SONY

HD COLOR CAMERA

HDC-900
HDC-900/L
HDC-910
HDC-910/L
HDC-930
HDC-950

HD CCD BLOCK ADAPTOR
HKC-T950

Digital HDVS MEMORY STICK

MAINTENANCE MANUAL
1st Edition (Revised 4)

⚠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。

設置や保守，点検，修理などを行う前に，別冊のインストレーションアンドメンテナンスマニュアルの「安全のために」と別冊のオペレーションマニュアルの「安全のために」を必ずお読みください。

⚠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.

HDC-900 (SY)	Serial No. 10001 and Higher		
HDC-900/L (J)	Serial No. 30001 and Higher		
		HDC-930 (SY)	Serial No. 10001 and Higher
HDC-910 (UCJ)	Serial No. 10001 and Higher	HDC-950 (JN, SY)	Serial No. 10001 and Higher
HDC-910/L (J)	Serial No. 30001 and Higher		
HDC-910 (CE)	Serial No. 40001 and Higher	HKC-T950 (SY)	Serial No. 10001 and Higher

For HDC-900/910/930/950

CAUTION

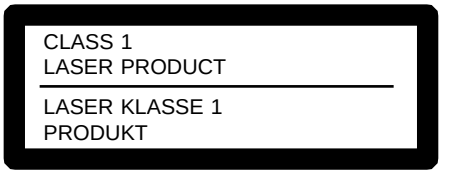
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

For HDC-900/910/930/950

Laser Diode Properties

Material	: In GaAsp
Wave length	: 1310 nm
Emission duration	: Pulse code modulation
Laser output power	: –8 dBm

For HDC-900/910/930/950



This HD color camera is classified as a CLASS 1 LASER PRODUCT.
The CLASS 1 LASER PRODUCT label is located on the cabinet near the CCU connector.

For HDC-900/910/930/950

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.

ADVARSEL

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

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.

VARNING

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

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.

VAROITUS

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

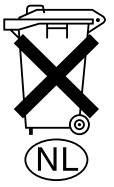
ADVARSEL!

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

For the customers in the Netherlands
Voor de klanten in Nederland

Hoe u de batterijen moet verwijderen, leest u in de tekst van deze handleiding.

Gooi de batterij niet weg maar lever deze in als klein chemisch afval (KCA).



Für Kunden in Deutschland

Entsorgungshinweis: Bitte werfen Sie nur entladene Batterien in die Sammelboxen beim Handel oder den Kommunen. Entladen sind Batterien in der Regel dann, wenn das Gerät abschaltet und signalisiert “Batterie leer” oder nach längerer Gebrauchsdauer der Batterien “nicht mehr einwandfrei funktioniert”. Um sicherzugehen, kleben Sie die Batteriepole z.B. mit einem Klebestreifen ab oder geben Sie die Batterien einzeln in einen Plastikbeutel.

For the customers in the U.S.A. and Canada

RECYCLING LITHIUM-ION BATTERIES

Lithium-Ion batteries are recyclable.
You can help preserve our environment by returning your used rechargeable batteries to the collection and recycling location nearest you.

For more information regarding recycling of rechargeable batteries, call toll free 1-800-822-8837, or visit http://www.rbrc.org/

Caution: Do not handle damaged or leaking Lithium-Ion batteries.

For the customers in Japan

リチウムイオン電池のリサイクルについて

このマークはリチウムイオン電池の
リサイクルマークです。

Li-ion

リチウムイオン電池は，リサイクルできます。
不要になったリチウムイオン電池は，金属部にセロハンテープなどの絶縁テープを貼ってリサイクル協力店へお持ちください。

充電式電池の回収・リサイクルおよびリサイクル協力店については社団法人電池工業会ホームページ
http://www.baj.or.jp/ を参照して下さい。

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5. SERVICE Menu

6. Electrical Alignment

Manual Structure

Purpose of this manual

This manual is the maintenance manual of HD Color Camera HDC-900/910/950/930 and HD CCD Block Adaptor HKC-T950 for HDC-950/930.
This manual is intended for use by trained system and service engineers, and describes the information regarding the circuit description, replacement of main parts, SERVICE menu and electrical alignment.

Related manuals

Besides this maintenance manual, the following manuals are available.

- **HDC-900/910 Operation Manual (Supplied with HDC-900/910)**
  This manual is necessary for the use and the operation of the HDC-900/910.
  Part number: 3-204-021-XX

- **HDC-950/930 Operation Manual (Supplied with HDC-950/930)**
  This manual is necessary for the use and the operation of the HDC-950/930.
  Part number: 3-204-027-XX

- **HKC-T950 Operation Manual (Supplied with HKC-T950)**
  This manual is necessary for the installation and operation of the HKC-T950
  Part number: 3-206-420-XX

- **Installation and Maintenance Manual (Supplied with HDC-900/910/950/930)**
  This manual intended for use by trained system and service engineers describes the information regarding the installation of the HDC-900/910/950/930 and the information required for initial services.
  Part number: 3-204-338-XX

- **e-Manual (Available on request)**
  This electronic manual intended for use by trained system and service engineers describes (detailed parts list, block diagrams, schematic diagrams, and board layouts) required for the parts-level service.
  For obtaining, contact your local Sony Sales Office/Service Center.

- **System Manual (Available on request)**
  This manual is necessary for connection and operation of this unit and other peripheral equipment.
  If this manual is required, please contact your local Sony Sales Office/Service Center.

- **“Semiconductor Pin Assignments” CD-ROM (Available on request)**
  This “Semiconductor Pin Assignments” CD-ROM allows you to search for semiconductors used in B&P Company equipment.
  Semiconductors that cannot be searched for on this CD-ROM are listed in the maintenance manual for the corresponding unit. The maintenance manual contains a complete list of all semiconductors and their ID Nos., and thus should be used together with the CD-ROM.
  Part number: 9-968-546-XX

Contents

The following are summaries of all the sections for understanding the contents of this manual.

Section 1
Service Overview

1-1. Optional Fixtures

Name	Sony Part No.	Remarks
EX-738 Board	A-8327-351-A	For extension of plug-in boards
Alignment sleeve remover HC-001	J-6480-010-A	For female connector
Cotton swab	——	Diameter about 4 mm Any available on the market
Installation and removal tool (for bushing)	J-6470-280-A	For lens cable replacement
PLD download fixture	J-7120-140-A	PLD data download cable

1-2. Cleaning of Connector/Cable

The photo receptive condition of the optical connector can be checked at the SDI page of the DIAGNOSIS menu of this unit. (For details, refer to Section 3-7 of the Installation and Maintenance Manual.) It can also be checked at OPTICAL CONDITION of the DPR board of the camera control unit.

When lit in green: Normal (−17 dBm or above)
When lit in yellow: Normal (−17 to −20 dBm)
When lit in red: Abnormal (Less than −20 dBm)

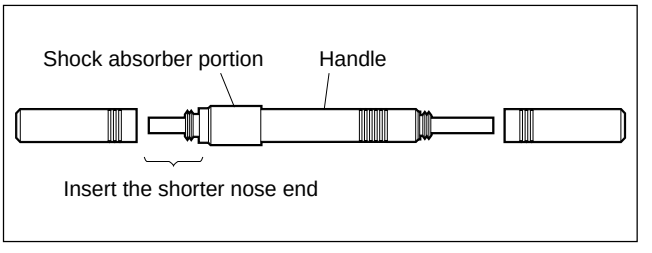
When lit in red, be sure to clean the optical contact portions.
When lit in yellow, cleaning is recommended.
The attenuation of the photo-receptive level may cause transmission error between the camera and HDCU. In the case of attenuation, be sure to clean optical contact portions proceeding as follows. The optical contact portions exist in the optical connector on the camera or HDCU, and in the optical/electrical cables, and connection connectors which are connected to the SDI or RX board.

Tools Required

- Alignment sleeve remover HC-001
  (for female connector)
  Sony P/N: J-6480-010-A

Note

Insert the shorter nose end when removing/installing the alignment sleeve.
Grasp not the shock absorber portion of the remover but the handle in use.

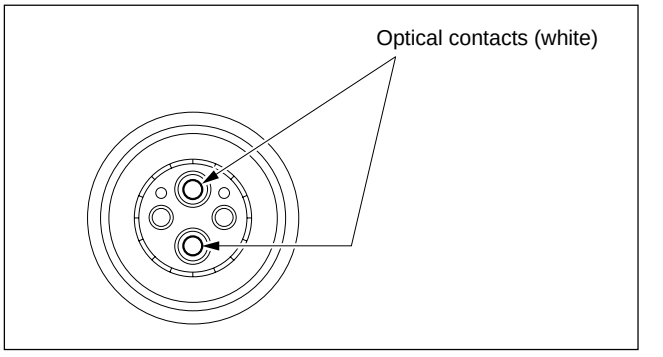


- Cotton swabs (commercially available)

Cleaning

Male connector

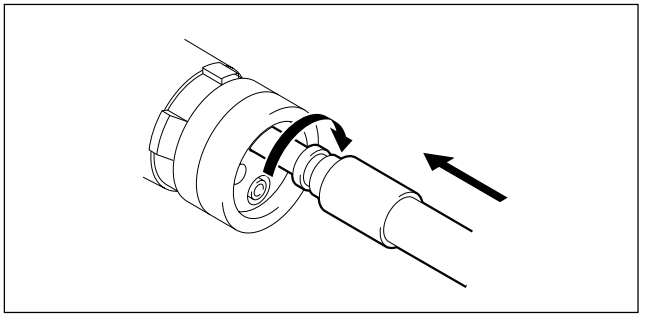
Clean the tip of the white optical contacts by a cotton swab moistened with alcohol.



Female connector

The optical contacts for female connector are in an unexposed state. In cleaning, it is necessary to be exposed by removing the alignment sleeve in advance. Proceed as follows.

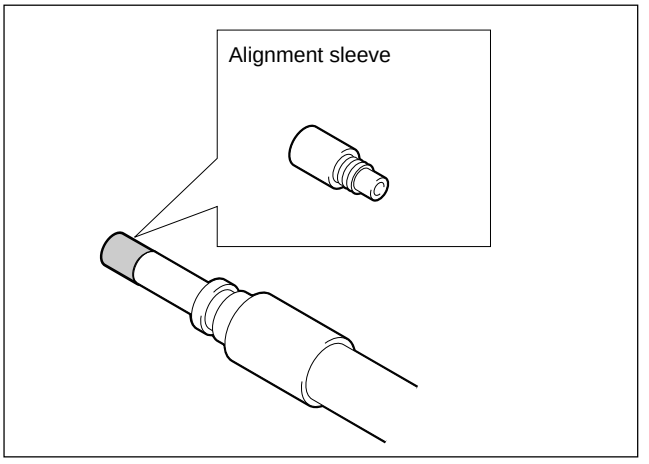
1. Insert the alignment sleeve remover into the alignment sleeve in the straight line and turn it clockwise.



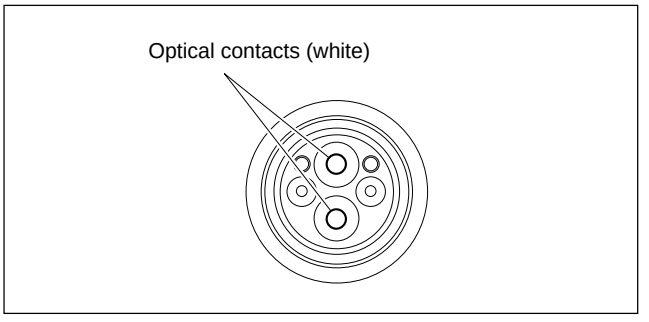
2. When the turn stops, pull out the remover in the straight line forcedly.

Note

The alignment sleeve can be removed/reinstalled with the sleeve itself attached to the tip of the remover. Great care should be taken so as not to lose or damage the alignment sleeve.
(Alignment sleeve: Sony P/N 9-980-074-01)



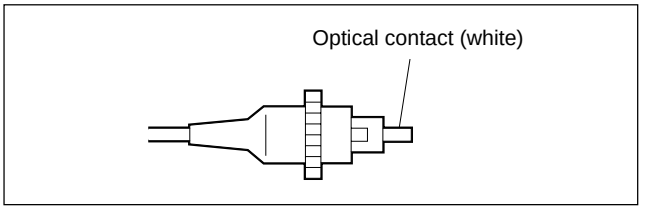
3. Clean the tip of the white optical contacts by a cotton swab moistened with alcohol.



4. Insert the remover with the alignment sleeve attached to its tip, and push it until it clicks.
5. Rotate the remover counterclockwise to install the alignment sleeve, and extract the remover.

Connection connector

After replacing the optical connector of the camera or HDCU, or replacing the SDI-49/RX-28 board, clean the tip of the white optical contact of the connection connector by a cotton swab moistened with alcohol.



1-3. Circuit Description

1-3-1. HDC-900/910, HDC-950/930

BI-145/150 board

The BI-145/150 board supplies the DC bias required for the CCD. The CCD output is sent through a buffer to the NR-69/73 board. The BI-145/150 board mounts horizontal clock drivers for the CCD and a reset gate driver.

CN-1947/2329 board

CN-1947/2329 board is the relay board that supplies each CCD driving pulse generated on the DR-412/492 board to the BI-145/150 board. The CN-1947/2329 board also generates the voltage used for the horizontal clock drivers for the CCD.

DR-412/492 board

The DR-412/492 board mounts the vertical clock drivers for CCD driving, drivers for a shutter pulse and V/H driver. And the DR-412/492 board generates the V-sub voltage proper to the CCD and then supplies it to the CCD. The voltage produced using a DC/DC converter is sent through this board to each board.

TG-214 Board

The TG-214 board synchronizes with the CHB-F and CHB-H signals sent from the SG-268 board to create the CCD drive pulses and sample-hold pulses. It also PLL locks the INT-H signal generated in the board with the CHB-H signal for synchronization.

DPR-154/156 Board

The R, G, and B signals input from the VA-196 board are A/D converted after passing through the pre-filter.
They are sent the DPR-156 board and returned to the DPR-154 board again. They are next subject to camera processing such as knee and gamma processing by the DSP IC and enhancer processing.
The signal output from DSP IC is interfaced with the DAD-37 board in the digital signal form. It is then D/A converted and output to the VDA-55 board.

PA-239 board

The CCD output is split into two channels. The PA-239 board is provided with a multiplexer which is used to return the split signals to thier original state.

NR-69/73 board

The NR-69/73 board performs correlative double sampling so as to extract a reset noise from the CCD output.

DU-69/RP-114 boards

The DU-69 and RP-114 boards mount the RPN correction circuit for the CCD.

VA-196 board

The VA-196 board consists of the video amplifier, gain-up amplifier, white balancing amplifier, white/black shading correction circuits, test signal generator, diagnosis circuit and so on.

The R, G and B video signals input from the CCD block are passed through the differential amplifier and pre-white-clip correction circuit. And then the residual component of clocks is removed at the LPF. The differential amplifier clamps the black level and also mixes the black shading correction signal with the video signals.

They are then input to the flair circuit after passing through the preset gain adjustment control, black set circuit, gain up amplifier, and white balance amplifier. They are then PRE KNEE processed in the amplifier in the next stage and output to the DPR board. The white balancing amplifier performs the white shading correction too.

In addition, the VA-196 board has the test signal generator which can generate two types of test signals. The test signals can be used for various adjustments or maintenance by switching the output signal from the CCD signal to either of test signals. The adjustment data for the VA-196 board is stored in the EEPROM on the board.

AT-130 board

AT-130 board consists of a microcomputer for system control and its peripheral circuits. The main program is written in the EPROM on the board. And the camera control data is kept in the NVRAM.

Moreover, the AT-130 board is provided with the interface circuit with the lens and auto-iris control circuit.

VDA-55 Board

The R, G, and B signals and Y, P_B, and P_R signals input from the DPR-154 board, and RET ($Y/P_B/P_R$) signals input from the DAD-37 board are selected by the switch, passed through the cable compensation circuit (25 m or 50 m), added with SYNC, and output from the 75 Ω driver to the VCR connector.

After the signal selected from the R, G, B, and Y signals or RET signal (Y) of the camera is mixed with two types of zebra signals, character signal, cursor signals, and VF detail signals, it is passed through the aspect modulation circuit, added with SYNC, and output to the viewfinder and TEST OUT connector from the 75 Ω driver. When only the camera is used, the camera and VCR playback signal are switched by the VCR PB ON signal, and output from this 75 Ω driver. Other VDA-55 boards are also provided with a self-diagnosis circuit.

DAD-37 board

The DAD-37 board performs digital-to-analog conversions and transmitting/receiving of the parallel digital signal for communication in digital form. Parallel-to-serial conversion is performed by the SDI-49 board.

Transmitting system:

- The $Y/P_B/P_R$ signals input from DPR-154 board are formatted for communication in digital and are then sent to the SDI-49 board.
- The intercom audio and microphone audio signals are multiplexed by format IC.
- The camera command signal is multiplexed by format IC.
- The format ID is multiplexed by format IC.

Receiving system:

- Separates the following signals from the parallel-to-digital signal sent from the SDI-49 board.
  $Y/P_B/P_R$ video signals (CCU RET)
  Intercom audio and program audio signals
  Prompter signal
  CCU command
  Synchronizing signal
- The Y signal is digital-to-analog converted at 74-MHz rate and the P_B and P_R signals are digital-to-analog converted at 37-MHz rate.
- Send the prompter signal from the HD CCU to the DAP board.

SDI-49 board

The SDI-49 board converts the parallel $Y/P_B/P_R$ signal multiplexed by the DAD-37 board to a serial digital signal and outputs it from the SERIAL OUT connector. And SDI-49 board also converts the serial digital signal to an optical signal and outputs it to the HD CCU.
The serial digital signal input from the RX-28 board is separated from clocks and is converted to a parallel digital signal. The converted signal is then output to the DAD-37 board.

RX-28 board

The optical signal transmitted from the HD CCU is converted to an electric signal by the RX-28 board and is output to the SDI-49 board. And the photo-reception level is detected by the RX-28 board and the detection value is output to the SDI-49 board.

AU-271 board, DU-104 board

The AU-271 board consists of the following circuits:

- Two intercom input amplifiers
- Two microphone input amplifiers
- Power supply for the above input amplifiers
- Two intercom receiving output amplifiers
- Two PGM output circuits
- TRACKER input/output circuit
- VTR intercom circuit
- Earphone output circuit

The input signal at the INCOM connector is converted to −20 dBu in level and is output to the DAP-24 board, after the microphone selection (carbon or dynamic microphone) is made and the microphone level +6 dB, 0 dB or −6 dB is selected.
The input signal at the MIC connector is also converted to −20 dBu in level and is output to the DAP-24 board, after the microphone level −20 dB, −30 dB, −40 dB, −50 dB, or −60 dB is selected. The same signal is output to the VTR connector in parallel. The microphone connected to the MIC connector is selectable from the microphone without power, AB powering or phantom microphone.
The intercom receiving signal is adjusted in level by EVR, with which the PGM and TRACKER signals are mixed, and is then output through the buffer. By setting the internal switch of DU-104 board, the intercom receiving signal can be interfaced with the optional RTS kit.
The PGM signal is adjusted in level by EVR, with which the intercom signal is mixed, and is then output through the output amplifier.

DAP-24 board

The intercom signals and microphone signals in two channels each, which are sent from the AU-271 board, are analog-to-digital converted by the DAP-24 board and are output via the DAD-37 board to the HD CCU.
The digital audio signals sent from the DAD-37 board is converted to analog intercom signals and analog program signals in two channels each and are output to the AU-271 board.
The DAP-24 board is equipped with the PLL circuit to synchronize the video signal with clocks as reference during analog-to-digital or digital-to-analog conversion.
In addition, the DAP-24 board has the detection circuit to detect the connection status with the HD CCU, standby intercom circuit, interface circuit with the viewfinder and diagnosis circuit.
The prompter signal from the DAD-37 board is output from the PROMPTER OUT after being decoded and digital-to-analog converted.

SG-268 board

The SG-268 board consists of the pulse generators.

- Generates various pulses as the reference of the VCO (74.25 MHz or 74.175 MHz) on the circuit boards. This pulse generator synchronizes the HD CCU or external sync signal input.
- Generates various marker signals.
- Outputs the status signal or diagnosis data as a character data from the character generator.
- Stores the oscillation frequency, its adjustment data in the EEPROM on the SG-268 board.

1-3-2. HKC-T950

IF-845 board (CCD block adaptor)

The main line signal (RGB) input from the CCD block is adjusted in the output level and then sent through the 75 Ω driver to the cable adaptor. The VF VIDEO signal sent from the cable adaptor is adjusted in the output level and then output through the 75 Ω driver at the VF and BNC connectors. The IF-845 board also sends/receives the sync signal required for CCD driving. Moreover, the IF-845 board is provided with the INCOM volume control circuit and fan control circuit.

AT-146 board (CCD block adaptor)

The AT-146 board consists of the control microcomputer and its peripheral circuit. The AT-146 board converts the control signal in the CCD block into the command that can be sent/received using the cable and sends/receives it to/ from the AT-147 board. Moreover, the AT-146 board sends/receives the control signals of switches on the handle, the lens, and VF. This board also controls the fan.

RE-202 board (CCD block adaptor)

The RE-202 board produces the power used in the CCD block and CCD block adaptor using the UNREG supplied from the camera and supplies it to each board of the CCD block and CCD block adaptor.

IF-846 board (Cable adaptor)

The main line signal (RGB) input from the CCD block adaptor is adjusted in the output level and then sent to the camera after the cable is compensated according to the cable length. The VF VIDEO signal sent from the camera is adjusted in the output level and then output through the 75 Ω driver to the CCD block adaptor. The IF-846 board has the PLL circuit. The phase of the main line signal sent from the CCD block is automatically adjusted using the PLL circuit so that it does not vary depending on the cable length.

AT-147 board (Cable adaptor)

The AT-147 board consists of the control microcomputer and its peripheral circuit. The AT-147 board converts the control signal in the CCD block into the command that can be sent/received using the cable and sends/receives it to/ from the AT-146 board. Moreover, the AT-147 board sends/receives the control signals of the switches on the handle, lens and VF.

The compensation data for each cable length as well as the setting data in the CCD block is stored in EEPROM on the AT-147 board.

1-4. Description of CCD Block Number

Every CCD unit has its own ID number called CCD block number. It shows the CCD block type and serial number for the CCD block.
The CCD block number label is put in the CCD unit.

Example : AOA xxxxx
- xxxxx: Serial number for the CCD unit
- AOA: CCD block type

Model	CCD block type
HDC-900 HDC-950	AOE
HDC-910 HDC-930	ATA

To replacing the CCD unit, refer to Section 2-1 (HDC-900/910) or Section 3-1 (HDC-950/930).

1-5. Notes on Flexible Card Wire

1-5-1. Disconnecting/Connecting Flexible Card Wire

The flexible card wires are used between the boards of HDC-900/910 and HDC-950/930. Take care not to bend forcedly these flexible card wires. This shortens the wire life.

HDC-900/910
- Between CN-1974 and AT-131
- Between CN-1961 and DR-412/492
- Between CN-1961 and PA-239

HDC-950/930
- Between CN-1961 and DR-412/492
- Between CN-1961 and PA-239
- Between MB-882 and CN-2018
- Between MB-882 and CN-1951
- Between MB-882 and SW-1017

Disconnectiong

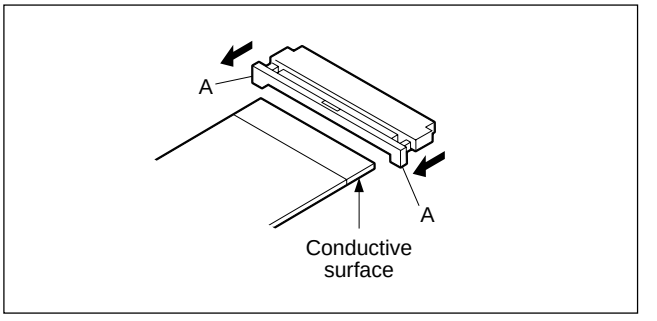
1. Trn off the power.
2. Slide portions A in the direction of the arrow to unlock and pull out the flexible card wire.

Connecting

Notes

- Be careful not to insert the flexible card wire obliquely.
- Check that the conducive surface of the flexible card wire is not soiled with dust.

1. Slide portions A in the direction of the arraw and insert the flexible card wire as far as it will go with the conductive serface down.
2. Slide portions A in the reverse direction to lock.



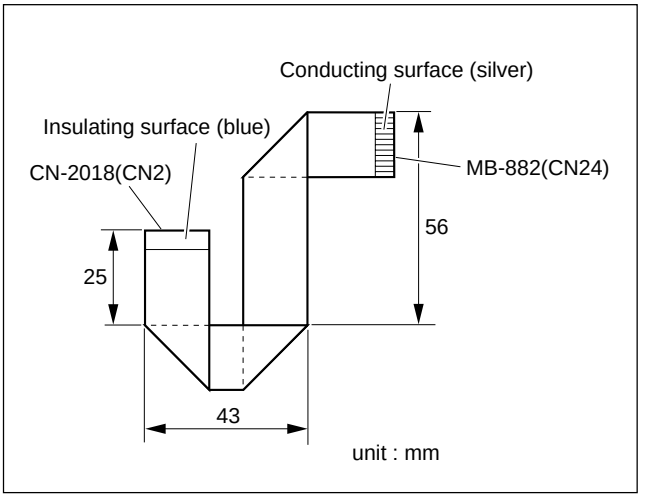
1-5-2. Forming Before Installation (HDC-950/930)

If using a new flexible card wire, be sure to hand-form it as shown in the figure before installation.

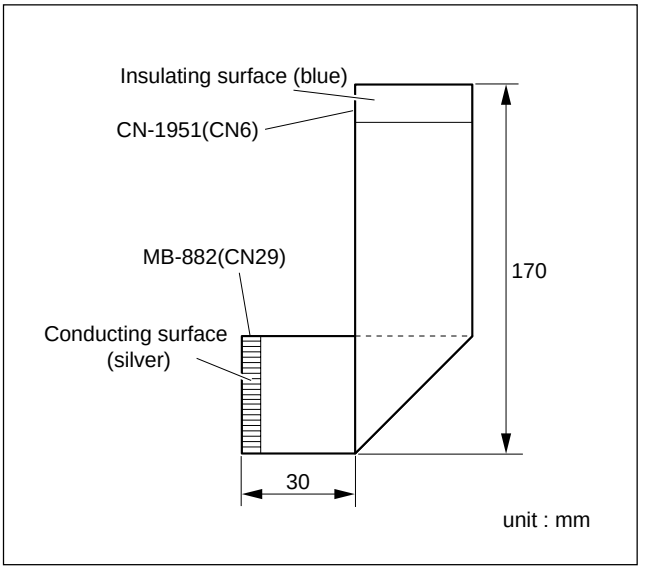
Note

Never fold it back after being formed once.

• MB-882 board CN24 ↔ CN-2018 board CN2



• MB-882 board CN29 ↔ CN-1951 board CN6



1-6. Positioning Adjustment for Installing the Filter Knobs (HDC-950/930, HKC-T950)

Installing the filter knobs, be sure to perform the following adjustment.

1. Remove the inside panel. (Refer to Section 1-4 of Installation and Maintenance Manual.)

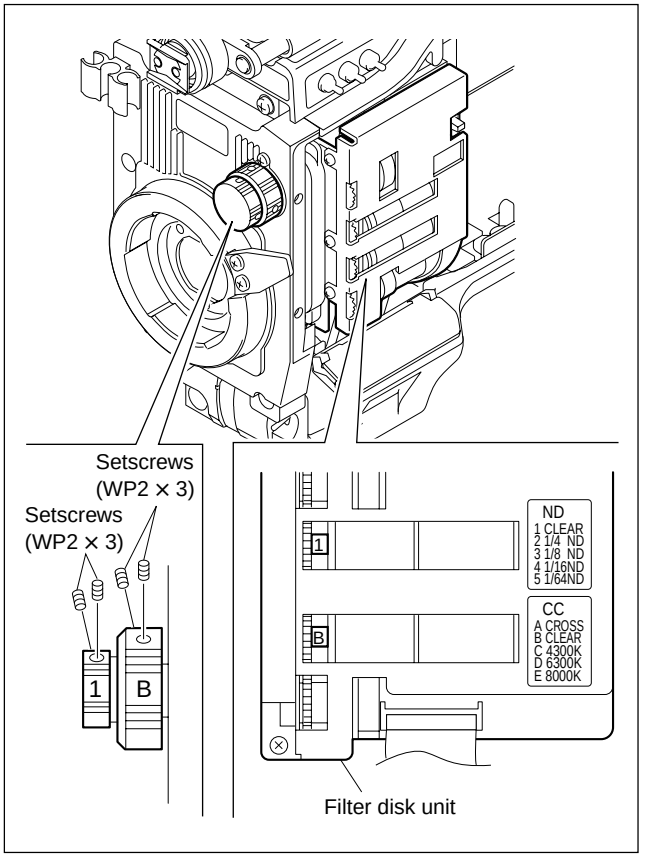
   Note

   If the HKC-T950 is installed, remove the right side panel of the CCD block adaptor referring to Section 3-15-5.

2. Align the CC filter knob number with the number (CC) on the filter disk unit and tighten the two set-screws.

   Tightening torque : 20×10^{-2} N•m (2.0 kgf•cm)
3. Rotate the CC filter knob and check that it moves smoothly.
4. Align the ND filter knob number with the number (ND) on the filter disk unit and tighten the two set-screws.

   Tightening torque : 20×10^{-2} N•m (2.0 kgf•cm)
5. Rotate the ND filter knob and check that it moves smoothly.



1-7. Notes on Replacement of Circuit Board

1-7-1. Note on Replacement of Parts

Every electrical part mounted on the mounted circuit boards used in the CCD unit cannot be replaced.
And every electrical part mounted on the SDI-49 and RX-28 boards cannot be replaced too. If there is any defective part, replace the mounted circuit board itself. Refer to Sections 2-6-1 and 2-6-2 (HDC-900/910) or 3-14-1 and 3-14-2 (HDC-950/930) for details on replacement.

1-7-2. Description on EEPROM (NV-RAM) Data

The table below gives the stored data of EEPROM (NV-RAM) on every printed circuit board.

Board	Ref. No.	Stored data
AT-130	IC5*	Paint data, Fails
DAD-37	IC6	DAD-37 adjustment data
DPR-154	IC212	DPR-154 adjustment data
RP-114	IC22	RP-114 adjustment data
SG-268	IC101	SG-268 adjustment data
VA-196	IC200	VA-196 adjustment data
VDA-55	IC8	VDA-55 adjustment data

* : NV-RAM

Note

The IC listed above cannot be replaced because it is the EEPROM (NV-RAM) that is storing data inherent in the board. The part number listed in “Spare Parts” is for EEPROM (NV-RAM) which is not programmed. If replacement is needed, consult your Sony representatives.

1-7-3. Adjustment after Replacement of Board

When replacing some electrical parts on the circuit board, or the circuit board itself, be sure to perform the following adjustments after replacement. If no adjustment item is listed, no adjustment is required.

HDC-900/910, HDC-950/930

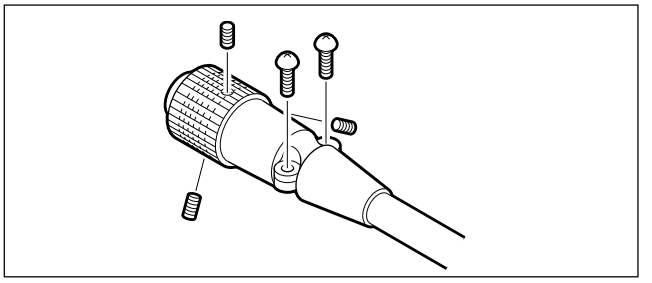
Board/Block	For Part Replacement	For Board Replacement
AT-130	——	——
AU-271	——	——
DAD-37	——	——
DAP-24	——	——
DPR-154	VTR26P OUT Level Adjustment	VTR26P OUT Level Adjustment
DPR-156	——	——
DU-104	——	——
PA-239	PA-239 Board Adjustment	PA-239 Board Adjustment
RE-181/182/184	——	——
RX-28	——	——
SDI-49	——	——
SG-268	——	——
VA-196	VA-196 Board Adjustment	VA-196 Board Adjustment
VDA-55	VTR26P OUT Level Adjustment	VTR26P OUT Level Adjustment
Filter Disk Unit	——	Filter Drive Adjustment

HKC-T950

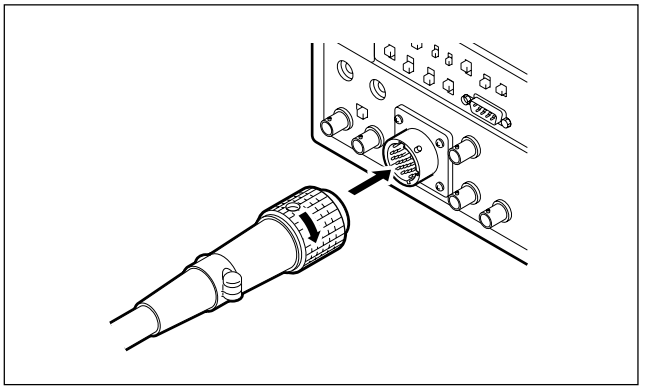
Board/Block	For Part Replacement	For Board Replacement
AT-146	——	——
AT-147	——	——
IF-845	——	——
IF-846	——	——
RE-202	——	——

1-8. Disassembly of HDCZ Connector

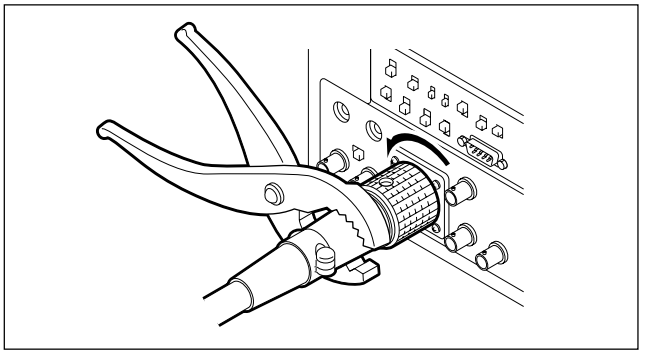
1. Remove the two screws and three setscrews.



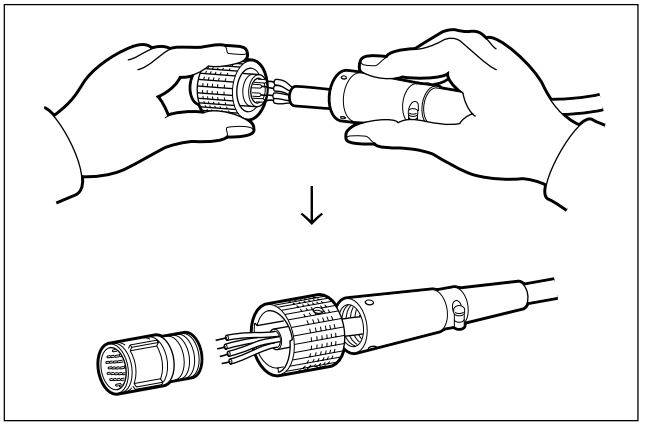
2. Connect the plug to the VTR or camera.



3. Loosen the plug counterclockwise by pliers.



4. Disassemble as illustrated and unsolder.



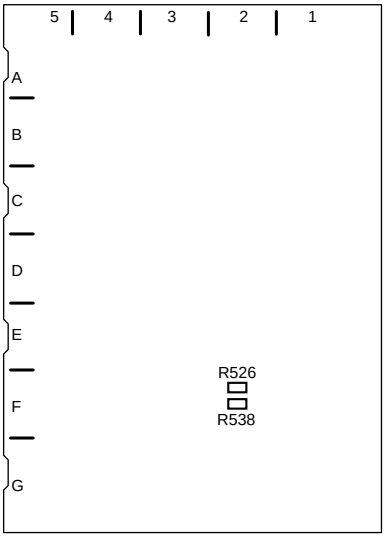
1-9. How to Supply a Power of +12 V

Each the model HDC-900/910 and HDC-950/930 can supply 12 V for MIC POWER to the microphone connected the AUDIO IN connector.

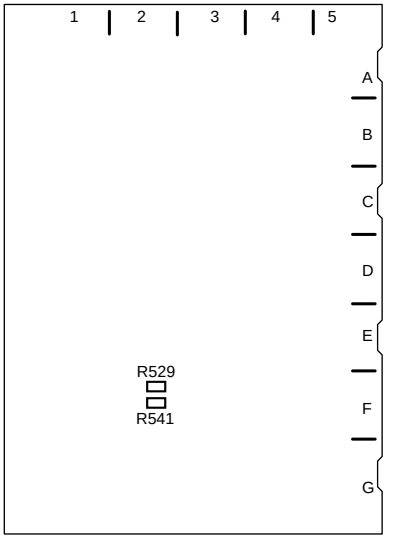
AU-271 board suffix -12

When require this power output:
First replace the resisters as shown in the side A and B of the AU-271 board as follows.
Refer to the Operation Manual and set on the MIC POWER switch of AUDIO IN connector.
R526, R529, R538, R541

Old part No.	New part No.
1-216-797-11 (10 Ω)	1-216-837-11 (22 kΩ)



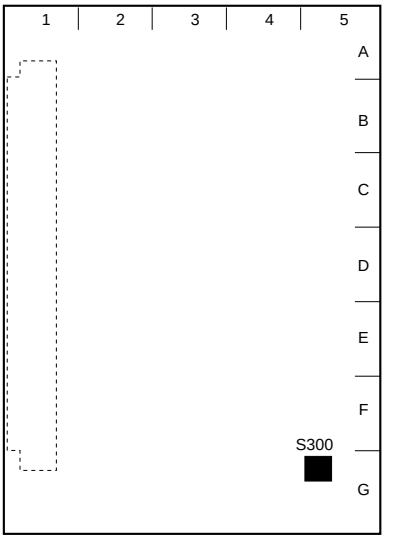
AU-271 Board (A side)



AU-271 Board (B side)

AU-271 board suffix -13 and higher

Set the switch S300 on the AU-271 board to ON, and set on the MIC POWER switch of AUDIO IN connector referring to the Operation Manual.



AU-271 board (B side)

Ref. No.	Contents
S300-1 *	Switch ON to supply +12 V for MIC POWER to the microphone connected the AUDIO IN 1 connector.
S300-2 *	Switch ON to supply +12 V for MIC POWER to the microphone connected the AUDIO IN 2 connector.

* : For details, refer to Section 1-5 of the Installation and Maintenance Manual.

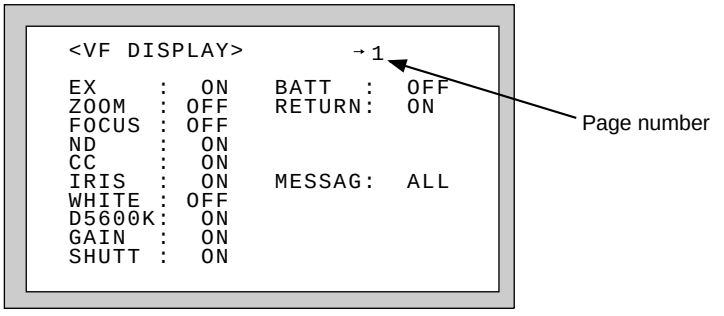
1-10. Version-Up of ROM/AT-130 Board

The ROM (IC1 on the AT-130 board) version can be upgraded using the memory stick. Follow the procedure shown below.

Notes

- Prepare the memory stick in which the upgraded program has been written.
- Refer to section 5-1 for basic operations of the setting menu.
- The version number of the ROM can be confirmed on the BOARD STATUS page of the DIAGNOSIS menu.

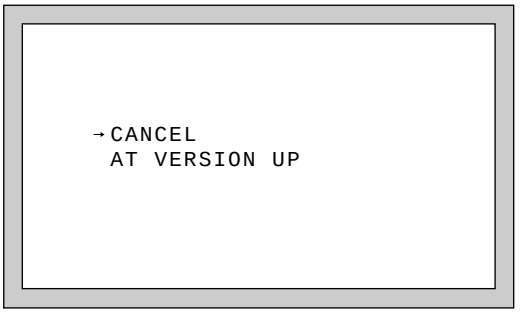
1. Turn the power of the unit on. Open the VF DISPLAY page of the OPERATION menu and move the cursor to the page number.



VF DISPLAY page

2. HDC-900/910 :
   Press the MENU SELECT switch toward the “ENTER” side to change the cursor to “?”.
   HDC-950/930 :
   Press the rotary encoder to change the cursor to “?”.
3. HDC-900/910 :
   Press the MENU SELECT switch toward the “ENTER” side again. Insert the memory stick into the camera unit with pressing the MENU SELECT switch toward the “ENTER” side, and remain presseng the MENU SELECT switch toward the “ENTER” side so that “MEMORY STICK ACCESS” is displayed on the screen.
   HDC-950/930 :
   Press the rotary encoder again. Insert the memory stick into the camera unit with pressing the rotary encoder and remain pressing the rotary encoder so that “MEMORY STICK ACCESS” is displayed on the screen.
   Note
   While “MEMORY STICK ACCESS” is displayed, do not eject the memory stick.

4. The VERSION UP execution page is displayed as shown below.
   HDC-900/910 :
   Move the cursor to “AT VERSION UP” and then press the MENU SELECT switch toward the “ENTER” side.
   HDC-950/930 :
   Move the cursor to “AT VERSION UP” and then press the rotary encoder.



VERSION UP execution page

5. HDC-900/910 :
   After “VERSION UP OK?” is displayed, press the MENU SELECT switch toward the “ENTER” side again.
   HDC-950/930 :
   After “VERSION UP OK?” is displayed, press the rotary encoder again.
   Note
   Press the MENU SELECT switch (HDC-900/910) or MENU switch (HDC-950/930) to “CANCEL” side to cancel the operation.
6. The back tally lamp behind the handle repeats blinking and lighting on, and lights off after about 30 seconds.
   If the back tally lamp remains lighting on and does not light off, proceed to step 8.
7. Turn the power off and then on. The unit will start with the ROM upgraded.

At step 6, if the back tally lamp remains lighting on and does not light off

8. Turn the power off.
9. Set S100-1 to S100-4 switches on the AT-130 board as shown below.
   Note
   When the version-up is finished, be sure to set the following switches to their original positions. Therefore, it is recommend to write down the customer setting positions to the following table.

Switch	Setting	Customer Setting Position
S100-1	OFF	
S100-2	OFF	
S100-3	ON	
S100-4	ON	

10. Leave the memory stick inserted in the unit and turn the power on.
11. The back tally lamp behind the handle repeats blinking and lighting on, and lights off after about 30 seconds.
12. Turn the power off.
13. Set S100-1 to S100-4 switches on the AT-130 board to their original positions.
14. Turn the power on. The unit will start with the ROM upgraded.

1-11. Note on Replacement of Lithium Battery

A letium battery is mounted on the AT-130 board to back up Real Time Clock (RTC).
If a battery comes to the lifetime, then RTC stops. Therefore, require the battery to be replaced and newly set to DATE/TIME of the CAM ID/DATE page in the MAINTENACE menu.
For procedures in detail, refer to Section 3-5 of the Installation and Maintenance Manual.

AT-130 board/CR2032 : Sony part No. (1-528-174-11)

CAUTION

In replacing, ensure that the battery is installed with "+" and "–" poles connected to the correct terminals.
An improper connection may cause an explosion or leakage of fluid.

1-12. Writing and Rewriting the PLD Internal Data (HKC-T950)

HKC-T950 uses the PLD (Programmable Logic Device) that supports the e-Production (EPR) system to write and rewrite the internal data.
If the part listed below needs to be replaced or to be upgraded, contact your Sony Sales Office/Service Center.

Note

The part number of PLD (or ROM for PLD) in which data is not written yet, is shown in "Spare Parts" of e-Manual. Therefore, if part replacement is required, write the data by the following procedure.
In the case of the PLD type that runs on the program stored in external ROM, data needs not to be written only by replacing the part if the specific PLD only is defective.

e-Production system has the advantages shown below.

- To write/rewrite the PLD internal data:
  1. The standard fixture (cable) can be used.
  2. The standard software (PLD Download Tool) can be used.
- The PLD internal data is controlled in the Sony Database Server under the name Project file (E_xxx_xxx_xx_xx).
- The printed circuit board is equipped with the standard connector (EPR connector) to write the PLD internal data. The indication "EPR" is shown on the printed circuit board.

Corresponding PLD

PLD (Ref No./board name)	EPR connector (Ref No./board name)	Project file No.
IC500/AT-147	CN5/ AT-147	E_000_000_57_xx

Equipment required

- PLD download fixture (Sony part number: J-7120-140-A) : The cable connected PC to HKC-T950.

  Note

  When connecting the fixture to the HKC-T950, remove the fixture cable from the fixture itself.
  Connect the opposite side to the fixture main unit before starting to use the fixture.
- PC : A PC having parallel port.
  A PC in which the PLD Download Tool software is already installed.
  For the applicable OS and the operating environment, refer to "Download Tool Operating Instruction for Device Programming".
- HD color camera HDC-950 or HDC-930

  Note

  Install the cable adaptor of HKC-T950 to HDC-950/930 before writing and rewriting the PLD internal data.

Data write procedure

Data write procedure in the PLD (or ROM for PLD) is outlined below.
For details of data write procedure, refer to "Download Tool Operating Instruction for Device Programming" which is available in the same site where the PLD Download Tool software is available.

1. Prepare the Project file.

   Note

   Download the Project file from the Sony Database Server.

2. Turn off the power of the camera. Connect the PC parallel port to the EPR connector of the target board using the PLD download fixture (cable).
3. Turn on the power of the camera.
   Start the Download Tool software and read the Project file.
4. Program the PLD (or ROM for PLD) with the Download Tool software.
5. Upon completion of programming, check that error message is not displayed. Turn off the power of the camera and back on.

1-13. Replacing the Fuse

WARNING

A fuse is critical parts to safe operation.
Replace this component with Sony parts whose part numbers appear in this manual published by Sony.
If not, this may cause a fire or electric shock.
Be sure to use the specified component in this manual.

The fuses are mounted on the RE-181 board of the following models. Be sure to replace with the specified fuse as shown below after removing the foreign substances that may cause the shorts.

Models/Applicable Serial No.

Model Name	Serial No.
HDC-900 (SY)	10206 -
HDC-910 (UCJ)	10001 -
HDC-910 (CE)	40001 -
HDC-930 (SY)	10069 -
HDC-950 (JN, SY)	10520 -

RE-181 board

Ref No. (Address)	Description	Parts No.
THP1 (C-2)	Fuse Chip 1 A/125V	⚠1-533-998-11

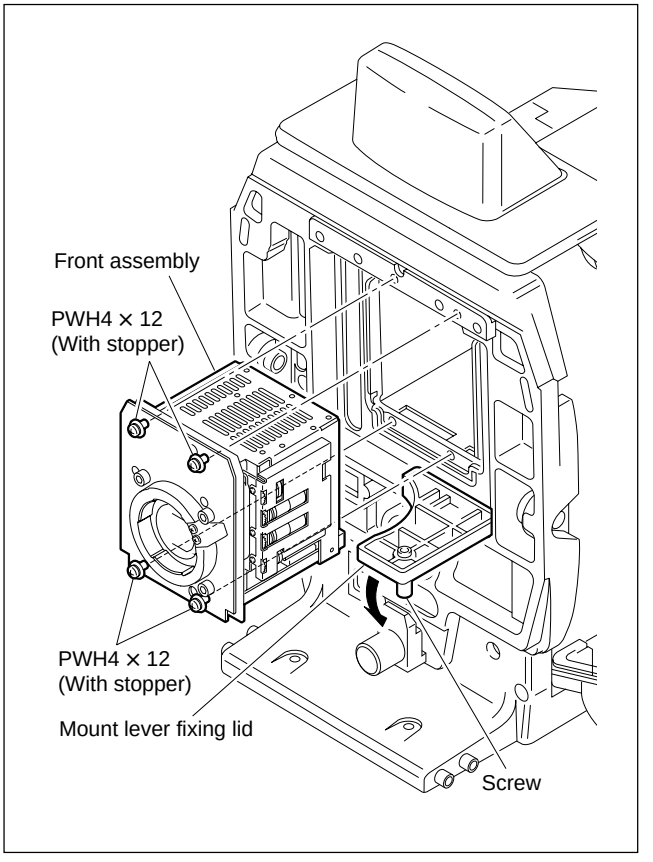
Section 2
Replacement of Main Parts (HDC-900/910)

2-1. Replacing the CCD Unit

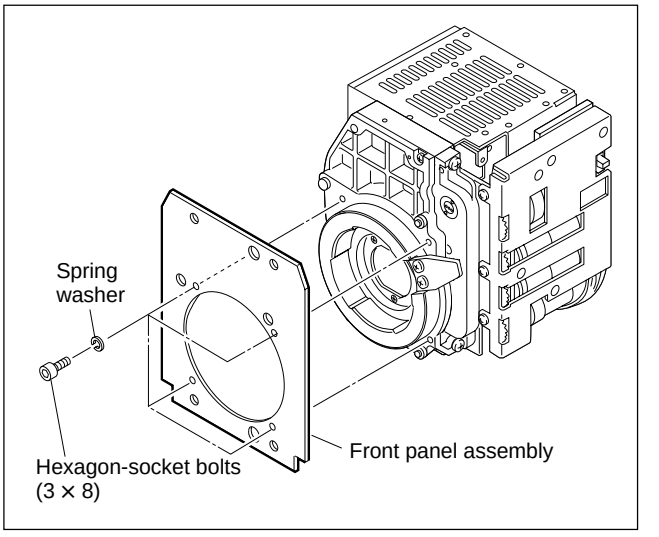
Note

Never remove or install the CCD unit with the power turned on. Because touching internal harness to the cabinet or other printed circuit boards during replacement causes shorts or electric hazards.
Prior to replacement, be sure to disconnect the optical cable or the cable connected at the DC IN connector in addition to turning off power switch.

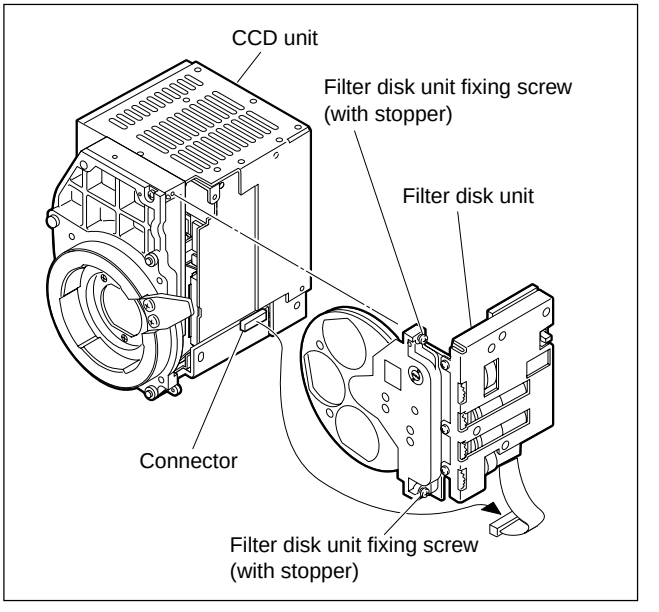
1. Open the right side panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
2. Loosen the screw of mount lever fixing lid, and open the mount lever fixing lid in the arrow direction.
3. Loosen the four screws of front assembly, and remove the front assembly.



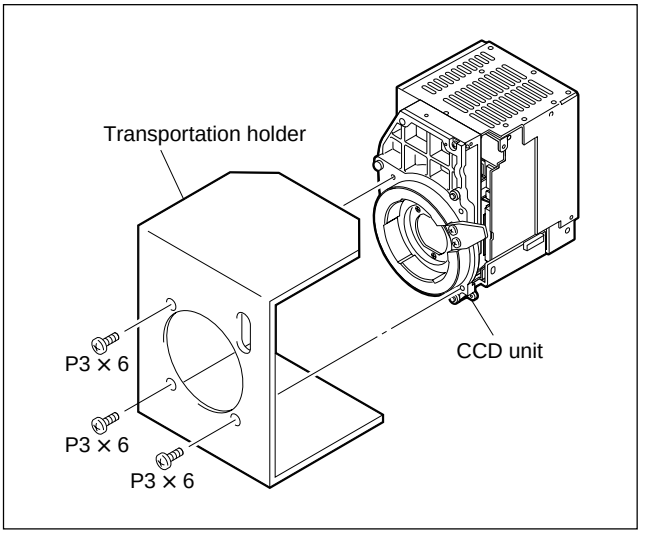
4. Remove the four hexagon-socket bolts, remove the four spring washers, and remove the front panel assembly.



5. Disconnect the connector of CCD unit, loosen the two fixing screws of the filter disk unit, and remove the filter disk unit.



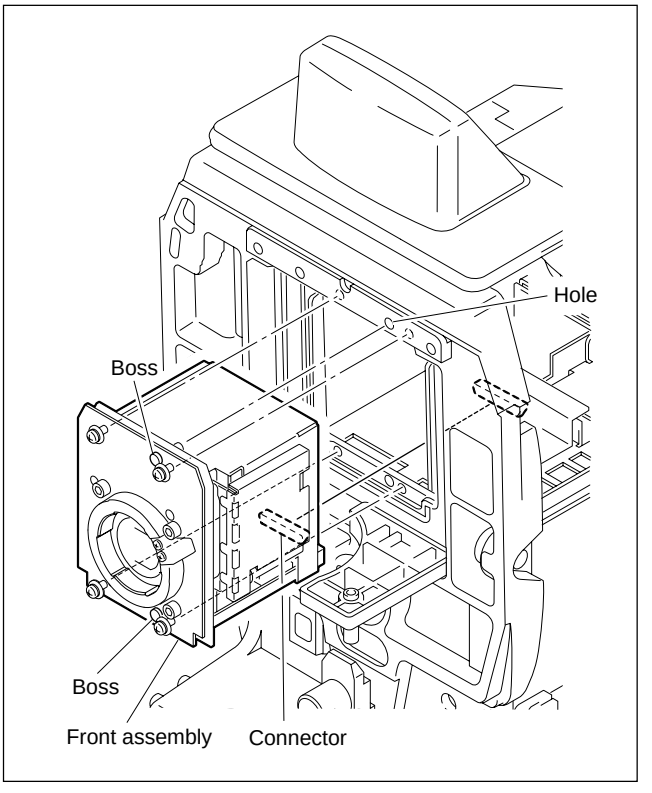
6. Remove the three screws, and remove the transportation holder from the CCD unit for repair part HKC-C900R (optional).



7. Install the new CCD unit in the reverse order of steps 1 to 6.

Note at installation

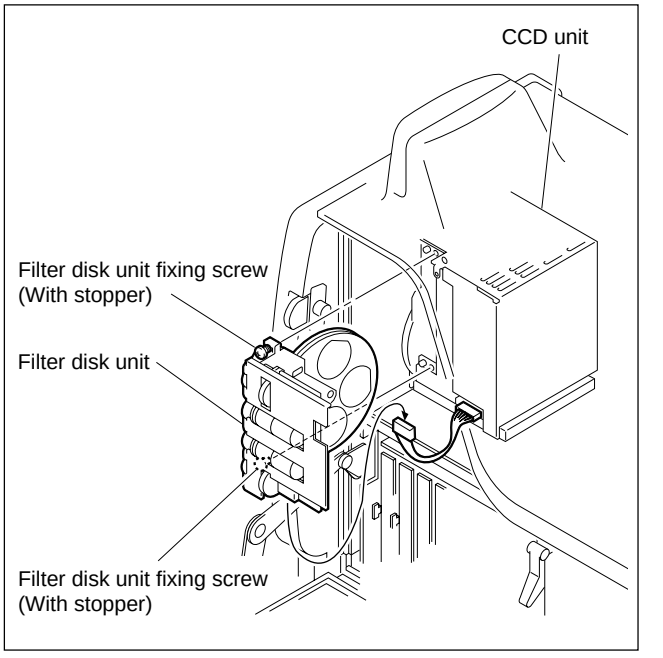
When installing the CCD unit, adjust the boss of the front assembly to the hole on the chassis and connect the connector firmly.



2-2. Replacing the Filter Disk Unit

2-2-1. Filter Disk Unit

1. Open the right side panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
2. Disconnect the harness from the connector of filter disk unit, loosen the two fixing screws of the filter disk unit, and remove the filter disk unit.



3. Install the new filter disk unit in the reverse order of steps 1 and 2.

Note at installation

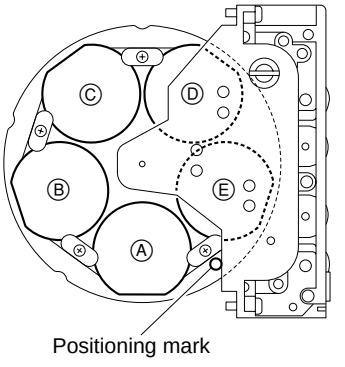
At installation, do not touch the surfaces of filters.

2-2-2. ND/CC Filters

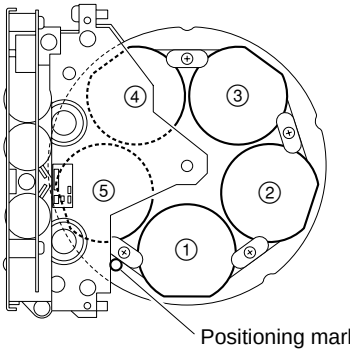
Five ND and CC filters each are provided with the filter disk unit. They have different features respectively. So when replacing filter, install observing the correct installation position and orientation.

ND/CC Filter List

Filter	Fig.	Type	Sony P/N	Orientation
CC	Ⓐ	Cross	9-939-645-01	Cut surface facing the lens
	Ⓑ	3200K	9-939-640-01	No orientation
	Ⓒ	4300K (light brown)	9-939-647-01	No orientation
	Ⓓ	6300K	9-939-648-01	No orientation
	Ⓔ	8000K (dark brown)	9-939-649-01	No orientation
ND	①	Clear	9-939-640-01	No orientation
	②	1/4 ND (light gray)	9-939-641-01	ND-coated (black-coated) surface facing the lens
	③	1/8 ND	9-939-642-01	
	④	1/16 ND	9-939-643-01	
	⑤	1/64 ND (dark gray)	9-939-644-01	No orientation



<Front view >



< Rear view >

Replacement

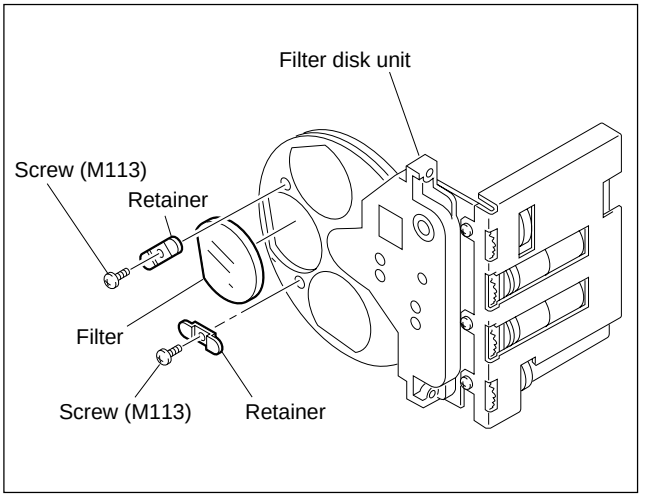
Note

It is recommendable to replace the ND or CC filter in a clean room.

1. Remove the filter disk unit. (Refer to Section 2-2-1.)
2. Remove the tow screws to remove retainers securing the filter to be replaced.
3. Install a new filter using the screws and retainers which were removed in procedure 2.

   Note

   When installing a CC cross filter or ND filter, take care that it is established to the correct orientation.



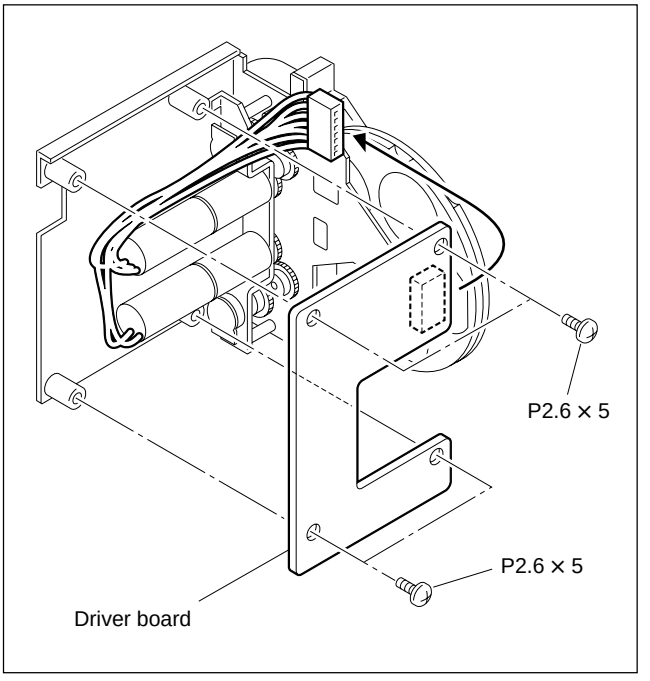
4. Install the filter disk unit in the camera. (Refer to Section 2-2-1.)

Adjustment

After replacement, white balance adjustment is required. Refer to Section 6-7 for details on adjustment.

2-2-3. Driver Board

1. Remove the filter disk unit. (Refer to Section 2-2-1.)
2. Remove the four screws.
3. Disconnect the harness from the connector of driver board, and remove the driver board.



4. Install the new driver board in the reverse order of steps 1 to 3.

Adjustment

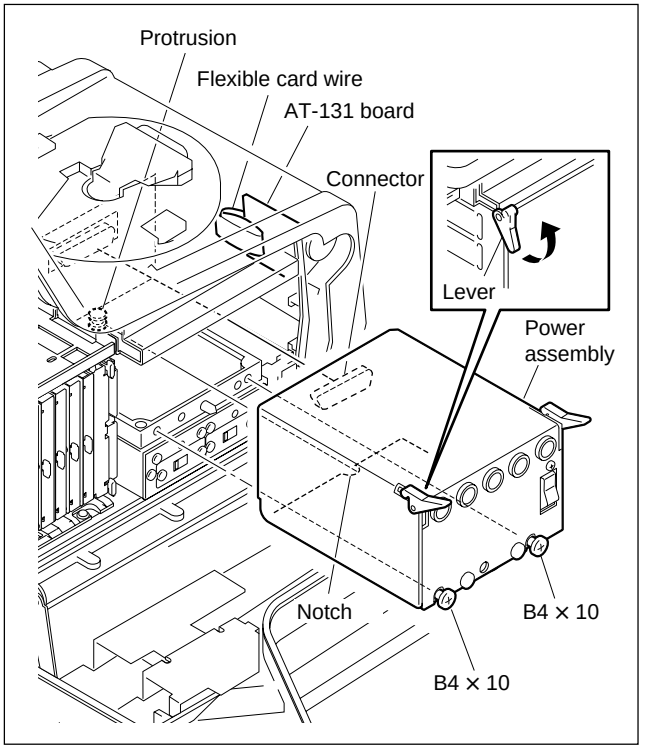
After replacement, filter positioning adjustment is required.
Refer to Section 6-8 for details on adjustment.

2-3. Replacing the Power Assembly

Notes

- To avoid electric hazards when disconnecting the power assembly, allow at least three minutes after powering off. To turn off the power, disconnect the optical cable or the cable connected at the DC IN connector in addition to turning off the power switch.
- The power assembly will go very hot during operation. If you touch the power assembly, there is some danger to get burned. When you repair power supply and peripheral equipment, allow a few minutes after powering off until the inside cools off.

1. Open the right side panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
2. Loosen the two screws, and up the lever in the arrow direction to remove the power assembly.



3. Install the new power assembly in the reverse order of steps 1 and 2.

Note at installation

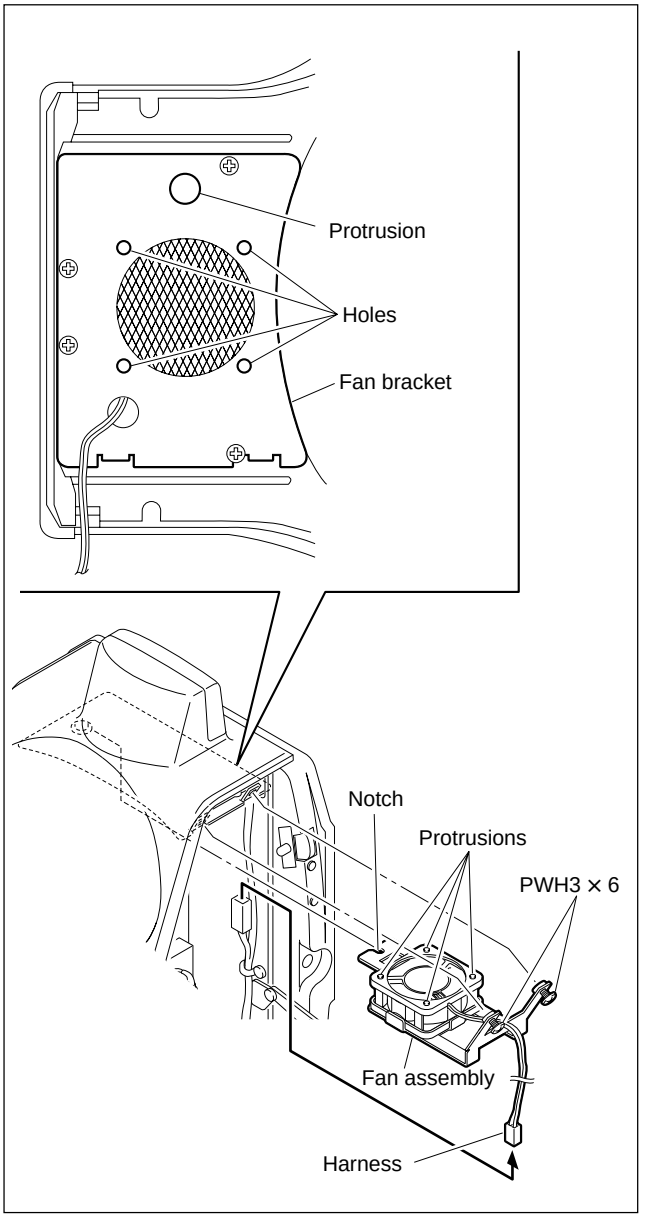
When installing the power assembly, make sure the flexible card wire of the AT-131 board does not get caught. Fit the notch on the power assembly to the protrusion on the chassis assembly, and make sure the connector is connected firmly.

2-4. Replacing the Fan

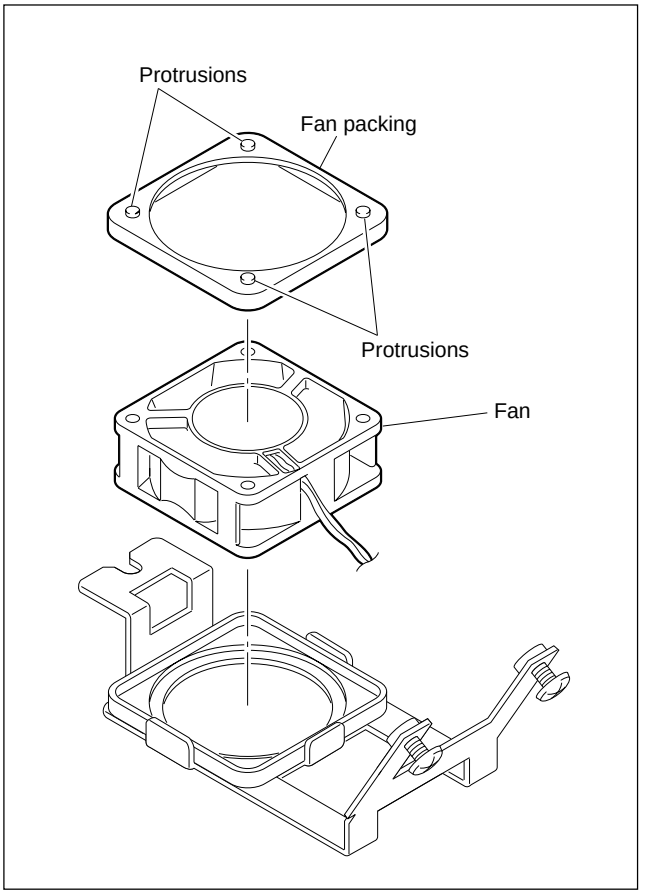
CAUTION

If the fan is out of order, the inside temperature of the unit will rise. Touching the inside in this state may cause a burn. When replacing the fan, allow a few minutes after powering off until the inside cools off.

1. Open the left side panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
2. Loosen the two screws, and disconnect the harness from the connector.
3. Pull the notch on the fan assembly from the protrusion on the fan bracket, and remove the fan assembly.



4. Remove the fan packing, and remove the fan.



5. Install the new fan in the reverse order of steps 1 to 4.

Notes at installation

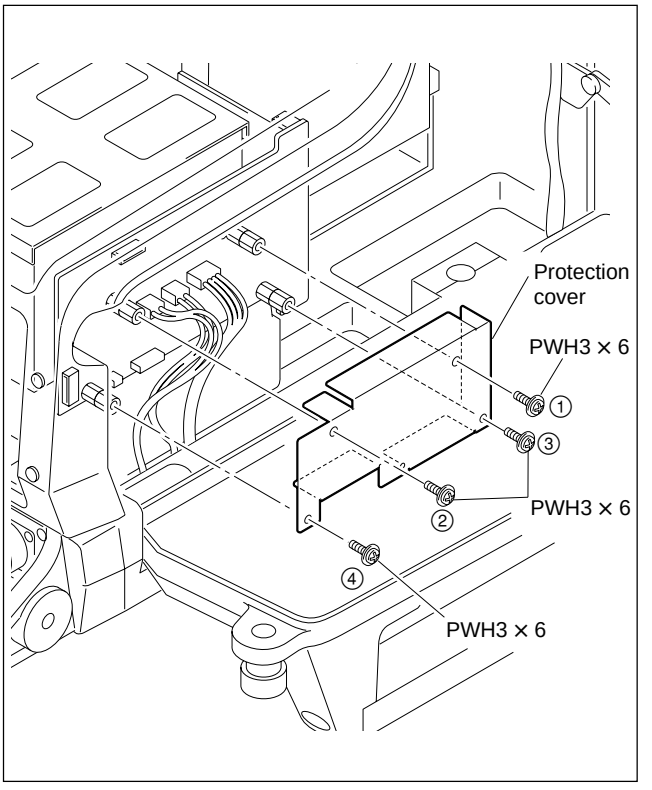
- Install the fan to the bracket with care so that the fan harness is routed as shown in the figure for step 4.
- To install the fan assembly, refer to the figure for step 3, and fit the notch on the fan assembly to the protrusion on the fan bracket, and the protrusions on the fan packing to the holes on the fan bracket.

2-5. Replacing the CCU Connector

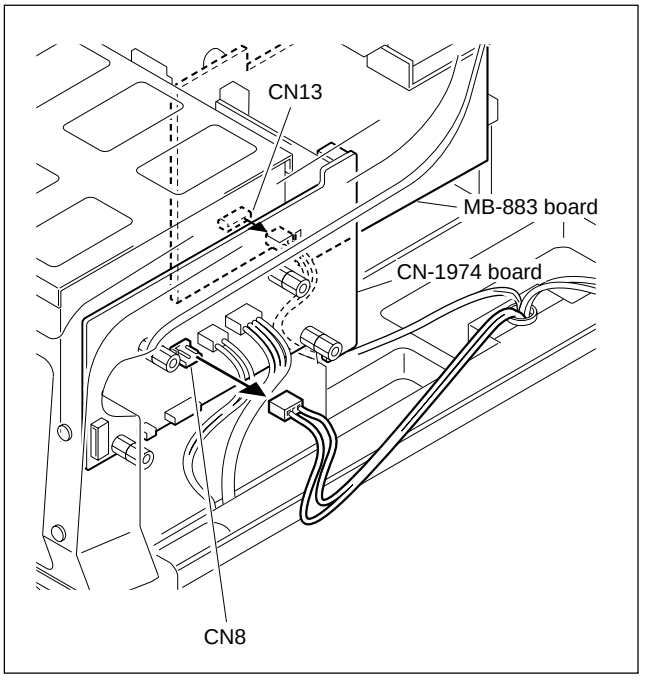
Note

Optical cables used in the unit are very fragile. So do not bend or yank in handling. This causes a break in the cable.

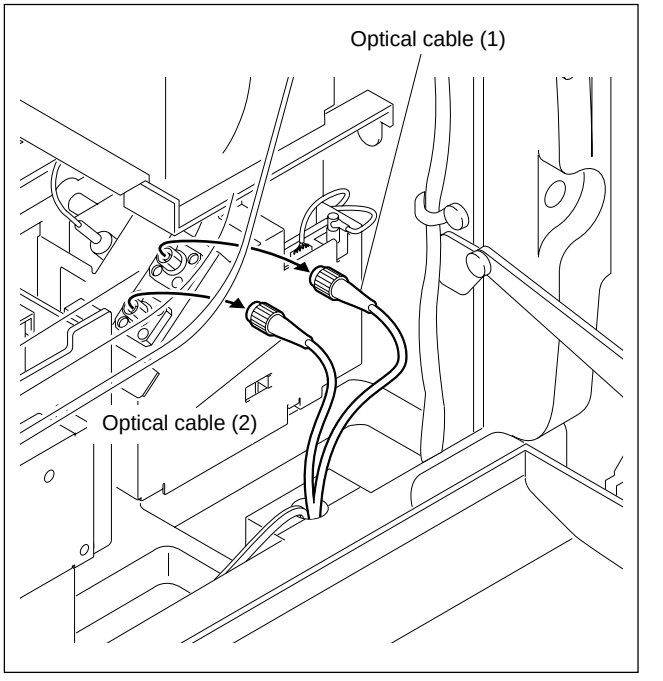
1. Open the left side panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
2. Remove the four screws in the order of ④, ③, ②, and ①, and remove the protection cover.



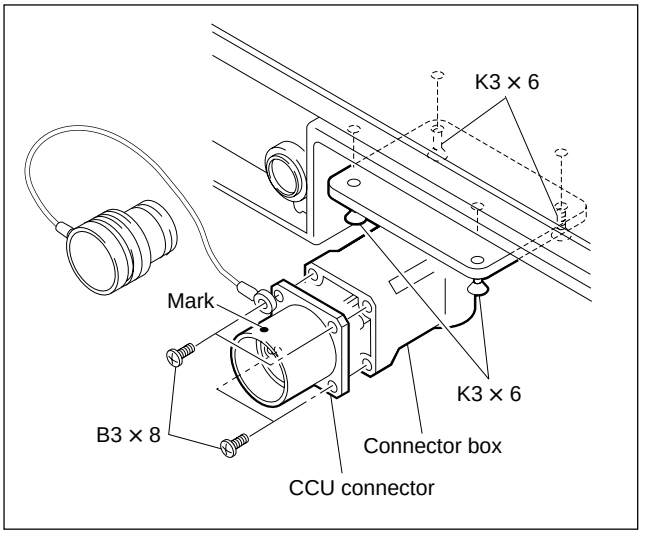
3. Disconnect the connector CN13 of the MB-883 board and connector CN8 of the CN-1974 board.



4. Disconnect the optical cables (1) and (2).



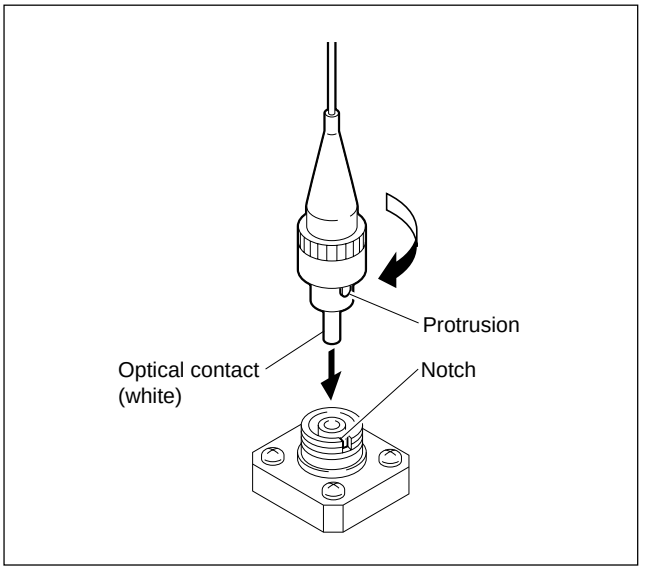
5. Remove the four screws, and remove the connector box.
6 Remove the four screws, and remove the CCU connector.



7. Install the CCU connector in the reverse order of steps 1 to 6.

Notes at installation

- Before connecting the connection connector, clean the white optical contact at the tip of connector with alcohol.
- Align the protrusion of the connector with the notch of the interconnection connector in connecting.
- When installing the CCU connector, be sure that the marker is positioned as shown in the figure for step 5.



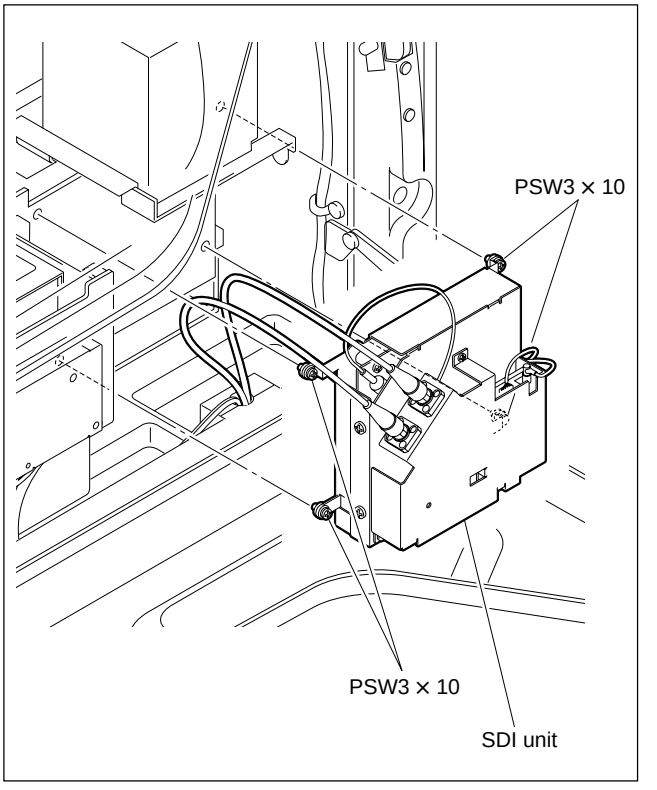
2-6. Replacing the Boards

2-6-1. SDI-49 Board

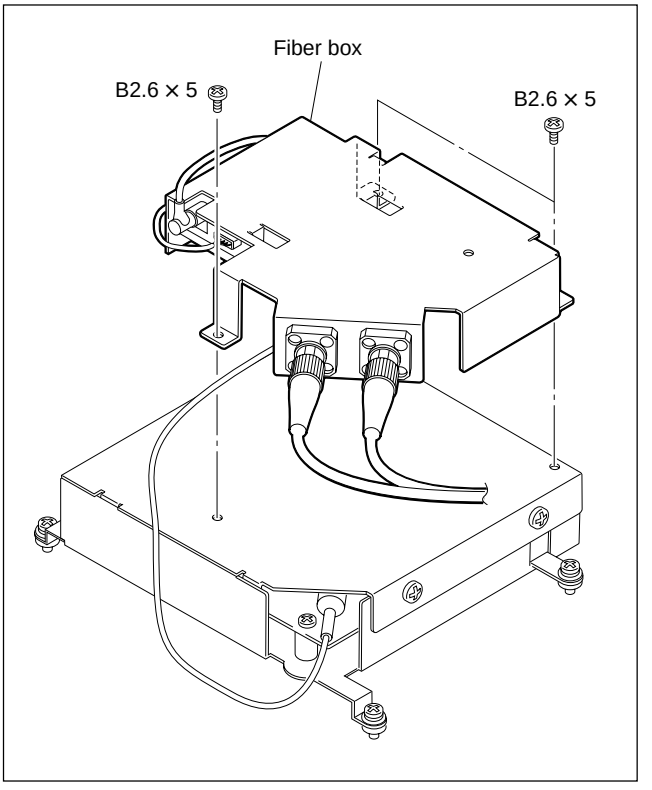
Notes

- Every electrical part mounted on the SDI-49 board cannot be replaced. If there is any defective part, replace the board itself.
- Optical cables used in the unit are very fragile. So do not bend or yank in handling. This causes a break in the cable.

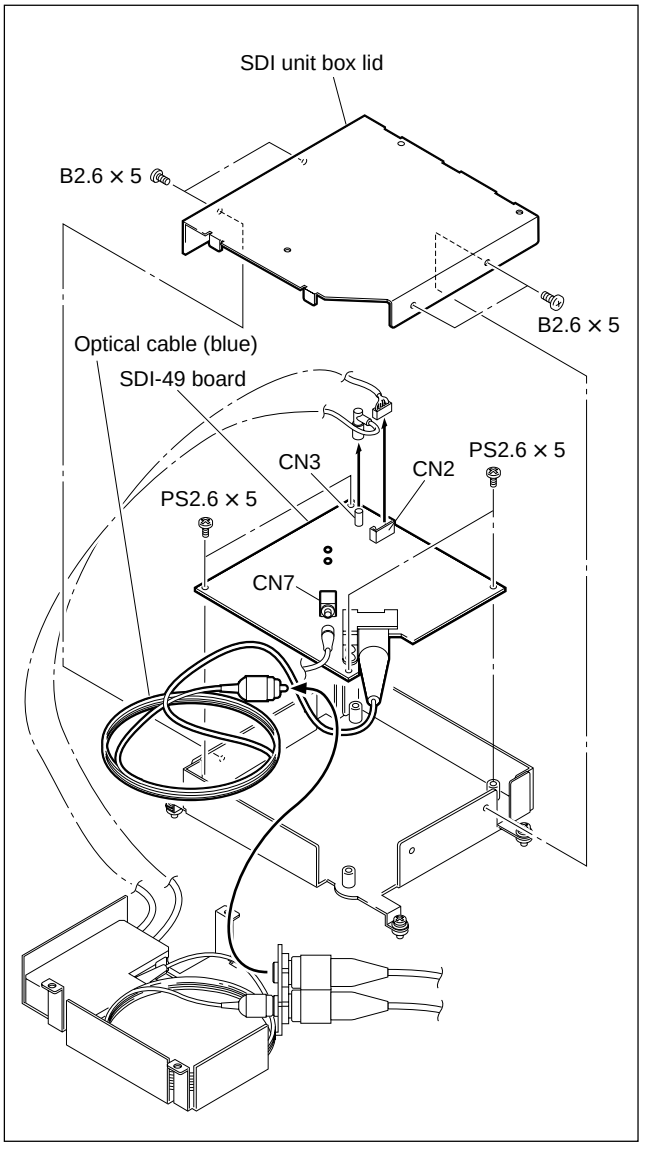
1. Open the left side panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
2. Loosen the four screws, and remove the SDI unit.



3. Remove the three screws, and remove the fiber box.



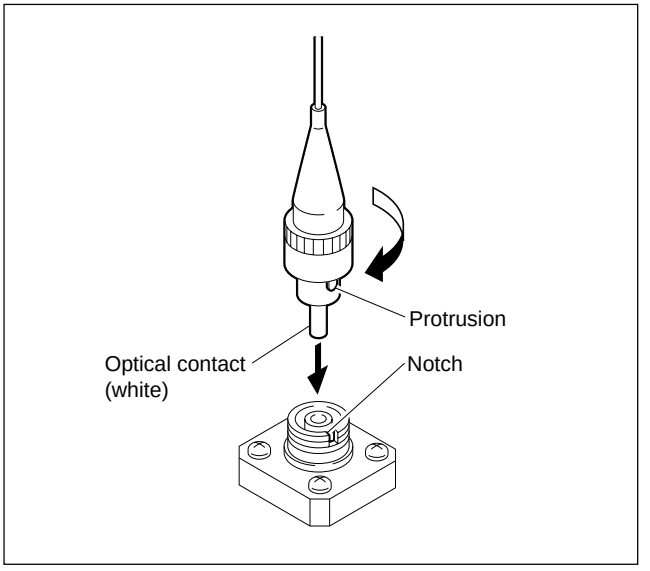
4. Remove the four screws, and remove the SDI unit box lid.
5. Disconnect the optical cable (blue).
6. Disconnect the harness from the connector CN2 of the SDI-49 board, and disconnect the coaxial cables from the connectors CN7 and CN3.
7. Remove the four screws, and remove the SDI-49 board.



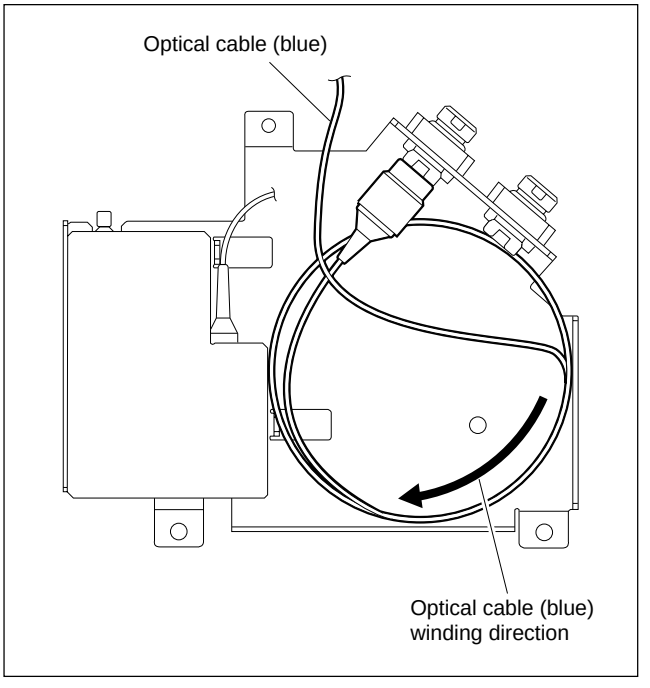
8. Install the new SDI-49 board in the reverse order of steps 1 to 7.

Notes at installation

- Before connecting the connection connector, clean the white optical contact at the tip of connector with alcohol.
- Align the protrusion of the connector with the notch of the interconnection connector in connecting.



- Refer to the figure and keep the extra optical cable (slacked part) in the fiber box.

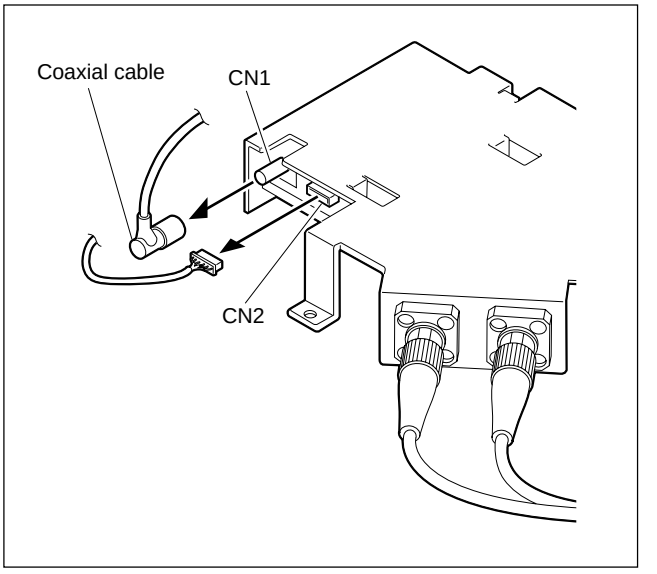


2-6-2. RX-28 Board

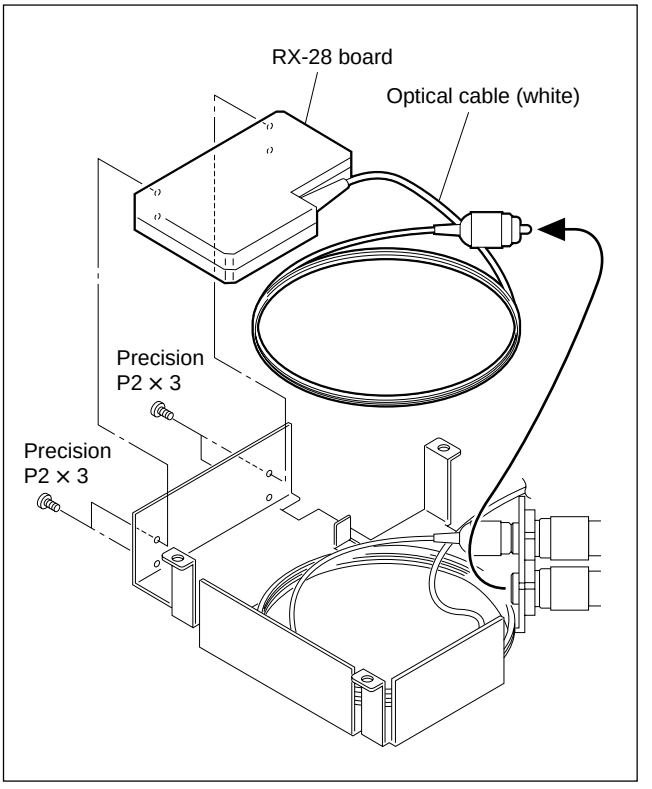
Notes

- Every electrical part mounted on the RX-28 board cannot be replaced. If there is any defective part, replace the board itself.
- Optical cables used in the unit are very fragile. So do not bend or yank in handling. This causes a break in the cable.

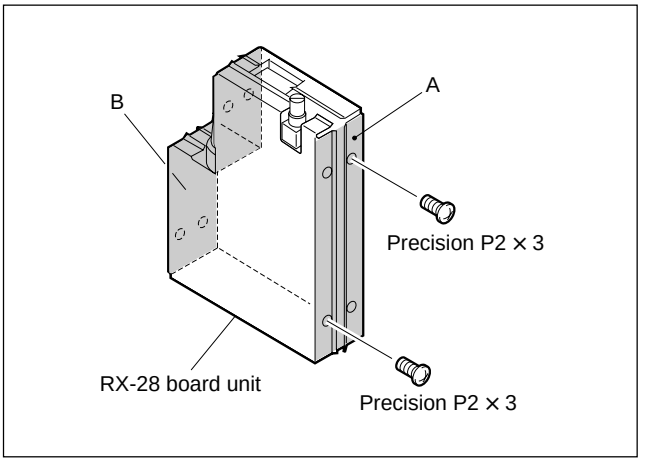
1. Perform steps 1 to 4 of Section 2-6-1.
2. Disconnect the harness from the connector CN2 of the RX-28 board, and disconnect the coaxial cable from the connector CN1.



3. Disconnect the optical cable (white).
4. Remove the four screws, and remove the RX-28 board.



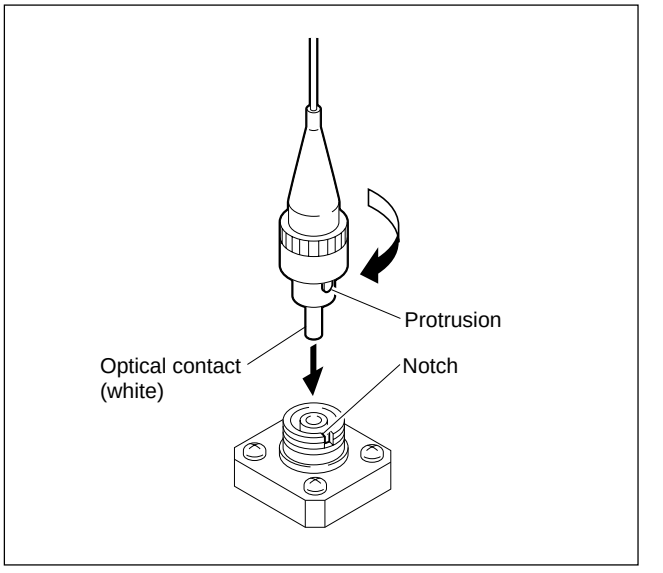
5. Remove the two screws at side A of the new RX-28 board and install them to empty screw holes on side B.



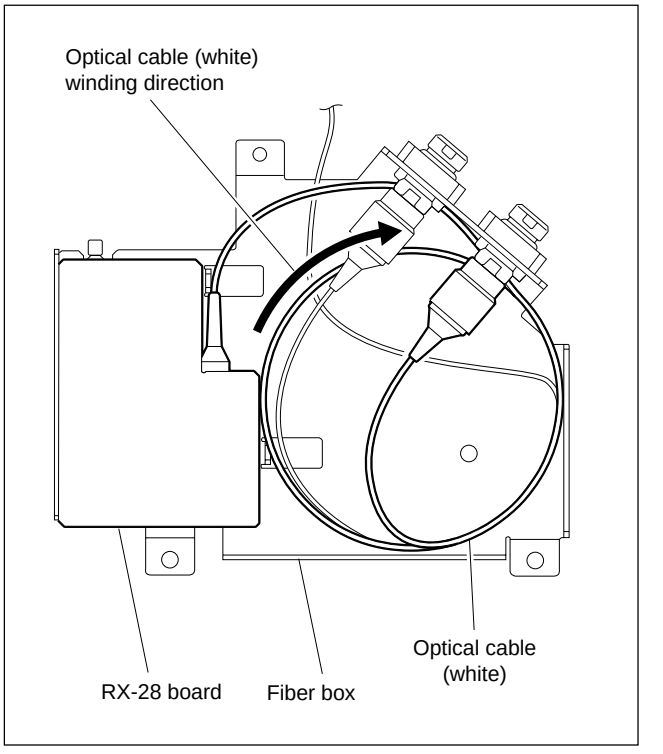
6. Install the new RX-28 board in the reverse order of steps 1 to 4.

Notes at installation

- Before connecting the connection connector, clean the white optical contact at the tip of connector with alcohol.
- Align the protrusion of the connector with the notch of the interconnection connector in connecting.



- Refer to the figure and keep the extra optical cable (slacked part) in the fiber box.



2-6-3. MB-883 Board

1. Remove the SDI unit. (Refer to steps 1 and 2 of Section 2-6-1.)

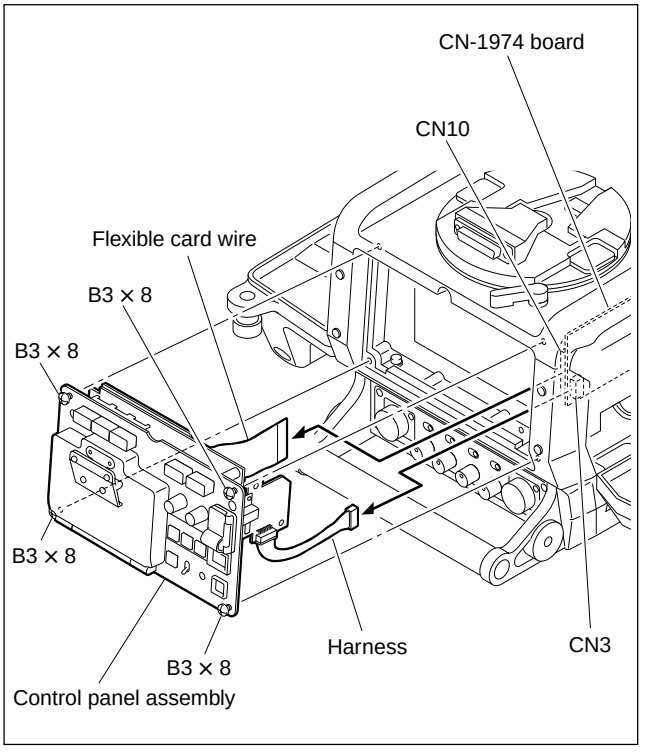
   Note

   Optical cables used in the unit are very fragile. So do not bend or yank in handling. This causes a break in the cable.

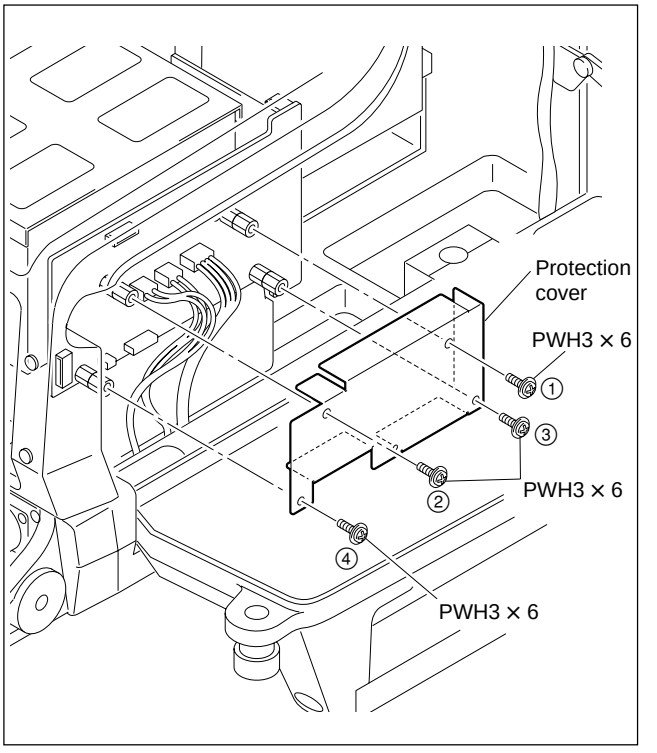
2. Loosen the four screws, disconnect flexible card wire and harness from connectors (CN10 and CN3) of the CN-1974 board, and remove the control panel assembly.

   Note

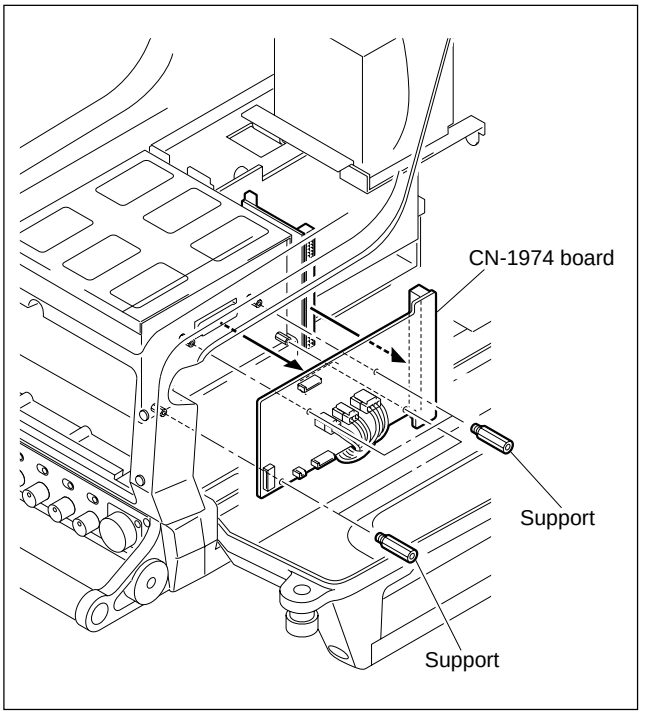
   Refer to Section 1-5 for details on disconnecting/ connecting the flexible card wire.



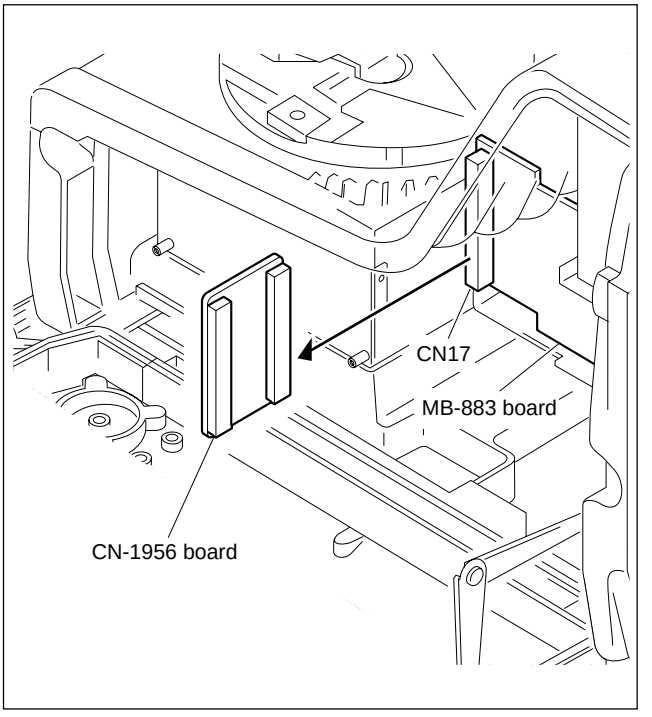
3. Remove the four screws in the order of ④, ③, ②, and ①, and remove the protection cover.



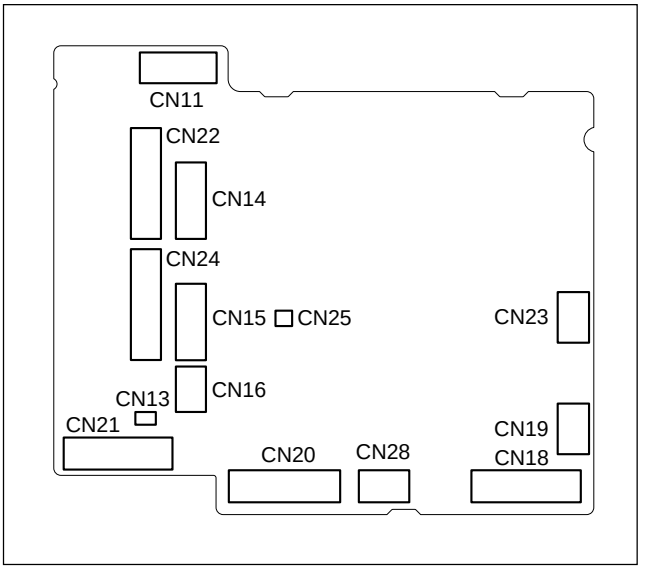
4. Remove the four supports of the CN-1974 board, and remove the CN-1974 board.



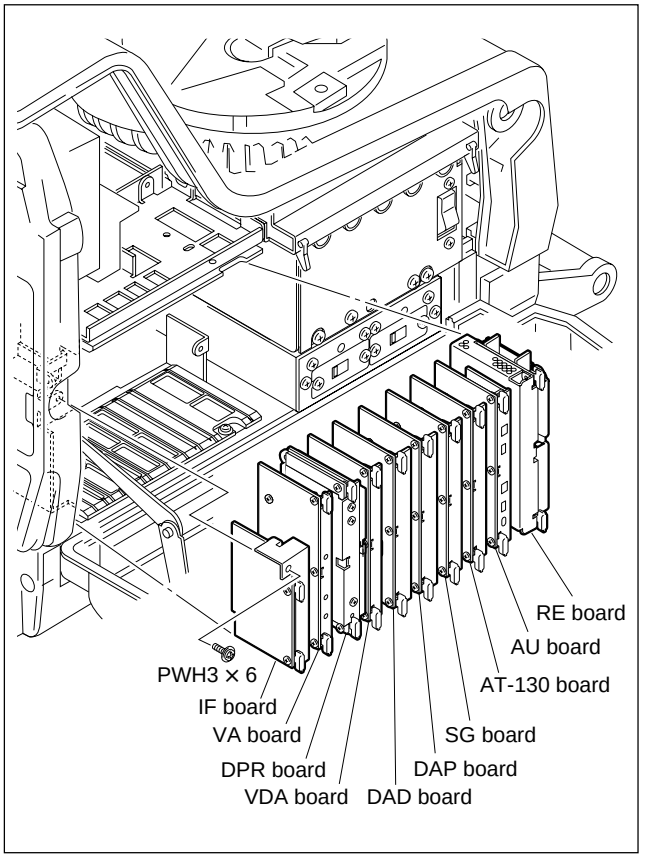
5. Remove the CN-1956 board.



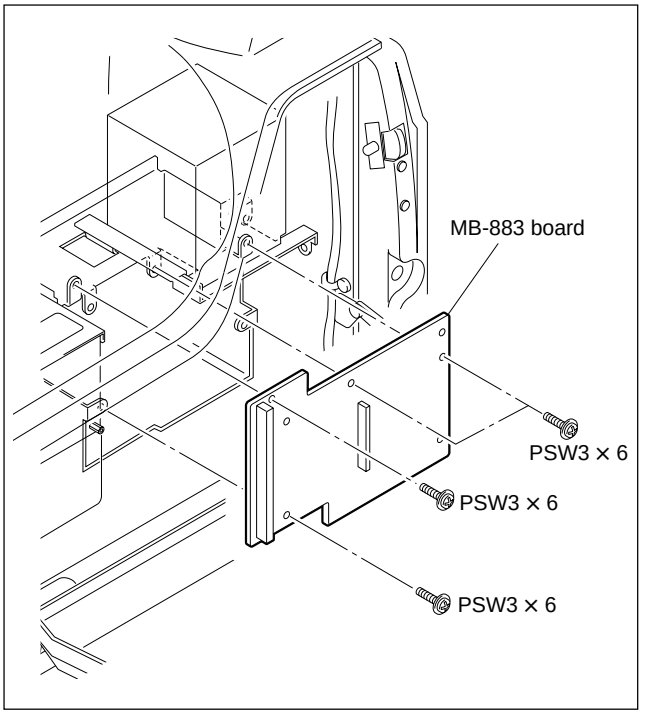
6. Disconnect the fourteen connectors (CN11, CN13 to CN16, CN18 to CN25, CN28) of the MB-883 board.



7. Open the right side panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
8. Pull out the plug-in boards (RE, AU, AT-130, SG, DAP, DAD, VDA, DPR, VA) along the groove of the board rail and remove.
9. Remove the four screws, and remove the MB-883 board.



10. Remove the screw, and remove IF board.



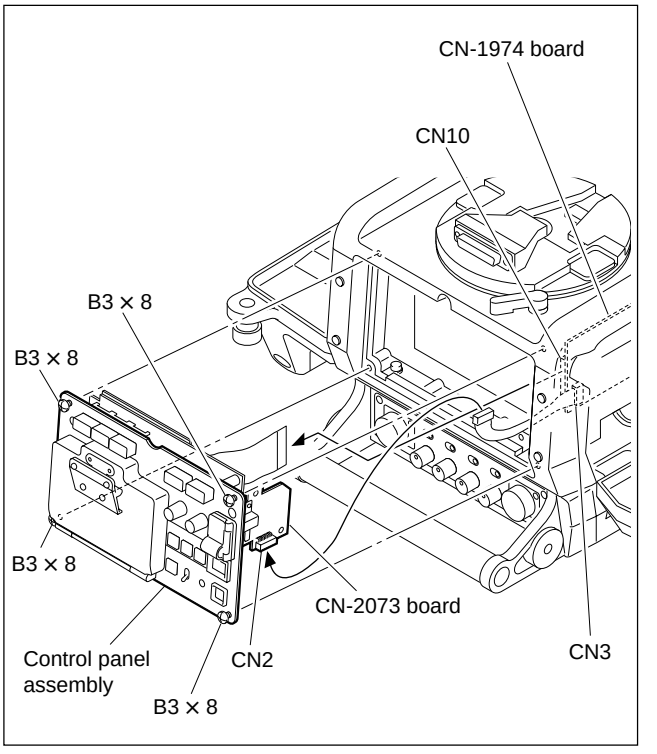
11. Install the new MB-833 board in the reverse order of steps 1 to 10.

2-6-4. CN-2073 Board

1. Loosen the four screws, and remove the control panel assembly.
2. Disconnect the flexible card wire from the connector CN10 of the CN-1974 board, and disconnect the harness from connector CN2 of the CN-2073 board.

Note

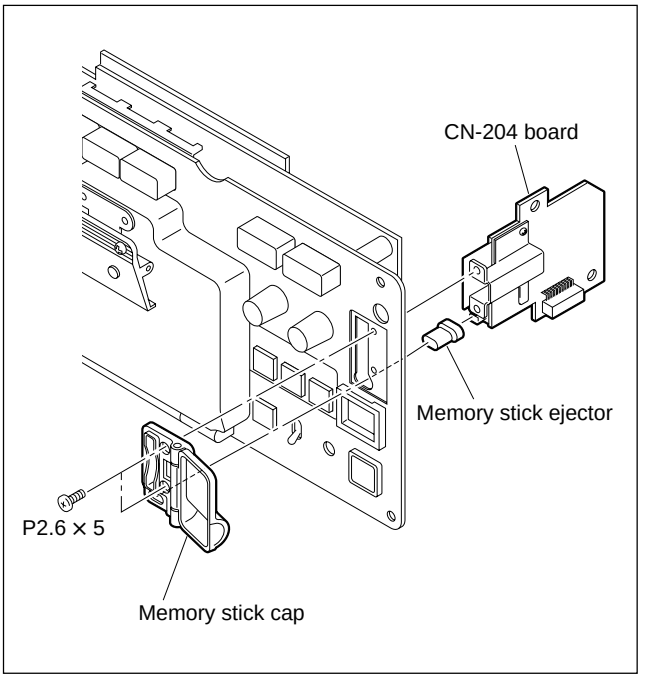
Refer to Section 1-5 for details on disconnecting/ connecting the flexible card wire.



3. Open the memory stick cap, and remove the two screws.
4. Remove the CN-2073 board.

Note

The memory stick ejector will disconnect at the same time. Be careful not to lose it.



5. Install the new CN-2073 board in the reverse order of steps 1 to 4.
6. After installing, make sure that the memory stick has been inserted in smooth free from getting any troubles.

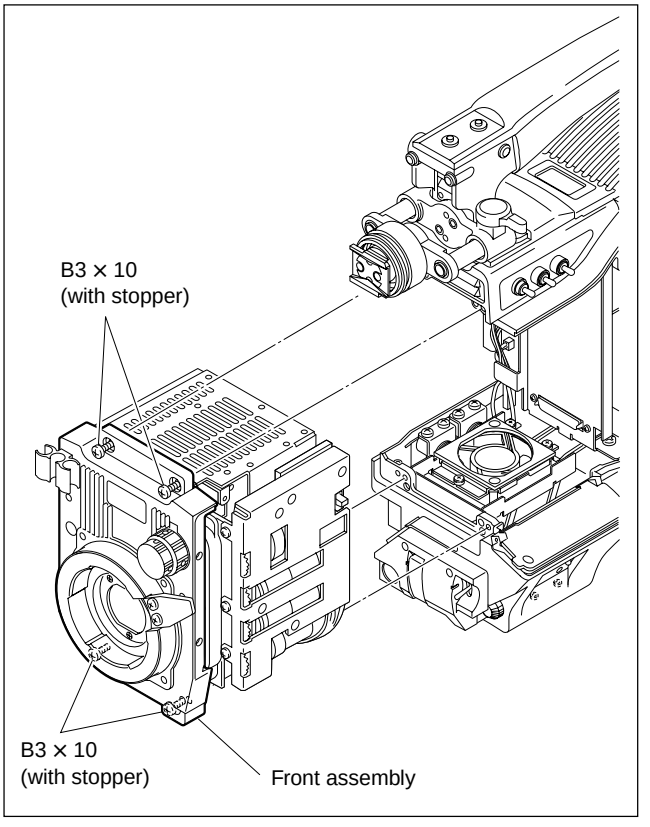
Section 3
Replacement of Main Parts (HDC-950/930, HKC-T950)

3-1. Replacing the CCD Unit

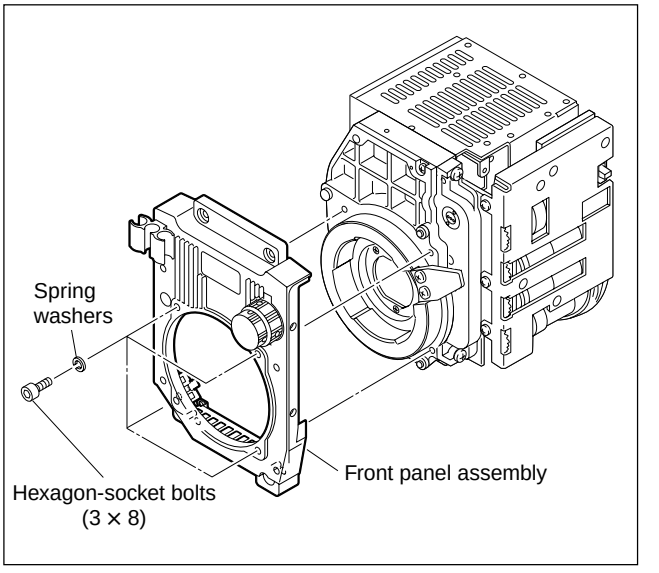
Notes

- Never remove or install the CCD unit with the power turned on. Because touching internal harness to the cabinet or other printed circuit boards during replacement causes shorts or electric hazards.
  Prior to replacement, be sure to disconnect the optical cable or the cable connected at the DC IN connector in addition to turning off power switch.
- The following replacement procedures of the CCD unit are described on the HDC-950/930 base. When the CCD unit of the HKC-T950 is replaced, remove the front assembly referring to Section 3-15-5 “IF-845 Board”, and then perform the following step 3 and later.

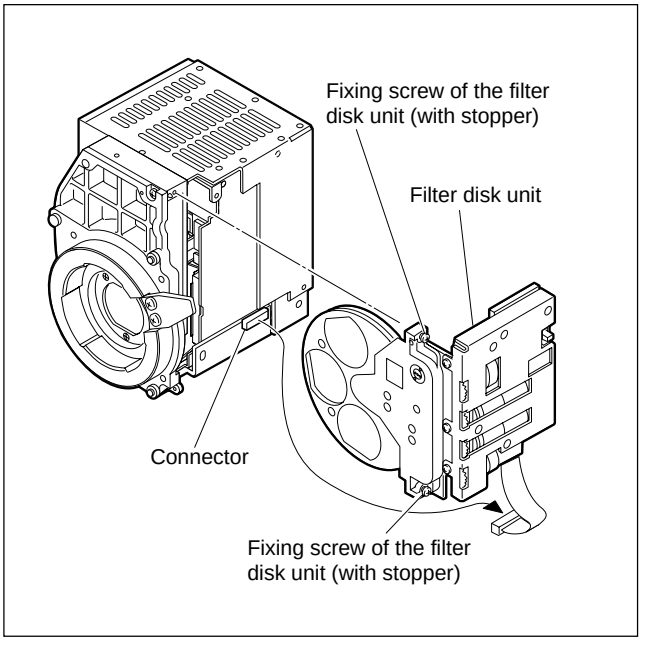
1. Remove the inside panel and outside panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
2. Loosen the four screws of front assembly, and remove the front assembly.



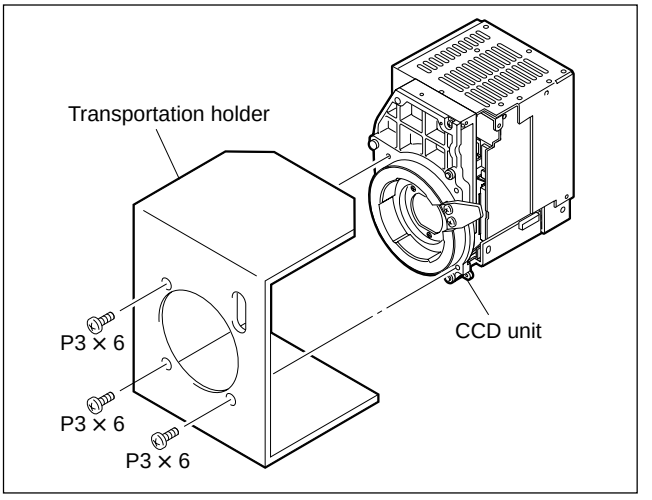
3. Remove the four hexagon-socket bolts, remove the four spring washers, and remove the front panel assembly.



4. Disconnect the harness from the connector of CCD unit, loosen the two fixing screws of the filter disk unit, and remove the filter disk unit.



5. Remove the three screws, and remove the transportation holder from the CCD unit for repair part HKC-C900R (optional).



6. Attach the new CCD unit in the reverse order of steps 1 to 4.

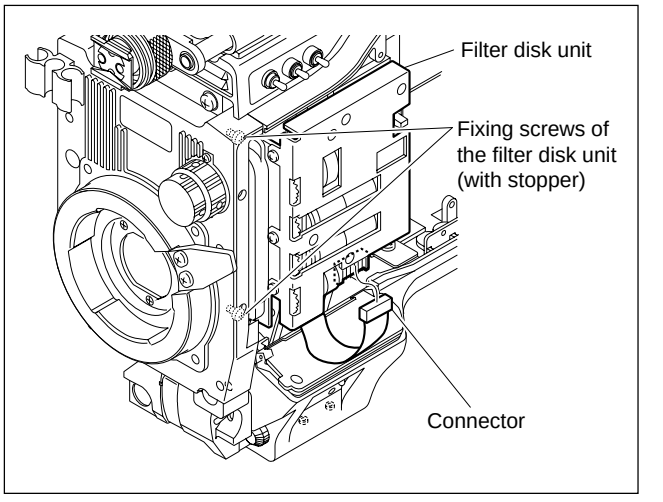
3-2. Replacing the Filter Disk Unit

3-2-1. Filter Disk Unit

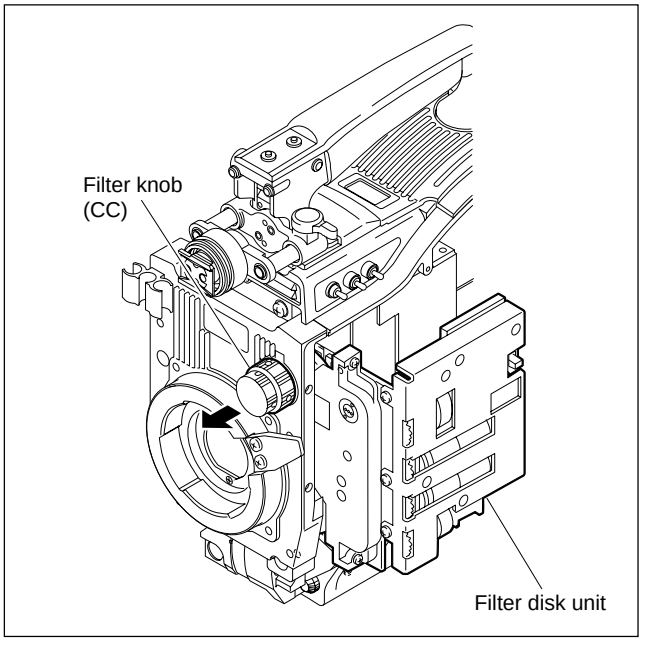
Note

The following replacement procedures of the filter disk unit are described on the HDC-950/930 base. When the filter disk unit of the HKC-T950 is replaced, remove the right side panel referring to Section 3-15-5 “IF-845 Board”, and then perform the following step 2 and later.

1. Remove the inside panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
2. Disconnect the connector of filter disk unit, loosen the two fixing screws of the filter disk unit.



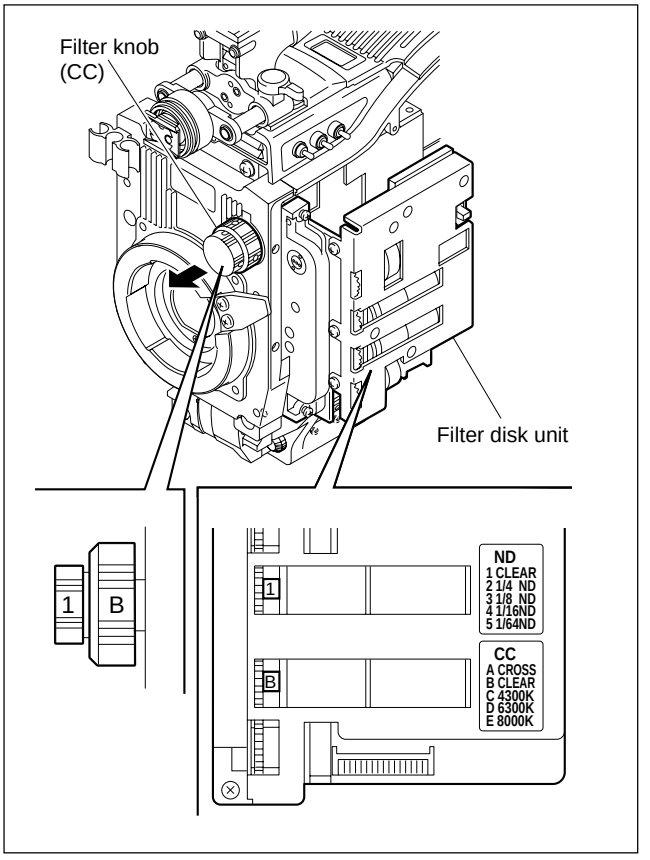
3. Pulling the filter knob (CC) to the arrow direction, draw out the filter disk unit.



4. Adjust the indication (ND, CC) of the filter knob to coincide with respective ND, CC of the new filter disk unit, respectively as shown below.
5. Pulling the filter knob (CC) to the arrow direction, then install the new filter disk unit in the camera.

Note

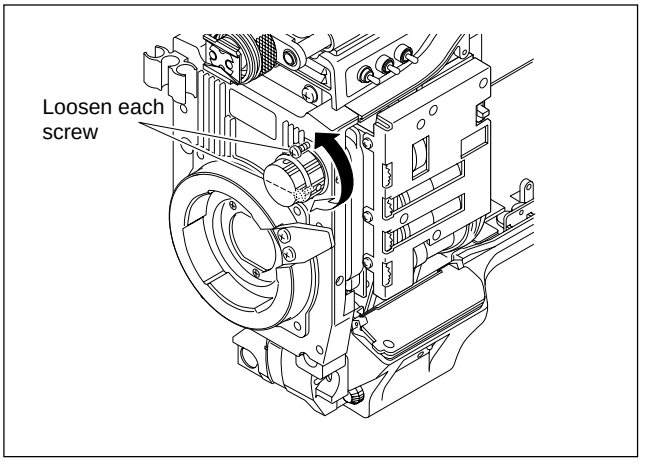
At installation, do not touch the surfaces of filters.



6. Little by little turning the filter knob (ND, CC) to left or right direction, have knob (ND, CC) and the filter disk unit ND, CC to be coincided properly.
7. Be sure that ND of the filter disk unit is correspondingly linked to the filter knob (ND) and do CC to (CC) in the same fashion by means of turning the filter knob (ND, CC).
8. Fix the filter disk unit using two screws, then connect a connector.

Note

There is an occasion need to tune up a balance for torque of the filter knob (ND, CC) when a replacement of a filter disk unit is performed. In this case loosen two screws first, then make the knob have 1 or 2 turns for adjusting torque. After making sure of the right torque, tighten the screws again.

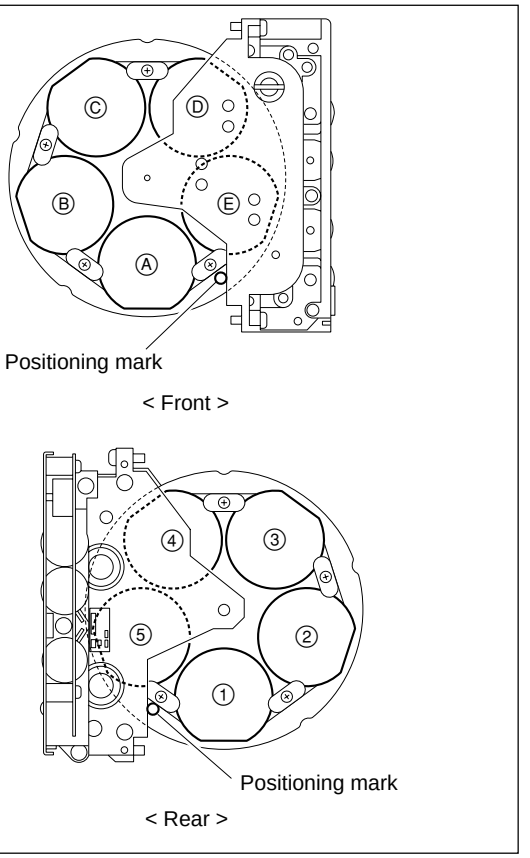


3-2-2. ND/CC Filters

Five ND and CC filters each are provided with the filter disk unit. They have different features respectively. So when replacing filter, install observing the correct installation position and orientation.

ND/CC Filter List

Filter	Fig.	Type	Sony P/N	Orientation
CC	Ⓐ	Cross	9-939-645-01	Cut surface facing the lens
	Ⓑ	3200K	9-939-640-01	No orientation
	Ⓒ	4300K (light brown)	9-939-647-01	No orientation
	Ⓓ	6300K	9-939-948-01	No orientation
	Ⓔ	8000K (dark brown)	9-939-649-01	No orientation
ND	①	Clear	9-939-640-01	No orientation
	②	1/4 ND (light gray)	9-939-641-01	ND-coated (black-coated) surface facing the lens
	③	1/8 ND	9-939-642-01	
	④	1/16 ND	9-939-643-01	
	⑤	1/64 ND (dark gray)	9-939-644-01	No orientation



Replacement

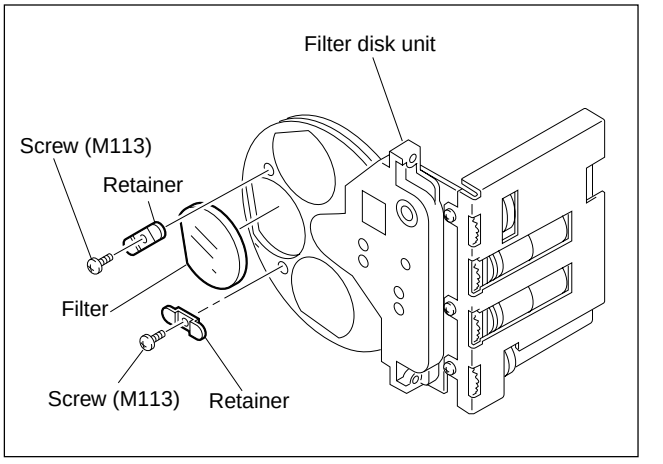
Note

It is recommendable to replace the ND or CC filter in a clean room.

1. Remove the filter disk unit. (Refer to Section 3-2-1.)
2. Remove the tow screws to remove retainers securing the filter to be replaced.
3. Install a new filter using the screws and retainers which were removed in procedure 2.

   Note

   When installing a CC cross filter or ND filter, take care that it is established to the correct orientation.



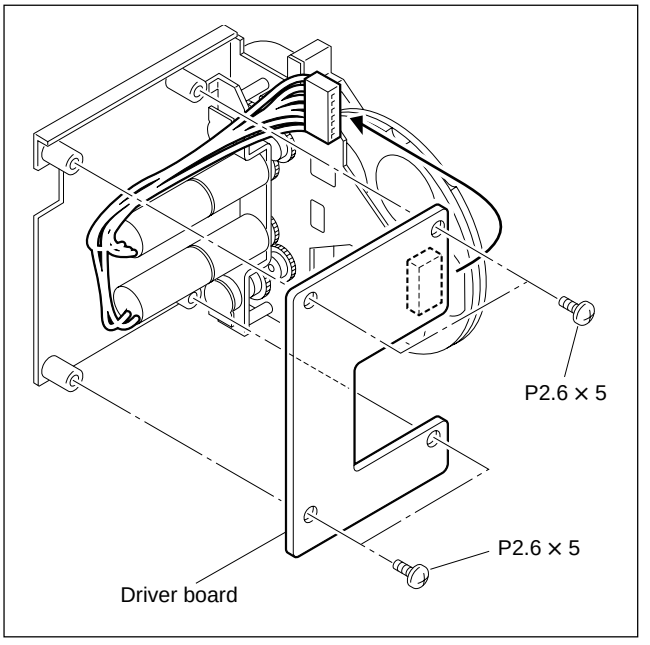
4. Install the filter disk unit in the camera. (Refer to Section 3-2-1.)

Adjustment

After replacement, white balance adjustment is required. Refer to Section 6-9 for details on adjustment.

3-2-3. Driver Board

1. Remove the filter disk unit. (Refer to Section 3-2-1.)
2. Remove the four screws.
3. Disconnect the connector of driver board, and remove the driver board.



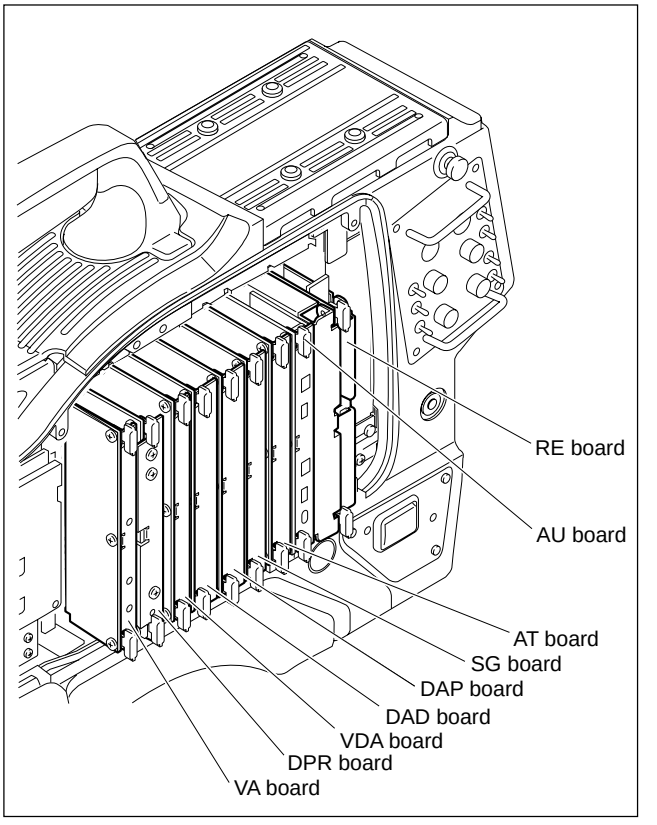
4. Attach the new driver board in the reverse order of steps 1 to 3.

Adjustment

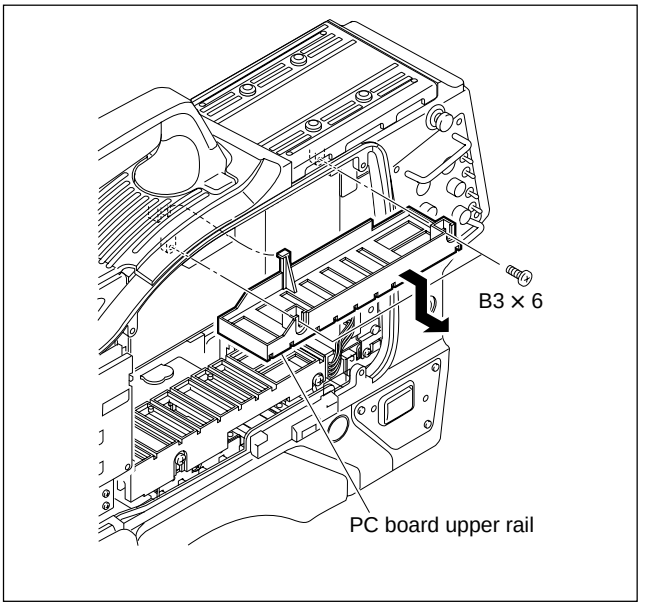
After replacement, filter positioning adjustment is required.
Refer to Section 6-8 for details on adjustment.

3-3. Replacing the AC/DC Converter Unit

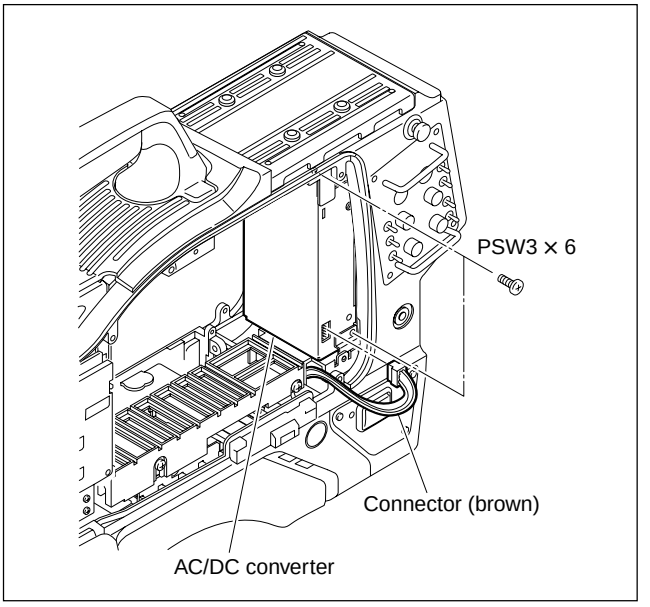
1. Remove the inside panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
2. Pull out the plug-in boards (RE, AU, AT, SG, DAP, DAD, VDA, DPR, VA) along the groove of the board rail and remove.



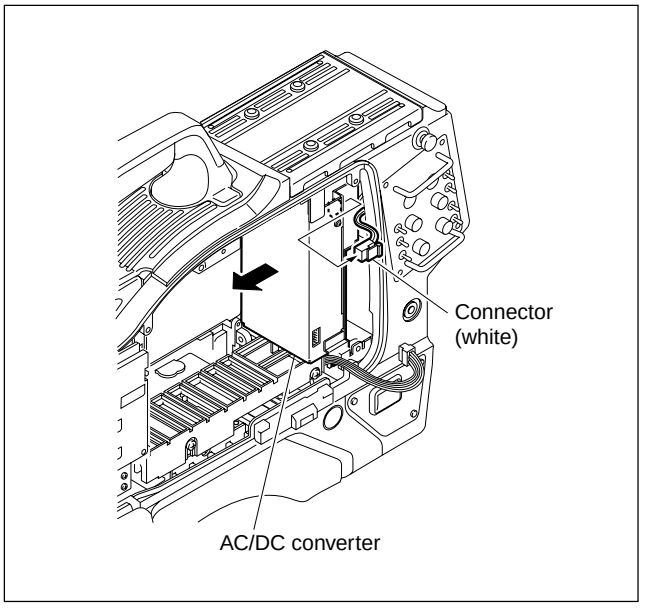
3. Remove the two screws, and remove the PC board upper rail to the arrow direction.



4. Disconnect the connector (brown) of AC/DC converter, and remove the two screws.



5. Slide the AC/DC converter to the arrow direction until the connector (white) fully can be recognized.
6. Disconnect the connector (white), and remove the AC/DC converter.



7. Install the new AC/DC converter in the reverse order of steps 1 to 6.

Note at installation

When fixing the screws, you are advised to do it with pressing the AC/DC converter downward in view of accurate and solid positioning.

3-4. Replacing the Fan

CAUTION

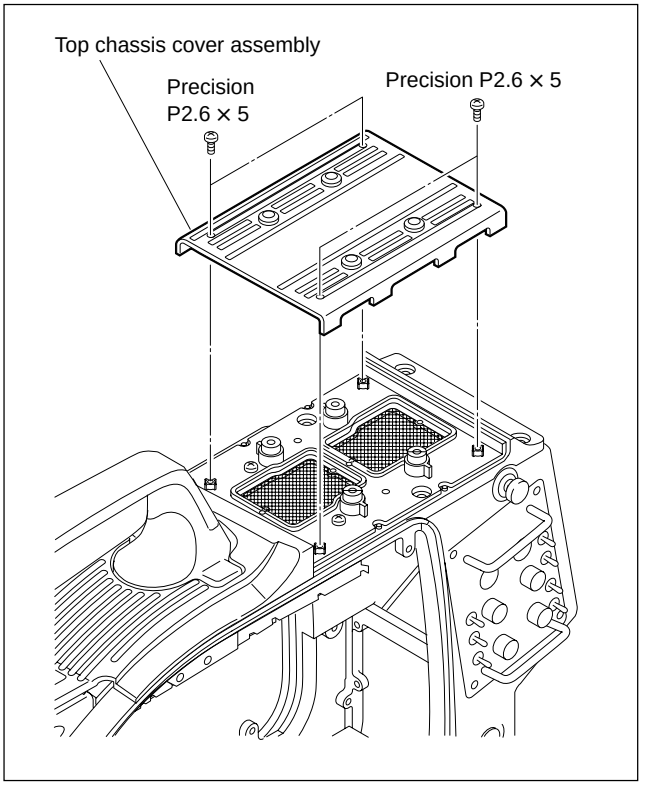
If the fan is out of order, the inside temperature of the unit will rise. Touching the inside in this state may cause a burn. When replacing the fan, allow a few minutes after powering off until the inside cools off.

3-4-1. Rear Fan

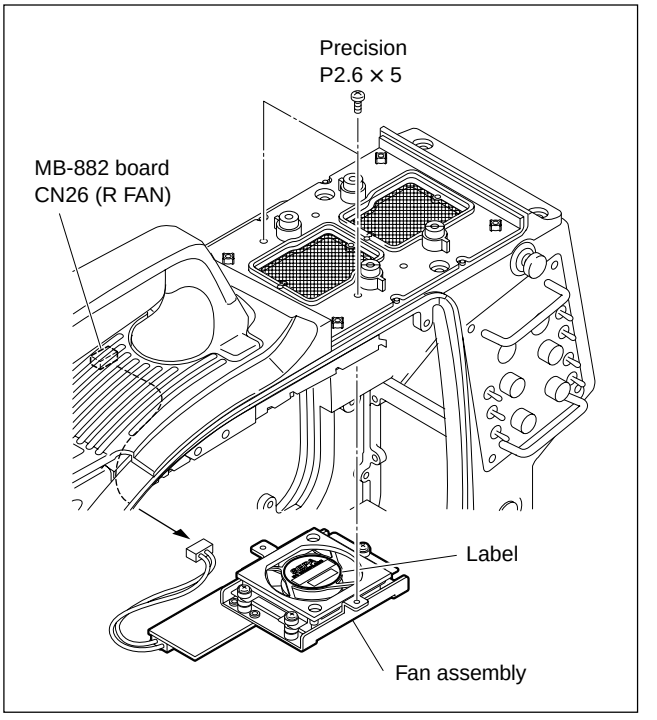
Note

When you need to replace a fan, clean it beforehand on the parts of take in/take out for air. (Refer to 2-2 of the Installation and Maintenance Manual.)

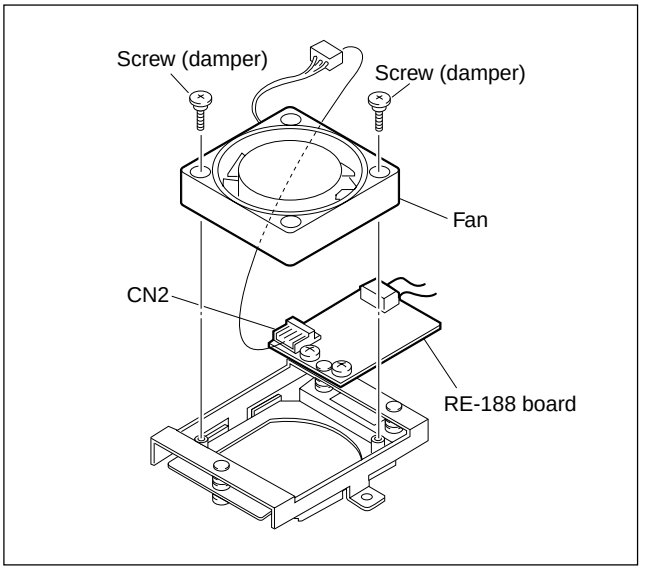
1. Remove the AC/DC converter. (Refer to Section 3-3.)
2. Remove the four screws, and remove the top chassis cover assembly.



3. Remove the two screws, supporting the fan assembly from the bottom side. Disconnect the connector (R FAN) of MB-882 board.



4. Disconnect the connector (CN2) of RE-188 board.
5. Remove the two screws, and remove the fan.



6. Install the new fan in the reverse order of steps 1 to 5.

Note at installation

Install the fan to the bracket with care so that the label faces the bracket as shown in the figure for step 3.

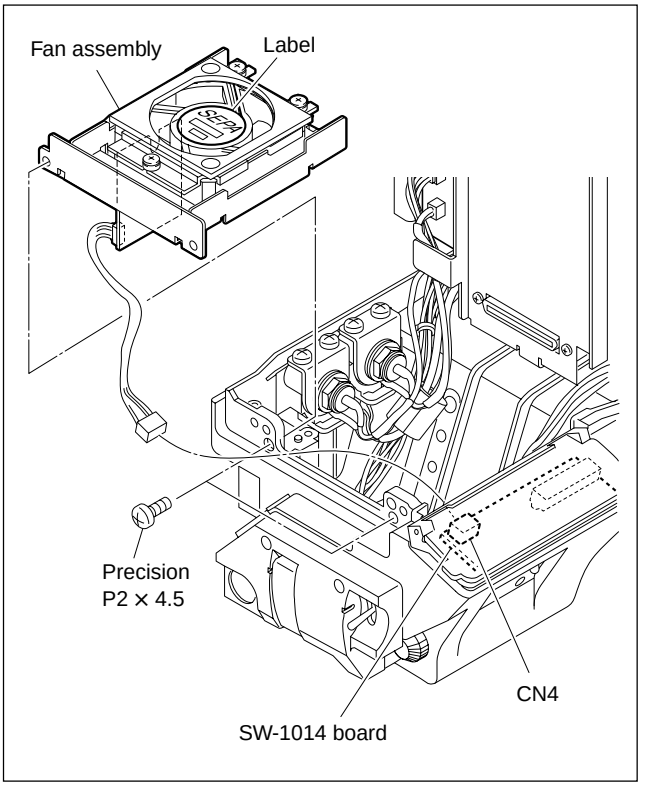
3-4-2. Front Fan

Note

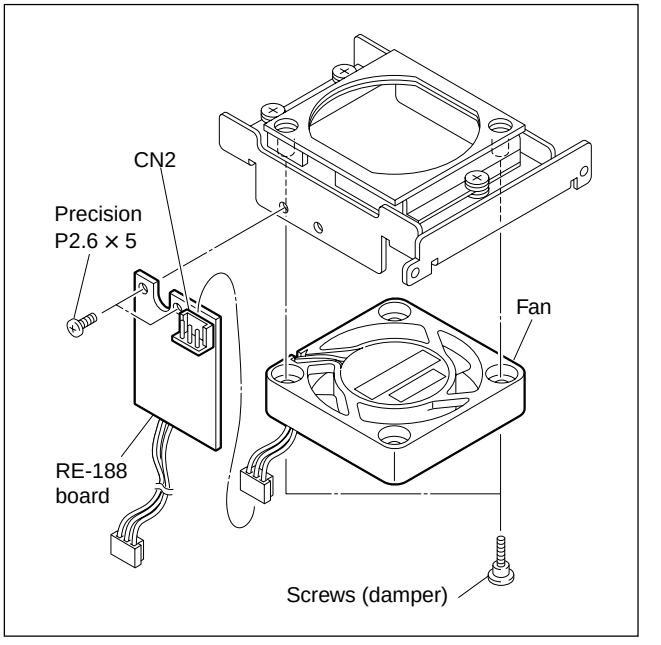
When you need to replace a fan, clean it beforehand on the parts of take in/take out for air. (Refer to 2-2 of the Installation and Maintenance Manual.)

1. Remove the front assembly. (Refer to steps 1 and 2 of Section 3-1.)
   Note
   If the HKC-T950 is installed, remove the cable adaptor first referring to Section 3-15-1.

2. Remove the two screws and remove the connector (CN4) of SW-1014 board, carrying the fan assembly rather loosened.



3. Disconnect the connector CN2 of RE-188 board.
4. Remove the two screws, and remove the RE-188 board.
5. Remove the two screws, and remove the fan.



6. Install the new Fan in the reverse order of steps 1 to 5.

Notes at installation

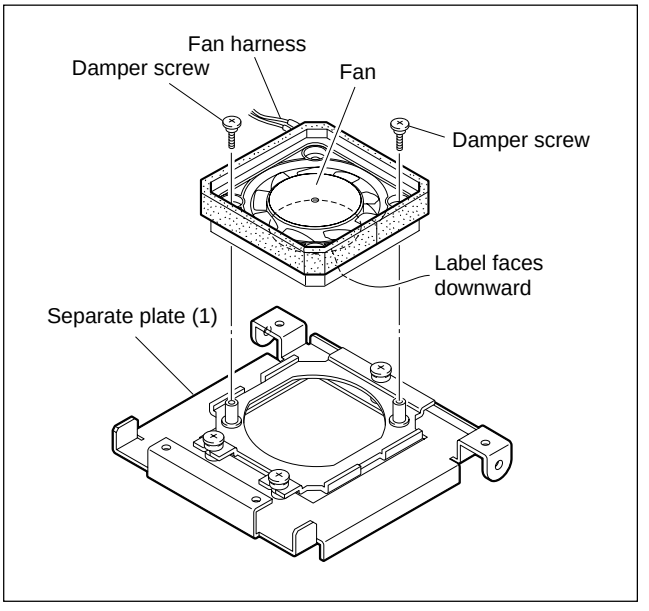
- Keep special attention to harnesses preventing from getting possible damages through current replacement.
- Install the fan to the bracket with care so that the label faces the bracket as shown in the figure for step 2.

3-4-3. Fan for HKC-T950

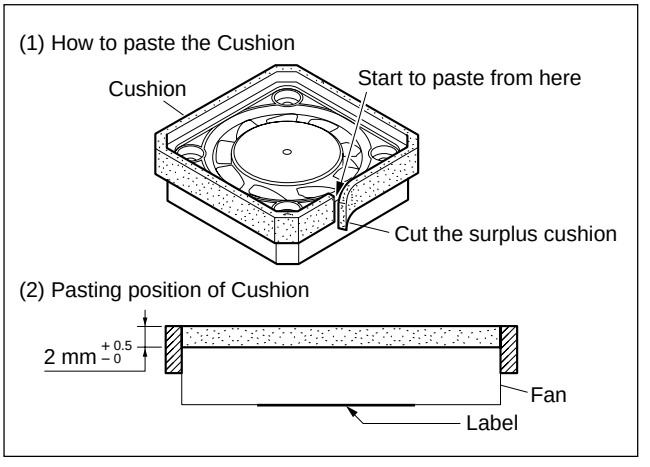
Note

When replacing the fan, replace the cushion pasted to the fan too.
Cushion : 3-690-767-0X

1. Remove the separate plate (2) block. (Refer to steps 1 to 7 of Section 3-15-5 “IF-845 Board”.)
2. Disconnect the connector (CN15) of the IF-845 board.
3. Remove the two damper screws, and remove the fan.



4. Paste a new cushion to a new fan.



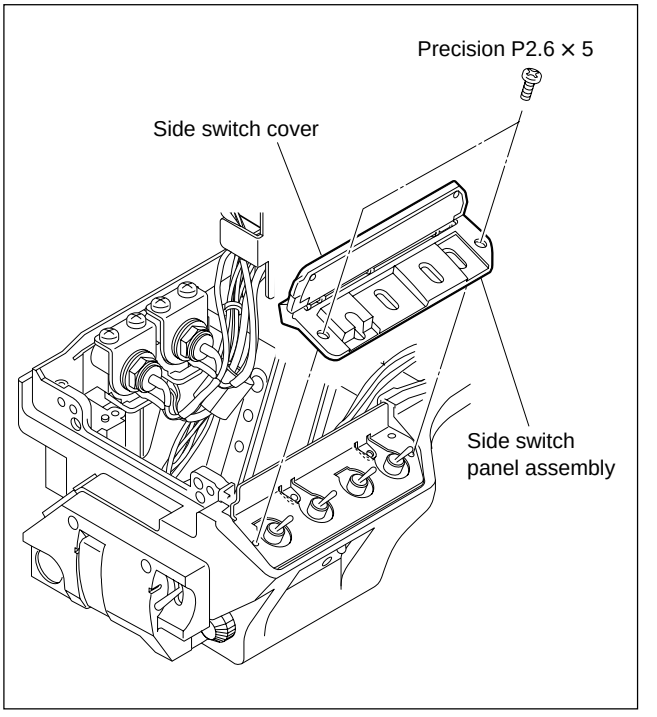
5. Install the new fan in the reverse order of steps 1 to 3.

Note at installation

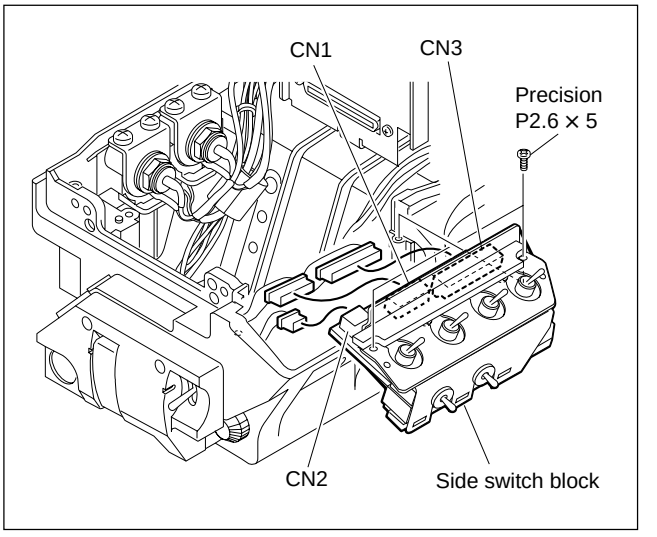
When installing the fan to the separate plate (1), be sure to install the fan so that the label faces downward as shown in the figure.

3-5. Replacing the Side Switches (SW-1014 Board)

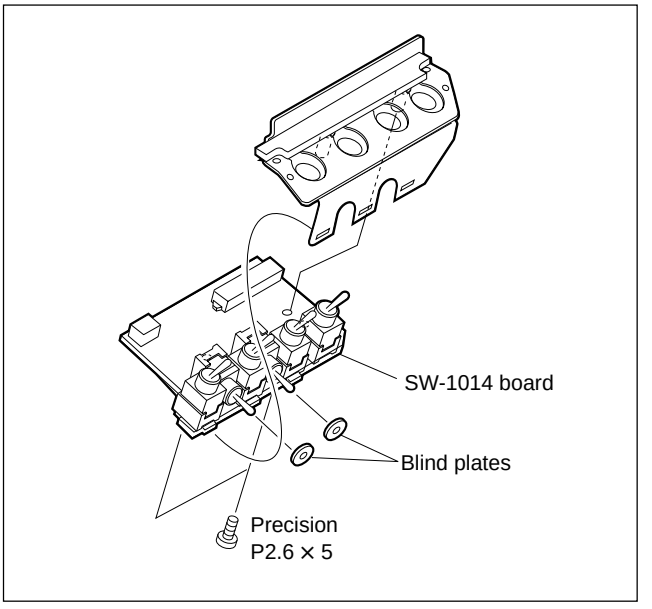
1. Remove the front fan assembly. (Refer to Section 3-4-2.)
2. Open the side switch covers, then removes the two screws, and remove the side switch panel assembly.



3. Disconnect the connectors (CN1, CN2, and CN3) of SW-1014 board.
4. Remove the two screws, and remove the side switch block.



5. Remove the two screws and two blind plates, and remove the SW-1014 board. Desolder the switch to be replaced.



6. Install the new switches in the reverse order of steps 1 to 5.

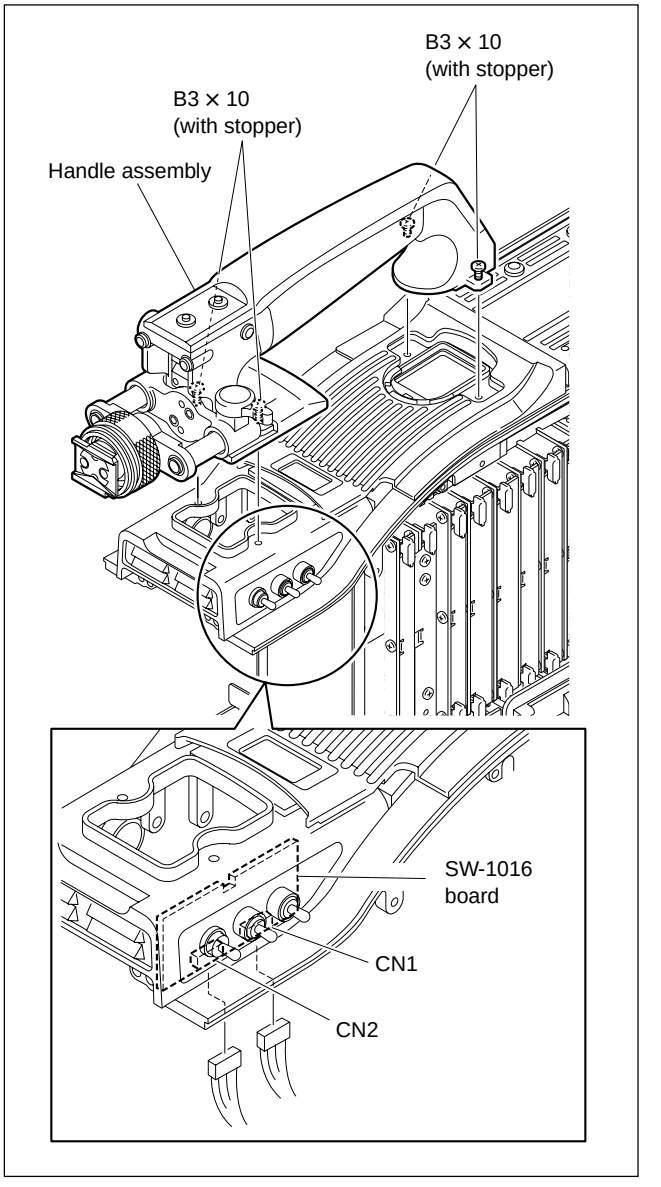
3-6. Replacing the VF DISP Switches (SW-1016 Board)

1. Remove the front assembly. (Refer to steps 1 and 2 of Section 3-1)

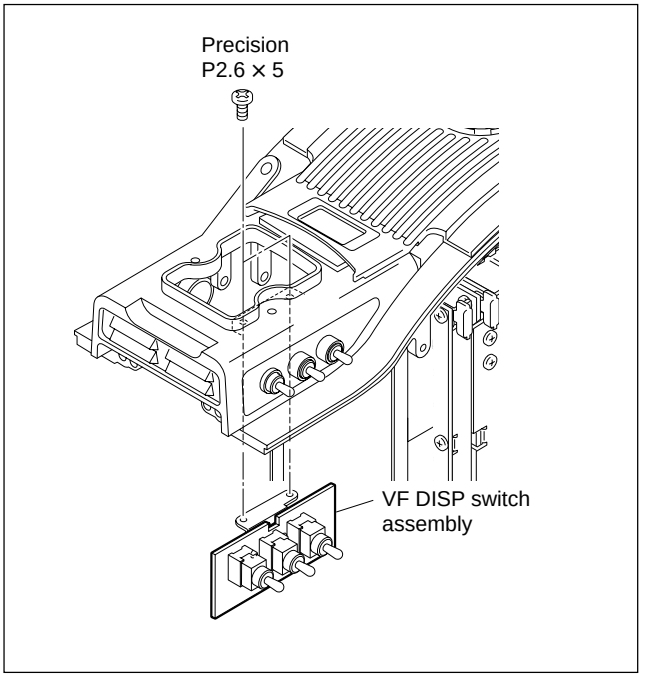
   Note

   If the HKC-T950 is installed, remove the cable adaptor first referring to Section 3-15-1.

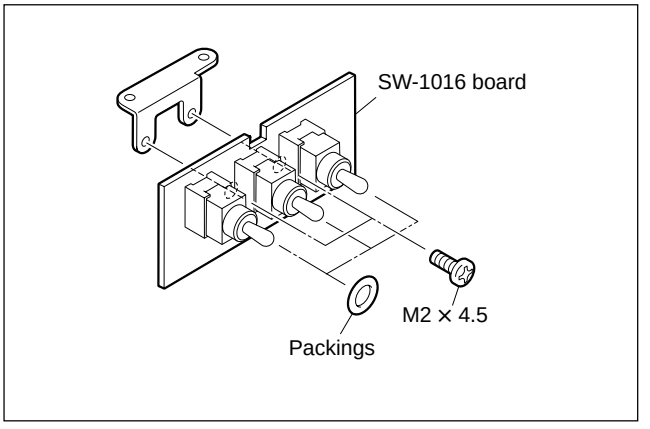
2. Disconnect the connectors (CN1 and CN2) of SW-1016 board.
3. Loosen the four screws, and remove the handle assembly.



4. Remove the two screws, and remove the VF DISP switch assembly.



5. Remove the two screws and three packings, and remove the SW-1016 board. Desolder the switch to be replaced.



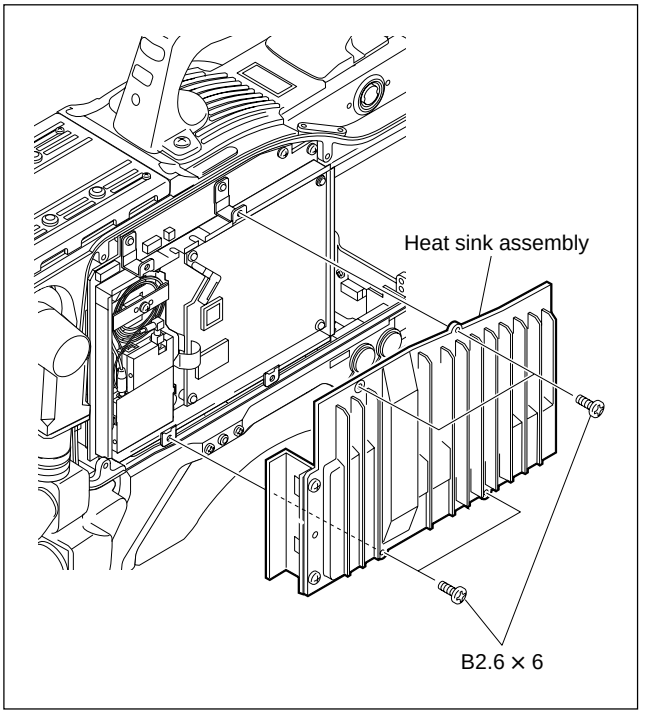
6. Install the new switches in the reverse order of steps 1 to 5.

3-7. Replacing the CCU Connector

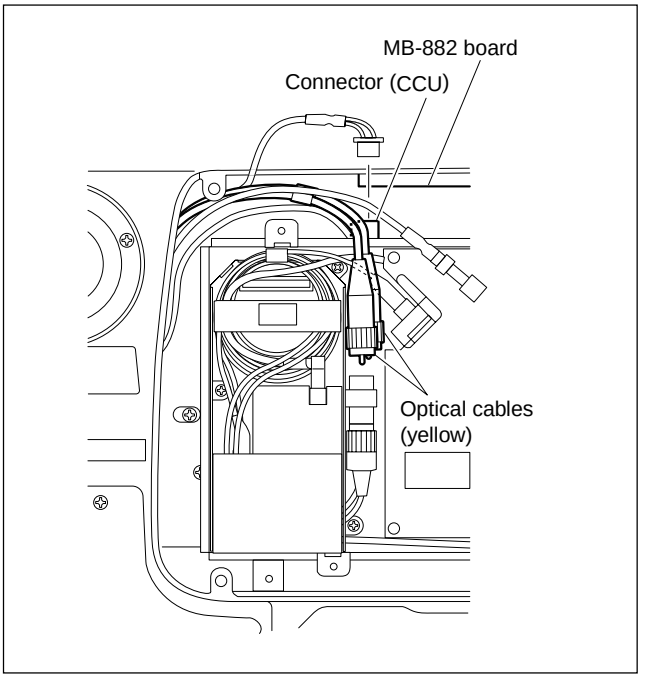
Note

Optical cables used in the unit are very fragile. So do not bend or yank in handling. This causes a break in the cable.

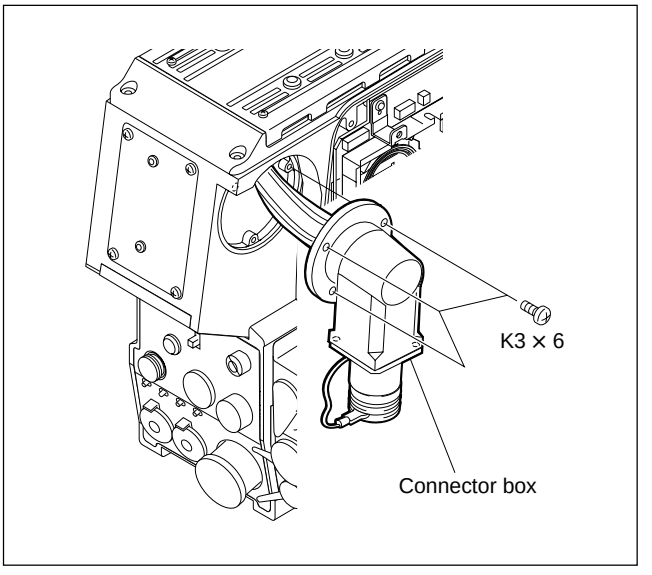
1. Remove the outside panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
2. Remove the four screws, and remove the heat sink assembly.



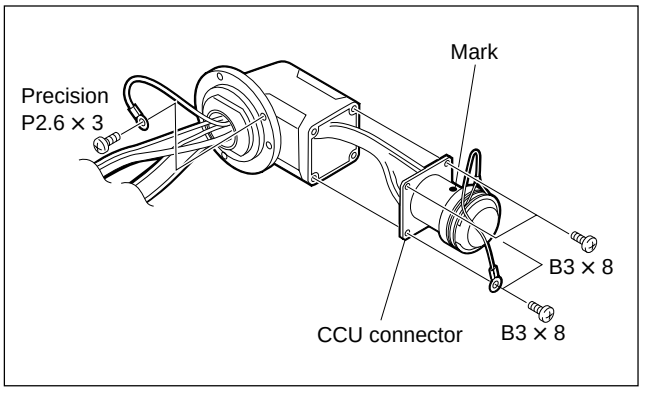
3. Disconnect the optical cables (yellow), and disconnect the connector (CCU) from the connector of the MB-882 board.



4. Disconnect the two connectors of AC/DC converter. (Refer to steps 1 to 6 of Section 3-3.)
5. Remove the three screws, and remove the connector box.



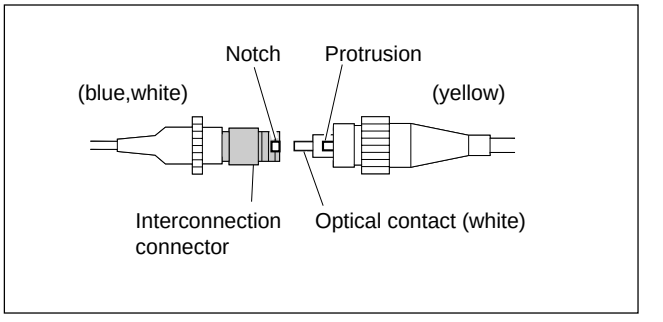
6. Remove the five screws, and remove the CCU connector.



7. Install the new CCU connector in the reverse order of steps 1 to 6.

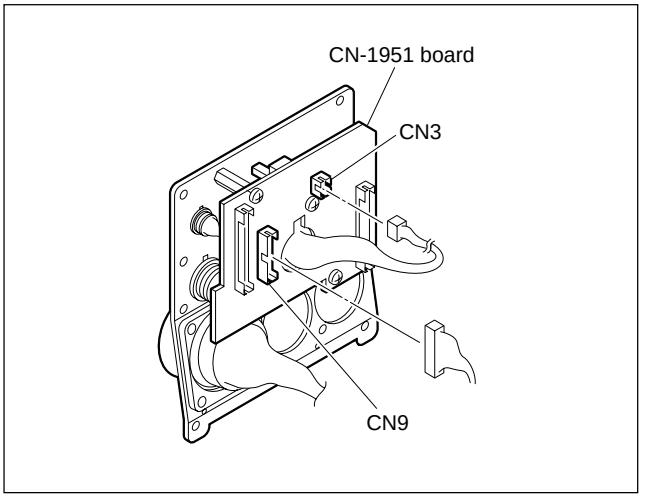
Notes at installation

- When installing the new CCU connector, be sure that the marker is positioned as shown in the figure for step 6.
- Before connecting the connection connector, clean the white optical contact at the tip of connector with alcohol.
- Align the protrusion of the connector with the notch of the interconnection connector in connecting.
  blue ..... yellow (1)
  white ..... yellow (2)

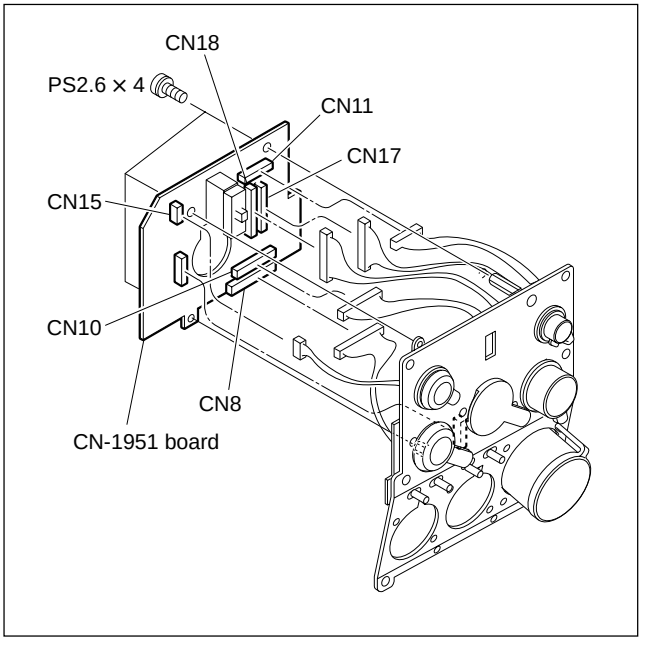


3-8. Replacing the TRACKER Connector

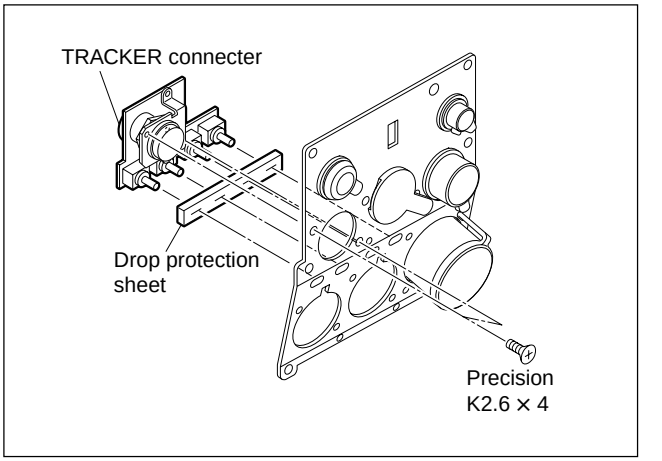
1. Remove the AUDIO IN connector. (Refer to Section 3-12-2.)
2. Disconnect the connectors (CN3 and CN9) of CN-1951 board.



3. Remove the three screws.
4. Disconnect the connectors (CN8, CN10, CN11, CN15, CN17 and CN18) of CN-1951 board, and remove the CN-1951 board.



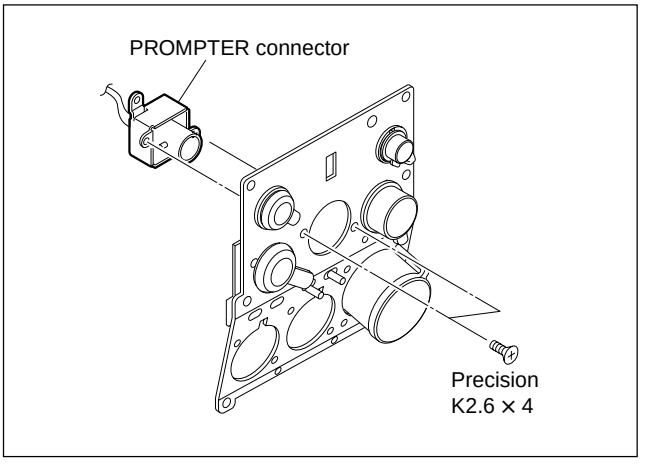
5. Remove the two screws, and remove the TRACKER connector.
6. Remove the drop protection sheet from the TRACKER connector.



7. Install the new TRACKER connector in the reverse order of steps 1 to 6.

3-9. Replacing the PROMPTER Connector

1. Remove the CN-1951 board. (Refer to steps 1 to 4 of Section 3-8.)
2. Remove the two screws, and remove the PROMPTER connector assembly.



3. Install the new PROMPTER connector in the reverse order of steps 1 and 2.

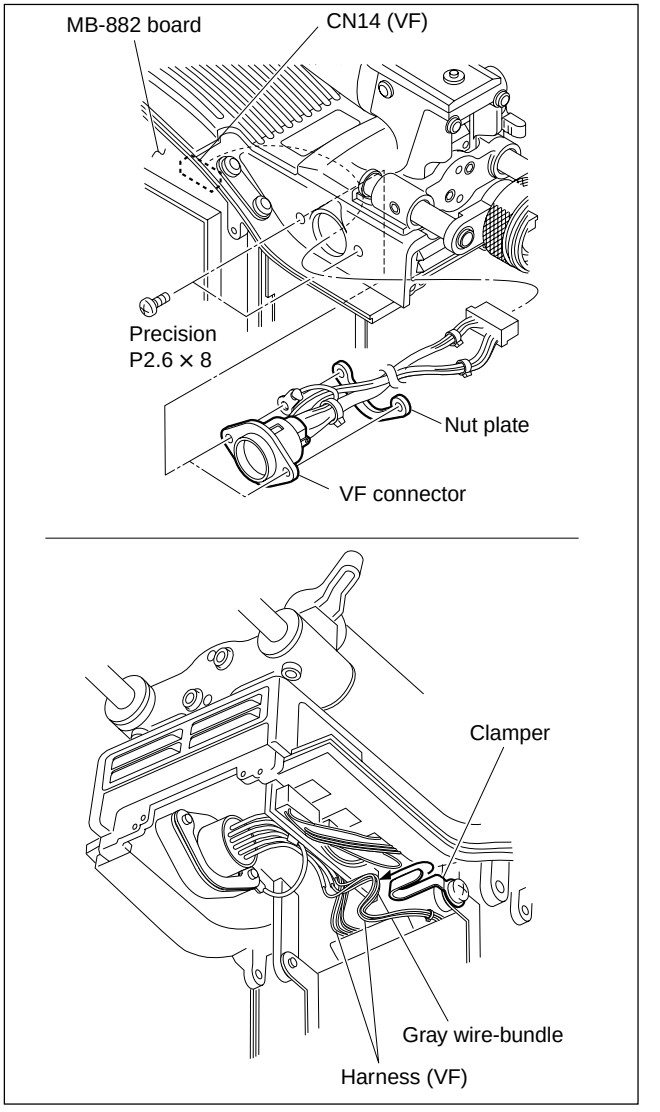
3-10. Replacing the VF Connector

1. Remove the front assembly. (Refer to steps 1 and 2 of Section 3-1.)

Note

If the HKC-T950 is installed, remove the cable adaptor first referring to Section 3-15-1.

2. Pull out the plug-in boards (RE, AU, AT, SG, DAP, DAD, VDA, DPR, VA) along the groove of the board rail and remove. (Refer to steps 1 and 2 of Section 3-1.)
3. Disconnect the connector (CN14) of MB-882 board.
4. Remove the two screws, and remove the VF connector and nut plate.



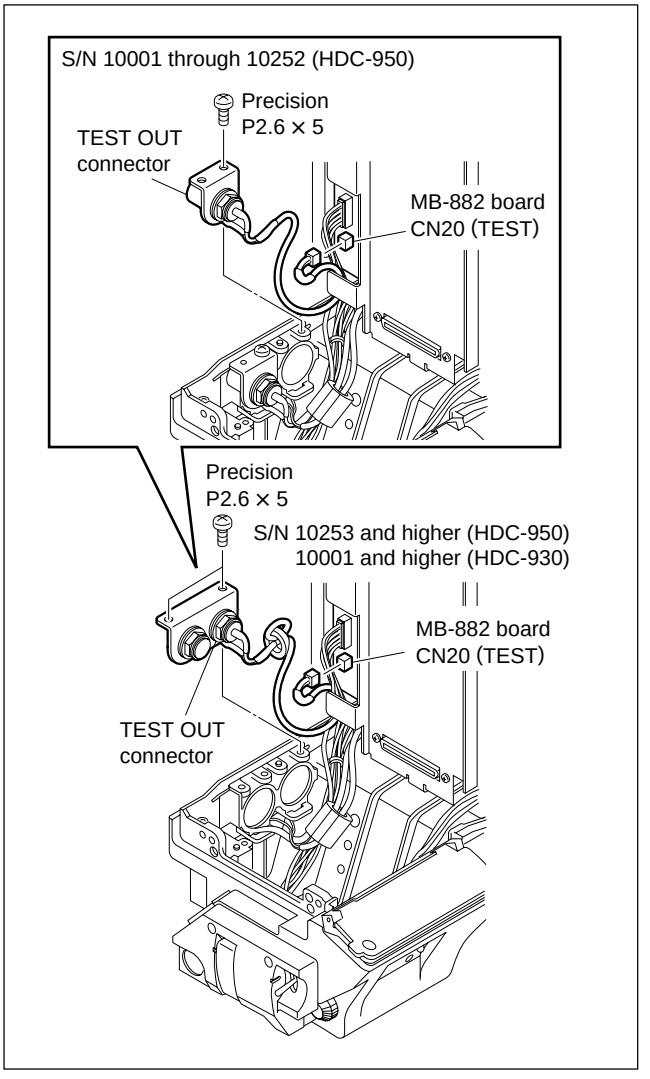
5. Install the new VF connector in the reverse order of steps 1 to 4.

Note at installation

Regarding harness (VF), follow with the mount procedures step 4. Fix the gray wire-bundle with clamper while other wire-bundles will be clamped with binding tie.

3-11. Replacing the TEST OUT Connector

1. Remove the front fan assembly. (Refer to Section 3-4-2.)
2. Disconnect the connector (CN20) of MB-882 board.
3. Remove the TEST OUT connector.
   For serial No. 10001 through 10252 (HDC-950)
   Remove one screw, and remove the TEST OUT connector.
   For serial No. 10001 and higher (HDC-930), or 10253 and higher (HDC-950)
   Remove the two screws, and remove the TEST OUT connector.

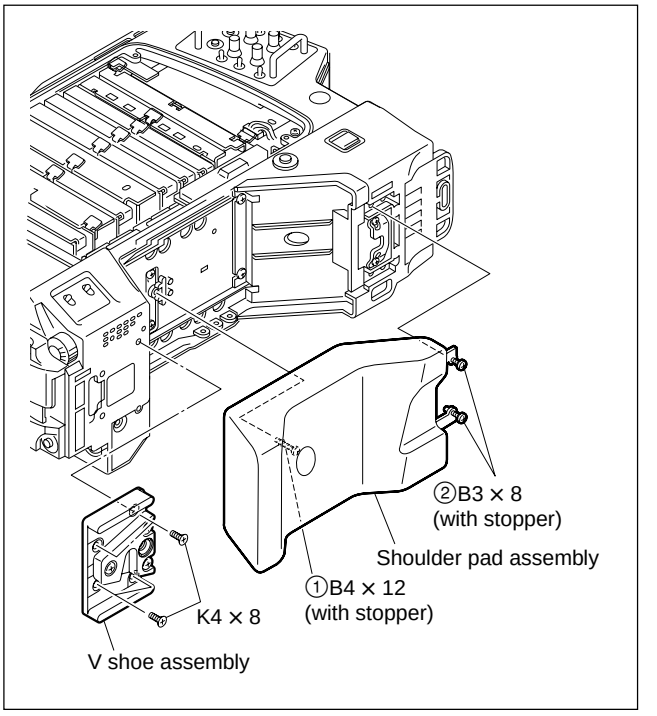


4. Install the new TEST OUT connector in the reverse order of steps 1 to 3.

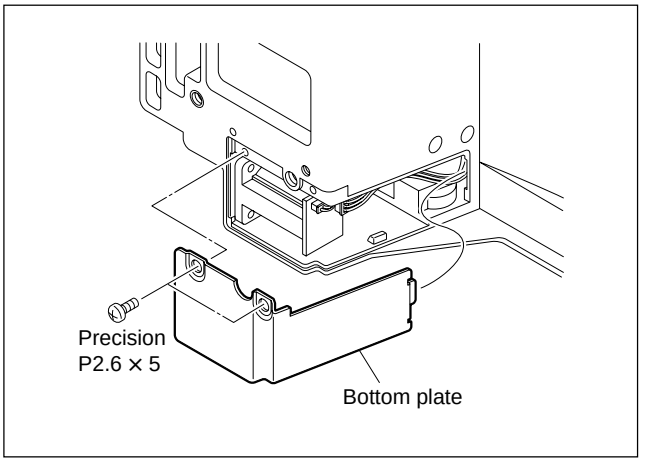
3-12. Replacing the MIC Connector

3-12-1. FRONT MIC Connector

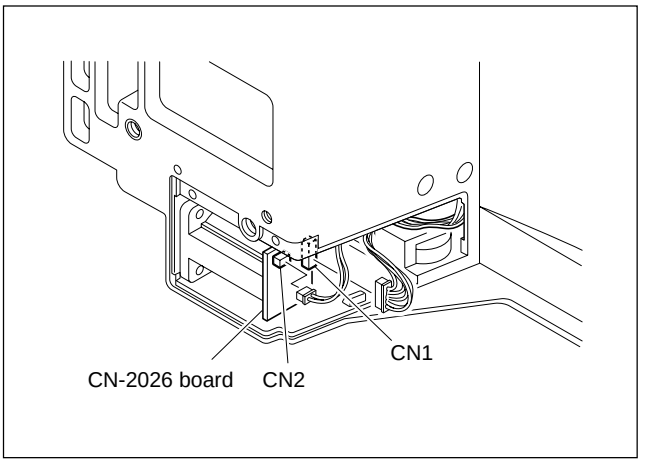
1. Remove the front fan assembly. (Refer to Section 3-4-2.)
2. Remove the two screw, and remove the V shoe assembly.
3. Remove the three screws in the order ② and ①, and remove the shoulder pad assembly.



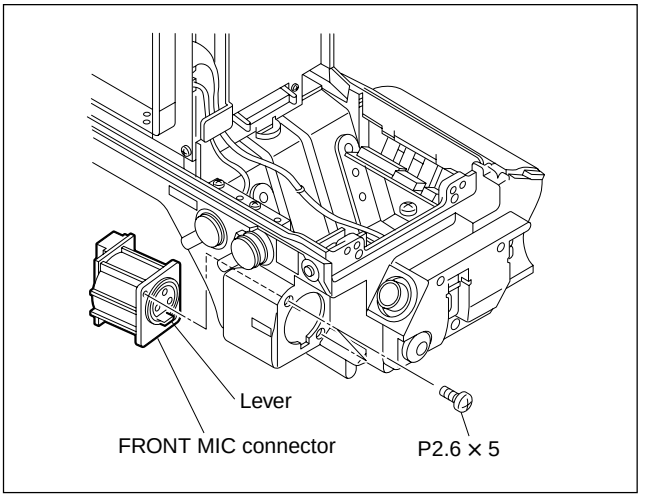
4. Remove the two screws, and remove the bottom plate.



5. Disconnect the connectors (CN1 and CN2) of CN-2026 board.



6. Remove the tow screws, and remove the FRONT MIC connector with pressing connector lever.



7. Install the new FRONT MIC connector in the reverse order of steps 1 to 6.

3-12-2. Replacing the AUDIO IN Connector

1. Loosen six screws, and pull out MIC panel assembly.

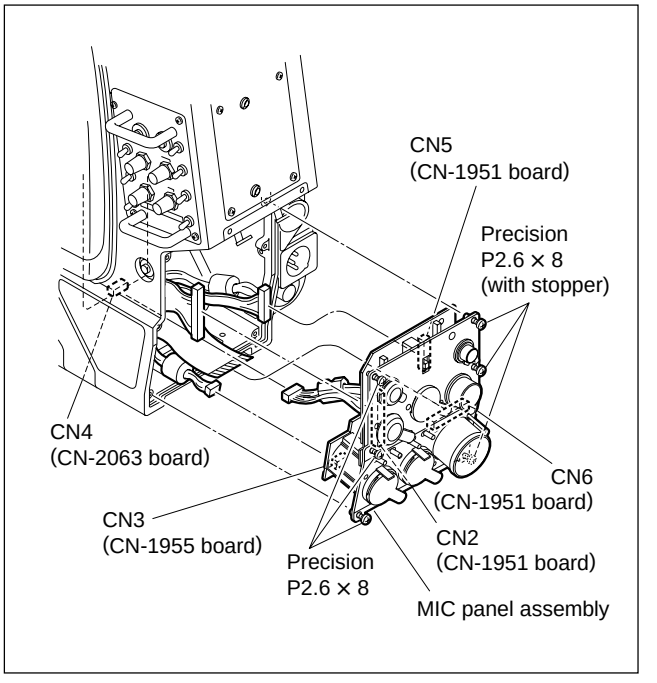
Note

When pulling out a MIC panel assembly, pay full attention to the harnesses and or flexible card wires connected to the MIC panel assembly so that they are free from incurring any damages.

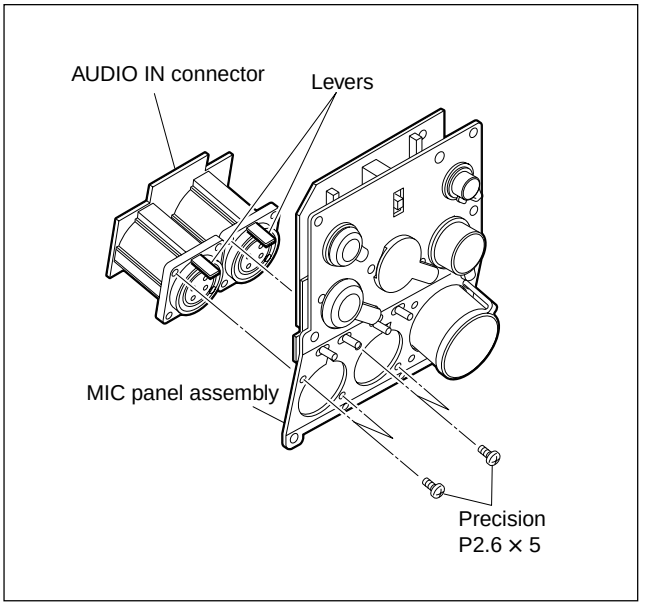
2. Disconnect the connectors (CN2, CN5) of CN-1951 board and from CN-2063 connector (CN4). Also, disconnect a flexible card wire from the connector (CN6) of CN-1951 board.

Note

Refer to Section 1-5 for details on disconnecting/ connecting the flexible card wire.



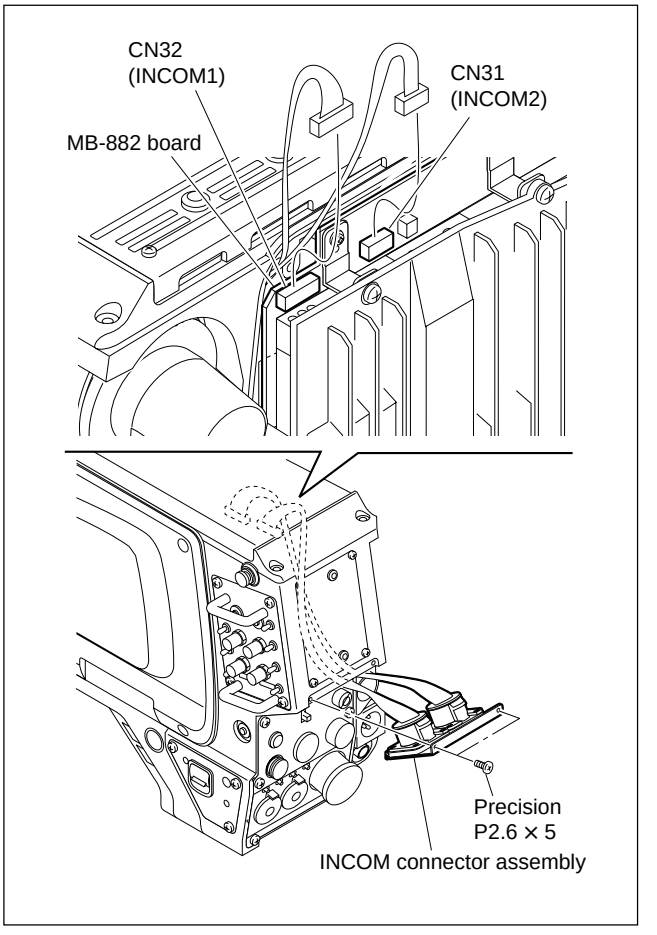
3. Remove the 4 screws first, and remove the AUDIO IN connector, pressing connector lever.



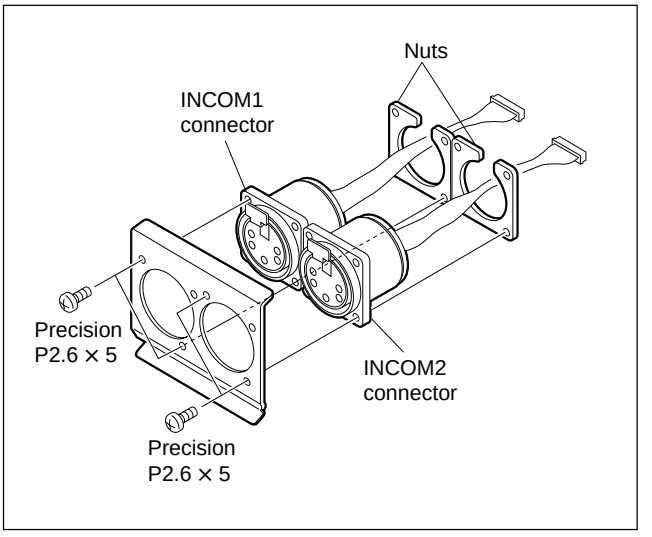
4. Install the new AUDIO IN connector in the reverse order of steps 1 to 4.

3-13. Replacing the INCOM Connector

1. Remove the outside panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
2. Disconnect the connectors (INCOM1 and INCOM2) of MB-882 board.
3. Remove the two screws, and remove the INCOM connector assembly.



4. Remove the two screws, and remove the INCOM1 connector or INCOM2 connector.



5. Install the new INCOM1 connector and INCOM2 connector in the reverse order of steps 1 to 4.

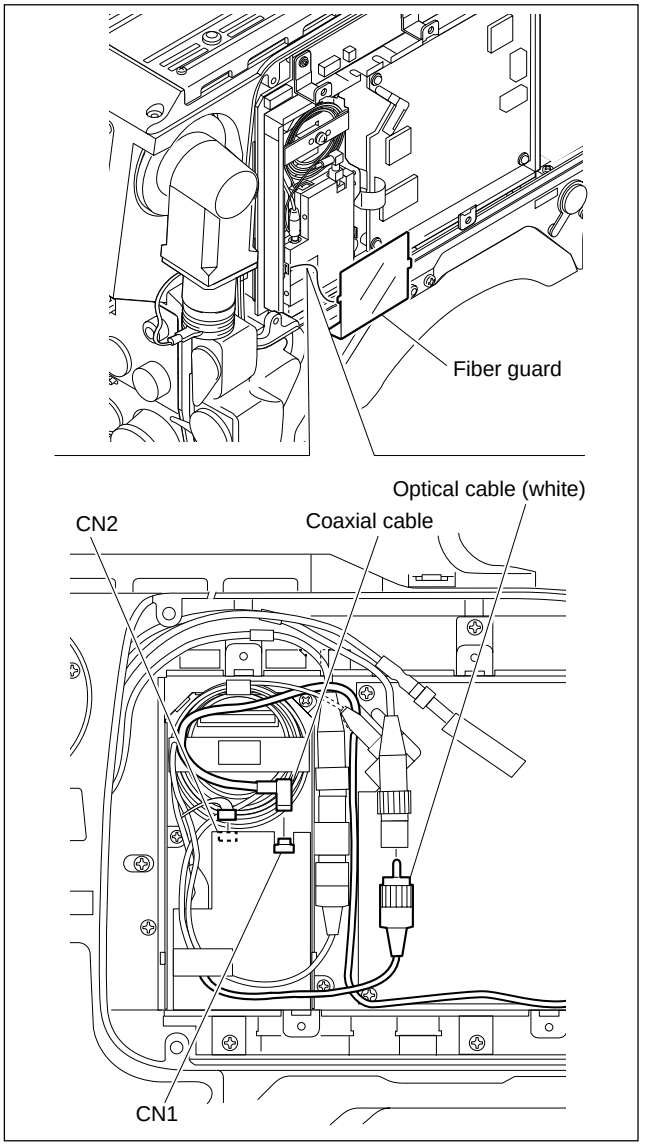
3-14. Replacing the Boards

3-14-1. RX-28 Board

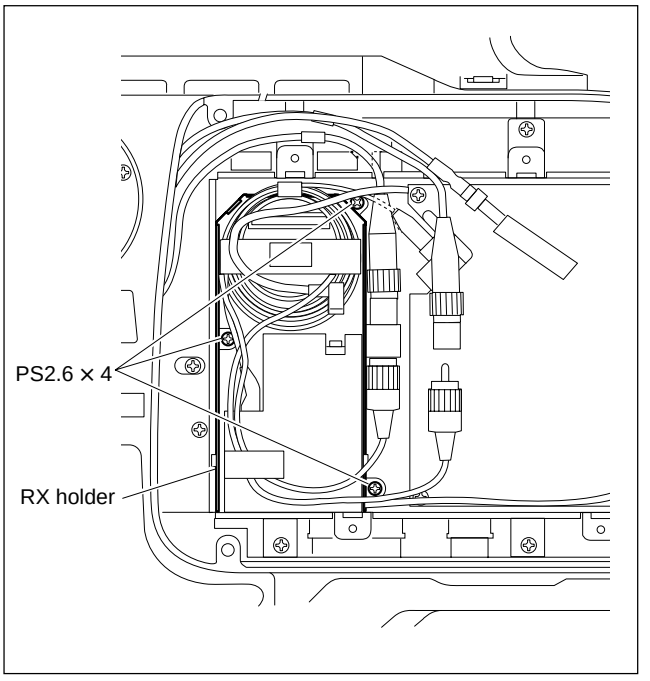
Notes

- Every electrical part mounted on the RX-28 board cannot be replaced. If there is any defective part, replace the board itself.
- Optical cables used in the unit are very fragile. So do not bend or yank in handling. This causes a break in the cable.

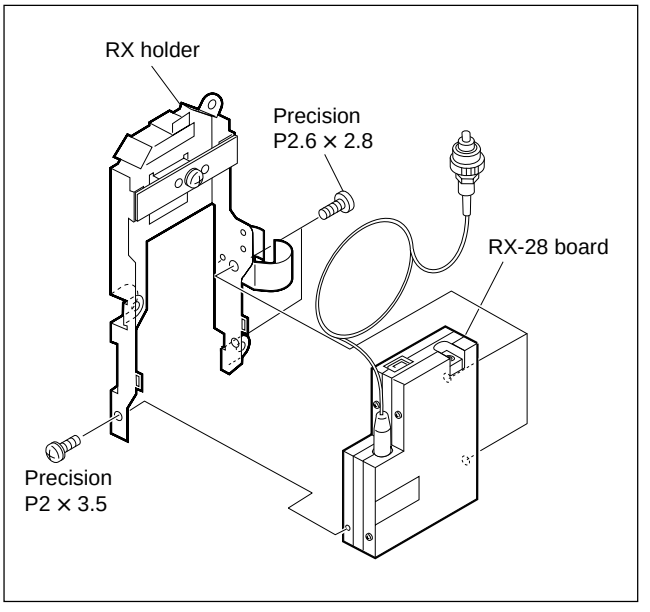
1. Remove the heat sink assembly.
   (Refer to steps 1 and 2 of Section 3-7.)
2. Disconnect the harness from the connector CN2 of the RX-28 board, and disconnect the coaxial cable from the connector CN1.
3. Disconnect the optical cable (white).
4. Remove the fiber guard.



5. Remove the three screws, and remove the RX holder.



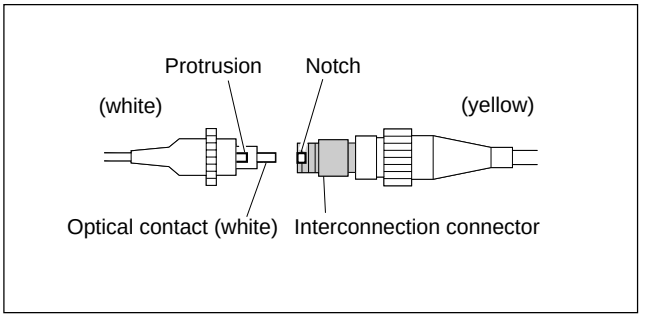
6. Remove the three screws, and remove the RX-28 board.



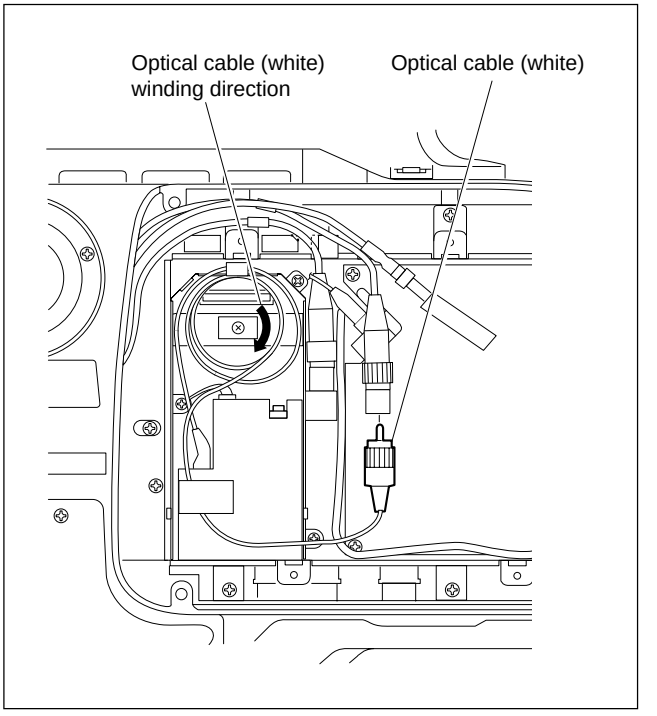
7. Install the new RX-28 board in the reverse order of steps 1 to 6.

Notes at installation

- Before connecting the connection connector, clean the white optical contact at the tip of connector with alcohol.
- Align the protrusion of the connector with the notch of the interconnection connector in connecting.



- Refer to the figure and keep the extra optical cable (slacked part) in the fiber box.

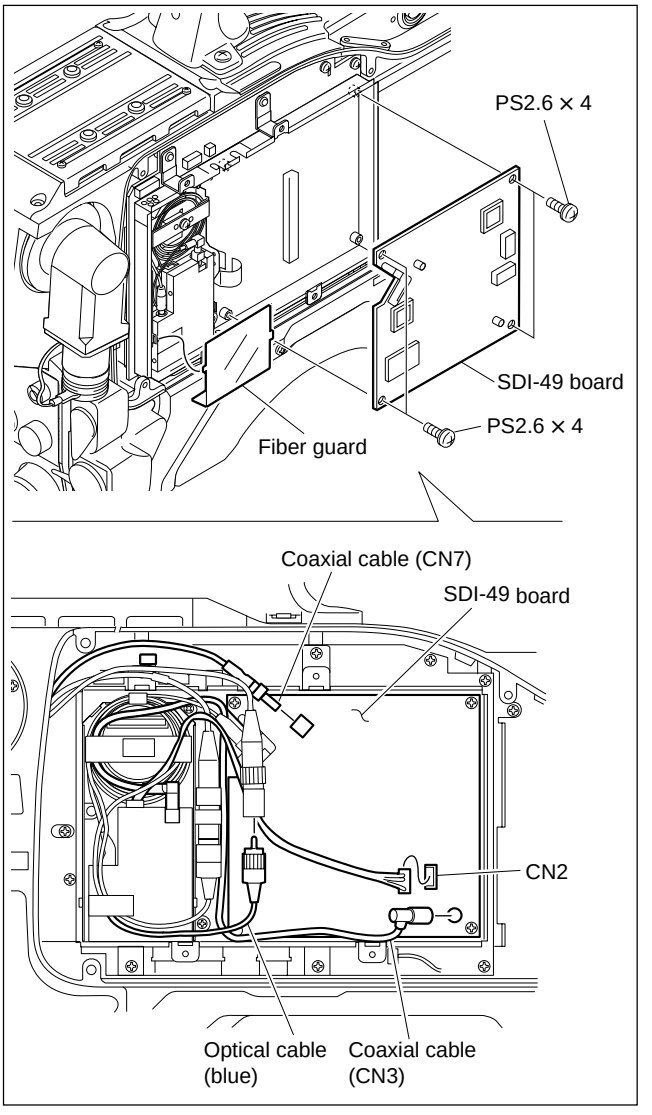


3-14-2. SDI-49 Board

Notes

- Every electrical part mounted on the SDI-49 board cannot be replaced. If there is any defective part, replace the board itself.
- Optical cables used in the unit are very fragile. So do not bend or yank in handling. This causes a break in the cable.

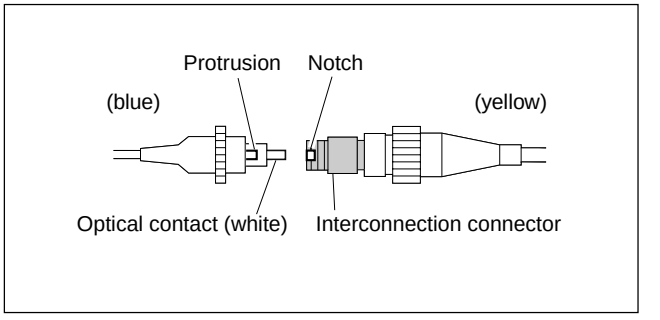
1. Remove the heat sink assembly. (Refer to steps 1 and 2 of Section 3-7.)
2. Disconnect the harness from the connector (CN2) of the SDI-49 board, and disconnect the coaxial cables from the connectors (CN7 and CN3).
3. Disconnect the optical cable (blue).
4. Remove the fiber guard.
5. Remove the four screws, and remove the SDI-49 board.



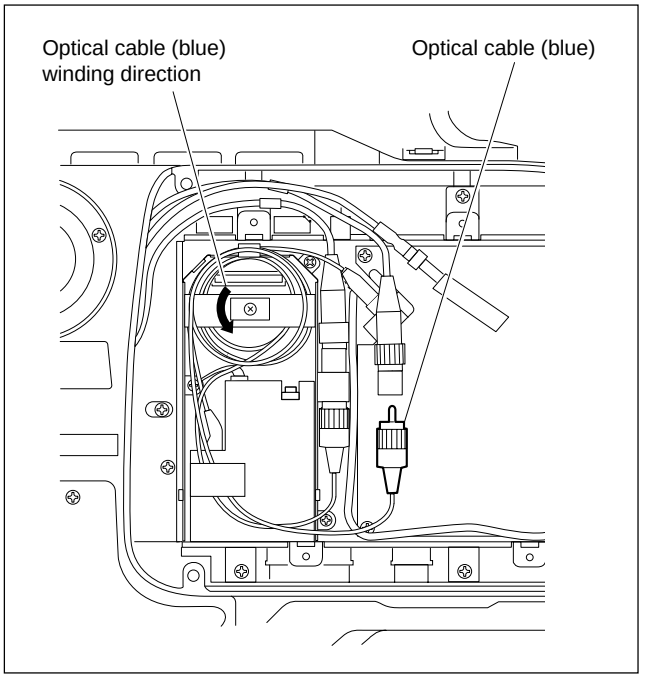
6. Install the new SDI-49 board in the reverse order of steps 1 to 5.

Notes at installation

- Before connecting the connection connector, clean the white optical contact at the tip of connector with alcohol.
- Align the protrusion of the connector with the notch of the interconnection connector in connecting.

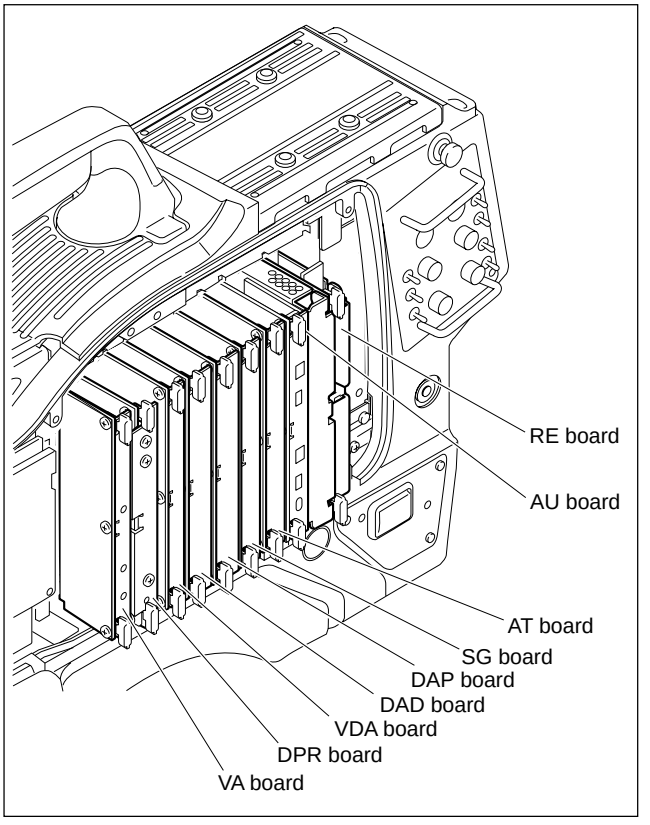


- Refer to the figure and keep the extra optical cable (slacked part) in the fiber box.

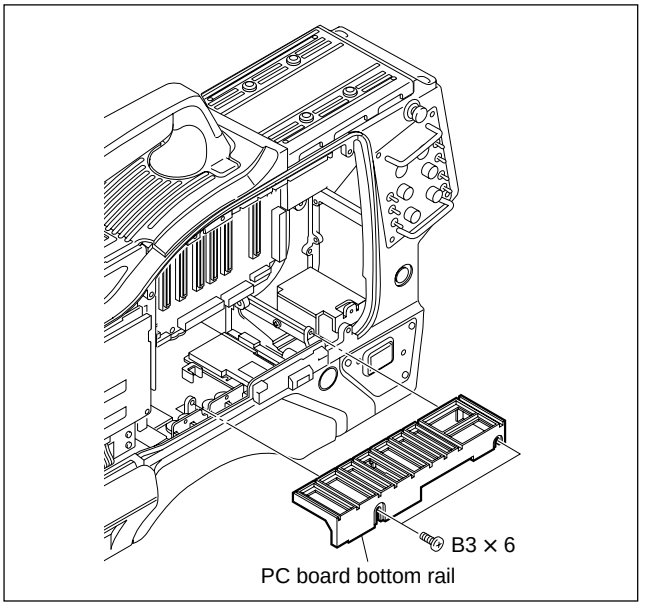


3-14-3. CN-2018 Board

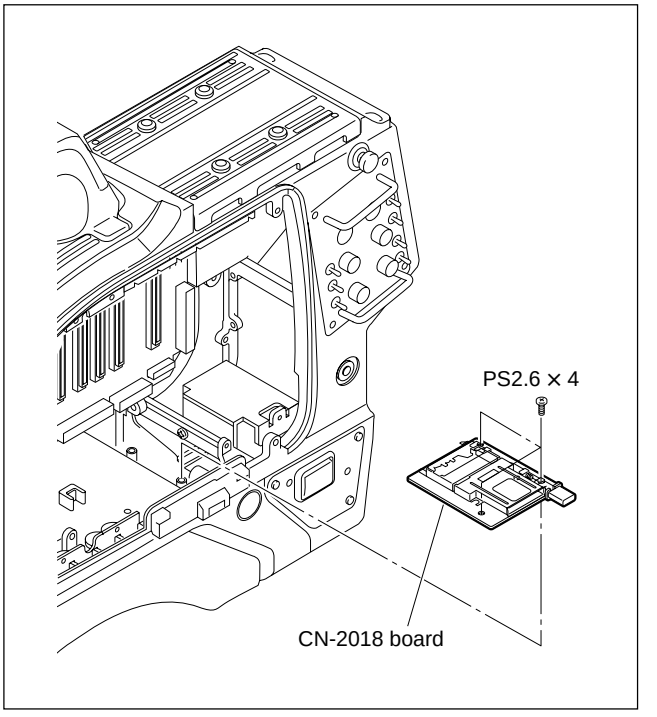
1. Remove the inside panel. (Refer to Section 1-4 of the Installation and Maintenance Manual.)
2. Pull out the plug-in boards (RE, AU, AT, SG, DAP, DAD, VDA, DPR, VA) along the groove of the board rail and remove.



3. Remove the two screws, and remove the PC board bottom rail.



4. Remove the three screws, and remove the CN-2018 board.



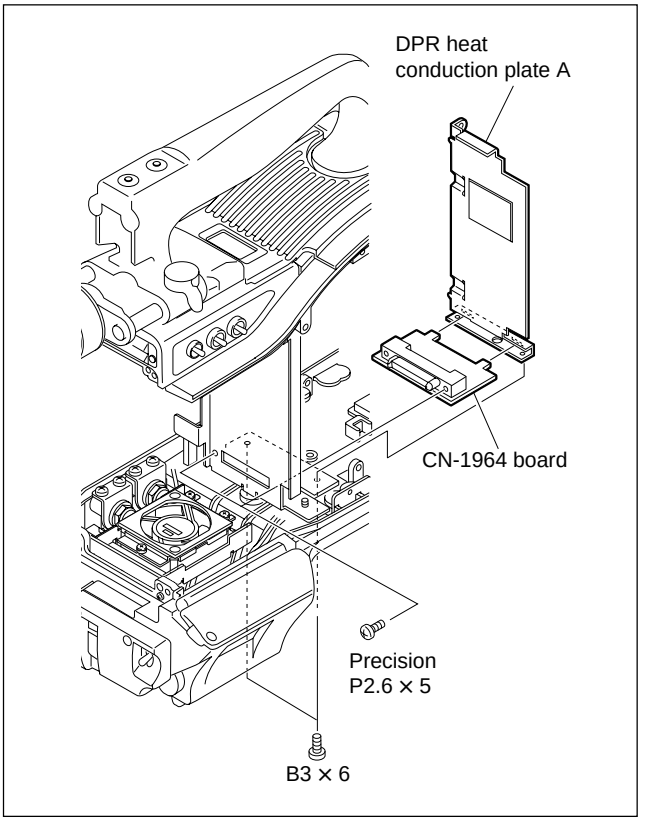
5. Install the new CN-2018 board in the reverse order of steps 1 to 4.

3-14-4. CN-1964 Board

Note

Optical cables used in the unit are very fragile. So do not bend or yank in handling. This causes a break in the cable.

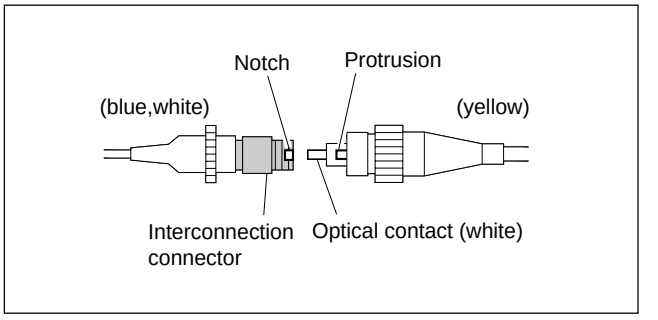
1. Remove the MB-882 board. (Refer to Section 3-14-5.)
2. Remove the pc board bottom rail. (Refer to steps 1 to 3 of Section 3-14-3.)
3. Remove the shoulder pad assembly. (Refer to steps 2 and 3 of Section 3-12.)
4. Remove the four screws, and remove the DPR heat conduction plate A and CN-1964 board.



5. Install the new CN-1964 board in the reverse order of steps 1 to 4.

Notes at installation

- Before connecting the connection connector, clean the white optical contact at the tip of connector with alcohol.
- Align the protrusion of the connector with the notch of the interconnection connector in connecting.
  blue ..... yellow (1)
  white ..... yellow (2)



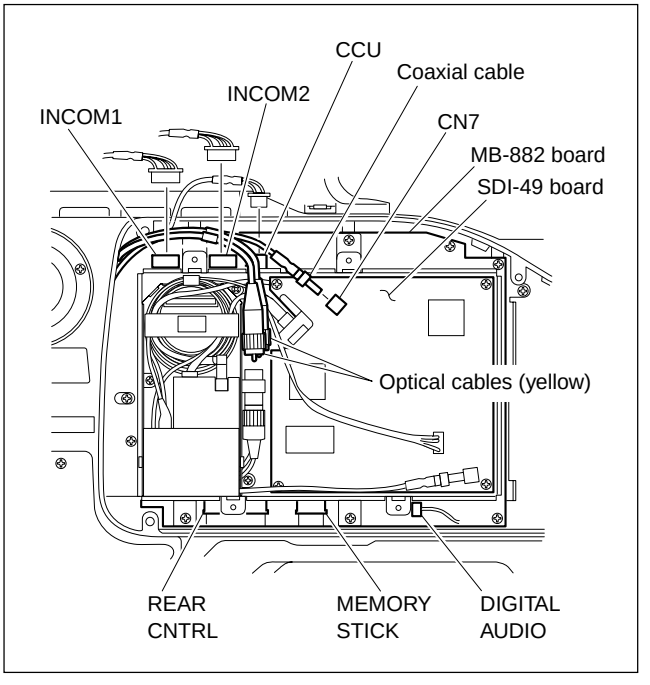
3-14-5. MB-882 Board

Note

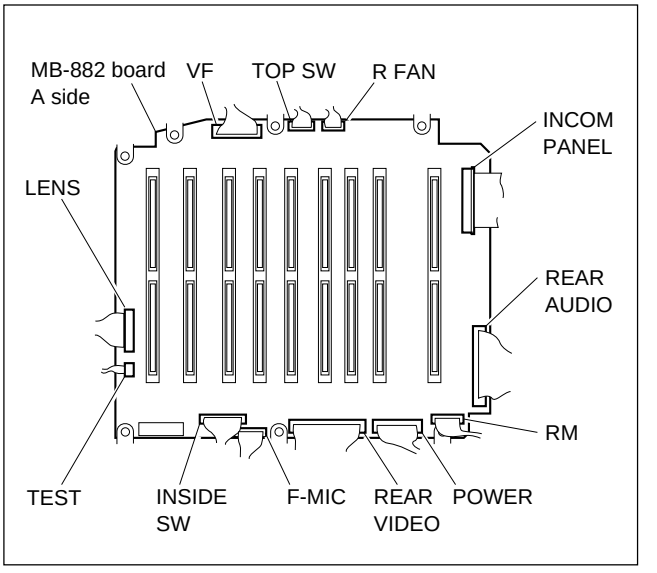
Optical cables used in the unit are very fragile. So do not bend or yank in handling. This causes a break in the cable.

1. Remove the front assembly. (Refer to steps 1 and 2 of Section 3-1.)
   Note
   If the HKC-T950 is installed, remove the cable adaptor first referring to Section 3-15-1.

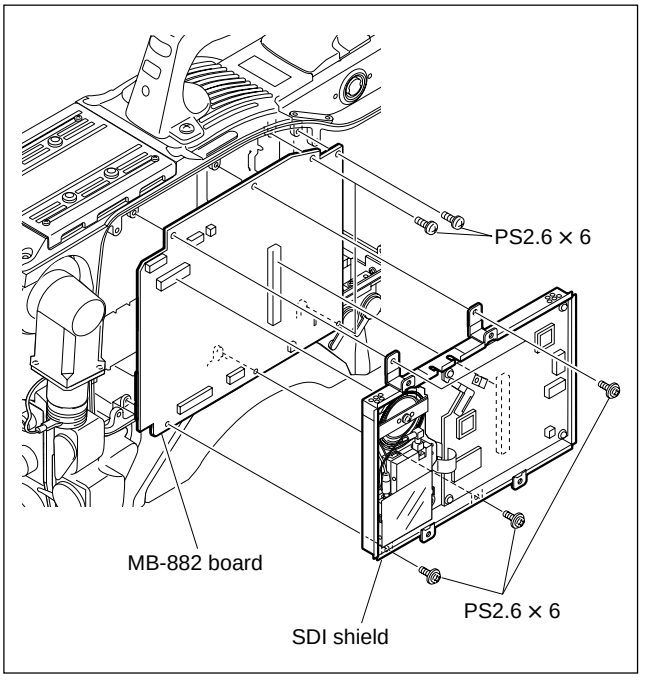
2. Pull out the plug-in boards (RE, AU, AT, SG, DAP, DAD, VDA, DPR, VA) along the groove of the board rail and remove. (Refer to step 2 of Section 3-3.)
3. Remove the heat sink assembly. (Refer to steps 1 and 2 of Section 3-7.)
4. Disconnect the two optical cables (yellow).
5. Disconnect a coaxial cable from the connector (CN7) of SDI-49 board, and disconnect the harnesses from connectors (INCOM1, INCOM2, CCU, DIGITAL AUDIO) and flexible card wires from the connectors (REAR CNTRL, MEMORY STICK) of MB-882 board.
   Note
   Refer to Section 1-5 for details on disconnecting/ connecting the flexible card wire.



6. Disconnect the harnesses from connectors (VF, TOP SW, R FAN, REAR AUDIO, RM, POWER, REAR VIDEO, F-MIC, INSIDE SW, TEST, LENS) and flexible card wire from (INCOM PANEL) of MB-882 board side-A.
   Note
   Refer to Section 1-6 for details on disconnecting/ connecting the flexible card wire.



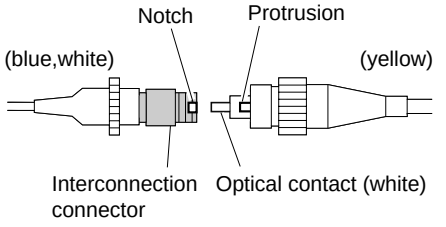
7. Remove the four screws, and remove the SDI shield.
8. Remove the three screws, and remove the MB-882 board.



9. Install the new MB-882 board in the reverse order of steps 1 to 8.

Notes at installation

- Before connecting the connection connector, clean the white optical contact at the tip of connector with alcohol.
- Align the protrusion of the connector with the notch of the interconnection connector in connecting.

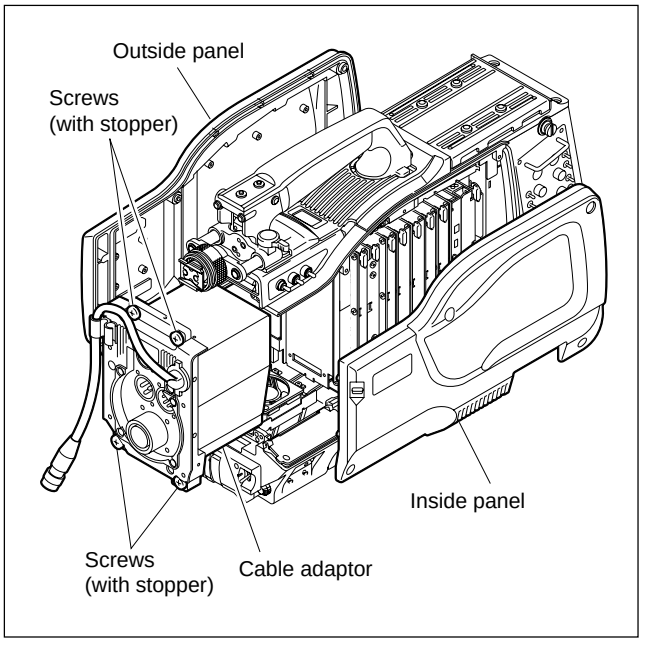


3-15. Replacing the Components of HKC-T950

The HKC-T950 consists of the CCD block adaptor and cable adaptor.
In the actual operation, the CCD block is installed in the CCD block adaptor, and the cable adaptor is installed in the place where the CCD block of the HDC-950/930 had been installed.
Following replacing procedures are described assuming the actual operation.

3-15-1. Removing the Cable Adaptor

1. Remove all the cables connected to the cable adaptor.
2. Remove the inside panel and outside panel of the HDC-950/930. (Refer to Section 1-4 of the installation and maintenance manual.)
3. Loosen the four screws, and remove the cable adaptor from the camera.

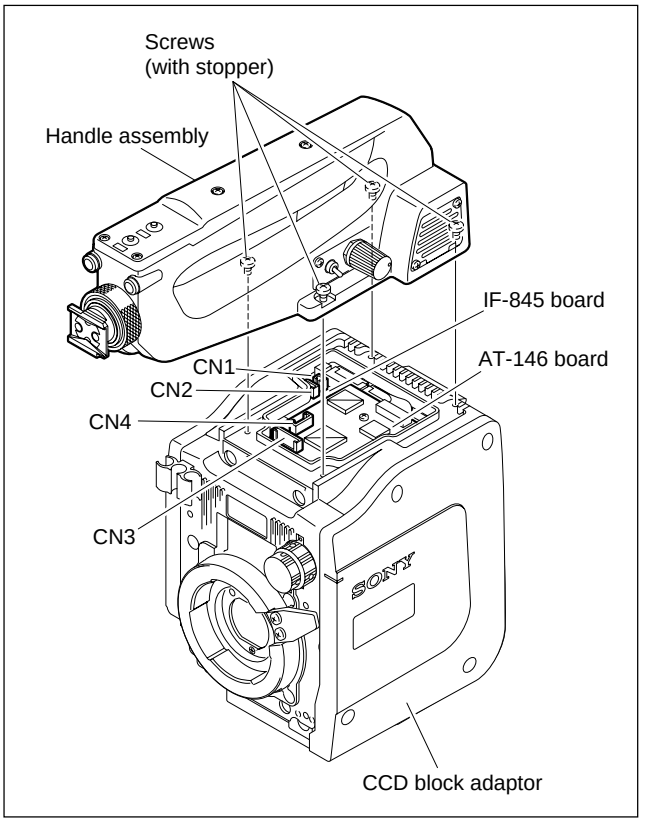


3-15-2. Removing/Installing the Handle Assembly

Note

If using the CCD block adaptor with the handle assembly detached, it is recommended to attach the chassis cover.

1. Loosen the four screws of the CCD block adaptor, and remove the handle assembly.
2. Disconnect the connectors (CN3, CN4) of the AT-146 board.
3. Disconnect the connectors (CN1, CN2) of the IF-845 board.
4. Install the handle assembly in the reverse order of steps 1 to 3 of removal.

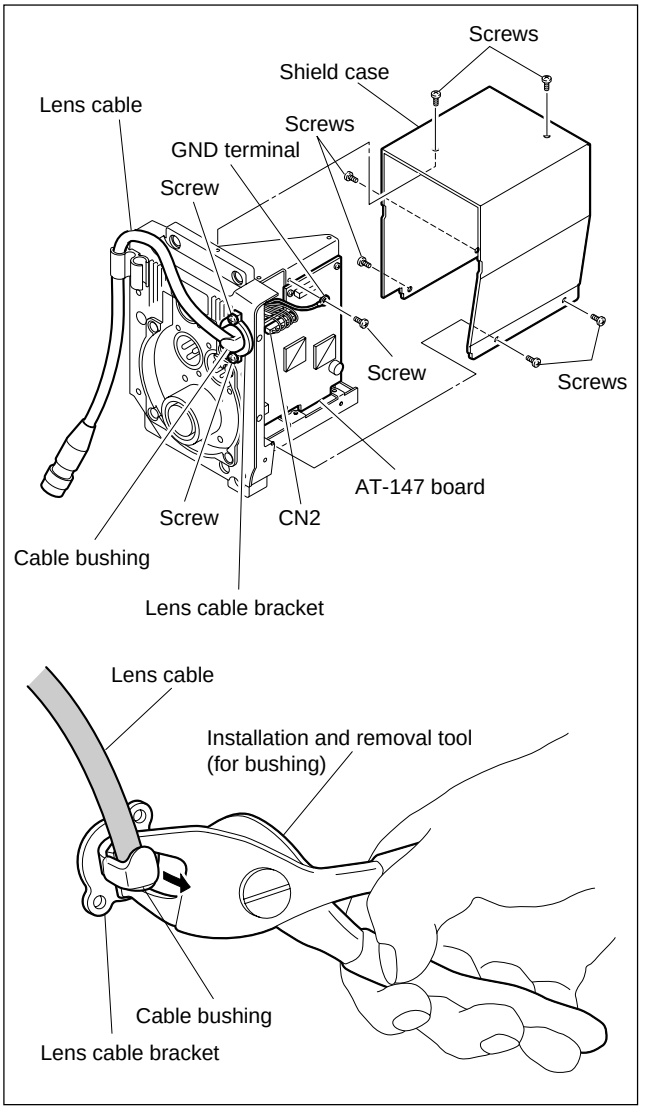


3-15-3. Replacing the Lens Cable

Tool: Installation and removal tool (for bushing)
(Sony Part number : J-6470-280-A)
(If it is not available, use a pair of pliers or a similar item.)

Removing

1. Remove the cable adaptor from the camera. (Refer to Section 3-15-1.)
2. Remove the six screws, and remove the shield case.
3. Disconnect the connector (CN2) of the AT-147 board.
4. Remove one screw, and remove the GND terminal.
5. Remove the two screws, and remove the lens cable bracket.
6. Pinch the cord bushing by the tool as shown in the figure and pull out the cord bushing in the direction of the arrow.



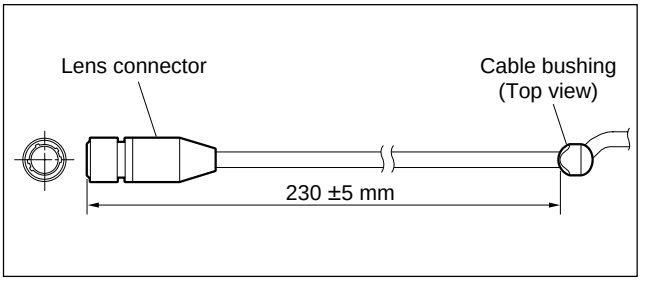
Installing

1. Install the cord bushing to the lens cable as shown in the figure.

   Note

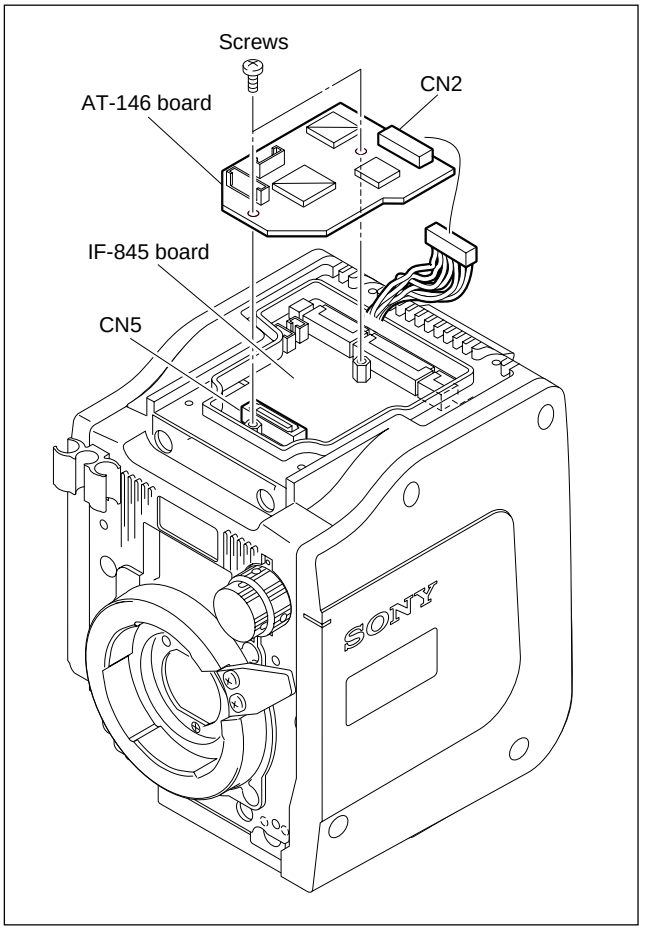
   When installing, ensure that the cord bushing is properly positioned and oriented with respect to the lens cable.

2. Install the cord bushing to the lens cable bracket in the reverse order of removal.
3. Install the lens cable in the reverse order of steps 1 to 5 of removal.



3-15-4. AT-146 Board

1. Remove the handle assembly of the CCD block adaptor. (Refer to Section 3-15-2.)
2. Remove the two screws, and remove the AT-146 board.
3. Disconnect the connector (CN2) of the AT-146 board.



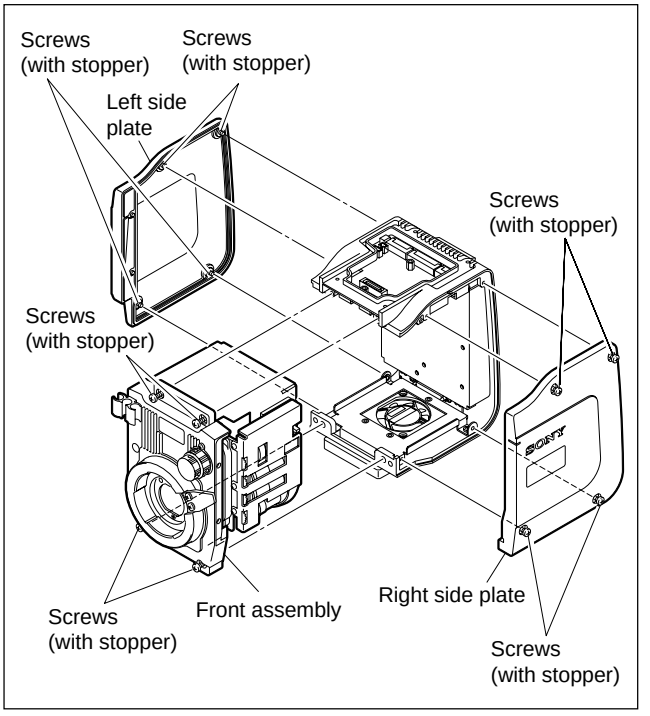
4. Install the new AT-146 board in the reverse order of steps 1 to 3.

Note at installation

Be sure to connect the connector (CN1) at the backside of the AT-146 board to the connector (CN5) of the IF-845 board.

3-15-5. IF-845 Board

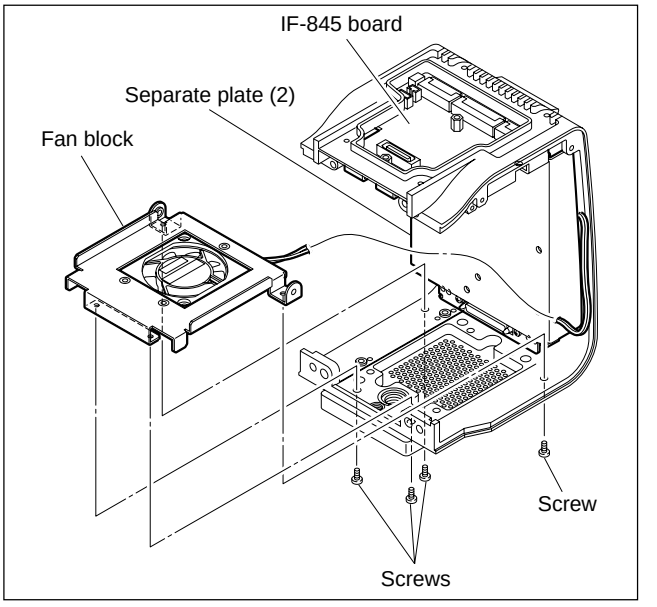
1. Remove the HDCZ cable from the CCD block adaptor.
2. Remove the AT-146 board. (Refer to Section 3-15-4.)
3. Loosen the four screws, and remove the right side panel.
4. Loosen the four screws, and remove the left side panel.
5. Loosen the four screws, and remove the front assembly in the direction shown in the arrow.



6. Remove the four screws on the bottom of the unit, and remove the fan block.

Note

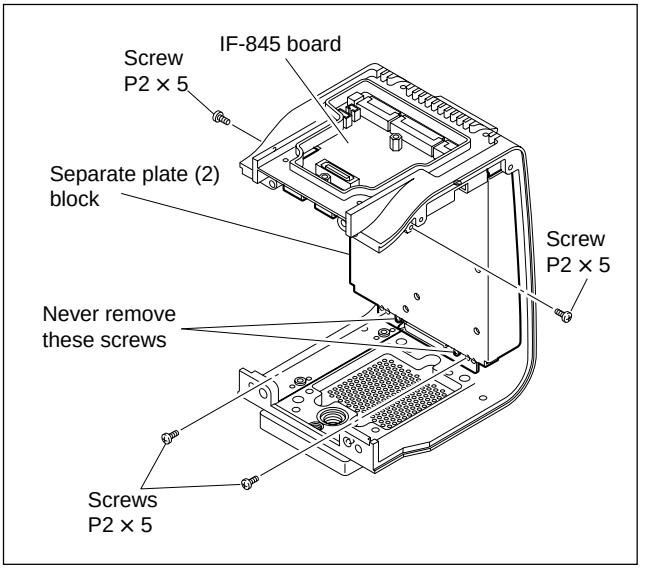
At this time, since the fan harness is connected to IF-845 board, be careful in handling.



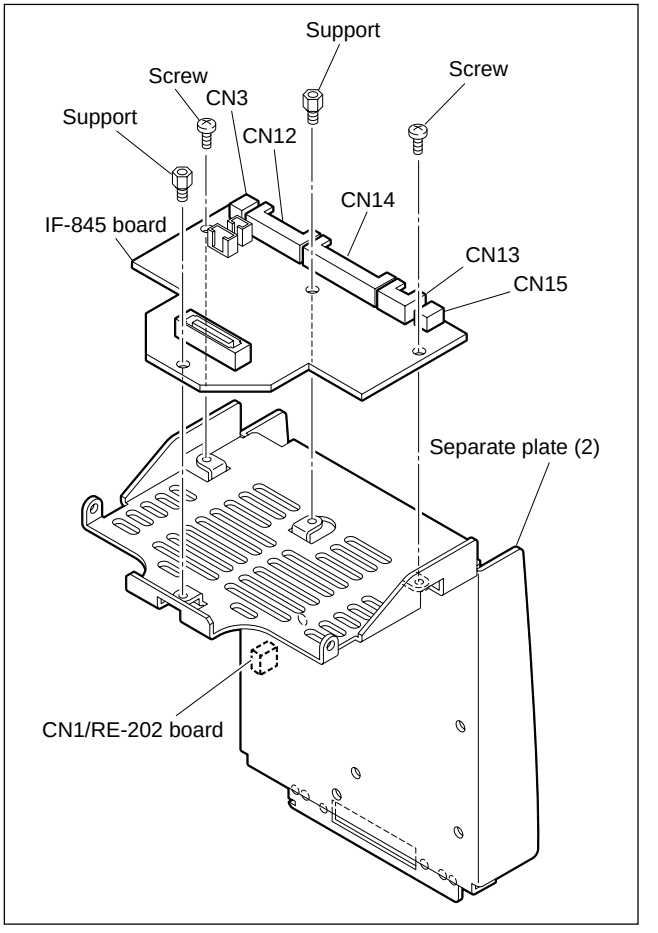
7. Remove the two screws on both sides in the upper portion and two screws of the lower portion of the separate plate (2) block, and the remove the separate plate (2) block.

Notes

- Do not remove the screws in the lower portion of the separate plate (2) block except the specified screws.
- At this time, since the harnesses are connected to IF-845 board of the separate plate (2) block, be careful in handling.



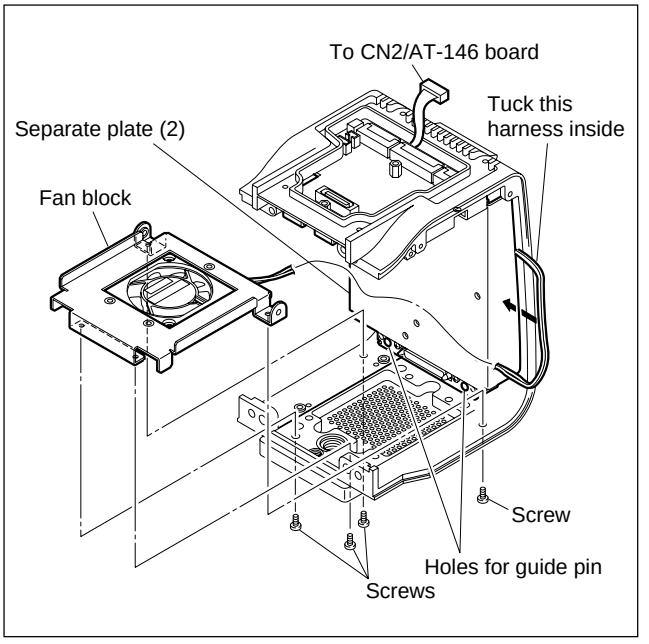
8. Disconnect the connectors (CN3, CN12, CN14, CN13, CN15) of the IF-845 board, and connector (CN1) of the RE-202 board.
9. Remove the two screws and two supports, and remove the IF-845 board.



10. Install the new IF-845 board in the reverse order of steps 1 to 9.

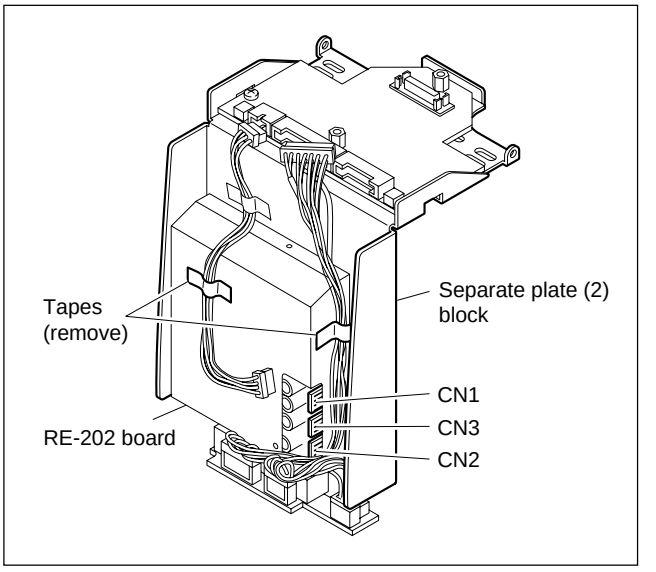
Notes at installation

- Tuck the harness of the fan to the back of the separate plate (2).
- Take out the connection connector to the AT-146 board from near center of the upper portion.
- Insert the guide pins of the chassis into the holes of the separate plate (2)
- Be very careful not to catch the fan harness between the chassis and fan itself when installing the fan block.

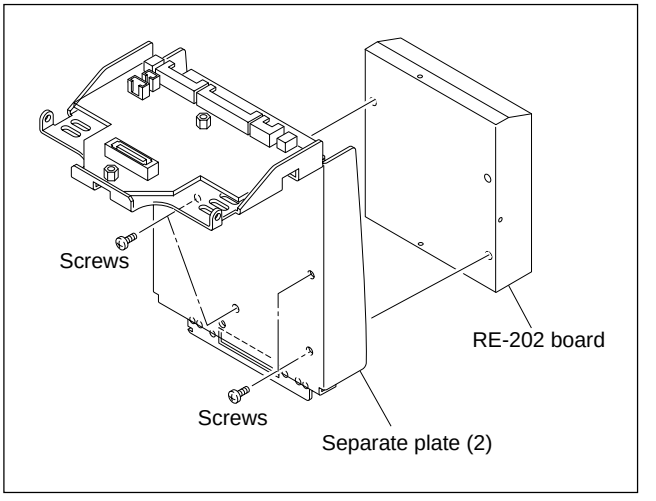


3-15-6. RE-202 Board

1. Remove the separate plate (2) block. (Refer to steps 1 to 7 of Section 3-15-5 “IF-845 Board”.)
2. Disconnect the connectors (CN3, CN2) of the RE-202 board.
3. Remove the adhesive tapes shown in the figure.



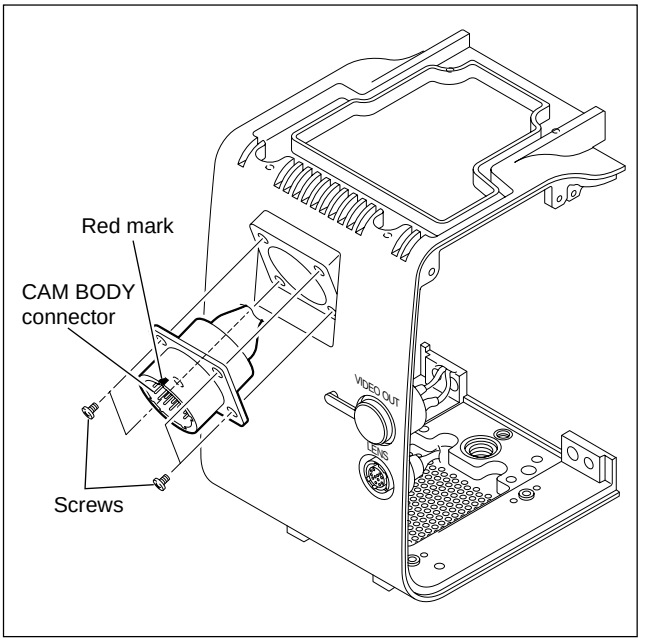
4. Remove the four screws, and remove the RE-202 board.



5. Install the new RE-202 board in the reverse order of steps 1 to 4.

3-15-7. CAM BODY Connector

1. Remove the separate plate (2) block. (Refer to steps 1 to 7 of Section 3-15-5 “IF-845 Board”.)
2. Remove the four screws, and remove the CAM BODY connector.



3. Install the new CAM BODY connector so that the red mark on it faces upwards.

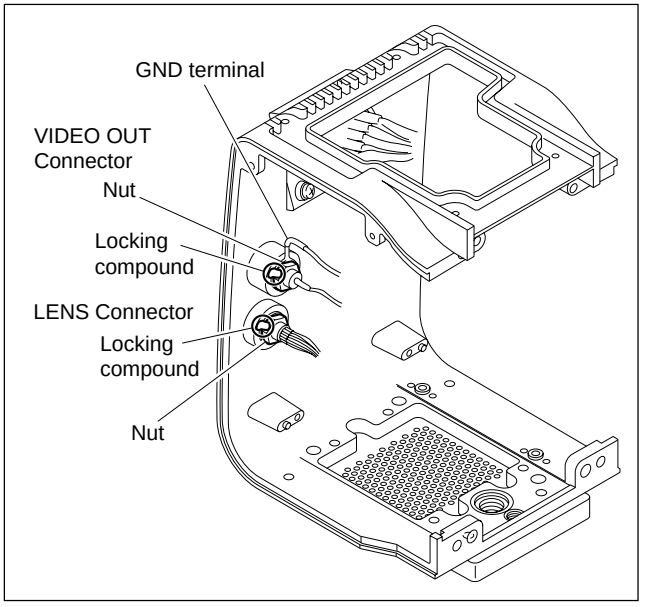
   Note

   Apply locking compound to the fixing screws.

4. Install the separate plate (2) block in the reverse order of removal.

3-15-8. VIDEO OUT/LENS Connector

1. Remove the separate plate (2) block. (Refer to steps 1 to 7 of Section 3-15-5 “IF-845 Board”.)
2. Remove the nut of the connector to be replaced.



3. Install the new connector in the reverse order of steps 1 and 2.

   Notes

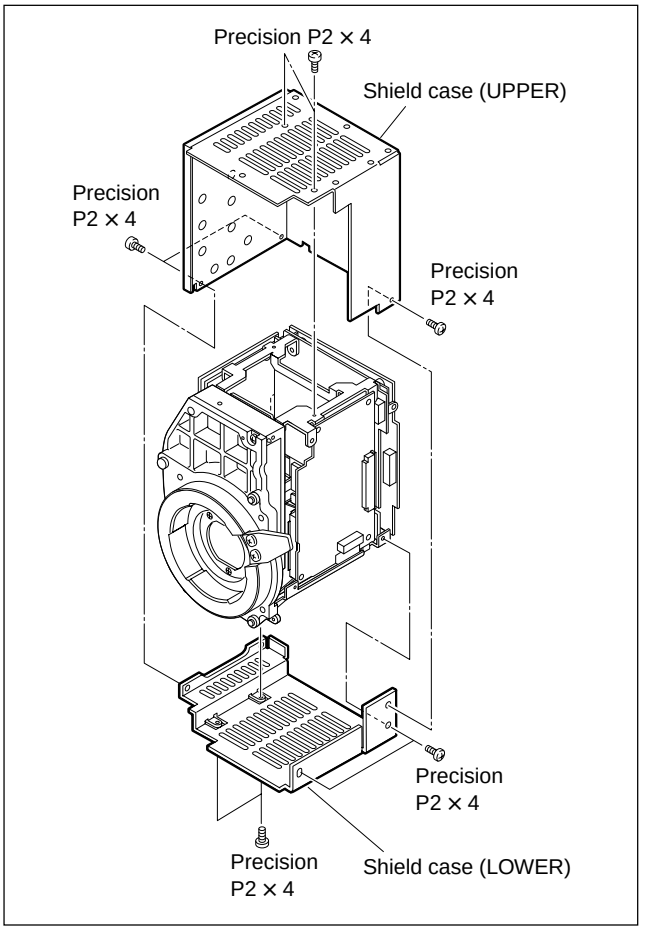
   - Align the position of GND terminal for the VIDEO OUT connector as shown in the figure, and the tighten the nut.
   - After tightening the nut, apply a locking compound to the position shown in the figure.

Section 4
Replacement of CCD Unit Boards

To replace the boards in the CCD unit, refer to Section 2-1 (HDC-900/910) or Section 3-1 (HDC-950/930) and remove the CCD unit from the main unit to replace.

4-1. CN-1961 Board

1. Remove the five screws, and remove the shield case (UPPER).
2. Remove the four screws, and remove the shield case (LOWER).

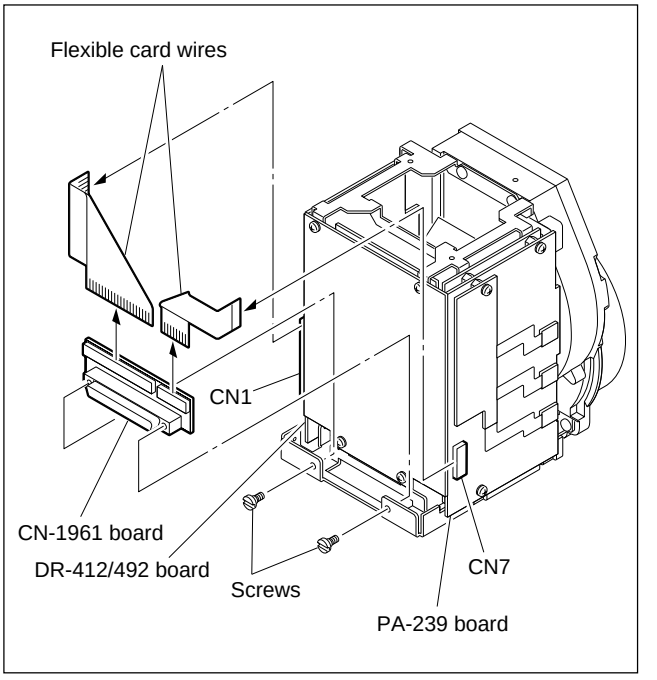


3. Disconnect the flexible card wires from the connector (CN1) of the DR-412/492 board and connector (CN7) of the PA-239 board.

Note

Refer to Section 1-5 for details on disconnecting/ connecting the flexible card wire.

4. Remove the two screws, and remove the CN-1961 board.



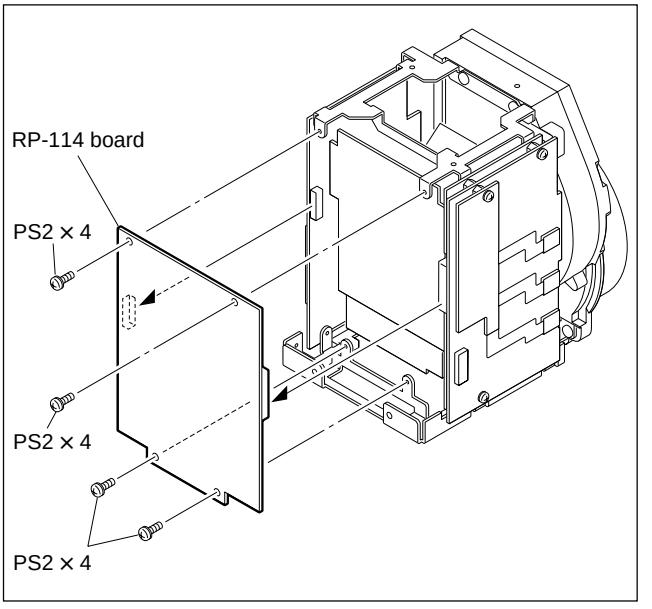
5. Install the new board in the reverse order of steps 1 to 4.

4-2. RP-114 Board

Note

Every electrical part mounted on the RP-114 board cannot be replaced. If there is any defective part, replace the board itself.

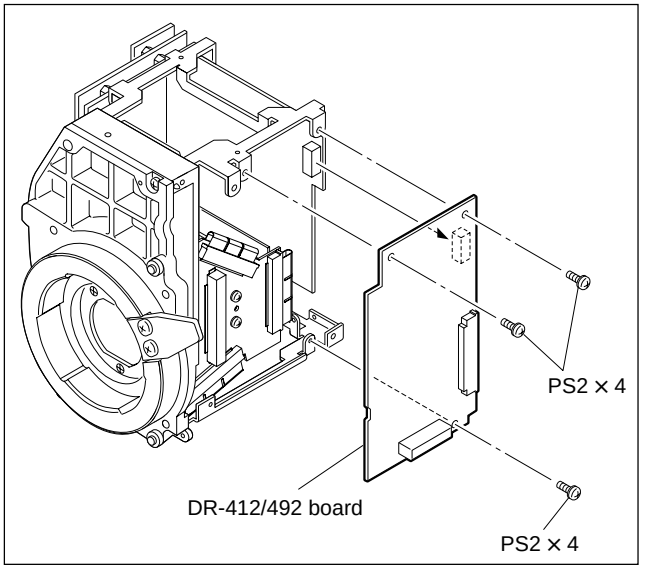
1. Remove the CN-1961 board. (Refer to Section 4-1.)
2. Remove the four screws, and remove the RP-114 board.



3. Install the new board in the reverse order of steps 1 and 2.

4-3. DR-412/492 Board

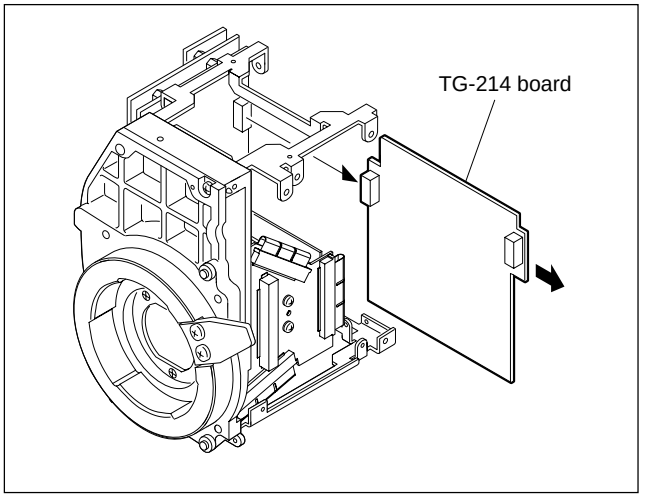
1. Remove the CN-1961 board. (Refer to Section 4-1.)
2. Remove the RP-114 board. (Refer to Section 4-2.)
3. Remove the three screws, and remove the DR-412/492 board.



4. Install the new board in the reverse order of steps 1 to 3.

4-4. TG-214 Board

1. Remove the CN-1961 board. (Refer to Section 4-1.)
2. Remove the RP-114 board. (Refer to Section 4-2.)
3. Remove the DR-412/492 board. (Refer to Section 4-3.)
4. Remove the TG-214 board in the arrow direction.



5. Install the new board in the reverse order of steps 1 to 4.

4-5. CN-1947/2329 Board

Note

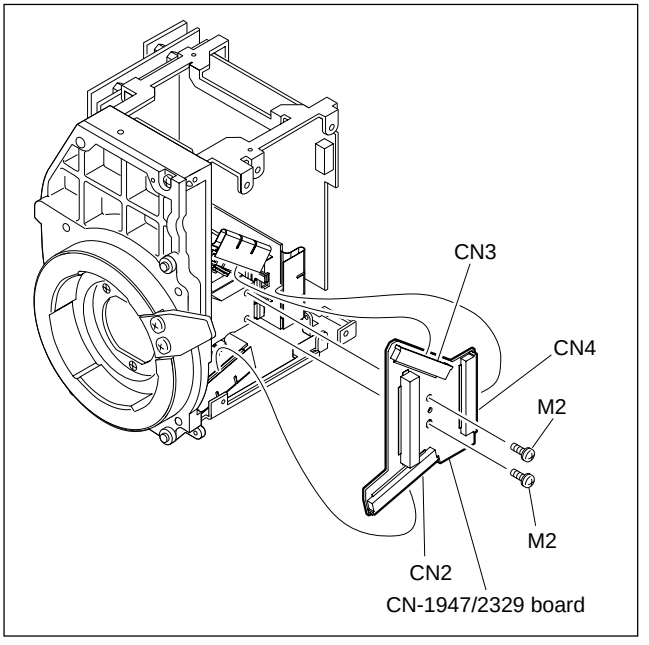
Every electrical part mounted on the CN-1947/2329 board cannot be replaced. If there is any defective part, replace the board itself.

1. Remove the CN-1961 board. (Refer to Section 4-1.)
2. Remove the RP-114 board. (Refer to Section 4-2.)
3. Remove the DR-412/492 board. (Refer to Section 4-3.)
4. Disconnect the flexible wires from the connectors (CN2, CN3, and CN4) of the CN-1947/2329 board.

   Note

   Refer to Section 1-5 for details on disconnecting/ connecting the flexible card wire.

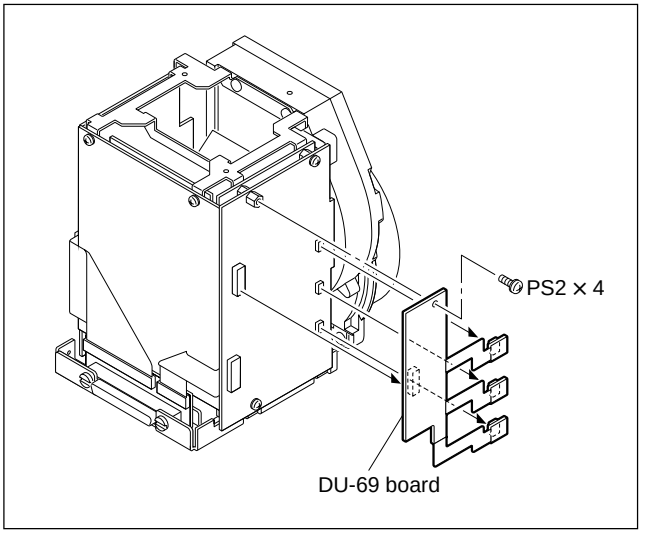
5. Remove the two screws, and remove the CN-1947/ 2329 board.



6. Install the new board in the reverse order of steps 1 to 5.

4-6. DU-69 Board

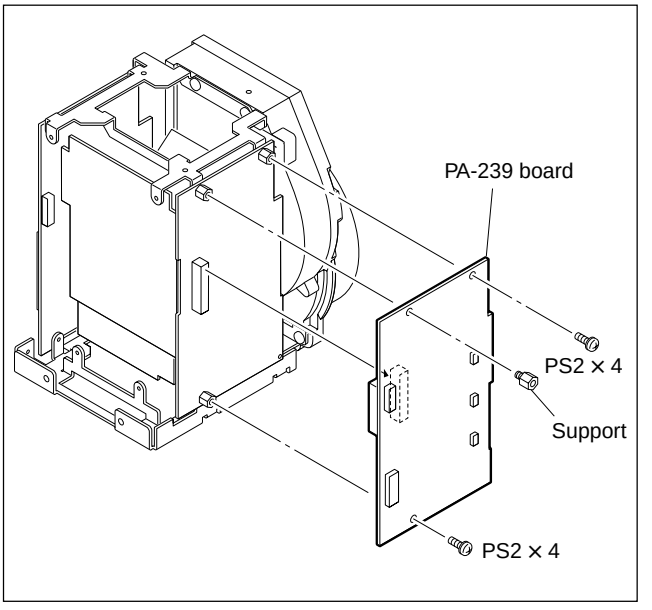
1. Remove the shield case (UPPER and LOWER). (Refer to steps 1 and 2 of Section 4-1.)
2. Remove one screw, and remove the DU-69 board.



3. Install the new board in the reverse order of steps 1 and 2.

4-7. PA-239 Board

1. Remove the CN-1961 board. (Refer to Section 4-1.)
2. Remove the RP-114 board. (Refer to Section 4-2.)
3. Remove the DU-69 board. (Refer to Section 4-6.)
4. Remove the two screws and one support, and remove the PA-239 board.



5. Install the new board in the reverse order of steps 1 to 4.

Adjustment after board replacement

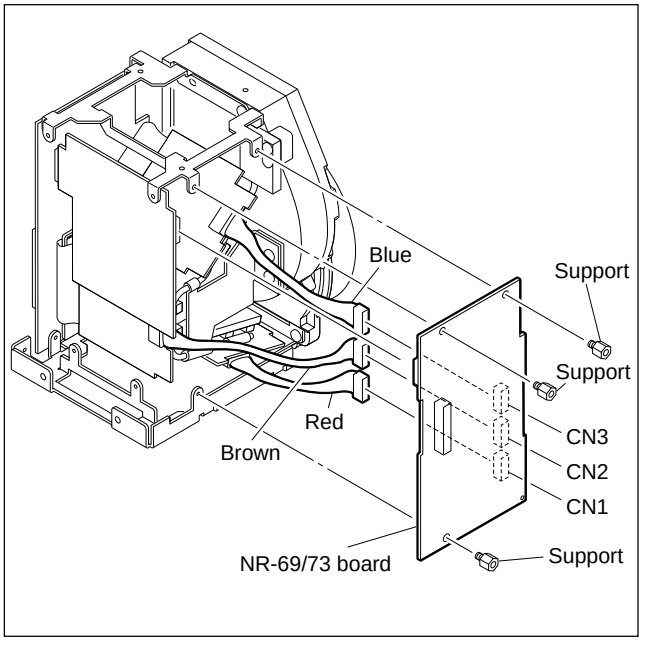
After replacement, PA-239 board adjustment is required. Refer to Section 6-3 for details on adjustment.

4-8. NR-69/73 Board

Note

Every electrical part mounted on the NR-69/73 board cannot be replaced. If there is any defective part, replace the board itself.

1. Remove the CN-1961 board. (Refer to Section 4-1.)
2. Remove the RP-114 board. (Refer to Section 4-2.)
3. Remove the DU-69 board. (Refer to Section 4-6.)
4. Remove the PA-239 board. (Refer to Section 4-7.)
5. Remove the three supports.
6. Disconnect the red, brown, and blue harness connectors from the connectors (CN1, CN2, and CN3) of side A of the NR-69/73 board, and remove the NR-69/73 board.



7. Install the new board in the reverse order of steps 1 to 6.

Section 5
SERVICE Menu

In this section, describes the service menu (SERVICE menu) in the setup menu displayed on the viewfinder. For other menus, refer to Section 3 of the Installation and Maintenance Manual.

5-1. Setup Menu

The setup menu is used for selecting various setting values, items displayed on the viewfinder screen, the method of displaying, and adjustments. The menu is displayed on the viewfinder screen. The menu can also be displayed by connecting an external monitor to the TEST OUT connector.
Normally, SERVICE menu will not be displayed in the setup menu, but this SERVICE menu can be displayed by setting the switches (S100-1 to S100-4) on the AT-130 board.

Structure of Setup Menu

The setup menu is composed of the following menus.

- USER menu (This menu is displayed only when the ROM version on the AT board of the unit is Ver 1.30 or higher.)
- USER MENU CUSTOMIZE menu (This menu is displayed only when the ROM version on the AT board of the unit is Ver 1.30 or higher.)
- OPERATION menu
- PAINT menu
- MAINTENANCE menu
- FILE menu
- DIAGNOSIS menu
- SERVICE menu (This menu is not displayed at the factory setting state.)

Note

Beside above menus, the TOP menu is provided for indicating the whole configuration of the menu items.

Selecting the Menu

The menus to be displayed on the viewfinder screen can be selected by the switches (S100-1 to S100-4) on the AT-130 board. At the factory setting state, the menu is set to display from OPERATION menu to DIAGNOSIS menu.

( ) : Shows the factory setting

Switch Settings				Setup Menu							
S100-1	**S100-2**	**S100-3**	**S100-4**	**USER**	**USER MENU CUSTOMIZE**	**OPERATION**	**PAINT**	**MAINTENANCE**	**FILE**	**DIAGNOSIS**	**SERVICE**
(OFF)	(OFF)	(OFF)	(OFF)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
ON	OFF	OFF	OFF	Yes	Yes	Yes	Yes	Yes	No	Yes	No
OFF	ON	OFF	OFF	Yes	Yes	Yes	Yes	No	No	Yes	No
ON	ON	OFF	OFF	Yes	Yes	Yes	No	No	No	Yes	No
OFF	OFF	ON	OFF	Yes	Yes	Yes	No	No	No	No	No
ON	ON	ON	ON	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Equipment Required

HDC-900/910

7-type viewfinder HDVF-700A/7700/C700W (or black-and-white monitor)
Camera control unit HDCU-900/700A

HDC-950/930

2-type viewfinder HDVF-20A (or black-and-white monitor)
Camera control unit HDCU-900/950/700A, or AC adapter AC-550, etc. for supplying the power to the camera.

Switches (HDC-900/910)

DISPLAY switch

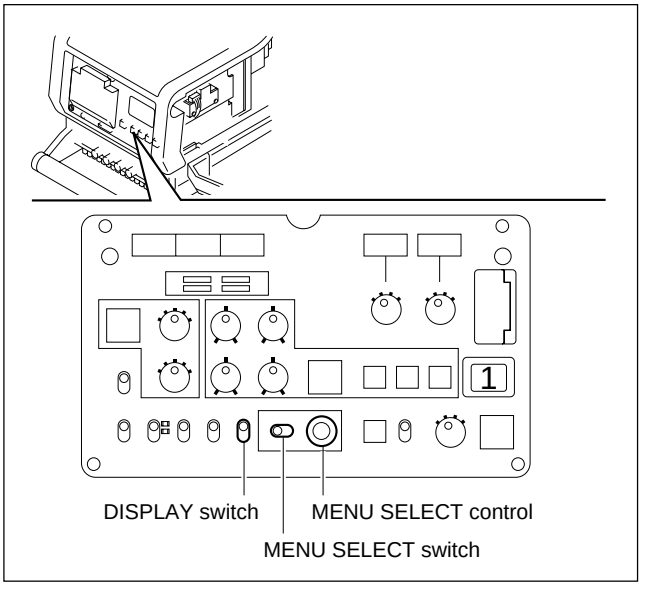
ON : Displays characters and messages indicating the settings and operating status of the unit on the viewfinder screen.
OFF : Turns off all the displays on the viewfinder screen.
MENU : Displays the setup menu on the viewfinder screen.

MENU SELECT control

Selects the items displayed on the viewfinder screen and changes settings.

MENU SELECT switch

ENTER : Determines the menu and item selected by the MENU SELECT control, and determines the setting values.
CANCEL : Cancels the menu setting mode and returns to the page selection mode or TOP menu.



Basic Operations (HDC-900/910)

1. Displaying the menu
   To display the OPERATION menu, turn the power on and set the DISPLAY switch to “MENU”. (*1)
   To display the other menus, set the DISPLAY switch from “OFF” to “MENU” while pressing the MENU SELECT switch toward the “ENTER” side, and obtain the TOP menu screen. Turning the MENU SELECT control, select the menu to be displayed, and press the MENU SELECT switch toward the “ENTER” side.
2. To change pages, set the cursor to the page number and turn the MENU SELECT control.
3. To shift the cursor, turn the MENU SELECT control. (Pressing the MENU SELECT switch toward the “ENTER” side determins the setting.)
4. To change a setting value, set the cursor to the item to be changed and press the MENU SELECT switch toward the “ENTER” side, then the cursor turns to “?” and the value changes by turning the MENU SELECT control.
   (Turning it fast, the value changes greatly, while turning it slowly, the value changes slightly for fine adjustment.) To determine the setting, press the MENU SELECT switch toward the “ENTER” side, and to cancel the change, press the MENU SELECT switch toward the “CANCEL” side.
5. By every set of the MENU SELECT switch to “CANCEL”, the screen returns to the item selection mode, page selection mode, and then TOP menu (*2).
6. To delete the menu displayed, set the DISPLAY switch to “OFF”.

(*1) : The display screen at the power on is changeable. For change, refer to MENU RESUME item in OTHERS 2 Page of the MAINTENANCE menu.
(*2) : The page selection mode is available, only when the basic operation step1 was performed and the operation started from the TOP menu.

Displaying characters on an external monitor (HDC-900/910)

When you want to display characters including the menu on an external monitor connected to the TEST OUT conector, proceed as follows.

1. Displaying characters. (including the menu)
   While pressing the MENU switch toward the “CANCEL” side, set the DISPLAY switch from “OFF” to “MENU”.
2. To remove the characters/menu from the external monitor.
   While pressing the MENU switch towards the “CANCEL” side, set the DISPLAY switch from “MENU” to “OFF”.

Switches (HDC-950/930)

DISPLAY switch

ON : Displays characters and messages indicating the settings and operating status of the unit on the viewfinder screen.

OFF : Turns off all the displays on the viewfinder screen.

MENU : Displays the setup menu on the viewfinder screen.

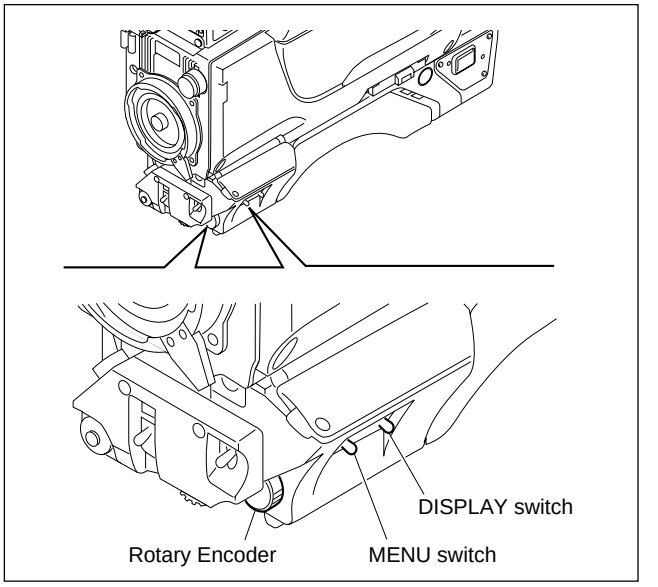
Rotary Encoder

Selects the items displayed on the viewfinder screen and changes settings.

MENU switch

STATUS : Allows you to check the current setting.

CANCEL : Cancels the menu setting mode and returns to the page selection mode or TOP menu.



Basic Operations (HDC-950/930)

1. Displaying the menu
   To display the OPERATION menu, turn the power on and set the DISPLAY switch to “MENU”. (*1)
   To display the other menus, set the DISPLAY switch from “OFF” to “MENU” while pressing the rotary encoder, and obtain the TOP menu screen. Turning the rotary encoder, select the menu to be displayed, and press the rotary encoder.
2. To change pages, set the cursor to the page number and turn the Rotary encoder.
3. To shift the cursor, turn the Rotary encoder. (Pressing the Rotary encoder determins the setting.)
4. To change a setting value, set the cursor to the item to be changed and press the Rotary encoder, then the cursor turns to “?” and the value changes by turning the Rotary encoder.
   (Turning it fast, the value changes greatly, while turning it slowly, the value changes slightly for fine adjustment.) To determine the setting, press the Rotary encoder, and to cancel the change, press the MENU switch toward the “CANCEL” side.
5. By every set of the MENU switch to “CANCEL”, the screen returns to the item selection mode, page selection mode, and then TOP menu (*2).
6. To delete the menu displayed, set the DISPLAY switch to “OFF”.

(*1) : The display screen at the power on is changeable. For change, refer to MENU RESUME item in OTHERS 2 Page of the MAINTENANCE menu.

(*2) : The page selection mode is available, only when the basic operation step1 was performed and the operation started from the TOP menu.

Displaying characters on an external monitor (HDC-950/930)

When you want to display characters including the menu on an external monitor connected to the TEST OUT conector, proceed as follows.

1. Displaying characters. (including the menu)
   While pressing the MENU switch toward the “CANCEL” side, set the DISPLAY switch from “OFF” to “MENU”.
2. To remove the characters/menu from the external monitor.
   While pressing the MENU switch towards the “CANCEL” side, set the DISPLAY switch from “MENU” to “OFF”.

5-2. TOP Menu

The TOP menu is provided for indicating the whole configuration of the menu items.

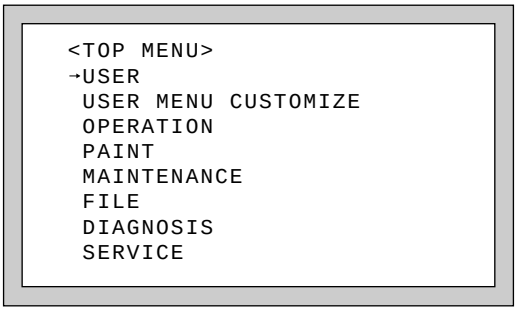
Displaying the TOP menu

HDC-900/910 : Set the DISPLAY switch from “OFF” to “MENU” while pressing the MENU SELECT switch toward the “ENTER” side.
HDC-950/930 : Set the DISPLAY switch from “OFF” to “MENU” while pressing the rotary encoder.

Reference

To select the menu to be displayed on the viewfinder, switch setting on the AT-130 board is required.
For details, refer to “Selecting the Menu” in Section 5-1.

TOP MENU



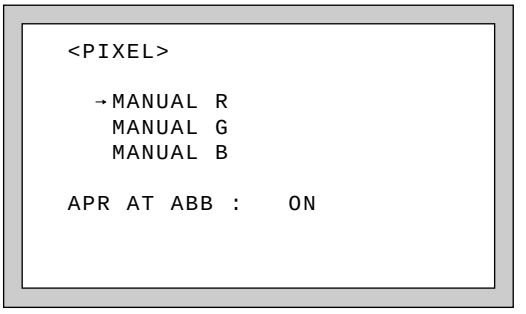
Menu	Description
USER *	You can select desired pages and items from the OPERATION, PAINT, MAINTENANCE, FILE and DIAGNOSIS menu pages and set them on the USER MENU CUSTOMIZE menu. For details, refer to the operation manual supplied with this unit.
USER MENU CUSTOMIZE *	This menu is used for editting menu pages and items to be set on the USER menu. For details, refer to the operation manual supplied with this unit.
OPERATION	This menu consists of VF screen display items to be set by a camera operator.
PAINT	This menu consists of general paint operation items such as white.
MAINTENANCE	This menu consists of paint items used less frequently such as shading adjustment and items required for the maintenance of the camera such as system change.
FILE	This menu is used for performing file operations such as saving the reference file.
DIAGNOSIS	This menu describes the self-diagnosis and VTR status, etc.
SERVICE	This menu consists of the adjustments and settings required during servicing such as RPN correction, etc.

* : These menus are displayed only when the ROM version on the AT board of the unit is Ver 1.30 or higher.

5-3. SERVICE Menu

This menu consists of the adjustments and settings required during servicing such as RPN correction, etc.

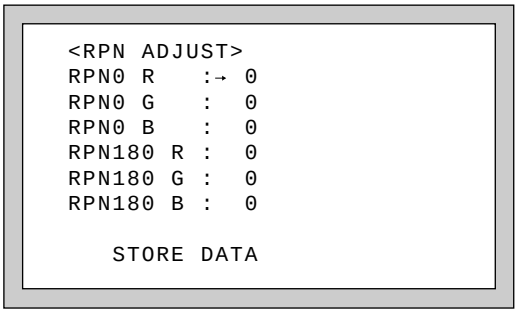
PIXEL page



Item	Setting	Description
MANUAL R	See below*	Perform the RPN correction manually for each channel.
MANUAL G		(Refer to Section 5-4.)
MANUAL B		
APR AT ABB	ON, OFF	Turns ON/OFF the APR (automatic RPN correction) during black balance automatic adjustment.

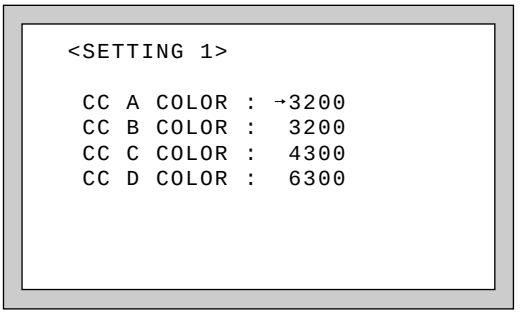
∗ : HDC-900/910 : Press the MENU SELECT switch toward the “ENTER” side.
HDC-950/930 : Press the rotary encoder.

RPN ADJUST page



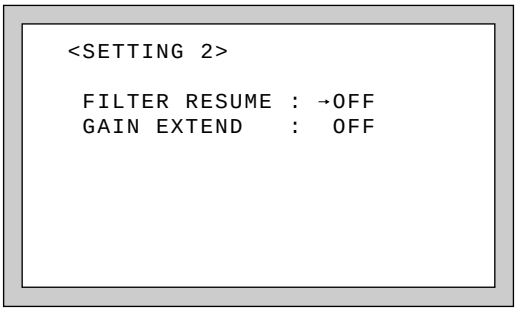
Item	Setting	Description
RPN0 R	80 to FF, 00 to 7F	Adjust the RPN offset of the R, G, B channels (two each).
RPN0 G		
RPN0 B		
RPN180 R		
RPN180 G		
RPN180 B		

SETTING 1 page



Item	Setting	Description
CC A COLOR	3200 to 9900	Sets according to the color temperature of the CCD filters
CC B COLOR		(A, B, C, D).
CC C COLOR		
CC D COLOR		

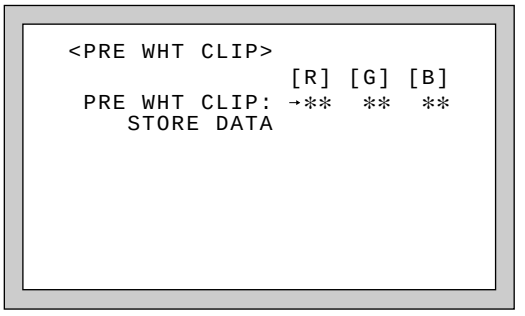
SETTING 2 page (Displays ROM Version 1.30 or higher)



Item	Setting	Description
FILTER RESUME*	ON, OFF	This function is to set whether to return the filter to the previous filter after the FILTER LOCAL button on the rear panel is turned ON for changing the filter and then it is turned OFF. ON : Returns the filter to the previous filter. OFF : Does not return the filter to the previous filter.
GAIN EXETEND	ON, OFF	Sets the gain selected by the GAIN SW page of the OPERATION menu. ON : –3, 0, 3, 6, 12, 18, 24, 30, 36, 42 dB OFF : –3, 0, 3, 6, 12 dB

*: HDC-900/910 only.

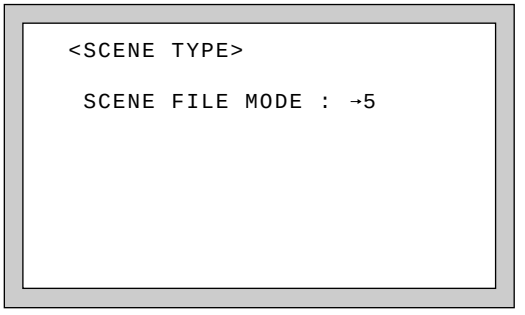
PRE WHT CLIP page (Displays ROM Version 1.30 or higher)



Item	Setting	Description
PRE WHT CLIP	80 to 7F	Sets the pre white clip level. (Refer to Section 5-5.)
STORE DATA	See below*	Stores the setting value of the pre white clip level.

*: HDC-900/910 : Press the MENU SELECT switch toward the “ENTER” side.
HDC-950/930 : Press the rotary encoder.

SCENE TYPE page (Displays ROM Version 1.30 or higher)



Item	Setting	Description
SCENE FILE MODE	5, 32	Sets the number of the scene files.

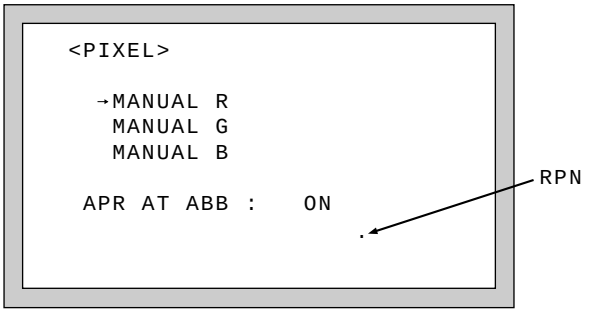
5-4. Manual RPN Correction

The CCD RPN (Residual Point Noise) is concealed automatically (APR) while the automatic black balance adjustment (ABB) is being executed.
For the RPN which cannot be concealed by APR, perform the manual RPN concealment as the following procedures.

Note

Depending on the RPN position, in some cases RPN can not be concealed even by concealing manually.

1. Set “DETAIL” to “OFF” on the SW STATUS page of the PAINT menu. (Refer to Section 3-4 of the installation and maintenance manual.)
2. Display the PIXEL page of the SERVICE menu. (Refer to Section 5-3.)
3. Move the “→” to “MANUAL, R, G, or B” depending on the RPN color, and press the rotary encoder.*1



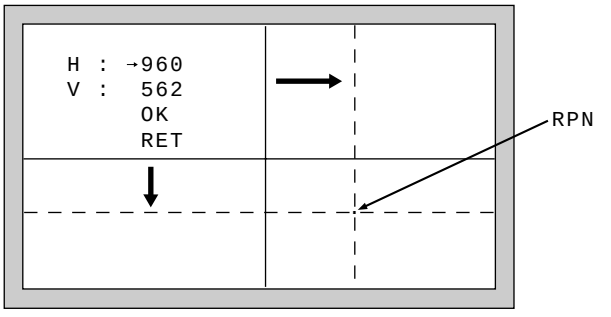
PIXEL page

4. The cursor selection page is displayed as shown below.
   Adjust the vertical and horizontal lines of the cross-shaped cursor to the RPN by changing the H and V values.
   Changing the H value moves the vertical line of the cross-shaped cursor while changing the V value moves the horizontal line of the cross-shaped cursor.

   Note

   If the cross-shaped cursor lines and characters of the setting overlap, the characters will automatically move to the opposite side of the cursor line.
   Then, the RPN will not be hidden by the characters of the setting.

   (H, V setting range)
   H: 0 (Left) to 1920 (Right)
   V: 0 (Top) to 1125 (Bottom)



Cursor selection page

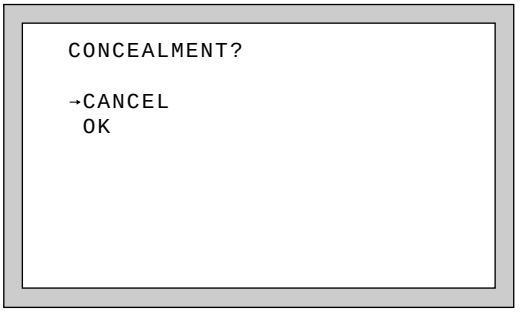
5. Move the “→” to “OK” and press the rotary encoder.*1
   Select the “RET” to cancel the concealment and return to PIXEL page.

6. Temporary concealment is executed and the concealment determination page (CONCEALMENT?) will be displayed as shown below.
   After RPN disappears, move the "→" to "OK" and press the rotary encoder.*1

   Note

   If "OK" is executed other than the RPN position, the erroneous data is stored. This erroneous data alone cannot be deleted.
   Before pressing the rotary encoder*1, be sure to check the RPN is disappeared.

   RPN concealment will be executed, and the PIXEL page will automatically be returned.
   If RPN still appears, move the "→" to "CANCEL", press the rotary encoder*1 and repeat from step 4.



Concealment determination page

7. Set the "DETAIL" of the SW STATUS page in the PAINT menu to "ON".
   (Refer to Section 3-4 of the Installation and Maintenance Manual.)

∗1 : For HDC-950/930
HDC-900/910 : Press the MENU SELECT switch toward the "ENTER" side.

5-5. Pre White Clip Level Adjustment (ROM Version 1.30 or Higher)

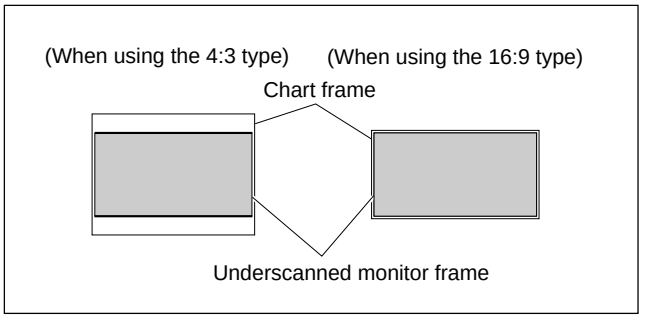
Note

For the pre white clip level adjustment, using an 89.9%-reflective grayscale chart is preferable.
Before beginning adjustment, be sure to set the illumination of the light source (or the lumirous intensity on the chart surface) and to set the color temperature exactly.
For details, refer to Section 6-1-5 "Maintaining the Grayscale Chart".

Eauipment: Oscilloscope
Object: Grayscale chart

Preparations

- Extend the VA-196 board with the extension board (EX-738).
- Shoot the grayscale chart as shown below.
  Illumination: 2400 lx
  Color temperture: 3200 K
  Reflective: 89.9 %



- Iris of the lens: Open
- Check the format.
  Checking item:
  MENU: MAINTENANCE
  PAGE: MULTI FORMAT
  ITEM: CURRENT

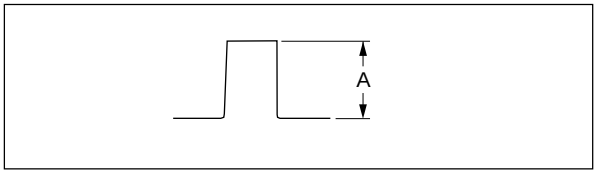
Adjustment Procedures

1. Change the gain of the camera by the MASTER GAIN in BLACK SHADING page of the MAINTENANCE menu, and adjust the pre white clip level so that the video level A becomes the specified value for each gain (−3, 0, 3, 6, 12 dB).
   (Specified values differ for each format.)
   Test Point R: TP1/VA-196 board
   G: TP2/VA-196 board
   B: TP3/VA-196 board
   Adjustment item:
   MENU: SERVICE
   PAGE: PRE WHT CLIP
   ITEM: PRE WHT CLIP [R]/[G]/[B]
   Specification:

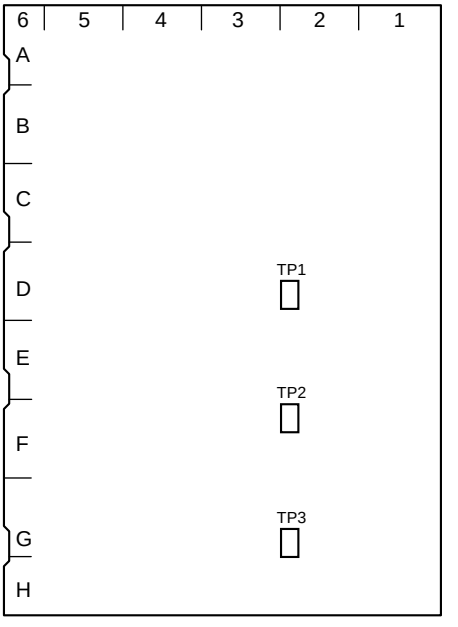
Format	Specified value
50I, 60I	A = 2.4 V p-p
HDC-950/HDC-900 only 24PsF, 25PsF, 30PsF	A = 1.2 V p-p

Specification of the VA-223 board (Dynamic range: expand at PsF).

Format	Specified value
HDC-950/HDC-900 only 24PsF, 25PsF, 30PsF	A = 1.84 V p-p



2. Stores the setting value of the pre white clip level.
   ITEM: STORE DATA
3. Change the format.
   Menu setting:
   MENU: MAINTENANCE
   PAGE: MULTI FORMAT
   ITEM: NEXT
4. Turn OFF the power and turn ON again, then repeat the steps 1 to 3 for all formats.



VA-196 board (A side)

Section 6
Electrical Alignment

Following are the adjustment items to be performed when the boards and block inside the camera block are repaired or replaced.
It is not necessary to perform the adjustment for other boards described in the following.

Board/Block	Adjustment items	Section
DPR-154	VTR26P OUT Level Adjustment	Section 3-5 of Installation and Maintenance Manual
PA-239	PA-239 Board Adjustment	Section 6-3
VA-196	VA-196 Board Adjustment	Section 6-4
VDA-55	VTR26P OUT Level Adjustment	Section 3-5 of Installation and Maintenance Manual
Driver board	Filter Positioning Adjustment	Section 6-8
Filter disk unit, ND filter	Adjustment After Replacement of ND Filter	Section 6-7

6-1. Preparations

6-1-1. Equipment Required

Measuring equipment

- HDTV serial digital waveform monitor*
  Leader Electronics LV5150DA, Leader Electronics LV5152DA (multi format) or equivalent
- HD monitor
  Sony BVM-D20F1/BVM-D14H5 or equivalent
- Oscilloscope
  Tektronix TDS460A or equivalent

* : If the HDTV serial digital waveform monitor cannot be prepared, perform the adjustments at the analog output using the HDTV analog waveform monitor.

Related Equipment

- HDVS camera system
  MSU-700A/750
  HDVF-20A (HDC-950/930)
  HDVF-700A (HDC-900/910)
- Lens
  Canon HJ18

Fixtures

- Pattern box PTB-500
  Sony Part No. : J-6029-140-B
- Grayscale chart (16 : 9 transparent type)
  Sony Part No. : J-6394-080-A
- Grayscale chart (4 : 3 reflective type)
  Commercially available
- Extension board EX-738
  Sony Part No. : A-8327-351-A
- CCZRGB-3 cable*
  If the cable is not available, make it referring to Section 6-1-2.

* : Required only when performing the adjustments at the analog output.

6-1-2. How to Make the CCZRGB-3 Cable

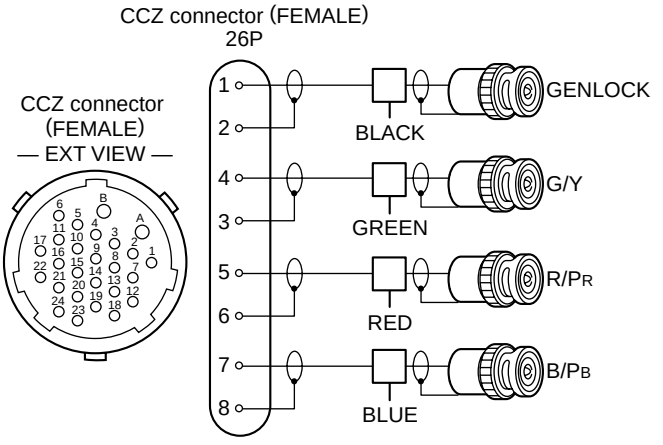
When performing the adjustments at the analog output, the CCZRGB-3 cable is required for the output signals from the VTR 26P OUT connector.
If the cable is not available, make the fixture proceeding as follows.

Parts required

- CCZ connector 1 pc (Sony part No.: 1-564-184-21)
- BNC connectors 4 pcs (Sony part No.: 1-569-370-11)
- 75 Ω coaxial cable 4 pcs

Procedures

Make the fixture as shown in the figure below.
Stick a label on each cable to clarify the output signal.



6-1-3. Precautions on Adjustments

- Turn ON the main power switch (external) before adjusting, and warm up the board for about 10 minutes.
- All measuring equipment must be calibrated.
- Periodic Maintenance must be conducted for the pattern box.
- “Section 6-1-8. Initial Settings” must be completed.

6-1-4. File data at Adjustment

The file structure of the adjustment data of HDC-900/910 and HDC-950/930 is as follows.

- Lens file is used for compensation of the deviation which generates by switching the lens extender from OFF to ON and for compensation of the difference in the characteristics between lenses. This file is stored in the camera. Mount the lens normally used during the adjustment. (Refer to Section 4-6 of Installation and Maintenance Manual.)
- The reference file stores the custom paint data adjusted by the video engineer. This file is stored in the camera and memory stick. Therefore, before performing adjustment, store this data in the memory stick first, and reset this data from the memory stick after adjustment. (Refer to Section 4-5 of Installation and Maintenance Manual.)
- OHB file is used for adjustment of the CCD block maintenance. This file is stored in the camera. (Refer to Section 4-7 of Installation and Maintenance manual.)

6-1-5. Maintaining the Grayscale Chart

For the VA gain adjustment, using an 89.9 %-reflective grayscale chart is preferable.
If a reflective chart is not available, use a well-maintained pattern box and a transparent grayscale chart for adjustment.
Before beginning adjustment, set the illumination of the light source (or the luminous intensity on the chart surface) properly proceeding as follows and set the color temperature to 3200 K exactly by adjusting light.

Information on the reflective grayscale chart (4 : 3)

Recommended chart

The reflective grayscale chart (4 : 3) is commercially available.

Recommended chart: Reflective grayscale chart (with a special case)
MURAKAMI COLOR RESEARCH LABORATORY GS-3
or equivalent

Supplier: MURAKAMI COLOR RESEARCH LABORATORY
Address: 3-11-3, Kachidoki, Chuo-ku, Tokyo, JAPAN
Postcode 104-0054
Phone: 81-3-3532-3011
Fax: 81-3-3532-2056

Handling precautions

- Do not touch the chart's surface.
- Do not subject the surface to dirt, scratches or prolonged exposure to sunlight.
- Protect the chart from excess moisture and harmful gas.
- Avoid resting articles against the case.
- Open the case and dry the chart more an hour for a month in no use long period.

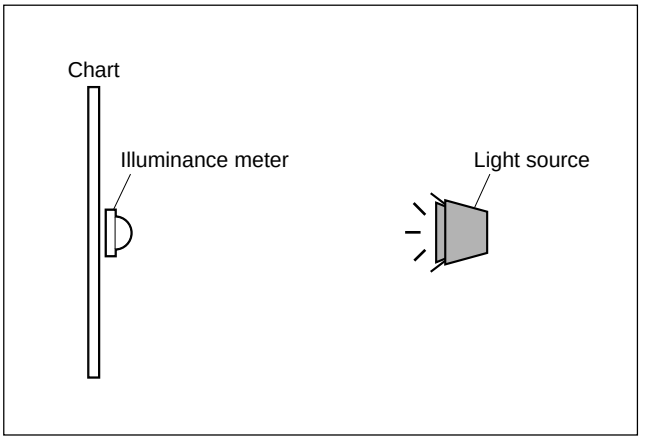
Replacement period when the chart is used as the reference

The reflective grayscale chart should be replaced every two years if it used as the reference. Because the chart deteriorates with time and proper adjustment cannot be achieved.
Replacement period varies according to storage conditions of the chart.

Setting illumination (when the reflective chart is used)

Equipment: Illuminance meter (Calibrated)

1. Turn on the light source and warm up for about 30 minutes.
2. Place the illuminance meter on the chart surface. Adjust the position and angle of the light source so that the whole surface of the chart is evenly 2000 lx.
   Note
   Light the chart from almost the same direction and height as the camera to shoot the chart.



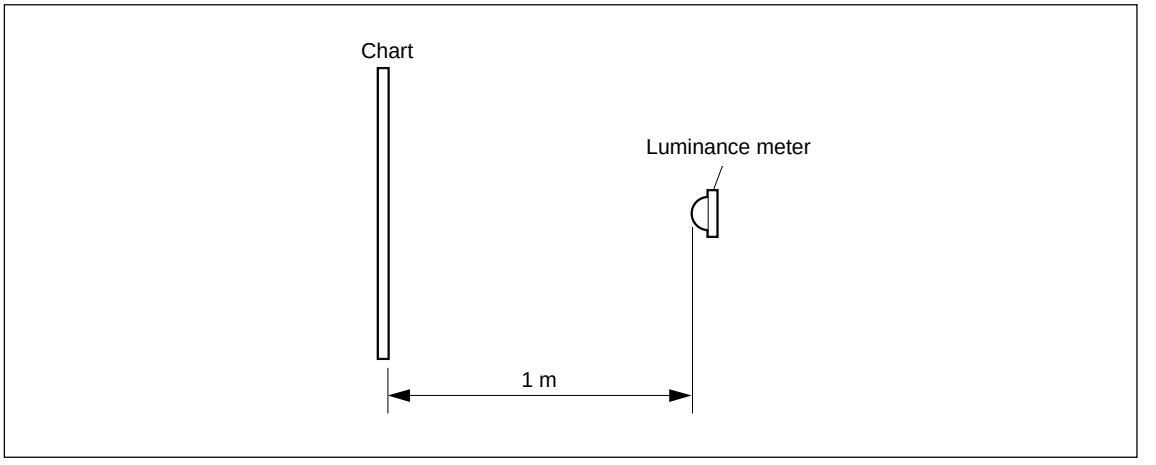
Setting luminous intensity (when the transparent chart is used)

Equipment: Luminance meter (Minolta LS-110 or equivalent. Calibrated.)

1. Light the pattern box and warm up for about 30 minutes.
2. Place the pattern box where the chart is not exposed to light, such as a darkroom.
   (Or cover the pattern box with a cover whose inside is painted in black.)
3. Place the luminance meter facing straight to the chart at a distance of 1 m from it.
4. Adjust the luminance control of the pattern box so that the white portion in the center of the chart is 573 ± 6 cd/m^2.

   Note

   This corresponds to the luminous intensity on the 89.9 %-reflective chart at 2000 lx.



6-1-6. Description on Setup Menu

A part of adjustments given in this section uses the setup menu. The setup menu consists of the following menus. Besides there is a TOP menu indicating the entire configuration of menu items.

- USER menu
- USER MENU CUSTOMIZE menu
- OPERATION menu
- PAINT menu
- MAINTENANCE menu
- FILE menu
- DIAGNOSIS menu

For details on the setup menu, refer to Section 3 of the Installation and Maintenance Manual.

In this manual, describes the setup menu operation as follows.

For example:
When AUTO LEVEL in AUTO SETUP page of MAINTENACE menu is performed:

MENU: MAINTENANCE
PAGE: AUTO SETUP
ITEM: AUTO LEVEL

How to change the setting values

To enter or cancel the setting value of items, which can be changed by turning the MENU SELECT control (HDC-900/910) or rotary encoder (HDC-950/930), proceed as follows.

HDC-900/910

To enter the setting value:

Press the MENU SELECT switch toward the “ENTER” side.

To cancel the setting value:

Before pressing the MENU SELECT switch toward the “ENTER” side, press the MENU SELECT switch toward the “CANCEL” side. The original setting is restored.

After pressing the MENU SELECT switch toward the “ENTER” side, the setting cannot be canceled.

HDC-950/930

To enter the setting value:

Press the rotary encoder.

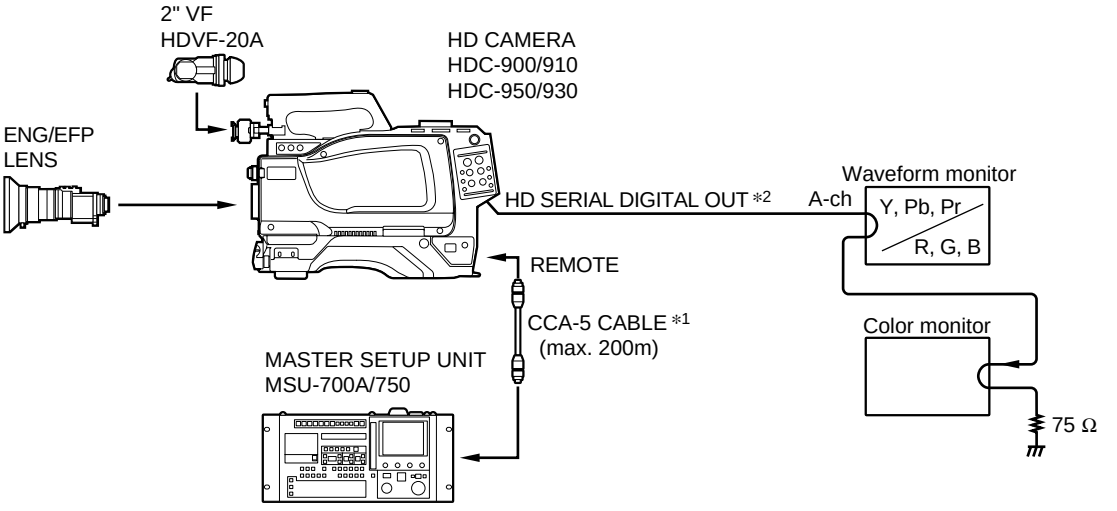
To cancel the setting value:

Before pressing the rotary encoder, press the MENU switch toward the “CANCEL” side. The original setting is restored.

After pressing the rotary encoder, the setting cannot be canceled.

6-1-7. Connection of Equipment

General Adjustments



∗1 : Required only when using MSU-700A/750.
∗2 : When performing adjustments at the analog output, connect the CCZRGB-3 cable to the VTR 26P OUT (R, G, B) connector and the HDTV analog waveform monitor.

6-1-8. Initial Settings

Note

In this section, describes the adjustment procedures using MSU-700A.

MSU control panel

When MSU-700A is used

- Power supply and signal switching block
  - ALL button → OFF (dark)
  - CAM PW button → ON (Lit)
  - VF PW button → ON (Lit)
  - TEST 1 button → OFF (dark)
  - TEST 2 button → OFF (dark)
  - BARS button → OFF (dark)
  - CLOSE button → ON (Lit)
- Camera/CCU circuit ON/OFF block
  - KNEE OFF button → OFF (Lit)
  - DETAIL OFF button → OFF (Lit)
  - LVL DEP OFF button → OFF (Lit)
  - MATRIX OFF button → OFF (Lit)
  - AUTO KNEE button → OFF (dark)
  - SKIN DETAIL button → OFF (dark)
- Others
  - GAMMA OFF button → ON (dark)
  - MASTER GAIN → 0 (0 dB)
  - FILTER(ND) button → 1 (CLEAR)
  - FILTER(CC) button → B (3200K)
  - ECS/SHUTTER ON button → OFF (dark)

When MSU-750 is used

- Power supply and signal switching block
  - ALL button → OFF (dark)
  - CAM PW button → ON (Lit)
  - VF PW button → ON (Lit)
  - TEST button → OFF (dark)
  - BARS button → OFF (dark)
  - CLOSE button → ON (Lit)
- Camera/CCU circuit ON/OFF block
  - Knee Off* → OFF (Lit in reverse)
  - Detail Off* → OFF (Lit in reverse)
  - Level Dep Off* → OFF (Lit in reverse)
  - Matrix Off* → OFF (Lit in reverse)
  - AUTO KNEE button → OFF (dark)
  - SKIN DETAIL button → OFF (dark)
- Others
  - Gamma Off* → ON (Lit normally)
  - Master Gain* → 0 (0 dB)
  - ND (1/2/3/4/5)* → 1 (CLEAR)
  - CC (A/B/C/D/E)* → B (3200K)
  - ECS/Shutter* → OFF (Lit normally)

∗: Push the FUNCTION button, then select the function menu display.

When adjusting using the Setup menu

Set S100-1 to S100-4 switches on the AT-130 board to OFF.

• OPERATION menu

Page	Setting item	Initial setting
GAIN SW	LOW	0 dB
	MIDDLE	6 dB
	HIGH	12 dB

• PAINT menu

Page	Setting item	Initial setting
VIDEO LEVEL	TEST	OFF
GAMMA	GAMMA	ON
KNEE	KNEE	OFF
	WHT CLIP	OFF
DETAIL 1	DETAIL	ON
SKIN DETAIL	SKIN DTL	OFF
USER MATRIX	MATRIX	OFF

• MAINTENANCE menu
Set as follows when performing adjustments at the HD SERIAL DIGITAL OUT.

Page	Setting item	Initial setting
SDI	BNC SDI OUT	ON

Side panel (HDC-950/930):
VTR SAVE/STBY switch → STBY
GAIN switch → L (0 dB)
OUTPUT/DCC switch → CAM/OFF
WHITE BAL switch → PRST

Front panel (HDC-950/930):
SHUTTER switch → OFF
FILTER control → 1B (3200 K)

6-2. Automatic Adjustment

MAINTENANCE menu is used to perform the automatic adjustment.
(Refer to Section 3-5 of the Installation and Maintenance Manual)

To execute the automatic adjustment

1. Set the setup menu as follows.
   MENU : MAINTENANCE
   PAGE : AUTO SETUP
   ITEM : AUTO LEVEL
2. Message “Completed” is displayed when the adjustment is completed.

6-3. PA-239 Board Adjustment

6-3-1. PA Balance Adjustment

Equipment: Oscilloscope
Object: Grayscale chart

Preparation

Extend the VA-196 board with the extension board (EX-738).

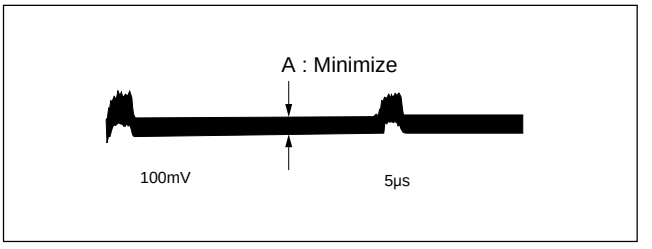
Adjustment Procedures

1. Setting for MSU-700A
   CLOSE button → ON (lit)
2. Black balance adjustment
   Adjust levels for R, G and B as follows.

	Test point/ EX-738 board	Adj. point/ PA-239 board
R-ch	TP22	⊘RV102
G-ch	TP14	⊘RV202
B-ch	TP6	⊘RV302

(GND: E1, Trigger: TP71)

Specification: Minimize the level at A (width).

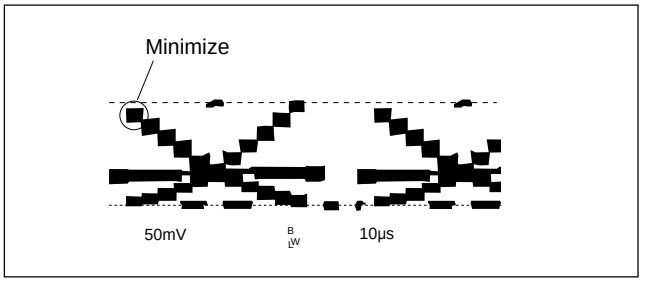


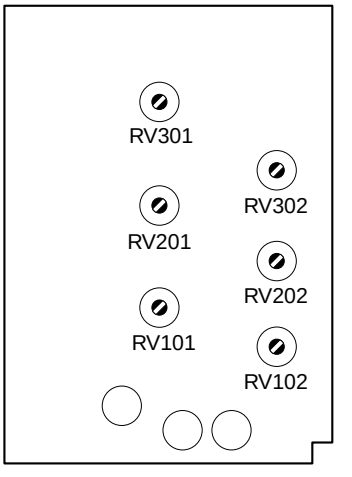
3. Setting for MSU-700A
   CLOSE button → ON (dark)
4. Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame (F10, 2000 lx, 3200 K).
5. White balance adjustment
   Adjust levels for R, G and B as follows.

	Test point/ EX-738 board	Adj. point/ PA-239 board
R-ch	TP22	⊘RV101
G-ch	TP14	⊘RV201
B-ch	TP6	⊘RV301

(GND: E1, Trigger: TP71)

Specification: Minimize the level (width) of the stepped part.





PA-239 Board

6-3-2. PA Gain Adjustment

Note

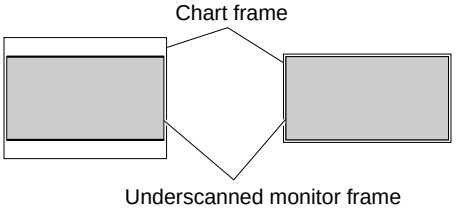
For the PA gain adjustment, using an 89.9%-reflective grayscale chart is preferable.
Before beginning adjustment, be sure to set the illumination of the light source (or the lumirous intensity on the chart surface) and to set the color temperature exactly.
For details, refer to Section 6-1-5 “Maintaining the Grayscale Chart”

Eauipment : Oscilloscope
Object : Grayscale chart

Preparations

- Extend the VA-196 board with the extension board (EX-738).
- Shoot the grayscale chart as shown below.
  (Lens: Canon HJ18, F10, 2000 lx, 3200 K).

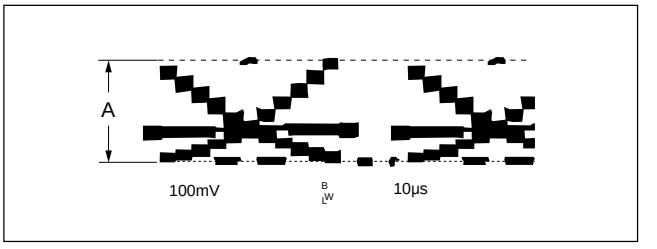
(When using the 4:3 type) (When using the 16:9 type)



- Setting for MSU-700A
  CLOSE button → OFF (dark)
  ECS/SHUTTER ON button → OFF (dark)

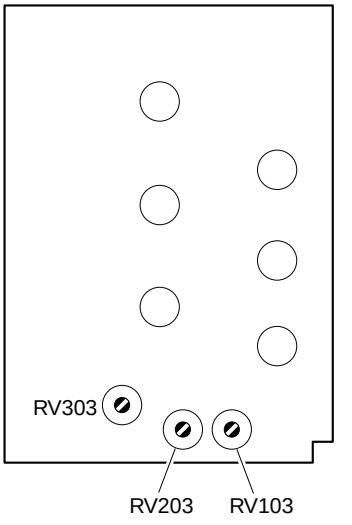
Adjustment Procedures

1. PA OUT R level adjustment
   Measuring point : TP22/EX-738 board
   Adjusting point : ⊘RV103/PA-239 board
   Specification : A = 400 ±10 mV
2. PA OUT G level adjustment
   Measuring point : TP14/EX-738 board
   Adjusting point : ⊘RV203/PA-239 board
   Specification : A = 400 ±10 mV
3. PA OUT B level adjustment
   Measuring point : TP6/EX-738 board
   Adjusting point : ⊘RV303/PA-239 board
   Specification : A = 130 ±5 mV



Setting After Adjustment

- After the adjustment, return the switches to their original settings.



PA-239 Board

6-3-3. RPN Adjustment

Preparations

- Adjust the monitor manually for a clearer view.
- Setting for MSU-700A
  CLOSE button → ON (lit)
  DETAIL OFF button → OFF (lit)
  MASTER GAIN → 12
- Menu setting
  MENU : SERVICE
  PAGE : RPN ADJUST

Adjustment Procedures

1. Set the cursor to the RPN0 R and press the Rotary Encoder.*1
2. The RPN appears on the monitor. Turn the rotary encoder until RPN disappears.*2
3. Perform steps 1 and 2 in the same way for the remaining 5 channels.
4. When the RPN disappears for all channels, adjust the cursor to STORE DATA, and press the rotary encoder.*1

∗1 : For HDC-950/930
HDC-900/910 : Press the MENU SELECT switch toward the “ENTER” side.
∗2 : For HDC-950/930
HDC-900/910 : Turn the MENU SELECT control until RPN disappears.

6-4. VA-196 Board Adjustment

6-4-1. VA Gain Adjustment

Note

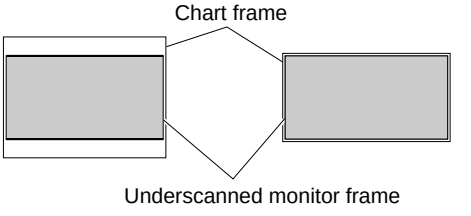
For the VA gain adjustment, using an 89.9%-reflective grayscale chart is preferable.
Before beginning adjustment, be sure to set the illumination of the light source (or the lumirous intensity on the chart surface) and to set the color temperature exactly.
For details, refer to Section 6-1-5 “Maintaining the Grayscale Chart”

Eauipment : Oscilloscope
Object : Grayscale chart

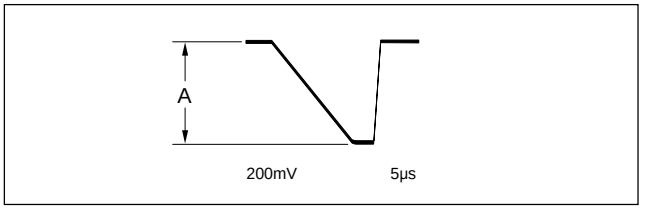
Preparations

- Extend the VA-196 board with the extension board (EX-738).
- Shoot the grayscale chart as shown below.
  (Lens: Cannon HJ18, F10, 2000 lx, 3200 K).

(When using the 4:3 type) (When using the 16:9 type)



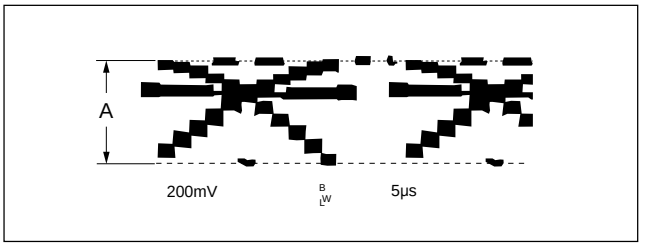
- Setting for MSU-700A
  TEST1 → ON
  Adjust the white R, G, B of the MSU-700A so that A becomes the specified value.
  Measuring point R : TP21/EX-738 board
  G : TP13/EX-738 board
  B : TP5/EX-738 board
  Adjustment point : white R, G, B



Specification : A = 1000 ±10 mV
TEST1 → OFF
CLOSE button → OFF (dark)
ECS/SHUTTER ON button → OFF (dark)

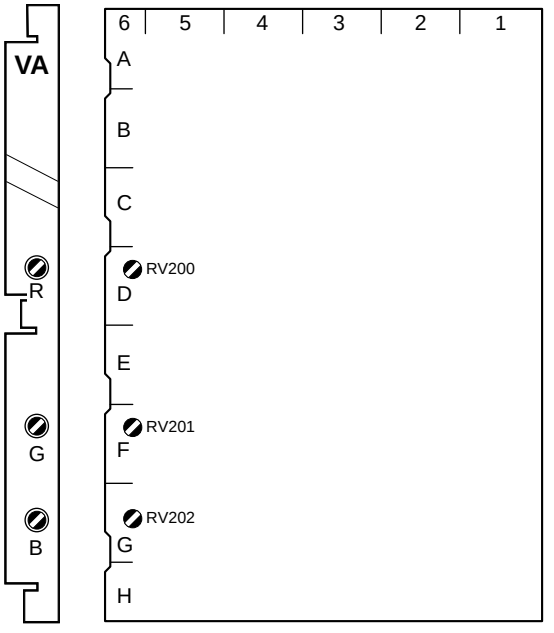
Adjustment Procedures

1. VA OUT R level adjustment
   Measuring point : TP21/EX-738 board
   Adjusting point : ⊘RV200/VA-196 board
   Specification : A = 1000 ±10 mV
2. VA OUT G level adjustme→nt
   Measuring point : TP13/EX-738 board
   Adjusting point : ⊘RV201/VA-196 board
   Specification : A = 1000 ±10 mV
3. VA OUT B level adjustment
   Measuring point : TP5/EX-738 board
   Adjusting point : ⊘RV202/VA-196 board
   Specification : A = 1000 ±10 mV



Setting After Adjustment

- After the adjustment, return the switches to their original settings.



VA-196 board (A side)

6-5. Video System Level Adjustment (When using the Setup Menu)

Notes

- This section describes the adjusting procedure using the setup menu.
  Refer to Section 6-6 when adjusting using MSU-700A/750.
- Perform the following adjustments (Sections 6-5-1 to 6-5-12) at the request of the customer.

6-5-1. White Shading Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Full white pattern

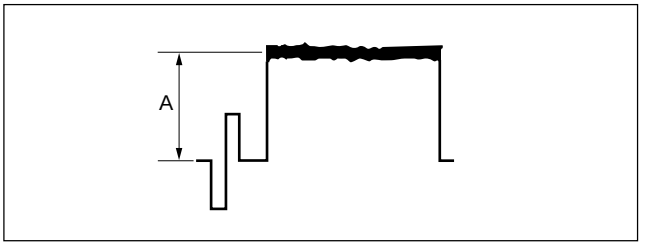
Note

When performing the white shading adjustment, make sure the following conditions are proper. If not, adjustment can not be complete.

- White pattern is not uneven.
- Luminance is correctly adjusted.
- Iris and zoom control of the lens are correctly adjusted.

Preparations

- Menu setting:
  MENU: PAINT
  PAGE: SW STATUS
  ITEM: KNEE → OFF
- Shoot the fully occupied white area of the white pattern on the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV (at F4 to F5.6)
  (If a lens aperture is greater than F5.6, adjust the light amounts with shutter.)



- Lens Focus: ∞
- Lens Extender/Shrinker: ×2, ×0.8 → OFF

• Call the file in accordance with the lens attached.
Menu setting:
MENU: FILE
PAGE: LENS FILE
ITEM: FILE No.

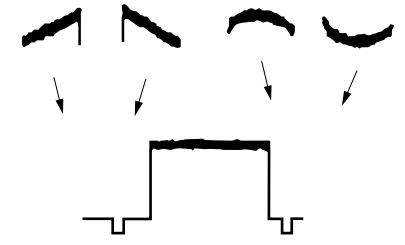
Note

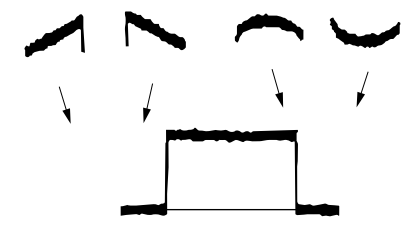
If no corresponding file exists, select the file number whose FILE NAME is displayed as NO OFFSET, and change the lens name.

Menu setting:
MENU: FILE
PAGE: LENS FILE
ITEM: FILE NAME

Adjustment Procedures

1. Adjust the white balance.
   AUTO W/B BAL switch (front panel) → WHT
2. Select the R signal output on the waveform monitor.
   If the white shading is monitored, make the waveform flat referring to the following tables.

	Output signal ofwaveform monitor	H SAW MENU: MAINTENANCE PAGE: WHITE SHADING	H PARA MENU: MAINTENANCE PAGE: WHITE SHADING
R	R	ITEM: H SAW (R)	ITEM: H PARA (R)
G	G	ITEM: H SAW (G)	ITEM: H PARA (G)
B	B	ITEM: H SAW (B)	ITEM: H PARA (B)
HD SERIAL DIGITAL OUT connector			

	Output signal ofwaveform monitor	V SAW MENU: MAINTENANCE PAGE: WHITE SHADING	V PARA MENU: MAINTENANCE PAGE: WHITE SHADING
R	R	ITEM: V SAW (R)	ITEM: V PARA (R)
G	G	ITEM: V SAW (G)	ITEM: V PARA (G)
B	B	ITEM: V SAW (B)	ITEM: V PARA (B)
HD SERIAL DIGITAL OUT connector			

3. Perform the adjustments for G-ch and B-ch with the same procedures as for R-ch.
4. Adjust the white balance.
   AUTO W/B BAL switch (front panel) → WHT

Lens File Store

Menu setting:
MENU: FILE
PAGE: LENS FILE
ITEM: STORE FILE

Specify the file number to be saved, and execute FILE STORE.

Adjustment for Lens Extender/Shrinker

When using the lens extender or lens shrinker, perform the following adjustments after the completion of lens file store.

Using the lens extender

5. Set the setup menu as follows.
   - Call the file in accordance with the lens attached.
     Menu setting:
     MENU: FILE
     PAGE: LENS FILE
     ITEM: FILE No.

     Note

     If no corresponding file exists, select the file number whose FILE NAME is displayed as NO OFFSET, and change the lens name.
     Menu setting:
     MENU: FILE
     PAGE: LENS FILE
     ITEM: FILE NAME
6. Lens extender (×2) → ON
7. Perform procedures 2 to 4, then perform the lens file store again.
8. Lens extender (×2) → OFF

Using the lens shrinker

9. Set the setup menu as follows.
   - Call the file in accordance with the lens attached.
     Menu setting:
     MENU: FILE
     PAGE: LENS FILE
     ITEM: FILE No.

     Note

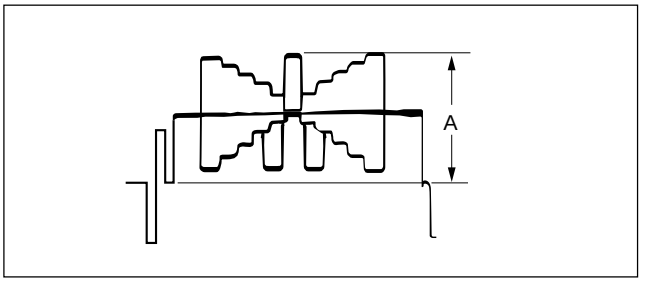
     If no corresponding file exists, select the file number whose FILE NAME is displayed as NO OFFSET, and change the lens name.
     Menu setting:
     MENU: FILE
     PAGE: LENS FILE
     ITEM: FILE NAME
10. Lens shrinker (×0.8) → ON
11. Perform procedures 2 to 4, then perform the lens file store again.
12. Lens shrinker (×0.8) → OFF

6-5-2. H/V Ratio Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

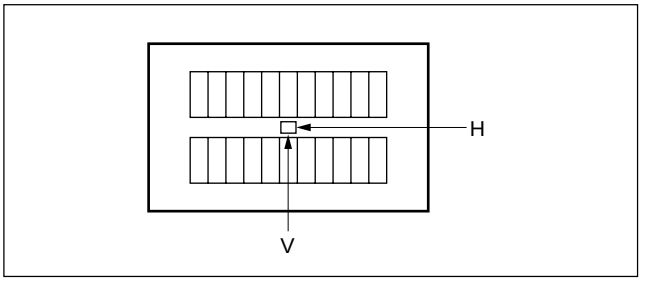
Preparations

- Menu setting:
  MENU: PAINT
  PAGE: KNEE
  ITEM: KNEE → OFF
  PAGE: DETAIL 1
  ITEM: DETAIL → ON
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV



Adjustment Procedures

1. Menu setting:
   MENU: PAINT
   PAGE: DETAIL 1
   ITEM: LEVEL → 99
   ITEM: LIMITER [M] → 0
   ITEM: CRISP →−25
   ITEM: LVL DEP → 25
2. Adjustment item:
   MENU: PAINT
   PAGE: DETAIL 1
   ITEM: HV RATIO
   Specification: A ratio between H and D detail amounts (white) to be added shall be equal. (from 20 to 40)

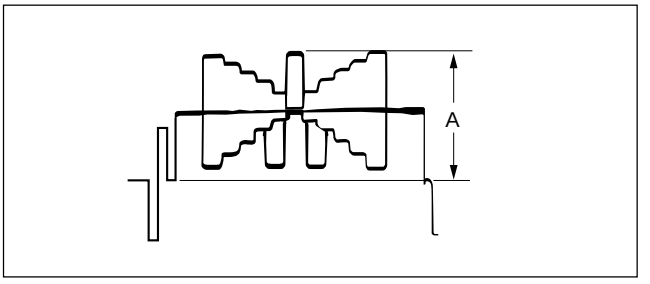


6-5-3. Detail Level Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

Preparations

- Menu setting:
  MENU: PAINT
  PAGE: KNEE
  ITEM: KNEE → OFF
  PAGE: DETAIL 1
  ITEM: DETAIL → ON
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV



Adjustment Procedure

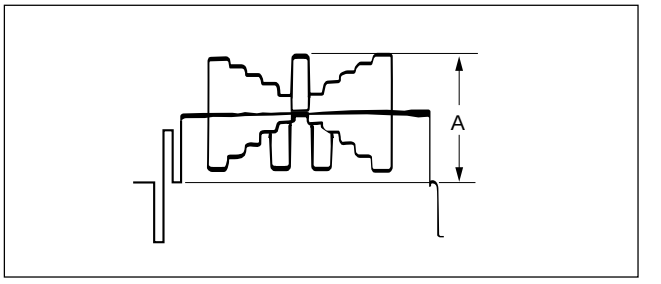
Adjustment item:
MENU: PAINT
PAGE: DETAIL 1
ITEM: LEVEL
Specification: Adjust the detail level to be added to each step of the grayscale for the desired level.

6-5-4. Crispening Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

Preparations

- Menu setting:
  MENU: PAINT
  PAGE: DETAIL 1
  ITEM: DETAIL → ON
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV



Adjustment Procedures

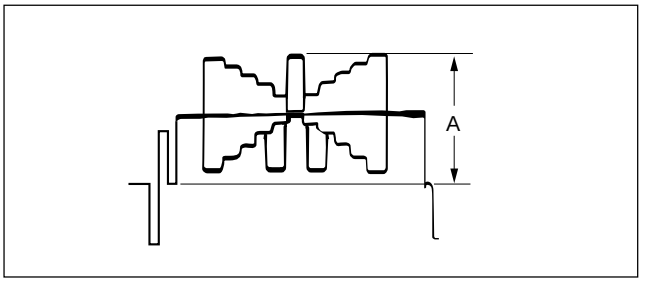
1. Adjust the white balance.
   AUTO W/B BAL switch (front panel) → WHT
2. Adjust the crispening level.
   Adjustment item:
   MENU: PAINT
   PAGE: DETAIL 1
   ITEM: CRISP
   Specification: Set Crispening to −99 once. And turn slowly for increment until the noise at the black level of the waveform is just decreased, or until an appropriate crispening level is obtained.

6-5-5. Level Dependent Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

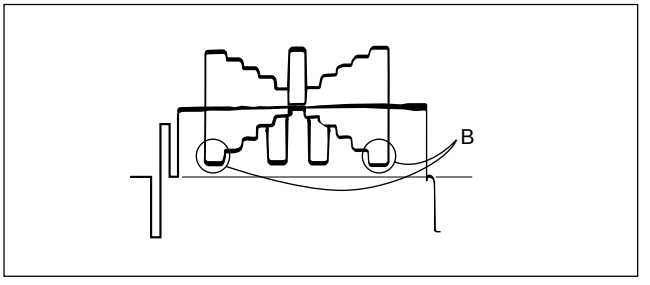
Preparations

- Menu setting:
  MENU: PAINT
  PAGE: DETAIL 1
  ITEM: DETAIL → ON
  ITEM: LVL DEP → ON
  Reference
  There are two LVL DEP items on the DETAIL 1 page.
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV



Adjustment Procedure

Adjustment item:
MENU: PAINT
PAGE: DETAIL 1
ITEM: LVL DEP
Specification: Set Level Dep to −99 once. And turn slowly for increment until spikes at portions B just decreased.



Note

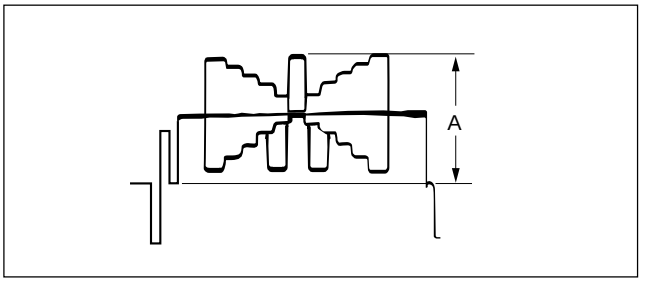
After adjustment is complete, be sure to perform Section 6-5-2 “H/V Ratio Adjustment”.

6-5-6. Detail Clip Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

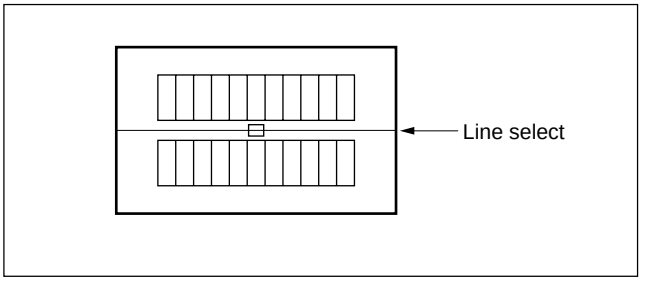
Preparations

- Menu setting:
  MENU: PAINT
  PAGE: KNEE
  ITEM: KNEE → OFF
  PAGE: DETAIL 1
  ITEM: DETAIL → ON
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV

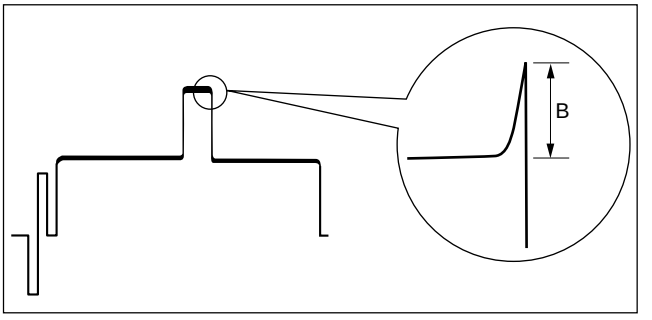


Adjustment Procedures

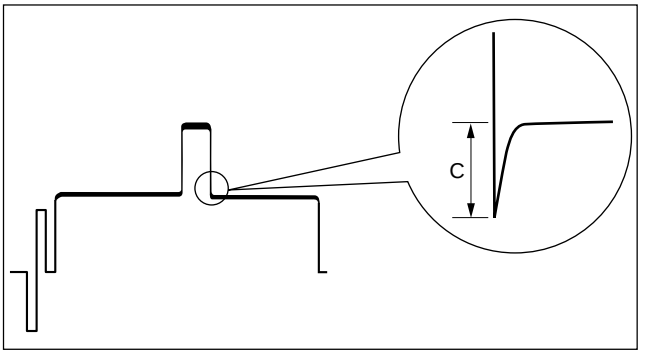
1. Adjust the white balance.
   AUTO W/B BAL switch (front panel) → WHT
2. Make a lines selection at the center white portion of the grayscale chart.



3. Adjust the white limiter.
   Adjustment item:
   MENU: PAINT
   PAGE: DETAIL 1
   ITEM: LIMITER WHT
   Specification: Adjust the edges at portion B for the desired clip level.



4. Adjust the black limiter.
   Adjustment item:
   MENU: PAINT
   PAGE: DETAIL 1
   ITEM: LIMITER BLK
   Specification: Adjust the edges at portion C for the desired clip level.



6-5-7. Auto-iris Adjustment

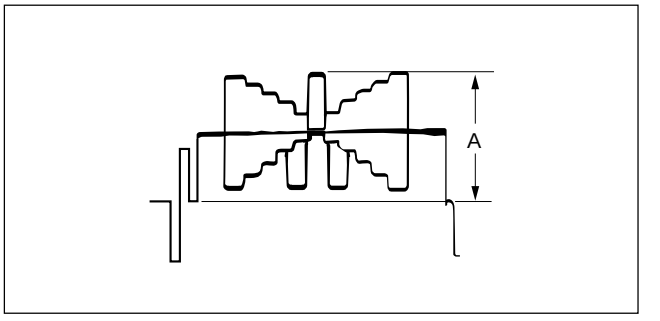
Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

Preparations

- Iris of the lens → AUTO
  Menu setting:
  MENU: PAINT
  PAGE: SW STATUS
  ITEM: KNEE → OFF
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.

Adjustment Procedures

1. Adjust the white balance.
   AUTO W/B BAL switch (front panel) → WHT
2. Adjust APL ratio.
   Adjustment item:
   MENU: MAINTENANCE
   PAGE: AUTO IRIS
   ITEM: APL RATIO
   Specification: Adjust to determine if the feedback is to be applied according to the peak luminance of the object or the average luminance. The higher you set the value, the feedback depends more on the average luminance.
3. Adjust the convergence target of the auto-iris-Adjustment.
   Adjustment item:
   MENU: MAINTENANCE
   PAGE: AUTO IRIS
   ITEM: IRIS LEVEL
   Specification: A = 700 ±7 mV



6-5-8. Pedestal Level Adjustment

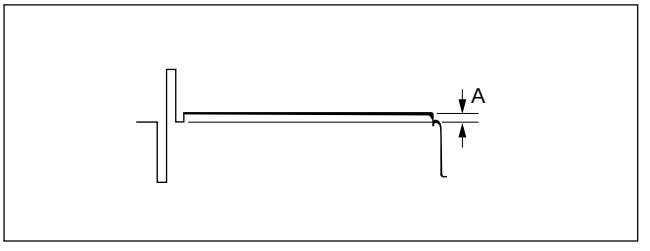
Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector

Preparations

- Iris of the lens → CLOSE

Adjustment Procedures

1. Adjustment item:
   MENU: PAINT
   PAGE: VIDEO LEVEL
   ITEM: BLACK
   Specification: Adjust the levels A for preferred level for R, G and B respectively. In case of all levels for R, G and B adjust simultaneously, adjust its using the Master.
   (Reference value: A = 21 mV)

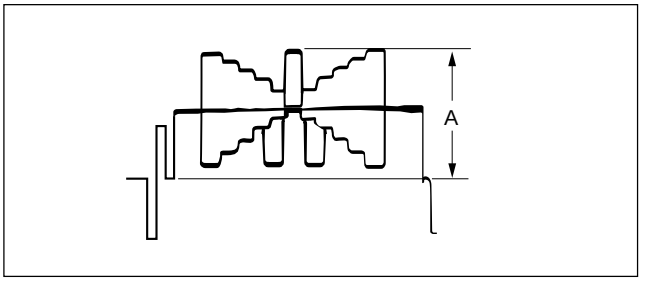


6-5-9. Flare Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

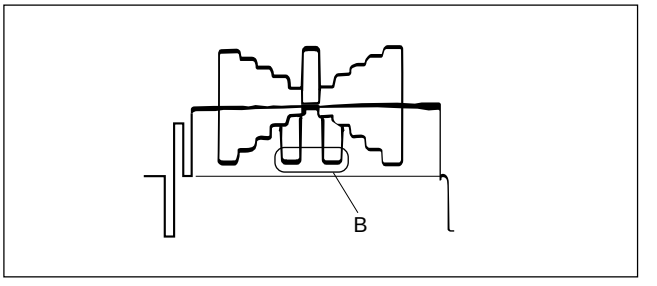
Preparations

- Menu setting:
  MENU: PAINT
  PAGE: KNEE
  ITEM: KNEE → OFF
  PAGE: DETAIL 1
  ITEM: DETAIL → OFF
  PAGE: USER MATRIX
  ITEM: MATRIX → OFF
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV



Adjustment Procedures

1. Adjustment item:
   MENU PAINT
   PAGE: VIDEO LEVEL
   ITEM: FLARE
   Specification: Adjust the levels B for preferred level for R, G and B respectively.

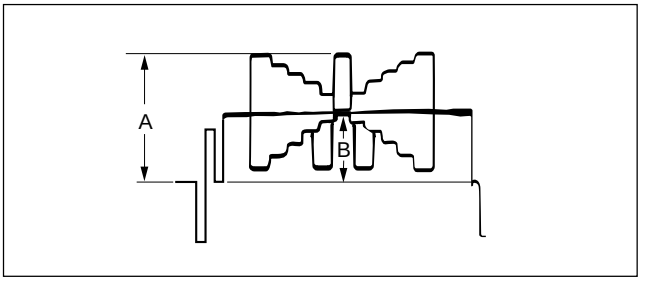


6-5-10. Gamma Correction Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

Preparations

- Menu setting:
  MENU: PAINT
  PAGE: SW STATUS
  ITEM: KNEE → OFF
  ITEM: GAMMA → OFF
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 700 ±20 mV



Adjustment Procedures

1. Adjust the white balance.
   AUTO W/B BAL switch (front panel) → WHT
2. Adjustment item:
   MENU: PAINT
   PAGE: GAMMA
   ITEM: LEVEL
   Specification: Adjust the cross points B of the gray scale for preferred level for R, G and B respectively.
   In case of all cross points for R, G and B adjust simultaneously, adjust its using the Master.

6-5-11. Knee Point/Knee Slope Adjustment

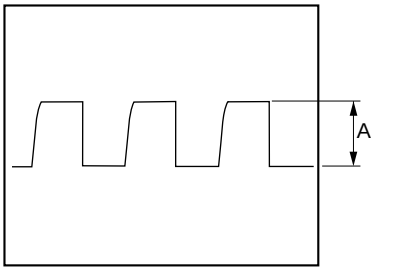
Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector

Preparations

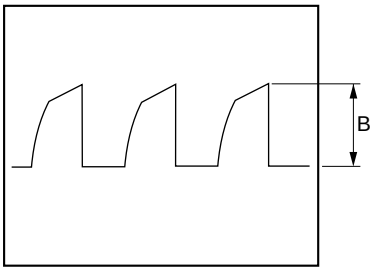
- GAIN switch (side panel) → M (+6 dB)
- Menu setting:
  MENU: PAINT
  PAGE: KNEE
  ITEM: KNEE → ON
  ITEM: TEST → 1

Adjustment Procedures

1. Adjustment item:
   MENU: PAINT
   PAGE: KNEE
   ITEM: SLOPE M → +99
2. Adjustment item:
   MENU: PAINT
   PAGE: KNEE
   ITEM: POINT
   Specification: Adjust the levels A for preferred level for R, G and B respectively.
   In case of all levels for R, G and B adjust simultaneously, adjust its using the Master.
   (Reference value: A = 686 mV)



3. Adjustment item:
   MENU: PAINT
   PAGE: KNEE
   ITEM: SLOPE
   Specification: Adjust the cross points B of the gray scale for preferred level for R, G and B respectively.
   In case of all cross points for R, G and B adjust simultaneously, adjust its using the Master.
   (Reference value: B = 735 mV)



Resetting after Adjustment

- GAIN switch (side panel) → L (0 dB)
- Menu setting:
  MENU: PAINT
  PAGE: SW STATUS
  ITEM: KNEE → OFF

6-5-12. White Clip Level Adjustment

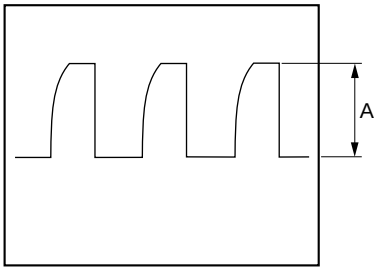
Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector

Preparations

- GAIN switch (side panel) → H (+12 dB)
- Menu setting:
  MENU: PAINT
  PAGE: KNEE
  ITEM: TEST → 1

Adjustment Procedures

1. Adjustment item:
   MENU: PAINT
   PAGE: KNEE
   ITEM: WHT CLP
   Specification: Adjust the levels A for preferred level for R, G and B respectively.
   In case of all levels for R, G and B adjust simultaneously, adjust its using the Master.
   (Reference value: A = 756 mV)



Resetting after Adjustment

- GAIN switch (side panel) → L (0 dB)
- Menu setting:
  MENU: PAINT
  PAGE: KNEE
  ITEM: TEST → OFF

6-5-13. File Store

After adjustments described in Section 6-5 are complete, be sure to execute the reference file store.

MENU: FILE
PAGE: REFERENCE
ITEM: STORE FILE

6-6. Video System Level Adjustment (When using MSU)

Notes

- This section describes the adjusting procedure using the master setup unit MSU-700A.
  Refer to Section 6-5 when using the setup menu.
- Perform the following adjustments (Sections 6-6-1 to 6-6-12) at the request of the customer.

6-6-1. White Shading Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Full white pattern

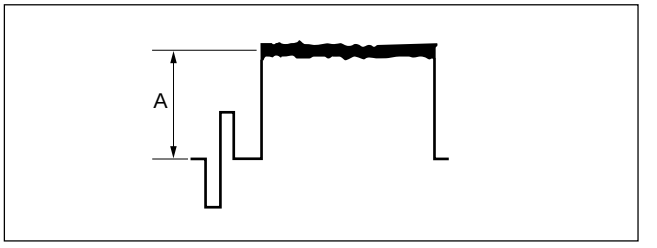
Note

When performing the white shading adjustment, make sure the following conditions are proper. If not, adjustment can not be complete.

- White pattern is not uneven.
- Luminance is correctly adjusted.
- Iris and zoom control of the lens are correctly adjusted.

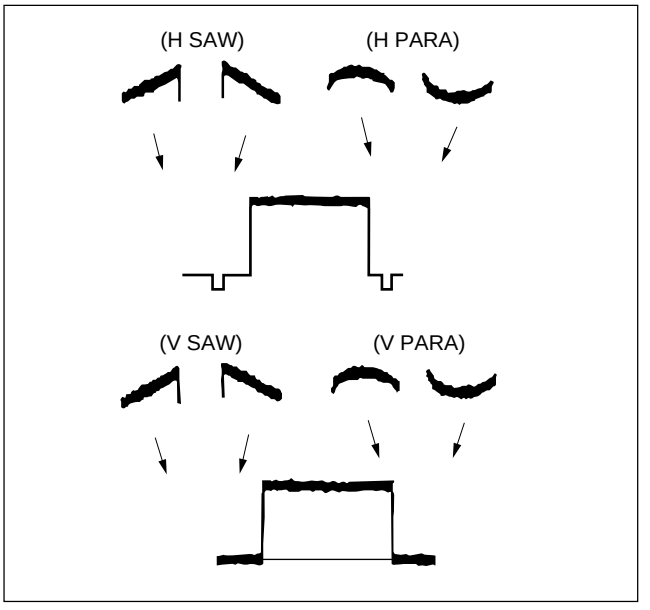
Preparations

- Setting for MSU-700A
  KNEE OFF button → OFF (lit)
- Shoot the fully occupied white area of the white pattern on the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV (at F4 to F5.6)
  (If a lens aperture is greater than F5.6, adjust the light amounts with shutter.)
- Lens Focus: ∞
- Lens Extender/Shrinker: ×2, ×0.8 → OFF
- Set the setup menu as follows.
  MENU: OPERATION
  PAGE: LENS FILE
  ITEM: FILE
  (Select the file in accordance with the lens attached. If there is no appropriate file, select NO OFFSET, then change the name of lens with MSU.)



Adjustment Procedures

1. Adjust the white balance.
   WHITE button/MSU-700A → ON (lit)
2. If the shading is monitored, proceed as follows
   MSU menu operation:
   - MAINTENANCE button → ON (lit)
   - Touch panel operation
     Adjusting → White Shading → R
   - Adjustment Items: H Saw, H Para, V Saw, V Para



3. Adjust for G-ch in the same manner.
4. Adjust for B-ch in the same manner.
5. Adjust the white balance.
   WHITE button/MSU-700A → ON (lit)

Lens File Store

MSU menu operation:

- FILE button → ON (lit)
- Touch panel operation
  Lens File → Lens Store → Store

Adjustment for Lens Extender/Shrinker

When using the lens extender or lens shrinker, perform the following adjustments after the completion of lens file store.

Using the lens extender

6. Set the setup menu as follows.
   MENU: OPERATION
   PAGE: LENS FILE
   ITEM: FILE
   (Select the file in accordance with the lens attached. If there is no appropriate file, select NO OFFSET, then change the name of lens with MSU.)
7. Lens extender (×2) → ON
8. Perform procedures 2 to 5, then perform the lens file store again.
9. Lens extender (×2) → OFF

Using the lens shrinker

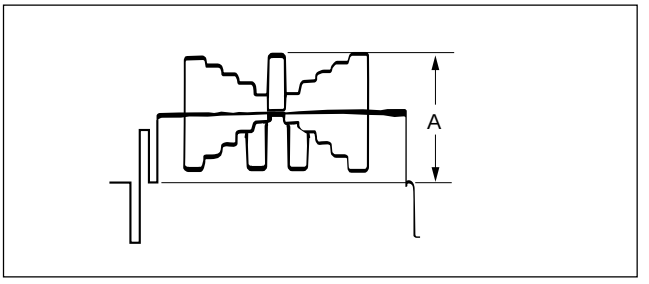
10. Set the setup menu as follows.
    MENU: OPERATION
    PAGE: LENS FILE
    ITEM: FILE
    (Select the file in accordance with the lens attached. If there is no appropriate file, select NO OFFSET, then change the name of lens with MSU.)
11. Lens shrinker (×0.8) → ON
12. Perform procedures 2 to 5, then perform the lens file store again.
13. Lens shrinker (×0.8) → OFF

6-6-2. H/V Ratio Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

Preparations

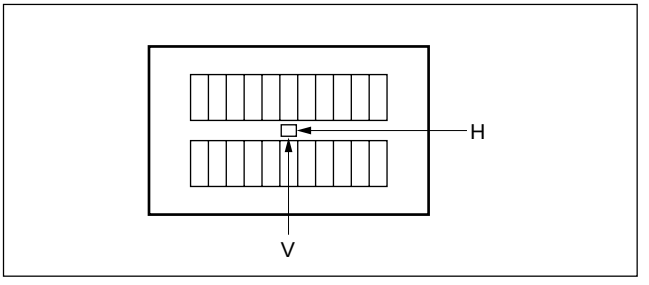
- Setting for MSU-700A
  DETAIL OFF button → ON (dark)
  KNEE OFF button → OFF (lit)
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV



Adjustment Procedures

1. **MSU menu operation:**
   - PAINT button → ON (lit)
   - Touch panel operation
     (Page 1/3) → Detail → Detail 1
   - Set each item as follows.
     Level → 99
     Limiter → 0
     Crispening → −25
     Level Dep → 25
2. **MSU menu operation:**
   - Touch panel operation
     Detail 2

   Adjustment Item: H/V Ratio
   Specification: A ratio between H and D detail amounts (white) to be added shall be equal. (from 20 to 40)

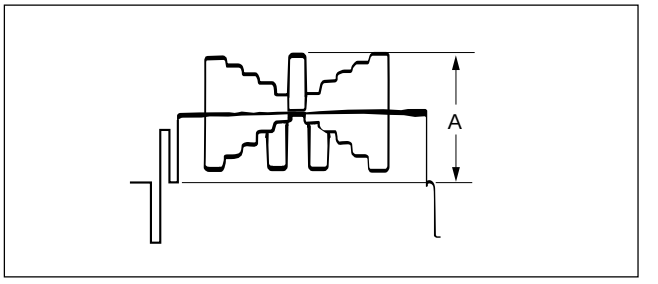


6-6-3. Detail Level Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

Preparations

- Setting for MSU-700A
  DETAIL OFF button → ON (dark)
  KNEE OFF button → OFF (lit)
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV



Adjustment Procedure

MSU menu operation:
- PAINT button → ON (lit)
- Touch panel operation
  (Page 1/3) → Detail → Detail 1

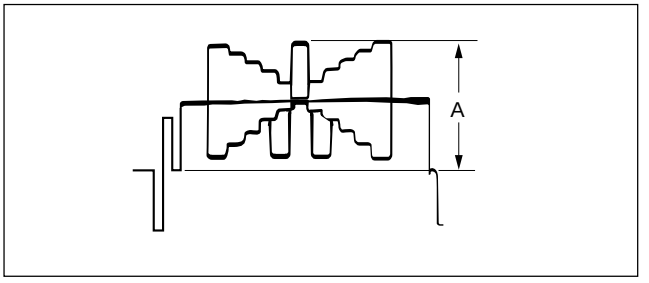
Adjustment Item: Level
Specification: Adjust the detail level to be added to each step of the grayscale for the desired level.

6-6-4. Crispening Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

Preparations

- Setting for MSU-700A
  DETAIL OFF button → ON (dark)
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV



Adjustment Procedures

1. Adjust the white balance.
   WHITE button/MSU-700A → ON (lit)
2. Adjust the crispening level.
   MSU menu operation:
   - PAINT button → ON (lit)
   - Touch panel operation
     (Page 1/3) → Detail → Detail 1

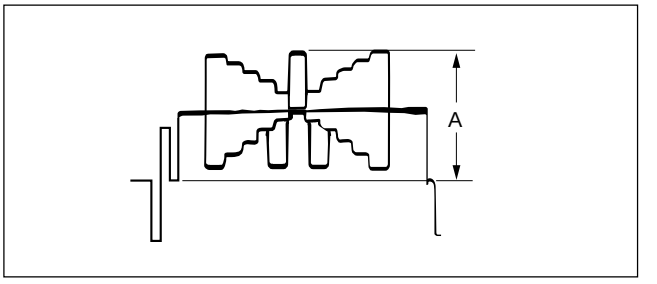
   Adjustment Item: Crispening
   Specification: Set Crispening to −99 once. And turn slowly for increment until the noise at the black level of the waveform is just decreased, or until an appropriate crispening level is obtained.

6-6-5. Level Dependent Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

Preparations

- Setting for MSU-700A
  DETAIL OFF button → ON (dark)
  LEVEL DEP OFF button → ON (dark)
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV

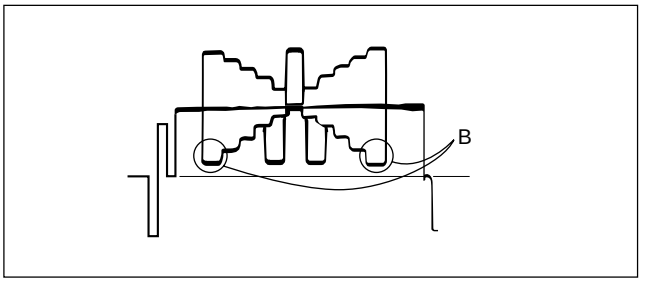


Adjustment Procedure

MSU menu operation:

- PAINT button → ON (lit)
- Touch panel operation
  (Page 1/3) → Detail → Detail 1

Adjustment Item: Level Dep
Specification: Set Level Dep to −99 once. And turn slowly for increment until spikes at portions B just decreased.



Note

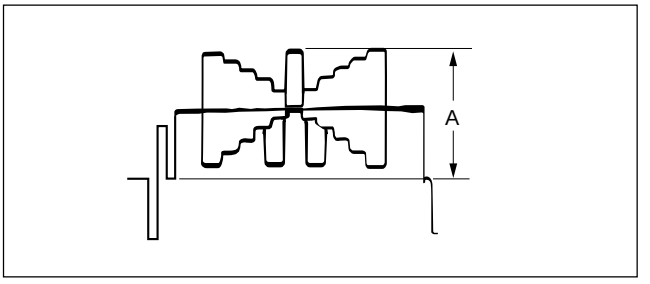
After adjustment is complete, be sure to perform Section 6-6-2 “H/V Ratio Adjustment”.

6-6-6. Detail Clip Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

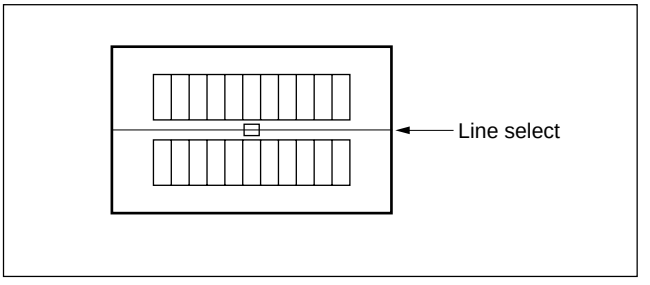
Preparations

- Setting for MSU-700A
  KNEE OFF button → OFF (lit)
  DETAIL OFF button → ON (dark)
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV



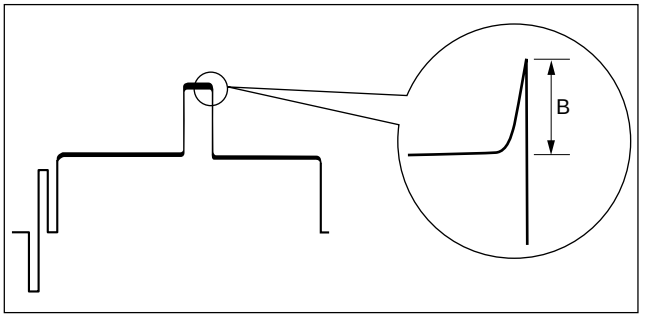
Adjustment Procedures

1. Adjust the white balance.
   WHITE button/MSU-700A → ON (lit)
2. Make a lines selection at the center white portion of the grayscale chart.



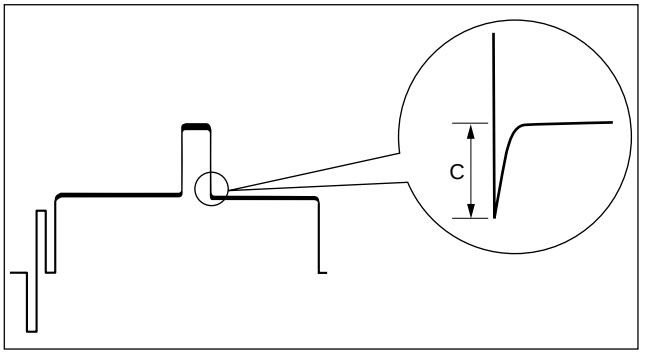
3. Adjust the white limiter.
   MSU menu operation:
   - PAINT button → ON (lit)
   - Touch panel operation
     (Page 1/3) → Detail → Detail 3

   Adjustment Item: W.Limiter
   Specification: Adjust the edges at portion B for the desired clip level.



4. Adjust the black limiter.
   MSU menu operation:
   - PAINT button → ON (lit)
   - Touch panel operation
     (Page 1/3) → Detail → Detail 3

   Adjustment Item: B.Limiter
   Specification: Adjust the edges at portion C for the desired clip level.



6-6-7. Auto-iris Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

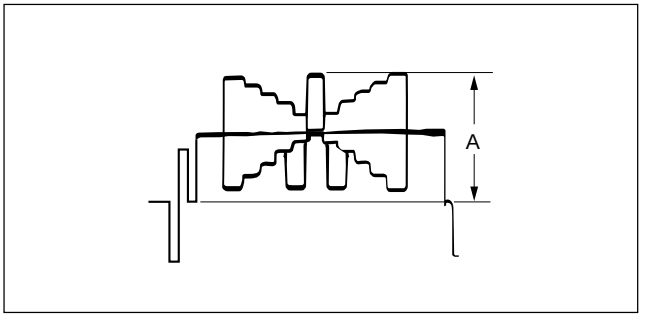
Preparations

- Setting for MSU-700A
  AUTO button (Iris control block) → ON (lit)
  KNEE OFF button → OFF (lit)
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.

Adjustment Procedures

1. Adjust the white balance.
   WHITE button/MSU-700A → ON (lit)
2. Adjust APL ratio.
   MSU menu operation:
   - MAINTENANCE button → ON (lit)
   - Touch panel operation
     Lens Adjusting → Auto Iris

   Adjustment Item: APL Ratio
   Specification: Adjust to determine if the feedback is to be applied according to the peak luminance of the object or the average luminance. The higher you set the value, the feedback depends more on the average luminance.
3. Adjust the convergence target of the auto-iris-Adjustment
   MSU menu operation:
   Adjustment Item: Level
   Specification: A = 700 ± 7 mV



6-6-8. Pedestal Level Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector

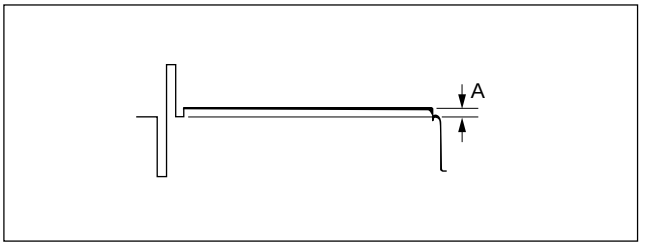
Preparations

- Settings for MSU-700A
  CLOSE button → ON (lit)

Adjustment Procedures

1. **MSU menu operation:**
   - PAINT button → ON (lit)
   - Touch panel operation
     (Page 1/3) → Black

   Adjustment Item: R, G, B Master
   Specification: Adjust the levels A for preferred level for R, G and B respectively. In case of all levels for R, G and B adjust simultaneously, adjust its using the Master.
   (Reference value: A = 21 mV)

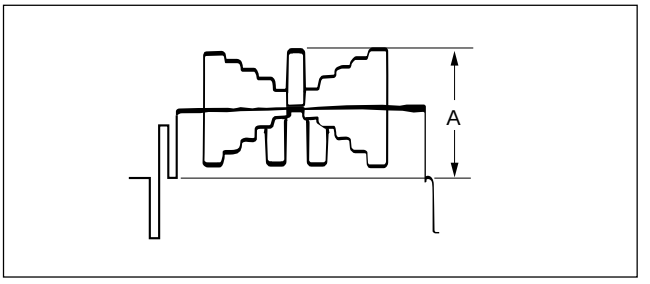


6-6-9. Flare Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

Preparations

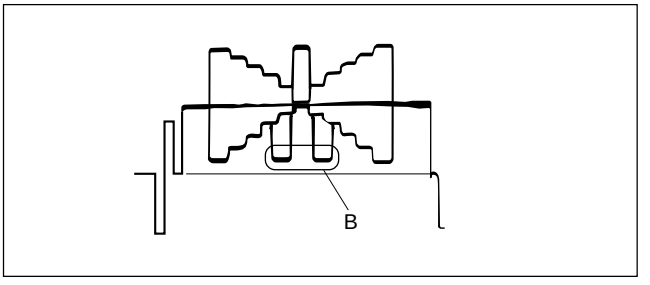
- Setting for MSU-700A
  KNEE OFF button → OFF (lit)
  DETAIL OFF button → OFF (lit)
  MATRIX OFF button → OFF (lit)
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 600 ±20 mV



Adjustment Procedures

1. **MSU menu operation:**
   - PAINT button → ON (lit)
   - Touch panel operation
     (Page 1/3) → Flare

   Adjustment Item: R, G, B
   Specification: Adjust the levels B for preferred level for R, G and B respectively.

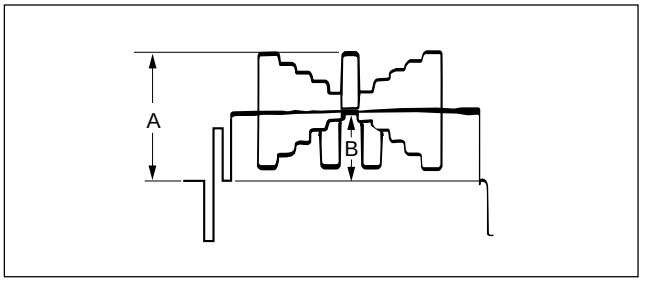


6-6-10. Gamma Correction Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

Preparations

- Setting for MSU-700A
  KNEE OFF button → OFF (lit)
  GAMMA OFF button → ON (Not lit)
- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Iris of the lens: A = 700 ±20 mV



Adjustment Procedures

1. Adjust the white balance.
   WHITE button/MSU-700A → ON (lit)
2. **MSU menu operation:**
   - PAINT button → ON (lit)
   - Touch panel operation
     (Page 2/3) → Gamma

   Adjustment Item: R, G, B, Master
   Specification: Adjust the cross points B of the gray scale for preferred level for R, G and B respectively.
   In case of all cross points for R, G and B adjust simultaneously, adjust its using the Master.

6-6-11. Knee Point/Knee Slope Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector

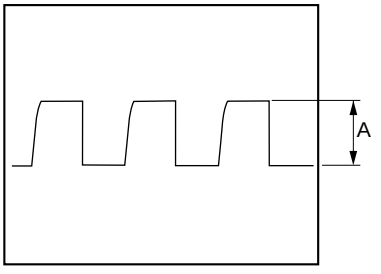
Preparations

- Setting for MSU-700A
  MASTER GAIN → +6 dB
  TEST1 button → ON (lit)
  KNEE OFF button → ON (dark)

Adjustment Procedures

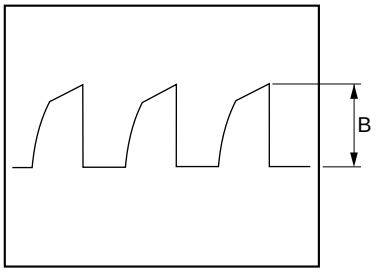
1. **MSU menu operation:**
   - PAINT button → ON (lit)
   - Touch panel operation
     (Page 2/3) → Knee Slope
   - Set Master to +99.
2. **MSU menu operation:**
   - Touch panel operation
     (Page 2/3) → Knee Point

   Adjustment Item: R, G, B Master
   Specification: Adjust the levels A for preferred level for R, G and B respectively. In case of all levels for R, G and B adjust simultaneously, adjust its using the Master.
   (Reference value: A = 686 mV)



3. **MSU menu operation:**
   - Touch panel operation
     (Page 2/3) → Knee Slope

   Adjustment Item: R, G, B Master
   Specification: Adjust the cross points B of the gray scale for preferred level for R, G and B respectively. In case of all cross points for R, G and B adjust simultaneously, adjust its using the Master.
   (Reference value: B = 735 mV)



Resetting after Adjustment

- MASTER GAIN/MSU-700A → 0 dB
- KNEE OFF button/MSU-700A → OFF (lit)

6-6-12. White Clip Level Adjustment

Equipment: Waveform monitor (R, G, B)
Test Point: HD SERIAL DIGITAL OUT connector

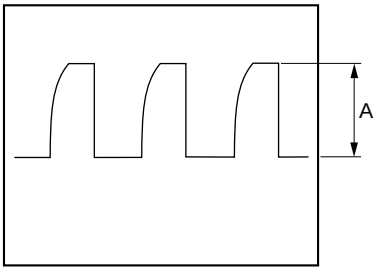
Preparations

- Setting for MSU-700A
  MASTER GAIN → +12 dB
  TEST1 button → ON (lit)

Adjustment Procedures

1. **MSU menu operation:**
   - PAINT button → ON (lit)
   - Touch panel operation
     (Page 2/3) → White Clip

   Adjustment Item: R, G, B Master
   Specification: Adjust the levels A for preferred level for R, G and B respectively. In case of all levels for R, G and B adjust simultaneously, adjust its using the Master.
   (Reference value: A = 756 mV)



Resetting after Adjustment

- MASTER GAIN/MSU-700A → 0 dB
- TEST1 button/MSU-700A → OFF (dark)

6-6-13. File Store

After adjustments described in Section 6-6 are complete, be sure to execute the reference file store.

1. **MSU menu operation:**
   - FILE button → ON (lit)
   - Touch panel operation
     Reference → Ref Store → Start
2. When the store operation is complete, the message "Completed" is displayed.

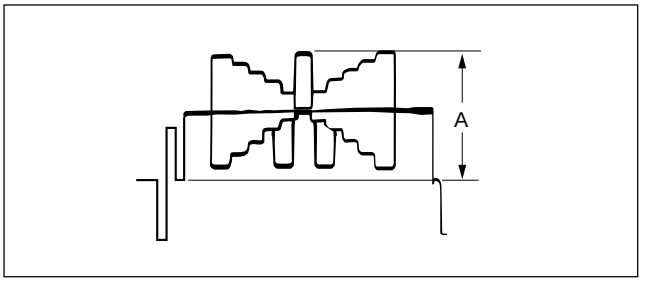
6-7. Adjustment After Replacement of ND Filter

When the filter disk unit or the ND filter alone in the filter disk unit is replaced, the correction of white balance is required. Proceed as follows.

Equipment: Waveform monitor (R, G, B)
Test point: HD SERIAL DIGITAL OUT connector
Object: Grayscale chart

Preparations

- Shoot the grayscale chart so that the chart frame is aligned with the underscanned monitor frame.
- Setting for MSU-700A
  AUTO button (Iris control block) → ON (lit)
- Iris of the lens: A = 600 ±20 mV



Adjustment Procedures

1. FILTER CTRL button/MSU-700A → ON (lit)
2. Select the ND 1 filter.
   ND 1 button/MSU-700A → ON (lit)
3. Adjust the white balance.
   WHITE button/MSU-700A → ON (lit)
4. After the white balance adjustment is complete, switch the filter from ND 1 to ND 2 and adjust the white balance for the ND 2 filter.
5. Switch the filter from ND2 to ND3 to ND4, and adjust the white balance for each.
   Set the GAIN for each ND filter as follows.
   MASTER GAIN/MSU-700A
   - ND filter 2: 6 dB
   - ND filter 3: 12 dB
   - ND filter 4: 18 dB

OHB File Store

1. **MSU menu operation:**
   - FILE button → ON (lit)
   - Touch panel operation
     OHB File → OHB Store → Store
2. When the store operation is complete, the message "OHB File Stored" is displayed.

Resetting after Adjustment

- MASTER GAIN/MSU-700A → 0 dB

6-8. Filter Positioning Adjustment

Note

- This adjustment is required only when replacing the CCD unit or the filter drive board.

Preparation

- S1/Filter drive board → ON (upper side)

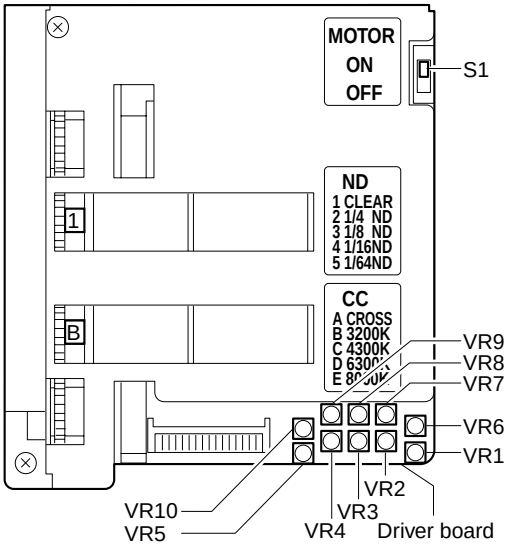
Adjustment Procedures

1. ND 1 button/MSU-700 → ON

2. Adjust ⊘VR1 so that the ND 1 filter stops at a proper click position (on the optical axis of the lens) observing from the lens mount.

3. Adjust positions for other filters in the same manner.

Filter	Adjustment Point
ND 1 (clear)	⊘VR1
ND 2 (1/4 ND)	⊘VR2
ND 3 (1/8 ND)	⊘VR3
ND 4 (1/16 ND)	⊘VR4
ND 5 (1/64 ND)	⊘VR5
CC A (cross)	⊘VR6
CC B (3200K)	⊘VR7
CC C (4300 K)	⊘VR8
CC D (5600 K)	⊘VR9
CC E (8000 K)	⊘VR10



HKC-T950 (SY)
HDC-900 (SY)
HDC-900/L (J)
HDC-910 (UCJ, CE)
HDC-910/L (J)
HDC-930 (SY)
HDC-950 (JN, SY) J, E
9-968-560-05

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