SONY®

HD CAMERA CONTROL UNIT
HDCU-950

SD ENCODER UNIT
HKCU-951

HD FRAME RATE CONVERTER UNIT
HKCU-953

Digital **HDVS**

INSTALLATION AND MAINTENANCE MANUAL
1st Edition (Revised 3)
Serial No. 10001 and Higher : HDCU-950
Serial No. 10001 and Higher : HKCU-951
Serial No. 10001 and Higher : HKCU-953

⚠警告

このマニュアルは，サービス専用です。

お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。

危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠ WARNING

This manual is intended for qualified service personnel only.

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

⚠ WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.

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

⚠ AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l'entretien. Afin de réduire les risques de décharge électrique, d'incendie ou de blessure n'effectuer que les réparations indiquées dans le mode d'emploi à moins d'être qualifié pour en effectuer d'autres. Pour toute réparation faire appel à une personne compétente uniquement.
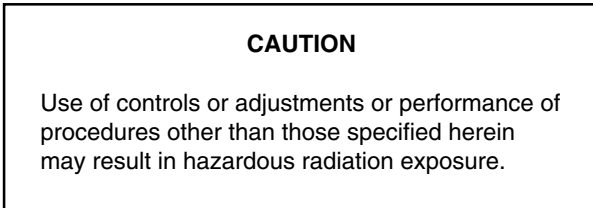
For HDCU-950

Laser Diode Properties
      Material   : In GaAsP
      Wave length   : 1310 $\pm$40 nm
      Emission duration : Continuous
      Laser output power: $-$8 dBm

For HDCU-950

CLASS 1
LASER PRODUCT

LASER KLASSE 1
PRODUKT
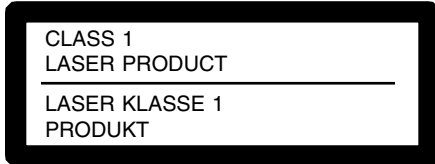
This HD camera control unit is classified as a CLASS 1 LASER PRODUCT.
The CLASS 1 LASER PRODUCT label is located on the left side panel.

For HDCU-950

CAUTION

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

For HDCU-950

Attention-when the product is installed in Rack:

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

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

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

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

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

Table of Contents

Manual Structure

1. Installation Overview

2. System Setup

3. Service Overview

Manual Structure

Purpose of this manual

This manual is the installation and maintenance manual of the following models :

HD Camera Control Unit   HDCU-950
SD Encoder Unit   HKCU-951
HD Frame Rate Converter Unit   HKCU-953

This manual is intended for use by trained system and service engineers, and describes the information regarding the installation of the unit and the information required for initial service.

Related manuals

Beside this Installation and Maintenance Manual, the following manuals are available for the unit.

- **Operation Manual (Supplied with HDCU-950)**

  This manual describes how to operate the HDCU-950.

- **Maintenance Manual (Available on request)**

  This manual intended for use by trained system and service engineers describes (the circuit overview, the main part replacements, electrical alignment, etc.) required for parts-level service.
  For obtaining, contact your local Sony Sales Office/Service Center.
  Part number : 9-967-988-0X

- **HDCU-950 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 parts-level service.
  For obtaining, 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 is a summary of the sections of this manual.

Section 1   Installation Overview
Describes how to checking the ROM version, connectors and cables, setting of switches on boards, function of the indicators on boards, installing in 19-inch rack, etc.

Section 2   System Setup
Describes how to set and adjust when connecting the unit to the camera system.

Section 3   Service Overview
Describes recommended replacement parts, how to cleaning connector/cables and charactor display function.

Trademark

Trademark or registered trademark used in this manual is follows.

・ Clear-Com is a registered trademark of Clear-Com Intercom Systems.

Section 1
Installation Overview

1-1. Checking the ROM and Software Version

When connecting the following peripheral equipment to the unit, confirm that the versions of the ROMs and software which are installed in each model. If the version is lower than the following one, the ROM needs to be replaced and the software needs to be upgraded.
In this case, contact your local Sony Sales Office/Service Center.

ROM

Peripheral equipment	Board	Ref. No.	ROM version
MSU-700A	CPU-293	IC5, IC6	Ver. 1.10 or higher
MSU-750	CPU-286	IC5, IC6	Ver. 1.10 or higher
CNU-700	AT-89 or AT-89A	IC4, IC5	Ver. 3.20 or higher
CNU-500	AT-100	IC4, IC5	Ver. 2.80 or higher
RCP-720/721	MPU-79	IC10	Ver. 2.80 or higher
RCP-730/731	MPU-79	IC10	Ver. 2.80 or higher
RCP-740/741	MPU-79	IC10	Ver. 2.80 or higher
RCP-700/701	MPU-92	IC6	Ver. 2.73 or higher

Software

Peripheral equipment	Board	Software version
RCP-750/751	MPU-123	Ver. 1.01 or higher
RM-B750	MPU-124	Ver. 1.00 or higher
HDC-950/900	AT-130	Ver. 1.20 or higher

1-2. Standard Accessories

The HDCU-950 and optional boards consist of the following components.

・ HDCU-950
  HDCU-950 unit   (1)
  Operation manual   (1)
  Maintenance manual   (1)
  4-pin plug connector (M)   (1)
  Remote indicator assembly   (1)

・ HCKU-951
  EN-145 board   (1)
  VDA-61 board   (1)

・ HKCU-953
  FC-88 board   (1)
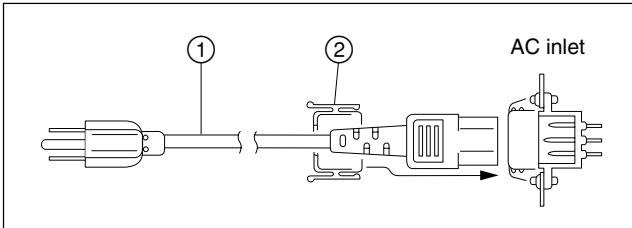 SDI-73 board   (1)

1-3. Power Cord

WARNING

The power cord is not supplied with this unit. Be sure to use the specified power cord.
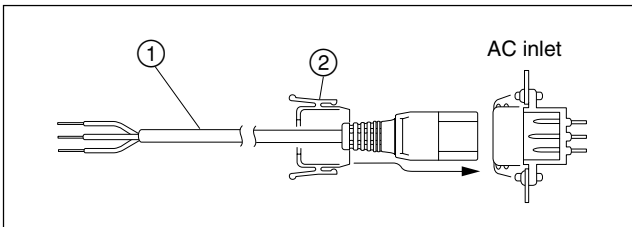Do not use the damaged power cord.

For U.S.A. and Canada
① Power cord 125 V 10 A (2.4 m) : ⚠ 1-551-812-11
② Plug holder (black) :   2-990-242-01

For Europe
① Power cord 250 V 10 A (2.5 m) : ⚠ 1-782-929-11
② Plug holder (brown) :   3-613-640-01

For Japan
Specified power cord : DK-2401 or equivalent
① Power cord set (Approx. 2.4 m)
② Plug holder (brown)   3-613-640-01
③ Conversion adapter 3P-2P   ⚠ 1-793-461-11

CAUTION

To avoid an electric shock, be sure to connect the ground to earth when the conversion adapter 3P-2P specified in No. ③ of the above illustration, is used.
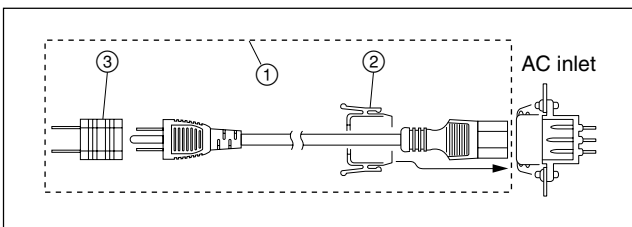
1-4. Matching Connectors and Cables

1-4-1. Connector Input/Output Signal

BNC Connector

HDCU-950

1125 digital signal
RET (1 to 3) IN : BNC
  Conforms to BTA-S004B, 1.485 Gbps/1.4835 Gbps
  SMPTE 292M

SERIAL OUT (1 to 2, MONI) : BNC
  Conforms to BTA-S004B, 0.8 V p-p, 75 Ω, 1.485 Gbps/
  1.4835 Gbps
  SMPTE 292M

REFERENCE IN : BNC
  ±0.3 V, ternary SYNC, 75 Ω
  Or, black burst signal 0.286 V p-p, 75 Ω

SD (525/625) digital signal
RET (1 to 3) IN : BNC
  Component serial signal : 270 Mbps
  SMPTE 259M

SD SDI OUT (1 to 2) : BNC
  Component serial signal : 0.8 V p-p, 75 Ω, 270 Mbps
  SMPTE 259M

Analog signal
PIX OUT : BNC
  1.0 V p-p, 75 Ω

WF OUT : BNC
  1.0 V p-p, 75 Ω

SYNC OUT : BNC
  ±0.3 V, ternary SYNC, 75 Ω
  Or, 0.3 V p-p, SD SYNC, 75 Ω selectable

Other
PROMPTER IN : BNC
1.0 V p-p, 75 Ω

HKCU-951 (525/625 analog signal)

Y/G OUT : BNC

Y : 1.0 V p-p (video: 0.714 V, sync : 0.286 V), 75 Ω

G : 0.7 V, 75 Ω

B-Y/B OUT : BNC

B-Y : 0.756 V p-p, 75 Ω (when 75 % color bar is input)

B :   0.7 V, 75 Ω

R-Y/R OUT : BNC

R-Y : 0.756 V p-p, 75 Ω (when 75 % color bar is input)

R :   0.7 V, 75 Ω

VBS OUT : BNC

1.0 V p-p, 75 Ω

HKCU-953

1125 digital signal

HD SDI OUT (1 to 2) : BNC

Conforms to BTA-S004B, 0.8 V p-p, 75 Ω, 1.485 Gbps/
1.4835 Gbps
SMPTE 292M

Analog signal

FRAME REFERENCE IN : BNC

±0.3 V, ternary SYNC, 75 Ω

Or, black burst signal 0.286 V p-p, 75 Ω

FRAME REFERENCE OUT : BNC

THROUGH OUT/0.3 V p-p, FRAME SYNC pulse, 75 Ω

CAMERA connector (optical/electrical composite connector)

VIDEO	Y/P_B/P_R
	Conforms to BTA-S004B, 1.485 Gbps/
	1.4835 Gbps serial
	SMPTE 292M
RET VIDEO	Y/P_B/P_R
	Conforms to BTA-S004B, 1.485 Gbps/
	1.4835 Gbps serial
	SMPTE 292M
INCOM	2ch
MIC	2ch
DIGITAL AUDIO (AES/EBU)	
CAMERA COMMAND	
PROMPTER	

MIC1/MCI2 (XLR 3-pin, Male)
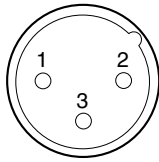
– EXT VIEW –

(0 dBu = 0.775 Vrms)

No.	Signal	Specifications
1	MIC OUT (G)	0 dBu/−20 dBu
2	MIC OUT (X)	(Selectable with S502,
3	MIC OUT (Y)	S503/AVP-4)

MIC REMOTE (D-sub 15-pin, Female)
(WF REMOTE (D-sub 15-pin, Female))
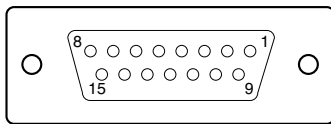
– EXT VIEW –

In the case of MIC REMOTE mode : S423-3/AT-149 → OFF

No.	Signal		Specifications
1	+5.5 V OUT		Max. 250 mA
2	TALLY GND		GND for TALLY
3	G TALLY OUT		ON (GND) : Max. 30 mA IN
4	R TALLY OUT		ON (GND) : Max. 30 mA IN
5	CHU MIC	CONT2	*1 Refer to the right column.
6	AMP	CONT1	
7	GAIN IN	CONT0	
8	MIC1 GAIN CONT ON/OFF IN		*2 Refer to the right column.
9	GND		GND for +5.5 V
10	TALLY OUT		R/G TALLY OUT ON (GND) : Max. 30 mA IN
11	NC		No connection
12	ASPECT REMOTE ON/OFF		L : REMOTE
13	ASPECT	CONT1	*3 Refer to the right column.
14	CTL	CONT2	
15	MIC2 GAIN CONT ON/OFF IN		*2 Refer to the right column.

*1 : CHU MIC 1/2 AMP GAIN

CONT0	CONT1	CONT2	CHU MIC AMP GAIN
H	H	H	60 dB
L	H	H	50 dB
H	L (H)	H (L)	40 dB
L	L (H)	H (L)	30 dB
H	H (L)	L (H)	20 dB

The setup for HDCU-700A mode is shown in parenthesis ( ).
In the case of HDCU-700A mode : S423-2/AT-149 → ON

*2 :

8pin	15pin	MIC GAIN CONT
L	L	MIC 1 and 2 ON
L	H	MIC 1 ON
H	L	MIC 2 ON
H	H	INTERNAL set

*3 :

CONT1	CONT2	ASPECT
L	H	SQ (16 : 9)
H	H	EC (4 : 3)
L	L	INTERNAL set
H	L	LB (4 : 3)

In the case of WF REMOTE mode : S423-3/AT-149→ ON Recall system

No.	Signal	Specifications
1	NC	No connection
2	NC	No connection
3	NC	No connection
4	NC	No connection
5	RECALL2 (G)	LOW ACTIVE
6	RECALL3 (B)	
7	RECALL1 (R)	
8	RECALL4 (SEQ)	
9	GND	
10	NC	No connection
11	NC	No connection
12	RECALL5 (ENC)	LOW ACTIVE
13	RECALL6 (R+B)	
14	RECALL7 (R+G)	
15	RECALL8 (G+B)	

INCOM/TALLY/PGM (D-sub 25-pin, Female)
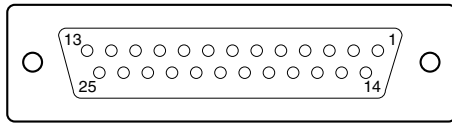
– EXT VIEW –

(0 dBu = 0.775 Vrms)

No.	Signal	Specifications
1	ENG (R) (X) OUT	ENG SYSTEM RECEIVE
2	ENG (R) (Y) OUT	0 dBu BALANCED
3	ENG (G)	GND for ENG
4	ENG (T) (X) IN	ENG SYSTEM TALK
5	ENG (T) (Y) IN	0 dBu BALANCED
6	PGM1 (X) IN	−20 dBu/0 dBu
7	PGM1 (Y) IN	(Selectable with
8	PGM1 (G) IN	S500/AVP-4)
9	GND	GND for AUX
10	AUX3	
11	R TALLY (X) IN	ON : 24 Vdc, TTL (H), SHORT
12	R TALLY (Y) IN	OFF : 0 Vdc, TTL (L), OPEN
13	GND	CHASSIS GND
14	PROD (R) (X) OUT	PROD SYSTEM
15	PROD (R) (Y) OUT	RECEIVE 0 dBu BALANCED
16	PROD (G)	GND for PROD
17	PROD (T) (X) IN	PROD SYSTEM TALK
18	PROD (T) (Y) IN	0 dBu BALANCED
19	PGM2 (X) IN	−20 dBu/0 dBu
20	PGM2 (Y) IN	(Selectable with
21	PGM2 (G) IN	S501/AVP-4)
22	AUX4	
23	AUX5	
24	G TALLY (X) IN	ON : 24 Vdc, TTL (H), SHORT
25	G TALLY (Y) IN	OFF : 0 Vdc, TTL (L), OPEN

WF MODE (4-pin, Female)
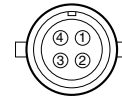
– EXT VIEW –

No.	Signal	Specifications
1	SEQ CONT OUT (G)	OPEN COLLECTOR +(PNP)/−(NPN)
2	SEQ CONT OUT (X)	(Selectable with S301/RC-91)
3	STAIR CASE OUT (X)	∗4
4	STAIR CASE OUT (G)	GND for STAIR CASE

∗4 : Stair Case signal

$12 ^{+1}_{-6}$ V · · · · R   G   B · · · · DC 0 ±2 V
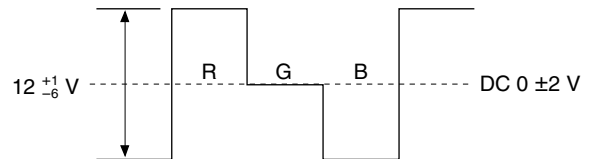
RCP/CNU (8-pin, Female)
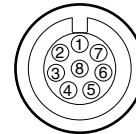
– EXT VIEW –

No.	Signal	Specifications
1	TX (+)	CCU SERIAL DATA
2	TX (−)	
3	RX (+)	RCP/CNU/BVP/MSU/
4	RX (−)	VCS SERIAL DATA
5	TX GND	GND for TX
6	POWER (+) OUT	RCP POWER, +30 V
7	POWER (−) OUT	GND for POWER
8	SPARE	

INCOM (5-pin, Female)
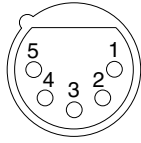
– EXT VIEW –

(0 dBu = 0.775 Vrms)

No.	Signal	Specifications
1	INCOM (T) IN (Y)	−20 dB
2	INCOM (T) IN (X)	(CARBON MIC)
		−40 dB
		(ECM MIC)
		−60 dB
		(DYNAMIC MIC)
3	INCOM (T) IN (G)	GND for INCOM
4	INCOM (R) OUT (X)	Max. 12 dBu
5	NC	No connection

1-4-2. Connection Connectors

When connecting cables to each connector of the connector panel during installation or service, connect the following connectors or equivalent to the tip.

Connector	Connector/cable
HDCU-950	
CAMERA	LEMO®
	PUW. 3K. 93C. TLCC96 ∗1
(HDC-900/950/930 side)	
CCU	LEMO®
	FUW. 3K. 93C. TLMC96 ∗1
HDCU-950	1-569-370-12 PLUG, BNC
REFERENCE IN	
PIX OUT	
WF OUT	
SYNC OUT	
PROMPTER IN	
HKCU-951	
Y/G OUT	
B-Y/B OUT	
R-Y/R OUT	
VBS OUT	
HKCU-953	
FRAME REFERENCE IN	
FRAME REFERENCE OUT	

Connector	Connector/cable
HDCU-950	1-569-370-12 PLUG, BNC or
RET IN (1-3)	BELDEN8281 Cable or
SERIAL OUTPUT (1-2, MONI)	equivalent
SD SDI OUT (1-3)	
HKCU-953	
HD SDI OUT (1-2)	
MIC1/MIC2	1-508-083-00 XLR 3-pin female
(3-pin, Male)	or CANNON XLR-3-11C
	equivalent
MIC REMOTE	1-506-582-11 D-sub 15-pin, male
(WF REMTOE)	or JAE DA-CI-J10 equivalent
(D-sub 15-pin, Female)	
INCOM/TALLY/PGM	D-sub 25-pin, male
(D-sub 25-pin, Female)	JAE DA-25PF-N equivalent
WF MODE	1-560-155-00 PLUG, 4-pin male
(4-pin, Female)	(supplied)
RCP/CNU	1-766-848-11 PLUG, 8-pin male
(8-pin, Female)	or CCA cable assembly (optional)
	CCA-5-30 (30 m), CCA-5-10
	(10 m), CCA-5-3 (3 m)
INCOM	1-508-370-11 XLR 5-pin, male
(5-pin, Female)	or CANNON XLR-5-12C
	equivalent

∗1 : Caution in making the optical/electric signal composite cable:
When making the optical/electric signal composite cable used for this camera system, the connection connectors specified in this manual must be used in order to comply with the limits for EMC regulations.
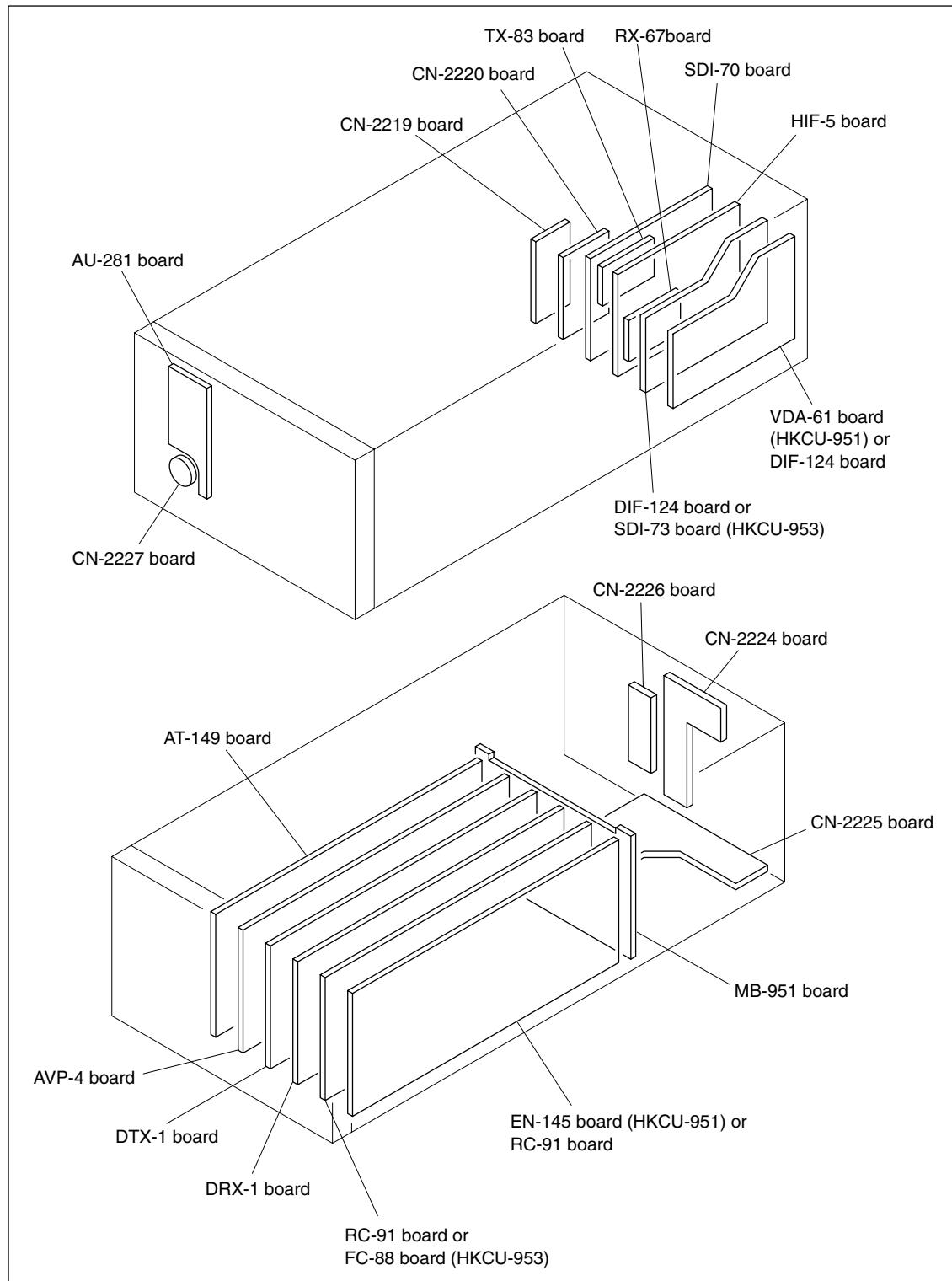
1-4-3. Note when Connecting CAMERA Connector

Before connecting the unit to the camera adapter, clean the following optical contact blocks.
For the cleaning procedure, refer to Section 3-1, "Cleaning of Connector/Cable".

· CAMERA connector of the unit
· CCU connector of the camera adaptor side
· Optical/electric signal composite cable

1-5. Circuit Boards Layouts

TX-83 board
RX-67board
CN-2220 board
SDI-70 board
CN-2219 board
HIF-5 board
AU-281 board
VDA-61 board (HKCU-951) or DIF-124 board
CN-2227 board
DIF-124 board or SDI-73 board (HKCU-953)
CN-2226 board
CN-2224 board
AT-149 board
CN-2225 board
MB-951 board
AVP-4 board
DTX-1 board
EN-145 board (HKCU-951) or RC-91 board
DRX-1 board
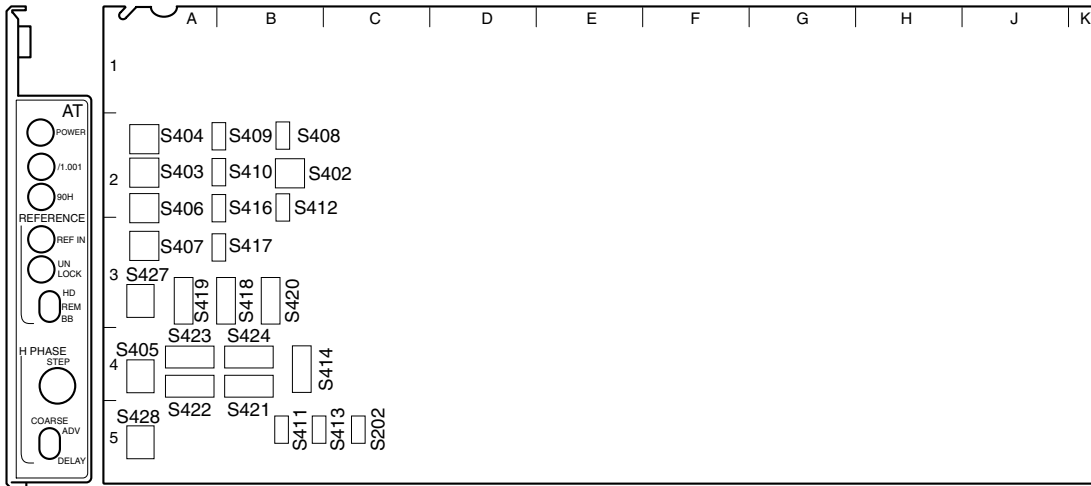RC-91 board or FC-88 board (HKCU-953)

Note

To install the optional board is required depending on the system to be used. For details, refer to Sections 1-8. "Installing the HKCU-951/953" and 2. "System Setup".

1-6. Setting of Switches on Boards

1-6-1. AT-149 Board

AT-149 board (A side/panel side)

Note

Do not change the settings of the switches described "Factory use only" and unused switches.

- S202

  Factory use only

  Factory setting : OFF

- S402 (SKIN GATE LEV)

  When S408 on the AT-149 board is set to LOC, adjusts the zebra level of the skin gate of the MONITOR output signal.

  Factory setting : 8

- S403 (MOD LEVEL)

  When S408 on the AT-149 board is set to LOC, this switch is valid.

  When S410 on the AT-149 board is set to ON, adjusts the aspect modulation level of the MONITOR output signal.

- 404 (MARKER SEL)

  Sets the type of the aspect marker.

Setting switches	Aspect marker
0	4 : 3
1	13 : 9
2	14 : 9
3	15 : 9
4	14.94 : 9
5	16 : 8.649
6	16 : 6.75
7	Not used
8 through F	Interlocking aspect ratio of the down-converter

  Factory setting : 8

- 405 (H PHASE STEP)

  Performs the coarse adjustment of the H phase when S427 on the AT-149 board is set to position other than REM. Perform the fine adjustment using S428 on the AT-149 board.

  Factory setting : 8

- S406 (V PHASE)

  Adjusts the vertical phase with regard to the reference signal in unit of line.

  Factory setting : 8

- S407 (CONVERSION DELAY PHASE)

  Performs the fine adjustment of the delay amount of the signal between HD and SD that is set by S417 on the AT-149, in unit of 1H or 2.2 μsec.

  Factory setting : 0

・ S408 (MARKER REMOTE/LOCAL SEL)

Selects either the HDCU-950 or the RCP/MSU connected outside in order to control the aspect marker and skin gate signal to be inserted in the HD SDI MONITOR output signal and in the PIX output signal that are output from the MONI connector on the rear panel.

REM : Control is performed by RCP/MSU etc., connected outside.

LOC : Control is performed by the switches (S402, S403, S409 and S410) on the AT-149 board.

Factory setting : REM

・ S409 (MARKER)

When S408 on the AT-149 board is set to LOC, this switch enables selection whether the ASPECT MARK-ER signal is inserted or not in the HD SDI MONITOR output signal and in the PIX output signal that are output from the MONI connector on the rear panel.

ON : Inserted

OFF : Not inserted

Factory setting : OFF

・ S410 (MODULAT)

When S408 on the AT-149 board is set to LOC, this switch enables selection whether the HD SDI MONI-TOR output signal that is output from the MONI connector on the rear panel, receives the aspect modulation processing or not.

ON : Processing is ON

OFF : Processing is OFF

Factory setting : OFF

・ S411 (RCP-PORT)

Not used.

Factory setting : ▮ (▮ indicates the switch lever position)
S411

・ S412 (SYNC OUT HD/SD)

Selects the type of the SYNC signal to be output from the SYNC OUT connector on the rear panel.

HD : HD SYNC signal output

SD : SD SYNC signal output

Factory setting : SD

・ S413

Not used.

Factory setting : ▮ (▮ indicates the switch lever position)
S413

・ S414 (FIBER/COAX-1/COAX-2 SEL)

When S423-8 on the AT-149 board is set to ON, select the camera signal reception mode of the HDCU-950. When S423-8 on the AT-149 board is set to OFF (factory setting), the signal is connected by the normal optical/electrical composite cable.

FIBER : Connection by normal optical/electrical composite cable

COAX-1 :One-way connection using a BNC cable*1

COAX-2 :Bi-directional connection using two BNC cables*2

Factory setting : FIBER

＊1: After receiving the HD-SDI signal output from the camera, the signal is locked and each signal is output correctly. (RET3 connector is used for the HD-SDI signal input connector from the camera.)

＊2: Connecting the camera equipped with the HD-SDI input/output is possible using the two BNC cables instead of the optical/electrical composite cable. Then the normal operation is possible except the power feeding function. (As to the HD-SDI output signal to the camera, the output signal from HD SDI MONITOR is used.) However, this function cannot be used by default at present. If you want to use this function, consult your local Sony Sales Office/ Service Center.

・ S416 (REF-10F-BB) (NTSC only)

Sets this switch when the multi frame is going to be locked using the 10F-BB signal (SMPTE318M) as a reference signal.

ON : Sets the 10F-BB signal as reference.

OFF : When the 10F-BB signal is not input to REFER-ENCE.

Factory setting : OFF

・ S417 (CONVERSION DELAY)

Selects delay amount between the HD-SDI output signal and the SDI signal after the HD-SDI signal is down-converted.

90H : Minimum delay mode equivalent to 90H lines of HD signal.

1FRAM : Unity phase mode with 1 frame delay

Factory setting : 90H

・ S418 (FIELD FREQUENCY SEL)

・ S419 (INTR/PROG/540P SEL)

When S420 on the AT-149 board is set to the position other than REMOTE, sets the conversion format of the MAIN HD SDI output signal that is output from the HD SDI OUT1 and 2 connectors on the rear panel.

Note

The MULTIFORMAT setting of the camera side shall have the same setting too.

Factory setting : 60V (S418)
                 INTR (S419)

FORMAT	S420	S418	S419
1080/60 (or 59.94) i	1.000 (or 1.001)	60V	INTR
1080/30 (or 29.97) PsF	1.000 (or 1.001)	60V	PROG
1080/50i	1.000	50V	INTR
1080/25PsF	1.000	50V	PROG
1080/24 (or 23.98) PsF	1.000 (or 1.001)	48V	PROG
540/60 (or 59.94) PsF	1.000 (or 1.001)	60V	540P

Note

540P and the formats other that what are describe above,
are not supported at present.

- S420 (FRAME FREQ.SELECT)
  Select coefficient between $\times \frac{1}{1.000}$ and $\times \frac{1}{1.001}$
  depending upon the HD signal frame frequency.
  /1.001 : $\frac{1}{1.001}$ times
  /1.000 :   1 time
  REMOTE : Control is performed by RCP/MSU, etc.,
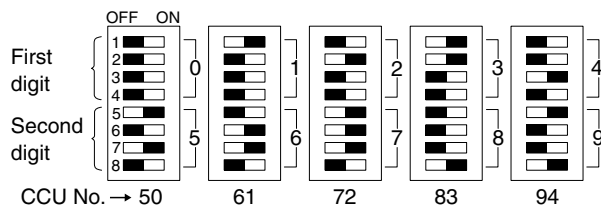   connected outside.
  Factory setting : REMOTE

- S421 (1-8 CCU No.)
  This switch is mainly used to set the CCU numbers when
  RCP is connected to the HDCU-950.
  Use switches 1 to 8 to set the CCU numbers from 1 to 96
  in BCD notation.
  Use switches 1 to 4 to set the first digit and use switches
  5 to 8 to set the second digit. ("a" to "f" are invalid.)

Factory setting : All OFF

- S422-1 to 5 (CCU MODE SET 2)
  Sets the CCU mode.
  Set all to OFF during ordinary operation.
  Factory setting : All OFF
  -6 : (RCP Sim-Cont)
  -7 : (P-B CHARA MIX)
  -8 : (TRUNK)

1-10 (E)

- S423 (CCU MODE SET 1)
  Sets the CCU mode.
  Factory setting : All OFF
  -1 : Sets the SD signal format when S420 on the AT-149
       board is set to position other than REMOTE.
       ON : PAL (625/50)
       OFF : NTSC (525/60)
  -2 : The remote control code of MIC GAIN can be
       switched to that of the HDCU-700A.
       ON : HDCU-700A mode
       OFF : Standard (default)
  -3 : Selects the function of the MIC REMOTE connector
       on the rear panel.
       ON : WFM REMOTE CTL
       OFF : MIC REMOTE CTL
  -4 : Set the switch to OFF. (900)
  -5 : Set the switch to OFF. (RCP-POW)
  -6 : The PIX select control from the RCP can be disabled.
       ON : Enabled
       OFF : Disabled
  -7 : Set the switching control of PIX/WFM.
       ON : Controllable only from RCP
       OFF : Controllable from both MSU and RCP
  -8 : Sets the reception mode of the camera HD-SDI
       signal using the electrical coaxial cable. Set this
       switch to OFF during ordinary operation.
       ON : Depending on the setting of S414 on the AF-
            149 board.
       OFF : Connection by normal optical/electrical
             composite cable

- S424-1 to 8
  Factory use only
  Factory setting : All OFF

- S427 (REFERENCE SIGNAL SEL)
  Selects the type and phase control methods of the
  external sync signal.
  HD : Sync-locks to the HD reference signal.
       (Supports automatically the frame frequency of
       the reference signal to be input.)
  BB : Sync-locks to the SD reference signal (BB).
       (When the HKCU-951 is mounted, VBS OUT is
       SC-locked.)
  REM : Control is performed by RCP/MSU, etc.,
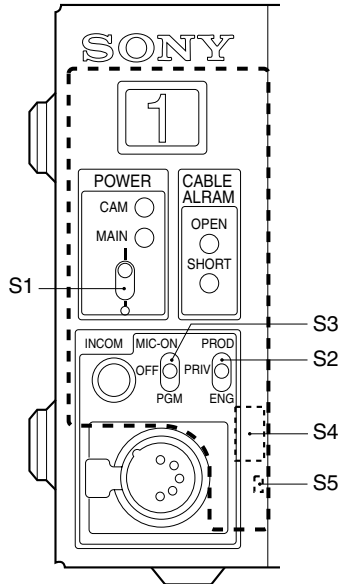   connected outside.
  Factory setting : REM

- S428 (H PHASE COARSE)
  Performs the fine adjustment of the H phase when S427 on
  the AT-149 board is set to position other than REM. Perform
  the coarse adjustment using S405 on the AT-149 board.
  Factory setting : CENTER
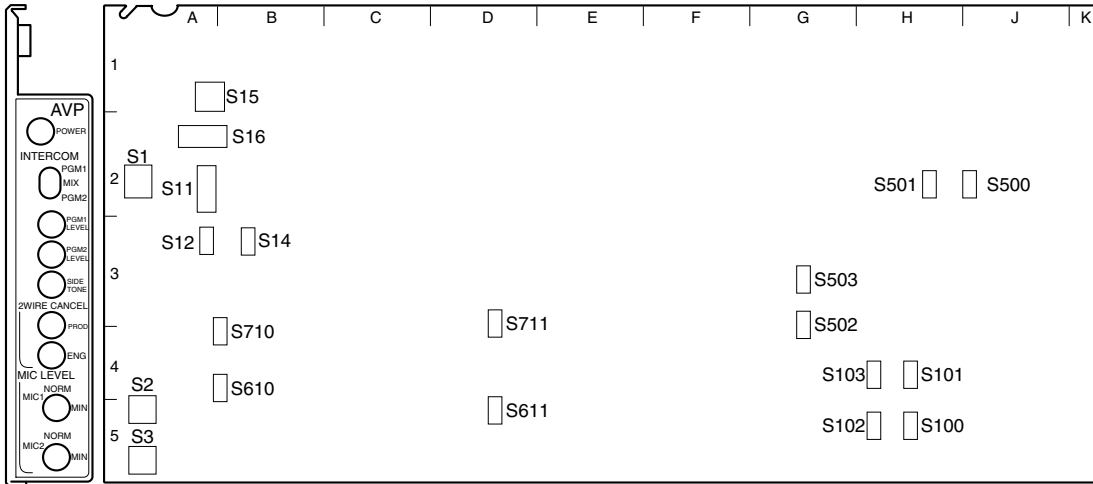
1-6-2. AU-281 Board (Front Panel)

AU-281 board (Front panel)

· S1 (POWER)

Turns ON/OFF the main power of this unit.

ON : Power ON

OFF : Power OFF

Factory setting : OFF

· S2 (INCOM SELECT)

Selects the line to which the INCOM connector on the front panel is connected.

PROD : Producer line

PRIV : Private (When the unit is disconnected from the producer line or engineer line, only the intercom between the unit and the camera is possible.)

ENG : Engineer line

Factory setting : PRIV

· S3 (INCOM MIC)

Performs the switching operations between ON/OFF of the headset microphone connected to the INCOM connector on the front panel and receiving audio/PGM (program audio) of the producer line (or engineer line).

MIC-ON : Turns ON the headset microphone.

MIC-OFF : Turns OFF the headset microphone.

PGM : The program audio is output to the INCOM connector on the front panel.

Factory setting : MIC-OFF

> **Note**

Selecting the receiving audio is valid when S11 on the AVP-4 board is OFF.

· S4 (TALK GAIN)

Sets the microphone input level according to the type of headset microphone to be connected to the INCOM connector on the front panel.

DYNAMIC : When using a dynamic microphone (−60 dB)

ECM : When using a electric condenser microphone (−40 dB)

CARBON : When using a carbon microphone (−20 dB)

Factory setting : CARBON

· S5 (TALK DYNAMIC/ECM MIC UNBALANCE GND)

When the headset microphone to be connected to the INCOM connector on the front panel is DYNAMIC or ECM, this switch sets the input level according to the type (balanced/unbalanced) of the headset microphone.

GND : In case of unbalanced type (upper side)

OPEN : In case of balanced type (lower side)

Factory setting : OPEN

1-6-3. AVP-4 Board

AVP-4 board (A side/panel side)

Note

Do not change the settings of the switches described
"Factory use only".

・ S1 (FP PGM SEL PGM1/MIX/PGM2)
Selects the PGM (program audio) that is output to the
INCOM connector on the front panel.
　PGM 1 :　PGM CH-1
　MIX :　　PGM CH-1 + PGM CH-2
　PGM 2 :　PGM CH-2
Factory setting : PGM 1

・ S2 (MIC 1 LEVEL)
・ S3 (MIC 2 LEVEL)
Use these switches to select AMP GAIN of MIC CH-1/
CH-2 of the camera head using this unit. Set GAIN to
either 60 dB (NORMAL), 50 dB, 40 dB, 30 dB or 20 dB
(MIN) according to MIC sensitivity and audio conditions
during shooting.
Factory setting : [NORM] (60 dB)

・ S11 (FP INCOM MODE SEP/MIX/OFF)
Selects the receiving audio of the producer line (or
engineer line) and also selects the mix mode of the PGM
(program audio).
　SEP :　The receiving audio and the PGM (program
　　　　audio) are output in the right and left channels
　　　　separately.
　MIX :　The receiving audio and the PGM (program
　　　　audio) are mixed and output.
　OFF :　Not mixed. (Depends on the setting of S3 on the
　　　　AU-281 board.)

Note

There is not the mix mode of the producer line and the
engineer line.

Factory setting : OFF

・ S12 (INPUT INCOM SELECT)
Set this switch to either channel 1 (PROD) or channel 2
(PROD, ENG) according to the intercom system. When
channel 1 is set, PROD is selected regardless of the
setting of the ENG/PROD select switches of the camera
side and the CCU side.
Factory setting : Channel 2

・ S14 (PGM INPUT SEL ANA/SDI)
Selects the type of the PGM (program audio).
　ANA :　Analog system PGM (Input signals to the
　　　　INCOM/TALLY/PGM connectors)
　SDI :　Embedded digital audio of the SDI signal
　　　　selected by S605 on the DTX-1 board.
Factory setting : ANA

・ S15 (MIC DELAY)

This switch is used to match the amount of delay of MIC and AES/EBU format audio signal with the video signal. About 5 msec. is delayed per one step.

  Example) : 7 : 1 FRAME DELAY (30 FRAME/SEC)
            8 : 1 FRAME DELAY (25 FRAME/SEC)

Factory setting : 0

・ S16-1 to 8

Factory use only

Factory setting : All OFF

・ S100 (R TALLY POWER/CONTACT)
・ S102 (R TALLY POWER/TTL)

Set these switches according to the signal standard of the R TALLY signal to be input in the INCOM/TALLY/ PGM connector on the rear panel. Refer to the following table for the relation between signals and switch setups.

Factory setting : CONTACT (S100)
               TTL (S102)

・ S101 (G TALLY POWER/CONTACT)
・ S103 (G TALLY POWER/TTL)

Set these switches according to the signal standard of the G TALLY signal to be input in the INCOM/TALLY/ PGM connector on the rear panel. Refer to the following table for the relation between signals and switch setups.

Factory setting : CONTACT (S101)
               TTL (S103)

Setting the tally system

	Red tally		Green tally	
Switch	S100	S102	S101	S103
Signal standard	POWER/ CONTACT	POWER/ TTL	POWER/ CONTACT	POWER/ TTL
Contact supply	CONTACT	–	CONTACT	–
24 V voltage supply	POWER	POWER	POWER	POWER
5 V voltage supply	POWER	TTL	POWER	TTL

・ S500 (PGM 1 SEL)

Set the input signal level of the PGM (program audio) CH-1 to either 0 dBu or −20 dBu.

Factory setting : 0 dBu

・ S501 (PGM 2 SEL)

Set the input signal level of the PGM (program audio) CH-2 to either 0 dBu or −20 dBu.

Factory setting : 0 dBu

・ 502 (MIC 2 OUT LEVEL)

Set the AUDIO signal level of the MIC-2 connector on the rear panel to either 0 dBu or −20 dBu.

Factory setting : 0 dBu

・ S503 (MIC 1 OUT LEVEL)

Set the AUDIO signal level of the MIC-1 connector on the rear panel to either 0 dBu or −20 dBu.

Factory setting : 0 dBu

・ S610 (PROD RTS/CLEAR)
・ S611 (PROD INCOM ENG SELECT)

Selects the intercom system of the producer line.

Factory setting : 4W (S611)
              RTS (S610)

	S611	S610
4-wire system	4W	–
RTS system	RTS	RTS
Clear-Com system	RTS	CC

・ S710 (ENG RTS/CLEAR)
・ S711 (ENG INCOM ENG SELECT)

Selects the intercom system of the engineer line.
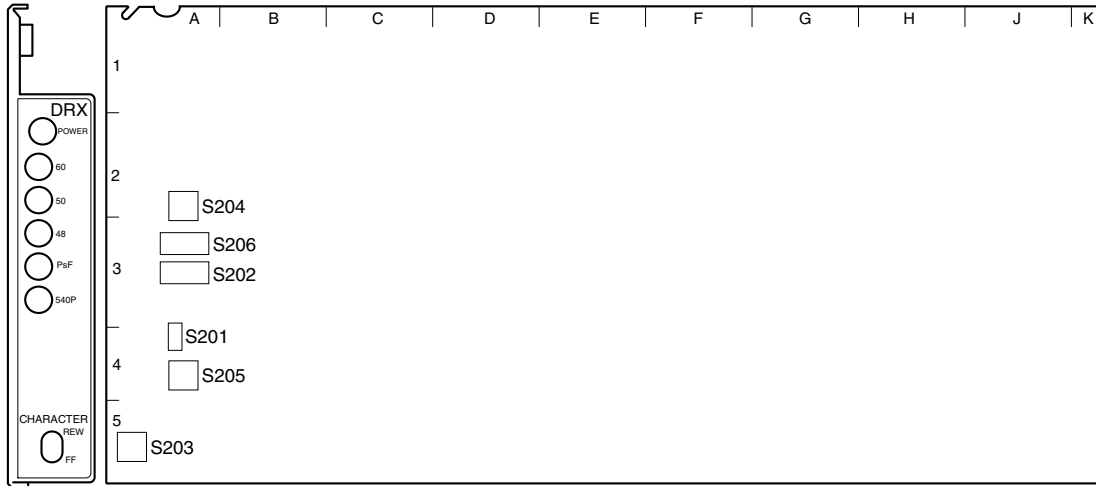
Factory setting : 4W (S711)
              RTS (S710)

	S711	S710
4-wire system	4W	–
RTS system	RTS	RTS
Clear-Com system	RTS	CC

1-6-4. DRX-1 Board

DRX-1 board (A side/panel side)

Note

Do not change the settings of the switches described "Factory use only".

- S201 (GRAY ON/OFF)

  When you turn off the power of the camera or when the communication with the camera is cut, this switch selects the signal to be output from the CCU.

  ON : Gray signal

  OFF : Color bar signal

  Factory setting : OFF

- S202-1 to 8

  Factory use only

  Factory setting : All OFF

- S203 (CHARACTER)

  The character page to be mixed into the signal that is output from the MONI connector on the rear panel, can be changed with REW/FF.

  REW : Returns to previous page.

  FF :   Goes to next page.

  Factory setting : CENTER

- S204

  Factory use only

  Factory setting : 0

- S205 (CB SEL)

  Selects the color bar signal that is output from the HD SDI OUT 1 and 2 connectors (of the HDCU-950/HKCU-953) on the rear panel.

Setting switches	Color bar
0	16 : 9-100%-CB (non-sprit) BAR
1	16 : 9-75%-CB (non-sprit)
2	4 : 3-100CB (non-sprit)
3	4 : 3-75%-CB (non-sprit)
4	16 : 9 SMPTE-CB (−I, +Q)
5	16 : 9 SMPTE-CB (0%)
6	4 : 3 SMPTE-CB (−I, +Q)
7	4 : 3 SMPTE-CB (0%)
8	Multi Format-A ARIB-75%-SMPTE-CB
9	Multi Format-B ARIB-100%-SMPTE-CB
A	Multi Format-C ARIB-CB (+I)
B	Multi Format-C SMPTE-CB (−I, +Q)

Factory setting : 0

・ S206

Factory setting : All OFF

-1, 2

Factory use only

-3 (MAIN/MONI CHANGE)

When this switch is set to ON, the character signal and the marker signal are mixed with the all output signals except the HD-SDI-MONITOR output.

ON : Change mode

OFF : Normal mode

-4 (MONI CHARACTER OFF)

Selects whether the character signal and the marker signal are mixed or not to the signal to be output from the MONI connector on the rear panel.
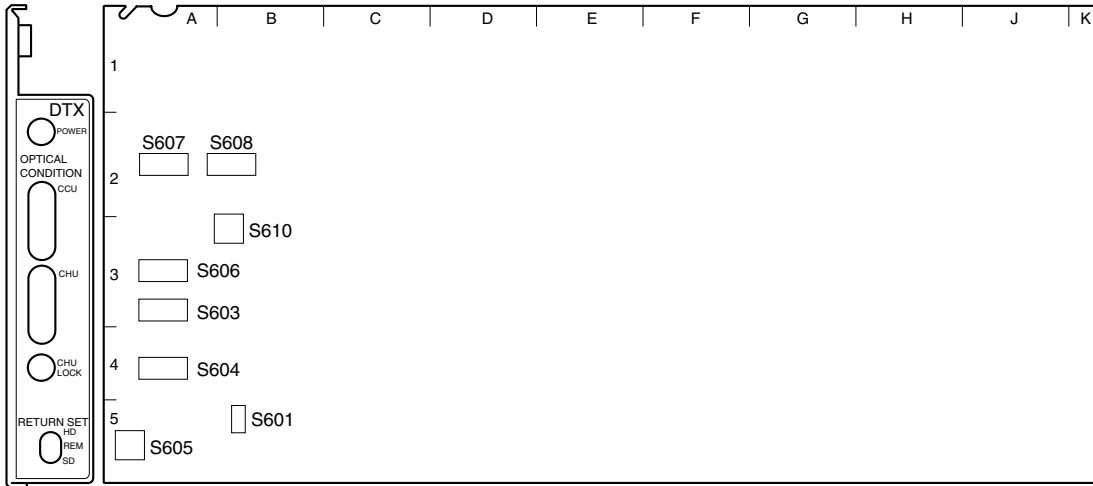
ON : Forced-OFF (Not mixed)

OFF : Normal mode (Mixed)

-5 (GRAY SIGNAL BAR-CHAR ON/OFF)

This switch enables mixing of the color bar character with the gray signal that is output when camera is turned off.

ON : GRAY BAR-CHAR ON

OFF : GRAY BAR-CHAR OFF

1-6-5. DTX-1 Board

DTX-1 board (A side/panel side)

Note

Do not change the settings of the switches described "Factory use only".

- S601 (SD RETURN FORMAT)

  Selects the signal format that is input to the RET1 to 3 connectors on the rear panel when S605 on the DTX-1 board is set to SD.

  VBS (20) : Analog VBS

  SDI (80) : SD SDI (D1)

  Factory setting : SDI

- S603 (SD RET ASPECT)

  This switch is valid when S605 on the DTX-1 board is set to SD.

  Selects the aspect ratio of the SD return signal to be input to the RET1 to 3 and RET4 (PROMPTER) connectors on the rear panel when S601 on the DTX-1 board is set to SD.

  S603-1, -2 : RET1

  S603-3, -4 : RET2

  S603-5, -6 : RET3

  S603-7, -8 : RET4 (PROMPTER)

S603-1, -3, -5, -7	S603-2, -4, -6, -8	Aspect ratio
ON	ON	Letter box[*1]
ON	OFF	Edge-crop[*1]
OFF	ON	Squeeze[*1]
OFF	OFF	It is interlocked with the down-conversion aspect ratio of the RC-91 board output.

[*1] : Letter box : The HD video signal of 16 : 9 (or aspect ratio set with S604 on the DTX-1 board) is inserted in the picture frame of 4 : 3 as it is and converted to the SD signal. (The black level is inserted in the top and bottom of the picture.)

Edge-crop : Video signal as large as 4 : 3 is cut from the HD video signal and is converted to the SD signal.

Squeeze : The HD video signal of 16 : 9 is converted to the SD signal as it is.

Factory setting : All OFF

- S604 (LB ASPECT)

  This switch is valid when S605 on the DTX-1 board is set to SD.

  Select the aspect ratio of the letter box, when S603 on the DTX-1 board is set to letter box.

  S604-1, -2 : RET1

  S604-3, -4 : RET2

  S604-5, -6 : RET3

  S604-7, -8 : RET4 (PROMPTER)

S604-1, -3, -5, -7	S604-2, -4, -6, -8	Aspect ratio
ON	ON	13 : 9
ON	OFF	14 : 9
OFF	ON	15 : 9
OFF	OFF	16 : 9

Factory setting : All OFF

・S605 (RETURN SET)

Sets the format of the return signal to be input to the RET1 to 3 connectors on the rear panel.

HD : Sets the RET1 to 3 to the HD-SDI.

SD : Sets the RET1 to 3 to SD. (Depends on the setting of S601, S603 and S604 on the DTX-1 board.)

REM : Sets the format of each return signal from RM/ MSU, etc. connected outside.

Factory setting : REM

・S606 (RET FC SET)

Sets the frame conversion type of the return signal to be input to the RET1 to 3 and RET4 (PROMPTER) connectors on the rear panel.

S606-1, -2 : RET1

S606-3, -4 : RET2

S606-5, -6 : RET3

S606-7, -8 : RET4 (PROMPTER)

S606-1, -3, -5, -7	S606-2, -4, -6, -8	Type of frame conversion
ON	ON	THROUGH : Frame conversion is not performed.
OFF	ON	A (24PsF conversion) : When the camera side is 24PsF, the forced-reverse conversion is performed. (Conversion to reconstruct 24PsF)
ON	OFF	B (48i conversion) : When the camera side is 24PsF, the forced-reverse conversion is performed. (Conversion to 48i format by simple skipping)
OFF	OFF	AUTO : Depends on the setting of S1-1 on the FC-88 board.

Factory setting : All OFF

・S607 (RETURN MODE)

Perform setting of the return signal.

Factory setting : All OFF

-1 (RET-DLY)

Sets the SD return signal and the delay amount of the phase during up-convert.

ON : Up-convert in the least time

OFF : 1-field delays at maximum.

-2 (RET4-VBS)

Sets whether the PROMPTER connecter on the rear panel is used or not as RET4 (VBS input).

ON : Uses it as PROMPTER input.

OFF : Uses it as RETURN4 (VBS input).

-3 to 8

Factory use only

・S608-1 to 8

Factory use only

Factory setting : All OFF

・S610 (FC SEQUENCE)

Phase at the conversion cycle can be changed during the frame frequency conversion of the return signal. (Timing to delete the field can be freely selected during conversion of 60i → 48i and 50i → 48i.)

Factory setting : 0

1-6-6. RC-91 Board
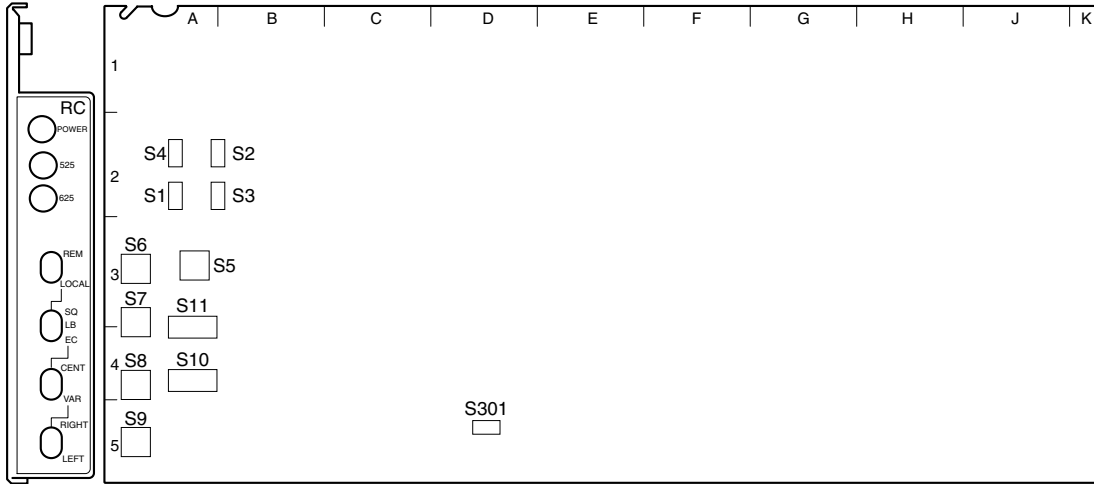
RC-91 board (A side/panel side)

Note

Do not change the settings of the switches described "Factory use only" and unused switches.

・ S1 (SET-UP ON/OFF)
Selects whether SETUP is added or not to the VBS signal to be output from PIX OUT/WF OUT connector on the rear panel.
　ON :　Added
　OFF : Not added
Factory setting : OFF

・ S2, S3, S4
Not used.
Factory setting :Left side when viewed from the panel side.

・ S5 (CB-SEL)
Selects the color bar signal to be output from the SD SDI OUT 1 and 2 connectors and the VBS OUT connector (when the HKCU-951 is installed) on the rear panel.

Setting switches	Color bar
0	100%-CB (non-split)
1	100% & 75%-CB (non-split)
2	75%-CB (non-split)
3	Pseudo SMPTE-CB
4	Mode to down-convert HD-CB
5-F	Not used

Factory setting : 0

・ S6 (ASPECT REMOTE/LOCAL)
Sets whether RCP/MSU connected outside controls or not the aspect ratio of the SD signal.
　REM :　Control is performed by RCP/MSU, etc. connected outside.
　LOCAL :Set using the switch on the RC-91 board.
Factory setting : REM

・ S7 (ASPECT SEL)
This switch is valid when S6 on the RC-91 board is set to LOCAL. Selects the aspect ratio to down-convert the HD signal to SD signal.
　SQ (Squeeze) :　The HD video signal of 16 : 9 is output to the SD OUT.
　LB (Letter Box) : The picture (13 : 9, 14 : 9, 15 : 9 or 16 : 9) having the aspect ratio selected by S10-3 and S10-4 on the RC-91 board is inserted in the picture of 4 : 3 as it is, and the signal is output to the SD OUT.
(Top and bottom are blanked and the right and left most ends are cut when the screen is 13 : 9, 14 : 9 or 15 : 9.)
　EC (Edge-Crop) : The right and left most ends are cut and the picture of 4 : 3 aspect ratio is output to the SD OUT. (Set the cutting position using S8 on the RC-91 board.)
Factory setting : SQ

• S8 (EC POSITION SEL)

This switch is valid when S6 on the RC-91 board is set to LOCAL.

When S7 on the RC-91 board is set to EC or LB, and S10-3 and S10-4 on the RC-91 board are set to 13 : 9, 14 : 9, or 15 : 9, select the cutting position.

CENT : Cuts out the center.

VAR : Changes the horizontal cutting position with S9 on the RC-91 board.

Factory setting : CENT

• S9 (EC POSITION CONT)

This switch is valid when S6 on the RC-91 board is set to LOCAL.

When S8 on the RC-91 board is set to VAR, adjust the horizontal cutting position.

	S8
The cutting position moves left.	LEFT
The cutting position moves right.	RIGHT

• S10

Factory setting : All OFF

-1 (MONI) :

Selects whether the SD SDI OUT2 connector on the rear panel is set or not as SD SDI MONITOR output.

ON : SD SDI MONITOR

OFF : SD SDI (MAIN)

-2 : Not used.

-3, -4 (LB0/LB1 SEL) :

These switches are valid when S6 on the RC-91 board is set to LOCAL.

When S7 on the RC-91 board is set to LB, select the aspect ratio (13 : 9, 14 : 9, 15 : 9 or 16 : 9) of the picture.

S10-3	S10-4	Aspect ratio
OFF	OFF	16 : 9
OFF	ON	15 : 9
ON	OFF	14 : 9
ON	ON	13 : 9

-5 (MIN-DLY) :

Regardless of the setting of S417 on the AT-149 board, down-conversion to the SD signal is performed with the minimum delay.

ON : Minimum delay

OFF : Normal mode (Depends on the setting of S417 on the AT-149 board.)

-6 (WF-SYNC) :

When mode other than ENC is selected in WF output, this switch sets whether SYNC is added or not.

-7 (Bar CHARACTER OFF) :

Sets the character with a bar added to the SD signal to OFF.

ON : Forced-OFF

OFF : Normal mode

-8 (PIX CHARACTER OFF) :

Selects whether the character signal is mixed or not to the signal to be output from the PIX connector on the rear panel.

ON : Forced-OFF (Not mixed)

OFF : Normal mode (Mixed)

• S11-1 to 8

Factory use only

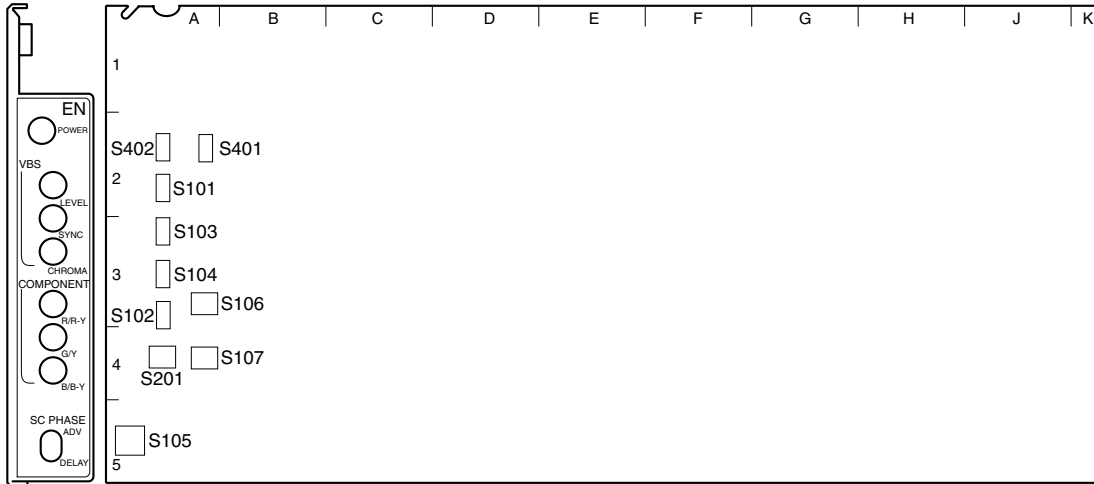Factory setting : All OFF

• 301 (SEQ CONT POLARITY)

Set this switch according to the used waveform monitor.

+ : PNP open collector output

− : NPN open collector output

Factory setting : −

1-6-7. EN-145 Board (HKCU-951)

EN-145 board (A side/panel side)

<table>
<tr><td>Note</td></tr>
</table>

Do not change the settings of the switches described "Factory use only" and unused switches.

• S101 (SD ANA OUT RGB/YCD)
   Selects the signal that is output from the Y/G, B-Y/B and R-Y/R connectors on the rear panel.
      YCD : Y/B-Y/R-Y
      RGB : RGB
   Factory setting : RGB

• S102
   Not used.
   Factory setting : A

• S103 (SDI A OUTPUT SDI/VBS)
   Selects either SDI signal or VBS signal to be output to the SD SDI OUT1 connector on the rear panel.
      SDI : SDI signal
      VBS : VBS signal
   Factory setting : SDI

• S104 (SDI B OUTPUT SDI/VBS)
   Selects either SDI signal or VBS signal to be output to the SD SDI OUT2 connector on the rear panel.
      SDI : SDI signal
      VBS : VBS signal
   Factory setting : SDI

• S105 (SC PHASE)
   Adjusts the SC phase with regard to the reference signal (BB).
      ADV :   Phase advances
      DELAY : Phase delays
   Factory setting : CENTER

• S106-1 to 4
   Factory use only
   Factory setting : All OFF

• S107
   Factory setting : All OFF
   -1 (ASPECT-F) :
   Selects whether the aspect flag is added or not to the VBS output.
      ON :   Added (in case if 16 : 9 NTSC)
      OFF : Not added
   -2 (WIDE-Q FIL) :
      ON :   WIDE-Q
      OFF : NARROW-Q
   -3 (CHROMA BOOST) :
   By setting it to ON, the chroma amount increases by about 2%.
   -4 (WFM-VBS) :
   The VBS signal that is SC-locked in the EN-145 board can be output as the VBS (ENC) of the WF output signal.
      ON :   VBS (SC-locked by SC-PLL) of the EN-145
             board.
      OFF : VBS (not SC-locked by SC-PLL) of the RC-91
             board.

· S201

-1, 2 (CB CONT)

Selects the color bar to be output from the ANALOG
COMPOSITE (VBS) generator.

Setting switches		Color bar
S201-1	OFF	SD COMPONENT-CB
	ON	SD COMPOSITE-CB
S201-2	OFF	SMPTE-CB
	ON	EIAJ/EBU

Factory setting : S201-1 → ON
                          S201-2 → OFF

-3, 4

Not used.
Factory setting : OFF

· S401 (G/Y SYNC SEL)

Selects whether SYNC is added or not to the G/Y signal
of SD.
  ON : Added
  OFF : Not added
Factory setting : ON

· S402 (SETUP SEL)

Selects whether SETUP is added or not to the VBS
signal of SD when S427-1 on the AT-149 board is set to
OFF (NTSC).
  ON : Added
  OFF : Not added
Factory setting: OFF

1-6-8. FC-88 Board (HKCU-953)
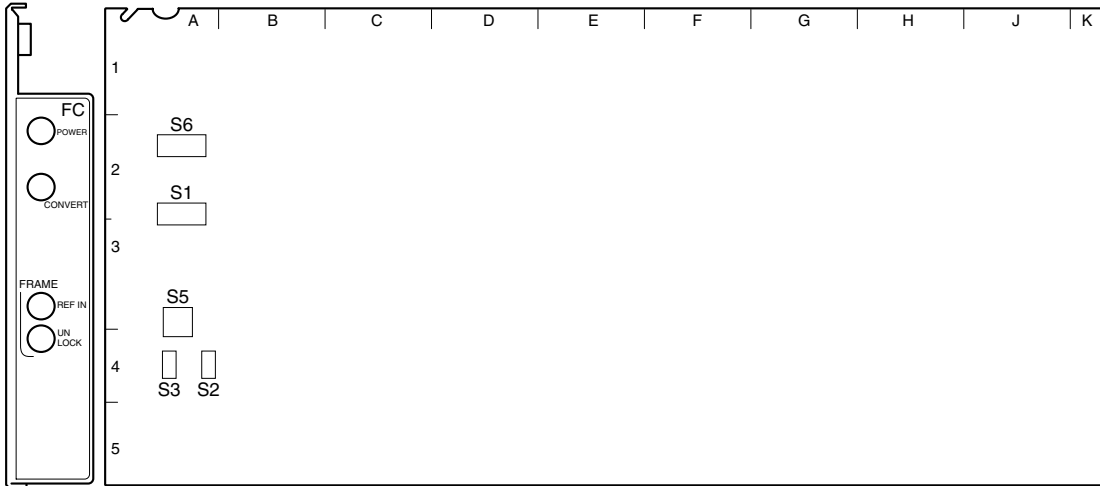
FC-88 board (A side/panel side)

Note

Do not change the settings of the switches described "Factory use only" and unused switches.

· S1 (MODE SET)

Factory setting : All OFF

-1 (50i → 60i : ENABLE) :

Selects whether 50i → 60i conversion is valid or not.

　ON : 　50i → 60i is valid.

　OFF : Through output without conversion

-2 (FC-CONV-MODE) :

Selects the conversion mode of the frame conversion.

　ON : 　Frame overlay

　OFF : 2 to 3 Pull down

-3 (SUB MODE 1) :

Selects whether the SUB-REFERENCE setting is detected automatically or not.

　ON : 　Manual setting (Depends on the setting of S1-4 on the FC-88 board)

　OFF : Automatic detection

-4 (SUB-REF MODE 2) :

When S1-3 on the FC-88 board is set to ON, sets whether SUB-REFERENCE is connected or not.

　ON : 　SUB-REFERENCE is not available

　OFF : SUB-REFERENCE is available

-5 (FC-PHASE ENABLE) :

The FC-SDI-OUT phase setting becomes valid with the HD-SD delay setting.

　ON : 　DRX-SDI-OUT phase adjustment

　OFF : FC-SDI-OUT phase adjustment

· S2 (FRAME CONVERT ON/OFF)

When the video format is set to the local setting (S420 on the AT-149 board is set to the mode other than REMOTE), ON/OFF setting of the FRAME CONVERTER function is enabled.

　ON : 　Turns ON the FRAME CONVERTER function, and converts the FRAME frequency when the camera format is set to 24PsF.

　　　　When the SD format is set to 525 (NTSC) (S423-1 on the AT-149 board is set to OFF), 24 PsF → 60i (2 to 3 Pull Down)

　　　　When the SD format is set to 625 (PAL) (S423-1 on the AT-149 board is set to ON), 24 PsF → 50i

　OFF : Turns OFF the FRAME CONVERTER function and delays the same signal as the MAIN HD-SDI output by a few clocks, and outputs it.

Factory setting : OFF

· S3

Not used.

Factory setting : OFF

· S5 (GEN LOCK)

Selects the FRAME REFERENCE signal to be input.

　0 : AUTO

　1 : FRAME REF HD

　2 : FRAME REF SD

　3 : FRAME REF S. SYNC

Factory setting : 0

· S6-1 to 8

Factory use only

Factory setting : All OFF

1-7. Functions of Indicators on Boards

1-7-1. AT-149 Board
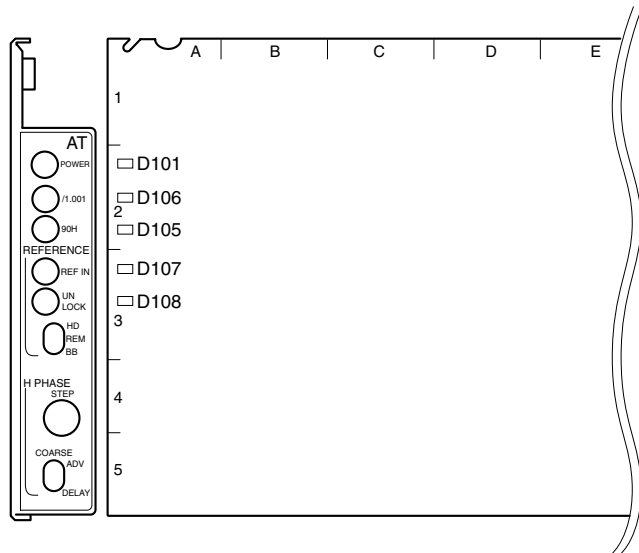
AT-149 board (A side/panel side)

D101 (green) : Power display

Lights up when the voltage used on this board is normally supplied.

D105 (yellow) : 90H display

Lights up when the delay amount of the SD signal for downconvert is set to 90H.

Note

The delay amount is set with S417 on the AT-149 board. For details, refer to Section 1-6-1. "Setting of Switches on Boards − AT-149 Board".

D-106 (green) : /1.001 display

Lights up when the SG operation CLOCK frequency is 74.17582 MHz.

Lights up when the frame frequency coefficient of the HD signal is set to 1/1.001 times.

Note

The frame frequency coefficient is set with S420 on the AT-149 board. For details, refer to Section 1-6-1. "Setting of Switches on Boards − AT-149 Board".

D107 (green) : REF IN display

Lights up when the REFERENCE signal is input to the REFERENCE connector on the rear panel.

D108 (red) : UNLOCK display

Lights up when the unit cannot be synchronized with the external REFERENCE signal in the external sync mode.

1-7-2. AU-281 Board
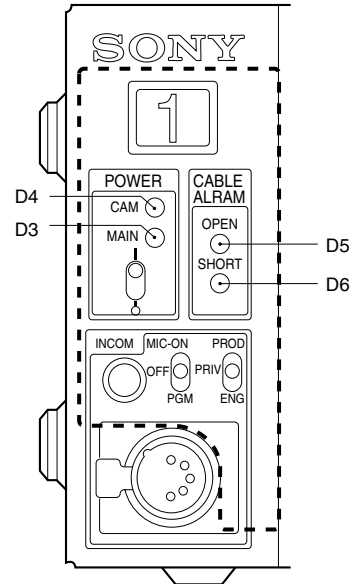
AU-281 board (panel side)

D3 (green) : MAIN POWER display

Lights up when the power is supplied to the unit correctly.

D4 (green) : CAM POWER display

Lights up when DC180 V power is supplied to the connected camera correctly.

D5 (red) : CABLE OPEN display

Lights up when OPEN of the power cable using optical/electrical composite cable is detected.
Blinks when ALARM (attenuation) of the optical level is detected.

D6 (red) : CABLE SHORT display

Lights up when short-circuit in the power cable using optical/electrical composite cable.

1-7-3. AVP-4 Board
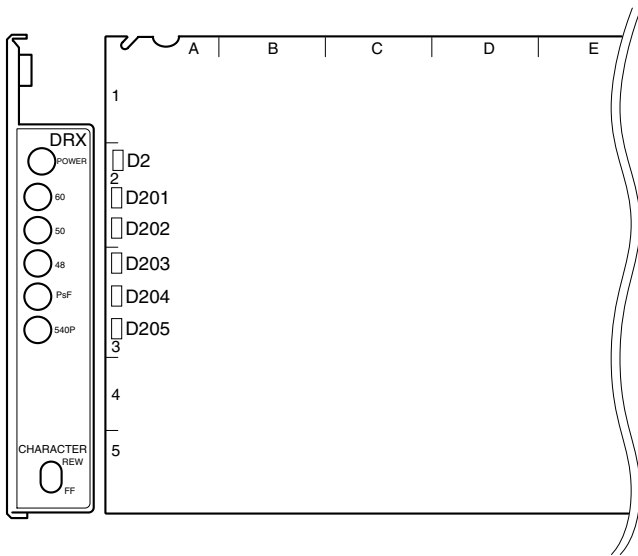
AVP-4 board (A side/panel side)

D1 (green) : POWER display

Lights up when the voltage used on this board is normally supplied.

1-7-4. DRX-1 Board
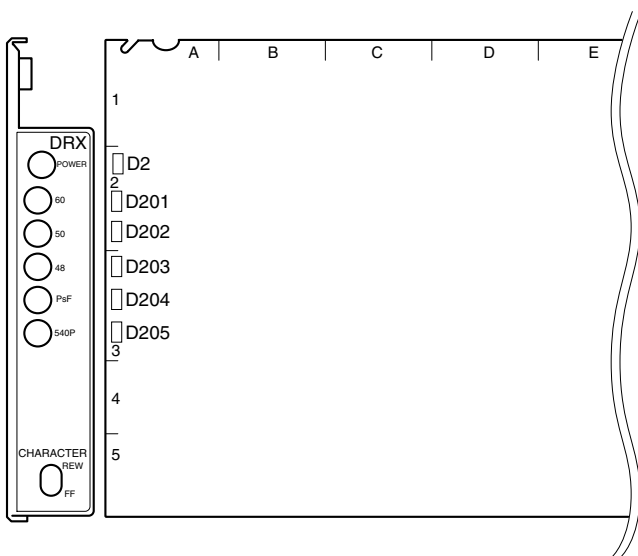
DRX-1 board (A side/panel side)

D2 (green) : POWER display

Lights up when the voltage used on this board is normally supplied.

D201, D202, D203 (green) : MAIN OUTPUT display

Displays the frame frequency of the MAIN HD SDI output signal of this unit and camera.

Blinks when the format setting is incorrect.

D201 lights up : Lights up when the frame frequency is 30 Hz (or 29.97 Hz)

D202 lights up : Lights up when the frame frequency is 25 Hz.

D203 lights up : Lights up when the frame frequency is 24 Hz (or 23.98 Hz)

Note

The format is set with S418 to S420 on the AT-149 board. For details, refer to Section 1-6-1. "Setting of Switches on Boards – AT-149 Board".

D204 (yellow) : PsF display

Lights up during progressive operation of the camera.

Blinks when the format setting is incorrect.

Note

The format is set with S418 to S420 on the AT-149 board. For details, refer to Section 1-6-1. "Setting of Switches on Boards – AT-149 Board".

D205 (red) : 540P display

Lights up when the connected camera is operated in the 540P mode.

Blinks when the format setting is incorrect.

Note

The format is set with S419 on the AT-149 board. For details, refer to Section 1-6-1. "Setting of Switches on Boards – AT-149 Board".

1-7-5. DTX-1 Board
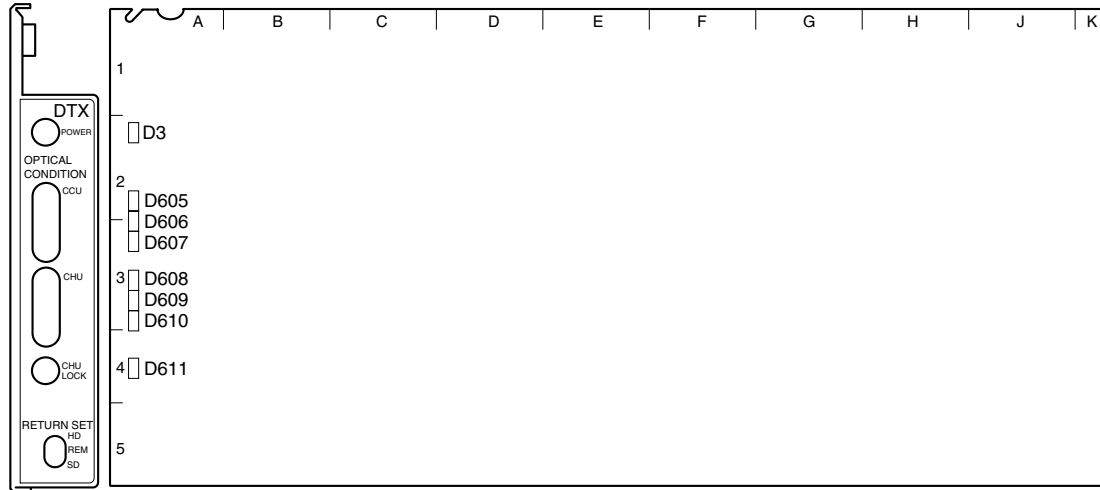
DTX-1 board (A side/panel side)

| Note |

When D607 and D610 light up, be sure to clean the CAMERA connector of the unit, CCU connector of the camera side and the optical/electrical composite cable. When D606 and D609 light up, perform the cleaning as well. For the cleaning procedure, refer to Section 3-1.

D3 (green) : POWER display

Lights up when the voltage used on this board is normally supplied.

D605, D606, D607 : OPTICAL CONDIITON (CCU) display

Displays the optical level received on the HDCU-950 side.
(0 dBm = 1 mW)
D605 (green) lights up :
Normal (The optical reception level is −17 dBm or more.)
D606 (yellow) lights up :
Normal (The optical reception level is −17 dBm to −20 dBm)
D607 (red) lights up :
Abnormal (The optical reception level is less than −20 dBm.)

| Note |

Attenuates about 0.5 dB for every 1 km of cable.
Attenuates about 0.5 dB for each relay connector.

D608, D609, D610 : OPTICAL CONDIITON (CHU) display

Displays the optical level received on the camera side.
(0 dBm = 1 mW)
D608 (green) lights up:
Normal (The optical reception level is −17 dBm or more.)
D609 (yellow) lights up:
Normal (The optical reception level is −17 dBm to −20 dBm)
D610 (red) lights up:
Abnormal (The optical reception level is less than −20 dBm.)

| Note |

Attenuates about 0.5 dB by every 1 km of cable.
Attenuates about 0.5 dB by each relay connector.

D611 (green) : CHU LOCK display

Lights up when communication with the connected camera is normally established.

1-7-6. RC-91 Board

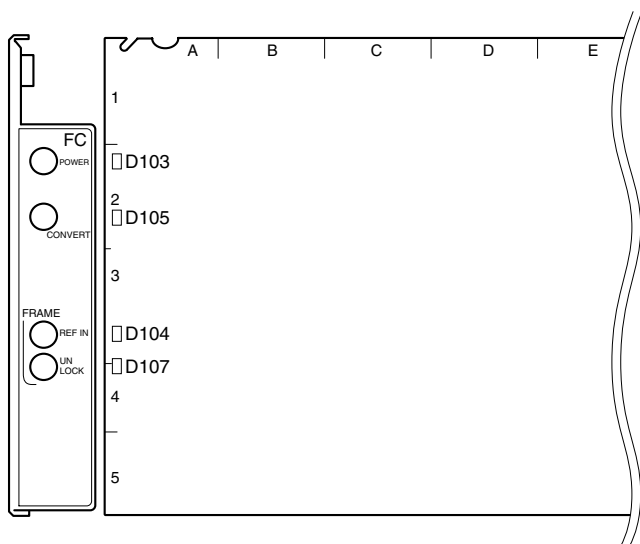**RC-91 board (A side/panel side)**

1-7-7. EN-145 Board (HKCU-951)
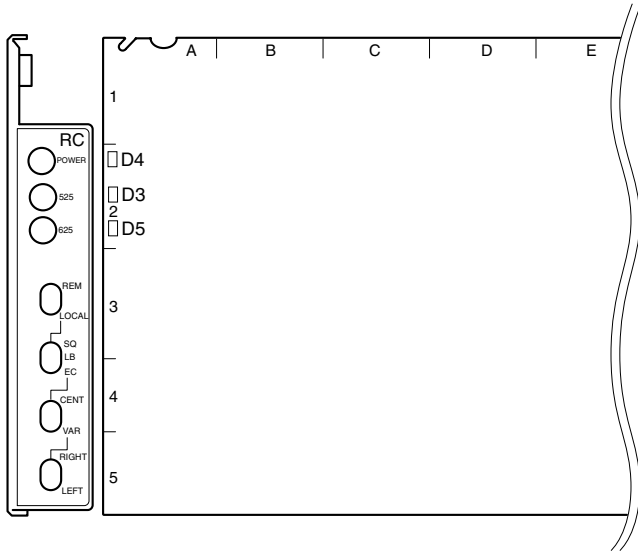
EN-145 board (A side/panel side)

D4 (green) : POWER display

Lights up when the voltage used on this board is normally supplied.

D3, D5 (green) : MAIN OUTPUT display

Displays the format setting of the SD system.
Blinks when the format setting is incorrect.
D3 (green) lights up :
When the SD system is set to 525/59.94i (NTSC).
D5 (green) lights up :
When the SD system is set to 625/50i (PAL).

Note

For details of the SD system setting, refer to Section 2-2, "Setting the System Format – SD system".

D103 (green) : POWER display

Lights up when the voltage used on this board is normally supplied.

1-7-8. FC-88 Board (HKCU-953)
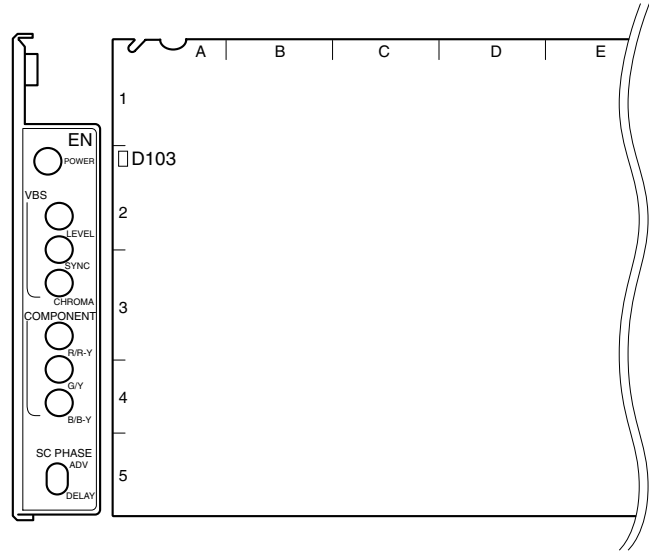
FC-88 board (A side/panel side)

D103 (green) : POWER display

Lights up when the voltage used on this board is normally supplied.

D104 (green) : SUB REF IN display

Lights up when the sub reference for frame lock is input.

D105 (green) : CONVERT display

Lights up when the shooting mode of the camera is set to 24PsF and the 60i or 50i signal is output from the HKCU-953.

D107 (red) : UNLOCK display

Lights up when the frame reference signal is not synchronized with the main reference signal.

## 1-8. Installing the HKCU-951/953

1-8-1. Installing the HKCU-951

Installation

Front side (EN-145 board)

1. Turn off the power and disconnect the power cord from the wall outlet.
2. Loosen the two screws (with drop-safe) and open the front panel in the direction of the arrow.
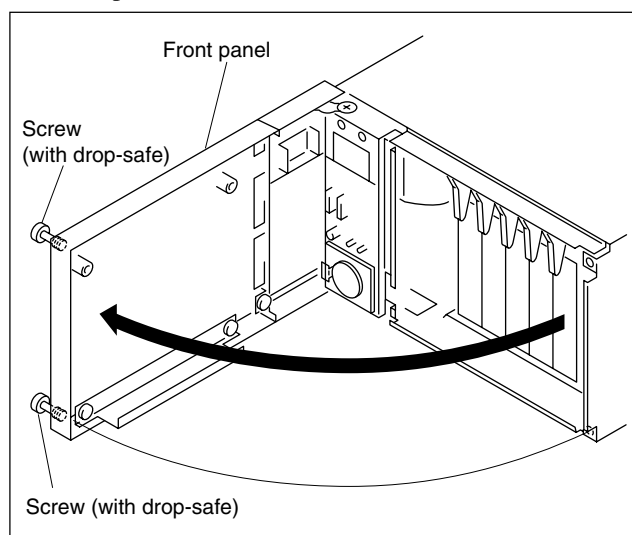
3. Insert the EN-145 board in the right most blank slot.

Note

Check that the EN-145 board is securely connected to the motherboard (MB-951 board).
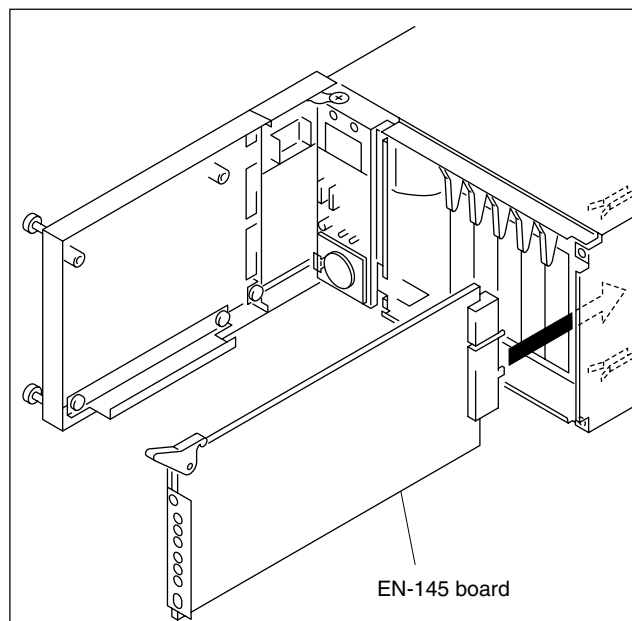
Rear side (VDA-61 board)

1. Remove the two screws and remove the blank panel by holding the handle.

   Note

   Store the removed blank panel in a safe place.

B3 × 5

Handle

Blank panel
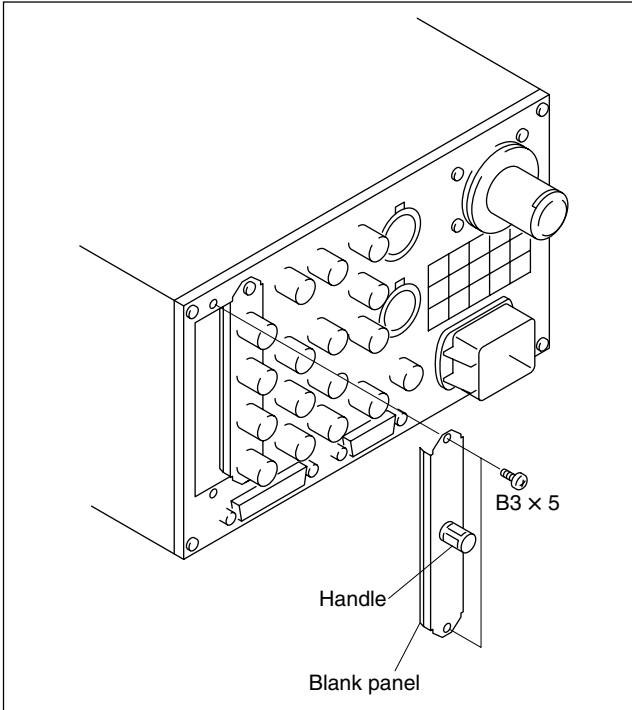
2. Insert the VDA-61 board in the slot.

   Notes

   ・ Because there is a difference of the depth between the upper groove and the lower groove, insert the VDA-61 board in a straight line after inserting it in the lower groove.
   ・ Check that the VDA-61 board is securely connected to the motherboard (MB-951 board).

3. Secure the VDA-61 board with the two screws removed in step 1.

Upper groove

B3 × 5

Lower groove

VDA-61 board

There is a difference of the depth.
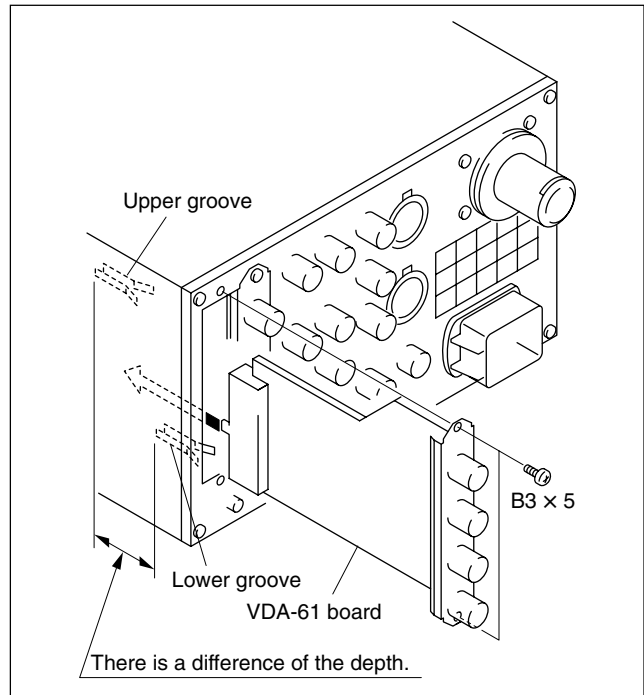
1-8-2. Installing the HKCU-953

Installation

Front side (FC-88 board)

1. Turn off the power and disconnect the power cord from the wall outlet.
2. Open the front panel. (Refer to Section 1-8-1, step 2.)
3. Pull up the lever in the direction of arrow A to unlock and pull out the RC-91 board.

RC-91 board

Levers

A
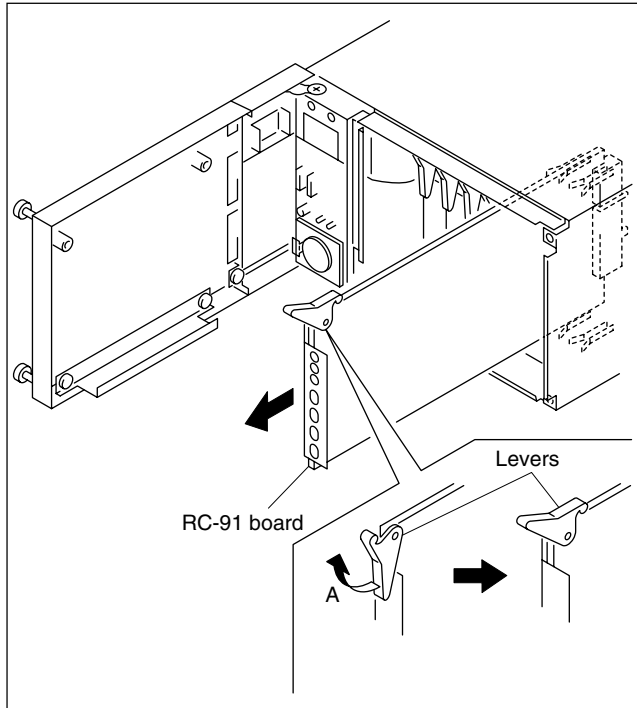
4. Insert the RC-91 board removed in step 3 in the right most slot.
   Insert the FC-88 board in the second slot from the right most slot.

   Note

   Check that the FC-88 and RC-91 boards are securely connected to the motherboard (MB-951 board).

RC-91 board

FC-88 board
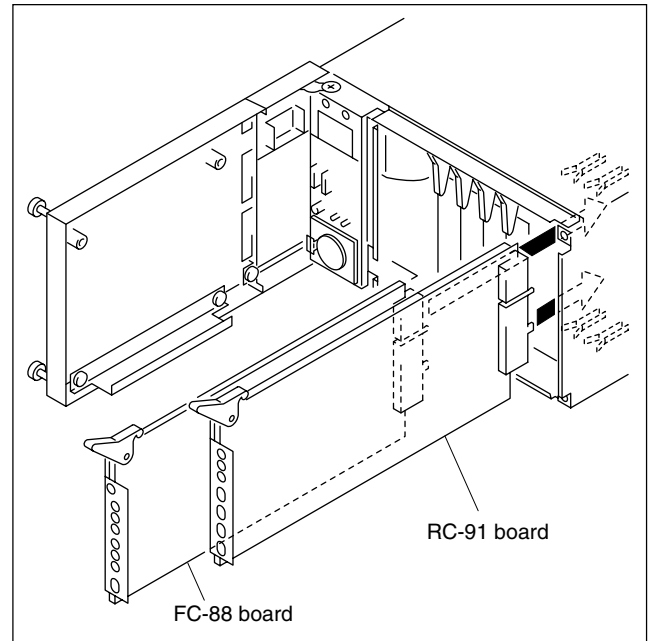
Rear side (SDI-73 board)

1. Remove the two screws and remove the blank panel by holding the handle.
2. Remove the two screws and remove the DIF-124 board.

   Note

   Store the removed blank panel in a safe place.

Handle

B3 × 5

DIF-124 board

B3 × 5

Blank panel
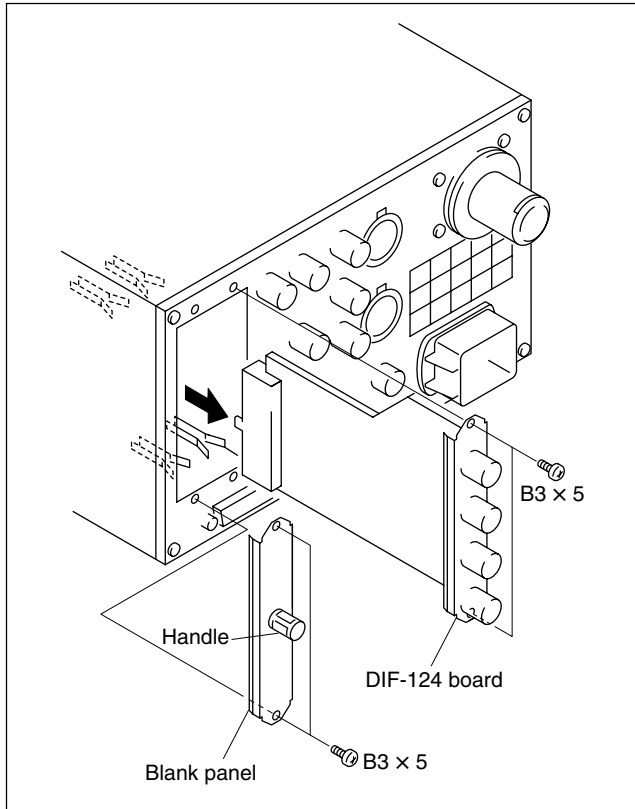
3. Insert the DIF-124 board removed in step 2 in the left most slot.
   Insert the SDI-73 board in the second slot from the left most.

   Notes

   • Because there is a difference of the depth between the upper groove and the lower groove, insert the SDI-73 (or DIF-124) board in a straight line after inserting it in the lower groove.
   • Check that the SDI-73 and DIF-124 boards are securely connected to the motherboard (MB-951 board).

4. Secure the DIF-124 board with the four screws removed in steps 1 and 2.

Upper grooves

SDI-73 board

B3 × 5

Lower grooves

DIF-124 board

There is a difference of the depth.

B3 × 5
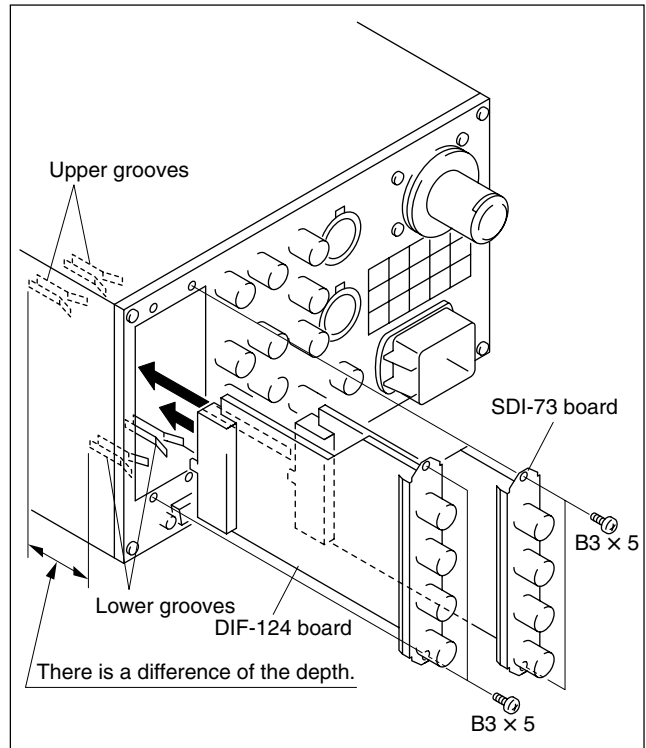
1-9. Installing the RM-B750

1-9-1. Connecting/Disconnecting the Flexible Card Wire

The flexible card wires are used to connect between the following boards. Life of flexile card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
· One flexible card wire between the AU-281 board (CN2) of the unit and the VA-211 board (CA2) of the RM-B750 (when the RM-B750 is installed)
· One flexible card wire between the VA-211 board (CN14) and MPU-124 board (CN104) of the RM-B750

Removal

1. Turn off the main power.
2. Slide the portion "A" in the direction of the arrow to unlock and pull out the flexible card wire.

Installation

| Notes |
· Do not insert the flexible card wire sideways.
· Confirm that there is no stain or dust on the contact surface of the flexible card wire.

1. Slide the portion "A" in the direction of the arrow and securely insert the insulated surface (Blue) of the flexible card wire into the connector in the direction that is shown against the recessed portion of the connector.
2. Return the portion "A" to its original position and lock the connector.
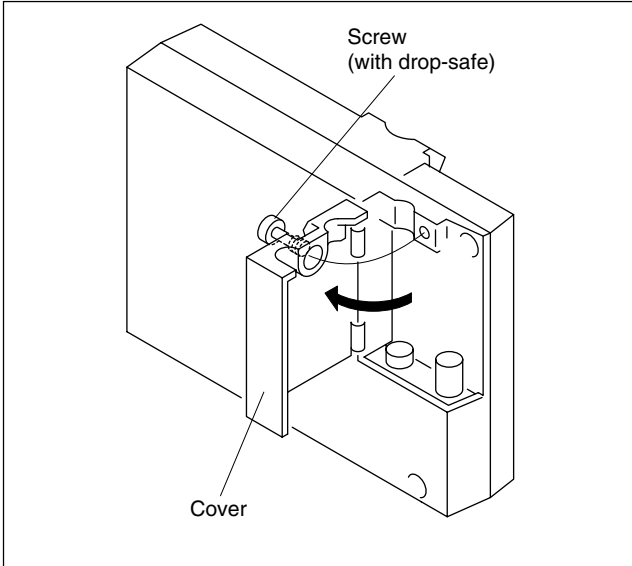

Type A

Type B
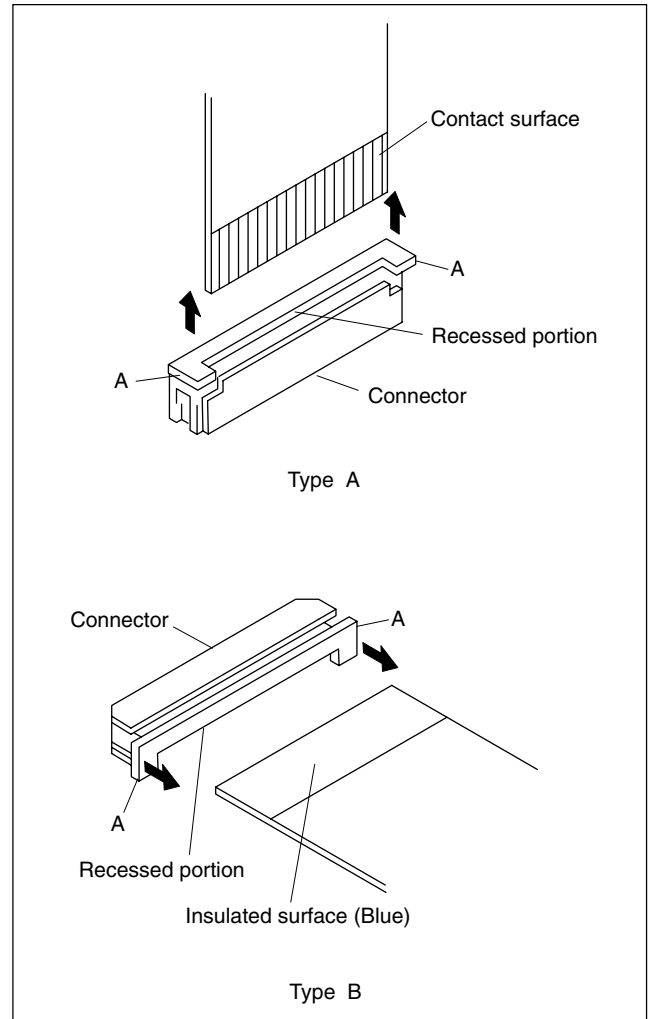
1-9-2. Installing the RM-B750

This section describes the installation procedure when the front panel of the remote control unit RM-B750 is used by being installed to the unit.

Removing the Front Panel from the RM-B750

1. Loosen the screw (with drop-safe) of the RM-B750 and open the cover in the direction of the arrow.

2. Loosen the four screws (with drop-safe) and open the front panel and the rear panel in the direction of the respective arrows.
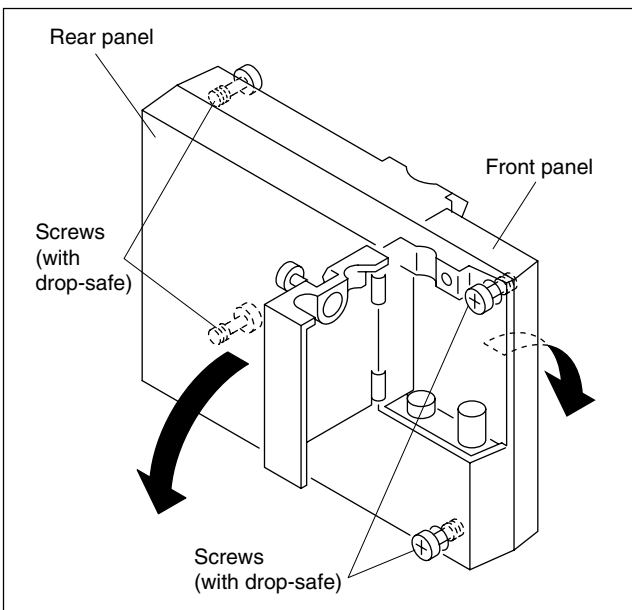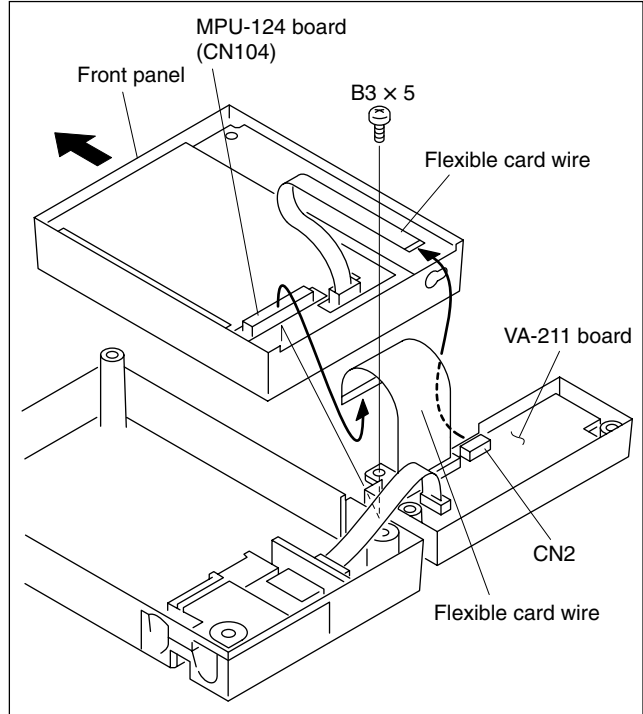

3. Disconnect the connector (CN104) from the MPU-124 board and the connector (CN2) from the VA-211 board respectively.

   Note

   Life of flexile card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

4. Remove the screw and remove the front panel in the direction of the arrow.

Installing the Front Panel to the Unit

5. Turn off the power and disconnect the plug from the outlet.
6. Open the front panel of the unit.
   (Refer to Section 1-8-1. step 2)
7. Remove the screw.
8. Slide the front panel in the direction of the arrow to extract the pin from the potbellied hole and remove the front panel.
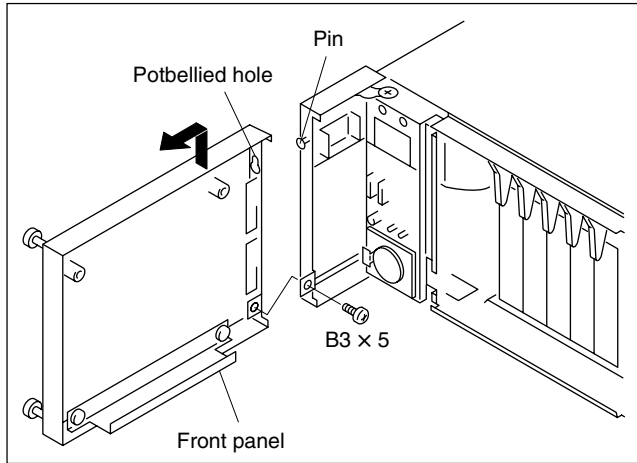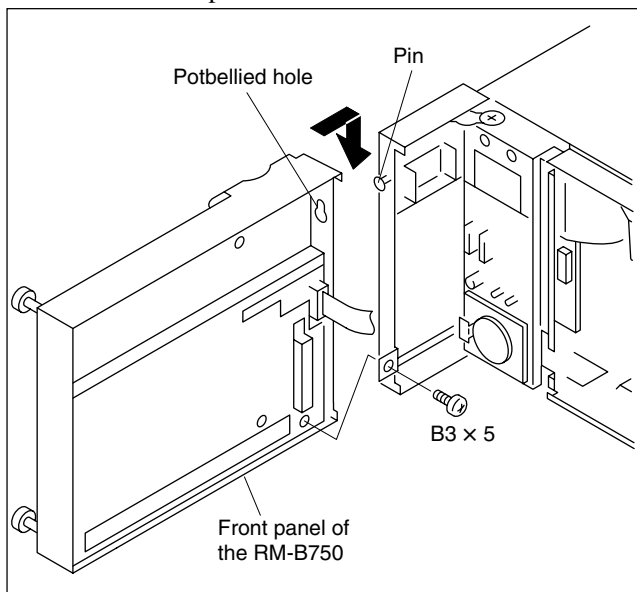

9. Insert the pin into the potbellied hole of the front panel of the RM-B750 removed in step 4 and slide the pin in the direction of the arrow.

   Note

   Confirm that the pin is hooked to the potbellied hole so that front panel does not drop.

10. Secure the front panel of the RM-B750 with the screw removed in step 7.


11. Connect the flexible card wire to the connector (CN2) of the AU-281 board.

    Notes

    ・ Do not insert the flexible card wire sideways. Insert it securely to the deep end as shown in the Fig 1.
      If the connection is not performed correctly, it may cause an failure.
    ・ Life of flexile card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
    ・ Install the connector so that the excessive force is not given to it.

12. Close the front panel of the RM-B750 in the direction of the arrow and secure it with the two screws (with drop-safe).
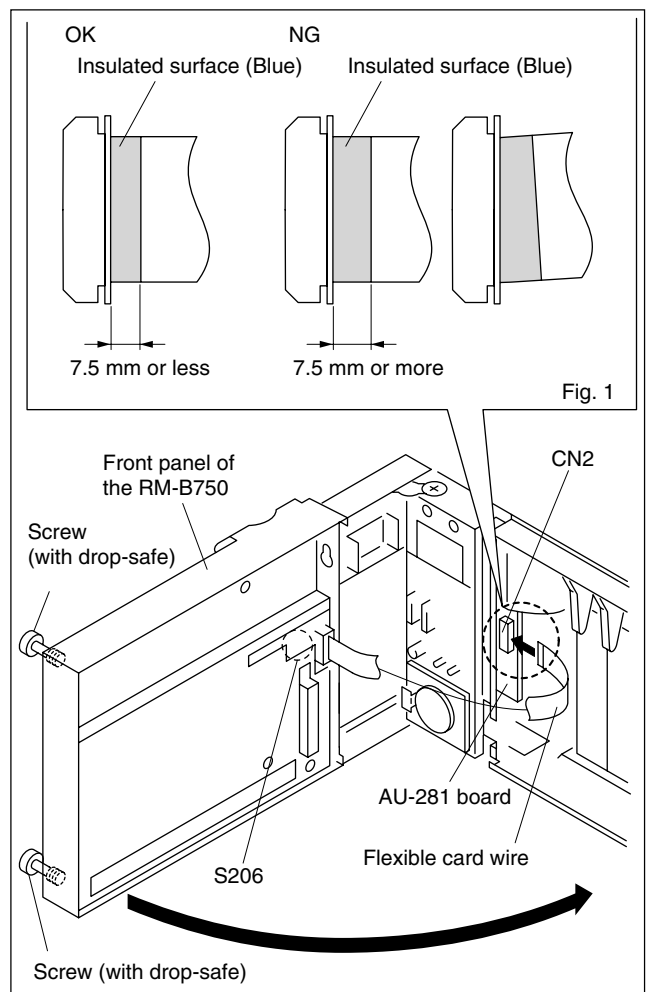
13. Upon completion of front panel installation, check that the switch S206 (CCU-PW) on the MPU-124 board of the RM-B750 is ON.

    Note

    The switch S206 (CCU-PW) on the MPU-124 board is the power ON/OFF switch for the RM-B750. If it is set to OFF, the panel functions are stopped.

1-10. Installing in 19-inch Rack

The two HDCU-950 can be mounted in parallel in a 19-inch EIA standard rack by using the rack mount adapter RMM-301 (optional). (Height three unit)

WARNING

If the rack falls due to the weight of the equipment, it may cause death or major injury.
To prevent the rack from falling or moving, be sure to fix the rack to the floor.

WARNING

If the rack falls, death or serious injury may result.
When attaching the unit, be sure to fix the rack to the floor and be careful not to attach at a height of 1.2 m or higher from the floor.

CAUTION

Use the specified rack mount adapter.
If not, injury could occur by drop of the unit because strength of the shelf board is not enough.

CAUTION

Mount the unit with more than two persons.
A one-man job may cause injury.

CAUTION

Be careful not to catch your finger or hand in the rack mount rail.

CAUTION

Mount in the rack in a stable position.
Injury could occur by drop of the unit in unbalance condition of installation or removal.
Install in a posture of stability and carefully.

Required Parts

- Rack mount adapter RMM-301   1 set
- Screw (B4 × 6) (supplied with the RMM-301)   4 pcs
  Sony part No. : 7-682-560-04
- Washer (W4, SMALL)
  (supplied with the RMM-301)   4 pcs
  Sony part No. : 7-688-004-03
- B5 screw (6 mm or longer)   4 pcs

Installation

1. Secure the RMM-301 in the 19-inch EIA standard rack with the four B5 screws (6 mm or longer).

57.2 mm

B5 screw
(6 mm or longer)

RMM-301

B5 screw
(6 mm or longer)
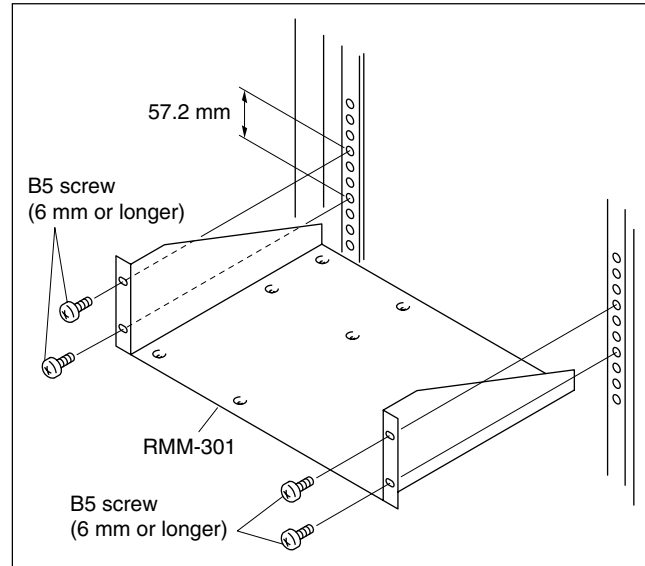
2. Secure the unit with the supplied four screws (B4 × 6) and the four washers.

W4

B4 × 6

W4

B4 × 6
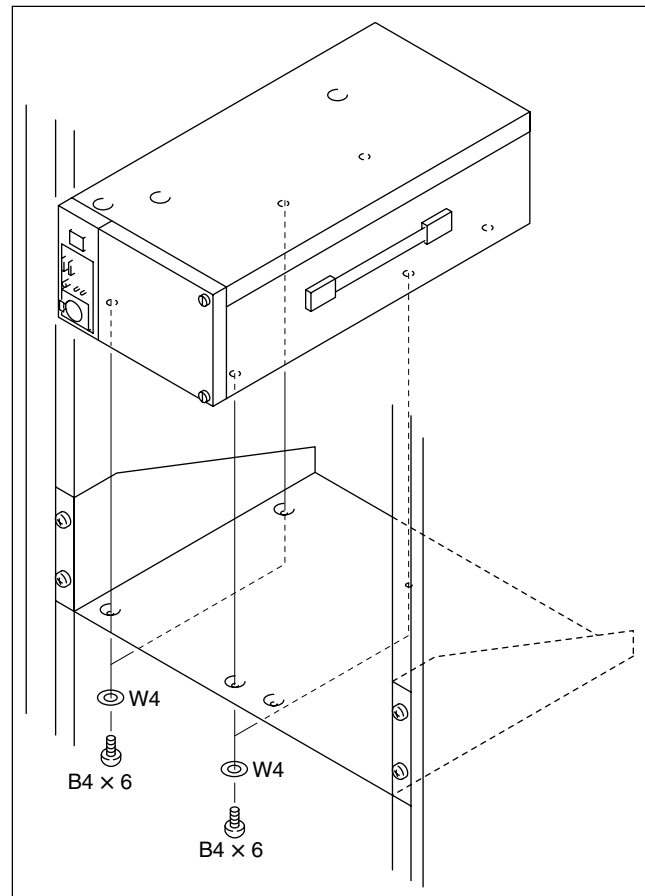
Section 2
System Setup

2-1. System Connection

This unit can support input and output of multiple formats. It can also support various types of user's format by installing the optional circuit boards.

The slots to which the circuit boards are inserted and the internal switches setting differ depending upon the system used. They need to be set according to the system used.

For the installation procedure, refer to "1-8. Installing the HKCU-951/953". For details of the slots in use on each board and for details of the switch setting on board, refer to this section and "1-6. Setting of Switches on Boards".

List of optional boards

Model name	Board name (Slots on the front)	Board name (Slots on the rear)
SD Encoder Unit HKCU-951	EN-145	VDA-61
HD Frame Rate Converter Unit HKCU-953	FC-88	SDI-73

HKCU-951: Install the HKCU-951 when you want to use the analog composite signal or analog component signal as the main signal.
HKCU-953: Install the HKCU-953 when you want to shoot picture in 24PsF mode of the camera, and you need the HD (SD) signal created by the 2 to 3 Pulled Down method.
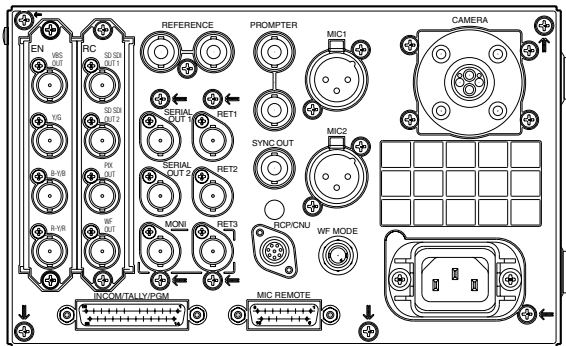
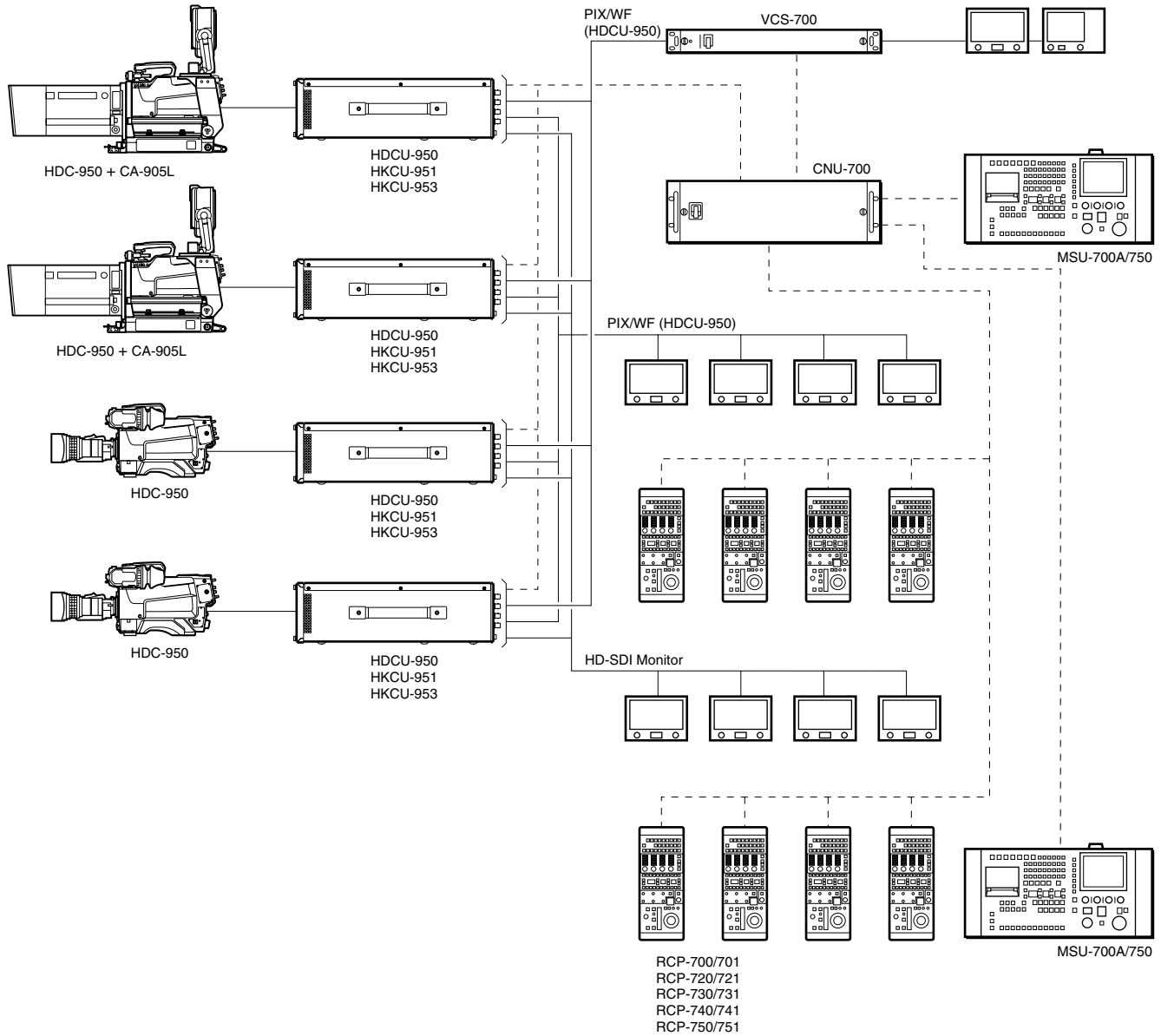HDCU-950 (without optional board installed)
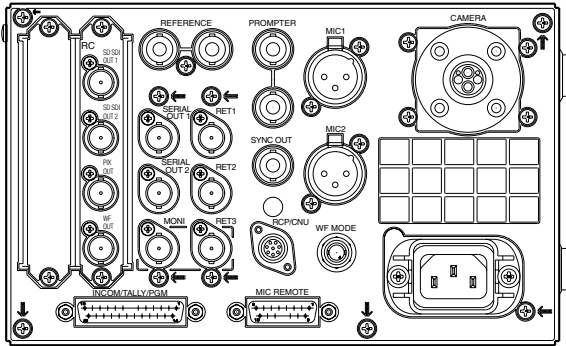
HDCU-950 with HKCU-953
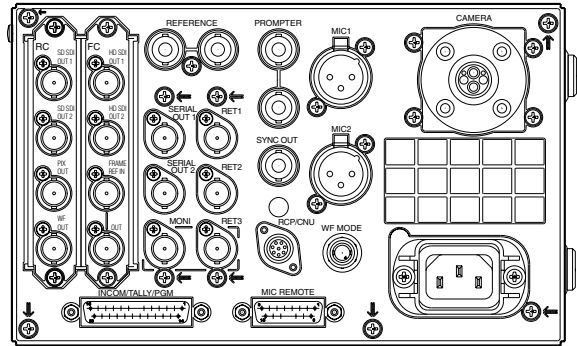
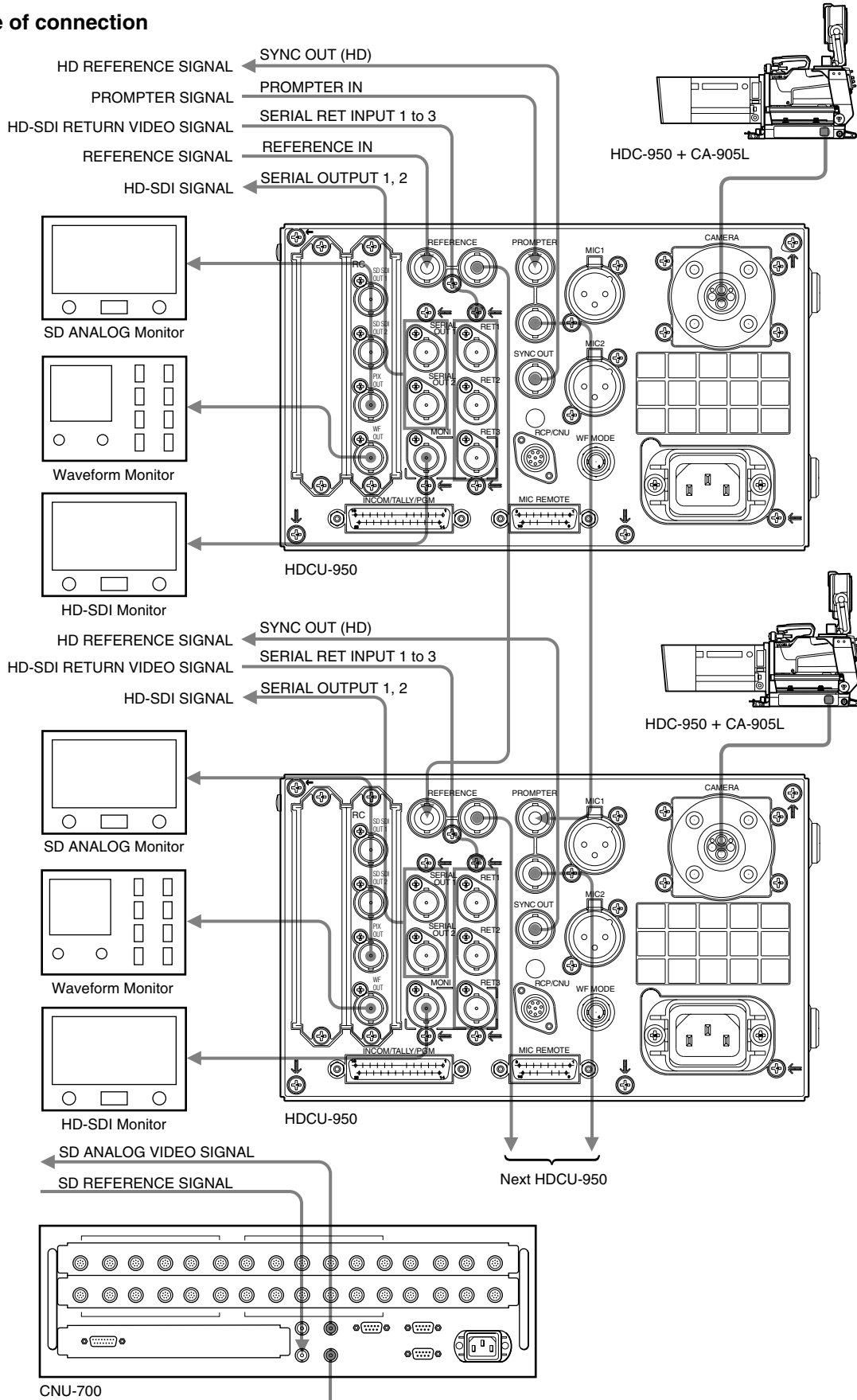
HDCU-950 with HKCU-951

2-1-1. Standard System

Combination of boards

Board name		Slot 1	Slot2	Slot3	Slot4	Slot5	Slot6
HDCU-950	Front side	AT-149	AVP-4	DTX-1	DRX-1	RC-91	–
	Rear side	CN-2219	CN-2220	SDI-70	HIF-5	DIF-124	–
HKCU-951 installed	Front side	AT-149	AVP-4	DTX-1	DRX-1	RC-91	EN-145
	Rear side	CN-2219	CN-2220	SDI-70	HIF-5	DIF-124	VDA-61
HKCU-953 installed	Front side	AT-149	AVP-4	DTX-1	DRX-1	FC-88	RC-91
	Rear side	CN-2219	CN-2220	SDI-70	HIF-5	SDI-73	DIF-124

2-1-2. Standard HD/SD System

Example of connection

HD REFERENCE SIGNAL — SYNC OUT (HD)

PROMPTER SIGNAL — PROMPTER IN

HD-SDI RETURN VIDEO SIGNAL — SERIAL RET INPUT 1 to 3

REFERENCE SIGNAL — REFERENCE IN

HD-SDI SIGNAL — SERIAL OUTPUT 1, 2

HDC-950 + CA-905L

SD ANALOG Monitor

Waveform Monitor

HD-SDI Monitor

HDCU-950

HD REFERENCE SIGNAL — SYNC OUT (HD)

HD-SDI RETURN VIDEO SIGNAL — SERIAL RET INPUT 1 to 3

HD-SDI SIGNAL — SERIAL OUTPUT 1, 2

HDC-950 + CA-905L

SD ANALOG Monitor

Waveform Monitor

HD-SDI Monitor

HDCU-950

Next HDCU-950

SD ANALOG VIDEO SIGNAL

SD REFERENCE SIGNAL

CNU-700

Terminated at 75 Ω

2-1-3. HD/SD Film Like System

Example of connection

SYNC OUT
SYNC SIGNAL

PROMPTER SIGNAL
PROMPTER IN

SDI RETURN VIDEO SIGNAL
SERIAL RET INPUT 1 to 3

REFERENCE SIGNAL
REFERENCE IN

SERIAL
OUTPUT 1, 2
HD-SDI SIGNAL

HD-SDI SIGNAL
HD SDI OUT 1, 2

SUB REFERENCE SIGNAL
FRAME REF IN

SD-SDI SIGNAL

HDC-950 + CA-905L

Picture Monitor

Waveform Monitor

HDCU-950

SYNC OUT
SYNC SIGNAL

SERIAL RET INPUT
1 to 3
SDI RETURN VIDEO SIGNAL

SERIAL
OUTPUT 1, 2
HD-SDI SIGNAL

HD-SDI SIGNAL
HD SDI OUT 1, 2

SD-SDI SIGNAL

HDC-950 + CA-905L

Picture Monitor

Waveform Monitor

HDCU-950

SD ANALOG VIDEO SIGNAL

SD REFERENCE SIGNAL

Next HDCU-950

CNU-700

Terminated at 75 Ω

2-1-4. Analog NTSC/PAL System

Example of connection

SD SYNC REFERENCE SIGNAL — SYNC OUT

PROMPTER SIGNAL — PROMPTER IN

ANALOG RETURN VIDEO SIGNAL — RET INPUT 1 to 3

REFERENCE SIGNAL — REFERENCE IN

ANALOG COMPONENT VIDEO SIGNAL — RGB/Component OUT

ANALOG COMPOSITE VIDEO SIGNAL — VBS OUT

HDC-950 + CA-905L

HDCU-950

SD SYNC REFERENCE SIGNAL — SYNC OUT

ANALOG RETURN VIDEO SIGNAL — RET INPUT 1 to 3

ANALOG COMPONENT VIDEO SIGNAL — RGB/Component OUT

ANALOG COMPOSITE VIDEO SIGNAL — VBS OUT

HDC-950 + CA-905L

HDCU-950

Next HDCU-950

WF 2

PIX 2

SD ANALOG VIDEO SIGNAL

SD REFERENCE SIGNAL

VCS

VCS-700

PIX 1

WF 1

REMOTE

PIX A

WF A

CNU-700

Terminated at 75 Ω

2-2.   Setting the System Format

2-2-1.   Setting the Multi-Format

Set format of the signal that is output from this unit.
Normally the Multi-Format is set from RM/MSU or a device that is connected outside. However, it can also be set by the switches on the AT-149 board or FC-88 (HKCU-953) board.

1.   Setting the HD-SDI output

Set format of the signal that is output as the HD-SDI signal. At the same time, this setting becomes the shooting mode of the camera.

(1) Set the field frequency coefficient.
     Setup switch : S420 on the AT-149 board (Factory setting : REMOTE)
         1.001 :   Set the field frequency to 1/1.001 times
                      (Set the field frequency to 1.001 when using NTSC (525/60) signal in the SD system.)
         1.000 :   Set the field frequency to 1 time.
                      (Set the field frequency to 1.000 when using PAL (625/50) signal in the SD system.)
         REMOTE : Set it with RM/MSU, etc., that is connected outside.
(2) Set the field frequency.
     Setup switch: S418 on the AT-149 board (Factory setting: 60 V)
         60 V : When the FC-88 board (HKCU-953) is not used but either the 60 field HD signal or the NTSC SD (525/60)
                signal is used.
         50 V : When the FC-88 board (HKCU-953) is not used but either the 50 field HD signal or the PAL SD (625/50)
                signal is used.
         48 V : Only the 24PsF progressive system is supported.
(3) Set the shooting mode of the camera.
     Setup switch : S419 on the AT-149 board (Factory setting : INTR)
         INTR : When shooting with interlacing system.
         PROG : When shooting with progressive (PsF) system.
         540P : When shooting with 540-60P system. (At present, this function is not supported.)

| Note |

If you select a format of 48i (48 field interlace) or other format that is not supported by the HDCU-950, the setting causes an error and the indicators (D201 to D205) on the AT-149 board flash.

2.   Setting the SD signal output

When S420 on the AT-149 board is set to the position other than REMOTE, set the SD signal output to NTSC (525/60) or PAL (625/50).
Setup switch : S423-1 on the AT-149 board (Factory setting : OFF)
     ON : PAL (625/50)
     OFF : NTSC (525/60)

3.   Setting the frame conversion (when the HKCU-953 is installed)

When the shooting mode of the camera is set to 24PsF, set the HD-SDI signal format that is output from the HKCU-953.
Setup switch : S2 on the FC-88 board (Factory setting: OFF)
     ON :   When the shooting mode of the camera is set to 24PsF, the frame frequency conversion is implemented.
     OFF : The frame frequency is not converted. The same signal as the main HD-SDI signal is output.

| Note |

The setting of the frame conversion frequency must follow the set format of the SD signal output.
When S423-1 on the AT-149 board is set to OFF (NTSC), the frame frequency is converted to 60i (30 Hz).
When S423-1 on the AT-149 board is set to ON (PAL), the frame frequency is converted to 50i (25 Hz).

2-2-2. Setting the Reference Input

Normally the reference input is set from RM/MSU or a device that is connected outside. However, it can also be set by the switch on the AT-149 board.

1. Setting the reference input signal format

Setup switch : REFERENCE switch (S427) on the AT-149 panel (Factory setting : REM)

HD :   When the HD analog ternary SYNC is used. (This unit supports the frame frequency automatically.)

BB :   When the BB (black burst) signal of SD is used.

REM : When the reference is set from RM/MSU or a device that is connected outside.

| Note |

When a position other than REM is set, all of the REFERENCE settings including the phase adjustment must be locally set.

| Note |

When the SD signal output is set to NTSC in setting the Multi-Format, if the 10F-BB signal to which the 10 frame sequence flag is added as the reference signal of SD is used, the frame sequence of the 24PsF signal and the 60i signal can be locked even if the sub reference signal is not input by setting S416 on the AT-149 board to ON.

2. Setting the sub reference input signal (when the HKCU-953 is installed)

The sub reference signal can be set with S5 on the FC-88 board (HKCU-953). However, the input signal can automatically be identified by setting the switch to AUTO.

Set the switch to AUTO normally. Input the frame frequency signal that is different from the main reference signal for the sub reference signal

Setup switch : S5 on the FC-88 board (Factory setting : 0)

0 (AUTO) :   Identifies the sub reference input signal automatically.

1 (FRAME REF HD) :   When the ternary SYNC of HD is input.

2 (FRAME REF SD) :   When the composite SYNC of SD is input.

3 (FRAME REF S.SYNC) : When the frame SYNC pulse gate signal that is output from the other CCU is input.

| Note |

When the sub reference is not input, the pulse gate signal of the frame sync is output from the loop-through output terminal. You can lock the frame sequence between multiple CCUs if you connect this signal to the sub reference input of other CCUs.

2-3. Audio System

2-3-1. Setting the Intercom System

This unit can be connected to the intercom lines (producer line and engineer line) of the two independent systems and can be switch them.

The intercom systems conforming to this unit are 4W, RTS and Clear-Com. The internal switches of the unit need to be set according to the system used.
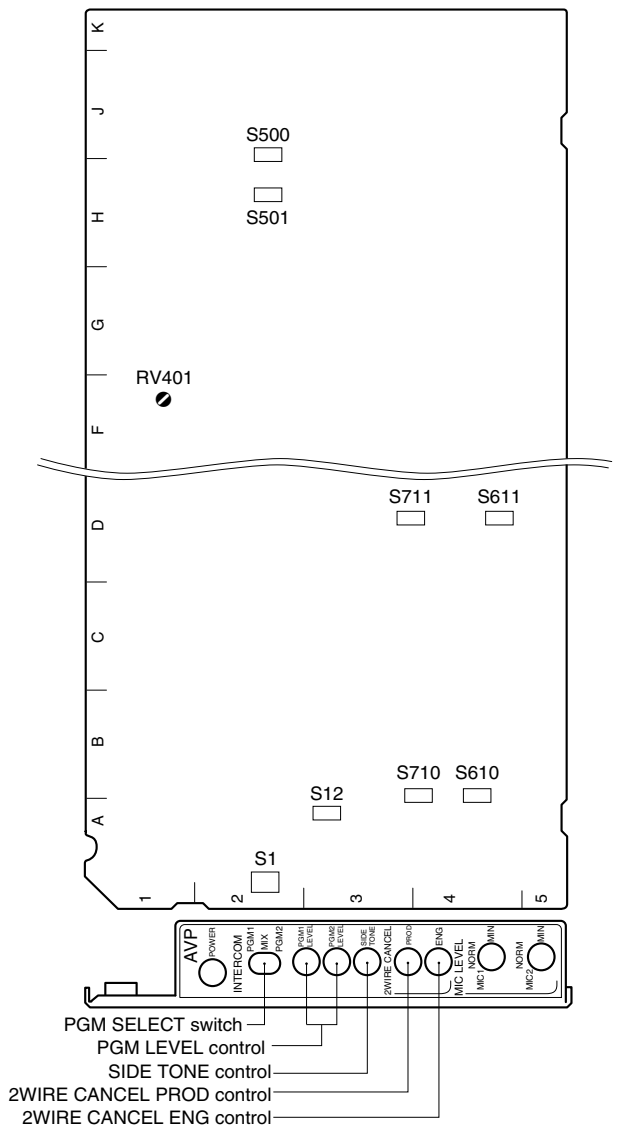
AVP-4 board (A side/panel side)

1. Selecting the intercom system

Select a system (4W, RTS or Clear-Com) respectively for the engineer line and the producer line according to the system used. Then, select the number of intercom line systems (1ch or 2ch).

・ **Selecting the producer line** :
Set switches S610/611 (PROD SELECT) on the AVP-4 board according to the system used.
Factory setting : 4W (S611)
RTS (S610)
・ **Selecting the engineer line** :
Set switches S710/711 (ENG SELECT) on the AVP-4 board according to the system used.
Factory setting : 4W (S711)
RTS (S710)
・ **When the intercom line is 1 channel** :
Set switch S12 (INPUT INCOM SELECT) on the AVP-4 board to 1 ch. Then, connect the intercom line to the producer line of this unit.
When the switch is set in this position, connection of the intercom line of this unit is fixed to the producer line regardless of the setting of the INCOM PROD/ENG switch of the HDC-950/930 and the INCOM SELECT switch on the front panel of this unit.
・ **When the intercom line is 2 channels** :
Set switch S12 (INPUT INCOM SELECT) on the AVP-4 board to 2ch.
Factory setting : 2ch

Adjusting the RTS cancel

When the RTS intercom system is used, the following adjustment also needs to be made.

(1) Connect a headset to the INCOM connector on the front and perform the procedure described in the following paragraph "2. Setting the headset microphone".

(2) Fully rotate the SIDE TONE control of the AVP-4 board panel counter-clockwise to minimize the side tone.

(3) Set the INCOM SELECT switch on the front panel to PROD.

(4) Speak into the microphone of the headset and adjust the 2WIRE CANCEL PROD control of the AVP-4 board panel to minimize the side tone.

(5) Set the INCOM SELECT switch on the front panel to ENG.

(6) Speak into the microphone of the headset and adjust the 2WIRE CANCEL ENG control of the AVP-4 board panel to minimize the side tone.

(7) Return the SIDE TONE control on the AVP-4 board panel to its original position or to the desired position of user.

| Note |

When setting S611 and S711 to RTS, be sure to connect them to the RTS system. Otherwise, they oscillate and have adverse effects on the peripheral circuits.

2. Setting the headset microphone

Set switch S4 (TALK GAIN) on the AU-281 board according to the type of headset microphone to be connected to the INCOM connector on the front.
When using a carbon microphone : CARBON (Sensitivity −20 dB, power is supplied.) (factory setting)
When using a electric condenser microphone : ECM (Sensitivity −40 dB, power is supplied.)
When using a dynamic microphone : DYNAMIC (Sensitivity −60 dB, power is not supplied.)

INCOM SELECT switch

S4
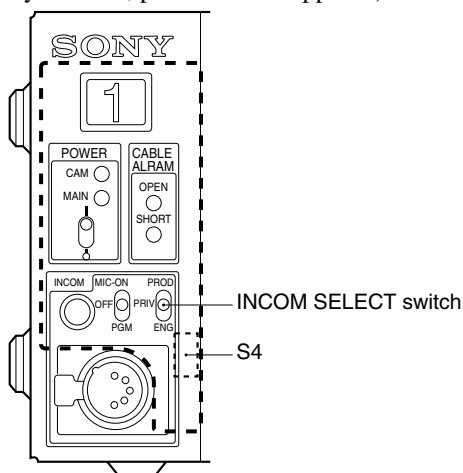
- **Adjusting the TALK level**
  Adjust the headset TALK level with control RV401 (TALK LEV) on the AVP-4 board according to user's request.
- **Adjusting amount of the side tone**
  Use the SIDE TONE control on the AVP-4 board panel and adjust amount of the side tone to be connected to the INCOM connector on the front according to user's request.

3. Setting the input level of the PGM audio signal

Set switches S500 (PGM1 SEL) and S501 (PGM2 SEL) on the AVP-4 board to 0 dBu or −20 dBu according to each level of audio 1 and 2 of the system.
Factory setting : 0 dBu

- **Selecting the PGM audio signal**
  Set the PGM audio signal of the headset connected to the INCOM connector on the front with the PGM SELECT switch on the AVP-4 board panel according to user's request.
  Selecting PGM 1 : PGM 1 (Factory setting)
  Selecting mix of PGM 1 and PGM 2 : Mix
  Selecting PGM 2 : PGM 2
- **Adjusting the mix amount of the PGM audio signal**
  Use the PGM 1, 2 LEVEL control on the AVP-4 board panel and adjust mix amount of the PGM audio signal of the headset connected to the INCOM connector on the front according to user's request.

4. Selecting an intercom line to be connected to the INCOM connector

Use the switch on the front panel to select the intercom line to be connected to the INCOM connector on the front as follows.
- **When connecting to the producer line** :
  Set the INCOM SELECT switch to PROD.
- **When connecting to the engineer line** :
  Set the INCOM SELECT switch to ENG.
- **When connecting only a camera** :
  Set the INCOM SELECT switch to PRIV. When this position is set, the intercom from outside is cut and the system consists of the intercom and camera.

Note

When switch S12 (INPUT INCOM SELECT) on the AVP-4 board is set to 1 ch, the INCOM SELECT switch on the front panel of the unit and the camera are fixed to the producer line regardless of the setting.

5. Setting the AVP-4 board switch

The flow of the switch setting on the AVP-4 board and the intercom signals is as follows.

2-3-2. Setting the Microphone

This unit can output the two independent microphone lines (MIC 1, MIC 2) of video camera HDC-950/930 as it receives these MIC signals.

Controlling the Microphone Input Gain Using the Remote Control

This unit can adjust the input gain of the MIC connector of camera HDC-950/930 using the remote control in the range of 60 dB to 20 dB in 10 dB steps using either of the following methods.

1. Adjusting the microphone input gain using the MIC LEVEL switch

MIC LEVEL switch

AVP-4 board (panel side)
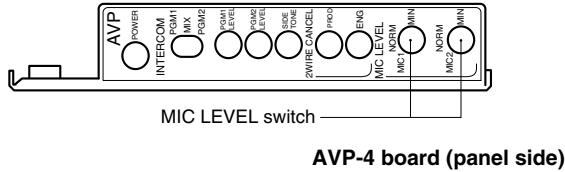
When the MIC REMOTE connector on the rear is connected to nothing or the levels of pin-8 (MIC 1) and pin-15 (MIC 2) of the MIC REMOTE connector are High, use the MIC LEVEL switch on the AVP-4 board panel of the unit to set the microphone input level.

Factory setting : NORM (60 dB)

2. Adjusting the microphone input gain using the MIC REMOTE connector

Set the microphone input gain control to ON or OFF via pin-8 and pin-15 of the MIC REMOTE connector on the rear as shown below. The input gain can be controlled via pin-5, pin-6 and pin-7 as shown in the table on the top-right.

Setting the microphone input control of the video camera

Pin No.		Microphone connector	
8	**15**	**MIC IN CH-1**	**MIC IN CH-2**
L	L	ON	ON
L	H	ON	OFF
H	L	OFF	ON
H	H	Internal setup (MIC LEVEL switch on the AVP-4 board panel)	

Setting the microphone input gain of the video camera

Pin No.	7	6	5
60 dB	H	H	H
50 dB	L	H	H
40 dB	H	L (H)	H (L)
30 dB	L	L (H)	H (L)
20 dB	H	H (L)	L (H)

H :   +5 V or OPEN
L :   GND
Input resistance : Pulled-up 100 kΩ +5 V
The setup for HDCU-700A mode is shown in parenthesis ( ).
In the case of HDCU-700A mode : S423-2/AT-149 → ON

3. Adjusting the MIC signal phase

AVP-4 board (A side)
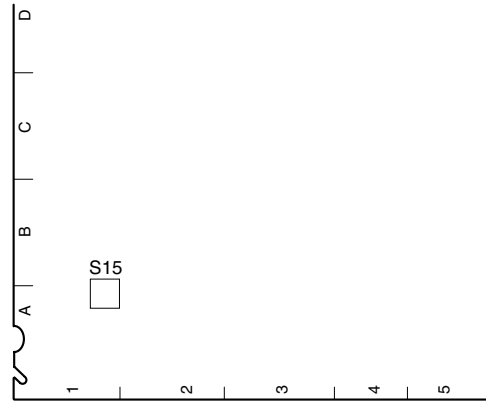
When the PGM microphone signal phase is in advance with respect to the video signal phase in use, adjust the audio phase using the switch S15 (MIC DELAY) on the AVP-4 board to adjust amount of audio delay. Each step of the switch corresponds to about 5 ms delay.

Example   7 : 1 FRAME DELAY (30 FRAME/SEC)
                8 : 1 FRAME DELAY (25 FRAME/SEC)

Factory setting : 0

Setting the Microphone Output Level
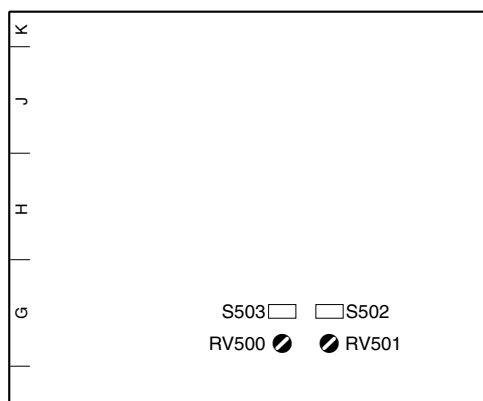
AVP-4 board (A side)

Select the microphone output signal level (0 dB, −20 dBu) from the MIC 1, 2 connector on the rear using the switches on the AVP-4 board.
Setting the output level of MIC 1 :
        Switch S503 (MIC 1 OUT LEVEL)
Setting the output level of MIC 2 :
        Switch S603 (MIC 2 OUT LEVEL)
Factory setting : 0 dBu (both S502 and S503)

The microphone output signal level from the MIC 1, 2 connector on the rear can be adjusted using the volume on the AVP-4 board.
Setting the output level of MIC 1 :
        RV500 (MIC 1 OUT LEVEL)
Setting the output level of MIC 2 :
        RV501 (MIC 2 OUT LEVEL)

2-4. Systems

2-4-1. Setting the Tally System

This unit supports the red tally and the green tally. It also supports the MAKING CONTACT and supplying power (24 V/TTL). Set the switches on the AVP-4 board according to the system used as follows :
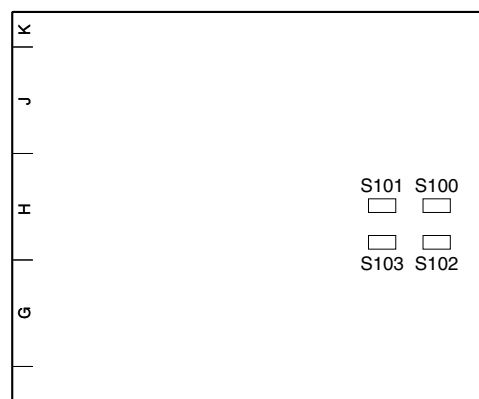
AVP-4 board (A side)

Set the tally system as shown in the following table.

Setting the tally system

	Red tally		Green tally	
Switch	**S100**	**S102**	**S101**	**S103**
MAKING CONTACT	CONTACT	–	CONTACT	–
Supplying 24 V power	POWER	POWER	POWER	POWER
Supplying 5 V power	POWER	TTL	POWER	TTL

Switches S100 and S101 are set to CONTACT when the unit is shipped from the factory.

2-4-2. Setting the Camera Number

System that does not use CNU-700/500
Use switch S421 on the AT-149 board to set the camera number.

Use switches 1 to 4 to set the first digit and use switches 5 to 8 to set the second digit. "0" to "f" can be set as each digit, but "a" to "f" are invalid. Camera numbers 1 to 96 can be set.
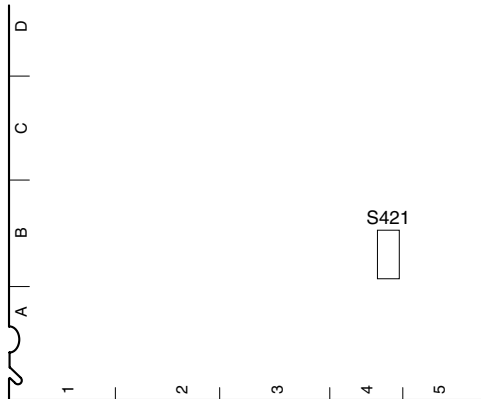
AT-149 board (A side)

(Example of setting)

First digit					
Second digit					
Camera number	50	61	72	83	94
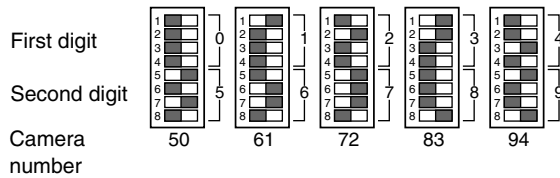
System that uses CNU-700/500
The CCU connector number on the rear of the CNU-700/500 is the camera number. For example, the camera number of the CCU video camera that is connected to the CCU 1 connector is 1.

2-4-3. Connecting the Control, Intercom and Tally Audio Signals

An example of connection is described on the next page.

In case of cascaded connection of the DVS-V1201 SD digital video routing switcher :
Set unit address switch "5" of REMOTE2 of the DVS-V1201 SD digital video routing switcher to ON and set the other switches to OFF. For cascaded connection of the DVS-V1201 SD digital video routing switcher when at least 13 cameras are used, set unit address switch "6" of the second camera to ON and set the other switches to OFF.

HDCU-950 ⬜1

REFERENCE PROMPTER MIC1 CAMERA

RC
SD SDI OUT 1
SD SDI OUT 2
SERIAL OUT 1 RET1
PIX OUT SERIAL OUT 2 RET2
MIC2
WF OUT MONI RET3
SYNC OUT
RCP/CNU WF MODE

RCP/CNU

INTERCOM/
TALLY/PGM

INTERCOM/PROGRAM/ ◄━━━ INCOM/TALLY/PGM MIC REMOTE
AUDIO/TALLY

MIC OUTPUT ◄━━━ MIC OUT

MIC CONTROL and TALLY ◄━━━ MIC REMOTE or WF REMOTE
or
WF MONITOR CONTROL
WF MONITOR ◄━━━ WF MODE
SEQ CONTROL

HDCU-950 ⬜2

REFERENCE PROMPTER MIC1 CAMERA

RC
SD SDI OUT 1
SD SDI OUT 2
SERIAL OUT 1 RET1
PIX OUT SERIAL OUT 2 RET2
MIC2
WF OUT MONI RET3
SYNC OUT
RCP/CNU WF MODE

INTERCOM/
TALLY/PGM

INTERCOM/PROGRAM/ ◄━━━ INCOM/TALLY/PGM MIC REMOTE
AUDIO/TALLY

MIC OUTPUT ◄━━━ MIC OUT

MIC CONTROL and TALLY ◄━━━ MIC REMOTE or WF REMOTE
or
WF MONITOR CONTROL
WF MONITOR ◄━━━ WF MODE
SEQ CONTROL

RCP/CNU

CCU1 CCU2 CNU-700 VCS

VSC-700 REMOTE

MSU

WF MODE RCP1 RCP2 RS232C

WF MONITOR CONTROL

MSU-700A CCU/CNU

HDS-X3400 REMOTE3

CCU/CNU CCU/CNU REMOTE2

REMOTE1 DVS-V1201

RCP-740/741 ⬜1 RCP-740/741 ⬜2

SWITCHER ◄━━━

PREVIEW

2-5. Video Signal System

The equipment that is used for this unit and the HDC-950/930 series camera system were set to the specified level when shipped from the factory. Before operating, check the signal levels between each equipment and adjust them if required. Some adjustments can be performed using the maintenance menu of the MSU-700A/750 instead of using the control or switches on the board. Perform the basic adjustments on the board and perform the fine adjustments on the maintenance menu.

2-5-1. Selecting the Input/Output Signal

Select the input/output terminal signal of the rear panel according to the video system to be installed.

2-5-2. Adjusting the Signal Phase

Adjust the signal phase of the unit. Before adjustment, input the next sync signal to the unit and each of the equipment used.

HDCU-950
REFERENCE
HD ternary SYNC : 0.6 V p-p
Or
black burst signal :   40 IRE (0.3 V p-p)
(SMPTE318M (10F-BB) is also acceptable.)
| Note |

When the VBS signal of HKCU-951 is used when (SC phase lock is required), use the black burst signal.

HKCU-953
FRAME REFERENCE
HD ternary SYNC : 0.6 V p-p
Or
black burst signal :   40 IRE (0.3 V p-p)
sequence pulse :   40 IRE (0.3 V p-p)
CNU-700/500
Signal in which sync signal is included
Signal level :   40 IRE (0.3 V p-p)
Waveform monitor
Sync signal specified by waveform monitor

Adjusting the Phase of the Sync Signal

Adjust the phase of the output signal to match it with that of the reference signal. Perform the adjustment using the switch on the AT-149/EN-145 board (HKCU-951) panel of the unit. The adjustment also can be performed on the maintenance menu of the MSU-700A/750. For more details, refer to the System Manual.

How to adjust on the AT-149 board/EN-145 board (HKCU-951) of the unit

REFERENCE SIGNAL
SELECT switch
H PHASE STEP switch
H PHASE COARSE switch
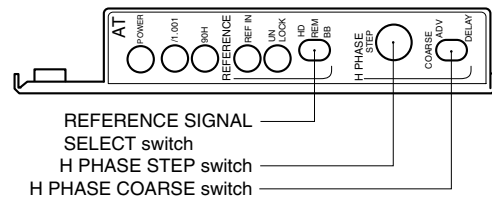
AT-149 board (panel side)

SC PHASE switch
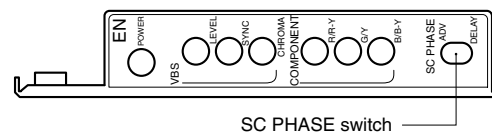
EN-145 board (panel side)

1. Select the type of external sync signal using the REFERENCE SIGNAL selector switch on the AT-149 board panel.
    HD :   HD ternary SYNC
    BB :   BB (black burst) signal
    REM : Control is perfomed by MSU, etc,. connected outside.
    Factory setting : REM
2. When setting HD in step 1 :
    1) Coarse-adjust the H phase using H PHASE STEP switch on the AT-149 board panel, then fine-adjust it using the H PHASE COARSE switch on the AT-149 board panel.
    When selecting BB in step 1 :
    1) Coarse-adjust the H phase using H PHASE SETP switch on the AT-149 board panel, then fine-adjust it using the H PHASE COARSE switch on the AT-149 board panel.
    2) Adjust the SC phase using switch SC PHASE on the EN-145 board (HKCU-951) panel (when the BB signal is selected as a reference).
    | Note |
    When using 10F-BB (NTSC 10-field sequence BB) of SMPTE318M as BB, the frame sequences of the 30 Hz frame frequency and the 24 Hz frame frequency can be locked by setting switch S416 (REF-10F-BB) on the AT-149 board to ON.

2-5-3. Setting Aspect Ratio Conversion during Down-convert

In the HDC-950/930 series camera system, the aspect ratio can be switched by using the HDCU-950 and MSU-700A/750 according to the system during HD-SD down-convert. Set the desired aspect ratio using the MIC REMOTE connector at the rear of the unit or the switch on the AT-149 and RC-91 boards.

The aspect ratio also can be set on the maintenance menu or the configuration menu of the MSU-700A/750. For more details, refer to the System Manual. The aspect ratio of the following four types can be switched in this system.

Squeeze :	The HD video signal of 16 : 9 is converted to the SD signal as it is. (16 : 9)
Edge-crop :	Video signal as large as 4 : 3 is cut from the HD video signal and is converted to the SD signal. (4 : 3)
Letter box :	The HD video signal of 16 : 9 is inserted into the picture frame of 4 : 3 as it is and converted to the SD signal. (4 : 3) (The black level is inserted into the top and bottom of the picture.)
Semi-letter box :	Video signal as large as 15 : 9, 14 : 9 or 13 : 9 is cut from the HD video signal, is inserted into the picture frame of 4 : 3 and is converted to the SD signal. (4 : 3) (The black level is inserted into the top and bottom of the picture.)

RC-91 board (A side/panel side)
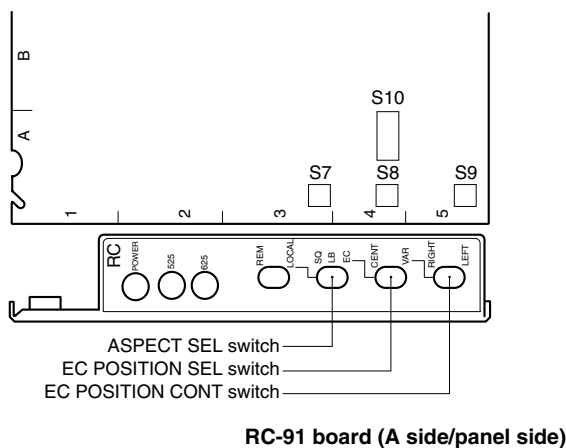
How to set using the MIC REMOTE connector at the rear of the unit

1. Set switch S423-3 (MIC REMOTE/WF REMOTE) on the AT-149 board to MIC REMOTE (OFF).
2. Set pin-12 (ASPECT REMOTE ON/OFF) of the MIC REMOTE connector at the rear to L.
3. Set pin-13 (ASPECT CTL CONT1) and pin-14 (ASPECT CTL CONT2) of the MIC REMOTE connector at the rear according to the desired aspect ratio while referring to the following table.

Pin-13 (ASPECT CTL CONT1)	Pin-14 (ASPECT CTL CONT2)	Aspect ratio
L	H	Squeeze (16 : 9)
H	H	Edge-crop (4 : 3)
L	L	Depends on the setting switches on the RC-91 board.
H	L	Letter box (4 : 3)

How to set on the RC-91 board of the unit

1. Set ASPECT REMOTE/LOCAL switch on the RC-91 board panel to LOCAL.
2. Set ASPECT SEL switch, EC POSITION SEL switch and EC POSITION CONT switch on the RC-91 board panel according to the desired aspect ratio.

   When setting ASPECT SEL switch to EC (edge-crop), CROP POSITION (horizontal cutting position) can be changed by using EC POSITION SEL switch and EC POSITION CONT switch.

   For more details, refer to Section 1-6-6, "Setting of Switches on Boards—RC-91 Board".

AT-149 board (A side)
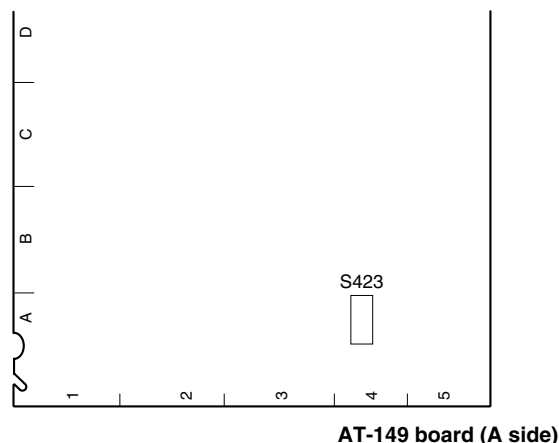
Examples of display

16 : 9 picture (picture from camera)

Horizontal cutting position of 16 : 9

Horizontal cutting position of 15 : 9

Horizontal cutting position of 14 : 9

Horizontal cutting position of 13 : 9

Horizontal cutting position of 4 : 3 (12 : 9)
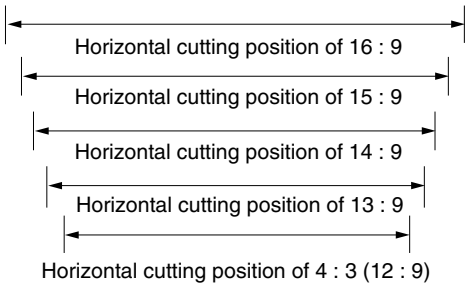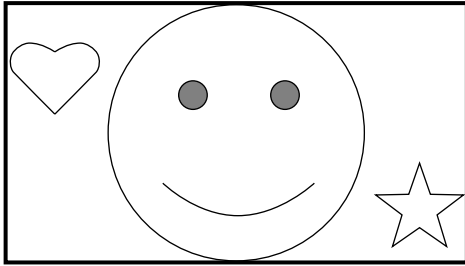
Picture whose aspect ratio is converted (SD SDI output)
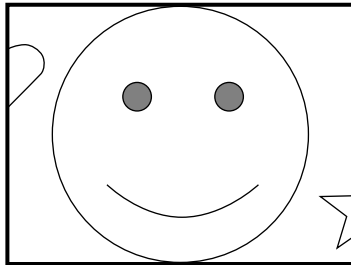
Edge-crop
S7/RC-91 → EC
The crop position can be changed by
using S8 and S9 on the RC-91 board.
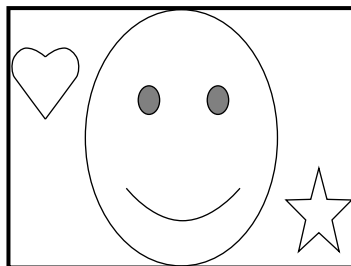
Squeeze
S7/RC-91 → SQ
The 16 : 9 ratio picture is output in the
SD SDI format without changing the ratio.
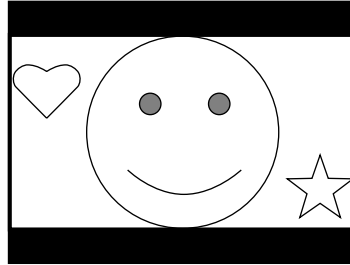
Letter box (16 : 9)
S7/RC-91 → LB
S10-3, -4/RC-91 → OFF
The 16 : 9 ratio picture is inserted into
the 4 : 3 ratio picture without changing
the ratio and is output in the SD SDI format.
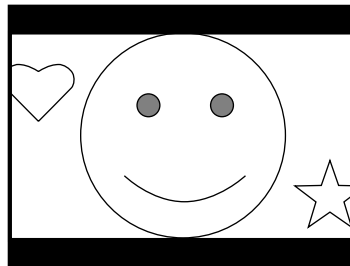
Semi-letter box (15 : 9)
S7/RC-91 → LB
S10-3/RC-91 → OFF
S10-4/RC-91 → ON
The picture that is cut out with the aspect
ratio of 15 : 9, is inserted into the 4 : 3 ratio
picture and is output in the SD SDI format.
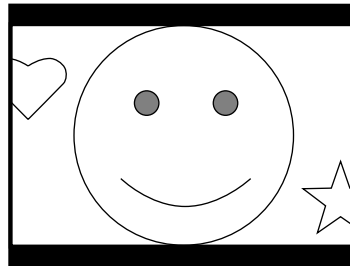
Semi-letter box (14 : 9)
S7/RC-91 → LB
S10-3/RC-91 → ON
S10-4/RC-91 → OFF
The picture that is cut out with the aspect
ratio of 14 : 9, is inserted into the 4 : 3 ratio
picture and is output in the SD SDI format.
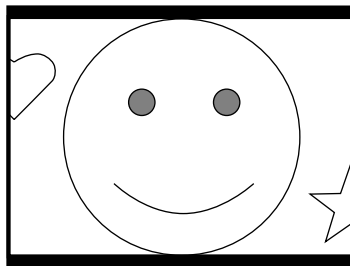
Semi-letter box (13 : 9)
S7/RC-91 → LB
S10-3, -4/RC-91 → ON
The picture that is cut out with the aspect
ratio of 13 : 9, is inserted into the 4 : 3 ratio
picture and is output in the SD SDI format.

2-5-4. Level Adjustment of the VBS Signal (only when HKCU-951 is installed)

Adjust the level of the VBS signal output from the unit using the color bar signal.
Use the switch on the EN-145 board (HKCU-951) and the control on the panel of the unit for adjustment.

How to adjust using the EN-145 board (HKCU-951) of the unit
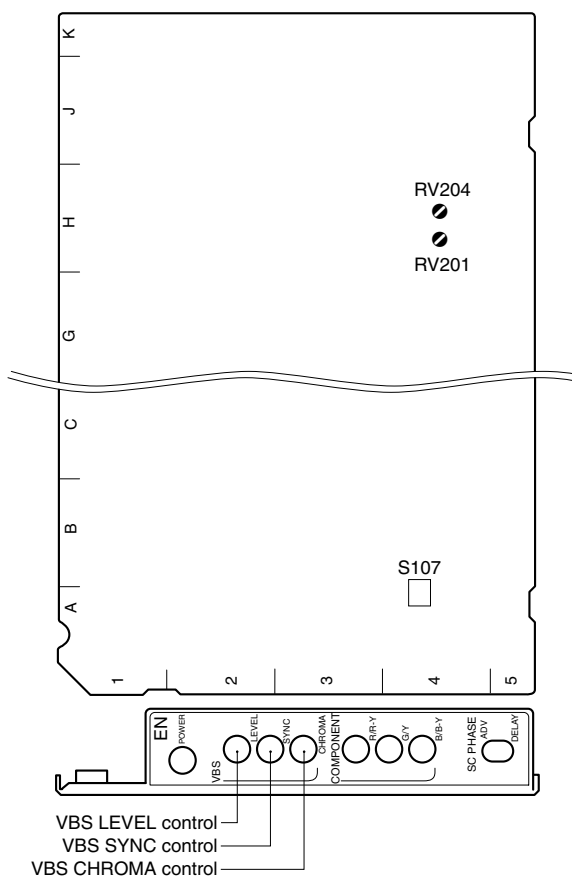
EN-145 board (A side/panel side)

1. Check the switch S107-3 on the EN-145 board to OFF.
   Factory setting : OFF
2. Press the BARS button of the MSU-700A/750, RCP-700 series, etc. to display the color bars on the wave-form or vector monitor.

3. Set the VBS LEVEL and the VBS SYNC control on the EN-145 board panel to their mechanical center. Then adjust RV201 (VBS GAIN) and RV204 (SYNC) in the EN-145 board so that the color bar signal has the specified amplitude.

   Measurement point : VBS OUT connector on the HDCU rear panel

   Specifications : A = 100 ± 1 IRE [for NTSC]
   A = 700 ± 7 mV p-p [for PAL]
   (VBS LEVEL control)
   B = 40.0 ± 0.4 IRE [for NTSC]
   B = 300 ± 3 mV p-p [for PAL]
   (VBS SYNC control)
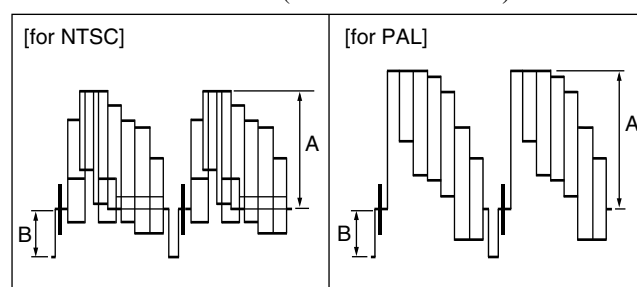
Adjust the VBS CHROMA control on the EN-145 board panel until every spots of the color bar signal fall into the specified locations "⊞" on vectorscope.
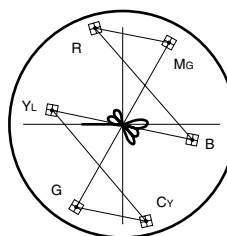
[for NTSC]   [for PAL]
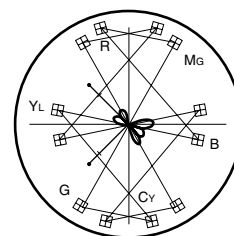
2-5-5. Adjusting the Level of Signals for Waveform Monitor

The video output signal of the unit can be checked on the waveform monitor connected to the WF OUT connector. Adjust the WF output signal level using the color bar signal.

In the system with the MSU-700A/750, CNU-700/500 or VCS-700, the video output signal can be checked on the waveform monitor connected to the VCS-700.

Adjusting the WF Output Signal Level

How to adjust on the RC-91 board of the unit
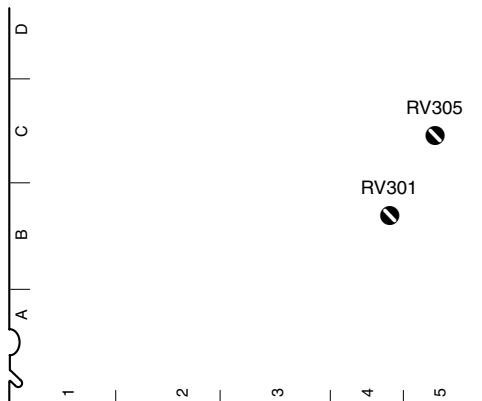
RC-91 board (A side)

1. Press the BARS button of the MSU-700A/750, RCP-740/741, etc., or press the ENC button of the WAVE-FORM MONITOR buttons (or MONITOR SELECT buttons) to display the color bars on the waveform monitor.
2. Adjust the color bar signal using control RV301 (WFM GAIN) and RV305 (WF CHROMA) on the RC-91 board so that it is within the specified level.
   Measurement point : WF OUT connector on the HDCU rear panel
   Specification : A = 100 ± 1 IRE [for NTSC]
   A = 700 ± 7 mVp-p [for PAL]
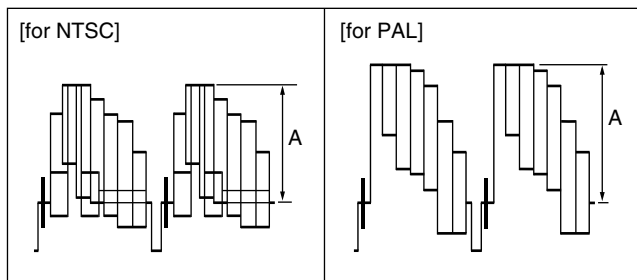
How to adjust using the VCS-700

In the system with the MSU-700A/750, CNU-700/500 or VCS-700, the video output signal of the unit can be checked on the waveform or vector monitor connected to the WF A OUTPUT connector and the WF B OUTPUT connector of the VCS-700.

Connect the WF OUT connector of the DIF-124 board to the WF 1 connector of the VCS-700 and connect the PIX OUT connector to the PIX 1 connector. Then adjust the signal level using the color bar signal.

1. Press the BARS button of the MSU-700A/750, RCP-740/741, etc., or press the ENC button of the WAVE-FORM MONITOR buttons (or MONITOR SELECT buttons) to display the color bars on the waveform or vector monitor.
2. Set the CONTROL switch of the VCS-700 to RESET.
3. Adjust the color bars signal using the WFM 1 LEVEL and WFM 1 CHROMA controls of the VCS-700 so that it is within the specified level.
   Measurement point : PIX OUT connector on the VCS-700
   Specification : A = 100 ± 1 IRE [for NTSC]
   A = 700 ± 7 mV p-p [for PAL]
   (WFM 1 LEVEL control)
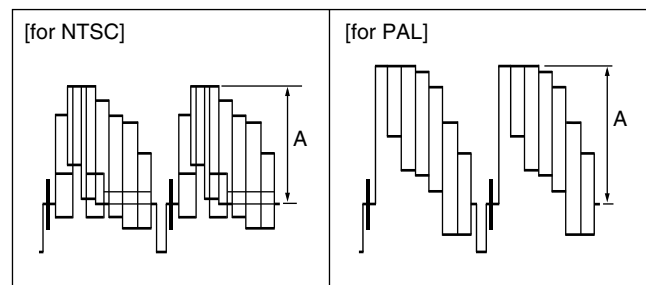
Each luminescent spot on the vector monitor must be within the "⊞" range.
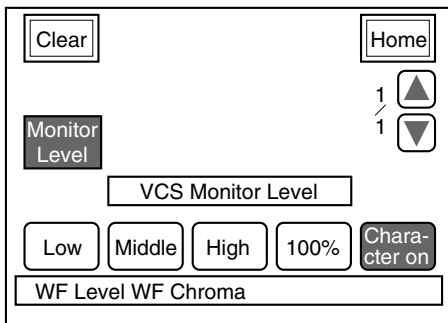(WFM 1 CHROMA control)
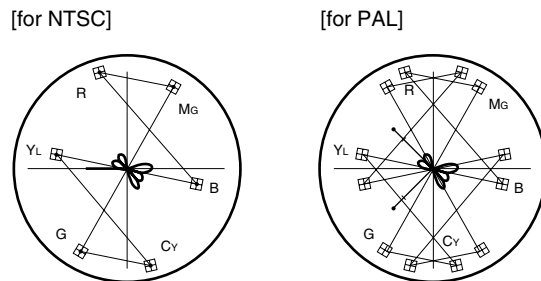
How to adjust using the MSU-700A/750

The signal level can be adjusted by using the MSU-700A/750 instead of using the controls of the VCS-700.

1. Press the MAINTENANCE button of the MODE block of the MSU-700A/750 so that the button lights. The maintenance menu is displayed.
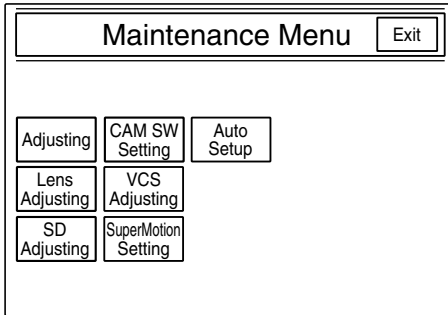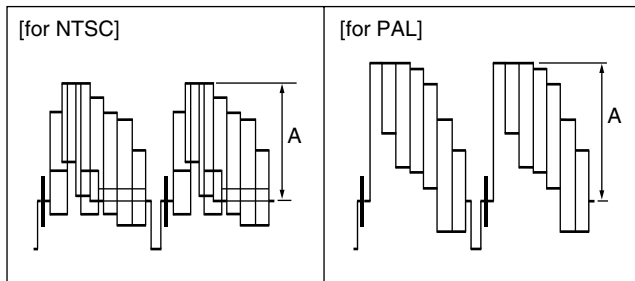

2. Press VCS Adjusting .
   The VCS monitor level adjustment item menu is displayed.

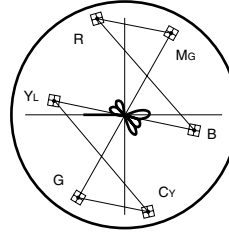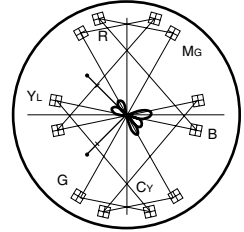3. Adjust the color bars signal of the WF Level and WF Chroma so that it is within the specified level.
   Measurement point : PIX OUT connector on the VCS-700
   Specification : $A = 100 \pm 1$ IRE [for NTSC]
                      $A = 700 \pm 7$ mV p-p [for PAL]
                      (WF Level)

Each luminescent spot on the vector monitor must be within the "⊞" range.
(WF Chroma)

Adjusting the Staircase Signal

Adjust the staircase signal to display signals in the sequential mode on the waveform monitor. If the signal of the sequential mode is not normally displayed on the waveform monitor, perform this adjustment.
When the waveform monitor is connected to the unit, perform the adjustment using controls RV303 (STAIR STEP POSITION) and RV304 (STAIR STEP LEVEL) on the RC-91 board panel of the unit. When the VCS-700 is connected, refer to the VCS-700 Maintenance Manual.
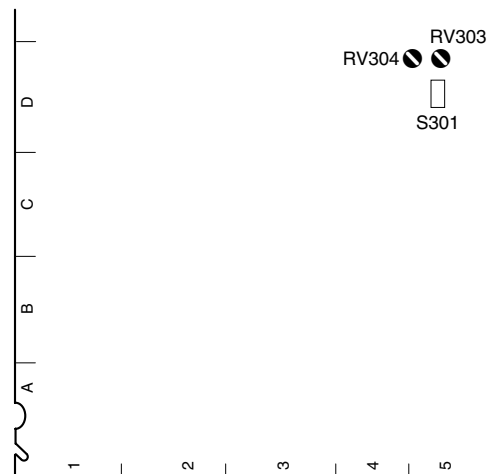
RC-91 board (A side)

1. Press the SEQ button of the WAVEFORM MONITOR buttons (or MONITOR SELECT buttons) of the MSU-700A/750, RCP-740/741, etc.
2. Adjust the position of the signal to be displayed using control RV303 (STAIR STEP POSITION) on the RC-91 board.
3. Use control RV304 (STAIR STEP LEVEL) on the RC-91 board so that the intervals of signals A and B to be displayed are almost equal.

Press the SEQ button of the WAVEFORM MONITOR button (or the MONITOR SELECT button) of the MSU-700A/750, RCP-740/741, etc., to output the waveform monitor control signal of the unit, synchronizing with the output signal of the WF OUT connector.
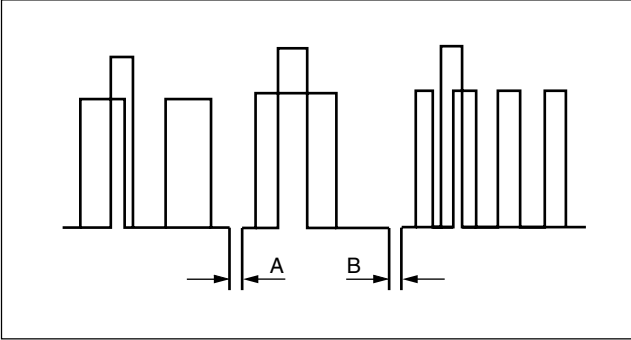
Note

The control method of the sequential mode depends on the waveform monitor used. If required, change the polarity of the control from the setting of switch S301 (SEQ) on the RC-91 board.

If adjustment is not possible even after the polarity is changed, perform the adjustment on the waveform monitor side.

2-5-6. Adjusting the Level of Signals for Picture Monitor

The video output signal can be checked on the waveform or vector monitor connected to the PIX OUT connector. Use the color bars to adjust the level of the PIX output signal.

In addition, in the system with the MSU-700A/750, CNU-700/500 or VCS-700, the video signal of the unit can be checked on the waveform or vector monitor connected to the VCS-700.
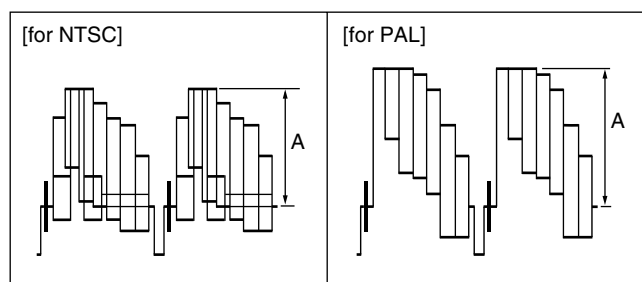
How to adjust on the RC-91 board of the unit
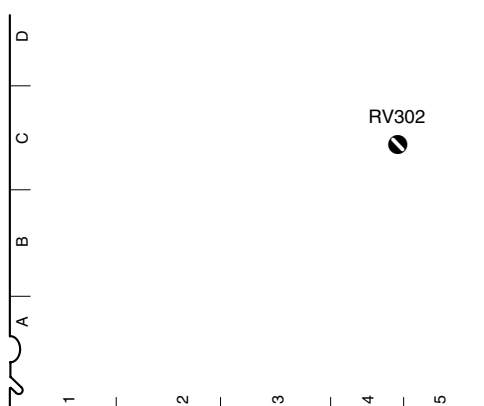
RC-91 board (A side)

1. Press the BARS button of the MSU-700A/750, RCP-740/741, etc., and press the ENC button of the PICTURE MONITOR buttons (or MONITOR SELECT buttons) to display the color bars on the waveform monitor.
2. Adjust the color bar signal using control RV302 (PIX GAIN) on the RC-91 board so that it is within the specified level.
    Measurement point : PIX OUT connector on the HDCU rear panel
    Specification : A = 100 ±1 IRE [for NTSC]
    A = 700 ±7 mV p-p [for PAL]


How to adjust using the VCS-700

In the system with the MSU-700A/750, CNU-700/500 or VCS-700, the video output signal of the unit can be checked on the waveform or vector monitor connected to the PIX A OUTPUT and PIX B OUTPUT connectors of the VCS-700.

Connect the PIX OUT connector of the DIF-124 board to the PIX 1 connector of the VCS-700 using the color bars signal.

1. Press the BARS button of the MSU-700A/750, RCP-740/741, etc., or press the ENC button of the WAVE-FORM MONITOR buttons (or MONITOR SELECT buttons) to display the color bars on the waveform or vector monitor.
2. Adjust the color bars signal using the PIX 1 LEVEL and PIX 1 CHROMA controls on the VCR-700 board so that it is within the specified level.
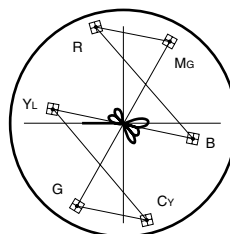   Measurement point : PIX OUT connector on the VCS-700
    Specification : A = 100 ±1 IRE [for NTSC]
    A = 700 ±7 mV p-p [for PAL]
    (PIX 1 LEVEL control)
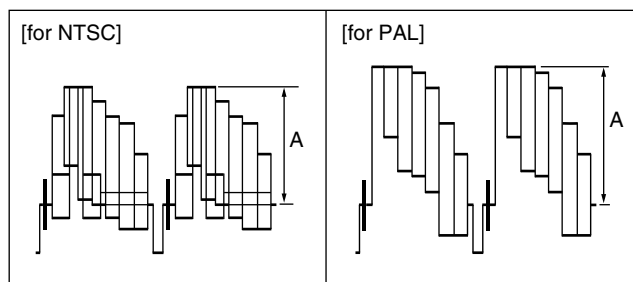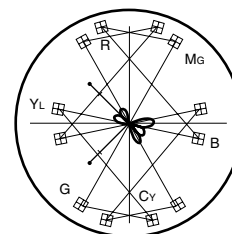

Each luminescent spot on the vector monitor must be within the "⊞" range.
(PIX 1 CHROMA control)

2-5-7.   Setting the RET Input

Set format of the return signal that is input to RET 1 to
RET 3 connectors on the rear panel of this unit.
Set the desired aspect ratio using the switch on the DTX-1
boards.
The aspect ratio also can be set on the maintenance menu
or the configuration menu of the MSU-700A/750. For
more details, refer to the System Manual.

Setting Format of the Return Signal

Setup switch : RETURN SET switch (S605) on the DTX-1
panel (Factory setting : REM)
  HD :   When HD-SDI signal is input as return signal.
 SD :   When SD-SDI or analog VBS signal is input as
return signal.*
  REM : When the reference is set from RM/MSU or a
device that is connected outside.

∗ :   To select either the SD-SDI or analog VBS signal, set the switch S601
on the DTX-1 board. For details, refer to Section 1-6-5. "Setting of
Switches on Boards – DTX-1 Board".

| Note |

When the PROMPTER connector on the rear panel of this
unit is used as RET 4, set the switch S607-2 on the DTX-1
board to OFF.
For details, refer to Section 1-6-5. "Setting of Switches on
Boards – DTX-1 Board".
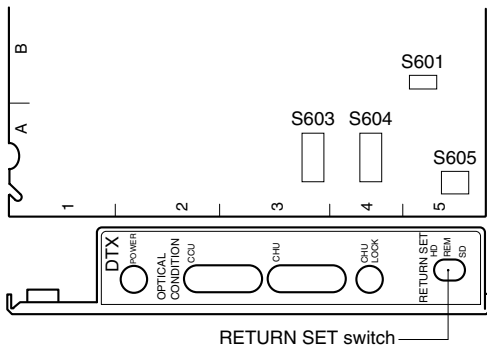
RETURN SET switch

DTX-1 board (A side/panel side)

Setting the Aspect Ratio for Up-conversion

When the RETURN SET switch on the DTX-1 board panel
is set to SD for setting the return signal format, set the
aspect ratio for up-conversion to each return input.

Setup switch : S603 and S604 on the DTX-1 board
(Factory setting : All OFF)
  S603-1, -2 : RET 1
  S603-3, -4 : RET 2
  S603-5, -6 : RET 3
  S603-7, -8 : PROMPTER (RET 4)

S603-1, -3, -5, -7	S603-2, -4, -6, -8	Aspect ratio
ON	ON	Letter box∗1
ON	OFF	Edge-crop∗1
OFF	ON	Squeeze∗1
OFF	OFF	It is interlocked with the down conversion aspect ratio of the RC-91 board output.

∗1 Letter box : The HD video signal of 16 : 9 (or aspect ratio set with S604
on the DTX-1 board) is inserted into the picture frame of 4 :
3 as it is and converted to the SD signal. (4 : 3) (The black
level is inserted into the top and bottom of the picture.)
  Edge-crop : Video signal as large as 4 : 3 is cut from the HD video signal
and is converted to the SD signal. (4 : 3)
  Squeeze :   The HD video signal of 16 : 9 is converted to the SD signal
as it is. (16 : 9)

  S604-1, -2 : RET 1
  S604-3, -4 : RET 2
  S604-5, -6 : RET 3
  S604-7, -8 : PROMPTER (RET 4)

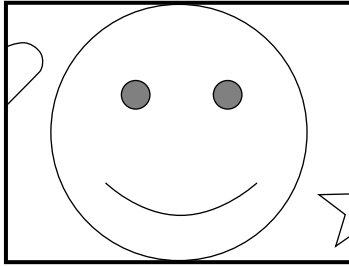| S604-1, -3, -5, -7	S604-2, -4, -6, -8	Aspect ratio
ON	ON	13 : 9
ON	OFF	14 : 9
OFF	ON	15 : 9
OFF	OFF	16 : 9

How to set the aspect ratio

1. Set RETURN SET switch on the DTX-1 board panel to SD.
2. Set the switch S601 (SD RETURN FORMAT) on the DTX-1 board, to SDI.
3. Set S603 (SD RET ASPECT) and S604 (LB ASPECT) on the DTX-1 board according to the desired aspect ratio.
   For more details, refer to Section 1-6-5, "Setting of Switches on Boards−DTX-1 Board".
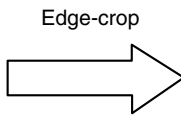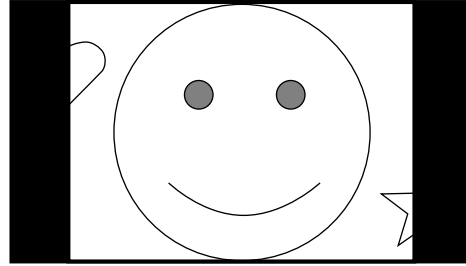
Examples of display

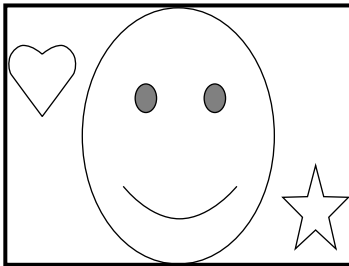RETURN VIDEO input picture   Picture on the HDC-950/930 viewfinder

Edge-crop
S603-1, -3, -5, -7/DTX-1 → ON
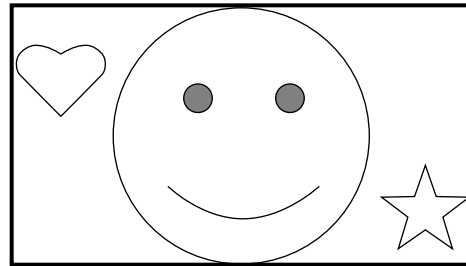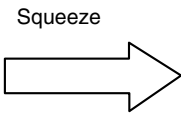S603-2, -4, -6, -8/DTX-1 → OFF

Edge-crop →

The rightmost end and the leftmost end are cut and replaced by black on the viewfinder.

Squeeze
S603-1, -3, -5, -7/DTX-1 → OFF
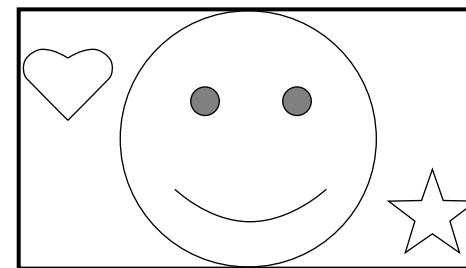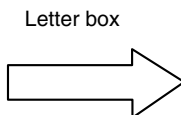S603-2, -4, -6, -8/DTX-1 → ON

Squeeze →

The same picture as the camera output picture is shown.

Letter box (16 : 9)
S603-1 to -8/DTX-1 → ON
S604-1 to -8/DTX-1 → OFF

Letter box →

The same picture as the camera output picture is shown.
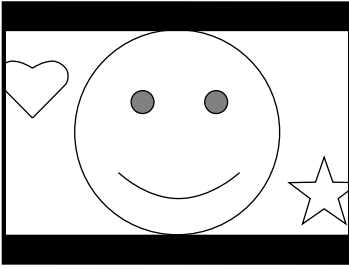
Semi-letter box (15 : 9)
S603-1 to -8/DTX-1 → ON
S604-1, -3, -5, -7/DTX-1 → OFF
S604-2, -4, -6, -8/DTX-1 → ON
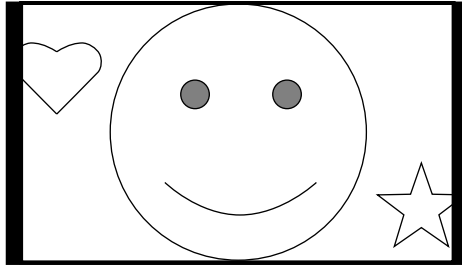
When the signal was up-converted in the edge-crop
mode

Semi-letter box (14 : 9)
S603-1 to -8/DTX-1 → ON
S604-1, -3, -5, -7/DTX-1 → ON
S604-2, -4, -6, -8/DTX-1 → OFF

When the signal was up-converted in the edge-crop
mode
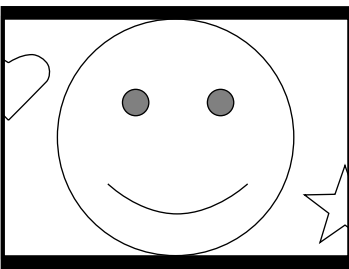
Semi-letter box (13 : 9)
S603-1 to -8/DTX-1 → ON
S604-1 to -8/DTX-1 → ON
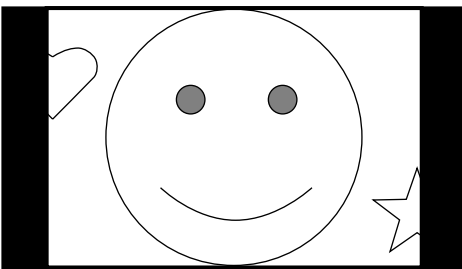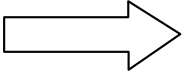
When the signal was up-converted in the edge-crop
mode

Setting the Frame Frequency Conversion

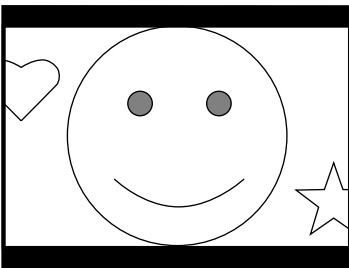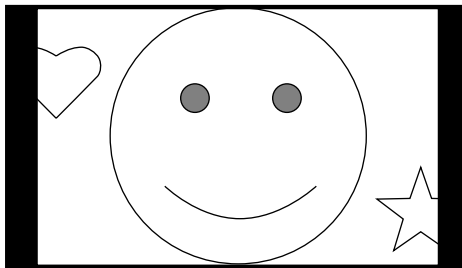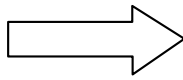When the HKCU-953 is installed and the operation frame
frequency of the camera is set to 24F (24PsF), set the
frame frequency conversion of the return signal.
Setup switch : S606 on the DTX-1 board
          (Factory setting : All OFF)
  S606-1, -2 : RET 1
  S606-3, -4 : RET 2
  S606-5, -6 : RET 3
  S606-7, -8 : PROMPTER (RET 4)

S603-1, -3, -5, -7	S603-2, -4, -6, -8	Type of the frame conversion
ON	ON	THROUGH : Frame frequency is not converted.
OFF	ON	A (24PsF conversion) : When the camera is 24PsF, the forced-reverse conversion is performed. (Conversion to reconstruct 24PsF)
ON	OFF	B (48i conversion) : When the camera is 24PsF, the forced-reverse conversion is perfomed. (Conversion to 48i format by simple skipping)
OFF	OFF	AUTO : Depends on the setting of S1-1 on the FC-88 board.

Setup switch : S610 on the DTX-1 board
          (Factory setting : 0)
You can set phase of the frame frequency conversion
manually. For details, refer to Section 1-6-5. "Setting of
Switches on Boards – DTX-1 Board".

2-6. Note on Using the Large Lens Adapter CA-905L

When attaching the large lens adapter CA-905L to the camera to be connected to the HDCU-950, note the following.

Viewfinder

Use of the 6-type color LCD viewfinder HDVF-C700W is recommended.
Because the 7-type B/W viewfinder HDVF-700A consumes a large amount of power, the maximum camera cable length in this case is limited to 300 meters.
Note that the 7-type color viewfinder HDVF-7700 cannot be used with the HDCU-950.

Lens

If you want to use a lens (such as a vibration-proof lens or high-magnification lens) which consumes a large current, it is recommended to operate the lens on an external power supply.
The power consumption for a lens that draws a large current increases for the time being when using the lens. If the power for the lens is supplied from the camera, the power to the camera may be stopped if the protection circuit detects a voltage drop in case of using a long cable.

Utility Power Supply

The HDCU-950 supplies power to the camera at DC 180 V. Therefore, the utility power outlet of the large lens adapter CA-905L cannot be used.

Section 3
Service Overview

3-1. Cleaning of Connector/Cable

Before connecting the unit to the camera, it is recommended to clean the following optical contact portions.
- CAMERA connector of the unit
- CCU connector of the camera side
- Optical/electrical cable

Follow the procedures below for cleaning.

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.

Shock absorber   Handle

Use the shorter nose end.
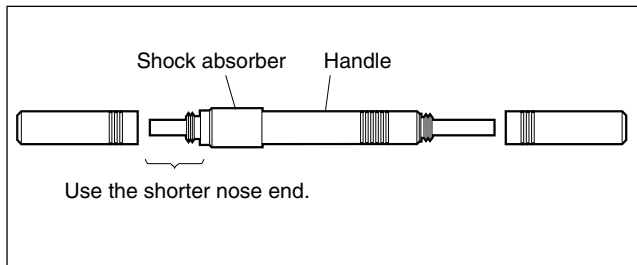
- Cotton swabs (commercially available)

  Note
  Use a cotton swab whose diameter is about 4 mm.
  If a cotton swab whose diameter exceeds 5 mm is used, the cotton swab cannot be inserted into the end of the connector and the tip of the optical contact cannot be cleaned.

Cleaning

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

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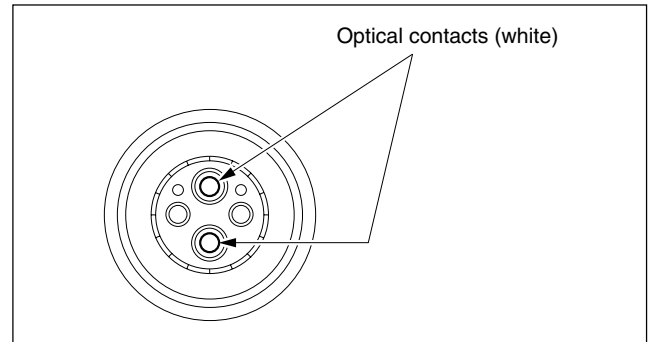
Female connector
The optical contacts for female connector are in an unexposed state. In cleaning, it is necessary to be exposed by removing the alignment sleeve in advance. Proceed as follows.

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

Alignment sleeve

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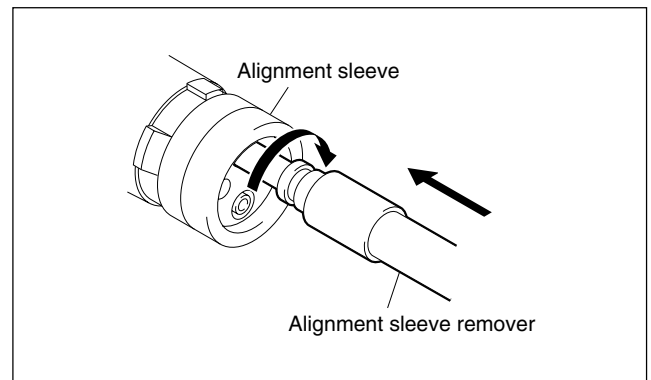
2. When the turn stops, pull out the remover in the straight line forcedly.

   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)
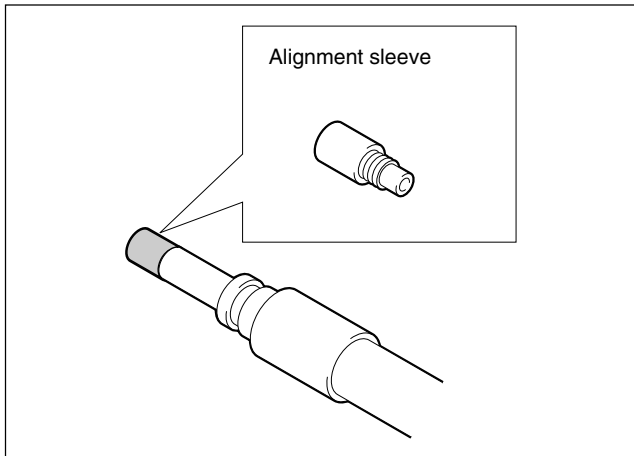
3. Clean the tip of the white optical contacts by a cotton swab moistened with alcohol.
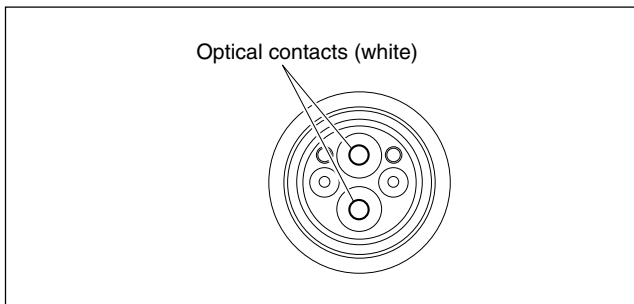
4. Insert the remover with the alignment sleeve attached to its tip, and push it until it clicks.
5. Rotate the remover counterclockwise to install the alignment sleeve, and extract the remover.

3-2. Recommended Replacement Parts

3-2-1. Power Fan

The recommended replacement fan should be used in the switching regulator of this unit.
The lifespan of the fan is about 30,000 hours, which means that the fan can be used for about three and a half years if the power is on all the time, so the fan should be replaced according to service conditons.
For the replacement procedure, refer to the separately available maintenance manual.

Replacement Part

Part :   Power fun
Part No. : 9-885-022-85

3-3. Character Display Function

This unit has the built-in character generation circuit. The character information such as the settings, state and self-diagnosis of the unit can be mixed with the HD SDI video signal and the SD video signal. The mixed signal can be output from the MONI OUT (DRX-1 board output) and the PIX OUT (RC-91 board output) connector respectively. They can be displayed on the HD monitor and the SD analog monitor.
The character MIX function can be forcibly turned OFF by turning OFF S206-4 (HD SDI) on the DRX-1 board or S10-8 (SD SDI) on the RC-91 board.

Operating procedure

In order to show the setting, the state and the self-diagnosis display on the HD monitor and the SD analog monitor, press the CHARACTER button of the RCP so that the button lights, or operate the CHARACTER switch on the panel surface of the DRX-1 board.
To change the page, press the CHARACTER button of the RCP. The page can also be changed by pressing the CHARACTER switch on the panel surface of the DRX-1 board panel.
When the CHARACTER button of the RCP (or CHAR-ACTER switch on the panel surface of the DRX-1 board) is kept pressed, the pages are changed continuously. After all the pages are displayed, the cycling display stops on the final page and the CHARACTER button of the RCP goes off. To display the character information again, press the CHARACTER button of the RCP.

| Note |

The first page is blank. When selecting the first page, the display of characters is OFF.
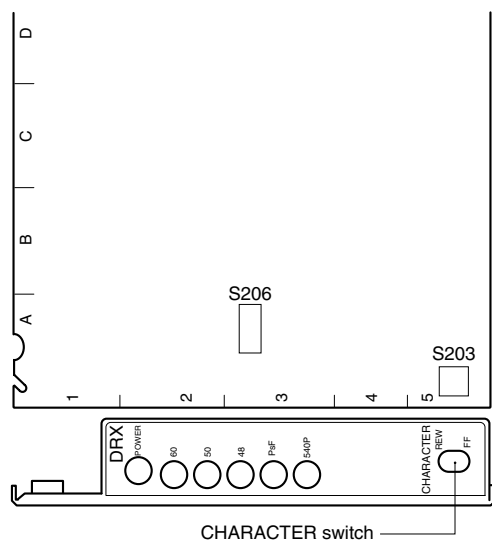
The contents of the pages displayed on the HD monitor (or SD analog monitor) are as follows.

Page	Title
0	Displays OFF (CHARACTER button OFF)
1	Camera Lens/Filter Status
2	Camera Status
3	System Status
4	Diagnosis
5	System Diag 1/3
6	System Diag 2/3
7	System Diag 3/3
8	AT Diag
9	AVP Diag
10	DTX Diag
11	DRX Diag
12-1	Slot-5 Diag (RC-91/DIF-124 Board)
12-2	Slot-5 Diag (FC-88/SDI-73 Board)
13-1	Slot-6 Diag (EN-145/VDA-61 Board)
13-2	Slot-6 Diag (RC-91/DIF-124 Board)
14	ROM Version

Required equipment

· HD monitor
    Sony BVM-D20F1J or equivalent
· SD monitor
    Sony BVM-1911/2811 or equivalent
· Remote control unit
    Sony RCP-700 series
· HDVS camera system
    HDC-950/930

DRX-1 board (A side/panel side)
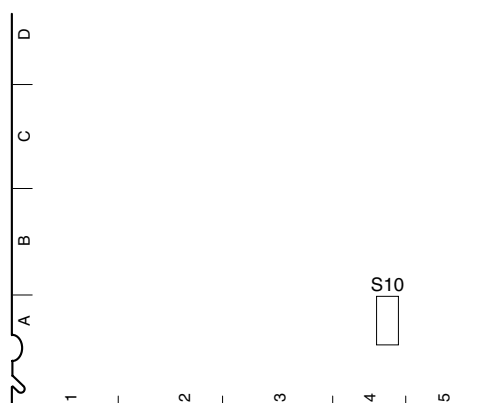
RC-91 board (A side)

Page 1

Camera Lens/Filter Status Display

```
①      EX



      ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
      |                     |──────── ③
      └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
②      1 A            F : CLS ───── ④
```

No.	Contents
①	Displays the setting state of the lens extender.
②	Displays the setting state of the ND filter and CC filter.
③	Displays the message when the optical reception level lowers.
④	Displays the setting state of the aperture of the lens.

Page 2

Camera Status Display

```
E X
White            B l a c k
  R :    0         R :    0
  G :    0         G :    0
  B :    0         B :    0
                   M :    0
BLK γ            F l a r e
         0 OFF     R :    0
Detail            G :    0
         1 ON      B :    0

1 A                       F : CLS
```

Contents

Displays information of White/Black/Black γ/Flare/Detail, etc.

Page 3

System Status Display

```
    * System Status *        ──── ①
HDC-950   1080/59.94I ─────── ②
Gen Lock : SD ───────────── ③
DRX:1080/59.94I ──────────── ④
FC :1080/59.94I ──────────── ⑤
RC : 525/59.94I ──────────── ⑥
RET1:HD SDI 59.94I ────────── ⑦
   2:HD SDI 59.94I ────────── ⑧
   3:HD SDI 59.94I ────────── ⑨
   4:SD VBS SQ ─────────────
```
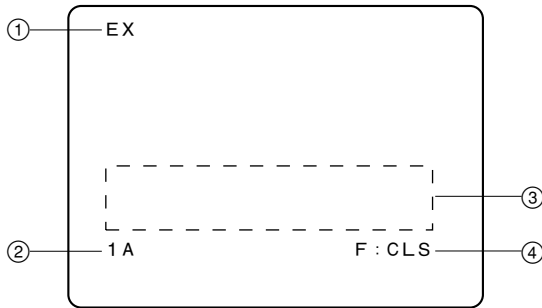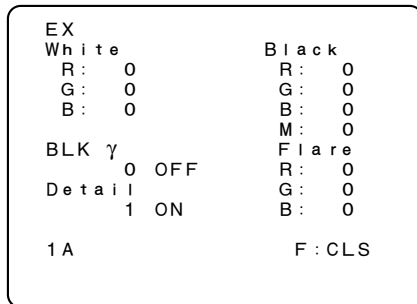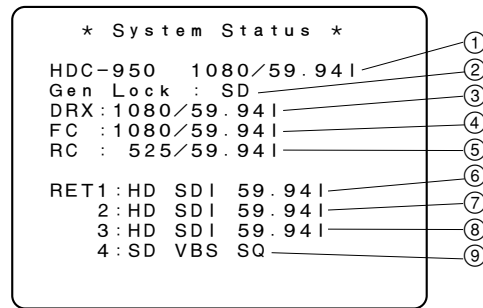
No.	Contents
①	Displays the type of camera connected to the unit. (HDC-950/HDC-930/UNDEFINED)
②	Displays the type of external sync signal. (Free/SD/HD)
③	Displays the setup format of the DRX-1 board.*1
④	Displays the setup format of the board mounted in the fifth slot from the left of the front side.*1
⑤	Displays the setup format of the board mounted in the sixth (right most) slot from the left of the front side.*1
⑥	Displays the type of signal that is input to the RET 1 connector on the rear panel of the unit.
⑦	Displays the type of signal that is input to the RET 2 connector on the rear panel of the unit.
⑧	Displays the type of signal that is input to the RET 3 connector on the rear panel of the unit.
⑨	Displays the type of signal that is input to the RET 4 (PROMPTER) connector on the rear panel of the unit.

*1 : For details, refer to Section 2, "System Setup".

Page 4

Diagnosis Display

```
          * Diagnosis *
①——  AT  : OK      DRX : OK  ——④
②——  AVP : OK      FC  : OK  ——⑤
③——  DTX : OK      RC  : OK  ——⑥
```
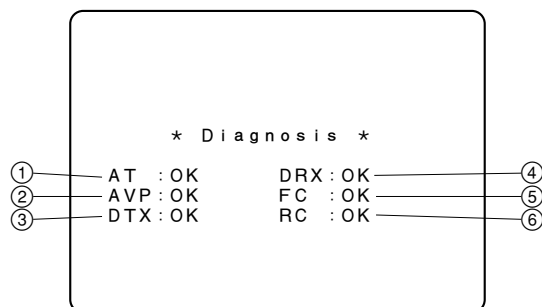
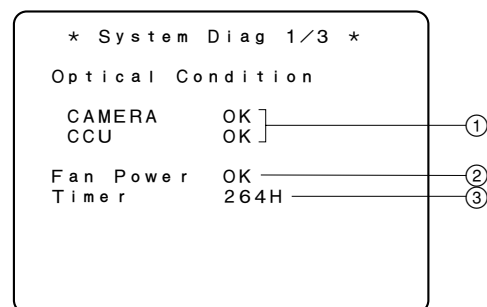| No.	Contents
①	Displays the self-diagnosis result of the AT-149 board (OK/NG).*2
②	Displays the self-diagnosis result of the AVP-4 board (OK/NG).*2
③	Displays the self-diagnosis result of the DTX-1 board (OK/NG).*2
④	Displays the self-diagnosis result of the DRX-1 board (OK/NG).*2
⑤	Displays the self-diagnosis result of the board mounted in the fifth slot from the left of the front side (OK/NG).*2
⑥	Displays the self-diagnosis result of the board mounted in the sixth (right most) slot from the left of the front side (OK/NG).*2

*2 : For the contents of the self-diagnosis of each board, refer to pages 8 to 14 of the character display.

Page 5

System Diag (1/3) Display

```
     * System Diag 1/3 *

  Optical Condition

    CAMERA    OK ⎤
    CCU       OK ⎦ ————————①

  Fan Power   OK ——————————②
  Timer       264H ————————③
```

No.	Contents
①	State of the optical reception level of the camera and camera control unit (OK/CARE/WARNING/NG)*3 CARE: The optical level is −17 to −20 dBm. WARNING: The optical level is −20 dBm or less. NG: The state when the optical level is low and any signal cannot be obtained. When either of CARE, WARNING or NG appears on the CCU side, clean the connector or cable while referring to Section 3-1. When either of CARE or WARNING or NG appears on the camera side, clean the connector or cable while referring to the Maintenances Manual of the camera.
②	State of the fan of the power supply block (OK/NG) NG : The fan of the switching regulator is defective.
③	Displays the accumulated power-on hours to the AT-149 board

*3 : The optical sending/receiving level state of the main unit also can be checked using the indicator on the panel surface of the DTX-1 board. For details, refer to Section 1-7-5. "Functions of the Indicators on the Boards − DTX-1 Board".

Page 6

System Diag (2/3) Display

```
    * System Diag 2/3 *
CAMERA   Cable Connect ──────①
         Data   OK ──────────②
         Power  ON ──────────③

RCP/CNU  Cable Connect ──────④
         Data   OK ──────────⑤
         Power  OFF ─────────⑥

PANEL    Cable Open ─────────⑦
         Data   -- ──────────⑧
         Power  ON ──────────⑨
```
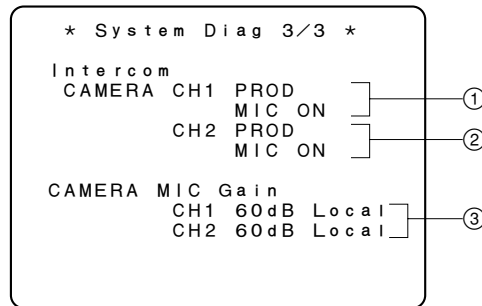
No.	Contents
①	State of camera cable connection (Open/Connect)
②	Existence of data from the camera (−−/Wait/Sense/OK) −− : The communication with the camera cannot be established. Wait : The communication with camera is in the wait state. Sense : The communication with the camera is being established.
③	State of the power supply of the camera (ON/OFF)
④	State of cable connection of the RCP/CNU connector on the rear panel of the unit (Open/Connect)
⑤	Existence of the data from the RCP/CNU connector on the rear panel of the unit (−−/Wait/Sense/OK) −− : The communication with the equipment connected to the RCP/CNU connector cannot be established. Wait : The communication with the equipment connected to the RCP/CNU connector is in the wait state. Sense : The communication with the equipment connected to the RCP/CNU connector is being established.
⑥	Power is supplied or not to the RCP/CNU connector on the rear panel. ON : 30 V power is supplied for RCP. OFF : Power is turned off.
⑦	State of cable connection with the front panel (Open/Connect)
⑧	Existence of the data from the front panel (−−/Wait/Sense/OK) −− : The communication with the equipment connected to the PANEL connector cannot be established. Wait : The communication with the equipment connected to the PANEL connector is in the wait state. Sense : The communication with the equipment connected to the PANEL connector is being established.
⑨	Power is supplied or not to the front RM panel. ON : 30 V power is supplied for the front panel. OFF : Power is turned off.

Page 7

System Diag (3/3) Display

```
    * System Diag 3/3 *
Intercom
  CAMERA CH1 PROD ┐
              MIC ON ┘ ──────①
         CH2 PROD ┐
              MIC ON ┘ ──────②

  CAMERA MIC Gain
         CH1 60dB Local ┐
         CH2 60dB Local ┘ ──③
```

No.	Contents
①	Setting state of the intercom channel 1 of the camera side (ENG/PROD)
②	Setting state of the intercom channel 2 of the camera side (ENG/PROD)
③	Gain and control state of the microphone circuit of the camera side (Remote/Local)

Page 8

AT Diag Display

Displays the details of self-diagnosis of the AT-149 board of the unit.

```
        *  A T   D i a g  *

System  Frequency  1.001 ──────①
CHU  Format  Setting
  Remote  1080/59.94I ──────②

Ref.H  Phase    SD  Local ──────③
HD−SD  DLY        90H ──────④
Marker  Setting    Remote ──────⑤

CCU  Mode        Normal──────⑥
```
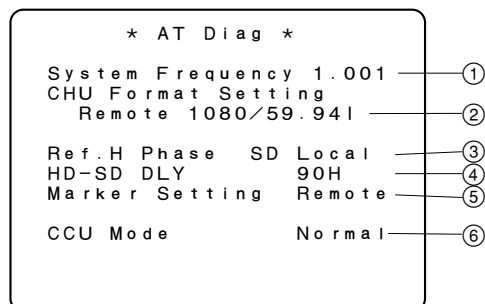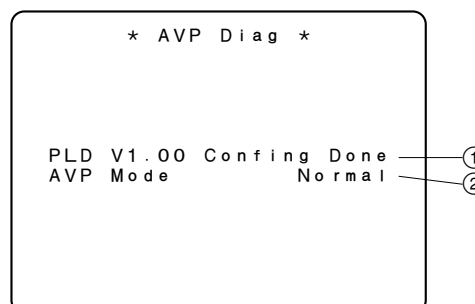
No.	Contents
①	Display of system frequency coefficient (1.001/1.000)∗4
②	Display of Remote/Local state of camera format setting and setup format
③	Setting of the reference signal and display of the Removal/Local state (SD Local/SD Remote/HD Local/HD Remote)
④	Setting state of delay amount (setting of S417 on the AT-149 board) when converting the format from the HD signal to SD signal (1 Frame/90H)∗4
⑤	Aspect marker added to the monitor signal and state of modulation chroma removal (setting of S408 on the AT-149 board) (Local/Remote)∗4
⑥	State of the operation mode (setting of S424 on the AT-149 board)∗5 of the AT-141 board (Normal/Test)

∗4 : For details, refer to Section 1-6-1. "Setting of Switches on Boards – AT-149 Board".
∗5 : Set S424 to all OFF so that it is set to normal mode.

Page 9

AVP Diag Display

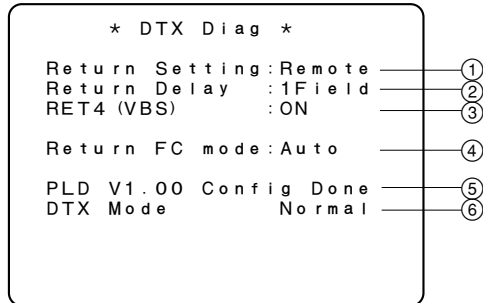Displays the details of self-diagnosis of the AVP-4 board of the unit.

```
        *  A V P   D i a g  *



PLD  V1.00  Config  Done ──────①
AVP  Mode          Normal ──────②
```

No.	Contents
①	Displays the version of the PLD (IC300 on the AVP-4 board) and the state of the PLD. (Config Done/Config NG) Config Done: PLD (IC300 on the AVP-4 board) started correctly. Config NG: PLD (IC300 on the AVP-4 board) did not start correctly.
②	State of the operation mode of the AVP-4 board (Normal/Test)

Page 10

DTX Diag Dispaly

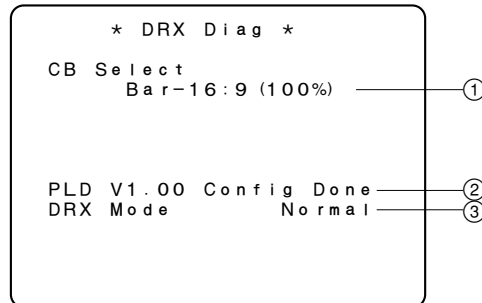Displays the details of self-diagnosis of the DTX-1 board of the unit.

```
        * D T X   D i a g  *
R e t u r n  S e t t i n g : R e m o t e ──── ①
R e t u r n  D e l a y    : 1 F i e l d ──── ②
R E T 4 ( V B S )         : O N ──── ③

R e t u r n  F C  m o d e : A u t o ──── ④

P L D  V 1 . 0 0  C o n f i g  D o n e ──── ⑤
D T X  M o d e          N o r m a l ──── ⑥
```

No.	Contents
①	Setting state of S605 on the DTX-1 board (HD/SD/Remote)*6
②	Setting state of the phase (setting of S607-1 on the DTX-1 board) with the SD return signal during up-conversion (SYS/MIN)*6
③	Setting state whether the PROMPTER connector on the rear panel is used or not with REM4 (setting of S607-2 on the DTX-1 board) (ON/OFF)*6
④	State of the frame frequency conversion mode (setting of S606 on the DTX-1 board) of the return signal (Through/A/B/Auto)*6
⑤	Displays the state of the PLD (IC401 on the DTX-1 board) version and PLD. (Config Done/Config NG) Config Done : PLD (IC401 on the DTX-1 board) started correctly. Config NG : PLD (IC401 on the DTX-1 board) did not start correctly.
⑥	State of the operation mode on the DTX-1 board (Normal/Test)

∗6 : For details, refer to Section 1-6-5. "Setting of Switches on Boards – DTX-1 Board".

Page 11

DRX Diag Dispaly

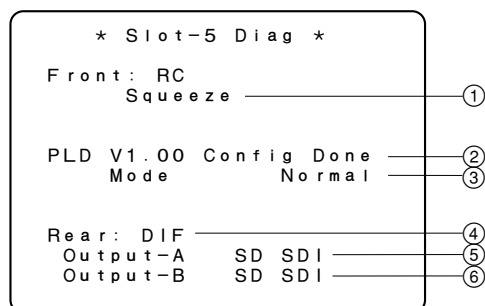Displays the details of self-diagnosis of the DRX-1 board of the unit.

```
        * D R X   D i a g  *
C B  S e l e c t
        B a r − 1 6 : 9 ( 1 0 0 % ) ──── ①



P L D  V 1 . 0 0  C o n f i g  D o n e ──── ②
D R X  M o d e          N o r m a l ──── ③
```

No.	Contents
①	Setting state of the HD output color bar (setting of S205 on the DRX-1 board)*7
②	Displays the state of the PLD (IC401 on the DRX-1 board) version and PLD (Config Done/Config NG) Config Done : PLD (IC401 on the DRX-1 board) started correctly. Config NG : PLD (IC401 on the DRX-1 board) did not start correctly.
③	State of the operation mode on the DRX-1 board (Normal/Test)

∗7 : For details, refer to Section 1-6-4. "Setting of Switches on Boards – DRX-1 Board".

Page 12-1

Slot-5 Diag Dispaly

Displays the details of self-diagnosis of the RC-91 board
when it is mounted in the fifth slot from the left on the
front side of the unit.

```
      * Slot-5 Diag *
Front: RC
      Squeeze ─────────────①

PLD V1.00 Config Done ────②
      Mode      Normal ───③

Rear: DIF ──────────────④
  Output-A    SD SDI ─────⑤
  Output-B    SD SDI ─────⑥
```

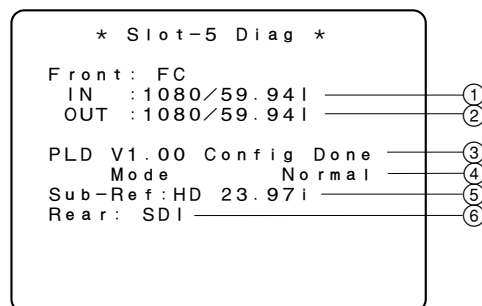| No.	Contents
①	Displays the aspect ratio conversion mode during down-conversion.
②	Displays the state of the PLD (IC301 and IC504 on the RC-91 board) version and PLD. (Config Done/Config NG) Config Done : PLD (IC301 and IC504 on the RC-91 board) started correctly. Config NG : PLD (IC301 and IC504 on the RC-91 board) did not start correctly.
③	State of the operation mode on the RC-91 board (Normal/Test)
④	Displays when the DIF-124 board is installed in the rear correctly.
⑤	Displays the type of signal that is output from the SD SDI OUT1 connector on the rear panel. (SD SDI/VBS)∗8
⑥	Displays the type of signal that is output from the SD SDI OUT2 connector on the rear panel. (SD SDI/VBS/MONI SDI)∗9

∗8 : When the HKCU-951 is installed, set the switch with S103 on the EN-145 board. When the HKCU-951 is not installed, the switch is fixed to SD SDI.
For details, refer to Section 1-6-7. "Setting of Switches on Boards – EN-145 Board".
∗9 : When S10-1 on the RC-91 board and the HKCU-951 are installed, set the switch with S104 on the EN-145 board.
For details, refer to Sections 1-6-6 and 1-6-7. "Setting of Switches on Boards – RC-91 Board and EN-145 Board".

Page 12-2

Slot-5 Diag Dispaly

Displays the details of self-diagnosis of the FC-88 board
when it is mounted in the fifth slot from the left on the
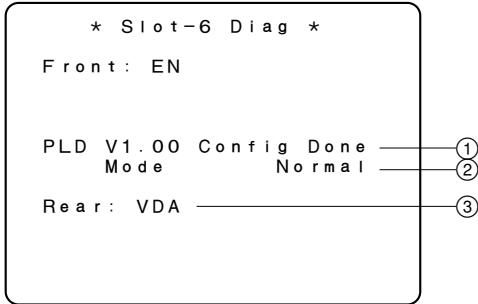front side of the unit.

```
      * Slot-5 Diag *
Front: FC
   IN  :1080/59.94I ──────①
   OUT :1080/59.94I ──────②

PLD V1.00 Config Done ────③
     Mode       Normal ───④
Sub-Ref:HD 23.97i ────────⑤
Rear: SDI ────────────────⑥
```

No.	Contents
①	State of the MAIN INPUT signal format of the frame converter
②	State of the conversion format of the frame converter MAIN OUTPUT signal
③	Displays the state of the PLD (IC301 on the FC-88 board) version and PLD. (Config Done/Config NG) Config Done : PLD (IC301 on the FC-88 board) started correctly. Config NG : PLD (IC301 on the FC-88 board) did not start correctly.
④	State of the operation mode on the FC-88 board (Normal/Test)
⑤	Displays the signal format of the reference signal that is input to the FRAME REF IN connector (Sub-Ref) on the rear panel (with HKCU-953).
⑥	Displays when the SDI-73 board is installed in the rear correctly.

Page 13-1

Slot-6 Diag Dispaly

Displays the details of self-diagnosis of the EN-145 board when the EN-145 board is mounted in the sixth slot (right most) from the left of the front side of the unit.
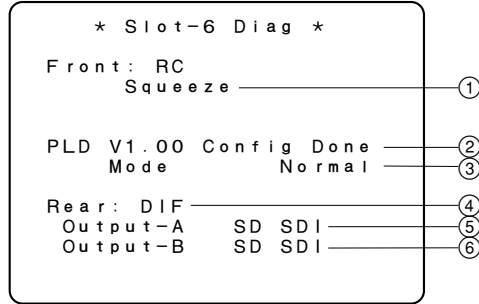
```
      * S l o t − 6   D i a g   *

F r o n t :   E N


P L D   V 1 . 0 0   C o n f i g   D o n e ──── ①
       M o d e         N o r m a l ──── ②

R e a r :   V D A ──────────────── ③
```

No.	Contents
①	Displays the state of the PLD (IC310 on the EN-145 board) version and PLD. (Config Done/Config NG)
	Config Done : PLD (IC310 on the EN-145 board) started correctly.
	Config NG : PLD (IC310 on the EN-145 board) did not start correctly.
②	State of the operation mode on the EN-145 board (Normal/Test)
③	Displays when the VDA-61 board is mounted in the rear correctly.

Page 13-2

Slot-6 Diag Dispaly

Displays the details of self-diagnosis of the RC-91 board when the RC-91 board is mounted in the sixth slot (right most) from the left of the front side of the unit.

```
      * S l o t − 6   D i a g   *

F r o n t :   R C
       S q u e e z e ──────────── ①

P L D   V 1 . 0 0   C o n f i g   D o n e ──── ②
       M o d e         N o r m a l ──── ③

R e a r :   D I F ──────────────── ④
O u t p u t − A       S D   S D I ──── ⑤
O u t p u t − B       S D   S D I ──── ⑥
```

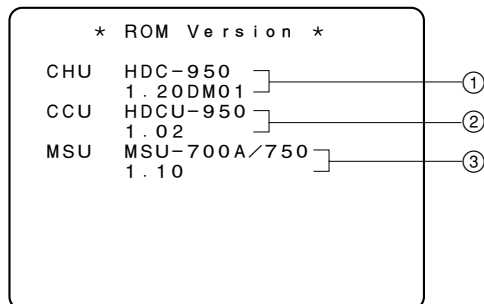| No.	Contents
①	Displays the aspect ratio conversion mode during down-conversion.
②	Displays the state of the PLD (IC301 and IC504 on the RC-91 board) version and PLD. (Config Done/Config NG)
	Config Done : PLD (IC301 and IC504 on the RC-91 board) started correctly.
	Config NG : PLD (IC301 and IC504 on the RC-91 board) did not start correctly.
③	State of the operation mode on the RC-91 board (Normal/Test)
④	Displays when the DIF-124 board is installed in the rear correctly.
⑤	Displays the type of signal that is output from the SD SDI OUT1 connector on the rear panel. (SD SDI/VBS)*10
⑥	Displays the type of signal that is output from the SD SDI OUT2 connector on the rear panel. (SD SDI/VBS/MONI SDI)*11

*10 : When the HKCU-951 is installed, set the switch with S103 on the EN-145 board. When the HKCU-951 is not installed, the switch is fixed to SD SDI.
For details, refer to Section 1-6-7. "Setting of Switches on Boards – EN-145 Board".
*11 : When S10-1 on the RC-91 board and the HKCU-951 are installed, set the switch with S104 on the EN-145 board.
For details, refer to Sections 1-6-6 and 1-6-7. "Setting of Switches on Boards – RC-91 Board and EN-145 Board".

Page 14

ROM Version Dispaly

Displays the ROM versions of the unit and the peripheral equipment of the unit.

```
        * ROM Version *

 CHU   HDC-950
       1.20DM01                ①
 CCU   HDCU-950
       1.02                    ②
 MSU   MSU-700A/750
       1.10                    ③
```

No.	Contents
①	Displays the ROM version of the camera.
②	Displays the ROM (IC510 and IC553 on the AT-149 board) version of the HDCU-950.
③	Displays the ROM version of the equipment that is connected to the RCP/CNU connector on the rear panel of he HDCU-950.

SAFETY CHECK-OUT

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

Check the metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 3.5 mA. Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 5.25 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 20 V AC range are suitable. (See Fig. A)
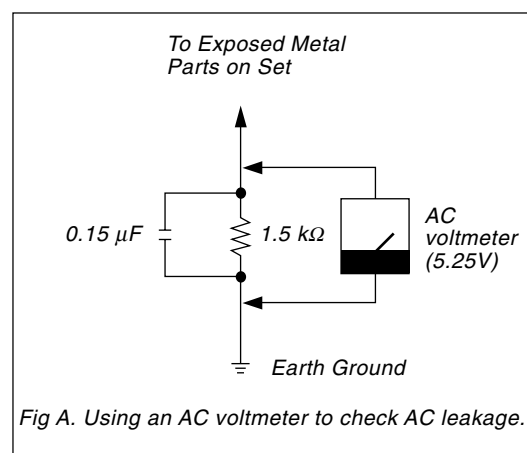

Fig A. Using an AC voltmeter to check AC leakage.