FOR-A
INNOVATIONS IN VIDEO and AUDIO TECHNOLOGY

OPERATION MANUAL

FA-9600

Frame Synchronizer

FA-96PS
FA-964K
FA-96UDC
FA-96AHDR/AHDR2
FA-96AES-UBL/-UBLC
FA-96ANA-AUD
FA-96MADI
FA-96EX3G44-R
FA-96EX12G06
FA-96SFPC4
FA-96GPI
FA-96DB9-CBL
FA-96DIN4-CBL

4th Edition - Rev. 6 (Software Ver. 3.6 or higher)

FOR-A COMPANY LIMITED

Edition Revision History

Edit.	Rev.	Date	Description	Section
1	-	2017/09/15	Supported 1080/59.94i, 1080/59.94p and 2160/59.94p.	
2		2017/09/25	Supported multi-format video signals. Supported HDMI, etc.	
2	1	2017/11/17	Added FA-96DIN4-CBL. Revised HDR related menus.	3-5 5-4 to 5-8 10-2-5
2	2	2017/12/22	Corrected GPI IN circuits. Revised Loss Mode description.	3-3, 3-4 5-10, 10-2-1
2	3	2018/03/16	SNMP function added. Factual errors corrected.	1-2, 12-2, 13
2	4	2018/04/16	SNMP function deleted. FA-96EX12G06 option added. Event data (csv files) description	 3, 5, 10, 13 Appendix
3 (V2.0)	-	2018/09/10	MU Operation Mode added HDMI AUDIO OUTPUT SELECT added EVENT EDITOR added SNMP Monitoring added	1-3, 7-9 6-10 14-4 15
3 (V2.0)	1	2018/11/05	Notice on overheat protection. FA-10DCCRU supported. Factual errors corrected.	2 4-3
4 (V3.0)	-	2019/03/22	MU Operation Mode added. Connection Example added OOTF for SR-Live support menu Event Auto Load Changed menus of various correction filters Event tally Supported Ember+ protocol.	1-3, 7-8 1-5 5-6 5-14, 5-15 5-22 to 5-25 14-3 Appendix 2
4 (V3.2)	1	2019/04/25	Color Correction (Balance Pre) added. SDR(SONY) added to gamma curves.	
4 (V3.3)	2	2019/08/21	FA-96ANA-AUD option added. FA-96SFPC4 option added. FRAME DELAY function changed	2-3-5, etc. 2-3-3, etc. 5-40, etc
4 (V3.4)	3	2019/09/24	Changed FRAME DELAY setting. Added “Load Impedance Matching” setting. (FA-96ANA-AUD option)	5-40 6-25
4 (V3.5)	4	2019/11/25	Added ANC USER PACKET menu items. Changed FA-96SFPC4 status display. Changed Loss Mode settings.	5-36 to 5-38 Appendix 1 5-45 5-47 to 5-50 5-13, 11-2-1
4 (V3.6)	5	2020/02/18	Added range setting in 3D-LUT mode. Supported FA-96MADI.	5-4 6-6, 6-14, 6-15, etc.
4 (V3.6)	6	2020/04/30	Corrected Ember+ commands.	Appendix 2

Precautions

Important Safety Warnings

[Power]

 Caution	Operate unit **only** at the specified supply voltage.
	Disconnect the power cord via the power plug only. Do **not** pull on the cable portion.
 Stop	Do **not** place or drop heavy or sharp-edged objects on the power cord. A damaged cord can cause fire or electrical shock hazards. Regularly check the power cord for excessive wear or damage to avoid possible fire / electrical hazards.
 Caution	Ensure the power cord is firmly plugged into the AC outlet.

[Grounding]

 Caution	**Ensure** the unit is properly grounded at all times to prevent electrical shock.
 Hazard	Do **not** ground the unit to gas lines, units, or fixtures of an explosive or dangerous nature.

[Operation]

 Hazard	Do **not** operate the unit under hazardous or potentially explosive atmospheric conditions. Doing so could result in fire, explosion, or other hazardous results.
 Hazard	Do **not** allow liquids, metal pieces, or other foreign materials to enter the unit. Doing so could result in fire, other hazards, or a unit malfunction.
	If a foreign material does enter the unit, turn the power off and **immediately** disconnect the power cord. Remove the material and contact an authorized service representative if damage has occurred.

[Transportation]

 Hazard	**Handle** with care to avoid impact shock during transit, which may cause malfunction. When you need to transport the unit, use the original or suitable alternative packing material.

[Circuitry Access]

	Do **not** remove covers, panels, casing, or access the circuitry with power applied to the unit. Turn the power off and disconnect the power cord prior to removal. Internal servicing / adjustment of unit should only be performed by qualified personnel.
 Stop	Do **not** touch any parts / circuitry with a high heat factor. Capacitors can retain enough electric charge to cause mild to serious shock, even after the power has been disconnected. Capacitors associated with the power supply are especially hazardous.
 Hazard	Unit should **not** be operated or stored with cover, panels, and / or casing removed. Operating the unit with circuitry exposed could result in electric shock / fire hazards or a unit malfunction.

[Potential Hazards]

 Caution	If abnormal odors or noises are noticed coming from the unit, immediately turn the power off and disconnect the power cord to avoid potentially hazardous conditions. If problems similar to the above occur, contact an authorized service representative **before** attempting to operate the unit again.

[Rack Mount Brackets, Ground Terminal, and Rubber Feet]

 Caution	To rack-mount or ground the unit, or to install rubber feet, do not use screws or materials other than those supplied. Doing so may cause damage to the internal circuits or components of the unit. If you remove the rubber feet that are attached to the unit, do not reinsert the screws that secure the rubber feet.

[Consumables]

 Caution	Consumable items that are used in the unit must be periodically replaced. For further details on which parts are consumables and when they should be replaced, refer to the specifications at the end of the Operation Manual. Since the service life of the consumables varies greatly depending on the environment in which they are used, such items should be replaced at an early date. For details on replacing consumable items, contact your dealer.

Upon Receipt

FA-9600 units and their accessories are fully inspected and adjusted prior to shipment. Check your received items against the packing lists below. Check to ensure no damage has occurred during shipment. If damage has occurred, or items are missing, inform your supplier immediately.

◆ **FA-9600 Box**

ITEM	QTY	REMARKS
FA-9600	1	
AC Cord	1 set	(Includes an AC cord retaining clip)
Rubber foot	4	
HDMI Cable Lacing Bracket	2 sets	
Rack Mount Brackets	1 set	EIA standard type (Includes 4 screws)
CD-ROM	1	Windows GUI / GUI Launcher installation files User manuals (PDF), etc.
Quick Setup Guide	1	

◆ **Hardware Option**

Option Card / Cable

ITEM	QTY	REMARKS
FA-96PS	1 set	Redundant power supply unit (Including AC cord and AC cord retaining clip)
FA-96AES-UBL	1	Digital audio (unbalanced) I/O card
FA-96AES-UBLC	1	Digital audio (unbalanced) I/O expansion cable
FA-96ANA-AUD	1	Balanced analog audio 4-In 4-Out card
FA-96MADI	1	MADI audio expansion card
FA-96GPI	1-2	External I/O control card
FA-96EX3G44-R	1	3G-SDI I/O card
FA-96EX12G06	1	12G-SDI 6-output expansion card
FA-96SFPC4	1	4-cage card for SFP modules
FA-96DB9-CBL	1	GPI expansion cable
FA-96DIN4-CBL	1	LTC I/O expansion cable

Remote Controller

FA-10RU	1	Remote Control Unit
FA-10DCCRU	1	Remote Control Unit

◆ **Software Option**

ITEM	QTY	REMARKS
FA-964K	1	4K and 12G-SDI option
FA-96UDC	1	Up/down converter option
FA-96AHDR2	1	Advanced HDR functions

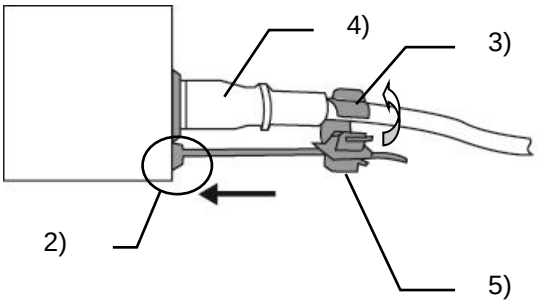
Trademarks

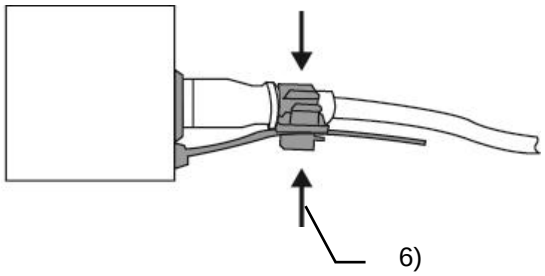
Installing the AC Cord Retention Clip

Secure the AC cord with the supplied ladder strap/retention clip assembly to prevent accidental removal from the unit.

◆ **Installing the clip**

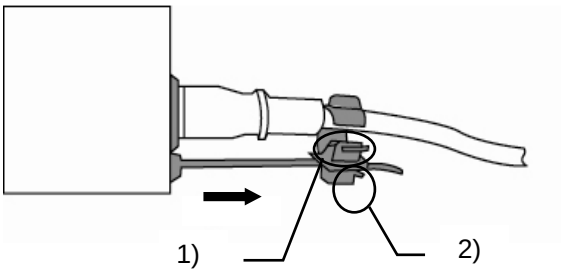
1) Wrap the retention clip around the AC cord (with the anchor of the ladder strap toward the unit).
2) Insert the anchor into the hole next to the AC IN socket.
3) Lightly fasten the clip around the AC cord.
4) Plug in the power cord.
5) Slide the clip on the ladder strap toward the plug.
6) Fasten the clip tightly.
7) Gently pull on the AC cord to ensure it is secured.





◆ **Unplugging the AC cord**

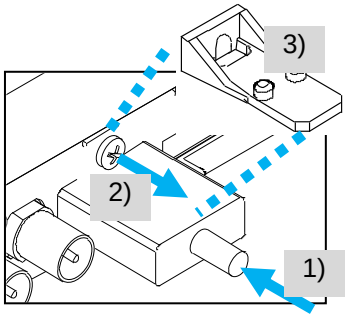
1) Push the tab on the retention clip up to unfasten the clip.
2) Push the tab on the ladder strap up and slide the clip back.
3) Unplug the AC cord.



Installing the HDMI Cable Lacing Bracket

Secure the HDMI cable to the panel with the supplied cable lacing bracket.

1) Plug the HDMI cable into the HDMI connector on the rear panel.
2) Loosen (but do not remove) the screw above the connector.
3) Place the bracket on the screw, above the connector.
   Tighten the screw (but not too tight) to secure the bracket.
4) Use the supplied tie wrap to secure the bracket to the connector.
5) Tighten the tie wrap and cut off any excess.



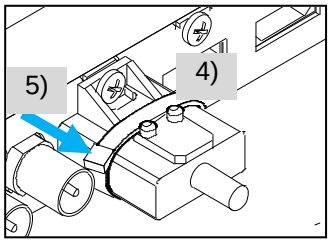


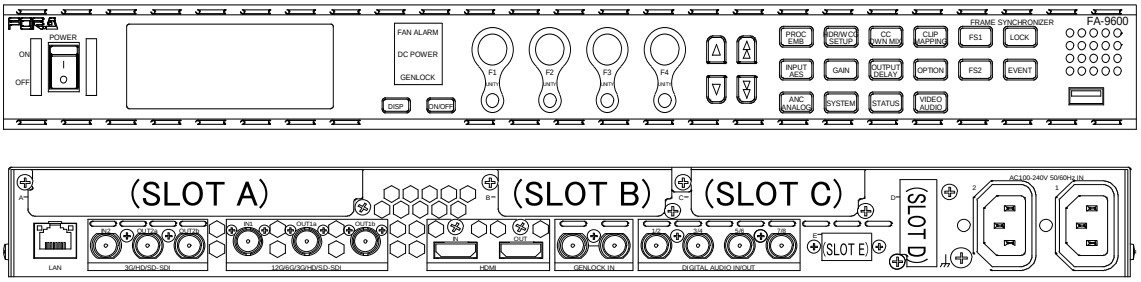
Table of Contents

1. Prior to Starting

1-1. Overview

The FA-9600 multi-purpose signal processor provides dual channel SD/HD frame synchronizer, with optionally supporting UHD 4K signals through Quad-Link 3G-SDI (*1,*2), Single-Link 12G-SDI (*1) and HDMI 2.0 (*1) interfaces.
More than a basic frame synchronizer, the FA-9600 is equipped with various converting capabilities including up-/down-conversions (*3). A newly developed color processing circuit supports the latest gamut and dynamic range specifications, and allows to interchange various video signals. Offering a wide range of audio processing, core features of remapping and gain adjustment.
The FA-9600 can be expanded by adding optional cards that make it an ideal standalone solution at transmission centers, in mobile production trucks, production studios, news stations, and other nonlinear editing and playout production environments.

(*1) FA-964K required
(*2) FA-96EX3G44-R required
(*3) FA-96UDC required



FA-9600 front and rear panels

1-2. Key Features

- Dual channel signal processor (FS) with 2 inputs and 4 outputs for each
- FA-964K option allows 4K/60p signals processing in either one of two FS channels
- Optional cards allow the latest 12G-SDI interface (*1) and support from SD to 4K/60p (*2)
- HDMI ports as standard for various connectivity purposes
- New Color Processor
  - ITU-R BT.2020 (WCG) and ITU-R BT.709 processing and conversion.
  - Various HDR/ SDR EOTF and OETF reduce differences with external devices. Custom EOTF / OETF log curves and color space data upload from computer
  - Dynamic Range conversion for Display light, OOTF (HLG) (*4)
  - SR-Live for HDR (*5) supported conversion (*4)
- Optional FA-96UDC converter
  - Up-/down-/IP-conversions (*3), ranging from SD to HD/4K (*2)
  - SQD / 2SI (*2,*3) and 3G-SDI Level-A/B (*3) conversion
  - 4K conversion between Single-, Dual- and Quad-Link SDI signals (Gearbox) (*2, *6)
- Robust frame synchronizer with audio and SDI error correction
- GUI software (full) and web browser (limited) control and SNMP monitoring (Support planned in the future)
- Miscellaneous options
  -Digital audio input/output expansion card / Digital audio expansion cable
  -Analog audio expansion
  -MADI audio expansion
  -3G-SDI input/output expansion
  -12G-SDI 6-output expansion
  -SFP cage card for 4 modules

-Redundant power supply system
-GPI input/output card / GPI expansion cable
- LTC input/output expansion cable

(*1) SD/HD and 3G-SDI if no FA-964K option installed.
(*2) FA-964K required
(*3) FA-96UDC required
(*4) FA-96AHDR (if FA-9600 firmware version is less than 3.0) or
FA-96AHDR2 (if FA-9600 firmware version is 3.0 or higher) required
(*5) SR-Live for HDR is a high quality and efficient live product workflow provided by SONY
(*6) FA-96EX3G44-R or FA-96SFPC4 required for Quad Link input.

1-3. Three MU Main Mode

FA-9600 units have two processing systems (**FS1** and **FS2**) and three MU Main mode: **Simultaneous 4K/HD**, **Dual HD** and **3D-LUT**. Available functions vary depending on the Mu Main mode. See Sec. 7-8 “MU OPERATION” and Secs 5-20 to 5-28.

-Simultaneous 4K/HD mode
FS1 supports **SD**, **HD** and **4K** signals with a **full-featured** converter.
FS2 supports **SD** and **HD** signals with a **restricted** converter

-Dual HD mode
FS1 supports **SD** and **HD** signals with a **full-featured** converter.
FS2 supports **SD** and **HD** signals with a **full-featured** converter.

- 3D-LUT mode (FA-96AHDR or FA-96AHDR2 required)
FS1 supports **SD**, **HD** and **4K** signals with a **full-featured** converter and can convert color space and dynamic range (between **SDR** and **HDR**) using **3D-LUT**.
FS2 is disabled.

* Converter function requires FA-96UDC.
* UHD 4K operation requires FA-964K.
* 3D-LUT mode requires FA-9600 Version 3.0 or higher and FA-96AHDR or FA-96AHDR2.
* SR-Live for HDR function requires FA-96AHDR2 optional software.

1-4. Notice on Overheat Protection

◆ **If temperature is close to the limit, a warning message is displayed**
If FA-9600 internal temperature is close to the upper limit of allowed operating range, a warning message is displayed on the front panel, Windows GUI and Web GUI. (The message will disappear if the temperature goes down to normal level.)

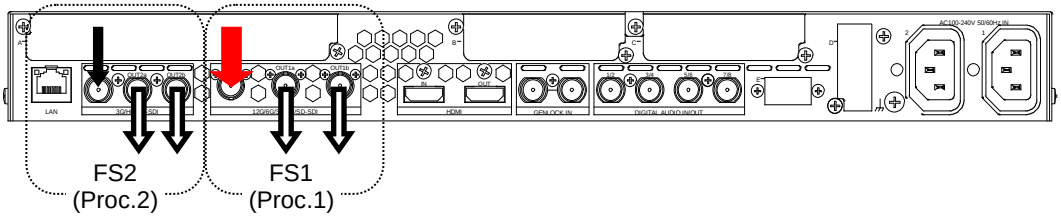
◆ **If temperature exceeds the limit, FA-9600 stops operation and signal output**
If FA-9600 internal temperature exceeds the upper limit of allowed operating range, the FA-9600 stops operation and signal output and displays an alert message that it stops operation due to the overheat protection, on the front panel, Windows GUI and Web GUI, until it is restarted.
In such cases, power off the FA-9600 and verify that air vents are not obstructed and whether the environment is causing the overheating. Wait for the device temperature to go down, then turn on the power.

1-5. Connection Example (Video Input / Output)

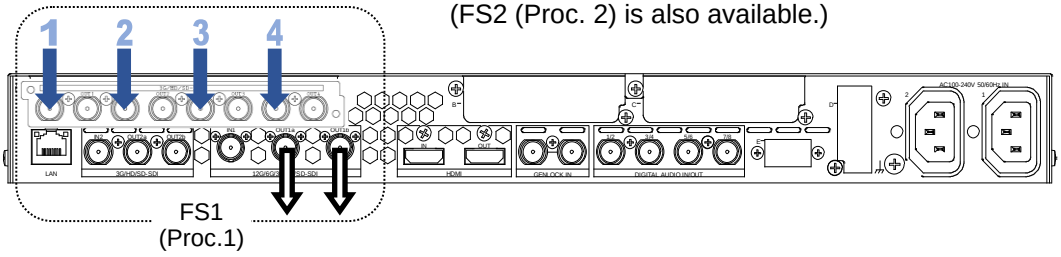
1-5-1. 4K In / HD Out + HD In / HD Out

Set MU Operation Mode to **Simultaneous 4K/HD**. (See 7-8. “MU OPERATION.”)
Input a **4K** video into FS1, change to **HD** in Converter1 (Proc. 1) and distribute to **two outputs**.
Input an **HD** video into FS2, send to Converter2 (Proc. 2) and distribute to **two HD outputs**.
Refer to **Example 1** and **Example 3** in Sec. 4-3. “Converter: HD<->4K” for how to set menu settings.

If 4K Input is 12G-SDI Single Link:



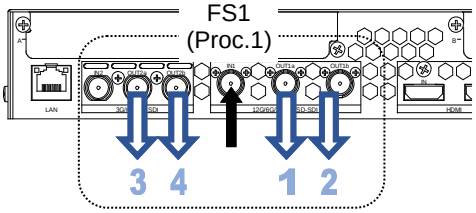
If 4K Input is 3G-SDI Quad Link (FA-96EX3G44-R option card required):
(FS2 (Proc. 2) is also available.)



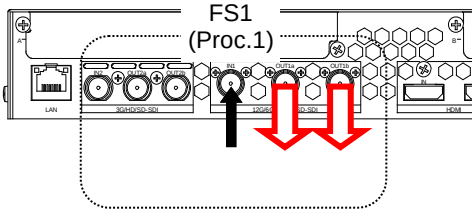
1-5-2. HD In / 4K Out

Set MU Operation Mode to **Simultaneous 4K/HD**. (See 7-8. “MU OPERATION.”)
Input an **HD** video into FS1, change to **4K** in Converter1 (Proc. 1) and distribute to **three outputs** using **12G-SDI Single Link** and **3G-SDI Quad Link** (FA-96EX3G44-R required).

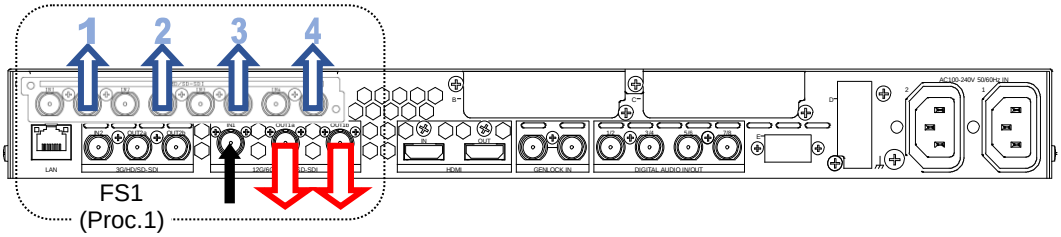
3G-SDI Quad Link Output



12G-SDI Single Link Output (2-distribution)

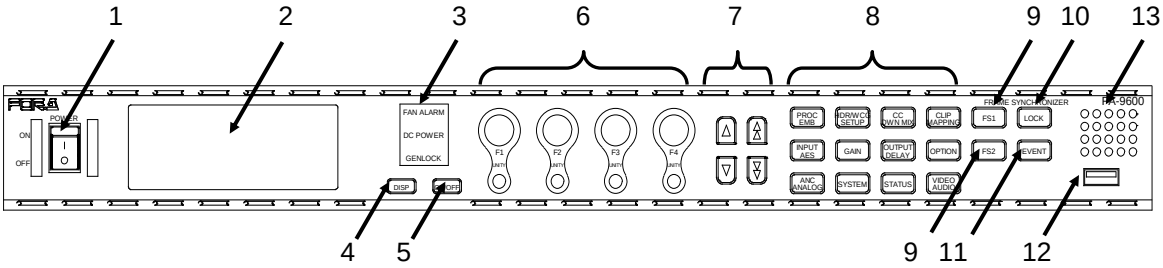


Simul output of **12G-SDI Single Link** and **3G-SDI Quad Link** (FA-96EX3G44-R required) (3-distribution)



2. Panel Descriptions

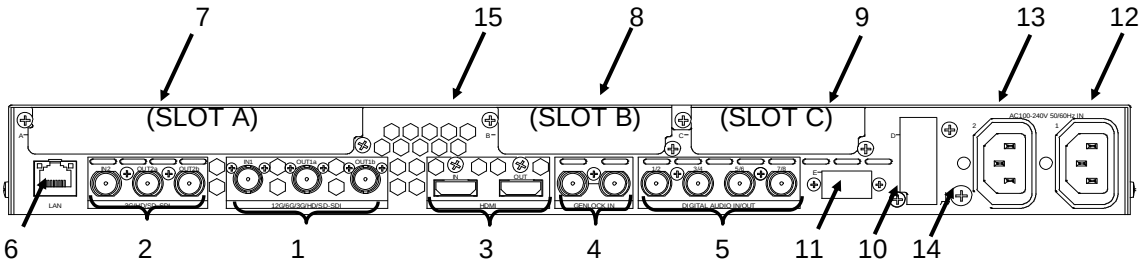
2-1. Front Panel



No	Name	Description	
1	Power switch	Turns unit ON / OFF.	
2	Color LCD panel	Displays menus and enters operational settings	
3	Alarm display	**FAN ALARM**: Lit when a fan alarm occurs. **DC POWER**: Lit when FA-96PS is installed and DC power error occurs. **GENLOCK**: Lit when an external reference signal is present.	
4	DISP button	Switches the LCD panel display.	
5	ON/OFF button	Turns the LCD panel display on/off. Turn OFF the LCD display while unused. This will extend the life of your LCD panel. Time out period can also be set, allowing you to automatically turn off the LCD display when no panel operation is detected for this period.	
6	F1-F4 control knobs UNITY buttons	Sets menu parameters by turning the control knobs. UNITY buttons allow you to reset parameters to their default values.	
7	Arrow buttons	Single	Selects a menu. (The arrows light to indicate movable directions.)
		Double	Selects a menu category. (The arrows light to indicate movable directions.)
8	Menu buttons	Displays the top menu in each menu category on the LCD panel by pressing a button.	
9	FS1 button FS2 button	Selects between FS1 and FS2.	
10	LOCK button	Locks the front panel operation. To lock the front panel, press and light the LOCK button. To release the panel lock, press and hold the lit LOCK button.	
11	EVENT button	Changes mode to event memory.	
12	USB slot	Do not use.	
13	Air supply vents	Internal cooling fans prevent overheating. Do not block the front, rear or side vents with other equipment or objects.	

* Install your FA-9600 unit in places where the LCD panel display can be correctly seen at the right angle, due to viewing angle problems caused by LCD systems. Installing the unit into a rack in a too-high position and viewing the screen from below may change contrast ratio and color values and distort menus, depending on the viewing angle.

2-2. Rear Panel



No	Name	Description
1	12G/6G/3G/HD/SD-SDI IN 1 OUT 1a/1b	SDI video input and output, supporting transmission rates of 270 Mbps to 12 Gbps. (BNC) 12G-SDI supported with FA-964K option. Up to 3G-SDI supported without FA-964K
2	3G/HD/SD-SDI IN 2 OUT 2a/2b	SDI video input and output, supporting transmission rates of 270 Mbps to 3 Gbps. (BNC) Bypassing relay from IN2 to OUT2a is possible when unit power is off or via manual operation.
3	HDMI IN HDMI OUT	HDMI input and output (Standard-A connectors) * Audio unsupported
4	GENLOCK IN	External reference signal input (BNC) Input a corresponding Black Burst or Tri-level Sync signal.
5	DIGITAL AUDIO IN/OUT 1/2 to 7/8	Digital audio input / output. Input or output selectable per 2-port pair. (BNC)
6	LAN	Ethernet port supporting 100/1000BASE-T (RJ-45) To control the unit from a Windows GUI interface or remote control unit, use an Ethernet hub to expand LAN ports.
7	SLOT-A	Option card installation slot for video expansion.
8	SLOT-B	Option card installation slot for audio expansion.
9	SLOT-C	Option card installation slot for audio expansion.
10	SLOT-D	Option card installation slot for control interface expansion.
11	SLOT E	Option card installation slot for control interface expansion
12	AC IN 1	AC power input. (100-240 V AC 50/60 Hz)
13	AC IN 2	AC power input when FA-96PS is installed. (100-240 V AC 50/60 Hz)
14	Ground Terminal	Used to ground the unit to protect operators from static electricity and/or electrical shock.
15	Air exhaust vents	Internal cooling fans prevent overheating. Do not block the front, rear or side exhaust vents with other equipment or objects.

2-3. Option Slots

The FA-9600 can be upgraded by installing optional modules into Slots A to C.
Install option cards into the correct slots since available slots are defined depending on the option type cards as shown below.

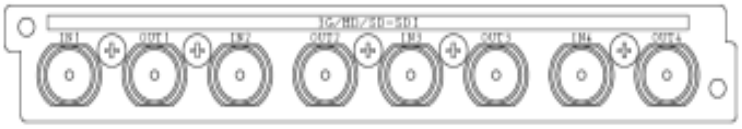
FA-9600 option list

Product name	Description	Slot
FA-96PS	Power supply option to enable redundant power supply mode.	-
FA-964K	Allows you to use 12G-SDI signals.	(Software)
FA-96UDC	Allows you to perform up-, down- and cross conversions.	(Software)
FA-96AHDR2	Allows you to use advanced color imaging features such as HDR (High Dynamic Range) and WCG (Wide Color Gamut).	(Software)
FA-96EX3G44-R	Allows you to expand 3G/HD/SD-SDI input/output.	A
FA-96EX12G06	Allows you to add 6 outputs of 12G/6G/3G/HD/SD-SDI.	A
* FA-96SFPC4	4-cage card for SFP modules	A
FA-96AES-UBL	Allows you to expand digital audio input/output.	B
FA-96AES-UBLC	Allows you to expand digital audio input/output.	B or C
* FA-96ANA-AUD	Balanced analog audio 4-In 4-Out card	B
FA-96MADI	Allows you to add MADI interface.	B
FA-96GPI	Allows you to add a GPI interface (10-input/10-output)	B or C
FA-96DIN4-CBL	Allows you to expand LTC input/output (1-input/1-output)	D
FA-96DB9-CBL	Allows you to add a GPI interface (7 input or output)	E

* Note that FA-96SFPC4 and FA-96ANA-AUD options cannot be installed together.

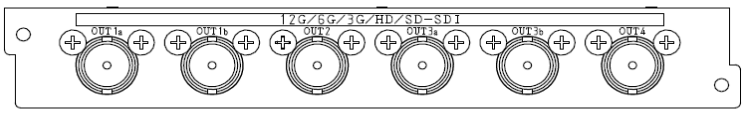
2-3-1. FA-96EX3G44-R (SDI I/O Expansion)

SDI expansion card that supports 4-input/4-output 3G/HD/SD-SDI and allows relay bypass.
Install the card to **Slot A**.



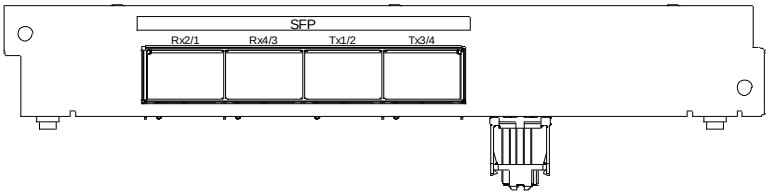
2-3-2. FA-96EX12G06 (12G-SDI Output Expansion)

SDI output expansion card that supports 12G/6G/3G/HD/SD-SDI. Up to 6 outputs can be added.
Install the card to **Slot A**.



2-3-3. FA-96SFPC4 (4-Cage Card for SFP Modules)

Cage (connector) card that can install up to 4 SFP or SFP+ (Small Form Factor Pluggable) modules. Install the card to **Slot A**.



NOTE

SFP/SFP+ modules are not supplied. Please prepare modules for yourself and consult your FOR-A supplier for more details.

The installed module information is displayed on the Status tab page in the Windows GUI. (See Sec. 11-7. “Status Tab Display.”)
The following Embrionix SFP modules have been tested and approved and are ready for use.

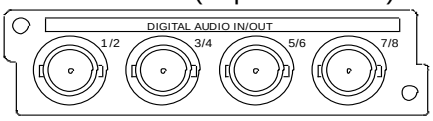
I/O	SFP module	Module type		
Rx (IN1-2/IN3-4)	EB12LC2R-MN-P-PA	12G/6G/3G/HD/SD-SDI	Dual receiver	SFP optical
	EB60LC2R-MN2-P	3G/HD/SD-SDI		
Tx (OUT1-2/OUT3-4)	EB12LC2T-SN-13D	12G/6G/3G/HD/SD-SDI	Dual trans-mitter	SFP optical
	EB60LC2T-MN2-13F	3G/HD/SD-SDI		

Use Singlemode fiber optic cables with LC connectors. For more details, visit Embrionix website (https://www.embrionix.com/)

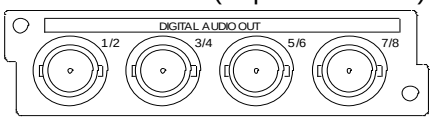
2-3-4. FA-96AES-UBL and 96AES-UBLC (Audio Expansion)

AES/EBU (digital) audio expansion card and cable that can add 4 ports respectively. Install a card into **Slot B** and a cable into **Slot B or C**.
Installing an **FA-96AES-UBL** card adds 4 ports (8 channels) for **input** or **output**. Input or output can be selected per 2 ports (4 channels) in the AES TERMINAL IN/OUT SET menu (see Sec. 6-17) in the same manner as standard AES ports.
Installing an **FA-96AES-UBLC** cable adds 4 ports (8 channels) for **output** and sets all standard AES ports to **input**.

FA-96AES-UBL (Expansion card)



FA-96AES-UBLC (Expansion cable)

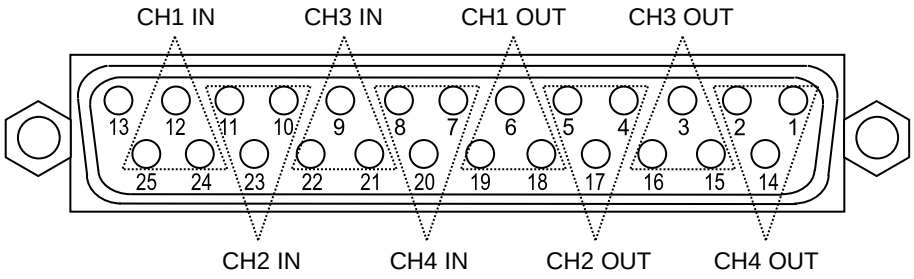


Installed AES card/cable			Input / Output	Total number of channels
Standard AES	-	-	I/O selectable per 4 channels	8
Standard AES	UBL	-	I/O selectable per 4 channels	16
Standard AES	-	UBLC	Std AES: 8-ch input, UBLC: 8-ch output	16
Standard AES	UBL	UBLC	Std AES: 8-ch input, UBLC: 8-ch output UBL: I/O selectable per 4 channels	24

2-3-5. FA-96ANA-AUD (Balanced Analog Audio 4-In 4-Out Card)

Analog audio expansion card that can add 4 balanced inputs and outputs for each. Respectively connect **hot** and **cold** lines to pins with **plus** (+) and **minus** (-) symbols. (See the table below.)
Install a card into **Slot B**.

◆ **FA-96ANA-AUD Connector (25-pin D-sub, female, with inch screws)**

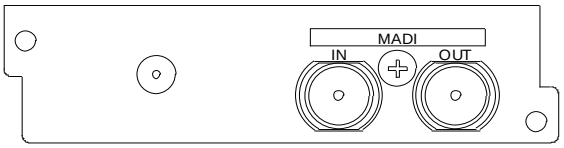


Connector Pin Assignments (Standard TASCAM)

Pin No.	Signal	Pin No.	Signal
1	CH4 OUT+	14	CH4 OUT-
2	CH4 OUT COM	15	CH3 OUT+
3	CH3 OUT-	16	CH3 OUT COM
4	CH2 OUT+	17	CH2 OUT-
5	CH2 OUT COM	18	CH1 OUT+
6	CH1 OUT-	19	CH1 OUT COM
7	CH4 IN+	20	CH4 IN-
8	CH4 IN COM	21	CH3 IN+
9	CH3 IN-	22	CH3 IN COM
10	CH2 IN+	23	CH2 IN-
11	CH2 IN COM	24	CH1 IN+
12	CH1 IN-	25	CH1 IN COM
13	NC		

2-3-6. FA-96MADI (MADI Audio Card)

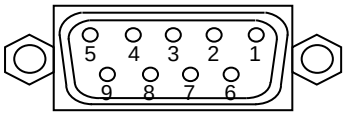
Audio expansion card that supports MADI (Multichannel Audio Digital Interface) audio using 75-ohm coaxial cable. Install a card into **Slot B**.



2-3-7. FA-96DB9-CBL (7 GPI Input/Output)

A GPI expansion cable that can be add **7 GPI input/output**. Install the option to **Slot E**.
The FA-96DB9-CBL connector pin assignments are as shown in the table below.
Use the menu to select input or output function for each pin. (See Sec. 7-1. “GPI UTILITY / INPUT / OUTPUT.”)

◆ **FA-96DB9-CBL Connector (9-pin D-sub, female, with inch screws)**

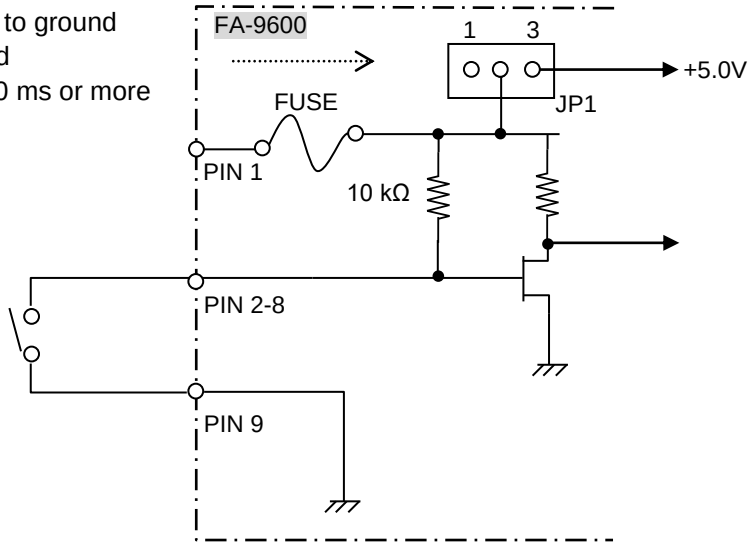


Connector Pin Assignments

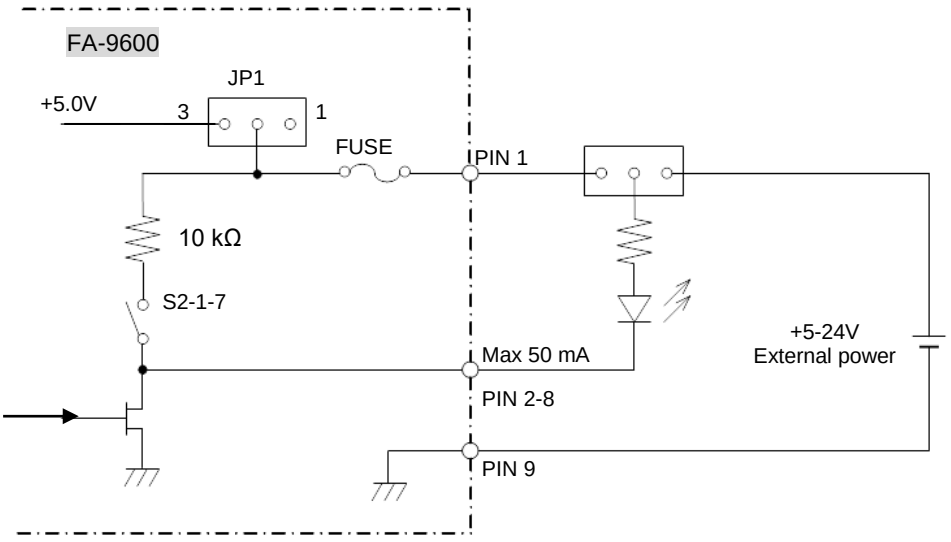
Pin No.	Description
1	DC IN or DC OUT DC IN or OUT (+5.0 V) set by the jumper pin: **JP1** (See the next page.) Factory default: **DC OUT** Total max load current is 200 mA.
2-8	GPI 1 - 7 (Input or output)
9	GND (Signal ground)

◆ **GPI Input Circuit**

Function **ON**: Pin shorted to ground
Function **OFF**: Pin opened
GPI input pulse width: 100 ms or more



◆ **GPI Output Circuit**



Jumper Setting

JP1: Switches between internal and external power.

1-2 shorted: DC IN (External power input)

2-3 shorted: DC OUT (Internal power output)

Dipswitch Settings

S2: 7 dipswitch pins turn output on/off.

Off: Push-pull output (factory default setting)

On: Open-drain output

Dipswitch Pin Assignments

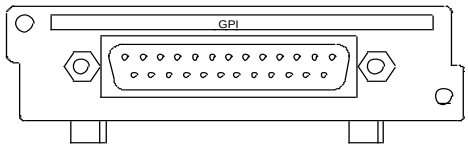
Dipswitch pin	Controlled output	Dipswitch pin	Controlled output
S2-1	GPI OUT 1	S2-5	GPI OUT 5
S2-2	GPI OUT 2	S2-6	GPI OUT 6
S2-3	GPI OUT 3	S2-7	GPI OUT 7
S2-4	GPI OUT 4		

IMPORTANT

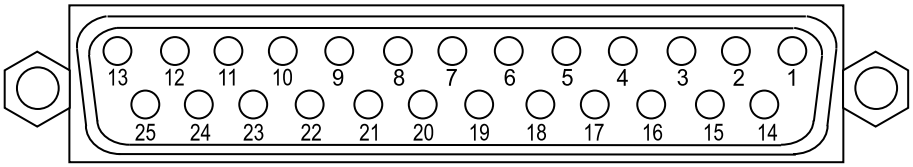
Loadable current for the GPI output circuit: Max 50 mA.
External power supply voltage: +5 to +24V DC

2-3-8. FA-96GPI (10 Inputs and 10 Outputs)

GPI interface card that provides **10 inputs and 10 outputs**.
Each input/output terminal is function-assignable. To assign functions, see Sec. 7-1 “GPI UTILITY/INPUT/OUTPUT.”
Install to **Slot B** or **C**.



◆ **FA-96GPI Connector (25-pin D-sub, female, with inch screws)**



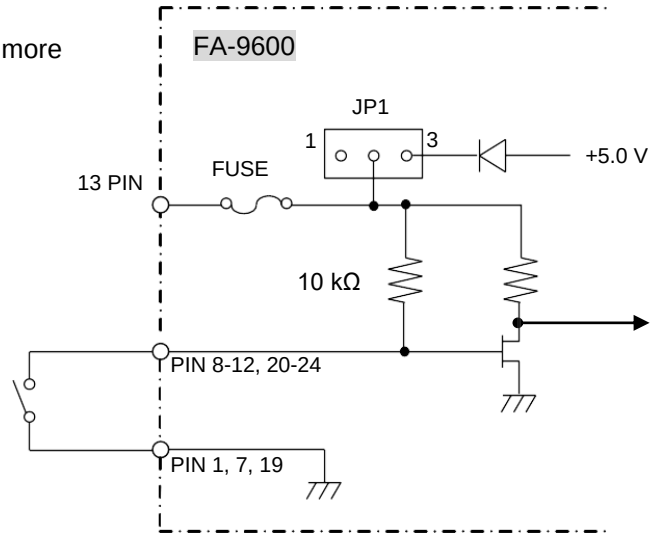
Connector Pin Assignments

Pin No.	Description
1	GND (Signal ground)
2	GPI OUT 1
3	GPI OUT 2
4	GPI OUT 3
5	GPI OUT 4
6	GPI OUT 5
7	GND (Signal ground)
8	GPI IN 1
9	GPI IN 2
10	GPI IN 3
11	GPI IN 4

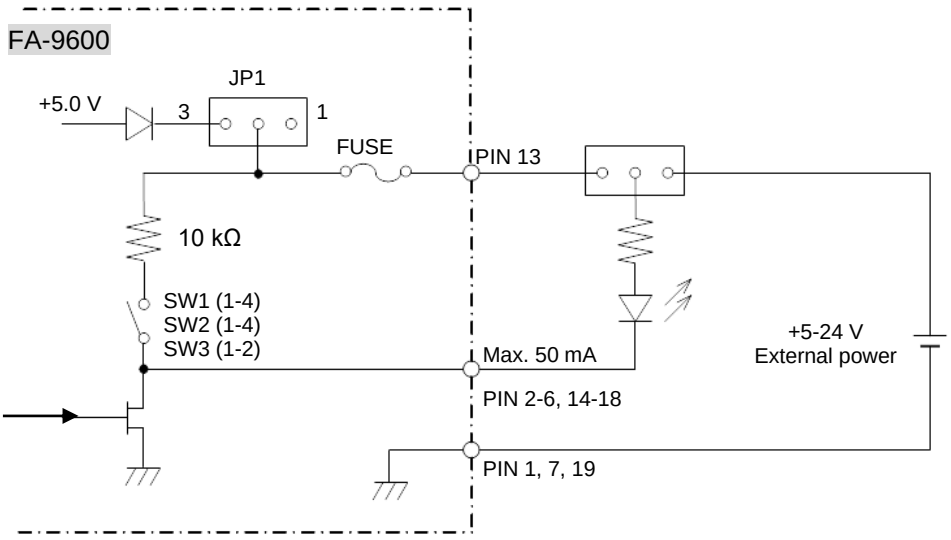
12	GPI IN 5
13	DC IN or DC OUT DC IN or OUT (+5.0 V) set by the jumper pin: **JP1** (See the next page.) Factory default: **DC OUT** Total max load current is 500 mA.
14	GPI OUT 6
15	GPI OUT 7
16	GPI OUT 8
17	GPI OUT 9
18	GPI OUT 10
19	GND (Signal ground)
20	GPI IN 6
21	GPI IN 7
22	GPI IN 8
23	GPI IN 9
24	GPI IN 10
25	NC

◆ **GPI Input Circuit**

GPI input pulse width: 100 ms or more



◆ **GPI Output Circuit**



Jumper setting

JP1: Switches between internal and external power.

1-2 shorted: DC IN (External power input)

2-3 shorted: DC OUT (Internal power output)

Dipswitch settings

SW1(1-4),SW2(1-4), SW3(1-2): 10 dipswitch pins turn output on/off.

Off: Push-pull output (factory default setting)

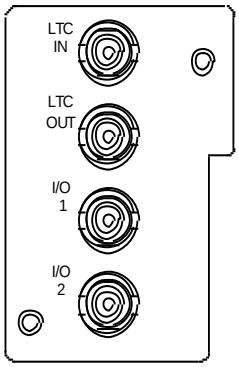
On: Open-drain output

Dipswitch Pin Assignments

Dipswitch pin	Controlled output	Dipswitch pin	Controlled output
SW1-1	GPI OUT 1	SW2-1	GPI OUT 5
SW1-2	GPI OUT 2	SW2-2	GPI OUT 6
SW1-3	GPI OUT 3	SW2-3	GPI OUT 7
SW1-4	GPI OUT 4	SW2-4	GPI OUT 8
		SW3-1	GPI OUT 9
		SW3-2	GPI OUT 10

2-3-9. FA-96DIN4-CBL (LTC I/O Expansion Cable)

The LTC Expansion Cable allows you to add one LTC input and one LTC output. Install the cable into Slot D.



I/O 1 and I/O 2 are reserved for future use.

3. Operation

3-1. Front Panel Operation

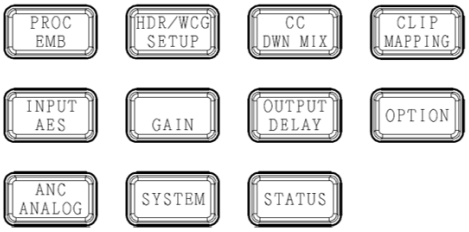
◆ **Lock Button**

All front panel operations are disabled when the LOCK button is lit.
To lock the front panel, press the LOCK button. The button light will turn on.
To unlock the front panel, hold down the LOCK button. The button will turn off.

◆ **Selecting a Menu**

VIDEO/AUDIO selection button

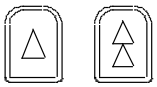
Both Video and Audio menus are assigned to some menu buttons.
The VIDEO/AUDIO button allows you to select Video or Audio menus and lights to indicate which menu is enabled. The blue button light indicates Video menus (upper menu labels) are enabled, and the orange light indicates Audio menus (bottom menu labels) are enabled. Press the button to change the light color.



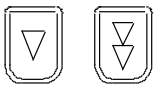
Menu buttons

◆ **Arrow buttons**

Moving between menu pages
Use up/down double-arrow buttons to move between menu pages.

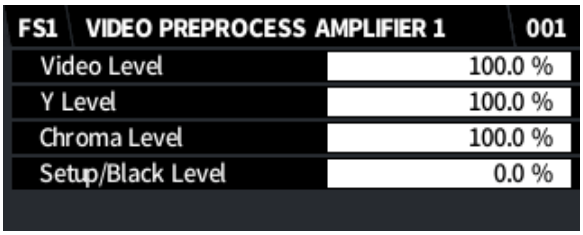


Moving between menu items
Use up/down single-arrow buttons to move between menu items in menu pages. The buttons are lit if available and unlit if unavailable.

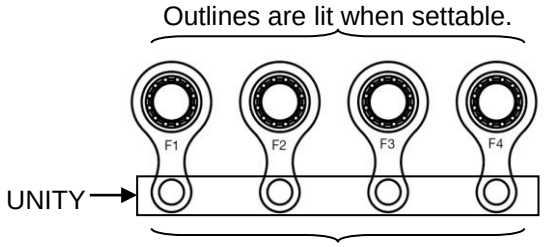


◆ **Setting Parameters**

Pressing a menu button displays the corresponding menu as shown below on the menu display and control knob (F1-F4) outlines will light if the buttons are available for menu setting. Lighting orange indicates that the selected parameter is set to default.
To change parameter values, press the corresponding function buttons. (A buzzer sound will be heard if the setting value exceeds the allowable parameter range.)
To set a parameter to its default value, press the corresponding UNITY button below F1-F4. (In such cases, repressing the UNITY button reverts it to the previous state.)



LCD display

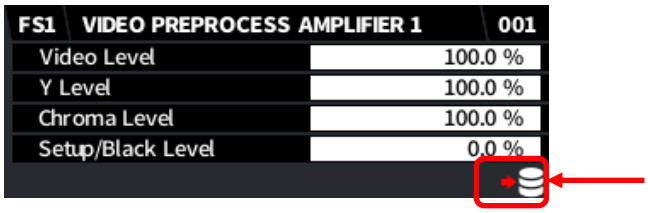


◆ **FS1/FS2 Selection Buttons**

"FS1" and "FS2" in front of menu titles indicate that the menu can be set independently between FS1 and FS2. Select an FS using the FS1 and FS2 buttons.
In 3D-LUT mode, only FS1 is available.

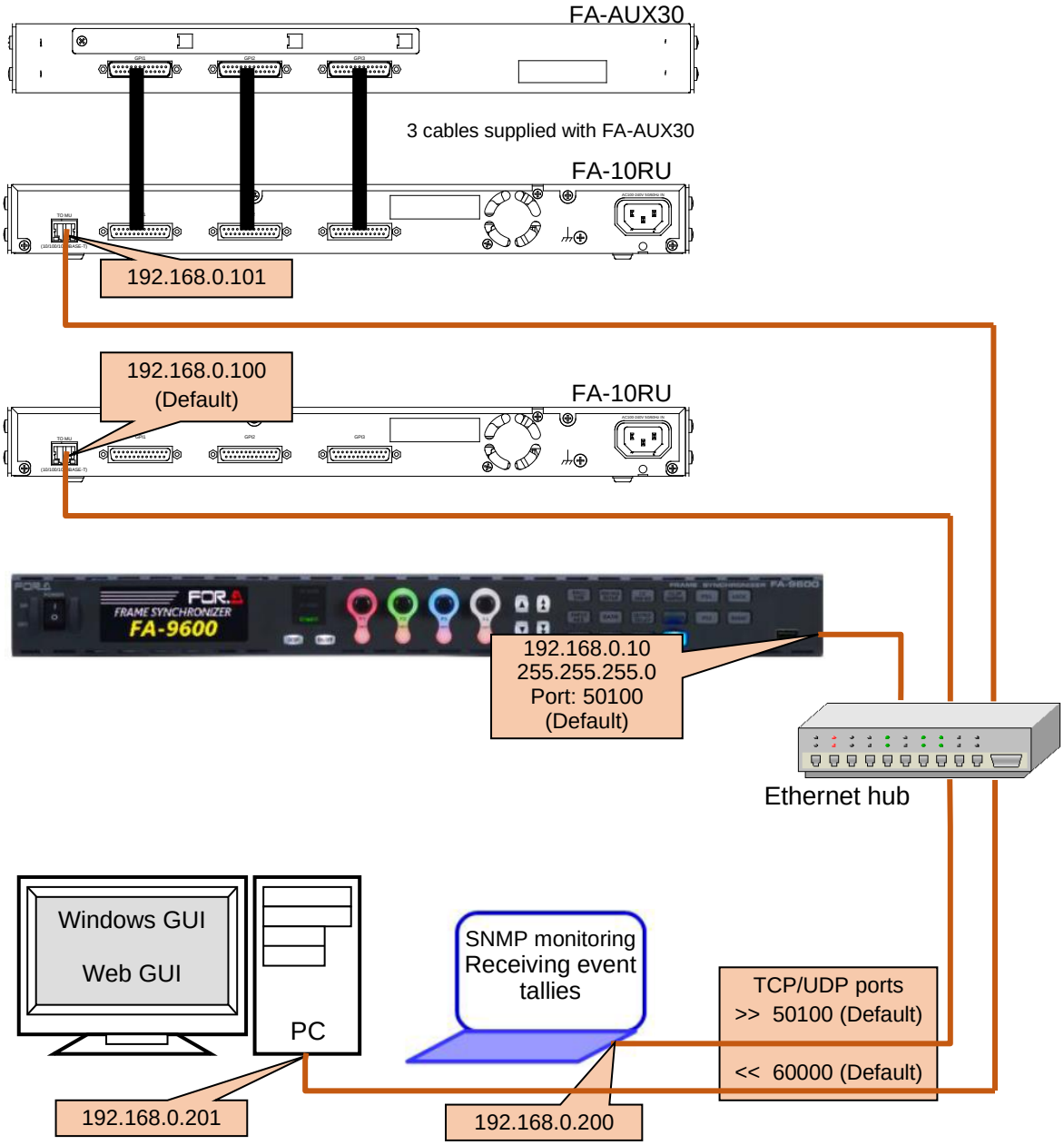
3-2. Memory Access Icon

An access icon as shown below will appear on the bottom-right corner of the menu screen while the built-in memory is being accessed, such as during power-on or event operation.
Do not power off FA-9600 units while the icon is displayed. Otherwise, memory data may be lost or broken.



3-3. FA-9600 Remote Control

Various remote control devices and tools are provided for FA-9600 units. The following diagram shows a remote connection example.



Refer to the table below to use your suitable control devices or tools.

To control from FA-10RU or FA-10DCCRU
>> Set **Remote Unit** to **Accept** in the Remote Control Unit Setting menu (See Sec. 7-4).

To control using LAN commands
>> Set **LAN Command** to **Accept** in the same menu as above.

To control using Ember+ commands
>> Set **Ember+** to **Accept** in the same menu as above

Remote control	Device	Connection	Function	Refer to
FA-10RU (*1)	FA-10RU	LAN	Almost all menu settings Event Save/Load Backup settings	FA-10RU Operation Manual
	FA-10RU FA-AUX30	LAN & original cables	Expanded control switches added to FA-10RU.	FA-10RU Operation Manual
FA-10DCCRU (*1)	FA-10DCCRU	LAN	Remote control unit dedicated to Color Correction feature.	FA-10DCCRU Operation Manual
	FA-10DCCRU FA-AUX30	LAN & original cables	Expanded control switches added to FA-10DCCRU.	FA-10DCCRU Operation Manual
Windows GUI (Software) (*1)	PCs Tablets	LAN	Almost all menu settings	Sec. 9 Sec. 11.
			Launcher tool for Window GUI.	Sec. 10.
Web GUI (Web browser)	Computers Tablets	LAN	Device status monitoring FA-9600 network settings Import/export events and gamma, gamut and lut data.	Sec. 12 Sec. 13.
Commands (Original) (*2)	Computers Tablets	LAN	Status messages and menu settings	FA-9600 Command Manual
Commands (Ember+) (*3)	Control unit	LAN	Status messages and menu settings	Appendix 2: Ember+
SNMP monitoring	Computers Tablets	LAN	Status monitoring and traps	Sec. 15.
GPIO	GPIO control device	GPI	GPI input/output using FA-96GPI and/or FA-96DB9-CBL options.	Sec. 7-1.

(*1) Up to **5** connections per FA-9600 are available for **Windows GUI**, **FA-10RU** and **FA-10DCCRU** at a time.

(*2) Up to **2** connections per FA-9600 are available for **LAN commands** at a time.

(*3) Up to **5** connections per FA-9600 are available for **Ember+ commands** at a time.

FA-9600 can save menu settings as events (excluding MU Operation Mode).
Complex conversion settings can be easily set by only loading events. Desired events can be loaded according to input signal format. Event data can be backed up and restored from web browsers (Web GUI).

Event operation	Operation	Description	Refer to Sec.
Event save	Front panel Windows GUI FA-10RU Original commands	Saves FA-9600 menu settings	8, 11-5 FA-9600 Command Manual
Event load		Loads FA-9600 menu settings	
Auto event load		Loads created and uploaded events	13-3
Event Load buttons	Windows GUI	Loads Color Processor settings.	4 11-2-5
Event export / import	Web GUI	Backups event data. Restores event data.	13-3
Event data editing	Web GUI Event Editor	Gives names to events. Edits and replaces event content using the Web GUI.	14
Event tally	Original message format	Notifies the difference between event content and FA-9600 menu settings. (Setup in Web GUI)	14-3

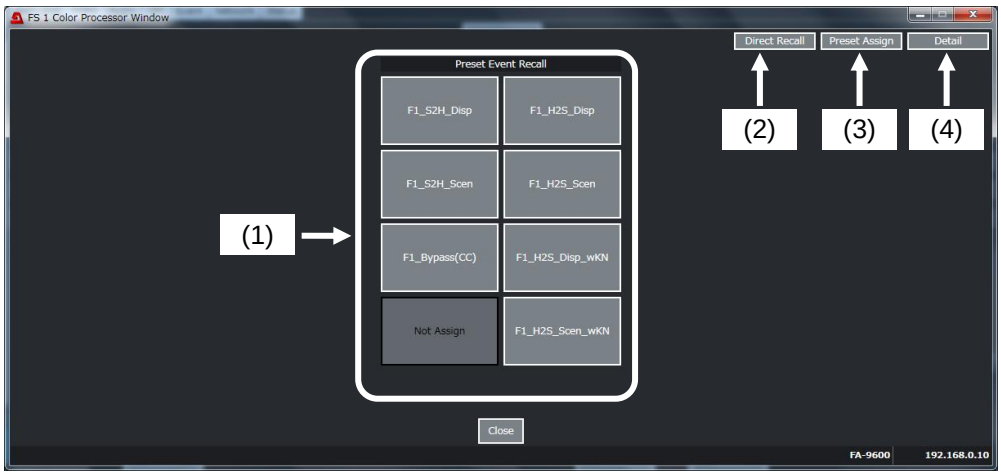
4. FA-9600 Setting Example

4-1. Color Processer: SDR<->HLG (with Preset Events)

Using preset events allows you to make color space or gamut conversion settings easier.
Eleven preset events are provided for each FS.

◆ **How to Load Preset Events**

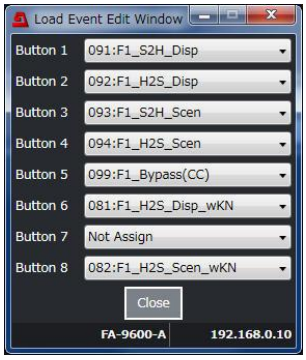
Launching the Window GUI software and opening "**Video Block**" > "**Color Processor 1**" or "**Color Processor 2**" menu displays the **Preset Event Recall** screen as shown below, in which Preset Event buttons are provided and allow you to instantly load complex color space and gamut settings simply by pressing these buttons.



(1) Preset Event Buttons (8 buttons)
Clicking a button loads the event assigned to the button.
See Sec. 4-1-1. "Preset Event Stored in FA-9600" for details on settings stored in events.

(2) Direct Recall Button
Allows you to select whether to display the confirmation dialog box when loading events using Preset Event buttons. Pressing the **Direct Recall** button turns the button to **blue** and the confirmation dialog box will never be displayed when recalling events.

(3) Preset Assign button
Allows you to remap Preset Event button assignments.
Pressing the **Preset Assign** button displays the dialog box as shown at right and enables you to change assignments.
(See 4-1-2. "Preset Event Stored in CD-ROM.")



(4) Detail button
Allows you to go to the Color Processor menu page, in which detailed menu settings can be checked or changed.
(See Sec. 11-2-5. "Color Processor1, 2")

Note that once the Color Processor menu is displayed using the **Detail** button, the **Preset Event Recall** screen will **never** be displayed when you open the Color Processor page. To make the Preset Event Recall screen appear again on the screen, press the **Preset** button at the upper-right corner of the Color Processor menu.

4-1-1. Preset Event Stored in FA-9600

1. Event No: 91/95
Event name: F1/F2_S2H_Disp
Conversion: Display-referred conversion from SDR to HLG
(Example in ITU-R BT.2390)
Application: Converts SDR contents to HDR (HLG) for HDR broadcasting.

2. Event No: 92/96
Event name: F1/F2_H2S_Disp
Conversion: Display-referred conversion from HLG to SDR referring to Display.
Inverse conversion of No 1.
Application: Converts contents created in HLG or Live HLG programs to SDR.
Monitors an HLG camera on SDR monitors

3. Event No: 93/97
Event name: F1/F2_S2H_Scen
Conversion: Scene Referred conversion from SDR to HLG
Application: Converts SDR camera images to HLG for HDR broadcasting.

4. Event No: 94/98
Event name: F1/F2_H2S_Scen
Conversion: Scene Referred conversion from HLG to SDR. Inverse conversion of No. 3
Application: Converts HLG camera images to SDR for SDR broadcasting.

5. Event No: 81/83
Event name: F1/F2_H2S_Disp_wKN
Conversion: Display Referred conversion from HLG to SDR with Knee function
Application: Converts HLG product or live contents to SDR contents.
Monitoring HLG cameras on SDR monitors.

6. Event No: 82/84
Event name: F1/F2_H2S_Scen_wKN
Conversion: Scene Referred conversion from HLG to SDR with Knee function
Application: Converts HLG camera images to SDR for SDR broadcasting.

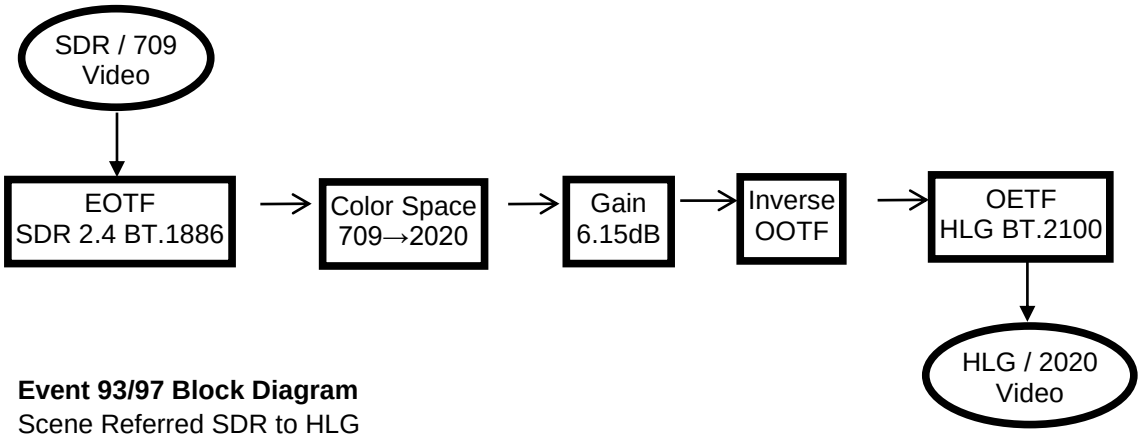
7. Event No: 99/100
Event name: F1/F2_Bypass(CC)
Conversion: Disables Dynamic Range and Color Gamut conversions, Gain adjustment and Knee function.
Application: Passes through inputs without changing Dynamic Range and Color gamut.
Disables Dynamic Range and Color Gamut conversions, Gain adjustment and Knee function after loading other events.

Parameter settings in preset events

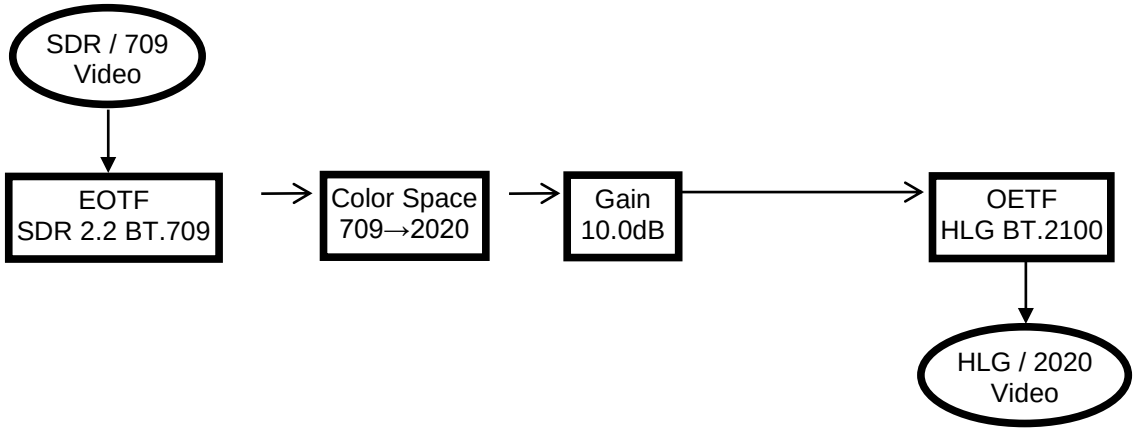
	Event No		Referred	Conversion	Input Gamma Curve / Color Space	Output Gamma Curve / Color Space	OOTF (Input)	Inverse OOTF (Output)	SDR GAIN (dB)	Knee
	FS1	FS2								
1	91	95	Display	SDR to HLG	SDR 2.4 BT.1886 / BT.709	HLG BT.2100 / BT.2020	Disable	Inverse OOTF	6.15	Disable
2	92	96		HLG to SDR	HLG BT.2100 / BT.2020	SDR 2.4 BT.1886 / BT.709	Enable	Disable	6.15	Disable
3	93	97	Scene	SDR to HLG	SDR 2.2 BT.709 / BT.709	HLG BT.2100 / BT.2020	Disable	Disable	10.04	Disable
4	94	98		HLG to SDR	HLG BT.2100 / BT.2020	SDR 2.2 BT.709 / BT.709	Disable	Disable	10.04	Disable
5	81	83	Display	HLG to SDR	HLG BT.2100 / BT.2020	SDR 2.4 BT.1886 / BT.709	Enable	Disable	6.15	Enable
6	82	84	Scene	HLG to SDR	HLG BT.2100 / BT.2020	SDR 2.2 BT.709 / BT.709	Disable	Disable	10.04	Enable

In Conversions 1 and 3, SDR 100% White is converted to HLG 75% White
In Conversions 2 and 4, HLG 75% White is converted to SDR 100% White.
Knee settings for Conversions 5 and 6: Output Clip: 109.0%, Knee Slope: 0.1, Knee Point: 96.0%

1. Event 91/95 Block Diagram
Display Referred SDR to HLG



3. Event 93/97 Block Diagram
Scene Referred SDR to HLG



4-1-2. Preset Events in CD-ROM (FA-96AHDR2 required)

8. Event No: Event 1/2 in the supplied CD-ROM
Event name: F1/F2_HLG_HLG_Live
Conversion: Conversion from HLG to HLG_Live
Application: Converts from HLG video to SR Live for HDR supported video.

9. Event No: Event 3/4 in the supplied CD-ROM
Event name: F1/F2_HLG_SDR_AIR
Conversion: Conversion from HLG or HLG_Live to SDR
Application: Performs conversions from HLG or HLG Live to SDR, equivalent of AIR Matching conversions.

10. Event No: Event 5/6 in the supplied CD-ROM
Event name: F1/F2_SDR_HLG_AIR
Conversion: Conversion from SDR to HLG
Application: Performs conversions from SDR to HLG, equivalent of AIR Matching conversions.

11. Event No: Event 7/8 in the supplied CD-ROM
Event name: F1/F2_SL3LH_HLG
Conversion: Conversion from S-Log3 to HLG
Application: After converting, retains the same look as before (S-Log3 video viewed on a monitor in S-Log3 (Live HDR) mode).

12. Event No: Event 9/10 in the supplied CD-ROM
Event name: F1/F2_SDR->HLG(Scene OAdj)
Conversion: Scene referred conversions from SDR to HLG adding an OOTF correction. (Example described in ITU-R BT.2390)
Application: Using SDR camera source on HLG TV programs with OOTF correction.

13. Event No: Event 11/12 in the supplied CD-ROM
Event name: F1/F2_HLG->SDR(Scene OAdj)
Conversion: Scene referred conversions from HLG to SDR with OOTF correction. (Example described in ITU-R BT.2390)
Application: Using HDR camera source on SDR TV programs with OOTF correction

Applying Preset Events 8 and 7 set parameters as shown below.

No	Event No		Referred	Conver-sion	Input Gamma Curve / Color Space	Output Gamma Curve / Color Space	OOTF (Input)	Inverse OOTF (Output)	OOTF RGB	Ope-ration	SDR GAIN (dB)	Knee
	FS1	FS2										
8	CD 1	CD 2	Scene	HLG→ HLG_Live	HLG BT.2100 / BT.2020	HLG BT.2100 / BT.2020	Disable	Enable	SR-Live	OOTF	0.0	Disable
9	CD 3	CD 4	AIR	HLG_Live →SDR	HLG BT.2100 / BT.2020	SDR 2.2 BT.709 / BT.709	Enable	Disable	SR-Live	Inverse OOTF	6.0	Enable
10	CD 5	CD 6	AIR	SDR→ HLG_Live	SDR 2.2 BT.709 / BT.709	HLG BT.2100 / BT.2020	Disable	Enable	SR-Live	OOTF	6.0	Disable
11	CD 7	CD 8	Display	S-Log3→ HLG	S-Log3 Live HDR / BT.2020	HLG BT.2100 / BT.2020	Disable	Enable	SR-Live	Disable	0.0	Disable
12	CD 9	CD 10	Scene	SDR→HLG	SDR 2.2 BT.709 / BT.709	HLG BT.2100 / BT.2020	Disable	Enable	Adjust-ment	OOTF	10.04	Disable
13	CD 11	CD 12	Scene	HLG→SDR	HLG BT.2100 / BT.2020	SDR 2.2 BT.709 / BT.709	Enable	Enable	Adjust-ment	Inverse OOTF	10.04	Enable

When converting **HLG** to **HLG LIVE**, to use the same reference white (75%) after conversion, set **DYNAMIC RANGE GAIN** (<p 49>) to **-5.1 dB**.

4-2. Color Processer: HLG<->PQ

As for PQ conversions, no presets are provided. Refer to the parameter settings in the table below to perform conversion settings manually.

Conversion	Input Gamma Curve / Color Space	Output Gamma Curve / Color Space	OOTF (Input)	Inverse OOTF (Output)
PQ to HLG	ST 2084 (PQ) / BT.2020	HLG BT.2100 / BT.2020	Disable	Enable
HLG to PQ	HLG BT.2100 / BT.2020	ST 2084 (PQ) / BT.2020	Enable	Disable

4-3. Converter: HD<->4K

See Sec. 5-13. “INPUT SELECT(Synchronizer).”
See Sec. 5-15. “INPUT SELECT(Color Processor.”
See Sec. 5-19. “OUTPUT SELECT.”
See Sec. 5-20. “FORMAT CONVERT (FA-96UDC).”

◆ **1080/59.94i input to 3840x2160/59.94p output**
Example 1: Outputs from **OUT1a/1b** using **12G Single Link**.
(OUT1a and OUT1b display the same image)
Example 2: Outputs from **OUT1a/1b** using **6G Dual Link**.
Example 3: Outputs from **Slot A OUT1-4** using **3G Quad Link**.

Menu	INPUT SELECT (Synchronizer)		OUTPUT SELECT		OUTPUT SELECT (Slot A)				SDI output
Item	Source Select	UHD Input Link	OUT1a/1b	OUT2a/2b	OUT 1	OUT 2	OUT 3	OUT 4	
Example 1	IN1	Single Link	SL(Proc.1)	-	-	-	-	-	12G Single Link
Example 2	IN1	Single Link	QL L1/L2 (Proc.1)	QL L3/L3 (Proc.1)	-	-	-	-	6G Dual Link
Example 3	IN1	Single Link	-	-	QL1 (Proc.1)	QL2 (Proc.1)	QL3 (Proc.1)	QL4 (Proc.1)	3G Quad Link

Menu	INPUT SELECT (Color Processor)	FORMAT CONVERT			
Item	Source Select	Converter	Format Standard	Frame/Field Rate	Level Setting
Examples 1-3	Manual	2160	59.94p	Level-A	2SI

- **3840x2160/59.94p input to 1080/59.94i output**
  Example 4: Converts from 4K input (**12G Single Link**) to HD and outputs from OUT1a/1b.
  Example 5: Converts from 4K input (**6G Dual Link**) to HD and outputs from OUT1a/1b.
  Example 6: Converts from 4K input (**3G Quad Link**) to HD and outputs from OUT1a/1b.

Menu	INPUT SELECT (Synchronizer)		OUTPUT SELECT	SDI input
Item	Source Select	UHD Input Link	OUT1a/1b	
Example 4	IN1	Single Link	SL(Proc.1)	12G Single Link
Example 5	Slot A	Dual Link	SL(Proc.1)	6G Dual Link
Example 6	Slot A	Quad Link	SL(Proc.1)	3G Quad Link

Menu	INPUT SELECT (Color Processor)	FORMAT CONVERT			
Item	Source Select	Converter	Format Standard	Frame/Field Rate	Level Setting
Examples 4-6	Manual	1080	59.94i	-	-

4-4. Converter: Adjusting Output Timing

See Sec. 5-21. “CONVERTER / VIDEO FRAME DELAY (FA-96UDC).”
See Sec. 5-40. “SYNCHRONIZER.”

When converting signals, the **Delay Mode** setting in the CONVERTER / VIDEO FRAME DELAY menu determines which parameter(s) is to be set for adjusting timing.

<If set to Frame / Minimum:>
The converter output delay timing cannot be adjusted and is determined by the **Timing(H)** setting in the **SYNCHRONIZER** menu. The converter I/O delay amount is displayed under **Timing(H, V)** in the CONVERTER / VIDEO FRAME DELAY menu.

<If set to Adjustable:>
The converter output delay timing can be adjusted under **Timing(H)** in the **CONVERTER / VIDEO FRAME DELAY** menu. The converter I/O delay is changed according to this setting. See the delay amount under Output Delay in this menu.

4-5. Converter: Outputting with Minimum Delay

See Sec. 5-21. “CONVERTER / VIDEO FRAME DELAY (FA-96UDC).”
See Sec. 5-40. “SYNCHRONIZER.”

To output images with minimum delay when converting from HD to 4K, follow the instructions below. Assume that images are output as set under Example 1 (from **OUT1a/1b** using **12G Single Link**) in the previous section.

<If SDI input and reference signals are synchronized with no time shift:>

Menu	SYNCHRONIZER			CONVERTER / VIDEO FRAME DELAY
Item	Genlock Source	Mode	Timing(H, V)	Delay Mode
Setting	GENLOCK IN	Line(Min)	(+700, 0)	Minimum

<If SDI input and reference signals are synchronized with a time shift:>

If input signals are advanced by 3 lines against reference:

Menu	SYNCHRONIZER			CONVERTER / VIDEO FRAME DELAY
Item	Genlock Source	Mode	Timing(H, V)	Delay Mode
Setting	GENLOCK IN	Line(Min)	(+700, -3)	Minimum

4-5-1. Video Output Timing in Converter Minimum Delay Mode

Output Signal Timing (in lines) for 59.94 (27.97) Hz Signals

<Output> / <Input>					2160							1080					720		525
					p				p		PsF	p		p	i	PsF	p	p	i
					59.94				29.97		29.97	59.94		29.97	59.94	29.97	59.94	29.97	59.94
					SQD		2SI		SQD	2SI	SQD								
					A	B	A	B	(B)	(B)	(B)	(A)	(B)						
2160	p	59.94	SQD	A	2	3	545	274	2	273	2	553	279	278	278	278	371	-188	-127
				B	2	2	545	274	2	273	2	553	278	278	278	278	371	-188	-127
			2SI	A	545	274	2	3	273	2	273	11	8	8	8	8	9	-369	-255
				B	545	274	2	2	273	2	273	11	8	8	8	8	9	-369	-255
	p	29.97	SQD	(B)	3	-559	540	-290	2	545	-562	549	-286	553	-287	-11	368	370	134
			2SI	(B)	5	-559	3	-559	545	2	-19	13	-553	11	-554	-553	10	10	8
	PsF	29.97	SQD	(B)	3	-559	544	-288	546	547	2	553	-284	555	-285	-9	372	372	134
1080	p	59.94		(A)	-560	285	23	14	285	14	285	2	3	2	2	2	13	-368	-254
				(B)	-560	285	23	14	285	14	285	2	2	2	2	2	13	-368	-254
	p	29.97			-560	-279	23	-550	-560	23	1	2	-559	2	-560	-562	11	12	9
	i	59.94			-557	-276	26	-546	-276	-547	-276	5	-558	-559	2	2	14	8	10
	PsF	29.97			-557	-276	26	-546	-276	-547	-276	5	-558	-559	2	2	14	8	10
720	p	59.94			-557	-276	26	-546	-276	-547	-276	18	-550	-551	-551	-551	2	2	-253
	p	29.97			4	-558	-538	296	-557	26	4	-546	292	18	291	-546	-374	2	140
525 (SD NTSC)	i	59.94			-528	300	54	29	300	28	300	47	25	25	25	25	34	18	2

For 12G-SDI, see the 2160/59.94p 2SI-A cells.
For 6G-SDI, see the 2160/29.97PsF 2SI cells.

Output Signal Timing (in lines) for 50 (25) Hz Signals

<Output> / <Input>					2160							1080					720		625
					p				p		PsF	p		p	i	PsF	p	p	i
					50				25		25	50		25	50	25	50	25	50
					SQD		2SI		SQD	2SI	SQD								
					A	B	A	B	(B)	(B)	(B)	(A)	(B)						
2160	p	50	SQD	A	2	3	544	274	2	273	2	553	280	278	278	278	371	-188	-157
				B	2	2	544	274	2	273	2	553	279	278	278	278	371	-188	-155
			2SI	A	544	274	2	3	273	2	273	11	8	8	8	8	9	-370	-306
				B	544	274	2	2	273	2	273	11	9	8	8	8	10	-369	-307
	p	25	SQD	(B)	3	-559	540	-289	2	544	-562	549	-286	553	-287	-11	368	370	156
			2SI	(B)	5	-559	3	-559	544	2	-20	13	-554	11	-554	-553	10	10	7
	PsF	25	SQD	(B)	3	-559	544	-287	546	546	2	533	-284	555	-285	-9	371	371	158
1080	p	50		(A)	-560	286	23	14	284	14	284	2	3	2	2	2	12	-368	-305
				(B)	-560	285	23	15	284	14	284	2	2	2	2	2	12	-368	-306
	p	25			-562	-279	22	-550	-560	23	1	1	-560	2	-560	-562	12	11	7
	i	25			-557	-275	26	-547	-277	-547	-277	5	-558	-559	2	2	14	8	8
	PsF	25			-557	-275	26	-547	-277	-547	-277	5	-558	-559	2	2	14	8	8
720	p	50			-557	-275	26	-547	-277	-547	-277	18	-551	-551	-551	-551	2	2	305
	p	25			2	-558	-540	295	-558	25	3	-548	291	17	291	-547	375	2	164
625 (SD PAL)	i	50			-546	291	37	21	290	20	290	29	17	16	16	16	22	12	2

For 12G-SDI, see the 3840x2160/50p 2SI-A cells.
For 6G-SDI, see the 2160/25PsF 2SI cells.

4-6. Aligning Audio and Video

See Sec. 6-22. “AUDIO INPUT DELAY” menu
See Sec. 6-25. “ADDITIONAL AUDIO DELAY” menu.

Frame Synchronizer and Converter processes have a delay time with regard to the audio process. Adding the delay to the audio process allows you to align the delay difference between audio and video.

◆ **Frame Synchronizer Delay Alignment**

(1) Open the AUDIO INPUT DELAY menu (see Sec. 6-22.) and press **Adjust**.
The video delay time (excluding the video converter delay) in FS1 or FS2 is displayed.
(2) Press **F4-UNITY**. The video delay time is added to the **Master Delay** value. This clears the delay difference between audio and video.

◆ **Video Converter Delay Alignments**

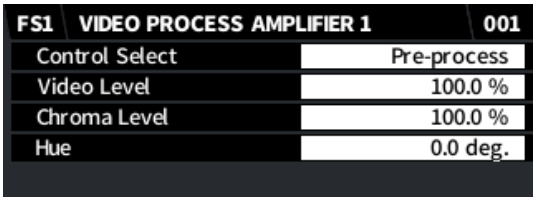
In the ADDITIONAL AUDIO DELAY menu (see Sec. 6-25), the delay difference between audio and video outputs caused by video converter is automatically cleared as default settings.

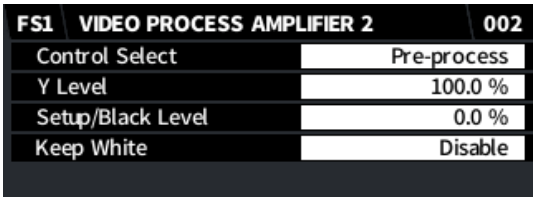
EMB1. Audio OUT: **Same as FS1**
(Automatically aligns FS1 audio output to FS1 video output.)
EMB2. Audio OUT: **Same as FS2**
(Automatically aligns FS1 audio output to FS1 video output.)
AES Audio OUT: **Same as FS1**
(Automatically aligns AES output to FS1 video output.)
OP(AES) Audio OUT: **Same as FS1**
(Automatically aligns AES optional output to FS1 video output.)
OP(ANA:B) Audio OUT: **Same as FS1**
(Automatically aligns optional analog audio output to FS1 video output.)

5. Video Setting Menus

The MU Main mode (**Simultaneous 4K/HD**, **Dual HD** or **3D-LUT**) determines which menus can be used on which FS. The menu access button, available MU Main modes and required option(s) are indicated on the right side of menu.
See Sec. 1-3. “Three MU MU Main Modes” and Sec. 7-8. “MU OPERATION” for more details.

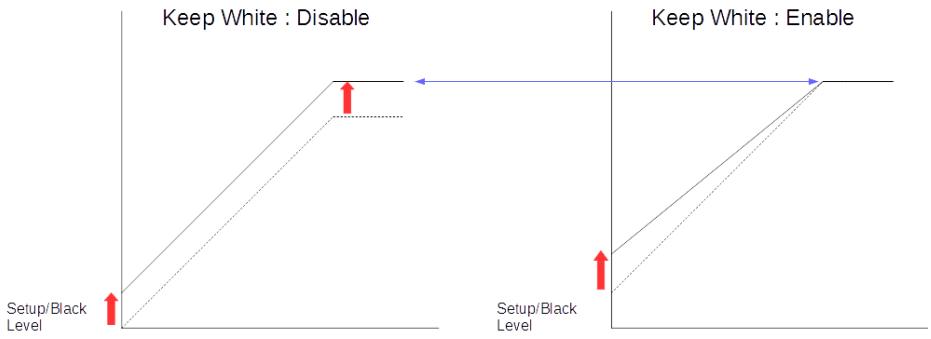
5-1. VIDEO PROCESS AMPLIFIER





Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting (Steps)	Description
Control Select	-	Pre-process Post-process	Selects a Proc Amp to be set. **Pre-process:** Proc Amp before Color Correction **Post-process:** Proc Amp after Color Correction **Post-process** can be selected only when FA-96AHDR or FA-96AHDR2 option.
Video Level	100.0 %	0.0 - 200.0 %	Adjusts the video level.
Chroma Level	100.0 %	0.0 - 200.0 %	Adjusts the chrominance level.
Hue	0.0 deg.	-179.8 - 180.0 deg. (0.2 deg.)	Adjusts the chroma phase.
Y Level	100.0 %	0.0 - 200.0 %	Adjusts the luminance level.
Setup/Black Level	0.0 %	-20.0 - 100.0 %	Adjusts the black level.
Keep White	Disable	Disable Enable	If set to **Enable**, the Y Level value automatically changes according to the Black Level setting (Keep White function). Always sets to **Disable** at startup.

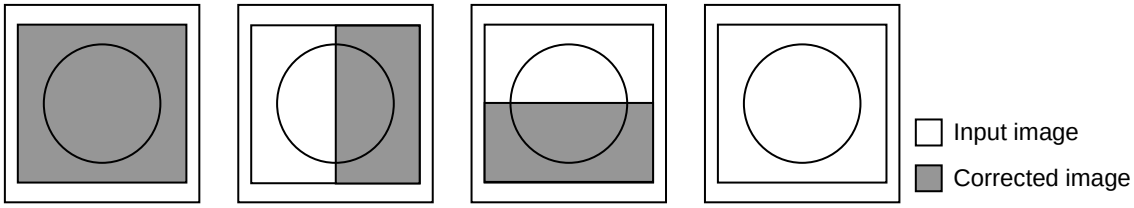


5-2. SPLIT MODE SELECT

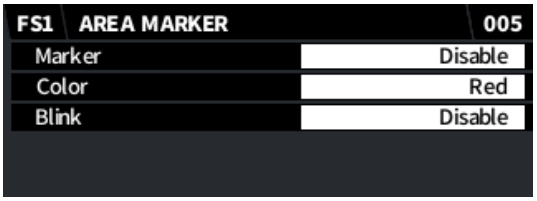
PROC EMB

Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
Mode	Operate	Operate V-Split H-Split Bypass	Selects the output image display method. **Operate:** Displays the image after correction. **V-Split:** Splits the screen vertically and displays images before and after correction. **H-Split:** Splits the screen horizontally and displays images before and after correction. **Bypass:** Displays the input image without correction.



5-3. AREA MARKER (FA-96AHDR2)



PROC EMB

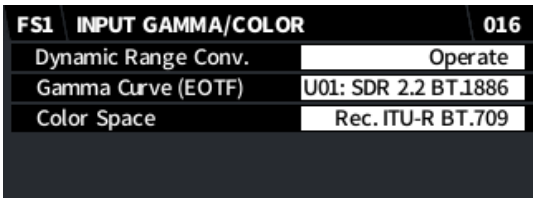
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

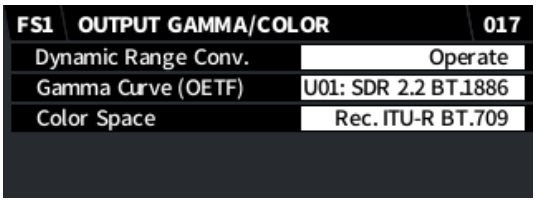
Required Option: FA-96AHDR or FA-96AHDR2

Item	Default	Setting	Description
Marker	Disable	Disable Luminance Gamut	Selects the marker mode. **Disable:** Plots no makers. **Luminance:** Marks pixels above the high threshold when enabling RGB Clip. **Gamut:** Marks pixels whose RGB values exceed the range between 0 and 1.0.
Color	Red	Red Green Blue	Selects the marker color.
Blink	Disable	Disable Enable	Setting to **Enable** toggles marker flashing on/off.

5-4. INPUT / OUTPUT GAMMA / COLOR

Input/output gamma and/or color space conversions require complex settings. To make settings easier, preset settings using event function are provided. See Sec 4-1 "Color Processor Setting Examples."





Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

◆ **INPUT GAMMA/COLOR**

Item	Default	Setting	Description
Dynamic Range Conv.	Bypass	Bypass Operate	**Operate**: Performs the Dynamic Range/Color Space processing and enables the Gamma Curve and Color Space settings. (*1) **Bypass**: Bypasses the processing.
Gamma Curve (EOTF)	U01: SDR 2.2 BT.1886	U01: SDR 2.2 BT.1886 U02: SDR 2.4 BT.1886 U03: HLG BT.2100 U04: HLG (RGB SG1.2) U05: HLG (RGB SG1.4) U06: ST 2084 (PQ) U07: SDR 2.2 BT.709 U08: S-Log3 U09: 01_Canon Log 2 U10: 01_Canon Log 3 S-Log3 Live HDR SDR(SONY)	Selects a gamma curve for input. Gamma setting data as shown at left are respectively stored in files named **U01** to **U10**. Gamma data names and content can be changed by editing files in the Web GUI. (See Sec. 13-4. "Data.") These settings are shared by both input and output gamma curve settings. **S-Log3 Live HDR** and **SDR(SONY)** require FA-96AHDR2 option. If **SDR(SONY)** is selected, choose a curve in the SR-Live menu (No. 021).
Color Space	Rec. ITU-R BT.709	Rec. ITU-R BT.709 Rec. ITU-R BT.2020 U1: S-Gamut/Gamut3 U2:User2 U3:User3 U4:User4 U5:User5	Selects a color space for input. **U1** to **U5** Gamut settings are stored in files and these names and content can be changed by editing files in the Web GUI. (See Sec. 13-4. "Data.") These settings are shared by both input and output gamut curve settings.

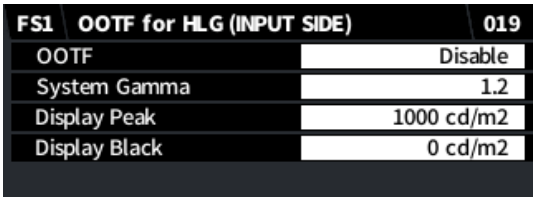
(*1) If Dynamic Range Conv. is set to **Operate**, super black below 0IRE in input video is clipped and not passed through.

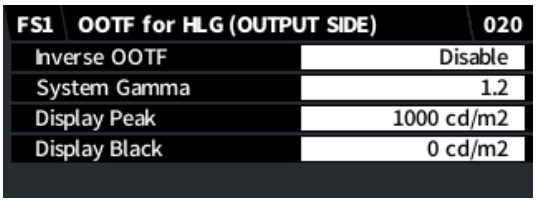
◆ **OUTPUT GAMMA/COLOR**

Item	Default	Setting	Description
Dynamic Range Conv.	Bypass	Bypass Operate	(Same setting as in the INPUT GAMMA/ COLOR menu above)
Gamma Curve (OETF)	**U01**: SDR 2.2 BT.1886	(Same as INPUT GAMMA / COLOR menu)	Selects a gamma curve for output.
Color Space	Rec. ITU-R BT. 709	(Same as INPUT GAMMA / COLOR menu)	Selects a color space for output.

5-5. OOTF for HLG

This menu is enabled if **Dynamic Range Conv**. is set to **Operate**. (See Sec. 5-4 "INPUT / OUTPUT GAMMA / COLOR.")
OOTF is applied as a display gamma (see ITU-R BT.2390) and effective when converting a signal to or from an HLG signal (with BT.2100 gamma curve).
Set **OOTF** to **Enable** for input curve and **Inverse OOTF** to **Enable** for output curve, then adjust other parameters.





Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

◆ **OOTF for HLG (INPUT SIDE)**

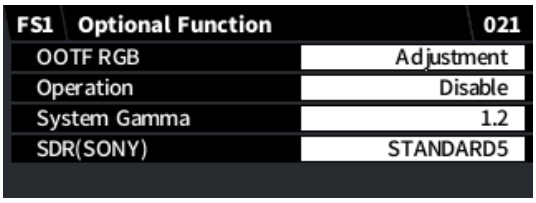
Item	Default	Setting (Steps)	Description
OOTF	Disable	Disable Enable	Selecting **Enable** applies correction when converting signals from HLG to another gamma curve referring to monitor brightness range. Selects the gamma and luminance peaks below. See Sec. 5-6-1. "About OOTF Related Parameters."
After selecting **Enable** for OOTF, set the following parameters.			
System Gamma	1.2	1.0 - 2.0	Sets the gamma value.
Display Peak	1,000 cd/m2	100 - 10,000 cd/m2 (100 cd/m2)	Sets the maximum luminance peak for Display Light.
Display Black	0 cd/m2	0 - 100 cd/m2 (10 cd/m2)	Sets the minimum luminance peak for Display Light.

◆ **OOTF for HLG (OUTPUT SIDE)**

Inverse OOTF	Disable	Disable Enable	Selecting **Inverse OOTF** applies correction when converting signals to HLG from another gamma curve referring to monitor brightness range. Selects the gamma and luminance peaks below. See Sec. 5-6-1. "About OOTF Related Parameters."
After selecting **Enable** for Inverse OOTF, set the following parameters.			
System Gamma	(Same as above)		
Display Peak	(Same as above)		
Display Black	(Same as above)		

5-6. Optional Function (FA-96AHDR2)

This menu is enabled if **Dynamic Range Conv**. is set to **Operate**. (See Sec. 5-4 "INPUT / OUTPUT GAMMA / COLOR."). OOTF is applied on RGB signals as a system gamma.
Selects an operation mode under OOTF RGB and **OOTF** or **Inverse OOTF u**nder Operation.



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Required Option: FA-96AHDR2

◆ **Optional Function**

Parameter	Default	Setting range	Description
OOTF RGB	Adjustment	Adjustment SR-Live	Selects an operation mode.
Operation	Disable	Disable Inverse OOTF OOTF	**Disable**: Uses no OOTF. **Inverse OOTF**: Removes OOTF adjustment. **OOTF**: Adds OOTF adjustment. See Sec. 5-6-1. "About OOTF Related Parameters."

In **Adjustment** mode, a conversion compliant to OOTF Adjustment defined in ARIB TR-B43 and ITU-R BT.2390 is performed. Select a gamma value below.

System Gamma	1.2	1.1 to 1.5	Selects a gamma value.

In **SR-Live** mode, a Sony proprietary OOTF is performed.

SDR (SONY)	STANDARD5	STANDARD1-7 HYPER1-4	Selects a gamma curve if **SDR(SONY)** is selected for Gamma Curve. (See Sec. 5-4)

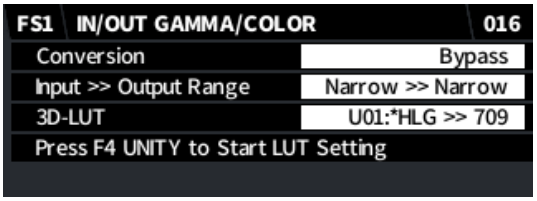
5-6-1. About OOTF Related Parameters

The following menu parameters are mutually related and settings are limited by each other. Shaded cells in the table below indicate not to able to set or change.

Menu	INPUT / OUTPUT GAMMA / COLOR	OOTF for HLG		Optional Function (FA-96AHDR2)
Refer to	5-4	5-5		5-6
Parameter	**Dynamic Range Conv**	**OOTF**	**Inverse OOTF**	**Operation**
Available settings	Bypass	-	-	-
	Operate	Enable	Enable	Disable
		Disable	Enable	Other than Disable
		Enable	Disable	Other than Disable
		Enable	Enable	Other than Disable (OOTF for HLG has higher priority.)

5-7. IN/OUT GAMMA/COLOR

Allows you to change dynamic range and color space, add gain and correct colors using a 3D-LUT.



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

◆ **Dynamic Range Color Space Conversion**

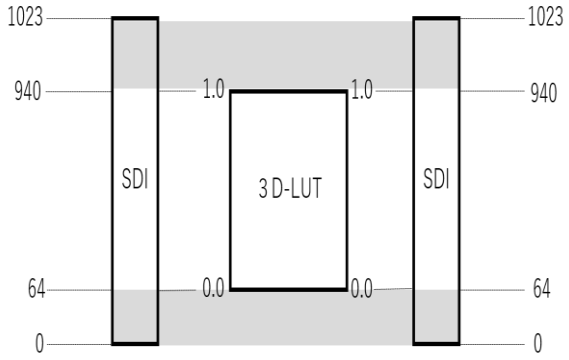
Parameter	Default	Setting range	Description
Conversion	Bypass	Bypass Operate	Setting to **Operate** enables conversions using 3D-LUT. In this case, select a table under 3D-LUT below.
Input >> Output Range	Narrow >> Narrow	Narrow >> Narrow SDI >> SDI Narrow >> SDI SDI >> Narrow	Selects an "Input >> Output" range pair for normalizing video data between 0 and 1. **Narrow**: 0x040 (64) - 0x3AC (940) **SDI**: 0x004 (4) - 0x3FB (1019)
3D-LUT	---	U01 HLG >> 709 U02 709 >> HLG U03 HLG >> 1886 U04 1886 >> HLG U05 FOR-A (1) U06 FOR-A (2) U07 FOR-A (3) U08 Linear U09 Linear U10 Linear HLGLive >> 709 (*1) 709 >> HLGLive (*1) SL3Live >> HLG (*1)	Selects a 3D-LUT table by turning F3 and pressing F4 Unity. While the table is in use, an asterisk "*" is displayed in front of the table name. U01 to U10 3D-LUT data as shown at left are stored in the supplied CD-ROM as files. These file names and content can be changed in the FA-9600 Web GUI. (See FA-9600 Operation Manual for details.)

(*1) FA-96AHDR2 option required

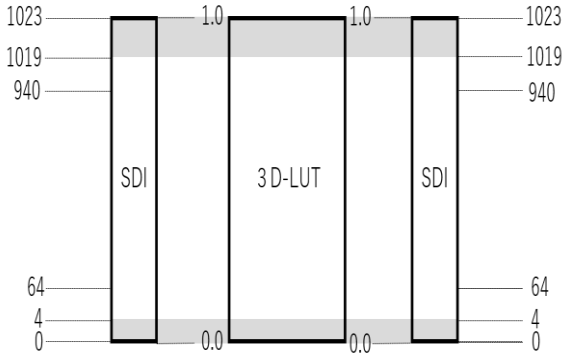
<3D-LUT Data Ranges>

3D-LUT data (.cube files) ranges, described above as "Narrow" and "SDI," are assumed to be nominalized as follows.

Narrow >> Narrow



SDI >> SDI



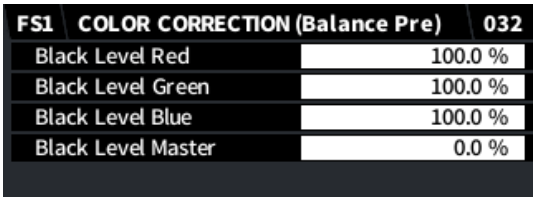
<3D-LUT Preset Data Details>

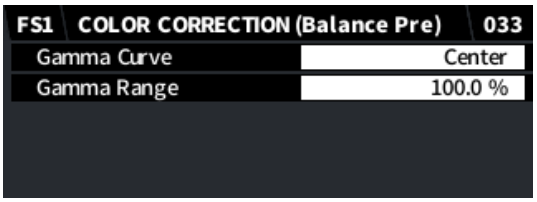
3D-LUT name	Description
HLG >> 709	Converts from HLG to SDR using Scene Referred. Reference white mapping: HLG(75%) to SDR(100%)
709 >> HLG	Converts from SDR to HLG using Scene Referred. Reference white mapping: SDR(100%) to HLG(75%)
HLG >> 1886	Converts from HLG to SDR using Display Referred. Reference white mapping: HLG(75%) to SDR(100%)
1886 >> HLG	Converts from SDR to HLG using Display Referred. Reference white mapping: SDR(100%) to HLG(75%)
FOR-A (1)	Converts from SDR(BT.2020) to SDR(BT.709). FOR-A original color gamut mapping
FOR-A (2)	Converts from HLG to SDR. FOR-A original color gamut mapping
FOR-A (3)	Converts from HLG to SDR. FOR-A original color gamut mapping using a lower gain than FOR-A (2).
Linear	No conversions on input/output
HLGLive >> 709	Converts from HLG-Live to SDR. (Sony's proprietary)
709 >> HLGLive	Converts from SDR to HLG-Live. (Sony's proprietary)
SL3Live >> HLG	Converts from S-Log3 Live HDR to HLG. (Sony's proprietary)

As factory default, 3D-LUT data is computed by normalizing video data of the SDI signal range of codes **64 - 940** between **0 and 1**. Thus, for the default data, use "**Narrow >> Narrow**" for Input >> Output Range.

5-8. COLOR CORRECTION (Balance Pre)

If Color Correction Mode is set to Balance (RGB) (Linear Color Correction **before** color space conversion):





Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

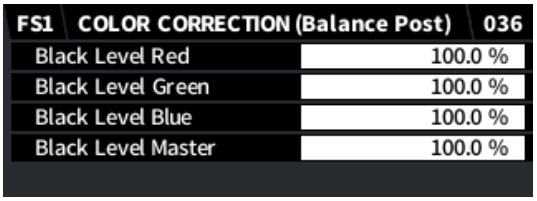
Item	Default	Setting	Description
White Level (RGB)	100.0%	0.0 - 200.0%	Sets the white level by separately adjusting R, G, and B components.
White Level Master	100.0 %	0.0 - 200.0%	Sets the white level by simultaneously adjusting R, G, and B components.
Black Level (RGB)	100.0%	0.0 - 200.0%	Sets the black level by separately adjusting R, G, and B components.
Black Level Master	100.0 %	0.0 - 200.0%	Sets the black level by simultaneously adjusting R, G, and B components.
Gamma Curve	Center	Center Black White	Selects a gamma curve type.
Gamma Range	100.0%	0.5% - 100.0%	Sets the upper threshold where the gamma correction is enabled. A 100% value is based on the INPUT GAMMA(EOTF) maximum value.
Gamma Level (RGB)	100.0%	0.0 - 200.0%	Sets the gamma level by separately adjusting R, G, and B components.
Gamma Level Master	100.0 %	0.0 - 200.0%	Sets the gamma level by simultaneously adjusting R, G, and B components.

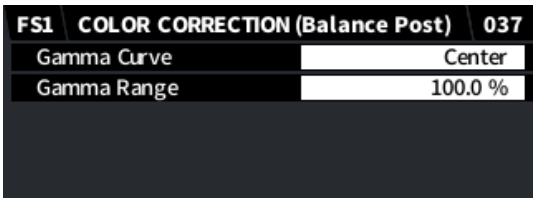
To adjust the black level before conversion, use Black Level parameters in this menu.

Ex) To decrease the black level of SDR input video by **3%** before SDR to HDR conversion, change **Black Level Master** to **97%**.

5-9. COLOR CORRECTION (Balance Post)

If Color Correction Mode is set to Balance (RGB) (Linear Color Correction **after** color space conversion):





Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

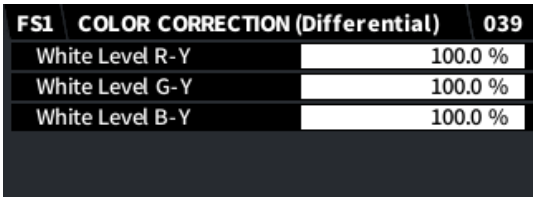
Item	Default	Setting	Description
White Level (RGB)	100.0%	0.0 - 200.0%	Sets the white level by separately adjusting R, G, and B components.
White Level Master	100.0 %	0.0 - 200.0%	Sets the white level by simultaneously adjusting R, G, and B components.
Black Level (RGB)	100.0%	0.0 - 200.0%	Sets the black level by separately adjusting R, G, and B components.
Black Level Master	100.0 %	0.0 - 200.0%	Sets the black level by simultaneously adjusting R, G, and B components.
Gamma Curve	Center	Center Black White	Selects a gamma curve type.
Gamma Range	100.0%	0.5% - 100.0%	Sets the upper threshold where the gamma correction is enabled. A 100% value is based on the OUTPUT GAMMA(OETF) maximum value.
Gamma Level (RGB)	100.0%	0.0 - 200.0%	Sets the gamma level by separately adjusting R, G, and B components.
Gamma Level Master	100.0 %	0.0 - 200.0%	Sets the gamma level by simultaneously adjusting R, G, and B components.

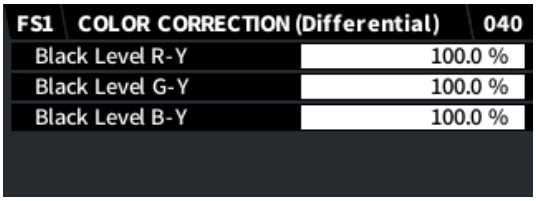
To adjust the black level after conversion, use Black Level parameters in this menu.

Ex) To increase the black level of SDR output video by **3%** after HDR to SDR conversion, change **Black Level Master** to **103%**.

5-10. COLOR CORRECTION (Differential)

If Color Correction Mode is set to Differential:

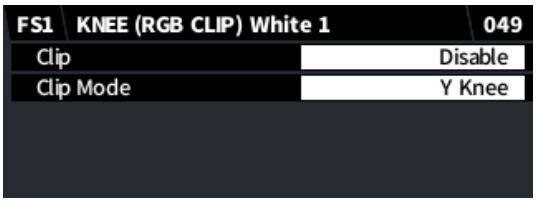


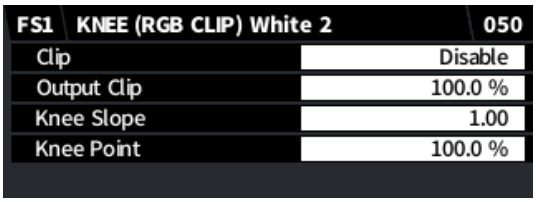


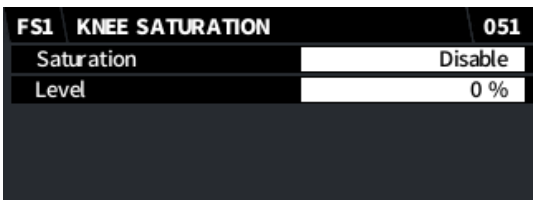
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

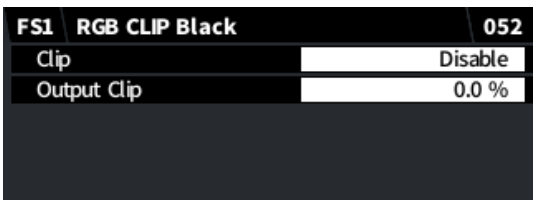
Item	Default	Setting	Description
White Level (R-Y) (G-Y) (B-Y)	100.0%	0.0 - 200.0%	Sets the white level by separately adjusting R-Y, G-Y and B-Y components.
Black Level (R-Y) (G-Y) (B-Y)	100.0%	0.0 - 200.0%	Sets the black level by separately adjusting R-Y, G-Y and B-Y components.

5-11. KNEE (RGB) CLIP (White/Black)









Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

KNEE (RGB CLIP) White 1-2

Item	Default	Setting	Description
Clip	Disable	Disable Enable	Setting **Enable** enables Knee function.
If set to **Enable**, following parameters are available.			
Clip Mode	RGB Knee	RGB Knee Y Knee	Selects RGB or Y for knee correction mode. Selecting **Y Knee** preserves colors more vividly in the knee correction (high luminance) areas.
Output Clip (*1)	109.0 %	50.0 - 150.0%	Sets the White threshold in RGB.
Knee Slope	0.10	0.10 - 1.00	Sets the knee slope inclination (compression ratio). The smaller the values, the more finely highlight details are viewed , but the darker the image looks.
Knee Point (*1)	96.0 %	50.0 - 150.0%	Sets the knee slope start point.

Knee Saturation

Type = Y Knee	Saturation	Disable	Disable Enable	If set to **Enable**, **Saturation Level** below can be adjusted.
	Level	0 %	0 - 200 %	Sets the Saturation Level for the knee correction (high luminance) areas. The smaller the value, the more colors are desaturated. Setting the value more than 100% makes colors thicker.

RGB CLIP Black

Item	Default	Setting	Description
Clip	Disable	Disable Enable	If set to **Enable**, Output Clip (Black threshold) below can be adjusted.
Output Clip (*1)	100.0 %	50.0 - 150.0%	Sets the Black threshold in RGB.

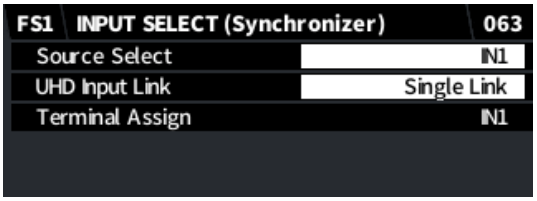
(*1) Setting values are equivalent to those in SDI signal levels (100%=940)

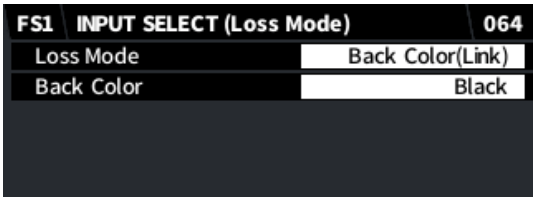
5-12. YCbCr CLIP

Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
Clip	Disable	Disable Enable	Enables/disables YCbCr CLIP.
Y White Clip	109.0%	50.0 to 109.0%	Sets the upper Y signal limit.
Y Black Clip	-7.5%	-7.5 to 50.0%	Sets the lower Y signal limit.
Chroma Clip	113.0%	50.0 to 113.0%	Sets the upper and lower CbCr signal limits.

5-13. INPUT SELECT (Synchronizer)





Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

<Simultaneous 4K/HD mode>
<3D-LUT mode>

Item	Default		Setting	Description
Source Select	IN1 (FS1) IN2 (FS2)		IN1 IN2 HDMI IN EX3G IN1 to IN4 SFP RX1 to RX4	Selects a video signal input to FS1 or FS2. **EX3G IN1** to **EX3G IN4**: Require FA-96EX3G44-R. **SFP RX 1** to **SFP RX 4**: Require FA-96SFPC4.
UHD Input Link (FA-964K)	Single Link		Single Link Dual Link Quad Link	Selects a UHD 4K SDI signal format. Quad Link is enabled with FA-96EX3G44-R or FA-96SFPC4 on Slot A. (FS1 only)
Terminal Assign	-		-	Displays the signal status that is selected under **Source Select** (FS1 only).
Loss Mode	W/o FA-964K	Back Color	Back Color Auto Freeze SDI Output Mute	Selects the output mode for input signal loss. **Back Color**: Outputs a monochrome (set under Back Color below) video. **Auto Freeze**: Freezes and outputs the last normal video. **SDI Output Mute**: Outputs no video signal so that the FA-9600 downstream device can detect video loss.
	W/ FA-964K	Back Color (Link)	Back Color(Link) Back Color(Sep) Auto Freeze SDI Output Mute(Link) SDI Output Mute(Sep)	See the table below for 4K multi-link input. **Back Color (Link)**: Outputs a monochrome (set under Back Color below) video. **Back Color (Sep)**: Output the input video displaying monochrome (set under Back Color below) for the lost part. **SDI Output Mute(Link)**: Stops video output if any one of four links is lost for Quad Link video. **SDI Output Mute(Sep)**: Stops video output if all four links are lost for Quad Link video.
Back Color	Black		Black, Blue, Red, Magenta, Green, Cyan, Yellow	Selects a monochrome used for **Loss Mode** settings.

Loss Mode: When a part of 4K video signal (Quad Link 3G) is lost:

4K input	Loss Mode setting	Output image when a part of input image is lost
2-Sample Interleave	Back Color(Link)	Compensates the lost link and restores the whole image to maintain its appearance.
	Back Color (Sep)	Replaces lost parts with monochrome to restore the whole input image. The image is displayed with lower luminance.

	Auto Freeze	Freezes the last normal image displayed on the screen.(*1)
	SDI Output Mute(Link)	Freezes the last normal image displayed on the screen until the video output is stopped. (*1)
	SDI Output Mute (Sep)	
Square	Back Color (Link)	Outputs a monochrome video.
	Back Color (Sep)	Outputs the input video displaying monochrome for the lost part.
	Auto Freeze	Freezes the last normal image displayed on the screen.
	SDI Output Mute (Link)	Freezes the last normal image displayed on the screen until the video output is stopped. (*1)
	SDI Output Mute (Sep)	

If a converter is used, both **Back Color (Sep)** and **Back Color (Link)** displays a monochrome video and SDI Output Mute(Link) is automatically set if **SDI Output Mute(Sep)** is selected.

(*1) Applied when **Synchronizer Mode** is set to **Frame/AVDL**. In other cases, it works in the same way as **Back Color (Link)**.

<Dual HD mode>

Item	Default	Setting	Description
Source Select	IN1 (FS1) IN2 (FS2)	IN1 IN2 HDMI IN EX3G IN1 to IN4 SFP RX1 to RX4	Selects a video signal input to FS1 or FS2. **EX3G IN1** to **EX3G IN4**: Requires FA-96EX3G44-R. **SFP RX1** to **SFP RX4**: Requires FA-96SFPC4.
Loss Mode	Back Color	Back Color Auto Freeze SDI Output Mute	Selects the output mode for input signal loss. **Back Color**: Outputs a monochrome (set under **Back Color** below) video. **Auto Freeze**: Freezes the last normal output video. **SDI Output Mute**: Outputs no signal so that the FA-9600 downstream device can detect video loss.
Back Color	Black	Black, Blue, Red, Magenta, Green, Cyan, Yellow	Selects a monochrome used for **Loss Mode** settings.

HDMI Input / Output

HDMI In/Out	Loss Mode	Description
HDMI In	Back Color	Outputs monochrome (color set under Back Color) video.
	Auto Freeze	Outputs monochrome (color set under Back Color) video.
	SDI Output Mute	Outputs no video signals so that downstream devices can detect signal loss.
HDMI Out	Back Color (Link) Back Color (Sep) Auto Freeze	Outputs the same video signals as those for SDI output.
	SDI Output Mute	Outputs monochrome (color set under Back Color) video.

SFP Input / Output

Selecting **SDI Output Mute** for Loss Mode freezes video **same as Auto Freeze** setting.

5-14. INPUT SELECT (Converter 1)

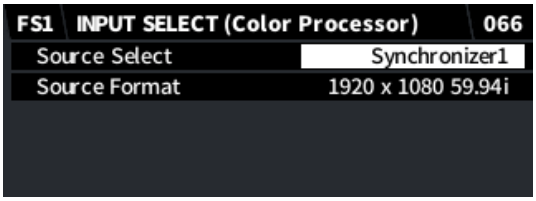
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Required option

FA-96UDC

Item	Default	Setting	Description
Source Select	Synchronizer1	Synchronizer1 Synchronizer2	Selects the Converter1 source signal.

5-15. INPUT SELECT (Color Processor)



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
Source Select	Synchronizer1 (FS1) Synchronizer2 (FS2)	Synchronizer 1 Converter 1 Synchronizer 2 Converter 2	Selects a source signal for FS1 or FS2 Color Processor.
Source Format	-	-	Displays the signal format selected under Source Select.

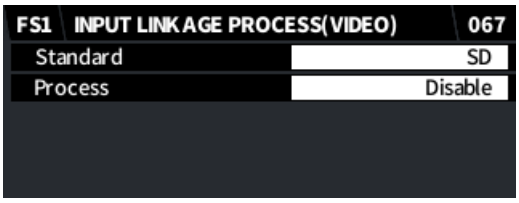
5-16. INPUT LINKAGE PROCESS (VIDEO)

An event (a set of menu settings) can be automatically loaded by linking to input signal format.
To check the input video format, see Sec. 5-45. “VIDEO INPUT STATUS.”

NOTE

Note that video processing from format detection to even loading may take a certain time, more than a frame in some cases.

To use auto (linkage) event load, a corresponding event should be created and uploaded in advance. (See Sec. 13-3-2-2. "Auto Loaded Events (Event 101 and higher)” in Sec. 13-3-2 “Event Data”.)



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

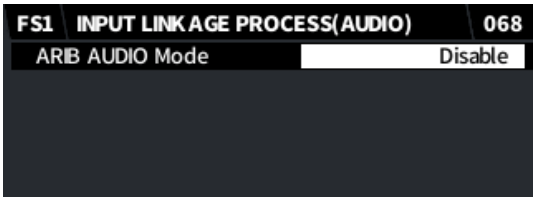
Item	Default	Setting	Description
Standard	-	SD 720 1080 2160	Selects a video format used for auto event load. **2160** is selectable in Simultaneous 4K/HD or 3D-LUT mode with FA-964K (FS1 only).
Process	Disable	Disable Enable	Enables/disables auto event load linked to input video.

5-17. INPUT LINKAGE PROCESS (AUDIO)

An event (menu settings) can be automatically loaded by linking to ARIB Audio mode (data in the control signal defined by ARIB STD-B39). input signal format. To check the input Audio Mode information, see Sec. 7-13. “INPUT ARIB B39 AUDIO MODE.”

Note that signal processing from data analysis to even loading may take a certain time, more than a frame in some cases.

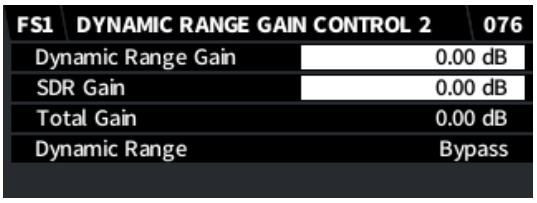
To use auto (linkage) event load, a corresponding event should be created and uploaded in advance. (See Sec. 13-3-2-2. "Auto Loaded Events (Event 101 and higher)” in Sec. 13-3-2 “Event Data”.)



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
ARIB AUDIO Mode	Disable	Disable Enable	Enables/disables auto event load linked to ARIB Audio Mode.

5-18. DYNAMIC RANGE GAIN CONTROL



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
Simul Mode	Disable	Disable Enable	Sets whether to keep the gain difference between FS 1 and 2. Setting to **Enable** allows you to set **Gain**, **Color Correction (Differential, Balance)** and **Clip (RGB Clip, YCbCr Clip)** by preserving the difference set under **Dynamic Range Gain**.
Dynamic Range Gain	0.00dB	-24.00 to 24.00dB	Sets the RGB dynamic range gain in the linear scale space.
SDR Gain	0.00dB	0.00 to 24.00dB	Sets the gain difference between SDR and HDR. The total gain is equal to addition of SDR Gain and Dynamic Range Gain values. This setting is ignored for conversions between SDR signals or between HDR signals, .
Total Gain	-	-	Displays the gain difference between before and after conversion.
Dynamic Range	-	-	Displays the conversion method being processed between SDR and HDR.

5-19. OUTPUT SELECT

Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / Proc1)

<Simultaneous 4K/HD mode>
<3D-LUT mode>

Item	Default	Setting	Description
OUT 1a/1b	SL (Proc.1)	SL (Proc.1) SL (Proc.2) DL L1/L2(Proc.1) QL L1/L2(Proc.1)	Assigns video signals (Color Processor output) to output ports. **SL**: Single Link signal **DL**: Dual Link signal (*1) **QL**: Quad Link signal (*1) **Proc. 1**: Color Processor1 output (FS1) (*1) **Proc. 2**: Color Processor2 output (FS2) and unavailable in 3D-LUT mode.
OUT 2a/2b	SL (Proc.2)	SL (Proc.1) SL (Proc.2) DL L1/L2(Proc.1) QL L3/L4(Proc.1)	
HDMI OUT	Proc.1	Proc.1 Proc.2	

<Dual HD mode>

OUT 1a/1b	Proc.1	Proc.1 Proc.2	Assigns video signals (Color Processor output) to output ports.
OUT 2a/2b	Proc.2		
HDMI OUT	Proc.1		

(*1) For 4K output, SDI link numbers can be manually assigned to each output port.
For HD/SD output, all ports distribute the same video signal regardless of selecting **DL** or **QL**.

5-19-1. OUTPUT SELECT (Slot A)

◆ **FA-96EX3G44-R Option**

Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Required Option

FA-96EX3G44-R

< Simultaneous 4K/HD mode>

Item	Default	Setting	Description
OUT 1 to OUT4	Proc.1	SL (Proc.1) (*1) SL (Proc.2) DL L1 (Proc.1) (*2) QL L1 (Proc.1) (*2)	Assigns a video signal to each output port.

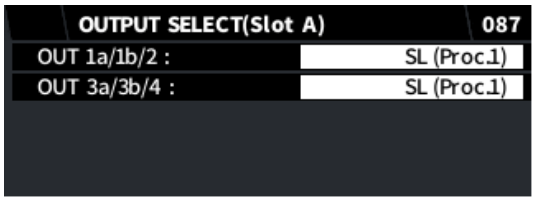
<Dual HD mode>

OUT 1a to 4	Proc.1	Proc.1 Proc.2	Assigns a video signal to each output port.

<3D-LUT mode>

OUT 1 to OUT4	Proc.1	SL (Proc.1) (*1) DL L1 (Proc.1) (*2) QL L1 (Proc.1) (*2)	Assigns a video signal to each output port.

◆ **FA-96EX12G06 Option**



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / Proc1)

Required Option: FA-96EX12G06

< Simultaneous 4K/HD mode>

Item	Default	Setting	Description
OUT 1a/1b/2	SL (Proc.1)	SL (Proc.1) SL (Proc.2) DL L1/L1/L1 (Proc.1) (*2) QL L1/L1/L2 (Proc.1) (*2)	Assigns a video signal to each output port.
OUT 3a/3b/4	SL (Proc.1)	SL (Proc.1) SL (Proc.2) DL L2/L2/L2 (Proc.1) (*2) QL L3/L3/L4 (Proc.1) (*2)	Assigns a video signal to each output port.

<Dual HD mode>

OUT 1a to 4	Proc.1	Proc.1 Proc.2	Assigns a video signal to each output port.

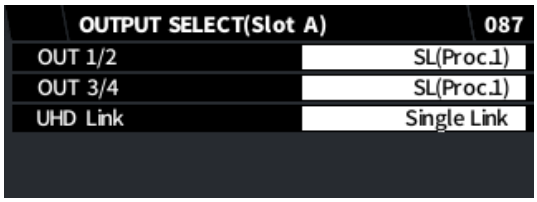
<3D-LUT mode>

OUT 1 to OUT4	Proc.1	SL (Proc.1) DL L1 (Proc.1) (*2) QL L1 (Proc.1) (*2)	Assigns a video signal to each output port.

(*1) For Quad Link 4K output, use either of the following settings:
Assign **SL (Proc.1)** to all four ports.
Respectively assign **QL L1** to **4** to four ports.

(*2) For **4K** output, SDI link numbers can be manually assigned to each output port.
For **HD/SD** output, all ports distribute the same video signal regardless of selecting **DL** or **QL**.

◆ **FA-96SFPC4 Option**



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / Proc1)

Required Option: FA-96SFPC4

< Simultaneous 4K/HD mode>

Item	(UHD link)	Default	Setting	Description
OUT 1/2	Single	SL (Proc.1)	SL (Proc.1) SL (Proc.2) SL(P1)/SL(P2) SL(P2)/SL(P1)	Assigns a video signal to each output port.
	Dual	DL L1/L2 (Proc 1)	DL L1/L2 (Proc 1) SL (Proc.2)	Output video signal (Fixed)
	Quad	-	QL L1/L2 (Proc 1)	
OUT 3/4	Single	SL (Proc.1)	(Same as OUT1/2)	Assigns a video signal to each output port.
	Dual	-	DL L1/L2 (Proc 1)	Output video signal (Fixed)
	Quad	-	QL L3/L4 (Proc 1)	
UHD Link		Single Link	Single Link Dual Link Quad Link	Selects the UHD 4K SDI link format for output.

<Dual HD mode>

Item	Default	Setting	Description
OUT 1/2	Proc.1	Proc.1 Proc.2 Proc.1/Proc.2 Proc.2/Proc.1	Assigns a video signal to each output port.
OUT 3/4	Proc.1		Assigns a video signal to each output port.
UHD Link	-	Single Link	SDI link format (Fixed)

<3D-LUT mode>

Item	(UHD link)	Default	Setting	Description
OUT 1/2 OUT 3/4	Single	-	SL (Proc.1)	Output video signal (Fixed)
	Dual	-	DL L1/L2(Proc.1)	
	Quad	-	QL L1/L2(Proc.1) QL L3/L4(Proc.1)	
UHD Link		Single Link	Single Link Dual Link Quad Link	Selects the UHD 4K SDI link format of Proc. 1 (FS1).

5-19-2. 4K (UHD) SDI Interface

The following three tables show 4K SDI interfaces and their ports, which vary depending on the installed option.

◆ **Standard configuration**

4K SDI interface			Output port			
			OUT 1a	OUT 1b	OUT 2a	OUT 2b
47.95 Hz or more	SL	12G-SDI	SL	SL	-	-
	DL	6G-SDI	L1	L2	-	-
	QL	3G-SDI	L1	L2	L3	L4
30Hz or less	SL	6G-SDI	SL	SL	-	-
	DL	3G-SDI	L1	L2	L1	L2
	QL	HD-SDI	L1	L2	L3	L4

◆ **If FA-96EX3G44-R installed**

4K SDI interface			Output port				FA-96EX3G44-R ports			
			OUT 1a	OUT 1b	OUT 2a	OUT 2b	OUT 1	OUT 2	OUT 3	OUT 4
47.95 Hz or more	SL	12G-SDI	SL	SL	-	-	-	-	-	-
	DL	6G-SDI	L1	L2	-	-	-	-	-	-
	QL	3G-SDI	L1	L2	L3	L4	L1	L2	L3	L4
30Hz or less	SL	6G-SDI	SL	SL	-	-	-	-	-	-
	DL	3G-SDI	L1	L2	L1	L2	L1	L2	L1	L2
	QL	HD-SDI	L1	L2	L3	L4	L1	L2	L3	L4

◆ **If FA-96EX12G06 installed**

4K SDI interface			Output ports				FA-96EX12G06 output ports					
			OUT 1a	OUT 1b	OUT 2a	OUT 2b	OUT 1a	OUT 1b	OUT 1	OUT 2a	OUT 2b	OUT 2
47.95 Hz or more	SL	12G-SDI	SL	SL	-	-	SL	SL	SL	SL	SL	SL
	DL	6G-SDI	L1	L2	-	-	L1	L1	L1	L2	L2	L2
	QL	3G-SDI	L1	L2	L3	L4	L1	L1	L2	L3	L3	L4
30Hz or less	SL	6G-SDI	SL	SL	-	-	SL	SL	SL	SL	SL	SL
	DL	3G-SDI	L1	L2	L1	L2	L1	L1	L1	L2	L2	L2
	QL	HD-SDI	L1	L2	L3	L4	L1	L1	L2	L3	L3	L4

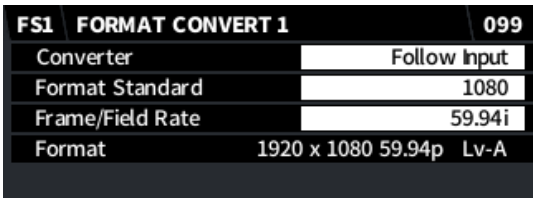
◆ **If FA-96SFPC4 installed**

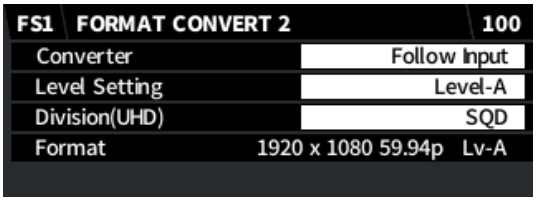
			Output ports				FA-96SFPC4 output ports			
4K SDI interface			OUT 1a	OUT 1b	OUT 2a	OUT 2b	OUT 1	OUT 2	OUT 3	OUT 4
47.95 Hz or more	SL	12G-SDI	SL	SL	-	-	SL	SL	SL	SL
	DL	6G-SDI	L1	L2	-	-	L1	L2	L1	L2
	QL	3G-SDI	L1	L2	L3	L4	L1	L2	L3	L4
30Hz or less	SL	6G-SDI	SL	SL	-	-	SL	SL	SL	SL
	DL	3G-SDI	L1	L2	L1	L2	L1	L2	L1	L2
	QL	HD-SDI	L1	L2	L3	L4	L1	L2	L3	L4

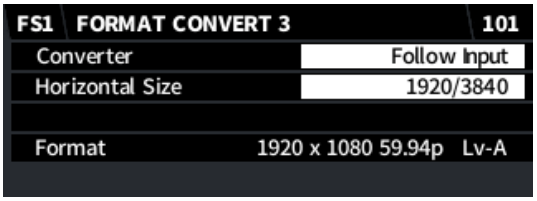
SL: Single Link
DL: Dual Link
QL: Quad Link
L1: QL / DL Link 1
L2: QL / DL Link 2
L3: QL Link 3
L4: QL Link 3

5-20. CONVERTER FORMAT (FA-96UDC)

This menu requires FA-96UDC to be installed.
See Sec. 5-20-1 “Available Conversions on Converter 1 (FS1)” and Sec. 5-20-2 “Available Conversions on Converter 2 (FS2)” for more details.







Simultaneous 4K/HD (FS1)
Dual HD
3D-LUT (FS1)

Required Option: FA-96UDC

Item	Default	Setting	Description
Converter	Follow Input	Follow Input Manual	Specifies the converter output format. **Follow Input**: Converter input signal format **Manual**: Signal format specified below.
Format Standard	1080	SD 720 1080 2160	Specifies the output format after conversion. **2160** available with FA-964K in Simultaneous 4K/HD and 3D-LUT mode (FS1 only).
Frame/Field Rate	59.94i	60p, 59.94p 50p, 48p, 47.95p 30p, 29.97p 25p, 24p, 23.98p 60i, 59.94i, 50i 24PsF, 23.98PsF 30PsF, 29.97PsF 25PsF	Specifies the frame/field rate.
Level Setting	Level-A	Level-A Level-B	Selects the SDI mapping level.
Division (UHD) (FA-964K)	2SI	SQD 2SI	Selects the SDI image division method when **2160** is selected under Format Standard.
Horizontal Size	1920/3840	1920/3840	Displays the horizontal image resolution. (Display only)
Format	-	-	Displays the converter output format.

5-20-1. Available Conversions on Converter 1 (FS1)

<59.94 Hz family>

✓: Available conversion		Output															
		2160/59.94p(*)	2160/29.97p(*)	2160/29.97PsF(*)	1080/59.94p(A)	1080/59.94p(B)	1080/29.97p	1080/59.94i(29.97PsF)	720/59.94p	720/29.97p	525/59.94i (SD-SDI)	2160/47.95p(*)	2160/23.98p(*)	2160/23.98PsF(*)	1080/23.98p	1080/23.98PsF	720/23.98p
Input	2160/59.94p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2160/29.97p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2160/29.97PsF (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/59.94p(A)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/59.94p(B)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/29.97p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/59.94i(29.97PsF)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	720/59.94p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	720/29.97p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	525/59.94i (SD-SDI)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2160/47.95p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2160/23.98p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2160/23.98PsF (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/23.98p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/23.98PsF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	720/23.98p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

(*) In Simultaneous 4K/HD or 3D-LUT mode with FA-964K option (including 3G-SDI Level-A/B and SQD/2SI)

<50 Hz family>

✓: Available conversion		Output									
		2160/50p (*)	2160/25p (*)	2160/25PsF (*)	1080/50p(A)	1080/50p(B)	1080/25p	1080/50i(25PsF)	720/50p	720/25p	625/50i (SD-SDI)
Input	2160/50p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2160/25p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2160/25PsF (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/50p(A)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/50p(B)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/25p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/50i(25PsF)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	720/50p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	720/25p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	625/50i (SD-SDI)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

(*) In Simultaneous 4K/HD or 3D-LUT mode with FA-964K option (including 3G-SDI Level-A/B and SQD/2SI).

<60 Hz family>

✓: Available conversion		Output														
		2160/60p(*)	2160/30p(*)	2160/30PsF(*)	1080/60p(A)	1080/60p(B)	1080/30p	1080/60(30PsF)	720/60p	720/30p	2160/48p(*)	2160/24p(*)	2160/24PsF(*)	1080/24p	1080/24PsF	720/24p
Input	2160/60p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2160/30p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2160/30PsF (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/60p(A)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/60p(B)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/30p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/60i(30PsF)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	720/60p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	720/30p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2160/48p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2160/24p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2160/24PsF (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/24p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1080/24PsF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	720/24p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

(*) In Simultaneous 4K/HD or 3D-LUT mode with FA-964K option (including 3G-SDI Level-A/B and SQD/2SI).

- Black video is output when any signal that is not listed in the above tables is specified for converter input or output.
- Conversions between 59.94 and 50 Hz family signals are not supported.

5-20-2. Available Conversions on Converter 2 (FS2)

<59.94 Hz family>

✓: Available conversion		Output									
		1080/59.94p(A)	1080/59.94p(B)	1080/29.97p	1080/59.94i(29.97PsF)	720/59.94p	720/29.97p	525/59.94i (SD-SDI)	1080/23.98p	1080/23.98PsF	720/23.98p
Input	1080/59.94p(A)	✓	✓	✓	✓	▲	▲	▲	✓	✓	▲
	1080/59.94p(B)	✓	✓	✓	✓	▲	▲	▲	✓	✓	▲
	1080/29.97p	✓	✓	✓	✓	▲	▲	▲	✓	✓	▲
	1080/59.94i(29.97PsF)	✓	✓	✓	✓	▲	▲	▲	✓	✓	▲
	720/59.94p	▲	▲	▲	▲	✓	✓	▲	▲	▲	✓
	720/29.97p	▲	▲	▲	▲	✓	✓	▲	▲	▲	✓
	525/59.94i (SD-SDI)	▲	▲	▲	▲	▲	▲	✓	▲	▲	▲
	1080/23.98p	✓	✓	✓	✓	▲	▲	▲	✓	✓	▲
	1080/23.98PsF	✓	✓	✓	✓	▲	▲	▲	✓	✓	▲
	720/23.98p	▲	▲	▲	▲	✓	✓	▲	▲	▲	✓

<50 Hz family>

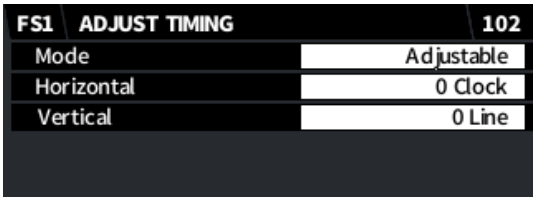
✓: Available conversion		Output						
		1080/50p(A)	1080/50p(B)	1080/25p	1080/50i(25PsF)	720/50p	720/25p	625/50i (SD-SDI)
Input	1080/50p(A)	✓	✓	✓	✓	▲	▲	▲
	1080/50p(B)	✓	✓	✓	✓	▲	▲	▲
	1080/25p	✓	✓	✓	✓	▲	▲	▲
	1080/50i(25PsF)	✓	✓	✓	✓	▲	▲	▲
	720/50p	▲	▲	▲	▲	✓	✓	▲
	720/25p	▲	▲	▲	▲	✓	✓	▲
	625/50i (SD-SDI)	▲	▲	▲	▲	▲	▲	✓

<60 Hz family>

✓: Available conversion		Output								
		1080/60p(A)	1080/60p(B)	1080/30p	1080/60i(30PsF)	720/60p	720/30p	1080/24p	1080/24PsF	720/24p
Input	1080/60p(A)	✓	✓	✓	✓	▲	▲	✓	✓	▲
	1080/60p(B)	✓	✓	✓	✓	▲	▲	✓	✓	▲
	1080/30p	✓	✓	✓	✓	▲	▲	✓	✓	▲
	1080/60i(30PsF)	✓	✓	✓	✓	▲	▲	✓	✓	▲
	720/60p	▲	▲	▲	▲	✓	✓	▲	▲	✓
	720/30p	▲	▲	▲	▲	✓	✓	▲	▲	✓
	1080/24p	✓	✓	✓	✓	▲	▲	✓	✓	▲
	1080/24PsF	✓	✓	✓	✓	▲	▲	✓	✓	▲
	720/24p	▲	▲	▲	▲	✓	✓	▲	▲	✓

- Black video is output when any signal that is not listed in the above tables is specified for converter input or output.
- Conversions between 59.94 and 50 Hz family signals are not supported.
- Input/output formats combinations marked as"▲" are available only on Dual HD mode. Using them in Simultaneous 4K/HD or 3D-LUT mode outputs black images.

5-21. ADJUST TIMING(FA-96UDC)



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Required Option: FA-96UDC

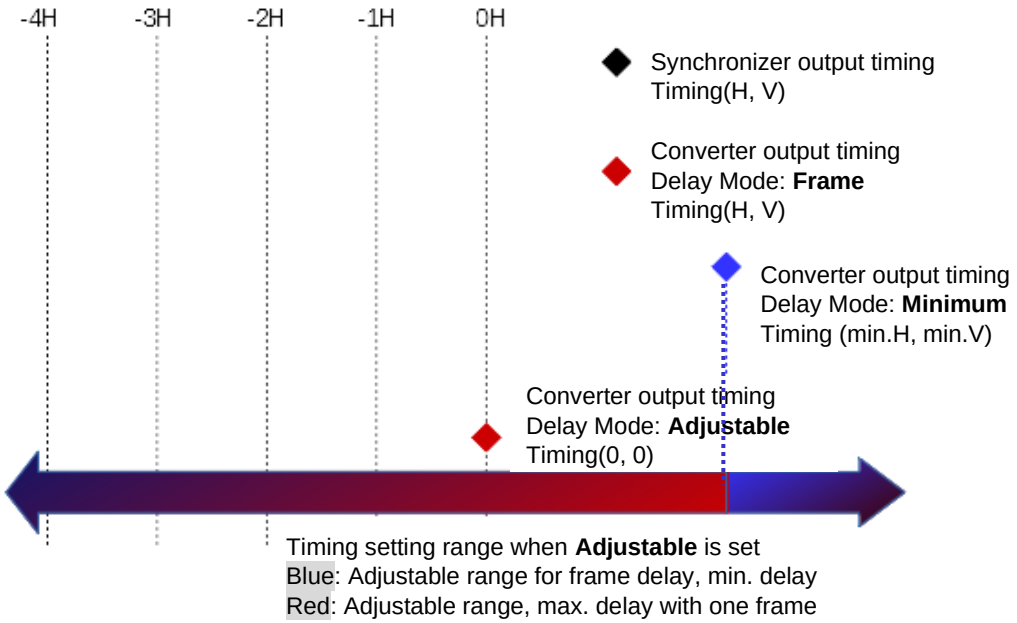
◆ **ADJUST TIMING**

Item	Default	Setting	Description
Mode	Frame	Frame Minimum Adjustable	Selects the Conversion 1 or 2 output timing (delay amount). **Frame:** Outputs at the same timing (delayed in frames) as that of the FS. **Minimum:** Outputs with the minimum delay. **Adjustable:** Outputs at the timing adjusted by the following parameters.
If Mode is set to **Adjustable**, use the following parameters to adjust the output timing.			
Horizontal	0 Clock	-2750 to 2750 Clock	Adjusts the horizontal timing. Adjustable range (see the table below) is defined by video format. If a limit is exceeded, one line is internally added or subtracted.
Vertical	0 Line	-563 to 563 Line	Adjusts the vertical timing. Adjustable range (see the table below) is defined by video format. If a limit is exceeded, plus and minus values are internally inverted.

<Horizontal/Vertical adjustable ranges>

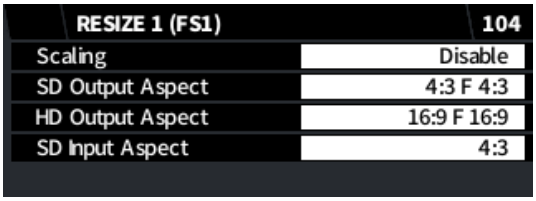
Video format	Horizontal range			Vertical range		
525/59.94i	-858	to	858	-263	to	263
625/50i	-864	to	864	-313	to	313
720/23.98p,24p	-2063	to	2063	-375	to	375
720/25p	-1980	to	1980	-375	to	375
720/29.97p, 30p	-1650	to	1650	-375	to	375
720/50p	-990	to	990	-375	to	375
720/59.94p, 60p	-825	to	825	-375	to	375
1080/23.98PsF, 23.98p, 24PsF, 24p	-1375	to	1375	-563	to	563
1080/24PsF, 25p	-1320	to	1320	-563	to	563
1080/29.97PsF, 29.97p, 30PsF, 30p	-1100	to	1100	-563	to	563
1080/50i	-1320	to	1320	-563	to	563
1080/59.94i, 60i	-1100	to	1100	-563	to	563
1080/47.95p, 48p(Level-A)	-1375	to	1375	-563	to	563
1080/47.95p, 48p(Level-B)	-2750	to	2750	-563	to	563
1080/50p(Level-A)	-1320	to	1320	-563	to	563
1080/50p(Level-B)	-2640	to	2640	-563	to	563
1080/59.94p, 60p(Level-A)	-1100	to	1100	-563	to	563
1080/59.94p, 60p(Level-B)	-2200	to	2200	-563	to	563
2160/23.98PsF, 23.98p, 24PsF, 24p	-1375	to	1375	-563	to	563
2160/25PsF, 25p	-1320	to	1320	-563	to	563
2160/29.97PsF, 29.97p, 30PsF, 30p	-1100	to	1100	-563	to	563
2160/47.95p, 48p(Level-A)	-1375	to	1375	-563	to	563
2160/47.95p, 48p(Level-B)	-2750	to	2750	-563	to	563
2160/50(Level-A)	-1320	to	1320	-563	to	563
2160/50p(Level-B)	-2640	to	2640	-563	to	563
2160/59.94p, 60p(Level-A)	-1100	to	1100	-563	to	563
2160/59.94p, 60p(Level-B)	-2200	to	2200	-563	to	563

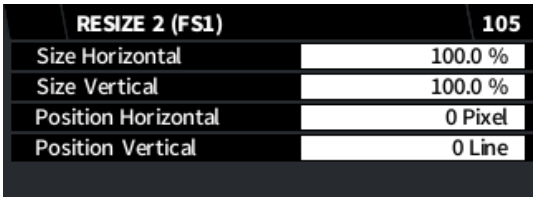
◆ **Delay variation depending on menu settings and processes**

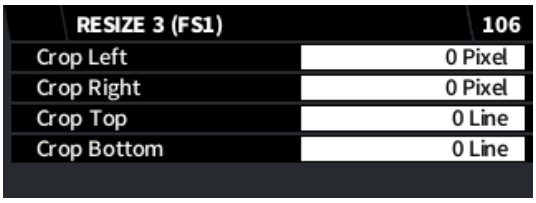


Timing setting range when **Adjustable** is set
Blue: Adjustable range for frame delay, min. delay
Red: Adjustable range, max. delay with one frame

5-22. RESIZE 1, 2, 3 (FA-96UDC)







Simultaneous 4K/HD (FS1)
Dual HD
3D-LUT (FS1)

Required Option: FA-96UDC

◆ **RESIZE 1**

Item	Default	Setting	Description
Scaling	Disable	Disable Enable	Enables/disables scaling or positioning up to 2K size for Size, Position and Crop settings.
SD Output Aspect	4:3 F 4:3	4:3 L 16:9 T 4:3 L 14:9 T 4:3 L>16:9 4:3 F 4:3 4:3 L 16:9 PRTD 4:3 L 14:9 4:3 F ALT 14:9 4:3 L ALT 14:9 4:3 L ALT 4:3 16:9 L>16:9 16:9 F 16:9 16:9 P 4:3 16:9 F PRTD 16:9 P 14:9 16:9 P ALT 14:9 16:9 F ALT 14:9 16:9 F ALT 4:3	Specifies the aspect ratio when converting HD-SDI to SD-SDI signals.
HD Output Aspect	16:9 F 16:9	16:9 L>16:9 16:9 F 16:9 16:9 P 4:3 16:9 F PRTD 16:9 P 14:9 16:9 P ALT 14:9 16:9 F ALT 14:9 16:9 F ALT 4:3	Specifies the aspect ratio when converting SD-SDI to HD-SDI signals.
SD Input Aspect	4:3	4:3 16:9	Selects the SD input aspect ratio. If the input image is horizontally squeezed, set to 16:9.

NOTE

If input and output signals are the same format, or converting signals between 1080 and 4K, only simple resolution conversion is performed, but scaling are not performed because higher priority is given to minimizing process delay. In such cases, you still need to perform scaling or positioning, **enable** this menu. Note that enabling this menu requires **one frame delay**.

◆ **RESIZE 2 (Available if Scaling is set to Enable)**

Item	Default	Setting	Description
Horizontal Size	100.0%	50.0% to 150.0%	Selects the horizontal image size ratio after conversion.
Vertical Size	100.0%	50.0% to 150.0%	Selects the vertical image size ratio after conversion.
Horizontal Position	0 Pixel	See the table below.	Selects the horizontal image position after conversion.
Vertical Position	0 Line	See the table below.	Selects the vertical image position after conversion.

◆ **RESIZE 3 (Available if Scaling is set to Enable)**

Cropping Left	0 Pixel	See the table below.	Crops the image from the left side.
Cropping Right	0 Pixel		Crops the image from the right side.
Cropping Top	0 Line	See the table below.	Crops the image from the top.
Cropping Bottom	0 Line		Crops the image from the bottom.

Video signal	Horizontal Position (per 2-pixel)	Vertical Position	Cropping Left Cropping Right (per 2-pixel)	Cropping Top Cropping Bottom
2160p	-1920 to 1920	-1080 to 1080	0-1918	0-1079
1080i/p	-960 to 960	-540 to 540	0-958	0-539
720p	-640 to 640	-360 to 360	0-638	0-359
525i (NTSC)	-360 to 360	-243 to 243	0-358	0-243
625i (PAL)	-360 to 360	-288 to 288	0-358	0-287

5-23. I/P CONVERTER SETTING (FA-96UDC)

Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Required Option: FA-96UDC

Item	Default	Setting	Description
Motion Sense	Adaptive	Adaptive Field Frame(Odd 1st) Frame(Even 1st)	**Adaptive:** Detects whether there is motion or no motion in the scene, and generates an optimal progressive image. **Field:** Generates a progressive image from one field of an interlaced image. The created image has no motion artifacts, but vertical resolution will be reduced. **Frame(Odd 1st):** Generates a progressive image from two fields (odd and even) of an interlaced image. Suitable for progressive segmented frame input shot in progressive format. **Frame(Even 1st):** Generates a progressive image from two fields (even and odd) of and interlaced image.

5-24. FILTER SETTINGS (FA-96UDC)

The menu requires FA-96UDC option and can enable/disable the following three filters: ANTI ALIAS H/V (see Sec. 5-25), ENHANCE H/V (see Sec. 5-26) and NOISE REDUCER (see Sec. 5-27).

Simultaneous 4K/HD (FS1)
Dual HD
3D-LUT (FS1)

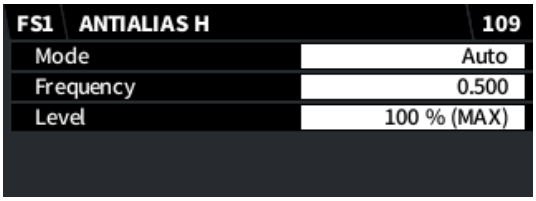
Required Option: FA-96UDC

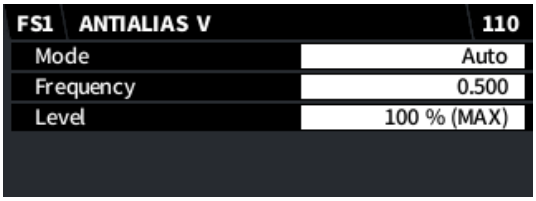
Item	Default	Setting	Description
HD/SD Details	Disable	Disable Enable	If using 2K signals (converting 2K to 2K), this parameter can enable / disable **Anti Alias**, **Enhance** and **Noise Reduce** together. However, all these functions are automatically enabled if aspect conversion or scaling is enabled (see Sec. 5-22), and they are automatically disabled if using 4K input and output, regardless of this setting.

Filters' process delay and when filters are enabled / disabled

Signal	Conversion	HD/SD Details setting	3 Filters	Filters' Process Delay
2160p/PsF	Level-A / B conversion	(Ignored)	Always disabled	None
	P / PsF conversion			
	2SI / SQD conversion			
	Simple rate conversion			
2160p/PsF 1080i/p/PsF 720p, SD	Format conversion (w/ aspect ratio conversion)	(Ignored)	Always enabled	About a dozen lines
1080i/p/PsF 720p SD	Scaling (See Sec. 5-22.)	(Ignored)	Always enabled	About a dozen lines
	Format conversion (w/o aspect ratio conversion)	Enabled	Enabled	About a dozen lines
		Disabled	Disabled	None

5-25. ANTIALIAS H/V (FA-96UDC)





Simultaneous 4K/HD (FS1)
Dual HD
3D-LUT (FS1)

Required Option: FA-96UDC

Item	Default	Setting (Steps)	Description
Mode	Auto	Auto Manual	To set Frequency manually, set to **Manual**.
Frequency	-	0.125 – 0.500 (0.025)	Sets the cutoff frequency of low-pass filter. If set to **0.5**, bandwidth of the highest pixel frequency in the original picture is reduced by about 10 %. The lower the value, the smoother the outlines, the more the low frequency ranges increase and the bandwidth of fine texture's frequencies is reduced.
Level	H:100% V:100%	0 (Off) – 100% (5%)	Sets the mixing percentage of filtered picture.

When converting from progressive videos to interlaced ones, it is recommended to change Vertical Frequency from default to **0.125**. This will reduce artifacts caused by conversions.

5-26. ENHANCE H/V (FA-96UDC)

The menu allows you to set the horizontal and vertical enhance levels. Note that the enhancer affects SD/HD video, but not 4K video. Thus, in conversions between 4K to HD, enhancements are solely targeted at HD images.

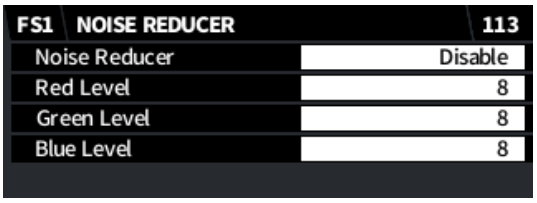
Simultaneous 4K/HD (FS1)
Dual HD
3D-LUT (FS1)

Required Option: FA-96UDC

Item	Default	Setting	Description
Enhance	Disable	Disable Enable	Enables/disables Horizontal / Vertical Enhancer.
High	1	0 – 10	Sets the horizontal enhance level of higher range between 0.29 to 0.4 in the sampling frequency.

Middle	1	0 – 10	Sets the horizontal enhance level of higher range between 0.17 to 0.29 in the sampling frequency.
Low	1	0 – 10	Sets the horizontal enhance level of higher range between 0.03 to 0.17 in the sampling frequency.

5-27. NOISE REDUCER (FA-96UDC)



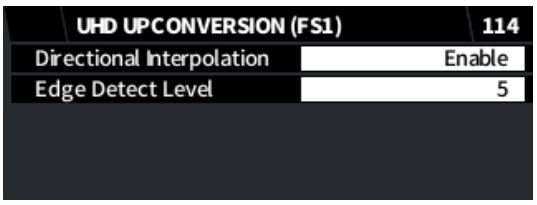
Simultaneous 4K/HD (FS1)
Dual HD
3D-LUT (FS1)

Required Option: FA-96UDC

Item	Default	Setting	Description
Noise Reducer	Disable	Disable Enable	Enables/disables Noise Reducer.
Red Level Green Level Blue Level	8	1-16	Sets the noise reduction level in RGB. The stronger (higher) the filtering level, the more the high-frequency components in video images are attenuated. This reducer is effective for random noises in low luminance side (darker parts) caused by a camera or other apparatus, but ineffective for noises in high luminance side (brighter parts) and block noises from picture compression.

5-28. UHD UPCONVERSION (FS1) (FA-96UDC/964K)

This menu requires FA-96UDC and FA-964K optional software, and is disabled if **Converter** is set to **Follow Input** in the FORMAT CONVERTER menu.

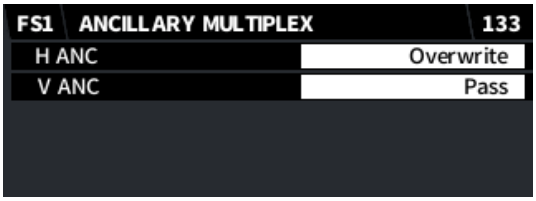


Simultaneous 4K/HD (FS1)
Dual HD
3D-LUT (FS1)

Required Option: FA-96UDC, FA-964K

Item	Default	Setting	Description
Directional Interpolation	Enable	Disable Enable	Enables/disables Edge Detect Level setting. Effective only for 4K up-conversions.
Edge Detect Level	5	0 - 10	Sets Edge Detect Level. The lower the value, the higher the detection sensitivity, increasing the directional interpolation area.

5-29. ANCILLARY MULTIPLEX

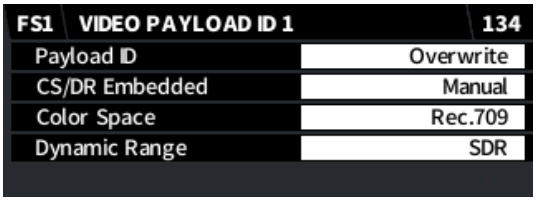


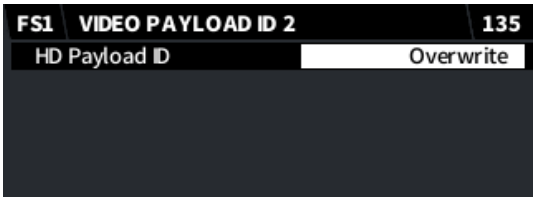
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
H ANC	Overwrite	Overwrite Pass Blank	Selects the HANC data insertion mode. **Overwrite:** Inserts the input HANC data in which audio and timecode data are rewritten. **Pass:** Inserts the input HANC data without processing. If input and output signal formats are different, "**Blank**" setting is automatically applied. **Blank:** Clears HANC space and inserts only the rewritten input audio and timecode data. See VANC setting (below) for SD timecode processing.
V ANC	Pass	Pass Rewrite	Selects the VANC data insertion mode. **Pass:** Passes through the input VANC data without processing. If input and output signal formats are different, the VANC space becomes blank. **Rewrite:** Outputs black in the VANC area. If ARIB STD-B37 STD-B39 and/or User Packet are set to other than **Disable** in the ANC DATA INSERTION menu (See Sec. 5-37.) and corresponding packets are included in the input signal, they are inserted in the proper space on the output signal.

To insert timecodes to SD output signals, select **Rewrite** under **V ANC**.
Whether a timecode is inserted into HD/3G/6G/12G-SDI signal depends on the **H ANC** setting.

5-30. VIDEO PAYLOAD ID 1, 2





Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
Payload ID	Overwrite	Pass Overwrite	Selects payload identifier insertion mode. Note that payload identifiers are always inserted if output video signals are 4K or HD, regardless of HANC and VANC settings and Payload ID codes in input video. **Pass**: Inserts the payload identifiers in the input signal without change. If the input and output signal formats are different, another payload ID code is automatically inserted into the output signal according to the following parameter settings. **Overwrite**: Inserts payload ID codes according to the following parameter settings.

If **Overwrite** is selected, set how and which info. is inserted using the following parameters.			
CS/DR Embedded	Auto	Auto Manual	Sets the payload identifier insertion mode for Dynamic Range and Color Space. **Auto**: Automatically inserts payload identifiers according to the Dynamic Range Conv. setting. (See Sec. 5-4. "INPUT / OUTPUT GAMMA / COLOR.") If set to **Bypass**, payload ID codes in the input signal are inserted. If set to **Operate**, Payload identifiers suitable to output gamma and color space settings are inserted. **Manual**: Inserts the codes using the following Color Space and Dynamic Range settings.
Color Space	Rec.709	Rec.709 VANC UHDTV Unknown	Selects a color space (gamut).
Dynamic Range	SDR	SDR HLG PQ Unspecified	Selects a dynamic range.
HD Payload ID	Enable	Enable Disable	Enables / disables to insert payload identifiers into HD-SDI output.

The corresponding information is inserted into the location defined in the following standards.
- 1.5G 1080-Lines: SMPTE ST292-1:2018
- 3G Level-A 1080-Lines: SMPTE ST425-1: 2017
- 3G Level-B 1080-Lines: SMPTE ST425-1: 2017
- Quad Link 1.5G 2160-Lines: SMPTE ST292-1:2018
- Dual Link 3G Level-B 2160-Lines SQD: SMPTE ST425-1:2017
- Dual Link 3G Level-B 2160-Lines 2SI: SMPTE ST425-3:2019
- 6G 2160-Lines: SMPTE ST2081-10:2018
- Quad Link 3G Level-A 2160-Lines SQD: SMPTE ST425-1: 2017
- Quad Link 3G Level-B 2160-Lines SQD: SMPTE ST425-1: 2017
- Quad Link 3G Level-A 2160-Lines 2SI: SMPTE ST425-5: 2019
- Quad Link 3G Level-B 2160-Lines 2SI: SMPTE ST425-5: 2019
- Dual Link 6G 2160-Lines: SMPTE ST2081-11: 2019
- 12G 2160-Lines: SMPTE ST2082-10:2018

5-31. VIDEO PAYLOAD ID LINKAGE

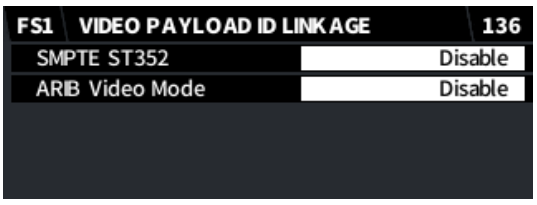
An event (a set of menu settings) can be automatically loaded linked with payload identifiers.

NOTE

Note that signal processing from data analysis to even loading may take a certain time, more than a frame in some cases.

To check each information, see Sec. 5-49. “Payload ID (FA-96EX3G44-R)” and Sec. 5-52. “INPUT ARIB B39 VIDEO MODE”

To use auto (linkage) event load, a corresponding event should be created and uploaded in advance. (See Sec. 13-3-2-2. “Auto Loaded Events (Event 101 and higher)” in Sec. 13-3-2 ″Event Data″.)

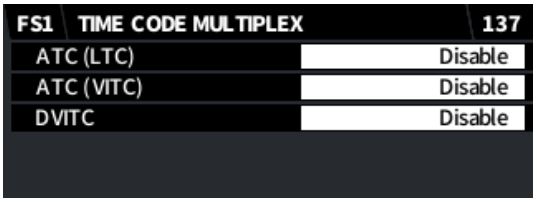


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
SMPTE ST352	Disable	Disable Enable	Enables/disables event auto load linked to the payload ID video information defined in SMPTE ST352.
ARIB Video Mode	Disable	Disable Enable	Enables/disables event auto load linked to the Video Mode data in the control signal defined in ARIB STD-B39. (FA-964K required. Disabled in Dual HD mode)

If both SMPTE ST352 and ARIB Video Mode are enabled, the ARIB Video Mode information has higher priority.

5-32. TIME CODE MULTIPLEX

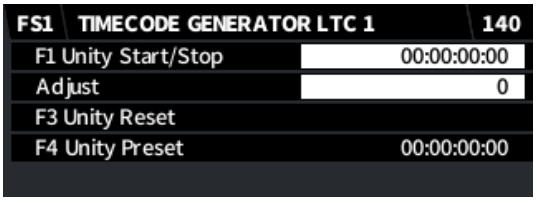


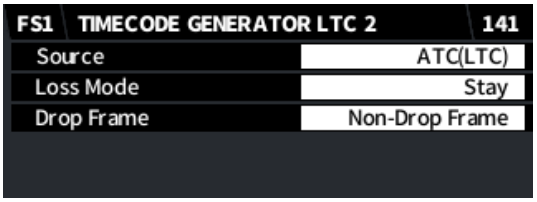
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

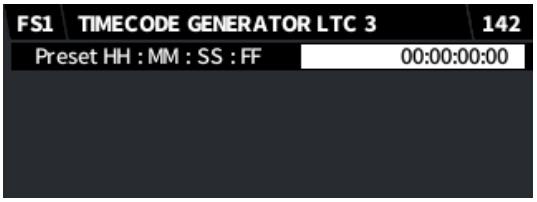
Item	Default	Setting	Description
ATC(LTC)	Disable	Disable Enable	Selects whether to embed timecode into each FS output. **Disable:** Embeds no timecode. **Enable:** Embeds timecode. Generate a timecode using following timecode menus. (DVITC is only for SD)
ATC(VITC)	Disable		
DVITC	Disable		

5-33. TIMECODE GENERATOR LTC 1, 2, 3

This menu allows you to generate LTC timecodes. To embed timecode onto FS output, set H ANC to **Overwrite** (Sec. 5-29. “ANCILLARY MULTIPLEX”) and ATC(LTC) to **Enable** (Sec. 5-32. “TIME CODE MULTIPLEX”).





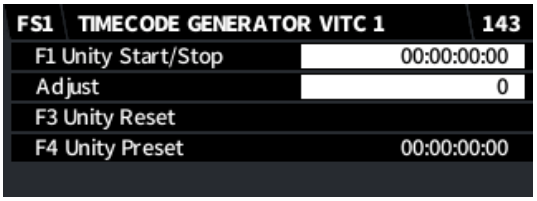


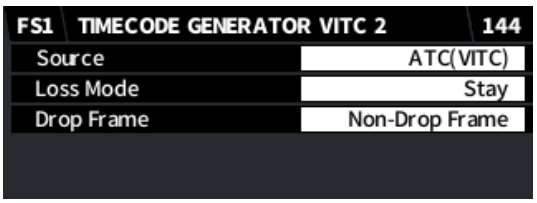
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

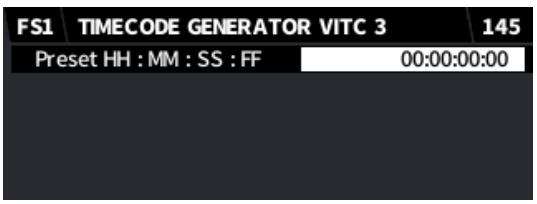
Item	Default	Setting	Description
Start/ Stop	-	-	Pressing F1 Unity button starts the timecode. Re-pressing the button stops the timecode.
Adjust	0	-16 to +16	Sets the offset from the source timecode. To delay the timecode, use a negative number.
-	-	-	Pressing F3 Unity resets the timecode.
-	-	-	Pressing F4 Unity sets the timecode to the preset set value.
Source	ATC(LTC)	ATC(LTC) ATC(VITC) VITC(DVITC) LTC IN Generator	Selects the timecode source. **ATC(LTC):** ATC(LTC) timecode in the SDI input **A(VITC):** ATC(VITC) timecode in the SDI input **VITC(DVITC):** VITC(DVITC) timecode in the SD-SDI input **LTC IN:** LTC input (FA-96DIN4- -CBL required) **Generator:** Generator's timecode
Loss Mode	Stay	Stay Continue Output Disable	Selects the way to recover when a timecode source loss is detected. **Stay:** Stays outputting the last timecode. **Continue:** Continues running with the timing before loss and keeps the continuity. **Output Disable:** Stops timecode output when the source loss is detected.
Drop Frame	Non-Drop Frame	Non-Drop Frame Drop Frame	Selects drop frame or non-drop frame timecode. **Drop Frame** is available only for 29.97/30Hz signals.
Preset HH:MM: SS:FF	00:00:00:00	00:00:00:00 to 23:59:59:29	Sets the timecode preset value. Pressing **F4 Unity** sets this value to the timecode.

5-34. TIMECODE GENERATOR VITC 1, 2, 3

This menu allows you to generate VITC/DVITC timecodes. To embed timecode onto FS output, set V ANC to **Rewrite** (Sec. 5-29. "ANCILLARY MULTIPLEX") and ATC(VITC)/DVITC to **Enable** (Sec. 5-32. "TIME CODE MULTIPLEX"). See the LTC timecode menus to set the VITC(DVITC) timecode.



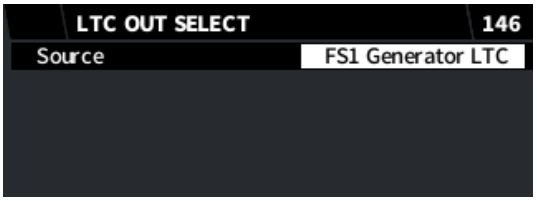




Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

5-35. LTC OUT SELECT (FA-96DIN4-CBL)

This menu requires FA-96DIN4-CBL option.



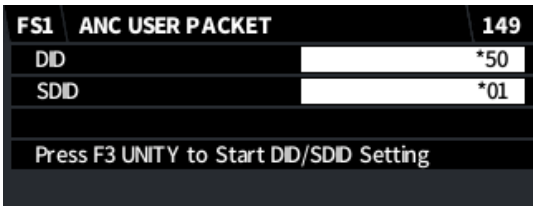
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Required Option: FA-96DIN4-CBL

Item	Default	Setting	Description
Source	FS1 Generator LTC	FS1 Generator LTC FS2 Generator LTC	The LTC OUT on FA-96DIN4-CBL outputs an internally generated timecode. This menu selects which timecode generator to be used.

5-36. ANC USER PACKET (Planned for future support)

This menu is planned for future support.



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
DID	50	50 to 5F (Hex)	Selects an ANC packet used as a User Packet in the input signal by using F1 for DID and F2 for SDID and pressing F3 Unity. An asterisk "*" is displayed in front of DID/SDID values if the packet is already used. F3 Unity cannot be pressed if a packet (DID/SDID values) is unavailable (see below).
SDID	01	01 to FF (Hex)	

<Unavailable ANC Packets>

ANC packets with DID and SDID values in the table at right are unavailable, because they are reserved by ARIB.

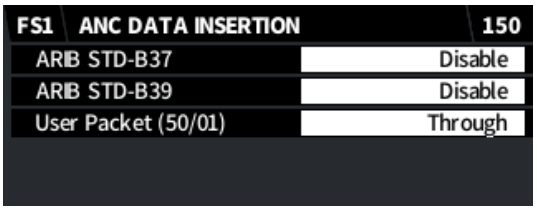
DID value	SDID value
5F	DC
	DD
	DE
	DF
	FE

5-37. ANC DATA INSERTION

This menu allows you to determine whether to pass through the following three VANC data packets inserted in SDI input.

ARIB STD-B37 (Closed Caption Data)
ARIB STD-B39 (Inter-Stationary Control Data)
User Packet (Selected in Sec. 5-36. "ANC USER PACKET") (Planned for future support)

Other VANC data packets cannot be managed independently, To enable this menu, set V ANC to **Rewrite**. (See Sec 5-29. "ANCILLARY MULTIPLEX.")



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
ARIB STD-B37	Disable	Disable Through	**Disable**: Disables ANC data insertion. **Through:** The packet data is extracted from the SDI signal and inserted directly into an appropriate place on the SDI output whose line number varies depending on the signal format. The packets may be lost or overlapped due to timing alignment, if the input signal is not synchronized with the reference. User packet insertion line can be specified in the ANC USER PACKET menu (see Sec. 5-38). **Overwrite:** Inserts the packet defined in ARIB STD-B39 by partially rewriting the input data (video mode / audio (expansion) mode). The additional information should be set under Audio Method and Audio Mode Data in the "AUDIO MUX MODE (ARIB STD-B39)" menu. (See Sec. 6-4)
ARIB STD-B39	Disable	Disable Through Overwrite	
User Packet (DID/SDID) (*1)	Disable	Disable Through	

(*1) Planned for future support

<Process Delay>

This process requires up to 2 frames. So, if the synchronizer operates in Line or AVDL mode, where the I/O delay is smaller, the packets may be delayed against video by 2 frames. To compensate for such a situation, use the converter delay line to add a delay to video. If video signals are delayed by more than 2 frames due to conversion process, the delay time is automatically added to ANC packet data.

<User Packet Insertion on Format Conversions>

I: Interlace and 3G Level-B
P: Progressive
PsF: Segmented frame

	60/59.94/50/48/47.95p		P to P conversion (Framerate reduced by half)	30/29.97/25/24/23.98p	
1	Frame 1	Packet A	Allows one packet per 2 frames.	Frame 1	Packet A
	Frame 2	Packet B			
	Frame 3	Packet C		Frame 2	Packet C
	Frame 4	Packet D			
1’	Frame 1	Packet A	Allows one packet per 2 frames.	Frame 1	Packet B
	Frame 2	Packet B			
	Frame 3	Packet C		Frame 2	Packet D
	Frame 4	Packet D			

2	60/59.94/50p		P to I(PsF) conversion (more than 30 frames)	60/59.94/50i(30/29.97/25PsF)	
	Frame 1	Packet A	Inserts frame packets to fields.	Field 1	Packet A
	Frame 2	Packet B		Field 2	Packet B

3	30/29.97/28/24/23.98p		P to P conversion (Framerate doubled)	60/59.94/50/48/47.95p	
	Frame 1	Packet A	Inserts one packet per 2 frames	Frame 1	Packet A
				Frame 2	(None)

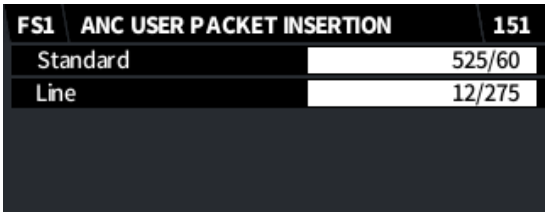
4	30/29.97/25p		P to I(PsF) conversion (30 frames or less)	60/59.94/50i (30/29.97/25PsF)	
	Frame 1	Packet A	Inserts frame packets to Field 1.	Field 1	Packet A
				Field 2	(None)

	60/59.94/50i		I to P conversion (30 frames or less)	30/29.97/25p	
5	Field 1	Packet A	Inserts Field 1 packets to frames.	Frame 1	Packet A
	Field 2	(None)			
6	Field 1	Packet A	Packets in Field 2 are not passed through.	Frame 1	Packet A
	Field 2	Packet B			

	60/59.94/50i		I to P conversion (more than 30 frames)	60/59.94/50p	
7	Field 1	Packet A	Inserts one packet per 2 frames	Frame 1	Packet A
	Field 2	(None)		Frame 2	(None)
8	Field 1	Packet A	Inserts field packets to frames.	Frame 1	Packet A
	Field 2	Packet B		Frame 2	Packet B

5-38. ANC USER PACKET INSERTION (Planned for future support)

This menu is planned for future support.



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

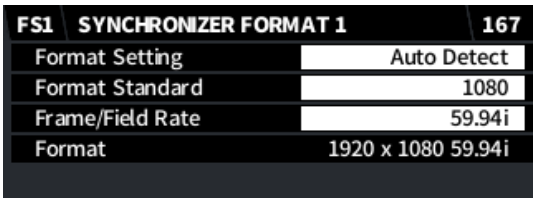
Item	Default	Setting	Description
Standard	-	525/59.94i 625/50i 720p 1080i, PsF/2160PsF 1080p/2160p(1.5G) 1080p/2160p(3G-A) 1080p/2160p(3G-B)	Selects the TV standard of the signal into which the user packet is inserted.
Line	(See the table below.)		Selects a line number into which the user packet is inserted.

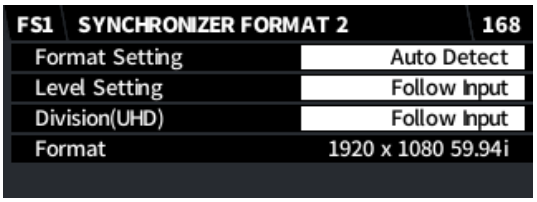
<Line default value and setting range>

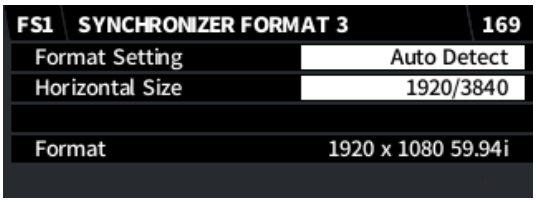
Standard setting	Line default value	Line setting range
525/59.94i	12/275	12/275 - 19/282
625/50i	8/321	8/321 - 22/335
720p	9	9 - 25
1080i, PsF/2160PsF	9/571	9/571 - 20/582
1080p/2160p(1.5G)	9	9 - 41
1080p/2160p(3G-A)	9	9 - 41
1080p/2160p(3G-B)	9/571	9/571 - 20/582

5-39. SYNCHRONIZER FORMAT

See Sec. “16-1. “Specifications” for the supported signal formats.



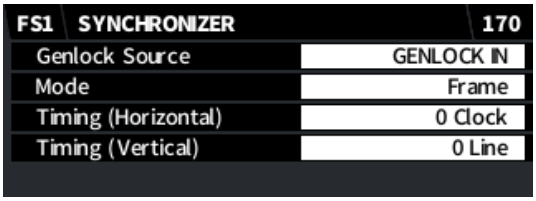




Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
Format Setting	Auto Detect	Auto Detect Manual	Selects the FS output format. **Auto Detect**: FS input signal format. **Manual**: Signal format specified below
Format Standard	1080	SD 720 1080 2160	Specifies the vertical image resolution. **2160** available with FA-964K in Simultaneous 4K/HD or 3D-LUT mode (FS1 only)
Frame/Field Rate	59.94i	60p, 59.94p, 50p 48p, 47.95p 30p, 29.97p 25p, 24p, 23.98p 60i, 59.94i, 50i 24PsF 23.98PsF 30PsF 29.97PsF 25PsF	Specifies the frame / field rate.
Level Setting	Follow Input	Follow Input Level A Level B (Dual Link)	Specifies the SDI mapping level.
Division (FA-964K)	Follow Input	Follow Input SQD 2SI	Specifies the SDI image division method. Available in Simultaneous 4K/HD or 3D-LUT mode (FS1 only)
Horizontal Size	1920/3840	1920/3840	Displays the horizontal image resolution (Display only)
Format	-	-	Displays the FS output format.

5-40. SYNCHRONIZER

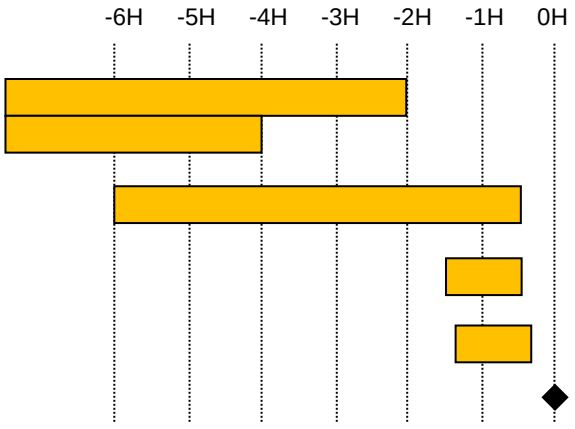


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
Genlock Source	GENLOCK IN	GENLOCK IN FS1 FS2 Free Run	Selects the reference signal (for both FS1 and FS2). **GENLOCK IN:** GENLOCK input signal **FS 1/2:** Input signal selected for Synchronizer 1 or Synchronizer 2. **Free Run:** Internal reference signal.
Mode	Frame	Frame Line AVDL Line(Min)	Selects the reference mode. Use "**Frame**" if genlock input and video input signals are not synchronized. When adjusting video signals, the reference point (H: 0, V: 0) can be offset under **Timing** settings. If the reference point is changed, adjustable ranges are also changed accordingly. See the chart below for details on adjustable ranges. **Frame**: Aligns input video signals using frame memory. **Line**: Aligns input video signals using using 1H memory. **AVDL**: Aligns input video signals using both 1H and frame memory. **Line (Min)**: Aligns input video signals using 1H memory.

◆ **Signal Synchronization and Signal Timing Control**

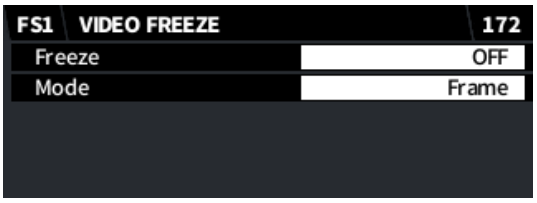
Bars in the figure below represent adjustable timing ranges for reference modes.
If timing difference of input signal exceeds the range, one frame delay may be added to the signal or output image may be shifted vertically.



Frame adjust range:
-2.0H (for 4K/HD/SD Single Link signals)
(-2.0H or advanced signals, no frame delay. Otherwise, a frame delay may occur.)
-4.0H (for 4K Dual/Quad Link signals)
AVDL adjust range:
-6.0H to -0.5H
(A frame delay may occur, if input signals exceed the range)
Line adjust range:
-1.5H to -0.5H (Output mages may be shifted vertically, if input signals exceed the range.)
Line(MIN) adjust range:
-(1H+700clk) to -700clk (Output mages may be shifted vertically, if input signals exceed the range.)
Synchronizer output timing: **Timing H:0, V:0**
(The timing reference point can be offset. See next page.)

Item	Default	Setting	Description
Timing (Horizontal)	0 Clock	-2750 to 2750 (1080/Level B) -1375 to 1375 (1080) -2063 to 2063 (720) -864 to 864 (SD)	Sets the horizontal offset.
Timing (Vertical)	0 Line	-563 to 563 (1080) -375 to 375 (720) -313 to 313 (SD)	Sets the vertical offset.

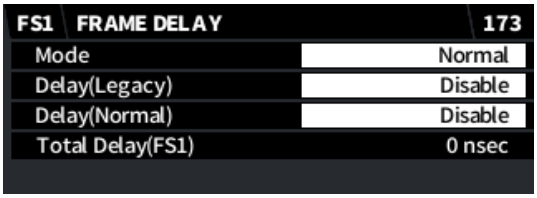
5-41. VIDEO FREEZE



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
Freeze	OFF	OFF ON	Turns freeze On/Off only when Synchronizer Mode (No. 170) is set to **Frame**.
Mode	Frame	Frame Odd Even	Sets the freeze mode. This setting is ignored if progressive/no signal is input to FS.

5-42. FRAME DELAY



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

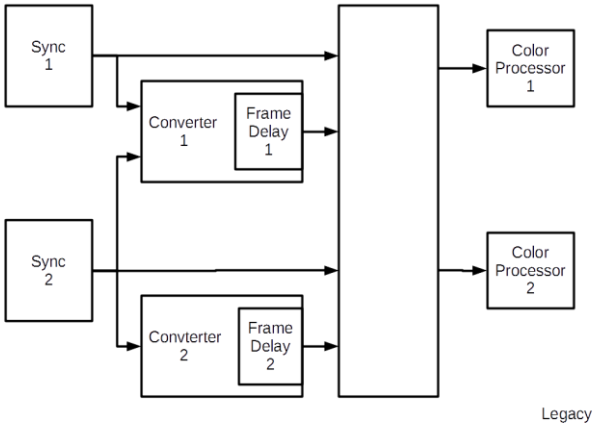
Item		Default	Setting	Description
Mode		Normal	Legacy Normal	Selects a frame delay processing mode between **Legacy** and **Normal** (applied to both F1 and F2).
If Legacy is selected	Delay (Legacy)	Disable	Disable 0.5-8.0 Frames	Allows you to add a delay in 0.5 frames respectively to FS1 (Converter1) and FS2 (Converter2). (FA-96UDC required)
If Normal is selected	Delay (Normal)	Disable	Disable 0.5-8.0 Frames	Allows you to add a delay in 0.5 frames respectively to FS1 and FS2.
Total Delay (FSx)		-	-	Displays the FS1 or FS2 total delay time. Turning the F4 control knob switches between F1 and F2.

5-42-1. FRAME DELAY Difference between Old and New Versions

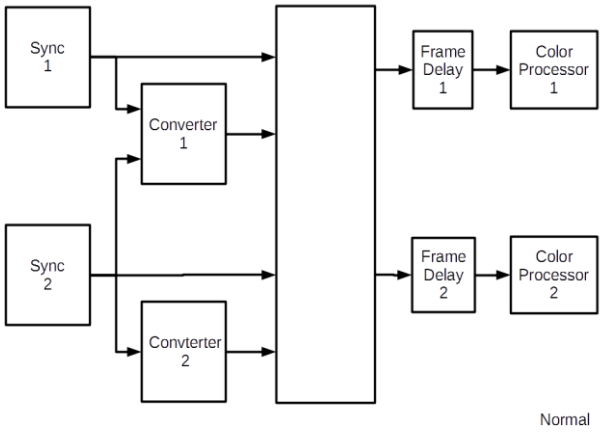
The FRAME DELAY function significantly changes in FA-9600 Version 3.3.

FA-9600 version	FRAME DELAY
Old versions (Legacy mode) (until **Version 3.2x**)	The function is included in the **FA-96UDC option** and adds a delay to **Converter 1** and **Converter 2** output respectively.
New versions (Normal) (**Version 3.3x** and later)	The function is provided **as standard** and adds a delay to **FS1** and **FS2** output respectively.

Legacy Mode Block Diagram



Normal Mode Block Diagram



- The FRAME DELAY values stored in the following events are ignored in new versions.
  Event data stored in FA-9600 old versions (until V3.2x)
  Event data created by the Event Editor or using event data list written in manuals of old FA-9600 versions.

- To apply FRAME DELAY values in old versions to those in new versions
  Recreate events using the new Event Editor or event data list in this manual.
  ▶ Refer to Sec. 8. “Event Memory” for details on how to save events.
  ▶ Refer to Sec. 14. “Event Data (CSV File)” for details on how to create events using other methods.

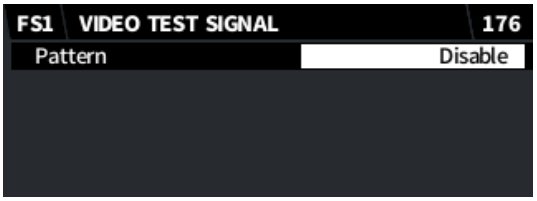
5-43. SDI BYPASS

Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Required Option: None

Item	Default	Setting	Description
IN 1 – OUT 1a	Operate	Operate Active Through	Enables/disables SDI 1 active bypass routing. Note that active bypass is ineffective when unit power is off.
IN 2 – OUT 2a	Operate	Operate Relay Bypass	Enables/disables SDI 2 relay bypass routing.
IN 1 – OUT 1 IN 2 – OUT 2 IN 3 – OUT 3 IN 4 – OUT 4	Operate	Operate Relay Bypass	Enables/disables bypass routing for SDI 1-4 on FA-96EX3G44-R cards installed into Slot A.

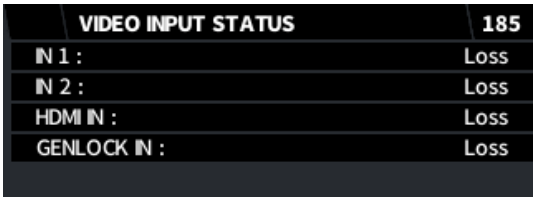
5-44. VIDEO TEST SIGNAL

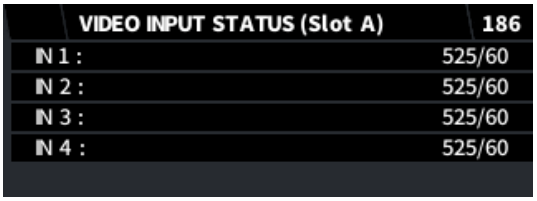


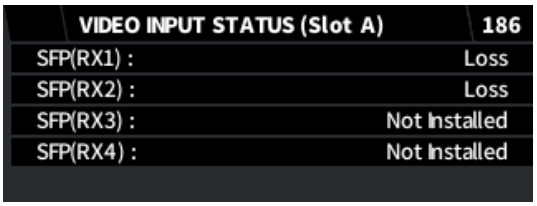
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
Pattern	Disable	Disable 100% Color Bar 75% Color Bar	Outputs the selected test signal.

5-45. VIDEO INPUT STATUS







Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

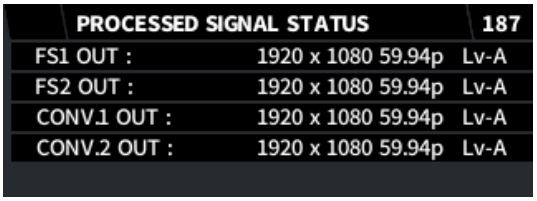
Required Option

FA-96EX3G44-R

FA-96SFPC4

Item	Description
IN 1 IN 2 HDMI IN	Displays each input signal format. **Loss**: No input signal **Bypass**: Input signal is directly pass through to output (process bypassed). **Unknown**: Input signal is not supported. 6G/12G-SDI signals input to IN2 are regarded as “loss.”
GENLOCK IN	Displays the GENLOCK IN signal format. **Loss**: No input signal **Unknown**: Input signal is not supported.
IN 1 IN 2 IN 3 IN 4	Displays each input signal format of the optional card installed on Slot A (FA-96EX3G44-R or FA-96SFPC4 inputs) Only the bitrate is displayed for deselected FA-96SFPC4 inputs.) **Loss**: No input signal **Bypass**: Input signal is directly pass through to output (process bypassed). **Unknown**: Input signal is not supported.
SFP(RX1) SFP(RX2) SFP(RX3) SFP(RX4)	Displays the signal format input to the FA-96SFPC4 card on the Slot A, or the bitrate if the signal is not selected for processing. **Loss**: No input signal **Unknown**: Input signal is not supported. **Not Installed**: No SFP module is installed.

5-46. PROCESSED SIGNAL STATUS



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Description
FS1 OUT FS2 OUT	Displays the FS1 output signal format. Displays the FS1 output signal format.
CONV.1 OUT CONV.2 OUT)	Displays the CONV1 (converter) output signal format. Displays the CONV2 (converter) output signal format. (FA-96UDC required)

5-47. SDI ERROR DETECTION

Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

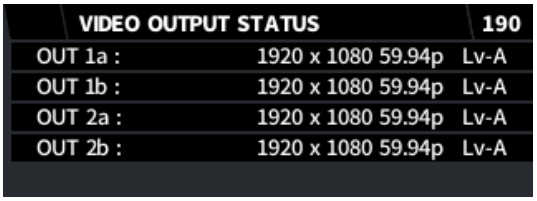
Required Option

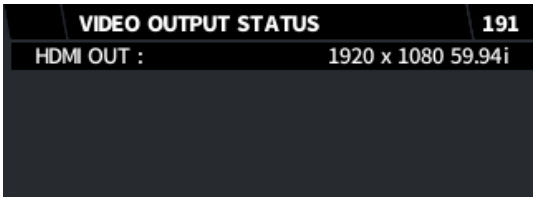
FA-96EX3G44-R

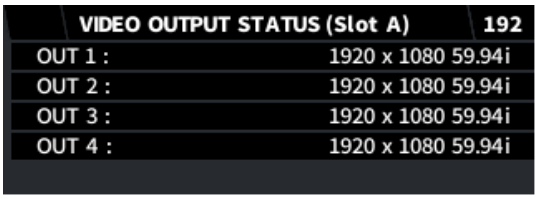
FA-96SFPC4

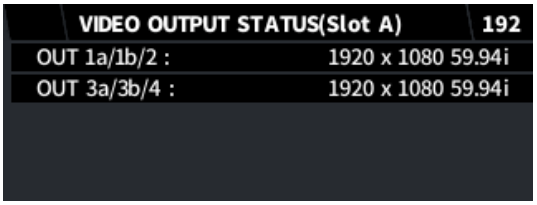
Item	Description
IN 1 IN 2	Displays the input signal error (TRS and CRC) count for SDI IN1-2. To reset the count, press F1/F2 Unity.
IN 1 | IN 4	Displays the input signal error (TRS , CRC) count for optional IN1-4. (FA-96EX3G44-R, Slot A) To reset the count, press each Unity button.
SFP(RX1) | SFP(RX4)	Displays the input or output error (TRS , CRC) count for optional SFP (RX1-4). (FA-96SFPC, Slot A) To reset the count, press each Unity button. If no SFP modules are inserted into cages, “Not Installed” is displayed.

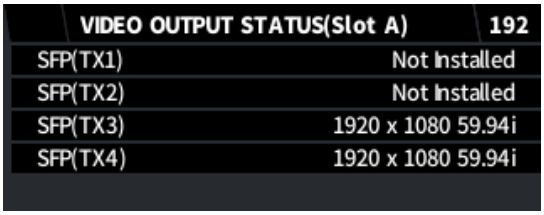
5-48. VIDEO OUTPUT STATUS











Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Required Option

FA-96EX3G44-R

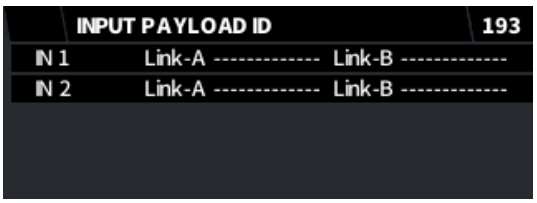
FA-96EX12G06

FA-96SFPC4

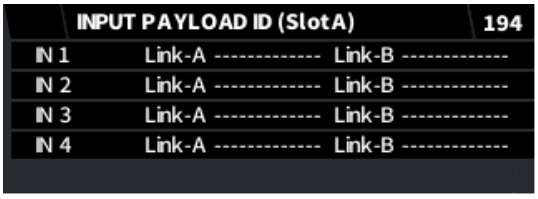
Item	Description
OUT 1a | OUT 2b HDMI OUT	Displays the output signal format.
OUT 1 | OUT 4	Displays the output signal format of the optional card installed on Slot A (FA-96EX3G44-R or FA-96SFPC4)
OUT 1a/1b OUT 2 OUT 3a/3b OUT 4	Displays the output signal format of the optional card installed on Slot A. (FA-96EX12G06)
SFP(TX1) | SFP(TX4)	Displays the output signal format of the optional card installed on Slot A. (FA-96SFPC4) If no SFP modules are inserted into cages, “Not Installed” is displayed.

5-49. Payload ID (FA-96EX3G44-R / FA-96SFPC4)

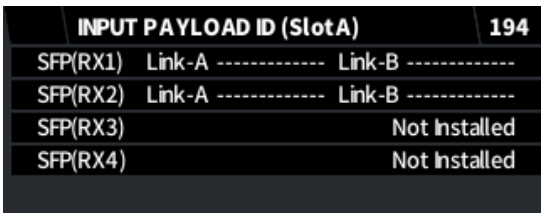
The Payload ID (Slot A) page is displayed when FA-96EX3G44-R or FA-96SFPC4 is installed.



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)



Required Option: FA-96EX3G44-R

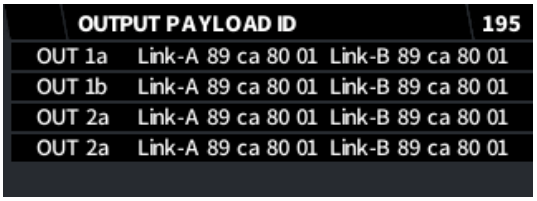


Required Option: FA-96SFPC4

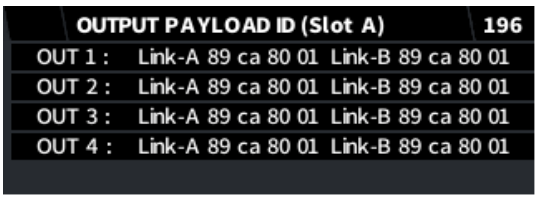
SDI signal / Display	SD	HD	3G Level A	3G Level B
Link A data	No display	Payload ID in Y signal	Payload ID in Y signal	Payload ID in Link A
Link B data	No display	No display	Payload ID in C signal	Payload ID in Link B

If no SFP modules are inserted into FA-96SFPC4 cages, “Not Installed” is displayed.

5-50. OUTPUT PAYLOAD ID

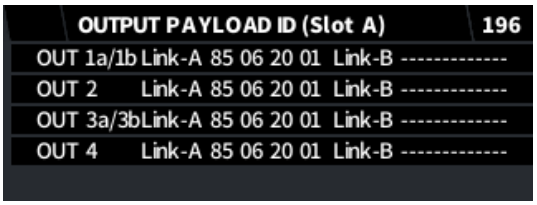


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

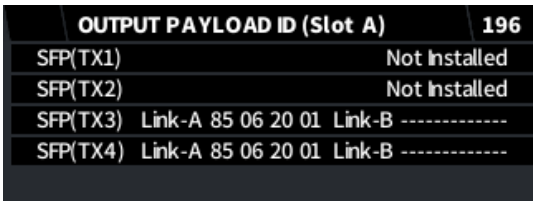


Required Option

FA-96EX3G44-R



FA-96EX12G06



FA-96SFPC4

Item	Description
OUT 1a | OUT 2b	Displays payload ID codes in outputs.
OUT 1 | OUT 4	Displays payload ID codes in outputs. (FA-96EX3G44-R, Slot A)
OUT 1a/1b OUT 2 OUT 3a/3b OUT 4	Displays payload ID codes in outputs. (FA-96EX12G06, Slot A)
SFP(TX1) | SFP(TX4)	Displays payload ID codes in outputs. (FA-96SFPC4, Slot A) If no SFP modules are inserted into cages, “Not Installed” is displayed.

5-51. INPUT TIMECODE DETECTION (FA-96DIN4-CBL)

Displays the timecode status in the SDI input and LTC IN (FA-96DIN4-CBL).

Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Required Option

FA-96DIN4-CBL

5-52. INPUT ARIB B39 VIDEO MODE

Displays the ARIB B39 Video Mode in ancillary area of SDI input.

Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

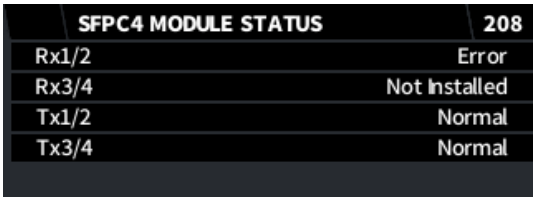
5-53. INPUT ANCILLARY DETECTION 1-4

Displays the ancillary data detected in the SDI input: DID/SDID, Line number and data.
If a checksum error occurs, "[C]" is displayed in front of the item.

Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Required Option: None

5-54. SFPC4 MODULE STATUS



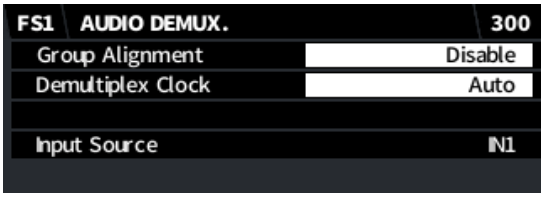
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Required Option: FA-96SFPC4

Item	Description
Rx1/2 Rx3/4 Tx1/2 Tx3/4	Displays the status information of SFP modules installed on FA-96SFPC4 option card. **Not Installed**: No SFP modules installed **Normal**: SFP module functions normally. **Warning**: A problem has occurred on the SFP module. **Error**: An error has occurred on the SFP module. Open the FA-9600 Windows GUI software to verify details.

6. Audio Setting Menus

6-1. AUDIO DEMUX

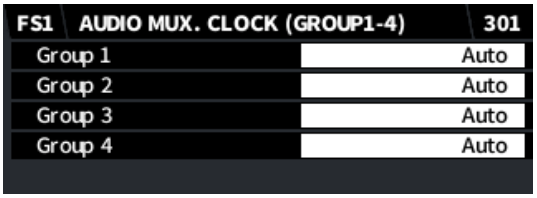


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default	Setting	Description
Group Alignment	Disable	Enable Disable	Selects whether to perform auto phase adjustment among each SDI input audio group. **Enable:** Performs auto adjustment. (*1) **Disable:** Performs no auto adjustment (Normal setting).
Demultiplex Clock	Auto	Auto Sync SDI Audio Clock	Selects the audio de-embedding method for HD/3G/6G/12G-SDI input. **Auto:** Uses the audio clock phase data in the SDI input to de-embed audio independently for each group (Synchronous or asynchronous de-embedding). If the audio phase data is incorrect or de-embedded audio has noticeable jitter, audio channels in all groups are de-embed synchronously. **Sync SDI:** Synchronously de-embeds audio channels in all groups without using the audio clock phase data. Only **Sync SDI** is available for SD-SDI input. **Audio Clock:** Uses the audio clock phase data in the SDI input to de-embed audio independently for each group (Synchronous or asynchronous de-embedding).
Input Source	-	-	Displays an SDI input whose audio is selected as FS1 sources.

(*1) Note that setting **Enable** may resets all groups depending on conditions of input audio groups. This menu is enabled when SD-SDI signals are input or Demultiplexer Clock is set to **Sync SDI**.

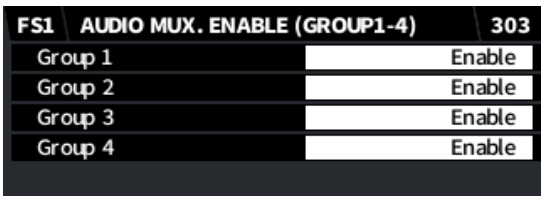
6-2. AUDIO MUX CLOCK (GROUP1-4)



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default	Setting	Description
Group 1 Group 2 Group 3 Group 4	Auto	Auto Reference Input Ch X/X Input Ch X/X	Selects an group audio clock used for SDI embedding. **Auto**: Uses a non-PCM audio if it is included in an audio group to be embedded. If there are multiple non-PCM audio channels in a group, a clock of the channel pair with the smallest numbers is selected. Uses a clock synced with the output video if all group channels are PCM. **Reference**: Uses a clock synced with the output video (Synchronous output with SRC). **CH 1/2 to 15/16**: Uses a selected input channel clock. To output asynchronous or non-PCM, audio channels, select the channels. **Reference** is always applied to SD-SDI input regardless of this setting.

6-3. AUDIO MUX ENABLE (GROUP1-4)

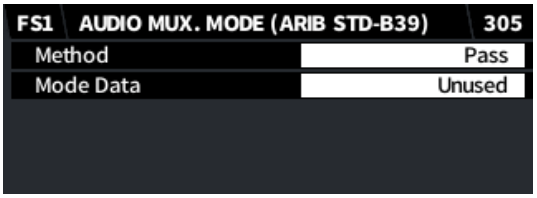


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default	Setting	Description
Group 1-4	Enable	Enable Disable	Enables/disables SDI audio embedding for each audio group.

6-4. AUDIO MUX MODE (ARIB STD-B39)

To insert AUDIO MODE data onto SDI output, set ARIB STD-39 to **Overwrite**. (See Sec. 5-37. “ANC DATA INSERTION.”



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

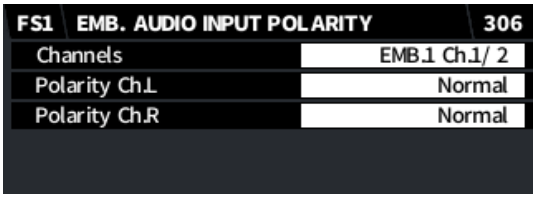
Item	Default	Setting	Description
Method	Pass	Pass Overwrite	Selects Audio Mode data insertion mode for ARIB STD-B39 defined Control signal. **Pass**: Passes the input signal ARIB STD-B39 Audio Mode data through to the output or overwrites the new information if input and output audio formats are different. **Overwrite:** Replaces the audio information to the one set under **Mode Data** if ARIB STD-B39 Audio Mode data is inserted in input signals.
Mode Data	Unused	(See table below)	Selects the Audio Mode data from the table below.

Mode Data Setting for the AUDIO MUX. MODE (ARIB STD-B39) menu

Unused	S	S+M	5.1+2S	7.1	22.2
M	2S	S+2M(S+D)	5.1+3S	7.1+S	22.2+S
2M(D)	3S	5.1+S	5.1+5.1	7.1+2S	22.2+2S
3M(D+M)	4S	3/1+S	5.1+5.1+S	7.1+3S	22.2+3S
4M(2D)	3/0	3/2+S	5.1+5.1+2S	7.1+5.1	22.2+5.1
5M(2D+M)	2/1	9M Over(M Only)		7.1+5.1+S	22.2+5.1+S
6M(3D)	3/1	5S Over(S Only)		7.1+5.1+2S	
7M(3D+M)	2/2	Other		7.1+5.1+5.1	
8M(4D)	3/2			7.1+5.1+5.1+S	
	3/2+LFE(5.1)				

M = Monaural, S = Stereo, D = Dual mono
X/X: Front channel / Back channel
LFE: Low Frequency Effect

6-5. EMD. AUDIO INPUT POLARITY



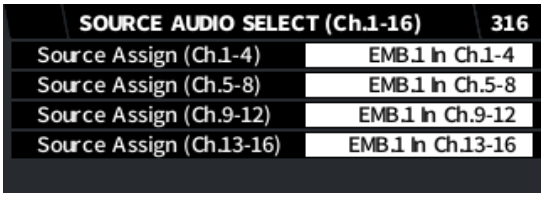
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

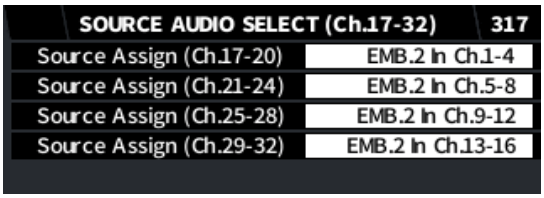
Item	Default	Setting	Description
Channels	-	Input Ch.1/2 to Input Ch.15/16	Selects a channel pair from embedded audio input.
Polarity Ch.L	Normal	Normal Invert	Selects the L (odd number) channel polarity for the selected channel pair. Setting to **Invert** inverts the audio polarity.
Polarity Ch.R	Normal	Normal Invert	Selects the R (even number) channel polarity for the selected channel pair. Setting to **Invert** inverts the audio polarity.

HDMI embedded audio channels always have normal polarity.

6-6. SOURCE AUDIO SELECT

This menu allows you to select 32 audio source channels processed on the FA-9600.

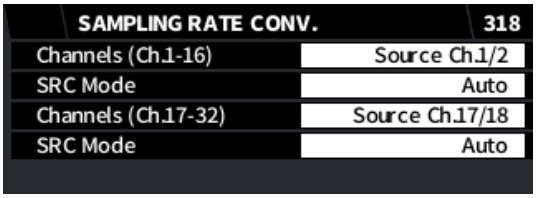




Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default	Setting	Description
Source Assign (Ch.1-4)	EMB.1 In Ch.1-4	EMB1 In Ch.1-4 to Ch.13-16 EMB2 In Ch.1-4 to Ch.13-16 AES In Ch.1-4 to Ch.5-8 OP(AES) In Ch.1-4 to Ch.5-8* OP(ANA:B) In Ch.1-4** OP(MADI) In Ch.1-4 to Ch.61-64***	Selects audio source channels per 4 channels. *** OP(AES) In Ch.1-8** require FA-96AES-UBL. If AES channels are set to output, an apostrophe (*) is displayed in front of AES and cannot be used. **** OP(ANA:B) In Ch.1-4** require FA-96ANA-AUD. ***** OP(MADI) In Ch.X-X** require FA-96MADI.
Source Assign (Ch.5-8)	EMB.1 In Ch.5-8		
Source Assign (Ch.9-12)	EMB.1 In Ch.9-12		
Source Assign (Ch.13-16)	EMB.1 In Ch.13-16		
Source Assign (Ch.17-20)	EMB.2 In Ch.1-4	EMB1 In Ch.1-4 to Ch.13-16 EMB2 In Ch.1-4 to Ch.13-16 OP(ANA:B) In Ch.1-4** OP(MADI) In Ch.1-4 to Ch.61-64***	
Source Assign (Ch.21-24)	EMB.2 In Ch.5-8		
Source Assign (Ch.25-28)	EMB.2 In Ch.9-12		
Source Assign (Ch.29-32)	EMB.2 In Ch.13-16		

6-7. SAMPLING RATE CONVERTER (SRC)



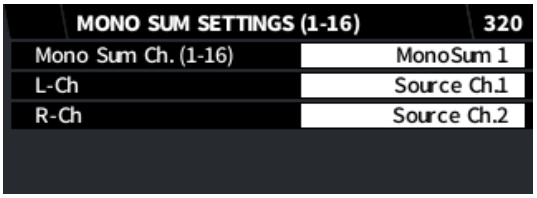
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default	Setting	Description
Channels (Ch. 1-16)	-	Source Ch.1/2 to Source Ch. 15/16	Selects an audio channel pair from 32 source channels.
Channels (Ch. 17-32)	-	Source Ch. 17/18 to Source Ch. 31/32	
SRC Mode	Auto	Auto Use SRC Bypass SRC	Sets the SRC processing mode for the channel pair selected under **Ch. Select**. **Auto:** PCM audio is processed by the SRC. Non-PCM audio is not processed by the SRC. **Use SRC:** Both PCM and non-PCM audio is processed by SRC. Note that SRC-processed audio may not be played properly if it is a true non-PCM audio signal. MADI input is forcibly processed as **Use SRC** regardless of this setting. **Bypass SRC:** Avoids the SRC. Use this setting for non-PCM audio. Note that to embed non-PCM audio to the SDI output, audio clock should be properly selected in the AUDIO MUX CLOCK (301) menu.

Pass audio channels through the SRC if they are used for HDMI, analog or MADI output.

6-8. MONO SUM SETTINGS (1-16)

FA-9600 units are equipped with **16 MONO SUM circuits** whose sources can be selected from **FA-9600 audio source channels 1-32**. MONO SUM output audio can be used for **SDI embedded audio** (EMB. AUDIO OUTPUT MAPPING menu, 345) and **AES output audio** (AES AUDIO OUTPUT MAPPING, 347).

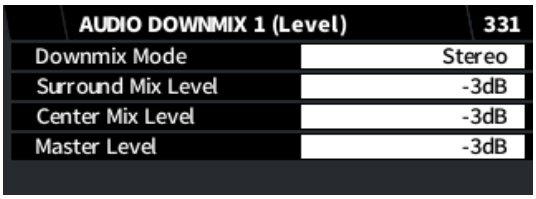


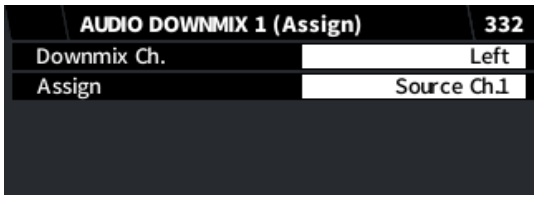
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

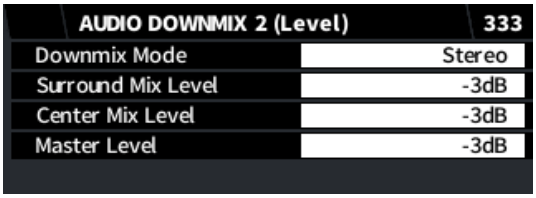
Item	Default	Setting	Description
Mono Sum Select (1-16)	-	MonoSum1-16	Selects a MONO SUM processor.
L-Ch	Source Ch.1-31 (odd channel)	Source Ch.1-32	Selects the L-channel source for the selected Mono Sum circuit.
R-Ch	Source Ch.2-32 (even channel)	Source Ch.1-32	Selects the R-channel source for the selected Mono Sum circuit.

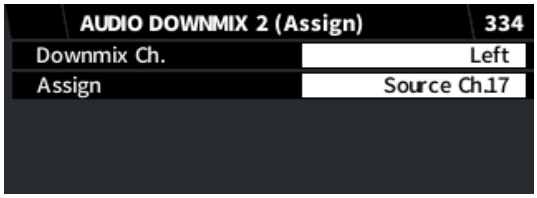
6-9. AUDIO DOWNMIX 1 and 2

FA-9600 units are equipped with **2 Audio Downmix modules**, which can accept **FA-9600 audio source channels 1-32**, and **Silence** as Downmix sources.
Downmix output audio can be used for SDI embedded audio (EMB. AUDIO OUTPUT MAPPING menu, 345) and AES output audio (AES AUDIO OUTPUT MAPPING, 347).









Downmix 1/2(Level)

Item	Default	Setting	Description
Downmix Mode	Stereo	Stereo Surround Monaural	Selects the Downmix mode.
Surround Mix Level	-3dB	-3dB -6dB -9dB Off	Sets the Ls/Rs (Surround channels) level. Setting to **Off** removes the Ls/Rs channels from mixing sources.
Center Mix Level	-3dB	-3dB -4.5 dB -6dB	Sets the C (Center channel) level. To use the same level as audio sources, set to **-3dB.** The L/R channel volume of downmixed audio may sound too large. In such cases, decrease the Center level to **-4.5dB** or **-6dB**.
Master Level	-3dB	-3dB 0dB Auto	Sets the entire downmix audio level. If set to **Auto**, Down MIX Master Level changes according to Down Mix Mode and Surround Mix Level settings.

Downmix 1/2 (Assign)

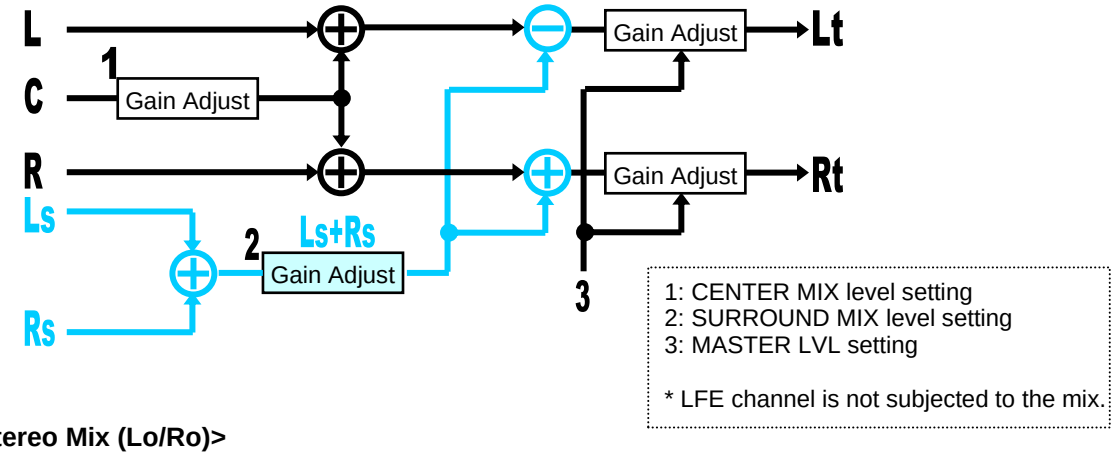
Select a channel under **Downmix Ch** and an audio source under **Assign**.

Downmix	Downmix Ch.	Assign default settings	Assign setting range
Downmix 1	Left Right Center Ls Rs	Source Ch.1 Source Ch.2 Source Ch.3 Source Ch.5 Source Ch.6	Source Ch.1-32 Silence
Downmix 2		Source Ch.17 Source Ch.18 Source Ch.19 Source Ch.21 Source Ch.22	

◆ **Down Mix Block Diagram**

<Surround Mix (Lt/Rt)>

Ls/Rs surround channels are summed to produce a mono surround channel and mixed to right and left channels by the 180 degree phase difference. (LFE channel is discarded.)

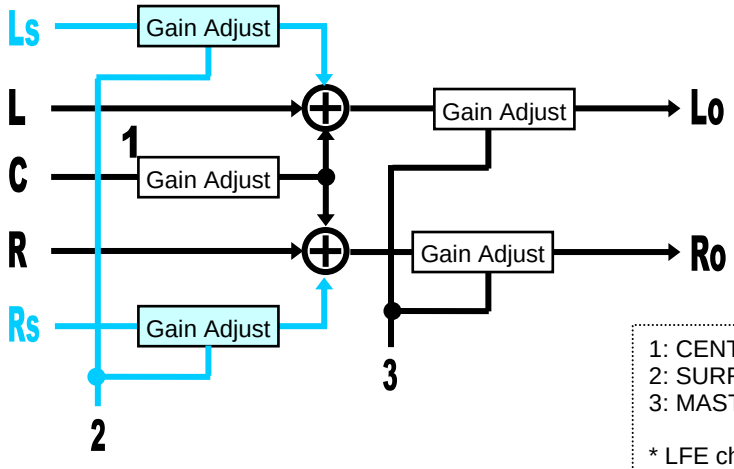


1: CENTER MIX level setting
2: SURROUND MIX level setting
3: MASTER LVL setting

* LFE channel is not subjected to the mix.

<Stereo Mix (Lo/Ro)>

For Stereo Monitors

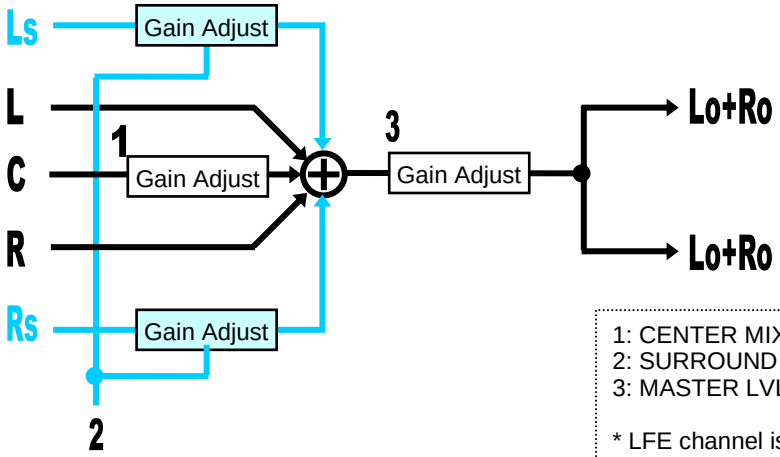


1: CENTER MIX level setting
2: SURROUND MIX level setting
3: MASTER LVL setting

* LFE channel is not subjected to the mix.

<Monaural Mix (Lo+Ro/Lo+Ro)>

For Monaural Monitors



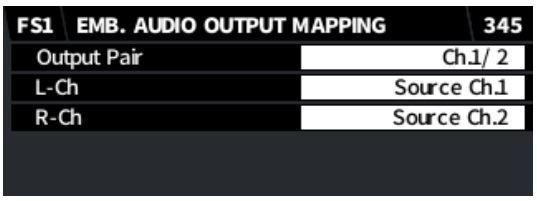
1: CENTER MIX level setting
2: SURROUND MIX level setting
3: MASTER LVL setting

* LFE channel is not subjected to the mix.

6-10. EMB. AUDIO OUTPUT MAPPING

Allows you to assign the following audio signals to SDI output and AES output audio channels.

Audio source signal	Description	Reference menu	Menu no.
Output Source Ch.1-32	Audio source channels 1-32	SOURCE AUDIO SELECT	316-317
Downmix 1L/1R Downmix 2L/2R	Downmix 1 output Downmix 2 output	AUDIO DOWN MIX1 AUDIO DOWN MIX2	331-332 333-334
Mono Sum Ch1-16	16 Mono Sum output	MONO SUM SETTINGS (1-16)	320
1kHz Tone, 500Hz Tone	Test signals		
Silence	Silence signal		

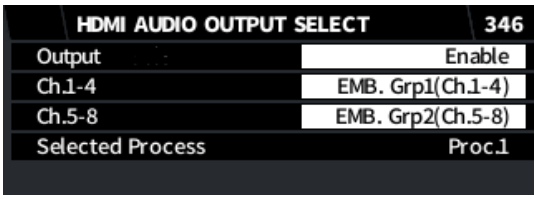


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default		Setting	Description
Output Pair	-		Output Ch.1/2-15/16	Selects an output channel pair.
L-Ch	FS1	Source Ch.1-15 (Odd channel)	Source Ch.1-32 500Hz Tone 1kHz Tone Silence Downmix 1_L Downmix 1_R Downmix 2_L Downmix 2_R Mono Sum 1-16	Selects the L channel source.
	FS2	Source Ch.17-31 (Odd channel)		
R-Ch	FS1	Source Ch.2-16 (Even channel)		Selects the R channel source.
	FS2	Source Ch.18-32 (Even channel)		

6-11. HDMI AUDIO OUTPUT SELECT

Selects 8 source channels for the HDMI audio output from all audio channels embedded in **Proc1(FS1)** or **Proc.2(FS2)** that is selected as the HDMI output source.

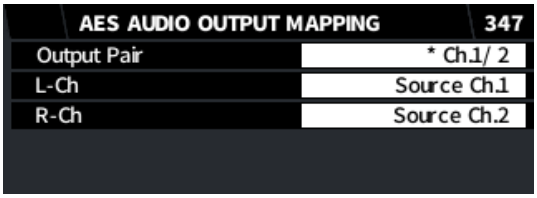


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default	Setting	Description
Output	Enable	Enable Disable	Enables/disables HDMI audio output.
Ch.1-4	EMB. Grp1 (Ch.1-4)	EMB.Grp1(Ch.1-4) EMB.Grp2(Ch.5-8) EMB.Grp3(Ch.9-12) EMB.Grp4(Ch.13-16)	Selects audio sources for each 4 channels. Audio sources can be selected those in the process displayed under **Selected Process**.
Ch.5-8	EMB. Grp2 (Ch.5-8)		
Selected Process	-	-	Displays a process to which the HDMI output belongs (Proc.1 or Proc.2). (See Sec. 5-19. “OUTPUT SELECT.”)

6-12. AES AUDIO OUTPUT MAPPING

Allows you to select AES output audio from the same audio sources as those for SDI output.

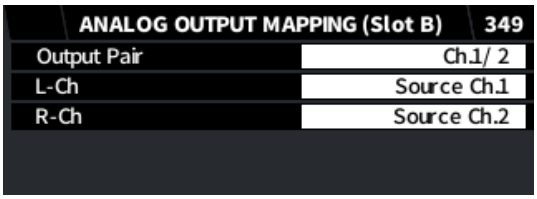


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default	Setting	Description
Output Pair	-	Ch.1/2-7/8	Selects an output channel pair. If an asterisk (*) is displayed in front of channels, they are used as input and cannot be used for output.
		(OP) Ch.1/ 2-7/8	Selects an output channel pair. (FA-96AES-UBL required) If an asterisk (*) is displayed in front of channels, they are used as input and cannot be used for output.
L-Ch	Ch.1: Source Ch.1 Ch.3: Source Ch.3 Ch.5: Source Ch.5 Ch.7: Source Ch.7	Source Ch.1-32 500Hz Tone 1kHz Tone Silence Downmix 1_L Downmix 1_R Downmix 2_L Downmix 2_R Mono Sum 1-16	Selects the L channel source.
R-Ch	Ch.2: Source Ch.2 Ch.4: Source Ch.4 Ch.6: Source Ch.6 Ch.8: Source Ch.8		Selects the R channel source.

6-13. ANALOG AUDIO OUTPUT MAPPING

Allows you to select analog output audio from the same audio sources as those for SDI output.



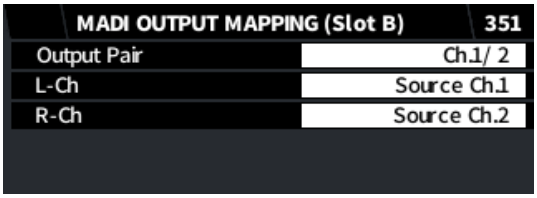
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Required option: FA-96ANA-AUD

Item	Default	Setting	Description
Output Pair	-	Ch.1/2 Ch.3/4	Selects an output channel pair.
L-Ch	Ch1: Source Ch.1 Ch3: Source Ch.3	Source Ch.1-32 500Hz Tone 1kHz Tone Silence Downmix 1_L Downmix 1_R Downmix 2_L Downmix 2_R Mono Sum 1-16	Selects the L channel source.
R-Ch	Ch2: Source Ch.2 Ch4: Source Ch.4		Selects the R channel source.

6-14. MADI OUTPUT MAPPING

Allows you to select MADI output signal from the same audio sources as those for SDI output.



CLIP MAPPING

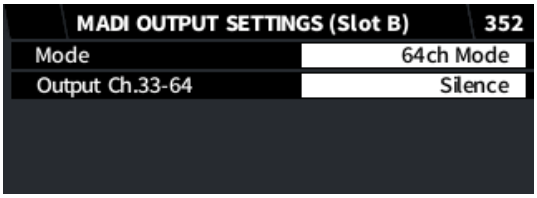
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Required option: FA-96MADI

Item	Default	Setting	Description
Output Pair	-	Ch.1/2-31/32	Selects an output channel pair.
L-Ch	Source Ch.1-31 (Odd channel)	Source Ch.1-32 500Hz Tone 1kHz Tone Silence Downmix 1_L Downmix 1_R Downmix 2_L Downmix 2_R Mono Sum 1-16	Selects the L channel source.
R-Ch	Source Ch.2-32 (Even channel)		Selects the R channel source.

6-15. MADI OUTPUT SETTINGS

Allows you to set up MADI signal output.



CLIP MAPPING

Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Required option: FA-96MADI

Item	Default	Setting	Description
Mode	64ch Mode	56ch Mode 64ch Mode Input Through Output Disable	Selects an MADI signal output mode. **56ch Mode**: 56-channel mode **64ch Mode**: 64-channel moce **Input Through**: Outputs MADI input signal without change. **Output Disable**: Outputs no MADI signal.
Output Ch.33-64	Silence	Silence MADI In Ch.1-32 MADI In Ch.9-40 MADI In Ch.17-48 MADI In Ch.25-56 MADI In Ch.33-64	Selects audio source for Ch 33-64 in MADI output signal. **Silence**: Silent signal **MADI In Ch.xx-xx**: MADI input channel sources whose sampling rate are to be converted into 48kHz (for synchronization with other channels). Their gain and delay cannot be adjusted.

6-16. AES INPUT HYSTERESIS

Allows you to align timing of AES input channels by grouping them.
This function is useful for multi-channel audio input such as surround sound.

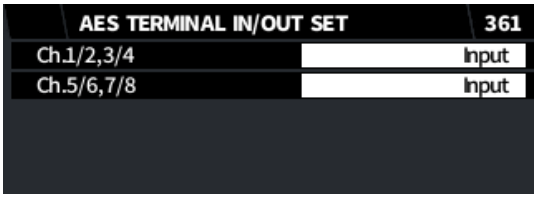
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default	Setting	Description
Channels	-	AES Ch. 1/2-7/8	Selects an AES input channel pair.
		OP(AES) Ch.1/ 2-7/8	Selects an AES input channel pair. (FA-96AES-UBL required)
Hysteresis	Disable	Disable Group A Group B	**Disable:** Disables channel alignment. **Group A/B:** Adds the channel pair to a group (A or B) and aligns audio word timing within the channel group by referring to the smallest channel pair. (*1)

(*1) If the reference audio is lost, the next smallest channel pair is used. Timing adjustment ranges within ± 0.25 samples.
Channel pairs in a group should be the same sampling rate and synchronized with each other.

6-17. AES TERMINAL IN/OUT SET

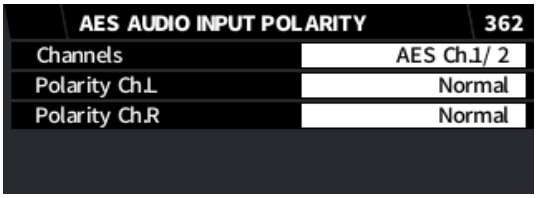
Allows you to select **Input** or **Output** for AES terminals.



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default	Setting	Description
Ch.1/2,3/4	Input	Input Output	Selects Input or Output for DIGITAL AUDIO IN/OUT1/2 and 3/4 ports. Fixed to **Input** if FA-96AES-UBLC installed.
Ch.5/6,7/8			Selects Input or Output for DIGITAL AUDIO IN/OUT5/6 and 7/8 ports. Fixed to **Input** if FA-96AES-UBLC installed.
Ch.1/2,3/4(OP)			Selects Input or Output for 1/2 and 3/4 ports on FA-96AES-UBL.
Ch.5/6,7/8(OP)			Selects Input or Output for 5/6 and 7/8 ports on FA-96AES-UBL.

6-18. AES AUDIO INPUT POLARITY



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

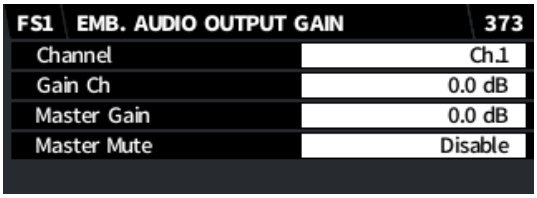
Item	Default	Setting	Description
Channels	-	AES Ch.1/2-7/8	Selects an AES input channel pair.
		OP(AES) Ch.1/ 2-7/8	Selects an AES input channel pair. (FA-96AES-UBL required)
Polarity Ch.L	Normal	Normal Invert	Selects the polarity for the L (odd) channel of the selected pair.
Polarity Ch.R	Normal	Normal Invert	Selects the polarity for the R (even) channel of the selected pair.

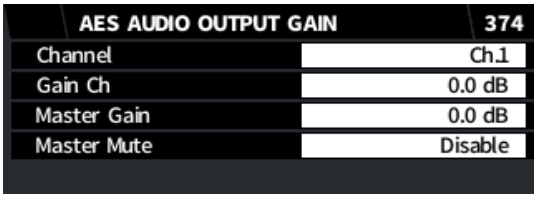
6-19. AUDIO OUTPUT GAIN

Allows you to adjust output audio gain for the following channels:

- SDI output audio (EMB. AUDIO OUTPUT MAPPING menu, 345)
- AES output audio (AES AUDIO OUTPUT MAPPING menu, 347)

Allowable gain adjustment ranges from -20 dB to 20 dB with **Master Gain** and individual **channel Gain**. Gain values exceeding these limits are clipped and set to the respective limit value.



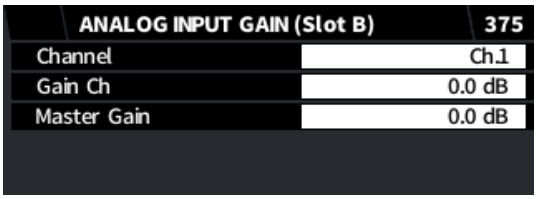


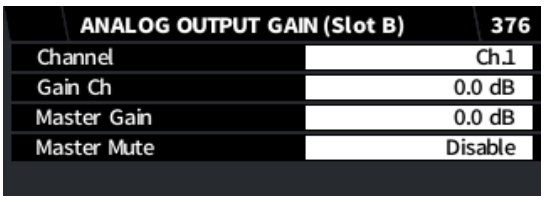
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default	Setting	Description
Channel	-	EMB: Ch.1-16 AES: Ch1-8. OP(AES): Ch.1-8	Selects a channel from each audio output. (OP(AES) represents the FA-96AES-UBL card.)
Gain Ch	0.0dB	-20.0dB to +20.0dB	Sets the gain for the selected audio channel.
Master Gain	0.0dB	-20.0dB to +20.0dB	Sets the all channels' gain offset respectively for FS1 embedded, FS2 embedded, AES and optional AES audio.
Master Mute	Disable	Disable Enable	**Enable:** Mutes (sets to silent) all linear PCM audio channels respectively for FS1 embedded, FS2 embedded, AES and optional AES audio.

6-20. ANALOG INPUT/OUTPUT GAIN

Allows you to adjust input / output analog audio gain.
Allowable gain adjustment ranges from -20 dB to 20 dB with **Master Gain** and individual **channel Gain**. Gain values exceeding these limits are clipped and set to the respective limit value.





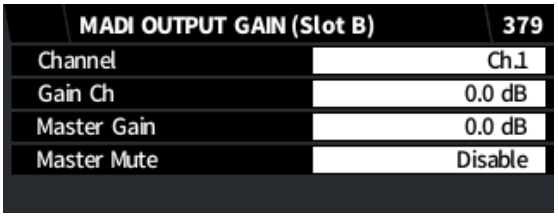
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Required option: FA-96ANA-AUD

Item	Default	Setting	Description
Channel	-	Ch.1-4	Selects an analog audio channel.
Gain Ch	0.0dB	-20.0dB to +20.0dB	Sets the gain for the selected audio channel.
Master Gain	0.0dB	-20.0dB to +20.0dB	Sets the gain offset for all analog audio channels.
Master Mute	Disable	Disable Enable	**Enable**: Mutes (sets to silent) all four analog audio output channels.

6-21. MADI OUTPUT GAIN

Allows you to adjust audio channel gain for MADI output.
Allowable gain adjustment ranges from -20 dB to 20 dB with **Master Gain** and individual **channel Gain**. Gain values exceeding these limits are clipped and set to the respective limit value.



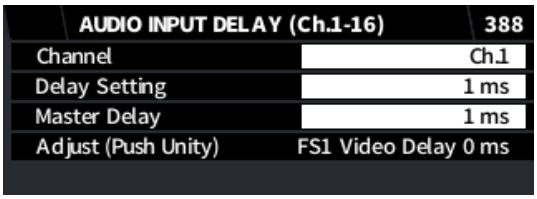
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

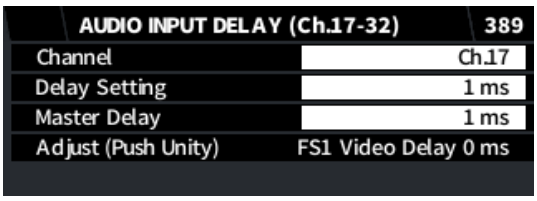
Required option: FA-96MADI

Item	Default	Setting	Description
Channel	-	Ch.1-32	Selects a MADI audio channel.
Gain Ch	0.0dB	-20.0dB to +20.0dB	Sets the gain for the selected audio channel.
Master Gain	0.0dB	-20.0dB to +20.0dB	Sets the gain offset for all MADI audio channels (Ch. 1-32).
Master Mute	Disable	Disable Enable	**Enable**: Mutes (sets to silent) all 32 audio output channels.

6-22. AUDIO INPUT DELAY

Allows you to add delay to 32 audio sources on the FA-9600. (See SOURCE AUDIO SELECT menu, 316-317). Allowable delay amount ranges from 1 msec to 1000 msec with **Master Delay** and individual **channel Delay**. Delay values exceeding these limits are clipped and set to the respective limit value.

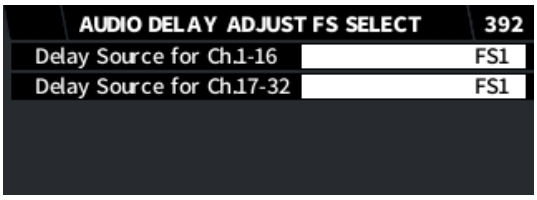




Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default	Setting	Description
Channel	-	Ch.1-32	Selects an audio channel.
Delay Setting	1 ms	1 ms to 1,000 ms	Sets the delay added to the selected channel. The displayed value already includes **Master Delay**.
Master Delay	1 ms	1 ms to 1,000 ms	Sets the delay offset for all 16 channels in each page.
Adjust (Push Unity)	-	-	Displays video delay (excluding the video converter delay) for FS1 or FS2 (selected in AUDIO DELAY ADJUST FS SELECT menu). Pressing **F4-UNITY** sets **Master Delay** to the displayed FS video delay.

6-23. AUDIO DELAY ADJUST FS SELECT



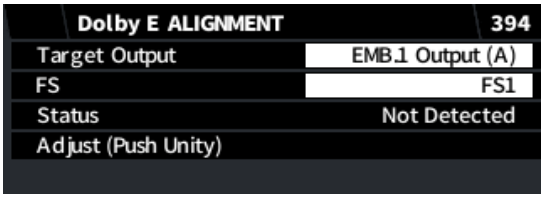
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Item	Default	Setting	Description
Delay Source for Ch.1-16 Delay Source for Ch.17-32	FS1	FS1 FS2	Selects an FS to be displayed under **Adjust** in the AUDIO INPUT DELAY menu.

6-24. Dolby E ALIGNMENT

The Dolby E Alignment function allows you to adjust the Dolby E input timing to an SDI output by aligning the Dolby E burst start point to the appropriate SDI line. Two aligners (A and B) are available on EMB1, EMB2 and AES outputs respectively.

- Dolby Alignment function requires one frame delay (max).
- To make the function effective, Dolby E and output video signals should be synchronized and have the same frame rate.



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

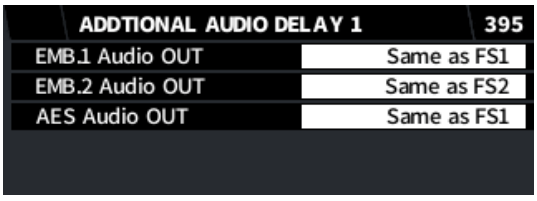
Item	Default	Setting	Description
Target Output (*1)	-	EMB.1 Output (A) EMB.1 Output (B) EMB.2 Output (A) EMB.2 Output (B) AES Output (A) AES Output (B)	Selects an audio output.
FS (AES only)	FS1	FS1 FS2	If the selected audio is AES, select an FS (SDI) for the timing reference.

(*1) If two or more Dolby E channels are detected respectively in EMB1, EMB2, AES Output, the smallest number of channel is assigned to Source (A) and next smaller channel is assigned to Source (B).

Item	Description
Status	Displays the output channel number and the timing reference line in SDI signals. If signals are unavailable, "**Error**" is displayed. If no Dolby E signals are detected, "**Not detected**" is displayed.
Adjust (Push Unity)	Press **F4 Unity** to execute the audio source (output) alignment. Audio alignment settings are disabled and reset under the following conditions. - When the Dolby E is changed to another audio. - When an event is loaded - When the FA-9600 is reset to default - When the FA-9600 is powered off.

6-25. ADDITIONAL AUDIO DELAY

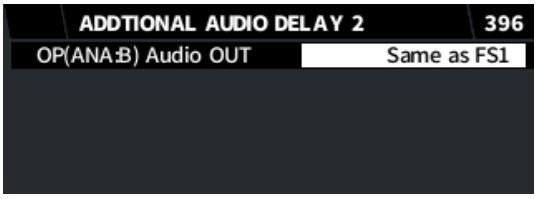
The delay time caused by Video Converter process can be automatically added to audio output channels to fill the time gap between video and audio. The delay time amount is displayed under **Total Delay** in the FRAME DELAY menu. (See Sec. 5-42. FRAME DELAY")
When any converter is not used, no delay time is added to audio regardless of this setting.
Refer to Sec. 4-6. "Aligning Audio and Video" for more details.



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Required option

FA-96UDC



Required option: FA-96UDC and FA-96ANA-AUD or FA-96UDC and FA-96MADI

Item	Default	Setting	Description
EMB.1 Audio OUT	Same as FS1	Disable Same as FS1	**Same as FS1**: To align audio and video (FS1 video converter output), adds an appropriate delay to audio channels to be embedded to SDI OUT1 .
EMB.2 Audio OUT	Same as FS2	Disable Same as FS2	**Same as FS2**: To align audio and video (FS2 video converter output), adds an appropriate delay to audio channels to be embedded to SDI OUT2.
AES Audio OUT OP(AES) Audio OUT OP(ANA:B) Audio OUT OP(MADI) Audio OUT	Same as FS1	Disable Same as FS1 Same as FS2	Sets the delay adjustment between AES, analog audio or MADI output and video output.

OP(AES) Audio OUT requires FA-96AES-UBL option.
OP(ANA:B) Audio OUT requires FA-96ANA-AUD option.
OP(MADI) Audio OUT requires FA-96MADI option.

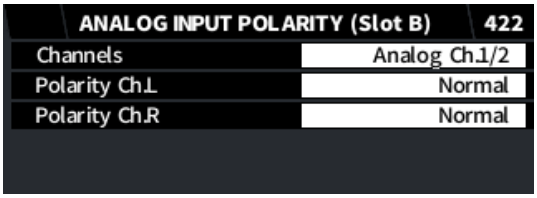
6-26. ANALOG INPUT/OUTPUT LEVEL

Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Required option: FA-96ANA-AUD

Item	Default	Setting	Description
Ch.1-4	+4 dBu	-10 dBu 0 dBu +4 dBu +8 dBu	Sets the signal level for each analog audio input/output channel.

6-27. ANALOG INPUT POLARITY

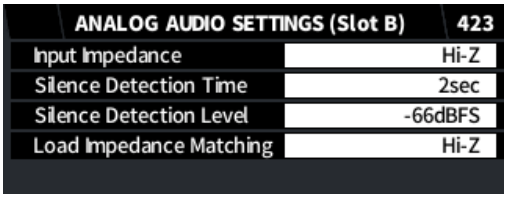


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Required option: FA-96ANA-AUD

Item	Default	Setting	Description
Channels	Analog Ch.1/2	Analog Ch.1/2 Analog Ch.3/4	Selects an analog audio input channel pair.
Polarity Ch.L	Normal	Normal Invert	Selects the polarity for the L (odd) channel of the selected pair.
Polarity Ch.R	Normal	Normal Invert	Selects the polarity for the R (even) channel of the selected pair.

6-28. ANALOG AUDIO SETTINGS



Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Required option: FA-96ANA-AUD

Item	Default	Setting	Description
Input Impedance	Hi-Z	600 Ohm Hi-Z	Sets the analog audio input impedance.
Silence Detection Time	2 sec	1-10 sec	Sets the duration to determine analog audio input signals are silent.
Silence Detection Level	-66dBFS	-66 dBFS -60 dBFS -54 dBFS -48 dBFS	Sets the audio level to determine the analog audio input signals are silent. The levels are measured as digital level after the following adjustments: - ANALOG INPUT LEVEL(Sec. 6-26) - ANALOG INPUT GAIN (Sec. 6-20) - AUDIO REFERENCE LEVEL (Sec. 7-2)
Load Impedance Matching	Hi-Z	Hi-Z 600 Ohm	Sets the input impedance of the downstream device that receives the analog audio signals from FA-9600. FA-9600 adjusts the audio level according to this setting.

7. System Setting Menus

The following menu allows you to overall FA-9600 settings and applied to both FS1 and FS2.

7-1. GPI UTILITY / INPUT / OUTPUT

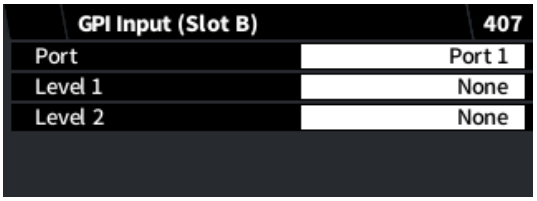
FA-96GPI or FA-96DB9-CBL option is required for GPI input / output functions.
The **FA-96GPI** option card provides GPI 10 inputs and 10 outputs and should be installed into **Slot B** or **C**. Refer to Sec. 2-3-8. “FA-96GPI (10 Inputs and 10 Outputs)” for details on the connector pin assignments. Use the following menus to assign functions to input and output ports.
The **FA-96DB9-CBL** option cable provides 7 GPI input/output ports and should be installed into **Slot E**. Refer to Sec. 2-3-7. “FA-96DB9-CBL (7 GPI Input/Output)” for details on the connector pin assignments. Use the following menus to select input or output and assign functions to ports.

Enabling/disabling GPI inputs

Required Option: FA-96GPI or FA-96DB9-CBL

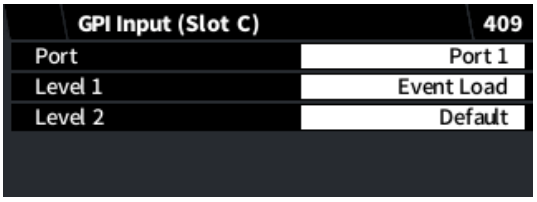
Item	Default	Setting	Description
GPI Lock	Unlocked	Unlocked Locked	**Unlocked:** Enables GPI inputs. **Locked:** Disables GPI inputs.

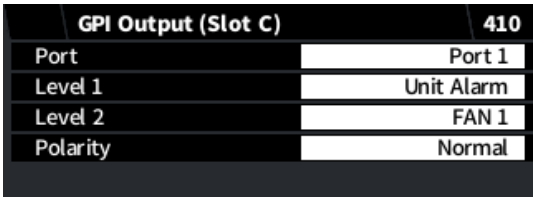
GPI SETTINGS (If the FA-96GPI card installed on Slot B)



Required Option: FA-96GPI (Slot B)

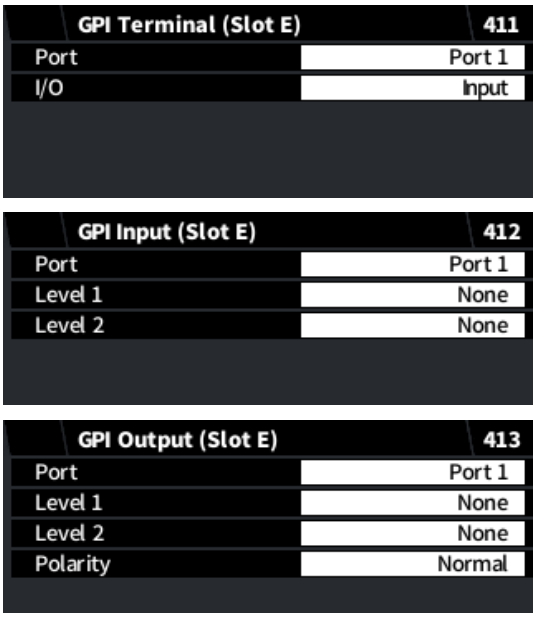
GPI SETTINGS (if the FA-96GPI card installed on Slot C)





Required Option: FA-96GPI (Slot C)

GPI SETTINGS (if the FA-96DB9-CBL installed on Slot E)



Required Option FA-96DB9-CBL (Slot E)

GPI Settings

- Select input or output. (FA-96DB9-CBL, Slot E only)
- Select a port under **Port** and function under **Level 1** and **Level 2**. Available **Level 2** settings will change according to **Level 1** selection. Assign input functions in the GPI Input menu and output functions in the GPI Output menu.

<GPI Terminal> (Slot E only)

Item	Setting
I/O	**Input:** Sets the terminal to GPI input. **Output:** Sets the terminal to GPI output.

<GPI Input>

Level 1 setting	Level 2 setting	Description
None	None	No function
Event Save	No.001-100 Event1 - 100	Saves settings to event by selecting an event number under Level 2.
Event Load	Default No.001-100 Event1 - 100	Loads settings from event by selecting an event number under Level 2.

<GPI Output>

Level 1 setting	Level 2 setting	Description
None	None	No function
Unit Alarm	FAN1/2/3	Outputs an alarm when FAN 1, 2 or 3 fails.
	FAN1	Outputs an alarm when FAN 1 fails.
	FAN2	Outputs an alarm when FAN 2 fails.
	FAN3	Outputs an alarm when FAN 3 fails.
	DC Power 1/2	Outputs an alarm when DC 1 or 2 has an error. (FA-96PS required)
	DC Power 1	Outputs an alarm when DC 1 has an error. (FA-96PS required)
	DC Power 2	Outputs an alarm when DC 2 has an error. (FA-96PS required)
	Any	Outputs an alarm when any of above occurs. (Same as FAN1/2/3 if FA-96PS uninstalled)

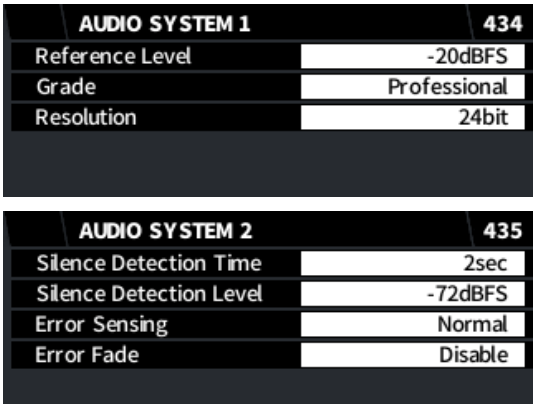
Video In	FS1 Video In	Indicates that a video signal is coming into FS1.
	FS2 Video In	Indicates that a video signal is coming into FS2.
	Reference In	Indicates that a reference signal is coming in.
Audio In	FS1 Audio In	Indicates that audio is coming into FS1.
	FS2 Audio In	Indicates that audio is coming into FS2.
	AES Audio In	Indicates that AES audio is coming in
	Option B Audio In	Indicates that AES audio is coming into Option B.
Event Tally	Default No.001-100 Event1-100	Outputs a tally signal when the current FA-9600 settings coincide with those stored in the selected event.

Select the alarm signal polarity if **Unit Alarm** is selected under Level 1 according to the connection device polarity.

Item	Default	Setting	Description
Polarity	**Normal**	Normal	Active low type
		Invert	Active high type

7-2. AUDIO SYSTEM 1, 2

AUDIO SYSTEM 1 settings are applied to all embedded and AES audio channels in FS 1 and FS 2.



◆ **AUDIO SYSTEM 1**

Item	Default	Setting	Description
Reference Level	-20 dBFS	-18 dBFS -20 dBFS	Selects the reference level for digital audio output. This level is also used as the test tone signal level and as the digital audio level corresponding to 0 dBu of analog audio if FA-96ANA-AUD is installed.
Grade	Professional	Professional Consumer	Selects the Digital Audio Interface information format (Channel Status Bit) between **Professional** and **Consumer**.
Resolution	24 bit	16 bit 20 bit 24 bit	Selects the audio word length for AES output.

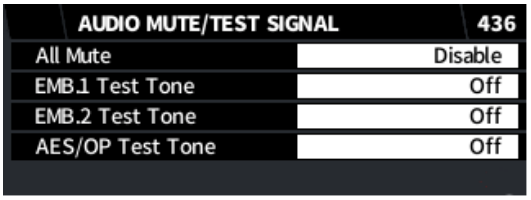
◆ **AUDIO SYSTEM 2**

Silence Detection Time	2 sec	1 – 10 sec	Sets the duration to determine digital audio input signals are silent. Digital audio input signals are judged as silent after the silent state lasts the set duration.
Silence Detection Level	-72 dBFS	-72 dBFS -66 dBFS -60 dBFS -54 dBFS -48 dBFS	Sets the audio level to determine digital audio input signals are silent.
Error Sensing	Normal	Disable Normal Sensitive	Selects the input audio error detection mode used for Error Fade above. **Disable:** Detects no errors for Error Fade. Normally do not use. (*1) **Normal:** Detects SDI signal switching, ADP (Audio Data Packet) change and DBN (Data Block Number) switching as Error Fade errors. Normally use this setting. **Sensitive:** Adds frequency change of Preamble Z appearance and EDP (Extended Data Packet) change (SD-SDI only) to those described above as Error Fade errors.
Error Fade	Disable	Disable Enable	Selects the way to handle output audio when an error is detected in the input audio. **Disable:** Passes through input audio without using any effects. **Enable:** Fades out and mutes audio when an input error is detected and fades in when recovered. (*2)

(*1) Audio input channels are passed through to output as many as possible by prohibiting automatic processing. However, audio output timing difference between groups or timing delay may occur caused by input signal switching or other reasons.

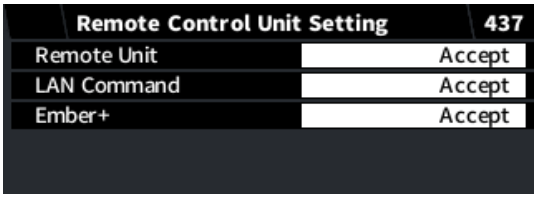
(*2) To fade in audio, AUDIO INPUT DELAY (see Sec. 6-22.) must be 5 ms or more.

7-3. AUDIO MUTE / TEST SIGNAL



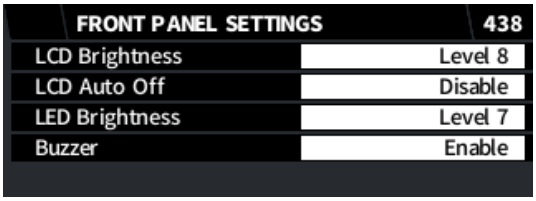
Item	Default	Setting	Description
All Mute	Disable	Disable Enable	Allows you to mute all audio output channels.
EMB.1 Test Tone	Off	Off 500Hz Tone 1kHz Tone	Allows you to assign an audio test signal to the embedded audio on the FS1 output.
EMB.2 Test Tone			Allows you to assign an audio test signal to the embedded audio on the FS2 output.
AES/OP Test Tone			Allows you to assign an audio test signal to all AES and analog audio output.

7-4. Remote Control Unit Setting



Item	Default	Setting	Description
Remote Unit	Accept	Refuse Accept	**Refuse:** Accepts no remote control unit' commands. **Accept:** Accepts remote control unit' commands.
LAN Command	Accept	Refuse Accept	**Refuse:** Accepts no external commands. **Accept:** Accepts external commands
Ember+	Accept	Refuse Accept	**Refuse:** Accepts no Ember+ commands. **Accept:** Accepts no Ember+ commands.

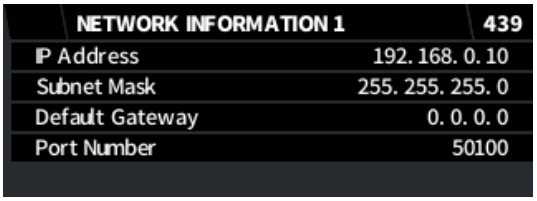
7-5. FRONT PANEL SETTINGS

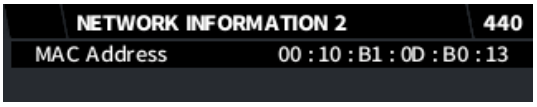


Item	Default	Setting	Description
LCD Brightness	Level 8	Level 1- 15	Adjusts the LCD panel display brightness. Level 1(dark), 15 (bright)
LCD Auto Off	Disable	Disable 5min 10min 30 min	Sets the LCD screen saver duration. Setting to **Disable** disables the screen saving feature.
LED Brightness	Level 7	Level 1- 15	Adjusts the brightness of button LEDs. Level 1(dark), 15 (bright)
Buzzer	Enable	Enable Disable	Turns the buzzer on/off.

7-6. NETWORK INFORMATION 1-2

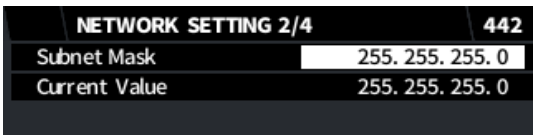
Displays the FA-9600 network settings.

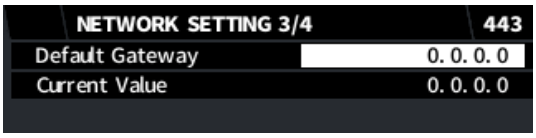


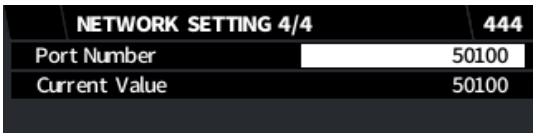


7-7. NETWORK SETTING 1/4 to 4/4

Allows you to set FA-9600 network settings. Restart the FA-9600 after changing settings.







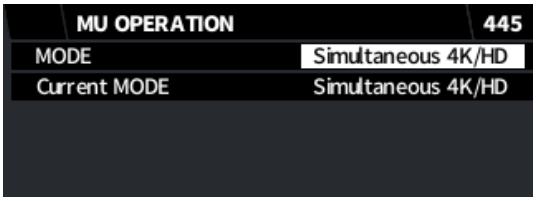
Item	Default	Description
IP Address	192.168.0.10	Sets the FA-9600 IP address.
Subnet Mask	255.255.255.0	Sets the FA-9600 subnet mask.
Default Gateway	0.0.0.0	Sets the FA-9600 default gateway.
Port Number	50100	Sets the FA-9600 TCP/UDP port.
Current Value	-.-.-.-	Displays current settings.

7-8. MU OPERATION

Sets the MU Main mode (FA-9600 operation mode).

If the MODE setting is changed, a system reboot message, “System value changed. Please restart!!”, appears. Reboot the FA-9600 after verifying the message. Note that it takes a certain amount of time until the message is displayed.
Also note that the MODE setting is not saved to events.

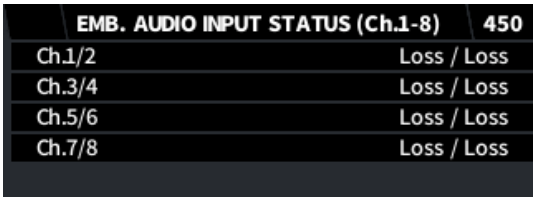
- Converter function requires FA-96UDC software option.
- UHD 4K operation requires FA-964K software card.
- 3D-LUT mode requires FA-96AHDR or FA-96AHDR2 software option.

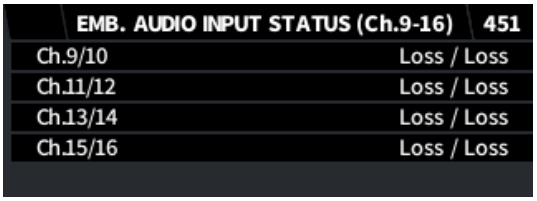


Item	Default	Setting	Description
MODE	Dual HD (*1)	Simultaneous 4K/HD	**FS1** supports **SD**, **HD** and **4K** signals with a **full-featured** converter. **FS2** supports **SD** and **HD** signals with a **restricted** converter.
		Dual HD	Both **FS1** and **FS2** support **SD** and **HD** signals with a **full-featured** converter.
		3D-LUT	**FS1** can converts between **SDR** and **HDR** using **3D-LUT** while adjusting colors and supports **SD**, **HD** and **4K** signals (4K requires FA-964K) with a **restricted** converter. **FS2** is disabled.

(*1) Simultaneous 4K/HD is default if FA-964K is installed.

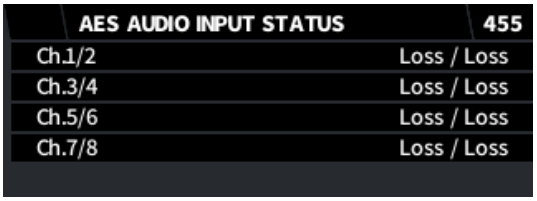
7-9. EMB. AUDIO INPUT STATUS

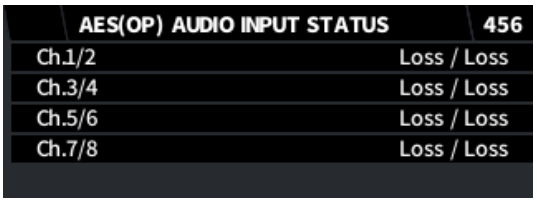




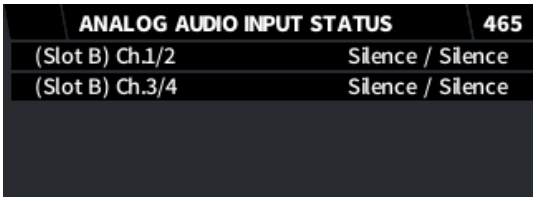
Item	Display	Description
Ch.1/2 Ch.3/4 Ch.5/6 Ch.7/8 Ch.9/10 Ch.11/12 Ch.13/14 Ch.15/16	Loss PCM, PCM (Async) Silence, Silence (Async) Dolby E, Dolby E (Async) Non-PCM, Non-PCM (Async) Bypass Not Supported (for HDMI audio only)	Displays FS1 and FS2 SDI embedded audio input status and HDMI audio input status.

7-10. AES / ANALOG AUDIO INPUT STATUS





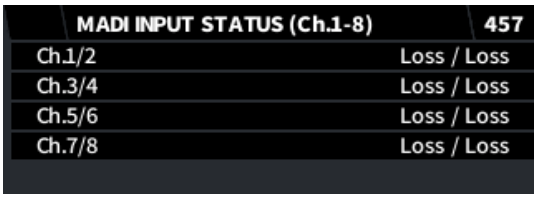
Option FA-96AES-UBL



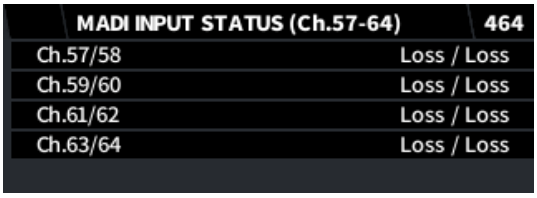
Option FA-96ANA-AUD

Item	Display	Description
Ch.1/2 Ch.3/4 Ch.5/6 Ch.7/8	Loss PCM (32kHz), PCM (44.1kHz), PCM (48kHz) Silence (32kHz), Silence (44.1kHz), Silence (48kHz) Dolby E, Non-PCM Output Settings	Displays each channel status of AES audio inputs. **Output Settings** is displayed if AES ports are set to output.
Ch.1/2 Ch.3/4	Silence Present	Displays each channel status of analog audio input.

7-11. MADI AUDIO INPUT STATUS



|

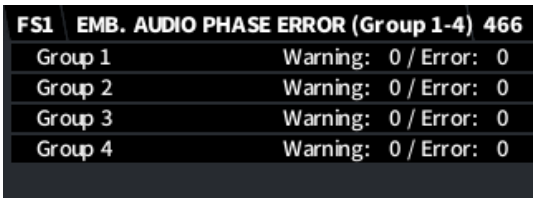


Option FA-96MADI

Item	Display	Description
Signal	Loss Present (32kHz, 56Ch) Present (32kHz, 64Ch) Present (44.1kHz, 56Ch) Present (44.1kHz, 64Ch) Present (48kHz, 56Ch) Present (48kHz, 64Ch) Not Supported	Displays the MADI audio input signal status.
Ch.1/2 to Ch.63/64	Loss Present Silence Non-PCM	Displays each audio channel status of MADI input.

7-12. EMB. AUDIO PHASE ERROR

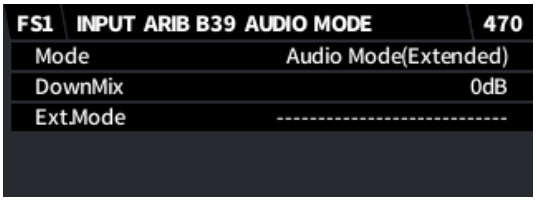
Displays the number of warnings and errors. To reset counts, press **F1 Unity**.



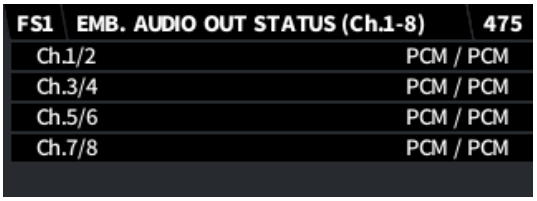
Item	Display	Description
Group1-4	Warning Error	**Warning:** Displays the number of corrected audio timing information errors. **Error:** Displays the number of uncorrected audio timing information errors.

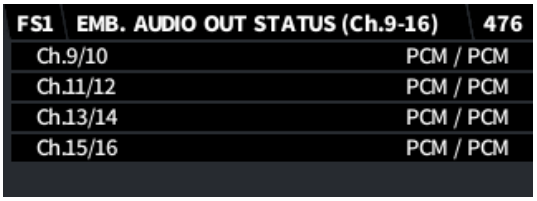
7-13. INPUT ARIB B39 AUDIO MODE

Displays the ARIB B39 Audio Mode in ancillary area of SDI input.



7-14. EMB. AUDIO OUT STATUS

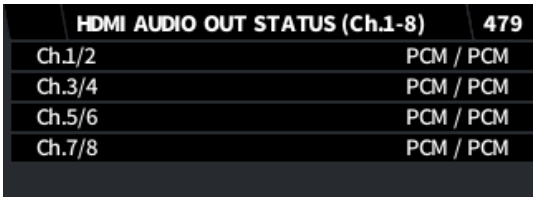




Option FA-96AES-UBL

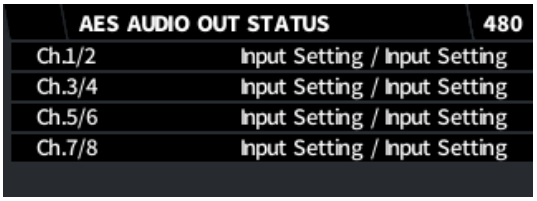
Item	Display	Description
Ch.1/2 Ch.3/4 Ch.5/6 Ch.7/8 Ch.9/10 Ch.11/12 Ch.13/14 Ch.15/16	PCM, PCM (Async) Mute, Mute (Async) Dolby E, Dolby E (Async) Non-PCM, Non-PCM (Async) Blank	Displays each embedded audio channel status of the FS1 or FS2 SDI output.

7-15. HDMI AUDIO OUT STATUS

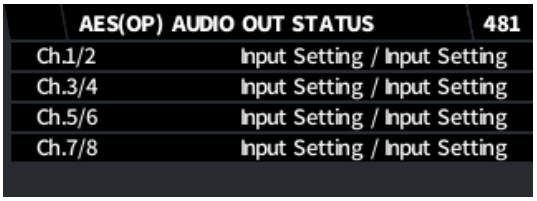


Item	Display	Description
Ch.1/2 Ch.3/4 Ch.5/6 Ch.7/8	PCM Mute Blank Not Supported	Displays HDMI output audio channel status.

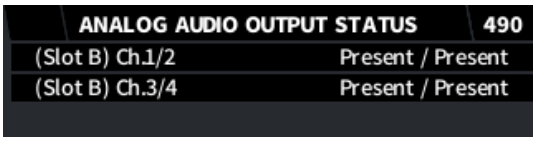
7-16. AES / ANALOG AUDIO OUT STATUS



* If FA-96AES-UBLC is installed, “(UBLC)” is displayed in the menu title, since UBLC has become the standard output of AES audio.



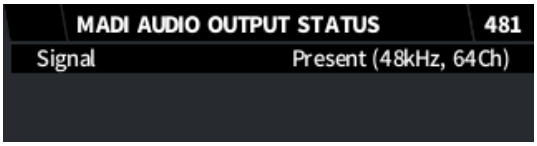
Option FA-96AES-UBL



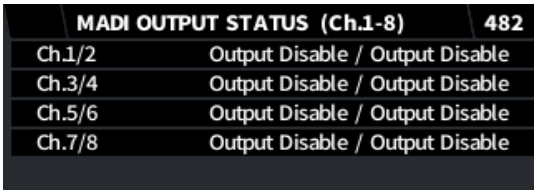
Option FA-96ANA-AUD

Item	Display	Description
Ch.1/2 Ch.3/4 Ch.5/6 Ch.7/8	PCM, PCM (Async) Mute, Mute (Async) Dolby E, Dolby E (Async) Non-PCM, Non-PCM (Async) Input Setting	Displays each channel status of AES outputs. **Input Settings** is displayed if AES ports are set to input.
Ch.1/2 Ch.3/4	Mute Present	Displays analog audio channel output status.

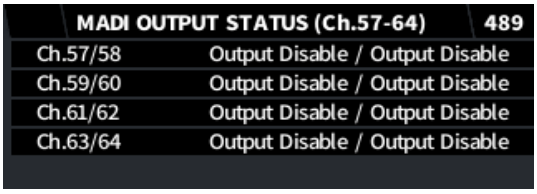
7-17. MADI AUDIO OUTPUT STATUS



Option FA-96MADI



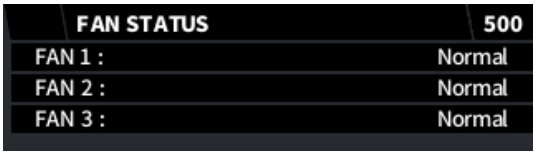
|

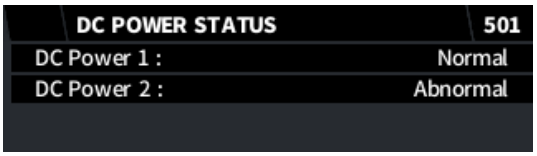


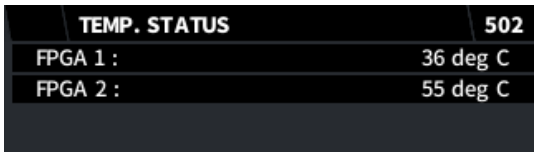
Item	Display	Description
Signal	Output Disable Input Through Present (48kHz, 56Ch) Present (48kHz, 64Ch)	Displays the MADI audio output signal status.
Ch.1/2 to Ch.63/64	Output Disable PCM Mute	Displays each audio channel status of MADI output.

7-18. FAN / DC POWER / TEMP. STATUS

Displays states of FAN 1 to 3, Power 1 and 2 (FA-96PS) and FPGA1-2 temperature.







7-19. VERSION INFO.

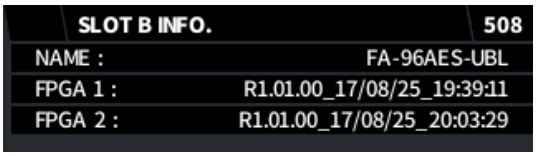
Displays the firmware and FPGA versions.

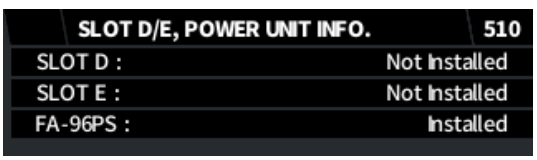
7-20. MAIN UNIT INFO.

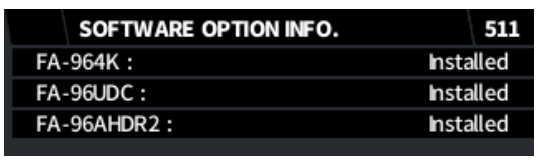
Displays the FA-9600 serial product number and unit name.

7-21. Option Information

Displays the option slot status.





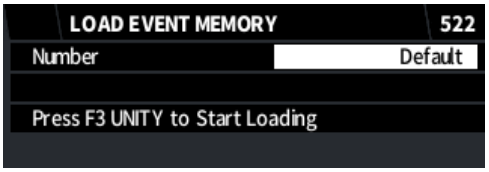


8. Event Memory

Each FA-9600 unit can save and load 10 sets of event memory data.

◆ **LOAD EVENT MEMORY**

Selects an event number for loading from **Event1-100** and **Default** and press F3 UNITY to load the event. Before loading events, the “Event Load executed!!” message appears in the bottom of the menu.

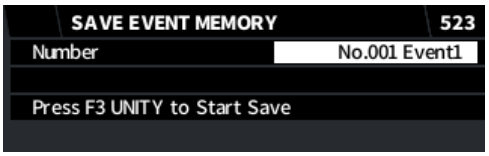


EVENT

◆ **SAVE EVENT MEMORY**

Selects an event number for saving from **Event1-100** and press F3 UNITY to save settings to the event number.

- While saving data, “Event Save executed!” is displayed in the bottom of the front panel screen.
- Data cannot be saved to event numbers that are disabled by using the Event Save Limit function. This function can be enabled only on the Web GUI. See Sec. 13-3-2. “Event Data” for more details.

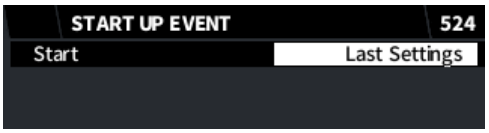


EVENT

The [Utility > Event data] page in the Web GUI allows you to change event data name and content. Refer to Sec. 13-3-2. "Event Data" and Sec. 14. "Event Data (CSV File)" for more details.

◆ **START UP EVENT**

Selects an event number to be loaded when the unit power turns on.



EVENT

Item	Default	Setting	Description
Start	Last Settings	Last Settings	Loads the settings last used.
		Default	Resets all settings to default at startup.
		Event 1-100	Loads the selected event memory at startup.

<Items Not Stored by Last Settings>

The following menu settings are not saved by **Last Settings** and are reset to default whenever FA-9600 are restarted.

Menu	Item not stored	Sec.
SPLIT MODE SELECT	Mode setting	5-2
AREA MARKER	Marker setting	5-3
TIMECODE GENERATOR LTC/VITC	Start/Stop setting	5-33, 5-34
VIDEO FREEZE	Freeze setting	5-41
VIDEO TEST SIGNAL	Pattern setting	5-44
AUDIO OUTPUT GAIN	Master Mute setting	6-19
ANALOG INPUT/OUTPUT GAIN	Master Mute setting	6-20

MADI OUTPUT GAIN	Master Mute setting	6-21
AUDIO MUTE/TEST SIGNAL	All settings	7-3

8-1. Items Not Stored in Event Memory

The following menu items are not stored in event memory.

Menu	Item not stored	Sec.
VIDEO PROCESS AMPLIFIER	Keep White setting	5-1
SPLIT MODE SELECT	Mode setting	5-2
AREA MARKER	Marker	5-3
INPUT LINKAGE PROCESS (VIDEO)	All menu settings	5-16
INPUT LINKAGE PROCESS (AUDIO)	All menu settings	5-17
VIDEO PAYLOAD ID LINKAGE	All menu settings	5-31
VIDEO FREEZE	Freeze	5-41
FRAME DELAY	Mode	5-42
VIDEO INPUT STATUS | INPUT TIMECODE DETECTION	All information and status	5-45 | 5-51
AUDIO OUTPUT GAIN	Master Mute setting	6-19
ANALOG INPUT/OUTPUT GAIN	Master Mute setting	6-20
MADI OUTPUT GAIN	Master Mute setting	6-21
GPI UTILITY / INPUT / OUTPUT	All menu settings	7-1
FRONT PANEL SETTINGS	All menu settings	7-5
NETWORK INFORMATION NETWORK SETTING	Network settings	7-6 7-7
MU OPERATION	MU Main mode setting	7-8
EMB. AUDIO INPUT STATUS | SOFTWARE OPTION INFO.	All information and status	7-9 | 7-21
START UP EVENT	All menu settings	8
Main Unit tab	Unit / FS Name settings	11
Network tab	All menu settings	11-6

◆ **Notes on Event Memory**

- Do not power off the FA-9600 unit while saving data to event memory. Otherwise, event data is not stored correctly.
- Wait at least 5 seconds and power off the FA-9600 unit before changing settings, since the unit regularly auto-saves setting data. (See Sec. 3-2. “Memory Access Icon”.)
- It is recommended to back up important data as files, referring to Sec. 13-3-2. “Event Data.”

9. Installing Windows GUI Software

9-1. System Requirements

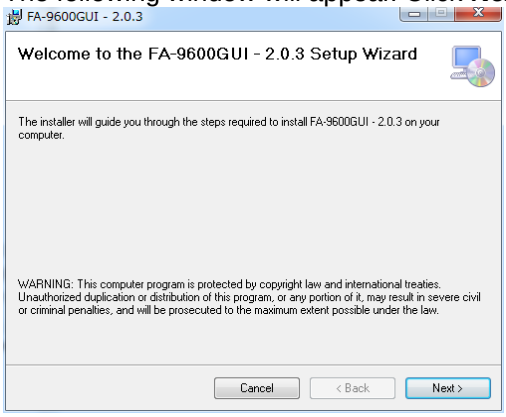
To use the Windows GUI, your computer must meet the following requirements.

OS	Windows® 7 Professional SP1 (32/64bit) Windows® 8.1,10 Pro (32/64bit) (Mac OS is not supported.)
CPU	Intel® Core™ 2 Duo processor 2 GHz or higher
RAM	2 GB or more
Display	Resolution: 1280×1024 pixels or better recommended Full color (24-bit) or more
Network port	Ethernet: 100BASE-TX/1000BASE-T More than 1 port
Network cable	100BASE-TX: Category 5 or higher 1000BASE-T: Category 5e or 6
Software	Microsoft® .NET Framework 4.7.1 Windows® Installer 3.1

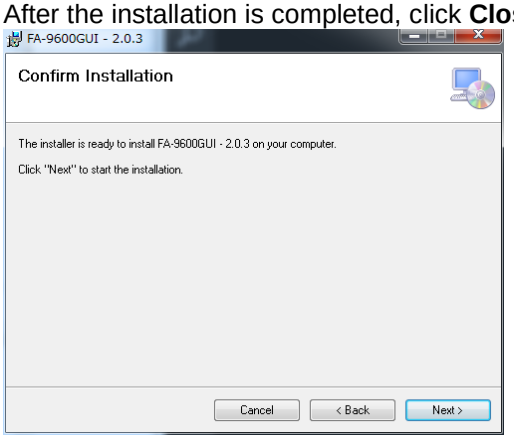
9-2. Installing Windows GUI Software

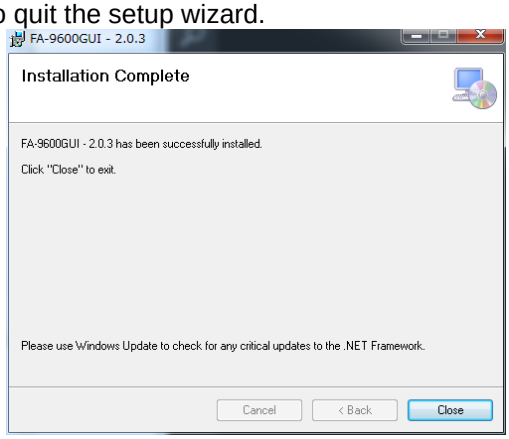
1. Open the CD-ROM, and the **FA-9600GUI** folder. Double-click the Setup icon to start the setup wizard.

2. The following window will appear. Click **Next**.



3. Select the installation directory, then click **Next**.
4. After the installation is completed, click **Close** to quit the setup wizard.





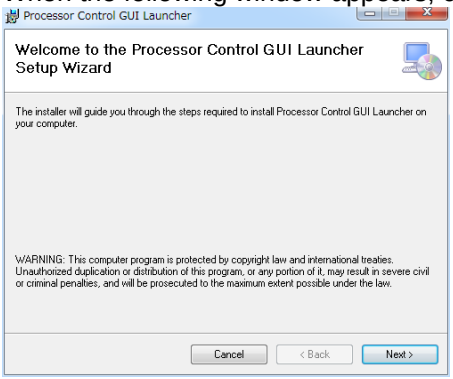
10. Processor Control GUI Launcher

Processor Control GUI Launcher allows you to connect multiple FA-9600 units and switch the Windows GUI control unit within them. Install the Processor Control GUI Launcher into your computer and register FA-9600 units.
The GUI Launcher can run in the same system as FA-9600 Windows GUI. (See Sec. 9-1. “System Requirements.”)

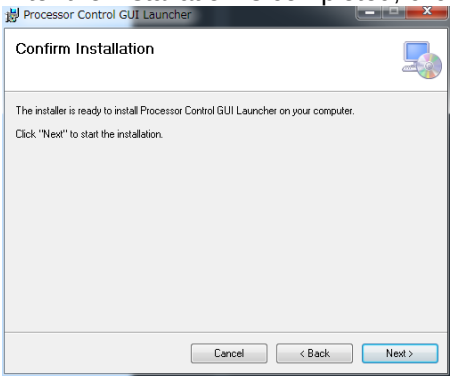
10-1. Installing the GUI Launcher

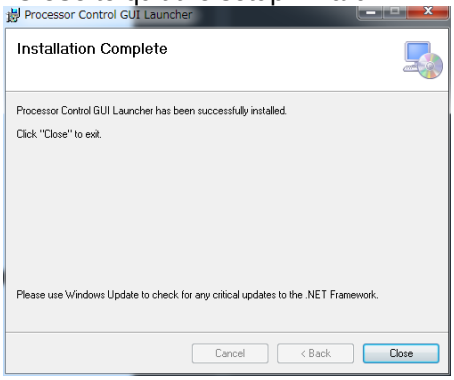
(1) Open the **Processor Control GUI Launcher** folder in the supplied CD-ROM and double-click the **Setup** file to start the setup wizard.

(2) When the following window appears, click **Next**.



(3) Click **Next** again.
(4) After the installation is completed, click **Close** to quit the setup wizard.





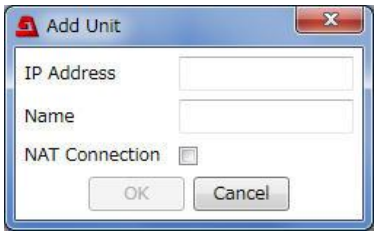
10-2. Starting Processor Control GUI Launcher

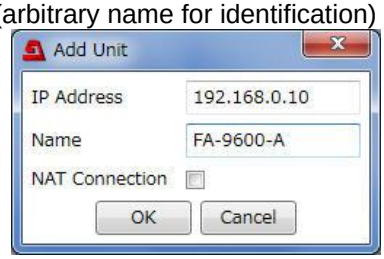
Once the GUI Launcher is installed, its icon is created on the desktop.
Double-click the icon to start the GUI Launcher.

When the GUI Launcher starts, the following Launcher screen appears.

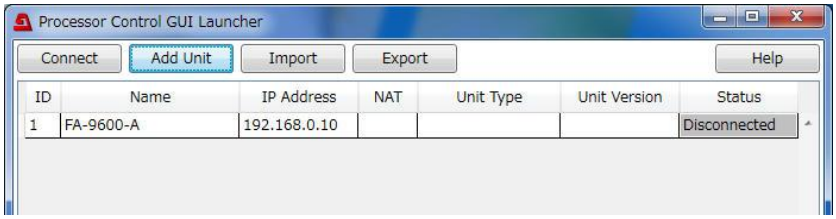
10-3. Registering FA-9600 Units

(1) Click **Add Unit** to open the ADD Unit window.
(2) Enter the IP address and Unit Name (arbitrary name for identification) and click **OK**.





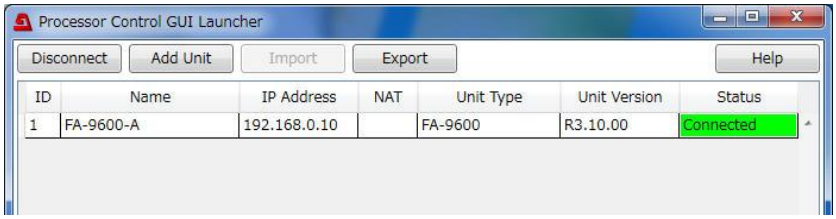
(3) The FA-9600 unit is registered, displayed in the Launcher screen list, and automatically connected to the unit.



The Status field shows the following status messages.

Status message	Meaning
Searching	Searching the target device.
Connected	Connected with the target device.
Disconnected	Disconnected with the target device.
Error	Unable to control the target device from Processor Control GUI Launcher.

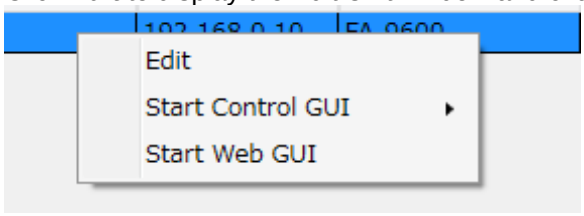
(4) When the connection is established, the Status display changes from **Searching** to **Connected**.

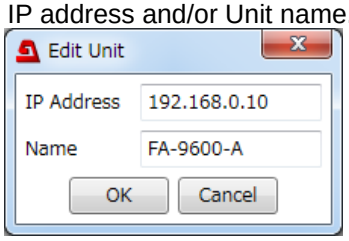


(5) Select a connected unit (with **Connected** state) in the list and double-click it to start the GUI. (The Windows GUI software must have been installed onto the computer.)

10-4. Changing Unit Information

(1) Right-click an FA-9600 in the list to display the context menu.
(2) Click **Edit** to display the Edit Unit window and change the IP address and/or Unit name.



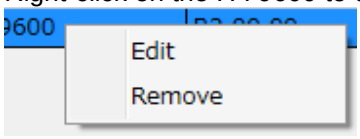


Note that changing IP addresses immediately starts searching for the unit with the new IP address.

10-5. Deleting FA-9600 from the List

(1) To delete an FA-9600 unit from the list, click **Disconnect** to disconnect all unit connection.

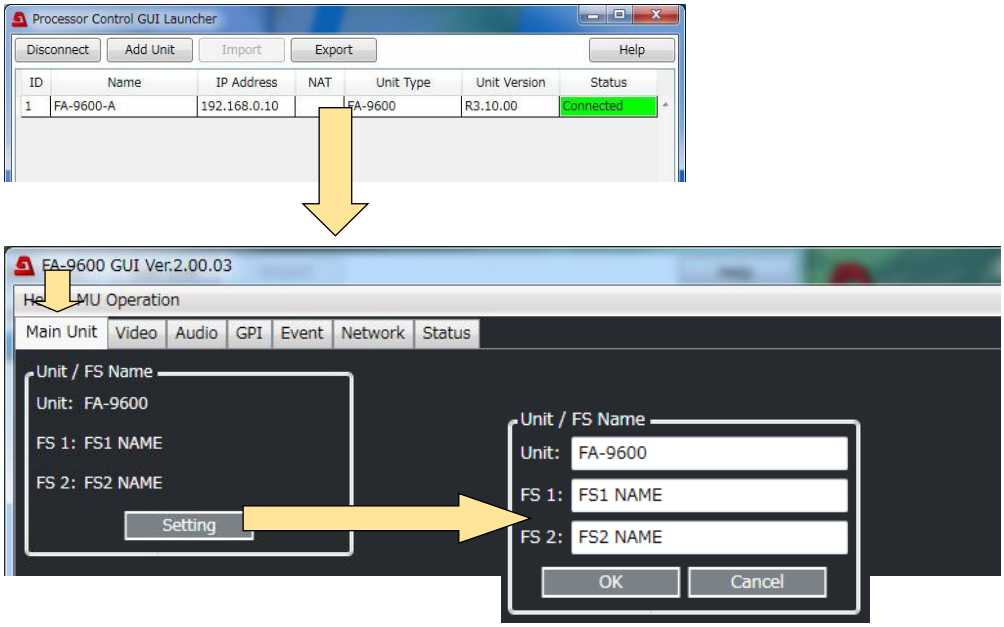
(2) Right-click on the FA-9600 to display the context menu.



(3) Click **Remove** to remove the unit entry.

11. Windows GUI Control

When the Windows GUI starts, the following window will appear.
Launch the Windows GUI using the Processor Control GUI Launcher.
Double-click a connected FA-9600 unit in the registration list to launch the Windows GUI.



◆ **Main Unit Tab**

Clicking the **Main Unit** tab displays the tab window as shown above.

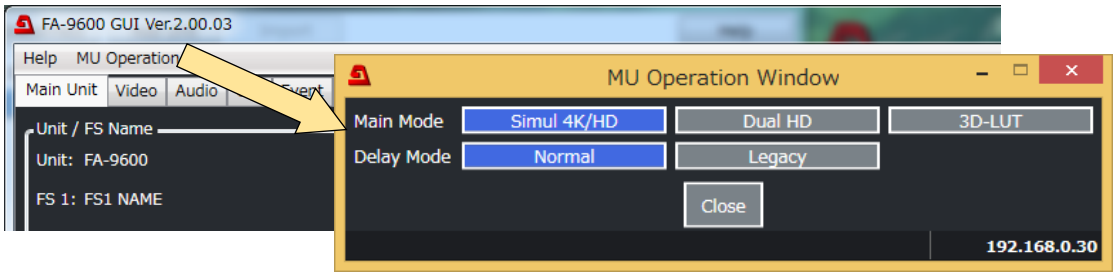
<Verifying / Changing Unit and FS Name>

Any names can be given to your FA-9600 unit and each FS.

To change names, click **Setting** to enter the setting mode.

Names should be within 15 characters using alphabet, numbers and symbols (Ascii characters excluding % and \).

11-1. Selecting MU Modes

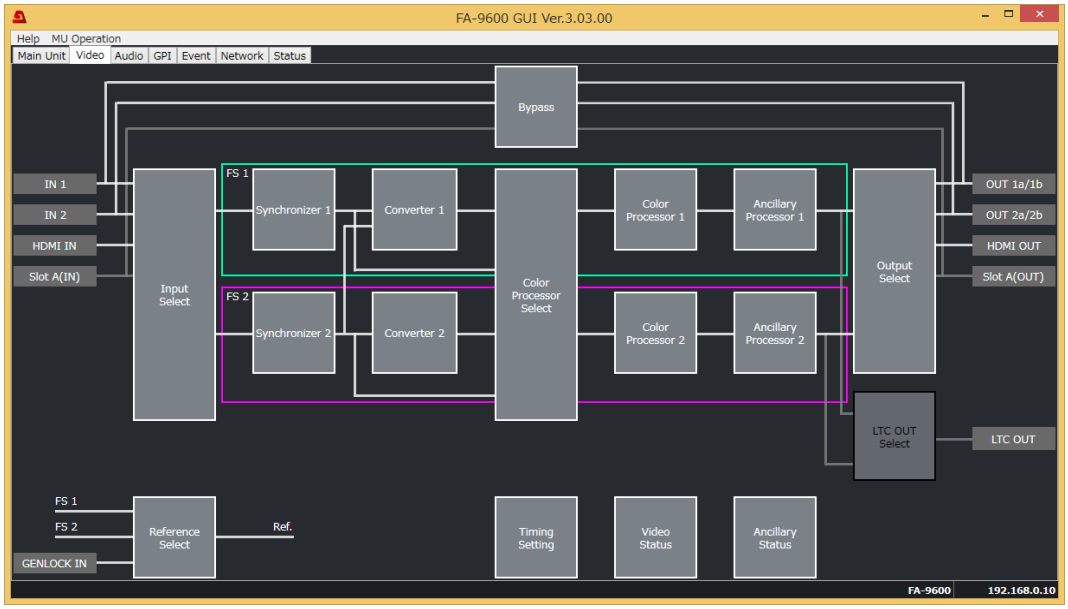


To change the MU Main Mode, click **MU Operation** to display the MU Operation Window.
Refer to Sec. 1-3. “Three MU Main Modes” for details on MU Main mode.
Note that menu items and values may change according to the MU Main mode.
Refer to Sec. 5-42 “FRAME DELAY” for details on Delay Mode.

If the MU Main mode is changed, a message that prompts you to restart the MU (FA-9600). In such cases, first, verify that the restart message “System value changed. Please restart!!” is also shown on the MU front panel display, then, restart the FA-9600 and GUI. Note that it may take some time for the restart message to appear on the front panel.

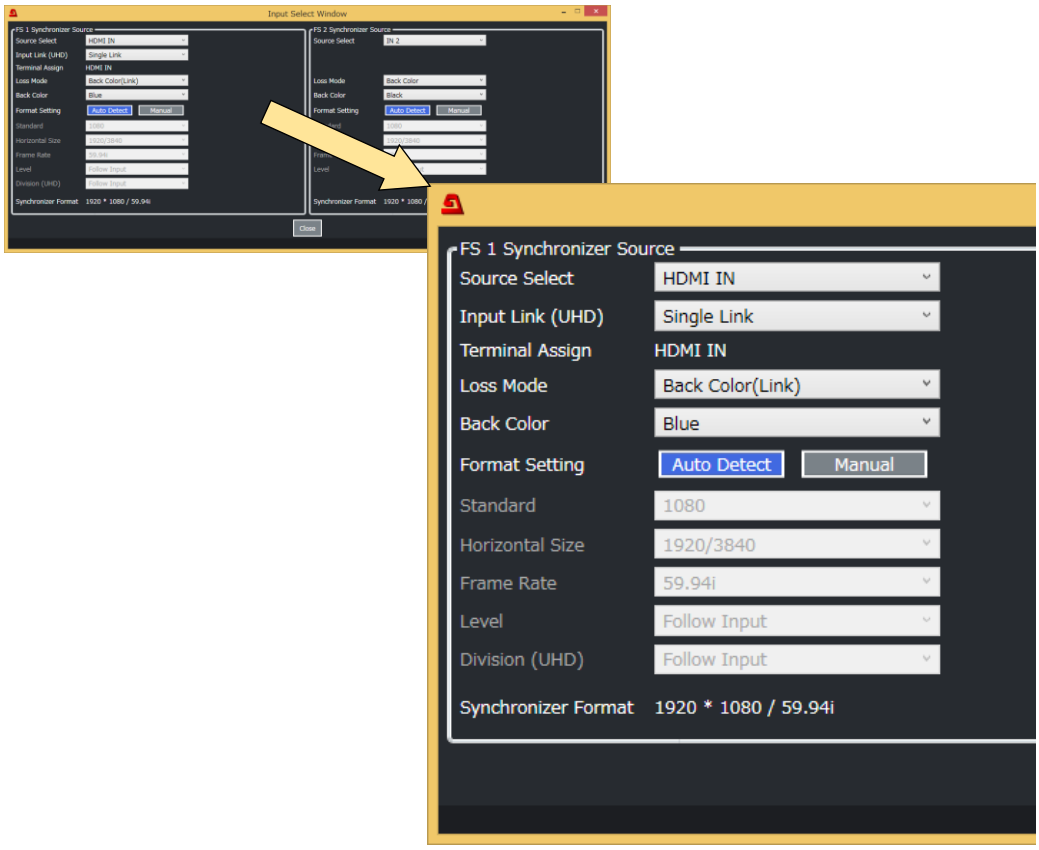
11-2. Video Tab Settings

Click the **Video** tab in the GUI screen to display the Video Block diagram as shown below.



11-2-1. Input Select

Click **Input Select** in the Video Block to display the following window.
The Left block is for FS1 (FS1 Synchronizer) settings and the Right block is for FS2 (FS2 Synchronizer) settings.



<Simultaneous 4K/HD mode>
<3D-LUT mode>

Item	Default		Setting	Description
Source Select	SDI 1 (FS1) SDI 2 (FS2)		IN1 IN2 HDMI IN EX3G IN1 to IN4 SFP RX1 to RX4	Selects a signal input to FS1 or FS2. **EX3G IN1** to **EX3G IN4:** Require FA-96EX3G44-R. **SFP RX1** to **SFP RX4**: Require FA-96SFPC4.
Input Link (UHD) (FA-964K)	Single Link		Single Link Dual Link Quad Link	Selects an SDI Link format for UHD 4K.(Quad Link requires FA-96EX3G44-R or FA-96SFPC4)
Terminal Assign	-		-	Displays the signal status that is selected under **Source Select** (FS1 only).
Loss Mode	W/o FA-964K (FS1/2)	Black Color	Back Color Auto Freeze SDI Output Mute	Selects the output mode for input signal loss. **Back Color**: Outputs a monochrome (set under **Back Color** below) video. **Auto Freeze**: Freezes and outputs the last normal video. **SDI Output Mute**: Outputs no video signal so that the FA-9600 downstream device can detect video loss.
	W/ FA-964K (FS1)	Black Color (Link)	Back Color (Link) Back Color (Separate) Auto Freeze SDI Output Mute (Link) SDI Output Mute (Separate)	See <p 46> for 4K multi-link input loss. **Back Color (Link)**: Outputs a monochrome (set under **Back Color** below) video. **Back Color (Separate)**: Output the input video displaying monochrome (set under Back Color) for the lost part. **SDI Output Mute(Link)**: Stops video output if any one of four links is lost for Quad Link video. **SDI Output Mute(Separate)**: Stops video output if all four links are lost for Quad Link video.
Back Color	Black		Black, Blue Red, Magenta Green, Cyan Yellow	Specifies a color used in Loss Mode.
Format Setting	Auto Detect		Auto Detect Manual	Specifies the FS output format. **Auto**: FS input signal format. **Manual**: Signal format specified below.
If Format Setting is set to **Manual**, specify the format using the following settings. For supported video formats, see Sec. 16-1. “Specifications.”				
Standard	1080		SD 720 1080 2160	Specifies the vertical image resolution.(2160 available only on FS1 and FA-964K required)
Horizontal Size	1920/3840		1920/3840	(Not used)
Frame Rate	59.94i		60p, 59.94p, 50p 48p, 47.95p 30p, 29.97p 25p, 24p, 23.98p 60i, 59.94i, 50i 24PsF, 23.98PsF 30PsF, 29.97PsF 25PsF	Specifies the frame / field rate.
Level	Follow Input		Follow Input Level-A Level-B	Specifies the SDI mapping level.

Division (FA-964K)	Follow Input	Follow Input SQD 2SI	Specifies the SDI image division method. (FS1 only, FA-964K required)
Synchronizer Format	-	-	Displays the detected video format of SDI input.

<Dual HD mode>

Item	Default	Setting	Description
Source Select	IN1 (FS1) IN2 (FS2)	IN1 IN2 HDMI IN EX3G IN1 to IN4 SFP RX1 to RX4	Selects a signal input to FS1 or FS2. **EX3G IN1** to **EX3G IN4:** Require FA-96EX3G44-R. **SFP RX1** to **SFP RX4**: Require FA-96SFPC4.
Loss Mode	Back Color	Back Color Auto Freeze SDI Output Mute	Selects the output mode for input signal loss. **Back Color**: Outputs a monochrome (set under **Back Color** below) video. **Auto Freeze**: Freezes the last normal output video. **SDI Output Mute**: Outputs no signal so that the FA-9600 downstream device can detect video loss.
Back Color	Black	Black, Blue, Red, Magenta, Green, Cyan, Yellow	Selects a monochrome used for **Loss Mode** settings.
Format Setting	Auto Detect	Auto Detect Manual	Specifies the FS output format. **Auto**: FS input signal format. **Manual**: Signal format specified below.
If Format Setting is set to **Manual**, specify the format using the following settings. For supported video formats, see Sec. 16-1. “Specifications.”			
Standard	1080	SD 720 1080	Specifies the vertical image resolution.
Horizontal Size	1920/3840	1920/3840	(Not used)
Frame Rate	59.94i	60p, 59.94p, 50p 48p, 47.95p 30p, 29.97p 25p, 24p, 23.98p 60i, 59.94i, 50i 24PsF, 23.98PsF 30PsF, 29.97PsF 25PsF	Specifies the frame / field rate.
Level	Follow Input	Follow Input Level-A Level-B	Specifies the SDI mapping level.
Synchronizer Format	-	-	Displays the detected input format.

11-2-2. Synchronizer

Click **Synchronizer, Timecode1** or **Synchronizer, Timecode2** in the Video Block to display the window below. See Sec. 5-40. “SYNCHRONIZER” for details on adjusting signal timing. See Sec. 5-36. “ANC USER PACKET” for details on user packets.

Item	Default	Setting	Description
Mode	Frame	Frame Line AVDL Line(Min)	Selects the reference mode. If the genlock and video signals are not synchronous, set to **Frame**. The adjustable range can be offset from the standard position (H:0, V:0) using the Timing setting. See Sec. 5-40. "SYNCHRONIZER." for the details. **Frame**: Adjusts input video timing using frame memory. **Line**: Adjusts input video timing using 1H (line) memory. **AVDL**: Adjusts input video timing using both frame memory and 1H memory. **Line (Min)**: Adjusts input video timing using 1H (line) memory.
(Adjust Timing) H Timing	0 Clock	-2750 to 2750(1080/Level B) -1375 to 1375(1080) -2063 to 2063(720) -864 to 864(SD)	Sets the horizontal offset.
(Adjust Timing) V Timing	0 Line	-563 to 563(1080) -375 to 375(720) -313 to 313(SD)	Sets the vertical offset.
(Video Freeze) Freeze	Disable	Off On	Turns freeze On/Off when Mode (see above) is set to **Frame**.

(Video Freeze) Mode	Frame	Frame Odd Even	Sets the freeze mode. This setting is ignored if progressive/no signal is input to FS.
Sync Delay		Displays the video process delay amount from Synchronizer input to adjustment by Adjust Timing.	

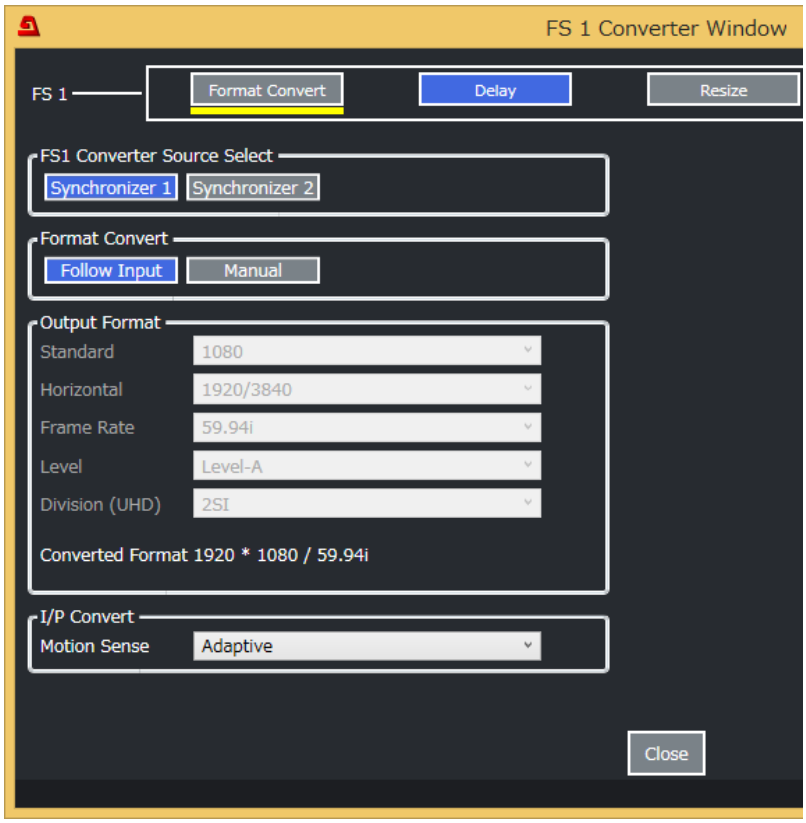
◆ **Vertical Demultiplex (Planned for future support)**

Item	Default	Setting	Description
User Packet: DID	50	50 - 5F	Selects an ANC packet used as a User Packet. Select the DID and SDID values , then click **Set**. If **Set** cannot be clicked, the packet (DID/SDID set) is unavailable. (See Sec. 5-36 “ANC USER PACKET.”
User Packet: SDID	01	01 - FF	
Status	-	-	Displays the set User Packet information: DID and SDID values and usage status (whether the packet already exists the input signal).

11-2-3. Converter 1-2

Click **Converter 1** or **Converter 2** in the Video Block to display the window as shown below. A converter flow will be displayed in the top. Click a block in the flow diagram to display the detailed settings below. The selected block is underlined in yellow.

11-2-3-1. If Format Convert Selected (FA-96UDC):



Item	Default	Setting	Description
FS1 Converter Source Select	Synchronizer 1	Synchronizer 1 Synchronizer 2	Selects a Converter1 input source.
Format Convert	Follow Input	Follow Input Manual	Specifies the converter output format. **Follow Input**: Converter input signal format **Manual**: Signal format specified below.

◆ **I/P Convert**

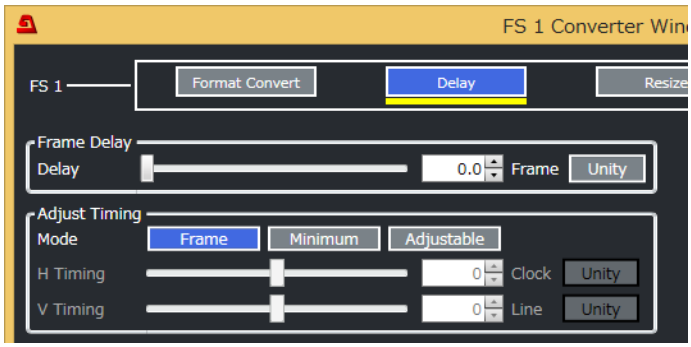
Item	Default	Setting	Description
Motion Sense	Adaptive	Adaptive Field Frame (Odd 1st) Frame (Even 1st)	**Field:** Generates a progressive image from one field of an interlaced image. The created image has no motion artifacts, but vertical resolution will be reduced. **Adaptive:** Detects whether there is motion or no motion in the scene, and generates an optimal progressive image. **Frame(Odd 1st):** Generates a progressive image from two fields (odd and even) of an interlaced image. Suitable for progressive segmented frame input shot in progressive format. **Frame(Even 1st):** Generates a progressive image from two fields (even and odd) of and interlaced image.

The following parameters are enabled when Format Convert is set to **Manual**.
Refer to Sec. 5-20-1. “Available Conversions on Converter 1 (FS1)” and Sec. 5-20-2. “Available Conversions on Converter 2 (FS2)” for more details.

◆ **Output Format**

Item	Default	Setting	Description
Standard	1080	SD 720 1080 2160	Specifies the vertical image resolution. (**2160** available only on FS1 in Simultaneous 4K/HD or 3D-LUT mode with FA-964K.)
Horizontal	-	-	(Not used)
Frame Rate	59.94i	60p, 59.94p, 50p, 48p, 47.95p 30p, 29.97p, 25p, 24p, 23.98p 60i, 59.94i, 50i 24PsF, 23.98PsF, 30PsF, 29.97PsF, 25PsF	Specifies the frame/field rate.
Level	Level-A	Level-A Level-B	Selects the SDI mapping level.
Division (UHD) (FA-964K)	2SI	SQD 2SI	Selects the SDI image division method when **2160** is selected under Standard.

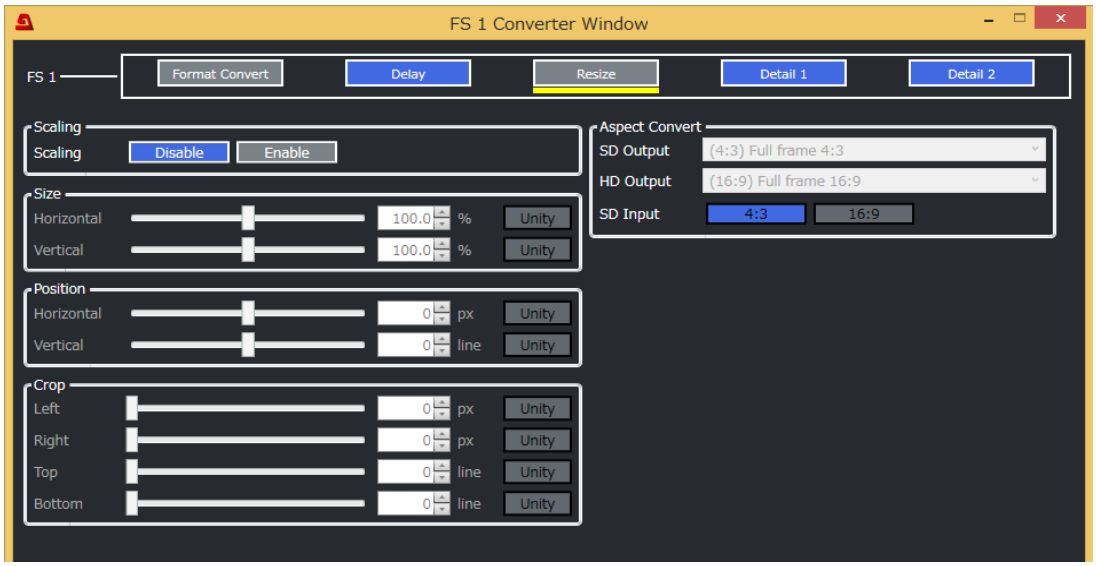
11-2-3-2. If Delay Selected



Item	Default	Setting	Description
Delay (*1)	0.0	0.0 to 8.0	Allows you to add a delay to converter output in 0.5 frames. <3G-Level B, 1080i and SD outputs> Per 0.5 frames for progressive input or aspect conversion and per one frames for other cases.
Mode	Frame	Frame Minimum Adjustable	Sets the conversion delay mode. **Frame:** Applies the delay set under Delay. **Minimum:** Applies the minimum delay. **Adjustable:** Applies the adjustable delay based on the Delay setting.
If Delay Mode is set to **Adjustable**, use the following parameters to adjust the output timing.			
H Timing	0 Clock	-2750 to 2750 Clock	Finely adjusts the horizontal timing. Adjustable range is defined by video format (see Sec. 5-21. "ADJUST TIMING (FA-96UDC)") and one line will be added or decreased internally if exceeding the range.
V Timing	0 Line	-563 to 563 Line	Finely adjusts the vertical timing. Adjustable range is defined by video format (see Sec. 5-21. "ADJUST TIMING (FA-96UDC)") and the vertical timing will be inverted internally (between positive and negative) if exceeding the range.

(*1) Unavailable if Delay mode is set to **Normal**. (See Sec. 11-1. “Selecting MU Modes.”).

11-2-3-3. If Resize Selected (Converter 1 Only)



◆ **Scaling**

Item	Default	Setting	Description
Scaling	Disable	Disable Enable	Enables/disables scaling or positioning up to 2K size for Size, Position and Crop.

The following settings are available if Scaling is set to **Enable**.

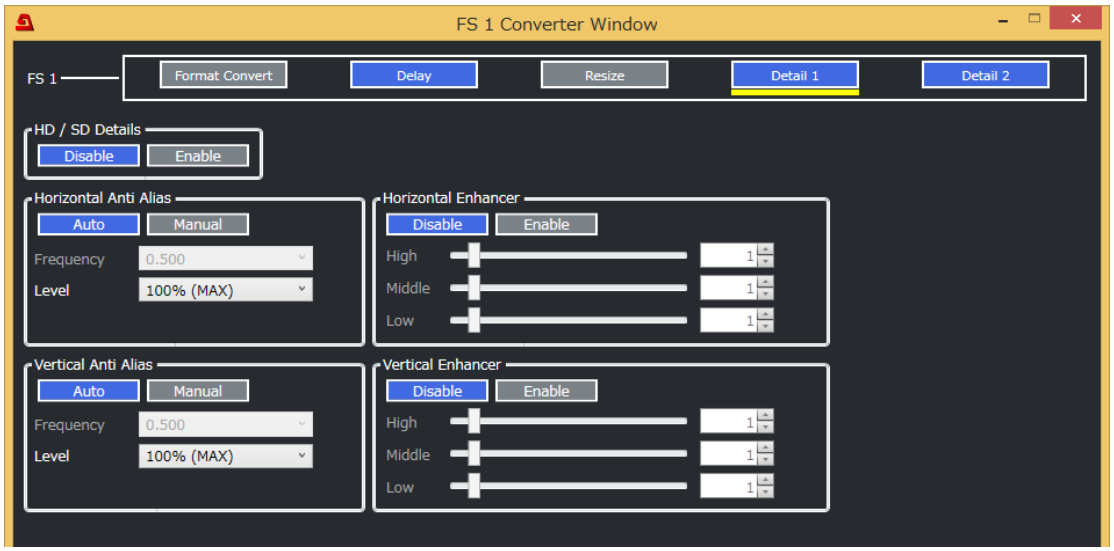
◆ **Size/Position / Crop**

Item	Default	Setting	Description
Horizontal Size	100.0%	50.0 to 150.0%	Selects the horizontal image size ratio after conversion.
Vertical Size	100.0%	50.0 to 150.0%	Selects the vertical image size ratio after conversion.
Horizontal Position	0 Px	Varies depending on the signal format. (See Sec 5-22.)	Selects the horizontal and vertical image position after conversion.
Vertical Position	0 Line		
Left	0 Px	Varies depending on the signal format. (See Sec 5-22.)	Crops the image from the left side.
Right	0 Px		Crops the image from the right side.
Top	0 Line		Crops the image from the top.
Bottom	0 Line		Crops the image from the bottom.

◆ **Aspect Convert**

Item	Default	Setting	Description
SD Output	(4:3) Full frame 4:3	(4:3) Letterbox 16:9 at top (4:3) Letterbox 14:9 at top (4:3) Letterbox greater than 16:9 (4:3) Full frame 4:3 (4:3) Letterbox 16:9 protected (4:3) Letterbox 14:9 (4:3) Full frame 4:3 Alternative 14:9 (4:3) Letterbox 16:9 Alternative 14:9 (4:3) Letterbox 16:9 Alternative 4:3 (16:9) Letterbox greater than 16:9 (16:9) Full frame 16:9 (16:9) Pillarbox 4:3 (16:9) Full frame protected (16:9) Pillarbox 14:9 (16:9) Pillarbox 4:3 Alternative 14:9 (16:9) Full frame 16:9 Alternative 14:9 (16:9) Full frame 16:9 Alternative 4:3	Sets the aspect ratio when converting HD-SDI to SD-SDI signals.
HD Output	(16:9) Full frame 16:9	(16:9) Letterbox greater than 16:9 (16:9) Full frame 16:9 (16:9) Pillarbox 4:3 (16:9) Full frame protected (16:9) Pillarbox 14:9 (16:9) Pillarbox 4:3 Alternative 14:9 (16:9) Full frame 16:9 Alternative 14:9 (16:9) Full frame 16:9 Alternative 4:3	Sets the aspect ratio when converting SD-SDI to HD-SDI signals.
SD Input	4:3	4:3 16:9	Selects the SD input aspect ratio. If the input image is horizontally squeezed, set to 16:9.

11-2-3-4. If Detail 1 Selected (Converter 1 Only)



◆ **HD/SD Details**

If using 2K signals (converting 2K to 2K), this parameter can enable / disable **Anti Alias**, **Enhancer** and **Noise Reducer** together. However, these three filters are automatically enabled/disabled in certain conditions. See Sec. 5-24. “FILTER SETTINGS (FA-96UDC)” for the details.

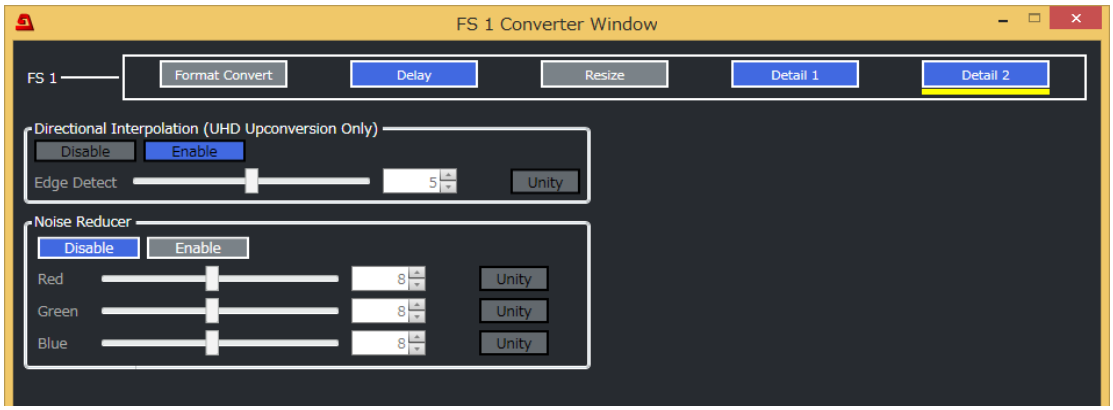
◆ **Horizontal / Vertical Anti Alias**

Item	Default	Setting	Description
Mode	Auto	Auto Manual	To manually set Frequency, set to **Manual**.
H Frequency V Frequency	-	0.125 to 0.500	Sets the cut-off frequency.
H / V Level	100% (MAX)	0 (Off) to 100% (MAX)	Sets the original video mixing level.

◆ **Horizontal / Vertical Enhancer**

Item	Default	Setting	Description
H / V Enhancer	Disable	Disable Enable	Enables/disables Horizontal / Vertical Enhancer.
H / V High	1	0 – 10	Sets the horizontal enhance level of higher range between 0.29 to 0.4 in the sampling frequency.
H / V Middle	1	0 – 10	Sets the horizontal enhance level of higher range between 0.17 to 0.29 in the sampling frequency.
H / V Low	1	0 – 10	Sets the horizontal enhance level of higher range between 0.03 to 0.17 in the sampling frequency.

11-2-3-5. If Detail 2 Selected (Converter 1 Only)



◆ **Directional Interpolation (for Up-Converting to UHD 4K)**

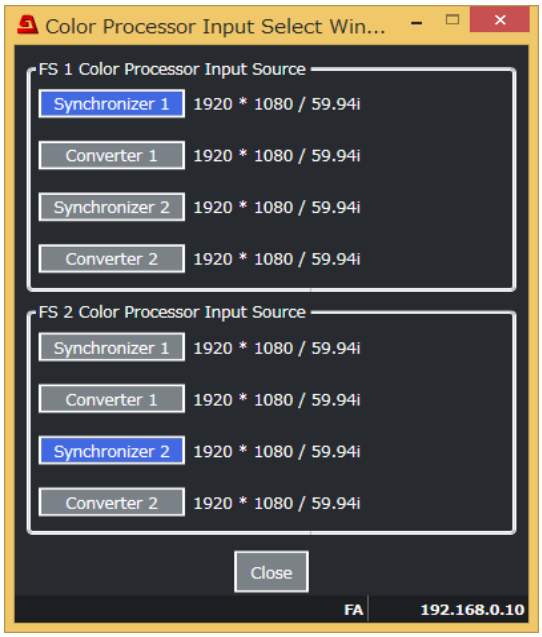
Item	Default	Setting	Description
Enable/ Disable	Enable	Disable Enable	Enables/disables Edge Detect Level setting. Effective only for 4K up-conversions.
Edge Detect	5	0-10	Sets Edge Detect Level. The lower the value, the higher the detection sensitivity, increasing the directional interpolation area.

◆ **Noise Reducer**

Item	Default	Setting	Description
Noise Reducer	Enable	Disable Enable	Enables/disables Noise Reducer applied for conversion noises.
Red	8	1-16	Sets the noise reduction level for low luminance side (darker areas) in RGB. Effective for camera lower random noises. Ineffective for noises in high luminance side (brighter areas) or block noises from compression. The stronger (higher) the Red, Green, Blue or Filter level, the fewer the high-frequency components in video images.
Green	8	1-16	
Blue	8	1-16	

11-2-4. Color Processor Select

Click **Color Processor Select** in the Video Block to display the windows as shown below.



Item	Default	Setting	Description
FS1 Color Processor Input Source	Synchronizer 1	Synchronizer 1 Converter 1 Synchronizer 2 Converter 2	Selects a source signal for FS1 Color Processor.
FS2 Color Processor Input Source	Synchronizer 2	Synchronizer 1 Converter 1 Synchronizer 2 Converter 2	Selects a source signal for FS2 Color Processor.

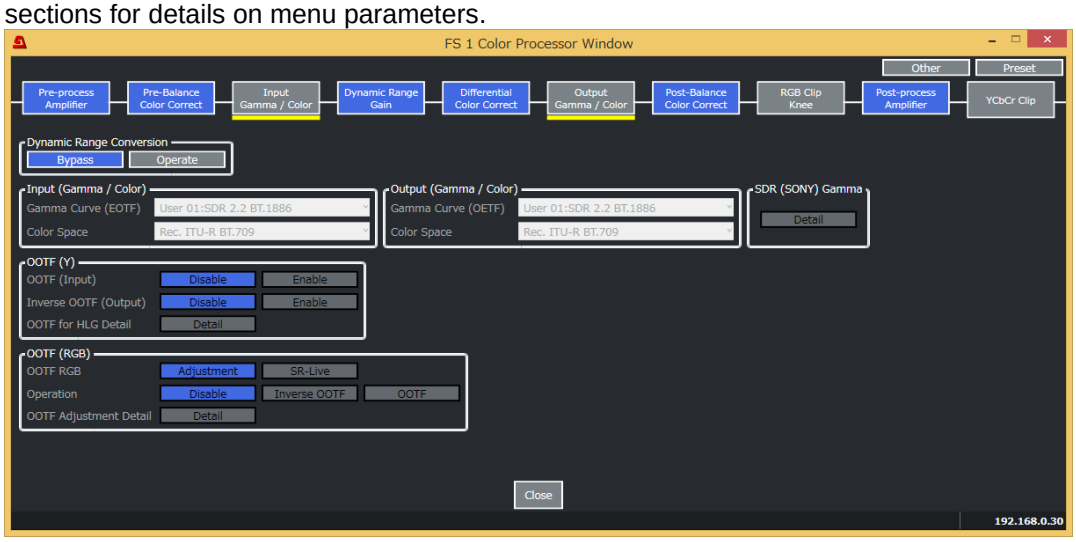
11-2-5. Color Processor 1, 2

Click **Color Processor 1** or **Color Processor 2** in the Video Block menu.

<Simultaneous 4K/HD mode>
<Dual HD mode>

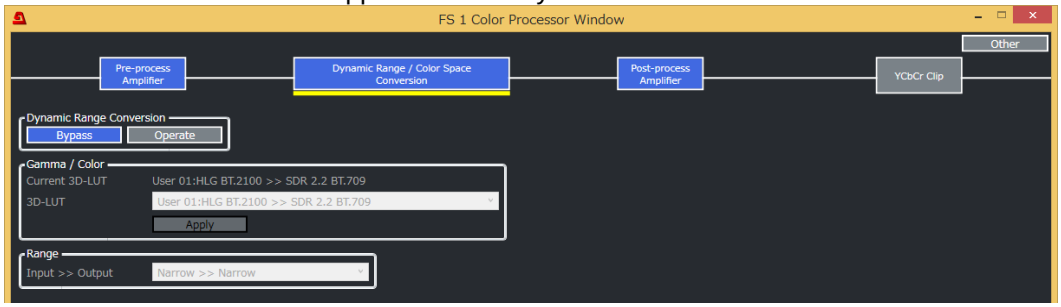
The **Preset Event Recall** screen is displayed. (See Sec. 4-1. “Color Processer: SDR<->HLG (with Preset Events)” for the details.)
Press **Detail** in the Preset Event Recall screen to display the detailed menu page. (This page directly appear in some cases without showing Preset Event Recall. In such cases, to display the Preset Event Recall screen, press **Preset** in the following menu page.)

A color correction flow will be displayed in the top. Click a block in the flow diagram to display menu parameters. The selected block is underlined in yellow. See Sec. 11-2-5-1 and later sections for details on menu parameters.



<3D-LUT mode>

The Color Processor menu appears differently in 3D-LUT mode.



Pre-process Amplifier/Post-process Amplifier
See Sec. 11-2-5-2. “Pre-process Amplifier/Post-process Amplifier” for menu details.

Dynamic Range / Color Space Conversion

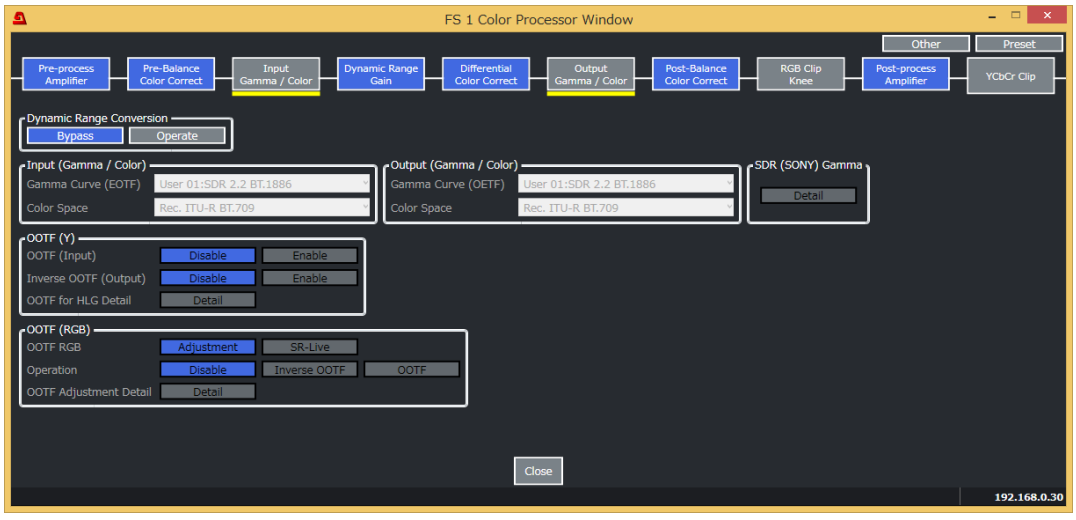
Item	Default	Setting	Description
Dynamic Range Conversion	Bypass	Bypass Operate	Setting to **Operate** enables conversions using 3D-LUT.
3D-LUT	User 01:	See Sec. 5-7. “IN/OUT GAMMA/COLOR (FA-96AHDR2).”	Selects a 3D-LUT table.
Input >> Output	Narrow >> Narrow	Narrow >> Narrow SDI >> SDI Narrow >> SDI SDI >> Narrow	Selects an "Input >> Output" range pair for normalizing video data between 0 and 1. **Narrow**: 0x040 (64) - 0x3AC (940) **SDI**: 0x004 (4) - 0x3FB (1019)

YCbCr Clip
See Sec. 11-2-5-7. “YCbCr Clip” for menu details.

11-2-5-1. Input / Output Gamma / Color (Dynamic Range Conversion)

Click **Color Processor 1** or **Color Processor 2** in the Video Block and select **Input Gamma / Color** or **Output Gamma / Color** to display the window as shown below.

◆ **Dynamic Range Conversion**
Enables/disables DRC (Dynamic Range Conversion). If setting to **Bypass**, the DRC process is bypassed. The following parameters are available when Dynamic Range Conversion is set to **Operate.**
Using preset evets allows you to make settings easier, see Sec. 4-1 “Color Processer Setting Example.”



◆ **Input (Gamma / Color)**

Item	Default	Setting	Description
Gamma Curve (EOTF)	User 01: SDR 2.2 BT.1886	User 01: SDR 2.2 BT.1886 User 02: SDR 2.4 BT.1886 User 03: HLG BT.2100 User 04: HLG (RGB SG1.2) User 05: HLG (RGB SG1.4) User 06: ST 2084 (PQ)	Selects a gamma curve for input. Gamma setting data as shown at left are respectively stored in files named **User 01** to **User 10**. Gamma data names and content can be

		User 07: SDR 2.2 BT.709 User 08: S-Log3 User 09: 01_Canon Log 2 User 10: 01_Canon Log 3 S-Log3 Live HDR SDR(SONY)	changed by editing files in the Web GUI. (See Sec. 13-4. “Data.”) These settings are shared by both input and output gamma curve settings. **S-Log3 Live HDR** and **SDR(SONY)** require FA-96AHDR2 option. If **SDR(SONY)** is selected, choose a curve by pressing the **SR-Live Detail** button.
Color Space	Rec. ITU-R BT.709	Rec. ITU-R BT.709 Rec. ITU-R BT.2020 User 01: S-Gamut/Gamut3 User 02: User2 User 03: User3 User 04: User4 User 05: User5	Selects a color space for input. User 01-05 Gamut settings are stored in files and these names and content can be changed by editing files in the Web GUI. (See Sec. 13-4. “Data.”) These settings are shared by both input and output gamut curve settings.

◆ **Output (Gamma / Color)**

Item	Default	Setting	Description
Gamma Curve (OETF)	User 01: SDR 2.2 BT.1886	(Same as Input)	Selects a gamma curve for output.
Color Space	Rec. ITU-R BT.709	(Same as Input)	Selects the color space for output

◆ **SDR(SONY) Gamma (FA-96AHDR2 required)**

If **SDR(SONY)** is selected for Gamma Curve, press the **Detail** button to display the dialog box.

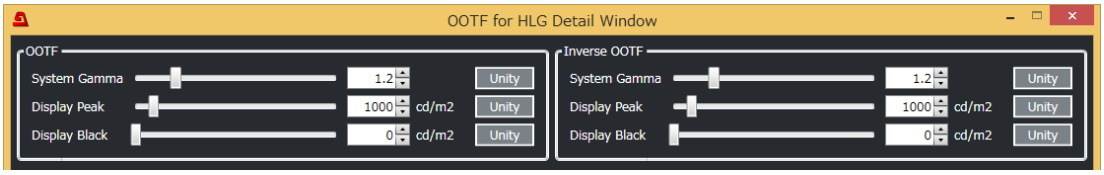
Item	Default	Setting	Description
Gamma Curve	STANDARD 5	STANDARD1-7 HYPER1-4	Selects a gamma curve.

◆ **OOTF (Y)**

OOTF is applied as a display gamma (see ITU-R BT.2390) and effective when converting a signal to or from an HLG signal (with BT.2100 gamma curve).

Change OOTF(Input) or Inverse OOTF(Output) to **Enable**, then click **Detail** under OOTF for HLG Detail to set the following parameters

See Sec. 5-6-1. "About OOTF Related Parameters" for details on settings



Item	Default	Setting	Description
System Gamma	1.2	1.0 to 2.0	Sets the gamma value.
Display Peak	1000 cd/m2	100 to 10000 cd/m2	Sets the maximum luminance peak for Display Light.
Display Black	0 cd/m2	0 to 100 cd/m2	Sets the minimum luminance peak for Display Light.

Refer to Sec. 4-1. “Color Processor Setting Example” for setting details.

◆ **OOTF (RGB) (FA-96AHDR2 required)**

OOTF is applied on RGB signals as a system gamma. Selects a mode under OOTF RGB and select **OOTF** or **Inverse OOTF** under Operation.

Item	Default	Setting	Description
OOTF RGB	Adjustment	Adjustment SR-Live	Selects an operation mode.
Operation	Disable	Disable Inverse OOTF OOTF	**Disable**: Uses no OOTF. **Inverse OOTF**: Removes OOTF adjustment. **OOTF**: Adds OOTF adjustment. See Sec. 5-6-1. "About OOTF Related Parameters."

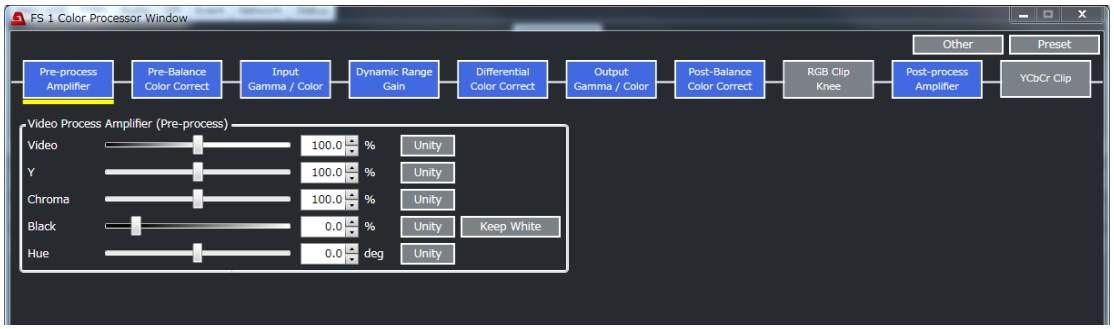
In **Adjustment** mode, a conversion compliant to OOTF Adjustment defined in ARIB TR-B43 and ITU-R BT.2390 is performed. Press **OOTF Adjustment Detail** to display the dialog box and select a gamma value.

System Gamma	1.2	1.1 to 1.5	Selects a gamma value.

In **SR-Live** mode, a Sony proprietary OOTF is performed.

11-2-5-2. Pre-process Amplifier/Post-process Amplifier

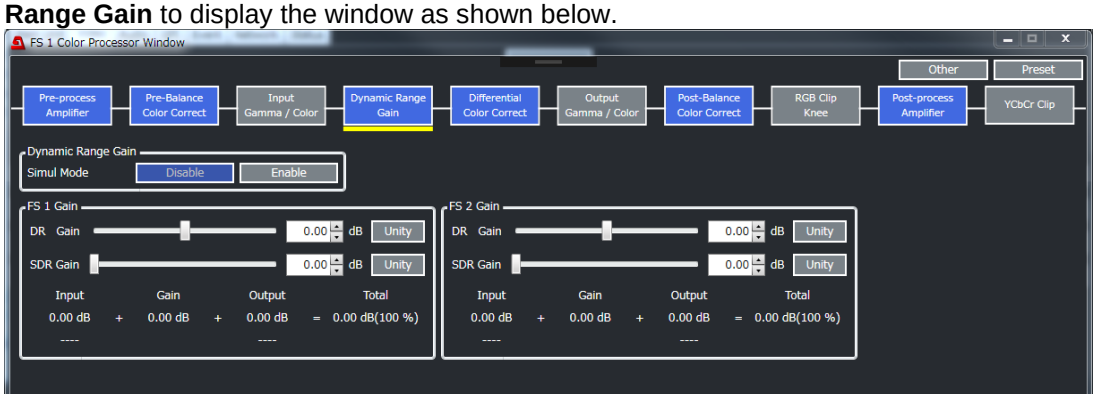
Click **Color Processor 1** or **Color Processor 2** in the Video Block and select **Pre-process Amplifier** or **Post-process Amplifier** to display the window as shown below.
Post Process settings require the FA-96AHDR or AHDR2 option.



Item	Default	Setting (Steps)	Description
Video	100.0%	0.0 to 200.0%	Adjusts the video level.
Y	100.0%	0.0 to 200.0%	Adjusts the luminance level.
Chroma	100.0%	0.0 to 200.0%	Adjusts the chrominance level.
Black	0.0%	-20.0 to 100.0%	Adjusts the black level.
Hue	0.0deg.	-179.8 to 180.0deg. (0.2 deg.)	Adjusts the chroma phase.
Keep White	Disable	Disable Enable	**Enable**: Y Level value automatically changes according to the Black Level setting (Keep White function). Always sets to **Disable** at startup.

11-2-5-3. Dynamic Range Gain

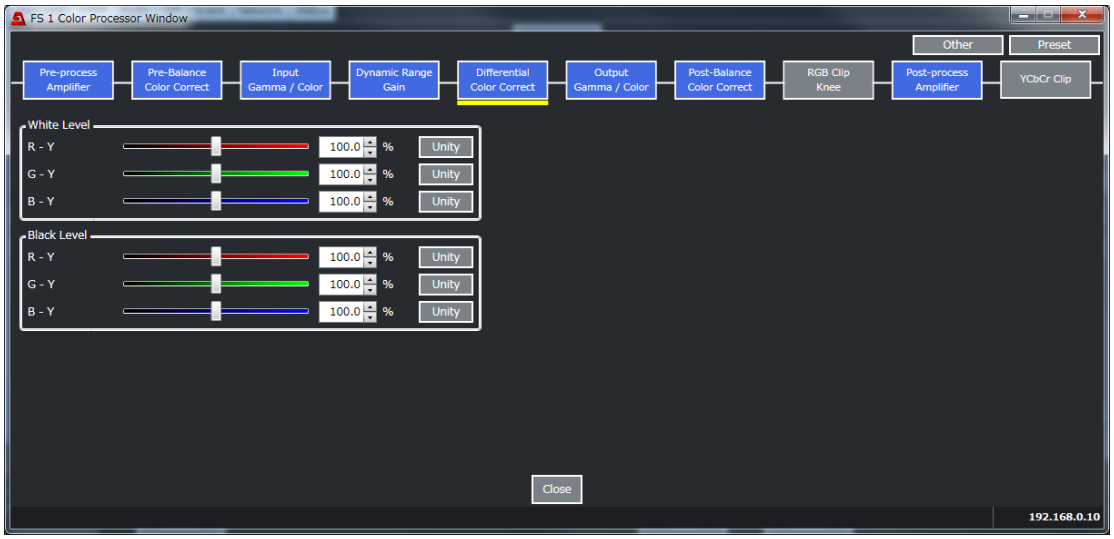
Click **Color Processor 1** or **Color Processor 2** in the Video Block and select **Dynamic Range Gain** to display the window as shown below.



Item	Default	Setting	Description
Simul Mode	Disable	Disable Enable	Sets whether to keep the gain difference between FS 1 and 2. Setting to **Enable** allows you to set **Gain**, **Color Correction (Differential, Balance)** and **Clip (RGB Clip, YCbCr Clip)** parameters by retaining the gain difference set under **Ratio** below.
DR Gain	0.00dB	-24.00 to 24.00dB	Sets the RGB dynamic range gain in the linear scale space.
SDR Gain	0.00dB	0.00 to 24.00dB	Sets the gain difference between SDR and HDR. The total gain is equal to addition of SDR Gain and DR Gain values. When converting between SDR signals or between HDR signals, this setting is ignored.
Input / Gain / Output / Total			Displays the gain difference between before and after conversion.

11-2-5-4. Differential Color Correct

Click **Color Processor 1** or **Color Processor 2** in the Video Block and select **Differential Color Correct** to display the window as shown below.



Item	Default	Setting	Description
White Level (R-Y) (G-Y) (B-Y)	100.0%	0.0 - 200.0%	Sets the white level by separately adjusting R-Y, G-Y and B-Y components.
Black Level (R-Y) (G-Y) (B-Y)	100.0%	0.0 - 200.0%	Sets the black level by separately adjusting R-Y, G-Y and B-Y components.

11-2-5-5. Pre-Balance Color Correct / Post-Balance Color Correct

Click **Color Processor 1** or **Color Processor 2** in the Video Block and select **Pre-Balance Color Correct** or **Post- Balance Color Correct** to display the window as shown below.

Item	Default	Setting	Description
White Level(RGB)	100.0%	0.0 - 200.0%	Sets the white level by separately adjusting R, G, and B components or simultaneously adjusting them using Master.
Black Level(RGB)	100.0%	0.0 - 200.0%	Sets the black level by separately adjusting R, G, and B components or simultaneously adjusting them using Master.
Gamma Curve	Center	Center Black White	Selects a gamma curve type.
Range	100.0%	0.5% - 100.0%	Sets the upper threshold where the gamma correction is enabled. A 100% value is based on the OETF Maximum Input or Output.
Gamma Level(RGB)	100.0%	0.0 - 200.0%	Sets the gamma level by separately adjusting R, G, and B components or simultaneously adjusting them using Master.

11-2-5-6. RGB Clip / Knee

Click **Color Processor 1** or **Color Processor 2** in the Video Block and select **RGB Clip / Knee** to display the window as shown below.

◆ **RGB Clip / Knee**

Item	Default	Setting	Description
White Clip / Knee	Disable	Disable Enable	Enables / disables Knee function.
Following 3 parameters are available when White Clip / Knee is set to **Enable**.			
Clip Mode	RGB Knee	RGB Knee Y Knee	Selects RGB or Y for knee correction mode. Selecting **Y Knee** preserves colors more vividly in the knee correction (high luminance) areas.
Output Clip	109.0 %	50.0 - 150.0%	Sets the White threshold in RGB.
Knee Slope	0.10	0.10-1.00%	Sets the knee slope inclination (compression ratio).
Knee Point	96.0 %	50.0 - 150.0%	Sets the knee slope start point. The maximum and default values vary depending on White Leve (RGB White CLIP) setting.

◆ **Knee Saturation (Enabled when Clip Mode =Y Knee)**

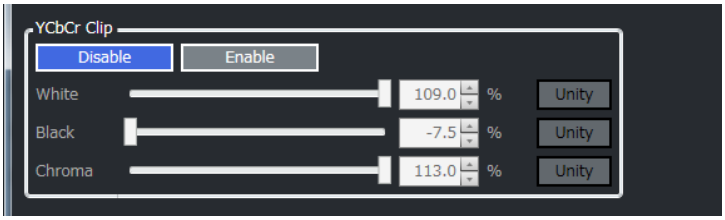
Item	Default	Setting	Description
Saturation	Disable	Disable Enable	Enables / disables the **Saturation Level** setting below.
Level	0 %	0 - 200%	Sets the Saturation Level for the knee correction (high luminance) areas. The smaller the value, the more colors are desaturated. Setting the value more than 100% makes colors thicker.

◆ **Black Clip**

Item	Default	Setting	Description
Disable /Enable	Disable	Disable Enable	Enables/disables the **Output Clip** setting below.
Output Clip	0.0%	-50.0 to 50.0%	Sets the Black threshold in RGB.

11-2-5-7. YCbCr Clip

Click **Color Processor 1** or **2** in the Video Block and select **YCbCr Clip** to display the menu.



Use the **Disable** / **Enable** button to enable / disable YCbCr CLIP.
If enabled, the following parameters are available.

Item	Default	Setting	Description
White	109.0%	50.0 to 109.0%	Sets the upper Y signal limit.
Black	-7.5%	-7.5 to 50.0%	Sets the lower Y signal limit.
Chroma	113.0%	50.0 to 113.0%	Sets the upper and lower CbCr signal limits.

11-2-5-8. Other

Click **Color Processor 1** or **Color Processor 2** in the Video Block and select **Other** to display the window as shown below.

Item	Default	Setting	Description
Test Signal	Disable	Disable 100% Color Bar 75% Color Bar	Outputs the selected test signal.
Split Mode	Operate	Operate V-Split H-Split Bypass	Selects the output image display method.
The following settings require FA-96AHDR or AHDR2.			

Marker	Disable	Disable Luminance Gamut	Selects the marker mode. **Disable:** Plots no markers **Luminance:** Marks pixels above the high threshold when enabling RGB Clip. **Gamut:** Marks pixels whose RGB values exceed the range between 0 and 1.0.
Color	Red	Red Green Blue	Selects the marker color.
Blink	Disable	Disable Enable	Toggles marker flashing on/off.

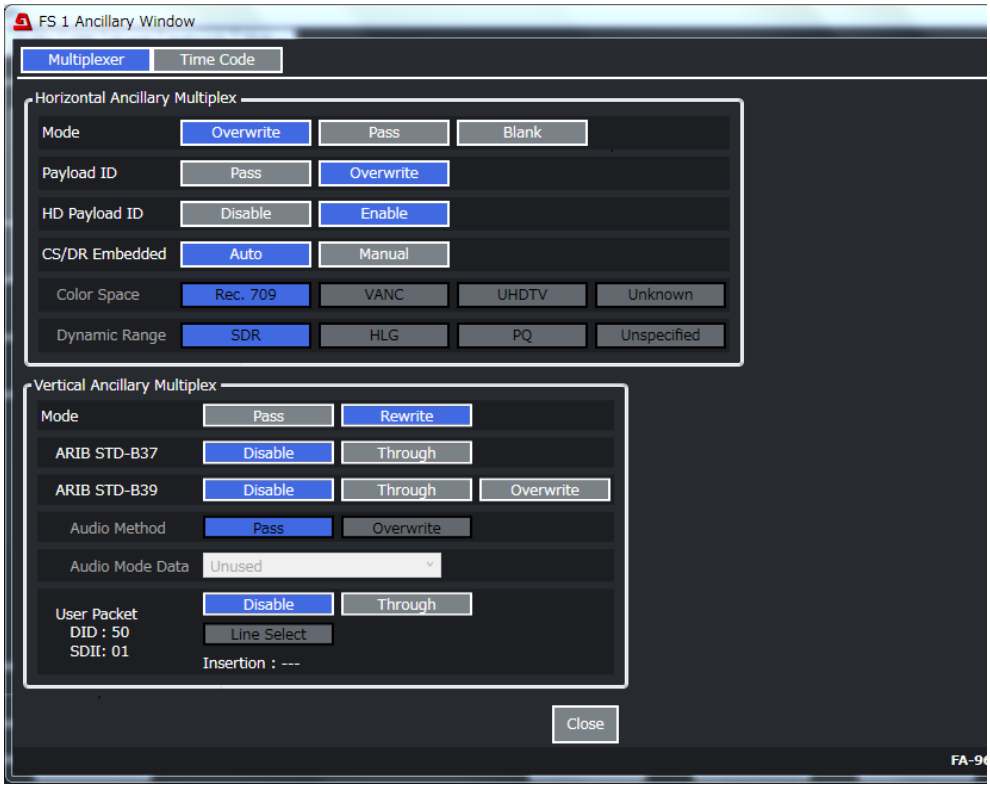
11-2-5-9. Preset

Clicking **Color Processor 1** or **Color Processor 2** in the Video Block and select **Preset** to displays the **Preset Event Recall** screen.
See Sec. 4-1. “Color Processer: SDR<->HLG (with Preset Events)“ for details on the screen.

11-2-6. Ancillary Processor 1, 2

Click **Ancillary Processor 1** or **Ancillary Processor 2** in the Video Block to display the menu window.
Switch the display by pressing **Multiplexer** or **Time Code** at the top of the window.

11-2-6-1. If Multiplexer Selected



◆ **Horizontal Ancillary Multiplex**

Item	Default	Setting	Description
Mode	Overwrite	Overwrite Pass Blank	Selects the HANC data insertion mode to each FS output. **Overwrite:** Inserts the input HANC data in which audio and timecode data are rewritten. **Pass:** Inserts the input HANC data without processing. If input and output signal formats are different, "**Blank**" setting is automatically applied. **Blank:** Clears HANC space and inserts only the rewritten input audio and timecode data. See VANC setting (below) for SD timecode processing.
Payload ID	Overwrite	Pass Overwrite	Selects payload identifier insertion mode. Note that payload identifiers are always inserted if output video signals are 4K or HD, regardless of HANC and VANC settings and Payload ID codes in input video. **Pass**: Inserts the payload identifiers in the input signal without change. If the input and output signal formats are different, another payload code is automatically inserted into the output signal according to the following parameter settings. **Overwrite**: Inserts payload ID code according to the following parameter settings.

Set the following parameters if **Overwrite** is selected for Payload ID. See Sec. 5-30. "VIDEO PAYLOAD ID 1, 2."			
HD Payload ID	Enable	Disable Enable	Enables/disables insertion of payload identifiers into HD-SDI.
CS/DR Embedded	Auto	Auto Manual	Sets the Payload ID codes insertion mode for Dynamic Range and Color Space. **Auto**: Automatically inserts the codes according to the Dynamic Range Conv. setting. (See Sec. 5-4. "INPUT / OUTPUT GAMMA / COLOR.") **Bypass**: Payload ID codes in input signal are inserted. If set to **Operate**, Payload ID codes suitable to output gamma and color gamut are inserted. **Manual**: Inserts the codes according to the following parameter settings.
Color Space	Rec.709	Rec.709 VANC UHDTV Unknown	Selects a color space (gamut).
Dynamic Range	SDR	SDR HLG PQ Unspecified	Selects a dynamic range.

◆ **Vertical Ancillary Multiplex**

Item	Default	Setting	Description
Mode	Pass	Pass Rewrite	Selects the VANC data insertion mode to each FS output. **Pass:** Passes through the input VANC data without processing. If input and output signal formats are different, the VANC space becomes blank. **Rewrite:** Outputs black in the VANC area. If ARIB STD-B37 STD-B39 and/or User Packet are set to other than **Disable** in the ANC DATA INSERTION menu (See Sec. 5-37.) and the packet is included in input signal, it is inserted in the proper space on the output signal.
Set the following parameters if Mode is set to **Rewrite.**			
ARIB STD-B37	Disable	Disable Through	**Disable:** Inserts no data packets. **Through:** Inserts data packets of input without change. **Overwrite**: Inserts the internally generated control signal packet defined by ARIB STD-B39. Audio data information to be inserted should be set under Audio Method and Audio Mode Data below. See Sec. 5-37. “ANC DATA INSERTION” for more details.
ARIB STD-B39	Disable	Disable Through Overwrite	
User Packet (Support planned)	Disable	Disable Through	
Set the following parameters if ARIB STD-B39 is set to **Overwrite.**			
Audio Method	Pass	Pass Overwrite	**Pass**: Passes the input signal ARIB STD-B39 Audio Mode data through to the output or overwrites the new information if input and output audio formats are different. **Overwrite:** Replaces the audio information to the one set under **Mode Data** if ARIB STD-B39 Audio Mode data is inserted in the input signal.
Audio Mode Data	Unused	-	Selects the Audio Mode data from the table in Sec. 6-4.

◆ **User Packet Line Select (Planned for future support)**

Press the **Line Select** button to display the dialog box.

Item	Default	Setting	Description
SD (525/59.94i)	Line 12/275	Line 12/275 - 19/282	Selects the line number into which the user packet is inserted under the output format.
SD (625/50i)	Line 8/321	Line 8/321 - 22/335	
720p	Line 9	Line 9 - 25	
1080i/PsF/2160PsF	Line 9/571	Line 9/571 - 20/582	
1080p/2160p(1.5G)	Line 9	Line 9 - 41	
1080p/2160p(3G-A)	Line 9	Line 9 - 41	
1080p/2160p(3G-B)	Line 9/571	Line 9/571 - 20/582	

11-2-6-2. If Time Code Selected:

◆ **Input Time Code Status**

Displays the timecode detection status in the SDI input. "N/A" indicates no timecode.

◆ **S12M-1 Embedded**

Allows you to select whether to insert timecode (DVITC, ATC (LTC) and ATC (VITC) to the SDI output on each FS.

To insert timecodes into **SD-SDI** signals, set Mode to **Rewrite** in the Vertical Ancillary Multiplex block of the Multiplexer screen. Whether to insert a timecode into **HD/3G/6G/12G-SDI** signals depends on the Mode setting in the Horizontal Ancillary Multiplex block.

◆ **Time Code Generator**

Allows you to generate LTC (at left) or VITC/DVITC (at right) timecodes for output.

To use **LTC** timecodes, set Mode to **Overwrite** in the Horizontal Ancillary Multiplex block of the Multiplexer screen and ATC(LTC) to **Enable** in the Time Code screen.

To use **VITC/DVITC** timecodes, set Mode to **Rewrite** in the Vertical Ancillary Multiplex block of the Multiplexer screen and ATC(VITC) or DVITC to **Enable** in the Time Code screen.

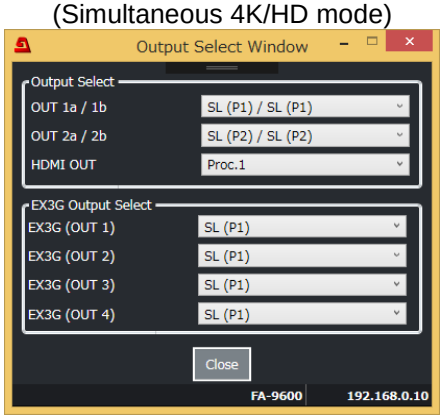
(Refer to Sec. 11-2-6-1. "If Multiplexer Selected" for details on H/V ANC settings.)

Item	Default	Setting	Description
Source	ATC (LTC)	ATC(LTC) ATC(VITC) DVITC LTC IN Generator	Selects the timecode source. **S12M-1 ATC(LTC):** ATC(LTC) timecode in the SDI input **S12M-1 ATC(VITC):** ATC(VITC) timecode in the SDI input **DVITC:** DVITC timecode in the SD-SDI input **LTC IN:** LTC input (FA-96DIN4-CBL required) **Generator:** Generator's timecode
Loss Mode	Stay	Stay Continue Output Disable	Selects the way to recover when a timecode loss is detected. **Stay:** Stays outputting the last timecode. **Continue:** Continues running with the timing before loss and keeps the continuity. **Output Disable:** Stops timecode output when the source loss is detected.
Adjust	0	-16 to +16	Sets the offset from the source timecode. Negative numbers delay the timecode.
Set the followings if Source is set to **Generator**.			
Start/Stop button	-	-	Clicking **Start** starts the timecode. Clicking **Stop** stops the timecode.
Reset button	-	-	Resets the timecode.
Preset value Preset button	-	-	Sets the timecode to a preset value.
Drop Frame	Off	Non-Drop Drop	Selects drop frame or non-drop frame timecode. **Drop** is available only for 29.97/30Hz signals.

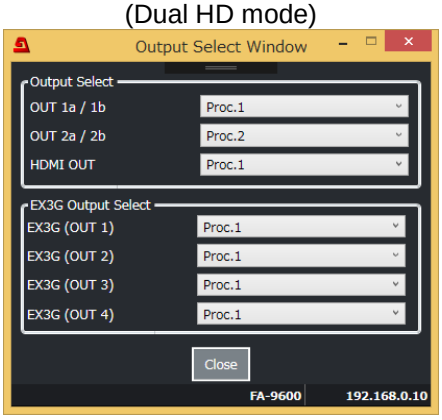
11-2-7. Output Select

Click **Output Select** in the Video Block to display the window as shown below.

(Simultaneous 4K/HD mode)



(Dual HD mode)



<Simultaneous 4K/HD mode>
<3D-LUT mode>

SL: Single Link signal
DL: Single Link signal
QL: Quad Link signal
L1-**L4**: SDI Link number

P1, Proc.1:
Color Processor1 output(FS1)
P2, Proc. 2:
Color Processor2 output(FS2)

Proc. 2 is unavailable in 3D-LUT mode.

Item	Default	Setting	Description
OUT 1a / 1b	SL (Proc.1)	SL (Proc.1) SL (Proc.2) DL L1 / L2 (P1) QL L1 / L2 (P1)	Selects an output signal.
OUT 2a / 2b	SL (Proc.2)		Selects an output signal.
HDMI OUT	Proc.1	Proc.1 Proc.2	Selects an HDMI output signal.

If FA-96EX3G44-R or FA-96EX12G06 installed

Item	Default	Setting	Description
EX3G (OUT 1)	SL (Proc.1)	(See Sec. 5-19-1. “OUTPUT SELECT (Slot A)”)	Selects an output signal for FA-96EX3G44-R.
EX3G (OUT 2)			
EX3G (OUT 3)			
EX3G (OUT 4)			
EX12G (OUT 1a / 1b / 2)	SL (Proc.1)	(See Sec. 5-19-1. “OUTPUT SELECT (Slot A)”)	Selects an output signal for FA-96EX12G06.
EX12G (OUT 3a / 3b / 4)			

If FA-96SFPC4 installed

Item		Default	Setting	Description
UHD Link		Single Link	Single Link Dual Link Quad Link	Selects an SDI Link format for FA-96SFPC4 output.
Item	(UHD Link)	Default	Setting	Description
OUT 1/2	Single	SL (Proc.1)	SL (Proc.1) SL (Proc.2) SL (P1) / SL (P2) SL (P2) / SL (P1)	Selects an output signal for FA-96SFPC4.
	Dual	DL L1 (P1) / L2 (P1)	DL L1 (P1) / L2 (P1) SL (Proc.2)	
	Quad	QL L1 (P1) / L2 (P1)	QL L1 (P1) / L2 (P1)	
OUT 3/4	Single	SL (Proc.1)	(Same as OUT 1/2)	Selects an output signal for FA-96SFPC4.
	Dual	DL L1 (P1) / L2 (P1)	(Same as OUT 1/2)	
	Quad	QL L3 (P1) / L4 (P1)	QL L3 (P1) / L4 (P1)	

<Dual HD mode>

SL: Single Link signal
DL: Single Link signal
QL: Quad Link signal
L1-**L4**: SDI Link number

P1, Proc.1:
Color Processor1 output(FS1)
P2, Proc. 2:
Color Processor2 output(FS2)

Item	Default	Setting	Description
OUT 1a / 1b	Proc.1	Proc.1 Proc.2	Selects an output signal.
OUT 2a / 2b	Proc.2		Selects an output signal.
HDMI OUT	Proc.1		Selects an HDMI output signal.

If FA-96EX3G44-R or FA-96EX12G06 installed

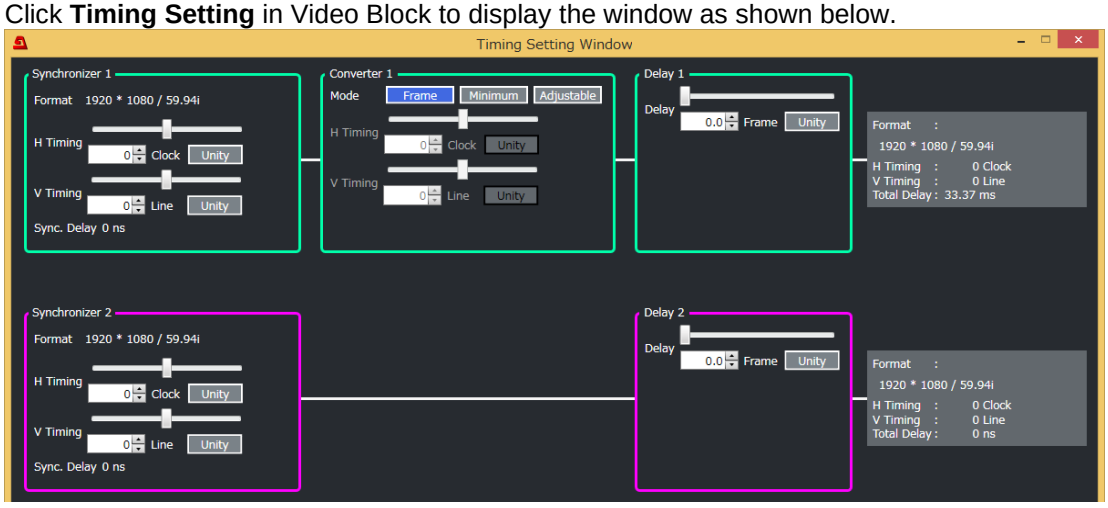
EX3G (OUT 1)	Proc.1	Proc.1 Proc.2	Selects an output signal for FA-96EX3G44-R.
EX3G (OUT 2)			
EX3G (OUT 3)			
EX3G (OUT 4)			
EX12G (OUT 1a / 1b / 2)	Proc.1	Proc.1 Proc.2	Selects an output signal for FA-96EX12G06.
EX12G (OUT 3a / 3b / 4)			

If FA-96SFPC4 installed

Item	Default	Setting	Description
UHD Link	-	Single Link	SDI Link format of FA-96SFPC4 output. (Fixed)
OUT 1/2	Proc.1	Proc.1 Proc.2 Proc.1 / Proc.2 Proc.2 / Proc.1	Selects an output signal.
OUT 3/4	Proc.1		Selects an output signal.

11-2-8. Timing Setting

Click **Timing Setting** in Video Block to display the window as shown below.

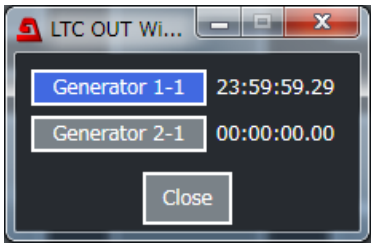


The path of the current processing flow, which varies depending on Color Processor Select settings, is displayed and different process timings can be adjusted in the window.

- **Synchronizer**
  See Sec. 5-40. “Synchronizer” for the details.
- **Converter**
  See Sec. 5-20. “FORMAT CONVERT (FA-96UDC)” for the details.
- **Delay**
  Allows you to add delay to **FS1** and **FS2** if Delay Mode is set to **Normal**.
  Allows you to add delay to **Converter1** and **Converter2** if Delay Mode is set to **Legacy**.
  See Sec. 5-42. “FRAME DELAY” and Sec. 11-1 “Selecting MU Modes.”

11-2-9. LTC OUT Select (FA-96DIN4-CBL)

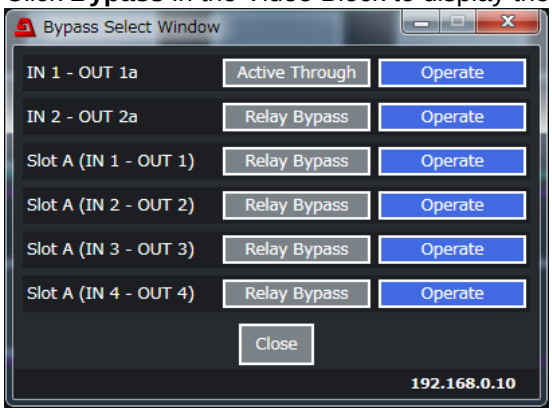
Click **LTC OUT Select** in the Video Block to display the window as shown below.



The LTC OUT on FA-96DIN4-CBL outputs an internally generated timecode.
This menu selects which timecode generator to be used.

11-2-10. Bypass

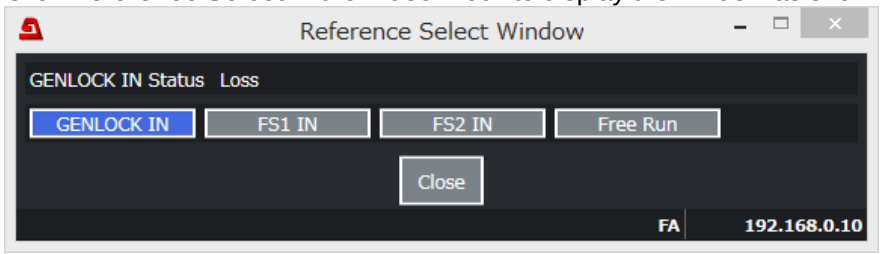
Click **Bypass** in the Video Block to display the window as shown below.



Selecting **Bypass** (or **Active Through** for IN 1 – OUT 1a) passes input through to output without processing.
Slot A (IN 1) to Slot A (IN 4) require FA-96EX3G44-R.

11-2-11. Reference Select

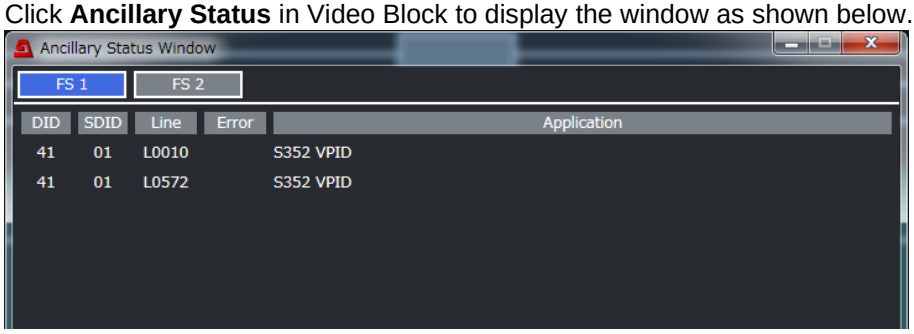
Click **Reference Select** in the Video Block to display the window as shown below.



Allows you to select the reference.
GENLOCK IN: External reference signal input to GENLOCK IN.
FS1 IN, FS2 IN: FS input signal selected under **Input Select**
Free Run: System clock

11-2-12. Ancillary Status

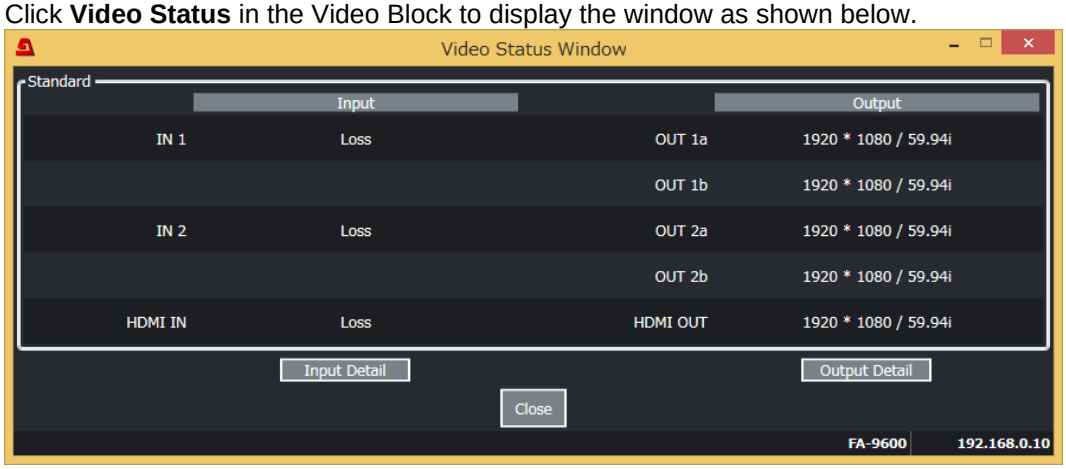
Click **Ancillary Status** in Video Block to display the window as shown below.



This window allows you to check ancillary data inserted in the SDI input signal.
If a checksum error occurs, “Error” is displayed.

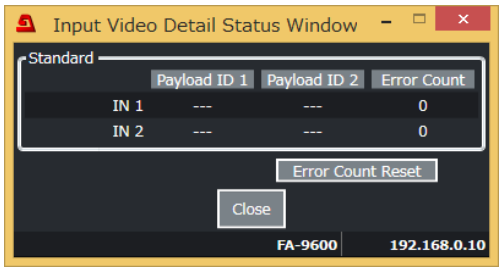
11-2-13. Video Status

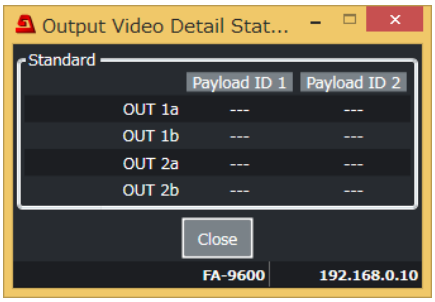
Click **Video Status** in the Video Block to display the window as shown below.



In the above window, input signal status is displayed on the left side and output signal status on the right side.

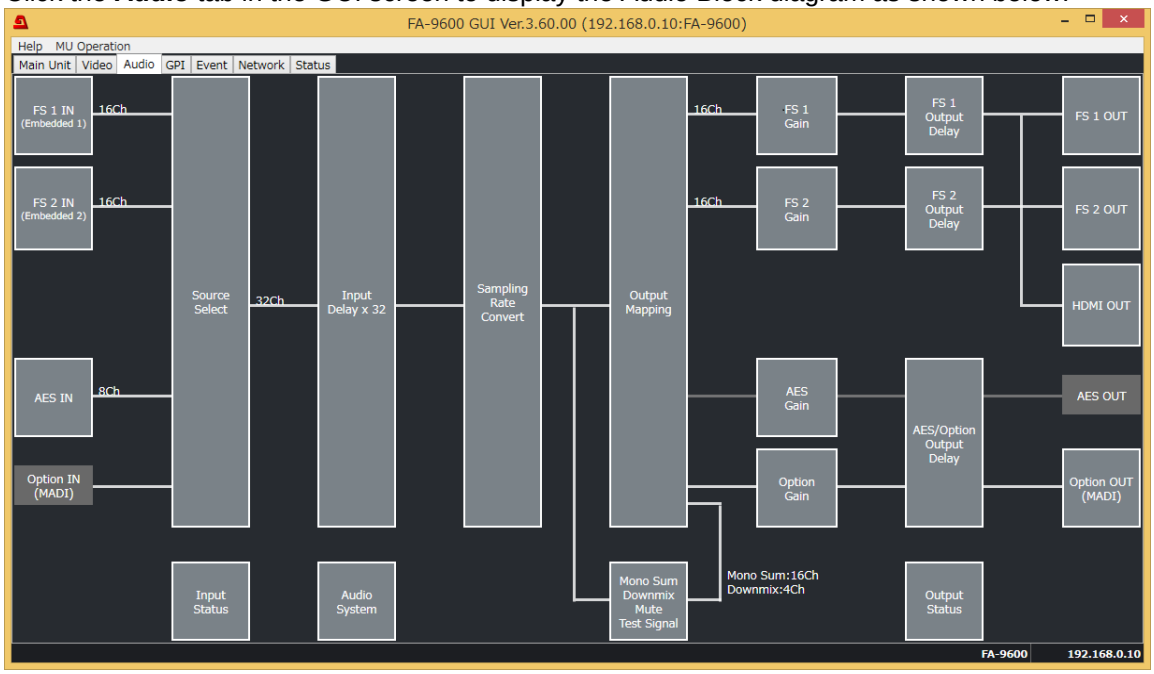
Clicking **Input Detail** pops up the window as shown at left and displays the input payload ID information and error counts. To reset error counts click **Error Count Reset**.
Clicking **Output Detail** pops up the window as shown at right and displays the output payload ID information.
Refer to Sec. 5-49. "Payload ID (FA-96EX3G44-R / FA-96SFPC4)" for details on payload identifiers.





11-3. Audio Tab Settings

Click the **Audio** tab in the GUI screen to display the Audio Block diagram as shown below.

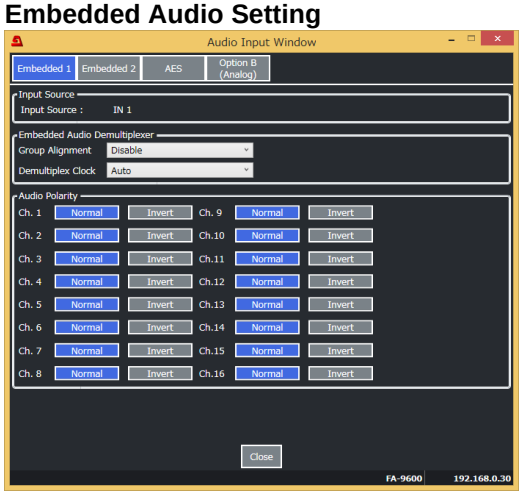


11-3-1. Audio IN (FS 1 / FS 2 / AES / Option)

Click **FS 1 IN**, **FS 2 IN**, **AES IN** or **Option IN** in the Audio Block to display the Audio Input Window, in which input audio clock and timing can be adjusted.

To set SDI embedded audio input to FS1, click **Embedded 1** to display the setting page.
To set SDI embedded audio input to FS2, click **Embedded 2** to display the setting page.

Embedded Audio Setting



Item	Default	Setting	Description
Input Source	-	-	Displays the audio source signal.
Group Alignment	Disable	Disable Enable	Selects whether to perform auto phase adjustment among each SDI input audio group. **Disable:** Performs no auto adjustment (Normal setting) **Enable:** Performs auto adjustment. (*1)

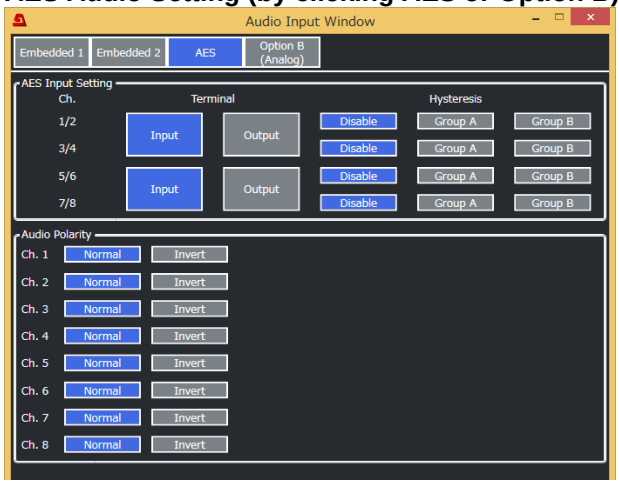
Demultiplex Clock	Auto	Auto Sync SDI Audio Clock	Selects the audio de-embedding method for HD/3G/6G/12G-SDI input. **Auto:** Uses the audio clock phase data in the SDI input to de-embed audio independently for each group (Synchronous or asynchronous de-embedding). If the audio phase data incorrect or de-embedded audio has noticeable jitter, audio channels in all groups are de-embed synchronously. **Sync SDI:** Synchronously de-embeds audio channels in all groups without using the audio clock phase data. Only **Sync SDI** is available for SD-SDI input. **Audio Clock:** Uses the audio clock phase data in the SDI input to de-embed audio independently for each group (Synchronous or asynchronous de-embedding).
Audio Polarity Ch.1 to 16 (*2)	Normal	Normal Invert	Selects the audio channel polarity.

(*1) If set to **Enable**, all audio groups are reset to adjust timings whenever input audio states change caused by signal loss or errors. This setting is effective only for SD-SDI input or when Demultiplexer Clock is set to **Sync SDI**.

(*2) HDMI embedded audio channels always have normal polarity.

To set **Standard AES** and optional **FA-96AES-UBLC** AES audio, click **AES**.
To set audio of the option card installed on Slot B (**FA-96AES-UBL** or **FA-96ANA-AUD**), click **Option B**.

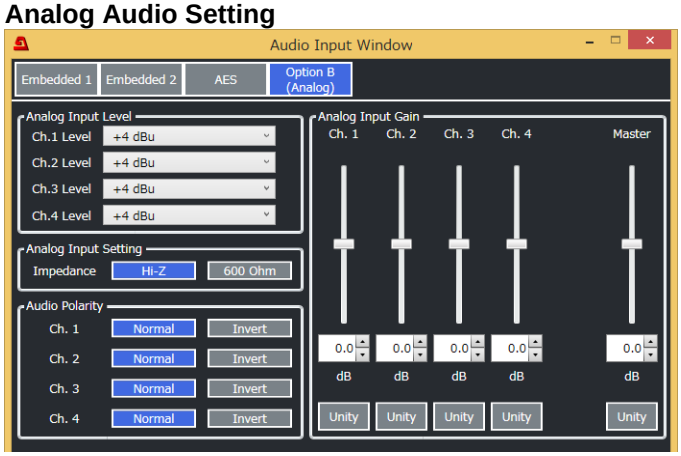
AES Audio Setting (by clicking AES or Option B)



Item	Default	Setting	Description
AES Input Setting Terminal Ch.1/2-3/4 Terminal Ch.5/6-7/8	Input	Input Output	Selects Input or Output for AES ports AES Input Ch.1/2-7/8 are fixed to **Input** if FA-96AES-UBLC installed.
AES Input Setting Hysteresis Ch.1/2 Hysteresis Ch.3/4 Hysteresis Ch.5/6 Hysteresis Ch.7/8	Disable	Disable Group A Group B	**Disable:** Disables channel alignment. **Group A/B:** Adds the channel pair to a group (A or B) and aligns audio word timing within the channel group by referring to the smallest channel pair. (*1)
Audio Polarity Ch.1 to 8	Normal	Normal Invert	Selects the AES channel polarity.

(*1) If the reference audio is lost, the next smallest channel pair is used. Timing adjustment ranges within ±0.25 samples. Channel pairs in a group should be the same sampling rate and synchronized with each other.

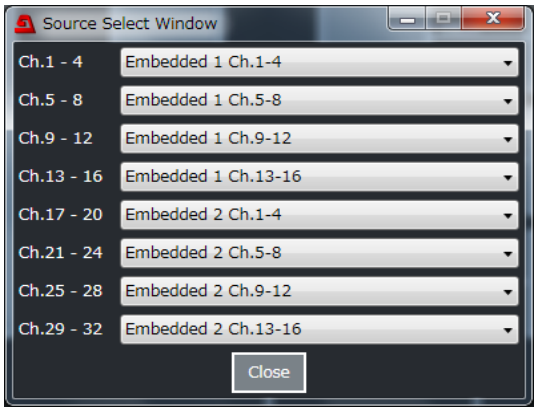
Analog Audio Setting



Item	Default	Setting	Description
Analog Input Level Ch.1-4 Level	+4 dBu	-10 dBu 0 dBu +4 dBu +8 dBu	Sets the signal level for each analog audio input channel.
Audio Input Setting Impedance	Hi-Z	Hi-Z 600 Ohm	Sets the analog audio input impedance.
Audio Polarity Ch.1-4	Normal	Normal Invert	Selects the polarity for each audio channel.
Analog Input Gain Ch.1-4	0.0dB	-20.0dB to +20.0dB	Sets the gain for each audio channel.
Analog Input Gain Master	0.0dB	-20.0dB to +20.0dB	Sets the gain offset for all analog audio channels.

11-3-2. Source Select

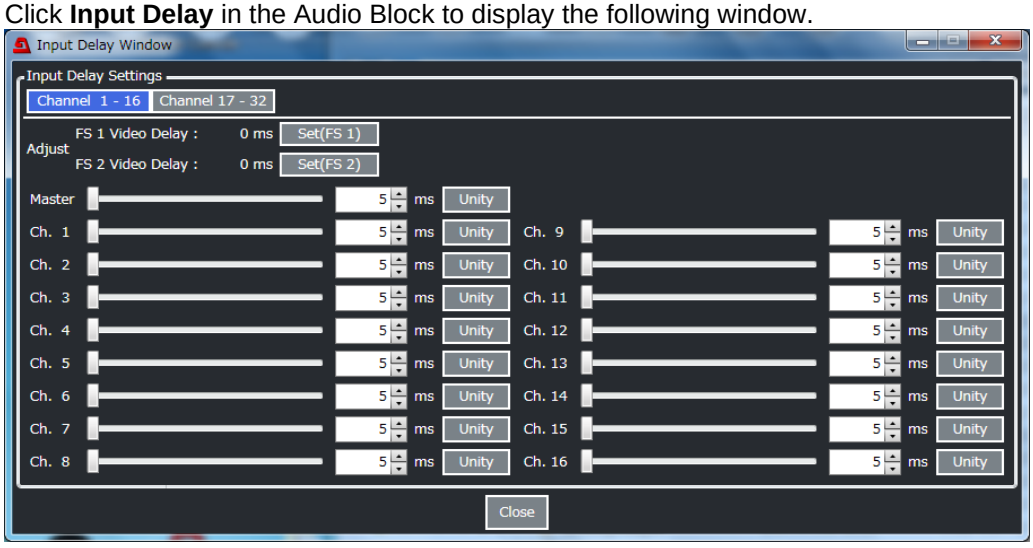
Click **Source Select** in the Audio Block to display the following window.



Item	Default	Setting	Description
Ch.1-4	Embedded 1 Ch.1-4	Embedded 1 Ch.1-4 to Ch.13-16 Embedded 2 Ch.1-4 to Ch.13-16 AES Ch.1-4 AES Ch.5-8 Option(AES) Ch.1-4 Option(AES) Ch.5-8 Option(Analog) Ch.1-4 Option(MADI) Ch.1-4 to Ch.61-64	Selects audio source channels per 4 channels. **Option(AES) Ch.1-8**: Require FA-96AES-UBL. **Option(Analog) Ch.1-4**: Require FA-96ANA-AUD. **Option(MADI) Ch.1-64**: Require FA-96MADI.
Ch.5-8	Embedded 1 Ch.5-8		
Ch.9-12	Embedded 1 Ch.9-12		
Ch.13-16	Embedded 1 Ch.13-16		
Ch.17-20	Embedded 2 Ch.1-4	Embedded 1 Ch.1-4 to Ch.13-16 Embedded 2 Ch.1-4 to Ch.13-16 Option(Analog) Ch.1-4 Option(MADI) Ch.1-4 to Ch.61-64	
Ch.21-24	Embedded 2 Ch.5-8		
Ch.25-28	Embedded 2 Ch.9-12		
Ch.29-32	Embedded 2 Ch.13-16		

11-3-3. Input Delay

Click **Input Delay** in the Audio Block to display the following window.

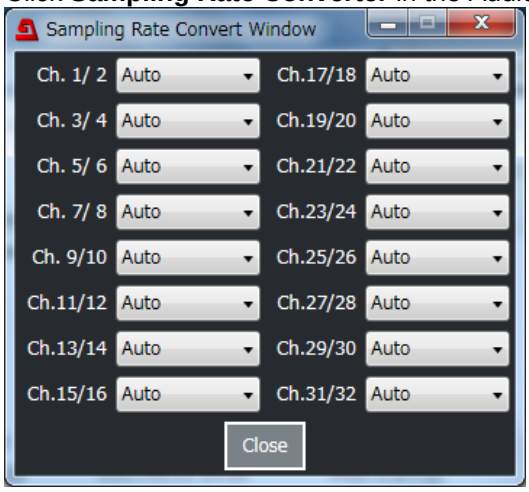


Allows you to add delay to the selected 32 audio source channels by using the **Channel 1-16** and **Channel 17-32** buttons to switch channels.

Item	Default	Setting	Description
Set (FS 1) button Set (FS 2) button	-	-	Clicking each button sets the FS video delay amount (excluding video converter delay) as the Master delay value.
Master	1ms	1-1000ms	Sets the delay offset for all 16 channels.
Ch.1 to 16 Ch.17 to 32	1ms	1-1000ms	Sets the delay added to the channel. **Master Delay** is already added to the displayed value.

11-3-4. Sampling Rate Converter

Click **Sampling Rate Converter** in the Audio Block to display the following window.



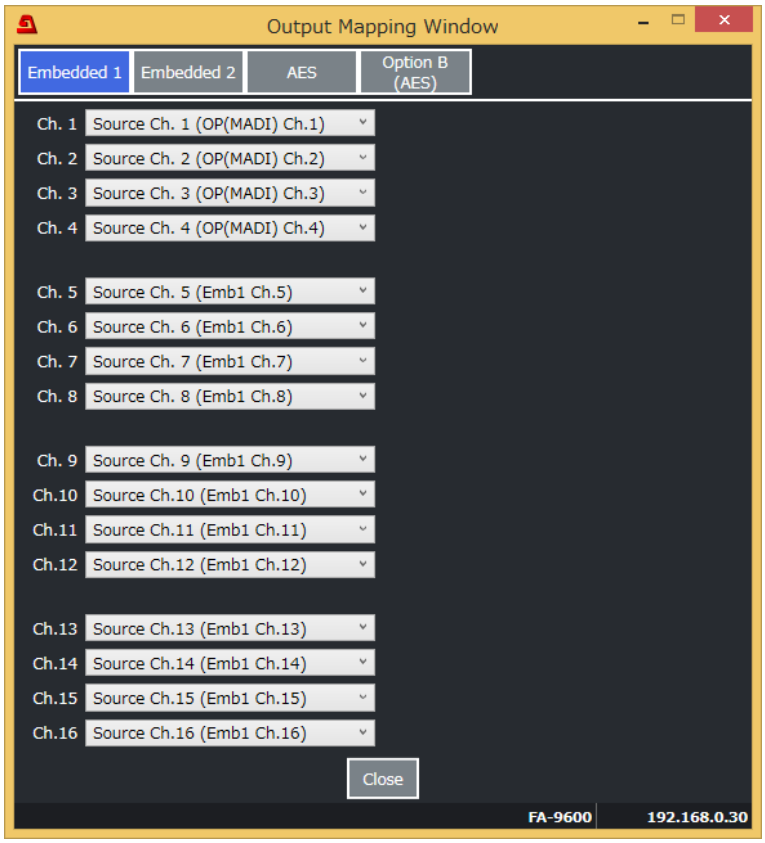
Item	Default	Setting	Description
Ch.1/2 to Ch.31/32	Auto	Auto Use SRC Bypass SRC	Sets the SRC processing mode for each channel pair. **Auto:** PCM audio is processed by the SRC. Non-PCM audio is not processed by the SRC. **Use SRC:** Both PCM and non-PCM audio is processed by SRC. MADI input is forcibly processed as **Use SRC** regardless of this setting. **Bypass SRC:** Avoids the SRC. Use **Bypass SRC** for non-PCM audio. Note that to embed non-PCM audio to the SDI output, audio clock should be properly selected in the Audio OUT (FS 1 / FS 2 / HDMI / Option) menu (Sec. 11-3-9.)

Pass audio channels through the SRC if they are used for HDMI, analog or MADI output.

11-3-5. Output Mapping

Click **Output Mapping** in the Audio Block to display the following window.

To set up FS1 SDI embedded audio, click **Embedded 1**.
To set up FS1 SD2 embedded audio, click **Embedded 2**.
To set up AES audio of **standard** and **FA-96AES-UBLC** option, click **AES**.
To set up optional audio in Slot B (**FA-96AES-UBL**, **FA-96ANA-AUD** or **FA-96MADI**), click **Option B**.



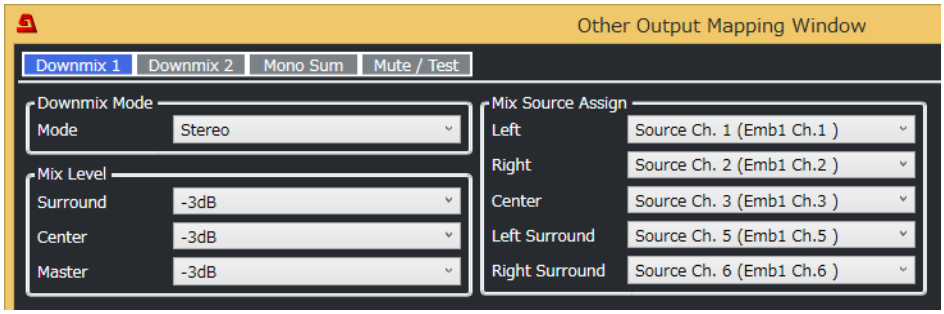
Item	Default	Setting	Description
FS 1 Ch.1- 16	Source Ch.1-16	Source Ch.1-32 (*1) 500Hz Tone 1kHz Tone Silence Down Mix 1_L Down Mix 1_R Down Mix 2_L Down Mix 2_R Mono Sum 1-16	Selects an audio source for each channel. **Source Ch.1-32:** 32 audio sources **1kHz / 500Hz Tone:** Test signals **Silence:** Silent signal **Down Mix 1L/1R, 2L/2R:** 2 downmix outputs **Mono Sum 1-16:** 16 Mono Sum mix outputs
FS 2 Ch.1- 16	Source Ch.17-32		
AES Ch.1- 8	Source Ch.1-8		
Option B(AES)Ch.1-8 (FA-96AES-UBL)	Source Ch.1-8		
Option B(Analog) Ch.1-4 (FA-96ANA-AUD)	Source Ch.1-4		
Option B(MADI) Ch.1-32 (FA-96MADI)	Source Ch.1-32		

(*1) Channel names shown in parentheses after channel numbers indicate original audio input names. Sec. 11-3-2. “Source Select.”

11-3-6. Mono Sum/Downmix/Mute/Test Signal

Click **Mono Sum Downmix Mute Test signal** in the Audio Block to display the Other Output Mapping window. Use **Downmix 1**, **Downmix 2**, **Mono Sum** or **Mute/Test** button to display the desired setting screen.

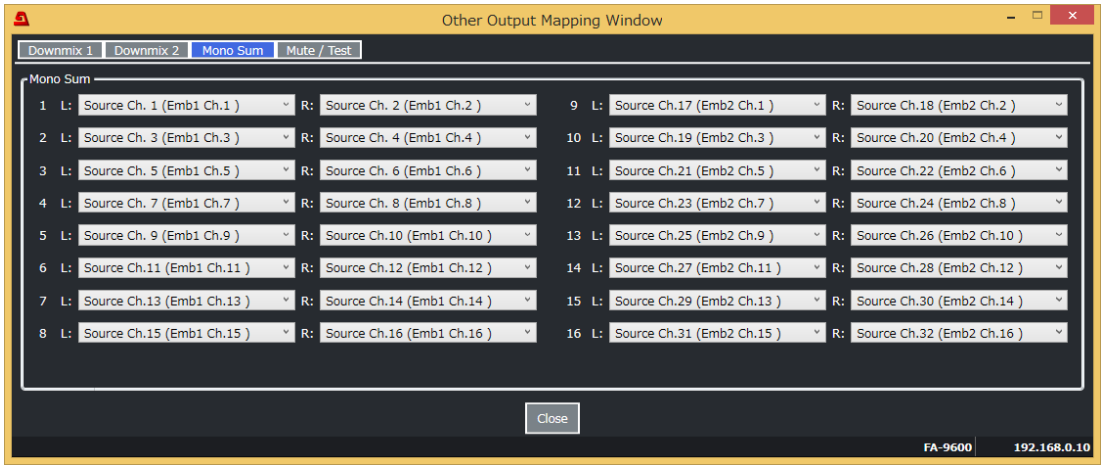
11-3-6-1. If Downmix 1 or Downmix 2 Selected



Item	Default	Setting	Description
Downmix Mode	Stereo	Stereo Surround Monaural	Selects the Downmix mode.
Mix Level Surround	-3dB	-3dB -6dB -9dB Off	Sets the Ls/Rs (Surround channels) level. Setting to **Off** removes the Ls/Rs channels from mixing sources.
Mix Level Center	-3dB	-3dB -4.5 dB -6dB	Sets the C (Center channel) level. To use the same level as audio sources, set to **-3dB.** The L/R channel volume of downmixed audio may sound too large. In such cases, decrease the Center level to **-4.5dB** or **-6dB**.
Mix Level Master	-3dB	-3dB 0dB Auto	Sets the entire downmix audio level. If set to **Auto**, Down MIX Master Level changes according to Down Mix Mode and Surround Mix Level settings.
Mix Source Assign Downmix 1			
Left	Source Ch.1	Source Ch.1-32 (*1) Silence	Selects an audio source for the selected channel.
Right	Source Ch.2		
Center	Source Ch.3		
Left Surround	Source Ch.5		
Right Surround	Source Ch.6		
Downmix 2			
Left	Source Ch.17	Source Ch.1-32 (*1) Silence	Selects an audio source for the selected channel.
Right	Source Ch.18		
Center	Source Ch.19		
Left Surround	Source Ch.21		
Right Surround	Source Ch.22		

(*1) Channel names shown in parentheses after channel numbers indicate original audio input names. Sec. 11-3-2. “Source Select.” See Sec. 6-9 "AUDIO DOWNMIX 1 and 2."

11-3-6-2. If Mono Sum Selected



Item	Default	Setting	Description
Mono Sum 1-16 L	Source Ch.1-31 (Odd channel)	Source Ch. 1-32 (*1)	Selects an audio source channel input to each Mono Sum L and R.
Mono Sum 1-16 R	Source Ch.2-32 (Even channel)		

(*1) Channel names shown in parentheses after channel numbers indicate original audio input names. Sec. 11-3-2. “Source Select.” See Sec. 6-9 "AUDIO DOWNMIX 1 and 2."

11-3-6-3. If Mute / Test Selected

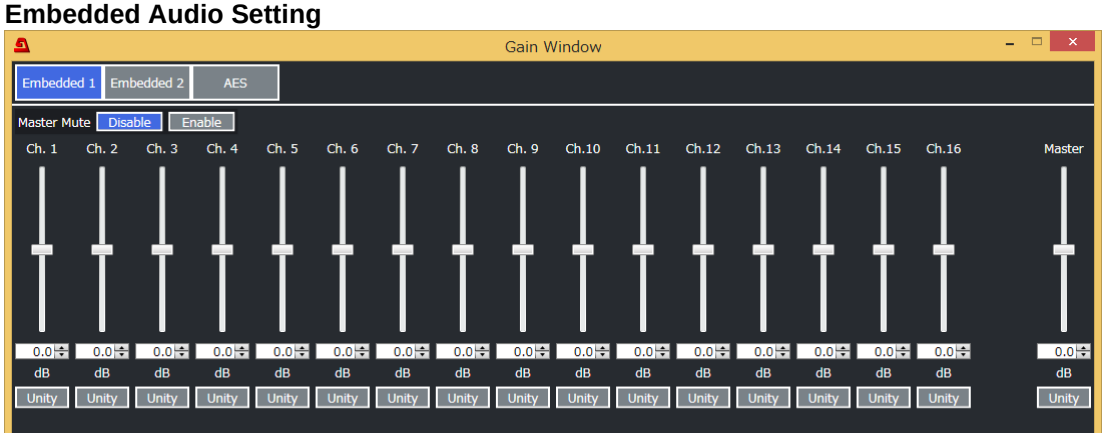
Item	Default	Setting	Description
All Mute	Disable	Disable Enable	Allows you to mute all output audio channels.
Test Tone FS 1	Off	Off 500Hz Tone 1kHz Tone	Allows you to assign an audio test signal to the embedded audio on the FS1 SDI output.
Test Tone FS 2	Off		Allows you to assign an audio test signal to the embedded audio on the FS2 SDI output.
Test Tone AES / Option	Off		Allows you to assign an audio test signal to all AES or analog (optional) output.

11-3-7. Audio Gain (FS 1 / FS 2 / AES / Option)

Click **FS 1 Gain**, **FS 2 Gain**, **AES Gain** or **Option Gain** in the Audio Block to display the Gain Window, in which output audio can be gained or muted.

To set FS1 SDI embedded audio, click **Embedded 1** to display the setting page.
To set FS2 SDI embedded audio, click **Embedded 2** to display the setting page

Embedded Audio Setting



Item	Default	Setting	Description
Master Mute	Disable	Disable Enable	**Enable:** Mutes all embedded audio channels.
Ch.1 to 16	0.0dB	-20.0dB to +20.0dB	Sets the gain for each embedded audio output channel.
Master	0.0dB	-20.0dB to +20.0dB	Sets the gain offset for all embedded output channels.

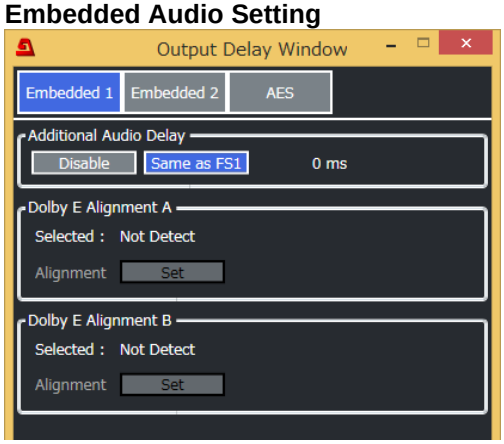
To set **Standard AES** and optional **FA-96AES-UBLC** AES audio, click **AES**.
To set audio of the option card installed on Slot B (**FA-96AES-UBL**, **FA-96ANA-AUD** or FA-96MADI), click **Option B**.
Set channel gains in the same manner as those for embedded audio.

11-3-8. Audio Delay (FS 1 / FS 2 / AES / Option)

Click **FS 1 Output Delay**, **FS 2 Output Delay** or **AES/Option Output Delay** in the Audio Block to display the Output Delay Window, in which output audio and video can be aligned.

To set FS1 SDI embedded audio, click **Embedded 1** to display the setting page.
To set FS2 SDI embedded audio, click **Embedded 2** to display the setting page

Embedded Audio Setting



<Embedded 1 (FS1)>

Item	Default	Setting	Description
Additional Audio Delay	Same as FS1	Disable Same as FS1	**Disable**: Disables delay adjustment. **Same as FS1**: Adjusts video and audio timings by adding the converter delay to embedded audio for the SDI output. The additional delay amount is displayed to the right.

<Embedded 2 (FS2)>

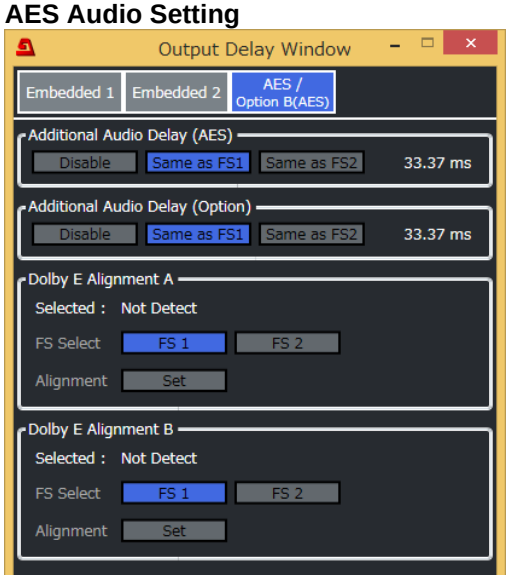
Item	Default	Setting	Description
Additional Audio Delay	Same as FS2	Disable Same as FS2	(See above.)

Item		Description
Dolby E Alignment A	Selected	Displays the channel number and status of audio source automatically assigned to Dolby E Alignment. (1st system)
	Set	Pressing the button adjusts the audio delay.
Dolby E Alignment B	Selected	Displays the channel number and status of audio source automatically assigned to Dolby E Alignment. (2nd system)
	Set	Pressing the button adjusts the audio delay.

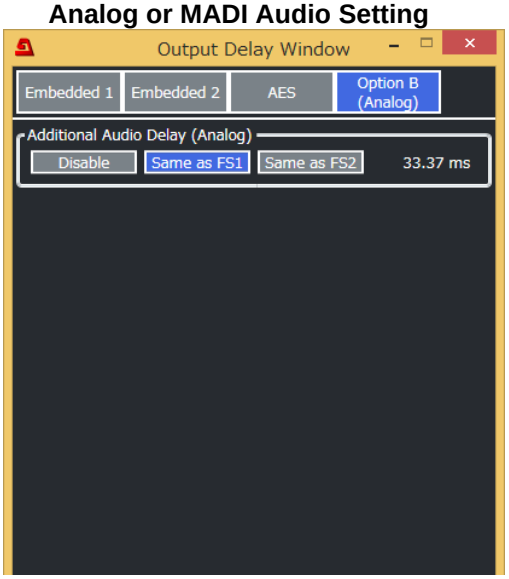
See Sec. 6-24. “Dolby E Alignment” for more details.

To set **Standard AES**, optional **FA-96AES-UBL** and **FA-96AES-UBLC** AES audio, click **AES**. To set audio of the option card installed on Slot B (**FA-96ANA-AUD** or **FA-96MADI**), click **Option B**.

AES Audio Setting



Analog or MADI Audio Setting



Item	Default	Setting	Description
Additional Audio Delay(AES)	Same as FS1	Disable Same as FS1 Same as FS2	Standard AES audio output setting **Disable**: Disables delay adjustment, **Same as FS1**: **Same as FS2**: Adjusts video and audio timings by adding the FS1 or FS2 converter delay to the audio output.

Additional Audio Delay(Option)	Same as FS1	Disable Same as FS1 Same as FS2	Optional AES audio output setting (Same as above)
Additional Audio Delay(Analog)			Optional analog audio output setting (Same as above)
Additional Audio Delay(MADI)			Optional MADI audio output setting (Same as above)

Item		Description
Dolby E Alignment A	Selected	Displays the channel number and status of audio source automatically assigned to Dolby E Alignment. (1st system)
	Set	Pressing the button adjusts the audio delay.
Dolby E Alignment B	Selected	Displays the channel number and status of audio source automatically assigned to Dolby E Alignment. (2nd system)
	Set	Pressing the button adjusts the audio delay.

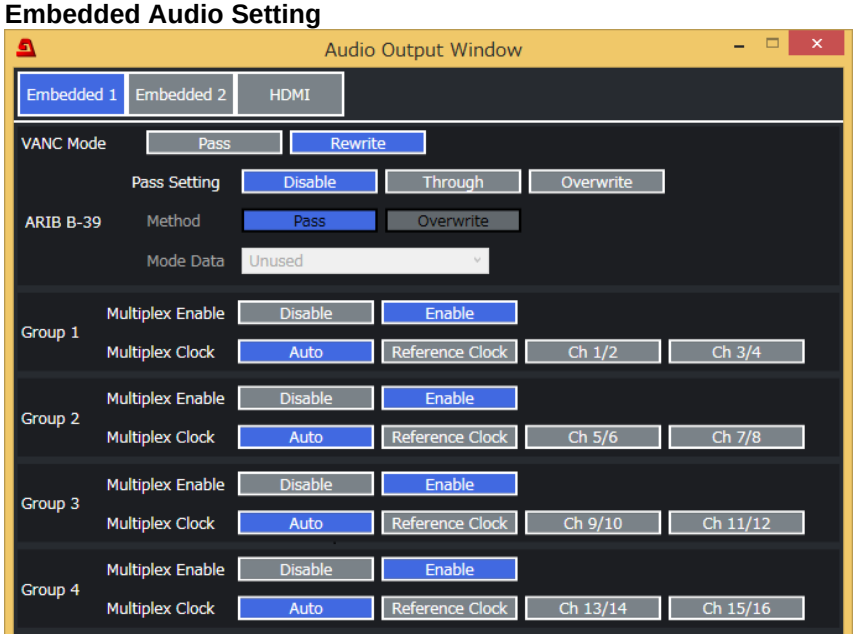
See Sec. 6-24. “Dolby E Alignment” for more details.

11-3-9. Audio OUT (FS 1 / FS 2 / HDMI / Option)

Click **FS 1 OUT**, **FS 2 OUT**, **HDMI OUT** or **Output OUT** in the Audio Block to display the Audio Output Window, in which audio output can be set.

To set FS1 SDI embedded audio, click **Embedded 1** to display the setting page.
To set FS2 SDI embedded audio, click **Embedded 2** to display the setting page

Embedded Audio Setting

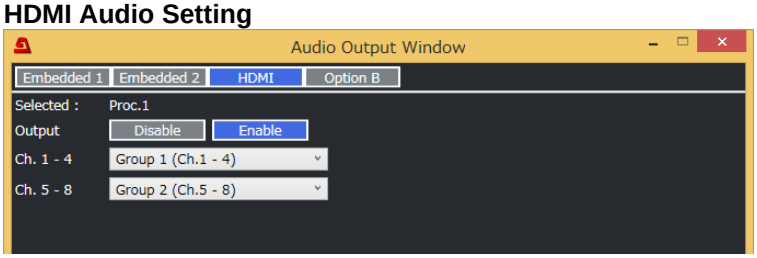


Item	Default	Setting	Description
VANC Mode	Pass	Pass Rewrite	Selects VANC data insertion mode. See the Mode setting in Vertical Ancillary Multiplex (Sec. 11-2-6-1. "If Multiplexer Selected.")
ARIB B-39 Pass Setting	Overwrite	Pass Overwrite	Selects payload identifier insertion mode. See the ARIB STD B-39 setting in Vertical Ancillary Multiplex (Sec. 11-2-6-1. "If Multiplexer Selected.")

ARIB B-39 Method	Pass	Pass Overwrite	Selects Audio Mode data insertion mode in ARIB STD-B39 defined Control signal. **Pass**: Passes the input signal ARIB STD-B39 Audio Mode data through to the output. If input and output video formats are different, inserts another data set under **Mode** in the same manner as for **Overwrite**. **Overwrite:** Replaces the audio information to the one set under **Mode Data** if ARIB STD-B39 Audio Mode data is inserted in input signals.
ARIB B-39 Mode Data	Unused	(See Sec. 6-4)	Selects the Audio Mode data from the table in Sec 6-4.
Group1-4 Multiplex Enable	Enable	Disable Enable	**Disable:** Inserts no audio channels. **Enable:** Inserts audio channels.
Group1-4 Multiplex Clock	Auto	Auto Reference Clock Input Ch X/X Input Ch X/X	Selects a reference clock for each audio group that is used for SDI embedding. **Auto**: Uses a non-PCM audio if it is included in an audio group for embedding. If there are multiple non-PCM audio channels in a group, a clock of the channel pair with the smallest numbers is selected. Uses a clock synced with the output video if all group channels are PCM. **Reference Clock**: Uses a clock synced with the output video (Synchronous output with SRC). **CH 1/2 to 15/16**: Uses the selected input channel pair clock. To asynchronously output non-PCM audio, select a channel pair. **Reference** is always applied to SD-SDI input regardless of this setting.

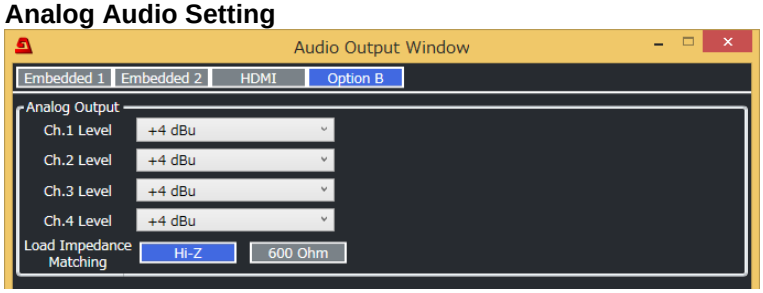
To set HDMI audio output, click **HDMI**.
To set audio of the option card installed on Slot B (**FA-96ANA-AUD** or **FA-96MADI**), click **Option B**.

HDMI Audio Setting



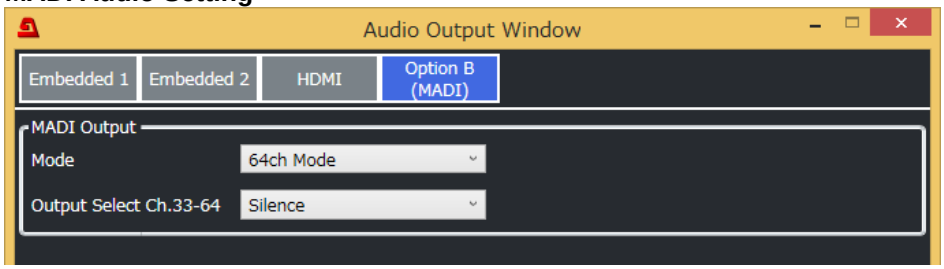
Item	Default	Setting	Description
Selected	-	-	Displays a process to which the HDMI output belongs (Proc.1 or Proc.2).
Output	Enable	Disable Enable	Enables/disables HDMI audio output.
Ch.1 - 4	Group 1(Ch.1-4)	Group 1(Ch.1-4) Group 2(Ch.5-8) Group 3(Ch.9-12) Group 4(Ch.13-16)	Selects audio sources per 4 channels. Audio sources can be selected from those in the process displayed under **Selected Process**.
Ch.5 - 8	Group 2(Ch.5-8)		

Analog Audio Setting



Item	Default	Setting	Description
Ch.1-4 Level	+4 dBu	-10 dBu 0 dBu +4 dBu +8 dBu	Sets the audio level for each analog output channel.
Load Impedance Matching	Hi-Z	Hi-Z 600 Ohm	Sets the input impedance of the downstream device that receives the analog audio signals from FA-9600. FA-9600 adjusts the audio level according to this setting.

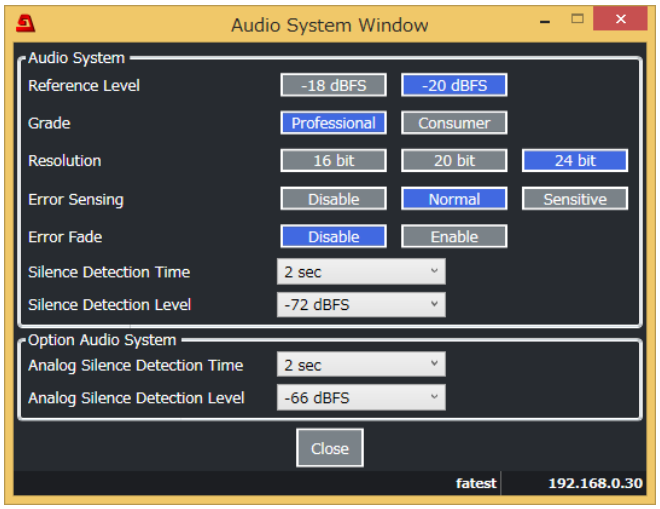
MADI Audio Setting



Item	Default	Setting	Description
Mode	64ch Mode	56ch Mode 64ch Mode Input Through Output Disable	Selects an MADI signal output mode. **56ch Mode**: 56-channel mode **64ch Mode**: 64-channel mode **Input Through**: Outputs MADI input signal without change. **Output Disable**: Outputs no MADI signal.
Output Select Ch.33-64	Silence	Silence MADI Input Ch.1-32 MADI Input Ch.9-40 MADI Input Ch.17-48 MADI Input Ch.25-56 MADI Input Ch.33-64	Selects audio source for Ch 33-64 in MADI output signal. **Silence**: Silent signal **MADI In Ch.xx-xx**: MADI input channel sources whose sampling rate are to be converted into 48kHz (for synchronization with other channels). Their gain and delay cannot be adjusted.

11-3-10. Audio System

Click **Audio System** in the Audio Block to display the setting window.



◆ **Audio System**

Item	Default	Setting	Description
Reference Level	-20 dBFS	-18 dBFS -20 dBFS	Selects the reference level for digital audio signals. This level is also used as the test tone signal level and as the digital audio level corresponding to 0 dBu of analog audio if FA-96ANA-AUD is installed
Grade	Professional	Professional Consumer	Selects the audio channel status for AES output. **Professional**: Professional grade audio **Consumer**: Consumer grade audio
Resolution	24 bit	16 bit 20 bit 24 bit	Selects an audio word length for AES outputs.
Error Sensing	Normal	Disable Normal Sensitive	Selects the input audio error detection mode used for Error Fade above. **Disable:** Detects no errors for Error Fade. Normally do not use. (*1) **Normal:** Detects SDI signal switching, ADP (Audio Data Packet) change and DBN (Data Block Number) switching as Error Fade errors. Normally use this setting. **Sensitive:** Adds frequency change of Preamble Z appearance and EDP (Extended Data Packet) change (SD-SDI only) to those described above as Error Fade errors.
Error Fade	Disable	Disable Enable	Selects the way to handle output audio when an error is detected in the input audio. **Disable:** Passes through input audio without using any effects. **Enable:** Fades out and mutes audio when an input error is detected and fades in when recovered. (*2)
Silence Detection Time	2 sec	1-10 sec	Sets the duration to determine digital audio input is silent. Digital audio signals are judged as silent after the silent state lasts the set duration.

Silence Detection Level	-72 dBFS	-72 dBFS -66 dBFS -60 dBFS -54 dBFS -48 dBFS	Sets the digital audio level to determine digital input audio is silent.

(*1) Audio input channels are passed through to output as many as possible by prohibiting automatic processing. However, audio output timing difference between groups or timing delay may occur caused by input signal switching or other reasons.

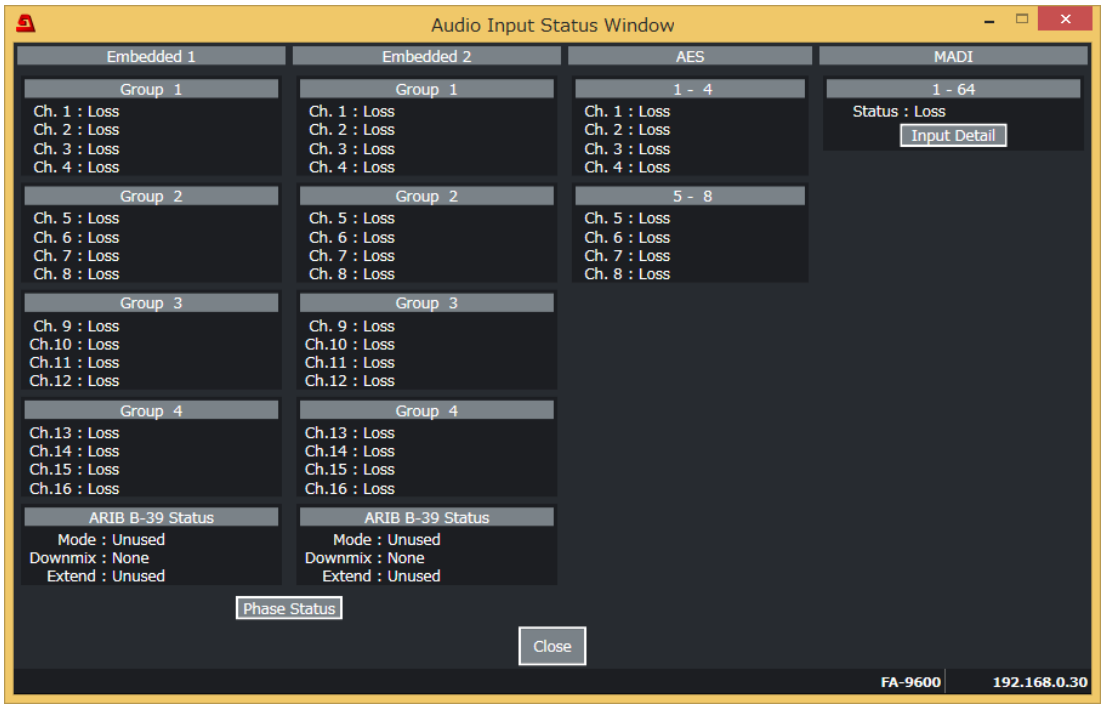
(*2) To fading audio, audio delay (See Sec. 6-22. “AUDIO INPUT DELAY”) must be set to 5 ms or more.

◆ **Analog Audio System (FA-96ANA-AUD required)**

Item	Default	Setting	Description
Silence Detection Time	2 sec	1-10 sec	Sets the duration to determine analog audio input is silent.
Silence Detection Level	-66 dBFS	-66 dBFS -60 dBFS -54 dBFS -48 dBFS	Sets the audio level to determine the analog audio input is silent.

11-3-11. Input Status

Click **Input Status** in the Audio Block to display the setting window.

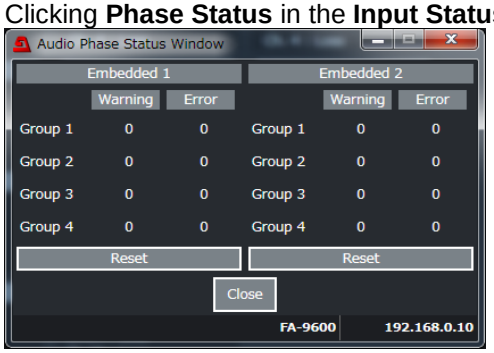


Displays the audio input channel status.

- FA-96AES-UBL audio status is displayed under AES Option B.
- FA-96ANA-AUD audio status is displayed under Analog Option B.
- FA-96MADI audio status is displayed under MADI Option B
  Clicking **Input Detail** allows you to check each channel status.

11-3-11-1. Phase Status

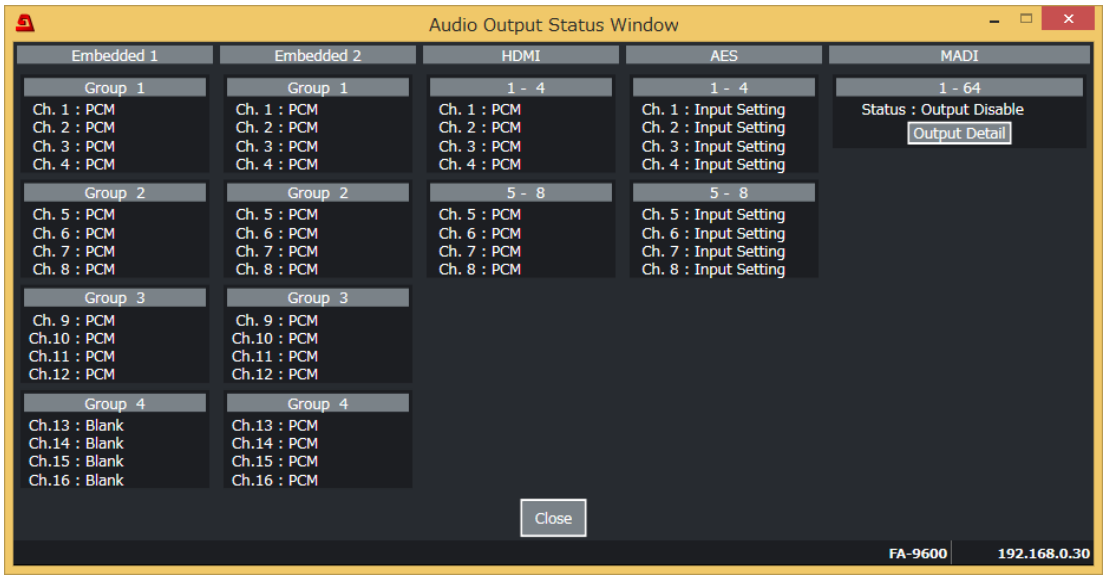
Clicking **Phase Status** in the **Input Status** window displays the window as shown below.



Item	Display	Description
Group1-4	Warning Error	**Warning:** Displays the number of corrected audio timing information errors. **Error:** Displays the number of uncorrected audio timing information errors.

11-3-12. Output Status

Click **Output Status** in the Audio Block to display the setting window.

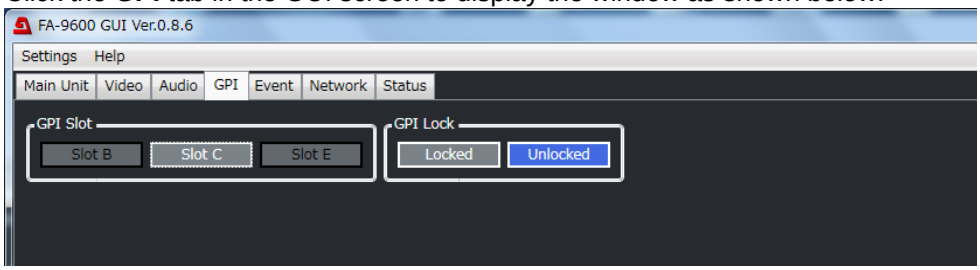


Displays the audio output channel status.

- FA-96AES-UBL audio status is displayed under AES Option B.
- FA-96ANA-AUD audio status is displayed under Analog Option B.
- FA-96MADI audio status is displayed under MADI Option B
  Clicking **Output Detail** allows you to check each channel status.

11-4. GPI Tab Settings

Click the **GPI** tab in the GUI screen to display the window as shown below.



◆ **GPI Slot**

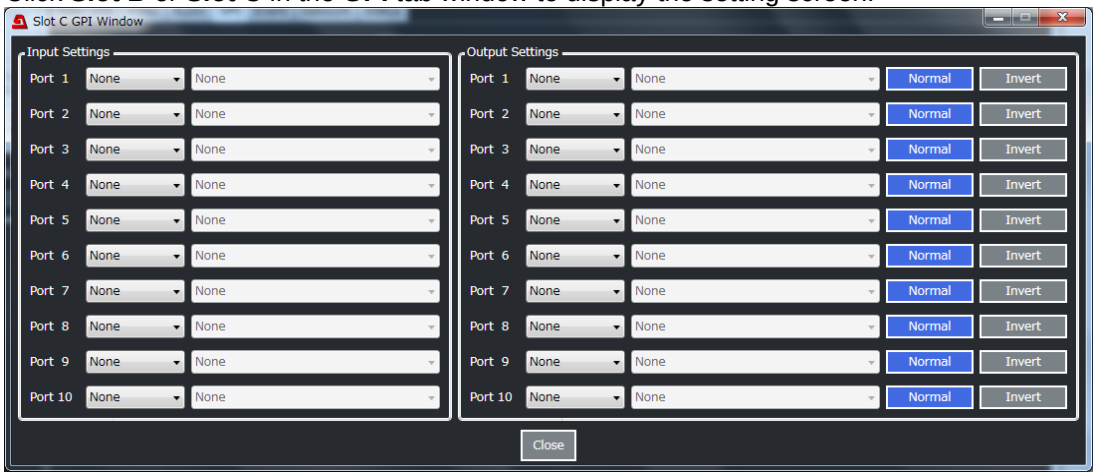
The FA-96GPI installed slot is active (Slot C in the above example) in the window.
Click the active slot to display the setting screen. (See Sec. 11-4-1. GPI Setting Screen.")

◆ **GPI Lock**

If setting to **Locked**, GPI inputs are disabled.
To unlock GPI control using the GUI, click **Unlocked** in the GPI tab window.
To unlock GPI control via GPI, assign GPI Lock to a pin and set the pin to ON and keep it more than 1 second, or delete the GPI Lock function from the pin while the GPI is locked.

11-4-1. GPI Setting Screen (Slot B or Slot C)

Click **Slot B** or **Slot C** in the **GPI** tab window to display the setting screen.



◆ **Input Settings**

Item	Default	Setting	Description
Port 1-10	None	None Event Save Event Load	Assigns input functions to GPI pins. **None:** No function **Event Save:** Saves settings to event by selecting an event number. (Event1-100) **Event Load:** Loads settings from event by selecting an event number. (Default, Event1-100)

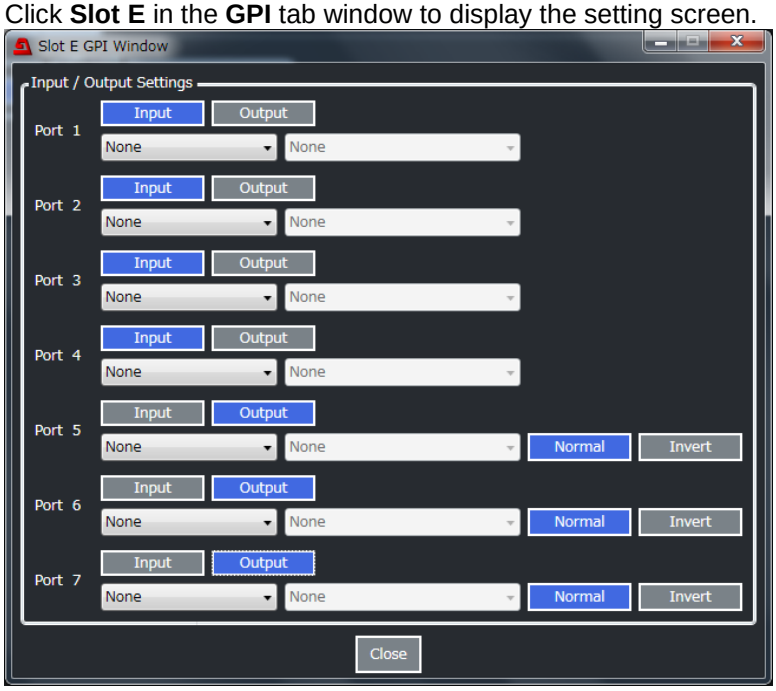
◆ **Output Settings**

Port 1-10	None	None Unit Alarm Video In Audio In Event Tally	Assigns output functions to GPI pins. **None**: No function **Unit Alarm**: Selects alarms for status notification. **Video In**: Selects a video input for status notification. **Audio In**: Selects an audio input for status notification. **Event Tally**: Selects an event number used to compare to FA-9600 settings.

	Normal	Normal Invert	Sets the GPI alarm output signal logic. **Normal**: Active low **Invert**: Active high

11-4-2. GPI Setting Screen (Slot E)

Click **Slot E** in the **GPI** tab window to display the setting screen.



◆ **Input / Output Settings**

Item	Default	Setting	Description
Port 1-7	Input	Input Output	Selects input or output for each GPI terminal.

◆ **Input Settings**

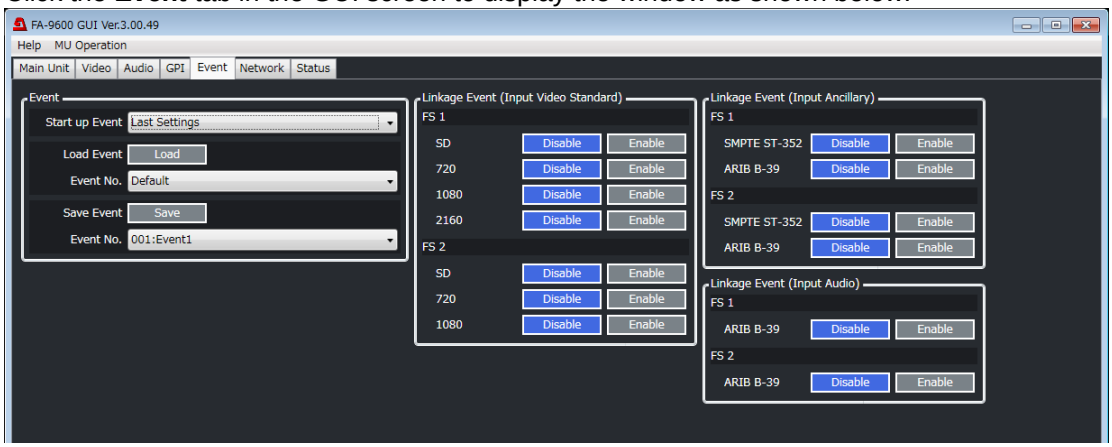
Port 1-7	None	None Event Save Event Load	Assigns input functions to GPI pins. **None:** No function **Event Save:** Saves settings to event by selecting an event number. (Event1-100) **Event Load:** Loads settings from event by selecting an event number. (Default, Event1-100)

◆ **Output Settings**

Port 1-7	None	None Unit Alarm Video In Audio In Event Tally	Assigns output functions to GPI pins. **None**: No function **Unit Alarm**: Selects alarms for status notification. **Video In**: Selects a video input for status notification. **Audio In**: Selects an audio input for status notification. **Event Tally**: Selects an event numbers used to compare to FA-9600 settings.
	Normal	Normal Invert	Sets the GPI alarm output signal logic. **Normal**: Active low **Invert**: Active high

11-5. Event Tab Settings

Click the **Event** tab in the GUI screen to display the window as shown below.



◆ **Event**

Select an event to be loaded at startup.

Item	Default	Setting	Description
Start up Event	Last Settings	Last Settings	Loads the settings last used.
		Default	Resets all settings to default.
		Event 1-100	Loads the selected event memory.

Item	Description
Load Event	Selects an event number and click **Load**. Click **OK** in the confirmation dialog. The current settings are saved in the event number.
Save Event	Selects an event number and click **Save**. Click **OK** in the confirmation dialog. The settings stored in the event are loaded to the FA-9600.

The [Utility > Event data] page in the Web GUI allows you to change event data name and content. Refer to Sec. 13-3-2. "Event Data" and Sec. 14. "Event Data (CSV File)" for more details.

◆ **Linkage Event (Input Ancillary)**
Linkage Event (Input Video Standard)
Linkage Event (Input Audio)

To use auto (linkage) event load, a corresponding event should be created and uploaded in advance. (See “Auto Loaded Events” in Sec. 13-3-2 “Event Data”.)

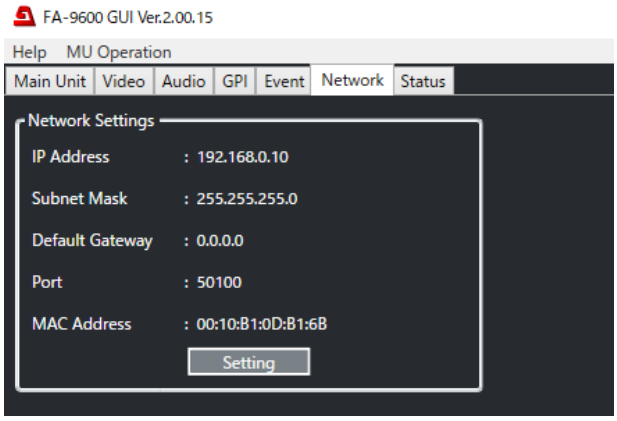
Item		Default	Setting	Description
FS1 FS2	SD 720 1080 2160	Disable	Disable Enable	Enables/disables auto event load linked to input video.
	SMPTE ST352	Disable	Disable Enable	Enables/disables event auto load linked to the payload ID video information defined in SMPTE ST352.
	ARIB B-39 (Input Video)	Disable	Disable Enable	Enables/disables auto event load linked to the Video Mode data defined in ARIB STD-B39.
	ARIB B-39 (Input Audio)	Disable	Disable Enable	Enables/disables auto event load linked to the Audio Mode data defined in ARIB STD-B39. (To check the input video audio mode, see Sec. 11-3-11. “Input Status.”)

NOTE

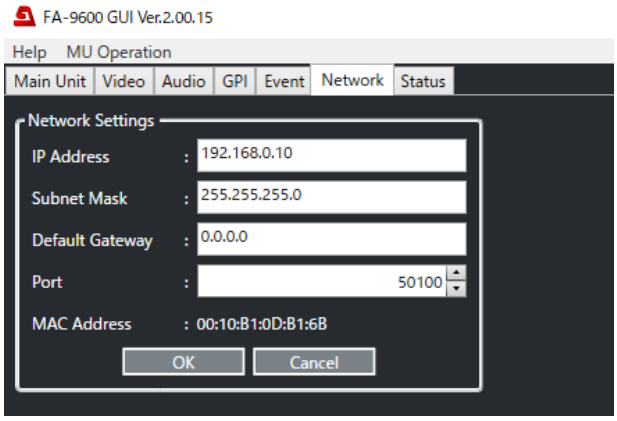
Note that signal processing from status change detection to even loading may take a certain time, more than a frame in some cases.

11-6. Network Tab Settings

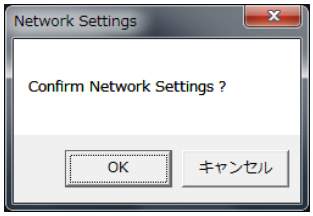
Click the **Network** tab in the GUI screen to display the window as shown below.
The current network settings are displayed in the screen.



Click **Setting** displays the following window and allows you to change network settings.



After changing settings, click **OK**. A confirmation dialog as shown below will appear.



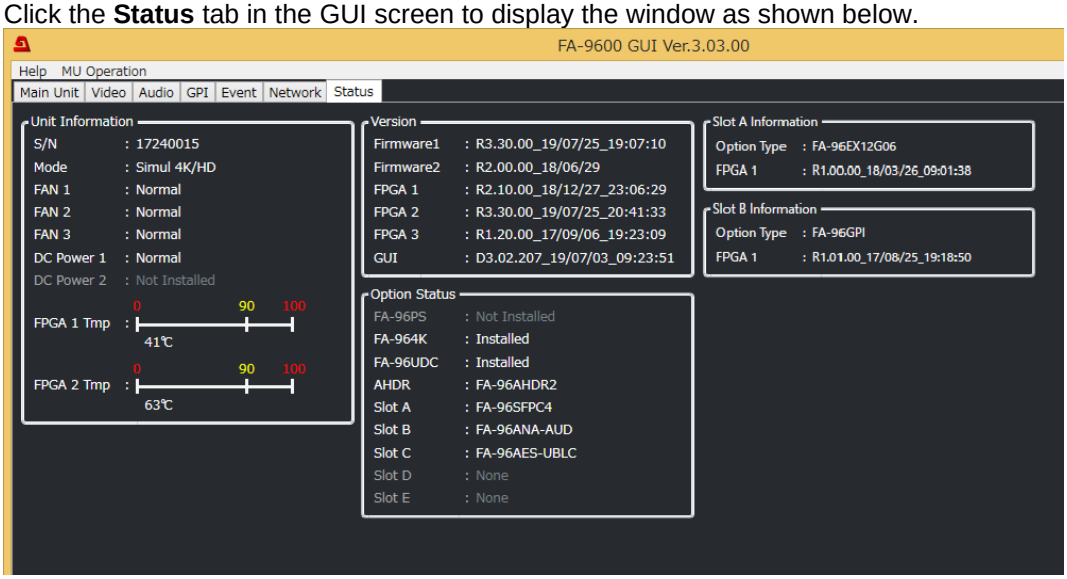
Click **OK** to confirm changes.

IMPORTANT

Note that network changes are applied after restart.

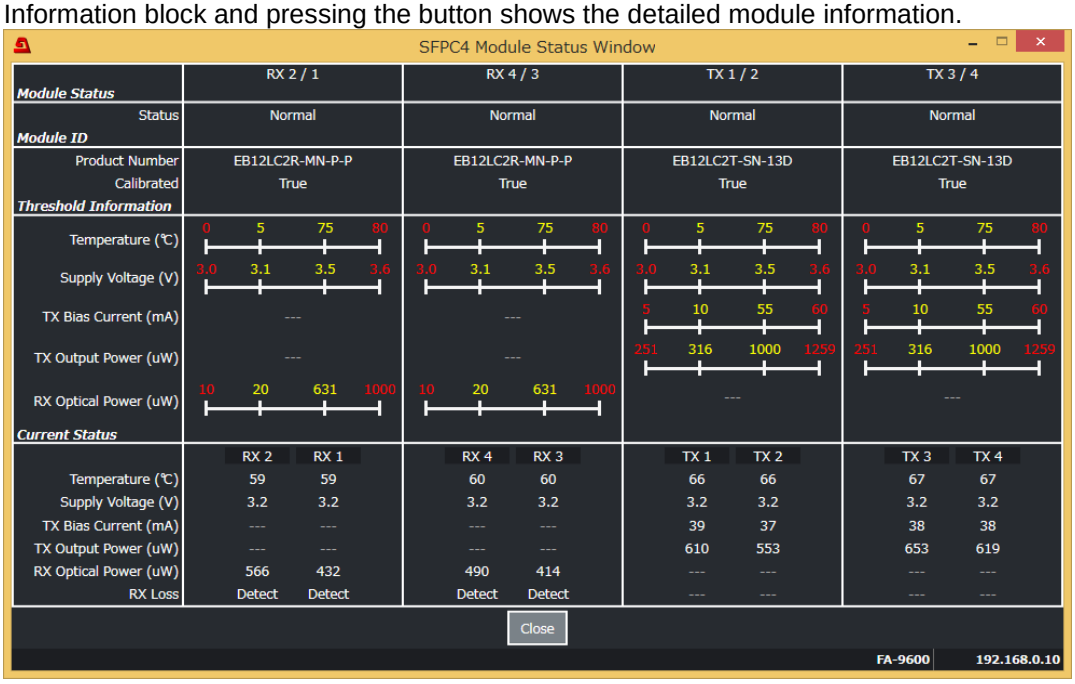
11-7. Status Tab Display

Click the **Status** tab in the GUI screen to display the window as shown below.



Product Number, MAC address, Versions and option status for the FA-9600 are displayed

If an FA-96SFPC4 option is installed, the Module Status button is displayed in the Slot A Information block and pressing the button shows the detailed module information.



Item	Description
Temperature	Displays the SFP module internal temperature.
Supply Voltage	Displays the power voltage supplied to SFP modules.
Tx Bias Current	Displays the bias current of transmitter modules.
Tx Output Power	Displays the transmitted optical power of transmitter modules.
Rx Optical Power	Displays the input optical power of receiver modules.
Rx Loss	Displays the input status receiver modules.

12. Web GUI Setup

◆ **System Requirements for Web GUI Control**

OS	Windows® 7 Professional SP1 (32/64bit) Windows® 8.1,10 Pro (32/64bit)
Web browser	Mozilla Firefox® 24 or later Windows® Internet Explorer 10 or later Google Chrome 28 or later
Network port	Wired or wireless LAN connection at more than 20 Mbps (IEEE802.3u/ab or IEEE802.11a/g/n compliant system)
Display	Resolution: 1024×768 pixels, 32-bit or better

◆ **Connection to FA-9600**

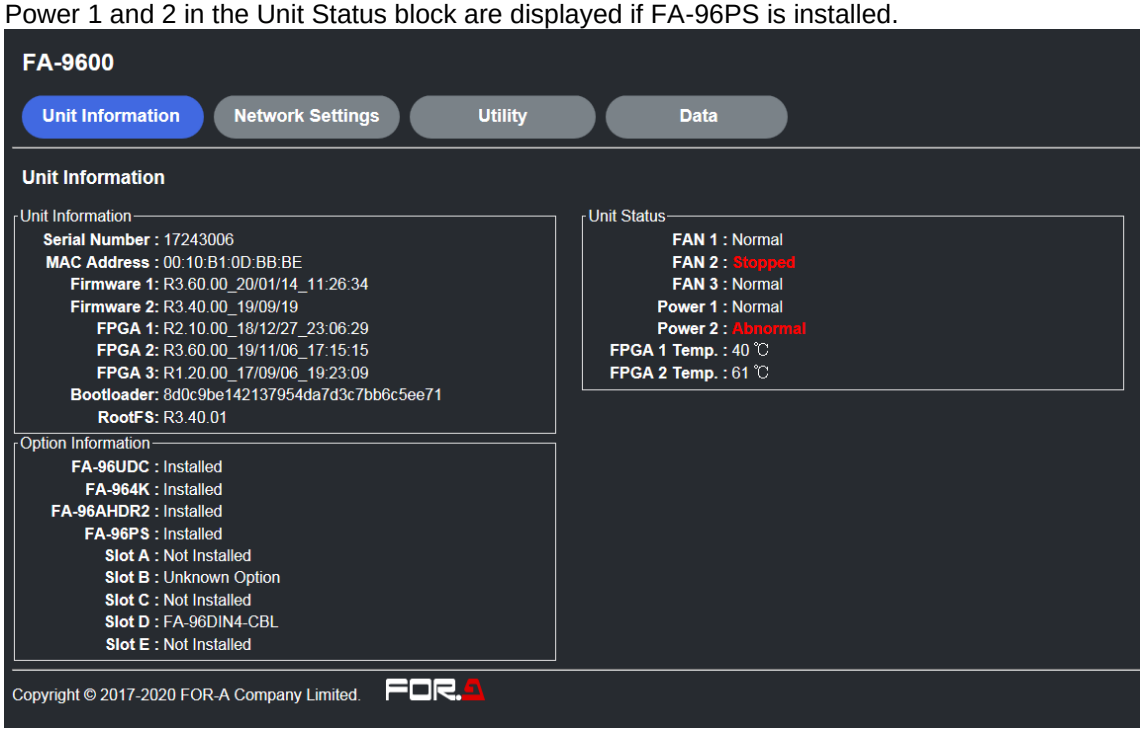
(1) Verify your computer is connected to the FA-9600 via wired or wireless LAN.
(2) Launch your web browser in the computer, tablet or other terminal device.
(3) Enter the FA-9600 IP address in the address bar. (The default FA-9600 IP address is **192.168.0.10**.)

13. Web GUI Control

This section describes how to control the FA-9600 using a Web GUI.
When the connection to the FA-9600 is successfully established, the Unit Information screen as shown below will appear.

13-1. Unit Information

Clicking **Unit Information** on the top of the page also displays this page in which FA-9600 unit information can be found.
Power 1 and 2 in the Unit Status block are displayed if FA-96PS is installed.

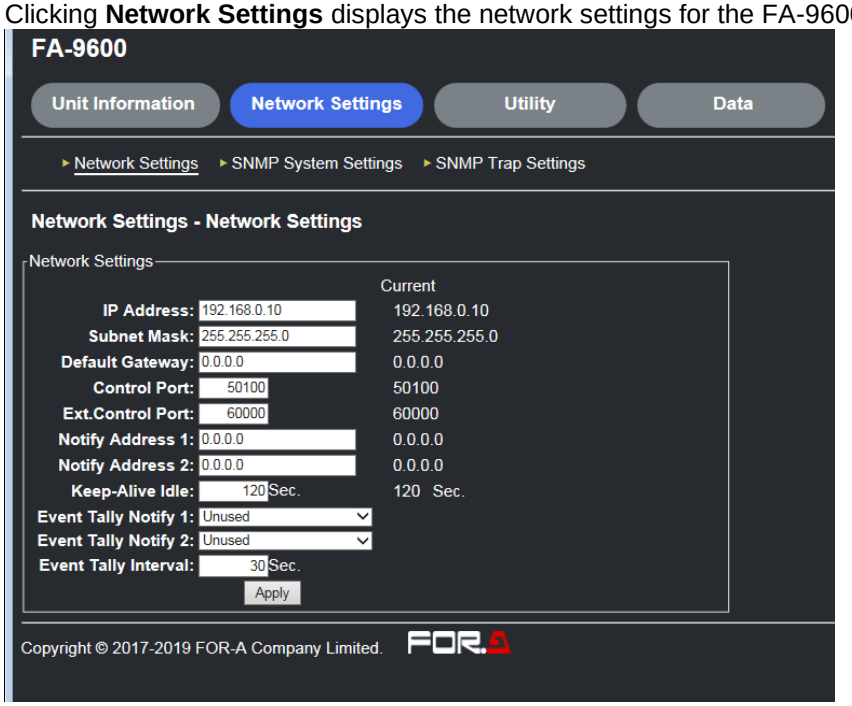


13-2. Network Settings

Clicking **Network Settings** in the Web GUI page displays a menu in which FA-9600 network and SNMP settings can be changed.

13-2-1. Network Settings

Clicking **Network Settings** displays the network settings for the FA-9600 LAN port.



Item	Default	Description
IP Address	192.168.0.10	Sets the IP address of the FA-9600 LAN port.
Subnet Mask	255.255.255.0	Sets the subnet mask of the LAN port.
Default Gateway	0.0.0.0	Sets the default gateway of the LAN port, as needed.
Control Port	50100	Sets the TCP/UDP port number used to connect the Windows GUI.
Ext. Control Port	60000	Selects a TCP/UDP port number used for sessions with external devices (Sending status change messages or event tallies.)
Notify Address 1, 2	0.0.0.0	Specifies destination addresses (1 and 2) for sending status change messages or event tallies.
Keep-Alive Idle	120 Sec	Sets the idle timeout period for status change message and event tally sessions.
Event Tally Notify 1. 2	Unused	Specifies two events (1 and 2) used for FA-9600 change monitoring.
Event Tally Interval	30 Sec	Sets the interval time for sending tallies from 5 to 255.
Apply button	-	Used to apply changes in this menu.

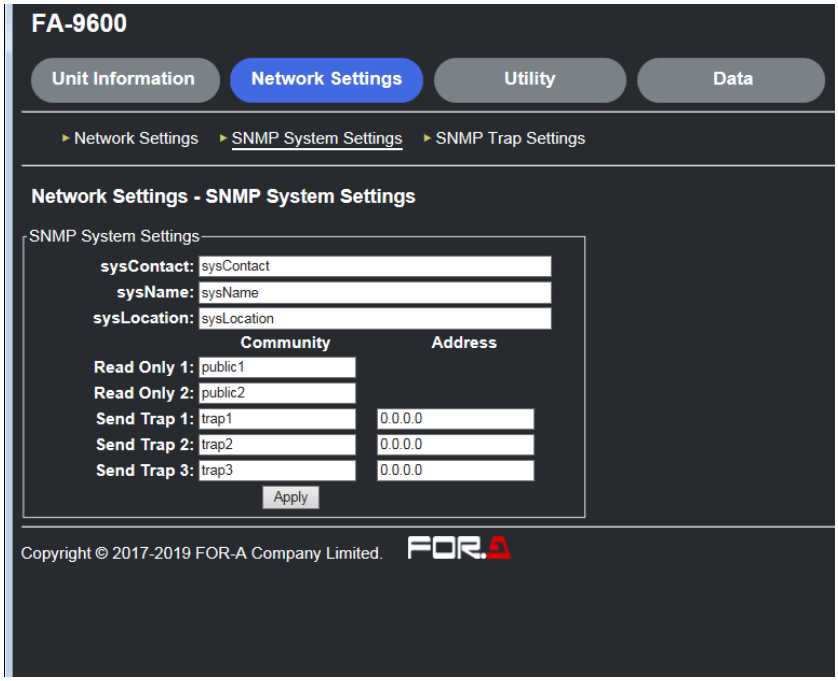
Click **Apply** after changing settings. A confirmation message window will appear. Click **OK** to confirm the change. A message appears and prompts you to restart the FA-9600. Close the message window and restart the FA-9600 to apply the change.

Refer to FA-9600 Command Operation Manual (separate manual) for details on control commands or status request message from external devices.

Refer to Sec. 14-3. “Event Tally” for details on event tallies.

13-2-2. SNMP System Settings

Clicking **SNMP System Settings** displays the SNMP settings.

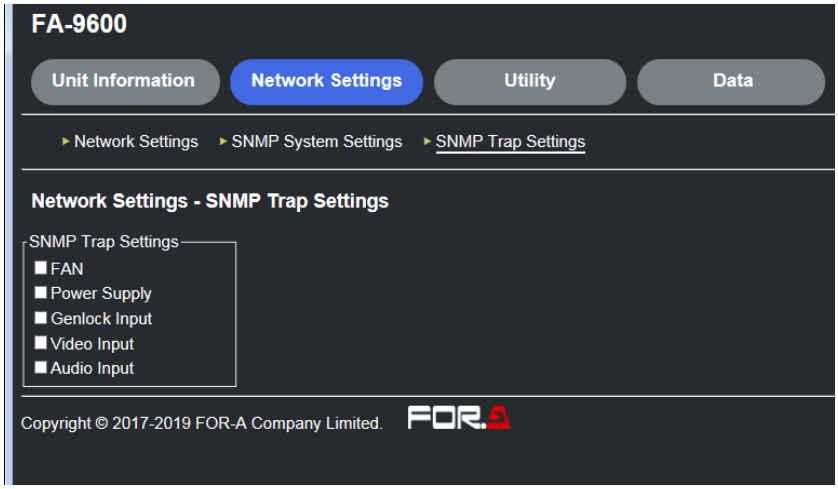


Item		Number of available characters (*1)	Description
SysContact		1-31	Allows you to enter comments regarding the person in charge of the device.
SysName		1-31	Allows you to set the device name.
SysLocation		1-31	Allows you to enter comments regarding the device location.
Read Only1	Community	1-15	Read only SNMP community name
Read Only2	Community	1-15	Read only SNMP community name
Send Trap1	Address	-	The SNMP manager's community name and IP address to which a trap is sent.
	Community	1-15	
Send Trap2	Address	-	
	Community	1-15	
Send Trap3	Address	-	
	Community	1-15	
Apply button		-	Allows you to apply changes.

(*1) Use only alphanumeric and symbol characters.

13-2-3. SNMP Trap Settings

Clicking **SNMP Trap Settings** displays the SNMP Trap settings.
Click checkboxes to enable desired traps.

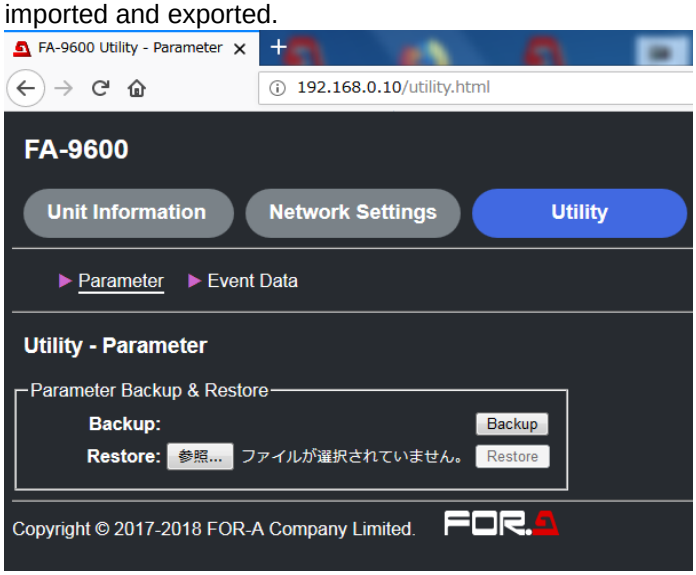


Trap	When traps are issued:
FAN	When the cooling fan status changed
Power Supply (w/ FA-96PS)	When the power unit status changed
Genlock Input	When the genlock input status changed
Video Input	When the video input status changed
Audio Input	When audio input status changed

13-3. Utility

13-3-1. Parameter

Click **Parameter** in the Web GUI page to display a menu, in which current settings can be imported and exported.



◆ **Parameter Backup & Restore**

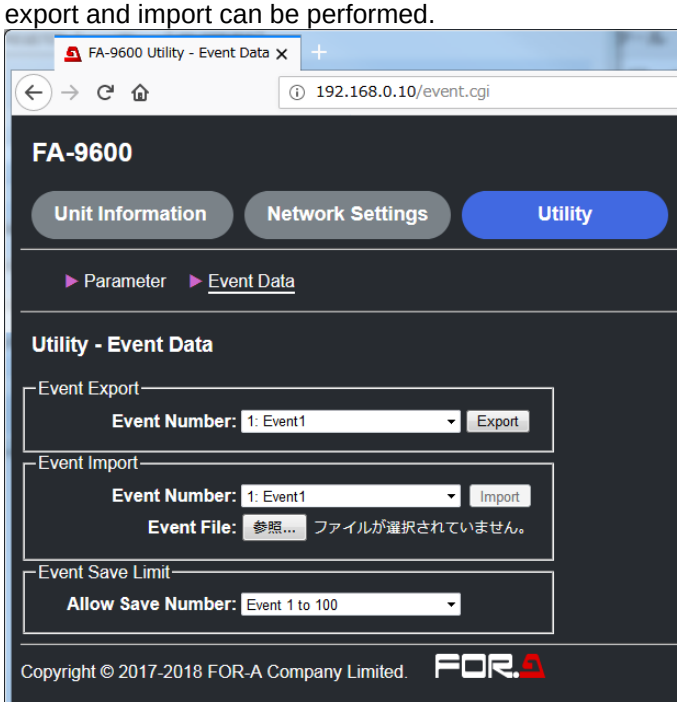
Backups / restores FA-9600 settings.

IMPORTANT

When restoring settings from backup requires a reboot of the FA-9600.

13-3-2. Event Data

Click **Event Data** in the Web GUI page to display a menu, in which event data (Event 1-100) export and import can be performed.



13-3-2-1. Event Data (Event 1-100)

◆ **Event Export**

Downloads FA-9600 event data and locally saves it in files.
Each event data is stored in csv files and all event data is stored in a tar.gz file.

(1) Select an event number.
(2) Click **Export** to locally save the event data in a file.
(If an event had no data, a file cannot be made or written.)

◆ **Event Import**

Replace FA-9600 event data with local data stored in files.

▶ See “Appendix 1: Event Data List” for details on event data.
▶ See Sec 14. “Event Data (CSV File)” for details on event data editing.

Each event data is stored in csv files and all event data is stored in a tar.gz file.

(1) Select an event number.
(2) Click **Browse…** to select a file.
(3) Click **Import** to replace the selected event data in FA-9600 with the file data.

> Event data is stored in the computer as csv files, which are editable and allow you to create event data specialized to particular menus.
> For example, edit only Audio OUTPUT MAPPING settings in a csv file and delete other menu items from the file. Then, import the file to an FA-9600 event and load the event to apply changes only to the Audio OUTPUT MAPPING menu. Thus, event data specialized to particular menus can be created.
> See Sec. 14. “Event Data (CSV File)” for more details on file editing.

◆ **Event Save Limit**

This function allows you to restrict the available event numbers.

Event Save Limit is enabled under the following Event Save operations:

- Saving events on the FA-9600 front panel
- Saving events in the Windows GUI
- Saving events on the Remote controller (FA-10RU) front panel
  (Only for events saved in FA-9600)

Event Save Limit is disabled under the following Event Save operations:

- Saving events by GPI commands sent by FA-9600 and Remote controller (FA-10RU).
- Saving events by control commands remotely sent to FA-9600.

13-3-2-2. Auto Loaded Events (Event 101 and higher)

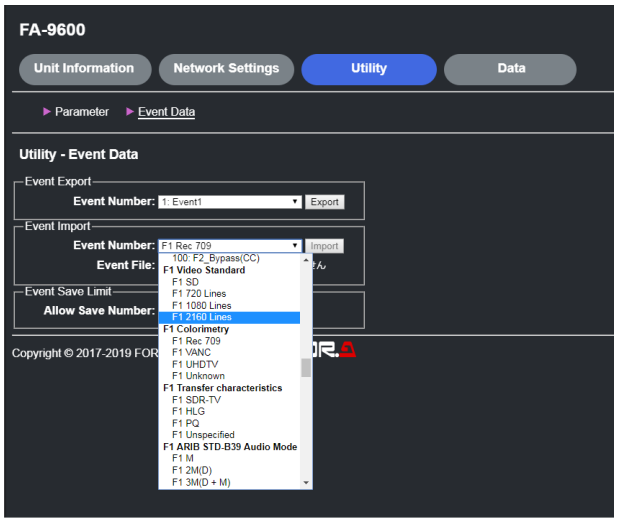
The following three menus allow you to automatically load events according to the input signal information.

INPUT LINKAGE PROCESS (VIDEO) (See Sec. 5-16.)
INPUT LINKAGE PROCESS (AUDIO) (See Sec. 5-17.)
VIDEO PAYLOAD ID LINKAGE (See Sec. 5-31.)

◆ **Operation Example (Linking with Video Format)**

The procedure example below shows how to automatically load an event according to 2160-line signal input.

(1) Open the INPUT LINKAGE PROCESS (VIDEO) menu on the front panel and set Standard to **2160**, and Process to **Enable**.
(2) Create an event data according to your needs and save it as a csv file.
   ▶ See “Appendix 1: Event Data List” for details on event data.
   ▶ See Sec 14. “Event Data (CSV File)” for details on event data editing.
(3) Open the **Web GUI** menu and go to **Utility > Event Data** menu page.
(4) Select [**F1 Video Standard** >> **F1 2160 Lines**] under **Event Number** in the Event Import block as an upload destination.



(5) Select the created event (csv) file under Event File.
(6) Click **Import** to save the event in the FA-9600.

Upload destinations for auto loaded events (Event Import) are as shown in the table blow. They are located after Event Number 100. F2 events are almost the same as those for F1.

Menu	Link item	Upload destination (Event Import setting)	Sample event data
INPUT LINKAGE PROCESS (VIDEO)	SD	F1 Video Standard >> F1 SD	
	720	F1 Video Standard >> F1 720 Lines	
	1080	F1 Video Standard >> F1 1080 Lines	
	2160	F1 Video Standard >> F1 2160 Lines	
VIDEO PAYLOAD ID LINKAGE (*1)	SMPTE ST352 or ARIB STD-B39 Video Mode	F1 Colorimetry >> F1 Rec 709 F1 Colorimetry >> F1 VANC F1 Colorimetry >> F1 UHDTV F1 Colorimetry >> F1 Unknown	Rec.709 and Rec.2020 sample data supplied on the CD-ROM (*2)
		F1 Transfer characteristics >> F1 SDR-TV F1 Transfer characteristics >> F1 HLG F1 Transfer characteristics >> F1 PQ F1 Transfer characteristics >> F1 Unspecified	SDR, HLG and PQ and sample data supplied on the CD-ROM (*2)

INPUT LINKAGE PROCESS (AUDIO)	ARIB STD-B39 Audio Mode	F1 ARIB STD-B39 Audio Mode >> F1 M F1 ARIB STD-B39 Audio Mode >> F1 2M(D) | F1 ARIB STD-B39 Audio Mode >> F1 22.2+5.1 F1 ARIB STD-B39 Audio Mode >> F1 22.2+5.1+S	

(*1) Data (Transfer characteristics/Colorimetry bit data and reference standard) to be linked to auto event load
- 1.5G 1080-Lines: SMPTE ST292-1: 2018
- 3G Level-A 1080-Lines: SMPTE ST425-1: 2017
- 3G Level-B 1080-Lines: SMPTE ST425-1: 2017
- Quad Link 3G Level-A 2160-Lines SQD: SMPTE ST425-1: 2017
- Quad Link 3G Level-B 2160-Lines SQD: SMPTE ST425-1: 2017
- Quad Link 3G Level-A 2160-Lines 2SI: SMPTE ST425-5: 2015
- Quad Link 3G Level-B 2160-Lines 2SI: SMPTE ST425-5: 2015
- 12G 2160-Lines: SMPTE ST2082-10:2018

(*2) The following sample files are located in the **PAYLOAD ID LINKAGE DATA** folder on the supplied CD-ROM.
- BT.709 **F1_BT.709.csv** Upload to: F1 Colorimetry >> F1 Rec 709
- BT.2020 **F1_BT.2020.csv** Upload to: F1 Colorimetry >> F1 UHDTV
- SDR **F1_SDR.csv** Upload to: F1 Transfer characteristics >> F1 SDR-TV
- HLG **F1_HLG.csv** Upload to: F1 Transfer characteristics >> F1 HLG-TV
- PQ **F1_PQ.csv** Upload to: F1 Transfer characteristics >> F1 PQ-TV

◆ Operation Example (Linking with Video Payload ID Information)

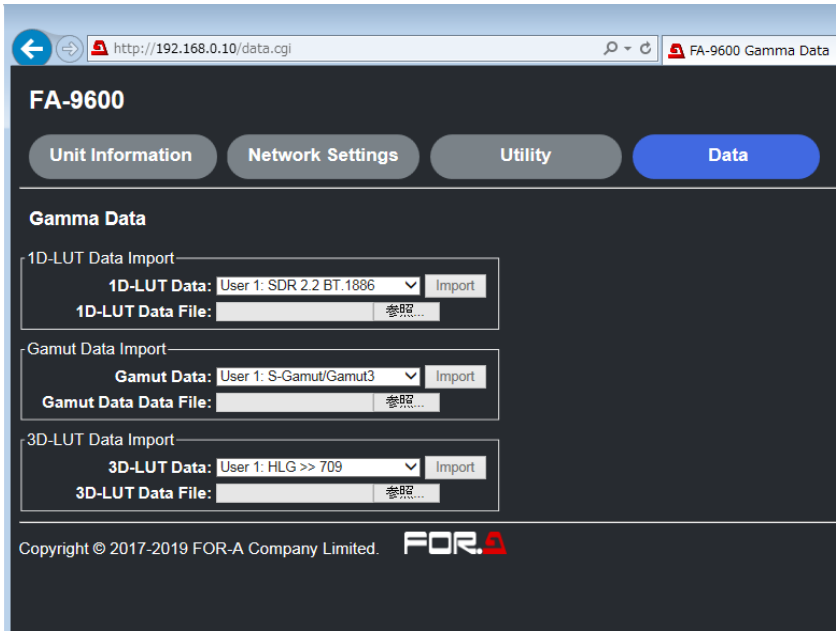
The procedure example below shows how to automatically load an event according to video payload ID information.

(1) Open the VIDEO PAYLOAD ID LINKAGE menu on the front panel and set SMPTE ST352 and ARIB Video Mode to **Enable**.
(2) Open the **Web GUI** menu and go to **Utility > Event Data** menu page.
(3) Select [**F1 Colorimetry >> F1 UHDTV**] under **Event Number** in the Event Import block as an upload destination.
(4) Insert the supplied CD-ROM into the drive. Click **Browse…** under **Event File** in the Event Import block and open **PAYLOAD ID LINKAGE DATA** folder in the CD-ROM. Specify the **F1_BT.2020.csv** file in the folder. (You can also edit the sample file and upload the edited file, as needed. See Sec 14. “Event Data (CSV File)” for event data editing.)
(6) Click **Import** to save the event in the FA-9600.

13-4. Data

Click **Data** in the Web GUI page to display a menu, in which the following data import (sending from Web GUI to FA-9600) can be performed.

Gamma data (User Gamma 1-10)
Gamut data (User Gamut 1-5)
3D-LUT data (User 3D-LUT 1-13)



◆ **Gamma Curve Import**

Upload local gamma curve data stored as a lut file to FA-9600.

(1) Click **Browse…** to select a lut file.
(2) Select a User Gamma number.
(3) Click **Import** to upload the file data to the selected number.

◆ **Gamut Data Import**

Upload local gamut data stored as a gmt file to FA-9600.

(1) Click **Browse…** to select a gmt file.
(2) Select a User Gamut number from 1 to 5.
(3) Click **Import** to upload the file data to the selected number. (Note that original User Gamut data is lost once it is replaced.)

◆ **3D-LUT Data Import**

Upload local 3D-LUT data stored as a bin file to FA-9600.

(1) Convert 3D-LUT data stored in the supplied CD-ROM to a dedicated bin file. (Refer to FA-9600 LUT Converter Operation Manual (separate manual) for more details.)
(2) Click **Browse…** to select a bin file.
(3) Select a User 3D-LUT number.
(4) Click **Import** to upload the file data to the selected number.

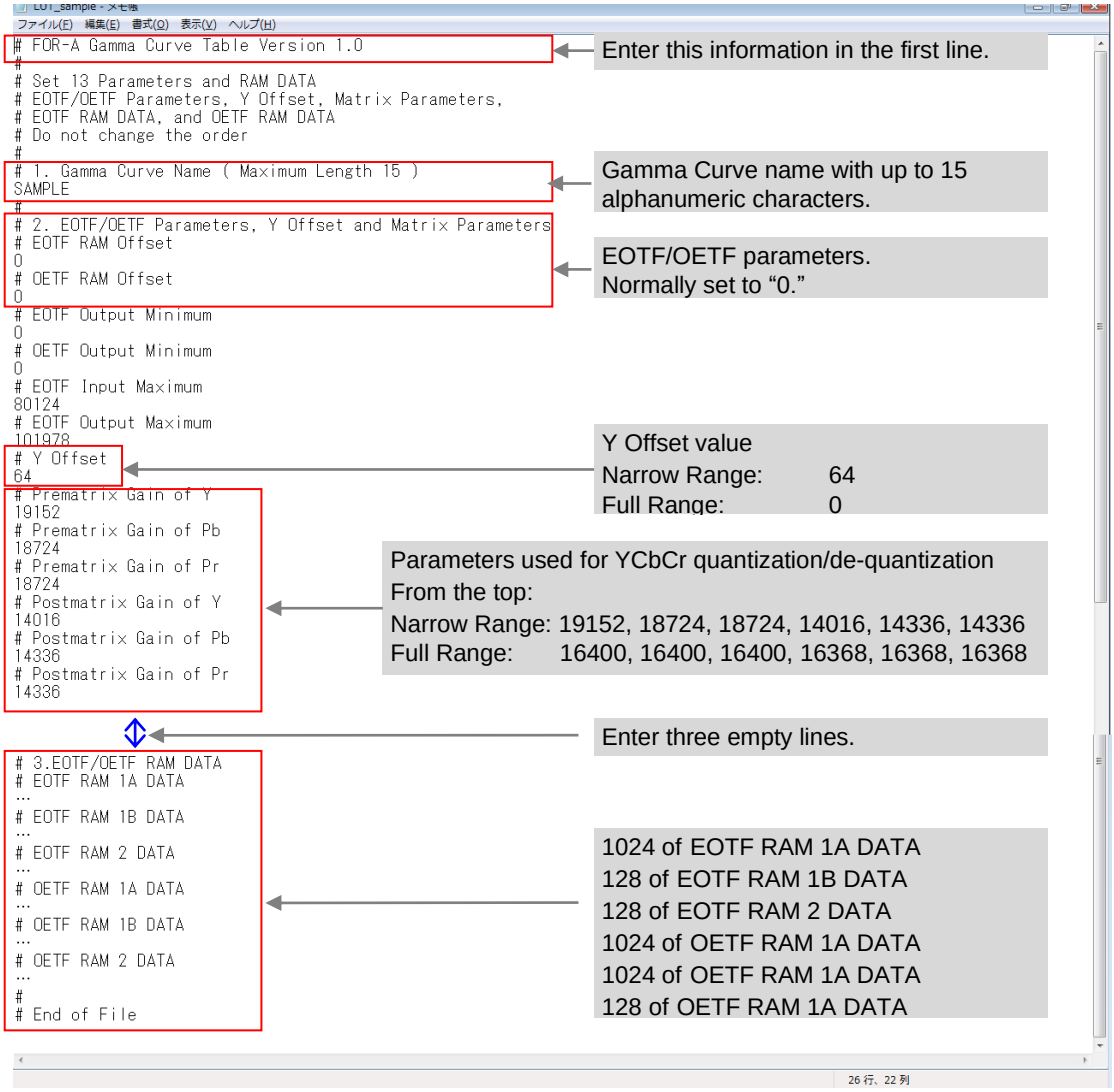
13-5. LUT and GMT Files

Lut and gmt files referred in previous chapters are text files in which Gamma Curve and Gamut data is recorded and have .lut and .gmt extension respectively. This chapter explains how to create and edit these files. Use only one-byte alphanumeric characters and start with “#” for comments.

Default Gamma Curve (.lut) files and Gamut (.gmt) files are provided on the FA-9600 CD-ROM. Use these sample files for your reference.

◆ **Gamma Curve**

A Gamma Curve sample file (.lut file) is shown below.



◆ **Gamut**

A Gamut sample file (.gmt file) is shown below.

GMT_sample.gmt - メモ帳

ファイル(F) 編集(E) 書式(O) 表示(V) ヘルプ(H)

```
# FOR-A Gamut Parameter Version 1.0
#
# Set 10 Parameters
# Name, 8 Chromaticity Values, Transfer Matrix
#
# Do not change the order
#
# 1. Color Space Name ( Maximum Length 15 )
SAMPLE
#
# 2. Chromaticity Values x and y of Primaries (Red, Green, Blue) and White point
# Chromaticity Value x of Red
0.640000
# Chromaticity Value x of Green
0.300000
# Chromaticity Value x of Blue
0.150000
# Chromaticity Value x of White
0.312700
# Chromaticity Value y of Red
0.330000
# Chromaticity Value y of Green
0.600000
# Chromaticity Value y of Blue
0.060000
# Chromaticity Value y of White
0.329000
#
# 3. Transfer Matrix 0:BT.709 or 1:BT.2020
0
#
# End of File
```

Enter this information in the first line.

Gamut name with up to 15 alphanumeric characters.

xy chromaticity values for Primaries (Red, Green, Blue) and White Point (See below)

Specify YCbCr and RGB transfer matrices: 0: BT. 709 or 1: BT. 2020

1 Opto-electronic conversion

Item	Parameter	System Values		
1.1	Opto-electronic transfer characteristics before non-linear pre-correction	Assumed linear		
1.2	Overall opto-electronic transfer characteristics at source(1)	$V = 1.099\,L^{0.45} - 0.099$ for $1 \geq L \geq 0.018$ $V = 4.500\,L$ for $0.018 > L \geq 0$ where: L : luminance of the image $0 \leq L \leq 1$ V : corresponding electrical *signal*		
1.3	Chromaticity coordinates (CIE, 1931)	x	y	
	Primary – Red (R) – Green (G) – Blue (B)	0.640 0.300 0.150	0.330 0.600 0.060	
1.4	Assumed chromaticity for equal primary signals (Reference white)	D_{65}		
		x	y	
	$E_R = E_G = E_B$	0.3127	0.3290	

Use these coordinates for xy chromaticity values.

(1) In typical production practice the encoding function of image sources is adjusted so that the final picture has the desired look, as viewed on a reference monitor having the reference decoding function of Recommendation ITU-R BT.1886, in the reference viewing environment defined in Recommendation ITU-R BT.2035.

2 Picture characteristics

Item	Parameter	System Values
2.1	Aspect ratio	16:9
2.2	Samples per active line	1 920
2.3	Sampling lattice	Orthogonal
2.4	Active lines per picture	1 080
2.5	Pixel aspect ratio	1:1 (square pixels)

Excerpted from https://www.itu.int/dms_pubrec/itu-r/rec/bt/R-REC-BT.709-6-201506-I!!PDF-E.pdf

14. Event Data (CSV File)

Event data is stored in the computer as csv files, which are editable and allow you to change FA-9600 settings. The appendix explains syntax and rules of csv files and how to edit the files.
See “Appendix 1: Event Data List” for details on event contents.

14-1. Syntax and Rules

- The file is line-based and each line represents each setting.
  Each line requires a **newline character** (CRLF).

- The following format is applied to each line.
  “Category”,“Target”,“Item”,“Value”

Event data example

```
Procss Amp,FS1,Pre Video Level,1000
Procss Amp,FS1,Pre Y Level,1000
Procss Amp,FS1,Pre Chroma Level,1000
Procss Amp,FS1,Pre Black Level,0
Procss Amp,FS1,Pre Hue,0
Procss Amp,FS1,Control Select,0
Procss Amp,FS1,Post Video Level,1000
Procss Amp,FS1,Post Y Level,1000
Procss Amp,FS1,Post Chroma Level,1000
Procss Amp,FS1,Post Black Level,0
Procss Amp,FS1,Post Hue,0
Split Mode,FS1,Mode Select,0
Area Marker,FS1,Marker Enable,0
Area Marker,FS1,Marker Color,0
Area Marker,FS1,Marker Blink,0
```

* Do **NOT** enter any trailing or leading **spaces** on commas or "CRLF."
* Only **alphanumeric characters** and **symbols** (7-bit ASCII characters) are available.
* Strings are **case sensitive**.
* Enter only strings and symbols listed in the Event Data List. (See “Appendix 1: Event Data List.”)
* CSV files must be encoded as **7-bit ASCII** files.

14-2. Event Data Editing Example (Value Change)

For example, to change **FS1 Video Level** (see Sec. 5-1. “VIDEO PROCESS AMPLIFIER”) to **123.4%**, there are two procedures as shown below.

◆ **If using a new file:**
(1) Create a csv file using a text editor.
(2) Type the text as shown below in the csv file. (See “Appendix 1: Event Data List” for details)

Process Amp,FS1,Pre Video Level,1234(newline character)

(3) Save the csv file as **7-bit ASCII**. If using the Windows **Notepad**, select “**ANSI**” for the Encoding menu to save the file.
(4) Import the csv file to FA-9600 using the Web GUI to apply the change.
See Sec. 13-3-2. "Event Data" for how to import events to the FA-9600.

◆ **If using an existing event file:**
(1) Export an event file from the FA-9600 to the Web GUI. Open the file using a text editor.
(See Sec. 13-3-2. "Event Data" for how to export events to the Web GUI.)
(2) Change the Value in the **Process Amp,FS1,Pre Video Level,…**“ line to **1234**.
(3)(4) (Same as above)

14-3. Event Data Editing Example (Event Name Change)

Let's change **Event Number 1** to "**Studio_A 4K>HD**" as shown below.

◆ **If using a new file:**

(1) Create a csv file using a text editor.

(2) Type the text as shown below in the csv file.

Event,COM,EventName,Studio_A 4K>HD(newline character)

* Do **NOT** enter any trailing or leading **spaces** on commas or "CRLF."
* Max **15 characters** for names (Front panel menu can show up to **10 characters**.)
* Only **alphanumeric characters** and **symbols** (7-bit ASCII characters) are available.
* Strings are **case sensitive**.

(3) Save the csv file as **7-bit ASCII**. If using the Windows **Notepad**, select "**ANSI**" for the Encoding menu to save the file.

(4) Import the csv file to FA-9600 using the Web GUI to apply the change.
See Sec. 13-3-2. "Event Data" for how to import events to the FA-9600.

◆ **If using an existing event file:**

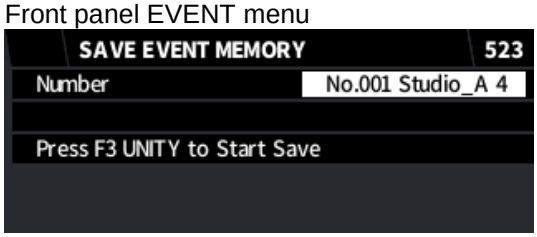
(1) Export an event file from the FA-9600 to the Web GUI. Open the file using a text editor.
(See Sec. 13-3-2. "Event Data" for how to export events to the Web GUI.)

(2) Type the text above anywhere in the csv file.

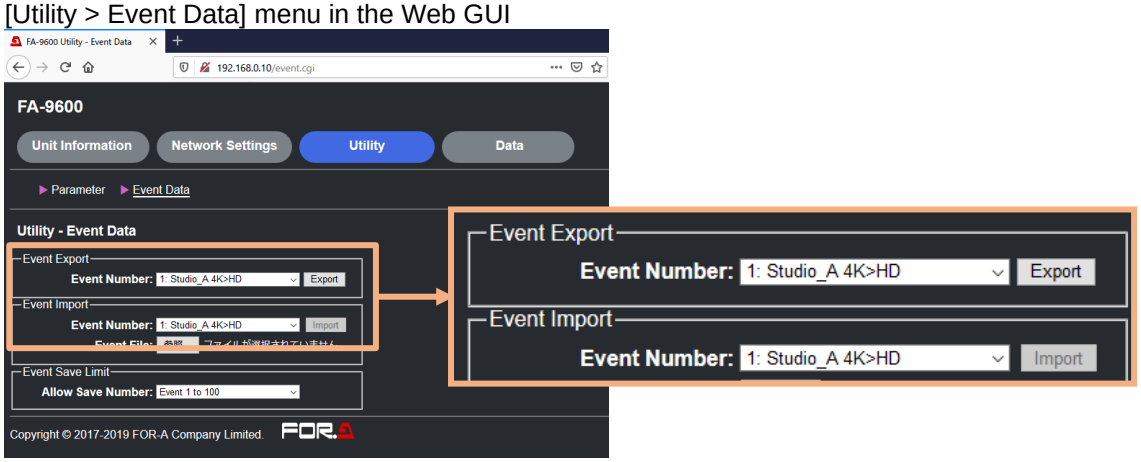
(3)(4) (Same as above)

The event name will be displayed as shown below when it is successfully applied:

Front panel EVENT menu



[Utility > Event Data] menu in the Web GUI



14-4. Event Tally

Event tally function allows you to send tallies that notify discrepancy between FA-9600 settings and setting values in events. Two events can be set as event tally reference. Event tallies are also sent periodically if no changes are made in FA-9600.

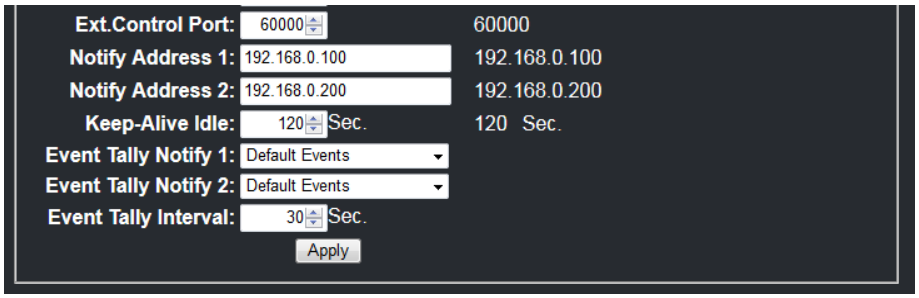
◆ **Communication Specifications**

Communication	Interface	Ethernet: IEEE802.3u/ab (100BASE-TX / 1000BASE-T)
	Protocol	UDP/IP
	Sending port for tallies	60000 (Default setting) (*1)
Tally	Event tallies (Diff or Same) are periodically (Default setting: 30 sec. interval) (*1) sent.	
	Event tallies (Diff) are sent when there is discrepancy between FA-9600 settings and setting values in events.	
Tally destinations	Destination 1: **0. 0. 0. 0** (Default setting) (*1) Destination 2: **0. 0. 0. 0** (Default setting) (*1)	

(*1) Settings can be changed in Web GUI. See the next section.

14-4-1. Event Tally Setup (Web GUI)

1) Connect to FA-9600 from Web GUI. (See Sec. 12. “Web GUI Setup.”)
2) Click the **Network Settings** tab and set the following items in the tab window. (See Sec. 13-2-1. ”Network Settings.”)



Item	Default	Description
Ext. Control Port *	60000	Sets the port number for sending tallies.
Notify Address 1, 2 *	0.0.0.0	Sets event tally destination addresses 1 and 2.
Keep-Alive Idle (*1)	120 Sec	Sets the idle timeout period for event tally sessions.
Event Tally Notify 1, 2 *	Unused	Specifies two events (1 and 2) used for FA-9600 change monitoring.
Event Tally Interval	30 Sec	Sets the interval time for sending tallies from 5 to 255.
Apply button	-	Confirm settings.

(*1) These communication settings are shared with external command control / status change messages. (See the FA-9600 Command Operation Manual, separate file) If addresses are changed here, destination addresses of status change messages are also changed.

3) Click **Apply** after changing settings. A confirmation message window will appear. Click **OK** to confirm the change.
4) A message appears and prompts you to restart the FA-9600. Close the message window and restart the FA-9600 to apply the change.

14-4-2. Tally Format

Notice,<Event Tally number>,<Event number>,<**DIFF** or **Same**>[CR][LF]

Tally messages sent from FA-9600 are composed of 4 elements (parameters) separated from each of them by a comma ″, .″

Parameter	Value	Description
Event Tally number	EventTally01 EvnetTally02	Event Tally number
Event number	Event0 to Event100	Reference event number
Comparison result	DIFF	Settings are different.
	Same	Settings are the same.

When a tally message is received, send “ACK” to the sender. If no “ACK” is sent, the tally messages are sent three times repeatedly at one second interval.

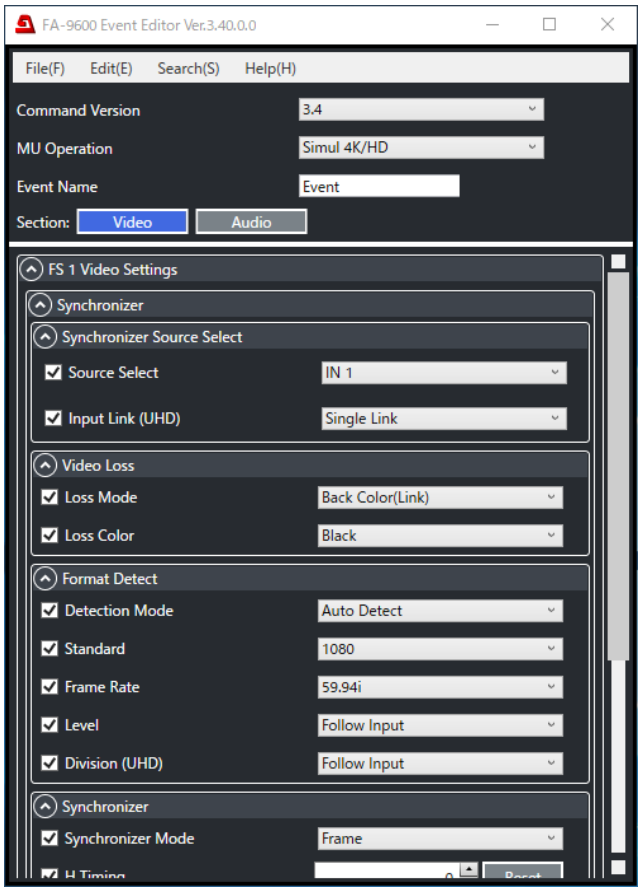
14-5. FA-9600 Event Editor

◆ **System Requirements**

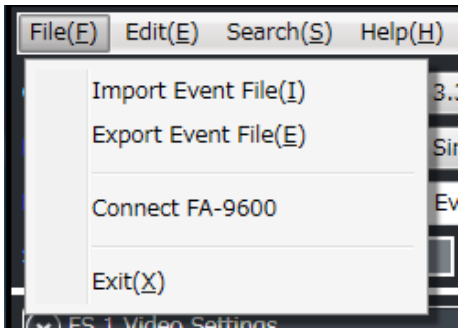
The Event Editor can run in the same system as FA-9600 Windows GUI. (See Sec. 9-1. “System Requirements.”)

◆ **Installing and Using FA-9600 Event Editor**

(1) Open the **FA-9600 Event Editor** folder in the supplied CD-ROM and double-click the **Setup** file to start the setup wizard.
(2) After installation, double-click the Event Editor icon on the desktop to start the Event Editor.
(3) Check the desired checkboxes to select items to be saved from all event items.



◆ **File Menu**

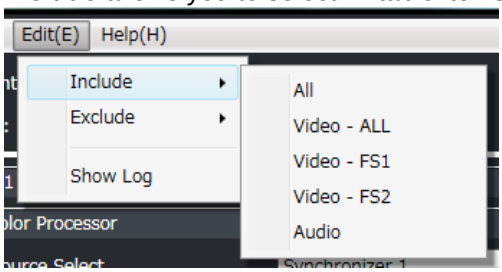


Menu	Description
Import Event File	Loads an event file stored in the PC to the Event Editor.
Export Event File	Saves the edited event items to an event file in the PC.
Connect FA-9600	Opens the FA-9600 communication window.
Exit	Closes the Event Editor.

◆ Edit Menu

<Include / Exclude>

Position the cursor on **Include** or **Exclude** opens a submenu as shown below.
Include allows you to select writable items and **Exclude** to deselect writable items.



Item	Include (Selecting items to write)	Exclude (Deselecting items)
All	Selects all menu items.	Deselects all menu items.
Video – ALL	Selects video menu items.	Deselects video menu items.
Video – FS1	Selects FS1 video menu items.	Deselects FS1 video menu items.
Video – FS2	Selects FS2 video menu items.	Deselects FS2 video menu items.
Audio	Selects audio menu items.	Deselects audio menu items.

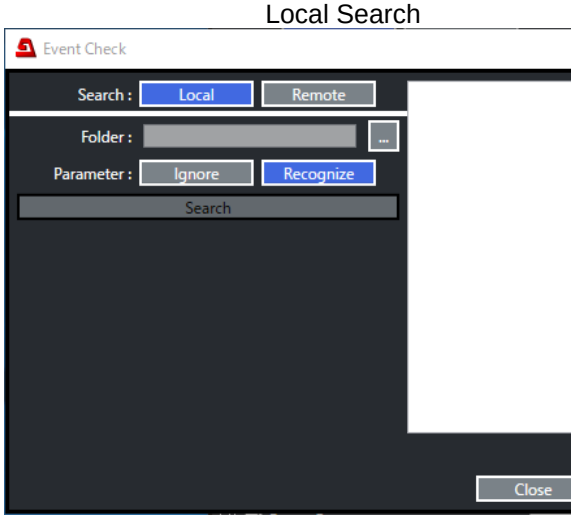
<Show Log>

Displays a log when loading a file.

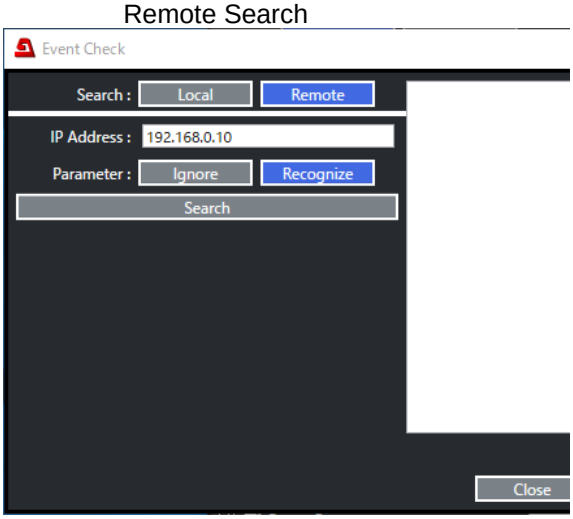
◆ Search Menu

Clicking **Search(S)** displays the window, in which data location of items that are to be saved to events can be searched. If the data is in a file in the PC, select **Local Search**. If the data is an event in the FA-9600, select **Remote Search**.

Local Search



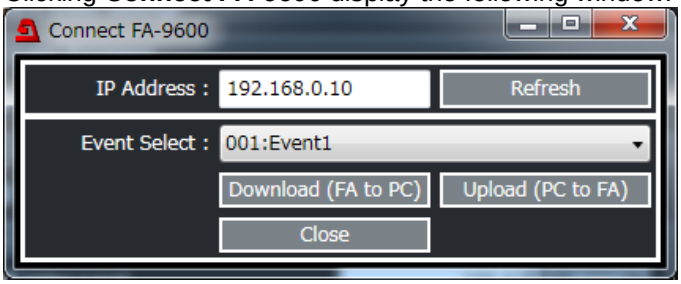
Remote Search



Item	Description	
Folder	Enters and displays the folder to be searched.(**Local Search** only)	
IP Address	Enters and displays the FA-9600 IP address to be searched. (**Remote Search** only)	
Parameter	**Ignore**	Search parameters regardless of their values.
	Recognize	Search parameters and values.
Search	Starts searching.	
Clear Log	Clears the search result.	
Save Log	Saves the search result.	

◆ **Connect FA-9600**

Clicking **Connect FA-9600** display the following window.



Menu	Description
IP Address	Enters the FA-9600 IP address for connection.
Refresh	Pressing the button allows you to connect the FA-9600 and to obtain information such event names from the FA-9600.
Event Select	Specifies an event to be changed.
Download (FA to PC)	Obtains the event data selected under **Event Select** from the FA-9600.
Upload (PC to FA)	Updates the FA-9600 data selected under **Event Select**. with the data edited in the Event Editor.
Close	Closes the Connect FA-9600 window.

See Sec. 5 to Sec. 7 for details on menu items.
See “Appendix 1: Event Data List” for details on event items.

15. SNMP Monitoring

The FA-9600 can be remotely monitored using the SNMP v2c protocol. MIB (Management Information Base) required for the monitoring is included in the supplied CD-ROM. See Sec. 13-2-2 "SNMP System Settings" for details about the SNMP network settings.

◆ **SET/GET List**

Object group	Item name	Object name in MIB file	Value	OID	Type	Trap	Note
OID : 1.3.6.1.4.1.20175.1.338.1.1. (Unit Info)							
Unit info.	Product Name	fa9600ProductName		1	OCTET STRING		
	Product Code	fa9600ProductCode		2	INTEGER		
	Unit Name	fa9600UnitName		3	OCTET STRING		
	Serial Number	fa9600SerialNumber		4	INTEGER		
	Firmware1 Ver	fa9600Firmware1Version		10	OCTET STRING		
	Firmware2 Ver	fa9600Firmware2Version		11	OCTET STRING		
	FPGA1 Ver.	fa9600Fpga1Version		12	OCTET STRING		
	FPGA2 Ver.	fa9600Fpga2Version		13	OCTET STRING		
	FPGA3 Ver.	fa9600Fpga3Version		14	OCTET STRING		
	FA-964K Inst.	fa964KInstalled	0: notInstalled 1: installed	21	INTEGER		
	FA-96UDC Inst.	fa96UdcInstalled	0: notInstalled 1: installed	22	INTEGER		
	AHDR Option Inst.	fa96AhdrOption	0: notInstalled 1: fa96Ahdr 2: fa96Ahdr2	24	INTEGER		
OID : 1.3.6.1.4.1.20175.1.338.1.1.31 (Option Slot Info)							
Option info.	SlotA Name	fa9600SlotAOptionName		1	OCTET STRING		
	SlotA Firm.Ver.	fa9600SlotAOptionFirmwareVersion		2	OCTET STRING		
	SlotA FPGA1 Ver.	fa9600SlotAOptionFpga1Version		3	OCTET STRING		
	SlotA FPGA2 Ver.	fa9600SlotAOptionFpga2Version		4	OCTET STRING		
	SlotB Name	fa9600SlotBOptionName		11	OCTET STRING		
	SlotB Firm.Ver.	fa9600SlotBOptionFirmwareVersion		12	OCTET STRING		
	SlotB FPGA1 Ver.	fa9600SlotBOptionFpga1Version		13	OCTET STRING		
	SlotB FPGA2 Ver.	fa9600SlotBOptionFpga2Version		14	OCTET STRING		
	SlotC Name	fa9600SlotCOptionName		21	OCTET STRING		
	SlotC Firm.Ver.	fa9600SlotCOptionFirmwareVersion		22	OCTET STRING		
	SlotC FPGA1 Ver.	fa9600SlotCOptionFpga1Version		23	OCTET STRING		
	SlotC FPGA2 Ver.	fa9600SlotCOptionFpga2Version		24	OCTET STRING		
	FA-96DIN4 Inst.	fa96Din4OptionInstalled	0: notInstalled 1: installed	41	INTEGER		
	FA-96DB9 Inst.	fa96Db9OptionInstalled	0: notInstalled 1: installed	51	INTEGER		
OID : 1.3.6.1.4.1.20175.1.338.1.2. (Status)							
OID : 1.3.6.1.4.1.20175.1.338.1.2.1 (Unit Status)							
Unit Status	Fan1 Status	fa9600Fan1Status	0: normal 1: stopped	1	INTEGER	✓	
	Fan2 Status	fa9600Fan2Status	0: normal 1: stopped	2	INTEGER	✓	
	Fan3 Status	fa9600Fan3Status	0: normal 1: stopped	3	INTEGER	✓	
	PowerStatus1	fa9600PowerSupplyUnitStatus1	-1: notInstalled 0: normal 1: abnormal	11	INTEGER	✓	
	PowerStatus2	fa9600PowerSupplyUnitStatus2	-1: notInstalled 0: normal 1: abnormal	12	INTEGER	✓	
	FPGA1 Temp.	fa9600Fpga1Temperature		21	INTEGER		
	FPGA2 Temp.	fa9600Fpga2Temperature		22	INTEGER	✓	
OID : 1.3.6.1.4.1.20175.1.338.1.2.2 (Video Status)							
Genlock Status	Genlock Status	fa9600GenlockInputStatus		11	OCTET STRING	✓	
OID : 1.3.6.1.4.1.20175.1.338.1.2.2.1 (Input Video Status)							
Input Status	Input SDI1 Status	fa9600InputVideoStatusSdi1		1	OCTET STRING	✓	
	Input SDI2 Status	fa9600InputVideoStatusSdi2		2	OCTET STRING	✓	
	Input HDMI Status	fa9600InputVideoStatusHdmi		3	OCTET STRING	✓	
OID : 1.3.6.1.4.1.20175.1.338.1.2.2.2 (Output Video Status)							
Output Status	Output SDI1 Status	fa9600OutputVideoStatusSdi1A		1	OCTET STRING		
		fa9600OutputVideoStatusSdi1B		2	OCTET STRING		
	Output SDI2 Status	fa9600OutputVideoStatusSdi2A		3	OCTET STRING		
		fa9600OutputVideoStatusSdi2B		4	OCTET STRING		
	Output HDMI Status	fa9600OutputVideoStatusHdmi		5	OCTET STRING		

Object group	Item name	Object name in MIB file	Value	OID	Type	Trap	Note
OID : 1.3.6.1.4.1.20175.1.338.1.2.2.2 (Output Video Status)							
Output Status	Output SDI1 Status	fa9600OutputVideoStatusSdi1A		1	OCTET STRING		
		fa9600OutputVideoStatusSdi1B		2	OCTET STRING		
	Output SDI2 Status	fa9600OutputVideoStatusSdi2A		3	OCTET STRING		
		fa9600OutputVideoStatusSdi2B		4	OCTET STRING		
	Output HDMI Status	fa9600OutputVideoStatusHdmi		5	OCTET STRING		
OID : 1.3.6.1.4.1.20175.1.338.1.2.3 (Audio Status)							
OID : 1.3.6.1.4.1.20175.1.338.1.2.3.1.1 (Audio Emb1 Status)							
Audio Emb1 Status	Channel	fa9600EmbeddedAudioStatusChannel1	1-16	1.a	INTEGER		*1*2
	Audio Status	fa9600EmbeddedAudioInputChannelStatus1	0: loss 1: pcm 2: asyncPcm 3: silence 4: asyncsilence 5: dolby-e 6: asyncDolby-E 7: nonPcm 8: asyncNonPcm 9: by-pass	11.a	INTEGER	✓	*1
OID : 1.3.6.1.4.1.20175.1.338.1.2.3.2.1 (Audio Emb2 Status)							
Audio Emb2 Status	Channel	fa9600EmbeddedAudioStatusChannel2	(Same as Emb1)	1.a	INTEGER		*1*2
	Audio Status	fa9600EmbeddedAudioInputChannelStatus2	(Same as Emb1)	11.a	INTEGER	✓	*1
OID : 1.3.6.1.4.1.20175.1.338.1.2.3.3.1 (Audio AES Status)							
Audio AES Status	Channel	fa9600AesAudioStatusChannel	1-8	1.a	INTEGER		*1*2
	Audio Status	fa9600AesAudioInputChannelStatus	0: loss 1: pcm33K 2: pcm44K1 3: pcm48K 4: silence33K 5: silence44K1 6: silence48K 7: dolby-e 8: nonPcm 9: outputSetting	11.a	INTEGER	✓	*1
OID : 1.3.6.1.4.1.20175.1.338.1.2.4 (Slot Option Status)							
OID : 1.3.6.1.4.1.20175.1.338.1.2.4.1 (SlotA Option Status)							
OID : 1.3.6.1.4.1.20175.1.338.1.2.4.1.1 (FA-96EX3G44-R Status)							
FA-96EX3G44-R Status	Input SDI Status1	fa96Ex3G44RInputSdiStatus1		1	OCTET STRING	✓	
	Input SDI Status2	fa96Ex3G44RInputSdiStatus2		2	OCTET STRING	✓	
	Input SDI Status3	fa96Ex3G44RInputSdiStatus3		3	OCTET STRING	✓	
	Input SDI Status4	fa96Ex3G44RInputSdiStatus4		4	OCTET STRING	✓	
	Output SDI Status1	fa96Ex3G44ROutputSdiStatus1		11	OCTET STRING		
	Output SDI Status2	fa96Ex3G44ROutputSdiStatus2		12	OCTET STRING		
	Output SDI Status3	fa96Ex3G44ROutputSdiStatus3		13	OCTET STRING		
	Output SDI Status4	fa96Ex3G44ROutputSdiStatus4		14	OCTET STRING		
OID : 1.3.6.1.4.1.20175.1.338.1.2.4.1.2 (FA-96EX12G06 Status)							
FA-96EX12G06-R Status	Output SDI Status1	fa96Ex12G06ROutputSdiStatus1		1	OCTET STRING		
	Output SDI Status2	fa96Ex12G06ROutputSdiStatus2		2	OCTET STRING		
	Output SDI Status3	fa96Ex12G06ROutputSdiStatus3		2	OCTET STRING		
	Output SDI Status4	fa96Ex12G06ROutputSdiStatus4		3	OCTET STRING		
OID : 1.3.6.1.4.1.20175.1.338.1.2.4.1.3 (FA-96SFPC4 Status)							
OID : 1.3.6.1.4.1.20175.1.338.1.2.4.1.3.1.1 (FA-96SFPC4 Rx Status)							
FA-96SFPC4 Rx Status	Channel	fa96Sfpc4RxStatusChannel	1 - 4	1.a	INTEGER		*1*2
	SFP Rx Signal Status	fa96Sfpc4RxVideoStatus		2.a	OCTET STRING	✓	*1
OID : 1.3.6.1.4.1.20175.1.338.1.2.4.1.3.2.1 (FA-96SFPC4 Tx Status)							
FA-96SFPC4 Tx Status	Channel	fa96Sfpc4TxStatusChannel	1 - 4	1.a	INTEGER		*1*2
	SFP Tx Status	fa96Sfpc4TxVideoStatus		2.a	OCTET STRING		*1
OID : 1.3.6.1.4.1.20175.1.338.1.2.4.2 (SlotB Option Status)							
OID : 1.3.6.1.4.1.20175.1.338.1.2.4.2.1.1.1 (FA-96AES-UBL Status)							
FA-96AES-UBL Status	Channel	fa96AesUblStatusChannel	(Same as Audio AES)	1.a	INTEGER		*1*2
	Audio Status	fa96AesUblInputChannelStatus	(Same as Audio AES)	11.a	INTEGER	✓	*1
OID : 1.3.6.1.4.1.20175.1.338.1.2.4.2.2.1.1 (FA-96ANA-AUD Status(Slot_B))							
FA-96ANA-AUD Status	Channel	fa96AnaAudStatusBChannel	1 - 4	1.a	INTEGER		*1*2
	Audio Status	fa96AnaAudStatusBChannelStatus	0: silence 1: present	11.a	INTEGER	✓	*1

OID : 1.3.6.1.4.1.20175.1.338.1.2.4.2.3 (FA-96MADI Status(Slot B))							
FA-96MADI Status	Signal	fa96MadiInputSignalStatus	0: loss, 1: present-32k-56ch 2: present-32k-64ch 3: present-44k-56ch 4: present-44k-64ch 5: present-48k-56ch 6: present-48k-64ch 7: notSupported	1	INTEGER		
	Channel	fa96MadiInputChannel		2.1.1.a			*1*2
	Audio Status	fa96MadiInputChannelStatus	0: loss 1: present 2: silence 3: nonPcm	2.1.11.a	INTEGER	✓	*1
OID : 1.3.6.1.4.1.20175.1.338.1.2.4.3 (SlotC Option Status)							

*1 The letter “a” in the OID column stands for numbers in the Value column.

*2 Obtainable only with Traps.

◆ TRAP List

Object group	Item name	When trap is sent:	Object name in MIB file	OID	Reference object	
TRAP	FAN1	FAN1 status change	fa9600Fan1StatusChanged	1	fa9600Fan1Status	
	FAN2	FAN2 status change	fa9600Fan2StatusChanged	2	fa9600Fan2Status	
	FAN3	FAN3 status change	fa9600Fan3StatusChanged	3	fa9600Fan3Status	
	Power1	Power Unit 1 status change	fa9600PowerSupplyUnitStatus1Changed	11	fa9600PowerSupplyUnitStatus1	
	Power2	Power Unit 2 status change	fa9600PowerSupplyUnitStatus2Changed	12	fa9600PowerSupplyUnitStatus2	
	FPGA2 Temp.	Temperature warning (Trap sent every minutes at 90℃)	fa9600Fpga2TemperatureWarning	21	fa9600Fpga2Temperature	
	FPGA2 Shutdown	FPGA2 shutdown due to high temperature.	fa9600Fpga2ThermalShutdown	22	fa9600Fpga2Temperature	
	Watchdog Timer	Reboot by Watchdog Timer	fa9600RebootWatchdogTimer	31		
	SDI Input1	SDI IN1 input format change	fa9600InputVideoStatusSdi1Changed	101	fa9600InputVideoStatusSdi1	
	SDI Input2	SDI IN2 input format change	fa9600InputVideoStatusSdi2Changed	102	fa9600InputVideoStatusSdi2	
	HDMI Input	HDMI IN input format change	fa9600InputVideoStatusHdmiChanged	103	fa9600InputVideoStatusHdmi	
	Genlock In.	GENLOCK IN input format change	fa9600GenlockInputStatusChanged	111	fa9600GenlockInputStatus	
	Emb IN FS1	Each embedded audio channel (FS1) status change	fa9600EmbeddedAudioInputChannelStatus1Changed	201	fa9600EmbeddedAudioStatusChannel1	fa9600EmbeddedAudioInputChannelStatus1
	Emb IN FS2	Each embedded audio channel (FS2) status change	fa9600EmbeddedAudioInputChannelStatus2Changed	211	fa9600EmbeddedAudioStatusChannel2	fa9600EmbeddedAudioInputChannelStatus2
	AES IN	Each AES IN channel status change	fa9600AesAudioInputChannelStatusChanged	221	fa9600AesAudioStatusChannel	fa9600AesAudioInputChannelStatus
	EX3G SDI In1	FA-96EX3G44-R SDI IN1 input format change	fa96Ex3G44RInputSdiStatus1Changed	1101	fa96Ex3G44RInputSdiStatus1	
	EX3G SDI In2	FA-96EX3G44-R SDI IN2 input format change	fa96Ex3G44RInputSdiStatus2Changed	1102	fa96Ex3G44RInputSdiStatus2	
	EX3G SDI In3	FA-96EX3G44-R SDI IN3 input format change	fa96Ex3G44RInputSdiStatus3Changed	1103	fa96Ex3G44RInputSdiStatus3	
	EX3G SDI In4	FA-96EX3G44-R SDI IN4 input format change	fa96Ex3G44RInputSdiStatus4Changed	1104	fa96Ex3G44RInputSdiStatus4	
	SFPC4 Rx	FA-96SFPC input status change	fa96Sfpc4RxStatusChanged	1301	fa96Sfpc4RxStatusChannel	fa96Sfpc4RxVideoStatus
	AESUBL IN	Each FA-96AES-UBL input channel status change	fa96AesUblInputChannelStatusChanged	2101	fa96AesUblStatusChannel	fa96AesUblInputChannelStatus
	ANAAUD IN (Slot B)	Each FA-96ANA-AUD input channel status change	fa96AnaAudStatusBChannelStatusChanged	2201	fa96AnaAudStatusBChannel	fa96AnaAudStatusBChannelStatus
	MADI IN	Each FA-96MADI input channel status change	fa96MadiInputChannelStatusChanged	2301	fa96MadiInputChannel	fa96MadiInputChannelStatus

16. Specifications and Dimensions

16-1. Specifications

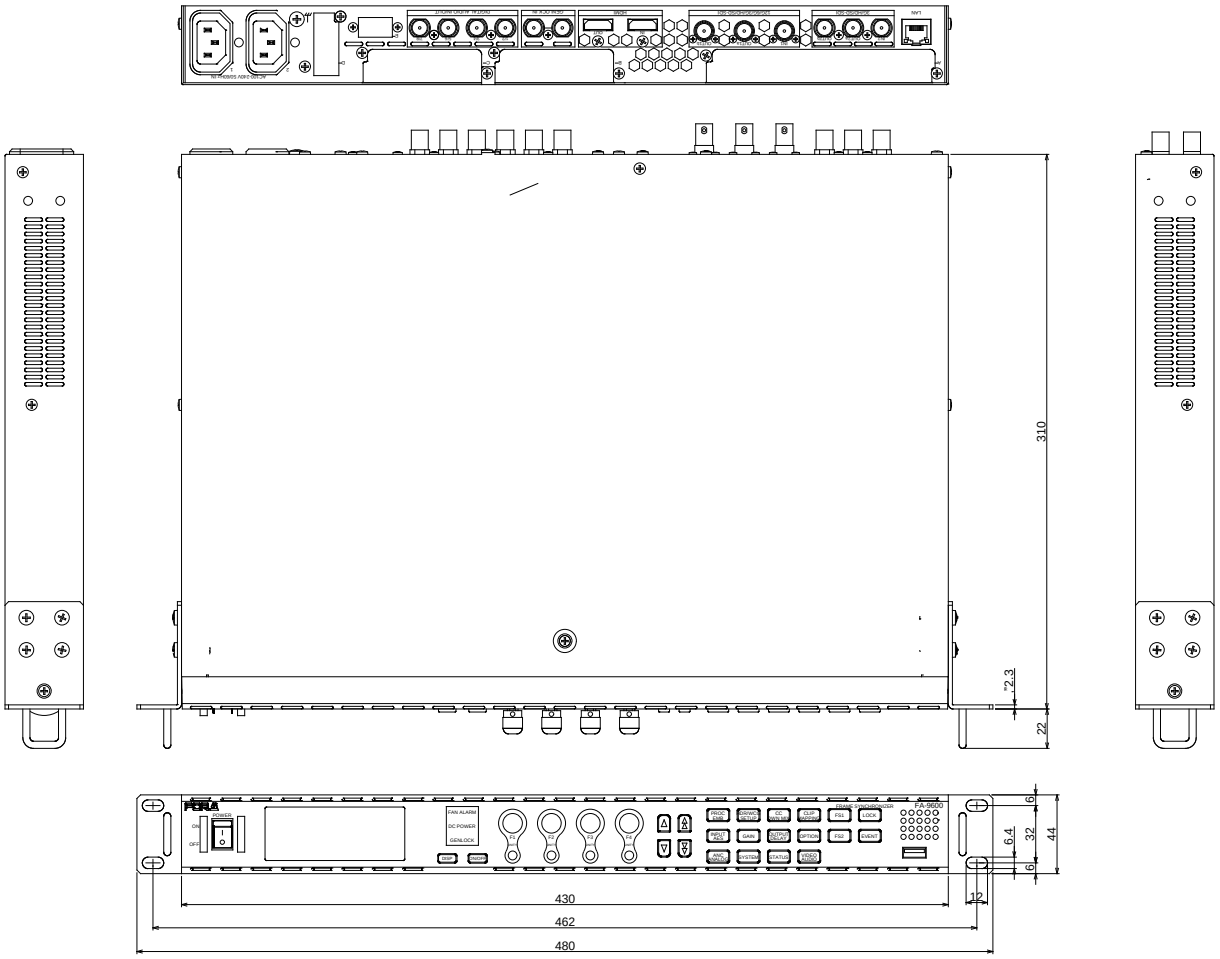
Video format	1080/60p, 59.94p, 50p, 30p, 29.97p, 25p, 24p, 23.98p 1080/60i (30PsF), 59.94i (29.97PsF), 50i (25PsF), 24PsF, 23.98PsF 720/60p, 59.94p, 50p, 30p, 29.97p, 25p, 24p, 23.98p 525/59.94i, 625/50i HDMI formats (future support planned): 720/30p, 29.97p, 25p, 24p, 23.98p, 1080/24PsF, 23.98PsF
(FA-964K)	3840 x 2160/60p, 59.94p, 50p, 48p, 47.95p, 30p, 29.97p, 25p, 24p, 23.98p, 30PsF, 29.97PsF, 25PsF, 24PsF, 23.98PsF (Single-Link 12G/6G-SDI) HDMI formats (future support planned): 2160/48p, 47.95p, 30p, 29.97p, 25p, 24p, 23.98p
(FA-964K) (FA-96EX3G44-R)	3840 x 2160/60p, 59.94p, 50p, 48p, 47.95p, 30p, 29.97p, 25p, 24p, 23.98p, 30PsF, 29.97PsF, 25PsF, 24PsF, 23.98PsF (Quad/Dual-Link 3G-SDI, Level-A/B, SQD/2SI, Quad-Link 1.5G-SDI, SQD)
Video input	3G-SDI: 3Gbps (Level-A/B) HD-SDI: 1.5 Gbps or SD-SDI: 270 Mbps 75Ω BNC x 2 (IN2 to OUT2a pass-through possible)
(FA-96EX3G44-R)	3G/HD/SD-SDI: 75Ω BNC x 4 (Input expansion)
(FA-964K)	12/6G/3G/HD/SD -SDI: (IN1 only)
HDMI	HDMI 2.0b Type-A connector x 1 YCbCr color sampling: 8-bit 4:2:2 or 10-bit 4:2:2 Input resolution: Video (SMPTE compliant) 3840x2160p, 1920x1080i/p, 1280x720p, 525/59.94i, 625/50i Frequency (Hz): 60, 59.94, 50, 30, 29.97, 25, 24, 23.98 HDCP unsupported
Video output	3G-SDI: 3Gbps (Level-A/B) HD-SDI: 1.5 Gbps or SD-SDI: 270 Mbps 75Ω BNC x 4 (2 with each distribution output)
(FA-96EX3G44-R)	3G/HD/SD-SDI: 75Ω BNC x 4 (output expansion) (Input to output pass-through possible)
(FA-96EX12G06)	12G/6G/3G/HD/SD-SDI: 75Ω BNC x 6 (output expansion)
(FA-964K)	12G/6G-SDI: (OUT1a/1b only) (OUT1a/1b and all FA-96EX12G06 outputs)
HDMI	HDMI 2.0b Type-A connector x 1 YCbCr color sampling: 8-bit 4:2:2 Output resolution: Video 3840x2160p, 1920x1080i/p, 1280x720p, 525/59.94i, 625/50i Frequency (Hz): 60, 59.94, 50, 30, 29.97, 25, 24, 23.98
SFP cage (FA-96SFPC4)	SFP/SFP+ module cage and connector x 4 With all SFP/SFP+ modules installed: 12G/6G/3G/HD/SD-SDI 4-input / 4-output
Resolution	4:2:2 digital component
Quantization	12G/3G/HD/SD-SDI: 10-bit
Genlock input	BB: NTSC: 0.429 Vp-p / PAL: 0.45 Vp-p or Tri-level Sync: 0.6 Vp-p BNC x 1 75Ω or loopthrough (75-ohm termination required if unused)
Sync mode	Frame, Line, AVDL, Line (Min)
System adjustment range	
Frame mode	Horizontal: -1/2 H to +1/2 H Vertical: -1/2 frame to +1/2 frame Delay: <Max> 1 frame +2 H <Min> 2 H (<Max> 1 frame + 4 H <Min> 4 H for Quad Link 3G-SDI)

Line mode	Horizontal: -1/2 H to +1/2 H Vertical: -1/2 frame to +1/2 frame Delay: <Max> 1 H + 1/2 H <Min> 1/2 H
AVDL mode	Horizontal: -1/2 H to +1/2 H Vertical: -1/2 frame to +1/2 frame Delay: HD <Max> 1 frame +1/2 H <Min> 1/2 H SD <Max> 1 H +1/2 H <Min> 1/2 H
Line (Min) mode	Horizontal: -1/2 H to +1/2 H Vertical: -1/2 frame to +1/2 frame Delay: <Max> 1 H + 700 clk <Min> 700 clk
Converter 1 (FA-96UDC)	4K 2SI/SQD conversion, Up-, Down-, Cross-conversions, Aspect ratio conversions, Resizing, Re-positioning, I-P conversions, 3G-SDI Level A/B conversions, Frame rate conversions (x1/2 and x2)
Supporter formats	3840 x 2160/59.94p, 50p 3840 x 2160/60p, 48p, 47.95p, 30p, 29.97p, 25p, 24p, 23.98p 3840 x 2160/30PsF, 29.97PsF, 25PsF, 24PsF, 23.98PsF 1080/59.94p, 50p, 29.97p, 25p, 23.98p 1080/59.94i, 50i, 23.98PsF 1080/60p, 30p, 24p 1080/60i, 30PsF, 29.97PsF, 25PsF, 24PsF 720/59.94p, 50p 720/60p, 30p, 29.97p, 25p, 24p, 23.98p 525/59.94i, 625/50i
Converter 2 (FA-96UDC)	I-P conversions 3G-SDI Level A/B conversions, Frame rate conversions (x1/2 and x2) (Up- / down- / cross-conversion, aspect conversion, resizing, position change: Dual HD mode (MU Main mode) only)
Supporter formats	1080/59.94p, 50p, 29.97p, 25p 1080/60p, 30p, 24p 1080/59.94i, 50i 1080/60i, 30PsF, 29.97PsF, 25PsF, 24PsF 720/60p, 30p, 29.97p, 25p, 24p, 23.98p
Frame delay	Max. 8 frames
Color processing	Proc. Amp, Color space conversion, EOTF (de-gamma) / OETF (gamma) Color corrector, Video clip
Proc. Amp.	Video level: 0.0% to 200.0% Chroma level: 0.0% to 200.0% Black level: -20.0% to 100.0% Hue: -179.8° to +180°
Color correction	Balance (RGB) mode Differential (YCbCr) mode
Video clip	Knee Clip (RGB), YCbCr Clip
Gamut	ITU-R BT.709/2020, User defined gamut (Data unloadable)
EOTF/OETF	HLG, SMPTE2048, ITU-R BT.1886, User defined functions (Data loadable)
SDI audio input	12G/6G/3G/HD-SDI: 16 channels (Group 1-4) 48 kHz 16- to 24-bit Synchronous / Asynchronous audio SD-SDI: 16 channels (Group 1-4) 48 kHz 16- to 24-bit Synchronous audio
SDI audio output	12G/6G/3G/HD-SDI: 16 channels (Group 1-4) 48 kHz 16/20/24-bit Synchronous / Asynchronous audio SD-SDI: 12 channels (Group 1-3) 48 kHz 16-/20-/24-bit Synchronous audio
HDMI audio input	8 channels 48kHz 16-24-bit synchronous
HDMI audio output	8 channels 48kHz 16/20/24-bit synchronous

AES audio input	1.0 Vp-p unbalanced 75Ω 32/44.1/48 kHz 16-24-bit
AES audio output	1.0 Vp-p unbalanced 75Ω 48 kHz 16/20/24-bit
(W/ FA-96AES-UBL)	BNC x 8 (AES/EBU input or output) 16 channels (8 stereo pairs)
(W/ FA-96AES-UBLC)	BNC x 4 (AES/EBU input) 8 channels (4 stereo pairs)
	BNC x 4 (AES/EBU output) 8 channels (4 stereo pairs)
Analog audio input	4 channels (2 stereo pairs) Hi-Z or 600 ohm balanced
Analog audio output	4 channels (2 stereo pairs) 100-ohm balanced
(W/ FA-96ANA-AUD)	25-pin D-sub (female) ×1 (TASCAM pin assignment)
	24-bit / 48 kHz A/D-D/A and internal processing
	Input/output level adjustment: +8, +4, 0, -10 dBu, Max. +24 dBu
	Frequency response: Within ±0.3 dB (20 Hz to 20 kHz)
	Distortion rate: 0.03% or less (1 kHz, +24 dBu)
	S/N ratio: 90 dB or more (at maximum level input)
Analog audio input	In x 1 (BNC coaxial 75-ohm) (Max. processed channels: 32)
Analog audio output	56 / 64 channels 32/44.1/48kHz, 16-24-bit, PCM only
(W/ FA-96MADI)	Out x 1 (BNC coaxial 75-ohm) (Max. processed channels: 32)
	56 / 64 channels 48kHz, 16/20/24-bit, PCM only
Audio delay adjustment	1 ms to 1,000 ms
Audio processing	SRC (Sample Rate Converter), Gain control, Downmix, Remap, Mute (processed per channel pair)
Interfaces	
Ethernet	100BASE-T RJ-45 x1
Temperature	0℃ to 40℃
Humidity	30% to 90% (no condensation)
Power	AC 100 V to 240 V ±10% 50/60 Hz
Consumption	FA-9600: 70 VA (67 W) (at AC 100-120 V) 72 VA (68 W) (at AC 220-240 V) W/ FA-96PS: 70 VA (65 W) (at AC 100-120 V) 86 VA (71 W) (at AC 220-240 V) Max. consumption w/ options 110 VA (107 W) (at AC 100-120 V) 110 VA (102 W) (at AC 220-240 V)
Dimensions	430 (W) x 310 (D) x 44 (H) mm
Weight	3.5 kg (w/ full options)
Consumables	Power unit: Recommended replacement period: 5 years Cooling fan: Recommended replacement period: 6 years

16-2. External Dimensions

(All dimensions in mm.)



Appendix 1: Event Data List

* If an optional card or software is required for items (parameters), it is listed under “Required.”

Category / Target / Item	Default	Value	Description	Required	Ref.
Event					
COM					
EventName	-	Event names	Adds event names to numbers, which are displayed in menus on the front panel, RU and Web GUI. Up to 15 alphanumeric and symbol characters.		14-3
Procss Amp					
FS1/FS2					
Pre Video Level	1000	0 - 2000	Preprocess settings Setting value is one-tenth of input value. Ex) 1234 => 123.4% (Hue: in 2 increments)		5-1
Pre Y Level	1000	0 - 2000			
Pre Chroma Level	1000	0 - 2000			
Pre Black Level	0	-200 - 1000			
Pre Hue	0	-1798 - 1800			
Post Video Level	1000	0 - 2000	Post-process settings Setting value is one-tenth of input value. Ex) 1234 => 123.4% (Hue: in 2 increments)		
Post Y Level	1000	0 - 2000			
Post Chroma Level	1000	0 - 2000			
Post Black Level	0	-200 - 1000			
Post Hue	0	-1798 - 1800			
Area Marker					
FS1/FS2					
Marker Color	0	0 1 2	0: Red 1: Green 2: Blue	FA-96AHDR/ 96AHDR2	5-3
Marker Blink	0	0 1	0: Disable 1: Enable		
Dynamic Range CONV					
FS1/FS2					
Gamma Curve Enable	0	0 1	0: Bypass 1: Operate	(FA-96 AHDR2)	5-4
EOTF DeGamma	1	1 2 3 4 5 6 7 8 9 10 11 13	Gamma curve used for input 1 - 10: User 01 - User 10 (FA-96AHDR2 required) 11: S-Log3 Live HDR 13: SDR(SONY)		
OETF Gamma	1	1 2 3 4 5 6 7 8 9 10 11 13	Gamma curve used for output 1 - 10: User 01 - User 10 (FA-96AHDR2 required) 11: S-Log3 Live HDR 13: SDR(SONY)		
OOTF IN Mode	0	0 1	INPUT SIDE OOTF On/Off 0: Disable 1: OOTF		5-5
OOTF IN System Gamma	12	10 - 20	INPUT SIDE OOTF Gamma value Setting value is one-tenth of input value. Ex) 11 => 1.1		
OOTF IN Display Peak	1000	100 - 10000	INPUT SIDE Peak (Max. Brightness) (in 100 increments)		
OOTF IN Display Black	0	0 - 100	INPUT SIDE Black (Min. Brightness) (in 10 increments)		
OOTF OUT Mode	0	0 2	OUTPUT SIDE OOTF On/Off 0: Disable 2: Inverse OOTF		
OOTF OUT System Gamma	12	10 - 20	OUTPUT SIDE OOTF Gamma value Setting value is one-tenth of input value. Ex) 11 => 1.1		

Category	Target	Item	Default	Value	Description	Required	Ref.
		OOTF OUT Display Peak	1000	100 - 10000	OUTPUT SIDE Peak (Max. Brightness) (in 100 increments)		
		OOTF OUT Display Black	0	0 - 100	OUTPUT SIDE Black (Min. Brightness) (in 10 increments)		
		OOTF RGB	0	0 1	0: Adjustment 1: SR-Live	FA-96AHDR2	
		System Gamma	1	0 1 2 3 4	0-4: 1.1 to 1.5	FA-96AHDR2	
		OOTF FOR SR-Live	0	0 1 2	0: Disable 1: Inverse OOTF 2: OOTF	FA-96AHDR2	5-6
		SDR(SONY)	0	0 1 2 3 4 5 6 7 8 9 10	0-6: STANDARD1-7 7-10: HYPER1-4	FA-96AHDR2	
		Dynamic Range Gain	0	-2400 - 2400	Setting value is one-hundredth of input value. Ex) 1230 => 12.30dB		5-18
		SDR Gain	0	0 - 2400	Setting value is one-hundredth of input value. Ex) 1230 => 12.30dB		
		DRC 3DLUT	0	1 2 3 4 5 6 7 8 9 10 11 12 13	3D-LUT data 1 - 10: User 01 - User 10 11 - 13:(FA-96AHDR2 required)	(FA-96AHDR2)	5-7
		IO Range	0	0 1 2 3	Input and output signal ranges for 3D-LUT 0: Narrow >> Narrow 1: SDI >> SDI 2: Narrow >> SDI 3: SDI >> Narrow	(FA-96 AHDR2)	5-7
	COM						
		Simul Mode	0	0 1	0: Disable 1: Enable		5-18
Color Space CONV							
	FS1/FS2						
		In Color Space	0	0 1 2 3 4 5 6	0: Rec. ITU-R BT.709 1: Rec. ITU-R BT.2020 2: User 1 3: User 2 4: User 3 5: User 4 6: User 5		5-4
		Out Color Space	0	0 1 2 3 4 5 6	0: Rec. ITU-R BT.709 1: Rec. ITU-R BT.2020 2: User 1 3: User 2 4: User 3 5: User 4 6: User 5		

Category / Target / Item	Default	Value	Description	Required	Ref.
Color Correct BAL(Pre)					
FS1/FS2					
White LevelR	0	-2000 to 2000	Setting value is one-tenth of input value. Ex) 1235 => 123.5%		5-9
White LevelG					
White LevelB					
White Level Master	1000	0 - 2000			
Black LevelR	0	-2000 - 2000			
Black LevelG					
Black LevelB					
Black Level Master	1000	0 - 2000			
Gamma LevelR	0	-2000 - 2000			
Gamma LevelG					
Gamma LevelB					
Gamma Level Master	1000	0 - 2000			
Gamma Curve	0	0 1 2	0: Center 1: Black 2: White		
Gamma Range	1000	5 - 1000	Setting value is one-tenth of input value. Ex) 125 => 12.5%		
Color Correct BAL					
FS1/FS2					
White LevelR	0	-2000 - 2000	Setting value is one-tenth of input value. Ex) 1235 => 123.5%		5-9
White LevelG					
White LevelB					
White Level Master	1000	0 - 2000			
Black LevelR	0	-2000 - 2000			
Black LevelG					
Black LevelB					
Black Level Master	1000	0 - 2000			
Gamma LevelR	0	-2000 - 2000			
Gamma LevelG					
Gamma LevelB					
Gamma Level Master	1000	0 - 2000			
Gamma Curve	0	0 1 2	0: Center 1: Black 2: White		
Gamma Range	1000	5 - 1000	Setting value is one-tenth of input value. Ex) 125 => 12.5%		
Color Correct DIF					
FS1/FS2					
White LevelR-Y	1000	0 - 2000	Setting value is one-tenth of input value. Ex) 1235 => 123.5%		5-10
White LevelG-Y					
White LevelB-Y					
Black LevelR-Y	1000	0 - 2000			
Black LevelG-Y					
Black LevelB-Y					
Knee Clip					
FS1/FS2					
Knee Type	1	0 1	0: Y 1: RGB		5-11
Knee Slop	100	10 - 100	Setting value is one-hundredth of input value. Ex) 15 => 0.15		
Knee Point	1000	500 - 1500	Setting value is one-tenth of input value. Ex) 1235 => 123.5%		
White Clip Enable	0	0 1	0: Disable 1: Enable		
White Clip	1000	500 - 1500	Setting value is one-tenth of input value.		
Knee Saturation Enable	0	0 1	0: Disable 1: Enable		
Knee Saturation Level	0	0 - 200	Adjusts colors in knee correction area.		
Black Clip Enable	0	0 1	0: Disable 1: Enable		
Black Clip	0	-500 - 500	Setting value is one-tenth of input value.		

Category / Target / Item	Default	Value	Description	Required	Ref.
YPbPr Clip					
FS1/FS2					
YPbPr Clip Enable	0	0 1	0: Disable 1: Enable		5-12
White Clip	1090	500 - 1090	Setting value is one-tenth of input value. Ex) 565 => 56.5%		
Black Clip	-75	-75 - 500			
Chroma Clip	1110	500 - 1130			
Sync					
FS1/FS2					
Input Source	0/1	0 1 2 5 6 7 8	0: IN 1 1: IN 2 2: HDMI IN (W/ FA-96EX3G44-R) 5-8: EX3G IN1-4 (W/ FA-96SFPC4) 5-6: SFP RX1-2 7-8: SFP TX1-2	(FA-96 EX3G44-R) (FA-96 SFPC4)	5-13
Loss Mode	0/2	0 1 2 8 9 10 11	0: Color(Link) (W/ FA-964K) 1: Color(Sep) (W/ FA-964K) 2: Color 8: Auto Freeze 9: SDI Output Mute 10: SDI Output Mute(Link) (W/ FA-964K) 11: SDI Output Mute(Sep) (W/ FA-964K)	(FA-964K)	
Input Loss Color	0	0 1 2 3 4 5 6	0: Black 1: Blue 2: Red 3: Magenta 4: Green 5: Cyan 6: Yellow		
Color Processor Source	0/2	0 1 2 3	0: Synchronizer 1 1: Converter 1 2: Synchronizer 2 3: Converter 2		5-15
Sync Format	0	0 1	0: Auto (FS input signal format) 1: Manual (Format set below)		5-39
Format Standard	2	0 1 2 3	0: SD 1: 720 2: 1080 3: 2160 (FS 1 only, w/ FA-964K)	(FA-964K)	
Format H Size	0	0	(Setting disabled)		
Format Frame/Field Rate	11	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	0: 60p 1: 59.94p 2: 50p 3: 48p 4: 47.95p 5: 30p 6: 29.97p 7: 25p 8: 24p 9: 23.98p 10: 60i 11: 59.94i 12: 50i 13: 24PsF 14: 23.98PsF 15: 30PsF 16: 29.97PsF 17: 25PsF		
Format Level	0	0 1 2	0: Follow Input 1: Level A 2: Level B(Dual Link)		
Format Division	0	0 1 2	(FS1 only) 0: Follow Input 1: SQD 2: 2SI	FA-964K	
Freeze Mode	0	0 1 2	0: Frame 1: Odd 2: Even		
Sync Mode	0	0 1 2 3	0: Frame 1: Line 2: AVDL 3: Line(Min)		5-40
Sync H Phase	0	-2750 - 2750	-2750Clock - 2750 Clock		
Sync V Phase	0	-563 - 563	-563Line - 563Line		
Frame Delay	0	0 - 80	0: Disable 5-80: 0.5 to 8.0 Frames (for Normal Mode) (in 5 increments)		5-42

Category / Target / Item	Default	Value	Description	Required	Ref.
Ancillary					
FS1/FS2					
H ANC MUX Mode	0	0 1 2	0: Overwrite 1: Pass 2: Blank		5-29
H ANC PayloadId	0	0 1	0: Pass 1: Overwrite		5-30
H ANC VPID DR/CS Mode	0	0 1	0: Auto 1: Manual		
H ANC VPID Color Space	0	0 1 2 3	0: Rec.709 1: VANC 2: UHDTV 3: Unknown		
H ANC VPID Dynamic Range	0	0 1 2 3	0: SDR 1: HLG 2: PQ 3: Unspecified		
H ANC VPID HD Mode	1	0 1	0: Disable 1: Enable		
H ANC LTC OUT	0	0 1	0: Disable 1: Enable		5-32
H ANC VITC OUT					
H ANC DVITC OUT					
V ANC MUX Mode	1	1 2	1: Pass 2: Rewrite		5-29
V ANC User Packet Detect DID	50	50-5F	User packet DID value (Support planned)		5-36
V ANC User Packet Detect SDID	01	01-FF	User packet SDID value (Support planned)		
V ANC ARIB B37 OUT	0	0 1	0: Disable 1: Through		5-37
V ANC ARIB B39 OUT	0	0 1 2	0: Disable 1: Through 2: Overwrite		
V ANC User Packet Insert	0	0 1	0: Disable 1: Through (Support planned)		
V ANC User Packet Insert Line 525	12	8 - 41	Line number into which the user packet is inserted for each video format. (Support planned)		5-38
V ANC User Packet Insert Line 625	8				
V ANC User Packet Insert Line 720	9				
V ANC User Packet Insert Line 1080i	9				
V ANC User Packet Insert Line 1080p(1.5G)	9				
V ANC User Packet Insert Line 1080p(3G-A)	9				
V ANC User Packet Insert Line 1080p(3G-B)	9				

Category	Target	Item	Default	Value	Description	Required	Ref.
		V ANC ARIB B39 AUDIO MODE	0	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46	Unused M 2M(D) 3M(D+M) 4M(2D) 5M(2D+M) 6M(3D) 7M(3D+M) 8M(4D) S 2S 3S 4S 3/0 2/1 3/1 2/2 3/2 3/2+LFE(5.1) S+M S+2M(S+D) 5.1+S 3/1+S 3/2+S 9M Over(M Only) 5S Over(S Only) Other 5.1+2S 5.1+3S 5.1+5.1 5.1+5.1+S 5.1+5.1+2S 7.1 7.1+S 7.1+2S 7.1+3S 7.1+5.1 7.1+5.1+S 7.1+5.1+2S 7.1+5.1+5.1 7.1+5.1+5.1+S 22.2 22.2+S 22.2+2S 22.2+3S 22.2+5.1 22.2+5.1+S		6-4
		V ANC ARIB B39 AUDIO MODE Enable	0	0 1	0: Pass 1: Overwrite		
		LTC Source	0	0 1 2 3 4	0: ST12M-2 ATC(LTC) 1: ST12M-2 ATC(VITC) 2: ST12M-1 VITC(DVITC) 3: ST12M-1 LTC IN (W/ FA-96DIN4-CBL) 4: Generator	(FA-96 DIN4-CBL)	5-33
		LTC Loss Mode	0	0 1 2	0: Stay 1: Continue 2: Disable		
		LTC Generate Run	0	0 1	0: Stop 1: Start		
		LTC Frame Adjust	0	-16 - 16			
		LTC DropFrame	0	0 1	0: Off 1: On		
		LTC PresetTime HH	0	0 - 23	Preset LTC timecode		
		LTC PresetTime MM	0	0 - 59			
		LTC PresetTime SS	0	0 - 59			
		LTC PresetTime FF	0	0 - 29			
		VITC Source	1	0 1 2 3 4	0: ST12M-2 ATC(LTC) 1: ST12M-2 ATC(VITC) 2: ST12M-1 VITC(DVITC) 3: ST12M-1 LTC IN (W/ FA-96DIN4-CBL) 4: Generator	(FA-96 DIN4-CBL)	5-34
		VITC Loss Mode	0	0 1 2	0: Stay 1: Continue 2: Disable		
		VITC Generate Run	0	0 1	0: Stop 1: Start		
		VITC Frame Adjust	0	-16 - 16			
		VITC DropFrame	0	0 1	0: Off 1: On		
		VITC PresetTime HH	0	0 - 23	Preset VITC timecode		
		VITC PresetTime MM	0	0 - 59			

Category / Target / Item	Default	Value	Description	Required	Ref.
VITC PresetTime SS	0	0 - 59			
VITC PresetTime FF	0	0 - 29			
Video System					
FS1/FS2					
Test Signal	0	0 1 2	0: Disable 1: 100% Color Bar 2: 75% Color Bar		5-44
VSYS					
Genlock Source	0	0 1 2 3	0: GENLOCK IN 1: FS1 2: FS2 3: Free Run		5-40
SDI1 Bypass SDI2 Bypass	1	0 1	0: Bypass 1: Operate		5-43
OUT 1a/1b	0	0 1 2 3	0. Proc. 1 / SL (Proc.1) 1. Proc. 2 / SL (Proc.2) 2: DL L1/L2(Proc.1) 3. QL L1/L2(Proc.1)		5-19
OUT 2a/2b	1	0 1 2 3	0: Proc. 1 / SL (Proc.1) 1: Proc. 2 / SL (Proc.2) 2: DL L1/L2(Proc.1) 3: QL L3/L4(Proc.1)		
UHD Input Link	0	0 1 2	0: Single Link 1: Dual Link 2: Quad Link (W/ FA-96EX3G44-R)		
HDMI OUT	0	0 1	0: Proc.1 1: Proc.2		
FA-96UDC					
FS1/FS2					
Converter1 Source	0	0 1	0: Synchronizer1 1: Synchronizer2	FA-96UDC (FS1)	5-14
Format Converter	0	0 1	0: Follow Input 1: Manual	FA-96UDC	5-20
Format Standard	2	0 1 2 3	0: SD 1: 720 2: 1080 3: 2160 (FS1, w/ FA-964K)		
Format H Size	0	0	(Setting disabled)		
Format Frame/Field Rate	11	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	0: 60p 1: 59.94p 2: 50p 3: 48p 4: 47.95p 5: 30p 6: 29.97p 7: 25p 8: 24p 9: 23.98p 10: 60i 11: 59.94i 12: 50i 13: 24PsF 14: 23.98PsF 15: 30PsF 16: 29.97PsF 17: 25PsF		
Format Level	1	1 2	1: Level-A 2: Level-B (Dual Link)		
Format Division (FS1 only)	1	1 2	1: SQD 2: 2SI	FA-96UDC FA-964K	
Delay Mode	0	0 1 2	0: Frame 1: Minimum 2: Adjustable	FA-96UDC	5-21
Adjust Delay H	0	-2750 - 2750	-2750Clock - 2750Clock		
Adjust Delay V	0	-563 - 563	-563Line - 563Line		
Frame Delay	0	0 - 16	0: Disable 1-16: 0.5 to 8.0 Frames (for Legacy Mode) (in 5 increments)		5-42
Motion Sense	0	0 1 2 3	0: Adaptive 1: Field 2: Frame(Odd 1st) 3: Frame(Even 1st)		5-23
Filter Setting HS Details	0	0 1	0: Disable 1: Enable		5-24
Advanced Antialias H Mode	0	0 1	0: Auto 1: Manual		5-25

Category / Target	Item	Default	Value	Description	Required	Ref.
	Advanced Antialias H Frequency	-	0 - 15	0 (0.125) to 15 (0.500)		
	Advanced Antialias H Level	20	0 - 20	Five times the entered value is set. Ex.) 12=> 60%		
	Advanced Antialias V Mode	0	0 1	0: Auto 1: Manual		
	Advanced Antialias V Frequency	-	0 - 15	0 (0.125) to 15 (0.500)		
	Advanced Antialias V Level	20	0 - 20	Five times the entered value is set. Ex.) 12=> 60%		
	Enhance H Enable	0	0 1	0: Disable 1: Enable		5-26
	Enhance H High	1	0 - 10	Sets the higher horizontal enhance level from 0.29 to 0.4 in the sampling frequency.		
	Enhance H Middle	1	0 - 10	Sets the middle horizontal enhance level from 0.17 to 0.29.		
	Enhance H Low	1	0 - 10	Sets the lower horizontal enhance level from 0.03 to 0.17.		
	Enhance V Enable	0	0 1	0: Disable 1: Enable		
	Enhance V High	1	0 - 10	Sets the higher vertical enhance level from 0.29 to 0.4 in the sampling frequency.		
	Enhance V Middle	1	0 - 10	Sets the middle vertical enhance level from 0.17 to 0.29.		
	Enhance V Low	1	0 - 10	Sets the lower vertical enhance level from 0.03 to 0.17.		
	Directional Interpolation	0	0 1	0: Disable 1: Enable	FA-96UDC FA-964K	5-28
	Edge Detect Level	5	0 - 10			
	SD Output Aspect Conv.	7	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	4: 4:3 L 16:9 T 5: 4:3 L 14:9 T 6: 4:3 L>16:9 7: 4:3 F 4:3 8: 4:3 L 16:9 PRTD 9: 4:3 L 14:9 10: 4:3 F ALT 14:9 11: 4:3 L ALT 14:9 12: 4:3 L ALT 4:3 13: 16:9 L>16:9 14: 16:9 F 16:9 15: 16:9 P 4:3 16: 16:9 F PRTD 17: 16:9 P 14:9 18: 16:9 P ALT 14:9 19: 16:9 F ALT 14:9 20: 16:9 F ALT 4:3	FA-96UDC	5-22
FA-96UDC						
FS1/FS2						
	HD Output Aspect Conv.	3	2 3 4 5 6 7 8 9	2: 16:9 L>16:9 3: 16:9 F 16:9 4: 16:9 P 4:3 5: 16:9 F PRTD 6: 16:9 P 14:9 7: 16:9 P ALT 14:9 8: 16:9 F ALT 14:9 9: 16:9 F ALT 4:3	FA-96UDC	5-22
	Input Aspect Ratio for SD	0	0 1	0: 4:3 1: 16:9		
	Aspect Conv. H Size	1000	500 - 1500	Setting value is one-tenth of input value. Ex) 1234 => 123.4%		
	Aspect Conv. V Size	1000	500 - 1500			
	Aspect Conv. H Pos	0	(See p 61)	Image position after conversion		
	Aspect Conv. V Pos	0				
	Aspect Conv. Crop Left	0		Image cropping		
	Aspect Conv. Crop Right	0				
	Aspect Conv. Crop Top	0				
	Aspect Conv. Crop Bottom	0				
	Aspect Conv. Scaling Enable	0	0 1	0: Disable 1: Enable		
	NR Enable	1	0 1	0: Disable 1: Enable	FA-96UDC	5-28
	NR R Level NR G Level NR B Level	8	1 - 16	Noise reduction level (for dark area)		

Category / Target / Item	Default	Value	Description	Required	Ref.
Audio Demux					
DMX1/DMX2					
Alignment	0	0 1	0: Disable 1: Enable		6-1
Audio Clock	0	0 1 2	0: Auto 1: Sync SDI 2: Audio Clock		
Audio Multiplex					
EMB1/EMB2					
Group1 Enable	1	0 1	0: Disable 1: Enable		6-3
Group2 Enable					
Group3 Enable					
Group4 Enable					
Group1 HD Clock	0	0 1 2 3	0: Auto 1: Reference 2: Input Ch X/X (Group1 1/2, Group2 5/6, Group3 9/10, Group4 13/14) 3: Input Ch X/X (Group1 3/4, Group2 7/8, Group3 11/12, Group4 15/16)		6-2
Group2 HD Clock					
Group3 HD Clock					
Group4 HD Clock					
Audio Polarity					
EMB1/EMB2					
Ch1 I Ch16	0	0 1	0: Normal 1: Invert		6-5
AES					
Ch1 I Ch8	0	0 1	0: Normal 1: Invert		6-18
Audio Source Select V2					
ASEL					
Ch1-4	0	0 - 33	0: EMB1 Input Ch.1-4 1: EMB1 Input Ch.5-8 2: EMB1 Input Ch.9-12 3: EMB1 Input Ch.13-16 8: EMB2 Input Ch.1-4 9: EMB2 Input Ch.5-8 10: EMB2 Input Ch.9-12 11: EMB2 Input Ch.13-16 12: AES Input Ch.1-4 13: AES Input Ch.5-8 (W/ FA-96AES- UBL) 14: OP(AES) Input Ch.1-4 15: OP(AES) Input Ch.5-8 (W/ FA-96ANA-AUD) 16: OP(ANA:B) In Ch.1-4 (W/ FA-96MADI) 18: OP(MADI) In Ch.1-4 19: OP(MADI) In Ch.5-8 20: OP(MADI) In Ch.9-12 21: OP(MADI) In Ch.13-16 22: OP(MADI) In Ch.17-20 23: OP(MADI) In Ch.21-24 24: OP(MADI) In Ch.25-28 25: OP(MADI) In Ch.29-32 26: OP(MADI) In Ch.33-36 27: OP(MADI) In Ch.37-40 28: OP(MADI) In Ch.41-44 29: OP(MADI) In Ch.45-48 30: OP(MADI) In Ch.49-52 31: OP(MADI) In Ch.53-56 32: OP(MADI) In Ch.57-60 33: OP(MADI) In Ch.61-64	(FA-96 AES-UBLC) (FA-96 AES-UBL) (FA-96 ANA-AUD) (FA-96 MADI)	6-6
Ch5-8	1				
Ch9-12	2				
Ch13-16	3				
Ch17-20	8	0 – 33 (Excluding AES inputs)			
Ch21-24	9				
Ch25-28	10				
Ch29-32	11				

Category / Target / Item	Default	Value	Description	Required	Ref.
Audio SRC					
ASRC					
Ch1/2 | Ch31/32	0	0 1 2	0: Auto 1: Use SRC 2: Bypass SRC		6-7
Audio Monosum					
MONO					
MONO1L	0	0 - 31	0 - 31: Source Ch.1 - 32		6-8
MONO1R	1				
MONO2L	2				
MONO2R	3				
MONO3L	4				
MONO3R	5				
MONO4L	6				
MONO4R	7				
MONO5L	8				
MONO5R	9				
MONO6L	10				
MONO6R	11				
MONO7L	12				
MONO7R	13				
MONO8L	14				
MONO8R	15				
MONO9L	16				
MONO9R	17				
MONO10L	18				
MONO10R	19				
MONO11L	20				
MONO11R	21				
MONO12L	22				
MONO12R	23				
MONO13L	24				
MONO13R	25				
MONO14L	26				
MONO14R	27				
MONO15L	28				
MONO15R	29				
MONO16L	30				
MONO16R	31				
Audio Downmix					
DMIX1/DMIX2					
Downmix Mode	0	0 1 2	0: Stereo 1: Surround 2: Monaural		6-9
Surround Level	0	0 1 2 3	0: -3dB 1: -6dB 2: -9dB 3: Off		
Center Level	0	0 1 2	0: -3dB 1: -4.5dB 2: -6dB		
Master Level	0	0 1 2	0: -3dB 1: 0dB 2: Auto		
Left Source	0/16	0 - 31 64 65 66	0 - 31: Source Ch.1 - 32 66: Silence		
Right Source	1/17				
Center Source	2/18				
Ls Source	4/20				
Rs Source	5/21				

Category / Target / Item	Default	Value	Description	Required	Ref.
Audio MAP					
EMB1/EMB2					
Ch1	0/16	0 - 31 64 65 66 80 81 82 83 96 98 100 102 104 106 108 110 112 114 116 118 120 122 124 126	0 - 31: Source Ch.1 - 32 64: 500Hz Tone 65: 1kHz Tone 66: Silence 80: Downmix 1_L 81: Downmix 1_R 82: Downmix 2_L 83: Downmix 2_R 96: Mono Sum 1 98: Mono Sum 2 100: Mono Sum 3 102: Mono Sum 4 104: Mono Sum 5 106: Mono Sum 6 108: Mono Sum 7 110: Mono Sum 8 112: Mono Sum 9 114: Mono Sum 10 116: Mono Sum 11 118: Mono Sum 12 120: Mono Sum 13 122: Mono Sum 14 124: Mono Sum 15 126: Mono Sum 16		6-10
Ch2	1/17				
Ch3	2/18				
Ch4	3/19				
Ch5	4/20				
Ch6	5/21				
Ch7	6/22				
Ch8	7/23				
Ch9	8/24				
Ch10	9/25				
Ch11	10/26				
Ch12	11/27				
Ch13	12/28				
Ch14	13/29				
Ch15	14/30				
Ch16	15/31				
AES					
Ch1	0	(Same as above)	See above.		6-12
Ch2	1				
Ch3	2				
Ch4	3				
Ch5	4				
Ch6	5				
Ch7	6				
Ch8	7				
AES SET					
SYS					
Hysteresis Ch1/2	0	0 1 2	0: Disable 1: Group A 2: Group B		6-16
Hysteresis Ch3/4	0				
Hysteresis Ch5/6	0				
Hysteresis Ch7/8	0				
Terminal I/O 1/2-3/4	0	0 1	0: Input 1: Output		6-17
Terminal I/O 5/6-7/8	0				
Audio Gain					
EMB1/EMB2					
Master Gain	0	-200 - 200	Setting value is one-tenth of input value. Ex) 123 => 12.3dB		6-19
Ch1 | Ch16	0	-400 - 400	Setting value is one-tenth of input value. Total gain for each channel = (Master Gain value) + (Channel Gain value)		
AES					
Master Gain	0	-200 - 200	Setting value is one-tenth of input value. Ex) 123 => 12.3dB		6-19
Gain Ch1 | Gain Ch8	0	-400 - 400	Setting value is one-tenth of input value. Total gain for each channel = (Master Gain value) + (Channel Gain value)		
Audio Delay					
ADLY G1/ADLY G2					
Master	1	1 - 1000	Master Delay		6-22
Ch1 | Ch16	0	-999 - 999	Total delay for each channel = (Master Delay value) + (Channel Delay value)		
Delay Adj FS	0	0 1	0: FS1 1: FS2		6-23
Audio Dolby Alignment					
AES					
FS Select A	0	0 1	0: FS1 1: FS2		6-24
FS Select B	0	0 1	0: FS1 1: FS2		

Category / Target / Item		Default	Value	Description	Required	Ref.
CDLY						
EMB1		1	0 1	0: Disable 1: Same as FS1/2		6-25
EMB2						
AES		1	0 1 2	0: Disable 1: Same as FS1 2: Same as FS2		
Audio System						
ASYS						
Reference Level		1	0 1	0: -18dBFS 1: -20dBFS		7-2
Grade		0	0 1	0: Professional 1: Consumer		
Resolution		2	0 1 2	0: 16bit 1: 20bit 2: 24bit		
Silence Time		2	1 - 10	1 - 10: 1 - 10sec		
Digital SilenceLevel		4	0 1 2 3 4	0: -48dBFS 1: -54dBFS 2: -60dBFS 3: -66dBFS 4: -72dBFS		
Error Sensing		1	0 1 2	0: Disable 1: Normal 2: Sensitive		
Error Fade		0	0 1	0: Disable 1: Enable		
Analog SilenceLevel		3	0 1 2 3	0: -48 dBFS 1: -54 dBFS 2: -60 dBFS 3: -66 dBFS	FA-96 ANA- AUD	6-28
Analog Silence Time		2	1 - 10	1 - 10: 1 - 10sec		
Audio Test/Mute						
Signal						
EMB1 Test Signal		0	0 1 2	0: Off 1: 500Hz Tone 2: 1kHz Tone		7-3
EMB2 Test Signal						
AES Test Signal		0	0 1 2	1: 500Hz Tone 2: 1kHz Tone		
Master Mute		0	0 1	0: Disable 1: Enable		
Audio HDMI						
SYS						
Group1		0/1	0 1 2 3	0: EMB.Group1(Ch.1-4) 1: EMB.Group2(Ch.5-8) 2: EMB.Group3(Ch.9-12) 3: EMB.Group4(Ch.13-16)		7-3
Group2						
HDMI Out Enable		1	0 1	0: Disable 1: Enable		
FA-96EX3G44						
SlotA						
OUT 1 | OUT 4		0	0 1 2 3	0: Proc.1 / SL(Proc.1) 1: Proc.2 / SL(Proc.2) 2: DL(Proc.1) 3: QL(Proc.1)	FA-96 EX3G44-R	5-19
Bypass1 | Bypass4		1	0 1	0: Bypass 1: Operate		5-43
FA-96EX12G06						
SlotA						
Simultaneous 4K/HD mode	OUT 1a/1b/2	0	0 1 2 3	0: SL (Proc.1) 1: SL (Proc.2) 2: DL L1/L1/L1 (Proc.1) 3: QL L1/L1/L2 (Proc.1)	FA-96 EX12G06	5-19
Simultaneous 4K/HD mode	OUT 3a/3b/4	1	0 1 2 3	0: SL (Proc.1) 1: SL (Proc.2) 2: DL L2/L2/L2 (Proc.1) 3: QL L3/L3/L4 (Proc.1)		
Dual HD mode	OUT 1a/1b/2	0	0 1	0: Proc. 1 1: Proc. 2		
	OUT 3a/3b/4					
3D-LU mode	OUT 1a/1b/2	0	0 2 3	0: SL (Proc.1) 2: DL L1 (Proc.1) 3: QL L1 (Proc.1)		
	OUT 3a/3b/4					

Category / Target / Item		Default	Value	Description	Required	Ref.
FA-96SPFC4						
SlotA						
Simultaneous 4K/HD mode, Single link	OUT 1/2	0	0 1 2 3	0: SL (Proc.1) 1: SL (Proc.2) 2: SL (P1) / SL (P2) 3: SL (P2) / SL (P1)	FA-96 SFPC4	5-19
Simultaneous 4K/HD mode, Dual/Quad link	OUT 1/2	0	0	0: DL L1/L2 (Proc 1) (in Dual link) 0: QL L1/L2 (Proc 1) (in Quad link)		
Simultaneous 4K/HD mode, Single link	OUT 3/4	0	0 1 2 3	0: SL (Proc.1) 1: SL (Proc.2) 2: SL (P1) / SL (P2) 3: SL (P2) / SL (P1)		
Simultaneous 4K/HD mode, Dual/Quad link	OUT 3/4	0	0	0: DL L1/L2 (Proc 1) (in Dual link) 0: QL L1/L2 (Proc 1) (in Quad link)		
Simultaneous 4K/HD mode	OUTLINK	0	0 1 2	0: Single Link 1: Dual Link 2: Quad Link		
Dual HD mode	OUT 1/2	0	0 1 2 3	0: Proc.1 1: Proc.2 2: Proc.1 / Proc.2 3: Proc.2 / Proc.1		
Dual HD mode	OUT 3/4					
Dual HD mode	OUTLINK	0	0	0: Single Link		
3D-LU mode	OUT 1/2	0	0	0: SL (Proc.1) * Single 0: DL L1/L2 (Proc.1) * Dual 0: QL L1/L2 (Proc.1) * Quad(OUT 1/2) 0: QL L3/L4 (Proc.1) * Quad(OUT 3/4)		
3D-LU mode	OUT 3/4					
3D-LU mode	OUTLINK	0	0 1 2	0: Single Link 1: Dual Link 2: Quad Link		
FA-96AESUBL						
SlotB						
Hysteresis Ch1/2		0	0 1 2	0: Disable 1: Group A 2: Group B	FA-96 AES- UBL	6-16
Hysteresis Ch3/4						
Hysteresis Ch5/6						
Hysteresis Ch7/8						
Polarity Ch1 | Polarity Ch8		0	0 1	0: Normal 1: Invert		6-18
MAP Ch1		0	0 - 31 64 65 66 80 81 82 83 96 98 100 102 104 106 108 110 112 114 116 118 120 122 124 126	0 - 31: Source Ch.1 - 32 64: 500Hz Tone 65: 1kHz Tone 66: Silence 80: Downmix 1_L 81: Downmix 1_R 82: Downmix 2_L 83: Downmix 2_R 96: Mono Sum 1 98: Mono Sum 2 100: Mono Sum 3 102: Mono Sum 4 104: Mono Sum 5 106: Mono Sum 6 108: Mono Sum 7 110: Mono Sum 8 112: Mono Sum 9 114: Mono Sum 10 116: Mono Sum 11 118: Mono Sum 12 120: Mono Sum 13 122: Mono Sum 14 124: Mono Sum 15 126: Mono Sum 16		6-12
MAP Ch2		1				
MAP Ch3		2				
MAP Ch4		3				
MAP Ch5		4				
MAP Ch6		5				
MAP Ch7		6				
MAP Ch8		7				
Master Gain		0	-200 - 200	Setting value is one-tenth of input value. Ex) 123 => 12.3dB		6-19
Gain Ch1 | Gain Ch8		0	-400 - 400	Setting value is one-tenth of input value. Total gain for each channel = (Master Gain value) + (Channel Gain value)		
Output Conv. Delay		0	0 1 2	0: Disable 1: Same as FS1 2: Same as FS2		6-25
Terminal Ch1		0	0 1	0: Input 1: Output		6-17
Terminal Ch2						

Category / Target / Item	Default	Value	Description	Required	Ref.
FA-96ANAAUD					
SlotB					
InputLevel Ch1 | InputLevel Ch4	2	0 1 2 3	0: -10 dBu 1: 0 dBu 2: +4 dBu 3: +8 dBu	FA-96 ANA- AUD	6-26
OutputLevel Ch1 | OutputLevel Ch4	2				
Polarity Ch1 | Polarity Ch4	0	0 1	0: Normal 1: Invert		6-27
MAP Ch1	0	0 - 31 64 65 66 80 81 82 83 96 98 100 102 104 106 108 110 112 114 116 118 120 122 124 126	0 - 31: Source Ch.1 - 32 64: 500Hz Tone 65: 1kHz Tone 66: Silence 80: Downmix 1_L 81: Downmix 1_R 82: Downmix 2_L 83: Downmix 2_R 96: Mono Sum 1 98: Mono Sum 2 100: Mono Sum 3 102: Mono Sum 4 104: Mono Sum 5 106: Mono Sum 6 108: Mono Sum 7 110: Mono Sum 8 112: Mono Sum 9 114: Mono Sum 10 116: Mono Sum 11 118: Mono Sum 12 120: Mono Sum 13 122: Mono Sum 14 124: Mono Sum 15 126: Mono Sum 16		6-13
MAP Ch2	1				
MAP Ch3	2				
MAP Ch4	3				
Master Gain	0	-200 - 200	Setting value is one-tenth of input value. Ex) 123 => 12.3dB		6-20
In Gain Ch1 | In Gain Ch4	0	-400 - 400	Setting value is one-tenth of input value. Total gain for each channel = (Master Gain value) + (Channel Gain value)		6-20
Out Master Gain	0	-200 - 200	Setting value is one-tenth of input value. Ex) 123 => 12.3dB		
Out Gain Ch1 | Out Gain Ch4	0	-400 - 400	Setting value is one-tenth of input value. Total gain for each channel = (Master Gain value) + (Channel Gain value)		
Output Conv. Delay	0	0 1 2	0: Disable 1: Same as FS1 2: Same as FS2		6-25
Input Impedance	1	0 1	0: 600 Ohm 1: Hi-Z		6-28
Load Impedance Match	1	0 1	0: 600 Ohm 1: Hi-Z		
FA-96MADI					
SlotB					
MAP Ch1	0	0 - 31 64 65 66 80 81 82 83 96 98 100 102 104 106 108 110 112 114 116 118 120 122 124 126	0 - 31: Source Ch.1 - 32 64: 500Hz Tone 65: 1kHz Tone 66: Silence 80: Downmix 1_L 81: Downmix 1_R 82: Downmix 2_L 83: Downmix 2_R 96: Mono Sum 1 98: Mono Sum 2 100: Mono Sum 3 102: Mono Sum 4 104: Mono Sum 5 106: Mono Sum 6 108: Mono Sum 7 110: Mono Sum 8 112: Mono Sum 9 114: Mono Sum 10 116: Mono Sum 11 118: Mono Sum 12 120: Mono Sum 13 122: Mono Sum 14 124: Mono Sum 15 126: Mono Sum 16	FA-96MADI	6-14
MAP Ch2	1				
MAP Ch3	2				
MAP Ch4	3				
MAP Ch5	4				
MAP Ch6	5				
MAP Ch7	6				
MAP Ch8	7				
MAP Ch9	8				
MAP Ch10	9				
MAP Ch11	10				
MAP Ch12	11				
MAP Ch13	12				
MAP Ch14	13				
MAP Ch15	14				
MAP Ch16	15				
MAP Ch17	16				
MAP Ch18	17				
MAP Ch19	18				

Category / Target	Item	Default	Value	Description	Required	Ref.
	MAP Ch20	19				
	MAP Ch21	20				
	MAP Ch22	21				
	MAP Ch23	22				
	MAP Ch24	23				
	MAP Ch25	24				
	MAP Ch26	25				
	MAP Ch27	26				
	MAP Ch28	27				
	MAP Ch29	28				
	MAP Ch30	29				
	MAP Ch31	30				
	MAP Ch32	31				
	Master Gain	0	-200 - 200	Setting value is one-tenth of input value. Ex) 123 => 12.3dB		
	Gain Ch1 | Gain Ch32	0	-400 - 400	Setting value is one-tenth of input value. Total gain for each channel = (Master Gain value) + (Channel Gain value)		6-21
	Output Conv. Delay	1	0 1 2	0: Disable 1: Same as FS1 2: Same as FS2		6-25
	Output Mode	1	0 1 2 3	0: 56ch Mode 1: 64ch Mode 2: Input Through 3: Output Disable		
	Output Select Ch.33-64	0	0 1 2 3 4 5	0: Silence 1: MADI In Ch.1-32 2: MADI In Ch.9-40 3: MADI In Ch.17-48 4: MADI In Ch.25-56 5: MADI In Ch.33-64		6-15
FA-96DIN4CBL						
SlotD						
	LtcOutSrc	0	0 1	0: Generator 1 1: Generator 2	FA-96 DIN4- CBL	5-35

Appendix 2: Ember+

FA-9600 units can be controlled using dedicated Ember+ commands over LAN.
Dynamic Range Control / Color Converter menu settings can be changed by these commands.

◆ **Communication Spedifications**

Communication	Interface	Ethernet: IEEE802.3u/ab (100BASE-TX / 1000BASE-T)
	Protocol	TCP/IP, Ember+
	Port number	55000
	Max number of sessions	Max. 5
Ember+	Version 1.7	
Glow DTD	Version 2.50	

Status Message

Element	Contents				Note
	Identifier	Description	Access	Type	
Node	processor				
Node	├identity				
Node	├deviceConfig				
Parameter	ipAddress		Read Only(1)	String(3)	FA-9600 IP address
Parameter	portNumber		Read Only(1)	Integer(1)	TCP/UDP port number
Parameter	deviceID		Read Only(1)	String(3)	Unit name
Node	└programConfig				
Parameter	bootloader		Read Only(1)	String(3)	Bootloader information
Parameter	rootfs		Read Only(1)	String(3)	rootfs software version
Parameter	fwVersion1		Read Only(1)	String(3)	FW 1 firmware version
Parameter	fwVersion2		Read Only(1)	String(3)	FW 2 firmware version
Parameter	fpgaVersion1		Read Only(1)	String(3)	FPGA 1 firmware version
Parameter	fpgaVersion2		Read Only(1)	String(3)	FPGA 2 firmware version
Parameter	fpgaVersion3		Read Only(1)	String(3)	FPGA 3 firmware version
Node	└FOR-A_FA		Read Only(1)	String(3)	
Node	labels				
Node	├ gammaCurves	User Gamma(1D-LUT)			Unavailable in 3D-LUT mode.
Parameter	g-1	User Gamma(1D-LUT) - 1	Read Only(1)	String(3)	User Gamma 1 (1D-LUT data) to User Gamma 10 (1D-LUT data).
|	|	|			
Parameter	g-10	User Gamma(1D-LUT) - 10	Read Only(1)	String(3)	
Node	├ colorSpaces	User Color Space			Unavailable in 3D-LUT mode.
Parameter	c-1	User Color Space - 1	Read Only(1)	String(3)	User Color space 1 to User Color space 5
	|	|			
Parameter	c-5	User Color Space - 5	Read Only(1)	String(3)	
Node	├ l3d	User 3D-LUT			Only available in 3D-LUT mode.
Parameter	l3d-1	User 3D-LUT - 1	Read Only(1)	String(3)	User 3D-LUT 1 to User 3D-LUT 10
	|	|			
Parameter	l3d-10	User 3D-LUT - 10	Read Only(1)	String(3)	
Node	└ events				
Parameter	e-1	event-1	Read Only(1)	String(3)	Event 1 to Event 100
	|				
Parameter	e-100	event-100	Read Only(1)	String(3)	

Setting Commands

Element	Contents									Note
	Identifier	Description	Minimum	Maximum	Access	Format	Enumeration	Factor	Default	Type	
Node	FOR-A_FA										
Node	parameters										
Node	video										
Node	common										Unavailable in 3D-LUT mode
Parameter	simulMode	Simul Mode			Read/Write(3)		0: Disable 1: Enable			Boolean(4)	Simul Mode
Node	fs-1 or fs-2										Only fs-1 in 3D-LUT mode.
Node	processAmplifier										
Node	preprocess										
Parameter	video	videoLevel	0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Video Level
Parameter	y	yLevel	0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Y Level
Parameter	chroma	chromaLevel	0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Chroma Level
Parameter	keepWhite				Read/Write(3)		0: Disable 1: Enable			Boolean(4)	Keep White
Parameter	black	blackLevel	-200	1000	Read/Write(3)	%.1f %%		10	0	Integer(1)	Black Level
Parameter	hue		-899	900	Read/Write(3)	%.1f deg		5	0	Integer(1)	Hue
Node	postprocess										
Parameter	video	videoLevel	0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Video Level
Parameter	y	yLevel	0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Y Level
Parameter	chroma	chromaLevel	0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Chroma Level
Parameter	keepWhite				Read/Write(3)		0: Disable 1: Enable			Boolean(4)	Keep White
Parameter	black	blackLevel	-200	1000	Read/Write(3)	%.1f %%		10	0	Integer(1)	Black Level
Parameter	hue		-899	900	Read/Write(3)	%.1f deg		5	0	Integer(1)	Hue
Node	colorCorrection										Unavailable in 3D-LUT mode
Node	pre-bal	Balanced Preprocess									
Node	white										
Parameter	red		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	White Level(Red)
Parameter	green		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	White Level(Green)
Parameter	blue		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	White Level(Blue)
Parameter	master		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	White Level(Master)
Node	black										
Parameter	red		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Black Level(Red)
Parameter	green		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Black Level(Green)
Parameter	blue		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Black Level(Blue)
Parameter	master		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Black Level(Master)

Element	Contents										Note
	Identifier	Description	Minimum	Maximum	Access	Format	Enumeration	Factor	Default	Type	
Node	FOR-A_FA										
Node	parameters										
Node	video										
Node	fs-1 or fs-2										Only fs-1 in 3D-LUT mode.
Node	colorCorrection										Unavailable in 3D-LUT mode.
Node	gamma										
Parameter	curve				Read/Write(3)		0: Center 1: Black 2: White			Integer(1)	Gamma Curve
Parameter	range		5	1000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Gamma Range
Parameter	red		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Gamma Level(Red)
Parameter	green		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Gamma Level(Green)
Parameter	blue		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Gamma Level(Blue)
Parameter	master		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Gamma Level(Master)
Node	balanced	Balanced Postprocess									
Node	white										
Parameter	red		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	White Level(Red)
Parameter	green		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	White Level(Green)
Parameter	blue		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	White Level(Blue)
Parameter	master		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	White Level(Master)
Node	black										
Parameter	red		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Black Level(Red)
Parameter	green		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Black Level(Green)
Parameter	blue		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Black Level(Blue)
Parameter	master		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Black Level(Master)
Node	gamma										
Parameter	curve				Read/Write(3)		0: Center 1: Black 2: White			Integer(1)	Gamma Curve
Parameter	range		5	1000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Gamma Range
Parameter	red		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Gamma Level(Red)
Parameter	green		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Gamma Level(Green)
Parameter	blue		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Gamma Level(Blue)
Parameter	master		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Gamma Level(Master)

Element	Contents									Note
	Identifier	Description	Minimum	Maximum	Access	Format	Enumeration	Factor	Default	Type	
Node	fs-1 or fs-2										Only fs-1 in 3D-LUT mode.
Node	colorCorrection										Unavailable in 3D-LUT mode.
Node	differential	Differential									
Node	white										
Parameter	r-y		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	White Level(R-Y)
Parameter	g-y		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	White Level(G-Y)
Parameter	b-y		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	White Level(B-Y)
Node	black										
Parameter	r-y		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Black Level(R-Y)
Parameter	g-y		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Black Level(G-Y)
Parameter	b-y		0	2000	Read/Write(3)	%.1f %%		10	1000	Integer(1)	Black Level(B-Y)
Node	drcAndCrc										
Parameter	drConvert	Dynamic Range Convtert			Read/Write(3)		0: Bypass 1: Operate			Boolean(4)	
Parameter	inputGamma				Read/Write(3)		0: ~Bypass 1-10: User 1-10 11: S-Log3 Live HDR 12: ~HLG Live 13: SDR(SONY)			Integer(1)	Unavailable in 3D-LUT mode. ~Bypass: Hidden ~HLG Live: Hidden The following settings require FA-96AHDR2. S-Log3 Live HDR SDR(SONY)
Parameter	inputColor				Read/Write(3)		0: BT.709 1: BT.2020 2-6: User 1-5			Integer(1)	Unavailable in 3D-LUT mode.
Parameter	outputGamma				Read/Write(3)		0: ~Bypass 1-10: User 1-10 11: S-Log3 Live HDR 12: ~HLG Live 13: SDR(SONY)			Integer(1)	Unavailable in 3D-LUT mode. ~Bypass: Hidden ~HLG Live: Hidden The following settings require FA-96AHDR2. S-Log3 Live HDR SDR(SONY)
Parameter	outputColor				Read/Write(3)		0: BT.709 1: BT.2020 2-6: User 1-5			Integer(1)	Unavailable in 3D-LUT mode.
Parameter	lut3d	3D-LUT			Read/Write(3)		0: ~Linear 1-10: User 1-10 11: HLGLive >> 709 12: 709 >> HLGLive 13: SL3Live >> HLG			Integer(1)	Availabe in 3D-LUT mode ~Linear: Hidden The following settings require FA-96AHDR2. HLGLive >> 709, 709 >> HLGLive and SL3Live >> HLG
Parameter	ioRange	In/Out Range			Read/Write(3)		0: Narrow >> Narrow 1: SDI >> SDI 2: Narrow >> SDI 3: SDI >> Narrow			Integer(1)	3D-LUT mode only
Parameter	drGain	Dynamic Range Gain	-2400	2400	Read/Write(3)	%.2f dB		100	0	Integer(1)	Unavailable in 3D-LUT mode.
Parameter	sdrGain	SDR Gain	0	2400	Read/Write(3)	%.2f dB		100	0	Integer(1)	Unavailable in 3D-LUT mode.

Element	Contents									Note
	Identifier	Description	Minimum	Maximum	Access	Format	Enumeration	Factor	Default	Type	
Node	fs-1 or fs-2										Only fs-1 in 3D-LUT mode.
Node	drcAndCrc										
Node	ootfInput										Unavailable in 3D-LUT mode.
Parameter	mode				Read/Write(3)		0: Disable 1: Enable			Boolean(4)	
Parameter	gamma	systemGamma	10	20	Read/Write(3)			10	12	Integer(1)	
Parameter	peak	displayPeak	100	10000	Read/Write(3)			1	1000	Integer(1)	Increments: 100
Parameter	black	displayBlack	0	100	Read/Write(3)			1	0	Integer(1)	Increments: 10
Node	ootfOutput										Unavailable in 3D-LUT mode.
Parameter	mode				Read/Write(3)		0: Disable 1: Enable			Boolean(4)	
Parameter	gamma	systemGamma	10	20	Read/Write(3)			10	12	Integer(1)	
Parameter	peak	displayPeak	100	10000	Read/Write(3)			1	1000	Integer(1)	Increments: 100
Parameter	black	displayBlack	0	100	Read/Write(3)			1	0	Integer(1)	Increments: 10
Parameter	ootfRgb	OOTF RGB			Read/Write(3)		0: Adjustment 1: SR-Live			Integer(1)	FA-96AHDR2 required
Parameter	sr-live	Operation			Read/Write(3)		0: Disable 1: Inverse OOTF 2: OOTF			Integer(1)	FA-96AHDR2 required
Parameter	systemGamma	System Gamma			Read/Write(3)		0: 1.1 1: 1.2 2: 1.3 3: 1.4 4: 1.5 5: ~User			Integer(1)	FA-96AHDR2 required ~User: Hidden
Parameter	sdrSony	SDR(SONY)			Read/Write(3)		0-7: STANDARD1-7 8-10: HYPER1-4			Integer(1)	FA-96AHDR2 required
Node	clip										
Node	kneeClip										Unavailable in 3D-LUT mode.
Parameter	whiteEnable				Read/Write(3)		0: Disable 1: Enable			Boolean(4)	
Parameter	clipType				Read/Write(3)		0: Y 1: RGB			Integer(1)	
Parameter	white		500	1500	Read/Write(3)	%.1f %%		10	1090	Integer(1)	
Parameter	kneeSlope		10	100	Read/Write(3)	%.2f		100	10	Integer(1)	
Parameter	kneePoint		500	1500	Read/Write(3)	%.1f %%		10	960	Integer(1)	
Parameter	saturation				Read/Write(3)		0: Disable 1: Enable			Boolean(4)	
Parameter	saturationLevel		0	200	Read/Write(3)	%d %%			0	Integer(1)	
Parameter	blackEnable				Read/Write(3)		0: Disable 1: Enable			Boolean(4)	
Parameter	black		-500	500	Read/Write(3)	%.1f %%		10	0	Integer(1)	

Element	Contents										Note
	Identifier	Description	Minimum	Maximum	Access	Format	Enumeration	Factor	Default	Type	
Node	fs-1 or fs-2										
Node	clip										
Node	yCbCrClip										
Parameter	enable				Read/Write(3)		0: Disable 1: Enable			Boolean(4)	
Parameter	white		500	1090	Read/Write(3)	%.1f %%		10	1090	Integer(1)	
Parameter	black		-75	500	Read/Write(3)	%.1f %%		10	-75	Integer(1)	
Parameter	chroma		500	1130	Read/Write(3)	%.1f %%		10	1130	Integer(1)	

Element	Contents								Note
	Identifier	Description	Minimum	Maximum	Access	Type	Type (Function)	Name (Function)	
Node	processor								
Node	functions								
Function	eventLoad								Load the event.
FunctionArguments							Integer	number	
Function	eventSave								Save the event.
FunctionArguments							Integer	number	
Parameter	altEventLoad		0	100	Write Only(2)	Integer(1)			Load the event (alternative). Use altEventLoad instead of eventLoad.
Parameter	altEventSave		1	100	Write Only(2)	Integer(1)			Save the event (alternative). Use altEventSave instead of eventSave.

Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

April 27, 2020 Printed in Japan

FOR-A COMPANY LIMITED

Head Office	3-8-1 Ebisu, Shibuya-ku, Tokyo 150-0013, Japan
Overseas Division	Tel: +81(0)3-3446-3936 Fax: +81(0)3-3445-5116
Japan Branch Offices	Osaka/Okinawa/Fukuoka/Hiroshima/Nagoya/Sendai/Sapporo
R&D/Production	Sakura Center/Sapporo Center

FOR-A Corporation of America Corporate Office/Service Center
11155 Knott Ave., Suite G, H & I, Cypress, CA 90630, U.S.A.
Tel: +1 714-894-3311 Fax: +1 714-894-5399

FOR-A Corporation of America Northeast Office
1360 Clifton Ave., Clifton, NJ 07012, U.S.A.
Tel: +1 973-220-8471 Fax: +1 714-894-5399

FOR-A Corporation of America Southeast Office
Tel: +1-305-773-7608

FOR-A Corporation of America Support Center
2400 N.E. Waldo Road, Gainesville, FL 32609, U.S.A.
Tel: +1 352-371-1505 Fax: +1 714-894-5399

FOR-A Latin America and the Caribbean Miami Office
Tel: +1 657-600-5759

FOR-A Latin America and the Caribbean Sao Paulo Office
Tel: +55 (0)11-99913-3751

FOR-A Europe S.r.l.
Via Volturno, 37, 20861 Brugherio MB, Italy
Tel: +39 039-916-4811 Fax: +39 039-878-140

FOR A UK Limited
Trident Court, 1 Oakcroft Road Chessington, KT9 1BD, U.K.
Tel: +44 (0)20-3044-2935 Fax: +44 (0)20-3044-2936

FOR-A Italia S.r.l.
Via Volturno, 37, 20861 Brugherio MB, Italy
Tel: +39 039-881-086/103 Fax: +39 039-878-140

FOR-A Corporation of Korea
1007, 57-5, Yangsan-ro, Yeongdeungpo-gu, Seoul 07271, Korea
Tel: +82 (0)2-2637-0761 Fax: +82 (0)2-2637-0760

FOR-A China Limited
1618 Huateng Building, No. 302, 3 District, Jinsong, Chaoyang, Beijing 100021, China
Tel: +86 (0)10-8721-6023 Fax: +86 (0)10-8721-6033

FOR-A Middle East Africa Office
Aurora Tower, Office 1407, Dubai Media City, P.O. Box 502688, Dubai, UAE
Tel: +971 (0)4 551 5830 Fax: +971 (0)4 551 5832

FOR-A India Private Limited
2nd Floor, Valecha Chambers, Link Road, Andheri (W), Mumbai 400053, India
Tel: +91 (0)22-2673-3623 Fax: +91 (0)22-2639-3415

FOR-A South East Asia Office
Studio 09, Rm. A1, 3/F., Phase 1, Hang Fung Ind. Bldg., 2G Hok Yuen St., Hung Hom, Hong Kong
Tel : +852 2110-1352

http://www.for-a.com/