SONY

PROFESSIONAL DISC RECORDER

PDW-F1600

MPEG TS BOARD
PDBK-201

XDCAM HD
Professional Disc System

Professional Disc
DL

MPEG HD422

CINEALTA

MAINTENANCE MANUAL
Volume 1 1st Edition (Revised 1)

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠ AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l’entretien. Afin de réduire les risques de décharge électrique, d’incendie ou de blessure n’effectuer que les réparations indiquées dans le mode d’emploi à moins d’être qualifié pour en effectuer d’autres. Pour toute réparation faire appel à une personne compétente uniquement.

安全のために，周辺機器を接続する際は，過大電圧を持つ可能性があるコネクターを以下のポートに接続しないでください。
：NETWORKコネクター
上記のポートについては本書の指示に従ってください。

For safety, do not connect the connector for peripheral device wiring that might have excessive voltage to the following port(s).
: NETWORK connector
Follow the instructions for the above port(s).

注意

指定以外の電池に交換すると，破裂する危険があります。
使用済の電池は，説明書に従って処理してください。

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

Vorsicht!

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Ersatz nur durch denselben oder einen vom Hersteller empfohlenen ähnlichen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

ADVARSEL!

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

ADVARSEL

Lithiumbatteri - Eksplosjonsfare.
Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandøren.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en likvärdig typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt gällande föreskrifter.

VAROITUS

Paristo voi räjähtää jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

Laser Diode Properties

Wavelength :	400 to 410 nm
Emission duration :	Continuous
Laser output power :	135 mW (max. of pulse peak.) 65 mW (max. of CW)
Standard :	IEC60825-1 (2001)

CAUTION

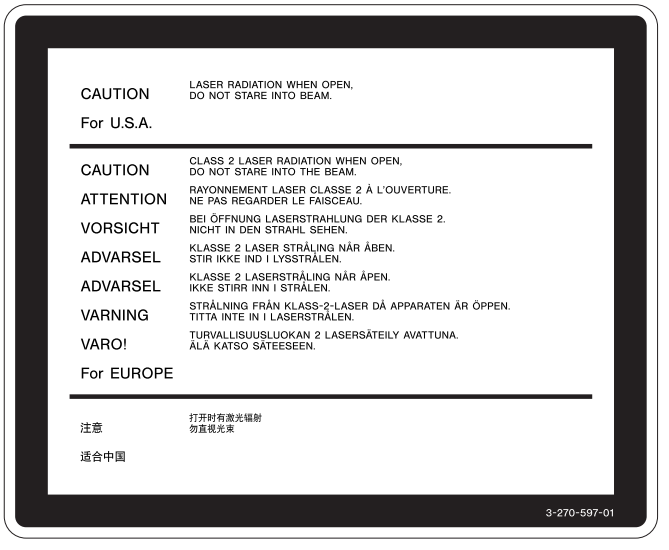
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CAUTION

The use of optical instruments with this product will increase eye hazard.

CLASS 1 LASER PRODUCT
LASER KLASSE 1 PRODUKT
LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

This Professional Disc Recorder is classified as a CLASS 1 LASER PRODUCT.



This label is located on the top panel of the drive unit.

GEFAHR

Bei geöffnetem Laufwerk und beschädigter oder deaktivierter Verriegelung tritt ein unsichtbarer Laserstrahl aus. Direkter Kontakt mit dem Laserstrahl ist unbedingt zu vermeiden.

Attention-when the product is installed in Rack:

1. **Prevention against overloading of branch circuit**
   When this product is installed in a rack and is supplied power from an outlet on the rack, please make sure that the rack does not overload the supply circuit.

2. **Providing protective earth**
   When this product is installed in a rack and is supplied power from an outlet on the rack, please confirm that the outlet is provided with a suitable protective earth connection.

3. **Internal air ambient temperature of the rack**
   When this product is installed in a rack, please make sure that the internal air ambient temperature of the rack is within the specified limit of this product.

4. **Prevention against achieving hazardous condition due to uneven mechanical loading**
   When this product is installed in a rack, please make sure that the rack does not achieve hazardous condition due to uneven mechanical loading.

5. **Install the equipment while taking the operating temperature of the equipment into consideration**
   For the operating temperature of the equipment, refer to the specifications of the Operation Manual.

6. **When performing the installation, keep the following space away from walls in order to obtain proper exhaust and radiation of heat.**
   Top: 2 cm (1 inches) or more
   Right, Left: 2 cm (1 inches) or more
   Rear: 25 cm (10 inches) or more

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9. Circuit Description

Manual Structure

Purpose of this manual

There are volume 1 and volume 2 in the Maintenance manual of PDW-F1600.
The service manuals (volume 1, 2) are intended for use by trained system and service engineers, and provides the information of maintenance and detailed service.

Related manuals

The following manuals are available in this model.
If this manual is required, please contact your local Sony Sales Office/Service Center.

- **Operation Manual (Supplied with the unit)**
  This manual is necessary for application and operation (and installation) of this unit.

- **Maintenance Manual**
  Volume 1: Describes about maintenance information, parts replacement, and guideline for adjustment.
  Part number: 9-968-649-0X
  Volume 2: Describes about block diagrams, schematic diagrams and detailed parts list required for parts-level service.
  Part number: 9-968-650-0X

- **“Semiconductor Pin Assignments” CD-ROM**
  This “Semiconductor Pin Assignments” CD-ROM allows you to search for semiconductors used in Broadcast and Professional equipment.
  This manual contains a complete list of semiconductors and their ID Nos., and thus should be used together with the CD-ROM.
  Part number: 9-968-546-06

Trademarks

Trademarks and registered trademarks used in this manual are follows.

- Ethernet is a registered trademark of Xerox Corporation.

Section 1
Service Overview

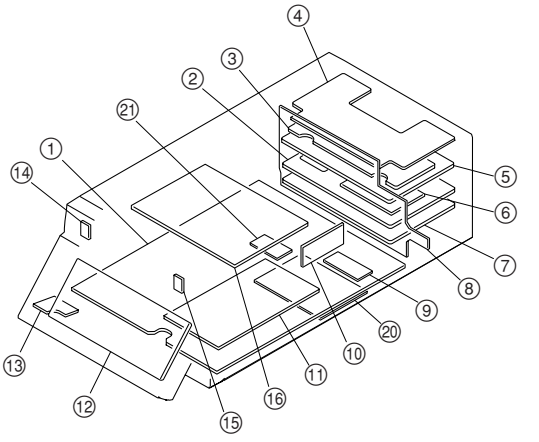
1-1. Circuit Function

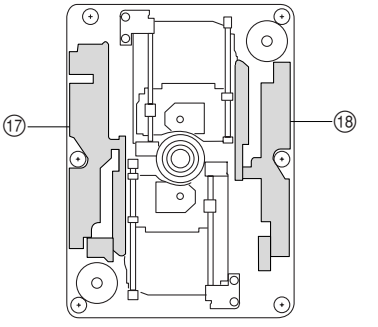
System configuration	Board name	Circuit function	Location No.
Digital process	HPR-23	Audio/Video/Core process/Host	①
and	ENC-107	MPEG HD encode	⑪
Video process	VPR-99	REF/Composite/AES I/O	②
	IF-1073	i.LINK PHY	⑨
Audio process	HPR-23	Audio process	①
	AU-311	Analog, audio I/O, A/D, D/A process	⑤
	HP-141	Headphone connector	⑬
HDSDI module	RX-93H	HDSDI module	⑥
Control panel	KY-624	Control panel (LCD/SW/JOG/SHUTTLE)	⑫
Network and	NET-4	Network, TC, USB, i. S400 (i.LINK)	⑦
I/O		REMOTE, VIDEO CONTROL I/O	
Other	EM-6	Electric double layer cap	⑩
Drive unit/	DR-601	Drive main	⑯
Sensor	SE-850	Acceleration sensor/Angular velocity sensor/ Cartridge sensor/Seek motor	⑰
	SE-851	Cartridge sensor/DEW sensor/Seek motor	⑱
	SE-852	Loading position sensor/ Cartridge sensor/ STB OFF sensor	⑲
Power supply	PS-726	AC/DC, DC IN AC/DC select	④
	RE-245	DC-DC out	③
Hardware key	DU-477	Hardware key	㉑
Option	TSI-60 (PDBK-201)	MPEG TS Input/Output	⑳

1-2. Location of Main Parts

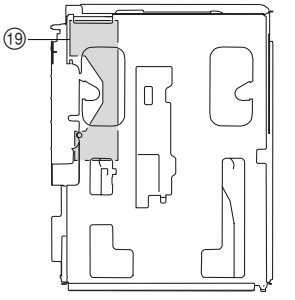
1-2-1. Printed Circuit Boards

AU-311 ..... ⑤
DR-601 ..... ⑯
EM-6 ..... ⑩
ENC-107 ..... ⑪
HP-141 ..... ⑬
HPR-23 ..... ①
IF-1073 ..... ⑨
MB-1113 ..... ⑧
NET-4 ..... ⑦
PS-726 ..... ④
RE-245 ..... ③
RX-93H ..... ⑥
SE-850 ..... ⑰
SE-851 ..... ⑱
SE-852 ..... ⑲
SW-1353 ..... ⑭
SW-1354 ..... ⑮
TSI-60 ..... ⑳
VPR-99 ..... ②
KY-624 ..... ⑫
DU-477 ..... ㉑





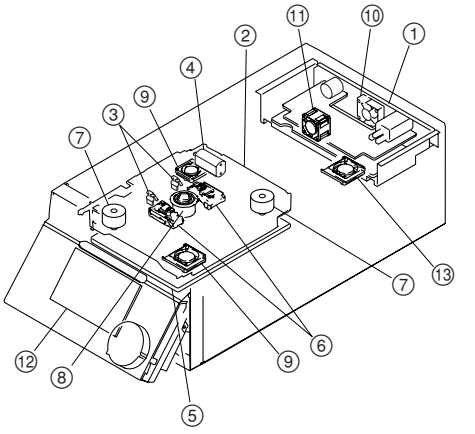
<Drive top view>



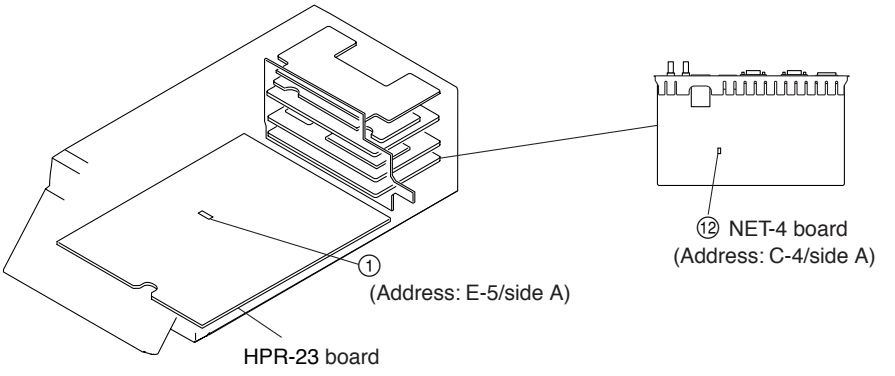
<Loader top view>

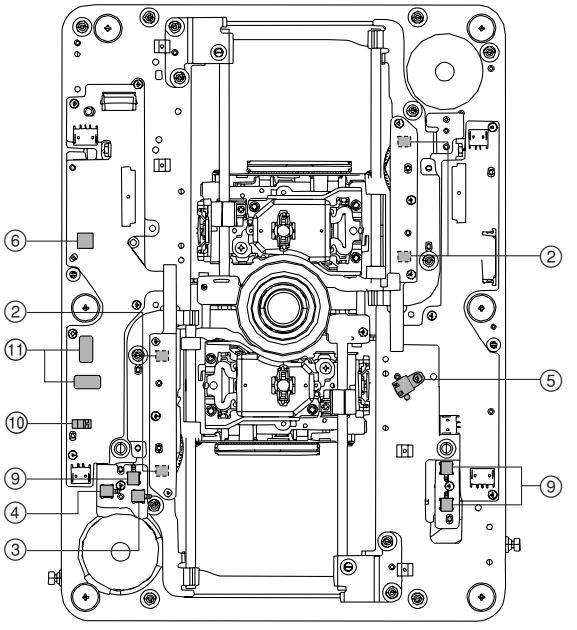
1-2-2. Main Mechanical Part Locations

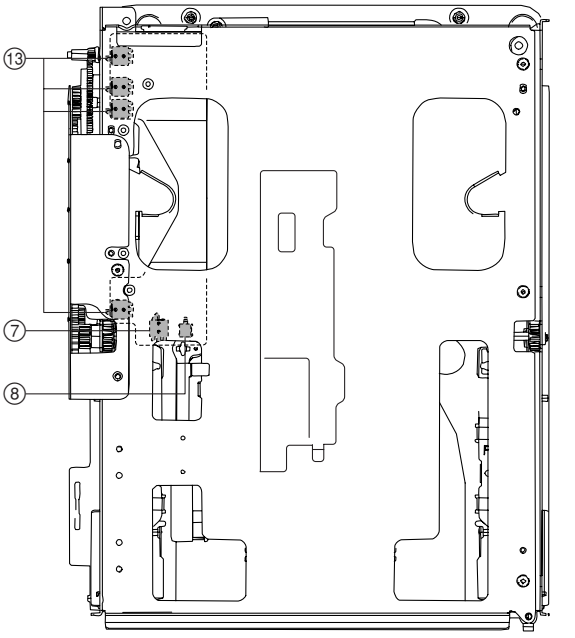
① Power supply unit
② Loader assembly
③ Cleaner assembly
④ Loading motor assembly
⑤ Drive sub assembly
⑥ Optical block assembly
⑦ Seek motor assembly
⑧ Spindle motor
⑨ Fan motor (drive)
⑩ Fan motor (power supply)
⑪ Fan motor (AU)
⑫ LCD unit
⑬ Fan motor (NET-4)



1-3. Function and Location of Sensors





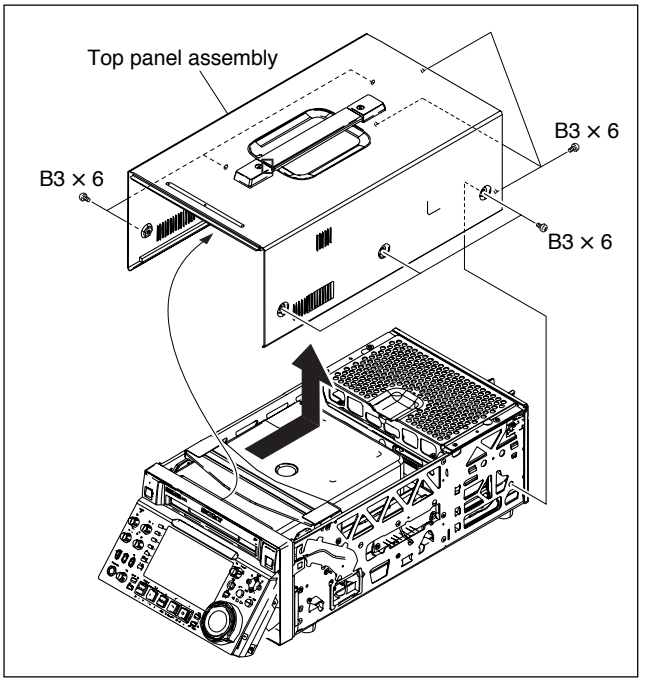


No.	Name	Function
①	Temperature sensor	IC1001 on the HPR-23 board, Controls the temperature alarm control of IC1001 on the HPR-23 board.
②	OP position sensor	Detects a position of the Optical block assembly.
③	REC INH sensor	Detects a status of the write-inhibited tab of a cartridge.
④	Cartridge down sensor	Detects the cartridge down.
⑤	Condensation sensor	Detects condensation.
⑥	Acceleration sensor (FCS/TRK)	Detects optical drive posture.
⑦	Cartridge in sensor	Detects the cartridge in the drive.
⑧	STBY OFF sensor	Loader position sensor
⑨	Cartridge classification sensor	Detects disc type of single-layer or dual-layer.
⑩	Acceleration sensor (ND)	Detects acceleration added to the optical drive.
⑪	Angular rate sensor	Detects angular rate added to the optical drive.
⑫	Temperature sensor	IC707 on the NET-4 board, Controls the temperature alarm control of IC707 on the NET-4 board.
⑬	Loadermode sensor	Detects loadermode.

1-4. Removing/Reinstalling Cabinet

1-4-1. Removing/Reinstalling Top Panel Assembly

1. Turn off the power of the unit.
2. Remove the nine screws (Rear panel : three screws, side panel : six screws), and remove the top panel assembly in the direction of the arrow.



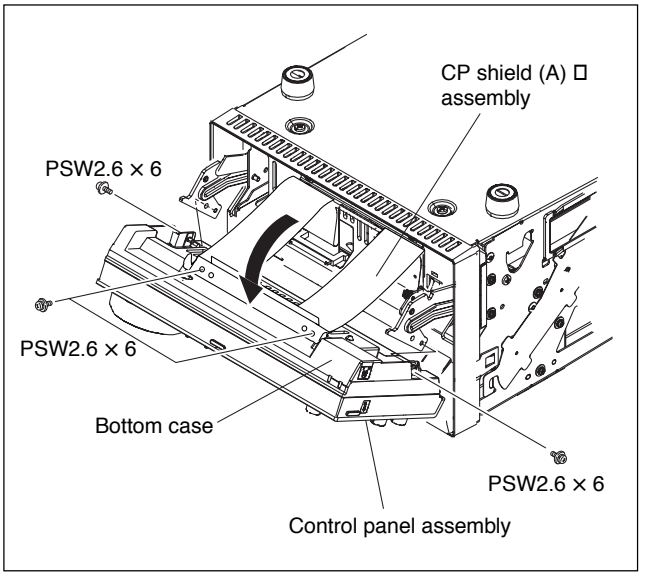
3. Reinstall the top panel assembly by reversing the steps of removal.

1-4-2. Removing/Reattaching Front Panel Assembly

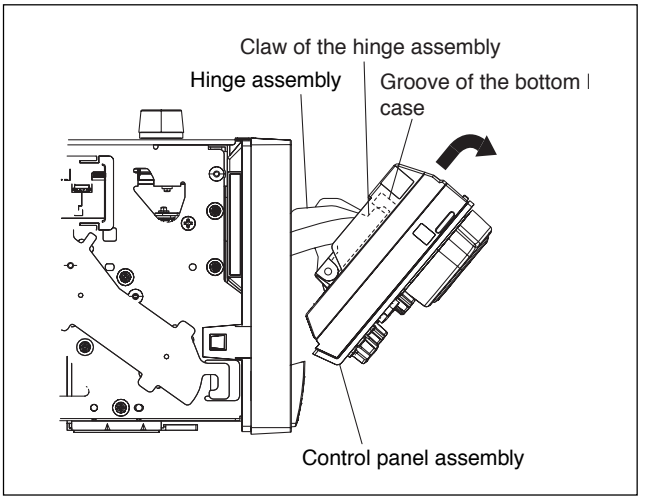
Note

Removing and reattaching the front panel assembly is performed while the PDW-F1600 has been turned upside down as described below.

1. Remove the top panel assembly. (Refer to Section 1-4-1)
2. Turn the PDW-F1600 upside down.
3. Turn the control panel assembly in the direction of the arrow. Remove the two screws securing the CP shield (A) assembly, and remove the metal bracket of the CP shield (A) assembly from the bottom case.
4. Remove the two screws from the right side panel and left side panel of the control panel assembly.



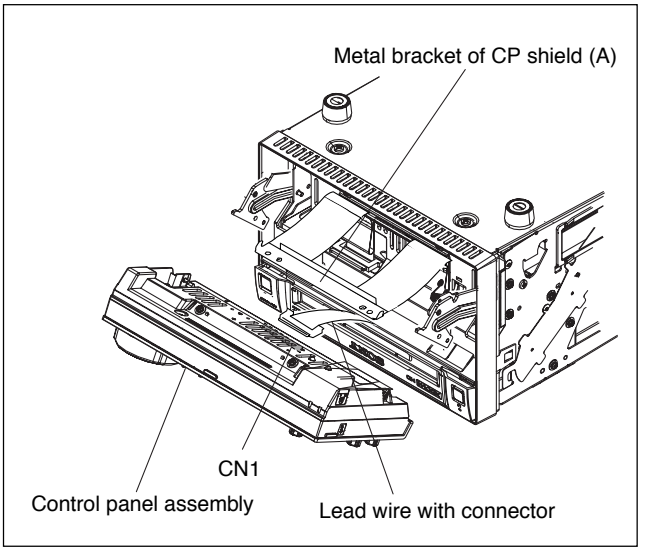
5. Move the control panel assembly slightly in the arrow direction, and disengage the two claws of the hinge assemblies from the groove of the bottom case.



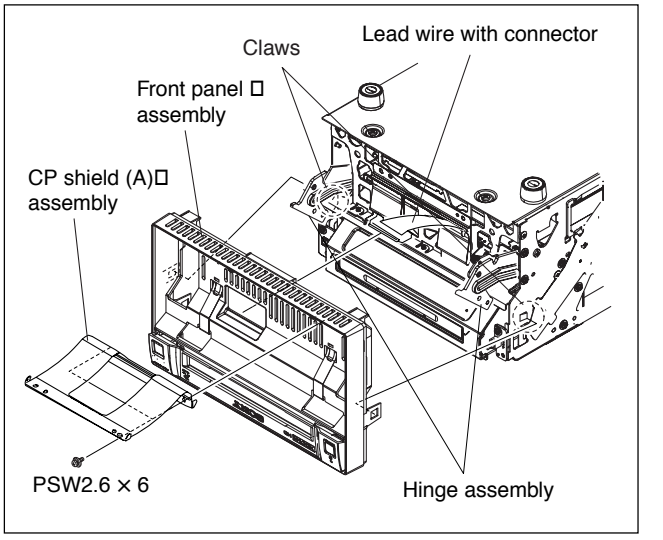
6. Remove the lead wire with connector from the connector CN1, and remove the control panel assembly.

Note

Be careful not to damage the lead wire with connector.



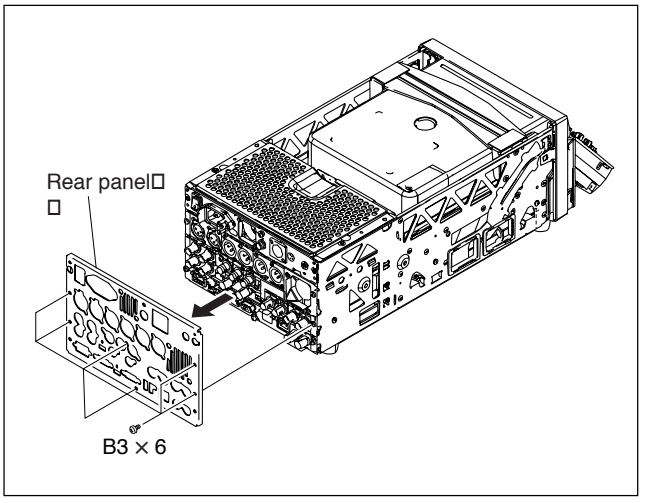
7. Remove the two screws, and remove the CP shield (A) assembly.
8. Disengage the two claws, and remove the front panel assembly.



9. Reinstall the front panel assembly by reversing the steps of removal.

1-4-3. Removing/Reinstalling the Rear Panel

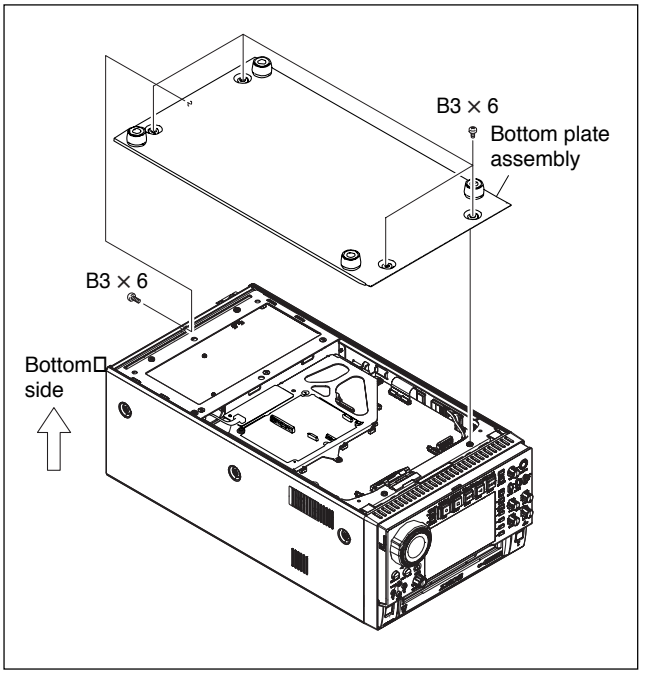
1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the six screws and remove the rear panel.



3. Reinstall the rear panel by reversing the steps of removal.

1-4-4. Removing/Reinstalling Cabinet

1. Turn the PDW-F1600 upside down.
2. Remove the five screws, and remove the bottom plate assembly.
3. Reinstall the bottom plate assembly by reversing the steps of removal.



1-5. How to Take Out a Cartridge Manually

1-5-1. Manual Ejection with the Gear

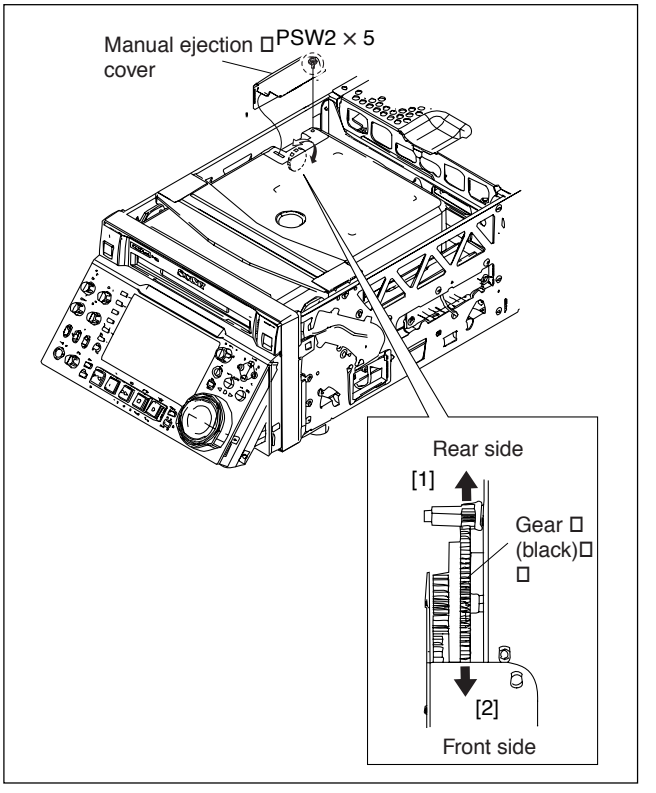
When the power of the unit does not turn on or the loader (P200) assembly does not operate, eject the cartridge in the following steps.

1. Turn off the power of the unit.
2. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
3. Loosen the screw with drop safe that is fixing the manual ejection cover, and remove the manual ejection cover.
4. Turn the gear (black) in the direction of arrow [1] until it stops.

Notes

- Turn the gear (black) slowly without applying too much force. Do not turn the gear beyond the place where it stops.
- If the gear (black) cannot be turned, the loader (P200) assembly may be defective. Refer to "1-5-2. Manual ejection when the gear is broken" described later, and take out the cartridge.

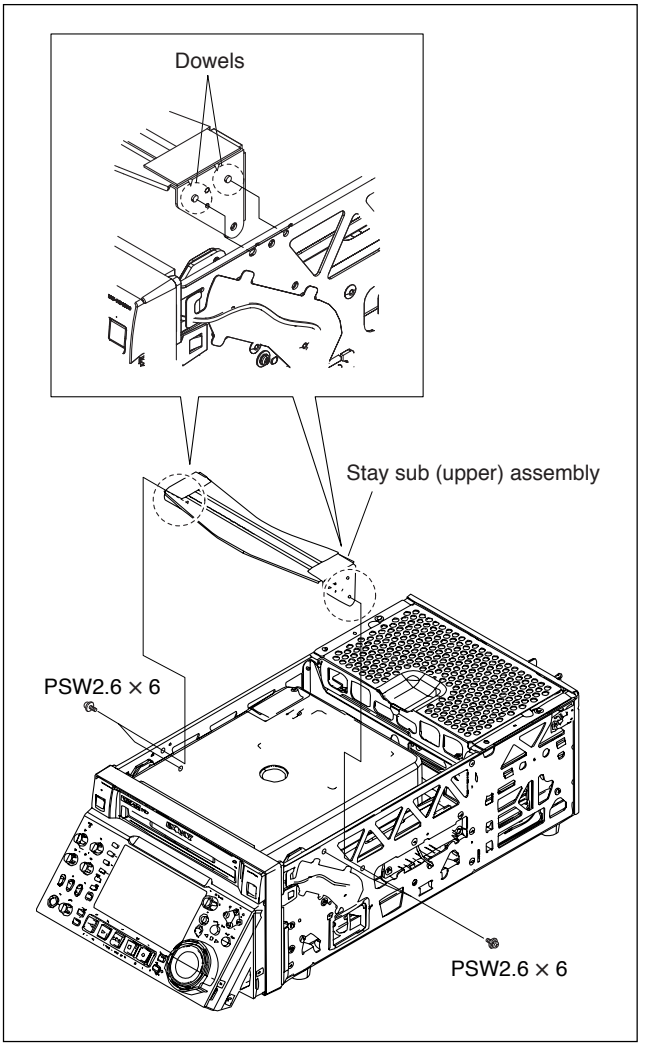
5. Turn the gear (black) in the direction of arrow [2], and take out the cartridge.



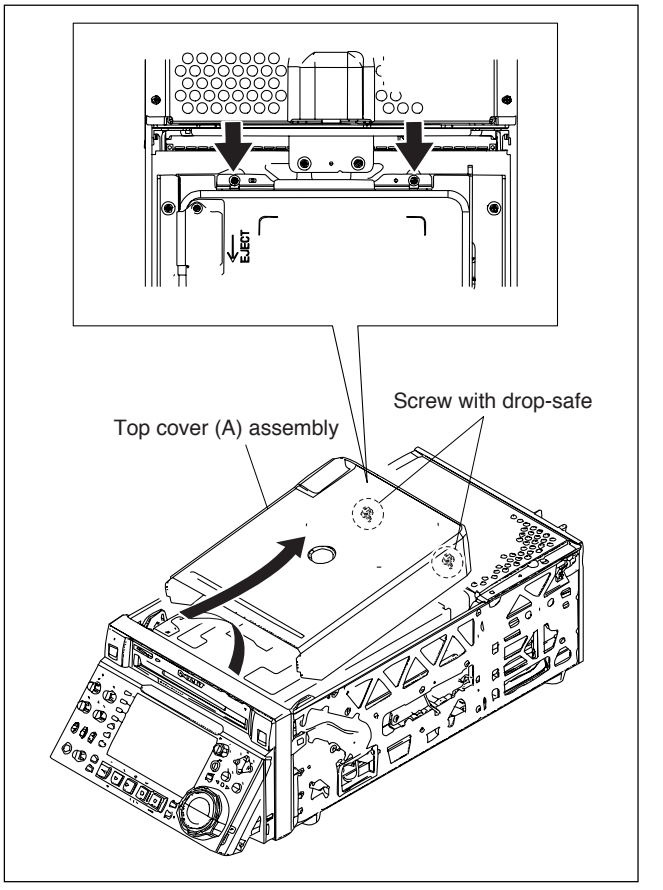
1-5-2. Manual Ejection when the Gear is Broken

If the gear (black) for manual ejection does not turn, the loader (P200) assembly may be defective.
Eject the cartridge in the following steps.

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the four screws, and remove the stay sub (upper) assembly.



3. Loosen the two screws with drop safe that are fixing the top cover (A) assembly.
4. Remove the top cover (A) assembly in the direction of the arrow.



5. Release the lock by sliding portion A of connector CN1 on the SE-852 board as shown in the figure with tweezers or another tool, and disconnect the flexible card wire.

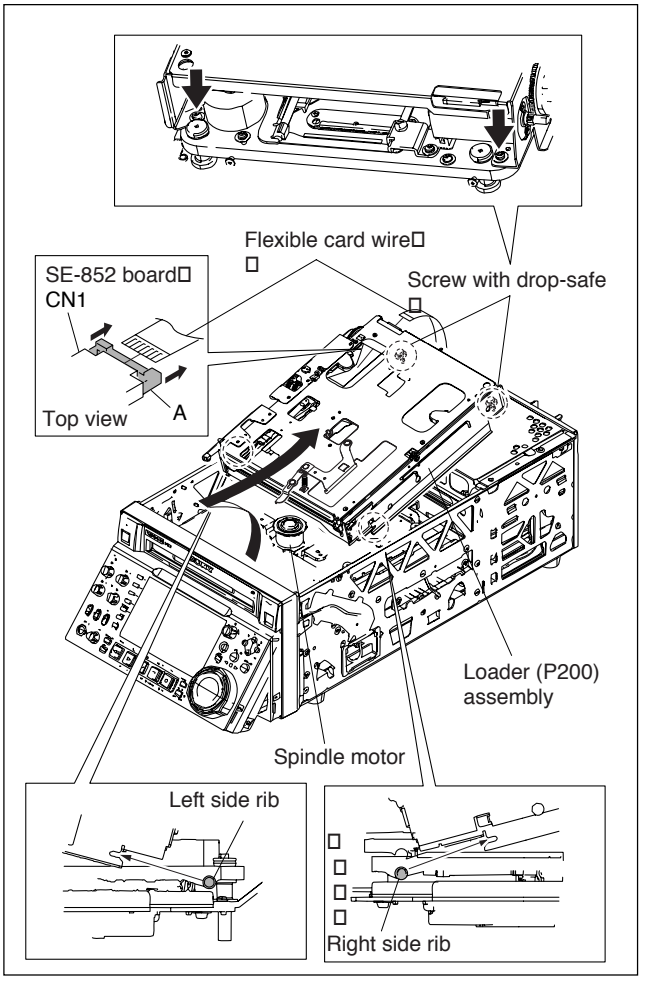
Notes

- Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold it.
- When reinstalling the removed parts, be careful not to break the locking claws of the connector CN1 of the SE-852 board.

6. Loosen the two screws with drop-safe on the loader (P200) assembly.
7. Remove the loader (P200) assembly from the rear side in the direction of the arrow.

Notes

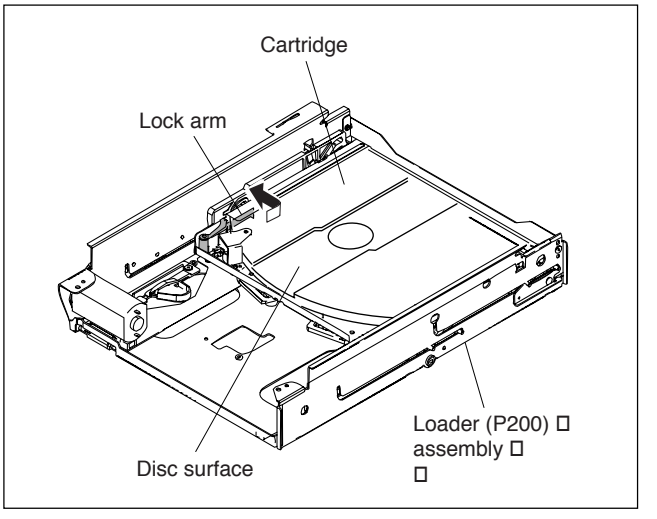
- Stepped shafts are inserted into the loader (P200) assembly on both sides of the front. Remove the loader (P200) assembly after slightly pulling it toward the rear.
- The spindle motor has an intense powerful magnet. A part of the loader (P200) assembly may be attracted by the magnetic force or hooked on the edge of the spindle motor. Be careful when removing the loader (P200) assembly.



8. While pushing the lock arm in the direction of the arrow, take out the cartridge from the loader (P200) assembly.

Notes

- Do not touch the disc surface.
- To installing the loader (P200) assembly, refer to "6-3. Replacing Loader Assembly".



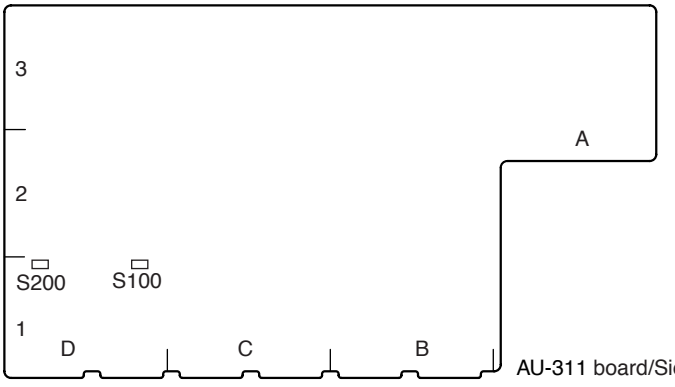
1-6. Switch Settings on the Boards / Description of the LED Functions

AU-311 Board

Notes

Never change the setting of the factory use switches.

The number shown in the parentheses ( ) indicates the address on the circuit board.



AU-311 board/Side A

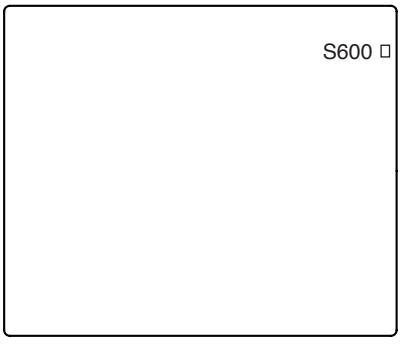
Ref. No.	Bit	Name	Description	Factory setting
S100 (D-1)	–	CH1 terminator	Turns ON/OFF the 600 Ω terminal for the Ch1 analog input	OFF 600 Ω ON ↔ OFF (■ : Knob position)
S200 (D-1)	–	CH2 terminator	Turns ON/OFF the 600 Ω terminal for the Ch2 analog input	OFF 600 Ω ON ↔ OFF (■ : Knob position)

DR-601 Board

Notes

Never change the setting of the factory use switches.

The number shown in the parentheses ( ) indicates the address on the circuit board.



DR-601 board/Side A

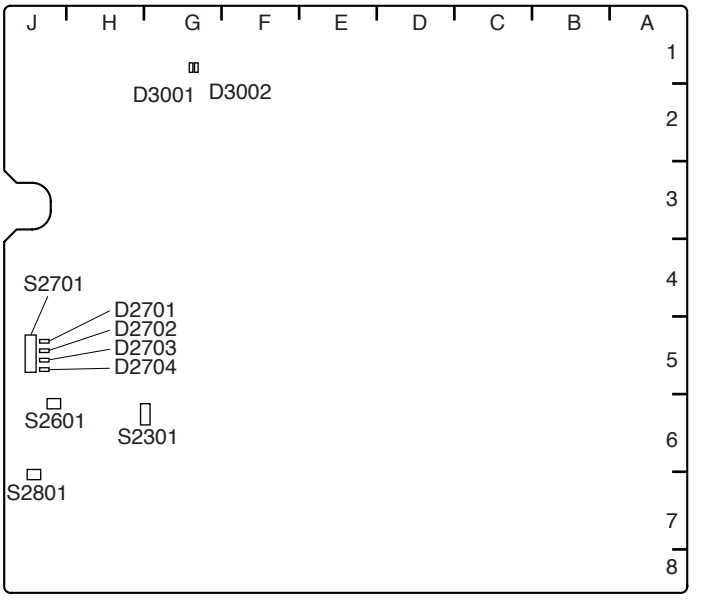
Ref. No.	Bit	Name	Description	Factory setting
S600	–	System reset	Factory use	–

HPR-23 Board

Notes

Never change the setting of the factory use switches.

The number shown in the parentheses ( ) indicates the address on the circuit board.



HPR-23 board/Side B

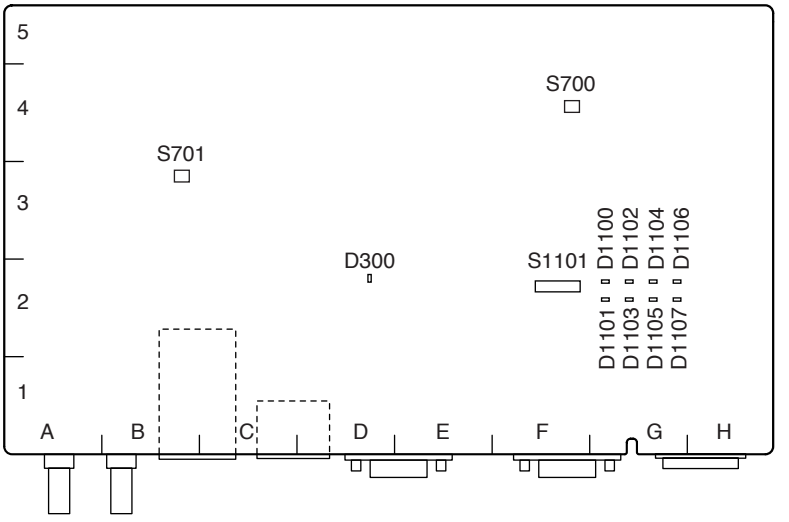
Ref. No.	Bit	Name	Description	Factory setting
S2301 (G-6)	1, 2, 3, 4		Not used	OFF
S2601 (J-6)	–		Factory use	–
S2701 (J-5)		ITRON SW		
	1		Not used	OFF
	2		Factory use	OFF
	3		ON : Starts ITRON mandatorily in normal mode OFF : Normal operation	OFF
	4		ON : Starts ITRON mandatorily in recovery mode OFF : Normal operation	OFF
	5		ON : Serial No. writable OFF : Normal operation	OFF
	6		ON : MAINTENANCE mode access disable OFF : Normal operation	OFF
	7		Factory use	OFF
	8		Not used	OFF
S2801 (J-7)	–	POWER RESET SW	Factory use	–
D2701 (J-5)		CPU LED	Blink : CPU COUNTER	
D2702 (J-5)		CPU LED	Blink : CPU COUNTER	
D2703 (J-5)		CPU LED	Blink : CPU COUNTER	
D2704 (J-5)		CPU LED	Blink : CPU COUNTER	
D3001 (G-1)		FPGA LED	Lights : FPGA CONFIG OK Blink : FPGA CONFIG NG	
D3002 (G-1)		CPU CLOCK LED	Blink : CPU CLOCK (33 MHz) COUNTER	

NET-4 Board

Notes

Never change the setting of the factory use switches.

The number shown in the parentheses ( ) indicates the address on the circuit board.



NET-4 board/Side B

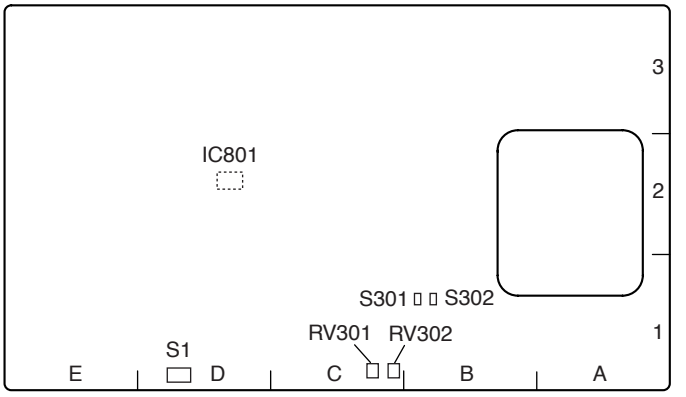
Ref. No.	Bit	Name	Description	Factory setting
S700 (F-4)		RESET	Factory use	–
S701 (B-3)		USB TEST	Factory use	–
S1101 (F-2)	1 - 8		Factory use	OFF

VPR-99 Board

Notes

Never change the setting of the factory use switches.

The number shown in the parentheses ( ) indicates the address on the circuit board.



VPR-99 board/Side A

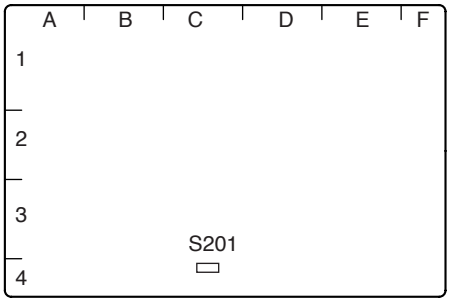
Ref. No.	Bit	Name	Description	Factory setting
S1 (D-1)	1		ON : Starts mandatorily in normal mode. OFF : Normal operation	OFF
	2		ON : Starts mandatorily in recovery mode. OFF : Normal operation	OFF
	3, 4		Select the connected external terminal. S1-3 S1-4 OFF OFF Not connected OFF ON iTRON ON OFF Drive ON ON Factory use	OFF
S301 (B-1)	–		Factory use	FIX
S302 (B-1)	–		Factory use	FIX
RV301 (C-1)	–		Factory use	Full counterclockwise turn
RV302 (C-1)	–		Factory use	Full counterclockwise turn

ENC-107 Board

Notes

Never change the setting of the factory use switches.

The number shown in the parentheses ( ) indicates the address on the circuit board.



ENC-107 board/Side A

Ref. No.	Bit	Name	Description	Factory setting
S201 (C-4)	1		Factory use	OFF
	2		Factory use	OFF
	3		Factory use	OFF
	4		Factory use	OFF

1-7. Circuit-Protection Part List

1-7-1. Circuit Protection Element

This unit is equipped with the positive characteristics thermister(s) (power thermister) as the circuit protection element. The positive characteristics thermister limits the electric current flowing through the circuit as the internal resistance increases when an exces-sive current flows or when the ambient temperature increases.
If the positive characteristics thermister works, turn off the main power of the unit and inspect the internal circuit of this unit. After the cause of the fault is removed, turn on the main power again. The unit works normally.
It takes about one minute to cool down the positive characteristics thermister after the main power is turned off.

Board	Ref. No. (Address)	Part No.
EM-6	THP1 (A-1/Side A)	⚠1-805-846-11
PS-726	THP1 (C-3/Side A)	⚠1-810-509-11
	THP2 (B-1/Side A)	⚠1-803-615-21
KY-624	F1 (B Side)	⚠1-803-353-21
	F2 (B Side)	⚠1-771-075-21

1-7-2. Replacing Fuse

WARNING

The fuse is essential parts for safe operation.
Replace the components with Sony parts whose part numbers appear in the manual published by Sony. If the components are replaced with any parts other than the specified ones, this may cause a fire or electric shock.

CAUTION

If the fuse is replaced while the main power is kept on, this may cause electric shock.
Before replacing the fuse, not only turn off the POWER switch but also disconnect the cable that is connected to the DC IN connector.

This unit is equipped with fuses.
The fuses blow if an excessive current flows due to abnormality inside the equipment. If fuses blow, turn off the main power of the equipment once, and inspect inside of the equipment and remove the cause of excessive current. After that, replace the fuses.

Board	Ref. No. (Address)	Part No./Name
PS-726	F1	⚠1-576-659-11 Fuse 5 A, 250 V
RE-295	F100	⚠1-576-269-21 Fuse 3.15 A,125 V

1-8. Equipment and Fixtures List for Check/Adjustment

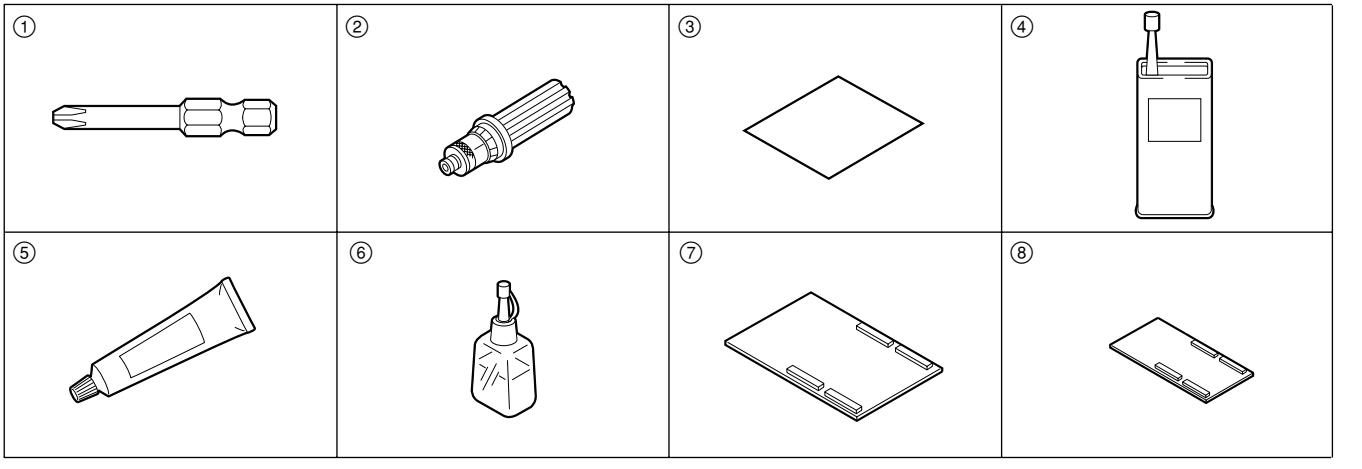
1-8-1. Equipment for Check/Adjustment

It is recommended to use the equipment listed below or the equivalents.
Each equipment listed below is available as a standard product. However, it may not be producted now.

Equipment	Model name	Remarks
Oscilloscope	Tektronix TDS3054B or TDS460A	
Frequency counter	Advantest TR5821	
USB memory	Sony	For updating the software (Refer to Section 1-10.)

1-8-2. Fixtures

Fig. No.	Part No.	Description	Usage
—	J-6570-130-A	Alignment disc (PFD23A-RS)	Servo adjustment and skew adjustment
①	J-6325-110-A	Torque screwdriver's bit (M1.4/M1.7)	Tightening screws
	J-6325-380-A	Torque screwdriver's bit (M2)	
	J-6323-430-A	Torque screwdriver's bit (M3)	
②	J-6325-400-A	Torque screwdriver (3 kg•cm) (0.3 N•m)	Tightening screws
	J-6252-510-A	Torque screwdriver (]6 kg•cm) (0.6 N•m)	
	J-6252-520-A	Torque screwdriver (10 kg•cm) (1.0 N•m)	
③	3-184-527-01	Cleaning cloth (15 cm × 15 cm)	Cleaning
—	3-703-358-08	Parallel pin (2 mm × 20 mm)	Gear replacement (one pin required)
④	7-432-114-11	Locking compound 200 g	Inhibits loosening of screws
⑤	7-600-000-48	Sony bond (SC608LVZ2) 180ML	Bonding
—	7-651-000-10	Sony grease SGL-601 (50 g)	Lubrication
⑥	9-919-573-01	Cleaning liquid	Cleaning
⑦	A-1541-245-A	Extension board EX-1045	AU-311/VPR-99/NET-4 board extension
⑧	A-1541-246-A	Extension board EX-1047	NET-4 board extension
—	Separately available	Flat-blade screwdriver (2.3 mm)	Skew adjustment
—	Separately available	Weight (50 to 100 g)	Servo adjustment and skew adjustment



1-9. Replacing NV-RAM and Memory Backup Battery

(1) Overview

This unit is provided with a batter backed RAM and EEPROMs on the boards.
These memory devices store system setup data, adjustment data, and other data.
When any of these devices or the backup battery is replaced, the memory data must be rewritten.

Board	Ref. No.	Type	Stored data
HPR-23	IC2907	RAM (with backup battery)	SYSTEM SEL setting data of setup menu CLIP INFORMATION setting data NUMERIC data of CLIP TITLE Error log data Watch information
HPR-23	IC2701	EEPROM	Hours meter data H1: OPERATION Serial number data TC PRESET value TIME ZONE data Free-running frequency adjustment value HD f0, SD f0 DC+12V adjustment value Setup menu data Menu bank 1-3 data Menu backup data for SAVE MENU DATA in MAINTENANCE MENU
SE-850	IC4	EEPROM	Adjustment value of DRIVE MAINTENANCE menu Hours meter data H2: LASER PARAMETER H3: SEEK RUNNING H4: SPINDLE RUNNING H5: LOADING COUNTER
NET-4	IC1301	EEPROM	Control data
AU-311	IC912	EEPROM	Analog input level adjustment value (ch1/ch2) Analog line output level adjustment value (ch1/ch2) Monitor output level adjustment value (Lch/Rch)
VPR-99	IC801	D/A converter with built-in EEPROM	Video adjustment data (59.94i/50i) SDI ENC VCO data

(2) Replacing Memory Backup Battery (IC2907/HPR-23 board)

A crystal oscillator incorporating a backup battery is attached to IC2907 on the HPR-23 board.

WARNING

When replacing the part, be sure to use the specified one below.

Use of an unspecified part may result in burst, fire or heating.

Replacement part

Model: M4T28-BR12SH1
(lithium battery integrated crystal oscillator)

Part No.: ⚠ 1-767-156-11

Recommended replacement cycle:
10 years

Replacement

Note

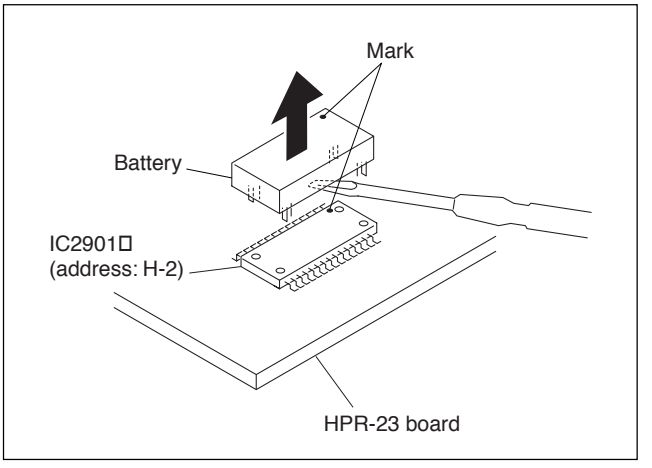
When replacing the battery, install a new battery in correct orientation of the mark.

1. Take note of the following setting data, if possible.
   - SYSTEM SEL setting data of the setup menu
   - CLIP INFORMATION setting data
   - NUMERIC data of CLIP TITLE
   - Error log data

   Note

   Taking note of these data before replacement facilitates re-setting of menu data and other data after replacement of the battery. However, no error log data can be restored.

2. Turn off the power of the unit.
3. Remove the HPR-23 board. (Refer to Section 6-12-9.)
4. Remove the ENC-107 board.
5. Insert a flat-blade screwdriver between the battery and IC2907 and detach the battery.



6. Install a new battery matching its mark with the mark on IC2907.
7. Install the ENC-107 board.
8. Install the HPR-23 board.
9. Turn on the power of the unit while pressing the MENU and RESET buttons simultaneously. When "ALL RESET" appears, release your fingers from the keys.
10. Press the SET button.

    Note

    Fixed values of the ROM is used for initialization data.

11. Restart the unit.
12. Perform the settings again using the data noted in step 1.
13. Perform the settings the current date and time.

(3) Replacing NV-RAM (IC2907/HPR-23 board)

Replace IC2907, after detaching the battery. The other replacement steps are the same as those in (2) Replacing Memory Backup Battery (IC2907/HPR-23 board).

(4) Replacing EEPROM (IC2701/HPR-23 board)

Note

Even if this EEPROM is replaced in the field, no data can be initialized. When you need to replace this EEPROM, contact your local Sony Sales Office/Service Center.

(5) Replacing EEPROM (IC4/SE-850 board)

1. Turn off the power of the unit, and then remove the SE-850 board. (Refer to Section 6-12-12.)
2. Replace IC4 (side A).
3. Install the SE-850 board, and then turn on the power of the unit.
4. Perform UPLOAD TO EEPROM of the MAINTENANCE MENU. (Refer to Section 4-7-25.)

(6) Replacing EEPROM (IC1301/AU-311 board)

Note

Even if this EEPROM is replaced in the field, no data can be initialized. When you need to replace this EEPROM, contact your local Sony Sales Office/Service Center.

(7) Replacing EEPROM (IC912/AU-311 board)

1. Turn off the power of the unit, and then remove the AU-311 board. (Refer to Section 6-12-1.)
2. Replace IC912 (B-3/side B).
3. Install the AU-311 board, and then turn on the power of the unit.
4. Audio system adjustment (Refer to Section 8-6.)

(8) Replacing D/A converter (IC801/VPR-99 board)

1. Turn off the power of the unit, and then remove the VPR-99 board. (Refer to Section 6-12-2.)
2. Replace IC801 (D-2/side B).
3. Install the VPR-99 board, and then turn on the power of the unit.
4. Video system adjustment. (Refer to Section 8-4.)
5. SDI output adjustment. (Refer to Section 8-5.)

1-10. Firmware/Software

1-10-1. Firmware Update

This section describes how to update the firmware using the MAINTENANCE MENU.

The firmware update function updates various types of firmware. When an option board is installed, the firmware on the option board is upgraded at the same time.
A USB Memory*1 containing the new version firmware package file is required for the update.
For getting such firmware package file, contact your local Sony Sales Office/Service Center.
Put the firmware package file in the root directory of the USB Memory*1.

Notes

- It takes about 16 minutes to update the firmware.
- If the USB Memory*1 is removed during update, it may become unavailable. Do not remove the USB Memory*1 during update.

*1: General USB memory devices used for PCs are available. However, if "Unknown USB" appears in the TC display section of the control panel when the USB memory is connected to the USB connector or "NO USB MEMORY" appears on the message screen during update, there may be a problem with the connected USB memory or it may be recognized to be an unsupported device. In this case, replace it with another USB memory device and retry registration of the installation key.

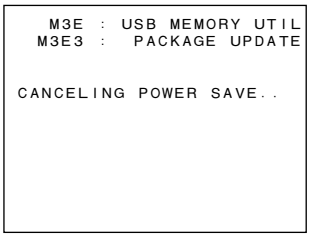
Update Procedure

1. Connect the USB memory in which the latest version of the firmware package file is stored to the USB connector.

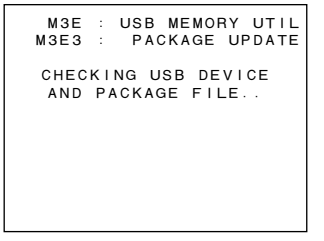
   Notes

   - Do not connect USB memories other than the one in which the firmware package file is stored to the USB connector.
   - Do not connect more than one USB memory.

2. If a disc is inserted, eject it.
3. Display MAINTENANCE MENU.
   (Refer to the Operation Manual.)
4. Select "M3: OTHERS" with the [↑]/[↓] button, and press the [→] button.
5. Select "M3E: USB MEMORY UTIL" with the [↑]/[↓] button, and press the [→] button.
6. "M3E3: PACKAGE UPDATE" is selected. Press the [→] button.
7. The PACKAGE UPDATE screen appears. When in the power save mode, while the NET board is starting up, the following message is displayed until the startup process is complete.



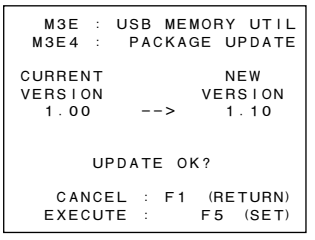
8. The firmware package file is searched on the USB memory.



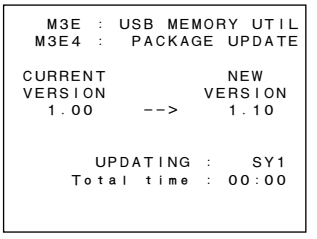
Note

If update cannot be performed, an error message appears.
Pressing the [SET] button in this state, the check is performed again.

9. When a package file that can be updated is found, the screen changes to the following display. Press the SET button.



10. The update is executed, and the firmware name currently updated and the elapsed time are displayed.



Note

Never disconnect the USB memory during the update.

11. The update is complete, and the message "COMPLETE" appears.
12. Turn the power OFF, and then turn it back ON.
13. Execute RESET ALL SETUP of the MAINTENANCE MENU. (Refer to the Operation Manual.)

Updates the following softwares.

Name	Board	CPU	ROM
SY1	HPR-23	IC2601	IC2905, IC2906
SY2K SY2U	NET-4	IC1	IC907, IC908
DRV	DR-601	IC600	IC602
PIER	HPR-23	IC2103	IC2905, IC2906
PHOT	HPR-23	IC801	IC2905, IC2906
VAX	HPR-23	IC206	IC2905, IC2906
LVIS	HPR-23	IC501	IC2905, IC2906
FAM	HPR-23	IC1201	IC2905, IC2906
LUNA	VPR-99	IC100	IC2905, IC2906 (HPR-23)
DSP0	HPR-23	IC1701, IC1702	IC2905, IC2906
DSP1	HPR-23	IC1801, IC1802	IC2905, IC2906
DSP2	HPR-23	IC1901	IC2905, IC2906
PRXA	HPR-23	IC2001, IC2002	IC2905, IC2906
TSYS TMBP	ENC-107	IC201, IC401, IC601 IC801, IC1001	IC2905, IC2906 (HPR-23)
HDRX	RX-93	IC300	IC103
KY KYIC	KY-624	U1	U5
MENU FTBL	HPR-23	IC2601	IC2905, IC2906
TS (Option) TSIC (Option)	TSI-60	IC200 IC500	IC202 IC503, IC504

1-10-2. Registering Software Option Using USB Memory

This unit is provided with software option PDBK-UPG02 that is made available by registering a software key (installation key).
The installation key can be registered by using a USB memory*1 or on the XDCAM website. This section describes registration of the installation key using a USB memory*1.
For registration of the installation key on the XDCAM website, refer to "3-4-6. License Registration."

Note

∗1: General USB memory devices used for PCs are available. However, if "Unknown USB" appears in the TC display section of the control panel when the USB memory is connected to the USB connector or "NO USB MEMORY" appears on the message screen during update, there may be a problem with the connected USB memory or it may be recognized to be an unsupported device. In this case, replace it with another USB memory device and retry registration of the installation key.

Creating a text file

1. Enter a model name, serial number, and installation key sequentially using the PC's text editor or a similar tool to create a text file "pdw-instkey.lst".
   Examples of description for pdw-instkey.lst
   PDW-F1600,10000,0123456789abcdef
   PDW-F1600,10001,1234567890bcdefa
   PDW-F1600,10002,2345678901cdefab

   Note

   Be sure to insert a comma between these items (model name, serial number, and installation key).
   Be sure to insert a line feed code at the end of each character string.

2. Save the created file in the root directory of the USB memory.

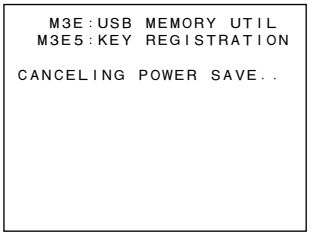
Registering the installation key

1. Connect the USB memory to the USB connector of the unit.

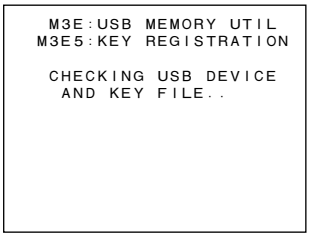
   Notes

   - Do not connect any USB memory other than the USB memory that contains the installation key to the USB connector.
   - Connect only a single USB memory device.

2. Eject the disc if it is mounted.
3. Display the MAINTENANCE MENU. (Refer to the Operation Manual.)
4. Select "M3:OTHERS" with the [↑]/[↓] buttons and press the [→] button.
5. Select "M3E:USB MEMORY UTIL" with the [↑]/[↓] buttons and press the [→] button.
6. Select "M3E5:KEY REGISTRATION" with the [↑]/[↓] buttons and press the [→] button.
   The KEY REGISTRATION screen opens.
7. The following message appears during startup of the NET board due to the power saving setting.



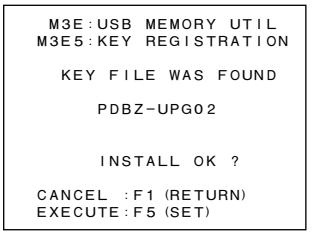
8. The installation key in the USB memory is searched.



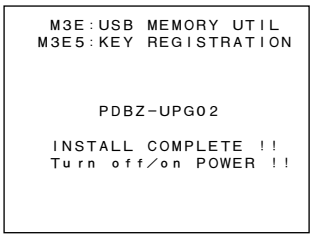
   Note

   When the update fails, an error message appears. Pressing the [SET] button in this state restarts checking.

9. When an updatable package file is found, the following screen opens. Press the [SET] button .



10. The installation key is installed and the following screen opens.



11. Turn off and on the power.

Confirming registration of the installation key

1. Display the MAINTENANCE MENU. (Refer to the Operation Manual.)
2. Select "M2:SERVICE SUPPORT" with the [↑]/[↓] buttons and press the [→] button.
3. Select "M22:OPTION STATUS" with the [↑]/[↓] buttons and press the [→] button.
4. Confirm a message "PDBZ-UPG02: ena" in the OPTION STATUS screen.

1-11. Internal Video Test Signal

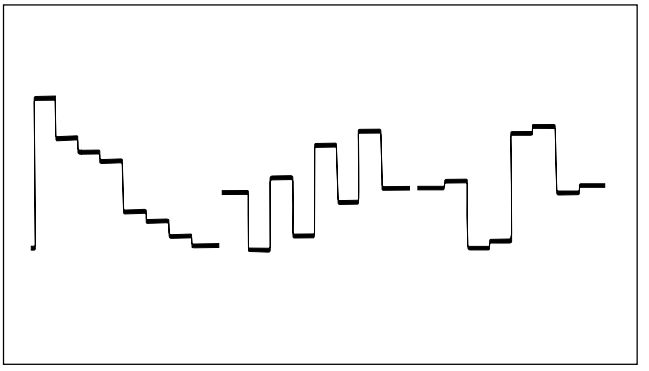
This unit has the internal video test signal generator.
The test signals output from the video test signal generator can be recorded.
Perform the following steps to output the test signals.

1. Display MAINTENANCE MENU. (Refer to the Operation Manual.)
2. Select "M0: CHECK" with the [↑]/[↓] button, and press the [→] button.
3. Select "C2: AUDIO/VIDEO" with the [↑]/[↓] button, and press the [→] button.
4. "C21: VIDEO TSG" is selected. Press the [→] button.
5. Select the test signal to be output using the [↑]/[↓] buttons, and press the [SET] button.
   75% COLOR BARS: 75% color-bar signal
   BLACK: black signal

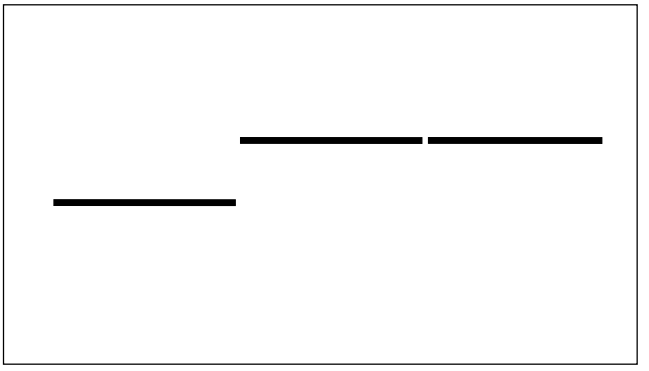
Describes output waveform figures of this generator in the next page.

HD video outputs

75% Color Bars

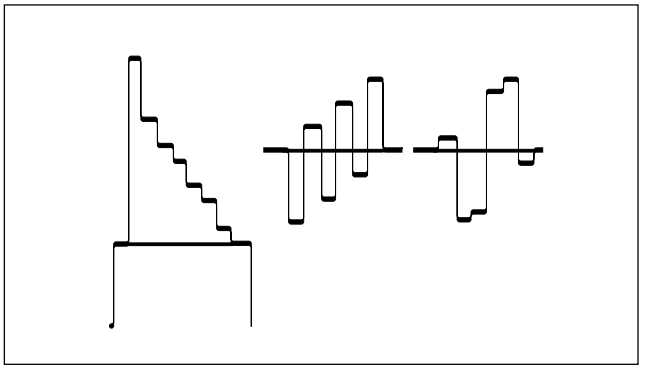


Black

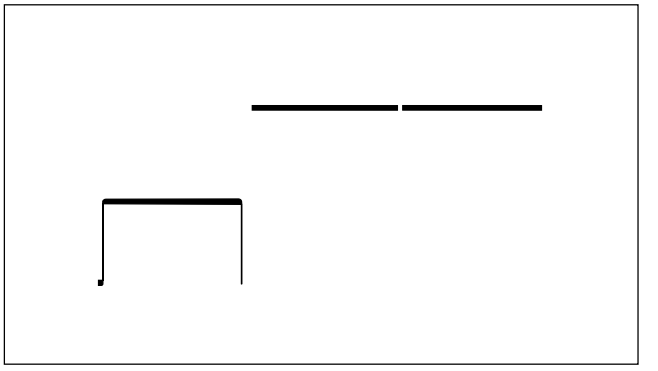


SD video outputs

75% Color Bars



Black



1-12. Service Action After Replacing or Repairing the Block and Board

Note

The ROMs on the boards below contain firmware. Upgrade the firmware to the latest version after replacing any of the boards. (Refer to Section 1-10.)

- HPR-23 board
- DR-601 board
- RX-93H board
- SE-850 board
- NET-4 board
- KY-624 board

1-12-1. Optical Block Assembly

After replacing the optical block assembly, perform the following adjustments in descending order.
(Refer to Section 7.)

- Servo1 Automatic Adjustment (Refer to Section 7-2.)
- Skew Adjustment (Refer to Section 7-3.)
- Servo2 Automatic Adjustment (Refer to Section 7-4.)
- Clear media log (Refer to Section 7-5.)

1-12-2. HPR-23 Board

Perform the following re-settings after replacing or repairing the HPR-23 board or after replacing the NVRAM (IC2907).

Re-setting After Replacing the HPR-23 Board

Perform the re-settings after replacing the NVRAM and following re-settings after the HPR-23 board is replaced.

- Default setting (Refer to the Operation Manual.)
- Time code setting (Refer to the Operation Manual.)
- Setup menu setting (Refer to the Operation Manual.)
- Menu bank 1 to 3 “SETUP BANK” setting (Refer to the Operation Manual.)
- Serial number setting
  For more information, contact your local Sony Sales Office/Service Center.

Adjustments After Repairing the HPR-23 Board

After the HPR-23 board is repaired, perform the following adjustments after the re-settings above.

- Perform the free-running frequency adjustment. (Refer to Section 8.)
  8-2. HD Free-Running Frequency Adjustment
  8-3. SD Free-Running Frequency Adjustment
  8-7. DC-IN +12V Adjustment

Re-setting After Replacing the NVRAM

- System setting “SYSTEM SEL” of the unit (Refer to the Operation Manual.)
- Clip information “CLIP INFORMATION” setting (Refer to the Operation Manual.)
- Clip title preset number “NUMERIC of CLIP AUTO TITLING” setting (Refer to the Operation Manual.)
- Function menu setting (Refer to the Operation Manual.)
- Current date and internal clock setting

1-12-3. DR-601 Board

Execute the adjustment in the following order after replacing or repairing the DR-601 board.

1. Servo1 Automatic Adjustment (Refer to Section 7-2.)
2. Skew Adjustment (Radial Skew Adjustment only) (Refer to Section 7-3-2.)
3. Servo2 Automatic Adjustment (Refer to Section 7-4.)
4. Clear media log (Refer to Section 7-5.)

1-12-4. SE-850 Board

This board includes EEPROM (IC4) that stores adjustment data, hours meter data, and other data.
Replace IC4 after the SE-850 board is replaced.

Execute the following adjustment after replacing or repairing the SE-850 board.

- ACCELERATION OFFSET (Refer to Section 4-7-20.)

Note

Execute the following menu only when the old IC4 was not removed from the old SE-857 and not installed on the new SE-857 board, or when only IC4 was replaced with the new IC.

- UPLOAD TO EEPROM (Refer to Section 4-7-25.)

1-12-5. NET-4 Board

This board includes EEPROM (IC1301) that stores control data.
Replace IC1301 after the NET-4 board is replaced.

1-12-6. AU-311 Board

Perform the following adjustment after replacing or repairing.
- Audio system adjustment. (Refer to Section 8-6.)

1-12-7. VPR-99 Board

Perform the following adjustment after replacing or repairing.
- Video system adjustment. (Refer to Section 8-4.)
- SDI output adjustment. (Refer to Section 8-5.)

1-13. Connecting/Disconnecting the Flexible Card Wire

This unit uses the five types of flexible card wires.

Notes

- Be very careful not to fold the flexible card wire. Life of flexible card wire will be significantly shortened if it is folded.
- The flexible card wire has the conduction side and the insulation side. If the conduction side and the insulation side are connected in the wrong direction, the circuit will not function.
- Insert the flexible card wire straight.
- Ensure that the conduction surface of the flexible card wire is not contaminated.

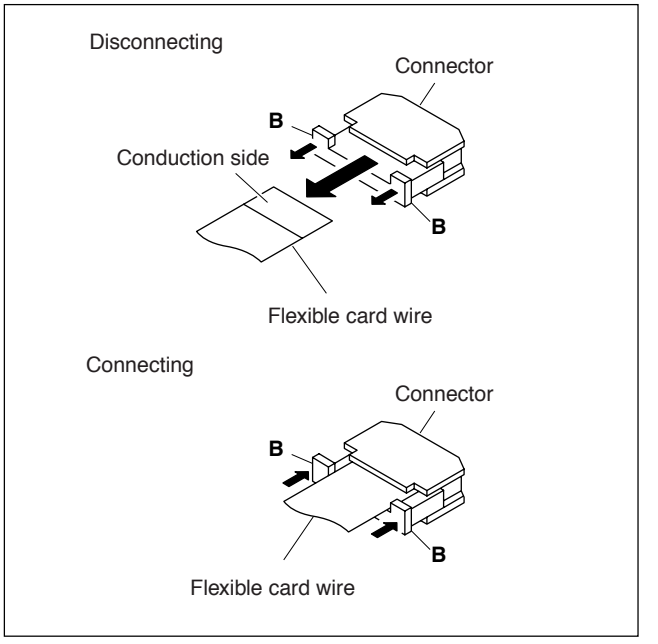
Type A

Disconnecting

Slide portions B of the connector to unlock, and disconnect the flexible card wire.

Connecting

Insert the flexible card wire firmly as far as it will go, and press portion B of the connector to lock.



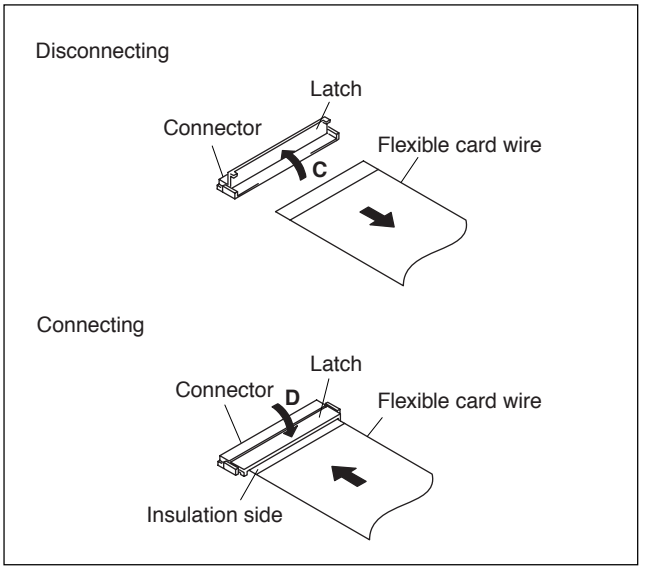
Type B

Disconnecting

Open the latch of the connector in the direction of arrow C to unlock, and disconnect the flexible card wire.

Connecting

1. Insert the flexible card wire firmly as far as it will go, with the insulation side up.
2. Close the latch of the connector in the direction of arrow D to lock.



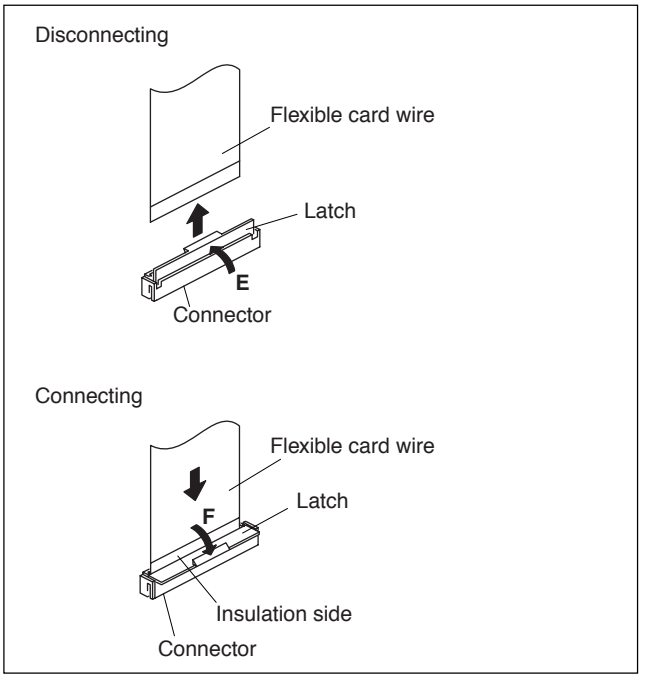
Type C

Disconnecting

Open the latch of the connector in the direction of arrow E to unlock, and disconnect the flexible card wire.

Connecting

1. Insert the flexible card wire firmly as far as it will go, with its conduction side facing front.
2. Close the latch of the connector in the direction of arrow F to lock.



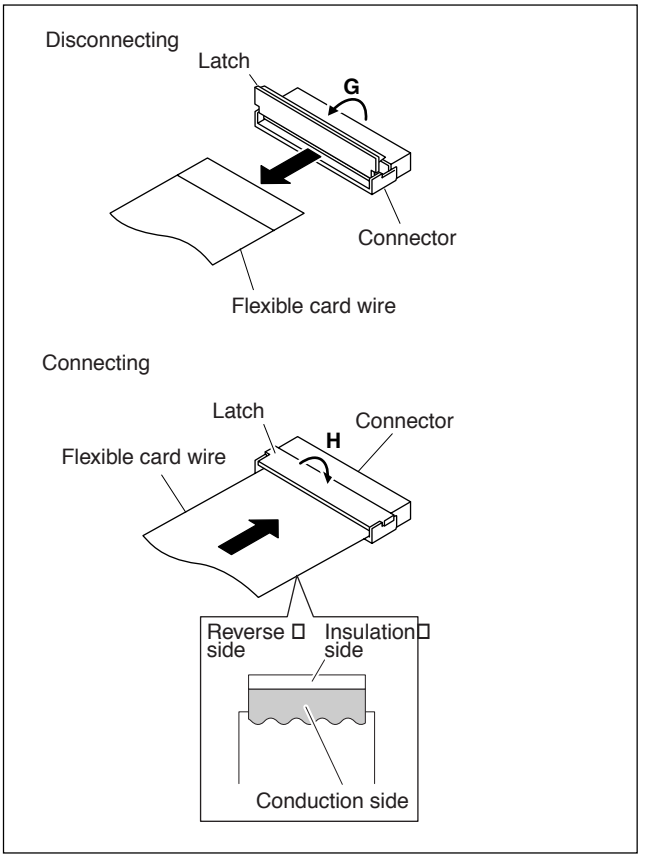
Type D

Disconnecting

Open the latch of the connector in the direction of arrow G to unlock, and disconnect the flexible card wire.

Connecting

1. Insert the flexible card wire firmly as far as it will go with its insulation side down (reverse side).
2. Close the latch of the connector in the direction of arrow H to lock.



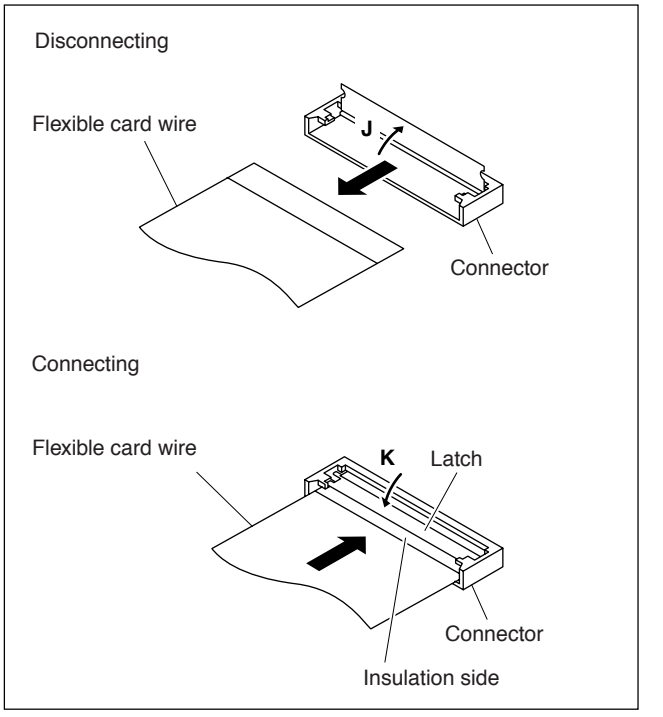
Type E

Disconnecting

Open the latch of the connector in the direction of arrow J to unlock, and disconnect the flexible card wire.

Connecting

1. Insert the flexible card wire firmly as far as it will go with its insulation side up.
2. Close the latch of the connector in the direction of arrow K to lock.



1-14. Notes on Handling Optical Block Assembly

To prevent the damage due to the electrostatic charge, be sure to put the following grounding while handling the optical block assembly (KES-330A).

Grounding for the human body

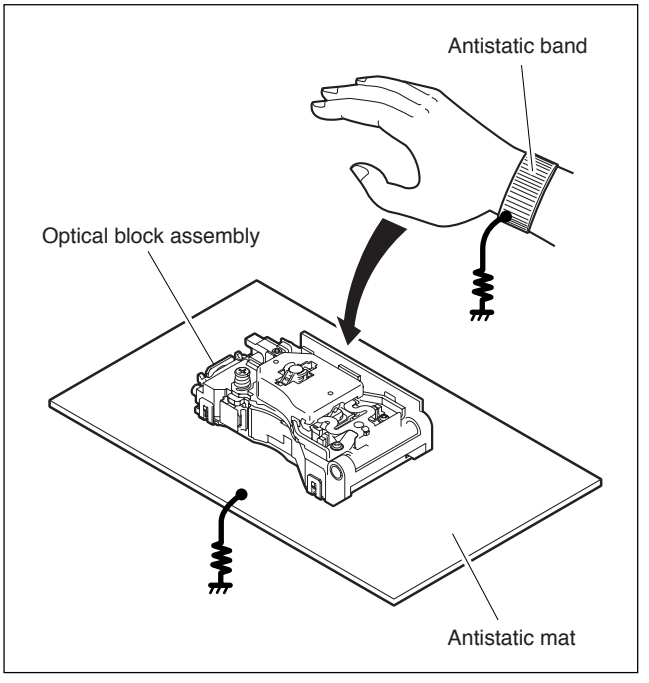
Be sure to put on an antistatic band for grounding (with impedance lower than 10^8 Ω) whose other end is grounded.

Note

Because static electricity charged on clothes is not drained away, be careful not to touch your clothes to the optical block assembly.

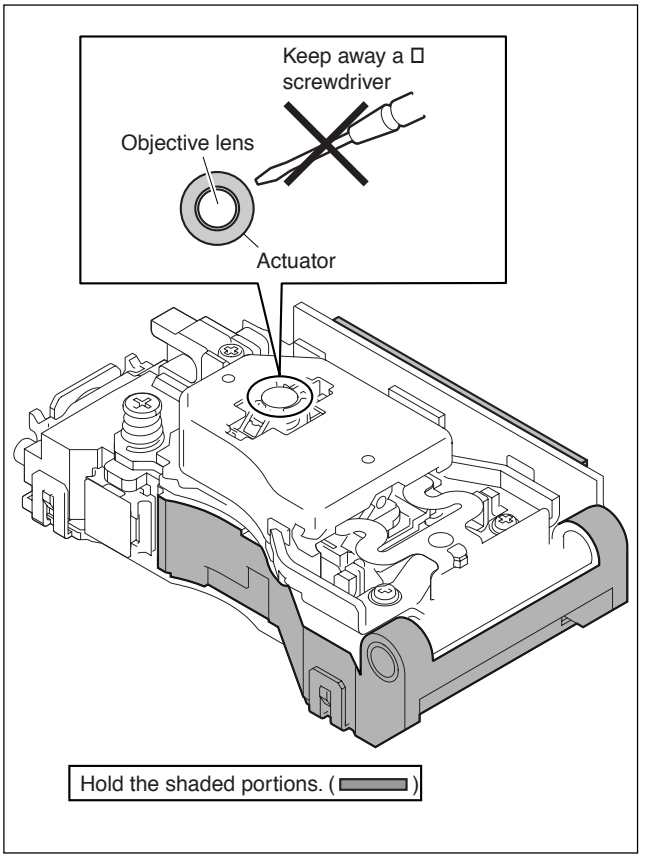
Grounding for the work table

Be sure to place the optical block assembly on an antistatic mat (with impedance lower than 10^9 Ω recommended) or a copper sheet for grounding.



Precautions

- The optical block assembly is a precise unit. Be careful not to subject it to shocks by dropping or rough handling.
- Do not touch the objective lens.
- Hold the slide base (die casting part) and the connector on the board when handling the optical block assembly. Do not touch the circuit on the print board with your hand or a substance directly; otherwise, the circuit may be damaged.
- The performance of the actuator may be affected if a magnetic material is located nearby, since the actuator has a powerful magnet.
  Keep magnetic substance away from the actuator. if the magnetic force makes a metallic material such as a screwdriver and so on hit the actuator, the objective lens will be damaged.
- Do not allow foreign materials to enter through gap in the cover of the actuator.



1-15. Unleaded Solder

Boards requiring use of unleaded solder are printed with a lead free mark (LF) indicating the solder contains no lead. (Caution: Some printed circuit boards may not come printed with the lead free mark due to their particular size.)

: LEAD FREE MARK

Notes

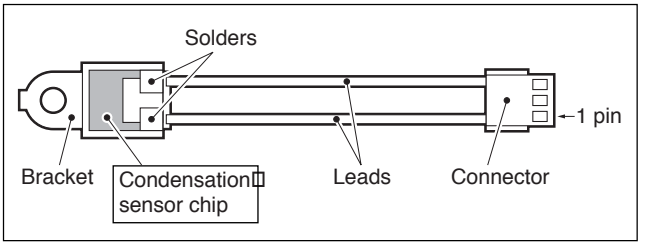
- Be sure to use the unleaded solder for the printed circuit board printed with the lead free mark.
- The unleaded solder melts at a temperature about 40 °C higher than the ordinary solder, therefore, it is recommended to use the soldering iron having a temperature regulator.
- The ordinary soldering iron can be used but the iron tip has to be applied to the solder joint for a slightly longer time. The printed pattern (copper foil) may peel away if the heated tip is applied for too long, so be careful.

1-16. Precautions for Use of Condensation Sensor

Due to the foreign substances adhering to the condensation sensor chip (see figure below), the sensor fails to measure the correct value of residence to humidity. This prevents the unit from functioning properly. If any foreign substance gets adhered to the chip, replace the condensation sensor with a new one.

Notes

- Do not touch the chip with bare hands.
- Do not clean the chip with alcohol or other similar agents.



Section 2
Error Messages

2-1. Error Messages Overview

This unit has a self diagnosis function to check internal errors.
When the unit detects an error, its error code and description are displayed on the following display units.

- Time data display (error code only)
- Monitor image display
- Video monitor connected to connector MONITOR

When an error occurs, its error code information is recorded in the error logger (maintenance logger) of the main unit and also in the error logger (drive logger) of the drive unit.
Refer to respective error tables for display contents on the time data display and for recording/non-recording in the error loggers.

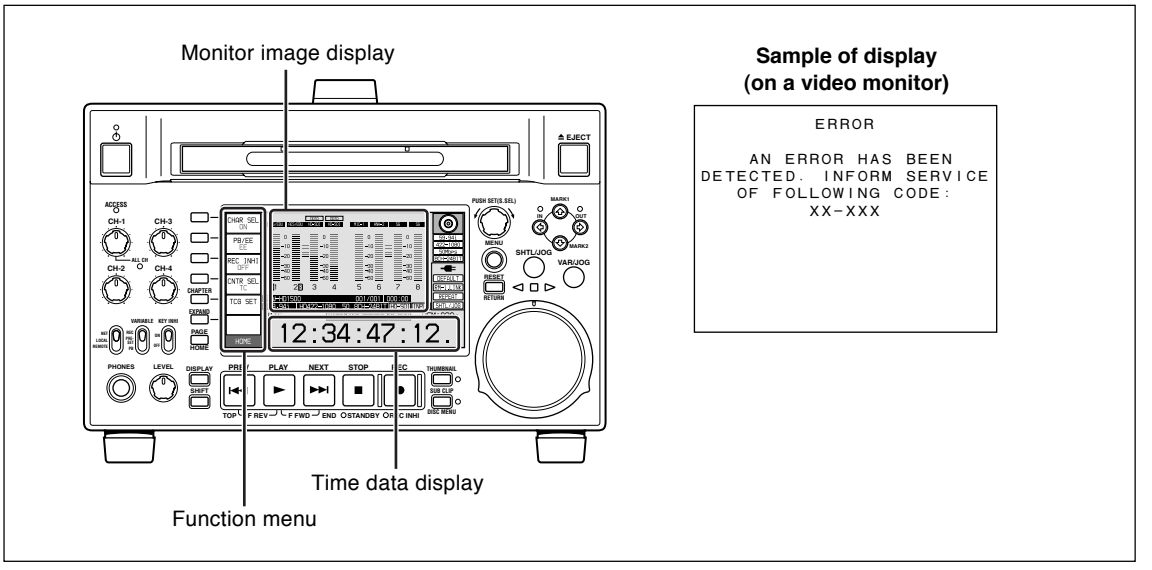
Note

"Time data display" column:

"←" means that the same error code as the left one is displayed.

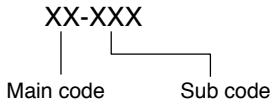
"Maintenance logger", "Drive logger" columns:

- "○" means that the error is recorded in the logger.
- "×" means that the error is not recorded in the logger.



2-2. Error Code List

An error code is provided in combination of 2-digit main code and 3-digit sub code.



Main code	Main error description
0X	Optical drive control errors, device errors
	• 02: Optical devices (LD, LCD)
	• 03: Optical drive two-axis (FCS, TRK)
	• 04: Optical drive seeking
	• 06: Optical drive SA actuator
	• 08: Optical drive spindle
20	Loader assembly errors
3X	Optical drive sensor system errors
5X	Read data errors
6X	Startup errors
91	Interface errors between CPU and peripheral devices
92	Synchronization system errors
95	Video/audio signal processing device errors

For details of sub codes, refer to respective error tables.

If multiple errors occur simultaneously

The highest-priority error is displayed.
When a higher-priority error is cleared, the following-priority error code is displayed.

Protection Mode

When this unit detects an error, it enters a protection mode to prevent the cartridge disc, optical drive, and other components from damage or failure.
The protection mode depends on error status. When a cartridge is inserted, press the EJECT button and remove the cartridge.
The cartridge may not be ejected even after the EJECT command has been received depending on error status. In this case, turn the unit power OFF and ON.

2-2-1. Error 0X

When errors related to optical drive control or to devices are detected, the following error codes are displayed.

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
02	020	←	○	○	Optical block assembly (OP0) (referred to as OP hereafter) is recording at maximum laser output. Perform the pickup lens cleaning. (Refer to Section 4-7-16.)
	0A0	←	○	○	Optical block assembly (OP1) (referred to as OP hereafter) is recording at maximum laser output. Perform the pickup lens cleaning. (Refer to Section 4-7-16.)
	F2E	←	○	○	OP laser is determined to be deteriorated in the laser deterioration assessment for OP (OP0).
	F37	←	○	○	No movement is detected in the ND filter initial operation check of OP (OP0).
	FAE	←	○	○	OP laser is determined to be deteriorated in the laser deterioration assessment for OP (OP1).
	FB7	←	○	○	No movement is detected in the ND filter initial operation check of OP (OP1).
	X25	←	○	○	OP (OP0) laser output error is detected.
	X26	←	○	○	OP (OP0) laser output coefficient cannot be adjusted.
	X27	←	○	○	OP (OP0) laser current is abnormal (zero or excessive).
	X28	←	○	○	OP laser output is stopped judging that no cartridge is inserted.
	X37	←	○	○	OP (OP0) ND filter setting cannot be changed.
	XA5	←	○	○	OP (OP1) laser output error is detected.
	XA6	←	○	○	OP (OP1) laser output coefficient cannot be adjusted.
	XA7	←	○	○	OP (OP1) laser current is abnormal (zero or excessive).
	XB7	←	○	○	OP (OP1) ND filter setting cannot be changed.
03	060	←	×	○	OP (OP0) tracking servo is frequently down.
	0E0	←	×	○	OP (OP1) tracking servo is frequently down.
	X54	←	○	○	No signal from disc required for OP (OP0) focus servo can be detected.
	X57	←	○	○	No control current is detected in OP (OP0) focus servo.
	X58	←	○	○	Excessive control current is detected in OP(OP0) focus servo.
	X67	←	○	○	No control current is detected in OP (OP0) tracking servo.
	X68	←	○	○	Excessive control current is detected in OP (OP0) tracking servo.
	XD4	←	○	○	No signal from disc required for OP (OP1) focus servo can be detected.
	XD7	←	○	○	No control current is detected in OP (OP1) focus servo.
	XD8	←	○	○	Excessive control current is detected in OP(OP1) focus servo.
	XE7	←	○	○	No control current is detected in OP (OP1) tracking servo.
	XE8	←	○	○	Excessive control current is detected in OP (OP1) tracking servo.
04	X7C	←	○	○	OP (OP0) cannot move to disc's innermost circumference.
	X7D	←	○	○	OP (OP0) cannot move to disc's outermost circumference.
	XFC	←	○	○	OP (OP1) cannot move to disc's innermost circumference.
	XFD	←	○	○	OP (OP1) cannot move to disc's outermost circumference.

(Continue)

(Continued)

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
06	049	←	○	○	OP (OP0) SA actuator cannot move to the target position.
	0C9	←	○	○	OP (OP1) SA actuator cannot move to the target position.
	E41	←	○	○	OP (OP0) SA actuator home position cannot be detected during startup adjustment.
	EC1	←	○	○	OP (OP1) SA actuator home position cannot be detected during startup adjustment.
	F41	←	○	○	OP (OP0) SA actuator home position cannot be detected during power-on initialization.
	FC1	←	○	○	OP (OP1) SA actuator home position cannot be detected during power-on initialization.
08	091	←	○	○	Spindle motor does not rotate after the predetermined time has passed (or no FG signal is detected).
	095	←	○	○	Spindle motor cannot be stopped (or abnormal FG signal is detected).
	292	←	○	○	Spindle motor rotation is detected during vertical move of loading. *
	992	←	○	○	Spindle motor rotation is detected during vertical move of unloading. *

* : The vertical move of loading/unloading is also carried out by STBY ON/OFF.

Note

Any number of the following is applicable for "X" in the sub codes above, showing an operation status where the error is detected.
Example) 527: Laser current of optical block assembly is abnormal (zero or excessive) "reading".

0: Operation cannot be identified or no need to be identified.
1: During loading
2: During vertical move of loading
3: Disc is not rotating
4: Seeking
5: Reading
6: Writing
7: Standby state
8: Ejecting
9: Unchucking
A: During disc removal
B: During lens cleaning or device checking
C, D: (Not used)
E: During startup adjustment of optical block assembly
F: During power-on initialization of optical block assembly

2-2-2. Error 20

When errors related to loader assembly are detected, the following error codes are displayed.

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
20	108	←	○	○	An abnormal current of the loading motor is detected.
	111	←	○	○	Horizontal move of loading did not end within the predetermined time.
	117	←	○	○	Displacement of cartridge is detected in the loader during horizontal move of loading.
	118	←	○	○	An abnormal current of the loading motor is detected during horizontal move of loading.
	211	←	○	○	Vertical move of loading did not end within the predetermined time.
	213	←	○	○	Cartridge cannot be detected after loading.
	217	←	○	○	Displacement of cartridge is detected in the loader during vertical move of loading.
	218	←	○	○	An abnormal current of the loading motor is detected during vertical move of loading.
	811	←	○	○	Ejection operation did not end within the predetermined time.
	818	←	○	○	An abnormal current of the loading motor is detected during the ejection operation.
	911	←	○	○	Unchucking operation did not end within the predetermined time.
	918	←	○	○	An abnormal current of the loading motor is detected during the unchucking operation.

2-2-3. Error 3X

When errors related to the optical drive sensor system are detected, the following error codes are displayed.

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
34	500	←	○	○	Loader position sensor (SE-852 board) is detects abnormal code.
	509	←	○	○	Sensor hole (SE-850/851 board) is detects abnormal code.
35	500	(Not displayed)	×	○	Abnormality of acceleration sensor is detected.
37	500	High TEMP!	×	○	Optical block assembly (OP0) temperature sensor detects abnormal status.
	580	High TEMP!	×	○	Optical block assembly (OP1) temperature sensor detects abnormal status.
3C	500	HUMID!	×	○	Dew condensation is detected.

2-2-4. Error 5X

When read data errors are detected, the following error codes are displayed.

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
50	010	(Not displayed)	×	○	BCA area data cannot be read.
	011	(Not displayed)	×	○	BCA area data is invalid.
51	020	DI read err	×	○	PIC area data cannot be read.
	021	DI read err	×	○	PIC area data is invalid.
	500	(Not displayed)	×	○	An attempt is made to insert a disc that is not the ProDisc.
52	X0B	Read err	×	○	Address cannot be read from disc in optical block assembly (OP0).
	X8B	Read err	×	○	Address cannot be read from disc in optical block assembly (OP1).
53	500	Disc Damage	×	○	An attempt is made to make recording in a disc while alternate area has no free space.

Note

Any number of the following is applicable for "X" in the sub codes above, showing an operation status where the error is detected.

Example) 50B: Address cannot be read from the disc in optical block assembly "during horizontal move of unloading".

0: Operation cannot be identified or no need to be identified.
1: During loading
2: During vertical move of loading
3: Disc is not rotating
4: Seeking
5: Reading
6: Writing
7: Standby state
8: Ejecting
9: Unchucking
A: During disc removal
B: During lens cleaning or device checking
C, D: (Not used)
E: During startup adjustment of optical block assembly
F: During power-on initialization of optical block assembly

2-2-5. Error 6X

When errors related to startup operation are detected, the following error codes are displayed.

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
60	E00	(Not displayed)	×	○	Optical block assembly (OP0) cannot seek to target position during startup.
	E80	(Not displayed)	×	○	Optical block assembly (OP1) cannot seek to target position during startup.
6F	E00	DRV ADJ err	×	○	Optical block assembly (OP0) startup adjustment cannot be completed.
	E80	DRV ADJ err	×	○	Optical block assembly (OP1) startup adjustment cannot be completed.

2-2-6. Error 91

When interface errors between CPU and peripheral devices are detected, the following error codes are displayed.

Note

System control CPU: IC2601 on the HPR-23 board

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
91	125	←	○	×	System control CPU detects interruption in communication with key control CPU (KY: U1/KY-624 board).
	130	←	○	×	System control CPU detects flash memory (IC2905, IC2906/HPR-23 board) error.
	139	←	○	×	System control CPU detects an error in setup menu data area (EEPROM: IC2701/HPR-23 board).
	13B	←	○	×	System control CPU detects an error in hours meter area (EEPROM: IC2701/HPR-23 board).
	13C	←	○	×	System control CPU detects an error in adjustment data area (EEPROM: IC2701/HPR-23 board).
	13D	←	○	×	System control CPU detects an error in hours meter area (EEPROM: IC2907/HPR-23 board).
	13E	←	○	×	System control CPU detects an error in Setup Menu customize display data area (EEPROM: IC2701/HPR-23 board).
	13F	←	○	×	System control CPU detects an error in F-KEY CONFIG data area (EEPROM: IC2701/HPR-23 board).
	155	←	○	×	Communication between system control CPU and optical drive (DR-601 board) is interrupted.
	1C1	←	○	×	System control CPU detects software option's installation key error.
	215	←	×	×	Key control CPU (KY: U1/KY-624 board) detects interruption in communication with system control CPU.
	430	←	○	×	CPU (NET-4 board) detects flash memory (IC907,IC908/NET-4 board) error. *
	551	←	○	○	Optical drive's system control CPU (DRV: IC600/DR-601 board) detects firmware error. Perform the firmware update. (Refer to Section 1-10.)
	595	←	○	○	Optical drive's system control CPU (DRV: IC600/DR-601 board) detects interruption in communication with SV DSP (IC400/DR-601 board) on the OP0 side.
	596	←	○	○	Optical drive's system control CPU (DRV: IC600/DR-601 board) detects no reply from SV DSP (DRV: IC400/DR-601 board) on the OP0 side during communication with SV DSP.
	5A5	←	○	○	Optical drive's system control CPU (DRV: IC600/DR-601 board) detects interruption in communication with SV DSP (IC1400/DR-601 board) on the OP1 side.
	5A6	←	○	○	Optical drive's system control CPU (DRV: IC600/DR-601 board) detects no reply from SV DSP (DRV: IC1400/DR-601 board) on the OP1 side during communication with SV DSP.

2-2-7. Error 92

When synchronization system errors are detected, the following error codes are displayed.

Note

System control CPU: IC1900 on the DPR-291 board

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
92	101	←	○	×	System control CPU detects REF FOE error (except 24P) .
	102	←	○	×	System control CPU detects REC FOE error.
	103	(Not displayed)	○	×	System control CPU detects no signal is input into the REF VIDEO IN connector.
	104	←	○	×	System control CPU detects 24P REF FOE error.

2-2-8. Error 95

When interface errors between device ICs are detected, the following error codes are displayed.

Note

System control CPU: IC2601 on the HPR-23 board

Optical drive's system control CPU (DRV): IC600 on the DR-601 board

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
95	101	←	○	×	Communication error between system control CPU and PCI bridge (IC801/HPR-23 board) is detected.
	102	←	○	×	Communication error between system control CPU and i.LINK (IC1201/ HPR-23 board) is detected.
	104	←	○	×	Communication error between system control CPU and MPEG IMX encode device (MIKE: IC1202/ENC-107 board) is detected.
	105	←	○	×	Communication error between system control CPU and video encoder (IC300/VPR-99 board) is detected.
	107	←	○	×	Communication error between system control CPU and MPEG encode device (TORINO: IC201, 401, 601 / ENC-107 board) is detected.
	108	←	○	×	MPEG encode device (TORINO: IC201 / ENC-107 board) has an error.
	109	←	○	×	Communication error between system control CPU and MPEG decode device (TORINO: IC801, 1001 / ENC-107 board) is detected.
	10A	←	○	×	MPEG decode device (TORINO: IC801, IC1001/ENC-107 board) has an error.
	10C	←	○	×	System control CPU detects signal processing device LVIS (IC501/HPR-23 board) error.
	10F	←	○	×	System control CPU detects PROXY decoder (IC501/HPR-23 board) error.
	110	←	○	×	System control CPU detects PROXY encoder (IC501/HPR-23 board) error.
	111	←	○	×	System control CPU detects PB DSP0 (IC1801/HPR-23 board) error.
	112	←	○	×	System control CPU detects PB DSP1 (IC1802/HPR-23 board) error.
	113	←	○	×	System control CPU detects REC DSP0 (IC1701/HPR-23 board) error.
	114	←	○	×	System control CPU detects REC DSP1 (IC1702/HPR-23 board) error.

(Continue)

(Continued)

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
95	115	←	○	×	System control CPU detects MONITOR DSP (IC1901/HPR-23 board) error.
	116	←	○	×	System control CPU detects LRZ DSP0 (IC2001/HPR-23 board) error.
	117	←	○	×	System control CPU detects LRZ DSP1 (IC2002/HPR-23 board) error.
	118	←	○	×	System control CPU detects HD-SDI module (IC500/RX-93 board) error.
	119	←	○	×	System control CPU detects TS option module (IC500/TSI-60 board (PDBK-201)) error.
	503	←	○	○	Optical drive's BDC (IC300/DR-601 board) error is detected during initial check.
	506	(Not displayed)	×	○	In optical block assembly (OP0), laser driver IC setting value error is detected.
	507	←	×	○	Adjustment data cannot be read from EEPROM in OP (OP0).
	508	←	○	○	Hours meter data cannot be read from EEPROM in OP (OP0).
	509	←	○	○	Adjustment data cannot be read from optical drive's EEPROM (IC4/SE-850 board).
	50A	←	○	○	Hours meter data cannot be read from optical drive's EEPROM (IC4/SE-850 board).
	50C	←	○	○	Optical drive's SYS PE (IC700/DR-601 board) configuration error is detected.
	50F	←	○	○	Cannot access SDRAM (IC300/DR-601 board) for Optical driver's BDC (IC300/DR-606 board).
	513	←	○	○	Optical drive's (OP0) BDC (IC300/DR-601 board) cannot set the SDRAM mode.
	51C	←	○	○	Optical drive's (OP0) BDC (IC300/DR-601 board) cannot reset free-run by SYS PE (IC700/DR-606 board).
	526	←	○	○	In optical block assembly (OP0), laser driver IC setting value cannot be recovered from abnormal state.
	52C	←	○	○	Auto setting by SYS PE (IC700/DR-601 board) is disabled with power control of optical drive's (OP0) BDC (IC300/DR-601 board).
	586	(Not displayed)	×	○	In optical block assembly (OP1), laser driver IC setting value error is detected.
	587	←	×	○	Adjustment data cannot be read from EEPROM in OP (OP1).
	588	←	○	○	Hours meter data cannot be read from EEPROM in OP (OP1).
	58F	←	○	○	Cannot access SDRAM (IC1300/DR-601 board) for Optical driver's BDC (IC300/DR-606 board).
	593	←	○	○	Optical drive's (OP1) BDC (IC1300/DR-601 board) cannot set the SDRAM mode.
	59C	←	○	○	Optical drive's (OP1) BDC (IC1300/DR-601 board) cannot reset free-run by SYS PE (IC700/DR-601 board).
	5A6	←	○	○	In optical block assembly (OP1), laser driver IC setting value cannot be recovered from abnormal state.
	5AC	←	○	○	Auto setting by SYS PE (IC700/DR-601 board) is disabled with power control of optical drive's (OP1) BDC (IC1300/DR-601 board).

Section 3
XDCAM Web Site

3-1. XDCAM Web Site Overview

Operations such as confirming the settings of the unit and upgrading the firmware can be performed via the network terminal.

The XDCAM website consists of the following menus.

Status menu
- Device Information
- Hours Meter
- Software Version

Disc menu
- Disc properties
- Thumbnails

Maintenance menu
- Network
- SNMP
- Account
- Setup Menu
- Software Update
- License Registration

Connecting to XDCAM Website

Tools/Equipment Required
- Personal computer (referred to as PC hereafter)
- Network cable (crossover or straight-through)

Procedure
1. Connect the unit to the host PC using one of the following ways. (Refer to the Operation Manual.)
   - Connect the unit to the host PC through a network device (such as a hub).
   - Directly connect the unit to the host PC.

2. Start the web browser of the host PC. Enter “http://192.168.1.10” in the Address bar. (The underlined part is the IP address of the unit.)
   Note
   Use Internet Explorer for the web browser of the host PC.
   Other web browsers may not function correctly.

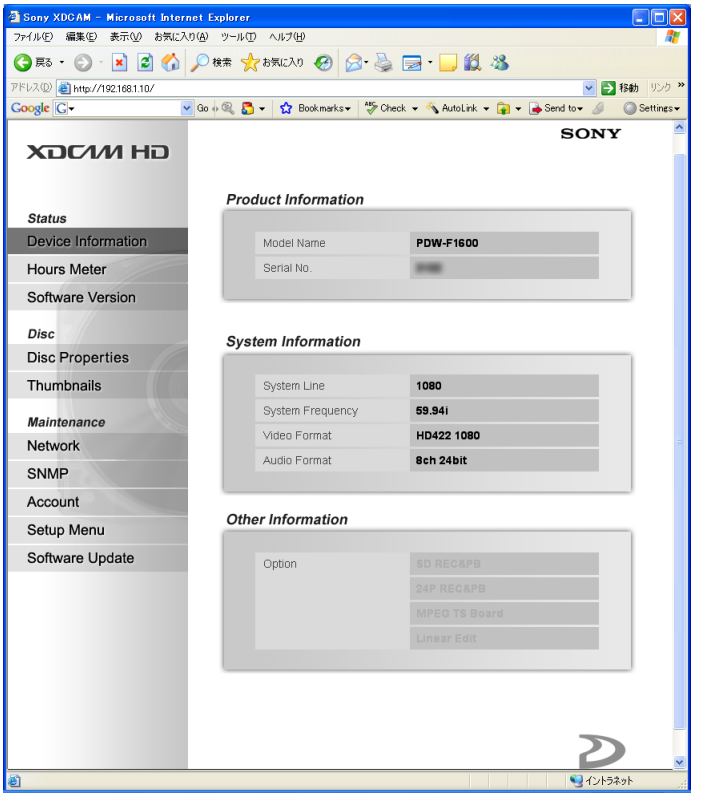
3. Enter “admin” for User name and “pdw-f1600” for Password, and then click “OK”.
   Note
   User name and User password can be changed on the Account page.

4. The XDCAM top page appears. Click a menu you want to browse on the left frame.

3-2. Status Menu

3-2-1. Device Information

The settings of the unit can be checked in the Device Information page of the Status menu.



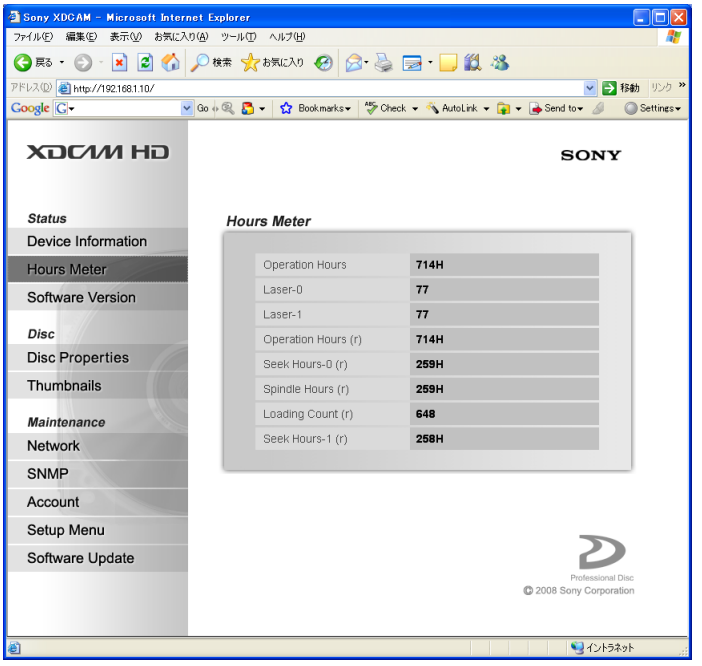
Item		Setting	Function
Product Information	Model Name	Display only	Displays the model name
	Serial No.	Display only	Displays the serial No.
System Information	System Line	Display only	Displays the signal standard
	System Frequency	Display only	Displays the signal standard
	Video Format	Display only	Displays the video recording format
	Audio Format	Display only	Displays the audio recording format
Other Information	Option	Display only	Displays the installed option

3-2-2. Hours Meter

The hours meter of the unit can be displayed on the Hours Meter page of the Status menu.

Note

The function is the same as that of the digital hours meter of the basic setup menu on the unit.
For “How to reset the hours meter”, contact your local Sony Sales Office/Service Center.



Item	Setting	Function
Operation Hours	Display only	Displays the total operation hours
Laser-0 *1	Display only	Displays the output count of laser on optical block assembly 0 *2
Laser-1 *1	Display only	Displays the output count of laser on optical block assembly 1 *2
Operation Hours (r)	Display only	Displays the total operation hours (Unit: hour, Resettable)
Seek Hours-0 (r)	Display only	Displays the total running hours 0 of seek on optical block assembly (Unit: hour, Resettable)
Spindle Hours (r)	Display only	Displays the total running hours of spindle motor (Unit: hour, Resettable)
Loading Count (r)	Display only	Displays the total loading counts of disc (Resettable)
Seek Hours-1 (r)	Display only	Displays the total running hours 1 of seek on optical block assembly (Unit: hour, Resettable)

*1 : Not resettable for this unit.
*2 : Increment of the counter depends on recording/playback ratio and operating temperature.

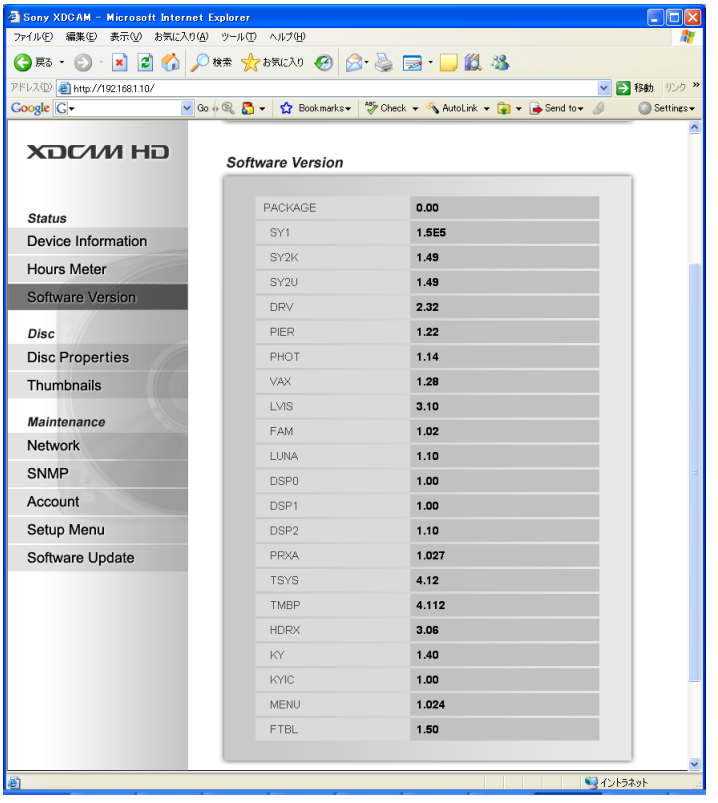
3-2-3. Software Version

The version of the software can be checked in the Software Version page of the Status menu.

Note

The function is the same as that of the SOFTWARE VERSION menu of the OTHERS of the MAINTENANCE menu on the unit.

(full version display)



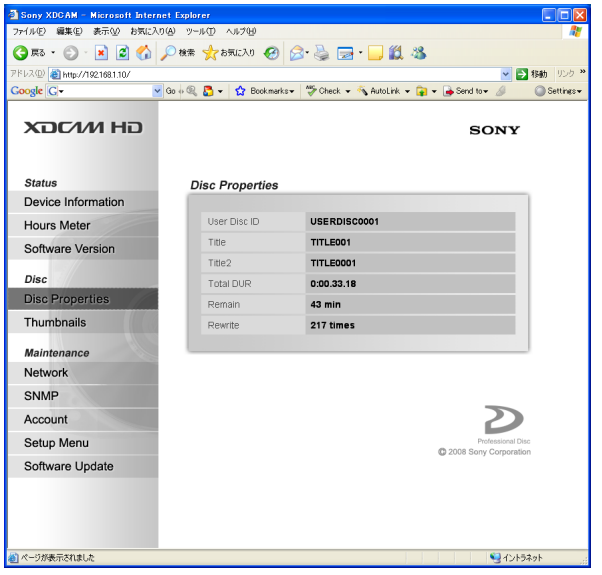
Item	Setting	Function	
Product Information	Model Name	Display only	Displays the model name
	Serial No.	Display only	Displays the serial No.
Software Version	PACKAGE	Display only	Shows the firmware package version
	SY1	Display only	Shows the version of ROM (IC2905, IC2906) on IC2601/HPR-23 board *1
	SY2K	Display only	Shows the version of ROM (IC907, IC908) on IC1/NET-4 board
	SY2U	Display only	Shows the version of ROM (IC907, IC908) on IC1/NET-4 board
	DRV	Display only	Shows the version of ROM (IC602) on IC600/DR-601 board
	PIER	Display only	Shows the version of ROM (IC2905, IC2906) on IC2103/HPR-23 board *1
	PHOT	Display only	Shows the version of ROM (IC2905, IC2906) on IC801/HPR-23 board *1
	VAX	Display only	Shows the version of ROM (IC2905, IC2906) on IC206/HPR-23 board *1
	LVIS	Display only	Shows the version of ROM (IC2905, IC2906) on IC501/HPR-23 board *1
	FAM	Display only	Shows the version of ROM (IC2905, IC2906) on IC1201/HPR-23 board *1
	LUNA	Display only	Shows the version of ROM (IC2905, 2906/HPR-23 board) on IC100/VPR-99 board
	DSP0	Display only	Shows the version of ROM (IC2905, IC2906) on IC1701, 1702/HPR-23 board *1
	DSP1	Display only	Shows the version of ROM (IC2905, IC2906) on IC1801, 1802/HPR-23 board *1
	DSP2	Display only	Shows the version of ROM (IC2905, IC2906) on IC1901/HPR-23 board *1
	PRXA	Display only	Shows the version of ROM (IC2905, IC2906) on IC2001, 2002/HPR-23 board *1
	TSYS	Display only	Shows the version of ROM (IC2905, 2906/HPR-23 board) on IC201, 401, 601, 801, 1001/ENC-107 board *1
	TMBP	Display only	Shows the version of ROM (IC2905, 2906/HPR-23 board) on IC201, 401, 601, 801, 1001/ENC-107 board *1
	HDRX	Display only	Shows the version of ROM (IC103) on IC300/RX-93 board *1
	KY	Display only	Shows the version of ROM (U5) on U1/KY-624 board
	KYIC	Display only	Shows the version of ROM (U5) on U1/KY-624 board
	MENU	Display only	Shows the version of ROM (IC2905, IC2906) on IC2061/HPR-23 board *1
	FTBL	Display only	Shows the version of ROM (IC2905, IC2906) on IC2061/HPR-23 board *1
Software Version (Option)	TS	Display only	Shows the version of ROM (IC504) on IC500/TSI-60 board
	TSIC	Display only	Shows the version of ROM (IC504) on IC500/TSI-60 board

*1: Using the firmware package file, the version can be upgraded.

3-3. Disc Menu

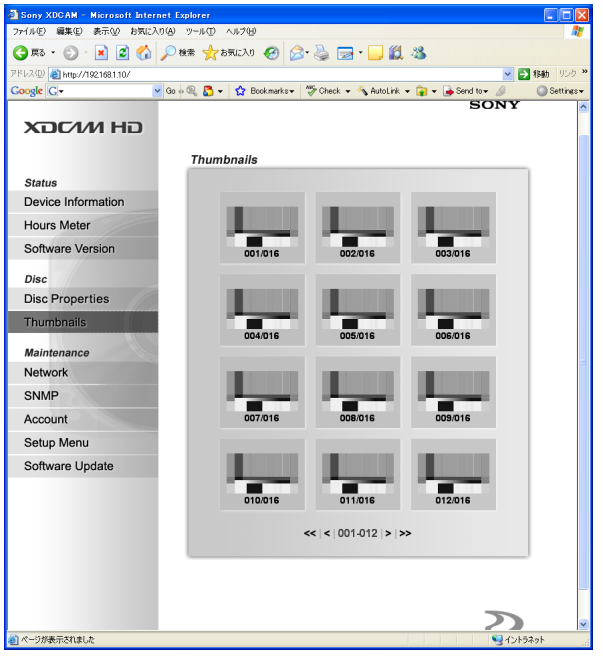
3-3-1. Disc Properties

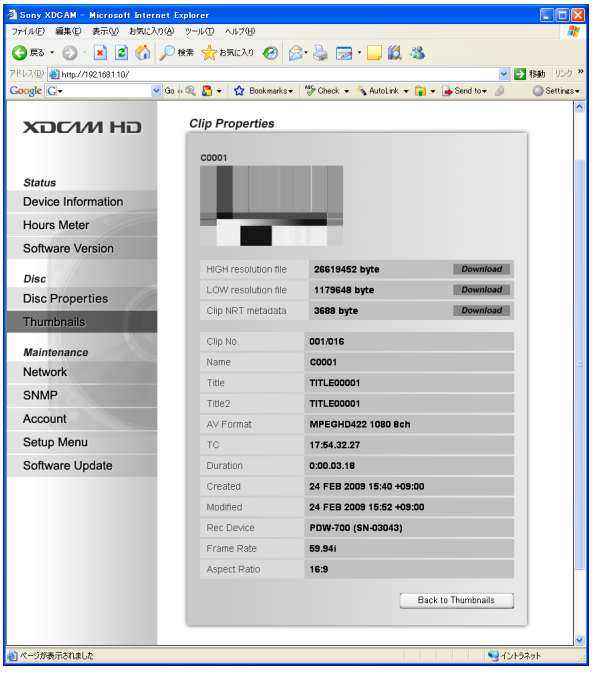
The information on the disc inserted in the unit can be checked on the Disc Properties page of the Disc menu.
For details, refer to Operation manual.



3-3-2. Thumbnails

The thumbnails and properties of the clips on the disc inserted in the unit can be checked on the Thumbnails page of the Disc menu.
For details, refer to Operation manual.





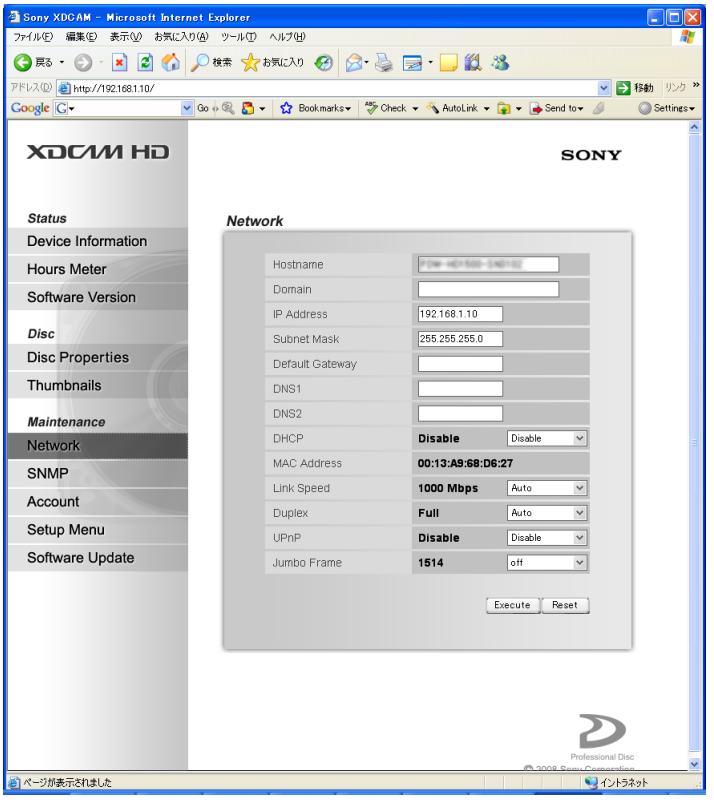
3-4. Maintenance Menu

3-4-1. Network

The network-related settings can be changed on the Network page of the Maintenance menu.

Note

The function is almost the same as that of the NETWORK CONFIG of the MAINTENANCE menu on the unit.



Item	Setting	Default	Function
Hostname	Charactor	PDW-F1600 Serial No.	Sets a host name
Domain	Charactor	—	Sets a domain name
IP Address	xxx.xxx.xxx.xxx	192.168.1.10	Sets an IP address (See below)
Subnet Mask	xxx.xxx.xxx.xxx	255.255.255.0	Sets a subnet mask (See below)
Default Gateway	xxx.xxx.xxx.xxx	0.0.0.0	Sets a default gateway (See below)
DNS 1	xxx.xxx.xxx.xxx	—	Sets a DNS server 1
DNS 2	xxx.xxx.xxx.xxx	—	Sets a DNS server 2
DHCP	Enable/Disable	Disable	Sets whether to automatically acquire an IP address on the DHCP server Enable: Enables automatic acquisition. If the server does not respond in 30 seconds, the IP address is set by Auto IP Disable: Disables automatic acquisition
MAC Address	Display only	—	Displays a MAC address
Link Speed	AUTO/10Mbps/100Mbps/1000Mbps	Auto	Sets a communication speed
Duplex	AUTO/Full Duplex/ Half Duplex	Auto	Sets a communication mode Auto Full duplex Half duplex
UPnP	Enable/Disable	Disable	Sets whether to use a UPnP Enable : Use Disable : Not use
Jumbo Frame	Off/4088/9014	Off	Sets a maximum frame size of Ethernet*1 (FCS*2 is not included) Off: 1514 byte (Factory setting) 4088: 4088 byte 9014: 9014 byte **Note** • Valid only when Link Speed is set to 1000Mbps. All related device on the network need to support it • When Link Speed is set to 10Mbps or 100Mbps, set to 4088 or 9014, the transmission speed becomes slow or the network connection is fail, depending on the network device

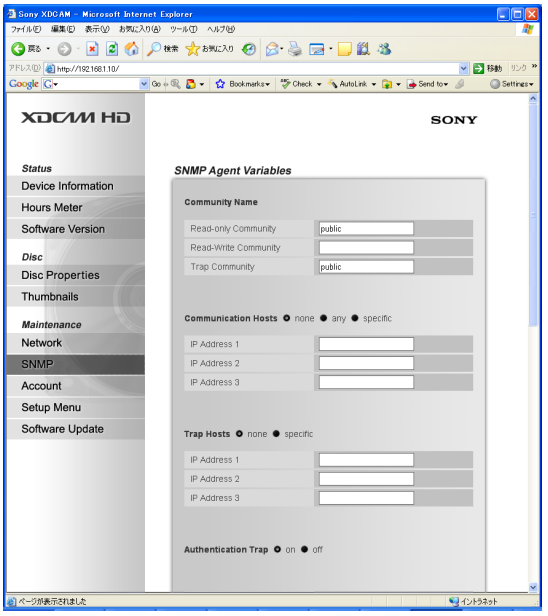
∗1: Ethernet is a registered trademark of Xerox Corporation.
∗2: Frame Check Sequence

Procedure

1. Enter the IP address (or the subnet mask or the default gateway).
   (Pressing “Reset” clears the Input window.)
2. Press “Execute” to change the setting.

3-4-2. SNMP

You can perform settings related to SNMP Agent of the SNMP function on the SNMP page of the Maintenance menu.



Item		Setting	Function
Community Name	Read-Only Community	public	Sets the reading community name *1 Used when reading the MIB stored in XDCAM.
	Read-Write Community	—	Sets the reading-writing community name *1 Used when reading or writing the MIB stored in XDCAM This needs to be set when writing the variables (sysContact,sysName,sysLocation) of MIB-2 of XDCAM from the SNMP manager
	Trap Community	public	Sets the community name of the trap issued from XDCAM *1
Communication Hosts	—	—	Sets the SNMP Manager with which to communicate using SNMP none : Rejects communication from all SNMP managers Set this when not using SNMP any : Accepts communication from all SNMP managers specific : Accepts communication only from the SNMP manager with the specified IP address
	IP Address 1/2/3	—	Specifies the IP address of the SNMP manager with which to communicate when “specific” is selected. Up to three IP addresses can be specified
Trap Hosts Hosts	—	—	Specifies the destination of the trap sent from XDCAM none : Does not send the trap specific : Specifies the SNMP manager to which to send the trap **Note** When using SONY-PRO-MIB, select “specific” and specify the IP address of the SNMP manager
	IP Address 1/2/3	—	Specifies the IP address of the SNMP manager to which to send the trap when “specific” is selected. Up to three IP addresses can be selected
Authentication Trap		on	Sets whether or not to issue an authentication trap when there is an access from a wrong community on : Issues an authentication error trap off : Does not issues an authentication error trap Normally, set this to “on”
Status		Display only	OK, OK : Reboot the machine : Displayed when the data is saved correctly **Note** When “NG” is displayed, check the entered characters

*1: Single-byte alphanumeric characters only. Up to 16 characters can be entered.

Procedure

1. Set the Community Name.
   Set the community name of SNMP Agent installed in XDCAM.
   Note
   To perform communication with SNMP, the community name set in the SNMP manager should correspond to the one set in XDCAM.
2. Set the target hosts for the communication (Communication Hosts).
3. Set the target hosts to which to send the trap (Trap Hosts).
   Note
   When you use SONY-PRO-MIB, select “specific” and then specify SNMP manager's IP address.
4. Set the Authentication Trap.
5. Save the setting by pressing “Execute”.
   Check that “OK” or “OK : Reboot the machine” is displayed in the Status field.
   Note
   The setting is enabled after the power is turned on again.
   To disable the setting, press “Reset”.

SNMP Specification

The specifications of the stored SNMP Agent are shown below.

SNMP Version	SNMPv1
MIB definition	SMIv2
Support PDU	GetRequest, GetNextRequest, SetRequest, GetResponce, Trap
Standard MIB	MIB-2
Extended MIB	SONY-PRO-MIB, SONY-XDCAM1-MIB

System Configuration Examples

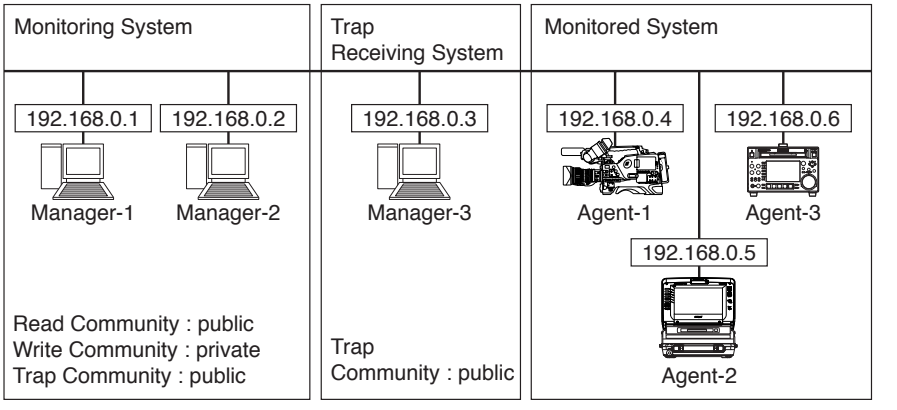
The system configuration examples and the corresponding settings are shown.

Community Name
- Read-only Community : public
- Read-Write Community : private
- Trap Community : public

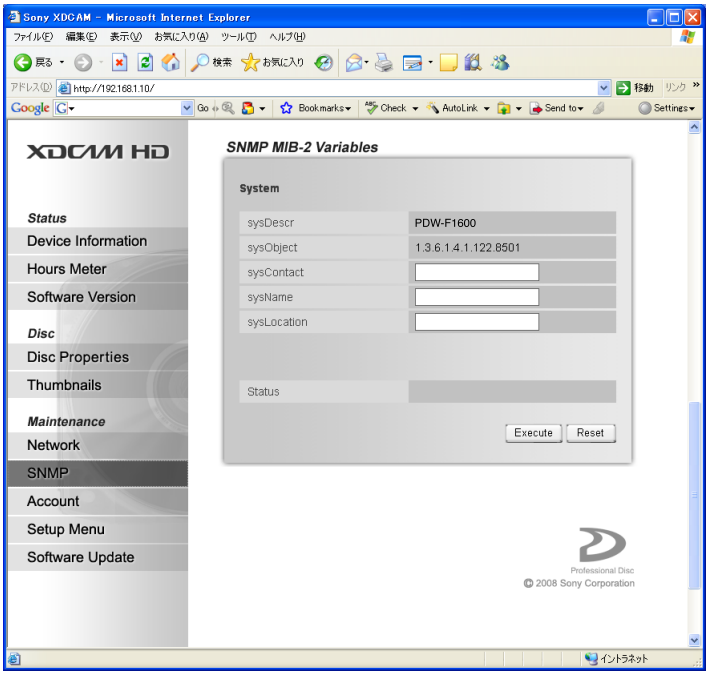
Communication Hosts : “specific”
- IP Address 1 : 192.168.0.1
- IP Address 2 : 192.168.0.2

Trap Hosts : “specific”
- IP Address 1 : 192.168.0.1
- IP Address 2 : 192.168.0.2
- IP Address 3 : 192.168.0.3

Authentication Trap : “on”



The system information of MIB-2 can be set on the SNMP page of the Maintenance menu.
The information is defined by the system group of MIB-2, and the setting contents are referred to from the SNMP manager.
The setting contents are used for system control, and will not affect the operations of XDCAM.
When monitoring the network consisting of multiple units of XDCAM or multiple devices with MIB-2 installed, individual devices can be identified based on this information.



Item	Setting	Function
sysDescr	Display only	Displays the model name
sysObject	Display only	Displays the object identifier
sysContact	ASCII character only *1	In general, sets the information such as device manager or contact (ex. Phone numbers, e-mail addresses, etc.)
sysName	ASCII character only *1	In general, sets the device name (ex: “XDCAM-002”, etc.)
sysLocation	ASCII character only *1	In general, sets the location where the device is installed (ex. “Studio-A”, etc.)
Status	ASCII character only *1	OK: Displayed when the data is saved correctly. **Note** When “NG” is displayed, check the entered characters.

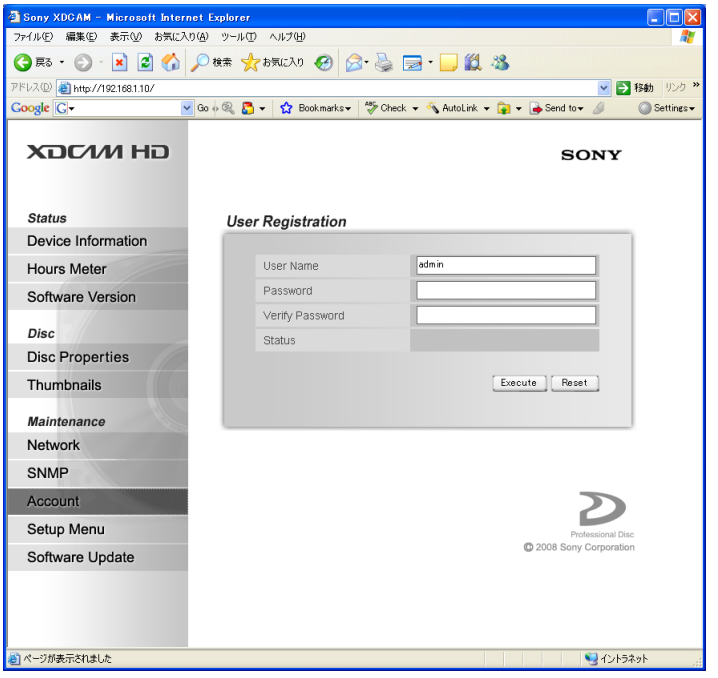
*1
・Up to 32 characters can be entered for each item.
・sysContact, sysName, sysLocation can be set from the SNMP manager as well. Up to 32 characters can be entered in this case, too.
・Chinese characters cannot be entered.

Procedure

1. Set the MIB-2 system information. (sysContact, sysName, sysLocation)
2. Save the setting by pressing “Execute”.
   Check that “OK” is displayed in the Status field.
   Note
   The setting is enabled after the power is turned on again.
   To disable the setting, press “Reset”.

3-4-3. Account

The user password for the XDCAM website can be changed on the Account page of the Maintenance menu.



Item		Setting	Function
User Registration	User Name	31-byte alphanumeric and hyphen *1	User name.
	Password	31-byte alphanumeric and hyphen *1	New password
	Verify Password	31-byte alphanumeric and hyphen *1	New password (Re-enter the new password for verification.)
	Status	Display only	Success: Displayed when the user password is changed. Error: Displayed when an unusable character is used in the password, or the verify password is conflict.

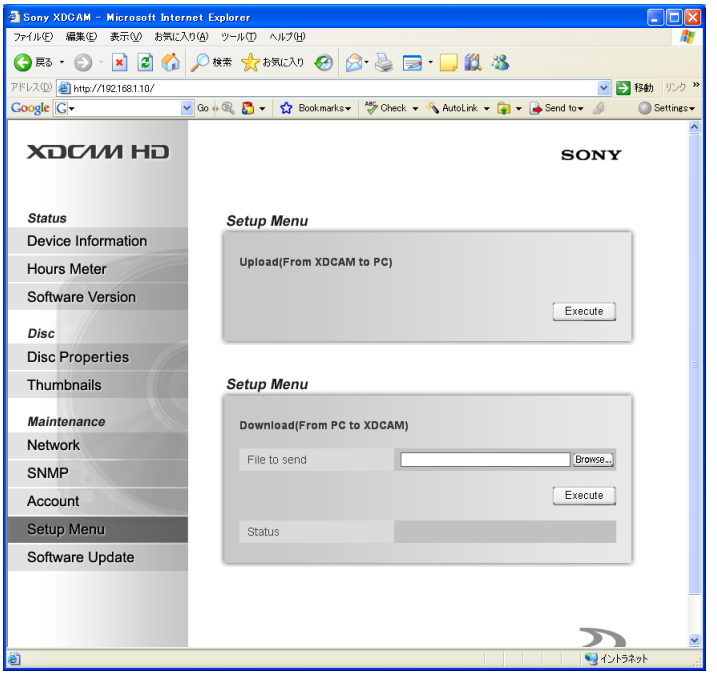
*1: Uppercase and lowercase characters are distinguished.

Procedure

1. Enter the new password in the Password box and Verify Password box. (Pressing “Reset” clears the Input window.)
2. Press “Execute” to change the password.

3-4-4. Setup Menu

The setup menu of the unit can be uploaded or downloaded in the Setup Menu page of the Maintenance menu.



Upload

Save the contents of the setup menu of the unit to the PC.

Procedure

1. Press “Execute” in the Upload field.
2. Save the contents of the setup menu according to the displayed message.

Download

Return the contents of the setup menu saved in the PC to the unit.

Procedure

1. Click “Browse” and select the file of the setup menu.
2. Press “Execute” in the Download field.
3. When the download is completed, the unit is automatically rebooted.

3-4-5. Software Update

In the Software Update page of the Maintenance menu, the batched update using the firmware package file can be performed.

In this section, the update method using the Web browser (Internet Explorer) is explained.

Note

The figures shown in this page are the sample of display. Due to the specification change, the actual screen display may differ from the sample figures.

Tools/Equipment Required

- Personal Computer (hereafter called PC)
- Firmware Package File
- Network Cable (Crossover or straight through cable)

For obtaining the firmware package, contact your local Sony Sales Office/Service Center.

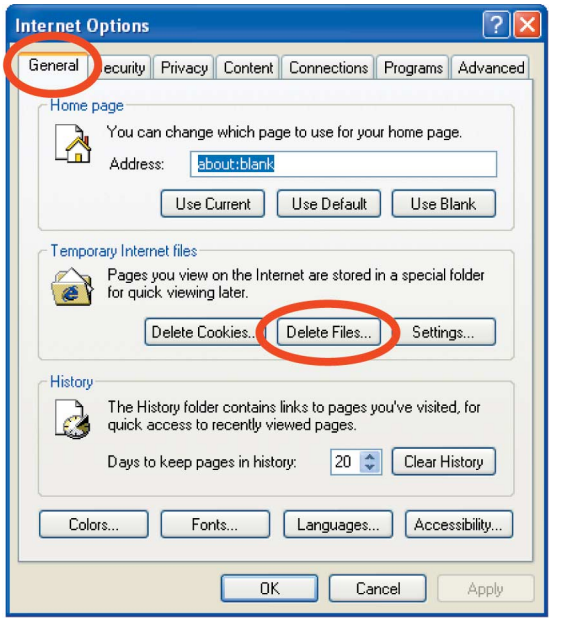
Preparation

1. Eject the disc.
2. Remove the i.LINK cable, the headphones and the audio cable.
3. Connect the unit in either method mentioned below. (Refer to the Operation Manual.)
   - Connect the unit and the host PC via other network device (such as a hub).
   - Connect the unit and the PC directly (using network crossover cable).
4. Copy the obtained firmware package to an arbitrary directory on the host PC.
5. Start up the Internet Explorer of host PC.

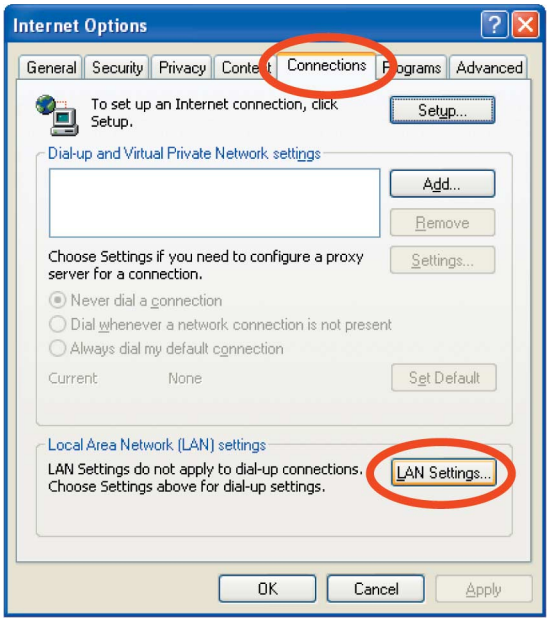
   Note

   Be sure to use the Internet Explorer for updating.
   Upgrade may not succeed with other web browsers.

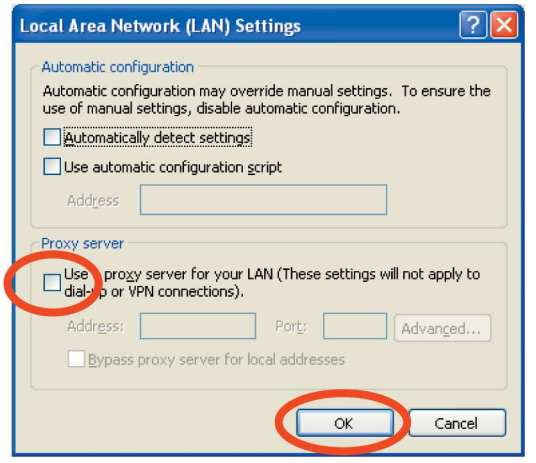
6. Select “Tool” - “Internet Options”.
7. Click “Delete Files” on the “General” page to delete the Temporary Internet files.



8. The confirmation message appears. Click “OK”.
9. Click “LAN Settings” on the “Connections” page.



10. Confirm that the checkbox of “Use a proxy server for your LAN” is not checked. If checked, uncheck the checkbox.
11. Click “OK”.

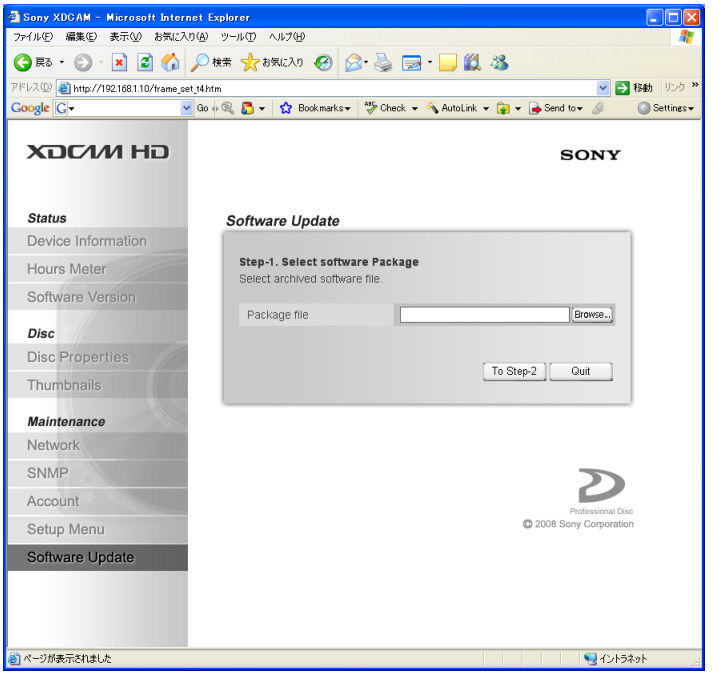


12. Click “OK” on the Internet Options window.

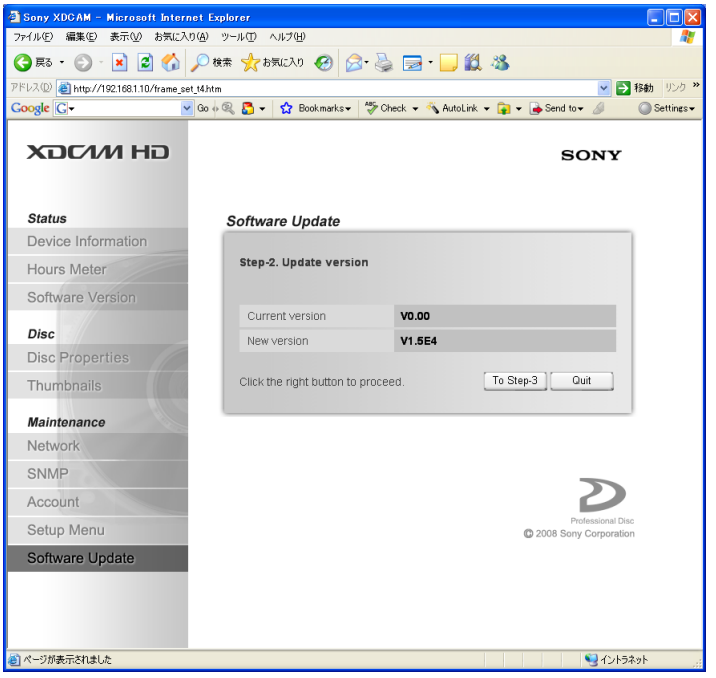
Update Procedure

1. Start up the Internet Explorer, and enter “http://192.168.1.10” in the Address bar. (Where the underlined part is the IP address of the unit.)
2. Enter “admin” for User name and “pdw-f1600” for Password. Then click “OK”.
   The XDCAM top page appears.

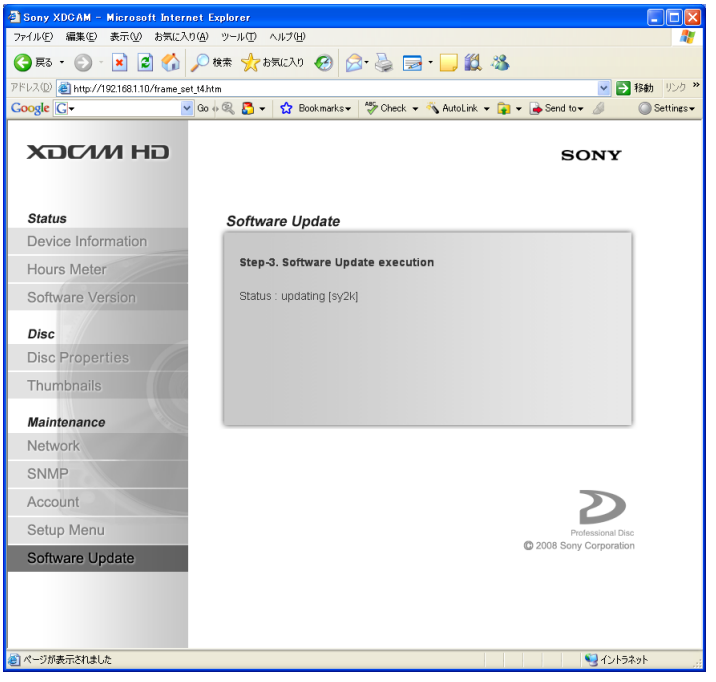
3. Click “Software Update” on the Maintenance menu in the left frame.
4. Click “Browse” and select the firmware package file copied in step 4 of “Preparation”.
5. Click “To Step-2”.



6. The current version firmware and new version firmware appears.
When the firmware update is click “To Step-3”.



7. The update starts, and it changes the following display.

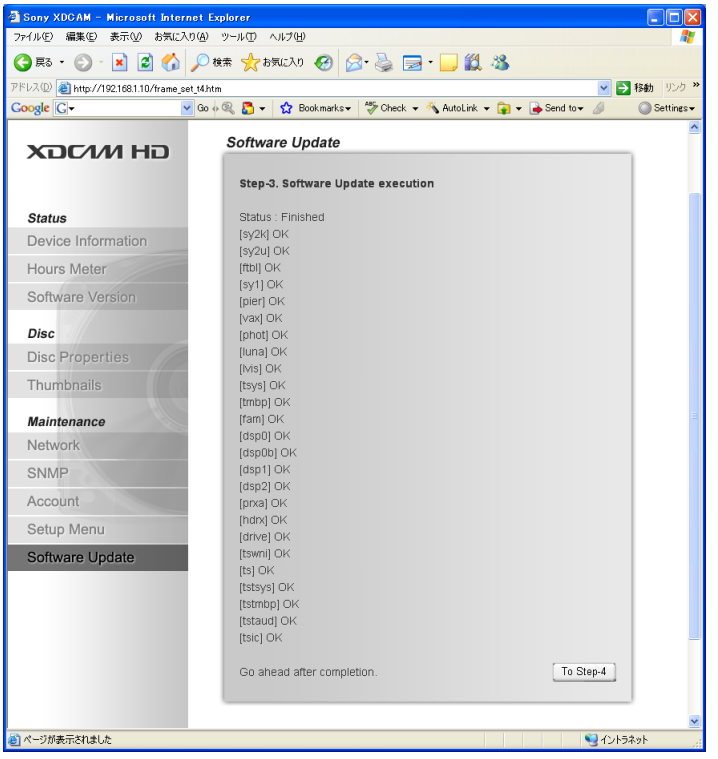


8. When the status turns to “Finished”, check that each firmware program is properly updated or not. (OK or NG)

Note

If no change is observed on the download menu for 10 minutes or any firmware program is marked “NG”, the update is failed. In this case, return to step 2 in “Preparation”. If the update is failed again, contact your local Sony Sales Office/Service Center.

9. When “OK” appears for all of the firmware programs, click “To Step-4”.

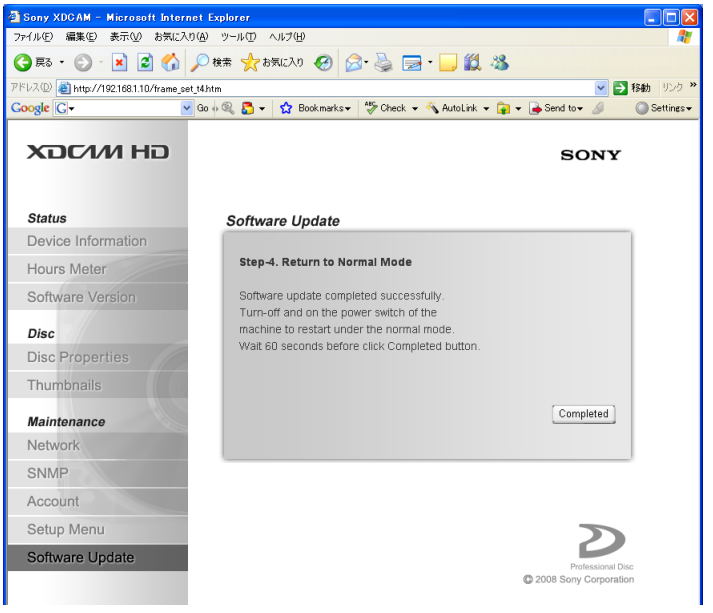


10. Press the ON/Standby switch to set the unit standby once and then press the ON/Standby switch again to set the unit in operating state.
    Wait for 60 seconds in this operating state.

    Note

    When “MENU Ver. UP” appears in the time data display, press the MENU button and then the SET button.

11. Click “Completed”.



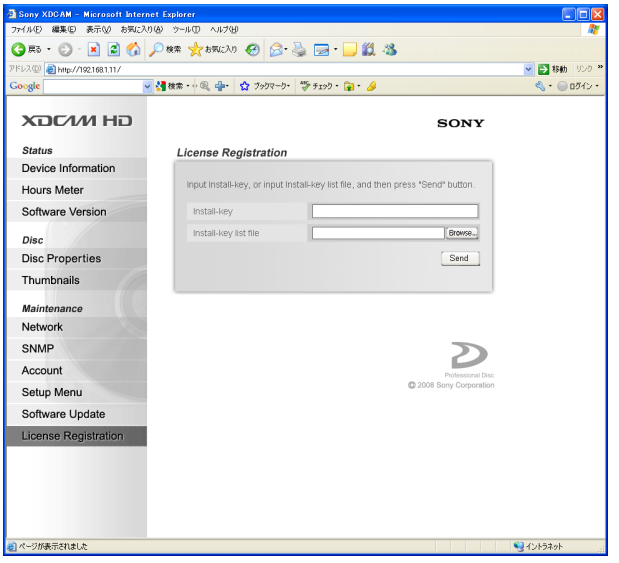
12. The window returns to the XDCAM top page and the update is completed.
13. Confirm that SY2K and SY2U are updated in the Software Version page. (Refer to Section 3-2-3.)

3-4-6. License Registration

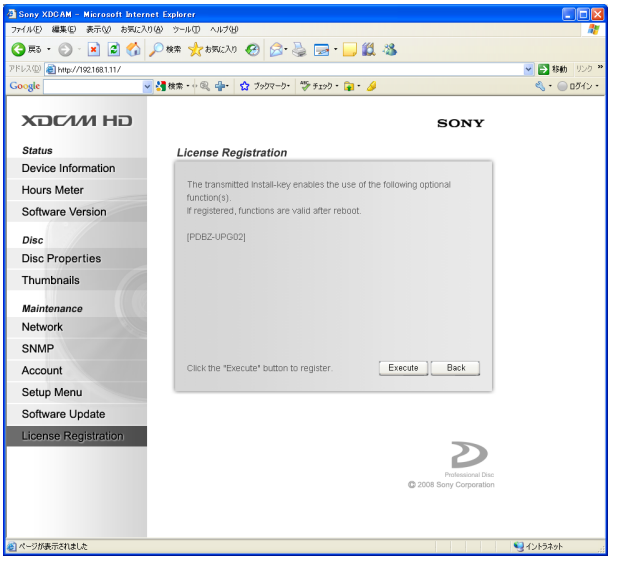
License registration of software option using the Install key can be made from the License Registration page of the Maintenance menu.

Procedure

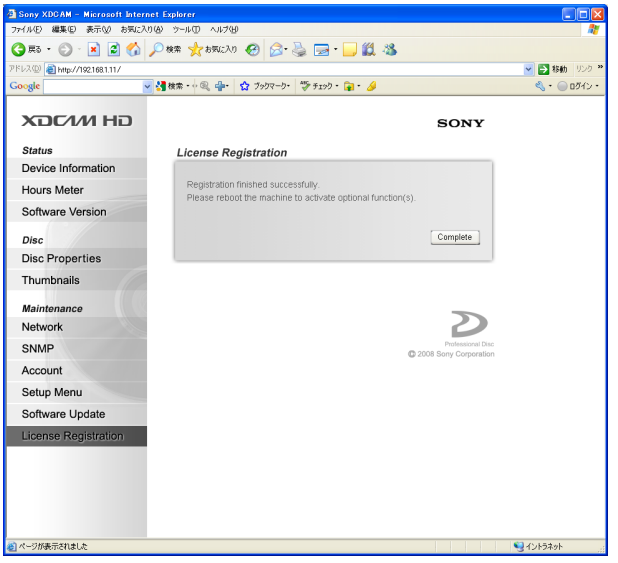
1. Enter the Install key character string in the Install-key field or alternately click the “Browse” button in the Install-key list file field to select the Install key list file.



2. Click “Send”.
3. The software option that is enabled by sending the Install key is displayed.
   To register the software option being displayed, click the “Execute” button.



4. The page that tells completion of registration appears.

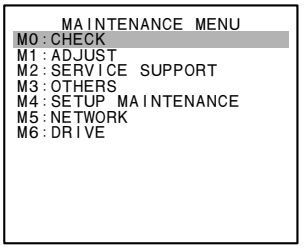


5. Turn the POWER switch OFF once and back ON. Functions of the registered software option are enabled.
6. Confirm that the software option can be operated from the Device Information page of the Status menu.

Section 4
Maintenance Mode

4-1. Maintenance Menu Overview

This unit has the MAINTENANCE MENU for unit maintenance.
The MAINTENANCE MENU consists of the following menus. Each menu is superimposed onto the monitor image and time data display areas, and on the monitor connected to this unit.



CHECK ..... (Section 4-3)
Checks the keyboard and the setting of the internal video test signals.

ADJUST ..... (Section 4-4)
Used for the video system, audio system, and free-run frequency adjustment.

SERVICE SUPPORT ..... (Section 4-5)
Displays or deletes the error log.

OTHERS ..... (Section 4-6)
Displays the software version, and checks the serial number of this unit, and sets the operation.
For details, refer to Operation Manual.

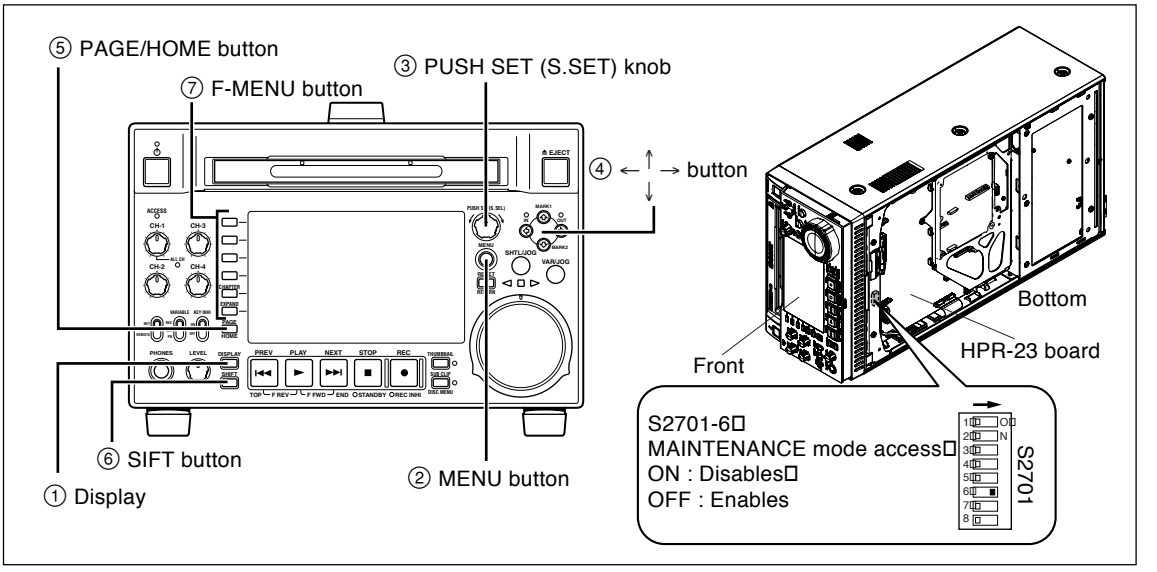
SETUP MAINTENANCE
Used for the setting up of this unit. For details, refer to Operation Manual.

NETWORK
Used for the setting of the network. For details, refer to Operation Manual.

DRIVE ..... (Section 4-7)
Used for the maintenance of the optical drive.

Operation Keys

The following are descriptions of the keys used in maintenance mode.



Number	Name	Function
①	Display	Displays the menu window selected from a menu.
②	MENU button	Used to start the maintenance menu or display the higher menu hierarchy again.
③	PUSH SET knob	Used to move the menu hierarchy, or execute the menu or an item in the menu. Turning this knob controls the cursor movement.
④	Cursor button	Moves the cursor (displayed in reverse video) on the display. Also used to change a set value.
⑤	PAGE/HOME button	Used to switch pages.
⑥	SHIFT button	Used to switch between functions for any button with two function.
⑦	F-MENU button (F1~F6)	Used to save the setting data and move the menu hierarchy. ∗The function assigned to each button is displayed in the F-MENU display area.

Activating the maintenance mode

Press the MENU button while pressing the PAGE/HOME button and SHIFT button. The MAINTENANCE MENU appears.

Exiting maintenance mode

Press the MENU button several times.

S2701-6 (HPR-23 board): Maintenance mode access prohibiting switch

To prohibit the activation of the maintenance mode by the button operation on the control panel, turn on this switch in advance.

Notes

- The factory default setting of the PDW-F1600 is OFF.
- When operating the switches on the HPR-23 board, remove the bottom panel by referring to section 6-12-8. Change the DIP switch S2701 with the power switch turned off.

4-2. Maintenance Menu List

The following lists the items in MAINTENANCE MENU and their factory settings.

Menu	Item	Sub Item1	Sub Item2	Sub Item3	Page
M0: CHECK	C2: AUDIO/ VIDEO	C21: VIDEO TSG	—	—	4-5
		C22: AUDIO TSG	—	—	4-5
	C3: KY	C30: KEYBOARD CHECK	—	—	4-5
M1: ADJUST	A2:AUDIO/ VIDEO/ BATTERY	A20: VPR VR	VIDEO OUT LEVEL	—	4-6
		A23: CP VR	HD 74MHz VCO	—	4-6
			SD 27MHz VCO		
			SDI ENC1 VCO		
			SDI ENC2 VCO		
		A27: APR VR	A271: INPUT UNITY	INPUT LEVEL CH1	4-6
				INPUT LEVEL CH2	
			A272: OUTPUT UNITY	OUTPUT LEVEL CH1	4-6
				OUTPUT LEVEL CH2	
				MONITOR LEVEL Lch	
				MONITOR LEVEL Rch	
		A2E: BATTERY	DC–IN +12V	—	4-6
		A2F: NV-RAM CONTROL	NO OPERATION	—	4-6
			SAVE ALL ADJUST DATA		
			ALL DATA PREVIOUS		
M2: SERVICE SUPPORT	M20: ERROR LOG	—	—	—	4-7
	M21: DIAG CONTROL	—	—	—	4-7
	M22: OPTION STATUS	—	—	—	4-7
M3: OTHERS	M30: SOFTWARE VERSION*1	—	—	—	—
	M31: SERIAL NUMBER*1	—	—	—	—
	M33: FILE I/F CONFIG*1	—	—	—	—
	M36: HOURS METER RESET*1	—	—	—	—
	M37: AUDIO CONFIG*1	—	—	—	—
	M38: F-KEY CONFIG	M380: HOME2	—	—	4-8
		M381: PAGE8 ASSIGN	—	—	4-9
		M382: PAGE8 NAME	—	—	4-11
		M38F: NV-RAM CONTROL	—	—	4-12
	M39: OTHER CONFIG*1	—	—	—	—
	M3B: VANC RX PARAMETER*1	—	—	—	—
	M3C: POWER SAVE CONTROL*1	—	—	—	—
	M3D: DATE/TIME PRESET*1	—	—	—	—
	M3E: USB MEMORY UTIL	M3E0: USB to ROM	D4: SETUP DOWNLOAD	—	4-12
		M3E1: ROM to USB	U4: SETUP UPLOAD	—	4-13
		M3E3: PACKAGE UPDATE*2	—	—	1-19
		M3E5: KEY REGISTRATION	—	—	—
	M3F: FACTORY SETUP	—	—	—	4-14
M4: SETUP MAINTE-NANCE*1	—	—	—	—	—
M5: NETWORK*1	—	—	—	—	—
M6: DRIVE	D0: DRIVE MAINTENANCE (Refer to the next page.)	—	—	—	—

*1: Refer to Operation Manual.
*2: Refer to “1-10. Firmware Update”.

DRIVE MAINTENANCE

4-3. CHECK (M0)

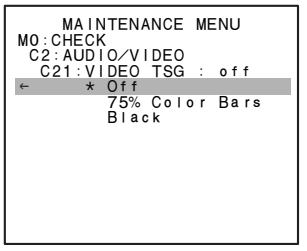
Checks the keyboard and the setting of the internal audio/ video test signals.

4-3-1. VIDEO TSG (C21)

This menu allows you to select display pattern of the test screen built in this unit.

Menu hierarchy:

[M0 : CHECK]
→ [C2 : AUDIO/VIDEO]
→ [C21 : VIDEO TSG]



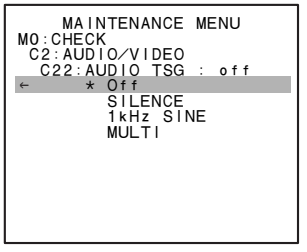
Off: Stops the test screen. (factory setting)
75% Color Bars: Displays a 75% color bars on the test screen.
BLACK: Displays the black on the test screen.

4-3-2. AUDIO TSG (C22)

This menu allows you to select output of the test signal generator built in this unit.

Menu hierarchy:

[M0 : CHECK]
→ [C2 : AUDIO/VIDEO]
→ [C22 : AUDIO TSG]



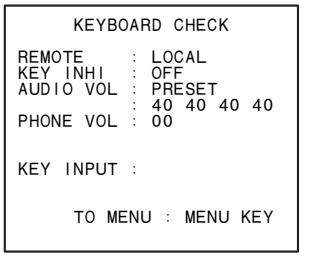
Off: Stops the operation of the internal test signal generator. (factory setting)
SILENCE: Generates a mute signal with the internal test signal generator.
1kHz SINE: Generates a 1 kHz signal with the internal test signal generator.
MULTI: Generates a signal which differs in frequency

4-3-3. KEYBOARD CHECK (C30)

This menu allows you to check the buttons in the Control Panel and the LEVEL knob.

Menu hierarchy:

[M0 : CHECK]
→ [C3 : KY]
→ [C30 : KEYBOARD CHECK]



Item	Setting	Description
REMOTE	—	Operation checks of the NETWORK/ LOCAL/REMOTE switches
KEY INHI	—	Status display of KEY INHI switch
AUDIO VOL	00 - FF	Operation checks of the REC/ PRESET/PB switches and the LEVEL knob
PHONE VOL	00 - FF	Operation check of the headphone VOL
KEY INPUT	—	Operation checks of the buttons in the Control Panel

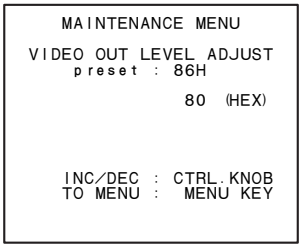
4-4. ADJUST (M1)

4-4-1. VPR VR (A20)

Used for the composite video output adjustment.
(Refer to “Section 8-4-3. Composite Video Output Adjustment” for details.)

Menu hierarchy:

[M1 : ADJUST]
→ [A2 : AUDIO/VIDEO/BATTERY]
→ [A20 : VPR VR]
→ [VIDEO OUT LEVEL]

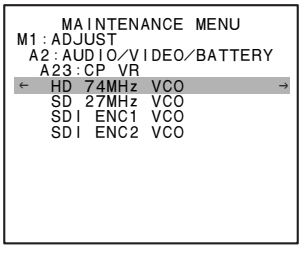


4-4-2. CP VR (A23)

Used for the free-run frequency adjustment.

Menu hierarchy:

[M1 : ADJUST]
→ [A2 : AUDIO/VIDEO/BATTERY]
→ [A23 : CP VR]



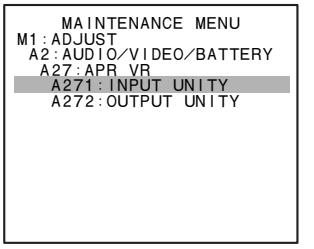
HD74MHz VCO: Adjust the HD free-run frequency.
(Refer to Section 8-2.)
SD27MHz VCO: Adjust the SD free-run frequency.
(Refer to Section 8-3.)
SDI ENC1 VCO: Adjust the SDI ENC1 free-run frequency.
(Refer to Section 8-5.)
SDI ENC2 VCO: Adjust the SDI ENC2 free-run frequency.
(Refer to Section 8-5.)

4-4-3. APR VR (A27)

Used for the audio system adjustment.
(Refer to “Section 8-6. Audio System Adjustment” for details.)

Menu hierarchy:

[M1 : ADJUST]
→ [A2 : AUDIO/VIDEO/BATTERY]
→ [A27 : APR VR]



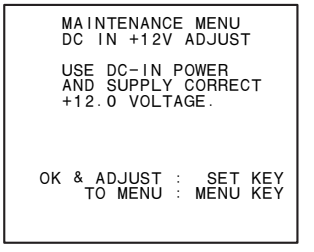
INPUT UNITY: Adjust the analog audio input system.
(Refer to Section 8-6-3.)
OUTPUT UNITY: Adjust the analog audio output system.
(Refer to Section 8-6-2.)

4-4-4. BATTERY (A2E)

Used for the DC-IN +12V input voltage adjustment.
(Refer to “Section 8-7. DC-IN +12 V Adjustment” for details.)

Menu hierarchy:

[M1 : ADJUST]
→ [A2 : AUDIO/VIDEO/BATTERY]
→ [A2E : BATTERY]



4-4-5. NV-RAM CONTROL (A2F)

Used for the saving the various adjustment data.
(Refer to “Section 8 Electrical Alignment” for details.)

Menu hierarchy:

[M1 : ADJUST]
→ [A2 : AUDIO/VIDEO/BATTERY]
→ [A2F : NV-RAM CONTROL]

4-5. SERVICE SUPPORT (M2)

Displays or deletes the error log.

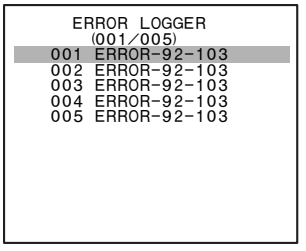
4-5-1. ERROR LOG (M20)

This menu displays registered error logs.
(Refer to “Section 2 Error Messages” for details.)

Menu hierarchy:

[M2 : SERVICE SUPPORT]
→ [M20 : ERROR LOG]

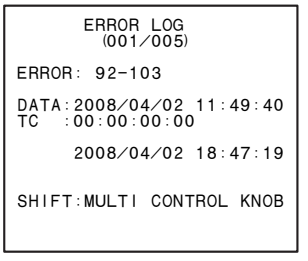
1. Select an error log using the ↑/↓ buttons, and press the → button.



2. Then the error log details appear.

Notes

- Turning the PUSH SET knob clockwise displays the latest error log details.
- Turning the PUSH SET knob counterclockwise displays the old error log details.



4-5-2. DIAG CONTROL (M21)

This menu allows you to delete registered error logs.

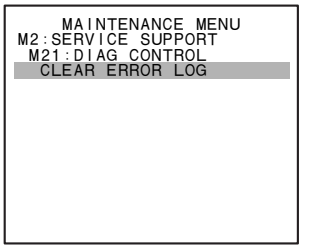
Note

Generally, do not delete the error logs.
The error logs contain important information helpful for resolving or avoiding problems.

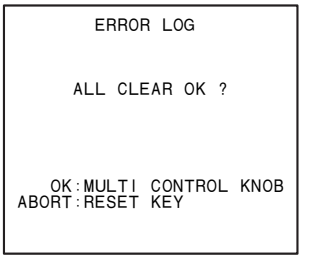
Menu hierarchy:

[M2 : SERVICE SUPPORT]
→ [M21 : DIAG CONTROL]

1. Press the → button.



2. A confirmation screen appears.
   Press the SET button.
   The error log is deleted and the screen shown in step 1 appears.

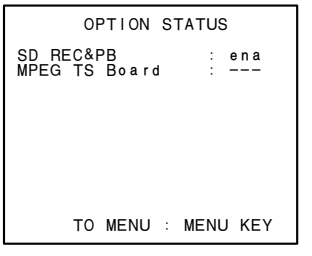


4-5-3. OPTION STATUS (M22)

Check presence of option board installation.

Menu hierarchy:

[M2 : SERVICE SUPPORT]
→ [M22 : OPTION STATUS]



4-6. OTHERS

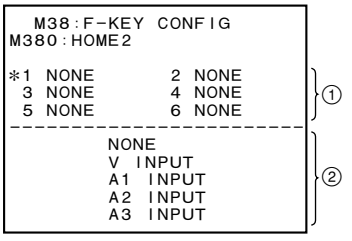
4-6-1. F-KEY CONFIG (M38)

This menu allows you to perform the setting related to function keys (F1 through F6 buttons).

Menu hierarchy:

[M3 : OTHERS]
→ [M38 : F-KEY CONFIG]
→ [M380 : HOME2]
→ [M381 : PAGE8 ASSIGN]
→ [M382 : PAGE8 NAME]
→ [M38F : NV-RAM CONTROL]

M380 : HOME2



This menu is used to assign functions below to F1 through F6 buttons of HOME2 page.

Assignable functions in HOME2 page
Function menus already set to function menu HOME and pages 1 through 7.

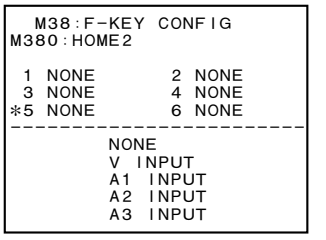
Description of menu display

① Area 1
The function names that are set to F1 through F6 buttons in function menu HOME2 page are displayed. When no function is set, NONE is displayed. (The factory setting is all NONE.)

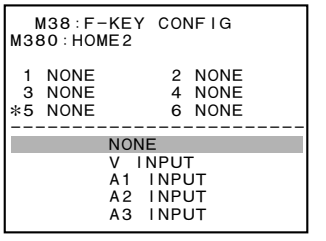
② Area 2
The function names that can be set to F1 through F6 buttons in function menu HOME2 page are displayed in scroll.

To execute the setting

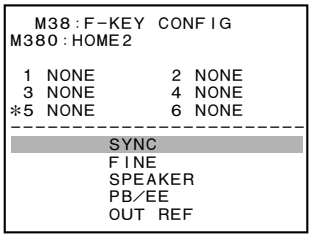
1. Turn the MULTI CONTROL knob to move the * mark in area 1 to the F button number to be set.
If the display of area 2 is scrolled, press the F1 (RETURN) button one, then turn the MULTI CONTROL knob.



2. Press the F2 (SELECT) button or MULTI CONTROL knob once to decide the F button to be set to.
The function name that is set to the F button selected in area 2 enters the "selected" state (by line-cursor indication). If no function is set, NONE enters the "selected" state.



3. Turn the MULTI CONTROL knob to select the function name among the function names that are displayed in area 2, to be set to the F button selected in step 1.
Function names in area 2 scrolls according to turning the MULTI CONTROL knob.



4. Press the F2 (SELECT) button or MULTI CONTROL knob once to decide the function to be set to the F button.
   The function name in area 2 is changed from the "selected" state to the "deselected" state. At the same time, the function name in area 1 (F button to be set to) is changed to what is selected in area 2.

```
  M38:F-KEY CONFIG
M380:HOME2

 1 NONE       2 NONE
 3 NONE       4 NONE
*5 SYNC       6 NONE
------------------------
        SYNC
        FINE
        SPEAKER
        PB/EE
        OUT REF
```

   To set a function to other F buttons, repeat steps 1 to 4.
5. To exit the menu, press the F1 (RETURN) button once.

After setting, save the setting by M38F : NV-RAM CONTROL.

M381 : PAGE8 ASSIGN

```
  M38:F-KEY CONFIG
M381:PAGE8 ASSIGN

*1 NONE       2 NONE      }①
 3 NONE       4 NONE      }
 5 NONE       6 NONE      }
------------------------
       NONE                }
001:P-ROLL TIME -          }②
002:CHARA H-POS -          }
003:CHARA V-POS -          }
004:SYNCHRONIZE -          }
```

This menu is used to assign the desired items of the basic/extended setup menu to F1 through F6 buttons of the PAGE8.

Note

The following setup menu items cannot be assigned to PAGE8.

Setup menu	Not assignable Item No.
Basic setup menu	013, B01 to B20, and H00 to H17, 029, 035
Extended setup menu	215

As for the details of the setup menu, refer to the Operation Manual.

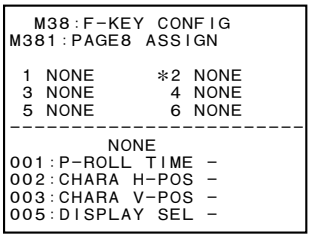
Description of superimposed display

① Area 1
The function names that are set to F1 through F6 buttons in setup menu PAGE8 are displayed. When no setup menu is set, NONE is displayed.
(The factory setting is all NONE.)

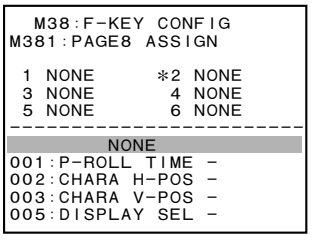
② Area 2
The setup menu names that can be set to F1 through F6 buttons of the function menu PAGE8 are displayed in scroll.

To execute the setting

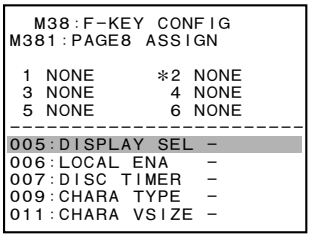
1. Turn the MULTI CONTROL knob to move the ∗ mark in area 1 to the F button number to be set.
   If the display of area 2 is scrolled, press the F1 (RETURN) button once, then turn the MULTI CONTROL knob.



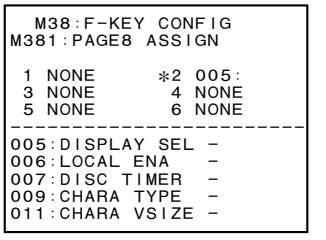
2. Press the F2 (SELECT) button or MULTI CONTROL knob once to decide the F button to be set to.
   The setup menu item name that is set to the F button selected in area 2 enters the “selected” state (by line-cursor indication). When the menu item is not assigned, NONE enters the “selected” state.



3. Turn the MULTI CONTROL knob to select the desired menu item among those displayed in the area 2.
   Display of menu items in area 2 scrolls by turning the MULTI CONTROL knob.
   To return from the “selected” state (by line-cursor indication) to the “deselected” state and to return to step 1 state, press the F1 (RETURN) button.



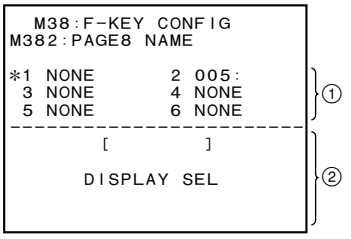
4. Press the F2 (SELECT) button or MULTI CONTROL knob once to decide the menu item to be set to the F button.
   The “selected” state (by line-cursor indication) of the menu item in area 2 is changed to the “deselected” state. At the same time, the item number of the menu item selected in area 2 is displayed in the menu item of area 1 (the F button to be set to).
   When a menu item containing a sub item is selected, the sub item is displayed in area 2. In the same manner, when the line cursor is moved to the sub item that you want to assign, and when the F2 (SELECT) button is pressed, the selected state is changed to the “deselected” state, and the selected “Setup menu item No.: _sub item No.” is displayed in area 1.



   To set a function to other F buttons, repeat steps 1 to 4.
5. To exit the menu, press the F1 (RETURN) button once.

After setting, save the setting by M38F : NV-RAM CONTROL.

M382 : PAGE8 NAME



This menu is used to set the desired name to the setup menu item assigned to PAGE8.

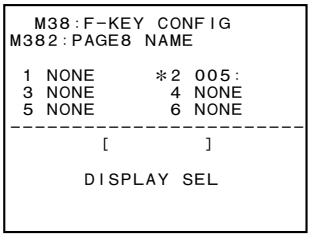
Description of superimposed display

① Area 1
The setup menu item names that are set to F1 through F6 buttons in the function menu PAGE8 or the item numbers are displayed. When no setup menu item is set, NONE is displayed.
(The factory setting is all NONE.)

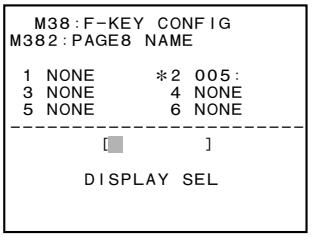
② Area 2
The setup menu item names that can be set to F1 through F6 buttons in function menu PAGE8 are displayed in scroll.

To execute the renaming

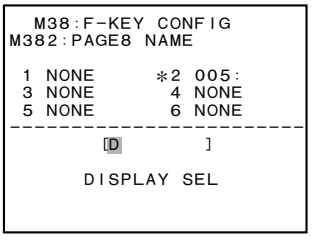
1. Turn the MULTI CONTROL knob to move the * mark in area 1 to the F button number to be set.



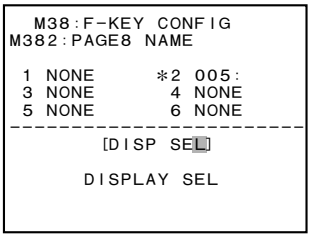
2. Press the F2 (SELECT) button or MULTI CONTROL knob once to decide the F button to be set to.
The cursor is appeared in area 2. For your reference, the original name of the setup menu item is displayed. Use the original name for your reference to abbreviation.



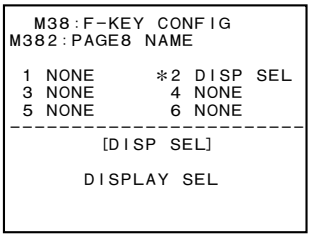
3. Press the ↑/↓ buttons or turn the MULTI CONTROL knob to change the character.



4. To move the cursor, press the ←/→ buttons or F3 (PREV), F4 (NEXT) button.



5. Repeat the steps 3 and 4 for each character.
   - When the RESET button is pressed, a single character at the cursor position can be cleared. The cursor position moves to the right after clearing.
   - When the MULTI CONTROL knob is pressed while pressing the SHIFT button, the setup item name (8 characters at the top) can be copied to the character setup area.
6. Press the F2 (SELECT) button.
The new name of the F button is displayed in area 1.



To rename other menu item, repeat steps 1 to 6.
7. To exit the menu, press the F2 (SELECT) button once.

After setting, save the setting by M38F : NV-RAM CONTROL.

M38F : NV-RAM CONTROL

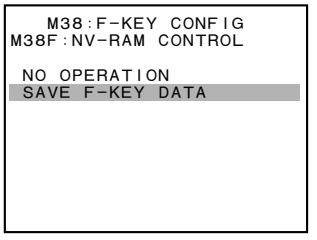
This menu is used to save the data set in the F-KEY CONFIG mode into the NV-RAM.

Note

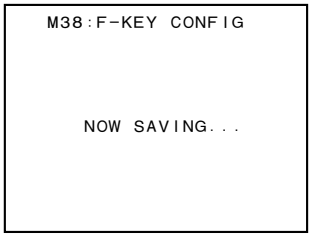
When the power is turned off without saving the setting data, the setting data returns to the former saved data.

To execute the menu

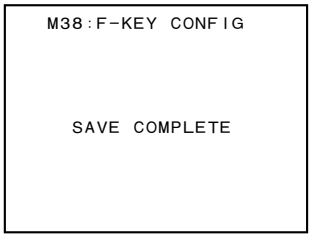
1. Turn the MULTI CONTROL knob to move the "selected" state (by line-cursor indication) to "SAVE F-KEY DATA".



2. Press the [→] button once.
   On pressing [→] button, the data transmission is initiated.
   A message "NOW SAVING…" will be displayed on the display.



3. Check that the data transmission is completed.
   On completing the data transmission, "SAVE COMPLETE" will be displayed on the superimposed display.
   If the saving is not performed properly due to some abnormality, "INCOMPLETE" is displayed on the superimposed display.



4. To exit the menu, press F1 (RETURN) button once.

4-6-2. USB to ROM (M3E0)

This menu is used for downloading the setup data of the setup menu saved in a USB memory to the unit.

Menu hierarchy:

[M3 : OTHERS]
→ [M3E : USB MEMORY UTIL]
→ [M3E0 : USB to ROM]
→ [D4 : SETUP DOWNLOAD]

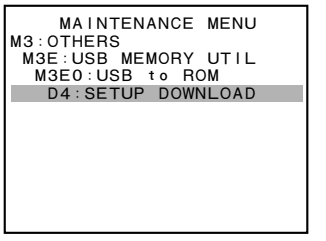
1. Insert a USB memory that contains the setup data in the MAINTENANCE connector on the rear panel.

   Note

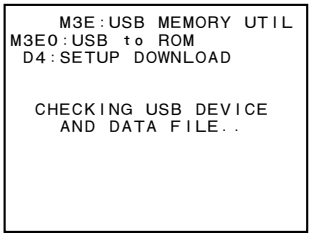
   A general purpose USB memory that is commonly used with PC can be used. However, the following error message may appear when a USB memory is inserted in the MAINTENANCE connector.
   - The message "Unknown USB" is displayed in the TC display window of the control panel.
   - The message "NO USB MEMORY" is displayed in the message window while downloading is in progress.

   If the above error message is displayed, the connected USB memory device may have some problems or is recognized as the unsupported device. Use another USB memory.

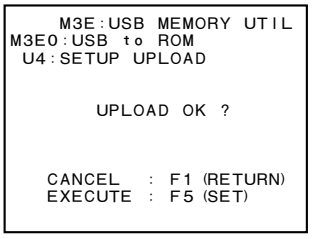
2. Open the [M3E0: USB to ROM] menu.



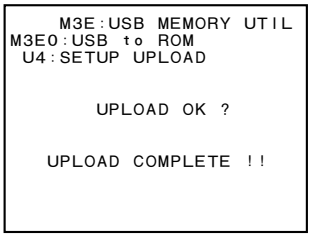
3. Press the [SET] button.



4. A screen prompting your confirmation is displayed awaiting the F5 (SET) button to be pressed.



5. Press the F5 (SET) button.
Result is displayed.



6. Press the F1 (RETURN) button.

4-6-3. ROM to USB (M3E1)

This menu is used for saving the setup data of the setup menu in a USB memory.

Menu hierarchy:

[M3 : OTHERS]
→ [M3E : USB MEMORY UTIL]
→ [M3E1 : ROM to USB]
→ [U4 : SETUP UPLOAD]

1. Insert a USB memory in the MAINTENANCE connector on the rear panel.

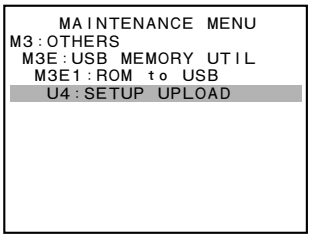
Note

A general purpose USB memory that is commonly used with PC can be used. However, the following error message may appear when a USB memory is inserted in the MAINTENANCE connector.

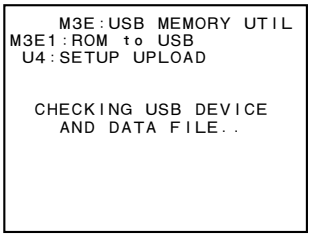
- The message “Unknown USB” is displayed in the TC display window of the control panel.
- The message “NO USB MEMORY” is displayed in the message window while downloading is in progress.

If the above error message is displayed, the connected USB memory device may have some problems or is recognized as the unsupported device. Use another USB memory.

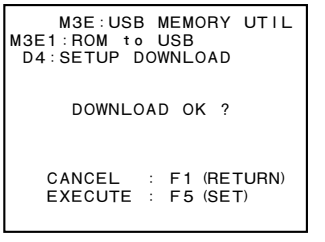
2. Open the [M3E1: ROM to USB] menu.



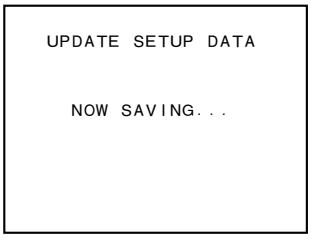
3. Press the SET button.



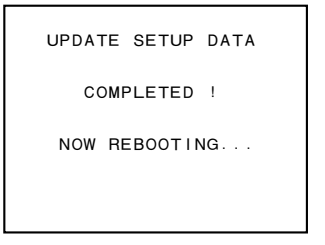
4. A screen prompting your confirmation is displayed awaiting the F5 (SET) button to be pressed.



5. Press the F5 (SET) button.
Downloading starts.



6. The following message is displayed and the Camcorder reboots.

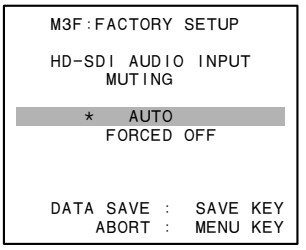


4-6-4. FACTORY SETUP

This menu sets operation of this machine when the HD-SDI Embedded Audio input signal is abnormal.

Menu hierarchy:

[M3 : OHTERS]
→ [M3F : FACTORY SETUP]
→ [HD-SDI AUDIO INPUT MUTING]



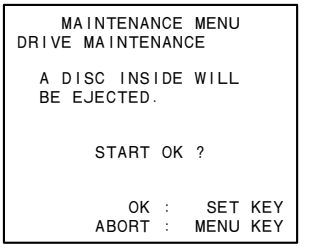
AUTO : Mutes the sound and flashes the input display. (Default setup when shipped from the factory)

FORCED OFF : The input display illuminates without muting the sound.

4-7. DRIVE MAINTENANCE (D0)

Used for the maintenance of the optical drive.

When the DRIVE MAINTENANCE menu is selected, the following screen is displayed.



Pressing the SET button displays MAINTENANCE MENU.
If a cartridge is remaining inside, it is ejected automatically.

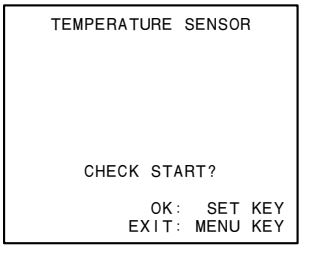
4-7-1. TEMPERATURE SENSOR

This menu allows you to check the temperature sensor on the optical drive.

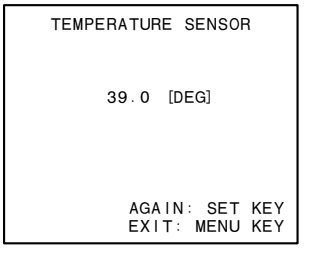
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [DEVICE]
→ [TEMPERATURE SENSOR]

1. A confirmation screen appears waiting for entry of the SET button.



2. Press the SET button.
The current temperature appears.



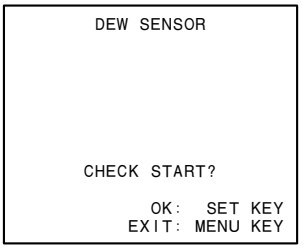
4-7-2. DEW SENSOR

This menu allows you to check the dew sensor on the optical drive.

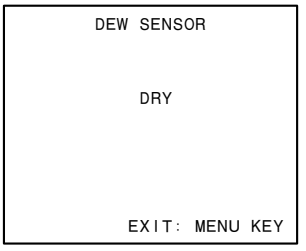
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [DEVICE]
→ [DEW SENSOR]

1. A confirmation screen appears waiting for entry of the SET button.



2. Press the SET button.
The result appears.



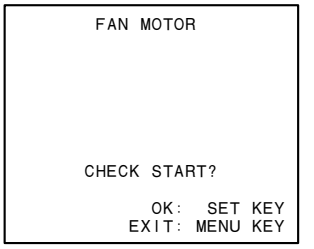
4-7-3. FAN MOTOR

This menu allows you to check the fan motor connected to the optical drive.

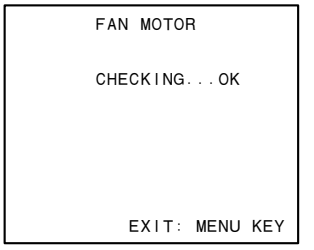
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [DEVICE]
→ [FAN MOTOR]

1. A confirmation screen appears waiting for entry of the SET button.

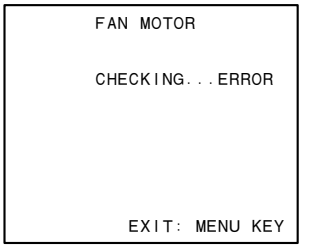


2. Press the SET button.
The result appears.



If failed:

The following screen appears.



4-7-4. ACCELERATION SENSOR

This menu allows you to check the acceleration sensor on the optical drive.

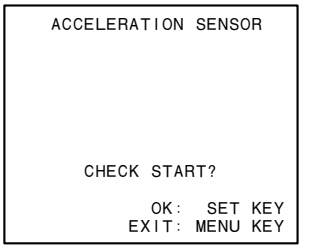
Note

Be sure to place the unit horizontally when checking the sensor.
The check may be failed if the optical drive is incorrectly placed.

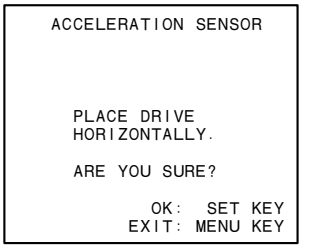
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [DEVICE]
→ [ACCELERATION SENSOR]

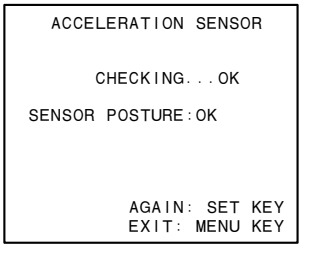
1. A confirmation screen appears waiting for entry of the SET button.



2. Press the SET button.
A confirmation screen appears.



3. Check that the unit is placed horizontally, and press the SET button.
When the optical drive is detected as horizontal, the following screen appears.

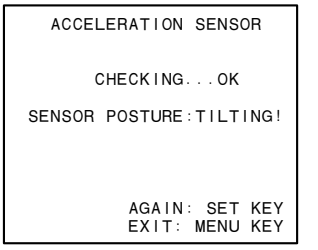


If failed:

The following screen appears.
Check optical drive posture and sensor installation.

Note

CHECKING: Disconnection check result
SENSOR POSTURE: SENSOR POSTURE check result
If the disconnection check results in an error, the SENSOR POSTURE check is not carried out.



4-7-5. LOADER

This menu allows you to check loader operations.

Note

Check that the loader is correctly installed on the optical drive before starting the check.

Note

If a cartridge is inserted, eject it.

Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [LOADER]

1. A confirmation screen appears waiting for insertion of a cartridge.

```
LOADER


INSERT DISC.


POSITION:EJECT
REC INHI:INHI
DOWN SENSOR:NOT DOWN
SENSOR HOLE:
EXIT: MENU KEY
```

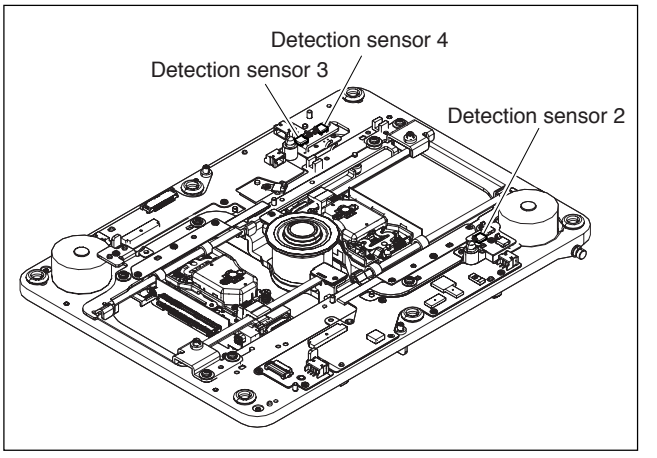
2. Insert a cartridge.
   The result appears just for a moment.
   The loader moves to the DOWN position.

```
LOADER

CHECKING...OK  → MOVE TO EJECT POS
                 MOVE TO STBY POS

POSITION:DOWN
REC INHI:INHI
DOWN SENSOR:DOWN
SENSOR HOLE:2 3 4
NEXT: MENU KEY
```

SENSOR HOLE

- When insert 23.3 GB SL disc such as PFD23A, the message “SENSOR HOLE:2 3 4” is displayed.
- When insert 50 GB SL disc such as PFD50LA, the message “SENSOR HOLE:3 4” is displayed.

In cases other than above, check the corresponding detection sensor because of possibility of failure.



If failed:

The following screen appears.

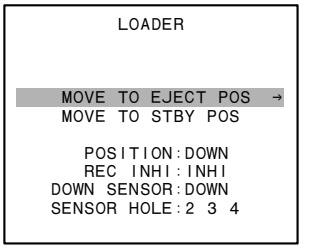
```
LOADER


CHECKING...ERROR


POSITION:EJECT
REC INHI:INHI
DOWN SENSOR:NOT DOWN
SENSOR HOLE:2 3 4
EXIT: MENU KEY
```

The following describes four procedures:

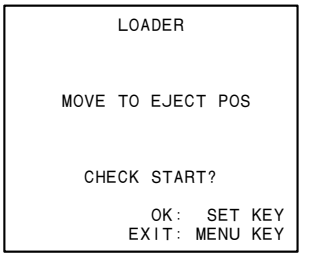
- Moving DOWN Position to EJECT Position
- Moving DOWN Position to STBY Position
- Moving STBY Position to EJECT Position
- Moving STBY Position to DOWN Position

Moving DOWN Position to EJECT Position

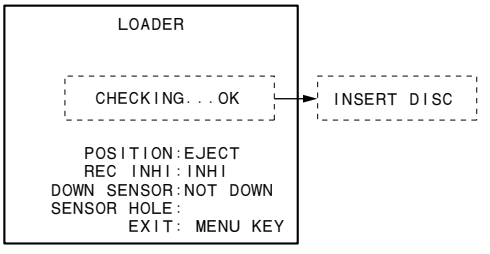
1. The item selection screen appears.



2. Press the [→] button.
   A confirmation screen appears.

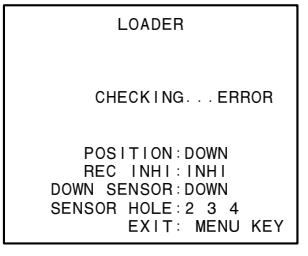


3. Press the [SET] button.
   The result appears just for a moment.
   The loader moves to the EJECT position to eject the cartridge.



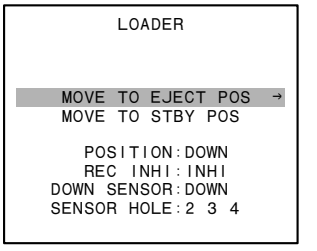
If failed:

The following screen appears.

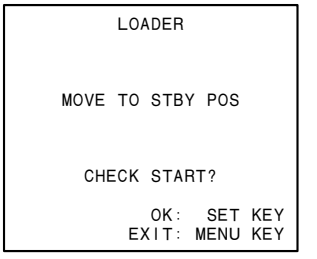


Moving DOWN Position to STBY Position

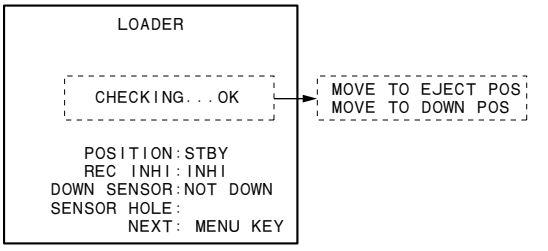
1. The item selection screen appears.



2. Select "MOVE TO STBY POS" using the [↑]/[↓] buttons.
3. Press the [→] button.
   A confirmation screen appears.

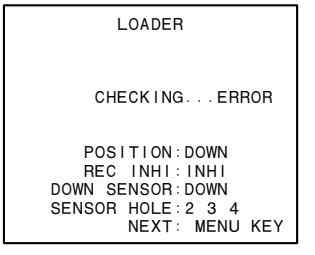


4. Press the [SET] button.
   The result appears just for a moment.
   The loader moves to the STBY position.



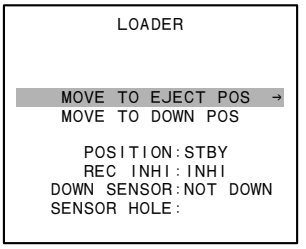
If failed:

The following screen appears.

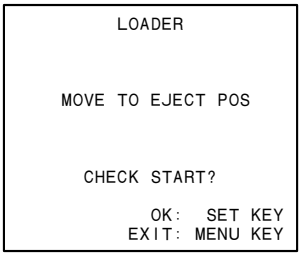


Moving STBY Position to EJECT Position

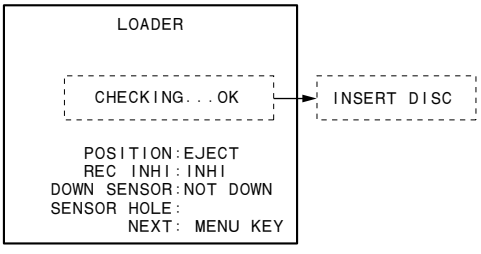
1. The item selection screen appears.



2. Press the [→] button.
   A confirmation screen appears.

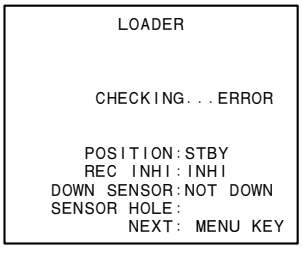


3. Press the [SET] button.
   The result appears just for a moment.
   The loader moves to the EJECT position to eject the cartridge.



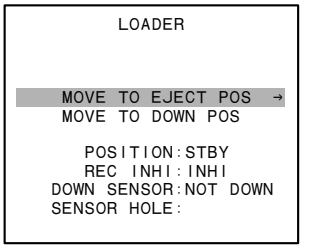
If failed:

The following screen appears.

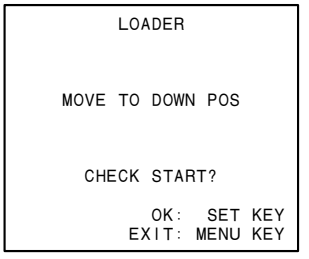


Moving STBY Position to DOWN Position

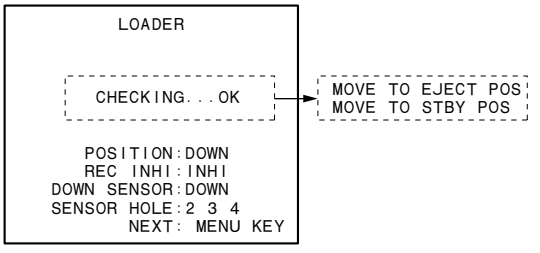
1. The item selection screen appears.



2. Select “MOVE TO DOWN POS” using the [↑]/[↓] buttons.
3. Press the [→] button.
   A confirmation screen appears.

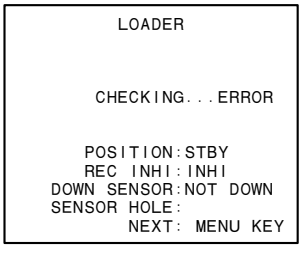


4. Press the [SET] button.
   The result appears just for a moment.
   The loader moves to the DOWN position.



If failed:

The following screen appears.



4-7-6. AUTO TEST

This menu allows you to check optical block assembly operations and the limit sensor.

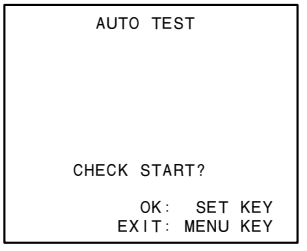
Note

If a cartridge is inserted, eject it.

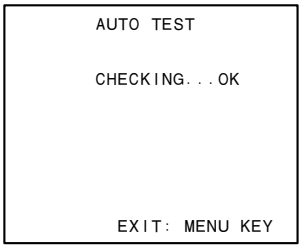
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [SLIDER]
→ [AUTO TEST]

1. Select "AUTO TEST" using the ↑/↓ buttons, and press the → button.
2. A confirmation screen appears waiting for entry of the SET button.

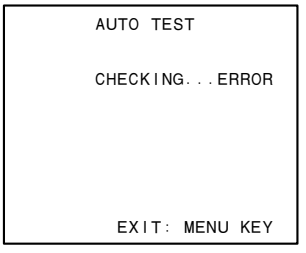


3. Press the SET button.
The result appears.



If failed:

The following screen appears.



4-7-7. IN-LIM TEST

This menu allows you to move the optical block assembly to the inner-limit position of the disc.

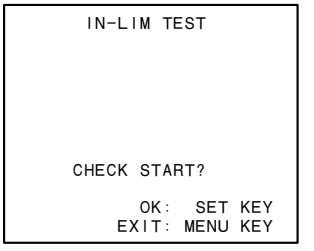
Note

If a cartridge is inserted, eject it.

Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [SLIDER]
→ [IN-LIM TEST]

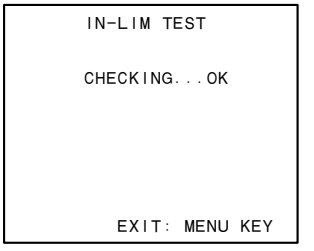
1. Select "IN-LIM TEST" using the ↑/↓ buttons, and press the → button.
2. A confirmation screen appears waiting for entry of the SET button.



3. Press the SET button.
The result appears.

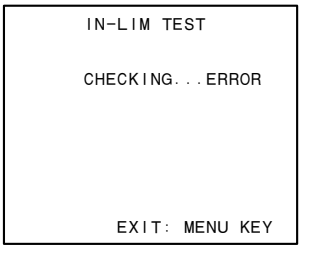
Note

Check visually that the optical block assembly moves to the inner-limit position.



If failed:

The following screen appears.



4-7-8. OUT-LIM TEST

This menu allows you to move the optical block assembly to the outer-limit position of the disc.

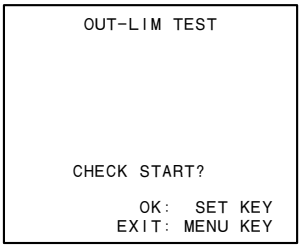
Note

If a cartridge is inserted, eject it.

Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [SLIDER]
→ [OUT-LIM TEST]

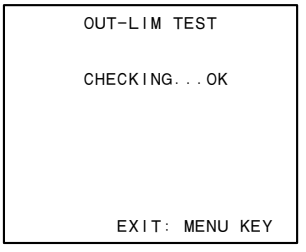
1. Select "OUT-LIM TEST" using the ↑/↓ buttons, and press the → button.
2. A confirmation screen appears waiting for entry of the SET button.



3. Press the SET button.
   The result appears.

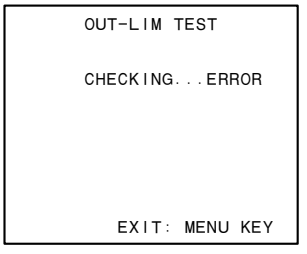
   Note

   Check visually that the optical block assembly moves to the outer-limit position.



If failed:

The following screen appears.



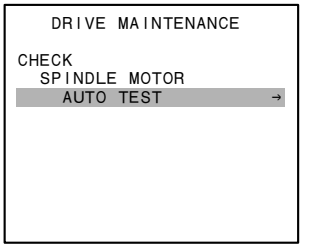
4-7-9. SPINDLE MOTOR

This menu allows you to check spindle motor operations.

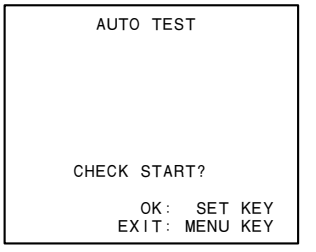
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [SPINDLE MOTOR]

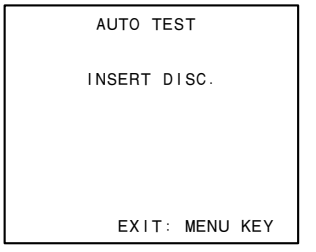
1. Press the → button.



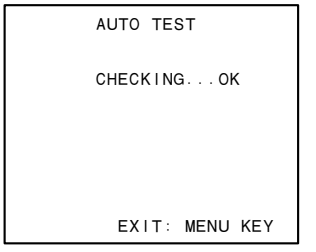
2. A confirmation screen appears waiting for entry of the SET button.



3. Press the SET button.
   A screen to insert a cartridge appears.



4. Insert a cartridge.
   The result appears.



If failed:

The following screen appears.

```
AUTO TEST

CHECKING...ERROR




EXIT: MENU KEY
```

4-7-10. FOCUS ACTUATOR

This menu allows you to check the focus of the 2-axis actuator.

Note

If a cartridge is inserted, eject it.

Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [OPTICAL BLOCK]
→ [FOCUS ACTUATOR]

1. A confirmation screen appears waiting for entry of the SET button.

```
FOCUS ACTUATOR




CHECK START?

      OK:  SET KEY
    EXIT: MENU KEY
```

2. Press the SET button.
   The result appears.
   Check that the 2-axis actuator moves several times.
   If the actuator does not move or its movement is not smooth, the harness may be connected improperly or the optical block may be defective.

```
FOCUS ACTUATOR

 CHECKING...OK




      EXIT: MENU KEY
```

If failed:

The following screen appears.

```
FOCUS ACTUATOR

 CHECKING...ERROR




      EXIT: MENU KEY
```

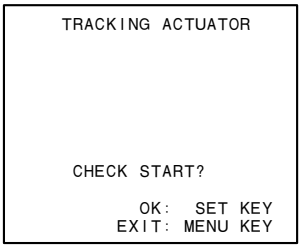
4-7-11. TRACKING ACTUATOR

This menu allows you to check the tracking of the 2-axis actuator.

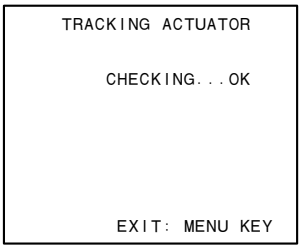
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [OPTICAL BLOCK]
→ [TRACKING ACTUATOR]

1. A confirmation screen appears waiting for entry of the SET button.

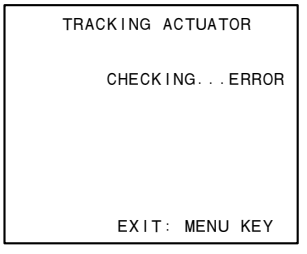


2. Press the SET button.
The result appears.
Check that the 2-axis actuator moves several times.
If the actuator does not move or its movement is not smooth, the harness may be connected improperly or the optical block may be defective.



If failed:

The following screen appears.



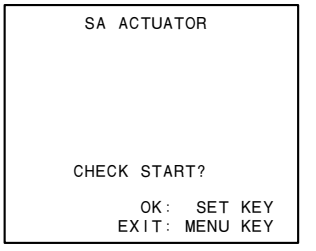
4-7-12. SA ACTUATOR

This menu allows you to check the SA actuator motor.

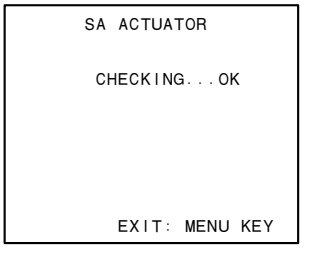
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [OPTICAL BLOCK]
→ [SA ACTUATOR]

1. A confirmation screen appears waiting for entry of the SET button.

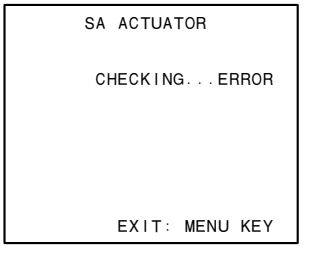


2. Press the SET button.
The result appears.



If failed:

The following screen appears.
The harness may be connected improperly or the optical block may be defective.



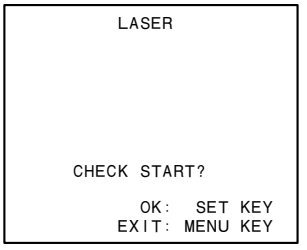
4-7-13. LASER

This menu allows to check the laser.

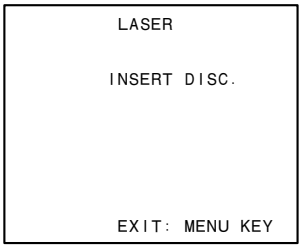
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [OPTICAL BLOCK]
→ [LASER]

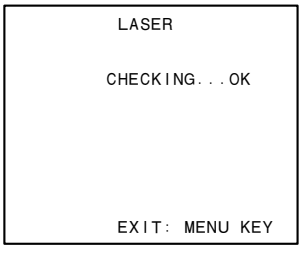
1. A confirmation screen appears waiting for entry of the SET button.



2. Press the SET button.
   A screen to insert a cartridge appears.

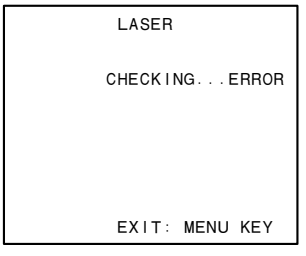


3. Insert a cartridge.
   The result appears.



If failed:

The following screen appears.



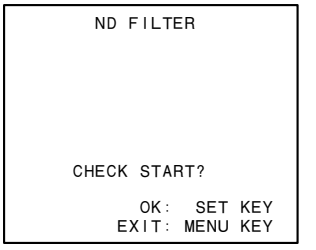
4-7-14. ND FILTER

This menu allows you to check the ND filter.

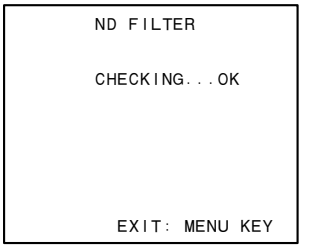
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [OPTICAL BLOCK]
→ [ND FILTER]

1. A confirmation screen appears waiting for entry of the SET button.

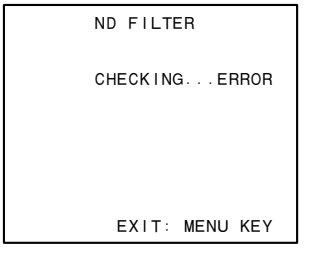


2. Press the SET button.
   The result appears.



If failed:

The following screen appears.



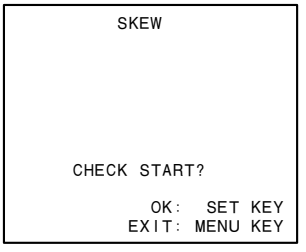
4-7-15. SKEW

This menu allows you to check the skew.
Remove the loader assembly before executing this menu.

Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [SKEW]

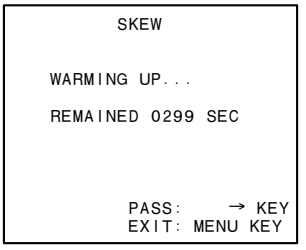
1. Select "SKEW" using the ↑/↓ buttons, and press the → button.
2. A confirmation screen appears waiting for entry of the SET button.



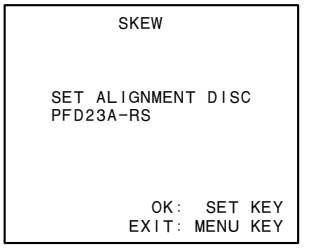
3. Press the SET button.
   A warm-up screen appears.

   Note

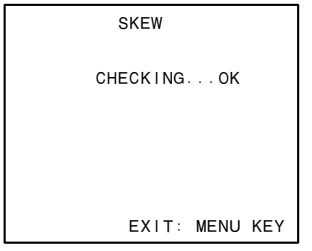
   If five minutes has already passed since power ON, this screen does not appear.



4. A confirmation screen appears when "0000 SEC" is displayed.

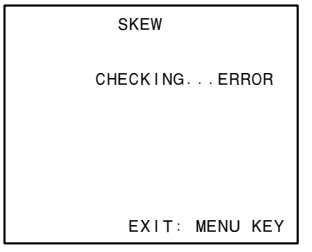


5. Set a cartridge. (Refer to Section 7-2.)
6. Press the SET button.
   The result appears.



If failed:

The following screen appears.
Perform optical drive alignment. (Refer to Section 7.)



4-7-16. LENS CLEANING

This menu allows you to clean the lens.

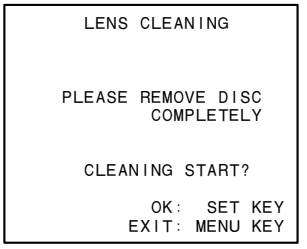
Note

Before cleaning, be sure to unload the disc from the unit. If the disc remains at the loading slot, cleaning will not be finished completely.

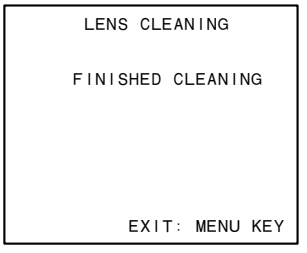
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [CHECK]
→ [LENS CLEANING]

1. A confirmation screen appears waiting for entry of the SET button.



2. Check that no disc is remaining, and then press the SET button.
   The result appears.



4-7-17. SERVO_1

This menu allows you to adjust the offset and gain of the signal circuit for servo error detection.
(Refer to "Section 7 Optical Drive Alignment" for details.)

Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [ADJUST]
→ [SERVO_1]

4-7-18. SKEW

This menu allows you to skew adjustment.
Remove the loader assembly before executing this menu.
(Refer to "Section 7 Optical Drive Alignment" for details.)

Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [ADJUST]
→ [SKEW]

4-7-19. SERVO_2

This menu allows you to adjust TE/CE BLOCK, and SV LOOP GAIN necessary for servo operation.

Note

Be sure to install the loader. The adjustments are not available if the loader is not installed.

Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [ADJUST]
→ [SERVO_2]

4-7-20. ACCELERATION OFFSET

This menu allows you to perform the offset adjustment of the acceleration sensor.

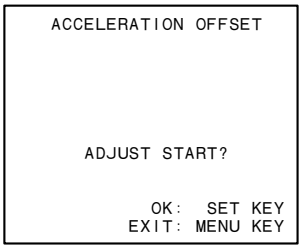
Note

Be sure to place the unit horizontally when adjusting the sensor.
The servo operation is not ensured if the optical drive is incorrectly placed.

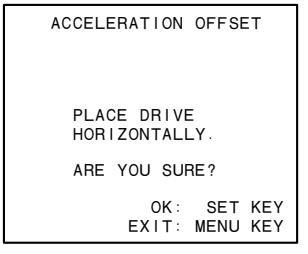
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [ADJUST]
→ [OTHER ADJUST]
→ [ACCELERATION OFFSET]

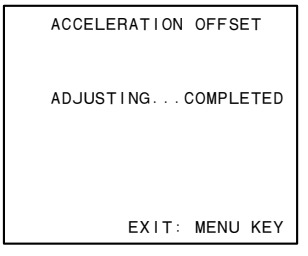
1. A confirmation screen appears waiting for entry of the SET button.



2. Press the SET button.
The result appears.

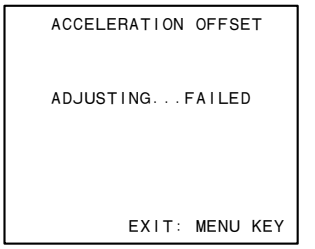


3. Press the SET button.
A confirmation screen appears.



If failed:

The following screen appears.



4-7-21. ERROR LOGGER

This menu allows you to delete registered error logs.

Notes

- DRIVE ERROR and DRIVE WARNING are recorded.
- Up to 16 pieces of log data are displayed.
  The following data is overwritten on the existing data from the oldest.

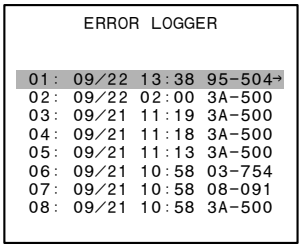
Menu hierarchy:

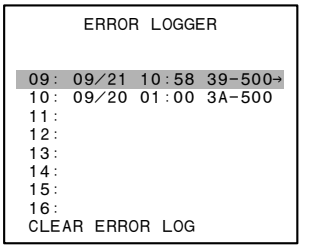
[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [ERROR LOGGER]

1. Select a desired error number using the [↑]/[↓] buttons.

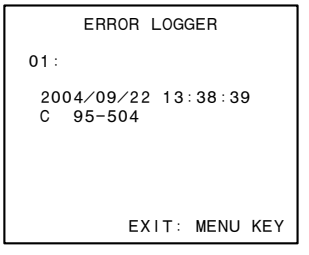
   Note

   To change the display to the next screen, keep pressing the [↓] button.



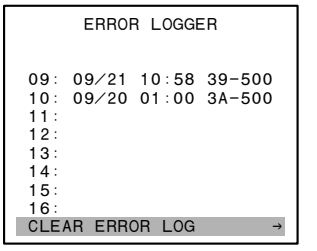


2. Press the [→] button.
   Detailed information of the selected error appears.

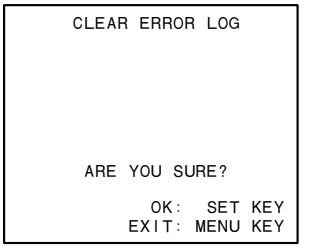


Clearing Error Log

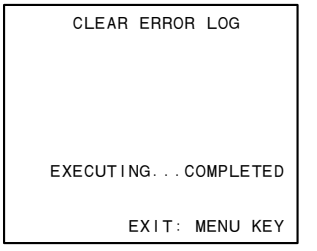
1. Display the error log list.
2. Select "CLEAR ERROR LOG" using the [↑]/[↓] buttons.



3. Press the [→] button.
   A confirmation screen appears.

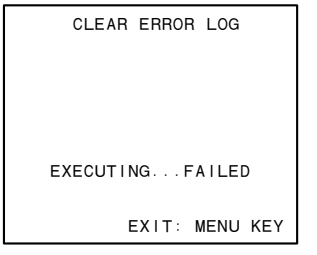


4. Press the [SET] button.
   The result appears.



If failed:

The following screen appears.

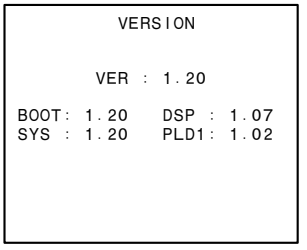


4-7-22. VERSION

This menu displays the version of the optical drive.

Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [OTHERS]
→ [VERSION]

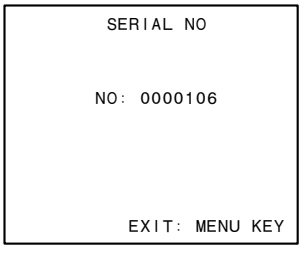


4-7-23. SERIAL NO

This menu displays the serial number of the optical drive.

Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [OTHERS]
→ [SERIAL NO]



4-7-24. CLEAR MEDIA LOG

This menu allows you to delete the log of media.
(Refer to "Section 7 Optical Drive Alignment" for details.)

Note

Once deleted, the deleted log cannot be restored.

Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [OTHERS]
→ [CLEAR MEDIA LOG]

4-7-25. UPLOAD TO EEPROM

This menu allows you to update the EEPROM (IC4) information backed up on the SE-850 board when only IC4 is replaced.

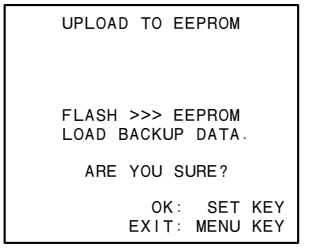
Note

When replacing the SE-850 board, remove the EEPROM (IC4) from the board, and then mount it on the new board. This menu is not necessary.
Execute this menu only when IC4 is replaced solely.

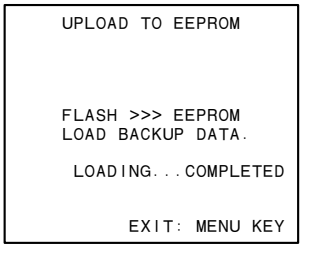
Menu hierarchy:

[M6 : DRIVE]
→ [D0 : DRIVE MAINTENANCE]
→ [OTHERS]
→ [MEMORY SUPPORT]
→ [UPLOAD TO EEPROM]

1. A confirmation screen appears waiting for entry of the SET button.

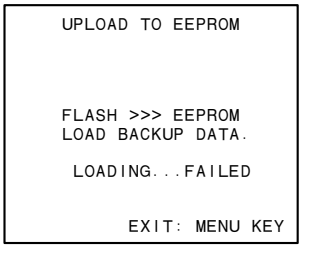


2. Press the SET button.
The result appears.



If failed:

The following screen appears.



Section 5
Periodic Check and Maintenance

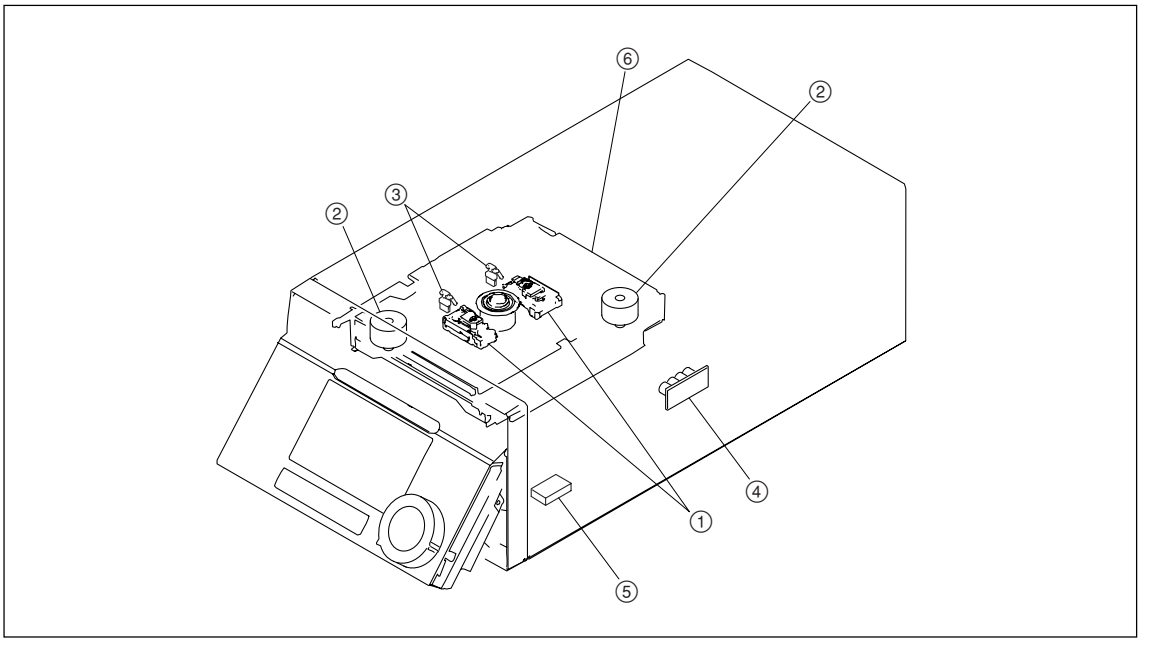
This section explains about periodic maintenance and how to clean.

5-1. Periodic Maintenance

To make the most of the functions, fully realize the performances of this unit and to lengthen the life of the unit, periodic check and parts replacement are recommended.

5-1-1. Index

It is necessary to check and replace periodically to the following parts.
The numbers in the illustration correspond to the table in the Section 5-1-3.



5-1-2. Digital Hours Meter

The elapsed operation time or count of the unit is displayed.
Use this digital hours meter as a guide to periodic check/replacement.

Displaying Digital Hours Meter

1. Display the setup menu with the [MENU] button.
2. Select "HOURS METER" with rotate the [PUSH SET] knob or the [↑]/[↓] button, and press the [PUSH SET] knob or [SELECT (F2)] button.

Display contents

Menu No.	Menu Display	Item	Contents
H11	OPE HOURS	Operation hours	Total operation hours (Resettable)
H12	LASER0	Laser parameter 0	Total output hours of laser on optical block assembly (OP0) (Resettable)
H13	SEEK HOURS0	Seek running 0	Total running hours of seek on optical block assembly (OP0) (Resettable)
H14	SPDL HOURS	Spindle running	Total running hours of spindle motor (Resettable)
H15	LOAD COUNT	Loading counter	Total loading counts of disc (Resettable)
H16	LASER1	Laser parameter 1	Total output hours of laser on optical block assembly (OP1) (Resettable)
H17	SEEK HOURS1	Seek running 1	Total running hours of seek on optical block assembly (OP1) (Resettable)

How to exit form the hours meter

Press the [MENU] button or [EXIT (F6)] button.

5-1-3. Periodic Check/Replacement Parts List

This table does not describe the guarantee period of each part.
The replacement period of each part is changed according to the environment and condition.

No.	Part to Be Replaced	Hours Meter (Menu item)	Check/Replacement Period	Parts Number and Name	Section
①	Optical block assembly	Laser parameter (LASER PARAMETER)	Replace every 6000.	⚠8-820-389-02 KES-330A/J1RP	6-8
②	Seek motor	Seek running hours (SEEK RUNNING)	Replace every 12000 H.	A-1374-689-A Seek motor assembly	6-9
③	Cleaner assembly	Laser parameter (LASER PARAMETER)	Check every 6000. Replace when bristles of brush become sparse or damaged remarkably.	A-1541-288-A Cleaner (P200) assembly	6-4
④	EM-6 board	Laser parameter (LASER PARAMETER)	Replace around the same time as optical block assembly.	A-1201-481-A EM-5S board	6-12-14
⑤	Lithium battery (for NVRAM)	Current-carrying hours (OPERATION)	About 10 years	⚠1-767-156-11 M4T28-BR12SH1	1-9
⑥	Loader assembly	Disc loading count* (LOADING)	Replace every 110,000 times.	A-1541-722-A Loader (P200) assembly (RP)	6-3

* : This count differs from the actual disc insertion times because the loader up/down count is made by the normal loading operation.

5-2. Cleaning

To make the most of the functions, fully realize the performance of this unit, and to lengthen the life of the unit and cartridge, clean the components often.

5-2-1. General Information for the Use of Cleaning Cloth

1. Cautions

- Be sure turn the power off before cleaning.
- Each block in the drive consists of precision parts and is adjusted precisely. Be careful not to damage the parts and to apply excessive force during cleaning.
- Do not insert a cartridge before cleaning fluid completely evaporates after cleaning.

2. Preparation

(1) Turn the power off.
(2) Remove the top plate. (Refer to Section 1-4-1.)
(3) Remove the loader assembly.
(Refer to Section 6-3.)

5-2-2. Cleaning Loader Assembly

Precautions

The loader assembly consists of precision parts.
Be careful not to damage and give excessive force to the parts.

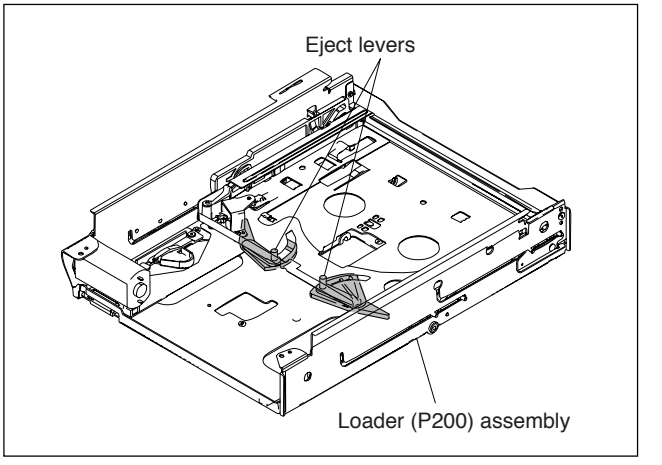
Cleaning Procedure

Tools

- Cleaning cloth (or cotton swab)
- Cleaning fluid (alcohol)

Procedure

1. Clean the eject levers in the loader assembly using the cleaning cloth (or cotton swab) with the cleaning fluid soaked.



5-2-3. Cleaning Spindle Motor

Precautions

- To prevent the possibility of damage to the optical block assembly in the drive by static electricity charged in a human body or clothes, be sure to establish a ground before cleaning the drive assembly.
  (Refer to Section 1-14.)
- The spindle motor and the actuator around the objective lens have a powerful magnet. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.
- The drive assembly consists of precision parts.
  Be careful not to damage and give excessive force to the parts.

Cleaning Procedure

Tools

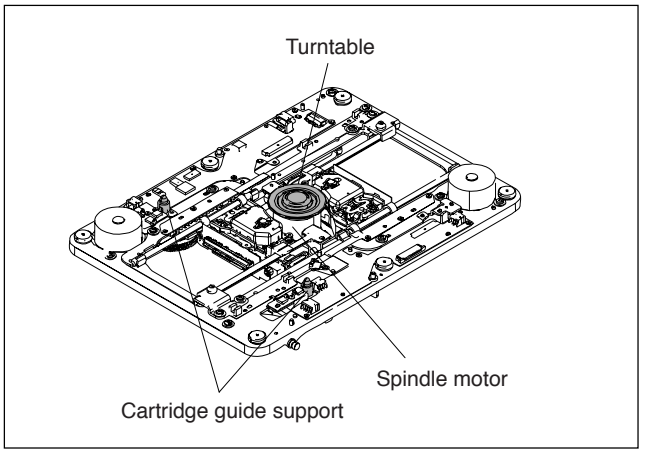
- Cleaning cloth (or cotton swab)
- Cleaning fluid (alcohol)

Procedure

1. Remove dust and dirt attached to the turntable of the spindle motor and the cartridge guide supports using the cleaning cloth (or cotton swabs) with the cleaning fluid soaked.

Note

After the cleaning, ensure that fibers of the cleaning cloth (or cotton swab) are not attached on the spindle motor.



5-2-4. Cleaning Pickup Lens

Error codes “02-020” may be displayed due to smudged lens.
If “02-020” is displayed, be sure to clean the pickup lens referring to “4-7-16. LENS CLEANING”.

Note

Before cleaning, be sure to unload the disc from the unit.

Section 6
Replacement of Main Parts

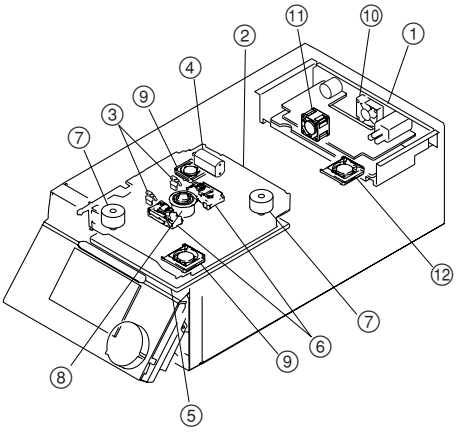
This section explains the replacement procedures of periodic replacement parts, main mechanical parts, power supply unit, and circuit boards.

6-1. General Information for Parts Replacement

6-1-1. Index

This section describes the replacement procedure of the parts below.

(1) Mechanical parts and power supply unit



No.	Part name	Section
①	Power Supply Unit	6-2
②	Loader Assembly	6-3
③	Cleaner Assembly	6-4
④	Loading Motor Assembly	6-5
⑤	Drive Sub Assembly	6-6
⑥	Optical Block Assembly	6-7
⑦	Seek Motor Assembly	6-9
⑧	Spindle Motor	6-10
⑨	Fan Motor (Drive)	6-11-1
⑩	Fan Motor (Power)	6-11-2
⑪	Fan Motor (AU)	6-11-3
⑫	Fan Motor (NET-4)	6-11-4

(2) Mounted Circuit Boards

Note

After replacing/repairing the mounted circuit boards (or the assembling parts including them), perform the steps after replacement/repair. (Refer to Section 1-12.)

Board name	Procedure	Steps after replacement
AU-311	Section 6-12-1	Section 1-12-6
DR-601	Section 6-12-11	Section 1-12-3
DU-477	Section 6-12-9	–
EM-6	Section 6-12-14	–
ENC-107	Section 6-12-9	–
HP-141	Section 6-12-7	–
HPR-23	Section 6-12-9	Section 1-12-2
IF-1073	Section 6-12-8	–
KY-624	Section 6-12-6	–
MB-1113	Section 6-12-10	–
NET-4	Section 6-12-3	Section 1-12-5
RX-93H	Section 6-12-2	–
SE-850	Section 6-12-12	Section 1-12-4
SE-851	Section 6-12-13	–
SE-852	Section 6-3 (Replace the Loader Assembly)	–
SW-1353	Section 6-12-4	–
SW-1354	Section 6-12-5	–
VPR-99	Section 6-12-2	Section 1-12-7

For the exploded views, refer to the Maintenance Manual Volume 2.

6-1-2. Basic Knowledge

1. Tools

Before using a tool, clean the surface of the tool using a cleaning cloth moistened with cleaning fluid.

- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01

Be careful not to damage the tool. If the flawed tool is used, adjustment cannot be performed correctly.

2. Grease

Use the specified grease at specified portions only.
If any other grease or oil is used, major malfunctions may be caused due to differences in viscosity or ingredients.
And if the grease or oil mixed with dust is used, major malfunctions may be caused.
Use the following grease.

- Grease (SGL-601): 7-661-000-10

Apply just enough grease to create a thin film on the surface of the part.
Any grease that adheres to other surrounding parts must be removed using gauze or soft cloth.

3. Stop Washer and E Ring

Do not use removed stop washers and E rings again.
Check required quantity of stop washers and E rings before replacement, and prepare them more than required quantity.

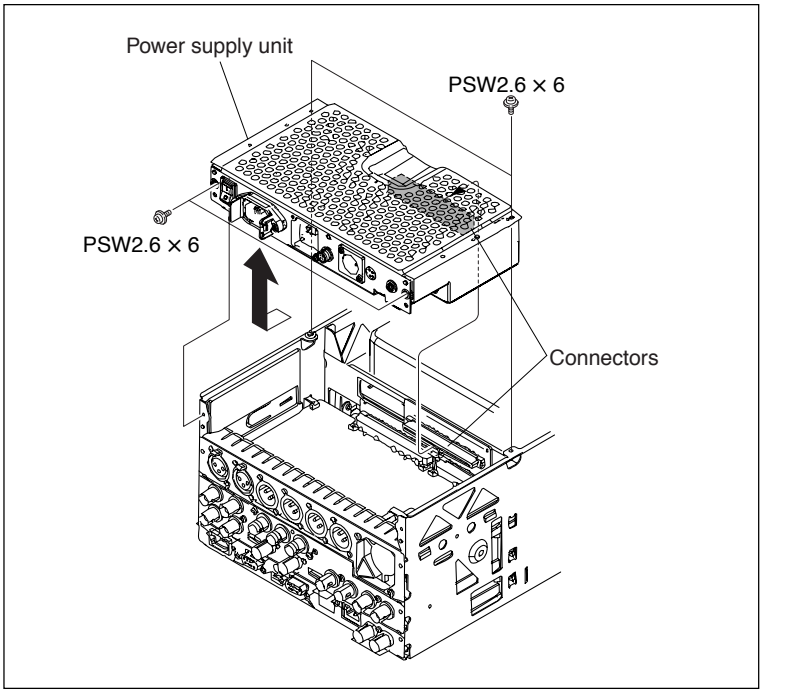
6-2. Removing/Reattaching Power Supply Unit

Removal

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the rear panel.
   (Refer to Section 1-4-3.)
3. Remove the four screws and disconnect the connector of the power supply unit in the arrow direction.

Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 4 of removal.



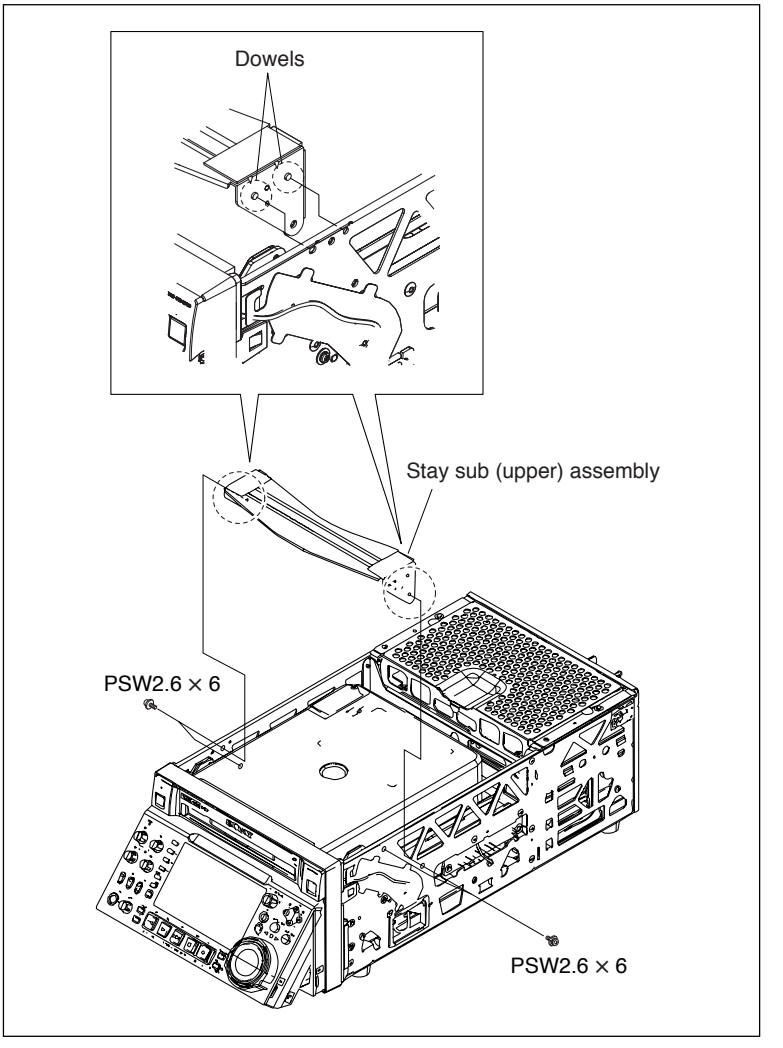
6-3. Replacing Loader Assembly

Notes

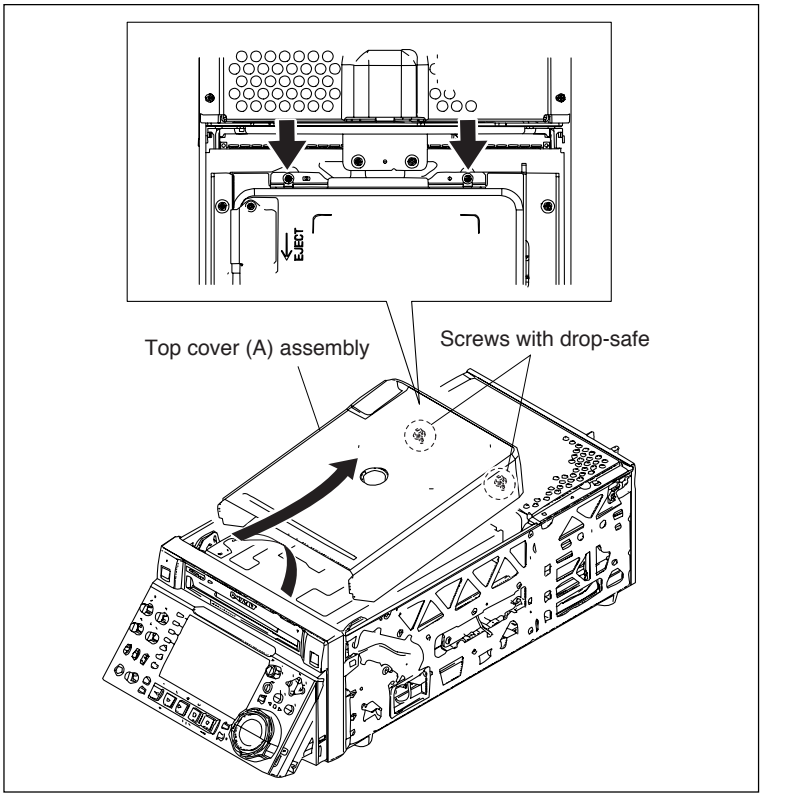
- The loader assembly requires periodic replacement. Refer to "5-1-3. Periodic Check/Replacement Parts List" for details.
- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-14.)
- The spindle motor and the actuator around the objective lens have a powerful magnet. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If a magnetic substance comes close to these parts, their characteristics may be changed.

Removal

1. Eject the cartridge.
   Note
   When the cartridge cannot be ejected with the unit powered on, eject the cartridge referring to "1-5. How to Take Out a Cartridge Manually."
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the four screws, and remove the stay sub (upper) assembly.
4. Loosen the two screws with drop safe that are fixing the top cover (A) assembly.



5. Remove the top cover (A) assembly in the direction of the arrow.



6. Release the lock by sliding portion A of connector CN1 on the SE-852 board as shown in the figure with tweezers or another tool, and disconnect the flexible card wire.

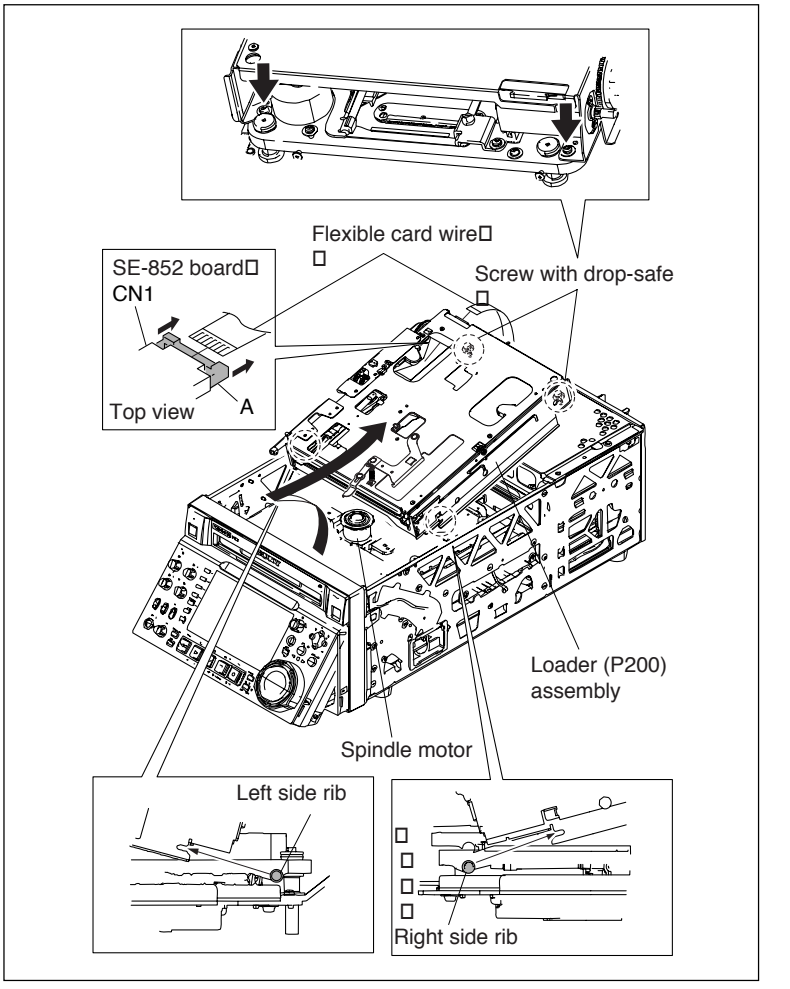
Notes

- Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold it.
- When reinstalling the removed parts, be careful not to break the locking claws of the connector CN1 of the SE-852 board.

7. Loosen the two screws with drop-safe on the loader (P200) assembly.
8. Remove the loader (P200) assembly from the rear side in the direction of the arrow.

Notes

- Stepped shafts are inserted into the loader (P200) assembly on both sides of the front. Remove the loader (P200) assembly after slightly pulling it toward the rear.
- The spindle motor has an intense powerful magnet. A part of the loader (P200) assembly may be attracted by the magnetic force or hooked on the edge of the spindle motor. Be careful when removing the loader (P200) assembly.

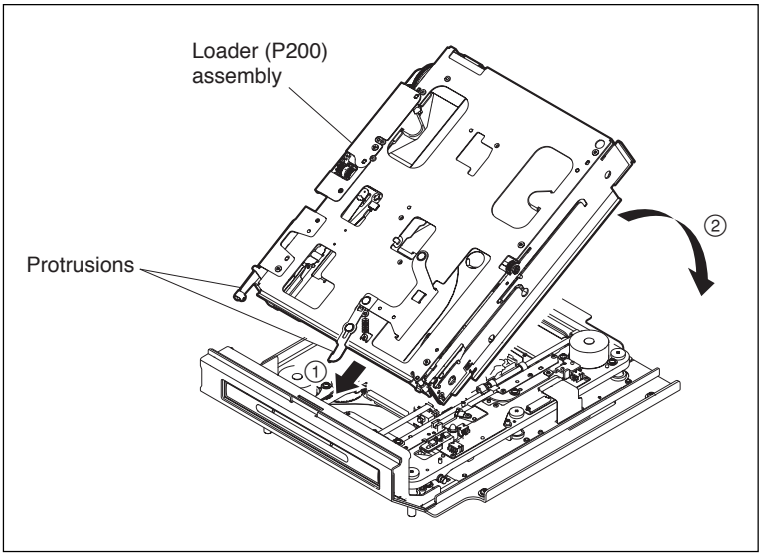


9. Insert the loader (P200) assembly in the direction of arrow 1 at an angle as shown in the figure, and then lower it gently in the direction of arrow 2.

   Note

   Be careful not to hit or bend the protrusion on the front of the loader (P200) assembly.

10. Install it by reversing steps 2 to 7 of removal.



6-4. Replacing Cleaner Assembly

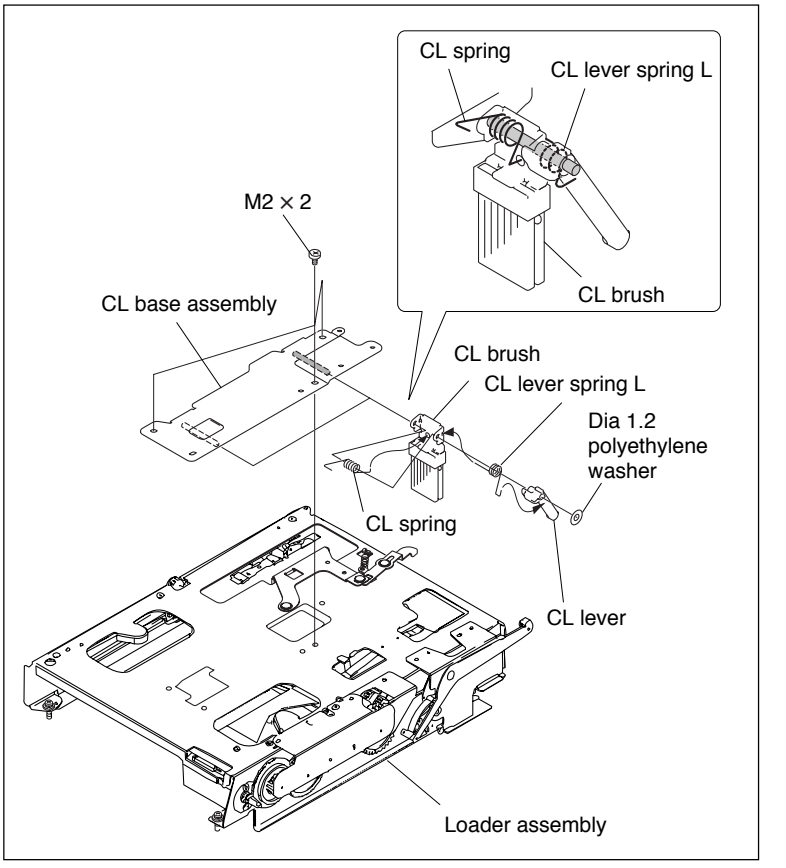
Notes

- The Cleaner assembly requires periodic check. Refer to "5-1-3. Periodic Check/Replacement Parts List" for details.
- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-14.)
- The spindle motor and the actuator around the objective lens have a powerful magnet. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If a magnetic substance comes close to these parts, their characteristics may be changed.

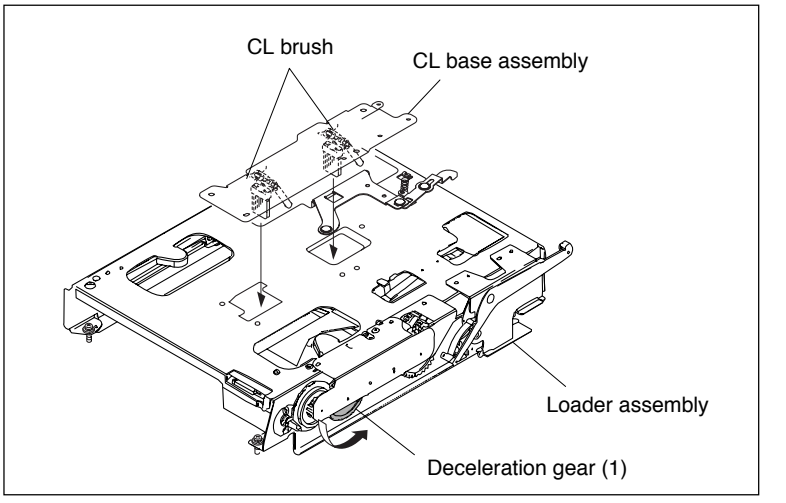
1. Remove the top panel assembly. (Refer to Section 1-4-1.)
2. Remove the loader assembly. (Refer to Section 6-3.)
3. Remove the three screws and remove the CL base assembly.
4. Remove the diameter 1.2 polyethylene washer and, remove the CL lever spring L and the CL lever.
5. Remove the CL spring and remove the CL brush.

Notes

- Be careful not to deform the CL base assembly.
- Take care so that the CL spring does not come off.



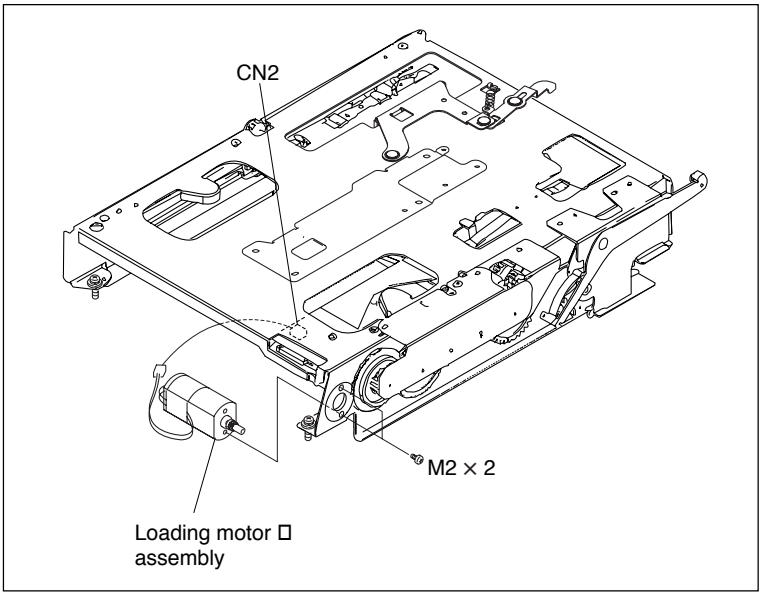
6. Rotate the deceleration gear (1) in the arrow direction until it is stopped so that the CL brush should not be pinched. Then, install the CL base assembly onto the loader assembly.
7. Reinstall the removed parts by reversing steps 1 to 5 of removal.



6-5. Replacing Loading Motor Assembly

1. Remove the top panel assembly. (Refer to Section 1-4-1.)
2. Remove the stay sub (upper) assembly. (Refer to Section 6-3.)
3. Remove the top cover (A) assembly. (Refer to Section 6-3.)
4. Remove the loader assembly. (Refer to Section 6-3.)
5. Disconnect the harness from the connector CN2
6. Remove the two screws, and remove the loading motor assembly.

7. Reinstall the removed parts by reversing steps 1 to 7 of removal.



6-6. Removing/Reattaching Drive Sub Assembly

Notes

- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-14.)
- The spindle motor and the actuator around the objective lens have a powerful magnet. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If a magnetic substance comes close to these parts, their characteristics may be changed.

Removal

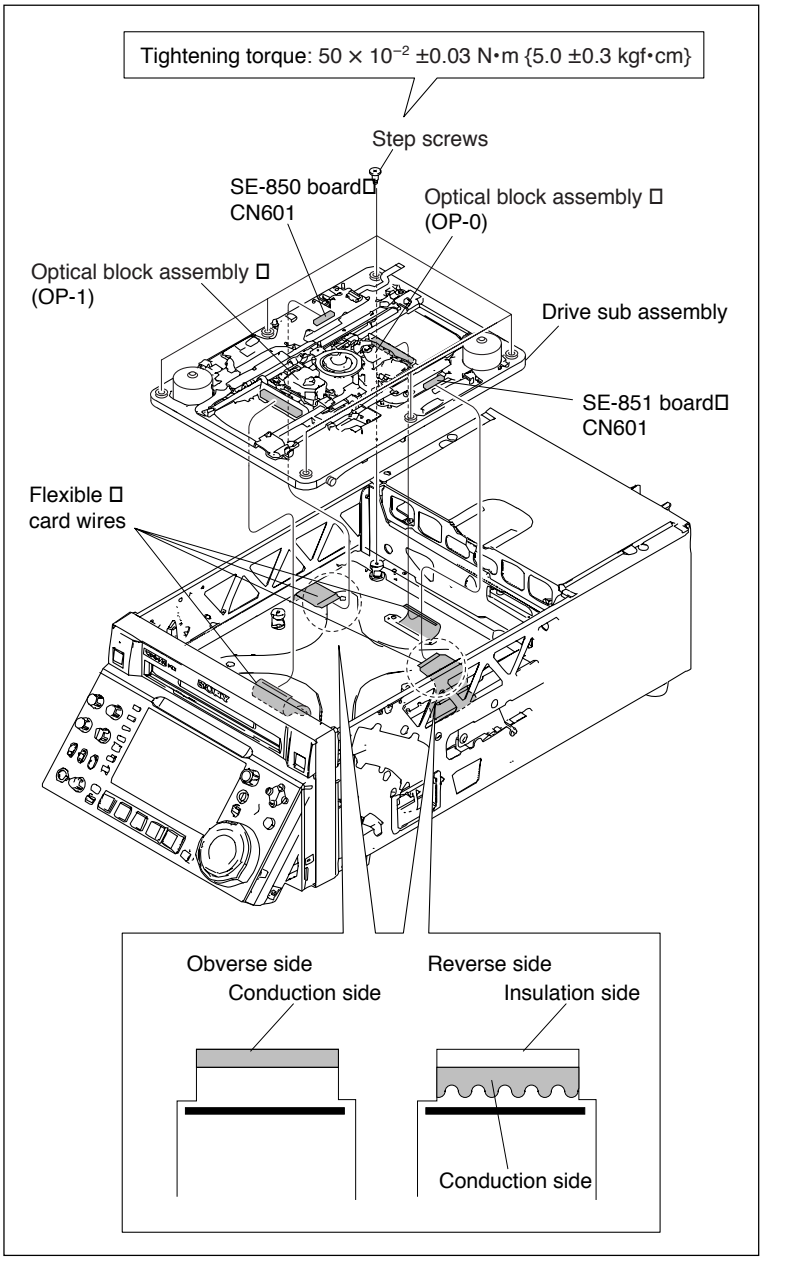
1. Remove the top panel assembly. (Refer to Section 1-4-1.)
2. Remove the stay sub (upper) assembly. (Refer to Section 6-3.)
3. Remove the top cover (A) assembly. (Refer to Section 6-3.)
4. Remove the loader assembly. (Refer to Section 6-3.)
5. Disconnect the flexible card wires from the connector CN601 on the SE-850 board, connector CN601 on the SE-851 board, and the two connectors of the optical block assembly OP-0 and of the optical block assembly OP-1.
6. Remove the six step-screws, and remove the drive sub assembly.

Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 6 of removal.

   Note

   The flexible card wires connected to the connector CN601 on the SE-850 board and to the connector CN601 on the SE-851 board have conduction areas on both sides, and the edges of their reverse sides are insulated. Insert each flexible card wire into the connector as far as it will go, and then lock it.



6-7. Replacing Optical Block Assembly

Notes

- To prevent the possibility of damage to the optical block assembly in the drive by static electricity charged in a human body or clothes, be sure to establish a ground before cleaning the drive assembly. (Refer to Section 1-14.)
- The spindle motor and the actuator around the objective lens have a powerful magnet. Keep magnetic substance away from these parts. If the magnetic force makes a metallic material such as a screwdriver and so on hit the actuator, the objective lens will be damaged. If a magnetic substance comes close to these parts, their characteristics may be changed.

Fixtures

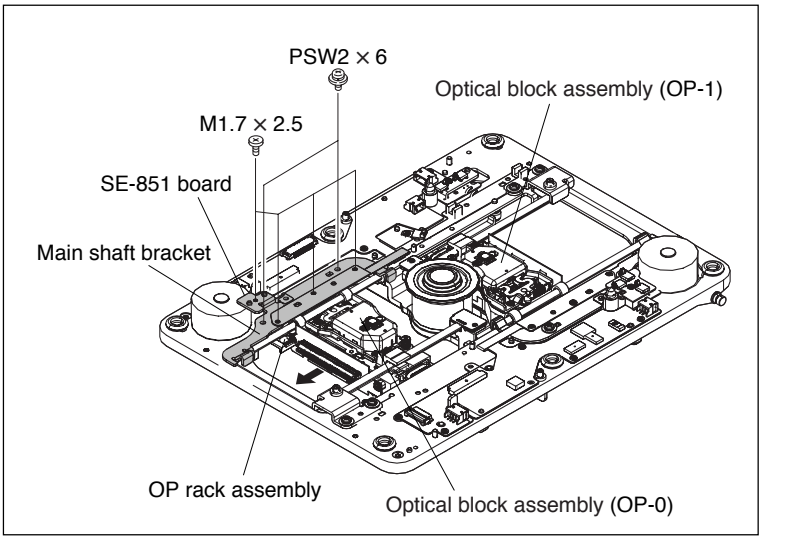
- Cleaning liquid
- Cleaning cloth
- Parallel pin (2 × 20) : 1

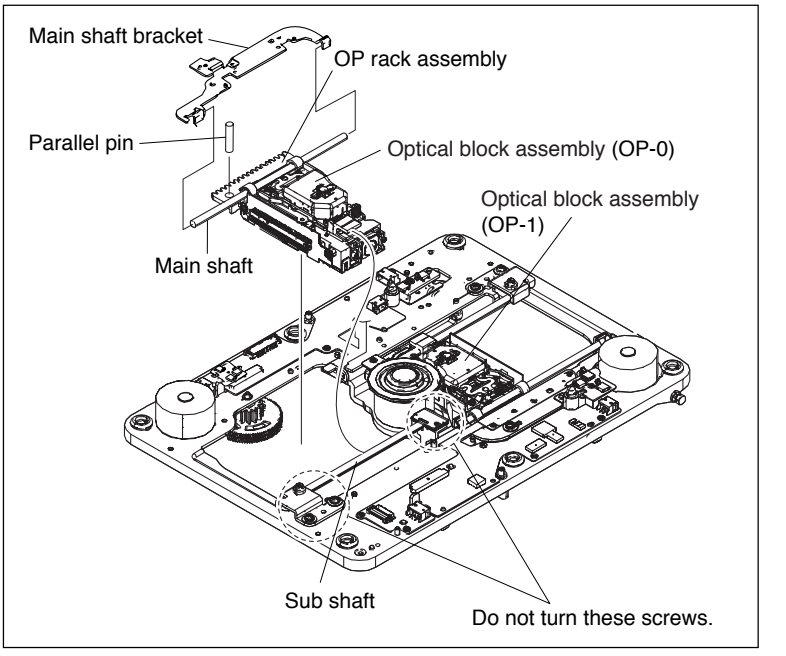
Removal

1. Remove the top panel assembly. (Refer to Section 1-4-1.)
2. Remove the stay sub (upper) assembly. (Refer to Section 6-3.)
3. Remove the top cover (A) assembly. (Refer to Section 6-3.)
4. Remove the loader assembly. (Refer to Section 6-3.)
5. Remove the four screws, and remove the sensor block of the SE-851 board.
6. Insert the parallel pin into the OP rack assembly.
7. Remove the flexible card wire of the optical block assembly.
8. Remove the two screws, and remove the main shaft bracket.
9. Push the die-cast bed of the optical block assembly (OP-0) in the direction of shown by the arrow until the OP rack assembly becomes entirely visible.
10. Remove the main shaft from the optical block assembly (OP-0).

    Note

    For removal of the optical block assembly (OP-1), refer to the removal procedure of the optical block assembly (OP-0).





Cleaning

1. Clean the spindle motor.
   (Refer to Section 5-2-3.)

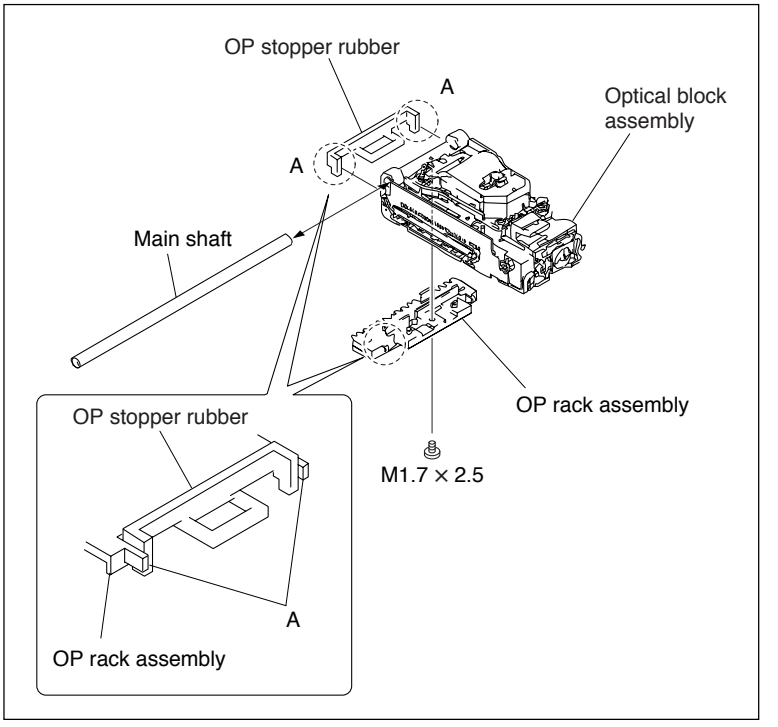
Replacement

1. Detach the main shaft from the removed optical block assembly, and clean the main shaft using a cleaning cloth with cleaning fluid soaked.
2. Clean the sub shaft using a cleaning cloth with cleaning fluid soaked.
3. Remove the screw to remove the OP rack assembly and the OP stopper rubber.
4. Install the OP stopper rubber and the OP rack assembly onto a new optical block assembly with a screw.
   Screw tightening torque :
   10×10^{-2} N•m (1.0 kgf•cm)

   Notes

   - If the OP stopper rubber is deformed or deteriorated, replace it with a new one.
   - Be careful so that the OP stopper rubber does not come out of the both ends (portion A) of the OP rack assembly.

5. Pass the main shaft through the new optical block assembly.

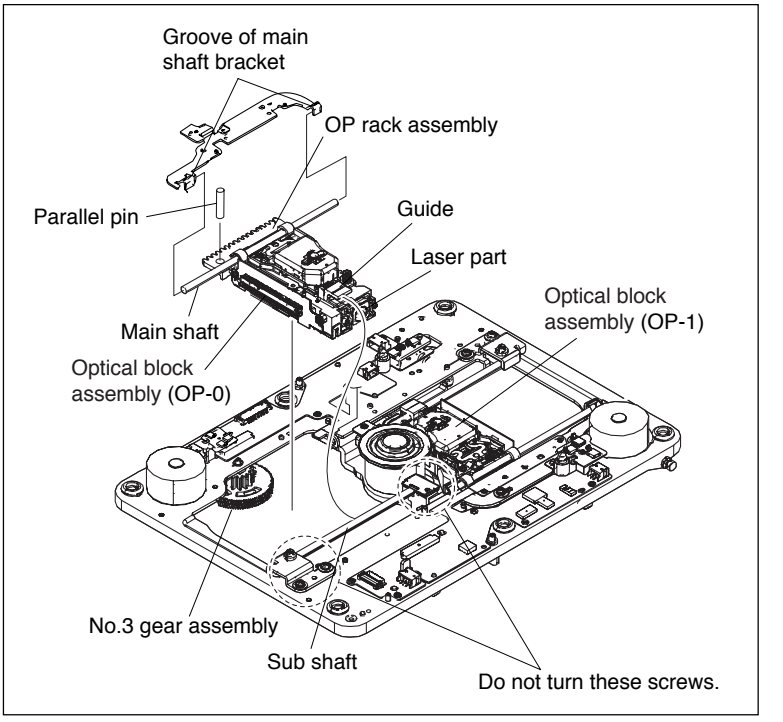


Reinstallation

1. Align the upper and lower holes of the OP rack assembly while pressing the both ends of the OP rack assembly, and insert the parallel pin into the holes.
2. Insert the guide into the sub shaft, and install the optical block assembly (OP-0) and the main shaft into the groove of the main shaft bracket.

   Notes

   - Install these parts so that the gear of the OP rack assembly is properly engaged with the gear of the No.3 gear assembly.
   - The laser part of the optical block assembly (OP-0) is precisely positioned. Do not hit the laser part against the sub shaft or the chassis when installing the optical block assembly.

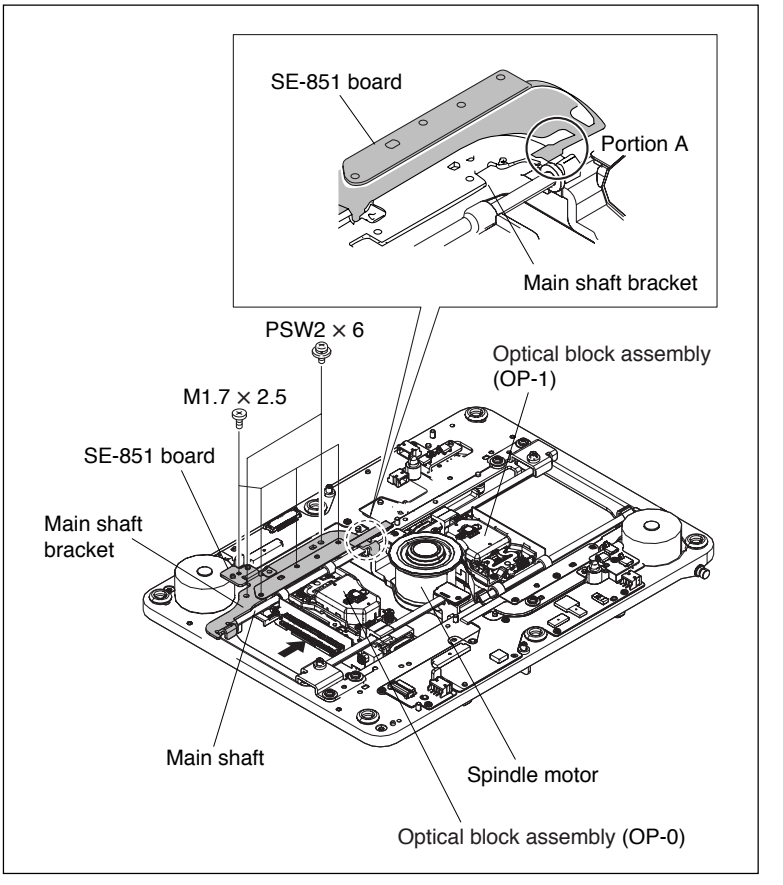


3. Install the main bracket with two screws.
4. Remove the parallel pin from the top, and confirm that the optical block can move smoothly.
5. Place the “A” portion of the SE-851 board on top of the main shaft bracket.

   Note

   The “A” portion of the SE-850 board and the SE-851 board prevents from the possible damage by the edge of the main shaft bracket.

6. Install the sensor block of the SE-851 board with the four screws. (For the optical block of the opposite side, install the sensor block of the SE-850 board with the three screws.)



6-8. Replacing No.2 Gear and No.3 Gear Assemblies

Notes

- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-14.)
- The spindle motor and the actuator around the objective lens have a powerful magnet. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If a magnetic substance comes close to these parts, their characteristics may be changed.

Fixtures

- Parallel pin (2 × 20) : 2
- Stopper washer : 2

Removal

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the stay sub (upper) assembly.
   (Refer to Section 6-3.)
3. Remove the top cover (A) assembly.
   (Refer to Section 6-3.)
4. Remove the loader assembly.
   (Refer to Section 6-3.)
5. Remove the drive sub assembly.
   (Refer to Section 6-6.)
6. Turn the drive sub assembly upside down.

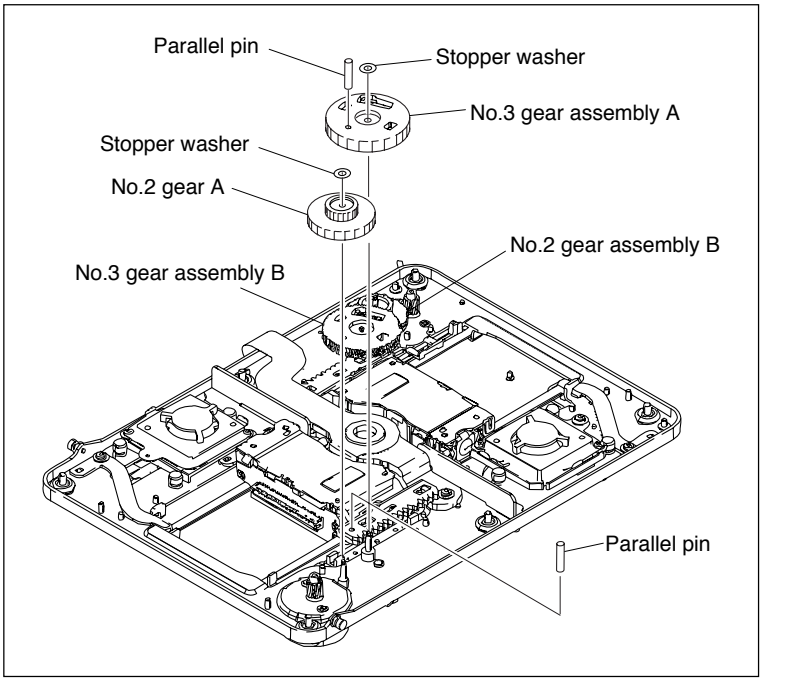
   Notes

   - Do not place the drive sub assembly upside down on a workbench or on anywhere. Doing so may result in damage of the optical block assemblies and spindle motor.
   - Before starting removal, be sure to insert the parallel pins into the No. 3 gear assembly and into the OP rack assembly respectively. Start the removal work after the parallel pins have been inserted.

7. Remove the stopper washer, and remove the No.3 gear assembly A.
8. Remove the stopper washer, and remove the No.2 gear assembly A.

   Note

   For removal of the No.2 gear assembly B and that of the No. 3 gear assembly B, refer to the removal procedure of the No.2 gear assembly A and that of the No. 3 gear assembly A.



Reinstallation

1. Press the die-cast bed of the optical block assembly so that the optical block assembly is moved to the position shown in the figure.
2. Align the upper and lower holes of the OP rack assembly while pressing the both ends of the OP rack assembly, and insert the parallel pin into the holes.
3. Install the No.2 gear A onto the base plate shaft.
4. Align the upper and lower holes of the No.3 gear assembly A while turning the No.3 gear assembly A, and insert the parallel pin into the holes.
5. Install the No.3 gear assembly A onto the base plate shaft.

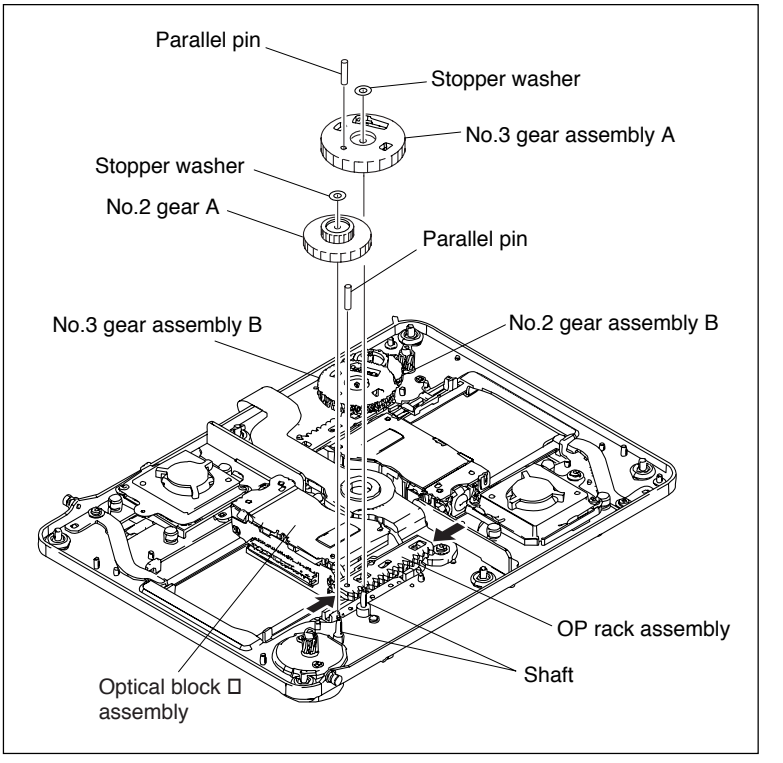
   Note

   Install the No.3 gear assembly A so that the gear of the No.3 gear assembly A is properly engaged with the gear of the OP rack assembly and with the No.2 gear A.

6. Attach two new stopper washers to the two shafts of the base plate.
7. Pull out the two parallel pins.
8. Press the die-cast bed or the connector of the optical block assembly, and check the followings:
   - The optical block assembly moves smoothly.
   - The OP rack assembly and the No.3 gear assembly A are properly engaged.

Note

For installation of the optical block assembly B, refer to the installation procedure of the optical block assembly A.



6-9. Replacing Seek Motor Assembly

Notes

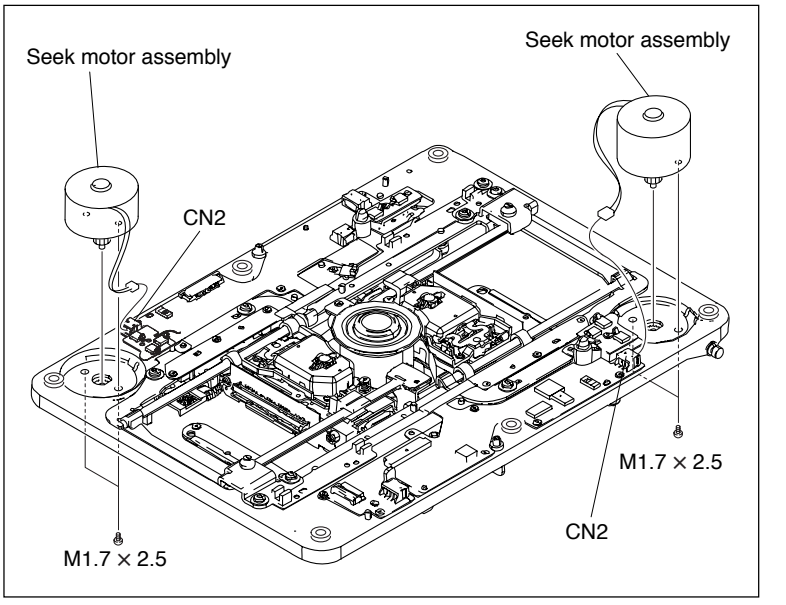
- The seek motor assembly requires periodic replacement. Refer to "5-1-3. Periodic Check/Replacement Parts List" for details.
- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-14.)
- The spindle motor and the actuator around the objective lens have a powerful magnet. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If a magnetic substance comes close to these parts, their characteristics may be changed.

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the stay sub (upper) assembly.
   (Refer to Section 6-3.)
3. Remove the top cover (A) assembly.
   (Refer to Section 6-3.)
4. Remove the loader assembly.
   (Refer to Section 6-3.)
5. Remove the drive sub assembly.
   (Refer to Section 6-6.)
   Disconnect the harness from the connector.
6. Turn the drive sub assembly upside down.

   Note

   Do not place the drive sub assembly upside down on a workbench or on anywhere. Doing so may result in damage of the optical block assemblies and spindle motor.

7. Remove the two screws, and remove the seek motor assembly.
8. Secure a new seek motor assembly with two screws.
   Screw tightening torque :
   10×10^{-2} N•m (1.0 kgf•cm)
9. Connect the harness to the connector CN2.
10. Reinstall the removed parts by reversing steps 1 to 7.



6-10. Replacing Spindle Motor

Notes

- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-14.)
- The spindle motor and the actuator around the objective lens have a powerful magnet. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If a magnetic substance comes close to these parts, their characteristics may be changed.

Fixtures

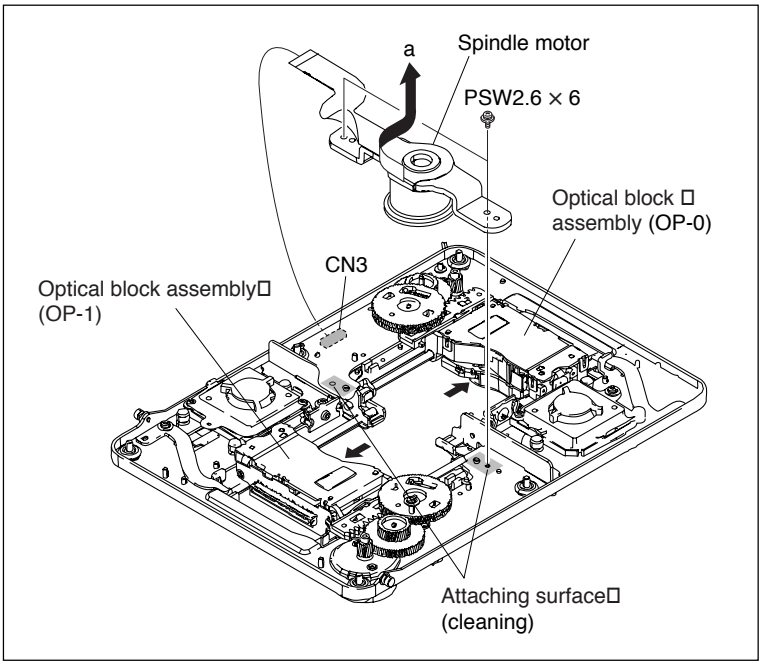
- Cleaning liquid
- Cleaning cloth

Replacement

1. Remove the top panel assembly. (Refer to Section 1-4-1.)
2. Remove the stay sub (upper) assembly. (Refer to Section 6-3.)
3. Remove the top cover (A) assembly. (Refer to Section 6-3.)
4. Remove the loader assembly. (Refer to Section 6-3.)
5. Remove the drive sub assembly. (Refer to Section 6-6.)
6. Turn the drive sub assembly upside down.

   Note

   Do not place the drive sub assembly upside down on a workbench or on anywhere. Doing so may result in damage of the optical block assemblies and spindle motor.



7. Press the die-cast beds of the optical block assembly (OP-0) and the optical block assembly (OP-1) in the arrow direction until the spindle motor mount bracket becomes visible.
8. Disconnect the flexible card wire from the connector CN3.
9. Remove the two screws, and remove the spindle motor in the direction of arrow “a”.

   Note

   In this state, inside of the main shaft of the optical block assembly is floating. Do not exert any load on the main shaft.

10. Clean the attaching surface and the two screw holes of a new spindle motor with a cleaning cloth moistened with cleaning fluid.
11. Install the spindle motor with two screws. Confirm that the main shaft of the optical block assembly has been installed onto the base of the spindle motor.
12. Connect the flexible card wire to the connector CN3.
13. Perform the skew adjustment. (Refer to Section 7.)
14. Reinstall the removed parts by reversing steps 1 to 9.

6-11. Replacing Fan Motor

6-11-1. Fan Motor (Drive)

Note

For replacement of the fan motor (drive) B, refer to the replacement procedure of the fan motor (drive) A.

Replacing Fan Motor (Drive) A

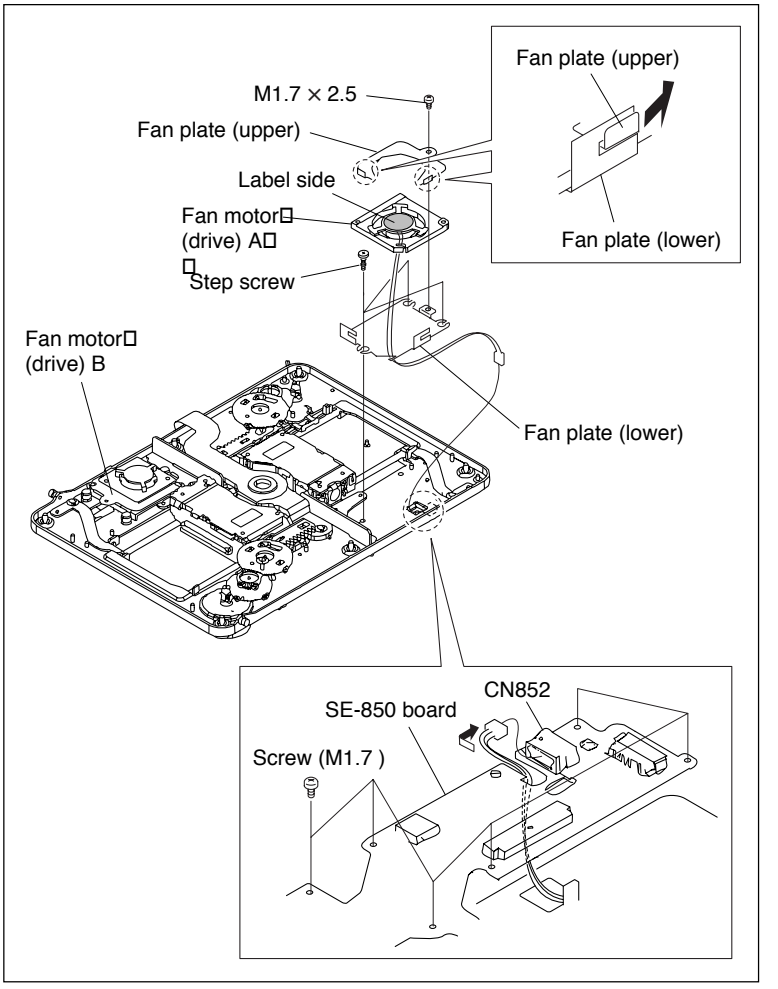
1. Remove the top panel assembly. (Refer to Section 1-4-1.)
2. Remove the stay sub (upper) assembly. (Refer to Section 6-3.)
3. Remove the top cover (A) assembly. (Refer to Section 6-3.)
4. Remove the loader assembly. (Refer to Section 6-3.)
5. Remove the drive sub assembly. (Refer to Section 6-6.)
6. Remove the six screws of the SE-850 board. While raising the SE-850 board slightly, disconnect the harness from the connector CN852.
7. Turn the drive sub assembly upside down.

   Note

   Do not place the drive sub assembly upside down on a workbench or on anywhere. Doing so may result in damage of the optical block assemblies and spindle motor.

8. Remove the three step-screws, and remove the fan plate (lower).
9. Remove the screw, and remove the fan plate (upper) by rotating it in the arrow direction.
10. Remove fan motor (drive) A.

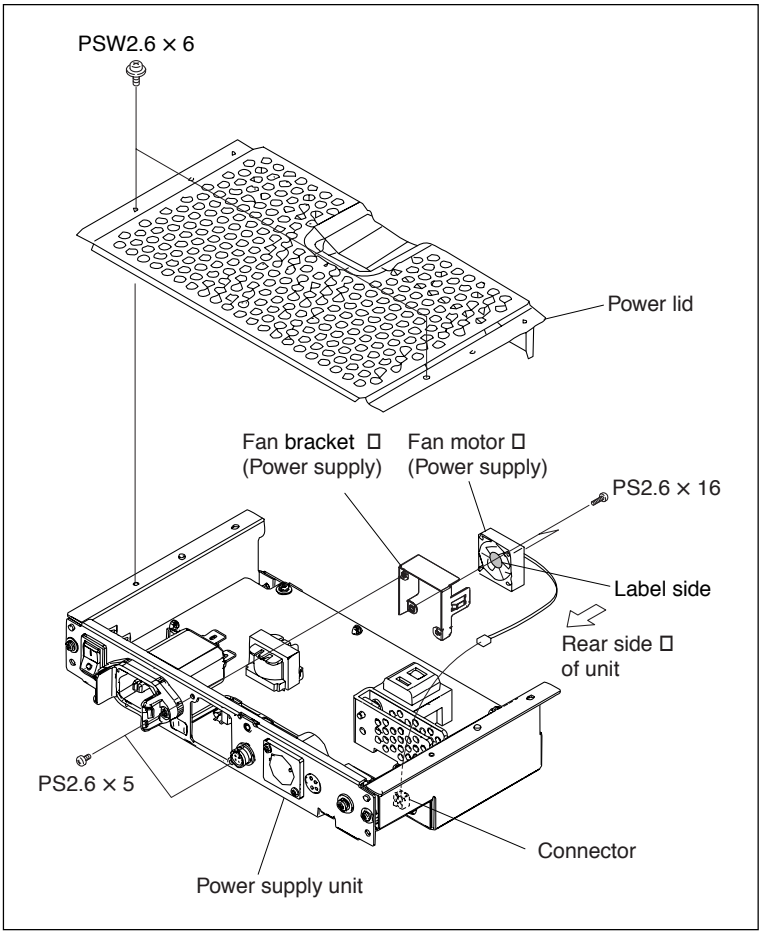
11. Place a new fan motor (drive) A with its label side up oriented as shown in the figure.
12. Reinstall the removed parts by reversing steps 1 to 10 of removal.



6-11-2. Fan Motor (Power Supply)

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the power supply unit.
   (Refer to Section 6-2.)
3. Remove the two screws, and remove the power lid.
4. Disconnect the harness from the connector.
5. Remove the two screws to detach the fan bracket (power supply).
6. Remove the two screws to detach the fan motor (power supply).

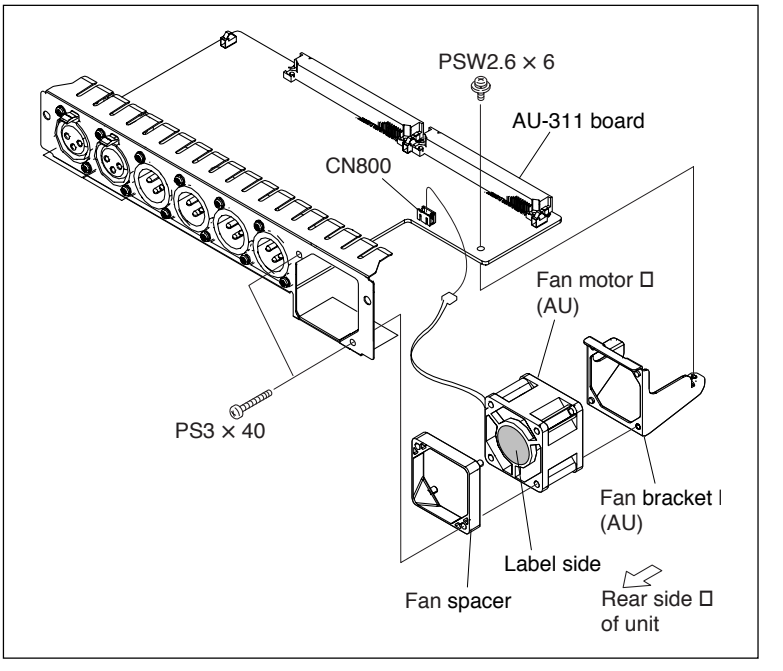
7. Attach a new fan motor (power supply) with its label side facing rear, oriented in the direction as shown in the figure.
8. Reinstall the removed parts by reversing steps 1 to 6 above.



6-11-3. Fan Motor (AU)

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the AU-311 board.
   (Refer to steps 2 and 3 of Section 6-12-1.)
3. Disconnect the harness from the connector CN800.
4. Remove the three screws to detach the fan motor bracket (AU), the fan spacer and the fan motor (AU).

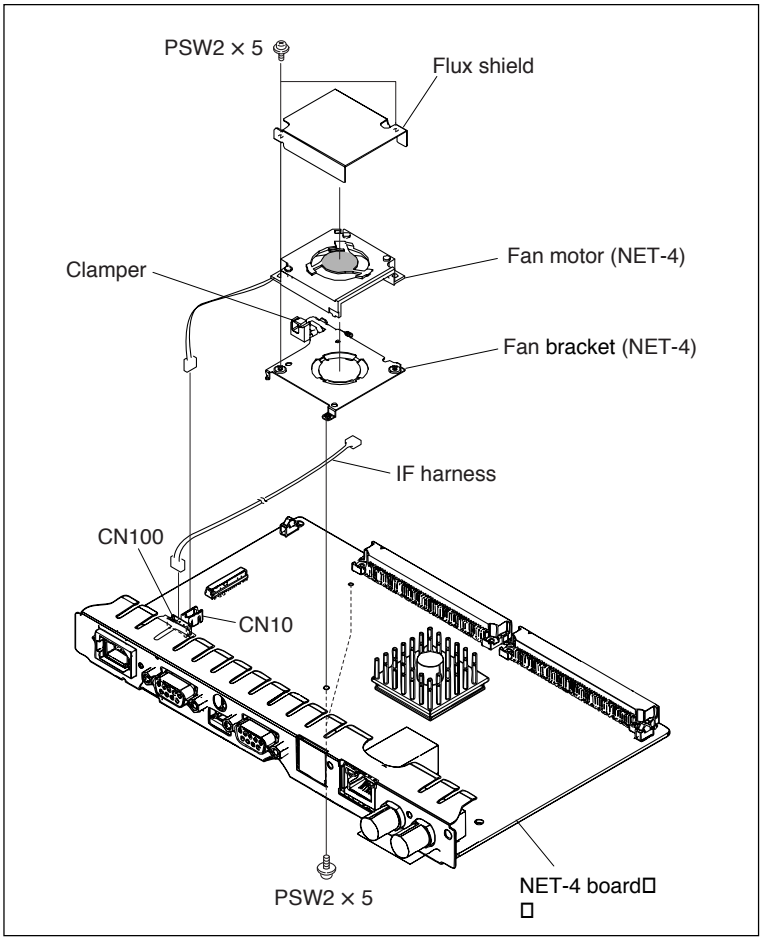
5. Attach a new fan motor (AU) with its label side facing rear, oriented in the direction as shown in the figure.
6. Reinstall the removed parts by reversing steps 1 to 4 above.



6-11-4. Fan Motor (NET-4)

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the NET-4 board.
   (Refer to steps 2 to 5 of Section 6-12-3.)
3. Disconnect the two harnesses from the connectors CN10 and CN100.
   - Release the clamper on the fan bracket (NET-4) to disconnect the fan harness and the IF harness. (Refer to Section 6-12-8.)
4. Remove the two screws to detach the fan bracket (NET-4) and the flux shield.
5. Remove the two screws to detach the fan motor (NET-4).

6. Attach a new fan motor (NET-4) with its label side down, oriented in the direction as shown in the figure.
7. Reinstall the removed parts by reversing steps 1 to 5 above.

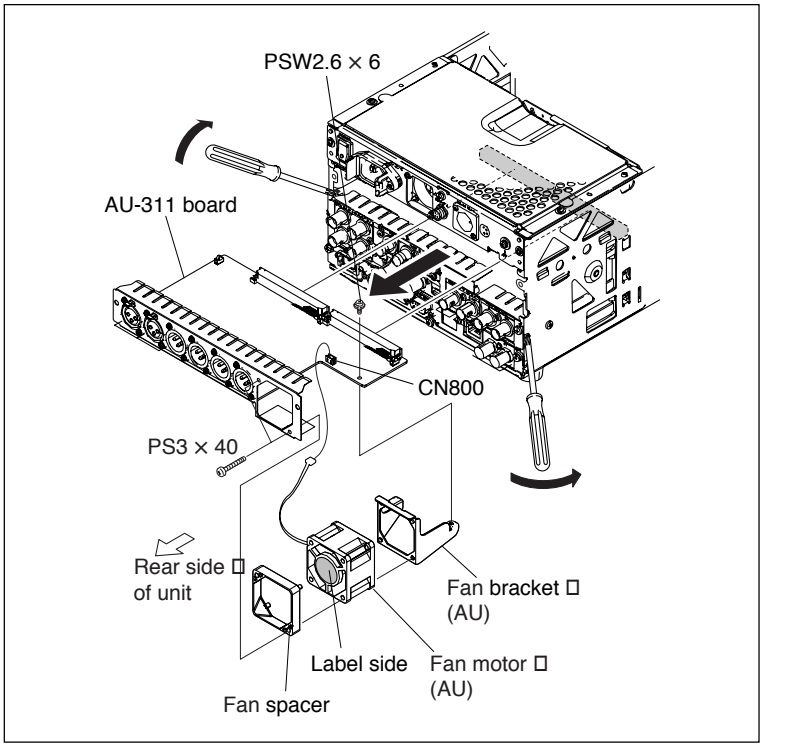


6-12. Removing/Reattaching Mounted Circuit Boards

6-12-1. AU-311 Board

Removal

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the rear panel.
   (Refer to Section 1-4-3.)
3. Pull out the AU-311 board in the arrow direction as follows:
   Insert tip of Phillips head screwdrivers into cut-outs at the right end and left end of the board to push the AU-311 board out of slot.
4. Disconnect the harness from the connector CN800.
5. Remove the three screws to detach the fan motor bracket (AU), the fan spacer, the fan motor (AU) and the AU-311 board.



Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 4 above.

   Note

   When installing the fan motor (AU), install it with its label side facing rear as shown in the figure.

6-12-2. RX-93H Board, VPR-99 Board

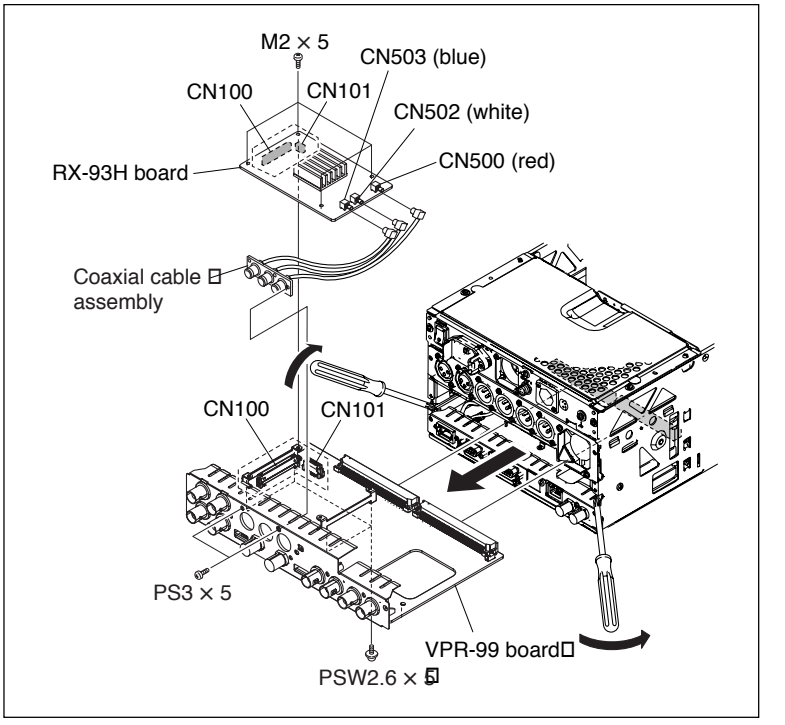
Removal

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the rear panel.
   (Refer to Section 1-4-3.)
3. Pull out the RX-93H board and the VPR-99 board in the arrow direction as follows:
   Insert tip of Phillips head screwdrivers into cut-outs at the right end and left end of the board to push the mounted board out of slot.
4. Remove the four screws, and disconnect the three coaxial cables from the connectors CN500, CN502 and CN503, to detach the RX-93H board.

   Note

   When reinstalling the board, couple the two connectors securely.

5. Remove the two screws to detach the coaxial cable assembly.



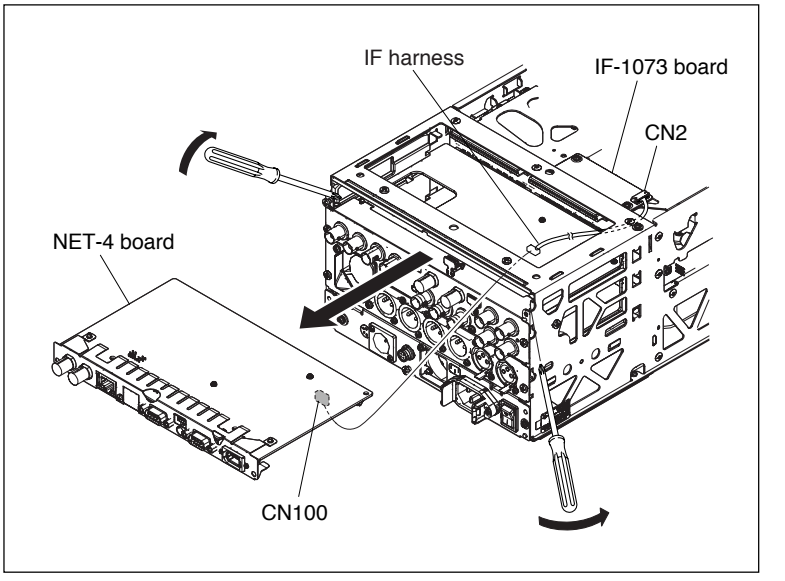
Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 4 above.

6-12-3. NET-4 Board

Removal

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Turn the PDW-F1600 upside down.
3. Remove the rear panel, and remove the bottom plate assembly.
   (Refer to Section 1-4-3 and 1-4-4.)
4. Disconnect the IF harness from the connector CN2 of the IF-1073 board.
5. (In the same way as other boards) insert tip of Phillips head screwdrivers into cut-outs at the right end and left end of the board to push the mounted board out of slot.
6. Pull out the NET-4 board in the direction of the arrow.
7. Disconnect the harness from the connector CN100.



Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 7 above.

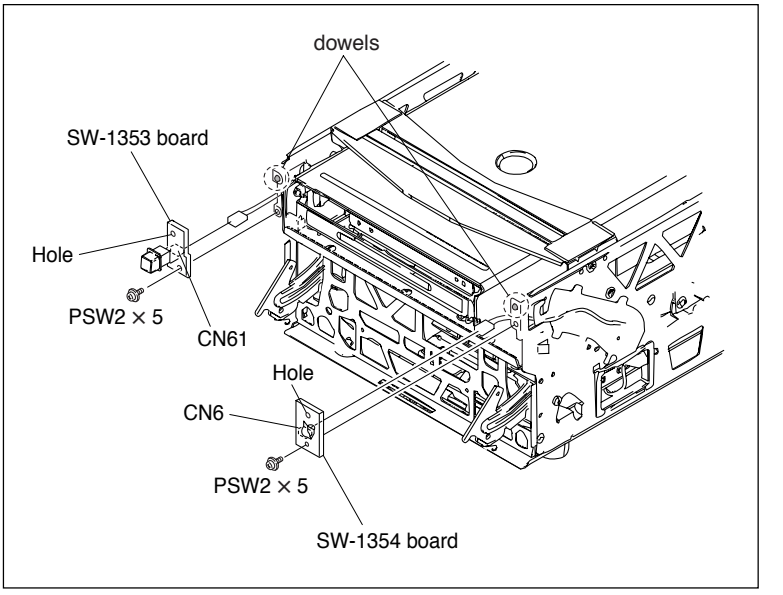
6-12-4. SW-1353 Board

Removal

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the front panel assembly.
   (Refer to steps 2 to 7 of Section 1-4-2.)
3. Remove the screw, and disconnect the harness from the connector CN61 to detach the SW-1353 board.

Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 3 above.
   When reinstalling the SW-1353 board, fit the dowels into the holes of the SW-1353 board.



6-12-5. SW-1354 Board

Removal

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the front panel assembly.
   (Refer to steps 2 to 7 of Section 1-4-2.)
3. Remove the screw, and disconnect the harness from the connector CN6 to detach the SW-1354 board.

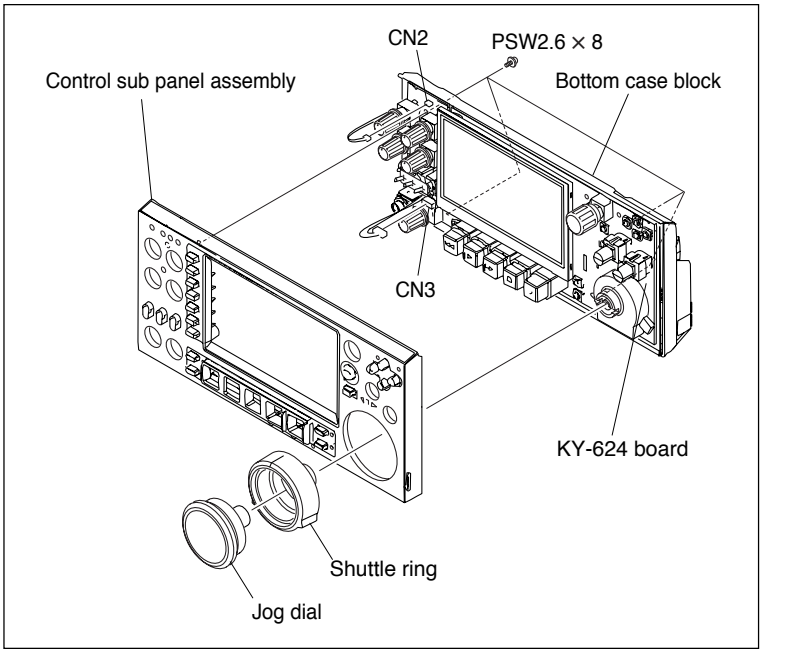
Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 3 above.
   When reinstalling the SW-1354 board, fit the dowels into the holes of the SW-1354 board.

6-12-6. KY-624 Board

Removal

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the control panel assembly.
   (Refer to steps 2 to 6 of Section 1-4-2.)
3. Remove the Jog dial and the Shuttle ring.
4. Remove the four screws, and remove the control sub panel block.
5. Disconnect the harnesses from the connectors CN2, CN3.



6. Remove the KY-624 board from the bottom case block.

Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 6 above.

   Note

   For the method of routing the HP harness (connected to CN3) and the speaker harness (connected to CN2), refer to Fig. 1.

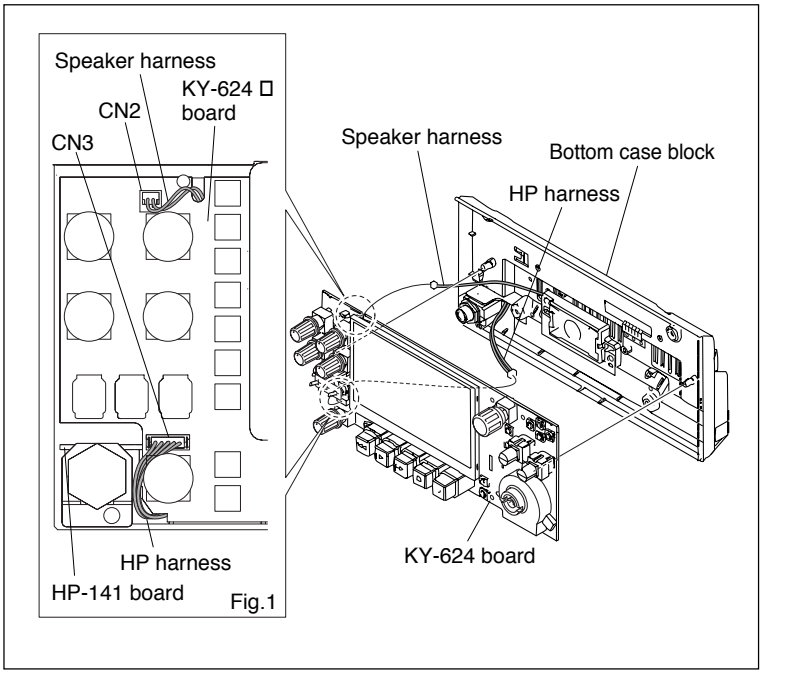
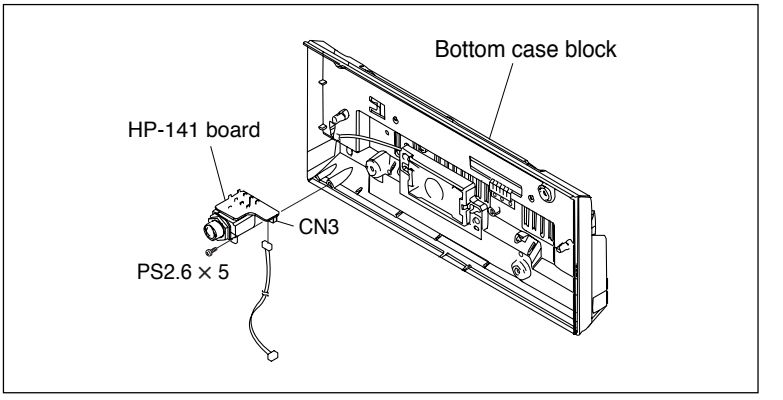


Fig.1

6-12-7. HP-141 Board

Removal

1. Remove the top panel assembly. (Refer to Section 1-4-1.)
2. Remove the control panel assembly. (Refer to steps 2 to 6 of Section 1-4-2.)
3. Remove the KY-624 board. (Refer to steps 3 to 6 of Section 6-12-6.)
4. Remove the screw, and remove the HP-141 board. (Remove HP-141 board with the harness connected.)
5. Disconnect the harness from the connector CN3 on the HP-141 board.



Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 4 above.

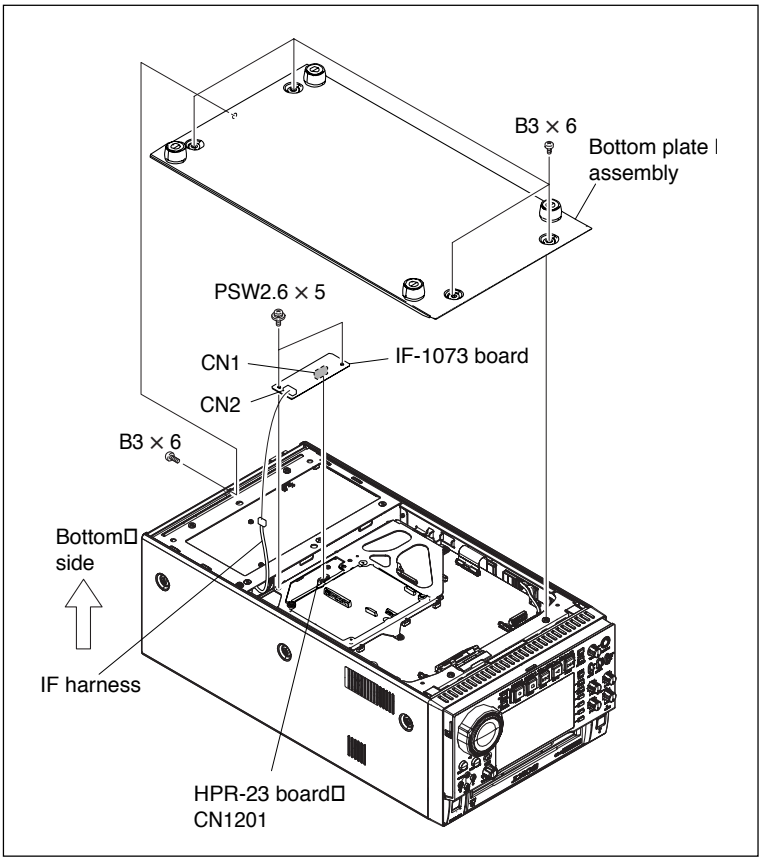
6-12-8. IF-1073 Board

Removal

1. Turn the PDW-F1600 upside down.
2. Remove the five screws, and remove the bottom plate assembly.
3. Disconnect the IF harness from the connector CN2.
4. Remove the two screws, and remove the IF-1073 board.

Reinstallation

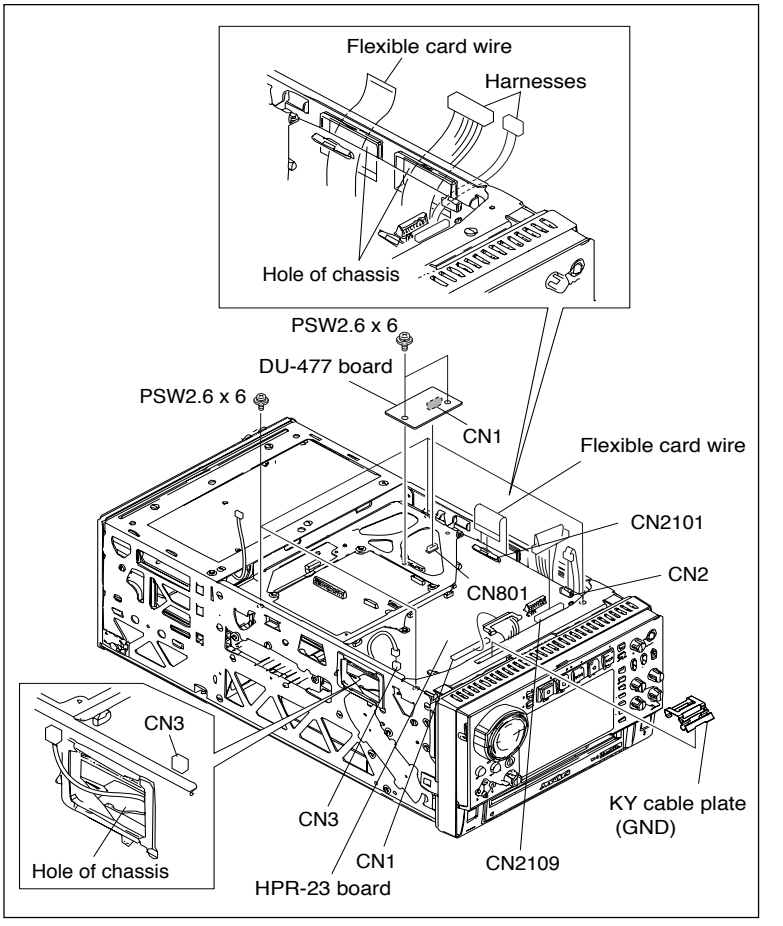
1. Reinstall the removed parts by reversing steps 1 to 4 above.



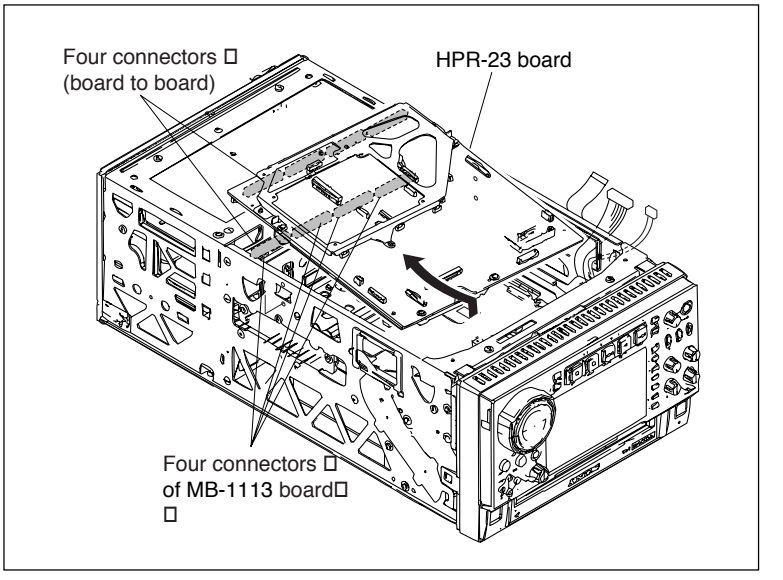
6-12-9. HPR-23 Board, ENC-107 Board, DU-477 Board

Removal

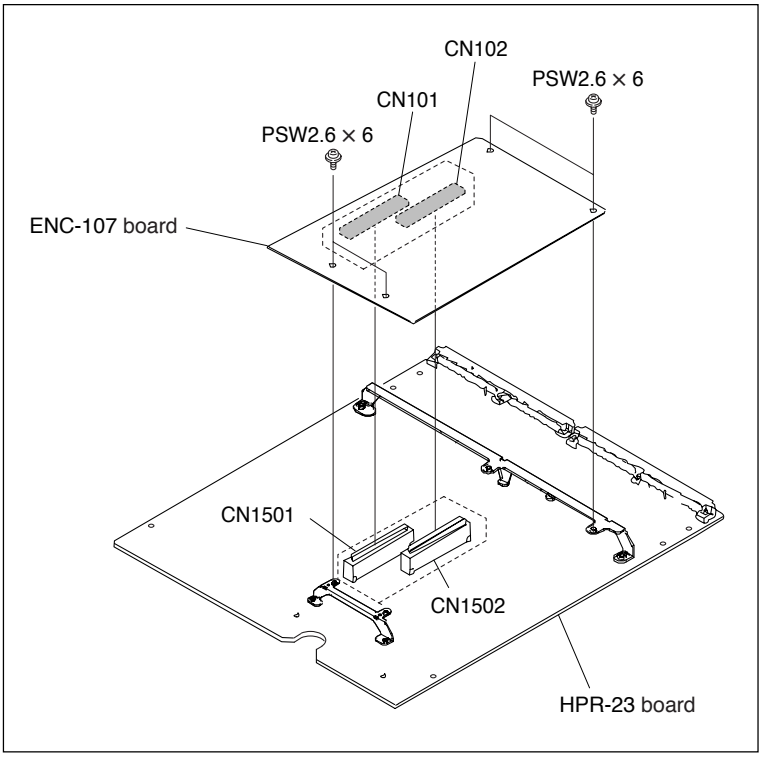
1. Remove the top panel assembly and the bottom plate assembly.
   (Refer to Sections 1-4-1 and 1-4-4.)
2. Remove the IF-1073 board.
   (Refer to Section 6-12-8.)
3. Remove the two screws and remove the DU-477 board.
4. Remove the KY cable plate (GND) from the chassis.
5. Disconnect the flexible card wire from the connector CN2101, and disconnect the harness from the connectors CN2109 and CN2 to remove the flexible card wire outside through the hole of the chassis.
6. Disconnect the harnesses from the connectors CN1 and CN3.
7. Remove the four screws.



8. Disconnect the four board-to-board connectors connecting the MB-1113 board to the HPR-23 board. Detach the HPR-23 board in the direction shown by the arrow.



9. Remove the four screws and remove the ENC-107 board.



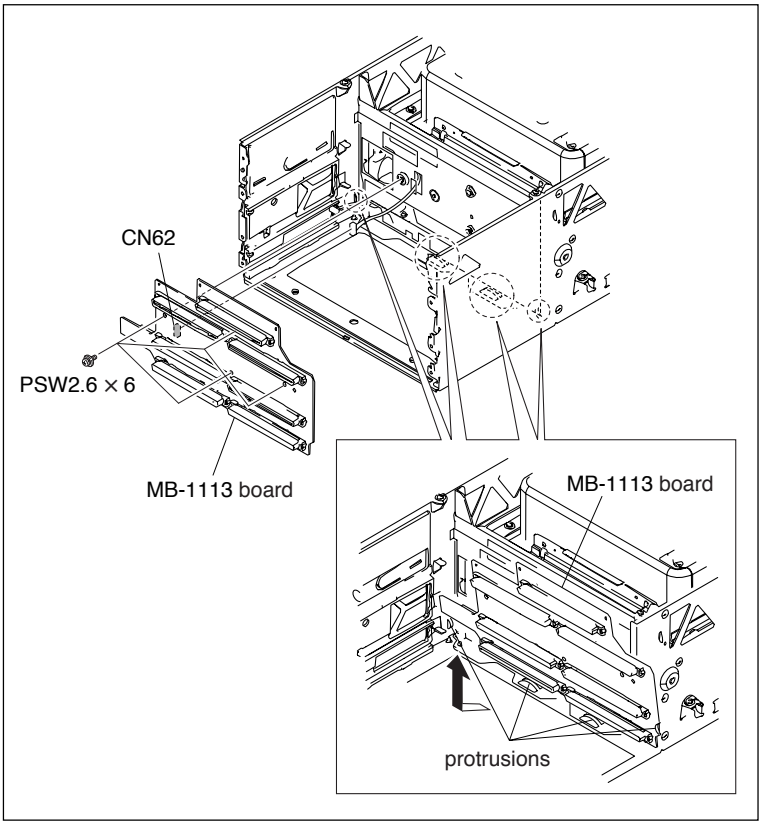
Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 9 above.

6-12-10. MB-1113 Board

Removal

1. Remove the top panel assembly, the rear panel and the bottom plate assembly. (Refer to Sections 1-4-1, 1-4-3 and 1-4-4.
2. Remove the power supply assembly, the AU-311 board, the VPR-99 board and the NET-4 board. (Refer to Sections 6-2, 6-12-1, 6-12-2 and 6-12-3.)
3. Remove the HPR-23 board. (Refer to Section 6-12-9.)
4. Disconnect the harness from the connector CN62.
5. Remove the four screws to detach the MB-1113 board from the four protrusions in the direction of the arrow.



Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 4 above.

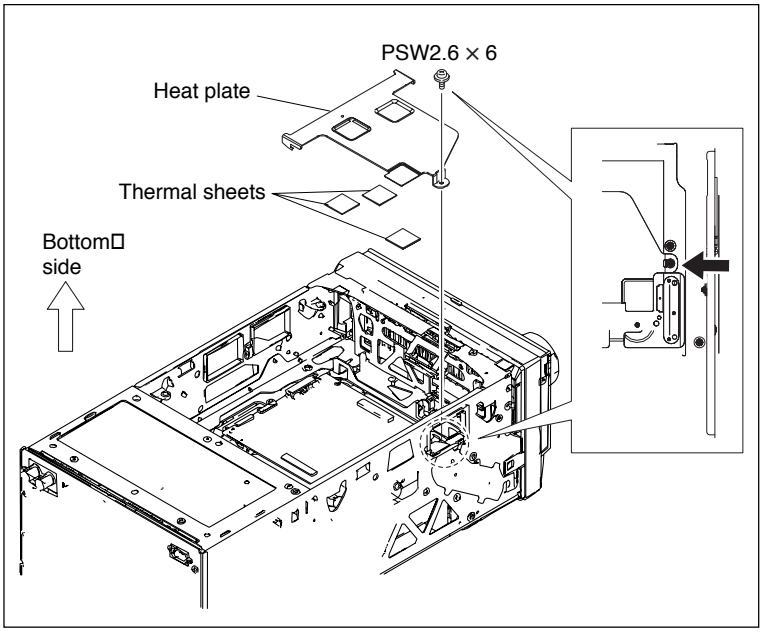
6-12-11. DR-601 Board

Removal

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Detach the IF-1037 board.
   (Refer to Section 6-12-8.)
3. Detach the HPR-23 board.
   (Refer to steps 3 to 8 of Section 6-12-9.)
4. Remove the screw, and remove the heat plate and the three thermal sheets.

   Note

   If the thermal sheet remains attached on the heat plate surface during the course of removing the heat plate, it is not necessary to peel the thermal sheet off the heat plate. Keep it attached.

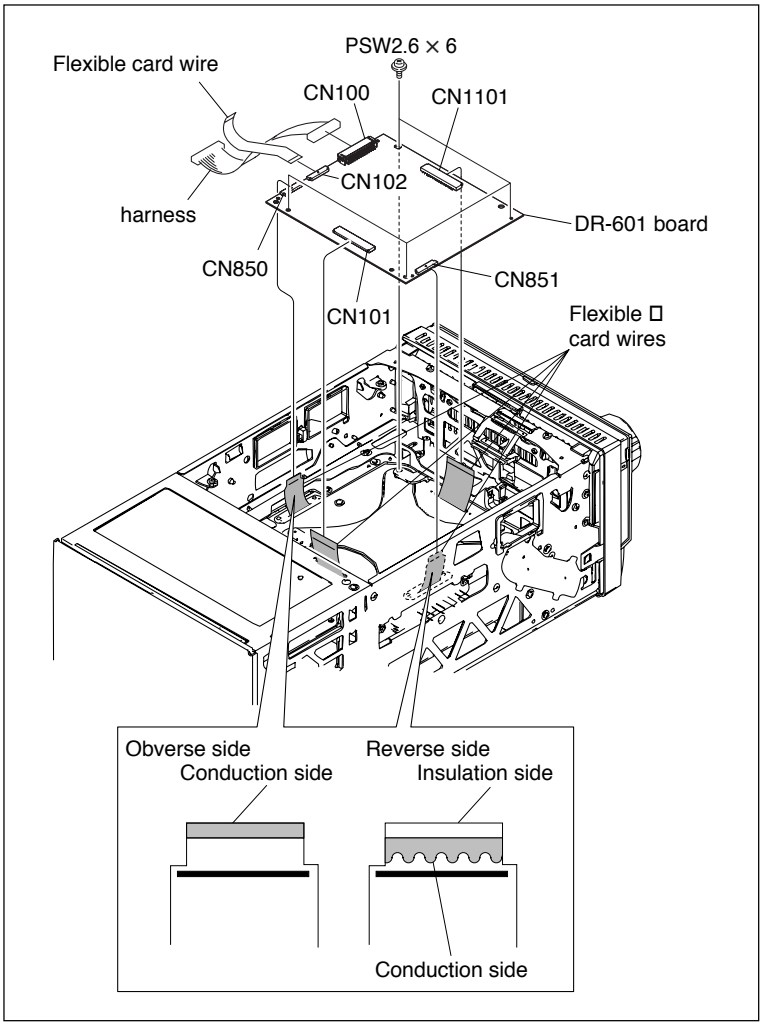


5. Disconnect the harness from the connector CN100, and disconnect the flexible card wires from the connectors CN102, CN850, CN851, CN101 and CN1101 respectively.

   Note

   The flexible card wires connected to CN850 and CN851 of the DR-601 board have a conductive area on both sides, and the tip on the reverse side is insulated. Insert the flexible card wire into the deep end of the connector as far as it will go, and then lock it.

6. Remove the four screws and detach the DR-601 board



Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 6 above.

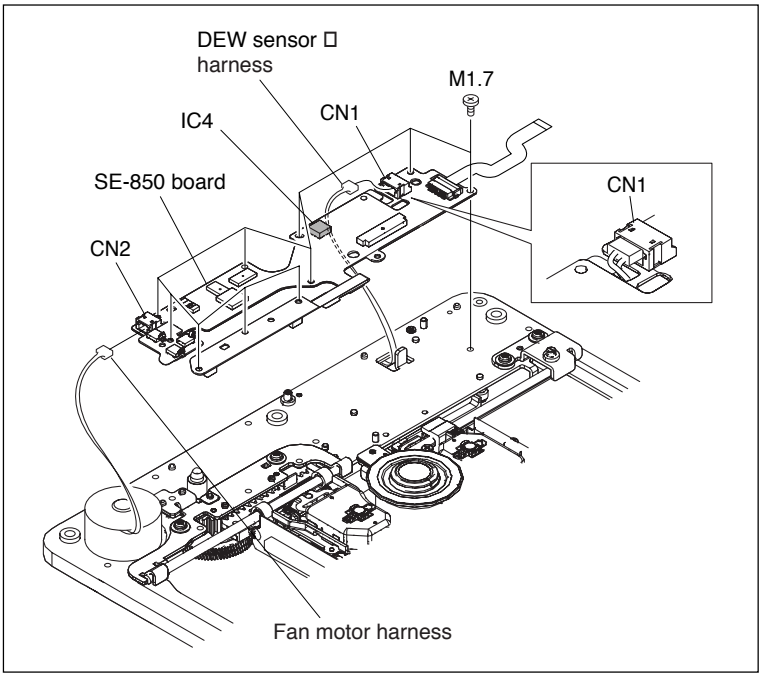
6-12-12. SE-850 Board

Notes

- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-14.)
- The spindle motor and the actuator around the objective lens have a powerful magnet. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If a magnetic substance comes close to these parts, their characteristics may be changed.

Removal

1. Remove the top panel assembly. (Refer to Section 1-4-1.)
2. Remove the stay sub (upper) assembly. (Refer to step 2 of Section 1-5-2.)
3. Remove the top cover (A) assembly. (Refer to steps 3 and 4 of Section 1-5-2.)
4. Remove the loader assembly. (Refer to steps 5 to 8 of Section 1-5-2.)
5. Remove the drive sub assembly. (Refer to Section 6-6.)
6. Disconnect the harnesses from the connectors CN1 and CN2. Remove the ten screws and detach the SE-850 board.



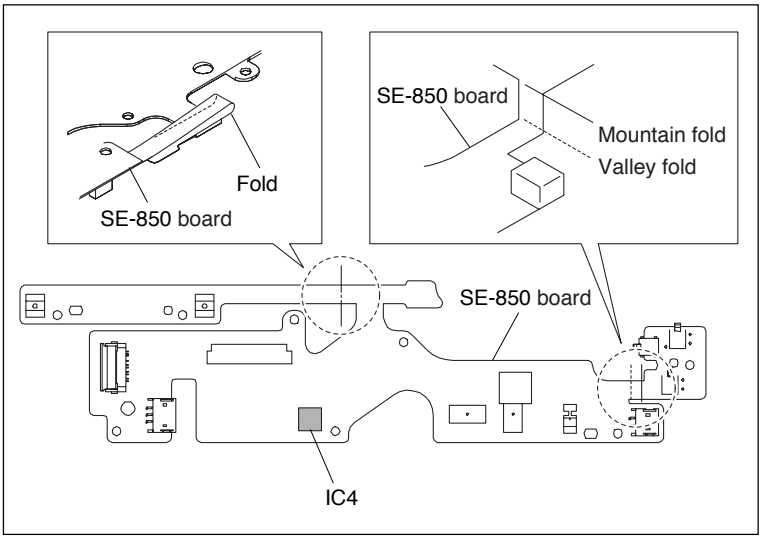
Reinstallation

1. When installing a new SE-850 board, fold it several times as shown in the figure to make creases for maintaining the folded shape.
2. When replacing the SE-850 board, remove IC4 from the old SE-850 board, and mount it on a new SE-850 board.

   Note

   IC4 retains data including adjustment data and hours meter data.

3. Reinstall the removed parts by reversing steps 1 to 6 of removal.
4. Take service action after replacing or repairing the SE-850 board.



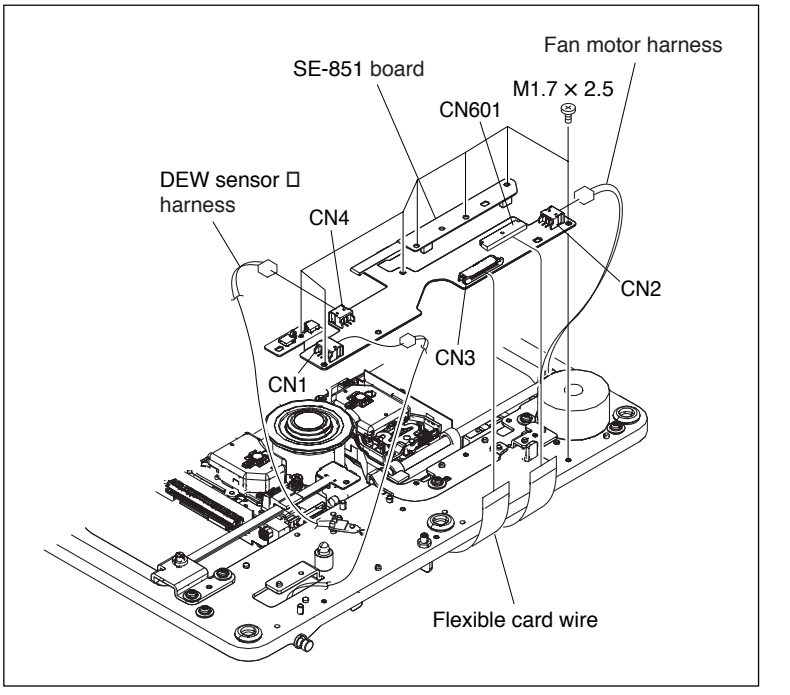
6-12-13. SE-851 Board

Notes

- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-14.)
- The spindle motor and the actuator around the objective lens have a powerful magnet. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If a magnetic substance comes close to these parts, their characteristics may be changed.

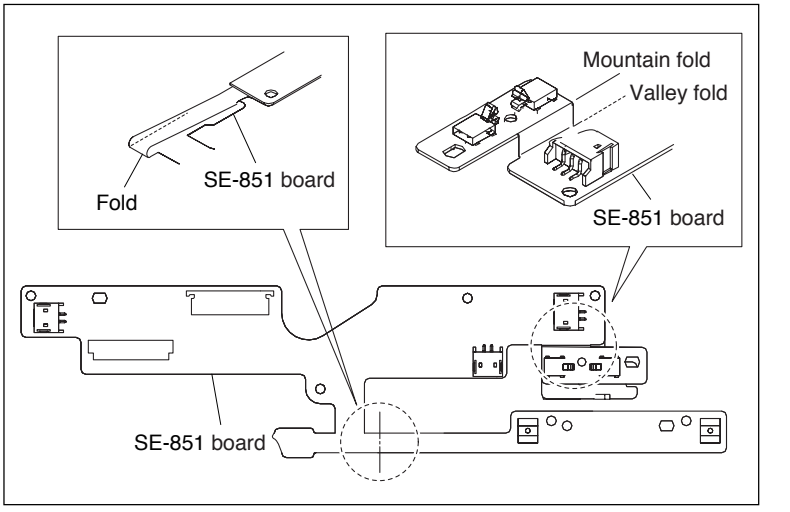
Removal

1. Remove the top panel assembly. (Refer to Section 1-4-1.)
2. Remove the stay sub (upper) assembly. (Refer to step 2 of Section 1-5-2.)
3. Remove the top cover (A) assembly. (Refer to steps 3 and 4 of Section 1-5-2.)
4. Remove the loader assembly. (Refer to steps 5 to 8 of Section 1-5-2.)
5. Disconnect the harnesses from the connectors CN1, CN2 and CN4. Disconnect the flexible card wires from the connectors CN3 and CN601. Remove the seven screws, and remove the SE-851 board.



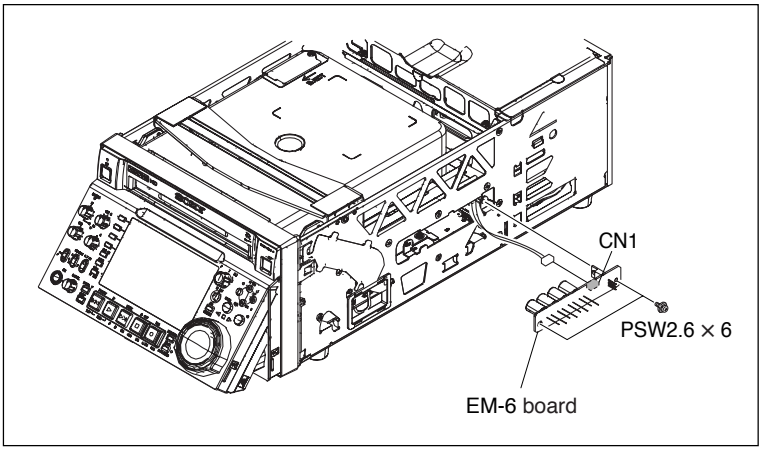
Reinstallation

1. When installing a new SE-851 board, fold it several times as shown in the figure to make creases for maintaining the folded shape.
2. Reinstall the removed parts by reversing steps 1 to 6 of removal.



6-12-14. EM-6 Board

1. Remove the top panel assembly. (Refer to Section 1-4-1.)
2. Remove the two screws. Disconnect the harness from the connector CN1, and detach the EM-6 board.



Reinstallation

1. Reinstall the removed parts by reversing steps of removal.

Section 7
Optical Drive Alignment

7-1. Optical Drive Alignment Overview

7-1-1. Precautions

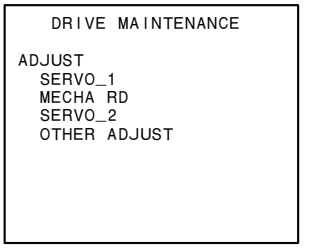
- Be sure to perform each adjustment in order unless any instructions are provided.
- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-14.)
- The spindle motor and the actuator around the objective lens have a powerful magnet. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If a magnetic substance comes close to these parts, their characteristics may be changed.

7-1-2. Fixtures

- Alignment disc (PFD23A-RS)
- Torque driver (for 3 kg)
- Bit for torque driver (M2)
- Flat-blade screwdriver
- Locking compound
- Weight (50 to 100 g)

7-1-3. Preparations Before Adjustment

1. Turn off the power.
2. Remove the top panel. (Refer to Section 1-4-1.)
3. Remove the stay sub (upper) assembly. (Refer to Section 6-3.)
4. Remove the top cover (A) assembly. (Refer to Section 6-3.)
5. Remove the loader (P-200) assembly. (Refer to Section 6-3.)
6. Turn on the power.
7. Display the maintenance menu. (Refer to Section 4-1.)
8. Select "DRIVE (M6)" with rotate the PUSH SET knob or the ↓ button, and press the PUSH SET knob or the SELECT (F2) or the → button.
9. The (D0) DRIVE MAINTENANCE screen appears. Repeat step 8, rotate the PUSH SET knob or the SELECT (F2) button, and press the → button.
10. Press the PUSH SET knob.
11. Select "ADJUST" with rotate the PUSH SET knob or the ↓ button, and press the → button. The ADJUST screen appears.



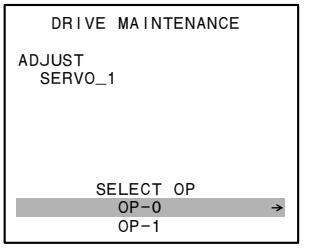
7-2. Servo1 Automatic Adjustment

Fixtures

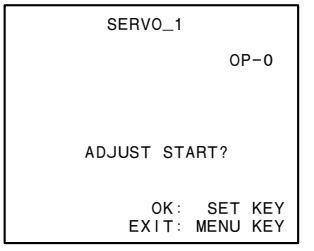
- Alignment disc (PFD23A-RS)
- Weight (50 to 100 g)

Adjustment Procedure

1. Display the adjustment items referring to Section 7-1-3.
2. Select "SERVO_1" with the ↑/↓ button, and press the → button.
3. Select "OP-0" or "OP-1" with the ↑/↓ button, and press the → button.



4. A confirmation screen appears waiting for entry of the SET button.



5. Press the SET button.
   A confirmation screen appears.

```
SERVO_1

                    OP-0

SET ALIGNMENT DISC
PFD23A-RS.


  ADJUST START?

        OK:  SET KEY
      EXIT: MENU KEY
```

6. Open the shutter of the cartridge of the alignment disc using the following procedure.
   Be sure to close it after the adjustment.

Note

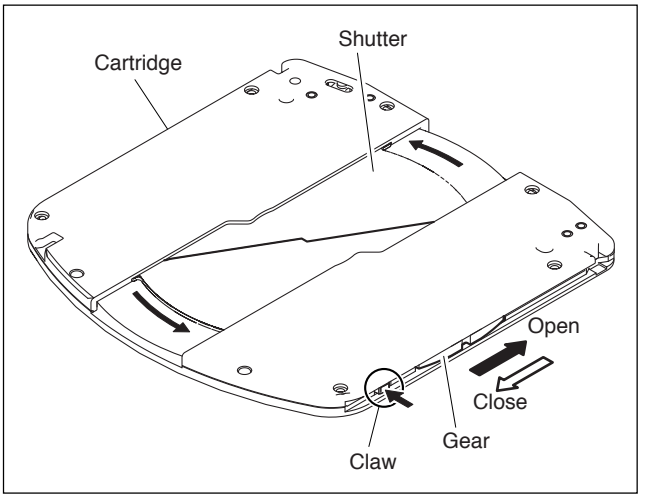
Opening the shutter of the cartridge by hand is limited to the optical drive alignment.
Do not open it for any other purpose or touch the disc in the cartridge.

How to Open

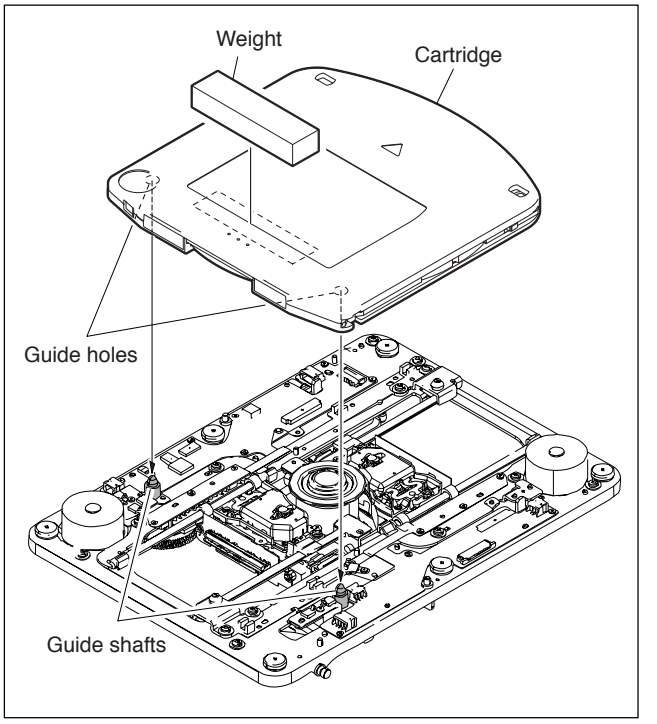
Move the cover in the direction of the arrow while pressing the claw. Then move the gear by hand until the shutter is completely opened.

How to Close

Move the gear and the cover in the direction of the arrow until the shutter is closed and the claw snaps.



7. Set the cartridge with its shutter opened so that its guide holes are aligned with the two guide shafts of the unit.
8. Put the weight on the cartridge.



9. Press the PUSH SET knob.
   The result appears.

```
SERVO_1

                    OP-0

ADJUSTING...COMPLETED




                EXIT: MENU KEY
```

10. When “COMPLETED” appears, press the MENU button.
    The ADJUST screen appears.
11. If necessary, adjust the other OP in the same way.
12. Make the skew adjustment. (Refer to Section 7-3.)

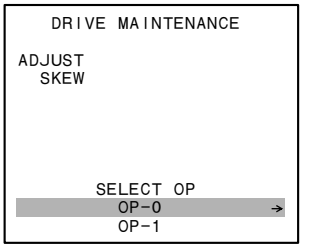
7-3. Skew Adjustment

Fixtures

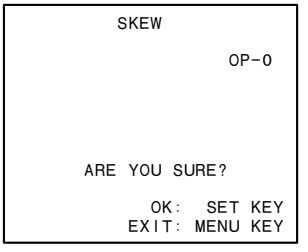
- Alignment disc (PFD23A-RS)
- Flat-blade screwdriver
- Locking compound

7-3-1. Tangential Skew Adjustment

1. Display the adjustment item referring to Section 7-1-3.
2. Select “SKEW” with the [↑]/[↓] button, and press the [→] button.
3. Select “OP-0” or “OP-1” with the [↑]/[↓] button, and press the [→] button.



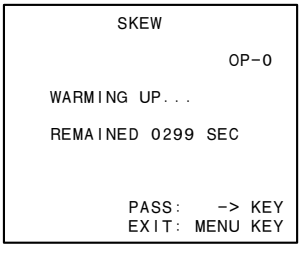
4. A confirmation screen appears waiting for entry of the [SET] button.



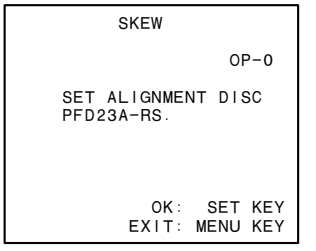
5. Press the [PUSH SET] knob.
   A warm-up screen appears.

   Note

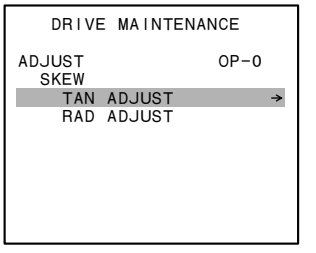
   If five minutes has already passed since power ON, this screen does not appear.



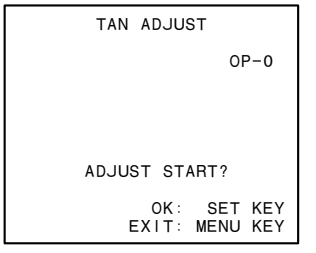
6. A confirmation screen appears when “0000 SEC” is displayed.



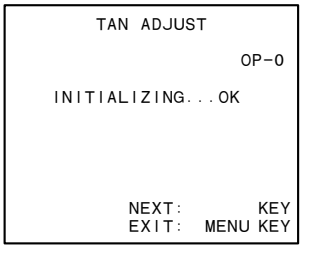
7. Set the alignment disc.
   The skew adjustment selection screen appears.
8. Select “TAN ADJUST” with the [↑]/[↓] button, and press the [→] button.



9. A confirmation screen appears waiting for entry of the [SET] button.



10. Press the [PUSH SET] knob.
    The result appears.

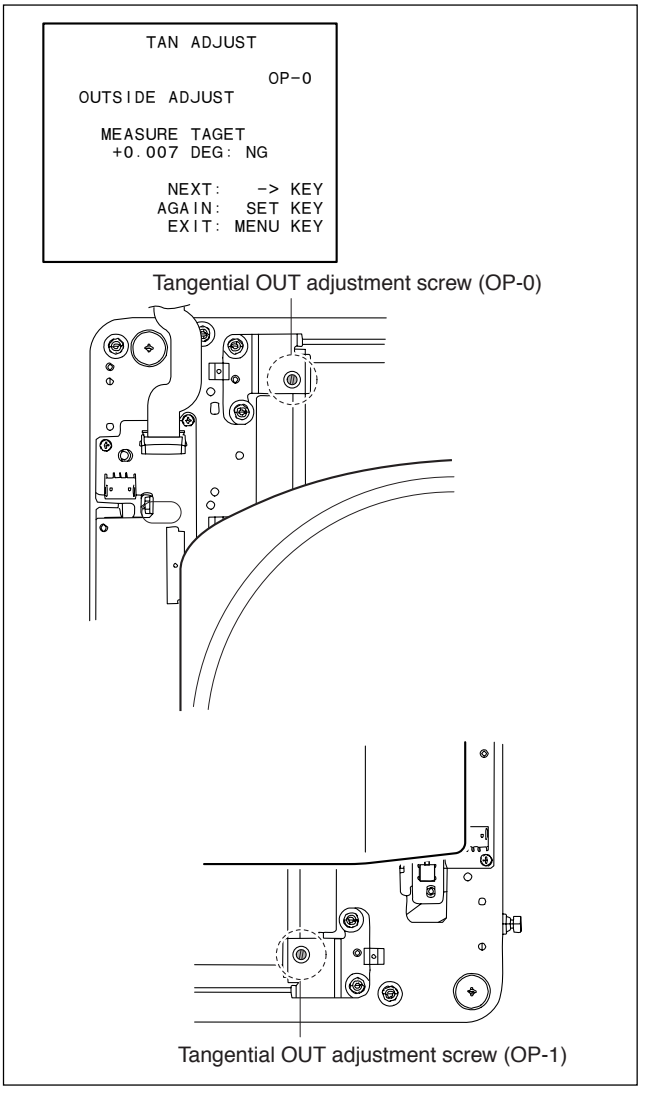


11. Press the [→] button.
    The result on the tangential OUT side appears.
12. If the adjustment failed, turn the tangential OUT adjustment screw.

Notes

- The adjustment screw should be turned clockwise for this adjustment. If they are turned too much, turn them back sufficiently, and turn them clockwise again.
- If measured data is +, turn the adjustment screw clockwise.
- If measured data is −, turn the adjustment screw counterclockwise.

13. Press the [PUSH SET] knob.
    The result on the tangential OUT side appears.
14. Repeat steps 10 to 11 until satisfactory result is obtained.
15. When the result is satisfactory, press the [→] button.

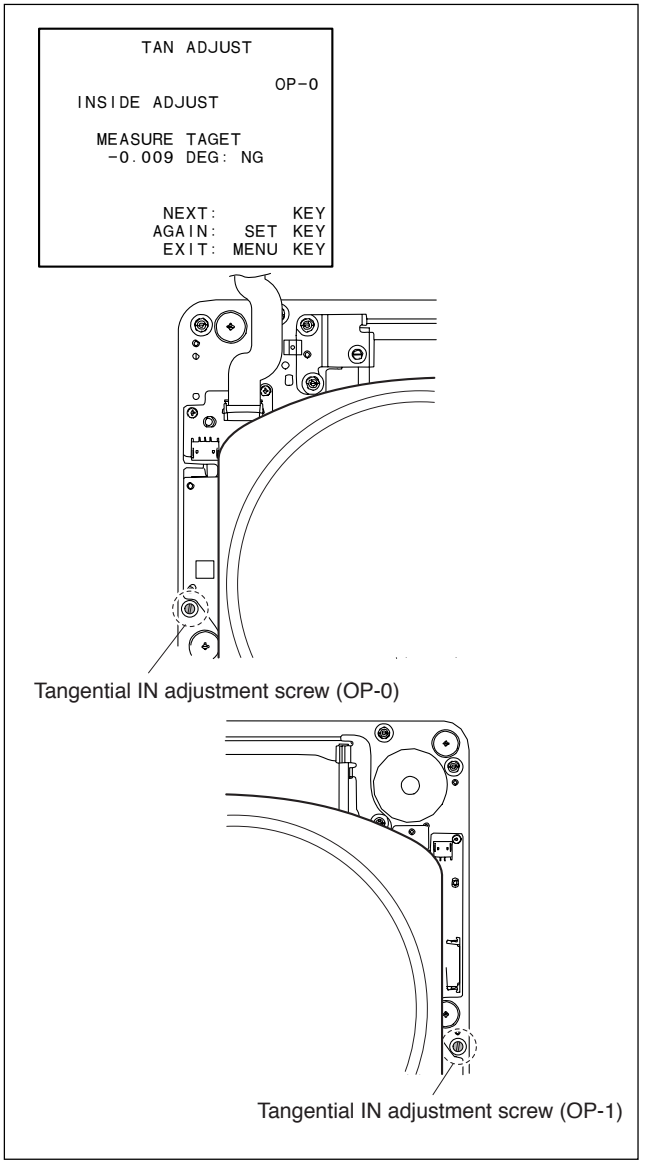


16. The result on the tangential IN side appears.
17. If the adjustment failed, turn the tangential IN adjustment screw.

Notes

- The adjustment screw should be turned clockwise for this adjustment. If they are turned too much, turn them back sufficiently, and turn them clockwise again.
- If measured data is +, turn the adjustment screw counterclockwise.
- If measured data is −, turn the adjustment screw clockwise.

18. Press the [PUSH SET] knob.
    The result on the tangential IN side appears.
19. Repeat steps 15 to 16 until satisfactory result is obtained.
20. When the result is satisfactory, press the [→] button.



21. The tangential skew adjustment result appears.
When "OK" appears, press the MENU button to make radial skew adjustment. (Refer to Section 7-3-2.)
When "ERROR" appears, press the MENU button to make adjustment from step 6.

```
        TAN ADJUST
                      OP-0
        CHECKING...OK



           EXIT: MENU KEY
```

22. If necessary, adjust the other OP in the same way.

7-3-2. Radial Skew Adjustment

1. Select "RAD ADJUST" with the ↑/↓ button, and press the → button.

```
    DRIVE MAINTENANCE

ADJUST                OP-0
  SKEW
    TAN ADJUST
    RAD ADJUST           →
```

2. A confirmation screen appears waiting for entry of the SET button.

```
        RAD ADJUST
                      OP-0


       ADJUST START?

                OK:  SET KEY
              EXIT: MENU KEY
```

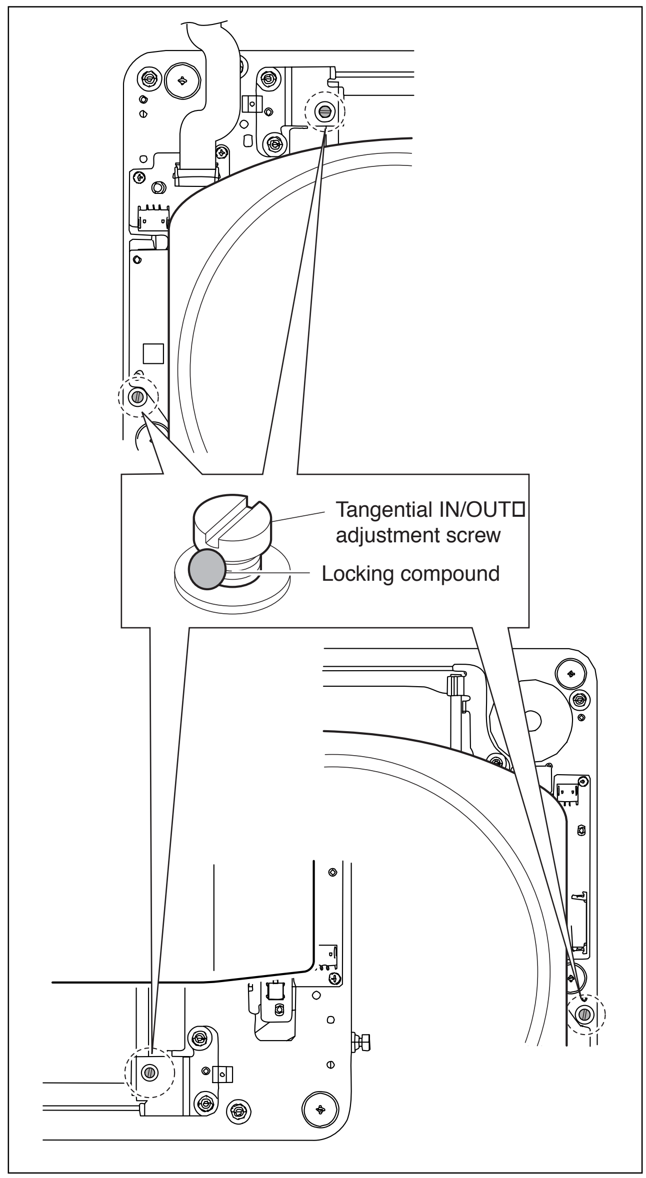
3. Press the PUSH SET knob.
The result appears.

```
        RAD ADJUST
                      OP-0
   ADJUSTING...OK



              EXIT: MENU KEY
```

4. When "COMPLETED" appears, press the MENU button.
5. Press the ← button.
The ADJUST screen appears.
6. Adjust the OP1 in the same way.
7. Press the ← button twice.
8. Remove the cartridge and the weight.
9. Apply locking compound to the screw shown in the figure.

Note

Apply the locking compound to the screw as shown in the figure, being careful not to put it over the head of the screw.



10. Perform the servo2 automatic adjustment.
(Refer to Section 7-4.)

7-4. Servo2 Automatic Adjustment

Note

This adjustment is not available when the loader assembly is removed. Be sure to install the loader assembly before making this adjustment.

1. Clean the loader assembly. (Refer to Section 5-2-2.)
2. Install the loader assembly. (Refer to Section 6-3.)
3. Display the adjustment item referring to Section 7-1-3.
4. Select “SERVO_2” with the [↑]/[↓] button, and press the [→] button.
5. Select “OP-0” or “OP-1” with the [↑]/[↓] button, and press the [→] button.
6. A confirmation screen appears waiting for entry of the [SET] button.

```
SERVO_2

                OP-0



ADJUST START?

      OK:  SET KEY
    EXIT: MENU KEY
```

7. Press the [PUSH SET] knob.
   A confirmation screen appears.

```
SERVO_2

                OP-0

INSERT ALIGNMENT DISC
PFD23A-RS.



        EXIT: MENU KEY
```

8. Set the alignment disc.
   The result appears.

```
SERVO_2

                OP-0

ADJUSTING...COMPLETED



        EXIT: MENU KEY
```

9. “COMPLETED” appears on the screen, and the ADJUST screen appears.
10. If necessary, adjust the other OP in the same way.
11. Press the [←] button to display the drive maintenance menu.
12. Clear the media log. (Refer to Section 7-5.)

7-5. Clearing Media Log

Note

This menu is used to clear acquired media log.
Once this menu is executed, the cleared log data can no longer be restored.

1. Select “OTHERS” with the [↑]/[↓] button, and press the [→] button.
2. Select “CLEAR MEDIA LOG” with the [↑]/[↓] button, and press the [→] button.
3. A confirmation screen appears waiting for entry of the [SET] button.

```
CLEAR MEDIA LOG



ARE YOU SURE?

      OK:  SET KEY
    EXIT: MENU KEY
```

4. Press the [PUSH SET] knob.
   The result appears.

```
CLEAR MEDIA LOG



EXECUTING...COMPLETED

        EXIT: MENU KEY
```

5. Perform the procedure after adjustment.
   (Refer to Section 7-6.)

If failed:

The following message is displayed on the screen.
The EEPROM (IC4/SE-850 board) may be defective.

```
CLEAR MEDIA LOG



EXECUTING...FAILED

        EXIT: MENU KEY
```

7-6. After Adjustment

1. Turn off the power.
2. Attach the top panel. (Refer to Section 1-4-1.)

Section 8
Electrical Alignment

8-1. Electrical Alignment Overview

8-1-1. Precautions

- Be sure to perform the respective adjustments in order shown unless otherwise instructed.
- Do not execute adjustment item of the maintenance menu, and do not change adjustment data unless it is required.
  In case if any adjustment item of the maintenance menu is changed unintentionally, do not save the data, and recover it by turning off the power of the unit.
- Before starting adjustment, it is recommended to make a copy of setup menu conditions.
  The settings can be returned easily to its customer condition after finishing adjustment.
  (Refer to Section 4-3.)

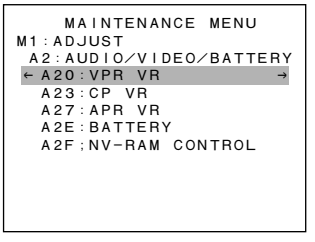
8-1-2. Tools/Fixtures

- Oscilloscope: TEKTRONIX TDS460A or equivalent
- Frequency counter: ADVANTEST TR5821 or equivalent

8-1-3. Displaying the Adjustment Item

Perform the electrical alignment using the adjustment menu of the maintenance mode.
Display the adjustment item as follows.

1. Display the maintenance menu. (Refer to Section 4-1.)
2. Select "ADJUST" using the [↓] button, and press the [→] button.
3. Press the [→] the button.
   The adjustment item appears.



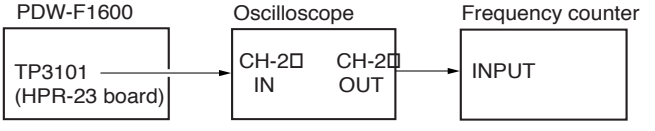
8-2. HD Free-Running Frequency Adjustment

Tools/Fixtures

- Oscilloscope: TEKTRONIX TDS460A or equivalent
- Frequency counter: ADVANTEST TR5821 or equivalent

Preparations

1. Turn off the power of the unit.
2. Remove the bottom panel. (Refer to Section 6-12-8.)
3. Connect an oscilloscope and a frequency counter to the unit.



Connection diagram

4. Turn on the power of the unit and the tools.
   Note
   Apply power to the unit and the tools to allow warm-up of 10 minutes or longer.

5. Set the system of the unit to 59.94i by performing the following steps (1) to (5).
   (1) Press the [MENU] button to display the system menu.
   (2) Select “013: SYSTEM FREQ” rotating the [PUSH SET] knob, and press the [SELECT] button.
   (3) Select “on” using the [+]/[–] buttons, and press the [SET] button.
   (4) Select “1080/59.94i” rotating the [PUSH SET] knob, and press the [SAVE] button.
   (5) Restart the unit.

HD Free-Running Frequency Adjustment

1. Set an oscilloscope as follows:
   CH-2: DC 2 V/DIV
   TIME: 100 µs/DIV
2. Display the adjustment item referring to Section 8-1-3.
3. Select "A23: CP VR" rotating the PUSH SET knob, and press the SELECT button.
4. Select "HD 74 MHz VCO" rotating the PUSH SET knob, and press the SELECT button.
   The HD 74 MHz VCO ADJUST menu appears.

```
MAINTENANCE MENU

HD 74MHz VCO ADJUST
 preset : 80H

          86 (HEX)


 INC/DEC : CTRL.KNOB
 TO MENU :  MENU KEY
```

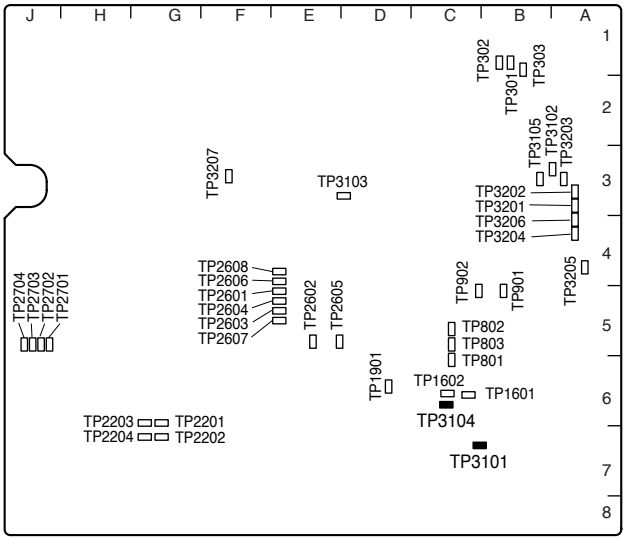
5. Perform the adjustment by rotating the PUSH SET knob so that a frequency counter reading satisfies the specification.
   Measurement Point: TP3101/HPR-23 board (C-7)
   Specification: 74.1758 ±0.0001 MHz
6. Press the MENU button to return to the MENU screen.
7. Press the RETURN button.
8. Select "A2F: NV-RAM CONTROL" rotating the PUSH SET knob, and press the SELECT button.

```
    MAINTENANCE MENU
M1:ADJUST
 A2:AUDIO/VIDEO/BATTERY
  A20:VPR VR
  A23:CP VR
  A27:APR VR
  A2E:BATTERY
  A2F:NV-RAM CONTROL
```

9. Select "SAVE ALL ADJUST DATA" rotating the PUSH SET knob, and press the SET button to save the adjustment data.

```
    MAINTENANCE MENU
     NV-RAM CONTROL

NO OPERATION
SAVE ALL ADJUST DATA
ALL DATA PREVIOUS


     EXECUTE:   SET KEY
     TO MENU:  MENU KEY
```

10. Amend "013: SYSTEM FREQ" to "1080/50i" by referring to "Preparations" paragraph of step 5.
11. Select "A23: CP VR" rotating the PUSH SET knob, and press the SELECT button.
12. Select "HD 74MHz VCO" rotating the PUSH SET knob, and press the SELECT button.
    The HD 74 MHz VCO ADJUST menu appears.
13. Perform the adjustment by rotating the PUSH SET knob so that a frequency counter reading satisfies the specification.
    Measurement Point: TP3101/HPR-23 board (C-7)
    Specification: 74.2500 ±0.0001 MHz
14. Press the MENU button to return to the MENU screen.
15. Press the RETURN button.
16. Select "A2F: NV-RAM CONTROL" rotating the PUSH SET knob, and press the SELECT button.
17. Select "SAVE ALL ADJUST DATA" rotating the PUSH SET knob, and press the SET button to save the adjustment data.
18. Amend "013: SYSTEM FREQ" to the customer's setups by referring to "Preparations" paragraph of step 5.



HPR-23 board (side B)

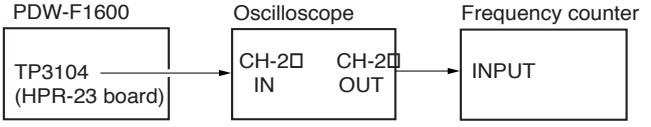
8-3. SD Free-Running Frequency Adjustment

Tools/Fixtures

- Oscilloscope: TEKTRONIX TDS460A or equivalent
- Frequency counter: ADVANTEST TR5821 or equivalent

Preparations

1. Turn off the power of the unit.
2. Remove the bottom panel. (Refer to Section 6-12-8.)
3. Connect an oscilloscope and a frequency counter to the unit.
4. Turn on the power of the unit and the tools



Connection diagram

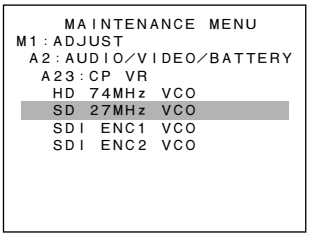
Note

Apply power to the unit and the tools to allow warm-up of 10 minutes or longer.

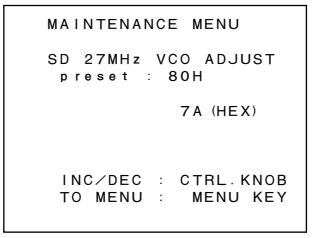
SD Free-Running Frequency Adjustment

1. Set an oscilloscope as follows:
   CH-2: DC 2 V/DIV
   TIME: 100 µs/DIV

2. Display the adjustment item referring to Section 8-1-3.
3. Select "A23: CP VR" rotating the PUSH SET knob, and press the SELECT button.
4. Select "SD 27MHz VCO" rotating the PUSH SET knob, and press the SELECT button.



The SD 27 MHz VCO ADJUST menu appears.



5. Perform the adjustment by rotating the PUSH SET knob so that a frequency counter reading satisfies the specification.
   Measurement Point: TP3104/HPR-23 board (C-6)
   Specification: 27.00000 ±0.00005 MHz

6. Press the MENU button to return to the MENU screen.
7. Press the RETURN button.
8. Select "A2F: NV-RAM CONTROL" rotating the PUSH SET knob, and press the SELECT button.
9. Select "SAVE ALL ADJUST DATA" rotating the PUSH SET knob, and press the SET button to save the adjustment data.

8-4. Video System Alignment/VPR-99 Board

8-4-1. Adjustment Overview

When the VPR-99 board was replaced or repaired, perform the video system alignment.

Notes

- The video system adjustments are required in both the standard mode and the alternative mode. Adjust in the 59.94 Hz mode first, and then adjust in the 50 Hz mode.
- In the video system alignment, be sure to adjust without the extension board.

The adjustments are performed using the menu of the maintenance mode.
As for detail of each menu in the maintenance mode, refer to Section 4.

Tools/Fixtures

The following equipment (or equivalent) and fixtures are required for the VPR-99 board adjustment:

Note

Before starting the adjustment, warm up the VTR and equipment to be used through the power for 30 minutes or more.

Tools/Fixtures	Type	Remarks
Analog composite waveform/vector monitor	Tektronix 1750A	For 59.94 Hz mode
	Tektronix 1751A	For 50 Hz mode
Analog composite video monitor (NTSC/PAL switchable type) **Note** Use this monitor for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 2 (SUPER) connector.		
75 Ω terminators (2 pieces)		

Adjustments

Section	Item	Adjustment point	Remarks
8-4-2	Preparation in 59.94 Hz mode		
8-4-3	Composite video output level adjustment (59.94 Hz Mode)		
		A20: VPR VR : VIDEO OUT LEVEL	VIDEO OUTPUT COMPOSITE
	Data saving	A2F: NV-RAM CONTROL	
8-4-4	Preparation in 50 Hz mode		
8-4-5	Composite video output level adjustment (50 Hz Mode)		
		A20: VPR VR: VIDEO OUT LEVEL	VIDEO OUTPUT COMPOSITE
	Data saving	A2F: NV-RAM CONTROL	
8-4-6	Perfection in 50 Hz mode alignment		

∗: If the specification is not satisfied, change the adjustment data.

8-4-2. Preparation in 59.94 Hz Mode

1. Turn the power off.
2. If the VPR-99 board is extended with an extension board, reattach the VPR-99 board without the extension board.
3. Turn the power on.
4. Set the VTR's switches and function menus as follows:

   Note

   Reset the setups to the customer settings after completing the video system adjustment.

Location Item			Customer setting		Setting at adjustment	Remarks
Function menu page	P1 : VIDEO	VID. PROC	_____	⇨	LOCAL	
		VIDEO	_____	⇨	PRESET	
		CHROMA	_____	⇨	PRESET	
		HUF	_____	⇨	PRESET	
		SETUP	_____	⇨	PRESET	
	HOME	CHAR SEL	_____	⇨	ON	

5. Set the ITEM-713 in the setup extended menu as follows:

   Note

   After completing the video system adjustment in the 59.94 Hz mode, be sure to reset them to the customer settings.

ITEM	SUB-ITEM	Customer setting		Setting at adjustment
713 : VIDEO SETUP REFERENCE	OUTPUT LEVEL	_____	⇨	0.0%

6. Check that the setup extended menu is set as follows: (Refer to the operation manual.)
   ITEM-013 (SYSTEM FREQUENCY SELECT) MENU ⇨ 59.94 Hz mode
   ITEM-930 (DOWN CONVERTER MODE) ⇨ SQUEEZE
7. Set the analog composite monitor to NTSC mode.

8-4-3. Composite Video Output Adjustment (59.94 Hz Mode)

Note

For the composite video output adjustment in the 50 Hz mode, refer to Section 8-4-5.

Tools/Fixtures

- Analog composite waveform monitor: Tektronix 1750A, or equivalent .
- Analog composite video monitor

  Note

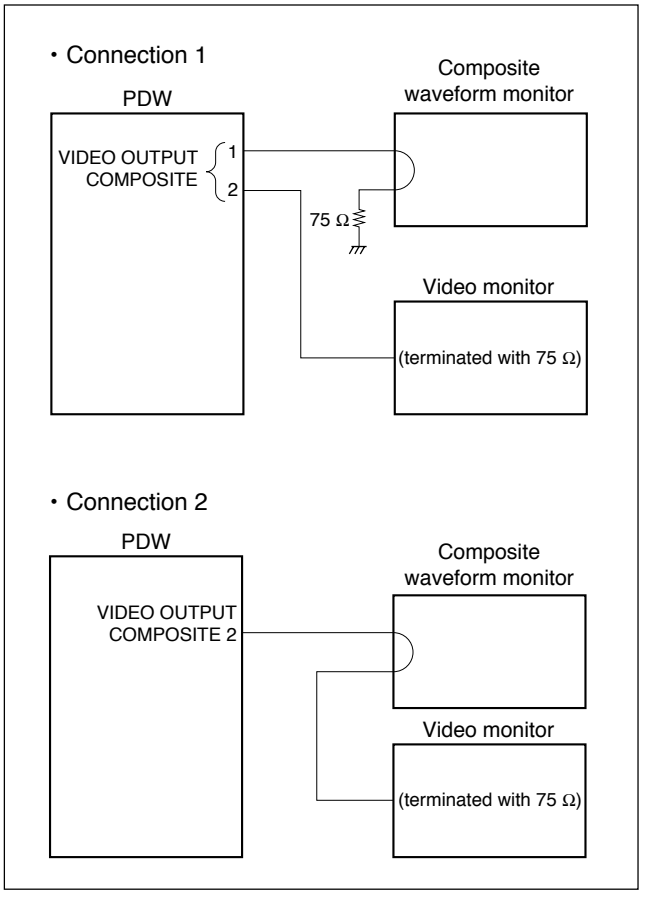
  Use this monitor for menu displaying.
  Be sure to connect it to VIDEO OUTPUT COMPOSITE 2 (SUPER) connector.

- 75 Ω terminator

Preparation

1. Connect the analog composite waveform monitor

Connect the analog composite waveform monitor to VIDEO OUTPUT COMPOSITE 1 connector shown as Connection 1 in the figure “Connections”. (Refer to Connection 1 in the figure “Connections”.)



Connection diagram

2. Check the settings for adjustment

Refer to “8-4-2. Preparation in 59.94 Hz Mode”.

3. Check the equipment has warmed up

Before starting the adjustment, warm up the VTR and equipment through the power for 30 minutes or more.

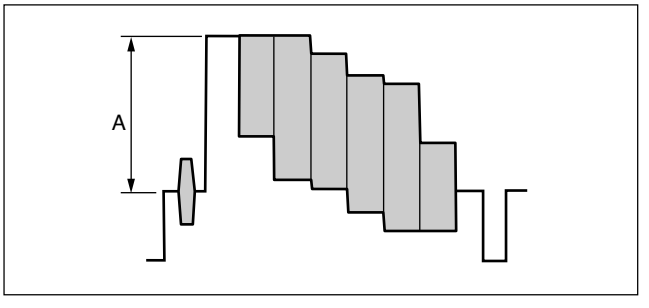
Output Level Adjustment

1. Select the function menu P1: VIDEO. a Press the V. INPUT button for an extended time for switchover from SD SDI to SG. (Default: 75% color bars)
2. Enter the maintenance mode.
3. Select A20: VPR VR as follows:
   Maintenance mode → M1: ADJUST → A2: AUDIO/ VIDEO/BATTERY → A20: VPR VR → VIDEO OUT LEVEL
4. Connect the analog composite waveform monitor to each VIDEO OUTPUT COMPOSITE connector, and check the white peak level. If the signal amplitude A is not within the specification, adjust it.

   Notes

   - The outputs of VIDEO OUTPUT COMPOSITE 1 and 2 connectors cannot be adjusted separately.
   - When checking/adjusting the output of VIDEO OUTPUT COMPOSITE 2 (SUPER) connector, change the connection of the video monitor as Connection 2 on the previous page.
   - The menu picture of the maintenance mode is superimposed in the output of VIDEO OUTPUT COMPOSITE 2 (SUPER) connector. If the superimposed picture obstructs, set the HOME CHAR SEL of function menu page to OFF. (Be sure to reset it to ON after checking/adjusting.)

Output channel	Adjustment point (A20 : VPR VR)	Specification
[Connection 1] COMPOSITE 1 [Connection 2] COMPOSITE 2	VIDEO OUT LEVEL	A = 100 ±1 IRE (A = 714 ±7 mV)



5. To exit A20: VPR VR, press the RETURN button once.

Saving the Data (Saving the adjustment data)

When the adjustment is not performed in step 4, skip over to step 6.

6. Enter A2F: NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the menu screen when this data saving is completed normally.

   Note

   To cancel saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

7. Exit the maintenance mode.

8-4-4. Preparation in 50 Hz Mode

Note

Perform the adjustments in the 50 Hz mode after completing the adjustments in the 59.94 Hz mode without fail.

1. Re-set the SUB-ITEM setting of the ITEM-713 in the setup extended menu to the customer settings. (Refer to Section 8-4-2.)
2. Switch the setting of setup menu to the 50 Hz mode with the setup menu ITEM-013. (Refer to the Operation Manual.)

Setup menu	Mode
ITEM-013 (SYSTEM FREQUENCY SELECT)	⇨ 50 Hz

3. Set the analog composite monitor to the PAL mode.

8-4-5. Composite Video Output Adjustment (50 Hz Mode)

Note

For the composite video output adjustment in the 59.94 Hz mode, refer to Section 8-4-3.

Tools/Fixtures

- Analog composite waveform monitor: Tektronix 1751A, or equivalent .
- Analog composite video monitor

  Note

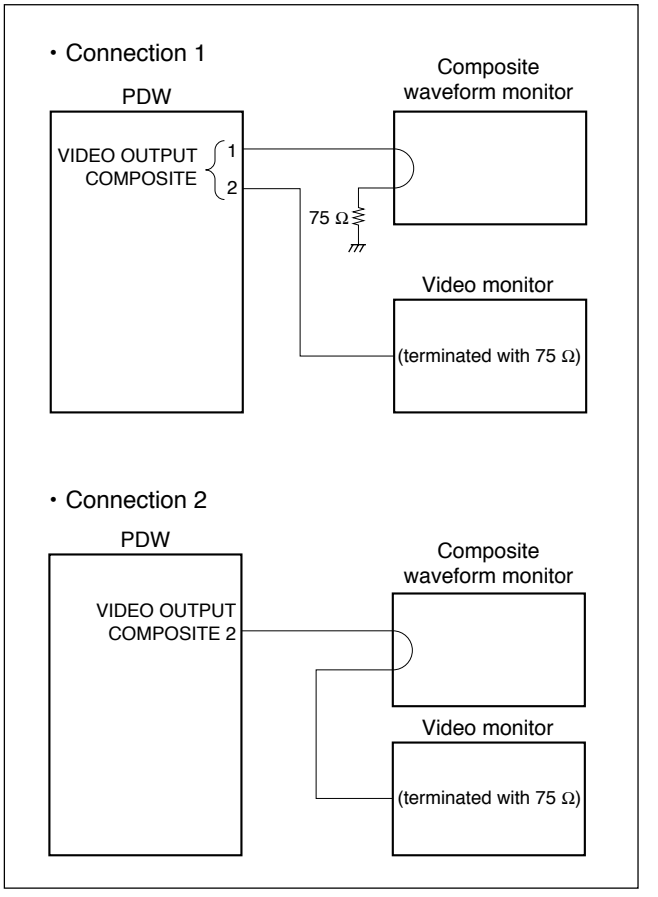
  Use this monitor for menu displaying.
  Be sure to connect it to VIDEO OUTPUT COMPOSITE 2 (SUPER) connector and set it to the PAL mode.

- 75 Ω terminator

Preparation

1. Connect the analog composite waveform monitor

Connect the analog composite waveform monitor to VIDEO OUTPUT COMPOSITE 1 connector shown as Connection 1 in the figure “Connections”. (Refer to Connection 1 in the figure “Connections”.)



Connection diagram

2. Adjustment conditions to be kept from the previous adjustment are;

- Settings for adjustment. (Refer to Section 8-4-2.)
- Warming up of equipment to be used (30 minutes or more).

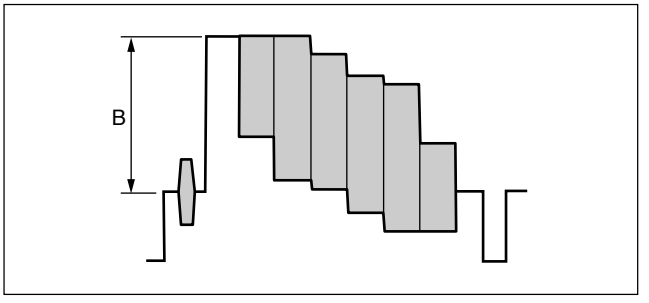
Output Level Adjustment

1. Enter the maintenance mode.
2. Select A20: VPR VR as follows:
   Maintenance mode → M1: ADJUST → A2: AUDIO/VIDEO/BATTERY → A20: VPR VR → VIDEO OUT LEVEL
3. Connect the analog composite waveform monitor to each VIDEO OUTPUT COMPOSITE connector, then check the white peak level. If the signal amplitude A is not within the specification, adjust it.

   Notes

   - The outputs of VIDEO OUTPUT COMPOSITE 1 and 2 connectors cannot be adjusted separately.
   - When checking/adjusting the output of VIDEO OUTPUT COMPOSITE 2 (SUPER) connector, change the connection of the video monitor as Connection 2 on the previous page.
   - The menu picture of the maintenance mode is superimposed in the output of VIDEO OUTPUT COMPOSITE 2 (SUPER) connector. If the superimposed picture obstructs, set the HOME CHAR SEL of function menu page to OFF. (Be sure to reset it to ON after checking/adjusting.)

Output channel	Adjustment point (A20 : VPR VR)	Specification
[Connection 1] COMPOSITE 1 [Connection 2] COMPOSITE 2	VIDEO OUT LEVEL	B = 700 ±7 mV



4. To exit A20: VPR VR, press the RETURN button once.

Saving the Data (Saving the adjustment data)

When the adjustment is not performed in step 3, skip over to step 5.

5. Enter A2F: NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   • Message "Save Complete" will be displayed on the menu screen when this data saving is completed normally.

   Note

   To cancel saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

6. Exit the maintenance mode.

8-4-6. Perfection in 50 Hz Mode Alignment

1. Switch the operation mode to the standard mode with the setup menu ITEM-013.

Setup menu	Mode
ITEM-013 (SYSTEM FREQUENCY SELECT)	⇨ 59.94 Hz

2. Reset the switches and function menu settings to the customer setting. (Refer to Section 8-4-2.)

8-5. SDI Output System Adjustment

8-5-1. Adjustment Overview

In the electrical adjustments for the SDI output, adjust each VCO free-running frequency for the encoders using the menu in the maintenance mode.

Note

For detail of each menu in the maintenance mode, refer to Section 4.

Tools/Fixtures

To perform the electrical adjustments for the SDI output lines, prepare the following equipment (or equivalent) and fixtures.

Note

The manual adjustment is not needed when the automatic adjustment can be is performed in the VTR.

• Analog composite video monitor

Note

This video monitor is for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 2 (SUPER) connector.

Adjustments

Since following adjustment items can be adjusted independently of each other, no special order has been observed.

Line	Item	Adjustment point
SDI output	Encoder VCO free-running freq. adjustment	SDI ENC1 VCO SDI ENC2 VCO
	Data saving	A2F : NV-RAM CONTROL

8-5-2. VCO Free-running Frequency Automatic Adjustment

Tools/Fixtures

- Analog composite video monitor

  Note

  This video monitor is for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 2 (SUPER) connector.

Preparation

1. Check the setting of the function menu

HOME F5 (CHAR SEL) ⇨ ON

2. Check that the VTR has warmed up

Before starting the adjustment, warm up the VTR through the power for 10 minutes or more.

Automatic Adjustment

1. Enter the maintenance mode.
2. Enter A23: CP VR as follows:
   Maintenance mode → M1: ADJUST → A2: AUDIO/VIDEO/BATTERY → A23: CP VR
3. Enter the specified sub menu SDI ENC1 VCO and SDI ENC2 VCO.
4. To execute the automatic adjustment, press the SHIFT button.
   - The displayed message on the menu screen changes to “Auto”. The displayed data value also changes.
5. Confirm the automatic adjustment completion on the menu screen.
   - The adjustment data on the display is fixed and will not change any more when the automatic adjustment is completed.
6. To exit the sub menu, press the RETURN button once.

   Note

   Return to step 3 in order to perform the other VCO freerunning frequency adjustment.

7. To exit A23 : CP VR, press the RETURN button once.

Saving the Data (Saving the adjustment data)

Note

If the automatic adjustment was not completed normally, do not save the adjustment data and execute “ALL DATA PREVIOUS”.

8. Enter A2F: NV-RAM CONTROL, then execute “SAVE ALL ADJUST DATA”.
   - Message “Save Complete” will be displayed on the menu screen when this data save is completed normally.

   Note

   When you want to load the previous data without saving the current adjusted data, execute “ALL DATA PREVIOUS”.

9. Exit the maintenance mode.

For Automatic Adjustment Failure

When the sub menu SDI ENC1 VCO or SDI ENC2 VCO fails:

The VPR-99 board is considered to be defective.

8-6. Audio System Adjustment

8-6-1. Adjustment Overview

Tools/Fixtures

Audio analyzer*1
  Audio Precision System One or System Two
  Tektronix AA501A-option 02
Audio signal generator
  Tektronix SG5010
  Agilent Technologies HP339A
  Or equivalent product
Audio level meter
  Agilent Technologies HP3400A
  Meguro Electronics MN-446
  Or equivalent product

*1: The audio analyzer should be filtered through 80 kHz LPF throughout adjustment.

Preparation

1. Turn on the power of the unit and the tools.
   Note
   Apply power to the unit and the tools to allow warm-up of 10 minutes or longer.

2. Set the VARIABLE switch to PRESET.
3. Select the maintenance menu M370 and set the HEADROOM to −20 dB.
4. Select the maintenance menu M373 and set the input level of all channels to +4 dB.
5. Select the maintenance menu M377 and set the output level to +4 dB.
   After completing the audio system adjustment, be sure to reset the above settings to the customer settings.

8-6-2. Analog Audio Output System Adjustment

1. Select the setup menu 808 and set the INTERNAL AUDIO SIGNAL GENERATOR to 1 kHz sine.
2. P2: AUDIO of the function menu → Press the A1 INPUT SEL button for a few seconds to start the SG (internal test signal generator).
3. Select CH-1 for the AUDIO MONITOR L-channel. Select CH-2 for the AUDIO MONITOR R-channel.

Channel-1 Adjustment

4. Connect an audio level meter or audio analyzer input to the ANALOG AUDIO OUTPUT CH-1 connector.
5. Launch the maintenance menu.
6. Select M1: ADJUST.
7. Select A27: APR VR.
8. Select A272: OUTPU UNITY.
9. Select OUTPUT LEVEL CH1.
10. Check that the audio output level conforms to the specification shown below on the audio level meter or audio analyzer. If not, adjust the setting value using the PUSH SET knob on the OUT CH1 UNITY ADJUST screen.
    Specification: +4.0 ±0.1 dBu (across 600 Ω load).
11. When the channel-1 adjustment is complete by step 10, press RETURN to return to the A272: OUTPUT UNITY screen.

Channel-2 Adjustment

12. Connect an audio level meter or audio analyzer input to the ANALOG AUDIO OUTPUT CH-2 connector.
13. Select A272: OUTPUT UNITY and select OUTPUT LEVEL CH2.
14. Check that the audio output level conforms to the specification shown below on the audio level meter or audio analyzer. If not, adjust the setting value using the PUSH SET knob on the OUT CH2 UNITY ADJUST screen.
    Specification: +4.0 ±0.1 dBu (across 600 Ω load).
15. When the channel-2 adjustment is complete by step 14, press RETURN to return to the A272: OUTPUT UNITY screen.

MONITOR L-Channel Adjustment

16. Connect an audio level meter or audio analyzer input to the AUDIO MONITOR L-CH connector.
17. Select A272: OUTPUT UNITY and select MONITOR LEVEL L-CH.
18. Check that the audio output level conforms to the specification shown below on the audio level meter or audio analyzer. If not, adjust the setting value using the PUSH SET knob on the MONITOR L UNITY ADJUST screen.
    Specification: +4.0 ±0.1 dBu (across 600 Ω load).
19. When the L-channel adjustment is complete by step 18, press RETURN to return to the A272: OUTPUT UNITY screen.

MONITOR R-Channel Adjustment

20. Connect an audio level meter or audio analyzer input to the AUDIO MONITOR R-CH connector.
21. Select A272: OUTPUT UNITY and select MONITOR LEVEL R-CH.
22. Check that the audio output level conforms to the specification shown below on the audio level meter or audio analyzer. If not, adjust the setting value using the PUSH SET knob on the MONITOR R UNITY ADJUST screen.
    Specification: +4.0 ±0.1 dBu (across 600 Ω load).
23. When the R-channel adjustment is complete by step 22, press RETURN to return to the A272: OUTPUT UNITY screen.
24. Press RETURN twice to return to the A2: AUDIO/VIDEO/BATTERY screen.

Saving the Data (Saving the adjustment data)

25. On the A2: AUDIO/VIDEO/BATTERY screen, select A2F: NV-RAM CONTROL.
26. Select SAVE ALL ADJUST DATA using the multi-function dial, and press the SET button to save the adjustment data.

    Note

    Message "Save Complete" will be displayed on the menu screen when this data save is completed normally.
27. Return the new setting to the original setting.

8-6-3. Analog Audio Input System Adjustment

Note

Before starting the adjustment, perform the "8-6-2. Analog Audio Output System Adjustment".

Channel-1 Adjustment

1. Select ANALOG (analog audio signal) on the A1 INPUT of the function menu.
2. Connect an audio signal generator output to the ANALOG AUDIO INPUT CH-1 connector.
3. Connect an audio level meter or audio analyzer input to the ANALOG AUDIO OUTPUT CH-1 connector.
4. Set the audio signal generator output to 1 kHz, +4 dBu.
5. Launch the maintenance menu.
6. Select M1: ADJUST.
7. Select A27: APR VR.
8. Select A271: INPUT UNITY.
9. Select INPUT LEVEL CH1.
10. Check that the audio output level conforms to the specification shown below on the audio level meter or audio analyzer. If not, adjust the setting value using the PUSH SET knob on the IN CH1 UNITY ADJUST screen.
    Specification: +4.0 ±0.1 dBu (across 600 Ω load).
11. When the channel-1 adjustment is complete by step 10, press RETURN to return to the A271: INPUT UNITY screen.

Channel-2 Adjustment

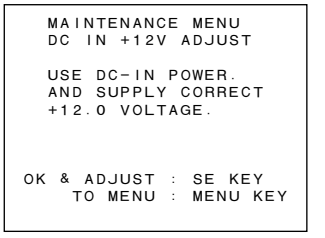
12. Select ANALOG (analog audio signal) on the A2 INPUT of the function menu.
13. Connect an audio signal generator output to the ANALOG AUDIO INPUT CH-2 connector.
14. Connect an audio level meter or audio analyzer input to the ANALOG AUDIO OUTPUT CH-2 connector.
15. Select INPUT LEVEL CH2 from the A271: INPUT UNITY screen.
16. Check that the audio output level conforms to the specification shown below on the audio level meter or audio analyzer. If not, adjust the setting value using the PUSH SET knob on the IN CH2 UNITY ADJUST screen.
    Specification: +4.0 ±0.1 dBu (across 600 Ω load).
17. When the channel-2 adjustment is complete by step 16, press RETURN to return to the A271: INPUT UNITY screen.
18. Press RETURN twice to return to the A2: AUDIO/VIDEO/BATTERY screen.

Saving the Data (Saving the adjustment data)

19. Select the A2: AUDIO/VIDEO/BATTERY screen and select A2F: NV-RAM CONTROL.
20. Select SAVE ALL ADJUST DATA using the multi-function dial, and press the SET button to save the adjustment data.
    Message “Save Complete” will be displayed on the menu screen when this data save is completed normally.
21. Return the new setting to the original setting.

8-7. DC-IN +12 V Adjustment

1. Enter the maintenance menu.
2. Select the following items in order from the top.
   [M1: ADJUST]
   →[A2: AUDIO/VIDEO/BATTERY]
   → [A2E: BATTERY]
   →[DC-IN +12 V]



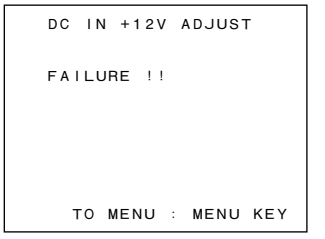
3. Press the SET button.
   Adjustment is executed automatically. When the adjustment is completed, the message “COMPLETE!” is displayed.

Note

When the AC power supply or battery pack is used, the message “FAILURE! !” is displayed and the adjustment is canceled.

If failed

The following screen appears.



Section 9
Circuit Description

This section describes circuits of the following categories. The overall block diagrams will help you understand the circuits well.

1. Video signal processing system
2. Audio signal processing system
3. Sync signal processing system
4. System control system
5. I/O interfaces, network processing system
6. Optical drive system

1. Video Signal Processing System

Recording System

HDSDI input

The SD/HDSDI signal input from the HDSDI INPUT connector is input into the connector (CN500) of the RX-93 board on the VPR-99 board and equalized (IC500). Then, the serial/parallel conversion is performed by FPGA (IC300) to the signal is separated into the video signal and audio signal and extracted.
The ANC data (LTC, VITC, UMID, essence mark) is read and sent to the HPR-23 board via the VPR-99 board.

The HD digital video signal sent to the HPR-23 board is sent to VAX (IC206) and then sent to LVIS (IC501) after various input systems are detected.
At LVIS, the HD digital video signals are divided into the one that is sent to the ENC-107 board as the record signal process system and the one that is returned to VAX again as the video output system of the E-E image.
On the ENC-107 board, the amount of encoding is estimated as the pre-encoding processing by the MPEG HD encoder TORINO (IC201) and the encoding and compression processes are performed by the TORINO (IC401, 601) based on the estimated value.
The digital encoded and compressed stream signal is sent to PIER (IC2103) on the HPR-23 board to be written into the PIER SDRAM.

In addition, the signals are down-converted inside LVIS and divided into the one that is returned to VAX again as the video output signal and the one for creating the proxy video data in LVIS. The encoded and compressed proxy video data is sent to PIER to be written into the PIER SDRAM.

SDSDI input

The SDSDI signal input from the SD/HDSDI INPUT connector is routed to the connector (CN500) of the RX-93 board on the VPR-99 board and equalized (IC500). Then, the serial/parallel conversion is performed by FPGA (IC300).
The ANC data (LTC, VITC, UMID, essence mark) is read and sent to the HPR-23 board via the VPR-99 board.
The SD digital video signal sent to the HPR-23 board is routed to VAX (IC206) where various input systems are detected, and is separated into the video signal and audio signal and extracted. They the SD digital video signal is sent to LVIS (IC501).
When recording format is HD (HD422, HD420), the SD digital video signal is up-converted inside LVIS, and is divided into the one that is sent to the ENC-107 board for the record signal process system and the one that is returned to VAX again as the video output system of the E-E image.
On the ENC-107 board, the amount of encoding is estimated as the pre-encoding processing by the MPEG HD encoder TORINO (IC201) and the encoding and compression processes are performed by the TORINO (IC401, 601) based on the estimated value.
The digital encoded and compressed stream signal is sent to PIER (IC2103) on the HPR-23 board and is written into the PIER SDRAM.

When recording format is IMX, the SD digital video signal is divided inside LVIS into the one that is sent to the ENC-107 board for the record signal process system and the one that is returned to VAX again as the HD video output system of the E-E image after up-conversion.
On the ENC-107 board, the encoding and compression processes are performed by the MPEG IMX encoder MIKE (IC1202).
The digital encoded and compressed stream signal is sent to PIER (IC2103) on the HPR-23 board and is written into the PIER SDRAM.

When recording format is DVCAM, the digital video signal is divided inside LVIS into the one that is sent to the internal DVCAM encode processing block and the one that is returned to VAX again as the HD video output system of the E-E image after up-conversion.
The digital stream signal that is encoded and compressed by the DVCAM encode processing block inside LVIS is sent to PIER (IC2103) on the HPR-23 board and is written into the PIER SDRAM.

In addition, the SD digital video signal that is input to LVIS is divided regardless of the recording format, into the one that is returned to VAX again as the SD video output signal of E-E image and the one for creating the proxy video data in LVIS. The proxy video data that is encoded and compressed inside LVIS is sent to PIER to be written into the PIER SDRAM.

i.LINK input (FAM)

The record digital data input from the i.LINK connector (CN1) on the NET-4 board is sent from the connector (CN100) to the connector (CN2) of the IF-1073 board on the HPR-23 board via the harness. Then, the record digital data is sent to the FAM Accelerator (IC1201) of the HPR-23 board via i.LINK PHY (IC1). After that, it is sent to PIER through the PCI BUS to be written into the PIER SDRAM.

Network input

The record digital data input from the network connector (CN2) on the NET-4 board is converted into the parallel data by the Ethernet interface IC (IC1300). Then, it is sent to PIER via the PCI bridge in the PHOT (IC801) on the HPR-23 board through the PCI BUS controlled by the LINUX CPU (IC1) to be written into the PIER SDRAM.

When recording to a disc, the PIER SDRAM data is sent to the drive block through the ATA66 interface.
In addition, the proxy video data needs to be created for the i.LINK input and the network input, so the record video data of the PIER SDRAM is sent from PIER to the ENC-107 board and decoded by the MPEG HD decoder TORINO (IC801, 1001), and then sent to LVIS on the HPR-23 board.
The proxy video data created by being down-converted, decoded and compressed in LVIS is sent back to PIER and then written into the PIER SDRAM.

Playback System

The playback video/audio data and the playback proxy video/audio data are sent from the drive block through the ATA66 interface to PIER (IC2103) on the HPR-23 board to be written into the PIER SDRAM.

The playback video data of the PIER SDRAM is, when it is the HD format (HD422, HD420), sent to the ENC-107 board from the PIER, decoded into the HD playback video signal by the MPEG HD decoder TORINO (IC801, IC1001) and is sent to LVIS (IC501) on the HPR-23 board as the HD playback video signal.
When the playback video data is IMX format (HD422, HD420), the signal is sent from PIER to the ENC-107 board in the same manner as the HD format signal. The signal is decoded into the SD playback video signal by the MPEG HD decoder TORINO (IC801, IC1001) and is sent to LVIS (IC501) on the HPR-23 board.
When the playback video data is DVCAM format, the signal is directly sent to LVIS (IC501) from PIER and is decoded into the SD playback video signal by the DVCAM decoder process block inside LVIS.

Because the proxy video data is used as the video data during the SEARCH operation, it is sent from PIER SDRAM to LVIS via PIER. The proxy video data receives the decode processing inside the LVIS, up-converted to the HD playback video signal.

HDSDI output

The HD playback video signal and the HD playback video signal that is up-converted by SD playback video signal inside LVIS are sent to VAX (IC206) after the OSD screen with GUI display is switched and the HD Video Process is performed in LVIS. After a part of the ANC data is written at this point, the HD playback video signal is sent to the RX-93 board on the VPR-99 board with the audio signal.
After characters for superimposing are added in the FPGA (IC300) on the RX-93 board, and the video signal, audio signal, and the ANC data (LTC, VITC, UMID, essence mark) are multiplexed, the HD playback video signal undergoes serial/parallel conversion and output from the RX-93 board connector (CN502, 503) as the 1.5 Gbps HDSDI signal, and then output to the outside from the HDSDI OUTPUT connector on the rear.

LCD monitor output

The HD playback video signal is output from LVIS to VAX, in which characters for superimposing are added. The signal undergoes pixel conversion to fit for the resolution to be displayed on the LCD monitor. Then, it is sent to the Graphic Controller on the KY-624 board through the harness from the connector (CN1) and displayed on the LCD monitor.

SDSDI/composite output

The HD playback video signal and the SD playback video signal that is down-converted by HD playback video signal inside LVIS are sent to VAX as the SD playback video signal after it is down-converted inside LVIS and the SD Process processing is performed. After a part of the ANC data is written at this point, the SD playback video signal is sent to LUNA (IC100) on the VPR-99 board with the audio signal. After characters for superimposing are added in LUNA and the video signal, audio signal, and the ANC data are multiplexed, the SD playback video signal undergoes serial/parallel conversion and output to the outside from the SDSDI OUTPUT connector (CN3, 4).
The SD playback video signal that is sent from LUNA to the video encoder (IC300) is encoded into the composite video signal and output to the outside from the COMPOSITE OUTPUT connector (CN5).

i.LINK output

The PIER SDRAM playback video data and the playback proxy video data are sent from PIER to the FAM Accelerator (IC1201) through the PCI BUS. Then, the playback video data are sent from the connector (CN2) through the harness to the connector (CN100) of the NET-4 board via the i.LINK PHY (IC1) of the IF-1073 board on the HPR-23 board.

Network output

The PIER SDRAM playback video data and the playback proxy video data are sent from PIER to the Ethernet interface IC (IC1300) on the NET-4 board through the PCI bus via the PCI bridge inside PHOT (IC801). Then, the playback video data is converted into the bit stream by the Ethernet interface IC and output from the network connector (CN2).

2. Audio Signal Processing System

Recording System

Analog audio input

The analog audio signals input from the AUDIO INPUT connector (CN100, CN200/AU-311 board) are converted into the serial digital audio signals (2-channel) in the audio A/D converter (IC108) on the AU-311 board, and then input into the FPGA (hereafter called VAX: IC206) on the HPR-23 board.

Digital audio (AES/EBU) input

The serial digital audio signals (4-channel) input from the AES/EBU INPUT connector (CN1, CN2/VPR-99 board) are level-converted by the line receiver (IC601/VPR-99 board), and then input into VAX on the HPR-23 board. After the serial digital audio signals are decoded in VAX, they are processed as the AES/EBU input signals when extension menu 815 is turned off.
On the other hand, when extension menu 815 is turned on, the signal processed by the sampling rate converter (IC1602, IC1603/HPR-23 board) is selected in VAX and processed as the AES/EBU input signal.

SDSDI/HDSDI input

The digital audio signal included in the SD/HDSDI signal input from the HDSDI INPUT connector (CN500/RX-93 board) is separated and extracted on the RX-93 board and then input into VAX via the CN100/VPR-99 board and the CN31/VPR-99 board. The digital audio signal is separated and extracted in VAX in case of SDSDI input.

The above input signals input into VAX are selected with the AUDIO INPUT SEL button on the front panel for each recording channel, multiplexed and sent to REC AUDIO DSP (IC1701, IC1702/HPR-23 board). The REC AUDIO DSP (IC1701, IC1702/HPR-23 board) performs signal processing, such as delay processing, recording level control, and muting, and then sends the signal back to VAX as the digital audio signal for recording. The returned data is multiplexed and sent from VAX to PIER (IC2103/HPR-23 board) as the digital audio signal for recording to be written into the PIER SDRAM (IC2302 to IC2305).
The proxy audio data for recording is compressed in the PROXY AUDIO DSP (IC2001, IC2002) based on the digital audio signal for recording of the PIER SDRAM (IC2302 to IC 2305) to be written into the PIER SDRAM (IC2302 to IC 2305) as the proxy audio data for recording.

FAM input

The record digital data input from the i.LINK connector (CN1) on the NET-4 board is sent from the connector (CN100) to the connector (CN2) of the IF-1073 board on the HPR-23 board via the harness. Then, the record digital data is sent to the FAM Accelerator (IC1201) on the HPR-23 board via iLINK PHY (IC1/IF-1073 board). After that, it is sent to PIER through the PCI BUS to be written into PIER SDRAM (IC2302 to IC2305).
When recording to a disc, the PIER SDRAM data is sent to the disc drive block through the ATA66 interface (CN2101/HPR-23 board).

Network input

The record digital data input from the network connector (CN2) on the NET-4 board is converted into the parallel data by the Ethernet interface IC (IC1300). Then, being controlled by the LINUX CPU (IC1), the parallel data is sent to PIER via the PCI bridge in the PHOT (IC801) on the HPR-23 board through the PCI BUS to be written into the PIER SDRAM.
When recording to a disc, the PIER SDRAM data is sent to the drive block through the ATA66 interface.

Playback System

The playback video/audio data and playback proxy video/audio data are sent from the disc drive block through the ATA66 interface (CN2101/HPR-23 board) to PIER of the HPR-23 board to be written in the PIER SDRAM.
The playback audio data in the PIER SDRAM (IC2302 to 2305) is sent to the PB AUDIO DSP (IC1801, 1802) for signal processing such as digital JOG sound processing, playback level control, and muting.
The data is then divided into two channels of mainline output and MONITOR output, and sent to VAX.
The two-channel signals sent to VAX are sent to the PB AUDIO DSP (IC1901) for signal processing such as MIX control, muting and delay processes. Then they are sent back to VAX and distributed to each output.
The playback proxy audio data on the PIER SDRAM (IC2302 to 2305) is sent to the PROXY AUDIO DSP (IC2001, 2002), expanded oppositely to the time it was recorded, and then sent to VAX. The signal is then multiplexed and is input to the PB AUDIO DSP (IC1801, 1802) to be used by switching with the mainline playback data as required for shuttle playback, for example.

Analog audio output

The playback digital audio data output from VAX is sent to the audio D/A converter (IC301) on the AU-311 board for conversion to analog audio signal. The 2-channel analog audio signals are output from the AUDIO OUT connector (CN400, 500/AU-311 board).

Digital audio (AES/EBU) output

The playback audio data are encoded in VAX, and the serial data (4 channel) are sent to the AES/EBU driver (IC604, 605/VPR-99 board), and output from the AES/EBU OUT connector (CN1, 2/VPR-99 board).

HDSDI output

The playback digital audio data output from VAX is input to the CN100/RX-93 board via the CN31/VPR-99 board. The audio data are sent to the HDSDI encoder together with the playback digital video data, and are then converted to serial digital data. The serial data is output from the HDSDI OUT connector (CN502, 503/RX-93 board).

SDSDI output

The playback digital audio data output from VAX is input to the LUNA (IC100/VPR-99 board) via the CN32/VPR-99 board. The audio data are multiplexed with the playback digital video data in LUNA. Then the multiplexed data undergoes parallel/serial conversion, and then output from the SDSDI OUTPUT connector (CN3, 4) to the outside as the SDSDI signal.

MONITOR output

The digital audio signal for monitoring output from VAX is sent to the audio D/A converter (IC302) on the AU-311 board for conversion to analog audio signal. The analog audio signal is then output from the AUDIO MONITOR OUT connector (CN600, 700/AU-311 board).

PHONES output, speaker output

The digital audio signal for headphone monitoring from VAX is sent to the audio D/A converter on the KY-624 board for conversion to analog audio signal. The analog audio signal is then sent from the KY-624 board via HP-141 board, and output from the PHONES connector (CN1).
The L/R ch is mixed to the D/A converter output, and then input to the speaker drive amplifier, where it becomes the speaker output.

FAM output

The playback audio data and the playback proxy audio data from the PIER SDRAM is sent to the FAM Accelerator (IC1201) from PIER via the PCI BUS. They are sent to the i.LINK PHY (IC1) on the IF-1073 board on the HPR-23 board, and then to the connector (CN100) on the NET-4 board via the harness from the connector (CN2). They are then output from the i.LINK connector (CN1).

Network output

The playback audio data and playback proxy audio data from the PIER SDRAM are sent to the Ethernet interface IC (IC1300) on the NET-4 board from PIER via the PCI BUS and the PCI bridge in PHOT (IC801) and the PCI bridge IC100. Then, they are converted to the bit stream by the Ethernet interface IC and output from the NETWORK connector.

3. Sync Signal Processing System

The reference video signal input from the REF.VIDEO INPUT connector (CN6) on the VPR-99 board s transferred to the SYNC SEP circuit for separating the sync signals. The separated sync signals are input into PHOT (IC801) on the HPR-23 board.

PHOT generates the following clock signals in synchronization with the separated sync signals or the extracted sync signals from the reference video signal or from the SD/HDSDI input signal.

- 74.25 MHz/74.1758 MHz reference clocks
- 27 MHz reference clock
- 24.576 MHz (512 FS) reference clock
- LCD display clock

With these reference clocks, PHOT generates sync timing signals such as HD, VD, and Frame, and supplies them to devices together with the clock signals.

When no signals are input into the REF.VIDEO INPUT connector or SD/HDSDI INPUT connector, sync timing signals are generated from the 74 MHz or 27 MHz clock of free-running oscillation.

4. System Control System

This unit mounts a RISC microprocessor (referred to as CPU: IC2601/HPR-23 board hereafter) as a system control CPU compatible with a real-time OS “iTRON”, which provides the functions below.

PCI bus interface

The CPU is connected to PIER (IC2103)/FAM Accelerator (IC1201)/PHOT (IC801) on the HPR-23 board via the PCI bus interface to control them and for mutual data transfer.

The CPU sends/receives data to/from the following devices through PIER.

- Proxy Audio DSP (IC2001/IC2002)
- LVIS (IC501)
- MIKE (IC1202/ENC-107 board)
- Optical DRIVE (DR-601 board)

Furthermore, the CPU also sends/receives data to/from the following devices through PHOT.

- VAX (IC206)
- Temperature sensor (IC1001)
- A/D converter for DC power voltage detection (IC1004)
- D/A converter for auto adjustment (IC1005)
- REC/PB Audio DSP (IC1701, IC1702, IC1801, IC1802, IC1901)
- TORINO (IC201, IC401, IC601, IC801, IC1001/ENC-107 board)

• KY microprocessor (KY-624 board)
• Analog audio control (AU-311 board)
• LUNA (IC100/VPR-99 board)
• Character generator (IC614, IC615/VPR-99 board)
• RX-93 (RX-93H board)
• Nios2 (TSI-60 board)

In addition, the CPU is connected to the NET-4 board (Linux board) through PCI-PCI Bridge installed in PHOT, and sends/receives data to/from the Ether/USB, and transfers the OSD data to LVIS. The FAM Accelerator is connected to the PC in FAM connection via i.LINK PHY (IF-1073 board), and sends/receives data on the disc.

Memory controller

• SDRAM (IC2602, IC2603, IC2604, IC2605) control (64 bits, 256 M bytes)
• FLASH MEMORY (IC2905, IC2906) control (32 bits, 64 M bytes)
• NVRAM control (8 bits, 32 K bytes)

Serial interface

• 9-pin remote control
• Video control
• Setting data saving EEPROM control

External control signal

• RESET signal output, board detection, switch setting acquisition, etc. for parallel I/O port control devices
• PIER/PHOT/VAX/FAM Accelerator/LUNA FPGA configuration

5. I/O Interface and Network Processing System

Ethernet

The Ethernet data is connected to the Ethernet interface IC (IC1300) from the 8-pin RJ45 connector (CN2 on the NET-4 board) for Ethernet, and converted into the parallel data.
After that, the parallel data is connected to the LINUX CPU (IC1) via the PCI bus, and controlled.

REMOTE (9P)

The REMOTE signal is connected to the driver/receiver IC109 (1/3) from the REMOTE (9P) connector (CN6 on the NET-4 board), and then connected to the CPU (iTRON) on the HPR-23 board, and controlled.

VIDEO CONTROL (9P)

The VIDEO CONTROL signal is connected to the driver/receiver IC109 (2/3) from the VIDEO CONTROL (9P) connector (CN4 on the NET-4 board), and then connected to the CPU (iTRON) on the HPR-23 board, and controlled.

Time code

Input side

The input signal of the time code is input from the BNC connector (the left one of the CN7, twin connector on the NET-4 board) of the TIME CODE IN, and then connected to the PHOT (IC801) on the HPR-23 board via the buffer/amplifier circuit (IC103, IC104).

Output side

The output signal of the time code is output from the PHOT (IC801) on the HPR-23 board, and then output from the BNC connector (the right one of the CN7, twin connector on the NET-4 board) of the TIME CODE OUT via the buffer/amplifier circuit (IC103, IC104) on the NET-4 board.

USB

The USB data is connected to the USB interface IC (IC1302) from the USB connector (CN600 on the NET-4 board), and then converted into the parallel data.
After that, the parallel data is connected to the LINUX CPU (IC1) via the PCI bus, and controlled.

6. Optical Drive System

Recording System

Recording data sent from the HPR-23 board through the ATA bus (Ultra ATA66) is sent to the Blu-ray Disc Controller: BDC (IC300, IC1300) on the DR-601 board.
The BDC performs signal processing to conform to recording format, such as ATA interface, ECC coding and 17PP (Parity Preserve/Prohibit RMTR) modulation.
The recording data is converted to multi-pulse in the BDC, and the multi-pulse data is sent through the flexible card wire to the optical block to be written into the disc.

Playback System

Data playback system

The RF signal played back from the disc is sent from the optical block to the Front End Processor: FEP (IC200, IC1200) on the DR-601 board where equalizing and asymmetry correction are performed after the RF signal passes through the AGC. After A/D conversion by the read clock played back in the PLL, the signal is sent to the BDC (IC300, IC1300).
In the BDC, the signal passes through the adaptive digital filter, and Viterbi demodulation, 17 demodulation, and ECC decoding are applied to the signal. Then the signal is sent through the ATA bus to the HPR-23 board as played back data.

Address playback system

Address information played back from the disc is sent from the optical block to the FEP (IC200, IC1200) on the DR-601 board in which the information passes through AGC and BPF and is then binarized. The internal
PLL generates a wobble clock (WCK).
In addition, the address information passes through AGC, HPF and LPF, is A/D converted in the FEP, and is then sent to the BDC (IC300, IC1300) for address decoding.

Servo System

Tri-axis actuator and SA actuator

The object lens of the optical block is controlled for focus direction, track direction, and tilt angle by the tri axis actuator. The light reflected from the disc is converted to the electrical signal by the optical block. The electrical signal is input to the FEP (IC200, IC1200) on the DR-601 board, and the focus error signal and the track error signal are detected. The SV DSP (IC400, IC1400) outputs the control data based on the errors to the driver (IC501, IC1501) and controls the focus actuator and the track actuator through the driver.
The tilt actuator is controlled for its angle against the disc to be optimum based on the tilt adjustment result for the jitter of the playback signal to be minimum and the output of the angular velocity sensor.
The SA actuator position is controlled for the spherical aberration to be optimum at the start-up adjustment when the disc is inserted. The SA actuator for the double layer disc is controlled to the optimum position every time when jumping the layer.

Seek motor

The seek motor drives the entire optical unit so that the track to be recorded or played back is kept within the object lens driving range.

ND filter

The transmission factor of the ND filter is selectable to reduce the laser noise that occurs when the read power light is emitted for the single layer disc.

Spindle motor

The FG generated by the spindle motor is amplified and shaped on the SE-851 board, and is then input into the SV DSP (IC400, IC1400) on the DR-601 board.
The SV DSP compares the FG frequency with the target frequency, and then controls the spindle motor via the driver IC500.

System Control

The SY CPU (IC600) on the DR-601 board performs system control. It controls ATA interface, Data Manager, RF-related ICs, servo ICs, and loader. It also carries out interlocking control, maintenance and error log management of each device including the optical block.
Firmware programs of the SY CPU and DSP as well as sources of each PLD are stored in the flash memory (IC602), and the SY CPU loads them to each device when the power is turned on.
The BDC (IC300, IC1300) and SV DSP (IC400, IC1400) are controlled by the parallel CPU bus, while RF-related ICs are controlled by the serial port through SYS PE (IC700).
Adjustment values and hours meter data are stored in the EEPROM (IC4/SE-850 board).

SAFETY CHECK-OUT

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

Check the metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

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

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

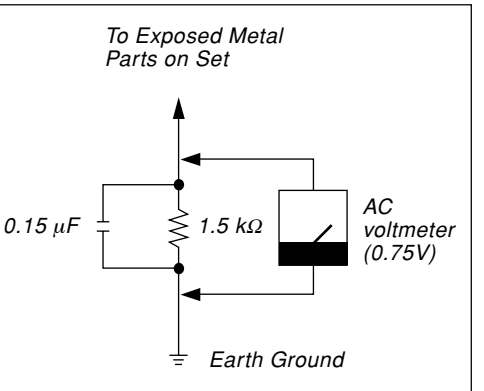


Fig A. Using an AC voltmeter to check AC leakage.

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