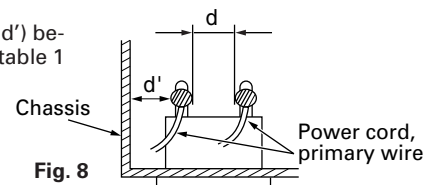
4. Leakage current test
Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).
Measuring Method : (Power ON)
Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

Fig. 9
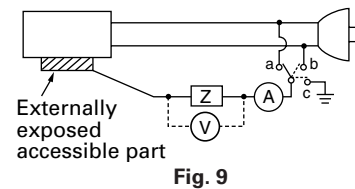
5. Grounding (Class I model only)
Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).
Measuring Method:
Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

Fig. 10
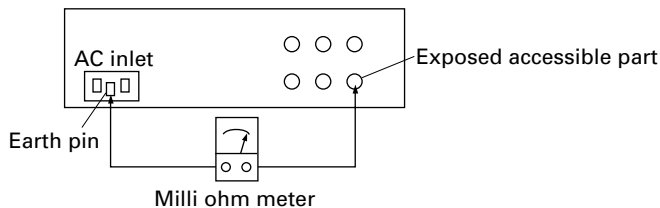
Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≤ 0.1 ohm
Europe & Australia	Z ≤ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 miute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	–	AC 900 V 1 minute	d, d' ≧ 3.2 mm
110 to 130 V / 200 to 240 V	Europe & Australia	R ≧ 10 MΩ/500 V DC	AC 3 kV 1 minute (Class II) / AC 1.5 kV 1 minute (Class I)	d ≧ 4 mm / d' ≧ 8 mm (Power cord) / d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF / 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V / 220 to 240 V	Europe & Australia	2 kΩ	i ≦ 0.7 mA peak / i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak / i ≦ 2 mA dc	Other terminals

Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

SECTION 1
SERVICE CAUTIONS AND DISASSEMBLY

1.1 HOW TO REMOVE THE COSMETIC PARTS

1.1.1 Left side cover

(1) Remove the two screws ① , slide the cassette cover downward and pull out to remove.

Fig. 1.1.1 (1)

Note :
When attaching the cassette cover, make sure to insert the hook of the cassette cover to the correct position of the cassette housing.

(2) Remove the two screws ② .
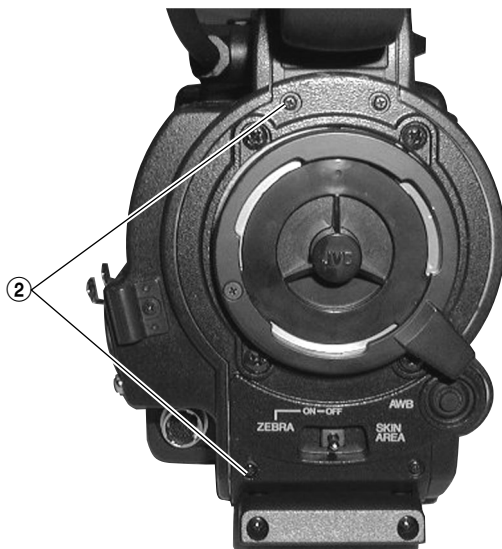
Fig. 1.1.1 (2)

(3) Remove the two screws ③ and open the left side cover.
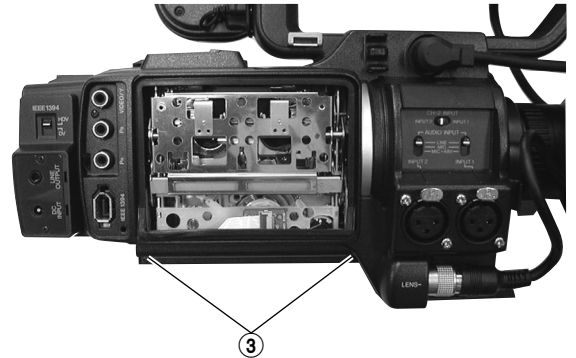
Fig. 1.1.1 (3)

(4) Disconnect the cables CN13 and CN43.

CN43   CN13
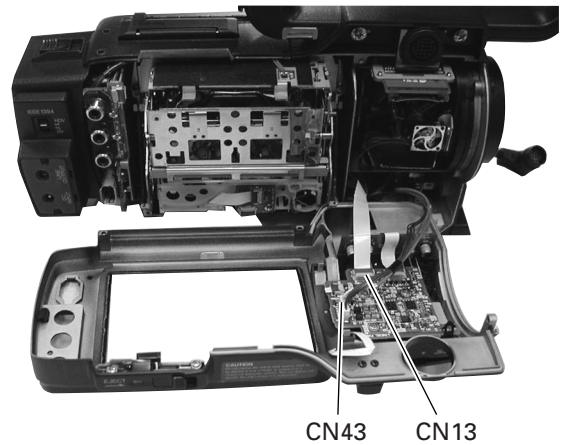
Fig. 1.1.1 (4)

1.1.2 Right side cover

(1) Remove the five screws ④ and open the right side cover.
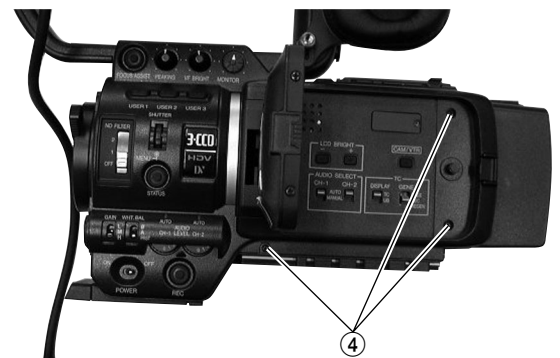
Fig. 1.1.2 (1)
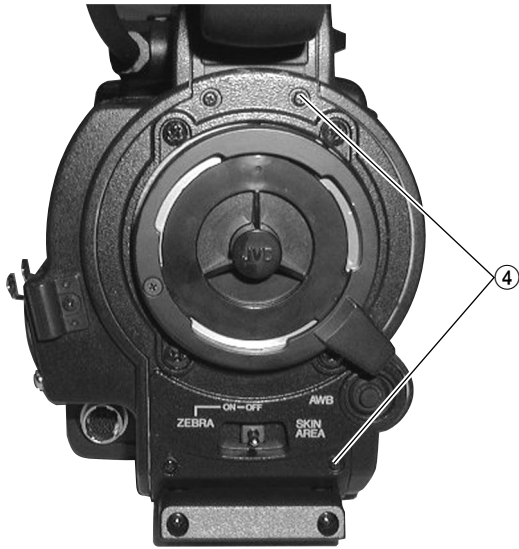
Fig. 1.1.2 (2)

(2) Disconnect the cables CN14, CN24 and CN43 on AUDIO board, CN10 and CN52 on STA board, CN52 on SWP board.

CN52　CN10　CN43　CN24　CN14
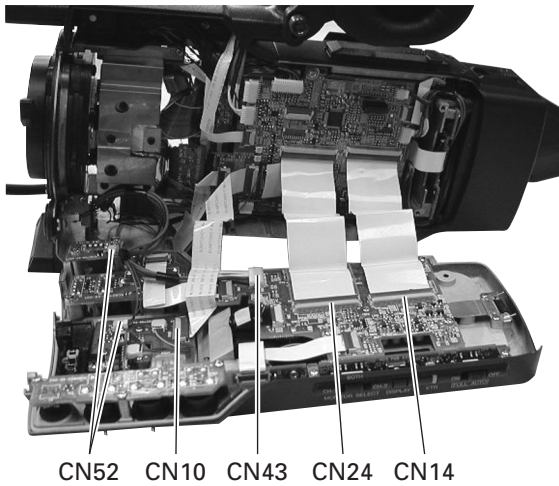
Fig. 1.1.2 (3)

1.2　HOW TO REMOVE THE OPTICAL BLOCK ASSEMBLY

> **CAUTION**
>
> When removing/mounting the optical block assembly in the camera, take care not to damage cables, also the positioning of the wire assembly is important. A malfunction may occur if a wire is somehow caught up.

(1) Remove left side cover and the right side cover. (see section 1.1.1 and 1.1.2)
(2) Remove the two screws ① and remove the FAN motor.
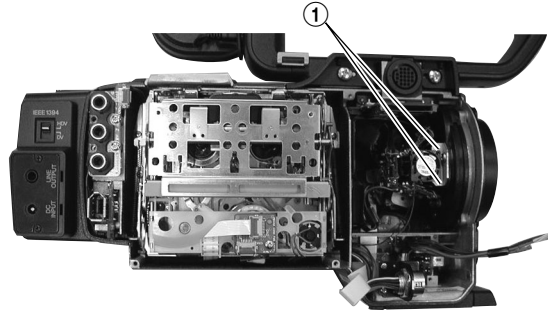
Fig. 1.2 (1)

(3) Remove the two screws ② and remove the SD board.
(4) Disconnect the cables CN26, CN27 and CN28.

② CN26　CN27

CN28
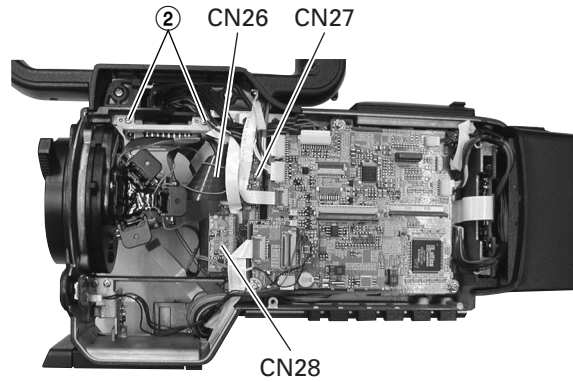
Fig. 1.2 (2)

(5) Remove the five screws ③ 3 and ④ , then remove the optical block assembly carefully not to damage boards and cables.
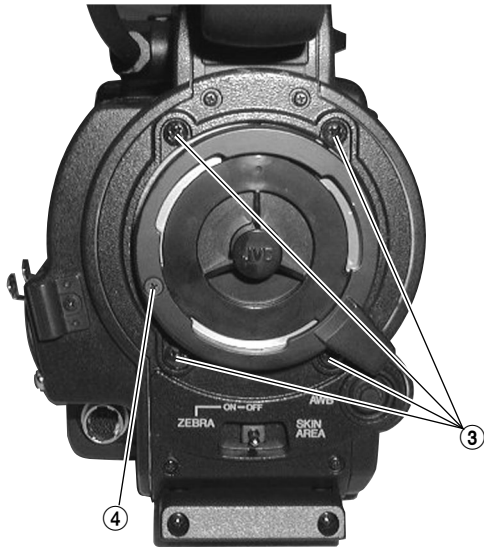
Fig. 1.2 (3)
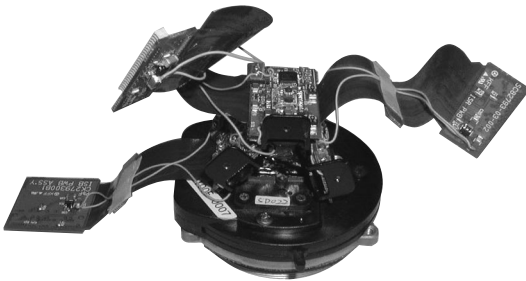
Fig. 1.2 (4)

┌─ **Note :** ──────────────────────────────
│ • The CCDs are bonded precisely to the prism. In case of trouble with a CCD, it is not possible to replace an individual CCD, but the entire optical block assembly should be replaced.
│ • The optical block assembly supplied as a service part.
│ • When replacing the optical block, attach the original FAN and FNC board to the new optical block because those are not included on the optical block assembly.
└──

1.3　HOW TO REMOVE VCR UNIT

1.3.1　Mechanism unit

(1) Remove the left side cover. (see section 1.1.1)
(2) Remove the four screws ①.
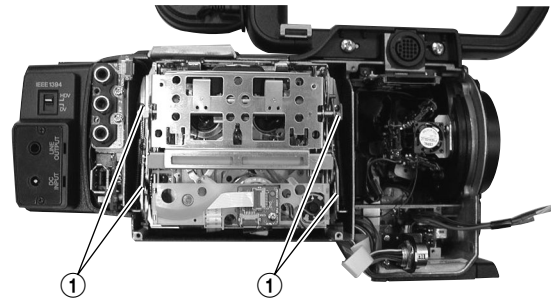
Fig. 1.3.1(1)

(3) Lift up the mechanism unit gently and disconnect the cablesCN75, CN16 and CN17.

CN75　　CN16　　CN17
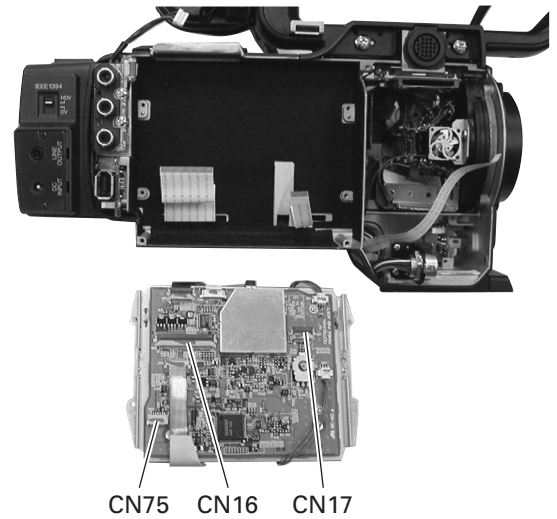
Fig. 1.3.1(2)

1.3.2 Cassette housing

(1) Remove the mechanism unit. (see section 1.3.1)
(2) Remove CN1 and release the motor wire. Release the lock sideways and remove the tape guard

CN1   Motor Wire

Fig. 1.3.2(1)

(3) Pop up the cassette housing by sliding release lever and remove the two screws ②.

②
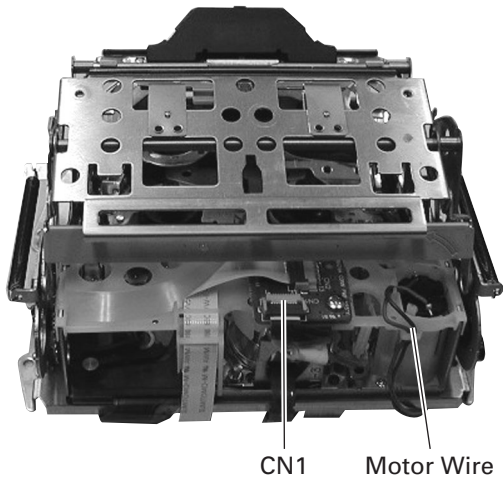
Release Lever

Fig. 1.3.2(2)

(4) Slide the outer unit to rear direction and lift up slightly. Pull out to side direction to release the outer unit. Perform same manner other side.
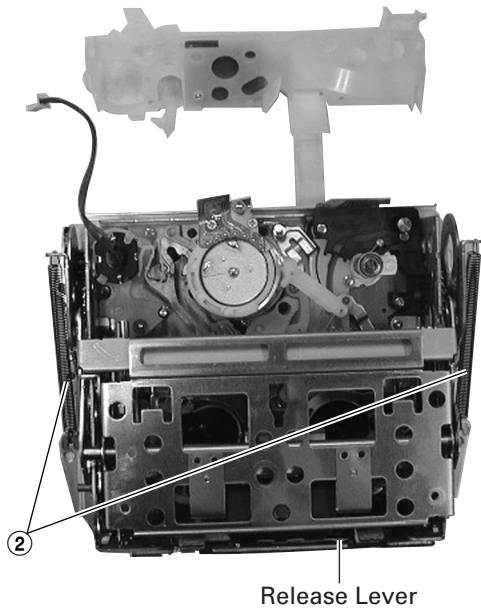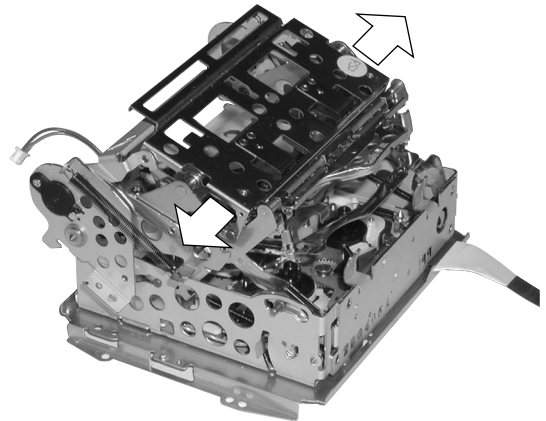
Fig. 1.3.2(3)

Fig. 1.3.2(4)

(5) Slide the cassette housing to the position of fig.1.3.2(5) and hold the cassette housing slightly to inside direction to release it.
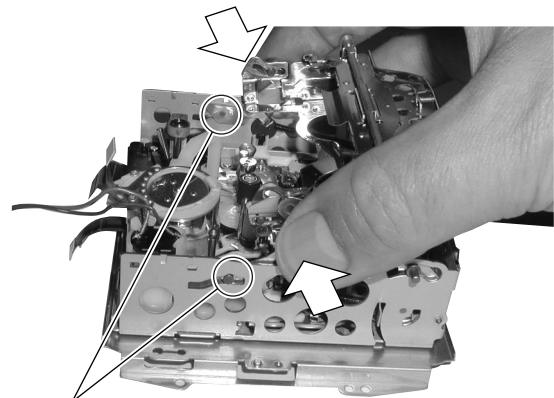
Release Position

Fig. 1.3.2(5)

(6) Release bosses of the cassette housing from the mechanism unit.
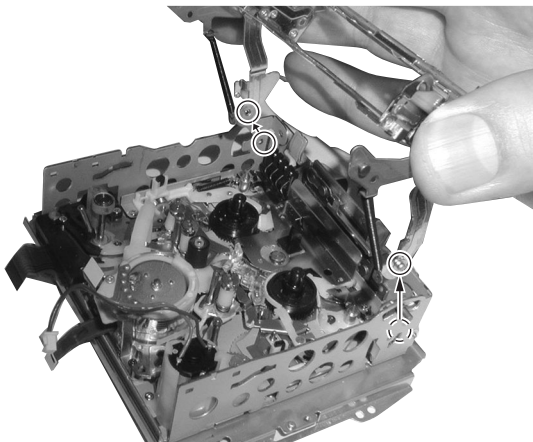
Fig. 1.3.2(6)

1.4   HOW TO REMOVE THE MAJOR BOARDS

1.4.1   Audio board

(1) Remove right side cover. (see section 1.1.2)
(2) Disconnect cables CN44, CN45 and CN62.
(3) Remove six screws ① and ②.
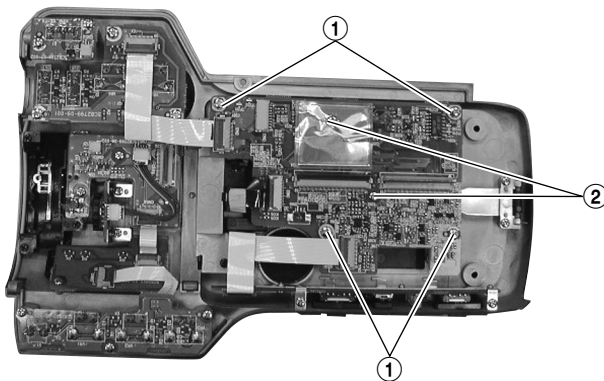
Fig. 1.4.1(1)

Note :
CN62 may be slightly hard to connect FPC cable. Make sure to insert the cable to correct position.

Fig. 1.4.1(2)

1.4.2   LCD monitor

(1) Remove Audio board. (see section 1.4.1)
(2) Remove two screws ③.
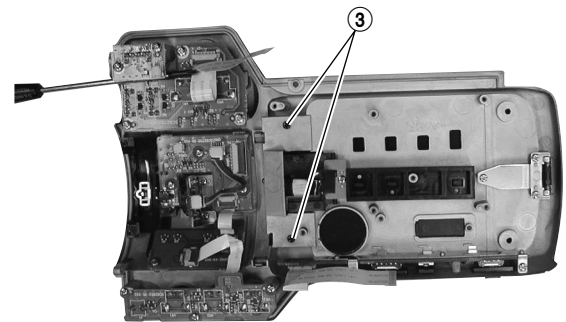
Fig. 1.4.2(1)

(3) Remove the hinge cover and remove two screws ④.

Hinge Cover
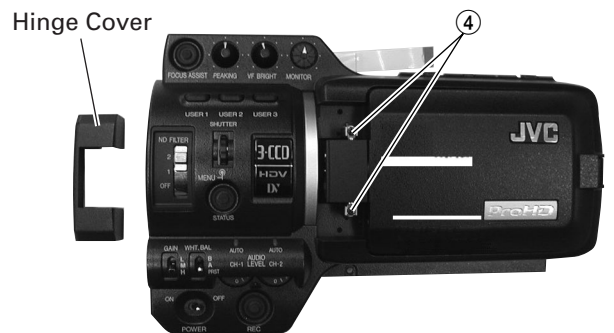
Fig. 1.4.2(2)

1.4.3 MIF board

(1) Remove the right side cover. (see section 1.1.2)
(2) Remove four screws ⑤.
(3) Remove the cables CN4, CN9, CN11, CN12, CN13, CN22, CN23, 34 and CN48, then lift up MIF board to release B to B connector between MIF board and MAIN board.

CN13 CN12 CN23 CN48 CN22

CN4
CN34
CN11
CN9
⑤
⑤
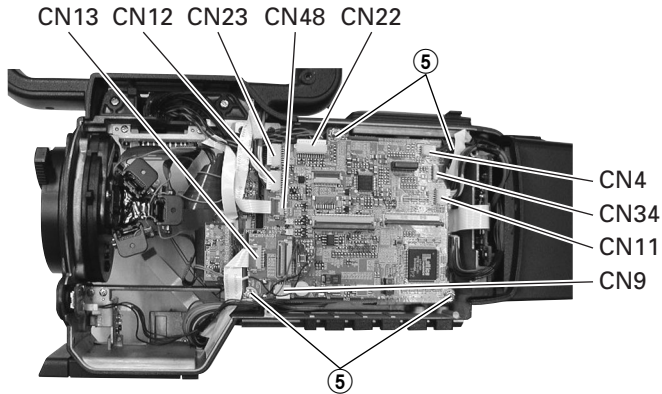
Fig. 1.4.3

1.4.4 MAIN board

(1) Remove MIF board. (see section 1.4.3)
(2) Remove six screws ⑥ and ⑦.
(3) Remove the cables CN3, CN16, CN17, CN18, CN19, CN26, CN27, CN28, CN29 and CN30.

⑦   ⑥
CN29
CN26
CN27
CN28
CN30
CN19
CN18 CN17 CN3 CN16
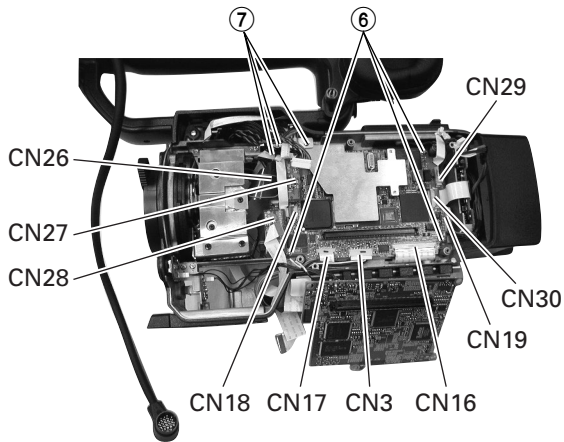
Fig. 1.4.4(1)

(4) Slide the MAIN board downward and pull out. Do not bend the Heat Pipe.

Do not bend the Heat Pipe.
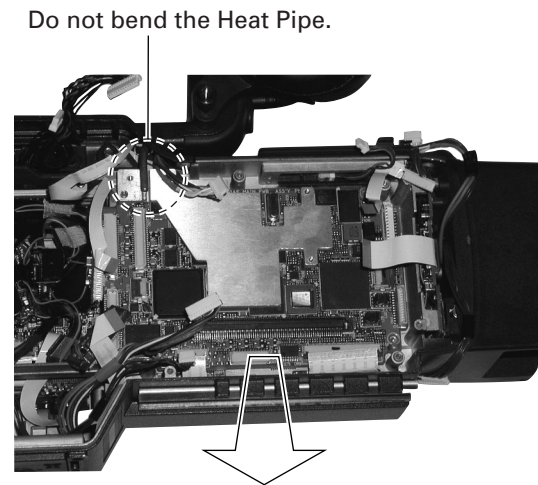
Fig. 1.4.4(2)

(5) Remove the two screws ⑧. Remove the heat sink carefully because it is being fitted sticky.

⑧
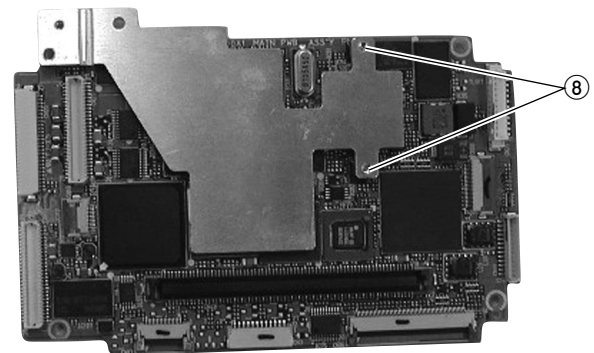
Fig. 1.4.4(3)

1.4.5 HANDLE assembly

(1) Remove left side cover and right side cover. (see section 1.1.1 and 1.1.2)
(2) Remove two screws ⑨.

⑨
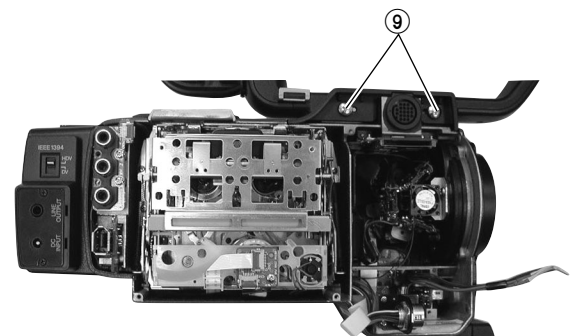
Fig. 1.4.5(1)

(3) Remove the cables CN12 and CN48. Remove the two screws ⑩ and lift up the handle assembly.

Fig. 1.4.5(2)

(4) Remove three screws ⑪.

Fig. 1.4.5(3)

(5) Remove the handle cover R and handle cover T.
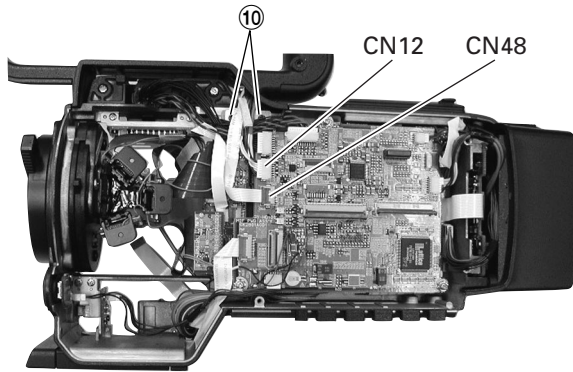
Fig. 1.4.5(4)

Note :
When connecting the LED connector on EAR board, ensure the polarity that the red wire should be connected longer pin of LED.

Fig. 1.4.5(5)
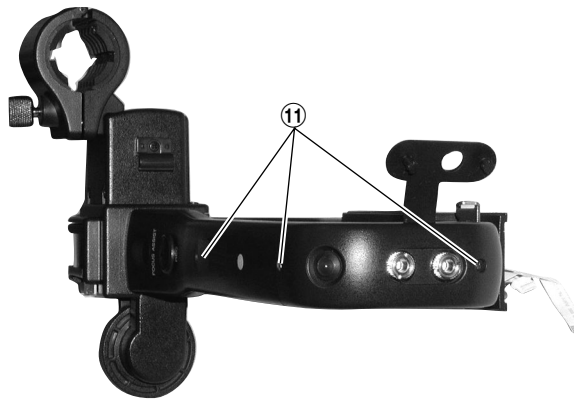
Note :
When removing the Heat Sink Ass'y, bend the Heat Pipe slightly like Fig. 1.4.5(6).
Return the bend after attaching the Heat Sink Ass'y.
Do not bend the other portion of Heat Pipe.
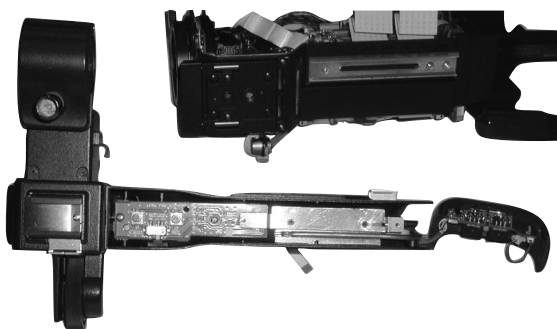
Fig. 1.4.5(6)

1.4.6 PS board

(1) Remove the four screws ⑫.
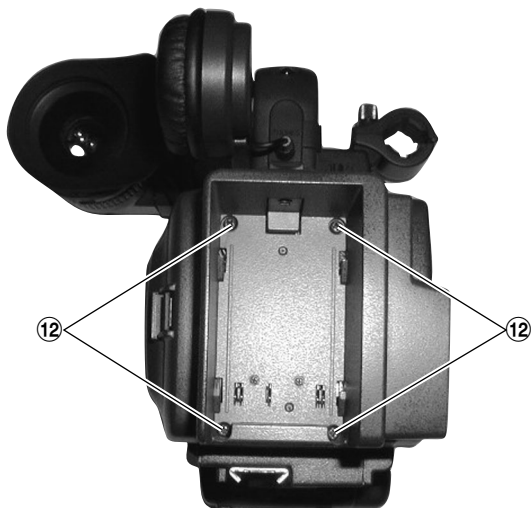
Fig. 1.4.6(1)

(2) Remove the four screws ⑬ and ⑭. Disconnect the cables CN1, 29, CN30, CN53 and CN75.
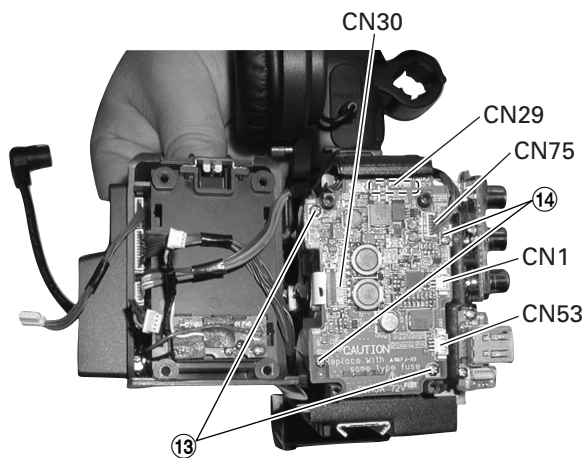
Fig. 1.4.6(2)

Note :

When replacing the fuse F1, ensure to replace with same type fuse. (refer to the parts list)

1.5 SERVICE MENUS

1.5.1 Modes required in servicing

(1) While holding down the specified button(s) (FOCUS ASSIST, USER 3), press and hold the STATUS button for more than 1 second in order to display the first-level menu of the service menu hierarchy. The items in the first-level menu vary according to which specified button is being held at the moment the STATUS button is pressed. (Characters are displayed on LCD monitor screen or View finder.)

Item	Displayed Content	When power up		
		—	Holding DISPLAY button	Holding DISPLAY button
		Activation Method		
		FOCUS ASSIST	USER 3	FOCUS ASSIST + USER 3
CAMERA1 MENU	Camera setting, blemish detect	○	○	○
CAMERA2 MENU	Error correct ON/OFF	—	○	○
CAMERA3 MENU	AW data reset menu	—	—	○
VTR1 MENU	Repeat, FF/REW speed setting	○	○	○
VTR2 MENU	Long pause, shutdown setting	—	○	○
VTR3 MENU	Reserved, BATT, Info.	—	—	○
DIP SW	DIP SW MENU	—	○	○
HOUR METER	Hour Meter indication	—	○	○
ERROR HISTORY	Error History	—	○	○
OTHERS	MENU SAVE etc.	—	○	○
VERSION	CPU Version indication	○	—	—

Table 1-5-1 Service Menu First Tier List

1.5.2 Operation in the first-level of the service menu

(1) While holding down the specified button(s) (FOCUS ASSIST or USER 3), press and hold the STATUS button for more than 1 second.
(2) The first-level of the service menu is displayed.
(3) Rotate the SHUTTER dial to move the cursor (▷) on to the item to be modified.
(4) Push into the SHUTTER dial to direct the item on which the cursor (▷) is located.
   • Pressing the STATUS button returns to the MENU display.
   • Can not open the service MENU while recording.
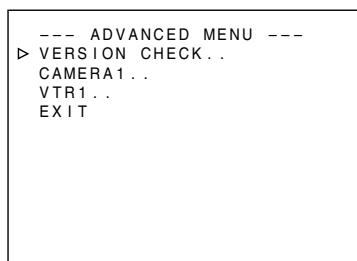
Fig. 1-5-2 (1)

While holding down the FOCUS ASSIST button, press and hold STATUS button for more than 1 second, this MENU screen is shown on the monitor. (Refer to Fig. 1-5-2(1))

```
    ––– SERVICE MENU –––
▷ CAMERA1..
  CAMERA2..
  VTR1..
  VTR2..
  DIP SW..
  HOUR METER
  ERROR HISTORY..
  OTHERS..
  EXIT
```

Fig. 1-5-2 (2)

At first, while holding down the DISPLAY button, turn ON the power switch, and then, while holding down the USER 3 button, press and hold STATUS button for more than 1 second, this MENU screen is shown on the monitor. (Refer to Fig. 1-5-2(2))

```
    ––– FACTORY MENU –––
▷ CAMERA1..
  CAMERA2..
  CAMERA3..
  VTR1..
  VTR2..
  VTR3..
  DIP SW..
  HOUR METER
  ERROR HISTORY..
  OTHERS..
  EXIT
```

Fig. 1-5-2 (3)

At first, while holding down the DISPLAY button, turn ON the power switch, and then, While holding down the FOCUS ASSIST and USER 3 button, press and hold STATUS button for more than 1 second, this MENU screen is shown on the monitor. (Refer to Fig. 1-5-2(3))

1.5.3 CAMERA 1 menu

(1) In a service menu, place the cursor (▷) on "CAMERA 1" and push the SHUTTER dial to display the CAMERA1 menu.

```
       ––– CAMERA1 –––

▷ LCD L/R REVERSE  OFF
  FAS AUDIO          AUTO
  ALC MODE           ALC+EEI
  EEI MAX            1/240
  IRIS ENF AUTO      ON
  PIXEL COMPEN DET   CANCEL
  PAGE BACK
```

Fig. 1-5-3 (1)

(2) Rotate the SHUTTER dial to move the cursor (▷) on the mode to be adjusted.
(3) Push the SHUTTER dial so that the parameter blinks.
(4) Rotate the SHUTTER dial to vary the parameter.
(5) After completing the parameter setting, push the SHUTTER dial to stop the blinking of the parameter and store the setting in memory.
(6) After completing the setting, move the cursor (▷) to "PAGE BACK" and push the SHUTTER dial to return to the display at the higher hierarchy level.

Item	Parameter	
LCD L/R REVERSE	OFF	When the face of LCD screen is turned toward the camera subject, does not invert the left and right of the LCD display. (normal image)
	ON	When the face of LCD screen is turned toward the camera subject, inverts the left and right of the LCD display. (mirror image)
FAS AUDIO	AUTO	When selected FAS mode, audio recording Level will be automatically set to AUTO mode.
	SW SET	When selected FAS mode, audio recording level will be depending on switch setting.
ALC MODE	ALC + EEI	When selected ALC mode including FAS mode, EEI function will be activated.
	ONLY ALC	When selected ALC mode including FAS mode, EEI function will not be activated.
EEI MAX	U MODEL	1/240 Maximum shutter speed is set to 1/240 second.
		1/480 Maximum shutter speed is set to 1/480 second.
		1/960 Maximum shutter speed is set to 1/960 second.
	E MODEL	1/200 Maximum shutter speed is set to 1/200 second.
		1/400 Maximum shutter speed is set to 1/400 second.
		1/800 Maximum shutter speed is set to 1/800 second.
IRIS ENF. AUTO	OFF	When selected FULL AUTO mode, IRIS mode will be depeng on IRIS MODE switch of the lens.
	ON	When selected FULL AUTO mode, Auto Iris mode will be activated even Manual Iris mode is selected.
PIXEL COMPEN DET	CANCEL	Does not execute blemish detection.
	EXECUTE	Execute blemish detection.

(☐ indicates the factory setting.)

Table 1-5-3 (1)

■ **White blemish detection**

Open the User MENU, select "VIDEO FORMAT", "REC", set to "HDV-HD24P" and push the SHUTTER dial.
Select "FRAME RATE", set to "24" and push the SHUTTER dial. Select "EXECUTE", push the SHUTTER dial, then GY-HD100 is automatically rebooted.

```
    ––– VIDEO FORMAT –––

  FRAME RATE        24
                    EXECUTE
▷ REC               HDV-HD24P
                    EXECUTE
  ASPECT            - - - -
  PB OUTPUT         720P
  PB TAPE           DVCAM
  OUTPUT TERMINAL   COMPOSITE
  SET UP            0.0%
  PAGE BACK
```

Fig. 1-5-3 (2)

Open the Service MENU, select "CAMERA1", "PIXEL COMPEN DET", "EXECUTE" and push the SHUTTER dial, then CCD white blemish detect operation start automatically. At this time, the lens is closed and the camera is in the SLOW SHUTTER mode.

```
      --- CAMERA1 ---

  LCD L/R REVERSE    OFF
  FAS AUDIO          AUTO
  ALC MODE           ALC+EEI
  EEI MAX            1/240
  IRIS ENF AUTO      ON
▷ PIXEL COMPEN DET EXECUIT
  PAGE BACK
```
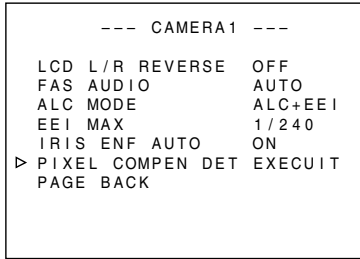
Fig. 1-5-3 (3)

After completing white blemish detection, return "REC" and "FRAME RATE" setting to original one's.

When the white blemish detection completes, the result data is stored in the memory of CPU, end message is shown as below, then please turn off.

```
      PIXEL COMPEN

          END

    TURN POWER OFF
    AND ON AGAIN
```
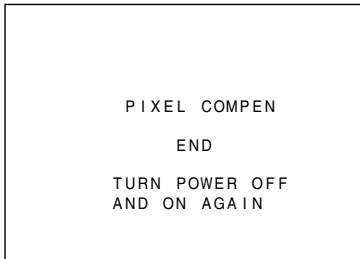
Fig. 1-5-3 (4)

If any errors occurs during the detection operation, an error message is displayed , and return to MENU display.

Message	Error details	Treatment
LENS NOT CLOSED?	The lens does not close for detection.	No result is stored in the EEPROM.
COUNT OVER	The number exceeds the specified count.	Only the specified count of data is stored in the EEPROM.

Table 1-5-3 (2)

■ **Details on correctable white blemish**

Up to 127 errors with composite video levels of 50mV or more can be corrected. No limitation of errors per line within 127 however, the maximum consecutive errors are 4 and the correction results may be inferior to the case of single error correction.

Oblique noise may be observed on the screen during white blemish detection. This is due to the principles of error correction and is not a malfunction.

White blemish can be detected in the following area.

100%

100%
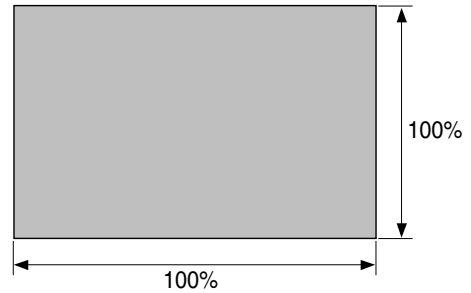
Fig. 1-5-3 (5)

1.5.4 CAMERA 2 menu

(1) In a service menu, place the cursor on "CAMERA 2" and push the SHUTTER dial to display the CAMERA2 menu.

```
      --- CAMERA2 ---

▷ PIXEL COMPEN        ON
  TEST SIGNAL         OFF
  PAGE BACK
```
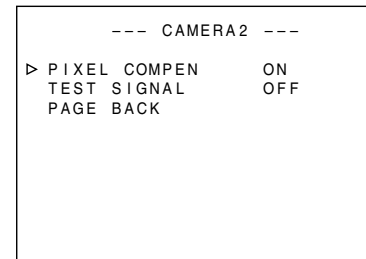
Fig. 1-5-4

Operation ways are almost same as CAMERA 1 MENU, so please refer it.

Item	Parameter	
PIXEL COMPEN *1	OFF	Does not correct the detected white blemish.
	ON	Corrects the detected white blemish.
	CHECK	Light up the pixels which are the detected white blemish.

(☐ indicates the factory setting.)

Table 1-5-4

*1: This mode is automatically set to ON when the power is turned on.
The OFF mode is enabled only after it is set to OFF at this screen until the power is turned off.

1.5.5 CAMERA 3 menu

In a service menu, place the cursor on "CAMERA 3" and push the SHUTTER dial to display the CAMERA3 menu.

```
      --- CAMERA3 ---

▷ AW/SKIN RESET    CANCEL
  PIXEL COMP RESET CANCEL
  CCD ADJ RESET     CANCEL
  CAN EEPROM RESET CANCEL
  PAGE BACK
```
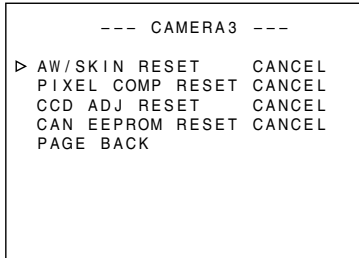
Fig. 1-5-5

Operation ways are almost same as CAMERA 1 MENU, so please refer it.

Item	Parameter	
AW/SKIN RESET	CANCEL	Does not reset the auto white data and the skin detect data.
	EXECUTE	Resets the auto white data and the skin detect data.
PIXEL COMP RESET	CANCEL	Does not reset the detected white blemish data.
	EXECUTE	Resets the detected white blemish data.
CCD ADJ RESET	CANCEL	Does not reset the CCD adjustment data.
	EXECUTE	Resets the CCD adjustment data.
CAM EEPROM RESET	CANCEL	Does not reset the EEPROM data for CAMERA CPU.
	EXECUTE	Resets the EEPROM data for CAMERA CPU.

(☐ indicates the factory setting.)

Table 1-5-5

1.5.6 VTR 1 menu

In a service menu, place the cursor on "VTR 1" and push the SHUTTER dial to display the VTR 1 menu.

```
        --- VTR1 ---

▷ BATT.DISPLAY      AUTO
  REC REPEAT        OFF
  PLAY REPEAT       OFF
  REMOTE FF/REW     FF/REW
  STEP SLOW[DV]     FRAME
  FF/REW SPEED      MAX
  VIDEO OUT HBLANK DV
  PAGE BACK
```
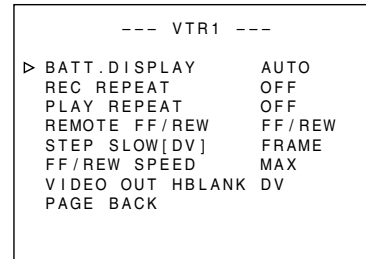
Fig. 1-5-6

Operation ways are almost same as CAMERA 1 MENU, so please refer it.

Item	Parameter	
BATT. DISPLAY	OFF	Does not indicate the Battery information.
	AUTO	Show the Battery information as Battery Info of VTR3 MENU.
REC REPEAT	OFF	Disable repeat recording
	2	Perform repeat recording 2 times.
	5	Perform repeat recording 5 times.
	12	Perform repeat recording 12 times.
	ON	Enable full repeat recording.
PLAY REPEAT	OFF	Disable repeat playback.
	ON	Enable repeat playback.
REMOTE FF/REW	FF/REW	When FF/REW command is received from REMOTE, it runs as FF/REW mode.
	SEARCH	When FF/REW command is received from REMOTE, it runs as search FWD/REV mode.
STEP SLOW [DV]	FIELD	
	FRAME	
FF/REW SPEED	X5	Maximum FF/REW speed is limited up to x5.
	X7.5	Maximum FF/REW speed is limited up to x7.5.
	X10	Maximum FF/REW speed is limited up to x10.
	MAX	*1No limitation
VIDEO OUT HBLANK	DV	Horizontal effective pixels are 720.
	STANDARD	Horizontal effective pixels are 710 at 60/30 frame rate and 702 at 50/25 frame rate.

(☐ indicates the factory setting.)

Table 1-5-6

*1: Maximum speed is x20 at VTR mode, but no function at CAM mode.

1.5.7 VTR 2 menu

In a service menu, place the cursor on "VTR 2" and push the SHUTTER dial to display the VTR 2 menu.

```
        --- VTR2 ---

 ▷ LONG PAUSE          ON
   BATT. SHUT DOWN    6.0V
   BATY.ALARM         6.9V
   ANTON SHUT DOWN   12.6V
   ANTON ALARM       13.5V
   DF MASK[DV]        OFF
   PAGE BACK
```
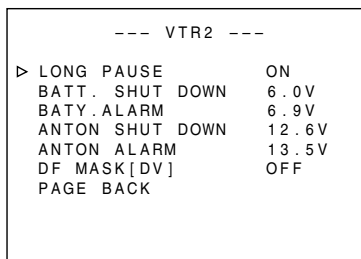
Fig. 1-5-7

Operation ways are almost same as CAMERA 1 MENU, so please refer it.

Item	Parameter	
LONG PAUSE	OFF	Disable the long pause function.
	ON	Enable the long pause function.
BATT. SHUTDOWN *1	6.8V	Setting of the battery voltage when shutdown should occur. (Setting in 0.1V steps between 6.3V and 7.5V.)
BATT. ALARM *1	6.9V	Setting of the battery voltage when battery alarm is indicated. (Setting in 0.1 V steps between 6.3V and 8.0V.)
ANTON SHUT DOWN	12.0V	Setting of the ANTON battery voltage when shutdown should occur. (Setting in 0.1V steps between 10.5V and 13.6V.)
ANTON ALARM	13.5V	Setting of the ANTON battery voltage when battery alarm is indicated. (Setting in 0.1 V steps between 10.5V and 13.6V.)
DV DF MASK *2	OFF	"1" is recorded as per format.
	ON	"0" is always recorded.

(☐ indicates the factory setting.)

Table 1-5-7

*1 : When operating by DC input, then "SHUT DOWN" will be set to 6.0V, and "ALARM" will be set to 6.9V automatically, and these setting will not relate to menu setting.
*2 : FRAME RATE 50/25 only

1.5.8 VTR 3 menu

In a service menu, place the cursor on "VTR 3" and push the SHUTTER dial to display the VTR 3 menu.

```
        --- VTR3 ---

 ▷ RESERVD              0
   BATTELY INFO..
   PAG BACK
```
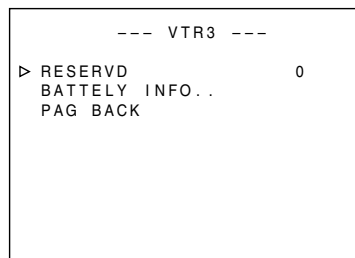
Fig. 1-5-8 (1)

Changing of setting is prohibited.

Item	Parameter	
RESERVED	0	Normal setting
BATTERY INFO		Refer to next page.

(☐ indicates the factory setting.)

Table 1-5-8 (1)

■ BATTERY INFO Display

Display method

Move the cursor to the "BATTERY INFO.." in "VTR3" screen and press SHUTTER dial. BATTERY INFO screen (right figure) will be displayed.

```
   --- BATTERY INFO---

 TYPE          ANTON SMART
 REMAIN     125Min/ 95%
  <12.8V 1.25A 30°C >
 FULL CAPACITY    32.6Ah
 PRESENT CAPACITY 30.5Ah
 SERIAL NO.       55520
 MANUFACTURE      2004/04
 SOFTWARE REV.    12.5
 CALIBRATION REQUIRED OFF
 ▷ PAGE BACK
```
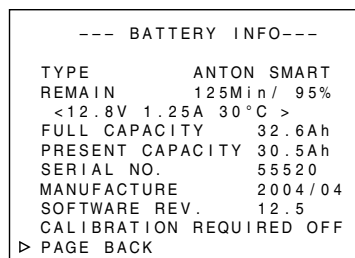
**Fig.1-5-8 (2) BATTERY INFO
(When the Anton/Bauer Smart Battery is detected)**

Item		Descriptions	
TYPE		ANTON SMART	When ANTON/BAUER SMART BATTERY is connected
		AFG	When BATTERY with I/F of AFG (AnalogFuelGauge) is connected
		OTHERS	When other BATTERY is connected
		NO DETECT	When no BATTERY is connected
REMAIN	Minute	Remaining battery lasting time [min] calculated based on current power consumption	
	%	Current remaining capacity [%] corresponding to total battery capacity	
	Voltage	Output voltage of battery	
	Current	Output current of battery	
	Temperature	Temperature of battery	
FULL CAPACITY		Capacity [Ah] when the BATTERY is fully charged	
PRESENT CAPACITY		Current BATTERY capacity [Ah]	
SERIAL NO.		Manufactured serial number	
MANUFACTURE		Manufactured date	
SOFTWARE REV.		Software revision number	
CALIBRATION		OFF Calibration not required	
REQUIRED		ON Calibration required	

Table 1-5-8 (2)

1.5.9 DIP SW menu

(1) In a service menu, place the cursor on "DIP SW " and push the SHUTTER dial to display the DIP SW menu.

```
  --- DIP SW[1/6] ---

  DIPSW ALL RESET    CANCEL
▷ NEXT PAGE
  PAGE BACK
```

Fig. 1-5-9 (1)

```
   --- DIP SW[2/6] ---

  DIPSW 0            0
▷ DIPSW 1           OFF
  DIPSW 2           OFF
  DIPSW 3           OFF
  DIPSW 4           OFF
  DIPSW 5           OFF
  DIPSW 6           OFF
  DIPSW 7           OFF
  NEXT PAGE
  PAGE BACK
```

Fig. 1-5-9 (2)

```
   --- DIP SW[3/6] ---

  DIPSW 8           OFF
▷ DIPSW 9           OFF
  DIPSW 10          OFF
  DIPSW 11          OFF
  DIPSW 12          OFF
  DIPSW 13          OFF
  DIPSW 14          OFF
  DIPSW 15          OFF
  NEXT PAGE
  PAGE BACK
```

Fig. 1-5-9 (3)

```
   --- DIP SW[4/6] ---

  DIPSW 16          OFF
▷ DIPSW 17          OFF
  DIPSW 18          OFF
  DIPSW 19          OFF
  DIPSW 20          OFF
  DIPSW 21          OFF
  DIPSW 22          OFF
  DIPSW 23          OFF
  NEXT PAGE
  PAGE BACK
```

Fig. 1-5-9 (4)

```
   --- DIP SW[5/6] ---

  DIPSW 24          OFF
▷ DIPSW 25          OFF
  DIPSW 26          OFF
  DIPSW 27          OFF
  DIPSW 28          OFF
  DIPSW 29          OFF
  DIPSW 30          OFF
  DIPSW 31          OFF
  NEXT PAGE
  PAGE BACK
```

Fig. 1-5-9 (5)

```
   ---DIP SW[6/6] ---

  DIPSW 32            0
▷ DIPSW 33            0
  DIPSW 34            0
  DIPSW 35          OFF
  DIPSW 36          OFF
  DIPSW 37          OFF
  DIPSW 38          OFF
  DIPSW 39          OFF
  PAGE BACK
```

Fig. 1-5-9 (6)

Operation ways are almost same as CAMERA 1 menu, so please refer it.

> **All DIP Switch settings which are shown below should not be changed ecxept for repair or maintenance. And do not forget to return original position after repair.**

Item	Parameter	Factory setting
--- DIP SW 1/6 ---		
DIP SW ALL RESET	CANCEL Cancel to reset all DIPSW settings. EXECUTE Execute to reset all DIPSW settings.	CANCEL
--- DIP SW 2/6 ---		
DIP SW 0	1 : Displays error rate monitor and CPU port information	0
DIP SW 1	ON : Disable warning message display	OFF
DIP SW 2	Change prohibited	OFF
DIP SW 3	ON : Disable DEW warning	OFF
DIP SW 4	Change prohibited	OFF
DIP SW 5	Change prohibited	OFF
DIP SW 6	Change prohibited	OFF
DIP SW 7	Change prohibited	OFF
--- DIP SW 3/6 ---		
DIP SW 8	Change prohibited	OFF
DIP SW 9	Change prohibited	OFF
DIP SW 10	ON : Displays error rate solely for audio block on the error rate monitor screen	OFF
DIP SW 11	Change prohibited	OFF
DIP SW 12	Change prohibited	OFF
DIP SW 13	Change prohibited	OFF
DIP SW 14	Change prohibited	OFF
DIP SW 15	Change prohibited	OFF
--- DIP SW 4/6 ---		
DIP SW 16	Change prohibited	OFF
DIP SW 17	Change prohibited	OFF
DIP SW 18	Change prohibited	OFF
DIP SW 19	Change prohibited	OFF
DIP SW 20	Change prohibited	OFF
DIP SW 21	Change prohibited	OFF
DIP SW 22	Change prohibited	OFF
DIP SW 23	Change prohibited	OFF
--- DIP SW 5/6 ---		
DIP SW 24	Change prohibited	OFF
DIP SW 25	Change prohibited	OFF
DIP SW 26	Change prohibited	OFF
DIP SW 27	Change prohibited	OFF
DIP SW 28	Change prohibited	OFF
DIP SW 29	Change prohibited	OFF
DIP SW 30	Change prohibited	OFF
DIP SW 31	Change prohibited	OFF

--- DIP SW 6/6 ---		
DIP SW 32	Change prohibited	0
DIP SW 33	Change prohibited	0
DIP SW 34	Change prohibited	0
DIP SW 35	Change prohibited	OFF
DIP SW 36	Change prohibited	OFF
DIP SW 37	Change prohibited	OFF
DIP SW 38	Change prohibited	OFF
DIP SW 39	Change prohibited	OFF

Table 1-5-9

ERROR RATE MONITOR screen

By setting "DIP SW 0" to "1", error rate and each CPU port information display screen will appear on the LCD monitor, View finder and monitor.

The values which are pointed by arrow are the error rate value. Error rate of CH-1 shown in upper row, and CH-2 shown in lower row, and these value are indicated total AUDIO/VIDEO error rate.

When the error rate increase , the warning message "HEAD CLEANING REQUIRED" is displayed. And this message is indicate when the error rate value is over 4,500 (one-channel AUDIO/VIDEO total) for 7 seconds consecutively.

ERROR RATE indicator
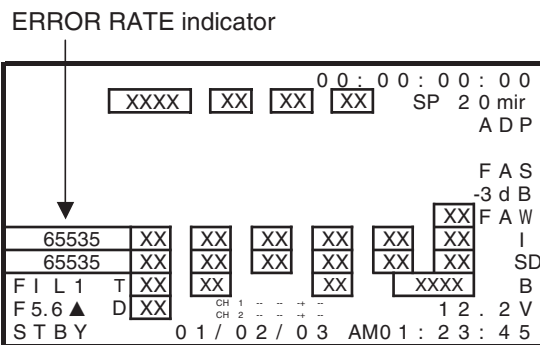
Fig. 1-5-9 (7)

1.5.10 HOUR METER

In a service menu, place the cursor on "HOUR METER " and push the SHUTTER dial to display the HOUR METER menu.

```
--- HOUR METER[1/2] ---
▷ DRUM           CLEAR
  TOTAL DRUM     000000H
  FAN            000000H
  POWER          000000H
  CAPSTAN        000000H
  SEACH          000H00M
  FF/REW         000H00M
  NEXT PAGE
  PAGE BACK
```

Fig. 1-5-10 (1)

```
--- HOUR METER[2/2] ---
▷ LOADING        0000000
  EJECT          0000000
  FWD/REV        0000000
  CLEANING TAPE  0000000
  PAGE BACK
```

Fig. 1-5-10 (2)

Operation ways are almost same as CAMERA 1 menu, so please refer it.

Item	Parameter
DRUM	000000 Displays the drum hour meter(maintenance for drum)
	CLEAR Resets the drum hour meter.
TOTAL DRUM	000000 Displays the total hour meter.
	CLEAR Resets the total drum hour meter. (This does not work unless the special setting)
FAN	000000 Displays the fan hour meter.
	CLEAR Resets the fan hour meter.
POWER	000000 Displays the power hour meter.
	CLEAR Resets the power hour meter.
CAPSTAN	000000 Displays the capstan hour meter.
	CLEAR Resets the capstan hour meter.
SEARCH	000000 Displays the search hour meter.
	CLEAR Resets the search hour meter.
FF/REV	000000 Displays the FF/REW hour meter.
	CLEAR Resets the FF/REW hour meter.
LOADING	000000 Displays the loading count.
	CLEAR Resets the loading count.
EJECT	000000 Displays the eject count.
	CLEAR Resets the eject count.
FWD/REV	000000 Displays the forward/reverse switching count.
	CLEAR Resets the forward/reverse switching count.
CLEANING TAPE	000000 Displays the cleaning tape working count.
	CLEAR Resets the cleaning tape working count.

Table 1-5-10

1.5.11 ERROR HISTORY

In a service menu, place the cursor on "ERROR HISTORY " and push the SHUTTER dial to display the ERROR HISTORY menu.

```
--- ERROR HISTORY ---

▷ (HISTORY-1)    7101
     CAP MOTOR FAILURE
  (HISTORY-2)    7101
     CAP MOTOR FAILURE
  (HISTORY-3)    7101
     CAP MOTOR FAILURE
  (HISTORY-4)    7101
     CAP MOTOR FAILURE
  CLEAR         CANCEL
  PAGE BACK
```

Fig. 1-5-11

(1) Rotate the SHUTTER dial to move the cursor onto the item to show details.
(2) Push the SHUTTER dial so that the details of ERROR HISTORY is shown.
(3) Rotate the SHUTTER dial to move cursor onto the "CLEAR", push the SHUTTER dial, then ERROR HISTORY will be deleted.

> **Note :**
> ERROR HISTORY was stored from "HISTORY-1" box to "HISTORY-4"box. Latest error was stored "HISTORY-4" box, and if there will be occur another error then latest error history will be rewrite on "HISTORY-4". From "HISTORY-1" to "HISTORY-3" will not rewrite, except to "CLEAR" operation.

1.5.12 Detail indication of ERROR HISTORY

In a ERROR HISTORY display, place a cursor onto the item and push SHUTTER dial, then detail display (MECHANISM INFO) picture will be shown.
MECHANISM INFO has 2 pages.

```
--- MECHANISM INFO 1/2--

 P.TM 000000H
 SYS MODE:PLAY(01.00)
 MSD MODE:PLAY(01.00)
         ->STOP(00.00)
 LAST KEY:PLAY(01.00)
 TAPE REM[0000]
 DEW [00] TEMP[00]
 DIAMETER TU[00]SP[00]
 NEXT PAGE
▷ PAGE BACK
```

Fig. 1-5-12 (1)

```
--- MECHANISM INFO 2/2--

 M.POSI BRK2FAST>BRK2FAST
 H.POSI INIT    >CASS IN
 CAP[OFF FWD]REL[OFF FWD]
 TU [ON] SP[OFF] DRM[OFF]
 DRV[00]CAPV[00] RELV[00]
 MCV[00]RELI[00]
 BGN[OFF]END[ON]  CAS[OFF]
 STD[OFF] HW[OFF] HW2[OFF]
 SPL[OFF]THIN[ON]
▷ PAGE BACK
```

Fig. 1-5-12 (2)

Item	Content	Displayed Content
P.TM	POWER HOUR METER	Power hour meter is displayed.
SYS MODE	SYSCON CPU mode when error occurred PLAY (03, 00) ⇧ ⇧ MODE DATA / Parameter	SFF/SREW parameter is speed display. (Refer to Table 1-9-11 (2) Speed parameter) Parameters of other modes are irrelevant. EJECT (01) : Eject
MSD MODE	MSD CPU mode and target mode when error occurred PLAY (01, 00) ⇧ ⇧ MODE DATA / Parameter	STOP (02) : Stop PLAY (03) : Play REC (13) : Rec STL (04) : Still RECP (14) : Rec Pause FF (05) : FF DVRC (15) : DV Rec REW (06) : Rew DVRP (16) : DV Rec Pause SFF (07) : Search Fwd POFF (1A) : Power Off SREW (08) : Search Rev NDEF (1F) : During initial operation SFF/SREW parameter is speed display (See Table 1-9-11 (2))
LAST KEY	Final Key code when error occurred PLAY (E7, 01) ⇧ ⇧ MODE DATA / Parameter	Other parameters are 01: ON, 00: OFF REC (E0) : Rec SFF (EB) : Search Fwd RECP (E1) : Rec Pause SREW (EC) : Search Rev DVRP (E2) : DV Rec Pause STOP (F0) : Stop ADUB (E5) : Audio Dub EJECT (F1) : Eject ADBP (E6) : Audio Dub Pause HWUP (F2) : Housing Up PLAY (E7) : Play HWDN (F3) : Housing Down STL (E8) : Still POFF (F4) : Power Off FF (E9) : FF DVRC (F5) : DV Rec REW (EA) : Rew PON (FA) : Power on
TAPE REM	TAPE REMAIN	Displays tape remaining in minutes ([FFFF] : not detected)
DEW	DEW sensor A/D intake value	DEW display at over [48]
TEMP	Temperature sensor A/D intake value The value "49" [5°C] is threshold of detecting low temperture. The value "DC" [60°C] is the threshold of displaying "OVER HEATING" message.	Temperature is displayed in hexadecimal value. -10°C ➡ [22] 20°C ➡[7C] 50°C ➡[CC] - 5°C ➡ [2D] 25°C ➡[8C] 55°C ➡[D4] 0°C ➡ [3A] 30°C ➡[9C] 60°C ➡[DC] 5°C ➡ [49] 35°C ➡[AA] "OVER HEATING" message 10°C ➡ [59] 40°C ➡[B7] 65°C ➡[E1] 15°C ➡ [6A] 45°C ➡[C2] 70°C ➡[E6]
DIAMETER	Displays wound tape diameter (Take-up, Supply)	[00]—[FF] : 0mm-82mm (Diameter) ([00] is non-detected)
M. POSI	Mechanism position and target mechanism position	[2EJ], [EJ], [EJ2CAIN], [CAIN], [CAIN2HLD], [HLD], [HLD2REV], [REV], [REV2FWD], [FWD], [FWD2STP], [STP], [STP2], [CLNOFF], [INIT]
CAP	Capstan status	[ON] : Rotate [FWD/REV]: Direction display [OFF] : Stop
REL	Reel status	[ON] : Rotate [FWD/REV]: Direction display [OFF] : Stop
DRM	Drum status	[ON] : Rotate [OFF] : Stop
DIR	Direction of tape running (Direction of target)	[FWD/REV]: Direction display
DRV	Drum control voltage	[00-FF] : 0—3V
CAPV	Capstan control voltage	[00-FF] : 0—3V
RELV	Reel control torque value	[00-FF] : 0—3A

Item	Content	Displayed Content
MCV/SPD	Loading/cassette housing control voltage (when error code 4xxx and error code 3xxx is displayed.)	[00-FF] : 0—8V (Displays mode motor control voltage during error code 3xxx) (Displays cassette motor control voltage during error code 4xxx)
	Tape speed (When the code excepting error code 4xxx and error code 3xxx is displayed.)	[00-FA] : 0—25X (FF is displayed when the speed is faster than this.) "Tape speed" is a function to convert the hexadecimal value into a decimal value, and no speed parameter of the tape. (ex. FAh = 250 → The speed is 25.0X.)
RELI	Reel current (Cassette housing motor current only during housing-related warning)	[00-FF] : 0—1.2A
BGN	Begin sensor	[ON] : Leader tape detected [OFF] : Magnetic tape detected
END	End sensor	[ON] : Trailer tape detected [OFF] : Magnetic tape detected
CAS	Cassette SW status	[ON] : No cassette [OFF] : Cassette detected
THIN	Thin tape detection	[ON] : THIN [OFF] : NORMAL

Table 1-5-12 (1) MECHANISM INFO content

Parameter	Speed
BD	+ 8.5
A9	+ 5.5
91	+ 2.5
80	+ 1
81	− 1.5
91	− 2.5
A9	− 4.5
BD	− 6.5

Table 1.5.12 (2) HDV Speed parameter

Parameter	Speed	Parameter	Speed
00	x 0	82	x 1.08
1F	x 0.03	83	x 1.11
40	x 0.10	84	x 1.12
53	x 0.20	85	x 1.16
61	x 0.30	91	x 2.00
6D	x 0.50	A9	x 5.00
7A	x 0.80	BD	x 9.00
7B	x 0.84	C0	x 10.0
7D	x 0.90		
7F	x 0.96		
80	x 1.00		
81	x 1.04		

Table 1-5-12 (3) DV Speed parameter

Error code	Display	Content of occurrence	Method of detection	Detected signal
0201	CONDENSATION ON DRUM	DEW detected	If DEW sensor detects condensation	IC71 (MSD) –detects voltage of pin E16
3200	LOADING FAILURE	Does not load	If mechanism position does not move in loading direction within 5 seconds	IC71 (MSD) –detects output of pin F14, rotary encoder
3300	UNLOADING FAILURE	Does not unload	If mechanism position does not move in unloading direction within 5 seconds	IC71 (MSD) –detects output of pin F14, rotary encoder
	No display	Does not intake	If intake is not completed within 5 seconds (Ejects without warning)	IC71 (MSD) –pin M9, CASSETTE SW is not detected within 5 seconds
4100	CASSETTE EJECT FAILURE	Does not eject	If eject is not completed within 5 seconds	IC71 (MSD) –pin P9, HOUSING SW is not detected within 5 seconds
5605	DEFECTIVE TAPE	Tape abnormality during intake	If begin or end side sensor is ON after intake	IC71 (MSD) –pin E15, START sensor and pin E14, END sensor are both detected
5606	DEFECTIVE TAPE	Tape tear during unloading	If reel FG is excessive during unloading	IC71 (MSD) –pin R14, TU REEL FG is detected
5607	DEFECTIVE TAPE	Tape tear during loading	If reel FG is insufficient during loading	IC71 (MSD) –pin R14, TU REEL FG is detected
5608	DEFECTIVE TAPE	Tape tear on the loading side	If only supply side reel does not rotate during FWD/REV	IC71 (MSD) –pin R13, SUP REEL FG is not detected
5609	DEFECTIVE TAPE	Tape tear during slack takeup	If tape slack takeup is not completed within 10 seconds	IC71 (MSD) –pin R14, TU REEL FG and pin R13, SUP REEL FG are both detected
5702	TAPE END DET. ERROR	End sensor abnormality	If trailer tape sending is not completed within 3 seconds	IC71 (MSD) –pin E14, END sensor is detected for over 3 seconds
5802	TAPE BEGIN DET. ERROR	Begin sensor abnormality	If leader tape sending is not completed within 3 seconds	IC71 (MSD) –pin E15, START sensor is detected for over 3 seconds
7001	DRUM MOTOR FAILURE	Drum motor does not rotate	If drum motor does not rotate for over 4 seconds	IC71 (MSD) –pin T14, DRUM FG is not detected for over 4 seconds
7101	CAP MOTOR FAILURE	Capstan motor does not rotate	If capstan motor does not rotate for over 2 seconds	IC71 (MSD) –pin T13, CAP FG is not detected for over 2 seconds
7202	SUPPLY REEL FAILURE	SUP reel does not rotate	If SUP reel does not rotate for over 3 seconds	IC71 (MSD) –pin R13, SUP REEL FG is not detected for over 3 seconds
7203	SUPPLY REEL FAILURE	SUP side tape slack	If only SUP reel does not rotate during REV	IC71 (MSD) –pin R13, SUP REEL FG is not detected
7302	TAKE UP REEL FAILURE	TU reel does not rotate	If TU reel does not rotate for over 3 seconds	IC71 (MSD) –pin R14, TU REEL FG is not detected for over 3 seconds
7303	TAKE UP REEL FAILURE	TU side tape slack	If only TU reel does not rotate during FWD	IC71 (MSD) –pin R14, TU REEL FG is not detected
7305	TAKE UP REEL FAILURE	Tape slack during unloading	If TU reel FG is insufficient during unloading	IC71 (MSD) –pin R14, TU REEL sensor is detected

Table 1-5-12 (4) Error Code Contents

1.5.13   OTHERS menu

In a service menu, place the cursor on "OTHERS" and push the SHUTTER dial to display the OTHERS menu.

```
       ---  OTHERS  ---

 ▷ MEMORY  SW  LOAD  :OFF
   MEMORY  SW  SAVE  :OFF
   ALL  RESET        :CANCEL
   MEM.EDIT        ADR:398
   DATA:4F
   PAGE  BACK
```
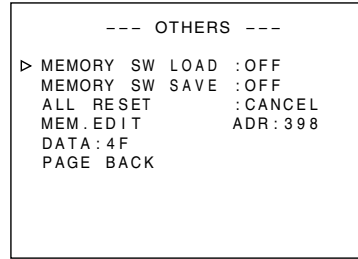
Fig. 1-5-13

Operation ways are almost same as CAMERA1 MENU, so please refer it.

Item	Parameter
MEMORY SW LOAD	OFF̲ — Standard setting START — Menu SW information is loaded from a store area.
MEMORY SW SAVE	OFF̲ — Standard setting START — Menu SW information is saved to a store area.
ALL RESET	CANCEL̲ — Standard setting EXECUTE — Resets all EEP-ROM data to default settings except adjustment data, hour meter data, and IEEE1394 ID data. Default settings at time of shipment differ by market region. I: for Japan, U: for USA, E: for EU, EC: for China
MEM.EDIT	Contents of the EEP-ROM can be edited directly 　　ADR: Address (0x000-0x7DF) display 　　DATA: Display of data embedded in address shown by ADR | Operation procedure | 1. Rotate the SHUTTER dial to move the cursor to MEM.EDIT. 2. Push the SHUTTER dial to blink the "ADR" parameter. 3. Then rotate the SHUTTER dial to adjust the specified value. 4. Next, push the SHUTTER dial to blink the DATA parameter. 5. Rotate the SHUTTER dial to adjust the specified value. 6. Finally, push the SHUTTER dial to store the data. **(NOTE)** Data that is crucial for the system is stored in the EEP-ROM, and making unadvised changes to it can cause the unit to stop operating correctly. Please do not use anything other than the IEEE1394 ID setting.

(□ is default setting when shipped from factory)

Table 1-5-13 OTHERS Menu Setting Items List

1.5.14 CPU version menu

Displays version of SYSCON CPU, Camera CPU , VTR CPU, ENC CPU, PACKAGE, FPGA2, FPGA3 and FPGA4.

```
        ---VERSION CHECK---
  SYS CPU      C1590  V00-00
  CAM CPU      C1591  V00-00
  VTR CPU      C1594  V00-00
  ENC CPU      L1187  V00-00

  PACKAGE      C1615  V00-00  ◄──── Software version
   FPGA2       C1595  V00-00
   FPGA3       C1596  V00-00
   FPGA4       C1597  V00-00

  ▷ PAGE  BACK
```
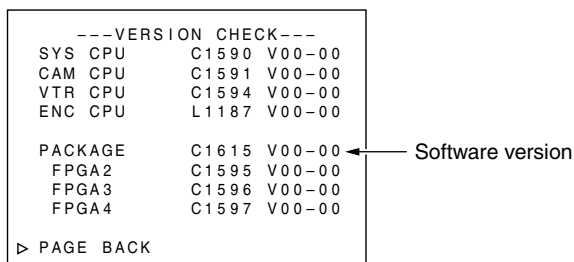
Fig. 1-5-14 CPU Version

1.5.15 EEP-ROM

(1) EEP-ROM and maintenance data

GY-HD100 is equipped with three EEP-ROMS for the purpose of data maintenance, and their contents are as per the following list. When the circuit board or EEP-ROM is replaced, there will be no data in the EEP-ROM. When the unit is powered up, and the SYSCON CPU recognizes that there is no data in the EEP-ROM, it automatically writes initial data into the EEP-ROM to initialize it. The memory data shown in Table 1-5-15 will all be reset back to default settings, so it will be necessary to perform necessary adjustments and settings again.

EEP-ROM	Board name	Memory data content
IC70	MAIN board (MSD CPU)	• Adjusted data (DVC section) • IEEE1394 ID data • HOUR METER data
IC57	MAIN board (Camera CPU)	• Blemish data
IC61	MIF board (SYSCON CPU)	• Adjusted data (Camera section) • User menu and Service menu settings data • ERROR HISTORY

Table 1-5-15 EEP-ROM Memory Data Content

(2) IEEE1394 ID setting method

IEEE1394 equipped units have an ID, as defined by the IEEE1394 standard, stored in the internal EEP-ROM (IC 70. At the time of production, the ID numbers allotted to each individual unit are written into the unit's memory, and a sticker bearing the ID is affixed inside the unit. When the EEP-ROM or MAIN circuit board is replaced, the ID needs to be set again.

Procedure for setting IEEE1394 ID
The ID is an 8 digit, hexadecimal code, with 1 high-end Byte being the model code, and 3 low-end Bytes being unique to the unit. The model code is automatically initialized, so only the lower 3 Bytes of unique code need to be set manually. Go from Service Menu → OTHERS Menu → MEM. EDIT (Memory Edit) to select the address in the ID data section and make the setting directly. The 3 low-end Byte address is as follows. Make the setting while confirming the ID printed on the label (GY-HD100U/E ID: 4Fxxxxxx, GY-HD101E ID: 4Exxxxxx) pasted on the inside of the GY-HD100 (See Fig. 1-5-15).

```
    IEEE1394 ID data  :  4F    xx    xx    xx    (Indicates on the label of GY-HD100 inside.)
                               ⇩     ⇩     ⇩
MEMORY Address number        "391" "392" "393"  (Each 1 Byte ID data are stored for every one Memory Address number.)
```

Setting procedure

   (1) Rotate the SHUTTER dial to move the cursor to MEM.
         EDIT.

   (2) Push the SHUTTER dial to make the ADR parameter blink.

   (3) Select ADR parameter "391".

   (4) Push the SHUTTER dial to make the DATA parameter
         blink.

   (5) Rotate the SHUTTER dial to set the ID data for ADR =
         "391".

   (6) Push the SHUTTER dial to confirm the DATA parameter.

   (7) In the same manner, select ADR parameter "392" and
         "393" to set the ID data.
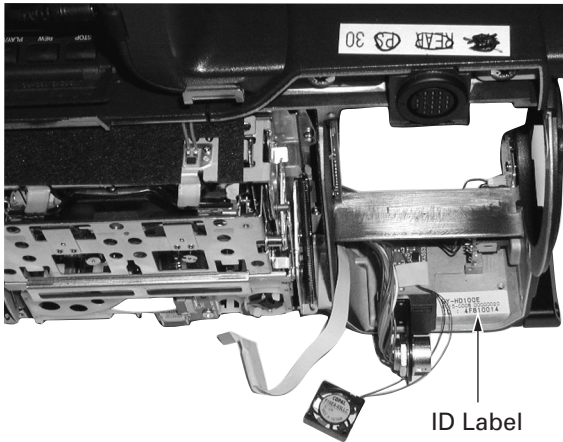
ID Label

Fig. 1-5-15 ID Label Attachment Position

1.6　HOW TO UPDATE FIRMWARE

Note :
- When replacing MIF board or MAIN board, firmware update is essential.
- Do not turn the power off during the update, otherwise CPU may be destroyed and replacement of CPU or board will be required.
- Under the battery operation firmware update can not be allowed, use the AC adapter.
- When update is failed audio AUTO LED's are flashing alternately. In this case try again after removing SD memory card.
- Remove the IEEE1394 cable, otherwise it may cause some troubles on GY-HD100.
- Do not format the SD memory card by PC.
  The SD memory card formatted by PC will not work correctly due to wrong formatting. In this case format the SD memory card on GY-HD100.
  You can also format the SD memory card using the general digital still camera equipped SD memory card slot, or formatting software supplied from SD memory card manufacturer such as Pnasonic.

1.6.1　Preparation (Copy firmware to SD memory card)

Note: 32MB - 512 MB of Panasonic SD memory card is recommended.
(1) Download the update file from JS-NET and unzip it to a PC.
(2) Insert the SD memory card to the PC and confirm that no file is in the SD memory card. If there are some files, delete them.
(3) Copy the unzipped update file(s) to the SD memory card.

1.6.2 Update procedure

(1) Eject and take out the cassette if loaded, and close the cassette cover.
(2) While pressing USER2 and USER3 buttons, turn on the power. Both HDV and DV LED will turn on a light.
(3) Insert the SD memory card to the card slot of GY-HD100.
(4) Rotate the SHUTTER dial, move the cursor to UPGRADE and press SHUTTER dial.
(5) Rotate the SHUTTER dial, select EXECUTE and press SHUTTER dial.
(6) Rotate the SHUTTER dial, move the cursor to CONTINUE? and press SHUTTER dial.
(7) Rotate the SHUTTER dial, select EXECUTE and press SHUTTER dial.

```
--- SYSTEM UPGRADE ---

UPGRADE SYSTEM FIRMWARE?


   UPGRADE        CANCEL
▷ EXIT
```

```
--- SYSTEM UPGRADE ---

UP GRADE WILL ERASE

CURRENT FIRMWARE!!!

CONTINUE?       CANCEL
▷ BACK
```

```
--- SYSTEM UPDATE ---

▷
        UPDATING...
```
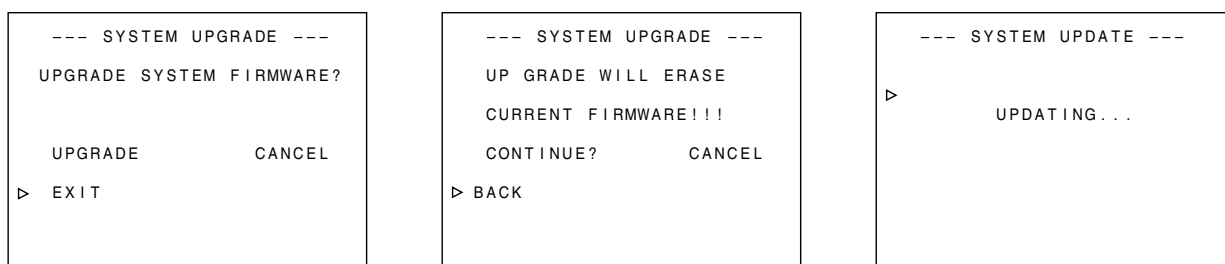
Fig.1.6.2 SYSTEM UPDATE Menu Screen

(8) When update is completed, audio AUTO LED's of AUDIO CH-1 and CH-2 are blinking slowly. It will take about seven minutes to complete.
(9) Remove the SD memory card, then GY-HD100 will reboot automatically.
(10) Turn off the power and turn on again.
(11) Enter the Service Menu to check CPU VERSION.

SECTION 2
MECHANICAL ADJUSTMENTS

2.1 BEFORE ADJUSTMENTS

2.1.1 Precautions

1) Be sure to apply a screw securing torque when attaching a part.
   The securing torque should be 0.04 N-m (0.4 kgf-cm) unless otherwise specified.
2) Always unplug the power cord of the set before attaching, removing or soldering a part.
3) When unplugging a connector, do not pull the wire but grasp the connector body.
4) Do not make an adjustment or rotate a potentiometer blindly while the source of trouble is not identified.
5) Before adjusting electrical circuitry, be sure to wait for more than 10 minutes after turning the power on.

2.1.2 Measuring instruments required for adjustments

Instrument	Condition
Oscilloscope	Calibrated instrument with measuring bandwidth of 100 MHz or more.

Table 2-1-1

2.1.3 Equipment required for adjustments
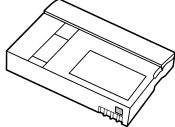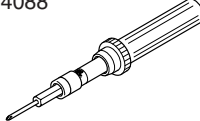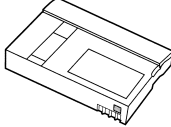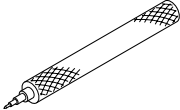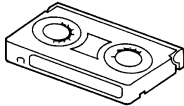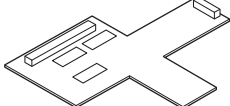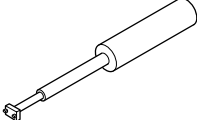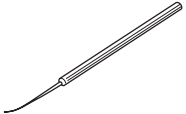
1	Alignment tape	5	Torque screwdriver
MC-1 (NTSC) MC-2 (PAL)		YTU94088	YTU94088-003 — Replaceable bit (long type)
2	DV tape	6	Slit washer attaching tool
For use in self-recording/playback. (M-DV 63PRO BU)		YTU94121A	
3	Cassette torque meter	7	Connector board (REWRITE PWB)
YTU94150A (or YTU94151A)		CK453800C	
4	Guide screwdriver	8	Chip IC replacement tool
YTU94085		PTS40844-2	

Table 2-1-2

2.2 BASICS OF MECHANISM DISASSAMBLY/ASSEMBLY

2.2.1 Assembly mode

The disassembly and assembly of the mechanism can be done in the ASSEMBLY mode (see Table 2-2-1).
The ASSEMBLY mode is provided in the intermediate position between C-IN and Harf LOAD. As the C-IN (Cassette IN) mode is usually set when a cassette tape is ejected, the ASSEMBLY mode should be entered after entering the C-IN mode.

There are 2 ways to set to ASSEMBLY mode as shown below:
1) Apply DC 3 V to the motor.
2) Remove the motor from the bracket (Gear cover) and turn the wheel gear 2 using screwdriver.

As shown in Fig. 2-2-1, the ASSEMBLY mode position refers to where the hole position of 7 cm component matches the hole position of the main deck.
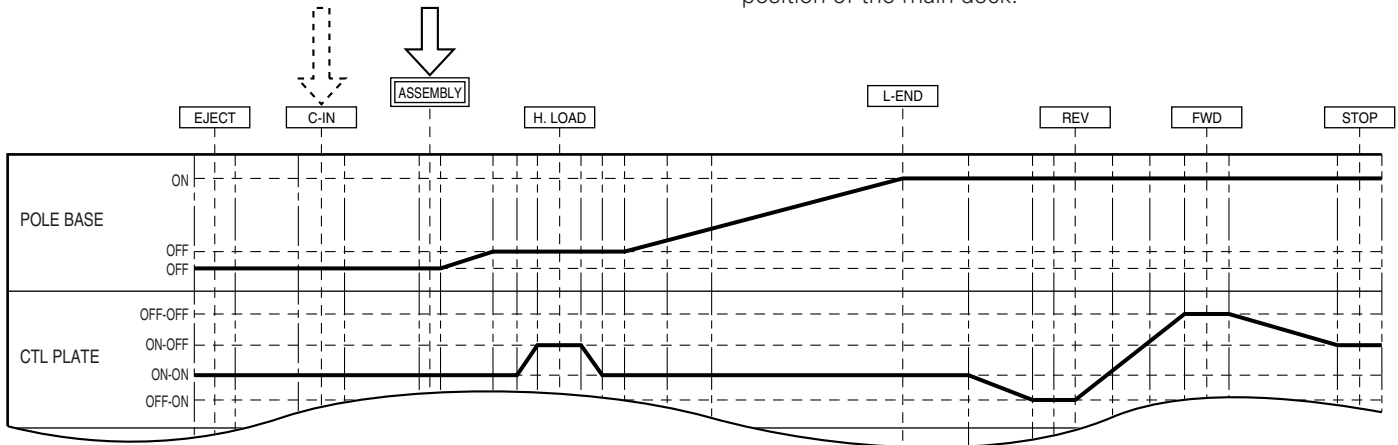
Table 2-2-1
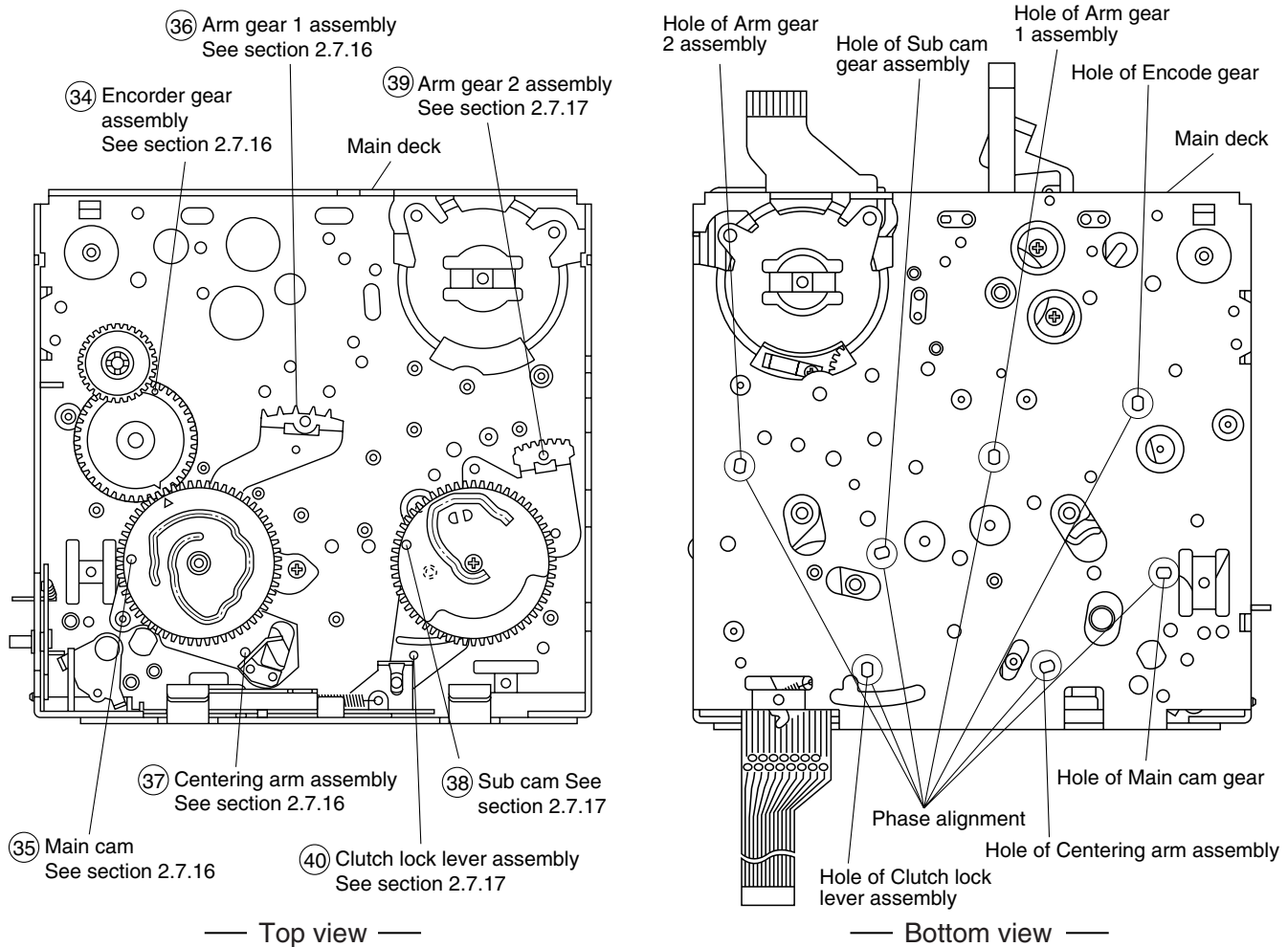
Fig. 2-2-1

2.3 MECHANISM TIMING CHART

See following table (Table 2-3-1).
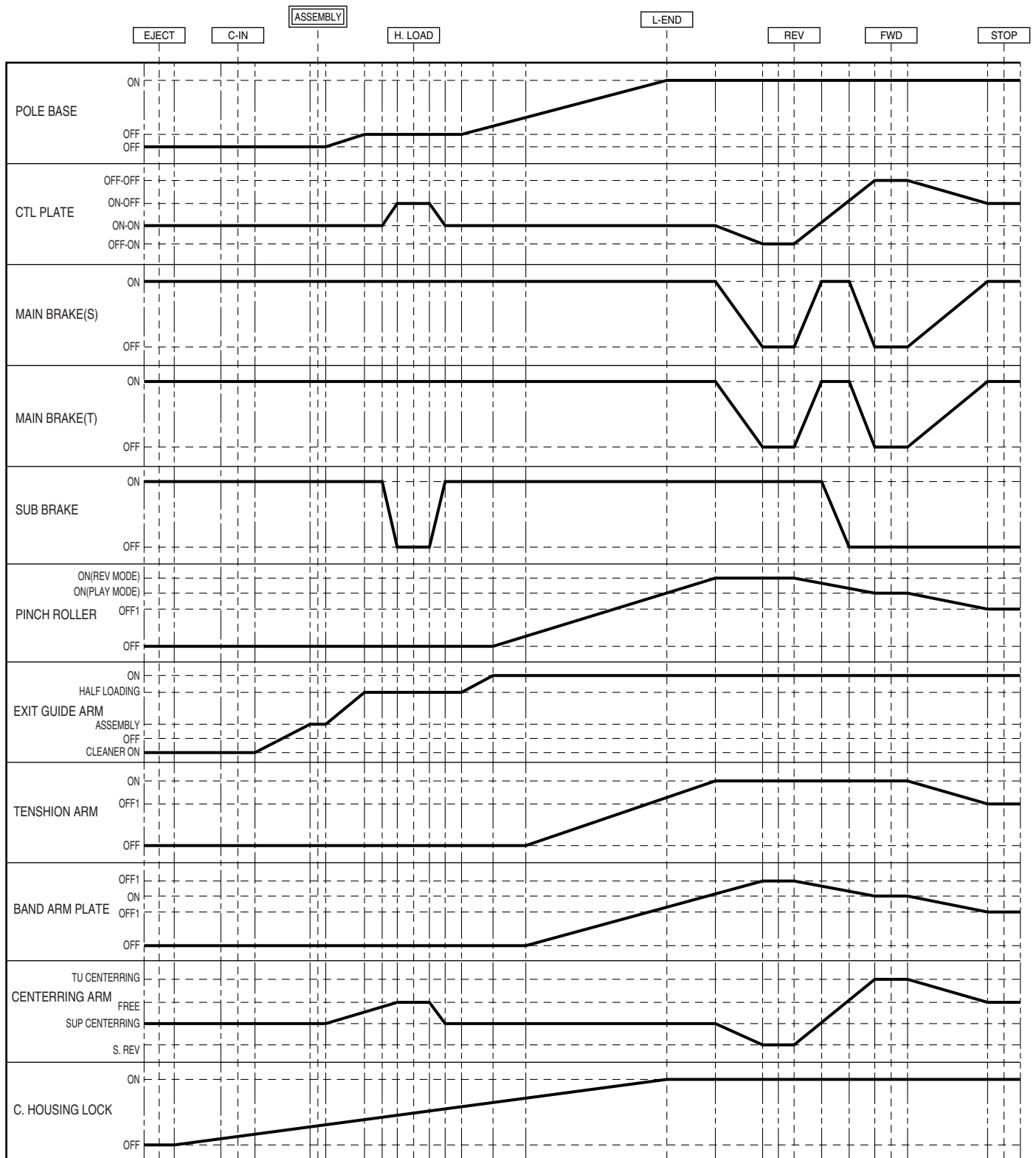
Table 2-3-1

2.4 MAINTENANCE AND INSPECTION OF MAJOR PARTS

Periodical inspection and maintenance are requisite to maintain the initial performance and reliability of the product. Table 2-4-1 (Maintenance & Inspection List) has been compiled assuming standard operating conditions, and the specifications in the table are greatly variable depending on the actual operating environment and conditions. Remember that, if the maintenance and inspection are not enforced properly, the operating hours of the product will not only reduce considerably but other unfavorable influences may produce.

Rubber parts may deform or degrade after long period of storage even if they are not used in this period.

The service life of the drum is variable depending on the tape used and operating environment.

2.4.1 Layout of major parts
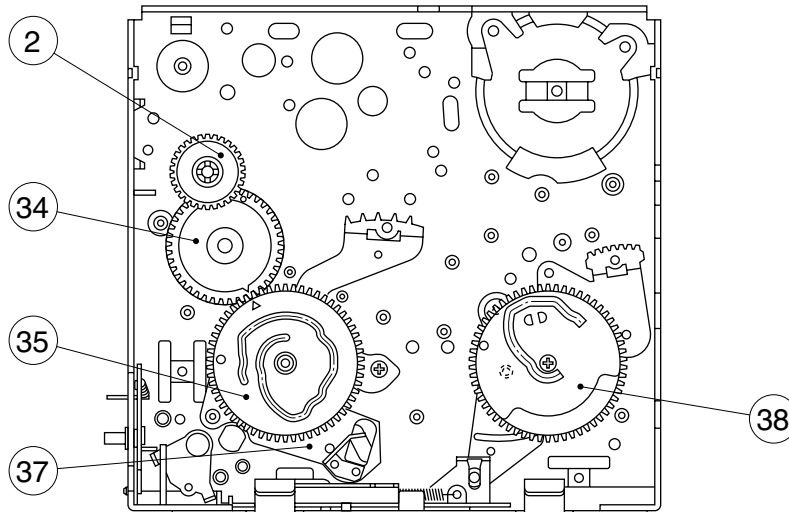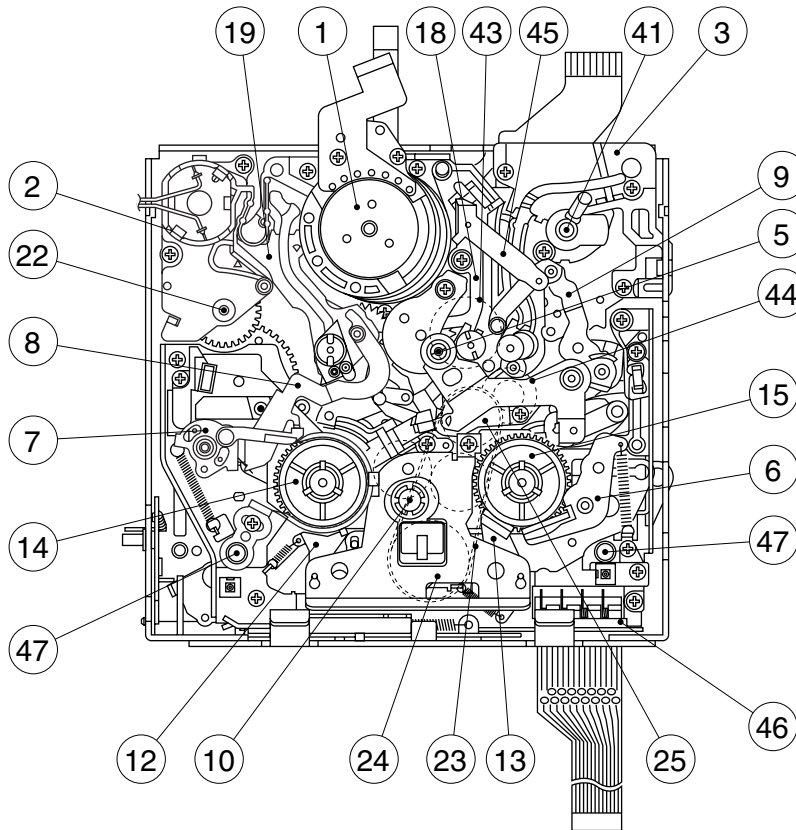
1) The 6000 H maintenance consists of a replacement of the entire mechanism assembly.
2) When mounting the capstan motor on the main deck, control of the verticality is required. Therefore, when the capstan motor reaches the end of its service life, the entire mechanism assembly should be replaced.

	Part Name	Symbol No.	Operating Hours (DRUM Hour Meter)												Ref.
			500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	
1	Tape transport parts		★	★	★	★	★	★	★	★	★	★	★		——
2	② Gear cover assembly	M 8 46	★	○★	★	●	★	○★	★	●	★	○★	★		2.7.14
3	⑧ Tension arm assembly	M 8 40	★	○★	★	●	★	○★	★	●	★	○★	★		2.7.8
4	⑲ Guide rail (S) assembly	M 8 22	★	○★	★	●	★	○★	★	●	★	○★	★		2.7.12
5	⑱ Guide rail (T) assembly	M 8 23	★	○★	★	●	★	○★	★	●	★	○★	★		2.7.12
6	③ Middle catcher assembly	M 8 24	★	○★	★	●	★	○★	★	●	★	○★	★		2.7.5
7	㊶ Capstan shaft	M 8 4	★	★	★	★	★	★	★	★	★	★	★		——
8	⑤ Pinch roller arm assembly	M 8 44	★	○★	★	●	★	○★	★	●	★	○★	★		2.7.3
9	⑨ Exit guide arm assembly	M 8 43	★	○★	★	●	★	○★	★	●	★	○★	★		2.7.4
10	① Drum assembly	M 8 50	○★	○★	★	●	★	○★	○★	●	★	○★	○★		2.7.2
11	㊶ Capstan motor	M 8 4						○	○	○	○	○	○	●	——
12	㉕ Reel drive pulley assembly	M 8 33		○△		●△		○△		●△		○△			2.7.15
13	㊸ R.drive gear 1	M 8 47		○△		●△		○△		●△		○△			2.7.15
14	㊹ R.drive gear 2	M 8 48		○△		●△		○△		●△		○△			2.7.15
15	㉔ Center gear assembly	M 8 34		○△		●△		○△		●△		○△			2.7.14
16	㉓ Timing belt	M 8 11		○		●		○		●		○			2.7.14
18	⑥ Sub-brake assembly	M 8 36		○		●		○		●		○			2.7.10
19	⑫ Main brake (S) assembly	M 8 38		○		○		○		○		○			2.7.10
20	⑬ Main brake (T) assembly	M 8 37		○		●		○		●		○			2.7.10
21	⑭ ⑮ Reel disk assemblies	M 8 39		○		●△		○		●△		○			2.7.11
22	⑦ Band arm plate assembly	M 8 41		○		●		○		●		○			2.7.8
23	⑩ Swing arm assembly	M 8 42		○		●		○		●		○			2.7.7
24	㉒ Wheel gear-2	M 8 3		○		●		○		●		○			2.7.2
25	㉞ Encoder gear	M 8 21		○		●		○		●		○			2.7.18
26	㊲ Centering arm assembly	M 8 26		○		●		○		●		○			2.7.18
27	㉟ Min cam	M 8 8		○		●		○		●		○			2.7.18
28	㊳ Sub cam	M 8 9		○		●		○		●		○			2.7.19
29	㊺ Cleaner arm assembly	M 8 43	○	●	○	●	○	●	○	●	○	●	○		2.7.4
30	㊷ Cassette guide pin (Sub deck)	M 8 35	★	★	★	★	★	★	★	★	★	★	★		——
31	㊻ MIC contact (Sub deck)	M 8 35	★	★	★	★	★	★	★	★	★	★	★		——
32	Mechanism assembly (including cassette housing assembly)	M 8 1												●	——
33	FAN motor	M 2 43												●	——

★: Clean with ethanol. ○: Check and replace if required. ●: Replace. △: Oil the shaft.
After replacing a part, apply lubricant to the required points.

Table 2-4-1

2.4.3 Cleaning

The mechanism incorporates a video head cleaner that is effective for the removal of magnetic dust, etc. However, tape lubricant adhering to the head surface produces a spacing loss, it is recommended to polish the heads using a head cleaning tape. When the video heads become soiled an increase in the error rate results. Eventually, when the error rate increase is too much to be corrected by the error correction circuit, block noise will be observed in the picture.

1) Cleaning the video heads
   Use the DVC cleaning cassette for cleaning the video heads. Always be sure to use the cleaning cassette, Part No. M-DV12CLAUX.
   The video heads should be cleaned periodically. Moreover, care should be taken about the operating environment as the tape running time standard varies accordingly. Please refer to "Precautions for Use of Head Cleaning Tape" in the instructions.

Caution
- **As the DVC cleaning tape has a much higher lapping effect than VHS cleaning tapes, frequent use of the DVC cleaning tape will reduce the head service life. Do not play the DVC cleaning tape for more than 10 seconds per run or for more than 4 times per cleaning session.**
- **The cleaning tape can be used effectively for up to about 4 passes. It cannot improve the cleaning effect even if it is run for more than 4 times.**
---

2) Cleaning the upper/lower drums
   Use a cleaning cloth or high-quality paper sheet to clean the upper drum. Moisten the cloth or paper sheet with a small amount of ethyl alcohol, apply it lightly against the upper drum while turning it by hand.
   After this operation, wipe it with a dry cloth or paper sheet without alcohol. Be sure to play the cleaning tape to its end. The lower drum tends to gather magnetic dust, etc. in its lead section, and linearity cannot be achieved if this becomes excessively dirty. The tape inlet and outlet areas are contaminated particularly easily, causing trouble such as dropout in FM signal reproduction, block noise on one side of a monitored picture, absence of audio output or incapability of time code readout. To clean the lead section, use a toothpick and rub lightly along the lead section. Be careful not to scratch the video head when this is done.

High-quality paper Upper drum
Apply lightly. Head tip
Core drum Toothpick
Lead
Lower drum
Carefully clean the lead tape inlet/outlet.
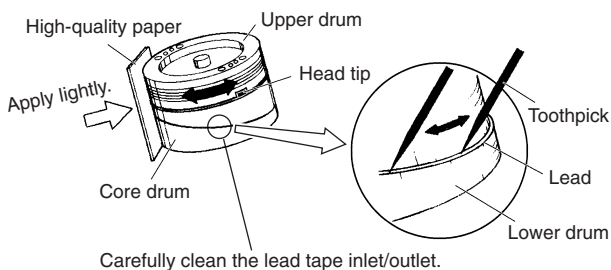
Fig. 2-4-1

3) Cleaning the tape transport system
   Moisten the tip of a cotton swab with alcohol and use it to clean the tape transport parts. Take special care of the TU/SUP guide roller flanges and the rear sides of the inclined poles, as these are the parts that most frequently collect magnetic dust.

Caution
Do not wipe the capstan shafts using alcohol. Otherwise, the oil in the bearings may be diluted by the alcohol and become attached to the tape.

Take special care.
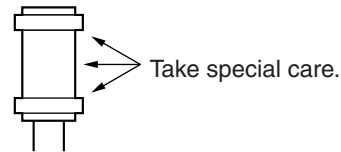
Fig. 2-4-2 Guide Roller

2.4.4 Oiling and greasing

Table 2-4-2 shows the oil and greases used with the set.

Classification	Name	Part No.
Oil	Cosmo Hydro HV100	YTU94027
Grease	Maltemp SH-P	KYODO-SH-P
	Hanal	RX-410R

Table 2-4-2

1) Oiling should be performed periodically. Oil the shafts by referring to the maintenance table.
2) After replacing a part, grease the required points. For the parts to be greased see the exploded diagram in chapter 5, "DISASSEMBLY DRAWINGS AND PARTS LIST".
3) As Hanal separates over time, be sure to mix it (shake) well before use.
4) Take care not to leave grease or oil on the tape transport parts which come into contact with the tape or on the brake pads.
5) Take care not to apply too much oil or grease. The standard oiling quantity is one drop and the standard greasing quantity is the quantity with which the grease does not overflow.

2.5   PERIODICAL MAINTENANCE

Perform maintenance at the correct times in accordance with the maintenance table.
Fig. 2-5-1 shows the flow chart of periodical maintenance procedures at different operating hours.

2000-hour maintenance

(Start)

↓

Replaced parts
㉑ Gear cover
⑧ Tension arm assembly
⑲ Guide rail (SUP) assembly
⑱ Guide rail (TU) assembly
③ Middle catcher assembly
⑤ Pinch roller arm assembly
⑨ Exit guide arm assembly
① Drum assembly
㉕ Reel drive pulley assembly
㊸ R. drive gear 1
㊹ R. drive gear 2
㉔ Center gear assembly
㉓ Timing belt
⑥ Sub-brake assembly
⑬ Main brake (TU) assembly
⑭⑮ Reel disk assembly
⑦ Band arm plate assembly
⑩ Swing arm assembly
② Wheel gear-2
㉞ Encoder gear
㊲ Centering arm assembly
㉟ Main cam
㊳ Sub cam
㊺ Cleaner arm assembly

↓

2.11 Torque adjustment

↓

2.12 Compatibility adjustment

↓

3.5.1 PB switching point adjustment

↓

3.5.2 Recording current adjustment

↓

3.5.3, 3.5.4 VCO center frequency adjustment

↓

(End)

6000-hour maintenance

(Start)

↓

Replaced parts
Mechanism assembly
(including capstan motor
and cassette housing assembly)

↓

2.11 Torque adjustment

↓

2.12 Compatibility adjustment

↓

3.5.1 PB switching point adjustment

↓

3.5.2 Recording current adjustment

↓

3.5.3, 3.5.4 VCO center frequency adjustment

↓

(End)

Fig. 2-5-1

2.6 DISASSEMBLY/ASSEMBLY OF MECHANISM ASSEMBLY

2.6.1 Assembly/disassembly

The following table shows the mechanism assembly/disassembly procedures.

① : Names of the disassembled/assembled parts.

② : Items of disassembly.

③ : Parts to be removed for disassembly, such as screws, washers and springs, and points.

Symbol	Name or Point
S	Screw
W	Washer
P	Spring
*	Connector, lock (L), soldering (SD), shield, etc.

2.6.2 Screws and washers used in mechanism assembly disassembly/assembly

Table 2-6-1 shows the symbols, designs, part numbers and colors of the screws and washers used with the Mechanism assembly.

When disassembling or assembling the Mechanism assembly, be sure to attach the correct screws and washers by referring to the following table.

Symbol	Design	Part No.	Color
(S1)		QYSDSP2005Z	Gold
(S2)		YQ43893	Silver
(S3)		YQ43893-7	Black
(S4)		QYSPSF2006Z	Gold
(S5)		LL40426-001A	Silver

Symbol	Design	Part No.	Color
W1		YQ44246	Red
W2		YQ44246-3	Black
W3		YQ43933-2	Black

Fig. 2-6-1

	Part Name	Item No.	Points	Remark
1	Ⓐ Cassette housing assembly, Ⓑ Main deck assembly	1	2(S1), 2(L1)	
2	① Drum assembly	2	3(S2)	
3	② Motor bracket (Gear cover) assembly	2	2(S2)	
4	③ Middle catcher assembly	5	3(S2)	

①   ②   ③

2.6.3 Mechanism assembly disassembly procedure table

No.	Part Name	Item No.	Points	Remark
1	Ⓐ Cassette housing assembly	1	2 (S5), 2 (L1)	
2	① Drum assembly	2	3 (S2)	
3	② Motor bracket (Gear cover) assembly	2	2 (S2)	
4	③ Middle catcher assembly	5	3 (S2)	
5	④ Reel cover assembly	6	(S2), 2 (L6)	
6	⑤ Pinch roller arm assembly	3	(W1), (L7)	
7	⑥ Sub-brake assembly	10	(P1), (W1), (L8)	
8	⑦ Band arm plate assembly	8	(S3), (L9), (P2), (W2)	
9	⑧ Tension arm assembly	8	(P3)	
10	⑨ Exit guide arm assembly	4	(W1)	
11	⑩ Swing arm assembly	7	–	Position alignment
12	⑪ Sub-deck assembly	9	5 (S2)	Position alignment
13	⑫ Main brake (SUP) assembly	10	(P4), (L10)	
14	⑬ Main brake (TU) assembly	10	(P5), (L11)	
15	⑭ Reel disk assembly (SUP)	11	–	
16	⑮ Reel disk assembly (TU)	11	–	
17	⑯ Prism	7	(S2)	
18	⑰ Control plate	11	2 (L12)	
19	⑱ Guide rail (TU) assembly	12	4 (S2)	Position alignment
20	⑲ Guide rail (SUP) assembly	12	(S2), 2 (L13)	Position alignment
21	㉒ Wheel gear 2	13	–	
22	㉓ Timing belt	13	–	
23	㉔ Center gear assembly	13	–	
24	㉕ Reel drive pulley assembly	14	(W1)	
25	㉙ Tension control arm assembly	15	(L15)	Position alignment
26	㉚ Brake control arm assembly	15	(W1), (L16)	Position alignment
27	㉛ Charge arm assembly	15	(L17)	Position alignment
28	㉞ Encoder gear	16	–	Phase alignment
29	㉟ Main cam	16	(W1)	Phase alignment
30	㊱ Arm gear 1 assembly	16	Collar	Position alignment
31	㊲ Centering arm assembly	16	–	Position alignment
32	㊳ Sub cam	17	(S2)	Phase alignment
33	㊴ Arm gear 2 assembly	17	–	Position alignment
34	㊵ Clutch lock lever (C.P.D arm) assembly	17	(L19)	Position alignment
35	㊶ Capstan motor	–	–	Change with mechanism assembly
36	㊷ Drum base deck	–	3 (S2)	
37	㊸ R.drive gear 1	14	(W1)	
38	㊹ R.drive gear 2	14	(W1)	
39	㊺ Cleaner (Exit guide) arm assembly	4	(W1)	

Table 2-6-2
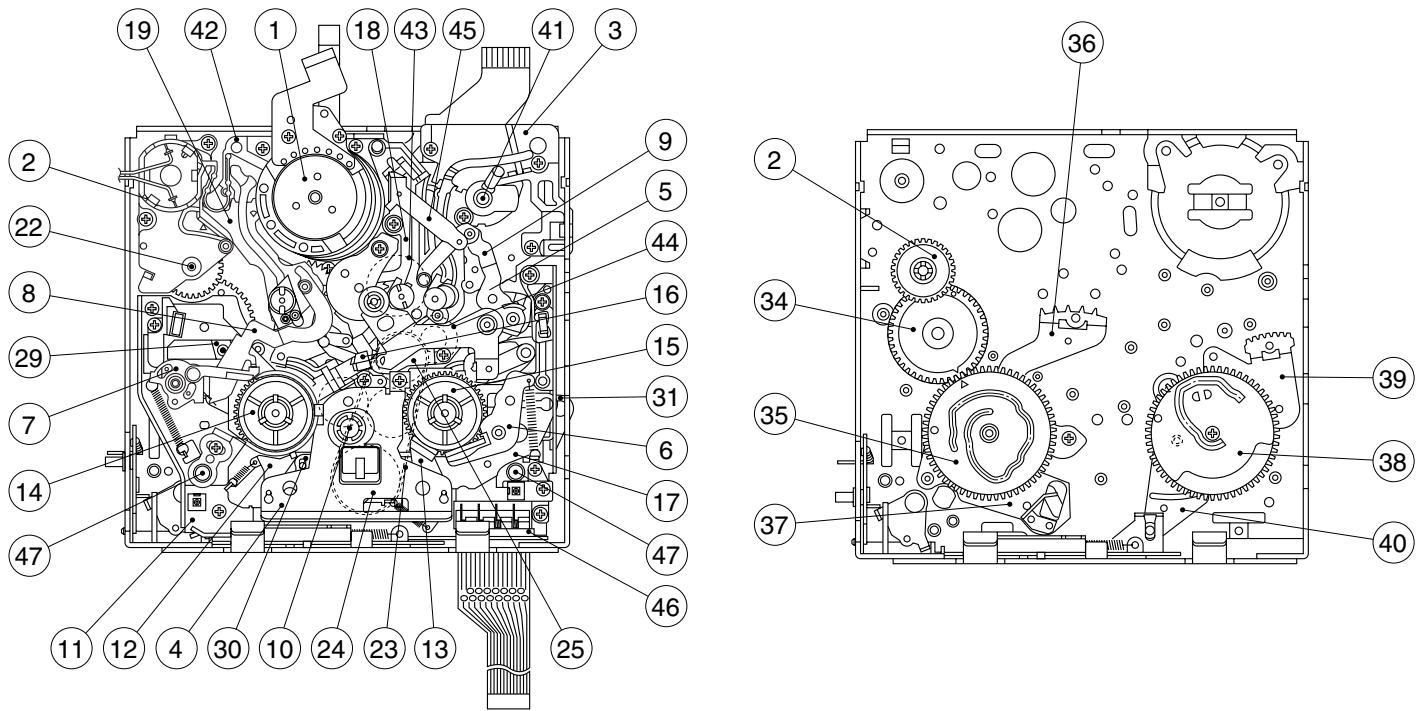
Fig. 2-6-1

2.6.4 Mechanism disassembly/assembly procedure chart
<How to read the chart>
· The following chart shows the disassembly/assembly procedures by dividing them into blocks A to I.
· To remove the tension arm sub-assembly which is located in block D; start disassembly from block A. The tension arm sub-assembly can be removed as the fourth operation after the removals of the cassette housing assembly (block A) → reel cover assembly (block B) → band arm plate assembly (block C).
· The parts enclosed in thick frames are the maintenance parts listed in the maintenance table.
· For details on the disassembly/assembly, see section 2.7, "Replacement of Major Parts".
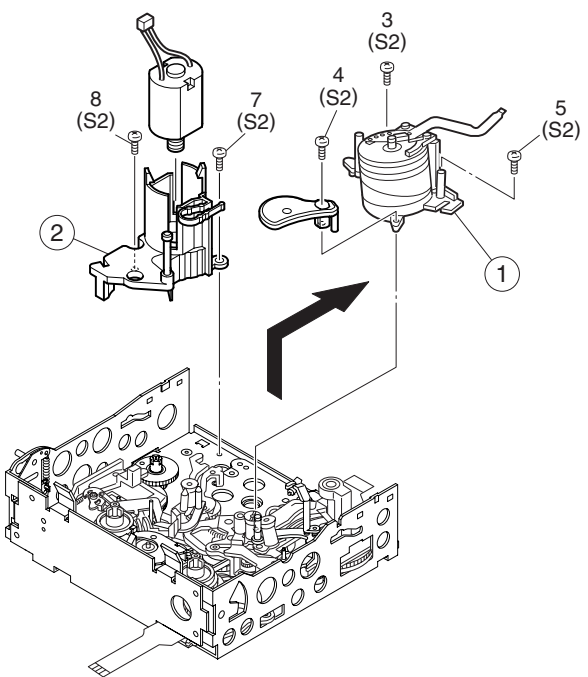
Fig. 2-6-2
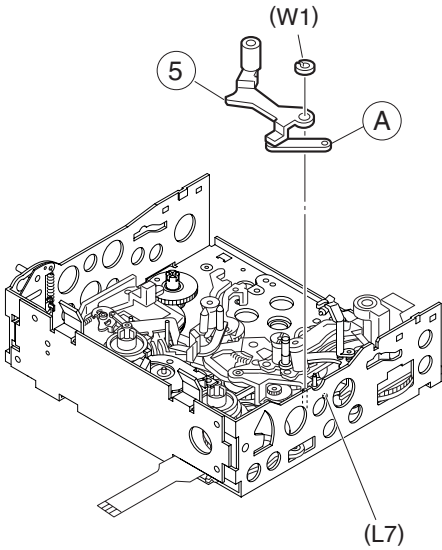
No.	Item	Reference picture/drawing	Procedure
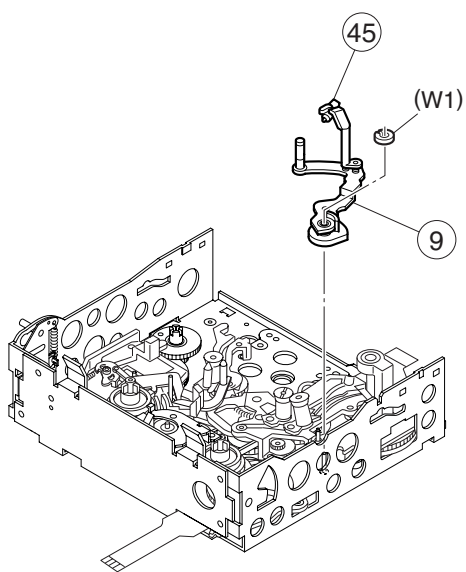
2.7   REPLACEMENT OF MAJOR PARTS

· Make sure that the mechanism is in the ASSEMBLY mode before proceeding to disassembly or assembly. (See section 2.1, "Assembly Mode".)

· Screws must always be tightened using a torque screwdriver and at the specified torque.
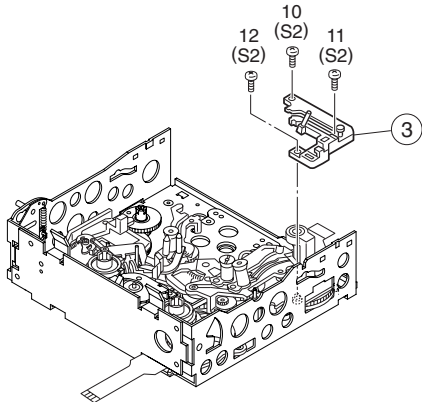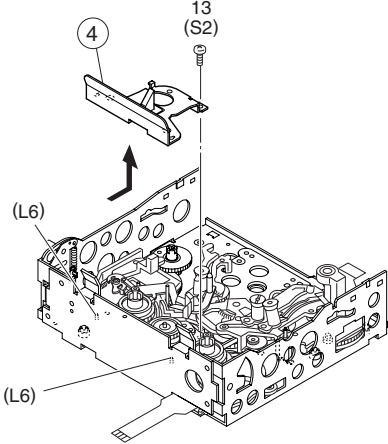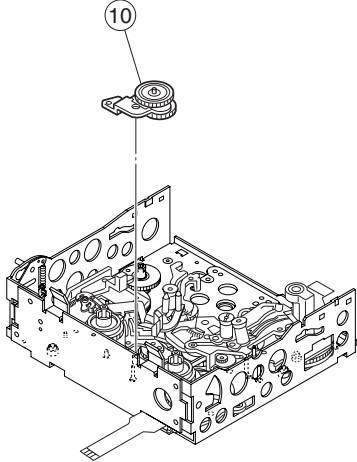
1	Ⓐ Cassette housing assembly		

Fig. 2-7-1

<Removal>
① Cassette housing assembly
See the 1.3.2 Cassette housing on the page 1-4.

② Outer unit assembly
1) Align the boss Ⓐ that pulls out the cassette housing to the round hole Ⓑ of Outer unit assembly, and then remove it.

<Attaching>
1) Reverse the removal procedure.

2	① Drum assembly, ② Motor bracket (Gear cover) assembly		

Fig. 2-7-2

<Removal>
① Drum assembly
1) Remove the 3 screws (S2) and take out the assembly.

② Motor bracket (Gear cover) assembly
1) Remove the 2 screws and take out the motor bracket assembly.
2) After removing the lock of the motor bracket, the motor can be removed by lifting the motor upward.

<Attaching>
1) Reverse the removal procedure

┌**NOTE**─────────────
· **When mounting the motor, make sure that the claw of the motor bracket is properly locked.**
If the claw is not properly locked, change the direction for mounting the motor.
└────────────────────

No.	Item	Reference picture/drawing	Procedure

| 3 | ⑤ Pinch roller arm assembly | | **\<Removal\>**
1) Remove the washer (W1) and pull out the assembly.

\<Attaching\>
1) Fit the pinch roller arm assembly Ⓐ into the boss (L7) of the charge arm assembly.
2) Attach the washer (W1). |

(W1)

⑤

Ⓐ

(L7)

Fig. 2-7-3

| 4 | ⑨ Exit guide arm assembly
㊺ Cleaner arm assembly | | **\<Removal\>**
1) Remove the washer (W1) and pull out the assembly.

\<Attaching\>
1) Reverse the removal procedure. |

㊺

(W1)

⑨

Fig. 2-7-4

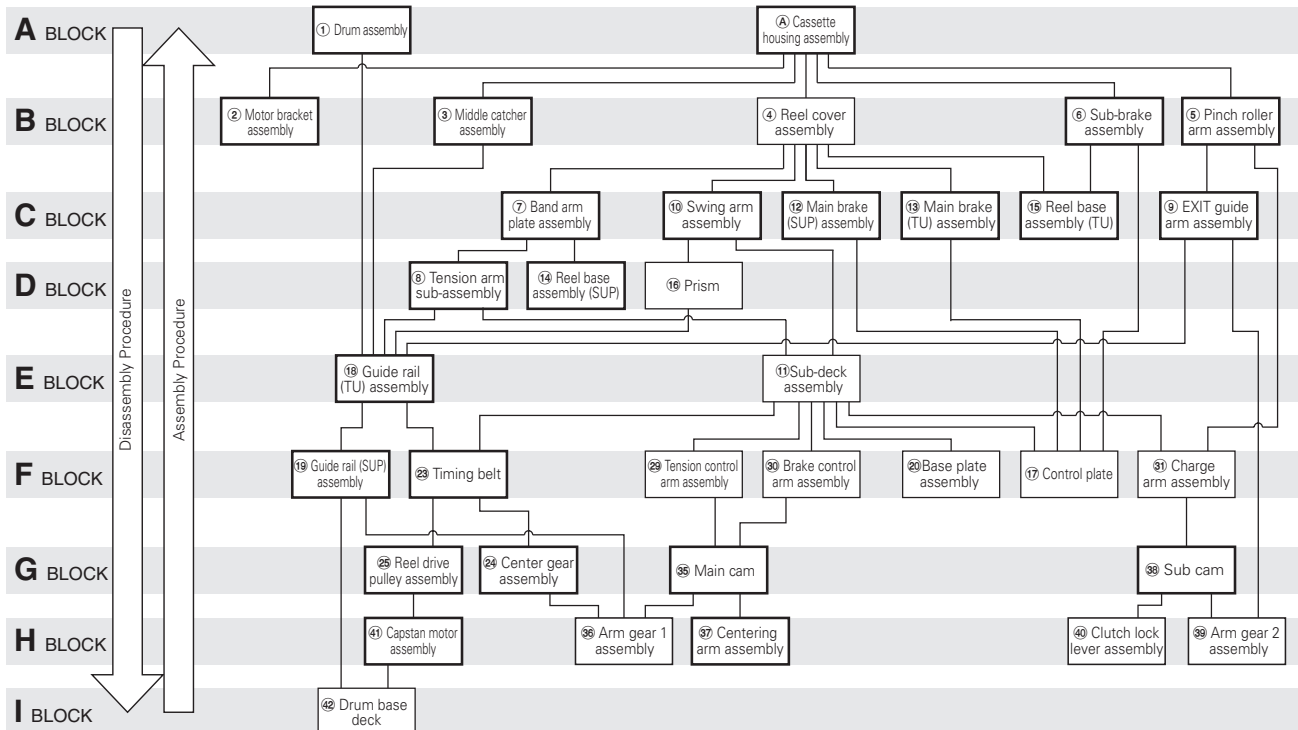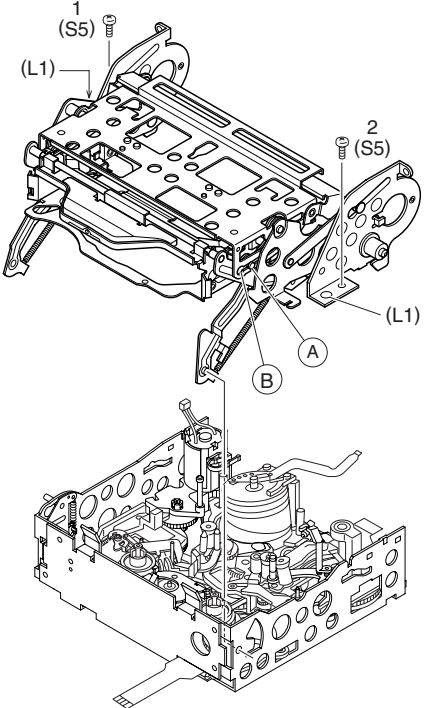| No.	Item	Reference picture/drawing	Procedure
5	③ Middle catcher assembly	12 (S2) 10 (S2) 11 (S2) ③ **Fig. 2-7-5**	**\<Removal\>** 1) Remove the 3 screws (S2) and remove the assembly. **\<Attaching\>** 1) Reverse the removal procedure.
6	④ Reel cover assembly	④ 13 (S2) (L6) (L6) **Fig. 2-7-6**	**\<Removal\>** 1) Remove the screw (S2). 2) Slide the assembly toward the drum and lift the assembly up to remove it. **NOTE** · **After having removed the reel cover, take care because the parts located below the reel cover tend to slip out easily.** **\<Attaching\>** 1) Insert the reel cover into (L6) and attach by reversing the removal procedure.
7	⑩ Swing arm assembly	⑩ **Fig. 2-7-7**	**\<Removal\>** 1) Pull the assembly upward. **\<Attaching\>** 1) Reverse the removal procedure.

No.	Item	Reference picture/drawing	Procedure

8 | ⑦ Band arm plate assembly, ⑧ Tension arm assembly

14 (S3)

(W2)

⑦

(P2)

8

(P3)

(L9)

Fig. 2-7-8(a)

Attaching the spring

Step 1

Hook ⓐ (Longer end)

⬇

Step 2
Hook ⓑ (Shorter end)

⬇

Step 3
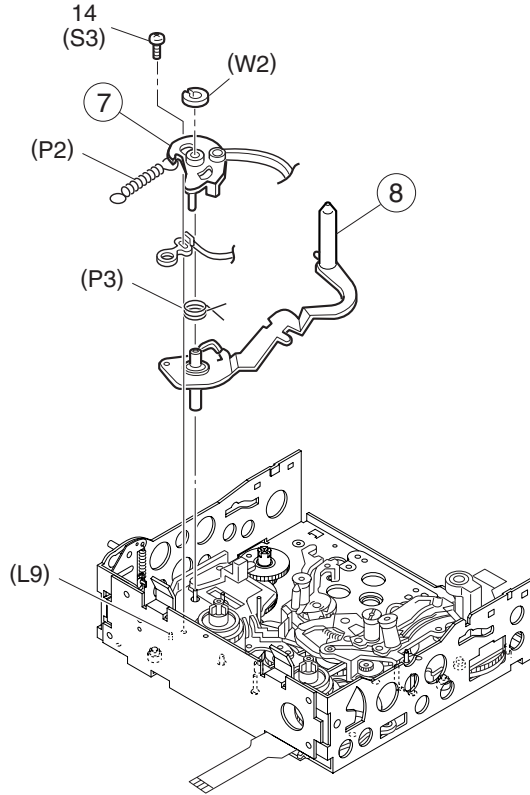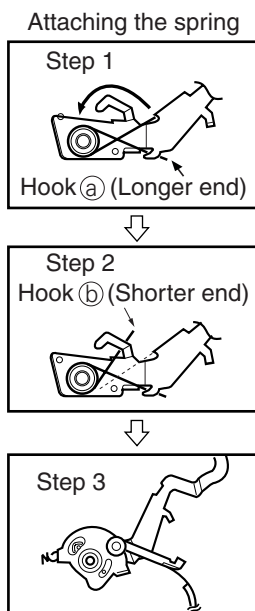
The spring (P3) should be attached only to the tension arm assembly ⑧. It should not contact the band arm plate assembly ⑦.

Fig. 2-7-8(b)

<Removal>
1) Remove the washer (W2).
2) Remove the screw (S3).
3) Remove the spring (P2).
4) Remove the band arm plate assembly and tension arm assembly.

NOTE
Be careful not to lose the spring (P3).

<Attaching>
1) Attach the spring (P3) to the tension arm assembly. Engage the longer end of spring to hook ⓐ and the shorter end to hook ⓑ as shown in Fig. 2-7-8(b).
2) Attach the tension arm sub-assembly.
3) Attach the band arm plate assembly.
4) Clamp with the screw (S3) and washer (W2).
5) Attach the spring (P2) to (L9).

NOTE
After attaching, ensure that the band arm assembly can rotate in the direction of the arrow as shown in Fig. 2-7-8(c).

Attach so that the section Ⓐ comes on the outer side of the tension arm assembly ⑧.

Ⓐ
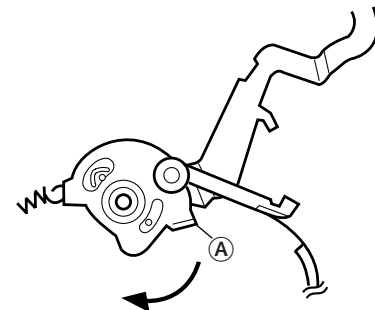
Fig. 2-7-8(c)

6) After attaching, adjust the tension.
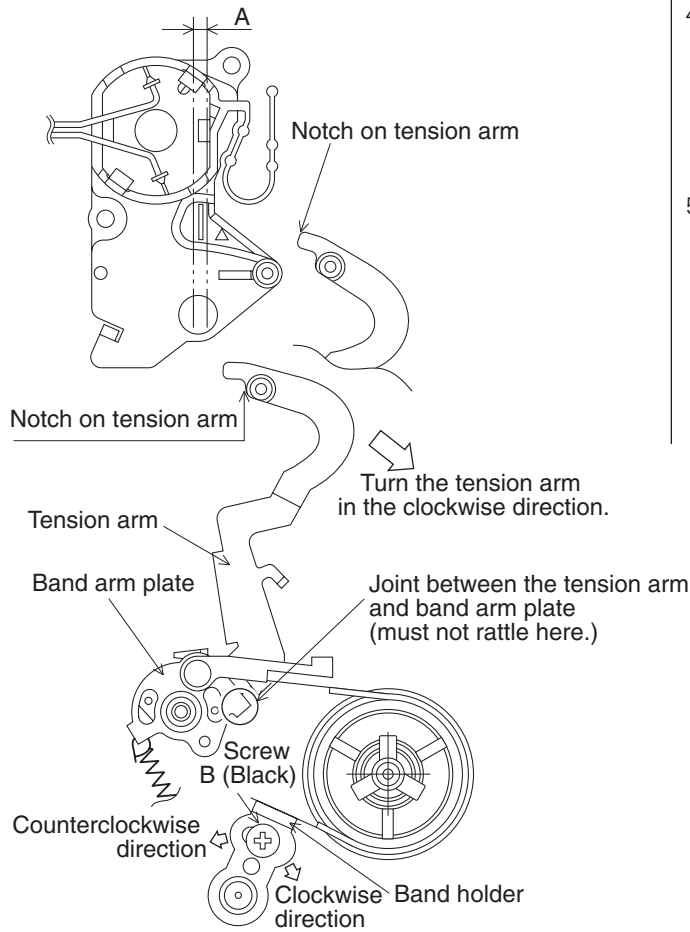
No.	Item	Reference picture/drawing	Procedure
8	<Tension arm assembly position adjustment>	 Fig. 2-7-8(d) Notch on tension arm Notch on tension arm Turn the tension arm in the clockwise direction. Tension arm Band arm plate Joint between the tension arm and band arm plate (must not rattle here.) Screw B (Black) Counterclockwise direction Clockwise direction Band holder	1) Without loading a tape, set the mechanism mode to PLAY mode. To switch the mode, rotate wheel gear 2 while the motor bracket assembly is disengaged (see 2.2, "Mechanism Modes"). 2) Rotate the tension arm slightly clockwise to eliminate production of rattle with the band arm plate. 3) Ensure that the notch on the tension arm is located within area A. (See Fig. 2-7-8(e).) 4) If the tension arm is not located in area A, loosen screw B (black) lightly and fine-adjust the position of the band arm plate assembly. Turn the screw counterclockwise to move the tension arm extremity toward the right or clockwise to move it toward the left. 5) After the adjustment, clamp the band holder by tightening screw B (black) (with a securing torque of 5.88 Nm, or 0.6 kgf-cm). Then adjust the tension arm position again. Fig. 2-7-8(e) No Good OK (Lower limit) No Good OK (Center) OK (Upper limit)
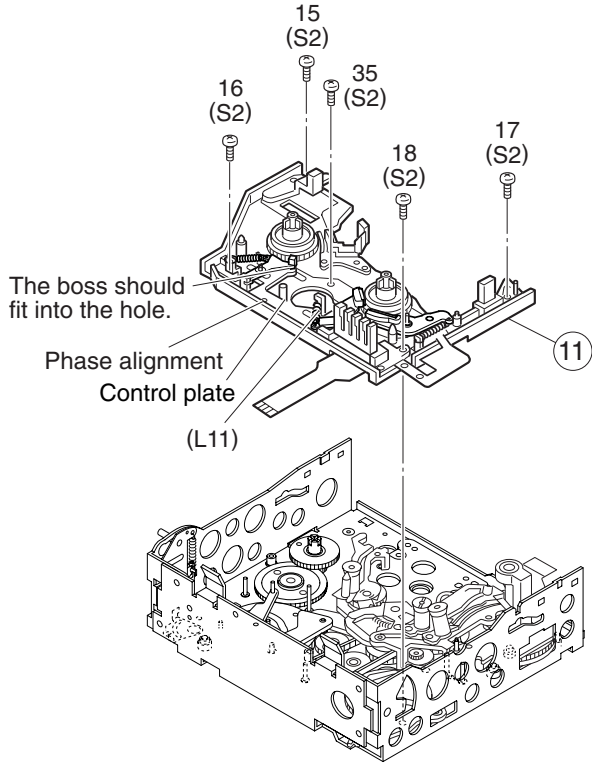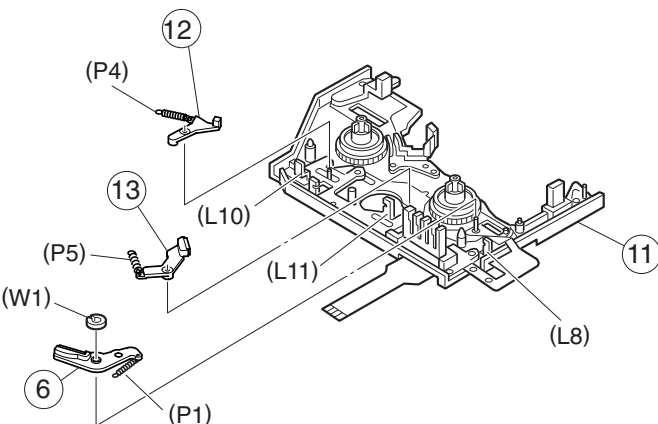
No.	Item	Reference picture/drawing	Procedure
9	⑪ Sub-deck assembly	 15 (S2) 16 (S2) 35 (S2) 18 (S2) 17 (S2) The boss should fit into the hole. Phase alignment Control plate (L11) ⑪ **Fig. 2-7-9**	**\<Removal\>** 1) Remove the 5 screws (S2) and pull out the assembly. **\<Attaching\>** 1) While sliding the control plate toward the left, attach the sub-deck assembly. **⌐NOTE** · **Attach by aligning the phase holes of the main deck assembly and control plate.** 2) Clamp with 5 screws (S2).
10	⑫ Main brake (SUP) assembly, ⑬ Main brake (TU) assembly, ⑥ Sub-brake assembly	 ⑫ (P4) ⑬ (L10) (P5) (L11) (W1) ⑪ (L8) ⑥ (P1) **Fig. 2-7-10**	**\<Removal\>** **Main brake (SUP) (TU) assembly** 1) Remove the spring by disengaging its ends from the hooks (L10) and (L11). **Sub-brake assembly** 1) Remove the washer (W1). 2) Remove the spring by disengaging it from the hook (L8). **\<Attaching\>** 1) Reverse the removal procedure.

No.	Item	Reference picture/drawing	Procedure
11	⑭ Reel disk (SUP) assembly, ⑮ Reel disk (TU) assembly, ⑰ Control plate, ⑯ Prism	 **Fig. 2-7-11**	**\<Removal\>** 1) Pull up each assembly to remove it. The control plate can be removed by sliding it toward the left as shown by the arrow. 2) Remove the screw (S2) to remove the prism. **\<Attaching\>** 1) Reverse the removal procedure.
12	⑱ Guide rail (TU) assembly, ⑲ Guide rail (SUP) assembly	 **Fig. 2-7-12(a)** **Fig. 2-7-12(b)**	**\<Removal\>** **Guide rail (TU) assembly:** 1) Remove the 4 screws (S2) and remove the assembly. **Guide rail (SUP) assembly:** 1) Remove the screw (S2) and remove the assembly. **\<Attaching\>** 1) Return the guide pole fully to the unloading position, and attach the assemblies by reversing the removal procedures. When attaching, place the alignment markings of the two gears so that they face each other. (See Fig. 2-7-12(b).)
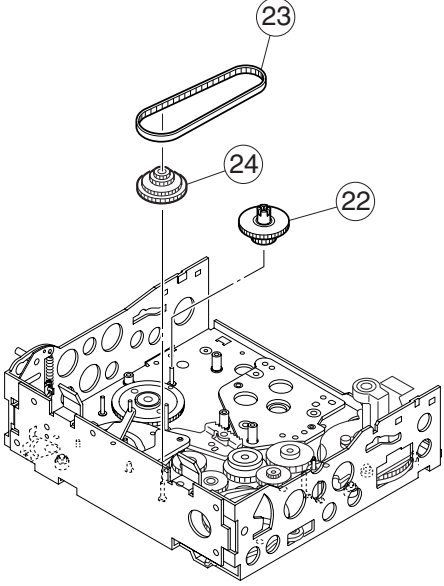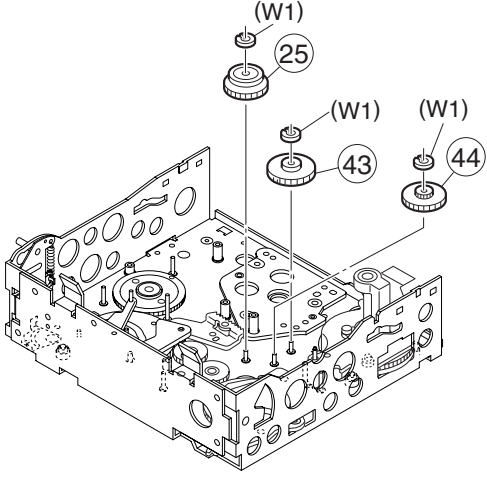
No.	Item	Reference picture/drawing	Procedure
13	㉒ Wheel gear 2, ㉓ Timing belt, ㉔ Center gear assembly	 **Fig. 2-7-13**	**\<Removal\>** 1) Each parts can be removed by simply pulling them out. **\<Attaching\>** 1) Reverse the removal procedure.
14	㉕ Reel drive pulley assembly, ㊸ R. drive gear 1, ㊹ R. drive gear 2	 **Fig. 2-7-14**	**\<Removal\>** 1) Remove the washer (W1) and take out the assembly. **\<Attaching\>** 1) Reverse the removal procedure.

No.	Item	Reference picture/drawing	Procedure

15 ㉙ Tension control arm assembly, ㉚ Brake control arm assembly, ㉛ Charge arm assembly

Fig. 2-7-15(a)

Align the phase of the main cam ㉟ then attach by fitting the bosses in the cam groove.

Fig. 2-7-15(b)

Attaching Tension Control Arm Assembly ㉙ and Brake Control Arm Assembly ㉚

Phase alignment
Boss (Phase alignment)
Align the phase of the sub cam ㊳, then attach by fitting the boss into the cam groove.

Fig. 2-7-15(c) Attaching the Charge Arm Assembly ㉛

<Removal>
1) The brake control assembly can be removed after removing the washer (W1).

<Attaching>
1) Align the phases of the main cam and sub cam , then attach by reversing the removal procedure. Refer to Fig. 2-7-15(b) and Fig. 2-7-15(c).

No.	Item	Reference picture/drawing	Procedure

16 | ㉞ Encoder gear, ㉟ Main cam , ㊱ Arm gear 1 assembly, ㊲ Centering arm assembly

\<Removal\>
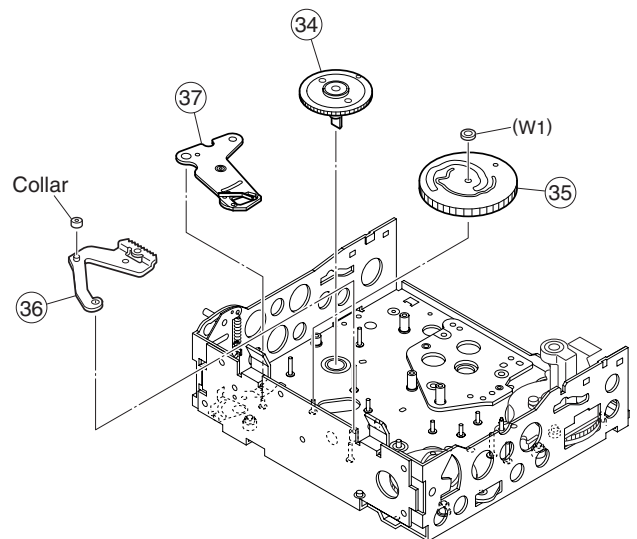
1) The main cam can be removed by removing the washer (W1). As the cam gear is engaged at the rear of the main deck assembly while the phase is aligned, deviate the phase in the direction of the arrow before removal. (See Fig. 2-7-16(b).)
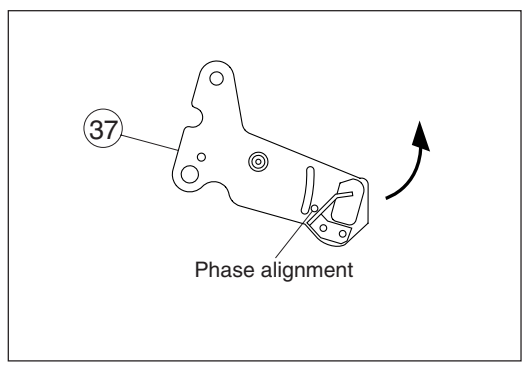
Fig. 2-7-16(a)

Fig. 2-7-16(b) Removing the Centering Arm Assembly ㊲

\<Attaching\>

1) Align the phase by referring to Figs. 2-7-16(c) and 2-7-16(d), then attach the ass'ies reverse the removal procedure.
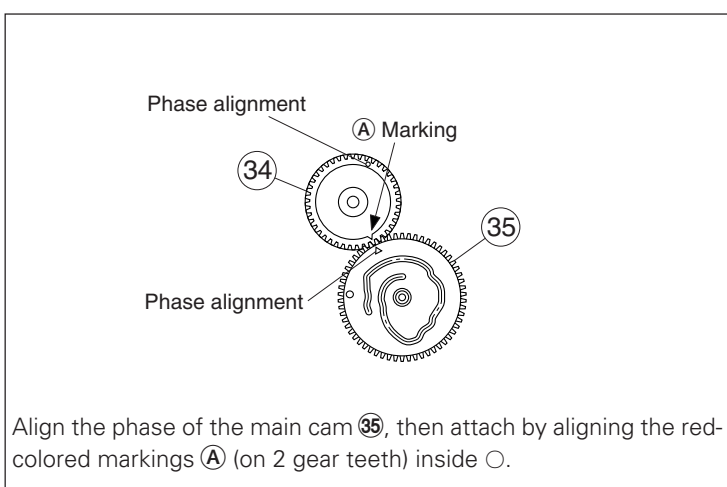
Align the phase of the main cam ㉟, then attach by aligning the red-colored markings Ⓐ (on 2 gear teeth) inside ○.

Fig. 2-7-16(c) Attaching the Rotary Encoder Assembly ㉞
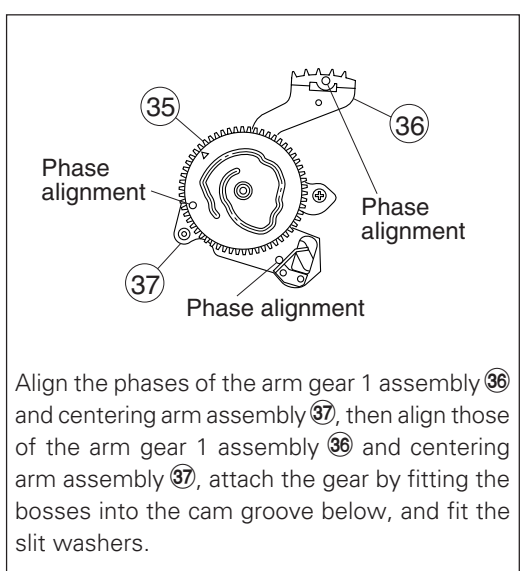
Align the phases of the arm gear 1 assembly ㊱ and centering arm assembly ㊲, then align those of the arm gear 1 assembly ㊱ and centering arm assembly ㊲, attach the gear by fitting the bosses into the cam groove below, and fit the slit washers.

Fig. 2-7-16(d) Attaching the Main Cam ㉟

No.	Item	Reference picture/drawing	Procedure
17	㊳ Sub cam ㊴ Arm gear 2 assembly, ㊵ Clutch lock lever assembly	31 (S2) ㊳ ㊵ (L19) ㊴ **Fig. 2-7-17(a)**	**\<Removal\>** 1) Remove the screw (S2) and take out the sub cam . As L19 is engaged at the rear of the main deck assembly while the phase is aligned, deviate the phase in the direction of the arrow before removal. 20. This checking should be done after completing the switching point adjustment. Phase alignment ㊵ **Fig. 2-7-17(b) Removing the Clutch Lock Lever Assembly ㊵** **\<Attaching\>** 1) Align the phase correctly by referring to Fig. 2-7-17(c), then attach by reversing the removal proce-dure. ㊴ ㊳ Phase alignment Phase alignment ㊵ Phase alignment Align the phases of the arm gear 2 assembly ㊴ and clutch lock lever assembly ㊵, attach them by fitting the boss into the cam groove below, and clamp with the screw. **Fig. 2-7-17(c) Attaching the Sub Cam ㊳**
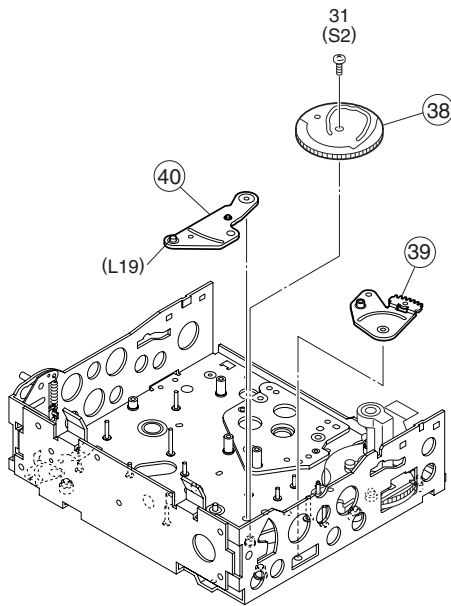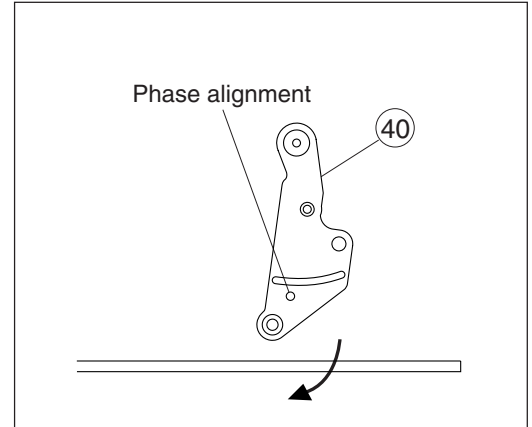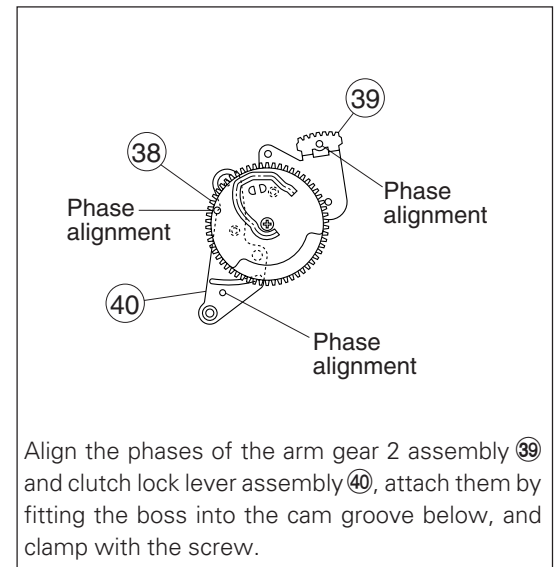
2.8 CONFIRMATION AND ADJUSTMENT OF MECHANISM PHASES

See Fig. 2-8-1.

㊱ Arm gear 1 assembly
See section 2.7.16

㉞ Encorder gear
assembly
See section 2.7.16

㊴ Arm gear 2 assembly
See section 2.7.17

㊳ Sub cam
See section 2.7.17

㉟ Main cam
See section 2.7.16

㊲ Centering arm assembly
See section 2.7.16

㊵ Clutch lock lever assembly
See section 2.7.17

Fig. 2-8-1

2.9   DISASSEMBLY PROCEDURE LIST

Fig. 2-9-1

**Note)   For the grease and oil application points,
          see section 5.6, "MECHANISM ASSEMBLY PARTS LIST M 6 "**

2.10 MECHANISM DISASSEMBLY/ASSEMBLY SHEET

Screw Management																	
Drawing No.	Ⓐ		①			②			③		④	⑦	⑪				
No.	1	2	3	4	5	7	8	10	11	12	13	14	15	16	17	18	35
Table	S5	S5	S2	S2	S2	S2	S2	S2	S2	S2	S2	S3	S2	S2	S2	S2	S2
Application																	
Ref. No.	No.1		No.2					No.5			No.8		No.9				

Ⓐ Cassette housing assembly
1 (S5)
2 (S5)
Ⓐ
Ⓑ
S37×2

① Drum assembly
4 (S2)
3 (S2)
5 (S2)
S2×3

④ Reel cover assembly
13 (S2)
S2,L6×2

② Motor bracket assembly
8 (S2)
7 (S2)
S2×4

⑤ Pinch roller arm assembly
(W1)
W1,7

③ Middle catcher assembly
10 (S2)
12 (S2)
11 (S2)
S2×3

⑥ Sub-brake assembly
(W1)
(P1)
P1,W1,L8

⑰ Control plate
L12×2

⑱ Guide rail (TU) assembly
20 (S2)
21 (S2)
22 (S2)
23 (S2)
S2×4

⑲ Guide rail (SUP) assembly
(L13)
24 (S2)
S2,L13×2

㉔ Center gear assembly

㉕ Reel drive pulley assembly
(W1)
W1

㉙ Tension control arm assembly
(L15)

㉚ Brake control arm assembly
(L16) (W1)
W1,L16

㉟ Main cam
(W1)
W1

㊱ Arm gear 1 assembly
Collar
Collar
Collar

㊲ Centering arm assembly

㊳ Sub cam
31 (S2)
S2

2-24
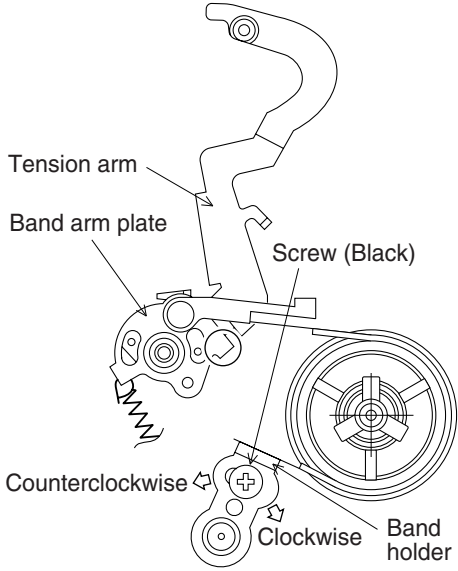
Screw Management									
⑯	⑱				⑲	㊳	㊷		
19	20	21	22	23	24	31	32	33	34
S2	S2	S2	S2	S2	S2	S2	S2	S2	S2
No.11	No.12				No.17		–		

The slit washers cannot be reused once they have been removed.

⑦ Band arm plate assembly

14 (S3)

(W2)

(P2)

S3,P2,L9,W2

⑧ Tension arm assembly

(P3)

P3

⑪ Sub-deck assembly

15 (S2)

16 (S2)

35 (S2)

18 (S2)

17 (S2)

S2×5

⑫ Main brake (SUP) assembly

(P4)

P4,L10

⑬ Main brake (TU) assembly

(P5)

P5,L11

⑭ Reel base assembly (SUP)

⑮ Reel base assembly (TU)

⑨ Exit guide arm assembly
㊺ Cleaner arm assembly

(W1)

(W1)

W1

⑩ Swing arm assembly

㊸ R. drive gear 1

(W1)

㊹ R. drive gear 2

(W1)

⑯ Prism

19 (S2)

S2

㉒ Wheel gear

㉓ Timing belt

㉛ Charge arm assembly

(L17)

L17

㉞ Encorder gear

㊴ Arm gear 2 assembly

㊵ Clutch lock lever assembly (C.P.D arm assembly)

L19

㊶ Capstan motor

ADJ NUT

(P7)

ADJ NUT,P7

㊷ Drum base deck

33 (S2)

32 (S2)

34 (S2)

S2×3

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure

2.11 TORQUE ADJUSTMENTS

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
1	SUP backup torque adjustment	• Cassette torque meter	Play	◎ Supply side indication of cassette torque meter ☆ $3.9^{+1.47}_{-0.39} \times 10^{-4}$N·m ($4.0^{+1.5}_{-0.4}$ gf·cm)	(1) Insert the cassette torque meter and enter play mode. (2) The supply backup torque should be as specified. (If it fluctuates, read the center value.) (3) If it is out of specification, eject the tape, remove the cassette housing, loosen the screw (black) slightly and fine-adjust the band holder. Slightly turn the band holder as follows. · To increase torque: Counterclockwise · To decrease torque: Clockwise. **NOTE** **The screw securing torque should be 0.0588 N-m (0.6 kgf·cm).** 4) Check the supply backup torque again and repeat the above steps until it becomes as specified.
2	Take-up wind torque adjustment	Cassette torque meter YTU94150A	PLAY, Adjustment menu No. 110	◎ Take-up side reading of cassette torque meter ☆ $4.9^{+4.90}_{-1.96} \times 10^{-4}$ N·m ($5.0^{+5.0}_{-2.0}$ gf·cm)	1) Select adjustment menu [119. FWD TORQUE]. **(For the adjustment menu, see 3.3, "Adjustment menu".)** 2) Insert the torque cassette meter YTU94150A and press the [PLAY] button. 3) Adjust the TU wind torque so that it is within the specified range. · Press JOG dial to enter the adjustment mode. · To increase the torque → Rotate JOG dial to the clockwise. · To decrease the torque → Rotate JOG dial to the counter-clockwise. 4) After adjustment, press JOG dial to store the adjustment data.

Tension arm

Band arm plate

Screw (Black)

Counterclockwise

Clockwise

Band holder

2.12 COMPATIBILITY ADJUSTMENT

2.12.1 Compatibility adjustment flow chart

Fig. 2-12-1 shows the flow chart of compatibility adjustment.

```
                    ┌──────────┐
                    │  Start   │
                    └────┬─────┘
                         │
        ┌────────────────┴────────────────┐
        │    Connect the connector board. │
        └────────────────┬────────────────┘
                         │
        ┌────────────────┴────────────────┐
        │ Set the RF envelope adjusted     │
        │ waveform flat.                   │
        └────────────────┬────────────────┘
                         │
   NG ◄─────────────< Is the envelope flat? >
                         │ OK
                         │
   NG ◄─────< Eject the cassette tape and start
                playback. Is the envelope still flat? >
                         │ OK
                         │
   NG ◄─────< Is the envelope restored within 1 second
               after mode transition from Eject to Play? >
                         │ OK
                         │
   NG ◄─────< Is the envelope restored within 1 second
               after mode transitions from SEARCH FWD
               to PLAY and from SEARCH REV to PLAY? >
                         │ OK
```

Enter modes PLAY → SEARCH REV → SEARCH FWD → PLAY in this sequence, and ensure that tape is not damaged by wrinkles. — NG → Transport system part defect.

OK

Check the envelope during FF and REW, and confirm that the specified waveforms are output in both modes. — NG → · Tension band or main brake assembly defect. · Tension error.

OK

Electrical adjustments

Fig. 2-12-1

2.12.2 Tape transport restriction

The unit uses only the SUP guide roller and TU guide roller to restrict the tape transport. The tape is free (no restriction) from other parts.
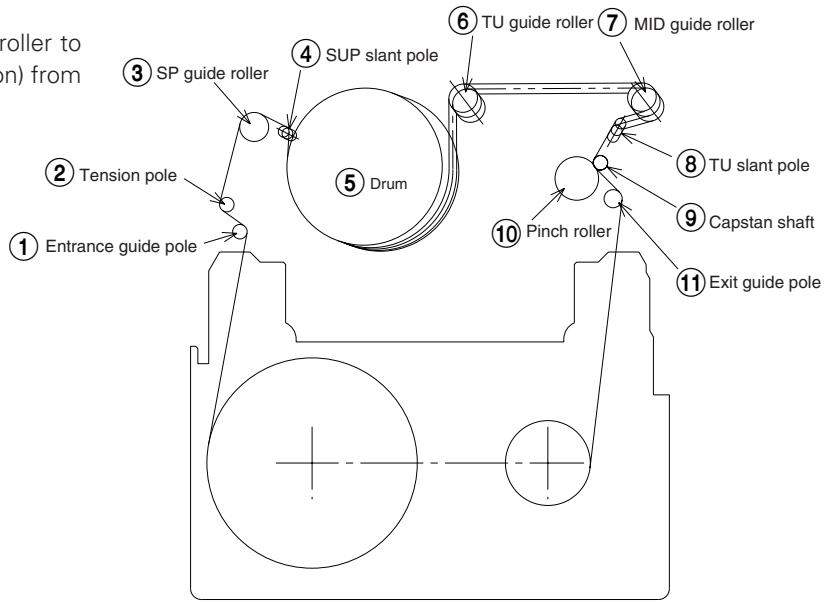
Fig. 2-12-2
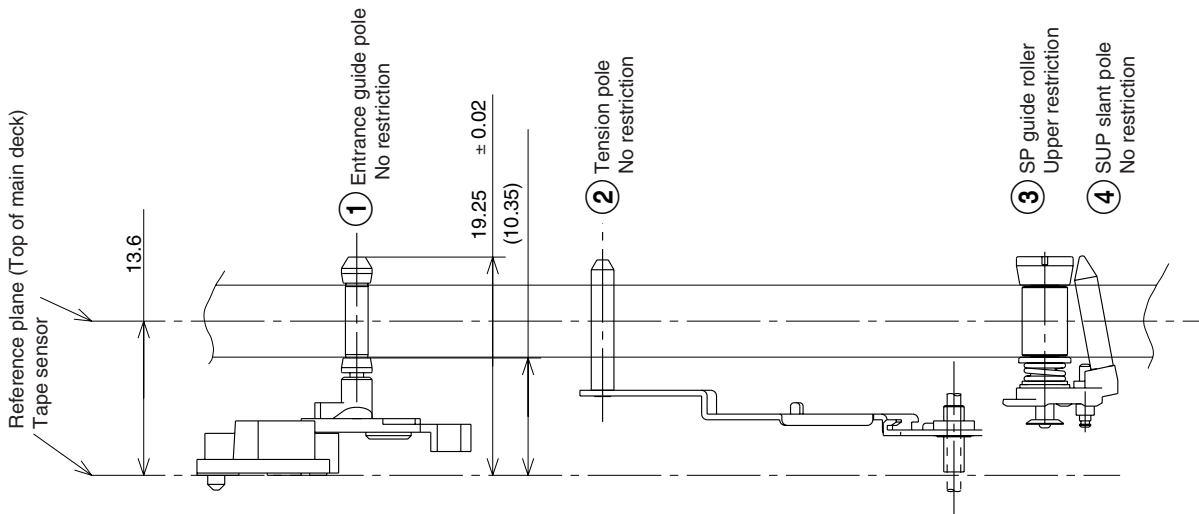
Fig. 2-12-3 Tape Restriction on Supply Side
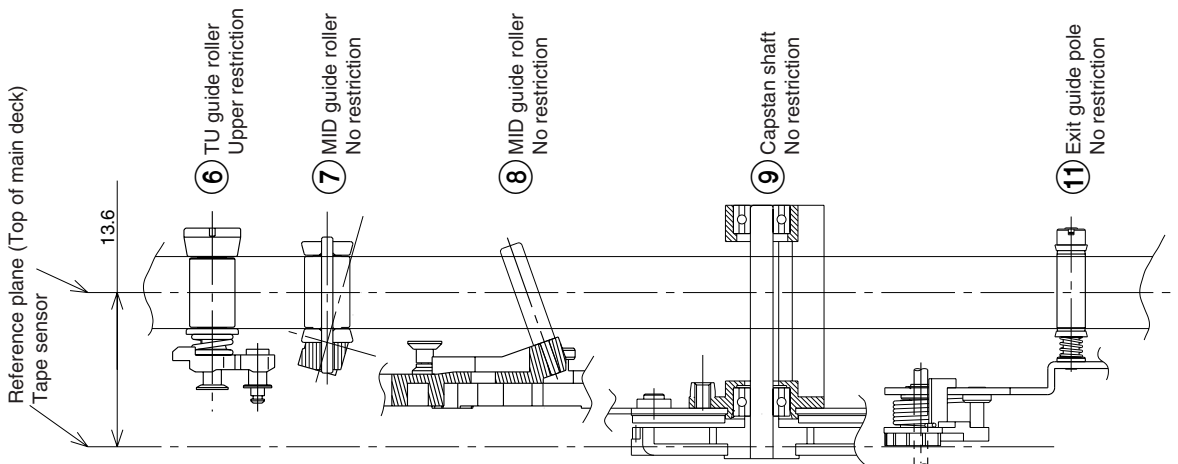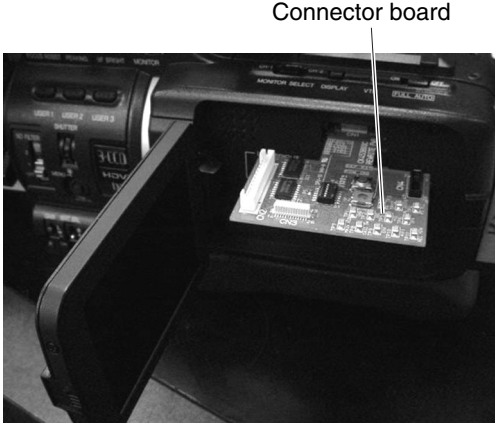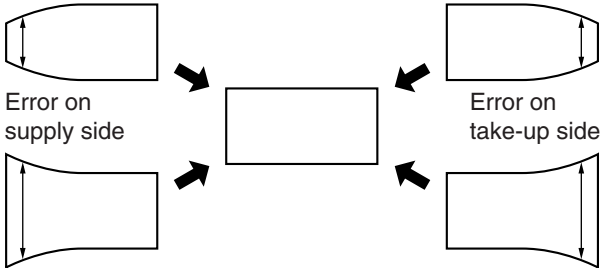
Fig. 2-12-4 Tape Restriction on Take-up Side

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure

2.12.3 Compatibility adjustment

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
1	Preparation				(1) Mount a connector board to the CN23 on the A/L/S board by inserting it in the slot that is provided to accommodate it. This may be achieved without removing the R. side cover. (See Fig. 2-12-6.) NOTE · **Make sure the component surface of the connector board is upside.** NOTE · **Be sure to clean the tape transport parts and play a cleaning tape before proceeding to the compatibility adjustment.**

Connector board

Fig. 2-12-5 How to mount a connector board

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
2	RF envelope adjustment	• Oscilloscope, alignment tape MC-1(NTSC) MC-2(PAL) Color bar portion	Play	◎ TP9 ENV OUT [connector board] ◎ TP5 HID [connector board] ① Supply guide roller ① Take-up guide roller ☆ Make the waveforms flat. The drop level should be less than 3 dB with both SUP and TU levels. ☆ Flatness variation should be less than 2 dB.	(1) Play alignment tape color bar portion. (2) Observe the measuring points and adjust the supply guide roller and take-up guide roller so that the RF waveform is flat. (3) Set the mode to EJECT, then set to the PLAY mode and ensure that the RF waveform is flat.

Error on supply side   Error on take-up side

Fig. 2-12-6

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
3	Waveform rise check	• Oscilloscope, alignment tape MC-1(NTSC) MC-2(PAL) Color bar portion	Eject →Play Search FWD →Play Search REV → Play	◎ TP9 ENV OUT [Rewrite board] ◎ TP5 HID [Rewrite board] ☆The envelope waveform should be restored within 1 sec.	(1) Switch the mode from Eject → Play and ensure that the envelope waveform is restored in less than 1 sec. (2) Switch the mode from Search FWD → Play and from Search REV → Play, and ensure that the envelope is restored in less than 1 sec. in both cases. (3) If the waveform does not restore in the specified period, fine-adjust the supply/take-up guide rollers as far as the envelope waveform specification is met, then restart checking from the above procedure 1 again.
4	Damage check	• Self-recorded/ played tape 60ME	Play ↓ Search REV ↓ Search FWD ↓ Play	◎ TP9 ENV OUT [Rewrite board] ◎ TP5 HID [Rewrite board] ☆The tape should not be damaged by wrinkle.	(1) Transport the self-recorded/played tape from the beginning by changing modes in order of Play → Search REV → Search FWD → Play, and ensure that wrinkles due to strong restriction by the guide rollers and guide pole are not produced on tape. (2) Perform the same check at the section near the end of tape. (3) Make sure that no tape damage occurs when a tape is being loaded, unloaded or ejected.
5	Envelope check during FF/REW	• Oscilloscope, alignment tape MC-1(NTSC) MC-2(PAL) Color bar portion	FF REW	◎ TP9 ENV OUT [Rewrite board] ◎ TP5 HID [Rewrite board] ☆ Ⓐ > 55μsec. ☆ Ⓑ ≧ T/3	(1) Insert the alignment tape and enter Stop mode. (2) Enter FF mode. (3) Ensure that the envelope output is present at 55 μs before the HID switching timing. (4) Check the take-up side of the envelope to see that the MAX output duration is more than 1/3 the HID duration. **This checking should be done after completing the switching point adjustment.** (5) Enter REW mode and check the same items as (3) and (4) above. (6) If the envelope is out of specification, check the tension band and main brake assembly and replace as required. Confirm the playback switching point.
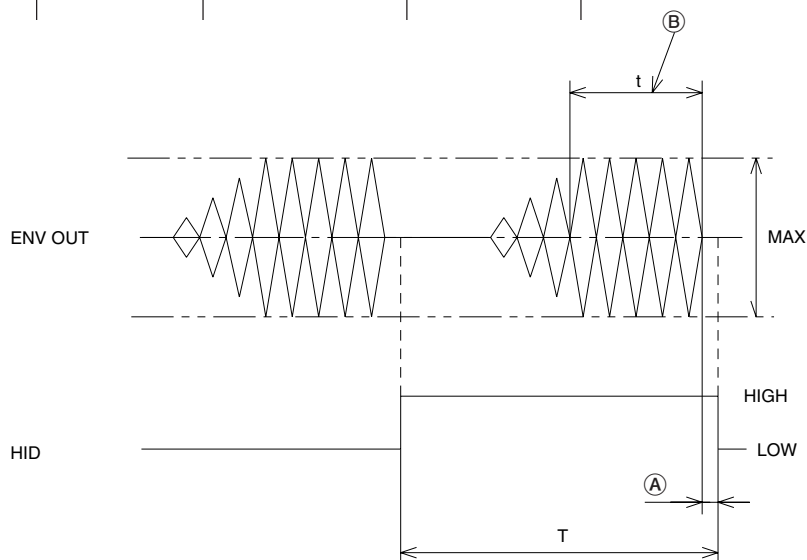
Fig. 2-12-7

SECTION 3
ELECTRICAL ADJUSTMENTS

3.1 FUNCTIONS REQUIRED FOR ADJUSTMENTS, SETUP

3.1.1 General instruments necessary for adjustment

Instrument	Condition	Instrument	Condition
Oscilloscope	Calibrated instrument with a measuring bandwidth of 100 MHz or more.	Frequency counter	Instrument calibrated for 8 digits or more. Stability of 0.1 ppm or 1×10^{-7} or better is required at 0 to 40°C.
Vectorscope	Calibrated instrument		
Audio tester	Calibrated instrument	Monitor TV	Color video monitor with a 75Ω video input.

3.1.2 Special implements required for adjustment
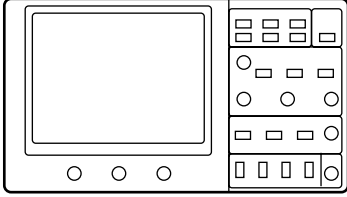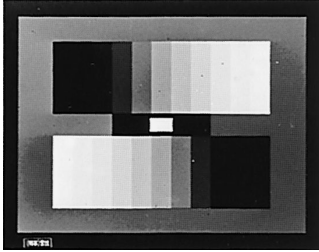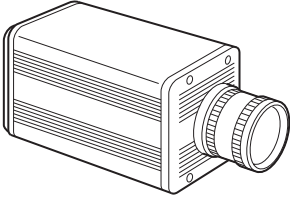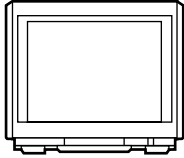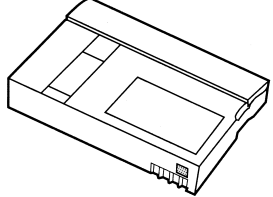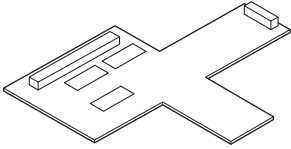
1	Waveform monitor (WFM)	2	Gray scale chart	3	Tripod base

4	Camera and lens	5	Monitor TV	6	Alignment tape

MC-1 : NTSC
MC-2 : PAL

7	REWRITE board

CK453800C

Fig. 3-1-1 Special implements required for adjustment

3.2 STANDARD SETUP
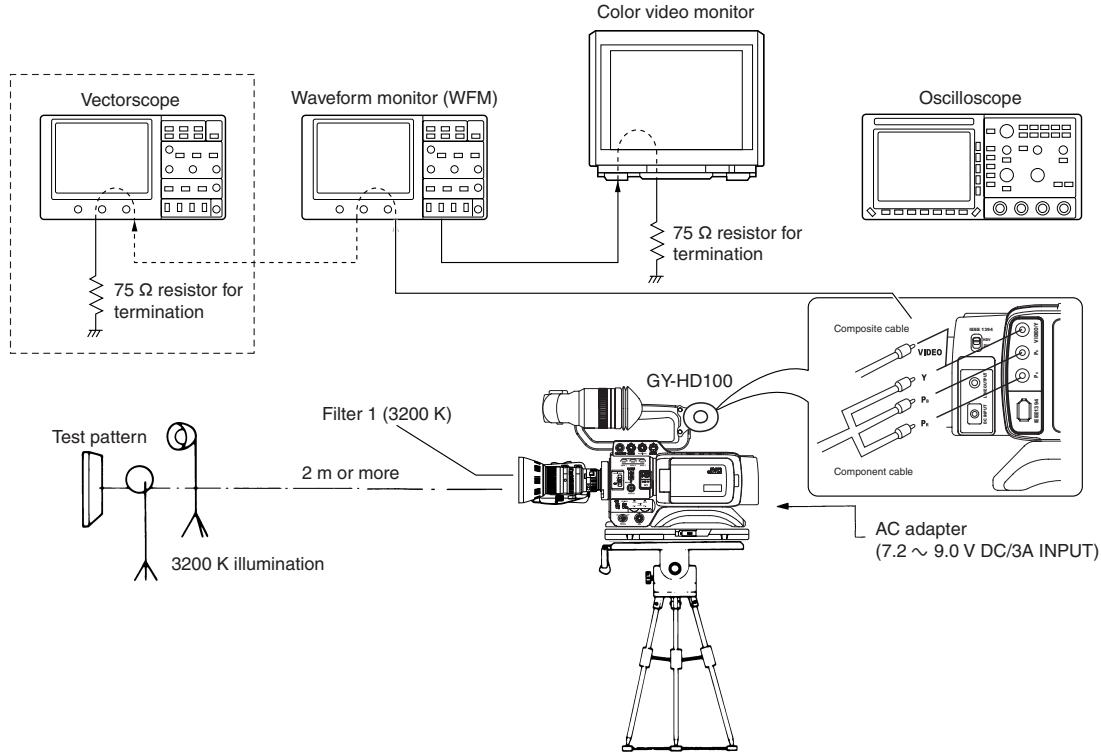
Adjustment items

For Camera-1 adjustment

No.	Item name	Adjustment value	Remarks
0	COUNTRY	U_E, I_EC	NTSC & PAL
1	VIDEO MODE CHANGE	NTSC, PAL	NTSC & PAL
2	27MHz CAM	0 to 255	NTSC
3	SENC SDRAM	-	NTSC & PAL
5	FPGA4 VD	0 to 7	NTSC & PAL
6	FPGA4 SDRAM	0 to 15	NTSC & PAL
10	Y LEVEL[COMPOSITE]	0 to 255	NTSC
11	C LEVEL	0 to 255	NTSC & PAL
12	Y LEVEL[COMPONENT]	0 to 255	NTSC
13	B-Y LEVEL	0 to 255	NTSC
14	R-Y LEVEL	0 to 255	NTSC
20	FPGA BLACK[B]	0 to 40	NTSC
21	FPGA BLACK[R]	0 to 40	NTSC
22	MASTER BLACK	0 to 40	NTSC
23	BLACK OFFSET[G]	0 to 63	NTSC & PAL
24	BLACK OFFSET[B]	0 to 63	NTSC & PAL
25	BLACK OFFSET[R]	0 to 63	NTSC & PAL
37	WHITE OFFSET[G]	100 to 143	NTSC & PAL
38	WHITE OFFSET[B]	100 to 143	NTSC & PAL
39	WHITE OFFSET[R]	100 to 143	NTSC & PAL
40	IN GAIN[G]	-	NTSC & PAL
41	IN GAIN[B]	-	NTSC
42	IN GAIN[R]	-	NTSC
43	FLARE[B]	0 to 40	NTSC
44	FLARE[R]	0 to 40	NTSC
45	MASTER FLARE	0 to 20	NTSC

No.	Item name	Adjustment value	Remarks
46	CORING[G]L	0 to 63	NTSC & PAL
47	CORING[G]R	0 to 63	NTSC & PAL
48	CORING[B]L	0 to 63	NTSC & PAL
49	CORING[B]R	0 to 63	NTSC & PAL
50	CORING[R]L	0 to 63	NTSC & PAL
51	CORING[R]R	0 to 63	NTSC & PAL
52	BLACK SHADING[G]L	0 to 80	NTSC & PAL
53	BLACK SHADING[G]R	0 to 80	NTSC & PAL
54	BLACK SHADING[B]L	0 to 80	NTSC & PAL
55	BLACK SHADING[B]R	0 to 80	NTSC & PAL
56	BLACK SHADING[R]L	0 to 80	NTSC & PAL
57	BLACK SHADING[R]R	0 to 80	NTSC & PAL

For AUDIO adjustmnt

No.	Item name	Adjustment value	Remarks
60	AUDIO LEVEL[CH1]	-	NTSC
61	AUDIO LEVEL[CH2]	-	NTSC

For LCD & VF adjustment

No.	Item name	Adjustment value	Remarks
70	SUB-BRIGHT[B]	-	NTSC
71	SUB-BRIGHT[R]	-	NTSC
72	CONTRAST	100 to 160	NTSC
73	SUB-CONTRAST[B]	10 to 120	NTSC
74	SUB-CONTRAST[R]	10 to 120	NTSC
75	GAMMA-1	0 to 80	NTSC

For LCD & VF adjustment

No.	Item name	Adjustment value	Remarks
76	GAMMA-2	0 to 80	NTSC
77	PSIG BRIGHT	40 to 120	NTSC
78	COMMON DC	27 to 107	NTSC & PAL
79	HUE	35 to 95	NTSC
80	VCO FINE	0 to 255	NTSC & PAL
81	BLACK LIMITER	0 to 63	NTSC
82	VCO COARSE	1 to 7	NTSC & PAL
83	H-POSITION	2 to 31	NTSC & PAL
84	RESOLUTION	0 to 5	NTSC & PAL
85	VF SUB-BRIGHT[B]	27 to 107	NTSC
86	VF SUB-BRIGHT[R]	27 to 107	NTSC
87	VF CONTRAST	100 to160	NTSC
88	VF SUB-CONTRAST[B]	10 to 120	NTSC
89	VF SUB-CONTRAST[R]	10 to 120	NTSC
90	VF GAMMA-1	0 to 80	NTSC
91	VF GAMMA-2	0 to 80	NTSC
92	VF COM LEVEL	0 to 255	NTSC
93	VF COMMON DC	27 to 107	NTSC & PAL
94	VF HUE	35 to 95	NTSC
95	VF VCOL	0 to 255	NTSC & PAL
96	VF VCOH	0, 1	NTSC & PAL
97	VF H POSITION	0 to 79	NTSC & PAL
98	VF V POSITION	0 to 31	NTSC & PAL
99	VF RESOLUTION	0 to 5	NTSC & PAL

For DVC unit adjustment

No.	Item name	Adjustment value	Remarks
100	PB SW POINT	00000000 to FFFFFFFF	NTSC
101	ME REC CURRENT	0 to 255	NTSC
102	ME SP VCO	0000H to FFFFH	NTSC
103	FS PLL 48kHz	0 to 255	NTSC
104	FS PLL 44.1kHz	0 to 255	NTSC
105	FS PLL 32kHz	0 to 255	NTSC
106	27MHz VCO	0 to 255	NTSC
107	ATF GAIN	0 to 255	NTSC
108	AGC GAIN	0 to 255	NTSC
109	BGNEND SENS	0 to 255	NTSC
110	FWD TORQUE	0 to 255	NTSC

For CAMERA-2 adjustmnt

No.	Item name	Adjustment value	Remarks
200	AFE ALL RESET	CANCEL, EXECUTE	NTSC & PAL
201	H1 START[G]L	0 to 63	NTSC & PAL
202	H1 STOP[G]L	0 to 63	NTSC & PAL
203	H1 START[G]R	0 to 63	NTSC & PAL
204	H1 STOP[G]R	0 to 8	NTSC & PAL
205	RESET START[G]L	34 to 36	NTSC & PAL
206	RESET STOP[G]L	0 to 63	NTSC & PAL

For LCD & VF adjustment

No.	Item name	Adjustment value	Remarks
207	SHP PHASE[G]L	0 to 63	NTSC & PAL
208	SHD PHASE[G]L	0 to 63	NTSC & PAL
209	AD OUT PHASE[G]L	0 to 16	NTSC & PAL
210	RESET START[G]R	34 to 36	NTSC & PAL
211	RESET STOP[G]R	0 to 63	NTSC & PAL
212	SHP PHASE[G]R	0 to 63	NTSC & PAL
213	SHD PHASE[G]R	0 to 63	NTSC & PAL
214	AD OUT PHASE[G]R	0 to 63	NTSC & PAL
221	H1 START[B]L	0 to 63	NTSC & PAL
222	H1 STOP[B]L	0 to 63	NTSC & PAL
223	H1 START[B]R	0 to 63	NTSC & PAL
224	H1 STOP[B]R	0 to 8	NTSC & PAL
225	RESET START[B]L	34 to 36	NTSC & PAL
226	RESET STOP[B]L	0 to 63	NTSC & PAL
227	SHP PHASE[B]L	0 to 63	NTSC & PAL
228	SHD PHASE[B]L	0 to 63	NTSC & PAL
229	AD OUT PHASE[B]L	0 to 63	NTSC & PAL
230	RESET START[B]R	34 to 36	NTSC & PAL
231	RESET STOP[B]R	0 to 63	NTSC & PAL
232	SHP PHASE[B]R	0 to 63	NTSC & PAL
233	SHD PHASE[B]R	0 to 63	NTSC & PAL
234	AD OUT PHASE[B]R	0 to 63	NTSC & PAL
241	H1 START[R]L	0 to 63	NTSC & PAL
242	H1 STOP[R]L	0 to 63	NTSC & PAL
243	H1 START[R]R	0 to 63	NTSC & PAL
244	H1 STOP[R]R	0 to 8	NTSC & PAL
245	RESET START[R]L	34 to 36	NTSC & PAL
246	RESET STOP[R]L	0 to 63	NTSC & PAL
247	SHP PHASE[R]L	0 to 63	NTSC & PAL
248	SHD PHASE[R]L	0 to 63	NTSC & PAL
249	AD OUT PHASE[R]L	0 to 16	NTSC & PAL
250	RESET START[R]R	34 to 36	NTSC & PAL
251	RESET STOP[R]R	0 to 63	NTSC & PAL
252	SHP PHASE[R]R	0 to 63	NTSC & PAL
253	SHD PHASE[R]R	0 to 63	NTSC & PAL
254	AD OUT PHASE[R]R	0 to 63	NTSC & PAL
300	CLAMP ALL REST	CANCEL, EXECUTE	NTSC & PAL
301	CLAMP LEVEL[G]L	0 to 63	NTSC & PAL
302	CLAMP LEVEL[G]R	0 to 63	NTSC & PAL
303	CLAMP LEVEL[B]L	0 to 63	NTSC & PAL
304	CLAMP LEVEL[B]R	0 to 63	NTSC & PAL
305	CLAMP LEVEL[R]L	0 to 63	NTSC & PAL
306	CLAMP LEVEL[R]R	0 to 63	NTSC & PAL

3.3 ADJUSTMENT MENU

3.3.1 Switches and Functions Used in Adjustments

Most of the adjustment items employ microcomputer-controlled adjustments using electric potentiometers. The adjustment data is stored in EEPROM.

The switches used in the adjustments and their functions are as follows.

- MENU (STATUS) button : Press to start or exit from the adjustment menu.
- USER 1 , USER 2 : Press to select the adjustment item.
- JOG (SHUTTER) dial (rotate) : Rotate to adjust the selected item.
- JOG (SHUTTER) dial button (push in) : Press to start an adjustment and store the adjustment value in memory.

3.3.2 Procedure

(1) Turn the power ON, while holding the USER 1 and USER 2 buttons
(2) When the power is ON, press the MENU button to display the ADJUST MENU.
(3) Push the JOG dial button so that "*" blinks, and rotate the JOG dial to the specified value while observing the designated TP and measuring instrument. (In this mode, JOG dial rotate while holding the MENU button, then parameter value change quickly.)
(4) After completing the adjustment, push the JOG dial button to delete the "*" and store the adjustment value in memory. (If do not push the JOG dial button, adjustment value will not stored.)
(5) Press the USER 1 and USER 2 button to select the next item to adjust.
(6) Adjust for each item to do same procedure as above (3)(4).
(7) After completing all adjustments, press the MENU button to exit the ADJUST MENU.
(8) To return to normal operation mode, turn the power OFF and ON again.(If did not re-start camera power, camera will be still in ADJUST MODE, so if press the MENU button then ADJUST MENU indicate on the screen and will not indicate normal menu screen.)

```
– – – A D J U S T [ N T S C ] – – –

4 . I N G A I N ( B )
                        *                    Usually not displayed. Starts blinking
                                             when the SHUTTER (JOG) dial is pushed.
   V R   D A T A    :   1 5 5               Potentiometer value
   C T L   O U T    :   1 6 5               D/A output value
   S E T   D A T A  :   2 0 5               Adjustment value currently set
                                                  The value changes when
          R :      G :      B :                    the potentiometer value is
   R E F . X X X    X X X    X X X                 stored in memory.

                                             Displayed as the adjustment menu items.
```
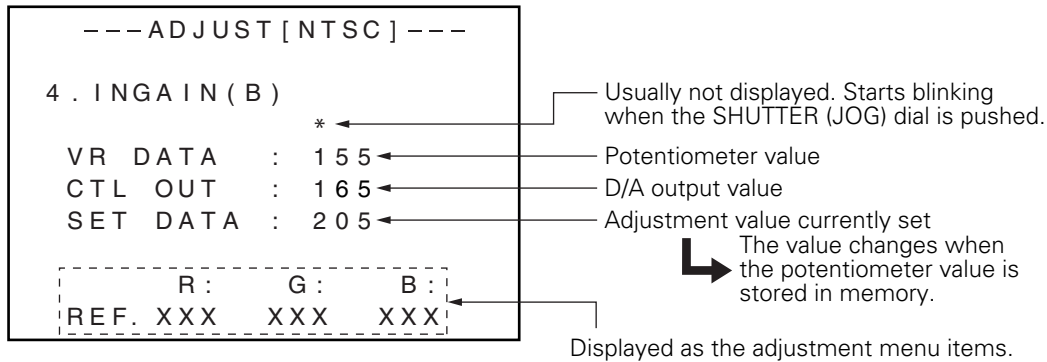
On-screen adjustment menu

3.3.3 Adjustment mode

When setting to adjustment mode with the MENU setting status below, an adjustment mode that outputs PAL signal will be set.
- FRAME RATE : 50/25
- REC : DV-50I

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (↑) Adjustment level (☆)	Adjustment procedure
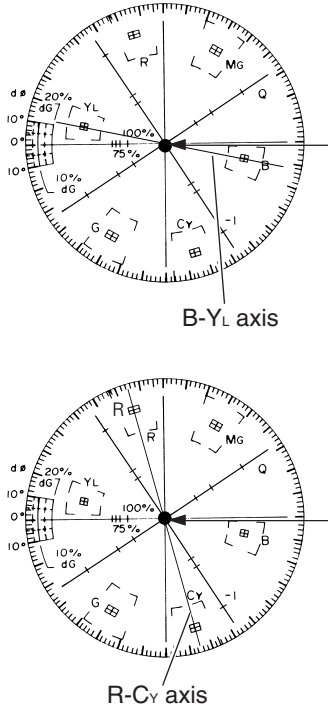
3.4 CAMERA ADJUSTMENTS

3.4.1 Camera adjustments
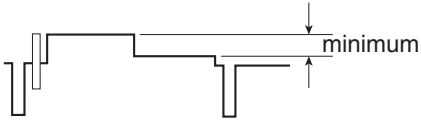
No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (↑) Adjustment level (☆)	Adjustment procedure
1	FH adjustment	Frequency counter	ADJUST MENU	◎ TP[FH] Rewrite board ↑ JOG dial ☆ 27,000,000 ± 30Hz	(1) Press the USER 1/2 button to select ADJUST MENU No.2 "27MHz CAM".(Color bar signal will be output automatically) (2) Push the JOG dial button so that "*" blinks, and then rotate the JOG dial to adjust to the specified value. (3) Press the JOG dial to store the adjustment data.
2	ENCODER adjustment (COMPOSITE)	Oscilloscope	ADJUST MENU	◎ VIDEO OUT ↑ JOG dial ☆ VIDEO level 1.000Vp-p	(1) Press the USER 1/2 button to select ADJUST MENU No.10 "Y LEVEL (COMPOSITE)" . (2) Rotate the JOG dial to the specified value. (3) Press the JOG dial to store the adjustment data.
				◎ VIDEO OUT ↑ JOG dial ☆ BURST level NTSC: 0.286 ± 0.015V PAL: 0.300 ± 0.015V	(4) Press the USER 1/2 button to select ADJUST MENU No.11 "LEVEL" . (5) Rotate the JOG dial to the specified value. (6) Press the JOG dial to store the adjustment data.
3	ENCODER adjustment (COMPONENT)	Oscilloscope	ADJUST MENU	◎ Y OUT ↑ JOG dial ☆ 1.000Vp-p	(1) Press the USER 1/2 button to select ADJUST MENU No.12 "Y LEVEL (COMPONENT)" . (2) Rotate the JOG dial to the specified value. (3) Press the JOG dial to store the adjustment data.
				◎ PB OUT ↑ JOG dial ☆ B-Y level 0.700 Vp-p	(4) Press the USER 1/2 button to select ADJUST MENU No.13 "B-Y (COMPONENT) LEVEL". (5) Rotate the JOG dial to adjust to the specified value. (6) Press the JOG dial to store the adjustment data.
				◎ PR OUT ↑ JOG dial ☆ R-Y level 0.700 Vp-p	(7) Press the USER 1/2 button to select ADJUST MENU No.14 "R-Y LEVEL (COMPONENT)". (8) Rotate the JOG dial to adjust to the specified value. (9) Press the JOG dial to store the adjustment data.

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
4	BLACK adjustment	Oscilloscope	ADJUST MENU	◎ VIDEO OUT ① JOG dial ☆ Minimize the carrier leak	(1) Press the USER 1/2 button to select ADJUST MENU No.20 "FPGA BLACK (B)". (2) Rotate the JOG dial to adjust to the specified value. (3) Press the JOG dial to store the adjustment data.
		![minimum diagram]		◎ VIDEO OUT ① JOG dial ☆ Minimize the carrier leak	(4) Then, Press the USER 1/2 button to select ADJUST MENU No.21 "FPGA BLACK (R)". (5) Rotate the JOG dial to adjust to the specified value. (6) Press the JOG dial to store the adjustment data.
	MASTER BLACK adjustment	Oscilloscope	ADJUST MENU	◎ VIDEO OUT ① JOG dial ☆ 0.053 ± 0.007V	(7) Then, press the USER 1/2 button to select ADJUST MENU No.22 "MASTER BLACK". (8) Rotate the JOG dial to adjust black level to the specified value. NOTE: **At first, set the level over than the specified value.** **And adjust the level of left side becomes equal to the specified value.** (9) Press the JOG dial to store the adjustment data.
		![0.053V diagram]		◎ VIDEO OUT ☆ Less than 0.03Vp-p	(10) Check the CHROMA signal to confirm that the carrier leakage should be specified level.
5	CLAMP LEVEL adjustmen	Lens cap	ADJUST MENU	◎ LCD monitor ① JOG dial ☆ [G] L Ref.: 127 or 128	(1) Press the USER 1/2 button to select ADJUST MENU No. 301 "CLAMP LEVEL[G]L". (2) Rotate the JOG dial to the specified value. (3) Press the JOG dial to store the adjustment data.
| | | ```
–––ADJUST[NTSC]–––

***.CLAMP LEVEL[*]*.
            *
VR DATA  : 155
CTL OUT  : 165
SET DATA : 205
         R:   G:    B:
REF. L  XXX  XXX   XXX
REF. R  XXX  XXX   XXX
``` | | ◎ LCD monitor<br>① JOG dial<br>☆ [G] L Ref.: 127 or 128 | (4) Press the USER 1/2 button to select ADJUST MENU No. 302 "CLAMP LEVEL[G]R".<br>(5) Rotate the JOG dial to the specified value.<br>(6) Press the JOG dial to store the adjustment data. |

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (↕) Adjustment level (☆)	Adjustment procedure
| | | ```
– – – A D J U S T [ N T S C ] – – –

* * * . C L A M P   L E V E L [ * ] * .
                    *
V R   D A T A    :   1 5 5
C T L   O U T    :   1 6 5
S E T   D A T A  :   2 0 5
            R :      G :     ┌B :┐
R E F . L   X X X    X X X   │X X X│
R E F . R   X X X    X X X   └X X X┘
``` | | ◎ LCD monitor<br>↕ JOG dial<br>☆ [B] L Ref.: 127 or 128 | (7) Press the USER 1/2 button to select ADJUST MENU No. 303 "CLAMP LEVEL[B]L".<br>(8) Rotate the JOG dial to the specified value.<br>(9) Press the JOG dial to store the adjustment data. |
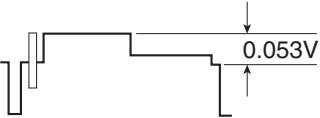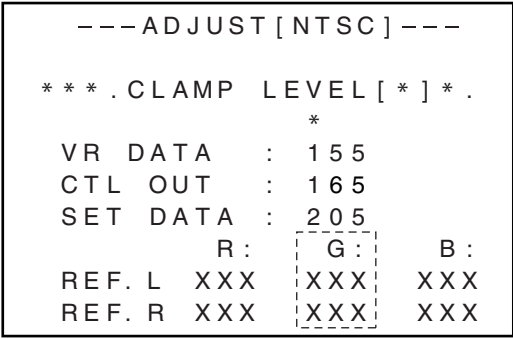| | | | | ◎ LCD monitor
↕ JOG dial
☆ [B] R Ref.: 127 or 128 | (10) Press the USER 1/2 button to select ADJUST MENU No. 304 "CLAMP LEVEL[B]R".
(11) Rotate the JOG dial to the specified value.
(12) Press the JOG dial to store the adjustment data. |
| | | ```
– – – A D J U S T [ N T S C ] – – –

* * * . C L A M P   L E V E L [ * ] * .
                    *
V R   D A T A    :   1 5 5
C T L   O U T    :   1 6 5
S E T   D A T A  :   2 0 5
          ┌R :┐     G :      B :
R E F . L │X X X│    X X X    X X X
R E F . R └X X X┘    X X X    X X X
``` | | ◎ LCD monitor<br>↕ JOG dial<br>☆ [R] L Ref.: 127 or 128 | (13) Press the USER 1/2 button to select ADJUST MENU No. 305 "CLAMP LEVEL[R]L".<br>(14) Rotate the JOG dial to the specified value.<br>(15) Press the JOG dial to store the adjustment data. |
				◎ LCD monitor ↕ JOG dial ☆ [R] R Ref.: 127 or 128	(16) Press the USER 1/2 button to select ADJUST MENU No. 306 "CLAMP LEVEL[R]R". (17) Rotate the JOG dial to the specified value. (18) Press the JOG dial to store the adjustment data.
6	IN GAIN adjustment	Vectorscope Gray scale chart	ADJUST MENU	◎ LCD display ↕ Lens Iris ☆ [G] Ref.: 370 ± 5	(1) While shooting the gray scale chart, set the Lens iris so that the [G] ref. data is specified value.
		B-Y_L axis		◎ VIDEO OUT ↕ JOG dial ☆ Position the noise on the B-Y_L axis at the center of the Vectorscope	(2) Press the USER 1/2 button to select ADJUST MENU No. 41 "IN GAIN(B)". (3) Rotate the JOG dial to the specified value. (4) Press the JOG dial to store the adjustment data.
				◎ VIDEO OUT ↕ JOG dial ☆ Position the noise on the R-C_Y axis at the center of the Vectorscope	(5) Press the USER 1/2 button to select ADJUST MENU No. 42 "IN GAIN(R)". (6) Rotate the JOG dial to the specified value. (7) Press the JOG dial to store the adjustment data.
		R-C_Y axis		◎ VIDEO OUT ↕ JOG dial ☆ Position the noise at the center of the Vectorscope carrier leak: less than 0.03V	(8) Repeat the adjustment from (1) to (6) avobe, adjust such that the position the noise becomes center of the Vectorscope. (9) Check the carrier leak of white window portion is specified value.

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
7	FLARE adjustment	Vectorscope Gray scale chart	ADJUST MENU	◎ LCD display ① Lens Iris ☆ Video level: 200%	(1) While shooting the gray scale chart, set the Lens iris so that the [G] ref. data is 370 ± 5. (2) Then, open the Lens iris by one step.
		B-Y_L axis		◎ VIDEO OUT ① JOG dial ☆ Position the noise on the B-Y_L axis at the center of the Vectorscope	(3) Press the USER 1/2 button to select ADJUST MENU No. 43 "FPGA FRARE(B)". (4) Rotate the JOG dial to the specified value. (5) Press the JOG dial to store the adjustment data.
				◎ VIDEO OUT ① JOG dial ☆ Position the noise on the R-C_Y axis at the center of the Vectorscope	(6) Press the USER 1/2 button to select ADJUST MENU No. 44 "FPGA FRARE(R)". (7) Rotate the JOG dial to the specified value. (8) Press the JOG dial to store the adjustment data.
		R-C_Y axis		◎ VIDEO OUT ① JOG dial ☆ Position the noise at the center of the Vectorscope carrier leak: less than 0.03V	(9) Repeat the adjustment from (3) to (8) avobe, adjust such that the position the noise becomes center of the Vectorscope. (10) Check the carrier leak of white black portion is specified value.
8	MASTER FRARE adjustment	–	ADJUST MENU	◎ LCD display ① JOG dial ☆ VR DATA: 15	(1) Press the USER 1/2 button to select ADJUST MENU No. 45 "MASTER FRARE(B)". (2) Rotate the JOG dial to the specified value. (3) Press the JOG dial to store the adjustment data.
9	COREING [G] adjustment	Oscilloscope	ADJUST MENU	◎ VIDEO OUT ① JOG dial ☆ Noise level on the left and right sides of the screen should have same.	(1) Press the USER 1/2 button to select ADJUST MENU No. 46 "COREING[G]L" or ADJUST MENU No. 47 "COREING[G]R". (2) Rotate the JOG dial to the specified value. (3) Press the JOG dial to store the adjustment data.
10	COREING [B] adjustment	Oscilloscope	ADJUST MENU	◎ VIDEO OUT ① JOG dial ☆ Noise level on the left and right sides of the screen should have same.	(1) Press the USER 1/2 button to select ADJUST MENU No. 48 "COREING[B]L" or ADJUST MENU No. 49 "COREING[B]R". (2) Rotate the JOG dial to the specified value. (3) Press the JOG dial to store the adjustment data.
11	COREING [R] adjustment	Oscilloscope	ADJUST MENU	◎ VIDEO OUT ① JOG dial ☆ Noise level on the left and right sides of the screen should have same.	(1) Press the USER 1/2 button to select ADJUST MENU No. 50 "COREING[R]L" or ADJUST MENU No. 51 "COREING[R]R". (2) Rotate the JOG dial to the specified value. (3) Press the JOG dial to store the adjustment data.

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (↥) Adjustment level (☆)	Adjustment procedure
12	BLACK L/R OFFSET adjustment	Oscilloscope	ADJUST MENU	◎ VIDEO OUT ↥ JOG dial ☆ The black level on the left and right side of the screen should have same level	(1) Press the USER 1/2 button to select ADJUST MENU No. 23 "BLACK OFFSET (G)". (2) Rotate the JOG dial to the specified value. (3) Press the JOG dial to store the adjustment data.
		Oscilloscope	ADJUST MENU	◎ VIDEO OUT ↥ JOG dial ☆ The black level on the left and right side of the screen should have same level	(4) Press the USER 1/2 button to select ADJUST MENU No. 24 "BLACK OFFSET (B)". (5) Rotate the JOG dial to the specified value. (6) Press the JOG dial to store the adjustment data.
		minimum		◎VIDEO OUT ↥ JOG dial ☆ The black level on the left and right side of the screen should have same level	(7) Press the USER 1/2 button to select ADJUST MENU No. 25 "BLACK OFFSET (R)". (8) Rotate the JOG dial to the specified value. (9) Press the JOG dial to store the adjustment data.
				◎ VIDEO OUT ↥ JOG dial ☆ The black level on the left and right side of the screen should have same level	(10) Repeat the adjustment from (4) to (9) above, adjust such that the right and left sides of the vectorscope become equal.
13	CROSS TALK adjustment	Monitor TV Point light source (incandescent lamp of more than 40W)	ADJUST MENU	◎ VIDEO OUT ↥ JOG dial ☆ The level at the edge on the right screen should not be obvious.	(1) Press the USER 1/2 button to select ADJUST MENU No. 249 "AD OUTPUT PHASE (R)L". (2) Set to a dark background and take photo such that the point light source appears on the left of the screen. (3) Rotate the JOG dial to the specified value. (4) Press the JOG dial to store the adjustment data.

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
14	WHITE L/R OFFSET [G]	Oscilloscope Gray scale chart	ADJUST MENU	◎ VIDEO OUT ① Lens IRIS ☆ Video level : 0.98 V (95IRE)	(1) Adjust the lens iris so that the white level on the gray scale chart is specified value.
		Oscilloscope Monitor TV	ADJUST MENU	◎ VIDEO OUT ① JOG dial	(2) Press the USER 1/2 button to select ADJUST MENU No. 37 "WHITE OFFSET (G)". (3) Rotate the JOG dial to the specified value. (4) Press the JOG dial to store the adjustment data.
	LINEARITY adjustment	Oscilloscope Gray scale chart	ADJUST MENU	◎ VIDEO OUT ① Lens IRIS ☆ The level difference between left and right should be maximum	(1) Press the USER 1/2 button to select ADJUST MENU No. 205 "RESET START (G)L". (2) While shooting the gray scale chart, set the Lens iris so that the video out level is specified value.
				◎ VIDEO OUT ① JOG dial ☆ The step levels of left and right should be the same.	(3) Rotate the JOG dial to the specified value. (4) Press the JOG dial to store the adjustment data. NOTE: **When the adjustment cannot be made, change the value of ADJUST MENU No. 210 "RESET START [G]R", readjust (1) to (4) such that the level difference becomes minimum.**
					(5) When the adjustments of No. WHITE OFFSET and No. LINEARITY cannot be made, change the setting of ADJUST MENU No. 204 "H1 STOP (G)R" to the sequence as shown below and readjust the 2 adjustments above. Initial setting "5" → "6" → "7" → "4".

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
15	WHITE L/R OFFSET [B]	Oscilloscope Gray scale chart	ADJUST MENU	◎ VIDEO OUT ① Lens IRIS ☆ Adjust such that the 100 % white portion of the color bar and the white portion of the gray scale have same level.	(1) Adjust the lens iris so that the white level on the gray scale chart is specified value.
		Oscilloscope Monitor TV	ADJUST MENU	◎ VIDEO OUT ① JOG dial ☆ Eliminate the gap of the H rate output waveform, and no line should be seen at the center of the monitor TV screen.	(2) Press the USER 1/2 button to select ADJUST MENU No. 38 "WHITE OFFSET (B)". (3) Rotate the JOG dial to the specified value. (4) Press the JOG dial to store the adjustment data.
	LINEARITY adjustment	Oscilloscope Gray scale chart	ADJUST MENU	◎ VIDEO OUT ① Lens Iris ☆ The level difference between left and right should be maximum	(1) Press the USER 1/2 button to select ADJUST MENU No. 225 "RESET START (B)L". (2) While shooting the gray scale chart, set the Lens iris so that the video out level is specified value.
				◎ VIDEO OUT ① JOG dial ☆ The step levels of left and right should be the same.	(3) Rotate the JOG dial to the specified value. (4) Press the JOG dial to store the adjustment data. ┌─ NOTE: ─ **When the adjustment cannot be made, change the value of ADJUST MENU No. 230 "RESET START [B]R", readjust (1) to (4) such that the level difference becomes minimum.**
					(5) When the adjustments of No. WHITE OFFSET and No. LINEARITY cannot be made, change the setting of ADJUST MENU No. 224 "H1 STOP (G)R" to the sequence as shown below and readjust the 2 adjustments above. Initial setting "5" → "6" → "7" → "4".

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
16	WHITE L/R OFFSET [R]	Oscilloscope Gray scale chart	ADJUST MENU	◎ VIDEO OUT ① Lens IRIS ☆ Adjust such that the 100 % white portion of the color bar and the white portion of the gray scale have same level.	(1) Adjust the lens iris so that the white level on the gray scale chart is specified value.
		Oscilloscope Monitor TV	ADJUST MENU	◎ VIDEO OUT ① JOG dial ☆ Eliminate the gap of the H rate output waveform, and no line should be seen at the center of the monitor TV screen.	(2) Press the USER 1/2 button to select ADJUST MENU No. 39 "WHITE OFFSET (R)". (3) Rotate the JOG dial to the specified value. (4) Press the JOG dial to store the adjustment data.
	LINEARITY adjustment	Oscilloscope Gray scale chart	ADJUST MENU	◎ VIDEO OUT ① Lens Iris ☆ The level difference between left and right should be maximum	(1) Press the USER 1/2 button to select ADJUST MENU No. 245 "RESET START (R)L". (2) While shooting the gray scale chart, set the Lens iris so that the video out level is specified value. ┌ NOTE: ─ **When the adjustment cannot be made, change the value of ADJUST MENU No. 250 "RESET START [R]R", readjust (1) to (4) such that the level difference becomes minimum.**
				◎ VIDEO OUT ① JOG dial ☆ The step levels of left and right should be the same.	(3) Rotate the JOG dial to the specified value. (4) Press the JOG dial to store the adjustment data.
					(5) When the adjustments of No. WHITE OFFSET and No. LINEARITY cannot be made, change the setting of ADJUST MENU No. 244 "H1 STOP (G)R" to the sequence as shown below and readjust the 2 adjustments above. Initial setting "5" → "6" → "7" → "4".

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (�①) Adjustment level (☆)	Adjustment procedure

3.4.2 AUDIO adjustment

Audio adjustments are required to input the test signal from LINE input.
All switches and VR's should be set the position as below table.

AUDIO INPUT (INPUT1/INPUT2)	: LINE	AUDIO MODE (MENU)	: 48k
CH2 INPUT	: INPUT 2	AUDIO SELECT	: MANUAL
AUDIO REF.LEVEL (MENU)	: –20dB	MONITOR SELECT	: BOTH
OUTPUT CHARACTOR (MENU)	: ON	WIND CUT (MENU)	: OFF
TEST TONE (MENU)	: OFF		

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (↑) Adjustment level (☆)	Adjustment procedure
1	INPUT LEVEL setting	Audio tester 1KHz/+4dBs	Camera mode	◎ LINE OUT ↑ AUDIO LEVEL VR ☆ -8dBs	(1) Input the test signal (1KHz /+4dBs) to the LINE input, adjust the adjustment point to the specified level.
2	Audio level meter adjustment	1KHz/+4dBs	Camera mode LCD should be Spread indication ADJUST MENU No.60 : AUDIO LEVEL (CH-1) No.61 : AUDIO LEVEL (CH-2)	◎ LCD MONITOR (Audio level meter) ↑ Auto adjustment ☆ -20dBs	(1) This adjustment item should be do after complete the INPUT LEVEL setting. (2) Press the USER 1/2 button to select ADJUST MENU No.60 "AUDIO LEVEL (CH1)". (3) Press the JOG dial to display (blink) the * mark on the adjustment screen. (4) Press the JOG dial again to clear the * mark display. (5) Press the USER1 button to select ADJUST MENU No.61 "AUDIO LEVEL (CH2). (6) Perform the adjustment using steps same as (3) and (4) above. (7) Turn off the power once and turn it on again. (8) Press the DISPLAY button to select enlarged display for the LCD level meter. (9) Check that the LCD level meter is lit to the level of –20dB.

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure

3.4.3 MONITOR LCD adjustment

For the MONITOR LCD adjustment, the following adjustment are required only. Other adjustment items should be default value.

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
1	COMMON DC adjustment	—	ADJUST MENU	◎ MONITOR LCD ① JOG dial ☆ Minimize the flicker	(1) Press the USER 1/2 button to select ADJUST MENU No.78,"COMMON DC". (2) Set the MONITOR LCD to field invert mode, rotate the JOG dial to adjust to the specified level. (3) Press the JOG dial to store the adjustment data.
2	VCO adjustment	—	ADJUST MENU	◎ MONITOR LCD ① JOG dial ☆ Most stable point for monitor screen	(1) Press the USER 1/2 button to select ADJUST MENU No.80."VCO FINE". (2) Rotate the JOG dial to adjust to the specified level. **NOTE:** **If adjustment cannot be done, change ADJUST MENU No. 82 "VCO COARSE" to 3 or 5 and readjust.** (3) Press the JOG dial to store the adjustment data.
3	H-POSITION adjustment	Gray scale chart	ADJUST MENU	◎ MONITOR LCD ① JOG dial ☆ Screen centering	(1) Press the USER 1/2 button to select ADJUST MENU No.83,"H POSITION". (2) Rotate the JOG dial to adjust the marker to horizontal center of the screen. (3) Press the JOG dial to store the adjustment data.

For item 2 (VCO adjustment):

NG   OK   OK   NG

For item 3 (H-POSITION adjustment):

50 %   50 %

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
4	SUB BRIGHT adjustment	Oscilloscope		◎ LCD display ☆ Y level Should be 200 mV ~ 400 mV.	(1) Shoot the LCD Screen using other cameras. (2) Check the camera output taken from the LCD Screen using a oscilloscope. (3) Check that the minimum level is above 200 mV and the maximum level is above 400 mV.
		Vectorscope	ADJUST MENU	◎LCD display ① JOG dial ☆ Position the noise on the B-YL axis at the center of the vectorscope.	(4) Press the USER 1/2 button to select ADJUST MENU No. 70 "SUB BRIGHT (B)". (5) Rotate the JOG dial to the specified value. (6) Press the JOG dial to store the adjustment data.
				◎LCD display ① JOG dial ☆ Position the noise on the R-CY axis at the center of the vectorscope.	(7) Press the USER 1/2 button to select ADJUST MENU No. 71 "SUB BRIGHT (R)". (8) Rotate the JOG dial to the specified value. (9) Press the JOG dial to store the adjustment data.
				◎LCD display ① JOG dial ☆ Position the noise at the center of the vectorscope.	(10) Repeat the adjustment from (4) to (9) above, adjust such that the right and left sides of the vectorscope become equal.

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure

3.4.4 VIEWFINDER adjustment

For the VIEWFINDER adjustment, the following adjustment are required only. Other adjustment items should be default value.

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
1	VF COMMON DC adjustment		ADJUST MENU	◎ VIEWFINDER ① JOG dial ☆ Minimize the flicker	(1) Press the USER 1/2 button to select ADJUST MENU No.93,"VF COMMON DC". (2) Rotate the JOG dial to adjust to the specified level. (3) Press the JOG dial to store the adjustment data.
2	VF VCO adjustment		ADJUST MENU	◎ VIEWFINDER ① JOG dial ☆ Most stable point for monitor screen NG　OK　OK　NG	(1) Press the USER 1/2 button to select ADJUST MENU No.95."VF VCO L". (2) Rotate the JOG dial to adjust to the specified level. **NOTE:** **If adjustment cannot be done, change ADJUST MENU No. 96 "VF VCO H" to 3 or 5 and readjust.** (3) Press the JOG dial to store the adjustment data.
3	VF H-POSI-TION adjustment	Gray scale chart	ADJUST MENU	◎ VIEWFINDER ① JOG dial ☆ Screen centering 50 %　50 %	(1) Press the USER 1/2 button to select ADJUST MENU No.97,"VF H POSITION". (2) Rotate the JOG dial to adjust the marker to horizontal center of the screen. (3) Press the JOG dial to store the adjustment data.

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
4	VF V-POSI-TION adjustment	Gray scale chart	ADJUST MENU	◎ VIEWFINDER ① JOG dial ☆ Screen centering	(1) Press the USER 1/2 button to select ADJUST MENU No.98 "VF V POSITION". (2) Shooting the Grey scale chart and rotate the JOG dial to adjust the white part in the middle of Grayscale so that it is at the center of the screen. (3) Press the JOG dial to store the adjustment data.
5	VF SUB BRIGHT adjustment	Oscilloscope		◎ View Finder ① VF BRIGHT level ☆ Y level The maximum level should be 500 mV.	(1) Shoot the View Finder using other cameras. (2) Check the camera output taken from the View Finder using a oscilloscope. (3) Check that the maximum level is shown around the center of V rate. (4) Adjust such that the maximum level is above 500 mV.
		Vectorscope	ADJUST MENU	◎ View Finder ① JOG dial ☆ Position the noise on the B-YL axis at the center of the vectorscope.	(5) Press the USER 1/2 button to select ADJUST MENU No. 85 "VF SUB BRIGHT (B)". (6) Rotate the JOG dial to the specified value. (7) Press the JOG dial to store the adjustment data.
				◎ View Finder ① JOG dial ☆ Position the noise on the R-CY axis at the center of the vectorscope.	(8) Press the USER 1/2 button to select ADJUST MENU No. 86 "VF SUB BRIGHT (R)". (9) Rotate the JOG dial to the specified value. (10) Press the JOG dial to store the adjustment data.
				◎ View Finder ① JOG dial ☆ Position the noise at the center of the vectorscope.	(11) Repeat the adjustment from (5) to (10) above, adjust such that the right and left sides of the vectorscope become equal.

50 %

50 %

3.5 DVC UNIT ADJUSTMENTS

Preparation : Connect the Rewrite board (CK453800C) to CN801 on the DBCD board. Connect it in the orientation shown in Fig. 3.4, so that the test point surface (component mounting surface) faces upward.

> **NOTE:**
> **When adjusting this item, set the MODE switch to VTR.**

REWRITE BOARD

Fig. 3.4 Rewrite board connection method

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
1	PB switching point adjustment	Alignment tape, NTSC : MC-1, PAL : MC-2 color bar recorded section	• PLAY • ADJUST MENU, 100. PB SW POINT	◎ TP6 (SPA) ◎ TP9 (ENV OUT) TRIG: TP5 (HID) GND: TP1 (GND) [Rewrite board] ① Auto adjustment ☆ a, b = 126 µs sec ± 10 µs sec	(1) Press the EDIT USER 1/2 button to select ADJUST MENU No. 100, "PB SW POINT". (2) Play the alignment tape. Ensure that the compatibility adjustment has been performed and the FM waveform at TP9 (ENV OUT) is flat and stable. (3) Press the JOG dial to cause the * marking to blink. The PB switching point will be adjusted automatically.

HID (TP5)

SPA (TP6)

ENV OUT (TP9)

a, b : 126µ sec ±10µ sec

```
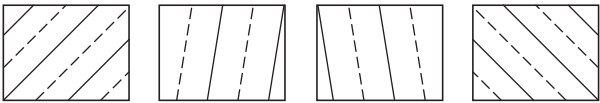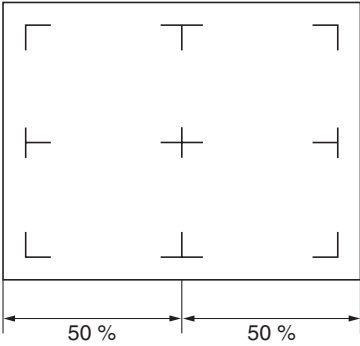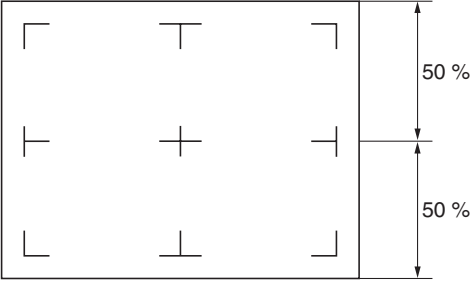--- ADJUST MENU ---

100.PB  SW  POINT
                  *
VR DATA  :  - - - -
CTL DATA :  1 2 0
SET DATA :  1 2 0


DATA : 0 0 0 0 0 0 0 0
```

← Rotate the JOG dial to display data.

After displaying the data, press the JOG dial to complete the adjustment.

(4) Measure TP6 (SPA) by triggering TP5 (HID) and confirm that the values a and b are within the specified ranges.
(5) Rotate the JOG dial to display the adjustment data in the "DATA:" field. (The DATA value should not be 00000000 or FFFFFFFF.)
(6) Press the [JOG] button so that the * marking stops blinking. Now the adjustment is complete.

> **NOTE:**
> **Make sure that the data value is displayed before pressing the JOG dial. If this adjustment is completed before the data value is displayed the adjustment value will not be put into the memory.**

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (⓪) Adjustment level (☆)	Adjustment procedure
2	ME SP VCO [Error rate adjustment]	Oscilloscope Self-recording tape	• Self-REC/ PLAY • ADJUST MENU No.102	◎ TP2 (SBE) [REWRITE BOARD] ⓪ JOG dial ☆ Minimum error rate, which should be = 498 or less (per CH)	Note: • **Be sure to use a brand-new tape for this adjustment.** • **Be sure to clean the drum with a head cleaning tape before adjustment.** • **The error rate should be mesured with the Viterbi OFF. The Viterbi is set to OFF automatically when the adjustment mode is entered.**

```
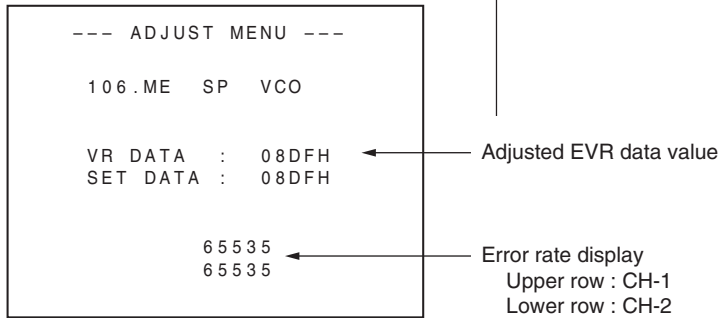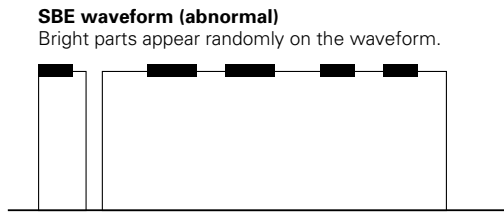  --- ADJUST MENU ---
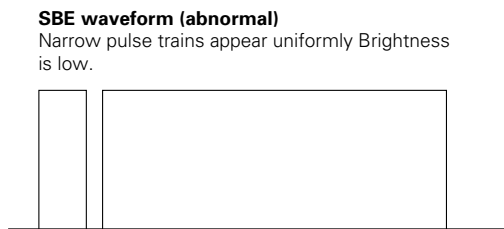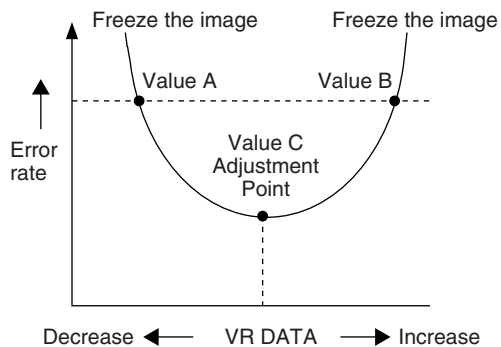
  106.ME  SP  VCO


  VR DATA  :  08DFH      ←——— Adjusted EVR data value
  SET DATA :  08DFH


       65535            ←——— Error rate display
       65535                  Upper row : CH-1
                              Lower row : CH-2
```

Fig. 3.5.2 (1) SP VCO Menu

SBE waveform (abnormal)
Bright parts appear randomly on the waveform.

Fig. 3.5.2 (2)

SBE waveform (abnormal)
Narrow pulse trains appear uniformly Brightness is low.

Fig. 3.5.2 (3)

Fig. 3.5.2 (4) Consept of the adjustment

(1) Prior to the procedure below, prepare self-recording tape.
(2) Select "102. ME SP VCO" adjustment.
(3) Play back the self recording tape, and decrease the VR DATA to make the SBE waveform abnormal. (Fig. 3.5.2(2)) (Pressing the [STATUS] button simultaneously with the JOG dial varies the adjustment value by ±10 steps)
(4) Increase the adjustment VR DATA little by little, and define the point where the SBE waveform becomes normal as value "A". (Fig. 3.5.2(3))
(5) Increase the adjustment VR DATA to make the SBE waveform abnormal. (Fig. 3.5.2(2))
(6) Decrease the adjustment VR DATA little by little, and define the point where the SBE waveform becomes normal as "B". (Fig. 3.5.2(3))
(7) Calculate the intermediate value "C" between the point A and the point B, and set the value C. (Since the adjustment values are hex number, use a functional computation-capable calculator or the PC calculator provided in Accessories.)
Setting value C=(A+B)/2
(8) Confirm that the error rate value is 498 or less in each channel.
(9) Check the tolerance of adjustment. Shift the adjustment value against the setting value by ±60h.
Conform that the error rate is 3,000 or less in each channel. When the error rate is over 3,000, recheck the adjustment procedure from (4).
(For example, when the adjustment value is "9ED", ±60h is "A4D" and "98D". So, shift the value to "A4D" and "98D", and check the tolerance of error rate adjustment.)
(10) Return the adjustment value to the setting value C, and Press the JOG dial to store the adjustment data.

No.	Item	Measuring instruments & Input signals	Mode	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
3	FS PLL 48 kHz adjustment	No input. Frequency counter	EE ADJUST MENU,110. FS PLL 48 kHz	◎ TP4 (FS PLL) GND: TP1 (GND) [Rewrite board] ① JOG dial ☆ 12.288 MHz ± 0.1 MHz	(1) Press the USER 1/2 button to select ADJUST MENU No. 103, "FS PLL 48 kHz". (2) Adjust the frequency to the specified level. (3) Press the JOG dial to store the adjustment data.
4	FS PLL 44.1 kHzHz adjustment	No input Frequency counter	EE ADJUST MENU, 111. FS PLL 44.1 kHz	◎ TP4 (FS PLL) GND: TP1 (GND) [Rewrite board] ① JOG dial ☆ 11.2896 MHz ± 0.1 MHz	(1) Press the USER 1/2 button to select ADJUST MENU No. 104, "FS PLL 44.1 kHz". (2) Adjust the frequency to the specified level. (3) Press the JOG dial to store the adjustment data.
5	27 MHz VCO center frequency adjustment	No input. Frequency counter	EE ADJUST MENU,113. 27 MHz VCO	◎ TP7 (MAIN VCO) GND: TP1 (GND) [Rewrite board] ① JOG dial ☆ 13.5 MHz ± 0.1 MHz	(1) Press the USER 1/2 button to select ADJUST MENU No. 106, "27 MHz VCO". (2) Adjust the frequency to the specified level. (3) Press the JOG dial to store the adjustment data.

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