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-96DNT
FA-96EX3G44-R
FA-96EX12G06
FA-96SFPC4
FA-96GPI/DB9-CBL
FA-96DIN4-CBL

5th Edition - Rev. 4 (Software Ver. 5.00)

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
4 (V3.8)	7	2020/08/26	Added KNEE (RGB Clip) function in 3D-LUT mode. Corrected factual errors.	5-11, etc.

4 (V3.9)	8	2020/10/30	Changed Process Amplifier menu. Added HDMI setting menu. Added “Video Format Conversions.” Extracts Ember+ commands from the manual to provide as a separate document.	5-1 5-45, etc. Appendix1
5 (V5.0)	-	2021/03/16	Added FA-96DNT option. Supports HDMI HDR Metadata. TV Logic WonderLookPro support (3D-LUT mode) Frequency deviation adjustment in free-run mode. Web GUI covered almost all of FA-9600 menus. Merged descriptions of Web and Windows GUIs	2-3-7, etc. 5-46, etc. 4-7, etc. 7-7 12
5 (V5.0)	1	2021/06/04	Added SNMP video format information examples. Corrected Ethernet spec.	14 2-2, 15-1
5 (V5.0)	2	2021/08/27	Revised description on image filters Changed notes on HDMI settings. Changed the format of product specifications. Revised Output Delay and Phase in Converter Minimum Delay Mode	5-24 12-2-3-4 5-42 15-1 App. 1-3
5 (V5.0)	3	2021/11/01	Factual errors corrected	
5 (V5.0)	4	2021/12/13	Revised description on frame adjust range	5-37

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	AC cord clamp included. (See next page for installation instructions.)
Rubber foot	4	
HDMI Cable Lacing Bracket	2 sets	See next page for installation instructions.
EIA Rack Mount Brackets	1 set	4 screws included.
CD-ROM	1	Installation files (Windows GUI, GUI Launcher and Event Editor) User manuals (PDF), etc.
Quick Setup Guide	1	

◆ **Hardware Option**

Option Card / Cable

ITEM	QTY	REMARKS
FA-96PS	1 set	Redundant power supply unit and AC cord AC cord clamp included (See next page.)
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-96DNT	1	Dante 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
FA-AUX30	1	Auxiliary Unit FA-10RU, FA-10DCCRU or FA-96GPI required

◆ **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

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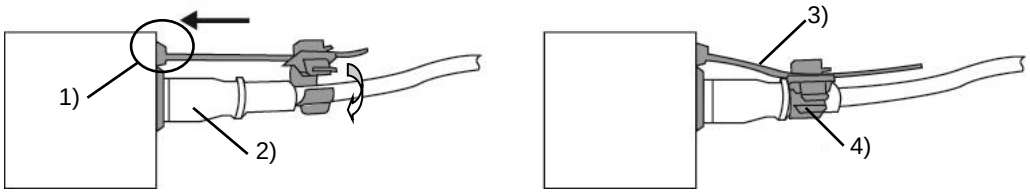
AC Cord Clamp Installation

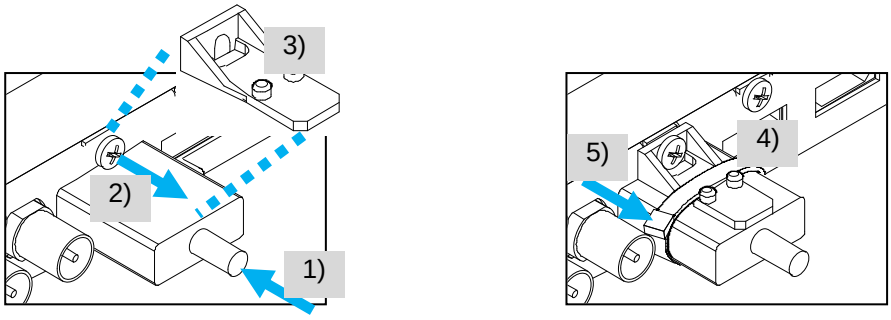
1) Insert the anchor into the hole next to the AC inlet.
2) Plug in the AC cord.
3) Adjust the strap length to fit.
4) Wrap the AC cord clamp around the AC cord.
5) Gently pull on the AC cord to ensure it has been securely plugged in.



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.



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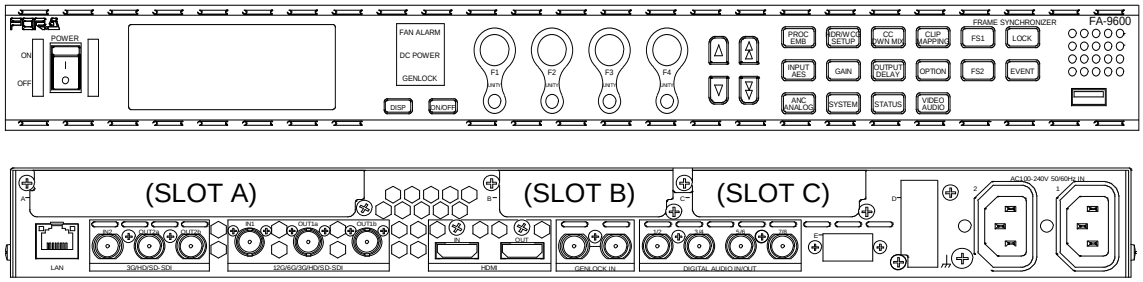
1. Prior to Starting

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
- Control operation using GUI software (full), web browser, Ember+ and external commands, and SNMP monitoring (Support planned in the future)
- 3D-LUT control via WonderLookPro (TV Logic) (3D-LUT mode only) (*4)
- Miscellaneous options
  -Digital audio input/output expansion card / Digital audio expansion cable
  -Analog audio expansion
  -MADI audio expansion

-Dante 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 FA-964K is not 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. 7-10 “MU OPERATION” and Secs 5-20 to 5-25.

-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 (FA-9600 Version 3.0 or higher) requires 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.)

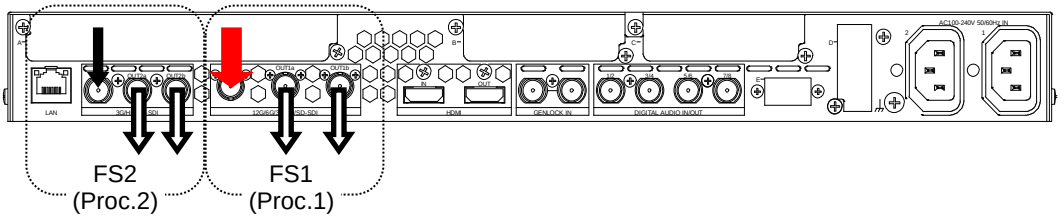
◆ **If temperature exceeds the limit, FA-9600 stops operation and signal output**
If FA-9600 internal temperature exceeds the upper limit of allowed operating range, the FA-9600 stops operation and signal output and displays an alert message that it stops operation due to the overheat protection, on 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)

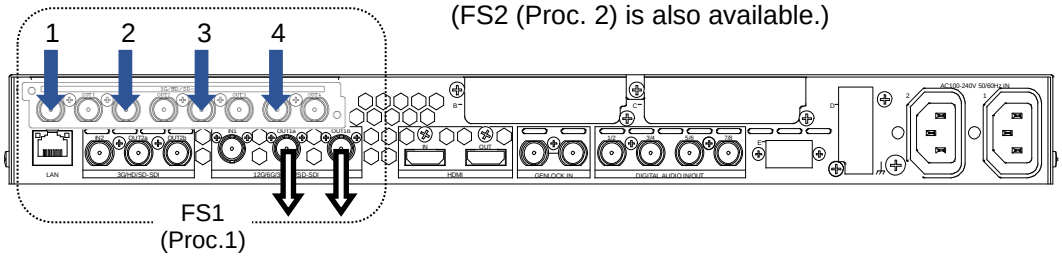
1-5-1. 4K In / HD Out + HD In / HD Out

Set MU Operation Mode to **Simultaneous 4K/HD**. (See 7-10. “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:



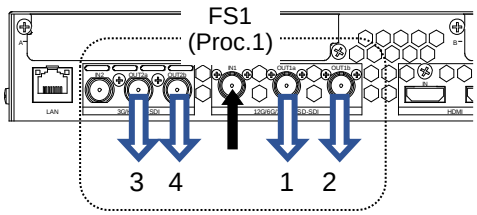
If 4K Input is 3G-SDI Quad Link (FA-96EX3G44-R option card required):
(FS2 (Proc. 2) is also available.)



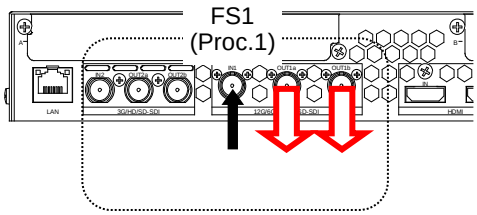
1-5-2. HD In / 4K Out

Set MU Operation Mode to **Simultaneous 4K/HD**. (See 7-10. “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).

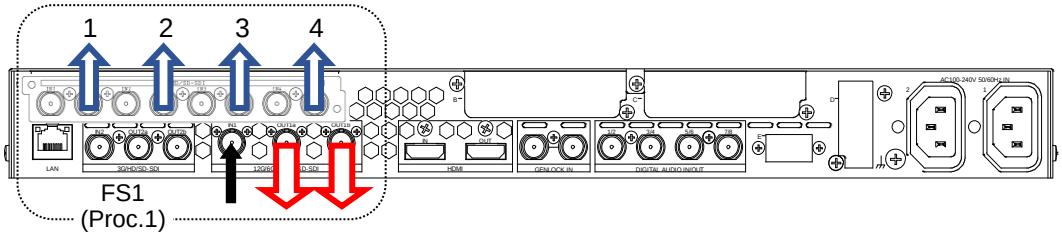
3G-SDI Quad Link Output



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

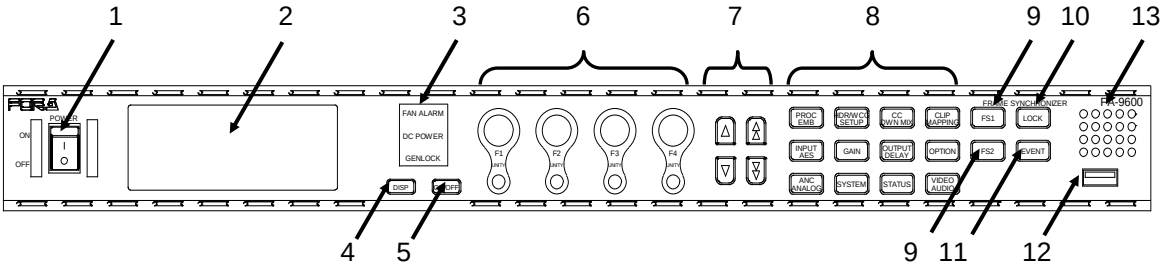


Simul output of **12G-SDI Single Link** and **3G-SDI Quad Link** (FA-96EX3G44-R required) (3-distribution)



2. Panel Descriptions

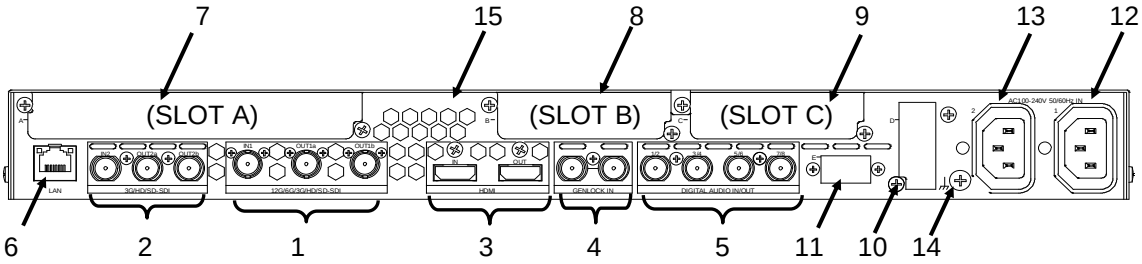
2-1. Front Panel



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 mode between Menu and Video. Pressing the button displays the input video on the front panel display (No. 2). To return to menu mode, repress the button. See Sec. 3-3. “Displaying Input Video on the Front Panel” for details on Input Video View mode.	
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) 6G/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 (Type-A connectors) HDCP 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 100BASE-TX (RJ-45) To control FA-9600 through Windows GUI, Web GUI or remote control unit, use a network switch 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.

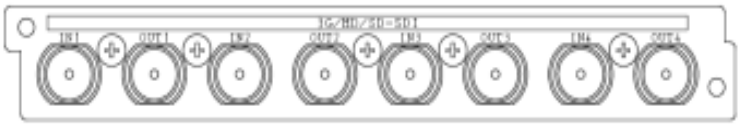
FA-9600 option list

Product name	Description	Slot
FA-96PS	Power supply option to enable redundant power supply mode.	-
FA-964K	Allows you to process 4K video 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-96DNT	Allows you to add Dante 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.

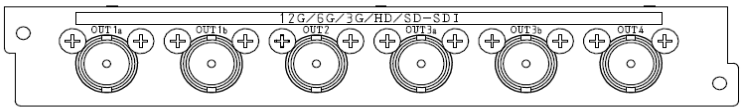
2-3-1. FA-96EX3G44-R (SDI I/O Expansion)

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



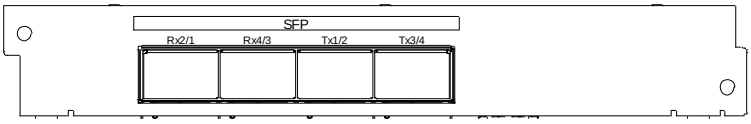
2-3-2. FA-96EX12G06 (12G-SDI Output Expansion)

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 page in the Windows GUI or Web GUI. (See Sec. 12-9. “Status.”)
The following Embrionix SFP modules have been tested and approved and are ready for use.

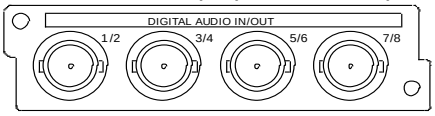
I/O	SFP module	Module type		
Rx (IN1-2/IN3-4)	EB12LC2R-MN-P-PA	12G/6G/3G/HD/SD-SDI	Dual receiver	SFP optical
	EB60LC2R-MN2-P	3G/HD/SD-SDI		
Tx (OUT1-2/OUT3-4)	EB12LC2T-SN-13D	12G/6G/3G/HD/SD-SDI	Dual trans-mitter	SFP optical
	EB60LC2T-MN2-13F	3G/HD/SD-SDI		

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

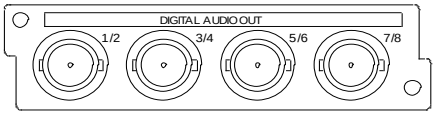
2-3-4. FA-96AES-UBL and 96AES-UBLC (Audio Expansion)

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. 6-18) 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)

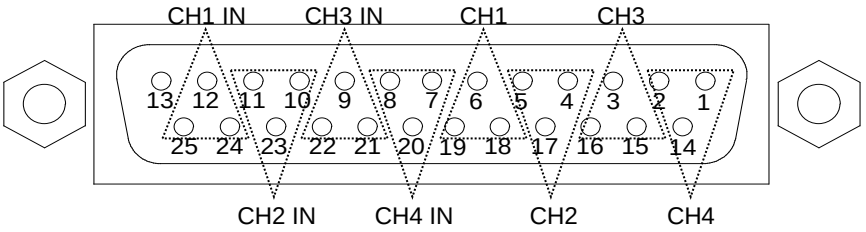


Installed AES card/cable			Input / Output	Total number of channels
Standard AES	-	-	I/O selectable per 4 channels	8
Standard AES	UBL	-	I/O selectable per 4 channels	16
Standard AES	-	UBLC	Std AES: 8-ch input, UBLC: 8-ch output	16
Standard AES	UBL	UBLC	Std AES: 8-ch input, UBLC: 8-ch output UBL: I/O selectable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

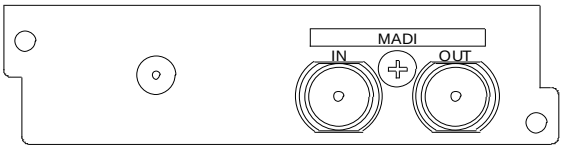


Connector Pin Assignments (Standard TASCAM)

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		

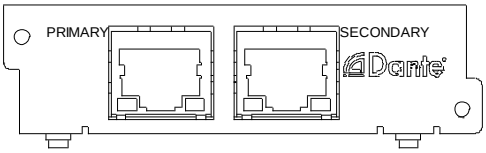
2-3-6. FA-96MADI (MADI Audio Card)

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-96DNT (Dante Audio Card)

Dante audio expansion card that supports multi-channel audio transmission over IP network and redundant audio routing with Primary and Secondary ports or daisy-chain connection. Use STP (Shielded Twist Pair) cable of CAT5e or higher.
Install a card into **Slot B**.



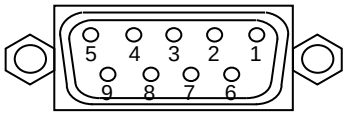
IMPORTANT

Using FA-9600 as a Dante device requires a computer in which **Dante Controller** software is installed. “Dante Controller” and User’s Manual can be downloaded from the Audinate website: **https://www.audinate.com/**, in which helpful documents about Dante network setup are provided. Refer to the manual, Audinate site information and documents to configure Dante network and audio routing.

2-3-8. 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.”)

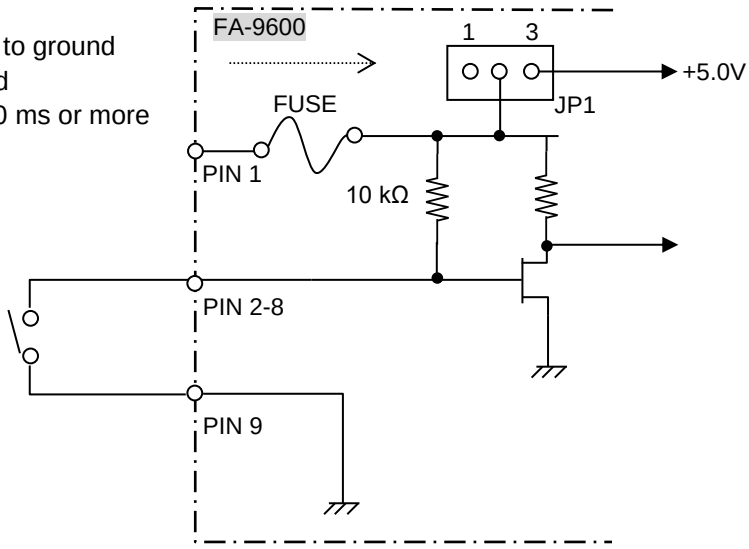
◆ **FA-96DB9-CBL Connector (9-pin D-sub, female, with inch screws)**



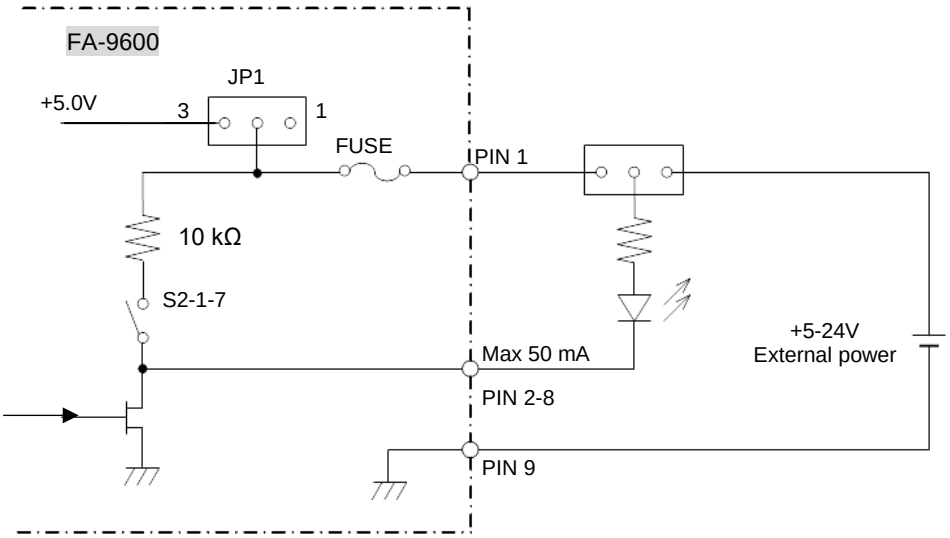
Connector Pin Assignments

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

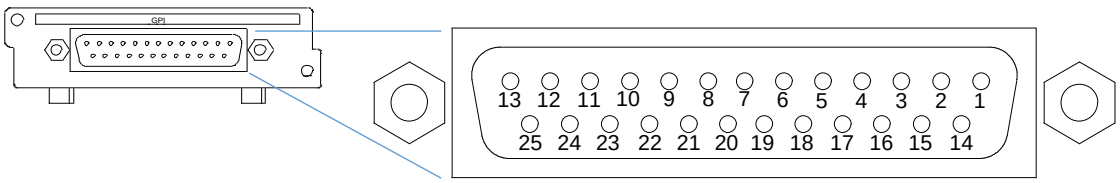
2-3-9. FA-96GPI (10 Inputs and 10 Outputs)

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

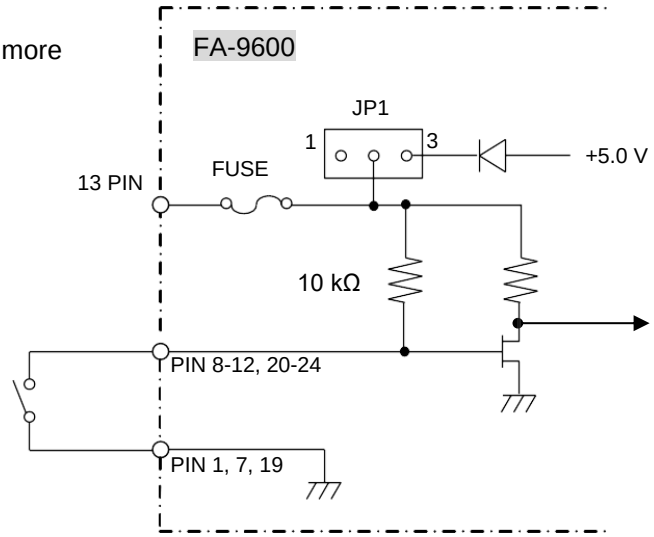
Pin No.	Description
1	GND (Signal ground)
2	GPI OUT 1
3	GPI OUT 2
4	GPI OUT 3
5	GPI OUT 4
6	GPI OUT 5
7	GND (Signal ground)
8	GPI IN 1
9	GPI IN 2
10	GPI IN 3
11	GPI IN 4
12	GPI IN 5
13	DC IN or DC OUT DC IN or OUT (+5.0 V) set by the jumper pin: **JP1** (See the next page.) Factory default: **DC OUT** Total max load current is 500 mA

Pin No.	Description
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

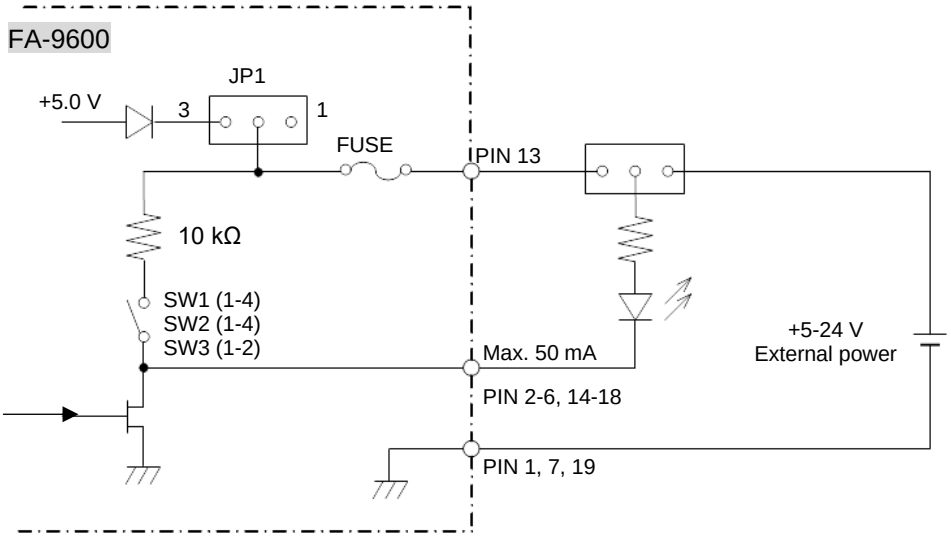
.

◆ **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)

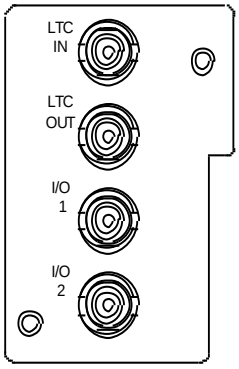
On: Open-drain output

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

2-3-10. 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

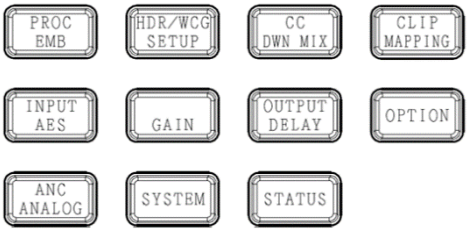
◆ **Lock Button**

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.

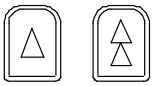


Menu buttons

◆ **Arrow buttons**

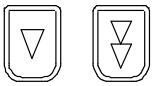
Moving between menu pages

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



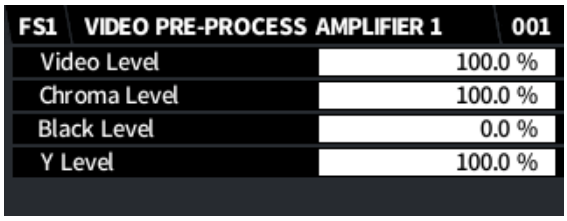
Moving between menu items

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

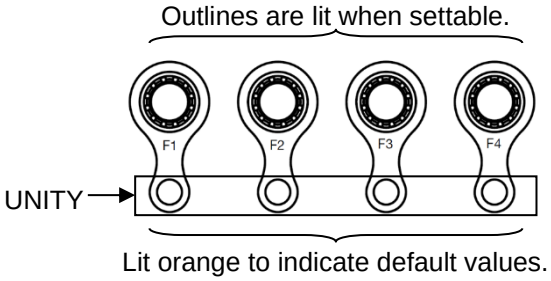


◆ **Setting Parameters**

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

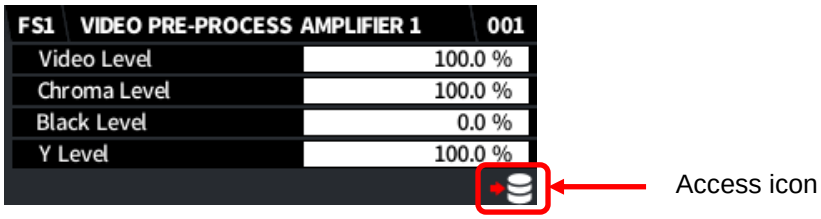


◆ **FS1/FS2 Selection Buttons**

"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.

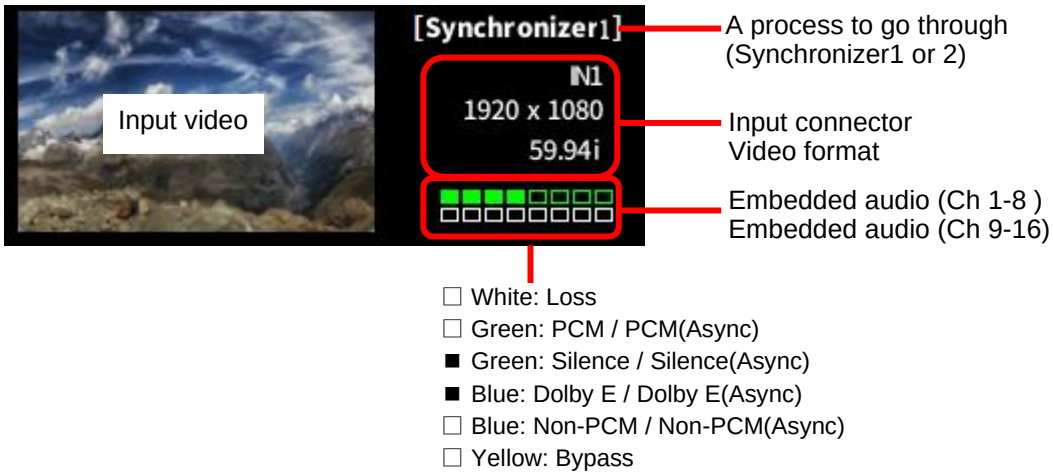
3-2. Memory Access Icon

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.



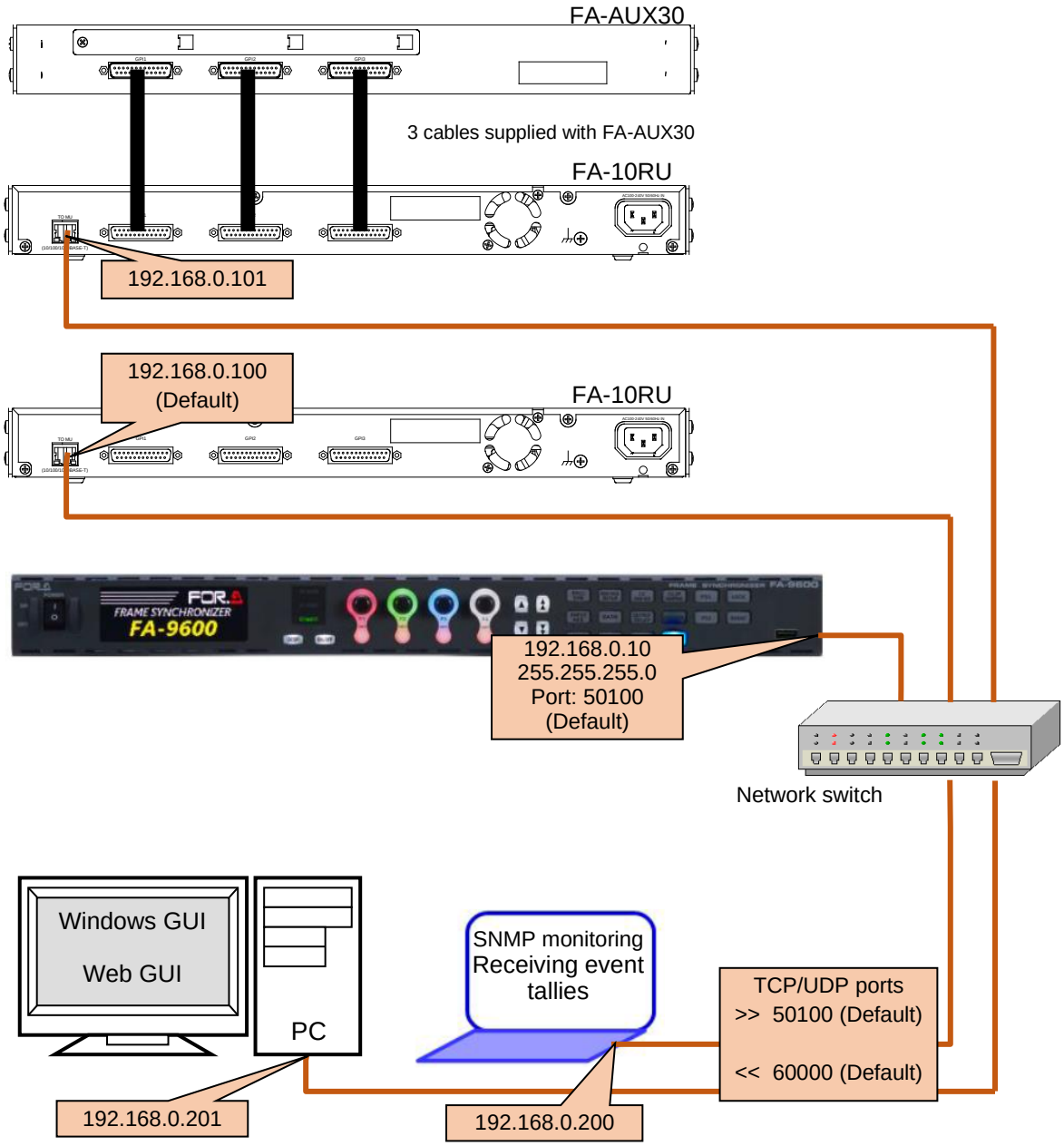
3-3. Displaying Input Video on the Front Panel

Pressing the DISP button allows you to display the input video image on the LCD panel as shown below. Repressing the button returns the mode to Menu.
FS1/2 allows you to switch between FS1 and FS2 input images.



3-4. 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. 7-5).

To control using LAN commands or link with TV Logic **WonderLookPro**
>> 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 (*1)
	FA-10RU FA-AUX30	LAN & original cables	Expanded control switches added to FA-10RU.	FA-10RU Operation Manual (*1)
FA-10DCCRU (*1)	FA-10DCCRU	LAN	Remote control unit dedicated to Color Correction feature.	FA-10DCCRU Operation Manual (*1)
	FA-10DCCRU FA-AUX30	LAN & original cables	Expanded control switches added to FA-10DCCRU.	FA-10DCCRU Operation Manual (*1)
Windows GUI (Software) (*2)	PCs Tablets	LAN	Almost all menu settings	Sec. 9 Secs. 11 - 12
			Launcher tool for Window GUI.	Sec. 10.
Web GUI (Web browser)	Computers Tablets	LAN	Almost all menu settings FA-9600 network settings Event import/export (upload / download) and data import (upload) of gamma, gamut and lut .	Secs. 11 - 12
Commands (Original) (*3)	Computers Tablets	LAN	Status messages and several menu settings	FA-9600 Command Manual (*1)
TV Logic WonderLookPro	Computers	LAN	3D-LUT control with WonderLookPro	Sec. 4-7
Commands (Ember+) (*4)	Control unit	LAN	Status messages and menu settings (for video and audio)	FA-9600 Ember+ Control Manual (*1)
SNMP monitoring	Computers Tablets	LAN	Status monitoring and traps	Sec. 14.
GPIO	GPIO control device	GPI	GPI input/output using FA-96GPI and/or FA-96DB9-CBL options.	Sec. 7-1.

(*1) Separate document

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

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

(*4) Up to **5** connections per FA-9600 are available for **Ember+ commands** at a time.
FA-9600 units can be controlled using dedicated Ember+ commands over LAN.
<Communication Specifications>

Communication	Interface	Ethernet: IEEE802.3u (100BASE-TX)
	Protocol	TCP/IP, Ember+
	Port number	55000
	Max number of sessions	Max. 5
Ember+	Version 1.7	
Glow DTD	Version 2.50	

IMPORTANT

An FA-9600 can accept up to 5 controllers (Windows GUI and Remote Control Units) at the same time.

3-4-1. Network Setting Quick Reference

Refer to the table below to set network communication settings of various remote controllers. Each remote control on/off (Accept / Refuse) can also be set in the menu. Enable controllers that you need to use and disable other controllers for best performance.

Item	Remote controller	Operation I/F	Setting item	Default	Ref.
1	FA-10RU FA-10DCCRU Windows GUI Web GUI	FA-9600 front panel Windows GUI Web GUI	FA-9600 network settings		7-9 12-7 12-8
			IP address	192.168.0.10	
			Netmask	255.255.255.0	
			Gateway	0.0.0.0	
			Port number	50100	
			Remote Unit On/Off	On (Accept)	7-5
2	LAN Commands (*1)	Web GUI	Port number for LAN commands	60000	12-8
			LAN command On/Off	On (Accept)	7-5
3	TV Logic WonderLookPro (*1)	Web GUI	Port number for LAN commands	60000	12-8
			LAN command On/Off	On (Accept)	7-5
4	Ember+ (*2)	–	Port number	55000 (Fixed)	3-4
			Ember+ On/Off	On (Accept)	7-5
5	SNMP	Web GUI	SNMP monitoring and trap settings		12-8 14
6	FA-96DNT	–	(Set in the Audinate Dante Controller)		2-3-7

(*1) Refer to “FA-9600 Commands Operation Manual.”
(*2) Refer to “FA-9600 Ember+ Control Manual.”

3-5. Saving / Loading Settings (Event Operation)

FA-9600 can save Video and Audio menu settings as events.
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 as csv files using web browsers (Web GUI). In addition, stored even content (in csv files) can be edited using a text editor or the provided Event Editor.

Event operation	Operation	Description	Ref.
Event save	Front panel Windows GUI Web GUI FA-10RU Original commands Ember+	Saves FA-9600 menu settings	8, 12-5 FA-9600 Comman d Manual
Event load		Loads FA-9600 menu settings	
Auto event load		Loads created and uploaded events	5-16 5-17 5-28 12-5-2
Event Load buttons	Windows GUI Web GUI	Loads Color Processor settings.	4-1 12-2-5
Event export / import	Web GUI	Backups event data. Restores event data.	12-5-4
Event data editing	Provided Event Editor Text editor	Gives names to events. Edits and replaces event content.	13 13-5
Event tally	Original message format	Setup in Web GUI Notifies the difference between event content and the current FA-9600 menu settings to external devices.	13-4

4. FA-9600 Setting Example

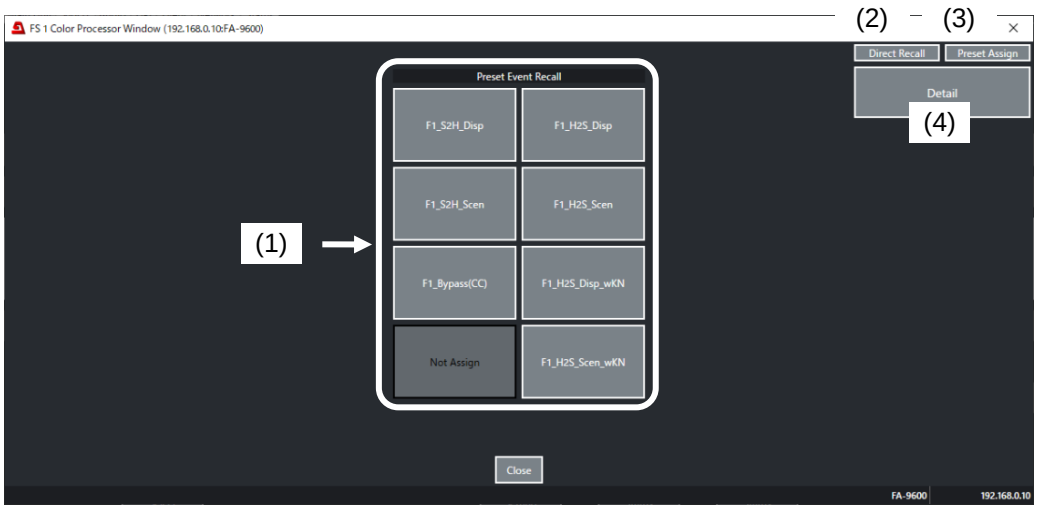
4-1. Color Processer: SDR<->HLG (with Preset Events)

Using preset events allows you to make dynamic range and color space conversion settings easier. Eleven preset events are provided for each FS.

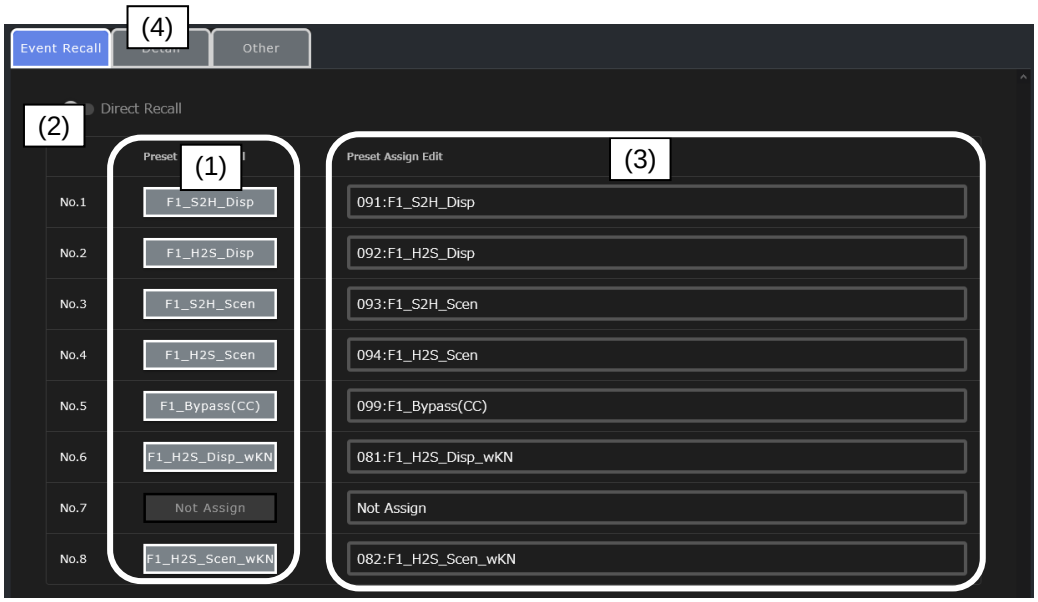
◆ How to Load Preset Events

When opening "**Video Block**" > "**Color Processor 1**" or "**Color Processor 2**" menu in the Windows GUI or the Web GUI, the **Preset Event Recall** screen as shown below is displayed.
The screen provides Preset Event buttons that allow you to instantly load complex color space and dynamic range settings simply by pressing these buttons.

[Windows GUI]



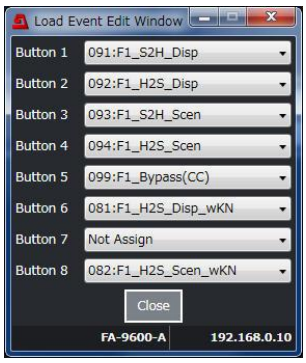
[Web GUI] (Scrolling up and down to go through the page.)



(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 (Windows GUI)
Context menu (Web GUI)

Allows you to remap Preset Event button assignments.
In the Web GUI, the menu list as shown at right is displayed and enables you to change assignments.
(See 4-1-2. “Preset Event Stored in CD-ROM.”)

(4) Detail button (Windows GUI)
Detail tab (Web GUI)

Allows you to go to the Color Processor menu page, in which detailed menu settings can be checked or changed.
(See Sec. 12-2-5. “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 (**Event Recall** button in the Web GUI).

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.

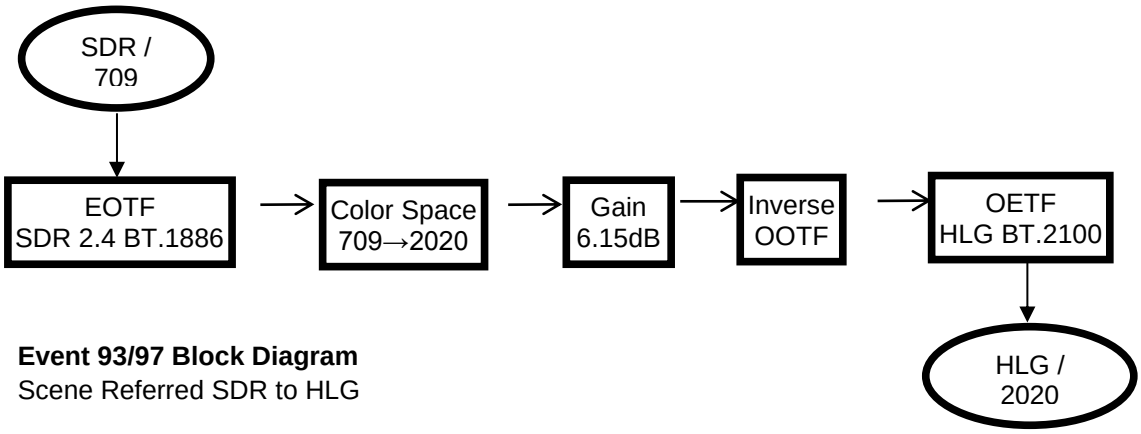
7. **Event No: 99/100**
   Event name: F1/F2_Bypass(CC)
   Conversion: Disables Dynamic Range and Color Gamut conversions, Gain adjustment and Knee function.
   Application: Passes through inputs without changing Dynamic Range and Color gamut.
   Disables Dynamic Range and Color Gamut conversions, Gain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

Parameter settings for preset events 1-6

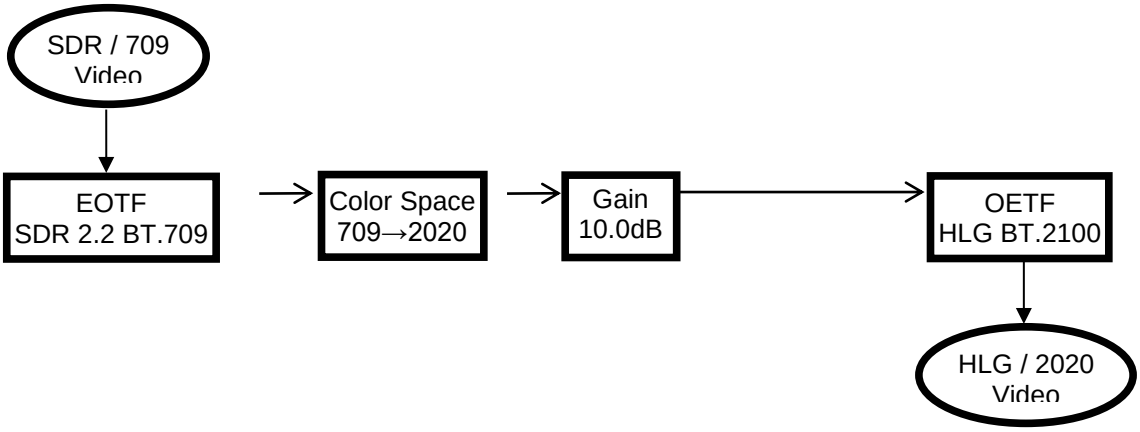
	Event No		Referred	Conversion	Input Gamma Curve / Color Space	Output Gamma Curve / Color Space	OOTF (Input)	Inverse OOTF (Output)	SDR GAIN (dB)	Knee
	FS1	FS2								
1	91	95	Display	SDR to HLG	SDR 2.4 BT.1886 / BT.709	HLG BT.2100 / BT.2020	Disable	Inverse OOTF	6.15	Disable
2	92	96		HLG to SDR	HLG BT.2100 / 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 to 13 set parameters as shown below.

No	Event No		Referred	Conversion	Input Gamma Curve / Color Space	Output Gamma Curve / Color Space	OOTF (Input)	Inverse OOTF (Output)	OOTF RGB	Operation	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	Adjustment	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	Adjustment	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 54>) 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**. (Both show the same image)
Example 2: Outputs from **OUT1a/1b** using **6G Dual Link**.
Example 3: Outputs from **Slot A (FA-96EX3G44-R)** 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	DL L1/L2 (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 (FA-96EX3G44-R)

Menu	INPUT SELECT (Color Processor)	FORMAT CONVERT			
Item	Source Select	Converter	Format Standard	Frame/Field Rate	Level Setting
Examples 1-3	Converter1	Manual	2160	59.94p	Level-A

◆ **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 (**Slot A: FA-96EX3G44-R, 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	EX3G IN-IN4 (Select one input.)	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, 5	Converter1	Manual	1080	59.94i	-

4-4. Converter: Adjusting Output Timing

See Sec. 5-21. “ADJUST TIMING (FA-96UDC).”
See Sec. 5-37. “SYNCHRONIZER.”

When converting signals, the **Mode** setting in the ADJUST TIMING 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 ADJUST TIMING menu.

<If set to Adjustable:>

The converter output delay timing can be adjusted under **Timing(H)** in the **ADJUST TIMING** 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 Signals with Minimum Delay

See Sec. 5-21. “ADJUST TIMING (FA-96UDC).”
See Sec. 5-37. “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			ADJUST TIMING
Item	Genlock Source	Mode	Timing(H, V)	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			ADJUST TIMING
Item	Genlock Source	Mode	Timing(H, V)	Mode
Setting	GENLOCK IN	Line(Min)	(+700, -3)	Minimum

Converter output phase and delay in Minimum Delay mode, see “Appendix 1-3: Output Delay and Phase in Converter Minimum Delay Mode.”

4-6. Aligning Audio and Video

See Sec. 6-24. “AUDIO INPUT DELAY” menu
See Sec. 6-27. “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. 6-24.) 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. 6-27), the delay difference between audio and video outputs caused by video converter is automatically cleared as default settings.

Menu item	Default	Description
EMB1. Audio OUT	Same as FS1	Automatically aligns FS1 audio output to FS1 video output.
EMB2. Audio OUT	Same as FS2	Automatically aligns FS2 audio output to FS2 video output.
AES Audio OUT	Same as FS1	Automatically aligns AES output to FS1 video output.
OP(AES) Audio OUT OP(ANA:B) Audio OUT OP(MADI) Audio OUT OP(DNT) Audio OUT	Same as FS1	Automatically aligns each optional audio output to FS1 video output.

4-7. Controlling 3D-LUT via WonderLookPro

WonderLookPro, a comprehensive color management software, can control 3D-LUT tables in FA-9600 in real-time. (**3D-LUT mode** only)

About WonderLookPro

- Supported WonderLookPro versions are 4.3.5 or higher (for Windows 64-bit or MacOS).
- To control FA-9600 3D-LUT, WonderLookPro Corporate License is required.
- For WonderLookPro system setup details, refer to “WonderLookPro Manual” and website information.

◆ **LAN connection**

Refer to Sec. 3-4. “FA-9600 Remote Control” to connect FA9600 and WonderLookPro (computer) via LAN.

◆ **Enabling WonderLookPro Control**

To enable 3D-LUT control from WonderLookPro, set the following menu items as shown below.

Menu items	Setting	Refer to Sec.
MU OPERATION	3D-LUT	7-10
Remote Control Unit Setting >> LAN Command	Accept	7-5

◆ **Menu Items affected by WonderLookPro**

The following menu item values are changed according to WonderLookPro settings.

Menu items affected by WonderLookPro		Refer to Sec.
Conversion	in the IN/OUT GAMMA/COLOR menu	5-7
IO Range	in the IN/OUT GAMMA/COLOR menu	
3D-LUT	in the IN/OUT GAMMA/COLOR menu	
3D-LUT table of User 10		12-6

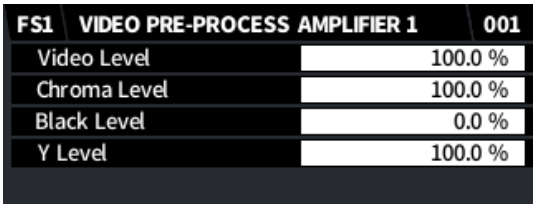
NOTE

- FA-9600 3D-LUT cannot be controlled properly, if WonderLookPro Control is disabled on the FA-9600.
- FA-9600 communicates with WonderLookPro via LAN using FA-9600 dedicated commands over HTTP (TCP/IP) and FA-9600 receive port is set to 60000 as factory default. Refer to “FA-9600 Command manual” for more details.

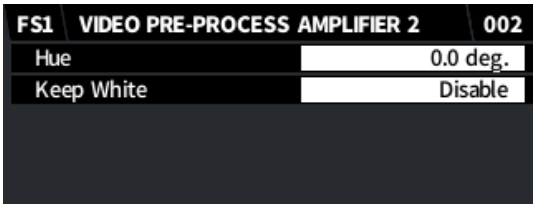
5. Video Setting Menus

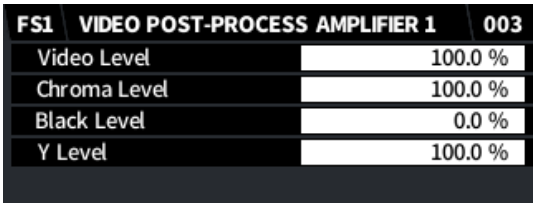
The MU Main mode (**Simultaneous 4K/HD**, **Dual HD** or **3D-LUT**) determines which menus can be used on which FS. The menu access button, available MU Main modes and required option(s) are indicated on the right side of menu.
See Sec. 1-3. “Three MU Main Modes” and Sec. 7-10. “MU OPERATION” for more details.

5-1. VIDEO PRE-/POST-PROCESS AMPLIFIER

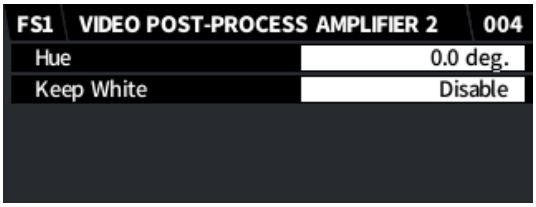


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)





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

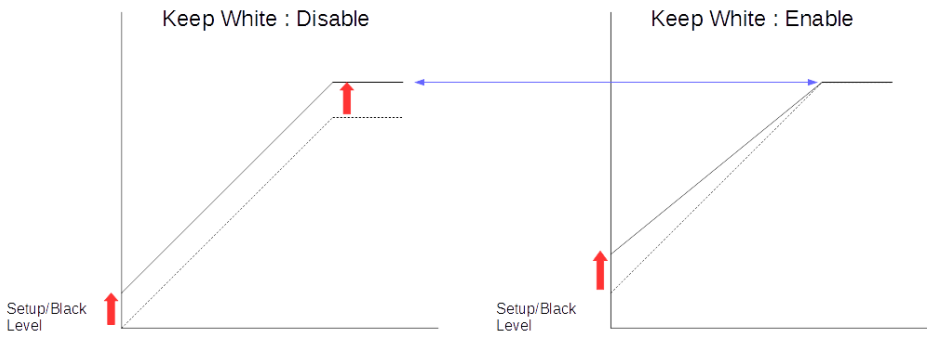


Required option: FA-96AHDR or FA-96AHDR2

- **VIDEO PRE-PROCESS AMPLIFIER (Proc Amp located before Color Correction)**
- **VIDEO POST-PROCESS AMPLIFIER * (Proc Amp located after Color Correction)**

Item	Default	Setting (Steps)	Description
Video Level	100.0 %	0.0 - 200.0 %	Adjusts the video level.
Chroma Level	100.0 %	0.0 - 200.0 %	Adjusts the chrominance level.
Black Level	0.0 %	-20.0 - 100.0 %	Adjusts the black level.
Y Level	100.0 %	0.0 - 200.0 %	Adjusts the luminance level. (If Keep White is enabled, an asterisk (*) is added in front of the value.)
Hue	0.0 deg.	-179.8 - 180.0 deg. (0.2 deg.)	Adjusts the chroma phase.
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.

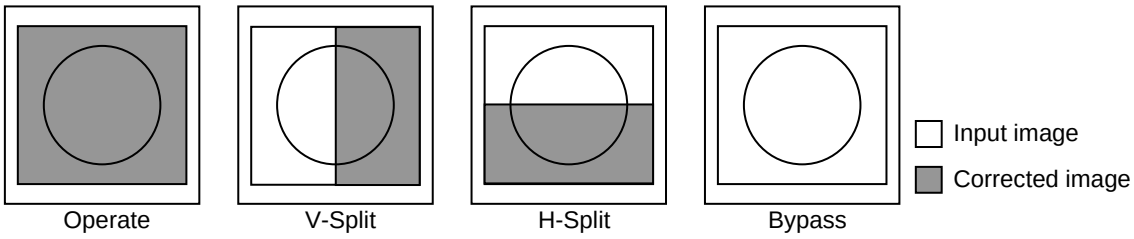
* POST-PROCESS AMPLIFIER requires FA-96AHDR or FA-96AHDR2 option.



5-2. SPLIT MODE SELECT

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.

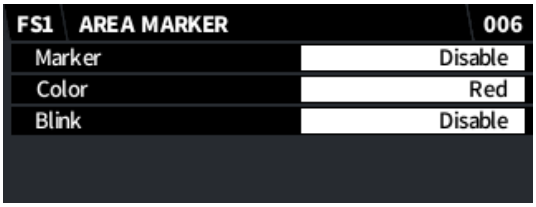


NOTE

The following settings are not reflected on split images.

- HDR settings (Sec. 5-4. “INPUT / OUTPUT GAMMA / COLOR” to Sec. 5-6. “Optional Function (FA-96AHDR2).”
- GAIN settings (Sec. 5-18. “DYNAMIC RANGE GAIN CONTROL.”)

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



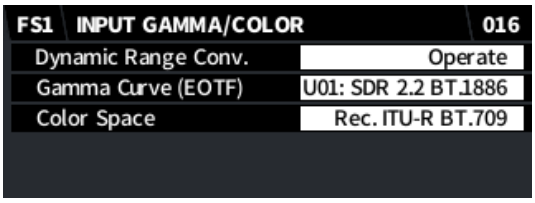
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

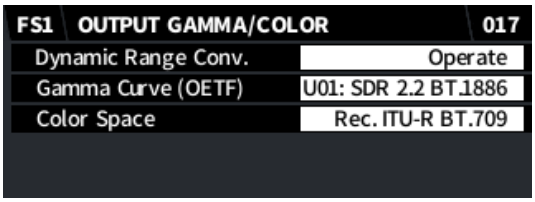
Required Option: FA-96AHDR or FA-96AHDR2

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 dynamic range and color space conversions require complex settings. To make settings easier, preset settings using event function are provided. See Sec 4-1 “Color Processer: SDR<->HLG (with Preset Events).”





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. 12-6. “Data Page (Web GUI).”) 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. 12-6. “Data Page (Web GUI).”) These settings are shared by both input and output gamut curve settings.

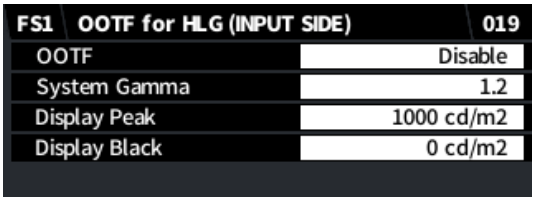
(*1) If Dynamic Range Conv. is set to **Operate**, super black below 0IRE in input video is clipped and not passed through.

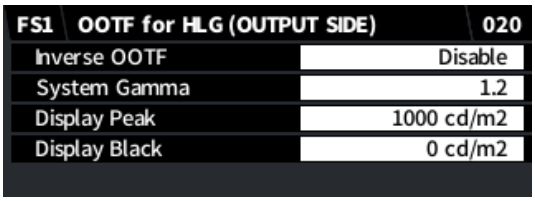
◆ **OUTPUT GAMMA/COLOR**

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)**

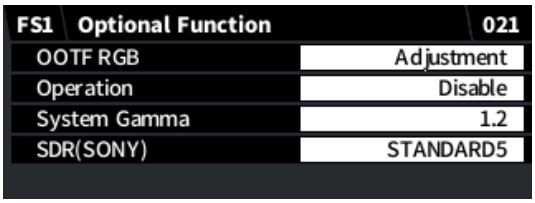
Item	Default	Setting (Steps)	Description
OOTF	Disable	Disable Enable	Selecting **Enable** applies correction when converting signals from HLG to another gamma curve referring to monitor brightness range. Selects the gamma and luminance peaks below. See Sec. 5-6-1. "About OOTF Related Parameters."
After 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)

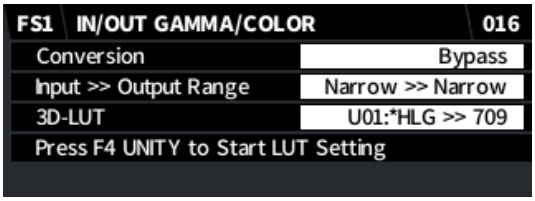
5-6-1. About OOTF Related Parameters

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**

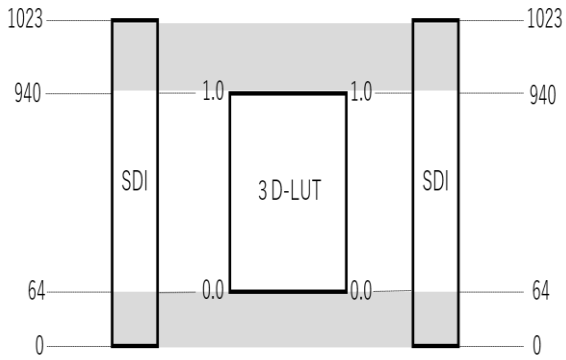
Parameter	Default	Setting range	Description
Conversion	Bypass	Bypass Operate	Setting to **Operate** enables conversions using 3D-LUT. In this case, select a table under 3D-LUT below.
Input >> Output Range	Narrow >> Narrow	Narrow >> Narrow SDI >> SDI Narrow >> SDI SDI >> Narrow	Selects an "Input >> Output" 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 Sec. 12-6. "Data Page (Web GUI).")

(*1) FA-96AHDR2 option required

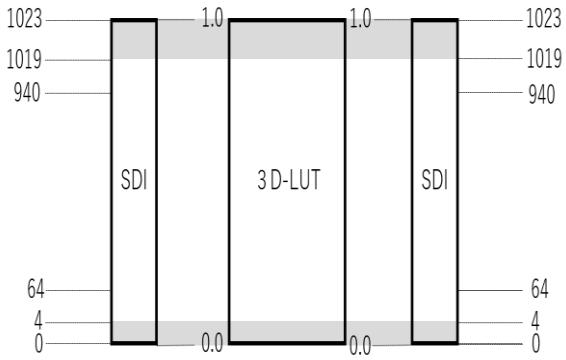
<3D-LUT Data Ranges>

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>

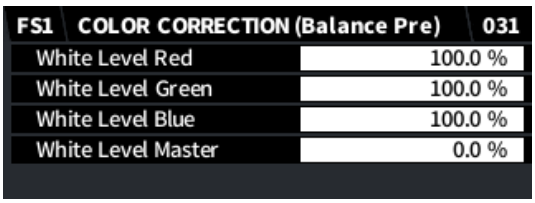
3D-LUT name	Description
HLG >> 709	Converts from HLG to SDR using Scene Referred. Reference white mapping: HLG(75%) to SDR(100%)
709 >> HLG	Converts from SDR to HLG using Scene Referred. Reference white mapping: SDR(100%) to HLG(75%)
HLG >> 1886	Converts from HLG to SDR using Display Referred. Reference 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 (*1)	Converts from HLG-Live to SDR. (Sony's proprietary)
709 >> HLGLive (*1)	Converts from SDR to HLG-Live. (Sony's proprietary)
SL3Live >> HLG (*1)	Converts from S-Log3 Live HDR to HLG. (Sony's proprietary)

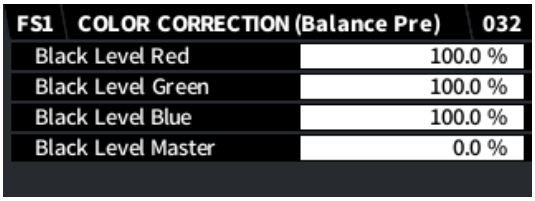
As factory default, 3D-LUT data is computed by normalizing video data of the SDI signal range of codes **64 - 940** between **0 and 1**. Thus, for the default data, use "**Narrow >> Narrow**" for Input >> Output Range.

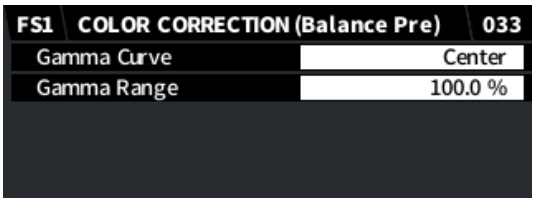
(*1) To use data, FA-96AHDR2 option is required. The data is not included in the supplied CD-ROM.

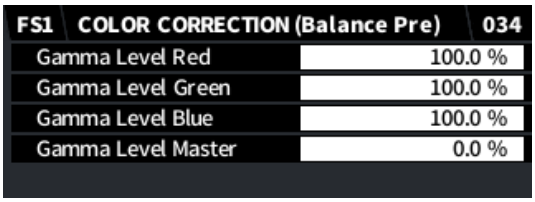
5-8. COLOR CORRECTION (Balance Pre)

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









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

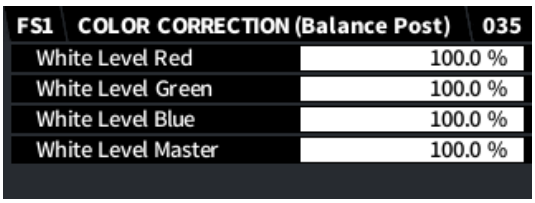
Item	Default	Setting	Description
White Level (RGB)	100.0%	0.0 - 200.0%	Sets the white level by separately adjusting R, G, and B components.
White Level Master	100.0 %	0.0 - 200.0%	Sets the white level by simultaneously adjusting R, G, and B components.
Black Level (RGB)	100.0%	0.0 - 200.0%	Sets the black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

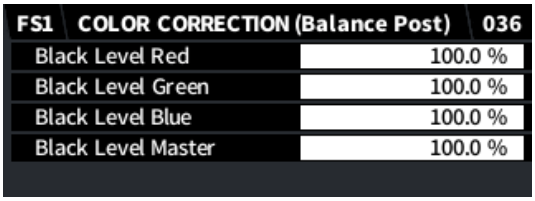
To adjust the black level before conversion, use Black Level parameters in this menu.

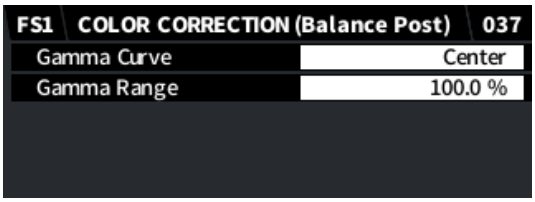
Ex) To decrease the black level of SDR input video by **3%** before SDR to HDR conversion, change **Black Level Master** to **97%**.

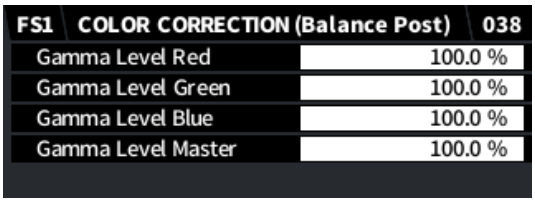
5-9. COLOR CORRECTION (Balance Post)

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:

FS1	COLOR CORRECTION (Differential)	039
White Level R-Y	100.0 %	
White Level G-Y	100.0 %	
White Level B-Y	100.0 %	

FS1	COLOR CORRECTION (Differential)	040
Black Level R-Y	100.0 %	
Black Level G-Y	100.0 %	
Black Level B-Y	100.0 %	

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)

FS1	KNEE (RGB CLIP) White 1	049
Clip	Disable	
Clip Mode	Y Knee	

FS1	KNEE (RGB CLIP) White 2	050
Clip	Disable	
Output Clip	100.0 %	
Knee Slope	1.00	
Knee Point	100.0 %	

FS1	KNEE SATURATION	051
Saturation	Disable	
Level	0 %	

FS1	RGB CLIP Black	052
Clip	Disable	
Output Clip	0.0 %	

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

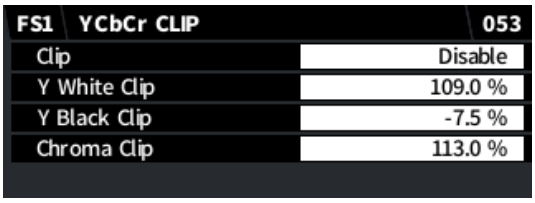
Type = Y Knee	Saturation	Disable	Disable Enable	If set to **Enable**, **Saturation Level** below can be adjusted.
	Level	0 %	0 - 200 %	Sets the Saturation Level for the knee correction (high luminance) areas. The smaller the value, the more colors are desaturated. Setting the value more than 100% makes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

RGB CLIP Black

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)

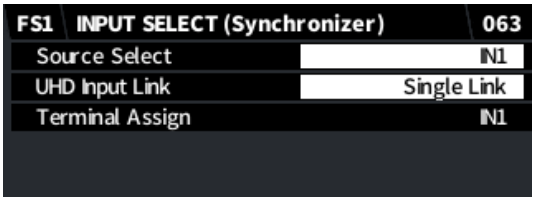
5-12. YCbCr CLIP

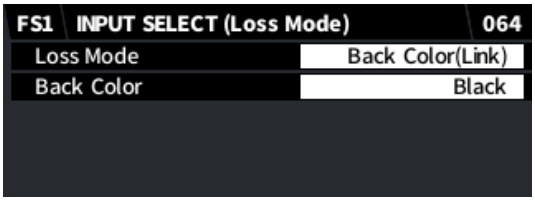


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

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.

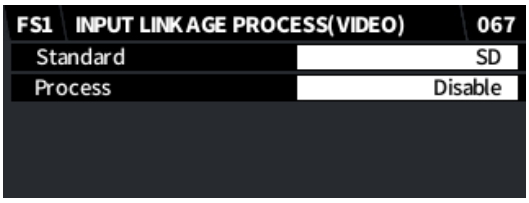
5-16. INPUT LINKAGE PROCESS (VIDEO)

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. 5-44. “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. 12-5-4-2. "Uploading Linkage Events.”)



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

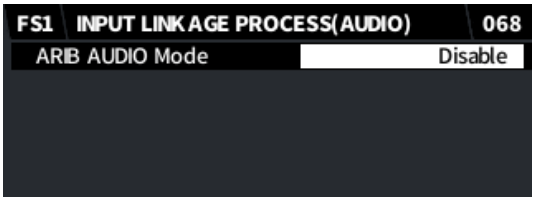
Item	Default	Setting	Description
Standard	-	SD 720 1080 2160	Selects a video format used for auto event load. **2160** is selectable in Simultaneous 4K/HD or 3D-LUT mode with FA-964K (FS1 only).
Process	Disable	Disable Enable	Enables/disables auto event load linked to input video.

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. 7-16. “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.

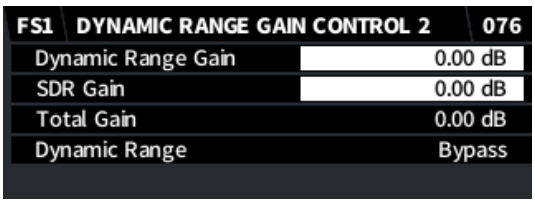
To use auto (linkage) event load, a corresponding event should be created and uploaded in advance. (See Sec. 12-5-4-2. "Uploading Linkage Events.″)



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** keeps the difference between the following settings. If **Enable** is set and **Dynamic Range Gain** of FS1 is changed, **Dynamic Range Gain** of FS2 is also changed with the same difference.
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	SL (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.

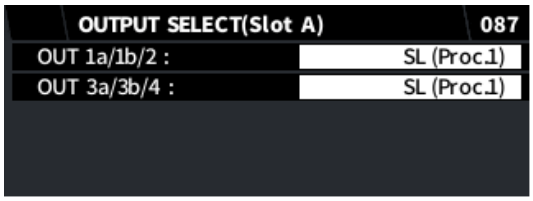
<Dual HD mode>

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	SL (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**



Required Option

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

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.

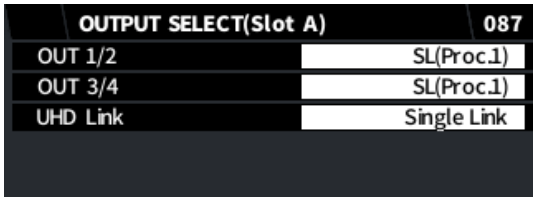
<3D-LUT mode>

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 (SFP or SFP+ module required)**



Required Option

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

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 2	OUT 3a	OUT 3b	OUT 4
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

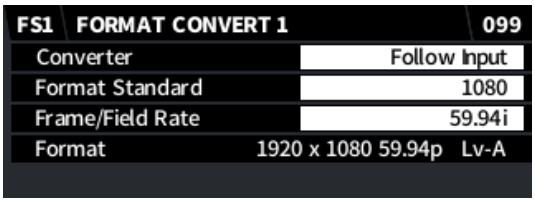
◆ **If FA-96SFPC4 installed**

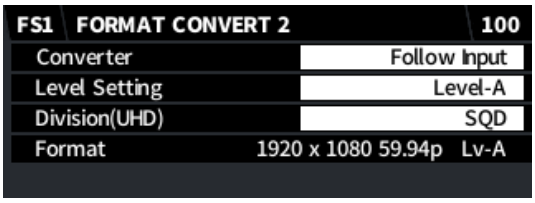
			Output ports				FA-96SFPC4 output ports			
4K SDI interface			OUT 1a	OUT 1b	OUT 2a	OUT 2b	OUT 1	OUT 2	OUT 3	OUT 4
47.95 Hz or more	SL	12G-SDI	SL	SL	-	-	SL	SL	SL	SL
	DL	6G-SDI	L1	L2	-	-	L1	L2	L1	L2
	QL	3G-SDI	L1	L2	L3	L4	L1	L2	L3	L4
30Hz or less	SL	6G-SDI	SL	SL	-	-	SL	SL	SL	SL
	DL	3G-SDI	L1	L2	L1	L2	L1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

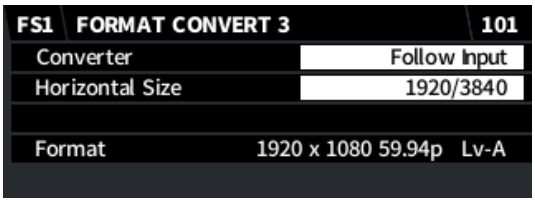
SL: Single Link
DL: Dual Link
QL: Quad Link
L1: QL / DL Link 1
L2: QL / DL Link 2
L3: QL Link 3
L4: QL Link 3

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

This menu requires FA-96UDC to be installed.
See “Appendix 1: Video Format Conversions” for more details.







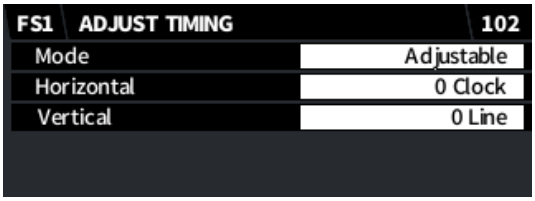
Required Option

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

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.

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



Required Option

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

FA-96UDC

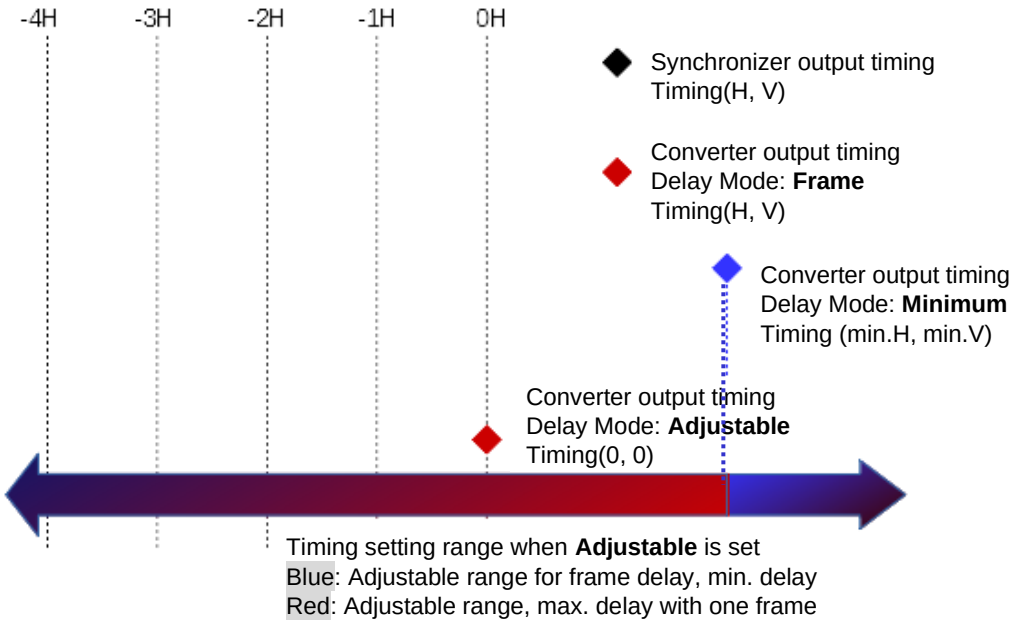
◆ **ADJUST TIMING**

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.

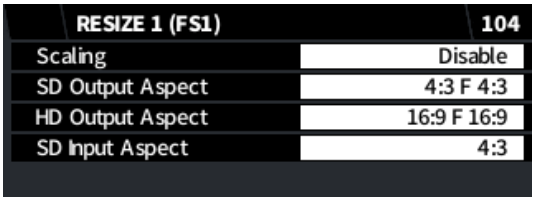
<Horizontal/Vertical adjustable ranges>

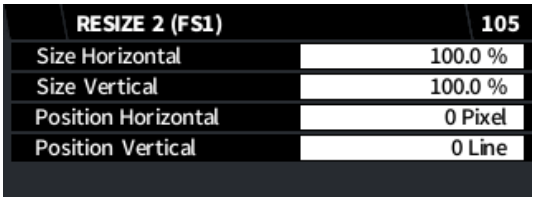
Video format	Horizontal range			Vertical range		
525/59.94i	-858	to	858	-263	to	263
625/50i	-864	to	864	-313	to	313
720/23.98p,24p	-2063	to	2063	-375	to	375
720/25p	-1980	to	1980	-375	to	375
720/29.97p, 30p	-1650	to	1650	-375	to	375
720/50p	-990	to	990	-375	to	375
720/59.94p, 60p	-825	to	825	-375	to	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
1080/50p(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

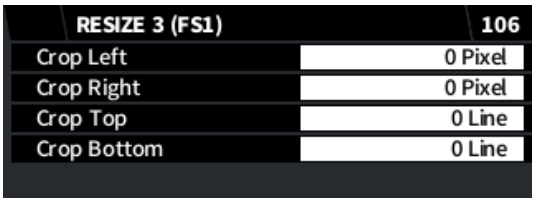
◆ **Delay variation depending on menu settings and processes**



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
Size Horizontal	100.0%	50.0% to 150.0%	Selects the horizontal image size ratio after conversion.
Size Vertical	100.0%	50.0% to 150.0%	Selects the vertical image size ratio after conversion.
Position Horizontal	0 Pixel	Varies by format after conversion. (See the table below.)	Selects the horizontal image position after conversion.
Position Vertical	0 Line	Varies by format after conversion. (See the table below.)	Selects the vertical image position after conversion.

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

Crop Left	0 Pixel	Varies by input signal format. (See the table below.)	Crops input image from the left side.
Crop Right	0 Pixel		Crops input image from the right side.
Crop Top	0 Line	Varies by input signal format. (See the table below.)	Crops input image from the top.
Crop Bottom	0 Line		Crops input image from the bottom.

Video signal	Position Horizontal (per 2-pixel)	Position Vertical	Crop Left Crop Right (per 2-pixel)	Crop Top Crop 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	0-242
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 enables/disables the following three HD/SD image filters together.

- ANTI ALIAS H/V (see Sec. 5-24-1)
- ENHANCE H/V (see Sec. 5-24-2)
- NOISE REDUCER (see Sec. 5-24-3).

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

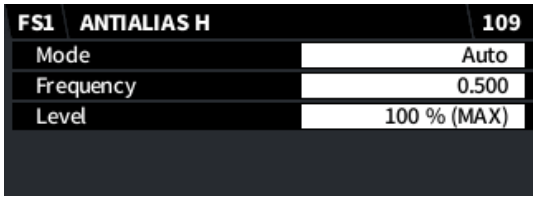
Required Option: FA-96UDC

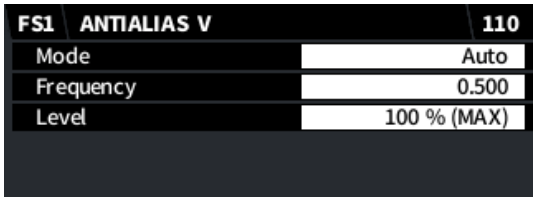
Item	Default	Setting	Description
HD/SD Details	Disable	Disable Enable	Enables / disables three HD/SD image filters together.

“HD/SD Details” functions differently depending on input / output image size as shown below.

Input image	Output image	HD/SD Details
2160p	(Same as input)	Unavailable
1080p/i 720p 525i 625i	(Same as input)	Available If set to **Enable**, images can be adjusted in ANTIALIAS, ENHANCE and NOISE REDUCER filter menus. Setting to **Enable**/**Disable** changes the delay amount. If set to **Enable**, a delay of tens of lines is added. See Sec. 5-39. “FRAME DELAY” for details on video delay amount by format conversion type.
(Input and output size or aspect ratio is different.)		All image filters are **always enabled** regardless of this setting. Images can be adjusted in each filter menu.

5-24-1. 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	If set to **Auto**, a recommended Frequency value is automatically set according to the input and output image size ratio. If set to **Manual**, the Frequency value can be adjusted manually.
Frequency	-	0.125 – 0.500 (0.025)	Sets the cutoff frequency of low-pass filter. (See the note below.)
Level	H:100% V:100%	0 (Off) – 100% (5%)	Sets the mixing percentage of filtered picture and unfiltered picture. **100%** indicates filtered picture only. (See the note below.)

If the image size is changed by video conversions, jaggies may appear on edges. Anti-aliasing filter can smooth out these jagged edges.
The anti-aliasing filter has low-pass characteristics (attenuating high frequency components and passing through low frequency components). Frequency in the menu limits the upper-side band.

If Mode is set to **Auto**, a recommended Frequency value is automatically set according to the input and output image size ratio. The value can be adjusted manually to fit individual image by changing Mode to **Manual**. (For example, using a lower value for CG graphics with sharp edges, or a higher value for lower resolution images).

The lower the Frequency value, the more smooth the lines are, but the more the detailed texture attenuates. The higher the Frequency value, the sharper images become but the more jaggies appear. The optimal Frequency value is largely dependent on the ratio of input and output image sizes.
When video images converted from Progressive to Interlaced (telecined video), a motion judder problem specific to telecined video caused by scenes with big and fast movements may occur. This can be reduced by decreasing only the V Level from the recommended value set by **Auto** (for example, decreasing to 0.125 from 0.25). Note that, however, if doing so, the vertical resolution may be deteriorated in other scenes where there are few and slow movements.

As for Level setting, the higher the value, the more the filtered areas increase and **100%** indicates filtered picture only. The higher the value, the more the higher frequency components attenuate and the more smooth the edges become.

5-24-2. ENHANCE H/V (FA-96UDC)

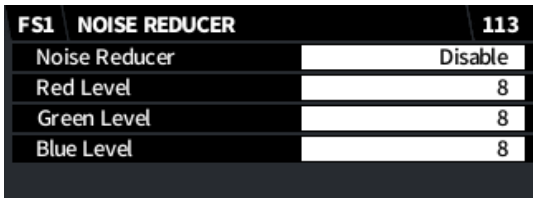
The menu sets the horizontal and vertical enhancements. Although enhancers are not effective on 4K images, they can be applied to HD input images before 4K up-conversion and to HD output images after down-conversion from 4K.
The enhancement filter allows you to sharpen blurry input images and restore blurred edges caused by anti-aliasing filtering that attenuates high-frequency information while down-converting.

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 Middle Low	1	0 – 10	Sets the enhancement level for high frequency bandwidth, middle frequency bandwidth and lower frequency bandwidth respectively Minimum level: **1** , Maximum level: **10** “**0**” disables the enhancement filter.

5-24-3. NOISE REDUCER (FA-96UDC)



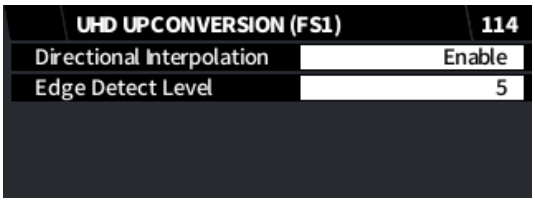
Simultaneous 4K/HD (FS1)
Dual HD
3D-LUT (FS1)

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.

5-25. 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.

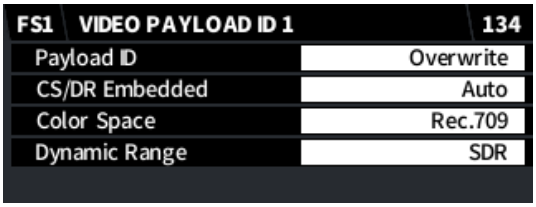
5-26. ANCILLARY MULTIPLEX

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, the HANC space becomes blank. **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. If the SDI input and reference are not synchronized, packet loss or duplication may occur due to timing adjustment. **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. 5-34.) 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.

5-27. 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 Auto(Keep Value)	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 the process is bypassed, payload ID codes in the input signal are inserted. If processed, 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. **Auto(Keep Value)**: Basically functions in the same manner as **Auto**. The only difference is the case of action on video loss. If set to **Auto**, output signal payload ID codes for Dynamic Range and Color Space are reset to default. If set to **Auto(Keep Value)**, the payload ID codes set just before the video loss are kept.
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

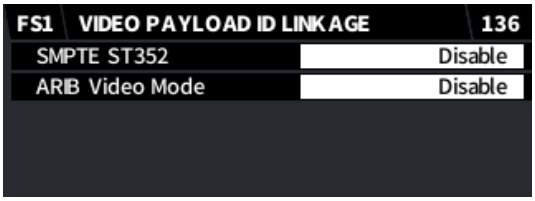
5-28. VIDEO PAYLOAD ID LINKAGE

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. 5-48. “Payload ID (FA-96EX3G44-R / FA-96SFPC4)” and Sec. 5-51. “INPUT ARIB B39 VIDEO MODE”
To use auto (linkage) event load, a corresponding event should be created and uploaded in advance. (See Sec. 12-5-4-2. "Uploading Linkage Events.”)

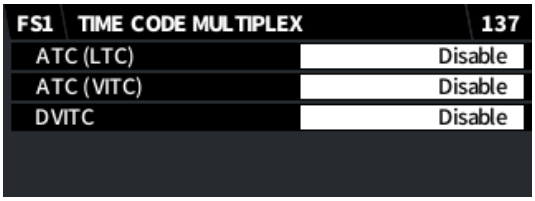


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

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.

5-29. TIME CODE MULTIPLEX

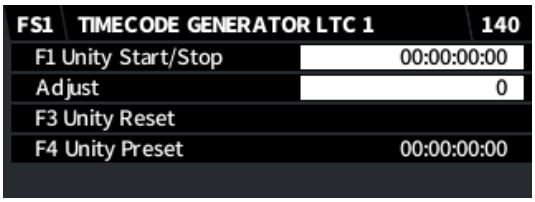


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

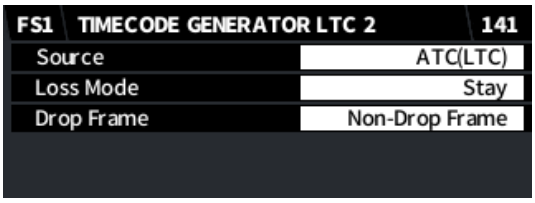
Item	Default	Setting	Description
ATC(LTC)	Disable	Disable Enable	Selects whether to embed timecode into each FS output. **Disable:** Embeds no timecode. **Enable:** Embeds timecode. Generate a timecode using following timecode menus. (DVITC is only for SD)
ATC(VITC)	Disable		
DVITC	Disable		

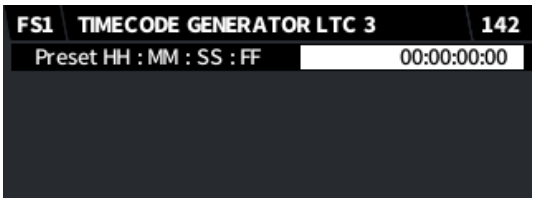
5-30. TIMECODE GENERATOR LTC 1, 2, 3

This menu allows you to generate LTC timecodes. To embed timecode onto FS output, set H ANC to **Overwrite** (Sec. 5-26. “ANCILLARY MULTIPLEX”) and ATC(LTC) to **Enable** (Sec. 5-29. “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. (See next page.) **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.

5-30-1. Timecode Source

Available timecode sources are restricted depending on frame rates of input and output video signals. If an invalid source is selected, an error message appears at the bottom of the menu and an asterisk (*) is added to the invalid source.
The following tables show which timecode source is available for which frame rates of input and output signals.

◆ **ATC or VITC**

ATC(LTC), **ATC(VITC)** or **VITC(DVITC)** can be used in the following frame rates of input and output signals.

✓: Available		Output				
		60/30Hz	59.94/ 29.97Hz	50/25Hz	48/24Hz	47.95/ 23.98Hz
Input	60/30Hz	✓				
	59.94/29.97Hz		✓			
	50/25Hz			✓		
	48/24Hz				✓	
	47.95/23.98Hz					✓

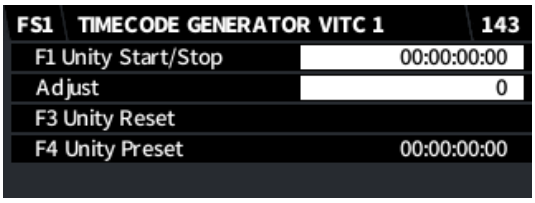
◆ **LTC In**

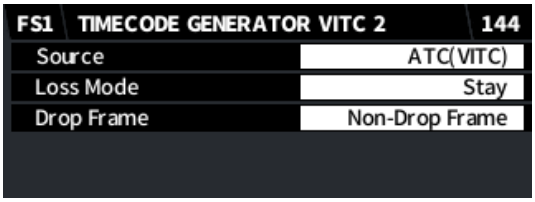
LTC In can be used in the following frame rates of input and output signals.

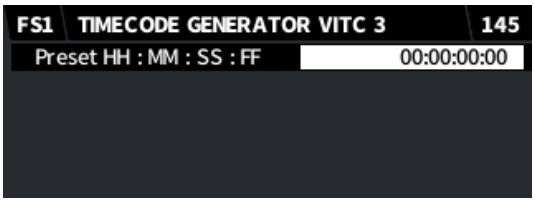
✓: Available		Output				
		60/30Hz	59.94/ 29.97Hz	50/25Hz	48/24Hz	47.95/ 23.98Hz
Input	30Hz (Non-Drop)	✓	✓			
	30Hz (Drop)		✓			
	25Hz			✓		
	24Hz				✓	✓

5-31. 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. 5-26. “ANCILLARY MULTIPLEX”) and ATC(VITC)/DVITC to **Enable** (Sec. 5-29. “TIME CODE MULTIPLEX”). See the LTC timecode menus to set the VITC(DVITC) timecode.







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

5-32. LTC OUT SELECT (FA-96DIN4-CBL)

This menu requires FA-96DIN4-CBL option.

Simultaneous 4K/HD
Dual HD
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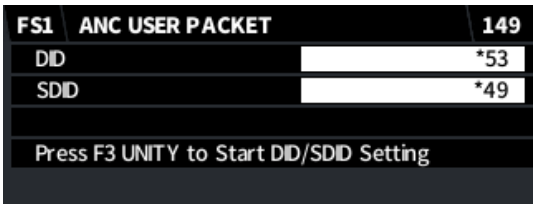
Required Option: FA-96DIN4-CBL

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.

An error message, “Cannot use with current source”, is displayed on the menu if the timecode generator source is unavailable due to frame rates of input and output signals.

5-33. 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	53	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	49	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.

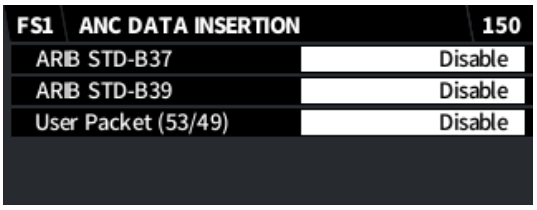
DID value	SDID value
5F	DC
	DD
	DE
	DF
	FE

5-34. 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. 5-33. “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 5-26. “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.5-35). **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)

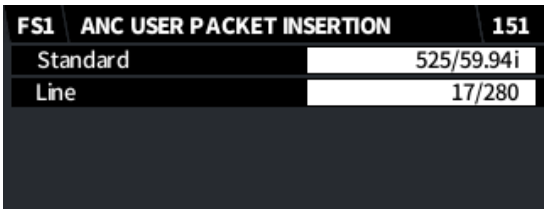
4	30/29.97/25p		P to I(PsF) conversion (30 frames or less)	60/59.94/50i (30/29.97/25PsF)	
	Frame 1	Packet A	Inserts frame packets to Field 1.	Field 1	Packet A
				Field 2	(None)

	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

5-35. ANC USER PACKET INSERTION (Planned for future support)

This menu is planned for future support.



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

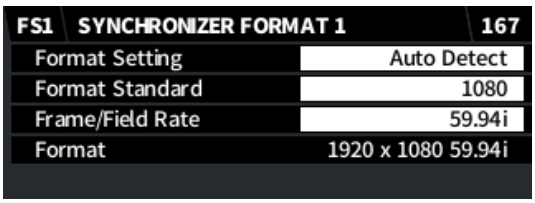
Item	Default	Setting	Description
Standard	-	525/59.94i 625/50i 720p 1080i, PsF/2160PsF 1080p/2160p(1.5G) 1080p/2160p(3G-A) 1080p/2160p(3G-B)	Selects the TV standard of the signal into which the user packet is inserted.
Line	(See the table below.)		Selects a line number into which the user packet is inserted.

<Line default value and setting range>

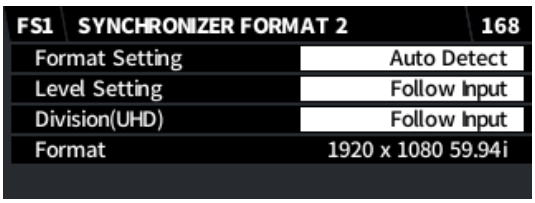
Standard setting	Line default value	Line setting range
525/59.94i	17/280	12/275 - 19/282
625/50i	17/330	8/321 - 22/335
720p	17	9 - 25
1080i, PsF/2160PsF	17/579	9/571 - 20/582
1080p/2160p(1.5G)	17	9 - 41
1080p/2160p(3G-A)	17	9 - 41
1080p/2160p(3G-B)	17/579	9/571 - 20/582

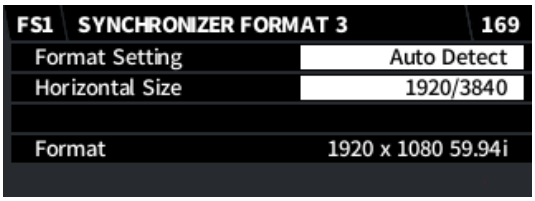
5-36. SYNCHRONIZER FORMAT

See Sec. “15-1. “Specifications” for the supported signal formats.



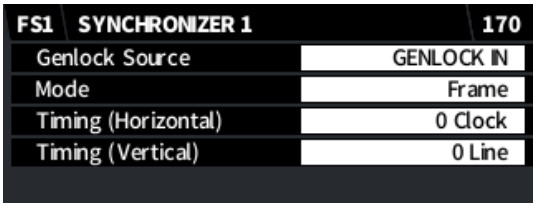
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

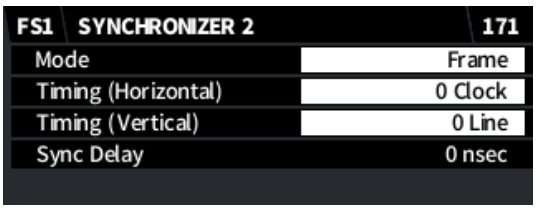




Item	Default	Setting	Description
Format Setting	Auto Detect	Auto Detect Manual	Selects the FS output format. **Auto Detect**: FS input signal format. **Manual**: Signal format specified below
Format Standard	1080	SD 720 1080 2160	Specifies the vertical image resolution. **2160** available with FA-964K 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.

5-37. SYNCHRONIZER





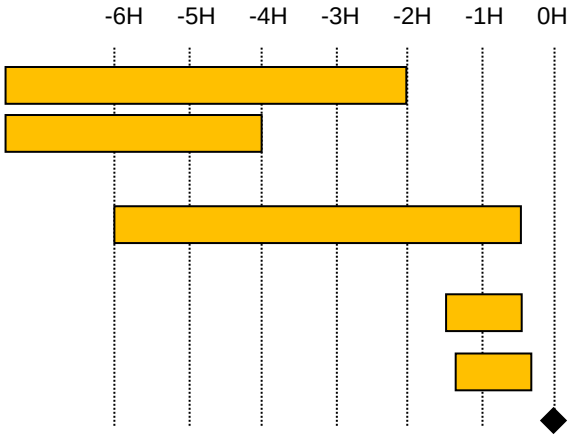
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

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. * Frequency deviation in free-run can be adjusted in the menu. See Sec. 7-7. “FREE RUN FREQUENCY ADJUST.”
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 1H memory. **AVDL**: Aligns input video signals using both 1H and frame memory. **Line (Min)**: Aligns input video signals using 1H memory.

* Mode appears both in Page 170 and 171.

◆ **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.

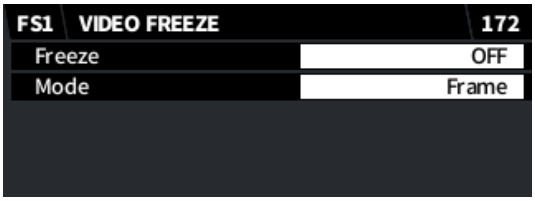


Frame adjust range:
-2.0H (for 4K/HD/SD Single Link signals)
(-2.0H or advanced signals, no frame delay. Otherwise, a frame delay may occur.)
-4.0H (for 4K Dual/Quad Link signals)
(If the phase difference of input signals is within 2 lines, they can be aligned as the same frame.)
AVDL adjust range:
-6.0H 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.
Sync Delay	-	-	Displays the process delay amount from Synchronizer input to Timing (H/V) adjustment.

* Timing (H) and Timing (V) appear both in Page 170 and 171.

5-38. VIDEO FREEZE



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

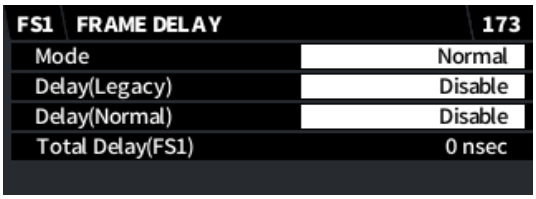
Item	Default	Setting	Description
Freeze	OFF	OFF ON	Turns freeze On/Off. Effective only when Synchronizer Mode (No. 170) is set to **Frame**.
Mode	Frame	Frame Odd Even	Sets the freeze mode. This setting is ignored if progressive/no signal is input to FS.

5-39. FRAME DELAY

Frame rates of input and output video signals determine whether the Frame Delay function is effective or not. If the function is ineffective, an asterisk (*) is added behind the setting value. See the table below for which input and output combinations make the function effective.

◆ **Which input and output formats (frame rates) make Frame Delay effective**

✓: Frame Delay effective		Output				
		60/30Hz	59.94/ 29.97Hz	50/25Hz	48/24Hz	47.95/ 23.98Hz
Input	60/30Hz	✓				
	59.94/29.97Hz		✓			
	50/25Hz			✓		
	48/24Hz				✓	
	47.95/23.98Hz					✓



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

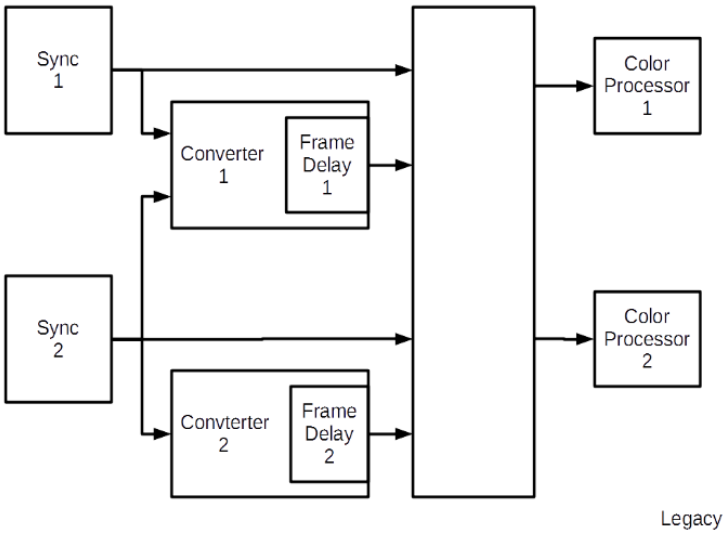
Item		Default	Setting	Description
Mode		Normal	Legacy Normal	Selects a frame delay processing mode between **Legacy** and **Normal** (applied to both F1 and F2).
If Legacy is selected	Delay (Legacy)	Disable	Disable 0.5-8.0 Frames	Allows you to add a delay in 0.5 frames respectively to FS1 (Converter1) 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.

5-39-1. FRAME DELAY Difference between Old and New Versions

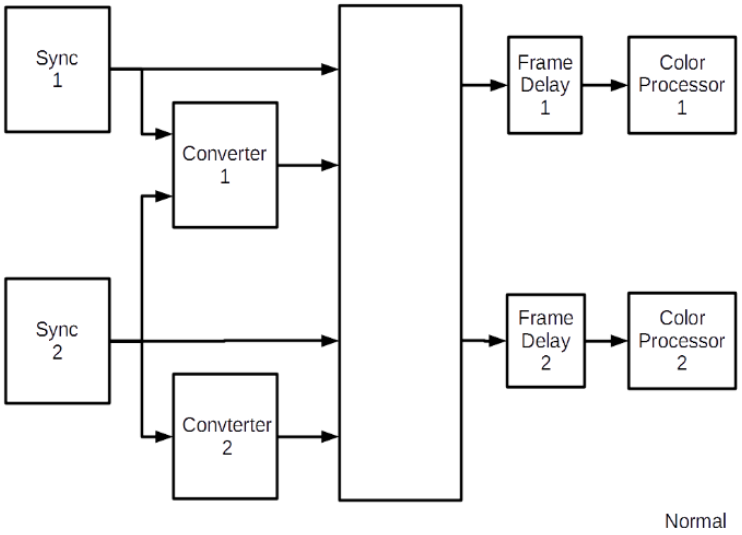
The FRAME DELAY function significantly changes in FA-9600 Version 3.3.

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. 13. “Event Data (CSV File)” for details on how to create events using other methods.

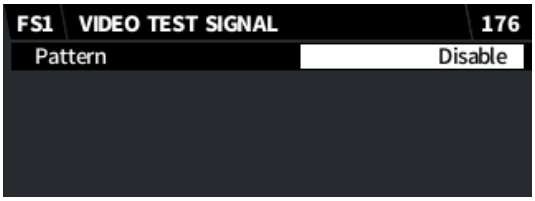
5-40. SDI BYPASS

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

Required option FA-96EX3G44-R

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.

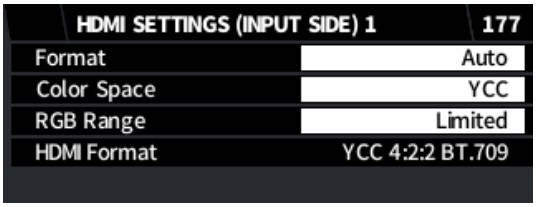
5-41. VIDEO TEST SIGNAL



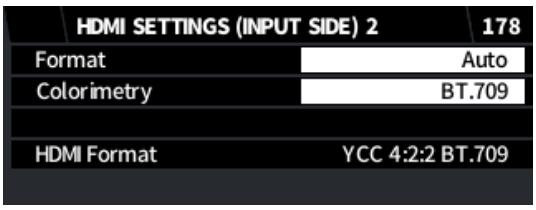
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

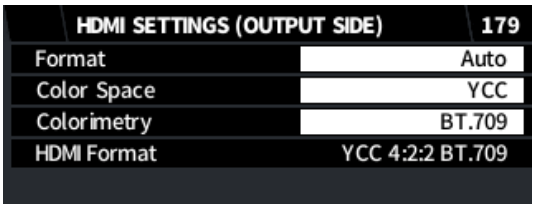
Item	Default	Setting	Description
Pattern	Disable	Disable 100% Color Bar 75% Color Bar	Outputs the selected test signal.

5-42. HDMI SETTINGS



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





Item	Default	Setting	Description
Format	Auto	Auto Manual	Selects the format setting mode for HDMI signal. **Auto**: Automatic setting For input, obtains format from input signal. For output, obtains format from EDID data of the connecting device (monitor, etc.). Default output format: **YCC BT.709** **Manual**: Manual setting
HDMI Format	-	–	Displays the HDMI signal format. Unsupported formats are displayed with an asterisk (*) at the beginning.
If Format is set to **Manual**, set the following items.			
Color Space	YCC	YCC RGB	Selects an HDMI color mode between **YCC** (YCbCr) and **RGB**.
RGB Range	Limited	Limited Full	If **RGB** (8-bit for each) is set, selects the data range for HDMI input. HDMI output always uses Limited Range. **Limited**: Limited Range between 16-235. **Full**: Full Range between 0-255.
Colorimetry	BT.709	BT.2020 BT.709	Selects a color gamut. (SD-SDI signals are processed using BT.601.)

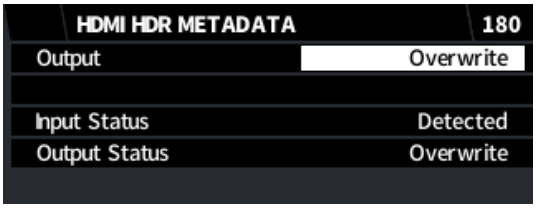
HDMI output video can be selected in the OUTPUT SELECT menu. (See Sec.5-19.)
HDMI output audio channels can be selected in the HDMI AUDIO OUTPUT SELECT menu. (See Sec. 6-11.)

IMPORTANT

In Simultaneous 4K/HD or 3D-LUT mode with FA-964K, FA-9600 prioritizes 4K video than HD video through EDID information if an HDMI device (such as a PC) that provides video signals to FA-9600 supports 4K. To use video resolution other than 4K in such cases, specify the desired video resolution in the HDMI device.

If the HDMI device is a Windows PC, video resolution of HDMI images may not be changed only by “Display resolution” setting on the Windows 10. In such cases, also change “Refresh rate”, or select from the mode list in Properties of the display adapter. Also verify that the selected signal format under Resolution in the “Advanced display settings” is supported by FA-9600.

5-43. HDMI HDR METADATA



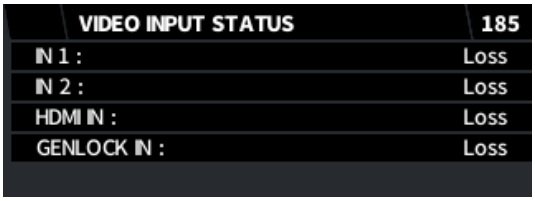
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

Item	Default	Setting	Description
Output	Overwrite	Pass Overwrite Disable	Selects the HDR metadata to be inserted into HDMI OUT. **Pass**: HDMI IN inserted data (Enabled only when INPUT SELECT is set to **HDMI IN** (see Sec. 5-13) and in other cases, same data as **Overwrite** setting.) **Overwrite**: Data set by the Windows GUI, Web GUI or Ember+ (See Sec. 12-2-9. “HDMI OUT (Windows GUI).”) **Disable**: No metadata

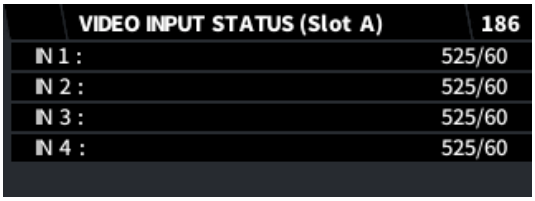
HDR metadata insertion status in HDMI IN and OUT are displayed as shown below.

Item	Display	Description
Input Status	None	Invalid data
	Unknown	All data values are zero.
	Detected	Data is correctly detected.
Output Status	Pass	HDR metadata in HDMI IN is inserted in HDMI OUT. (If HDR metadata is not inserted in HDMI IN or an SDI input is selected for source, HDR metadata is created and inserted by referencing color correction settings.)
	None	No HDR metadata is inserted in HDMI OUT. (Output is set to **Pass** and Input Status is to other than **Detected**.)
	Overwrite	HDR metadata set in the Windows GUI is inserted in HDMI OUT. (Same as the Output setting)
	Disabled	No HDR metadata is inserted in HDMI OUT. (Same as the Output setting)

5-44. VIDEO INPUT STATUS

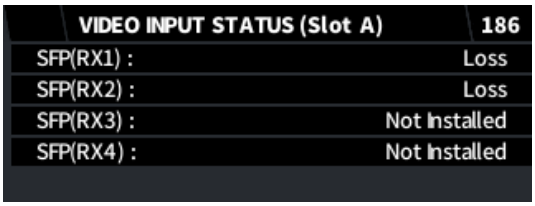


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)



Required Option

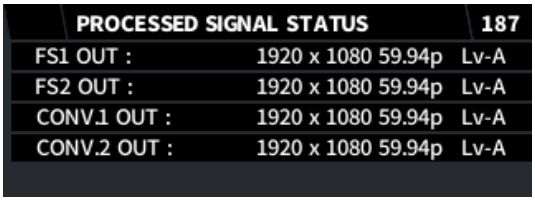
FA-96EX3G44-R



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.” -The following information is also displayed for HDMI inputs. Color Space: YCC(YCbCr), RGB RGB Range: F (Full), L (Limited) Colorimetry: 2020 (BT.2020), 709 (BT.709), 601 (BT.601)
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.

5-45. 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)

5-46. SDI ERROR DETECTION

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

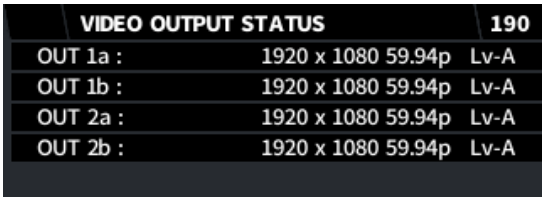
Required Option

FA-96EX3G44-R

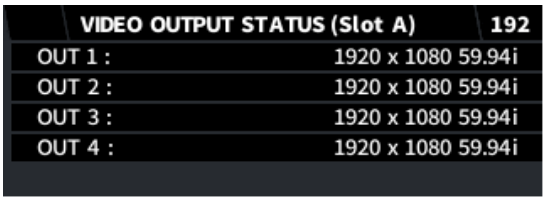
FA-96SFPC4

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.

5-47. VIDEO OUTPUT STATUS

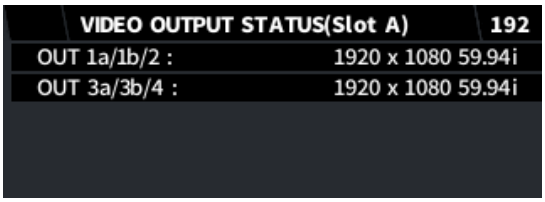


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

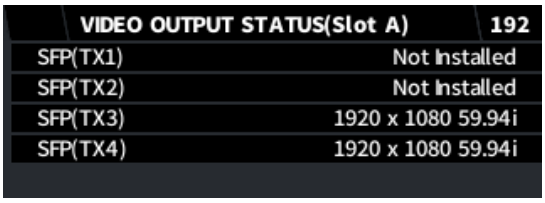


Required Option

FA-96EX3G44-R



FA-96EX12G06

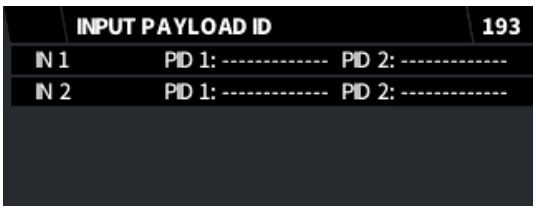


FA-96SFPC4

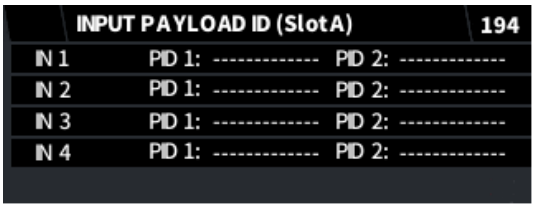
Item	Description
OUT 1a | OUT 2b HDMI OUT	Displays the output signal format. -The following information is also displayed for HDMI outputs. Color Space: YCC (YCbCr), RGB RGB Range: L (Limited) Colorimetry: 2020 (BT.2020), 709 (BT.709), 601 (BT.601)
OUT 1 | OUT 4	Displays the output signal format of the 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.

5-48. Payload ID (FA-96EX3G44-R / FA-96SFPC4)

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

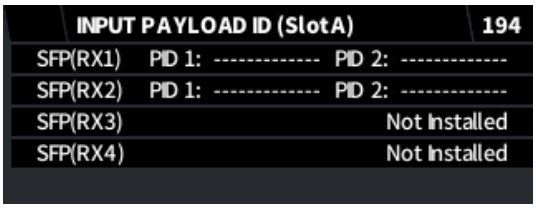


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)



Required Option

FA-96EX3G44-R

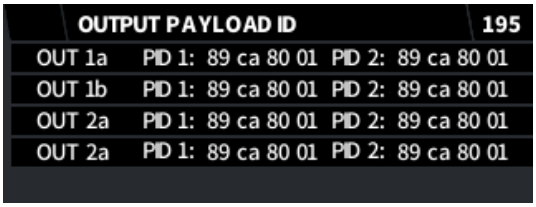


FA-96SFPC4

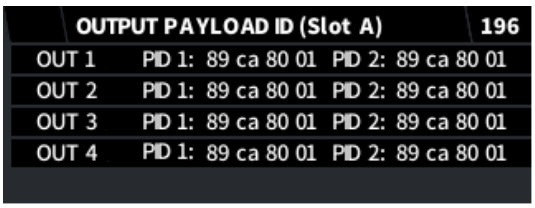
SDI signal / Display	SD	HD	3G Level A	3G Level B
PID 1 data	No display	Payload ID in Y signal	Payload ID in Y signal	Payload ID in Link A
PID 2 data	No display	No display	Payload ID in C signal	Payload ID in Link B

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

5-49. OUTPUT PAYLOAD ID

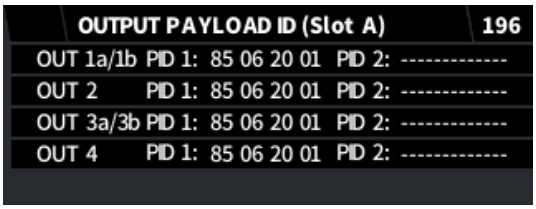


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

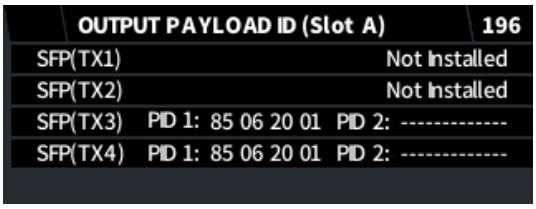


Required Option

FA-96EX3G44-R



FA-96EX12G06

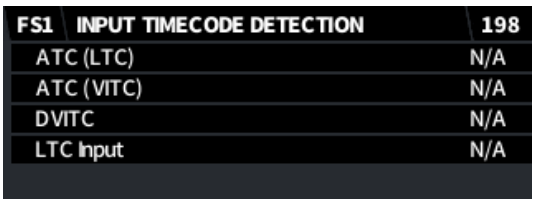


FA-96SFPC4

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.

5-50. 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

5-51. INPUT ARIB B39 VIDEO MODE

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

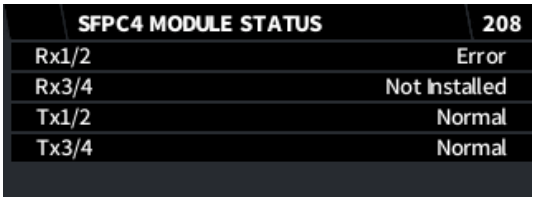
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

5-52. 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)

5-53. SFPC4 MODULE STATUS



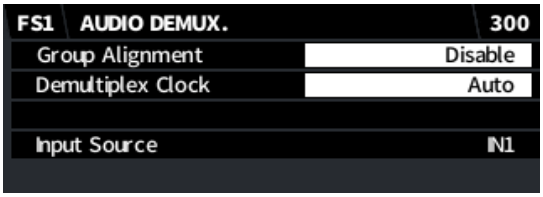
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1)

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 / Web GUI to verify details. (See Sec. 12-9. "Status.")

6. Audio Setting Menus

6-1. AUDIO DEMUX

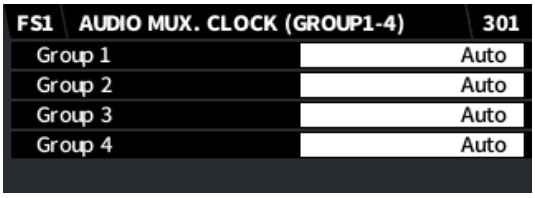


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

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**.

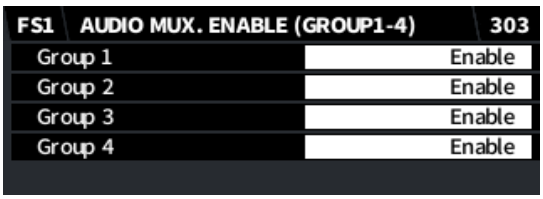
6-2. AUDIO MUX CLOCK (GROUP1-4)



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)

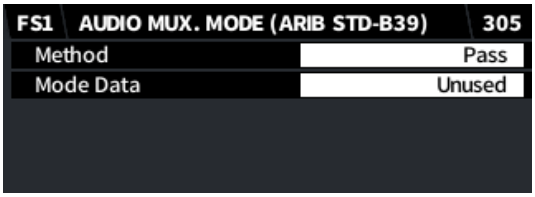


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

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. 5-34. “ANC DATA INSERTION.”



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

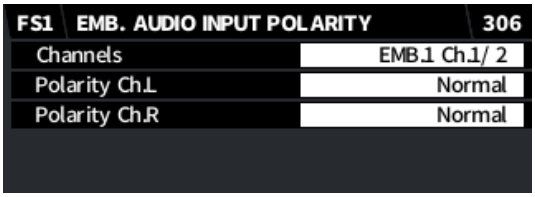
Item	Default	Setting	Description
Method	Pass	Pass Overwrite	Selects Audio Mode data insertion mode for ARIB STD-B39 defined Control signal. **Pass**: Passes the input signal ARIB STD-B39 Audio Mode data through to the output or overwrites the new information if input and output audio formats are different. **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. EMB. AUDIO INPUT POLARITY



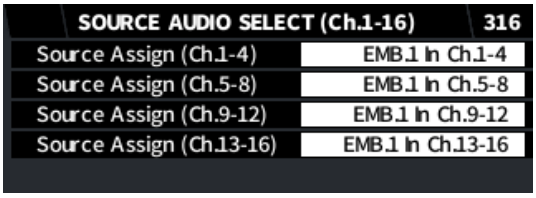
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

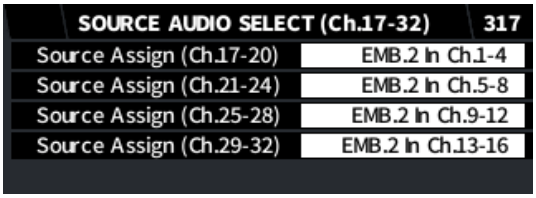
Item	Default	Setting	Description
Channels	-	Input Ch.1/2 to Input Ch.15/16	Selects a channel pair from embedded audio input.
Polarity Ch.L	Normal	Normal Invert	Selects the L (odd number) channel polarity for the selected channel pair. Setting to **Invert** inverts the audio polarity.
Polarity Ch.R	Normal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

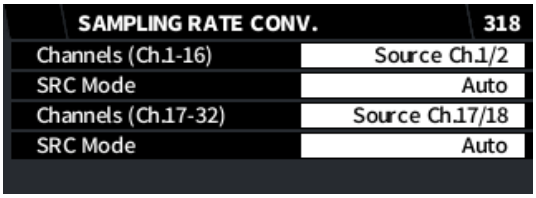




Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

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*** OP(DNT) In Ch.1-4 to Ch.29-32****	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. ***** OP(DNT) In Ch.X-X** require FA-96DNT.
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*** OP(DNT) In Ch.1-4 to Ch.29-32****	
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)



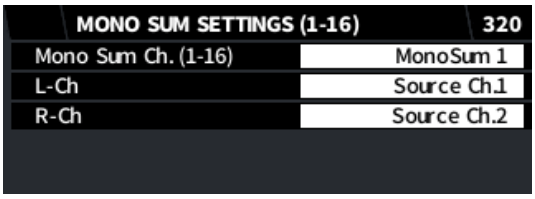
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

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 and Dante 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, MADI and Dante 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).



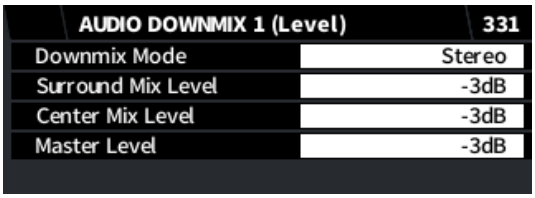
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

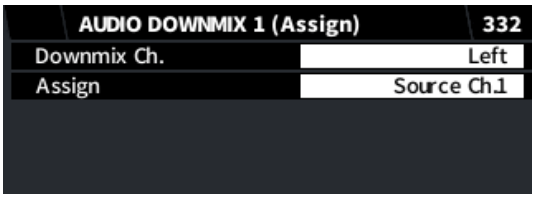
Item	Default	Setting	Description
Mono Sum Select (1-16)	-	MonoSum1-16	Selects a MONO SUM processor.
L-Ch	Source Ch.1-31 (odd channel)	Source Ch.1-32	Selects the L-channel source for the selected Mono Sum circuit.
R-Ch	Source Ch.2-32 (even channel)	Source Ch.1-32	Selects the R-channel source for the selected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

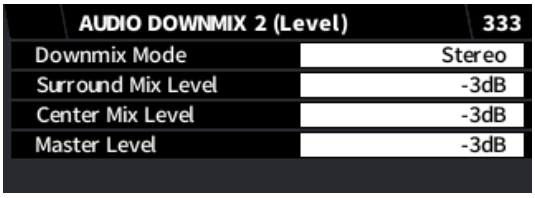
6-9. AUDIO DOWNMIX 1 and 2

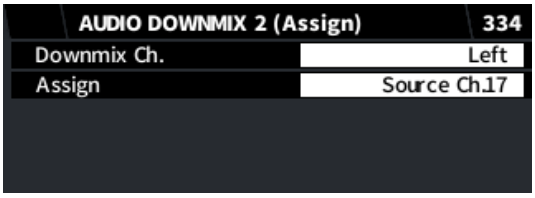
FA-9600 units are equipped with **2 Audio Downmix modules**, which can accept **FA-9600 audio source channels 1-32**, and **Silence** as Downmix sources.

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)

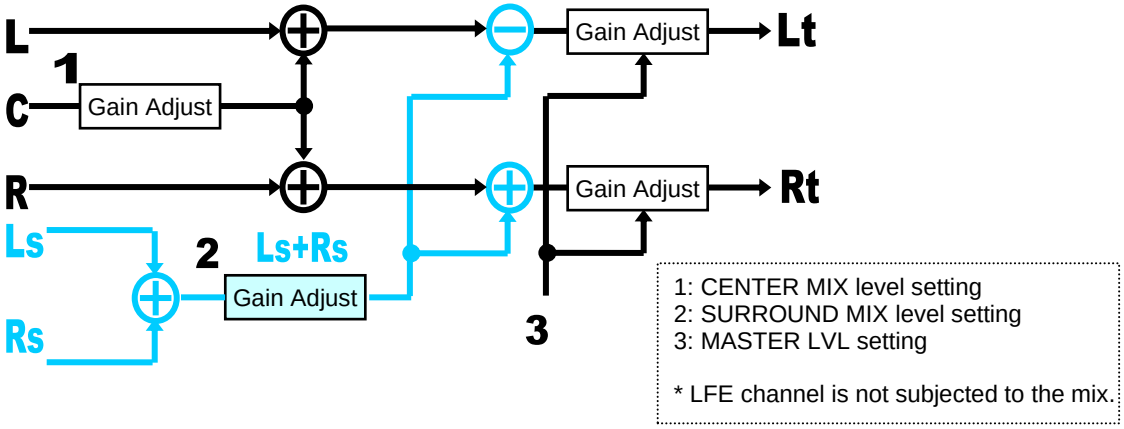
Select a channel under **Downmix Ch** and an audio source under **Assign**.

Downmix	Downmix Ch.	Assign default settings	Assign setting range
Downmix 1	Left Right Center Left Surround Right Surround	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**

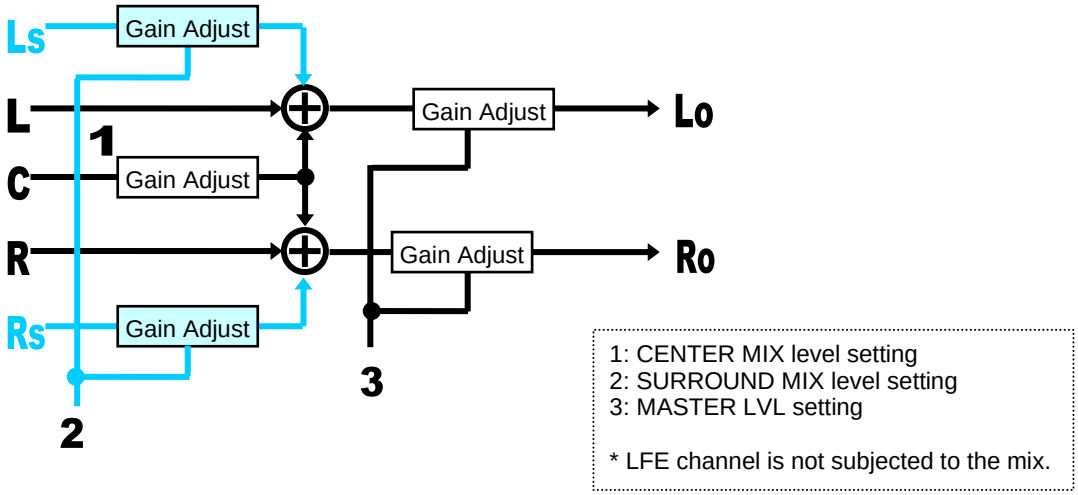
<Surround Mix (Lt/Rt)>

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.)



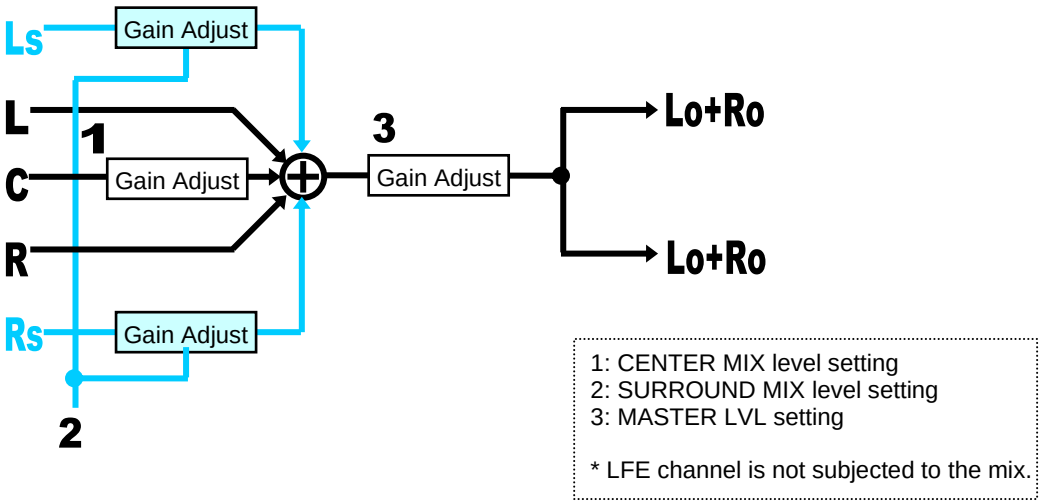
<Stereo Mix (Lo/Ro)>

For Stereo Monitors



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

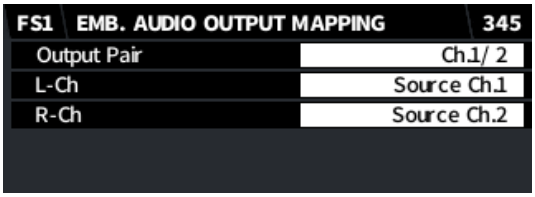
For Monaural Monitors



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.
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		

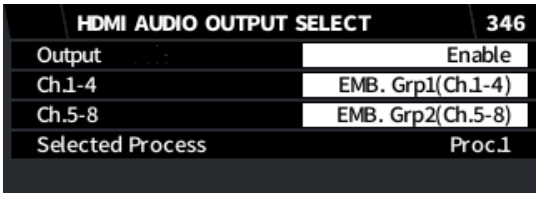


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

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.

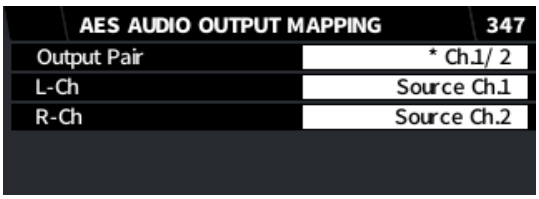


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

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.

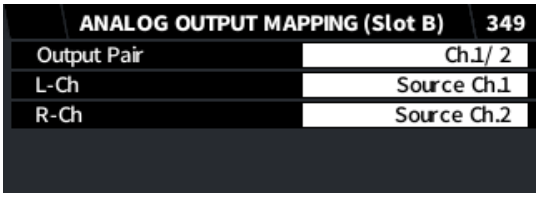


Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

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.



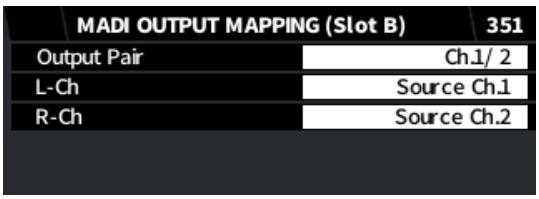
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

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.



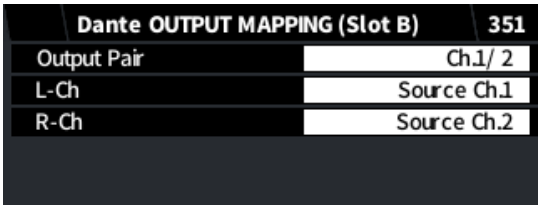
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

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. Dante OUTPUT MAPPINGS

Allows you to set up Dante audio output.



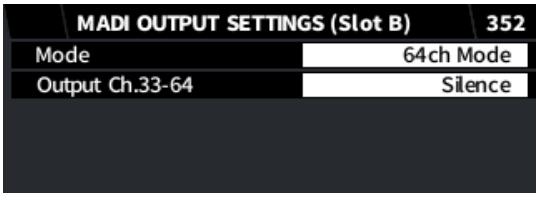
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

Required option: FA-96DNT

Item	Default	Setting	Description
Output Pair	–	Ch.1/2-31/32	Selects an output channel pair.
L-Ch	Source Ch.1-31 (Odd channels)	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 channels)		Selects the R channel source.

6-16. MADI OUTPUT SETTINGS

Allows you to set up MADI signal output.



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 mode **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.

6-17. 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.

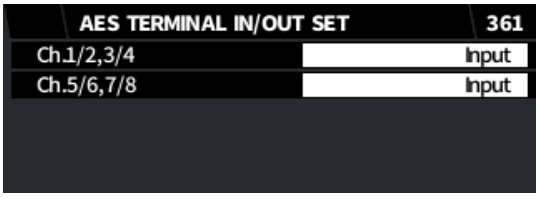
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

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.

6-18. AES TERMINAL IN/OUT SET

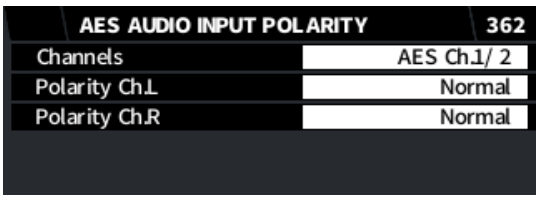
Allows you to select **Input** or **Output** for AES terminals.



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.

6-19. AES AUDIO INPUT POLARITY



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

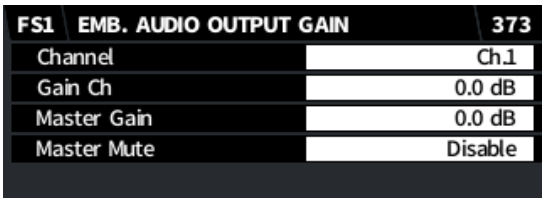
Item	Default	Setting	Description
Channels	-	AES Ch.1/2-7/8	Selects an AES input channel pair.
		OP(AES) Ch.1/ 2-7/8	Selects an AES input channel pair. (FA-96AES-UBL required)
Polarity Ch.L	Normal	Normal Invert	Selects the polarity for the L (odd) channel of the selected pair.
Polarity Ch.R	Normal	Normal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

6-20. AUDIO OUTPUT GAIN

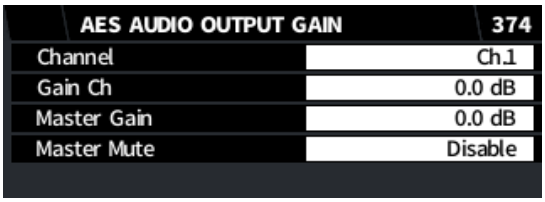
Allows you to adjust output audio gain for the following channels:

- 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.



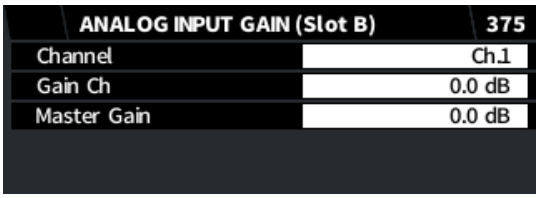
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)



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.

6-21. 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)

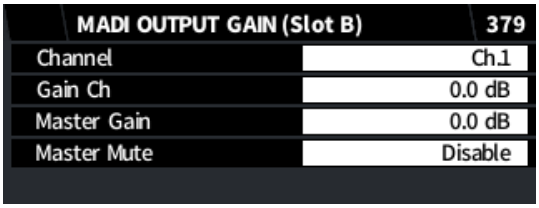
Required option

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.

6-22. MADI OUTPUT GAIN

Allows you to adjust audio channel gain for MADI output (FA-96MADI required).
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)

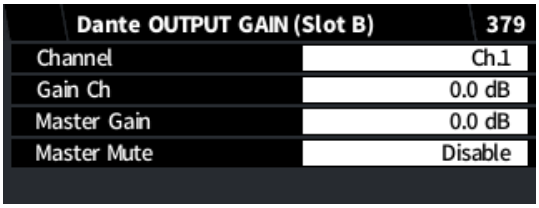
Required option

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.

6-23. Dante OUTPUT GAIN

Allows you to adjust Dante audio output 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)

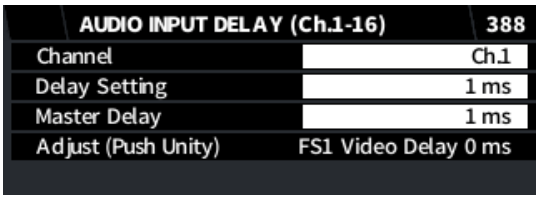
Required option

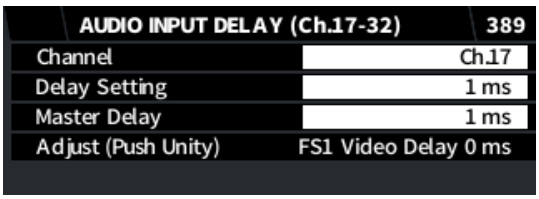
FA-96DNT

Item	Default	Setting	Description
Channel	-	Ch.1-32	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 Dante audio channels (Ch. 1-32).
Master Mute	Disable	Disable Enable	**Enable**: Mutes (sets to silent) all Dante audio output channels (Ch. 1-32).

6-24. 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.

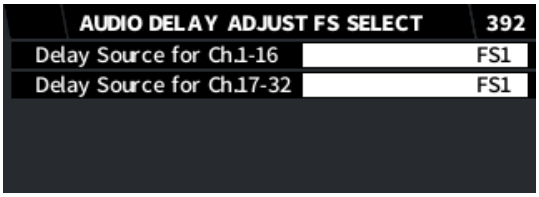




Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

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.

6-25. AUDIO DELAY ADJUST FS SELECT



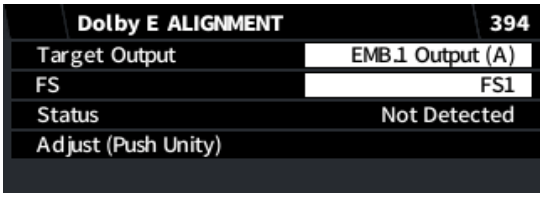
Simultaneous 4K/HD
Dual HD
3D-LUT (FS1 / EMB1)

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.

6-26. 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).

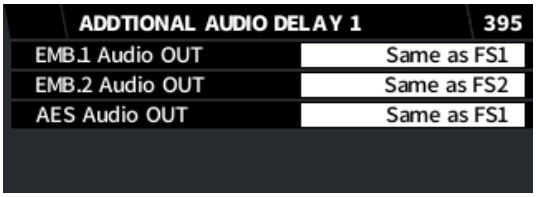
Item	Description
Status	Displays the output channel number and the timing reference line in SDI signals. If signals are unavailable, "**Error**" is displayed. If no Dolby E signals are detected, "**Not detected**" is displayed.
Adjust (Push Unity)	Press **F4 Unity** to execute the audio source (output) 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.

6-27. 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. 5-39. 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.
Frame rates of input and output video signals determine whether the Audio Delay function is effective or not. If the function is ineffective, an asterisk (*) is added behind the setting value. See the table below for which input and output combinations make the function effective.

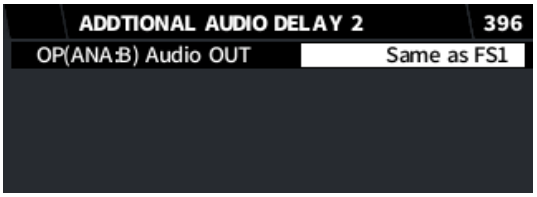
◆ **Which input and output formats (frame rates) make Audio Delay effective:**

✓: Audio Delay effective		Output				
		60/30Hz	59.94/ 29.97Hz	50/25Hz	48/24Hz	47.95/ 23.98Hz
Input	60/30Hz	✓			✓	
	59.94/29.97Hz		✓			✓
	50/25Hz			✓		
	48/24Hz	✓			✓	
	47.95/23.98Hz		✓			✓



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

Required option: FA-96AES-UBL



Required option: FA-96ANA-AUD, FA-96MADI or FA-96DNT

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 OP(DNT) Audio OUT	Same as FS1	Disable Same as FS1 Same as FS2	Adjusts audio output delay to sync audio (AES, analog, MADI or Dante) to video.

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.
OP(DNT) Audio OUT requires FA-96DNT option.

6-28. ANALOG INPUT/OUTPUT LEVEL

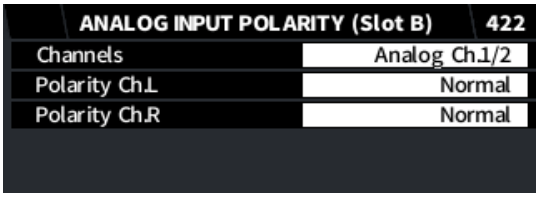
Required option

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

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.

6-29. ANALOG INPUT POLARITY



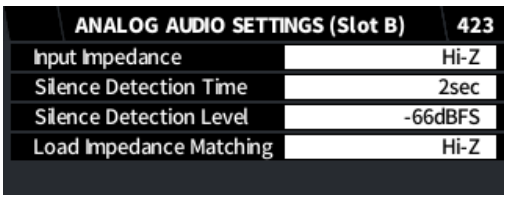
Required option

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

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.

6-30. ANALOG AUDIO SETTINGS



Required option

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

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. 6-28) - ANALOG INPUT GAIN (Sec. 6-21) - 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

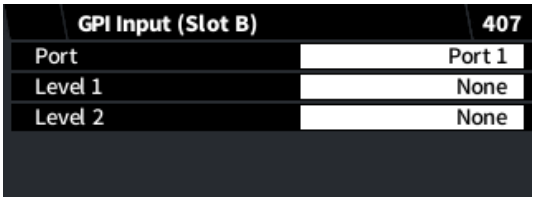
FA-96GPI or FA-96DB9-CBL option is required for GPI input / output functions.
The **FA-96GPI** option card provides GPI 10 inputs and 10 outputs and should be installed into **Slot B** or **C**. Refer to Sec. 2-3-9. “FA-96GPI (10 Inputs and 10 Outputs)” for details on the connector pin assignments. Use 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. 2-3-8. “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

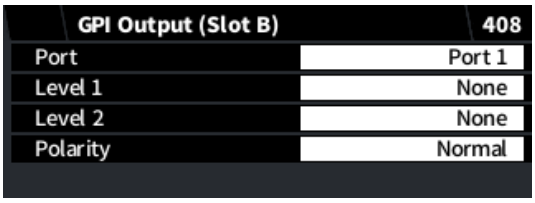
Required Option: FA-96GPI or FA-96DB9-CBL

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

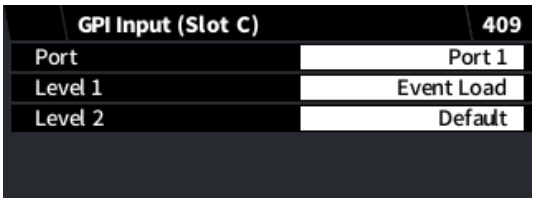
GPI SETTINGS (If the FA-96GPI card installed on Slot B)



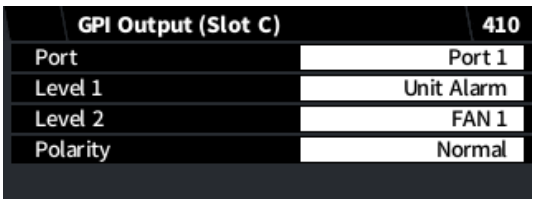
Required Option: FA-96GPI (Slot B)



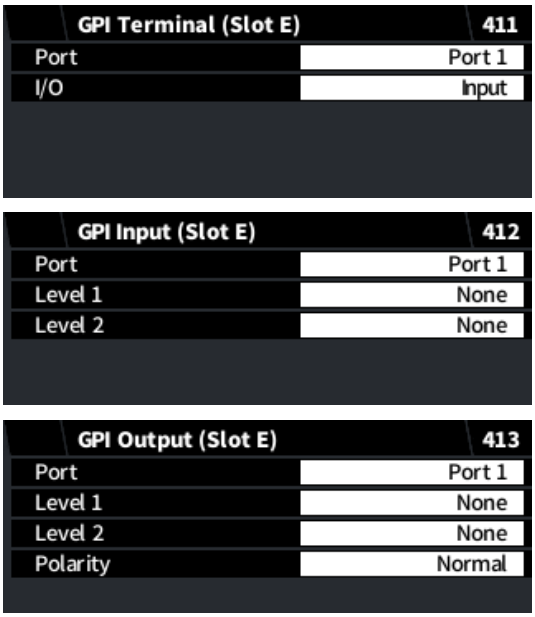
GPI SETTINGS (if the FA-96GPI card installed on Slot C)



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)

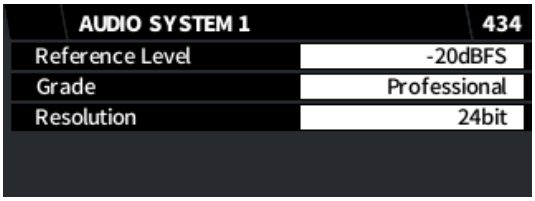
Video In	FS1 Video In	Indicates that a video signal is coming into FS1.
	FS2 Video In	Indicates that a video signal is coming into FS2.
	Reference In	Indicates that a reference signal is coming in.
Audio In	FS1 Audio In	Indicates that audio is coming into FS1.
	FS2 Audio In	Indicates that audio is coming 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.

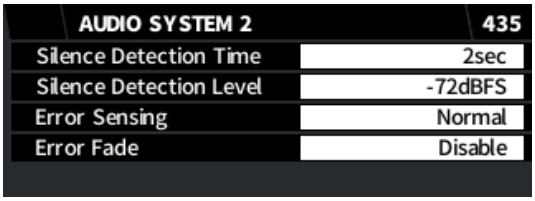
Select the alarm signal polarity if **Unit Alarm** is selected under Level 1 according to the connection device polarity.

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

7-2. AUDIO SYSTEM 1, 2

AUDIO SYSTEM 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.

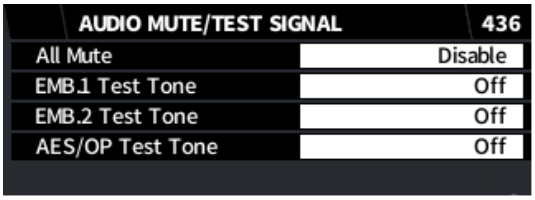
◆ **AUDIO SYSTEM 2**

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.

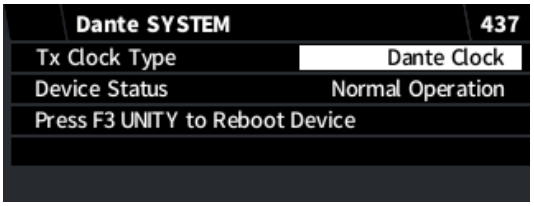
(*2) To fade in audio, AUDIO INPUT DELAY (see Sec. 6-24.) must be 5 ms or more.

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 standard and optional audio output.

7-4. Dante SYSTEM

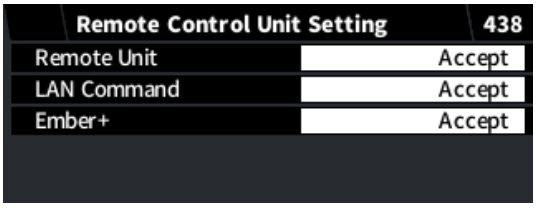


Required Option FA-96DNT

Item	Default	Setting	Description
Tx Clock Type	Dante Clock	Dante Clock Genlock Source	**Dante Clock**: Transmits Dante audio synced with the Dante network. **Genlock Source**: Transmits Dante audio synched with the SDI output. To use this setting, set Clock Settings for FA-9600 to **Enable Sync to External** in the Dante Controller.

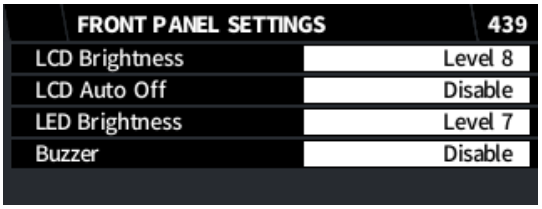
Item	Display	Description
Device Status	Normal operation Clock asynchronous Reset state Failsafe mode	Displays the FA-9600 status as a Dante device. **Clock asynchronous** indicates the device operates normally, but is not synced with the Dante network clock. **Reset state** indicates rebooting or sleeping
Reboot (Press F3 UNITY)	–	Pressing F3 UNITY twice reboot the Dante device (FA-9600). Use this if reboot is required by changes in Dante Controller. To cancel rebooting after pressing F3 UNITY once, press F4 UNITY. Rebooting takes about 10 seconds.

7-5. 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.

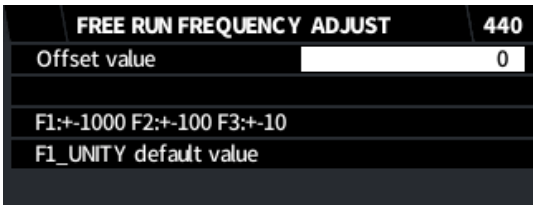
7-6. FRONT PANEL SETTINGS



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.

7-7. FREE RUN FREQUENCY ADJUST

Allows you to adjust the frequency deviation when Sync mode is set to **Free Run**.
See the next page for more details.



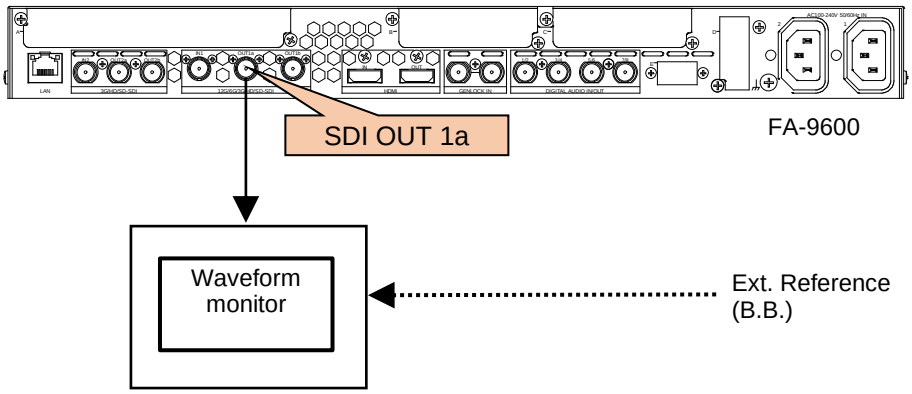
Item	Default	Setting	Description
Offset value	0	-196,600 to +196,600	Offsets the video frequency deviation in free-running (local) mode by considering the factory default value as "**0**." To adjust it coarsely, use F1, and finely, use F2 or F3.
F1 Unity	–	–	Pressing F1 Unity resets the Offset value to "**0**."

7-7-1. How to Adjust Free Running Frequency Deviation

This section explains how to adjust the frequency deviation of the built-in oscillator in free-running mode.
Different from signal generators, the FA-9600 built-in signal oscillator is not temperature compensated. Therefore, the frequency deviation changes due to ambient temperature changes.
Before adjusting the frequency, it is recommended to create the same environment (such as ambient temperature and video input signals) as the usage environment as much as possible. Then power on the devices and wait more than 30 minutes until the ambient temperature becomes stable.

<Connection>

Connect the FA-9600 to the waveform monitor as shown below. Input a reference to the waveform monitor and function the monitor in external reference mode.



<How to Check and Adjust Frequency>

(1) Verify that the VIDEO/AUDIO button on the FA-9600 front panel lights blue.
Press the SYSTEM button.

(2) Press ↓ three times to go to the ″SYNCHRONIZER 1″ menu. Turn right the F1 control to select "**Free Run**" under "Genlock Source."

(3) Show the SDI phase display on the waveform monitor. mode to SDI display. If the phase marker fluctuate greatly, adjust the phase using the below procedure.

(4) On the FA-9600 front panel, press the VIDEO/AUDIO button to turn it to orange.

(5) Press the SYSTEM button, then ↓ 6 times to go to the ″FREE RUN FREQUENCEY ADJUST″ menu.

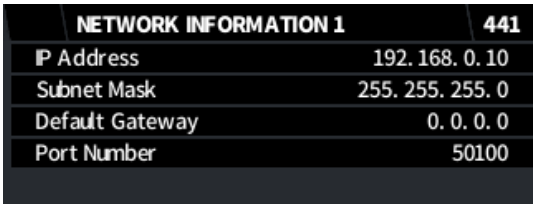
(6) While monitoring the phase marker on the waveform monitor, adjust the offset value using F1 to F3 controls.
The default Offset values is "0."
F1 allows you to adjust the value between +1,000 and -1,000,
F2 between +100 and -100 and F3 between +10 and -10. (Adjustable range is ±196,600)
If the marker is delayed (appears at right in the top side), turn F1-F3 controls to the left to decrease the value.
If the marker is advanced (appears at left in the bottom side), turn F1-F3 controls to the right to increase the value.
Adjust the value until the phase marker becomes stable.

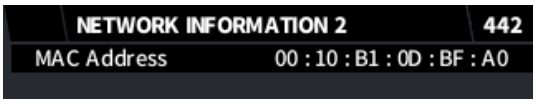
* Approximate adjustment is the best that this feature can do. Due to the lower accuracy of the built-in oscillator, the phase maker never rests exactly and adjustment with high precision is not possible.

* To reset the Offset value to default, press the F1 Unity button.

7-8. NETWORK INFORMATION 1-2

Displays the FA-9600 network settings.

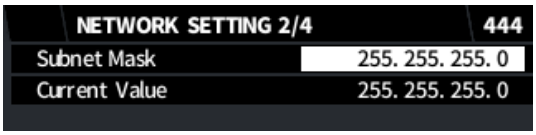




7-9. NETWORK SETTING 1/4 to 4/4

Allows you to set FA-9600 network settings.

> If network settings are changed, a system reboot message, “System value changed. Please restart!!”, appears. Reboot the FA-9600 after the message is displayed. Note that it takes a certain amount of time until the message is displayed.



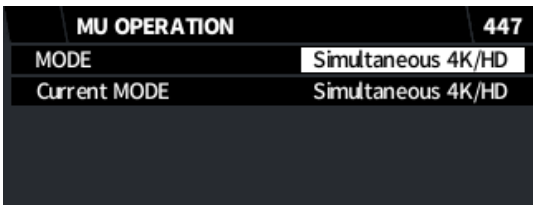
Item	Default	Description
IP Address	192.168.0.10	Sets the FA-9600 IP address.
Subnet Mask	255.255.255.0	Sets the FA-9600 subnet mask.
Default Gateway	0.0.0.0	Sets the FA-9600 default gateway.
Port Number	50100	Sets the FA-9600 TCP/UDP port.
Current Value	-.-.-.-	Displays current settings.

7-10. 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.

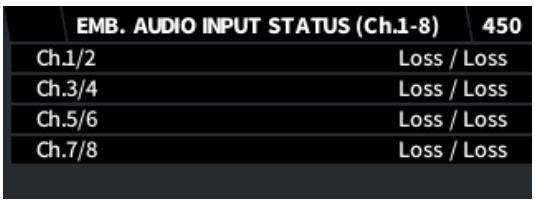
- Converter function requires FA-96UDC software option.
- UHD 4K operation requires FA-964K software card.
- 3D-LUT mode requires FA-96AHDR or FA-96AHDR2 software option.

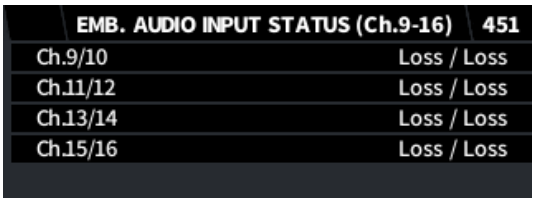


Item	Default	Setting	Description
MODE	Dual HD (*1)	Simultaneous 4K/HD	**FS1** supports **SD**, **HD** and **4K** signals with a **full-featured** converter. **FS2** supports **SD** and **HD** signals with a **restricted** converter.
		Dual HD	Both **FS1** and **FS2** support **SD** and **HD** signals 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.

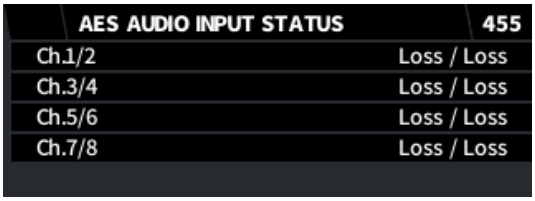
7-11. EMB. AUDIO INPUT STATUS

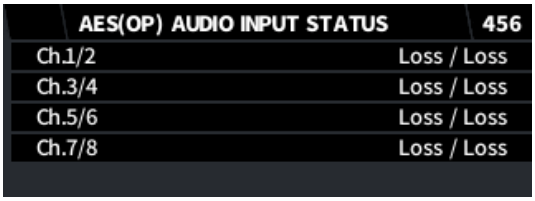




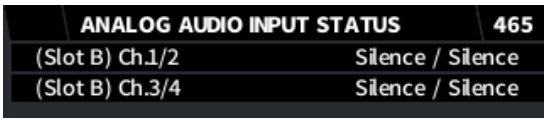
Item	Display	Description
Ch.1/2 Ch.3/4 Ch.5/6 Ch.7/8 Ch.9/10 Ch.11/12 Ch.13/14 Ch.15/16	Loss PCM, PCM (Async) Silence, Silence (Async) Dolby E, Dolby E (Async) Non-PCM, Non-PCM (Async) Bypass Not Supported (for HDMI audio only)	Displays FS1 and FS2 SDI embedded audio input status and HDMI audio input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

7-12. AES / ANALOG AUDIO INPUT STATUS





Required option FA-96AES-UBL

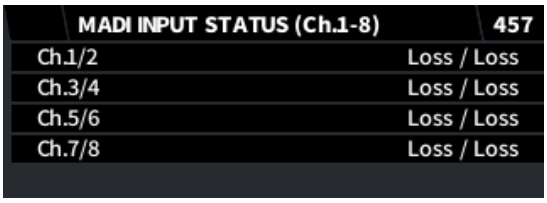


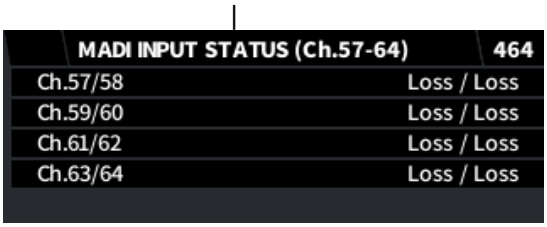
Required option FA-96ANA-AUD

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.

7-13. MADI AUDIO INPUT STATUS

Required option FA-96MADI

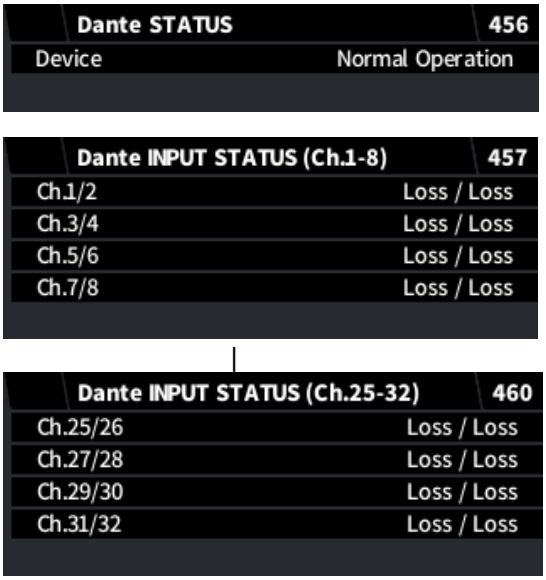




Item	Display	Description
Signal	Loss Present (32kHz, 56Ch) Present (32kHz, 64Ch) Present (44.1kHz, 56Ch) Present (44.1kHz, 64Ch) Present (48kHz, 56Ch)	Displays the MADI audio input signal status.

	Present (48kHz, 64Ch) Not Supported	
Ch.1/2 to Ch.63/64	Loss Present Silence Non-PCM	Displays each audio channel status of MADI input.

7-14. Dante STATUS / Dante AUDIO INPUT STATUS

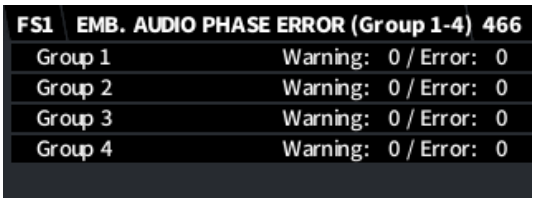


Required option FA-96DNT

Item	Display	Description
Device	Normal operation Clock asynchronous Reset state Failsafe mode	Displays the FA-9600 status as a Dante device. **Clock asynchronous** indicates the device operates normally, but is not synced with the Dante network clock. **Reset state** indicates rebooting or sleeping
Ch.1/2 to Ch.31/32	Loss Present (44.1kHz) Present (48kHz) Silence (44.1kHz) Silence (48kHz) Not Supported	Displays Dante audio input status per channel.

7-15. EMB. AUDIO PHASE ERROR

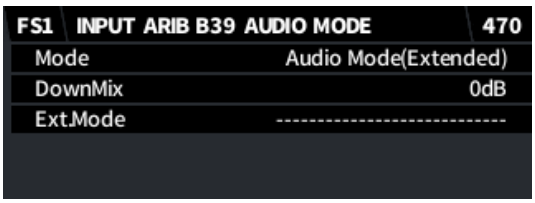
Displays the number of warnings and errors. To reset counts, press **F1 Unity**.



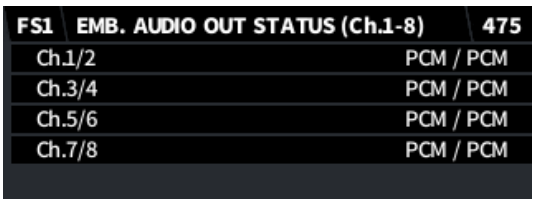
Item	Display	Description
Group1-4	Warning Error	**Warning:** Displays the number of corrected audio timing information errors. **Error:** Displays the number of uncorrected audio timing information errors.

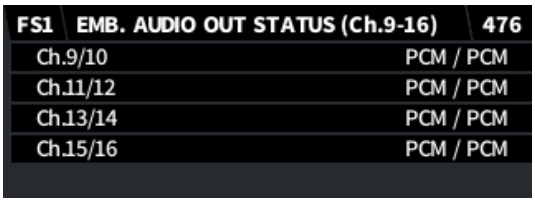
7-16. INPUT ARIB B39 AUDIO MODE

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



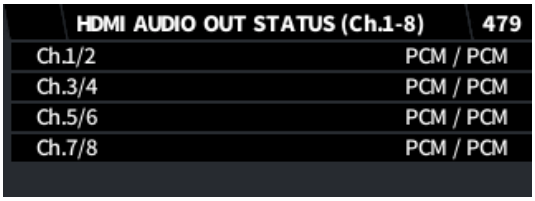
7-17. EMB. AUDIO OUT STATUS





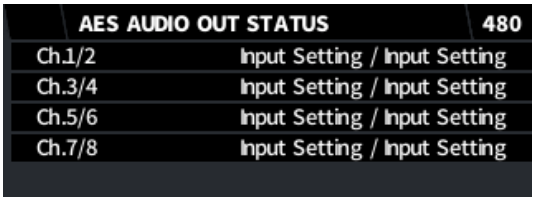
Item	Display	Description
Ch.1/2 Ch.3/4 Ch.5/6 Ch.7/8 Ch.9/10 Ch.11/12 Ch.13/14 Ch.15/16	PCM, PCM (Async) Mute, Mute (Async) Dolby E, Dolby E (Async) Non-PCM, Non-PCM (Async) Blank	Displays each embedded audio channel status of the FS1 or FS2 SDI output.

7-18. HDMI AUDIO OUT STATUS

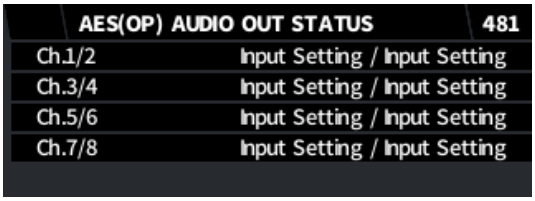


Item	Display	Description
Ch.1/2 Ch.3/4 Ch.5/6 Ch.7/8	PCM Mute Blank Not Supported	Displays HDMI output audio channel status.

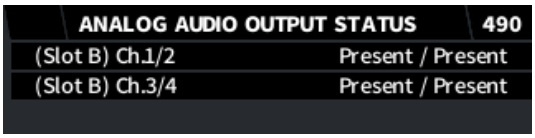
7-19. AES / ANALOG AUDIO OUT STATUS



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



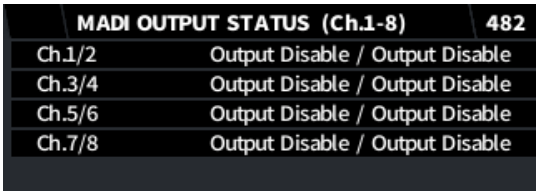
Required option FA-96AES-UBL



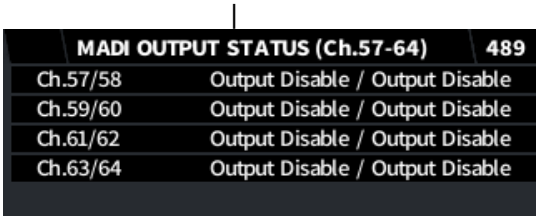
Required option FA-96ANA-AUD

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.

7-20. MADI AUDIO OUTPUT STATUS

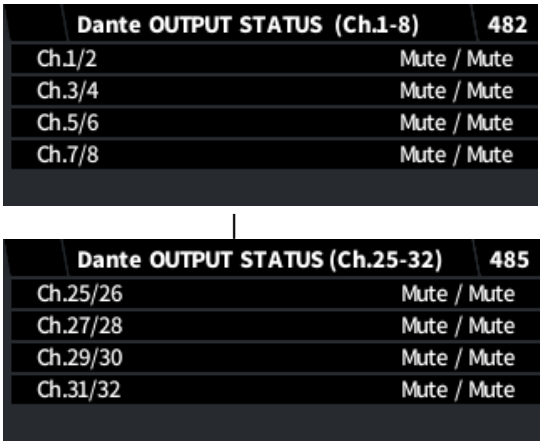


Required option FA-96MADI



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.

7-21. Dante OUTPUT STATUS

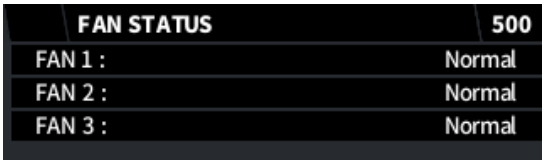


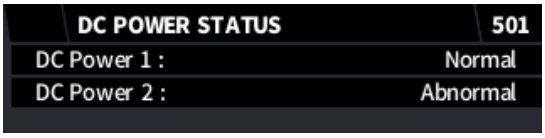
Required option FA-96DNT

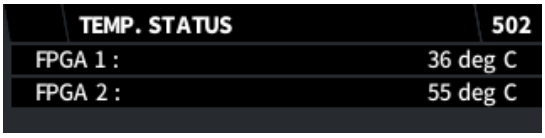
Item	Display	Description
Ch.1/2 to Ch.31/32	PCM Mute	Displays the output channel status of Dante audio.

7-22. FAN / DC POWER / TEMP. STATUS

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







7-23. VERSION INFO.

Displays the firmware and FPGA versions.

7-24. MAIN UNIT INFO.

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

MAIN UNIT INFO.	506
Unit Name	FA-9600
Serial Number	17240019
FS1 Name	FS1 NAME
FS2 Name	FS2 NAME

7-25. Option Information

Displays the option slot status.

SLOT A INFO.	507
NAME :	FA-96EX3G44-R
FPGA 1 :	R1.00.00_17/07/23_13:26:47
FPGA 2 :	--.--.--

SLOT B INFO.	508
NAME :	FA-96AES-UBL
FPGA 1 :	R1.01.00_17/08/25_19:39:11
FPGA 2 :	R1.01.00_17/08/25_20:03:29

SLOT C INFO.	509
NAME :	FA-96GPI
FPGA 1 :	R1.01.00_17/08/25_19:18:50
FPGA 2 :	--.--.--

SLOT D/E, POWER UNIT INFO.	510
SLOT D :	Not Installed
SLOT E :	Not Installed
FA-96PS :	Installed

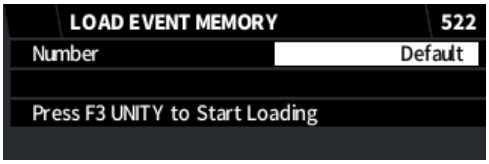
SOFTWARE OPTION INFO.	511
FA-964K :	Installed
FA-96UDC :	Installed
FA-96AHDR2 :	Installed

8. Event Memory

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

◆ **LOAD EVENT MEMORY**

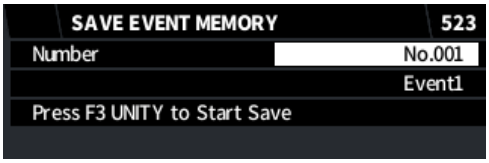
Selects an event number for loading from **Event1-100** and **Default** and press F3 UNITY to load the event. Before loading events, the “Event Load executed!!” message appears in the bottom of the menu.



◆ **SAVE EVENT MEMORY**

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

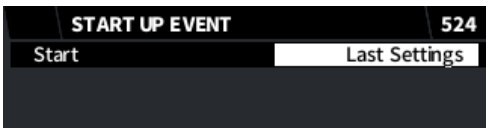
- While saving data, “Event Save executed!” is displayed in the bottom of the front panel screen.
- Data cannot be saved to event numbers that are disabled by using the Event Save Limit function. This function can be enabled only on the Web GUI. See Sec. 12-5-3. “Event Save Limit (Web GUI)” for more details.



The [Utility > Event data] page in the Web GUI allows you to change event data name and content. Refer to Sec. 12-5-4. "Event Import / Event Export (Web GUI) " and Sec. 13. "Event Data (CSV File)" for more details.

◆ **START UP EVENT**

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



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 at startup.

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	5-30, 5-31
VIDEO FREEZE	Freeze setting	5-38
VIDEO TEST SIGNAL	Pattern setting	5-41
AUDIO OUTPUT GAIN	Master Mute setting	6-20
ANALOG INPUT/OUTPUT GAIN	Master Mute setting	6-21
MADI OUTPUT GAIN	Master Mute setting	6-22
Dante OUTPUT GAIN	Master Mute setting	6-23
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 PRE-/POST-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	5-28
VIDEO FREEZE	Freeze	5-38
FRAME DELAY	Mode	5-39
VIDEO INPUT STATUS | INPUT TIMECODE DETECTION	All information and status	5-44 | 5-50
AUDIO OUTPUT GAIN	Master Mute setting	6-20
ANALOG INPUT/OUTPUT GAIN	Master Mute setting	6-21
MADI OUTPUT GAIN	Master Mute setting	6-22
Dante OUTPUT GAIN	Master Mute setting	6-23
GPI UTILITY / INPUT / OUTPUT	All menu settings	7-1
FRONT PANEL SETTINGS	All menu settings	7-6
NETWORK INFORMATION NETWORK SETTING	Network settings	7-8 7-9
MU OPERATION	MU Main mode setting	7-10
EMB. AUDIO INPUT STATUS | SOFTWARE OPTION INFO.	All information and status	7-11 | 7-25
START UP EVENT	All menu settings	8
Main Unit	Unit / FS Name settings	12-1-2
Network page	All menu settings	12-8

◆ **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. 12-5-4. “Event Import / Event Export (Web GUI).”

9. Installing Windows GUI Software

9-1. System Requirements

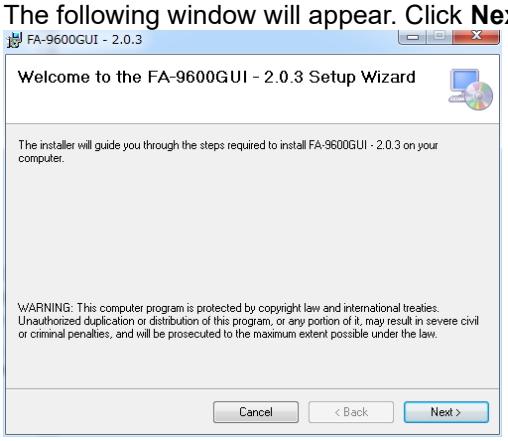
To use the Windows GUI, your computer must meet the following requirements.

OS	Windows 10 Pro (32/64bit) (macOS is not supported.)
CPU	Intel Core i5-6300U CPU@2.40 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

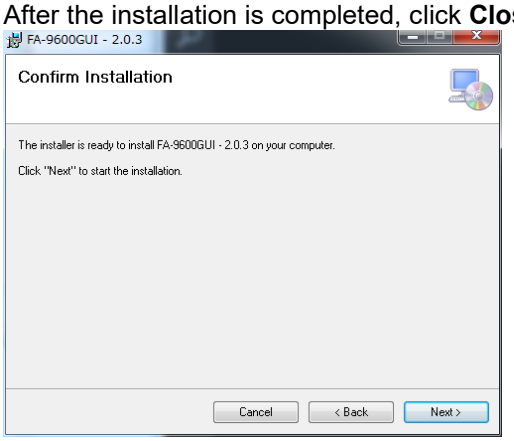
9-2. Installing Windows GUI Software

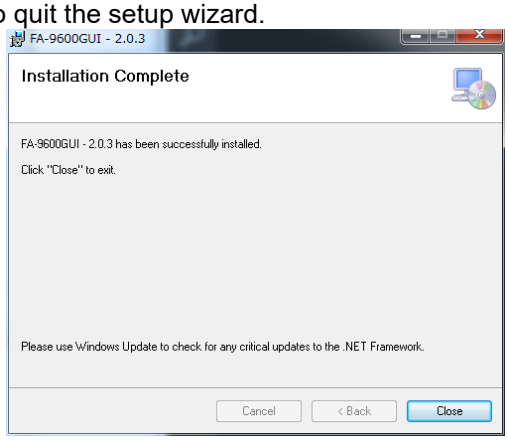
1. Open the CD-ROM, and the **FA-9600GUI** folder. Double-click the Setup icon to start the setup wizard.

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

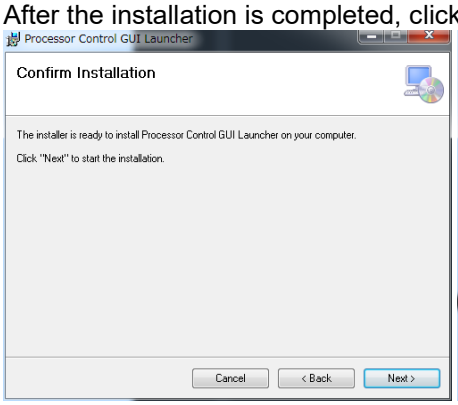
Processor Control GUI Launcher allows you to connect multiple FA-9600 units and switch the Windows GUI control unit within them. Install the Processor Control GUI Launcher into your computer and register FA-9600 units.
The GUI Launcher can run in the same system as FA-9600 Windows GUI. (See Sec. 9-1.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

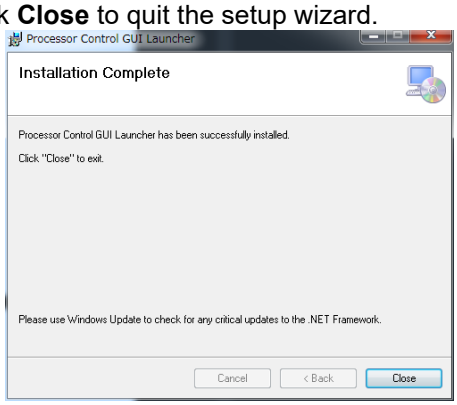
10-1. Installing the GUI Launcher

(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.





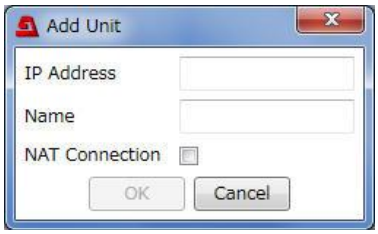
10-2. Starting Processor Control GUI Launcher

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

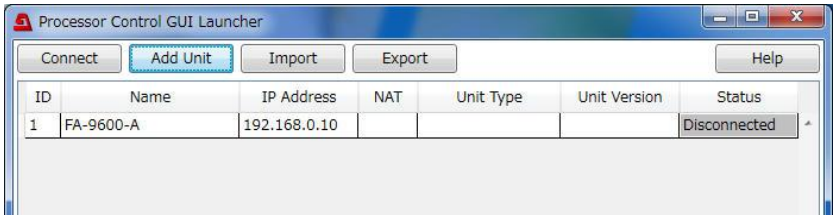
When the GUI Launcher starts, the following Launcher screen appears.

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**.



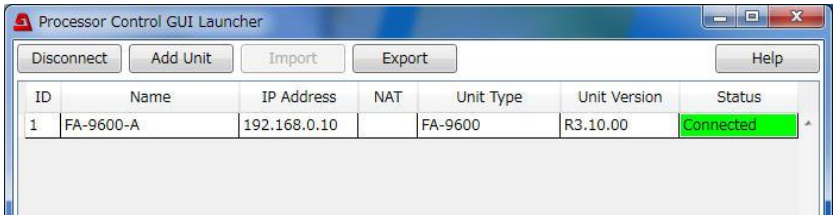
(3) The FA-9600 unit is registered, displayed in the Launcher screen list, and automatically connected to the unit.



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.

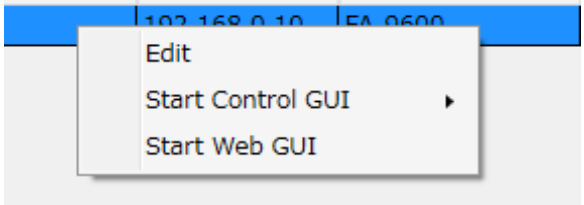
(4) When the connection is established, the Status display changes from **Searching** to **Connected**.

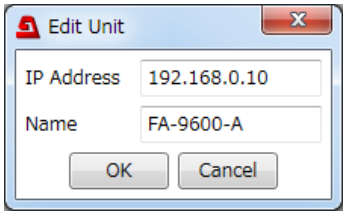


(5) Select a connected unit (with **Connected** state) in the list and double-click it to start the GUI. (The Windows GUI software must have been installed onto the computer.)

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.



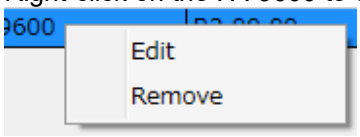


Note that changing IP addresses immediately starts searching for the unit with the new IP address.

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. Starting Windows GUI / Web GUI

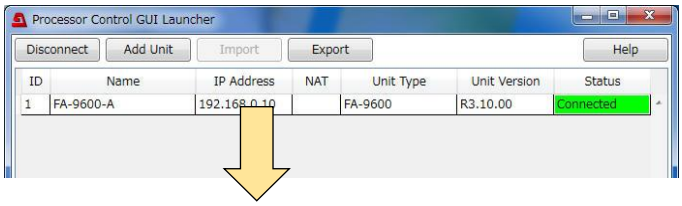
11-1. Difference between Windows GUI and Web GUI

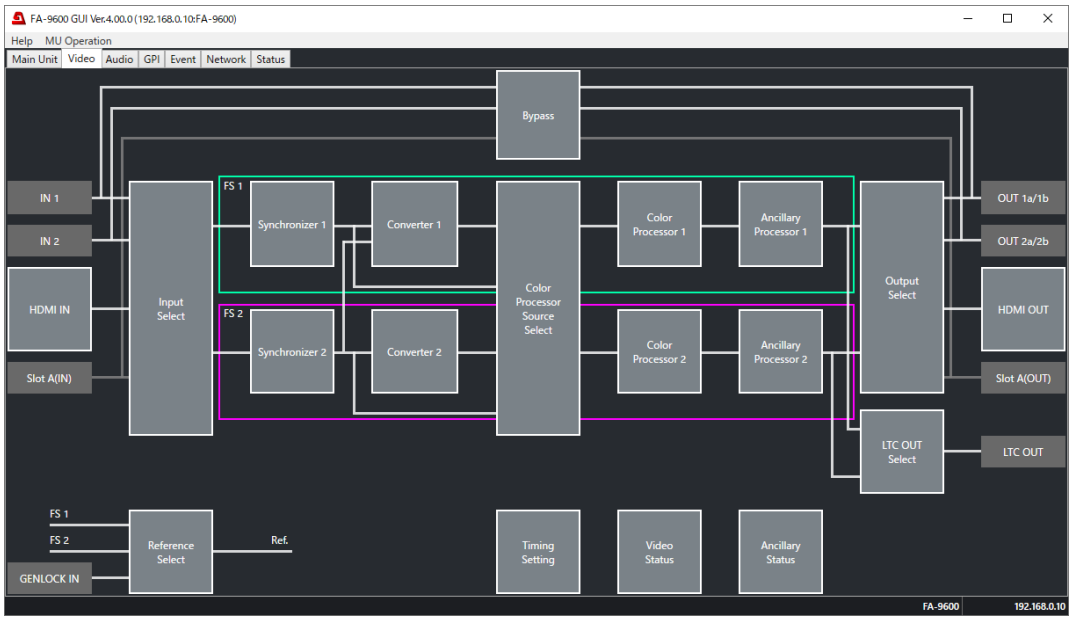
The table below shows differences between Windows GUI and Web GUI.

Item	Windows GUI	Web GUI
Operational environment (See Secs. 9-1 and 11-3)	Windows OS	Web browser (Windows/macOS)
Software installation	Required	Not required
Video settings	Available	Available
Audio settings	Available	Available
GPI settings	Available	Available
Event control in FA-9600 (Event load / Event save)	Available	Available
Event save item settings	---	Available
Event export and import between FA-9600 and external devices.	---	Available
All data backup to / restore from external devices	---	Available
LUT/Gamut data import to FA-9600	---	Available
Network settings	Party available	Available
SNMP settings	---	Available

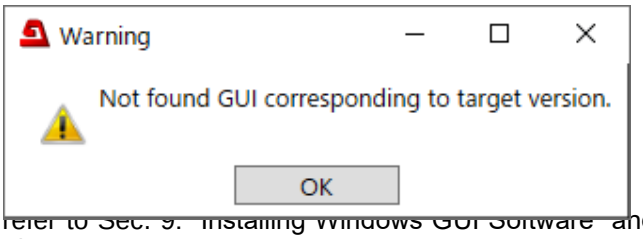
11-2. Starting Windows GUI

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.





If the installed GUI software does not support the version of FA-9600 that is being connected, an error message as shown below will appear and the Windows GUI control page cannot be opened.



In such cases, refer to Sec. 9. "Installing Windows GUI Software" and install the GUI software from the supplied CD-ROM.

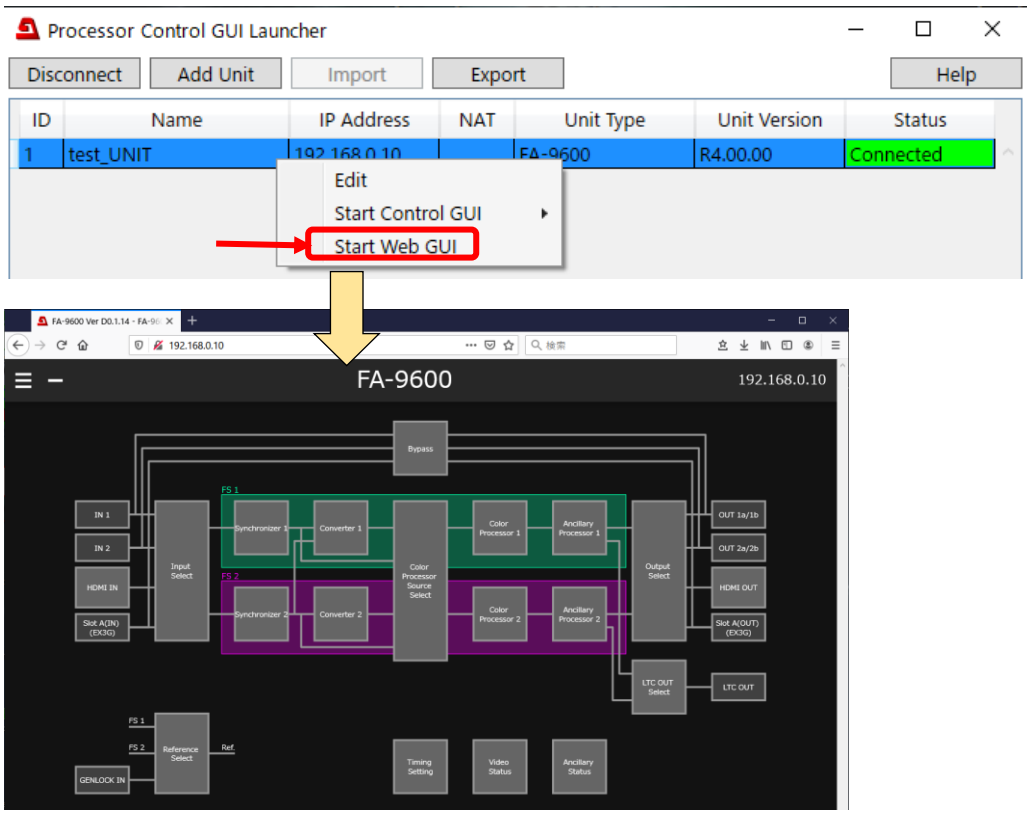
11-3. Starting the Web GUI

◆ **System Requirements for Web GUI Control**

OS	Windows 10 Pro (32/64bit) macOS Sierra 10.12.6
Web browser	Google Chrome 88, Mozilla Firefox 86 Microsoft Edge 88, Apple Safari 12
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

11-3-1. Using the Processor Control GUI Launcher

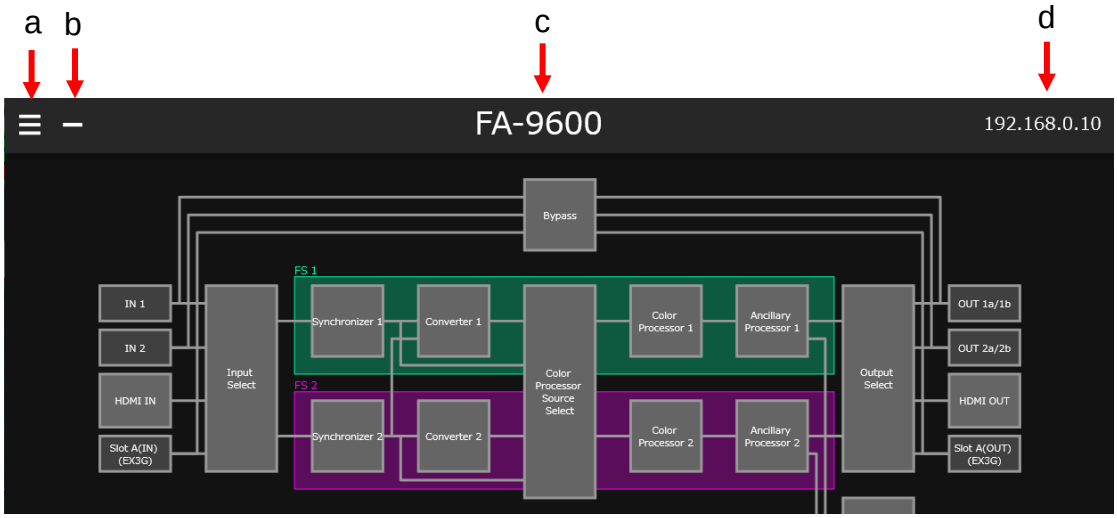
(1) Select the FA-9600 in the registration list and right-click on it to display the context menu.
(2) Select **Start Web GUI** in the menu to open the web browser and connect to the FA-9600.



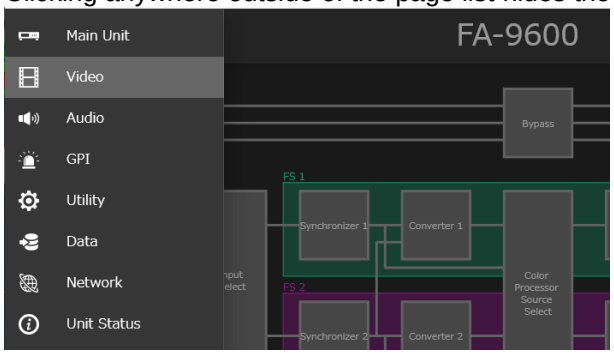
11-3-2. Using a Web Browser

(1) Verify that the FA-9600 and the control computer is connected via LAN.
(2) Launch your web browser in the computer.
(3) Enter the FA-9600 IP address in the address bar of the web browser.
(FA-9600 default IP address is **192.168.0.10**.)

11-3-3. Control Icons and Operational Tips



a **Page list button**
Allows you to display the page list at the left side of the windows as shown below.
Clicking an item in the page list open the menu page in the same manner as tabs in the Windows GUI.
Clicking anywhere outside of the page list hides the page list.



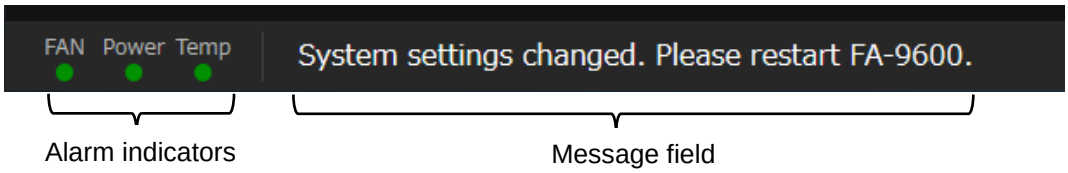
b **Status bar toggle button**
Allows you to toggle the status bar location:.
- The status bar is located always at the bottom of the window.
- The status bar moves up or down while scrolling through the content

c **Unit Name of the connected FA-9600.**
d **IP address of the connected FA-9600**

The menu page may be difficult to see due to the web browser's zoom level. In such cases, zoom in or out to adjust the menu diagram size to meet your need.

11-3-4. Alarm Indicators and Messages

The status bar in the bottom of the screen provides alarm indicators and message field.



<Alarm indicators>

FAN Indicates the FA-9600 **fan** status.: **Green**: Normal, **Red**: Error

Power Indicates the FA-9600 **power** status: **Green**: Normal, **Red**: Error.

Temp Indicates the FA-9600 **temperature** status:
Green: Normal, **Yellow**: Alert, **Red**: Error

* Alarm status can also be displayed in the Status menu page. See Sec. 12-9. “Status.”

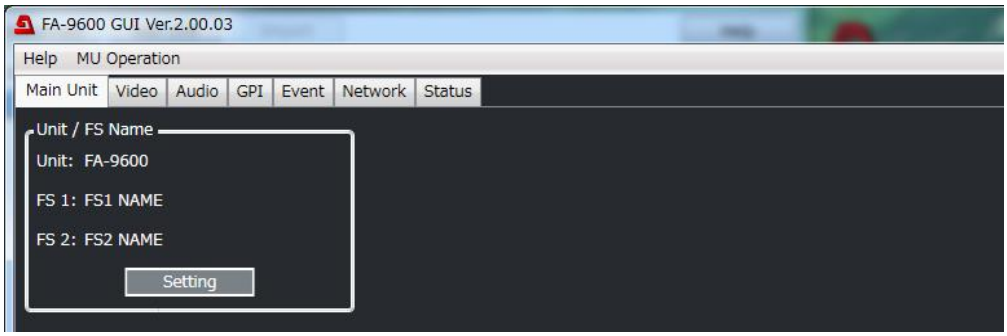
< Message field>

Allows you to inform timely and useful information that assist the operation such as restart message. Messages are displayed, as needed.

12. Windows GUI / Web GUI Operation

12-1. Main Unit

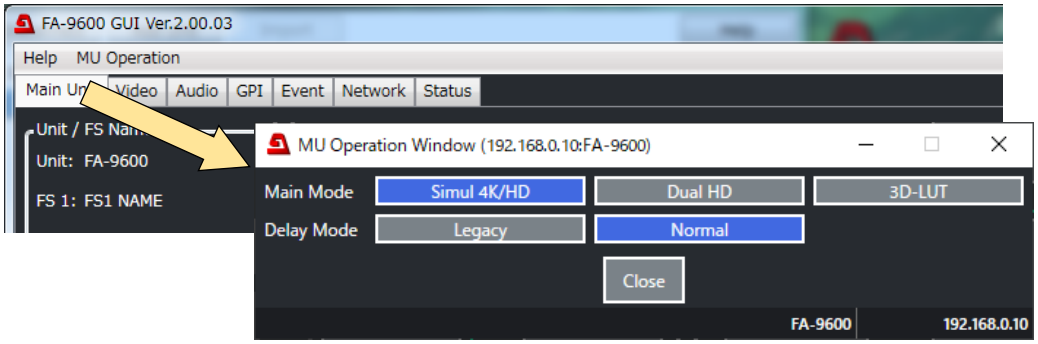
[Windows GUI]
Click the **Main Unit** tab to open the Main Unit window.



[Web GUI]
Click the page list icon at the top-left corner of the window to display the page list.
Click **Main Unit** in the page list to display the Main Unit screen.

12-1-1. Selecting MU Modes

[Windows GUI]



MU Main Mode
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.

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.

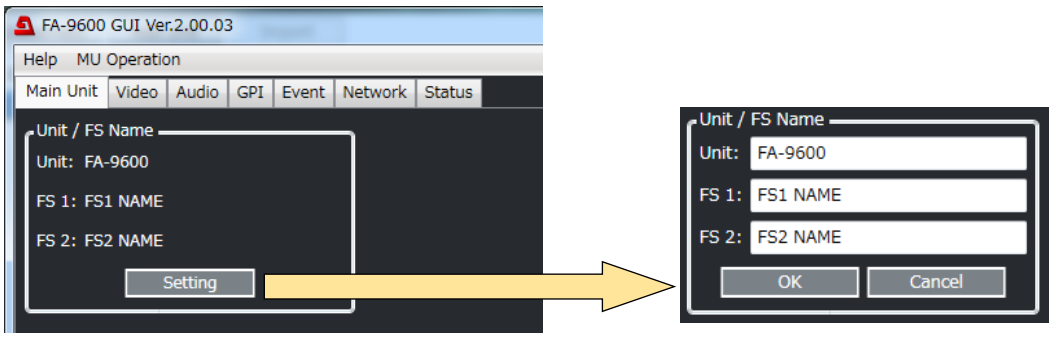
MU Delay Mode
Refer to Sec. 5-39 “FRAME DELAY” for details on Delay Mode.

[Web GUI]
See the description under [Windows GUI] above.

12-1-2. Verifying / Changing Device (Unit) and FS Names

Allows you to verify or change the FA-9600 device name and FS system names.

[Windows GUI]
Click the **Setting** button to display the Unit / FS Name dialog.
Up to 15 in Ascii characters (excluding numbers, “%” and “\”) are available.

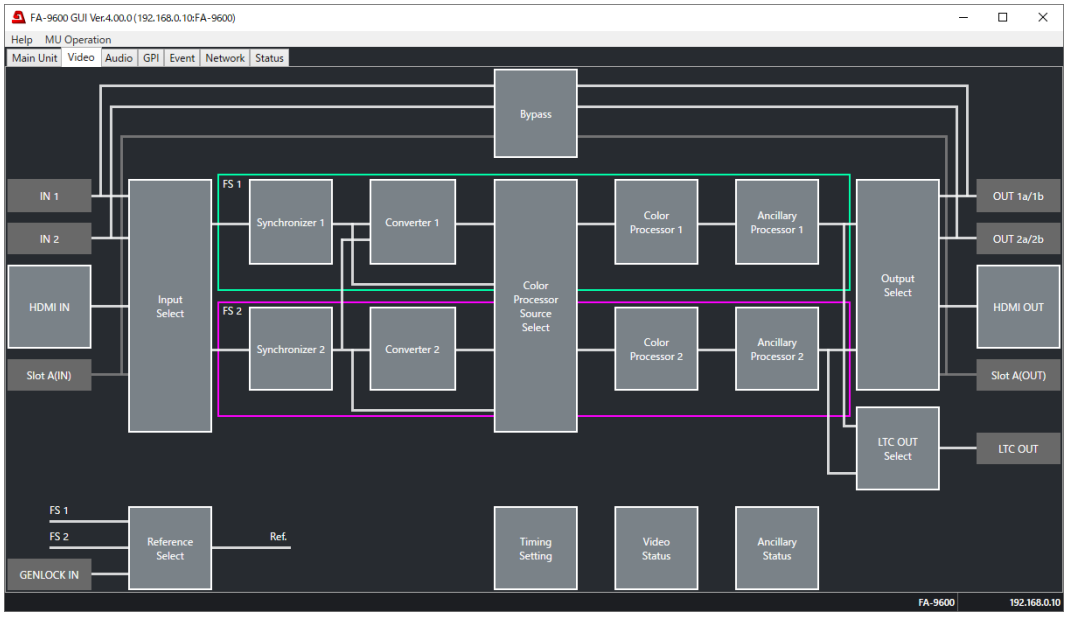


[Web GUI]
To change names, click on each name field (Unit, FS1 and FS2) and enter a new name.
Pressing Enter confirms changes. Or, name changes are confirmed when name fields are out of focus.

12-2. Video Settings

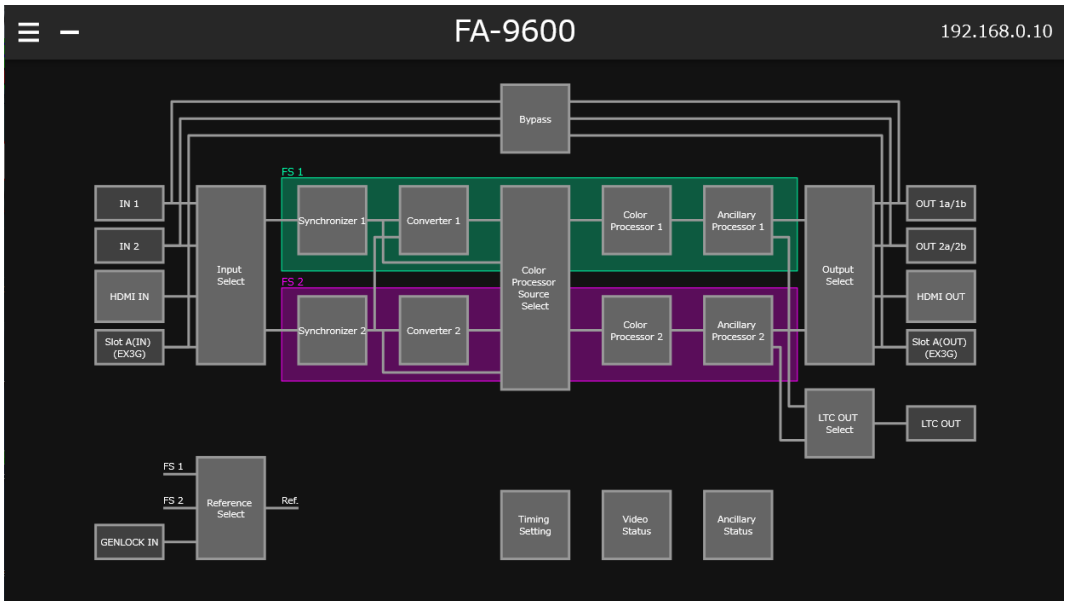
[Windows GUI]

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



[Web GUI]

Click **Video** in the page list to display the Video Block diagram.



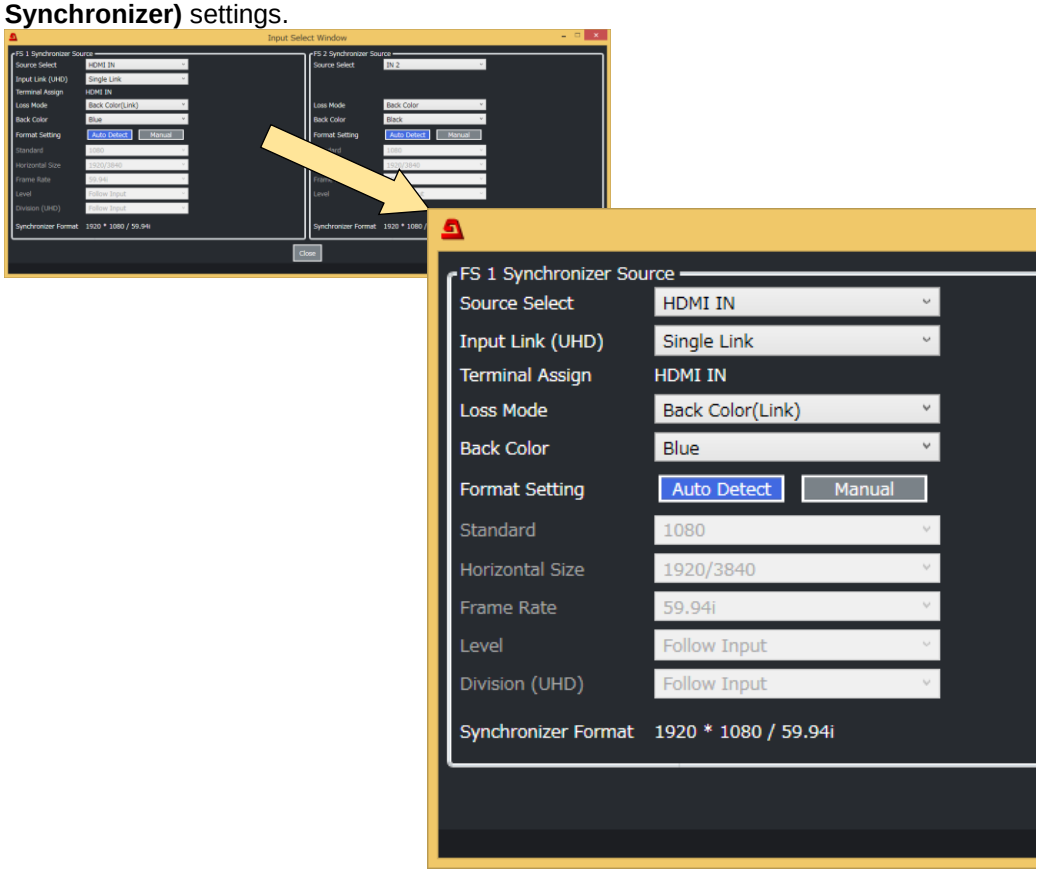
12-2-1. Input Select

Click **Input Select** in the Video Block to display the menu.

* Note that FS2 (FS2 Synchronizer) is not displayed in 3D-LUT mode.

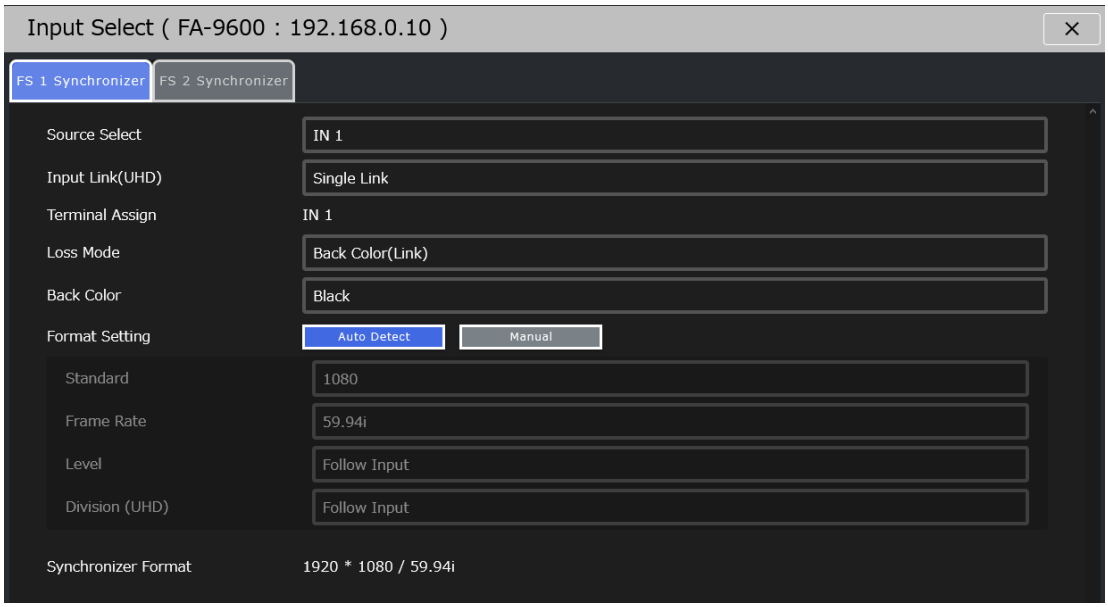
[Windows GUI]

The Left block is for **FS1 (FS1 Synchronizer)** settings and the Right block is for **FS2 (FS2 Synchronizer)** settings.



[Web GUI]

Select the **FS1 Synchronizer** tab or **FS2 Synchronizer** tab.



<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 51> 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. 15-1. “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.

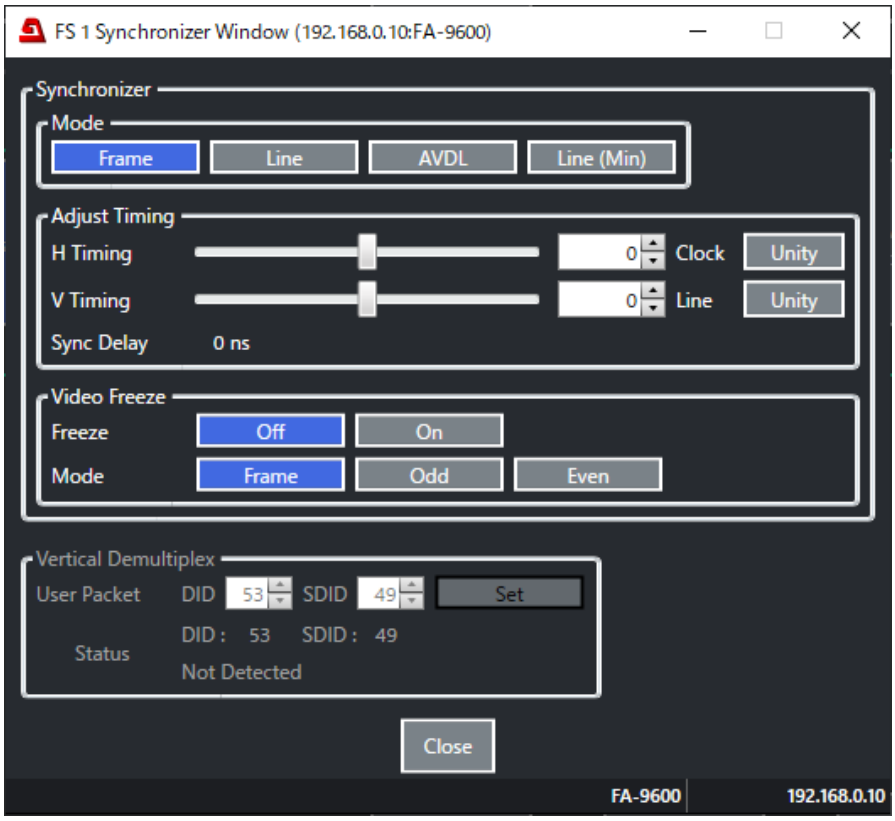
<Dual HD mode>

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. 15-1. “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.

12-2-2. Synchronizer 1 and 2

Click **Synchronizer 1** or **Synchronizer 2** in the Video Block to display the menu below. See Sec. 5-37. “SYNCHRONIZER” for details on adjusting signal timing.
See Sec. 5-33. “ANC USER PACKET” for details on user packets.

[Windows GUI]



[Web GUI]

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. 5-37. "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.	

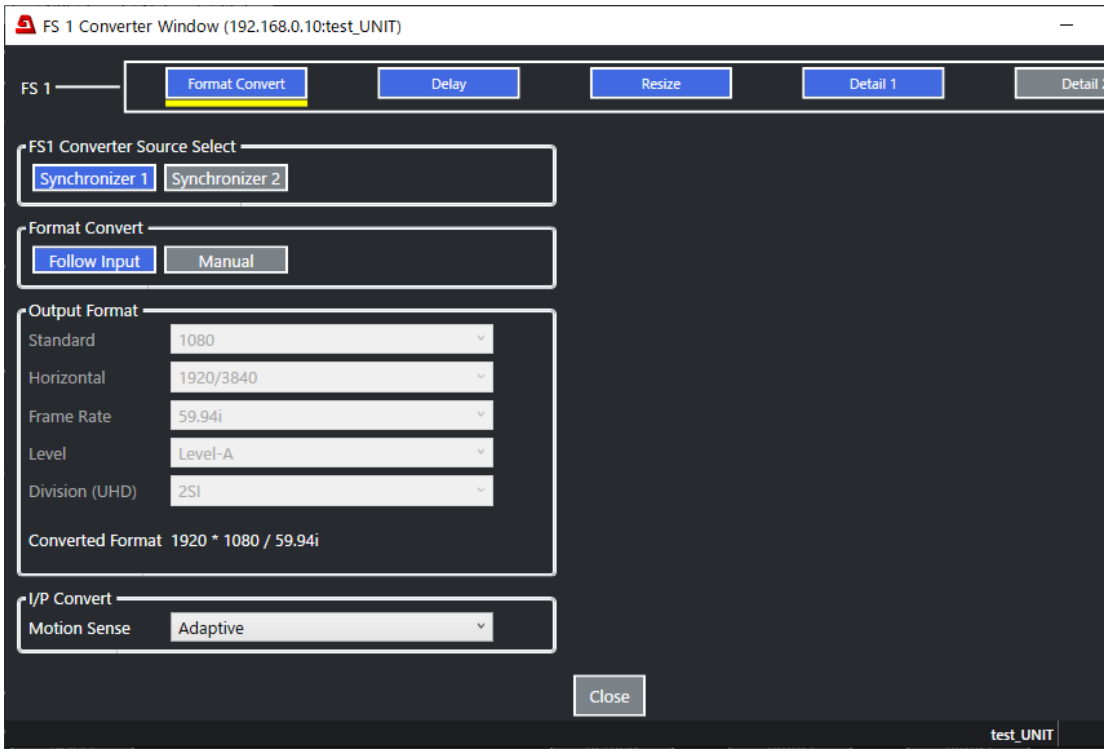
◆ **Vertical Demultiplex (Planned for future support)**

Item	Default	Setting	Description
User Packet: DID	53	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. 5-33 “ANC USER PACKET.”
User Packet: SDID	49	01 - FF	
Status	-	-	Displays the set User Packet information: DID and SDID values and usage status (whether the packet already exists the input signal).

12-2-3. Converter 1-2

Click **Converter 1** or **Converter 2** in the Video Block to display the menu as shown below.

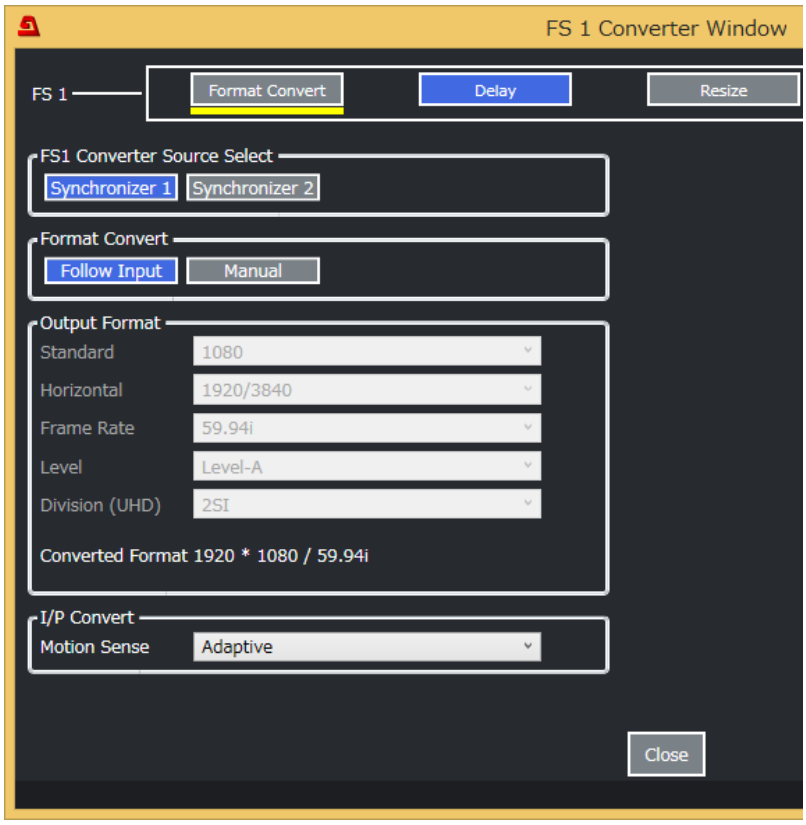
[Windows GUI]
A converter flow will be displayed in the top. Click a block in the flow diagram to display the detailed settings below. The selected block is underlined in yellow.



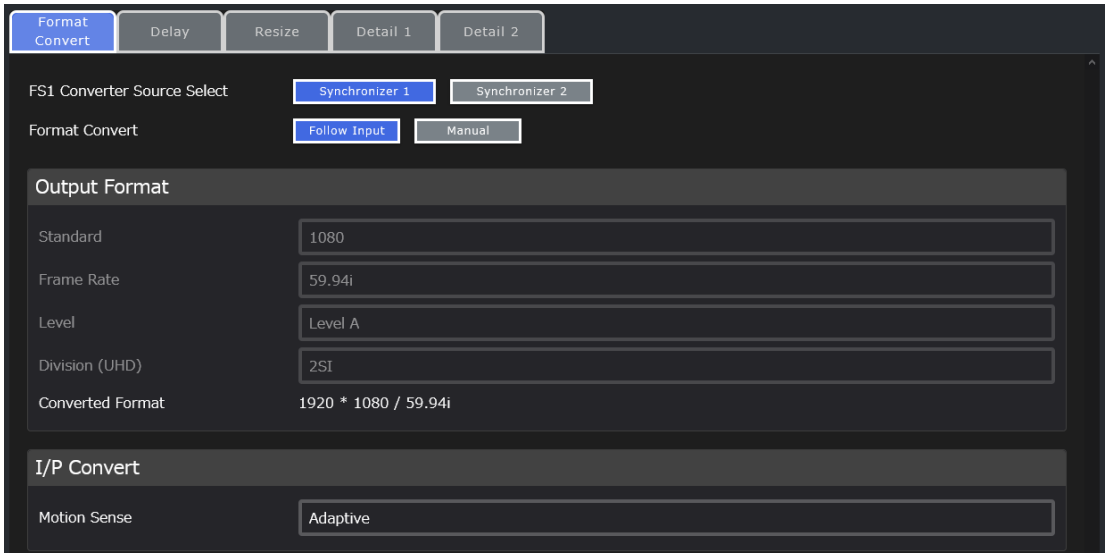
[Web GUI]
Use tabs at the top to switch menus.

12-2-3-1. If Format Convert Selected (FA-96UDC)

[Windows GUI]



[Web GUI]



Item	Default	Setting	Description
FS1 Converter Source Select (Converter 1 only)	Synchronizer 1	Synchronizer 1 Synchronizer 2	Selects a Converter1 input source. (Simultaneous 4K/HD mode only)
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.

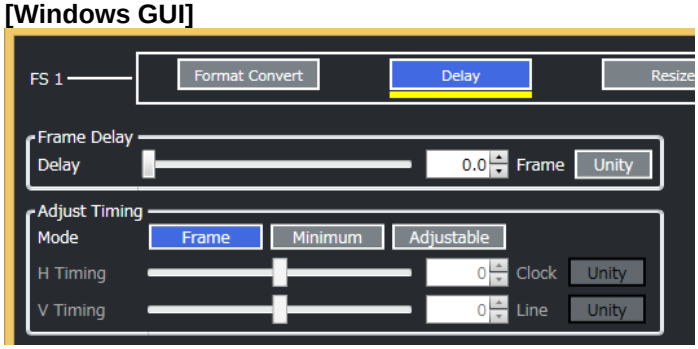
The following parameters are enabled when Format Convert is set to **Manual**.
Refer to "Appendix 1: Video Format Conversions" for more details.

◆ **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	-	-	Fixed (Not displayed in Web GUI)
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.

12-2-3-2. If Delay Selected

[Windows GUI]



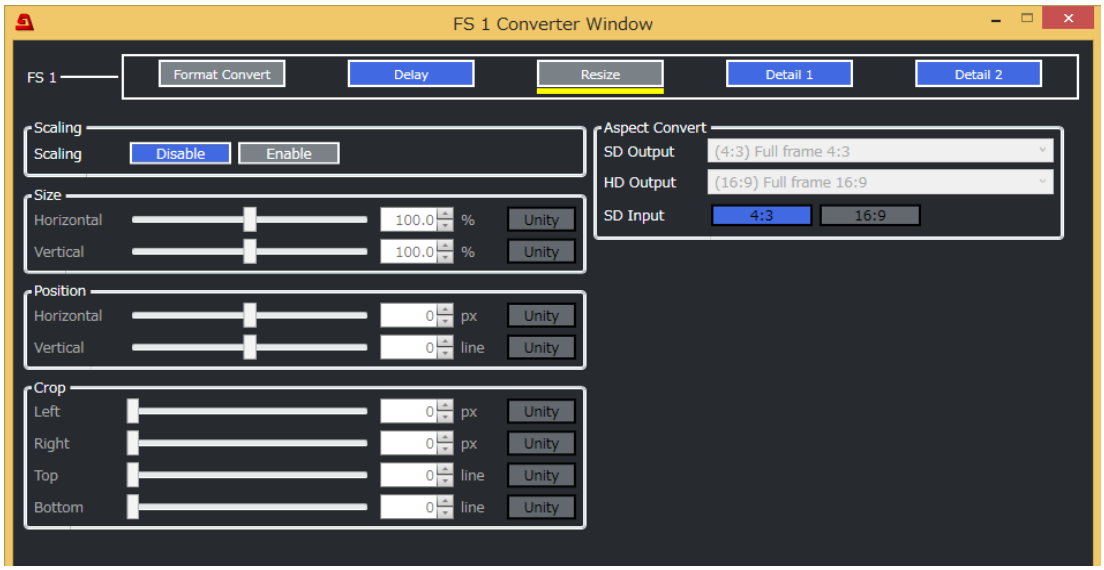
[Web GUI]

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. If Delay function has no effect due to format conversion, a message “Cannot use with current I/O formats” is displayed.
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. 12-1-1. “Selecting MU Modes.”).

12-2-3-3. If Resize Selected (Converter 1 only in Simul 4K/HD or 3D-LUT)

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)

◆ 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 by format after conversion. (See Sec 5-22.)	Selects the horizontal and vertical image position after conversion.
Vertical Position	0 Line		
Left	0 Px	Varies by input signal format. (See Sec 5-22.)	Crops input image from the left side.
Right	0 Px		Crops input image from the right side.
Top	0 Line		Crops input image from the top.
Bottom	0 Line		Crops input image from the bottom.

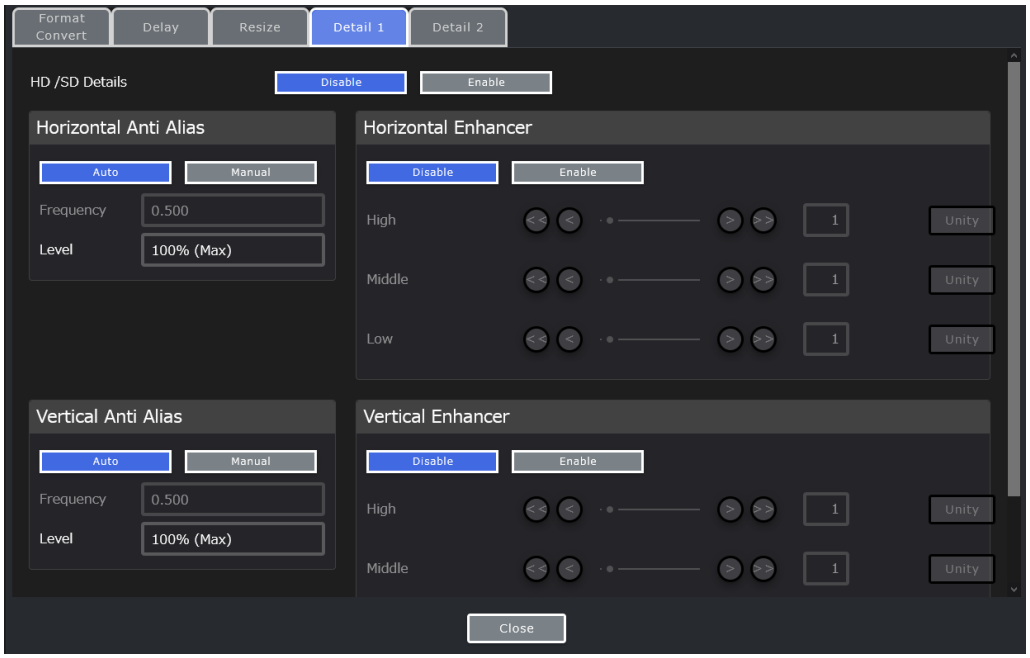
◆ **Aspect Convert**

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.

12-2-3-4. If Detail 1 Selected (Converter 1 only in Simul 4K/HD or 3D-LUT)

[Windows GUI]

[Web GUI] (Scrolling up and down to go through the page.)



◆ HD/SD Details

If using 2K signals (converting 2K to 2K), this parameter can enable / disable **Anti Alias**, **Enhancer** and **Noise Reducer** (see the next chapter) together. "HD/SD Details" functions differently depending on input / output image size as shown below.

Input image	Output image	HD/SD Details
2160p	(Same as input)	Unavailable
1080p/i 720p 525i 625i	(Same as input)	Available If set to **Enable**, images can be adjusted in ANTIALIAS, ENHANCE and NOISE REDUCER filter menus. Setting to **Enable**/**Disable** changes the delay amount. If set to **Enable**, a delay of tens of lines is added. See Sec. 5-39. "FRAME DELAY" for details on video delay amount by format conversion type.
(Input and output size or aspect ratio is different)		All image filters are **always enabled** regardless of this setting. Images can be adjusted in each filter menu.

◆ **Horizontal / Vertical Anti Alias**

Item	Default	Setting	Description
H/V Anti Alias	Auto	Auto Manual	If set to **Auto**, a recommended Frequency value is automatically set according to the input and output image size ratio. If set to **Manual**, the Frequency value can be adjusted manually.
H Frequency	-	0.125 to 0.500	Sets the cutoff frequency of low-pass filter. (See the note below.)
V Frequency			
H / V Level	100% (MAX)	0 (Off) to 100% (MAX)	Sets the mixing percentage of filtered picture and unfiltered picture. **100%** indicates filtered picture only. (See the note below.)

If the image size is changed by video conversions, jaggies may appear on edges. Anti-aliasing filter can smooth out these jagged edges.
The anti-aliasing filter has low-pass characteristics (attenuating high frequency components and passing through low frequency components). Frequency in the menu limits the upper-side band.

If Mode is set to **Auto**, a recommended Frequency value is automatically set according to the input and output image size ratio. The value can be adjusted manually to fit individual image by changing Mode to **Manual**. (For example, using a lower value for CG graphics with sharp edges, or a higher value for lower resolution images).

The lower the Frequency value, the more smooth the lines are, but the more the detailed texture attenuates. The higher the Frequency value, the sharper images become but the more jaggies appear. The optimal Frequency value is largely dependent on the ratio of input and output image sizes.

When video images converted from Progressive to Interlaced (telecined video), a motion judder problem specific to telecined video caused by scenes with big and fast movements may occur. This can be reduced by decreasing only the V Level from the recommended value set by **Auto** (for example, decreasing to 0.125 from 0.25). Note that, however, if doing so, the vertical resolution may be deteriorated in other scenes where there are few and slow movements.
As for Level setting, the higher the value, the more the filtered areas increase and **100%** indicates filtered picture only. The higher the value, the more the higher frequency components attenuate and the more smooth the edges become.

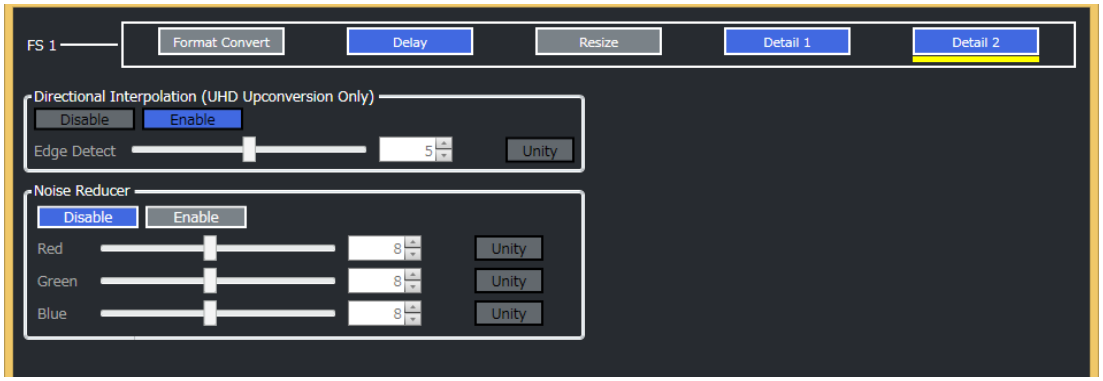
◆ **Horizontal / Vertical Enhancer**

The menu sets the horizontal and vertical enhancements. Although enhancers are not effective on 4K images, they can be applied to HD input images before 4K up-conversion and to HD output images after down-conversion from 4K.
The enhancement filter allows you to sharpen blurry input images and restore blurred edges caused by anti-aliasing filtering that attenuates high-frequency information while down-converting.

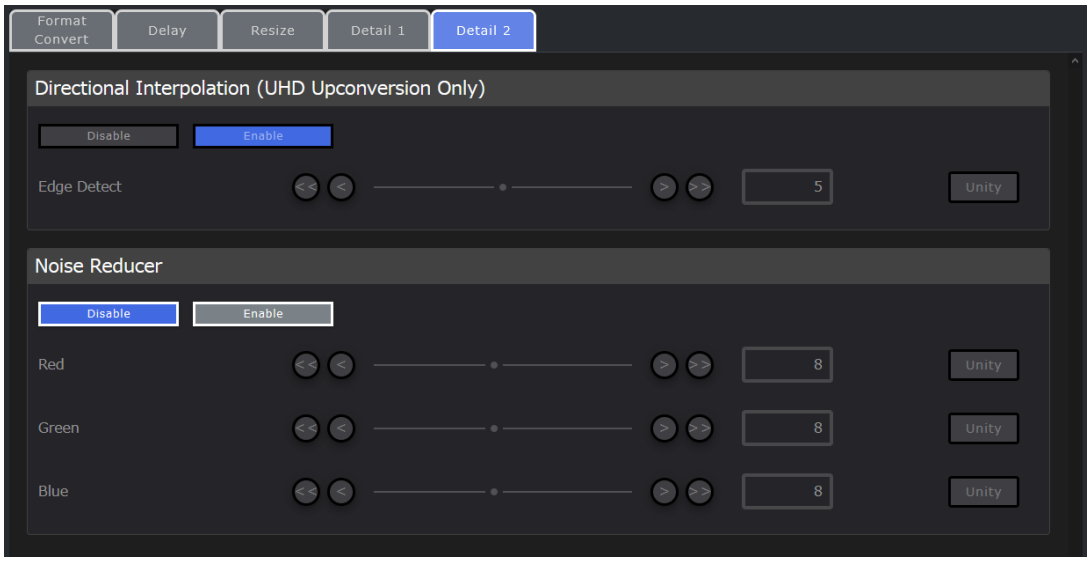
Item	Default	Setting	Description
H / V Enhancer	Disable	Disable Enable	Enables/disables Horizontal / Vertical Enhancer.
H / V High H / V Middle H / V Low	1	0 – 10	Sets the enhancement level for high frequency bandwidth, middle frequency bandwidth and lower frequency bandwidth respectively Minimum level: **1** , Maximum level: **10** “**0**” disables the enhancement filter.

12-2-3-5. If Detail 2 Selected (Converter 1 only in Simul 4K/HD or 3D-LUT)

[Windows GUI]



[Web GUI]



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

* FA-964K option required

* Dual HD mode unsupported

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 Green Blue	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.

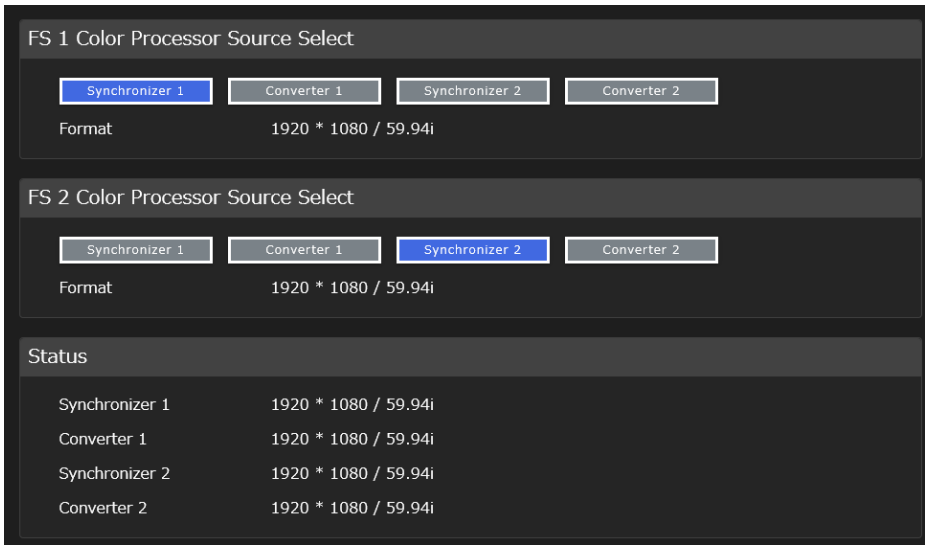
12-2-4. Color Processor Source Select

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

* FS2 is not supported in 3D-LUT mode.
* Converter1 and Converter2 buttons and status are displayed with FA-96UDC option.

[Windows GUI]

[Web GUI]



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.

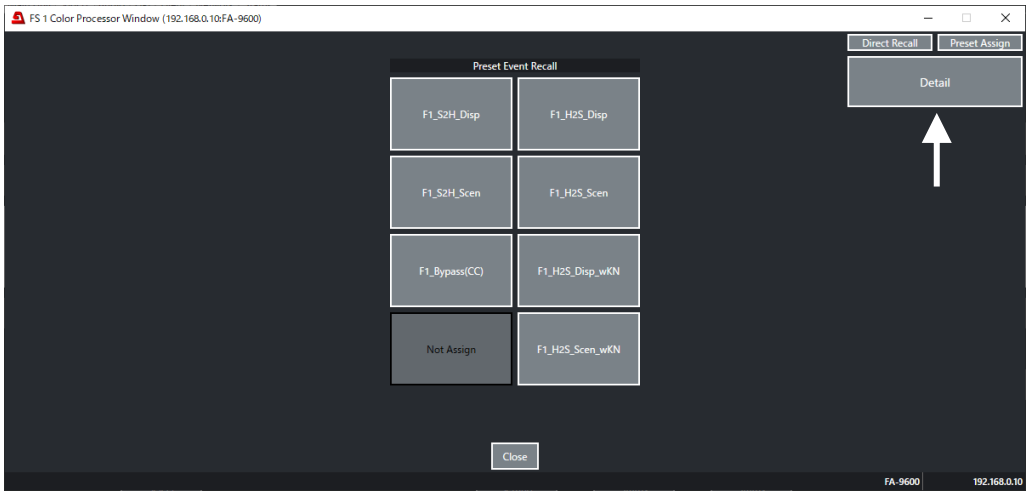
12-2-5. Color Processor 1, 2

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

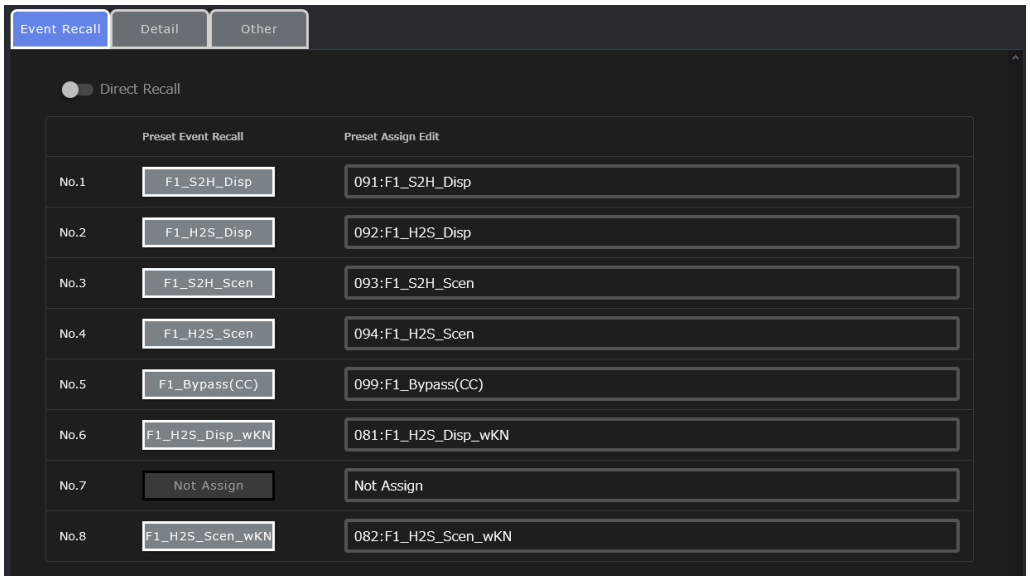
<Simultaneous 4K/HD mode>
<Dual HD mode>

The **Preset Event Recall** screen is displayed. Preset Event buttons are provided and allow you to instantly load complex color space and dynamic range settings simply by pressing these buttons. 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.)

[Windows GUI]

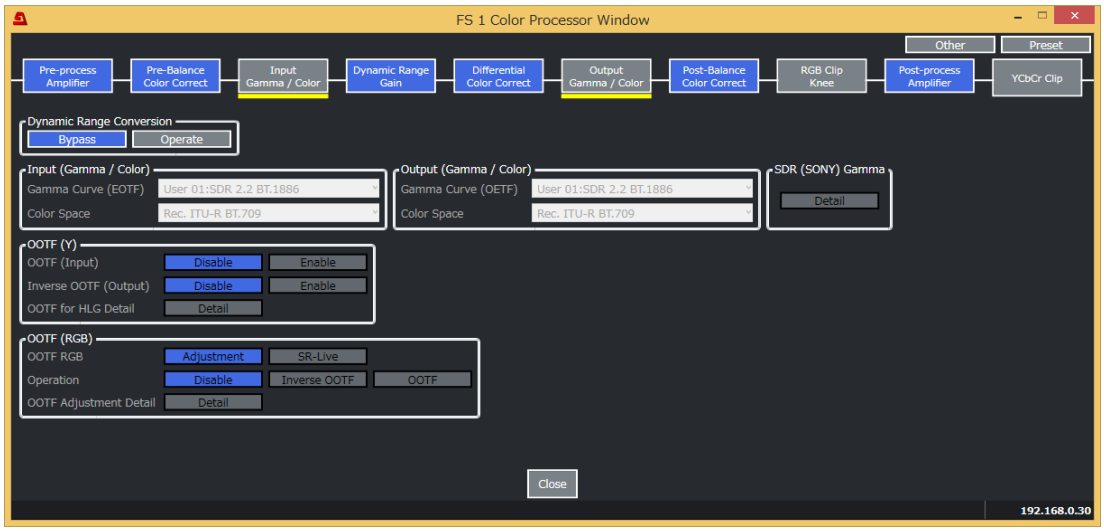


[Web GUI] (Scrolling up and down to go through the page.)



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. 12-2-5-1 and later sections for details on menu parameters.

[Windows GUI]

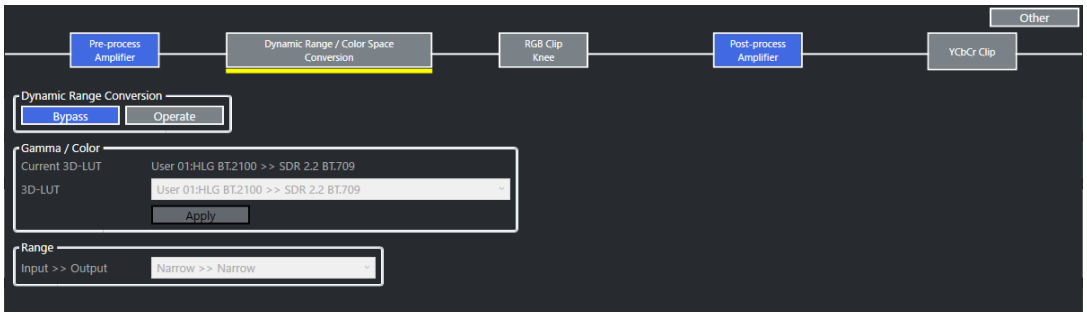


[Web GUI] (Scrolling up and down to go through the page.)

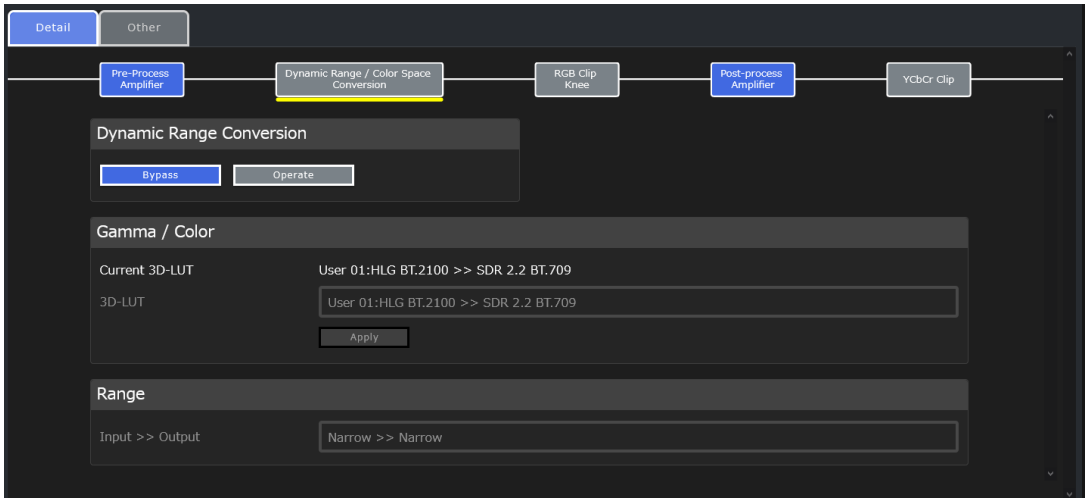
<3D-LUT mode>

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

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)



Pre-process Amplifier/Post-process Amplifier

See Sec. 12-2-5-2. “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.
Current 3D-LUT	-	-	Displays the current 3D-LUT.
3D-LUT	User 01:	See Sec. 5-7. “IN/OUT GAMMA/COLOR.”	Selects a 3D-LUT table and click Apply to confirm the change.
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)

For **RGB Clip Knee** menu, see Sec. 12-2-5-6. “RGB Clip / Knee” for menu details.
For **YCbCr Clip** menu, See Sec. 12-2-5-7. “YCbCr Clip” for menu details.

12-2-5-1. Input / Output Gamma / Color (Dynamic Range Conversion)

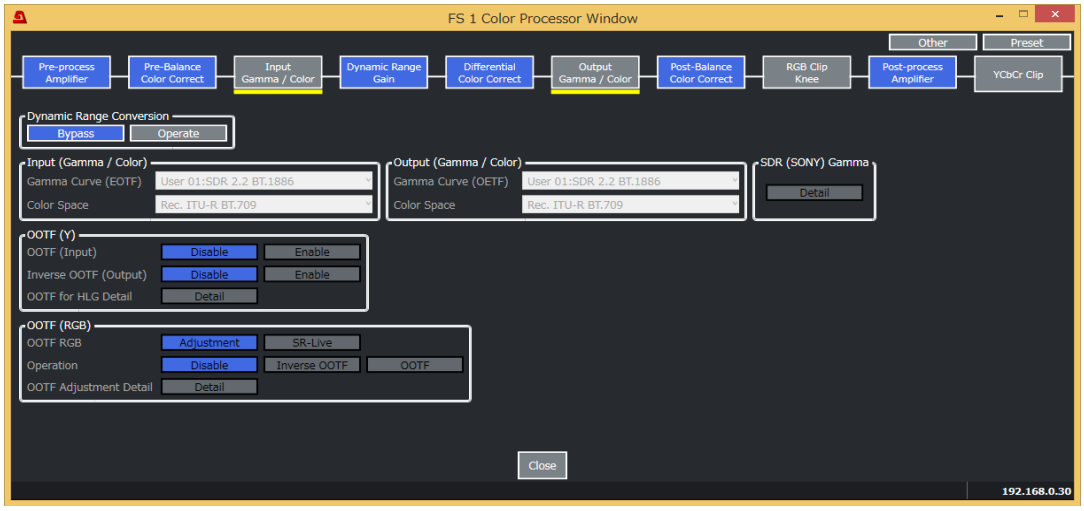
Click **Color Processor 1** or **Color Processor 2** in the Video Block and select **Input Gamma / Color** or **Output Gamma / Color** to display the menu as shown below.

◆ 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: SDR<->HLG (with Preset Events).”

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)

◆ **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) 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)	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 changed by editing files in the Web GUI. (See Sec. 12-6. “Data Page (Web GUI).”) 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. **User01**-**User05** Gamut settings are stored in files and these names and content can be changed by editing files in the Web GUI. (See Sec. 12-6. “Data Page (Web GUI).”) 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)**

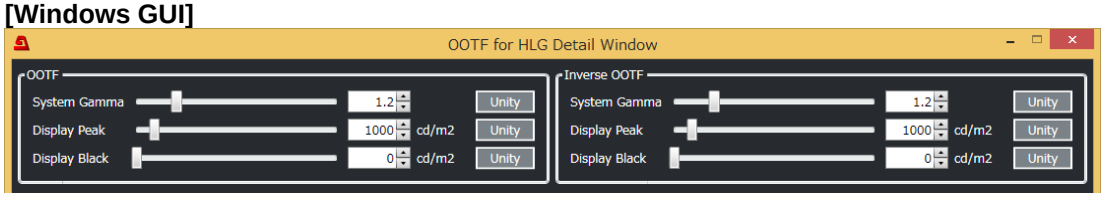
This setting is enabled only when **SDR(SONY)** is selected for Gamma Curve. In Window GUI, press the **Detail** button to display the dialog box.

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

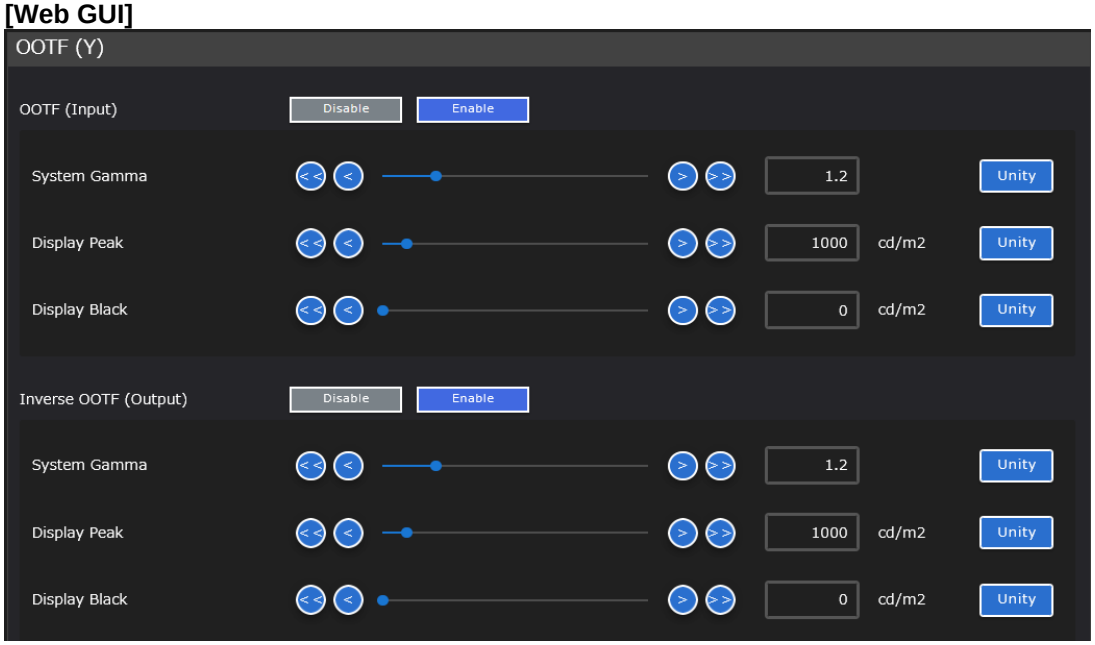
◆ **OOTF (Y)**

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 make needed settings.
In Windows GUI, click **Detail** under OOTF for HLG Detail to display a pop-up menu dialog and make needed settings.
See Sec. 5-6-1. "About OOTF Related Parameters" for details on settings.

[Windows GUI]



[Web GUI]



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 Processer: SDR<->HLG (with Preset Events)” 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. In Windows GUI, press **OOTF Adjustment Detail** to display the dialog box and select a gamma value.

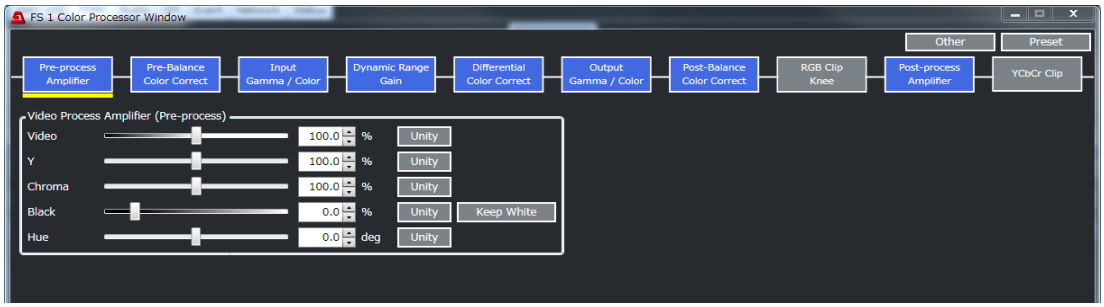
System Gamma	1.2	1.1 to 1.5	Selects a gamma value.

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

12-2-5-2. 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 menu as shown below.
Post Process settings require the FA-96AHDR or AHDR2 option.

[Windows GUI]



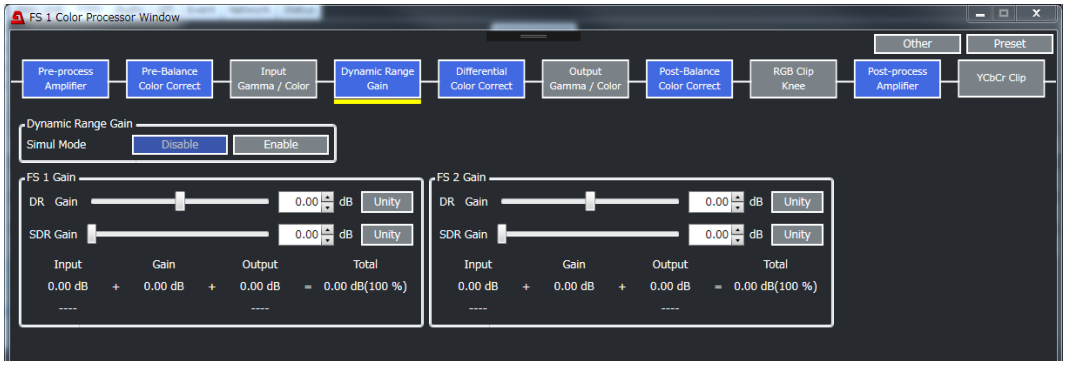
[Web GUI]

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.

12-2-5-3. Dynamic Range Gain

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

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)

Item	Default	Setting	Description
Simul Mode	Disable	Disable Enable	Sets whether to keep the gain difference between FS 1 and 2. If **Enable** is set and **Dynamic Range Gain** of FS1 is changed, **Dynamic Range Gain** of FS2 is also changed with the same difference.
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.

12-2-5-4. Differential Color Correct

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

[Windows GUI]

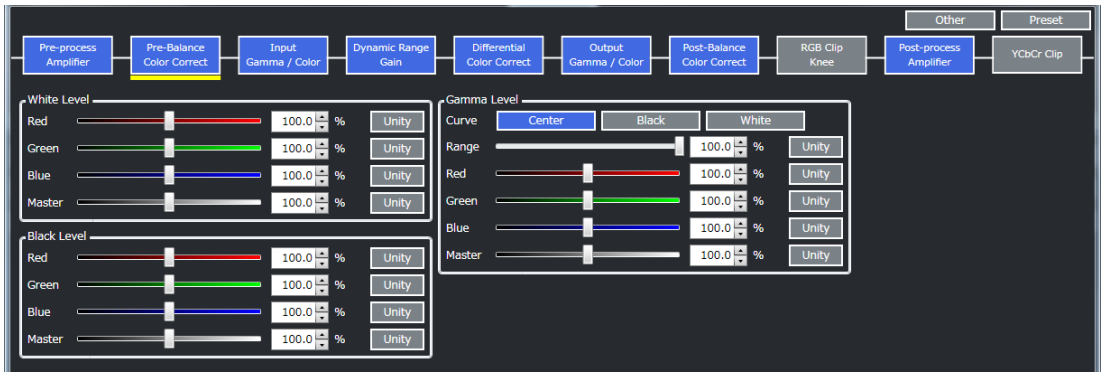
[Web GUI] (Scrolling up and down to go through the page.)

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.

12-2-5-5. 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 menu as shown below.

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)

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.

12-2-5-6. RGB Clip / Knee

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

[Windows GUI]

[Web GUI] (Scrolling up and down to go through the page.)

◆ **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.

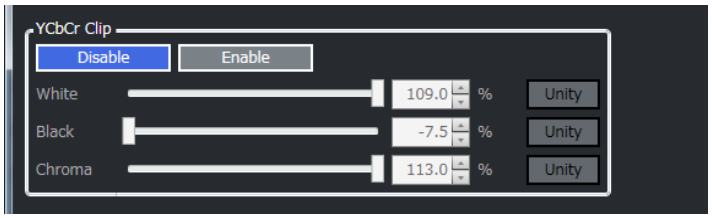
◆ **Black Clip**

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.

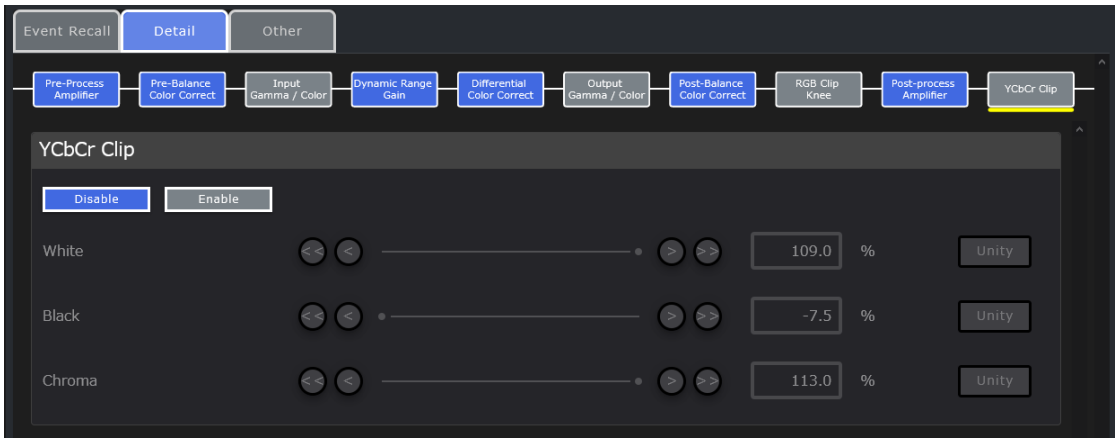
12-2-5-7. YCbCr Clip

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

[Windows GUI]



[Web GUI]



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.

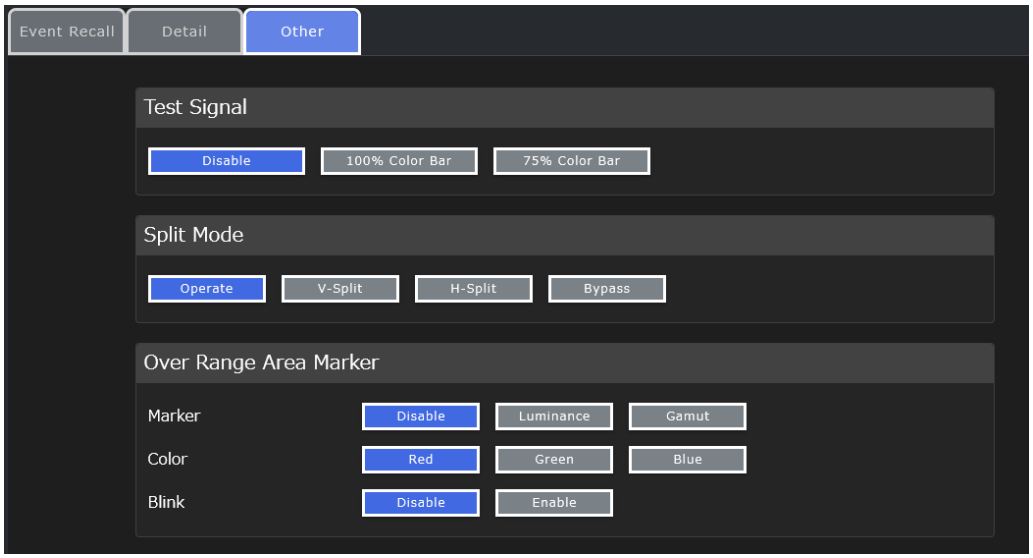
12-2-5-8. Other

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

* Split Mode and Over Range Area Marker are not displayed in 3D-LUT mode.

[Windows GUI]

[Web GUI]



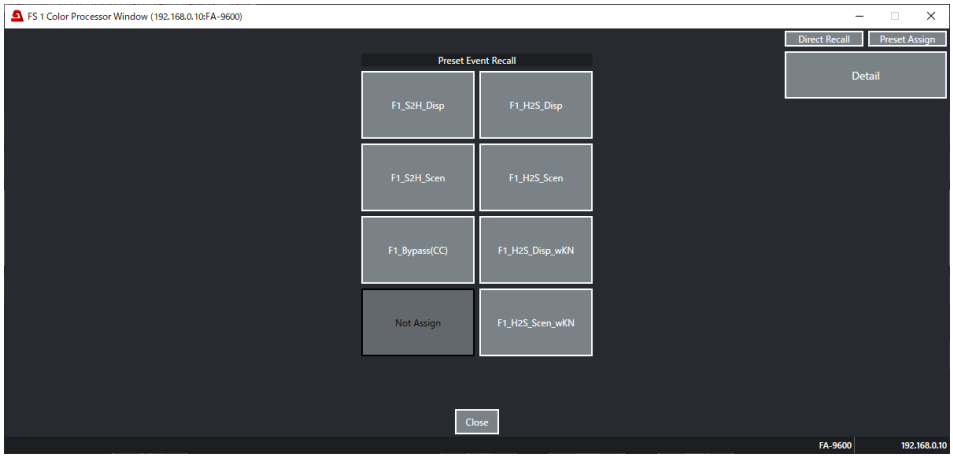
Item	Default	Setting	Description
Test Signal	Disable	Disable 100% Color Bar 75% Color Bar	Outputs the selected test signal.
Split Mode	Operate	Operate V-Split H-Split Bypass	Selects the output image display method.
The following settings require FA-96AHDR or AHDR2.			
Marker	Disable	Disable Luminance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

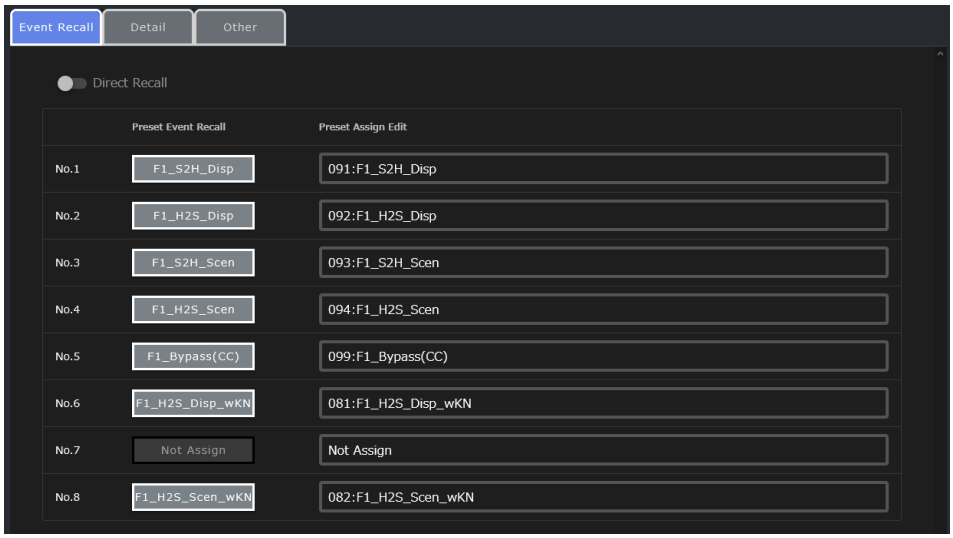
12-2-5-9. Preset

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

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)

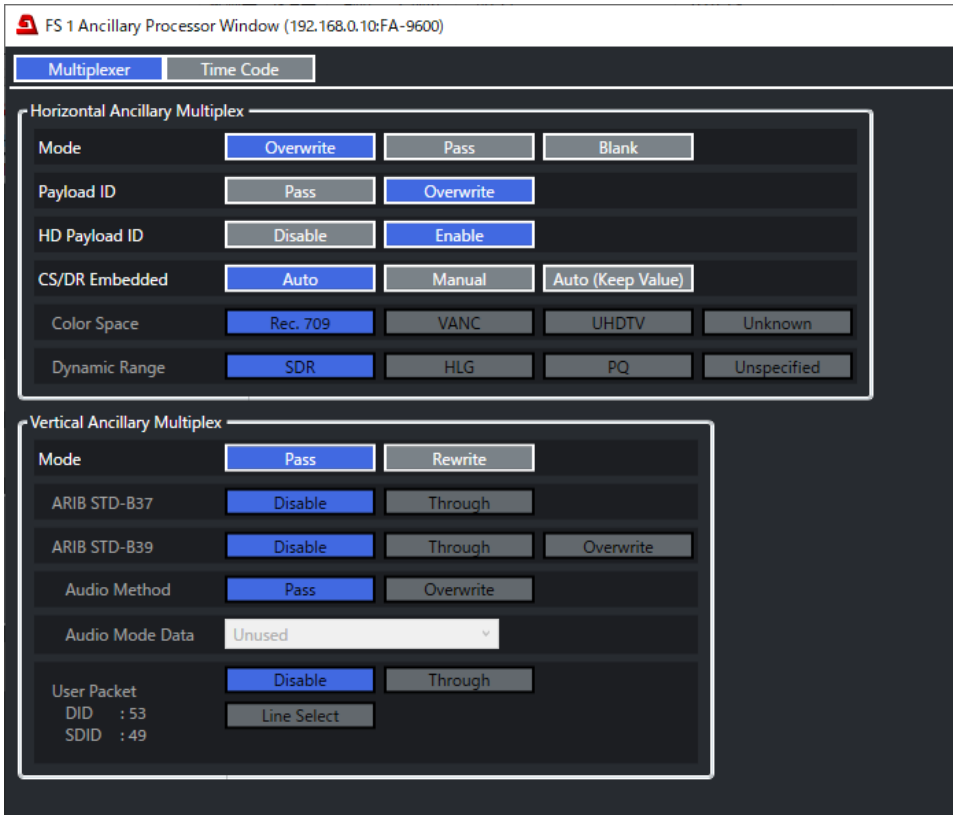


12-2-6. Ancillary Processor 1, 2

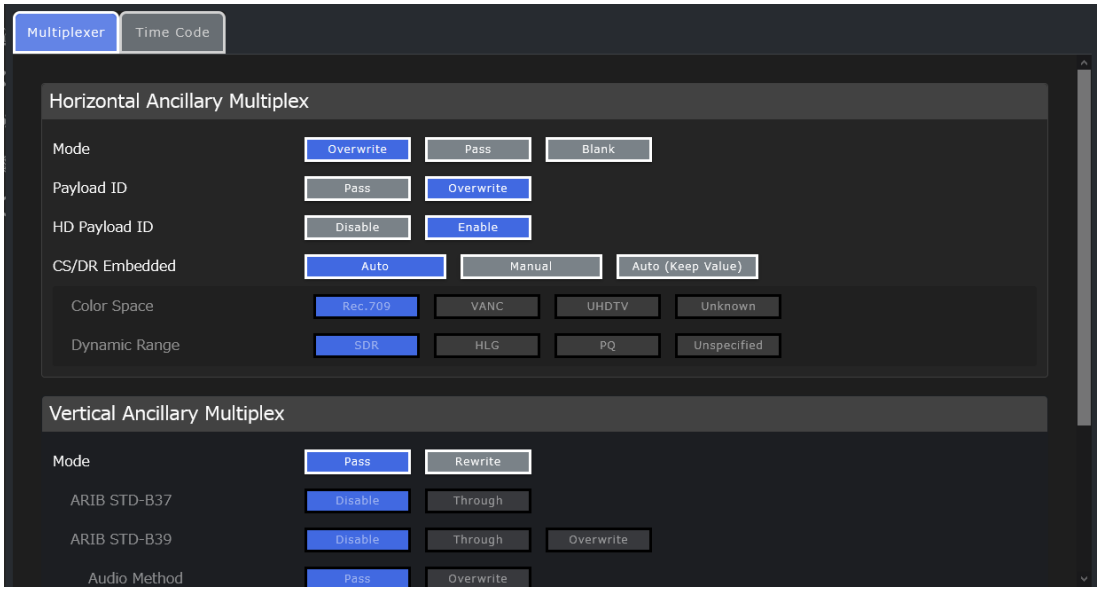
Click **Ancillary Processor 1** or **Ancillary Processor 2** in the Video Block to display the menu. Switch the display by pressing **Multiplexer** or **Time Code** button or tab) at the top of the window.

12-2-6-1. If Multiplexer Selected

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)



◆ **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, , the HANC space becomes blank. **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. 5-27. "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 Auto(Keep Value)	Sets the Payload ID codes 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 the process is bypassed, payload ID codes in the input signal are inserted. If processed, 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. **Auto(Keep Value)**: Basically functions in the same manner as **Auto**. The only difference is the case of action on video loss. If set to **Auto**, output signal payload ID codes for Dynamic Range and Color Space are reset to default. If set to **Auto(Keep Value)**, the payload ID codes set just before the video loss are kept.
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. **Pass:** Passes through the input VANC data without processing. If input and output signal formats are different, the VANC space becomes blank. If the SDI input and reference are not synchronized, packet loss or duplication may occur due to timing adjustment. **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. 5-34.) 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:** Extracts packets from the SDI input and inserts them into the appropriate place of the SDI output without change. The inserted line varies by signal format. If the SDI input and reference are not synchronized, packet loss or duplication may occur due to timing adjustment. **Overwrite**: Inserts the internally generated (Audio Mode) control signal packets defined by ARIB STD-B39. Audio data information to be inserted should be set under Audio Method and Audio Mode Data below. Other information in the input signal (except Audio Mode) is used for output. See Sec. 5-34. “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)**

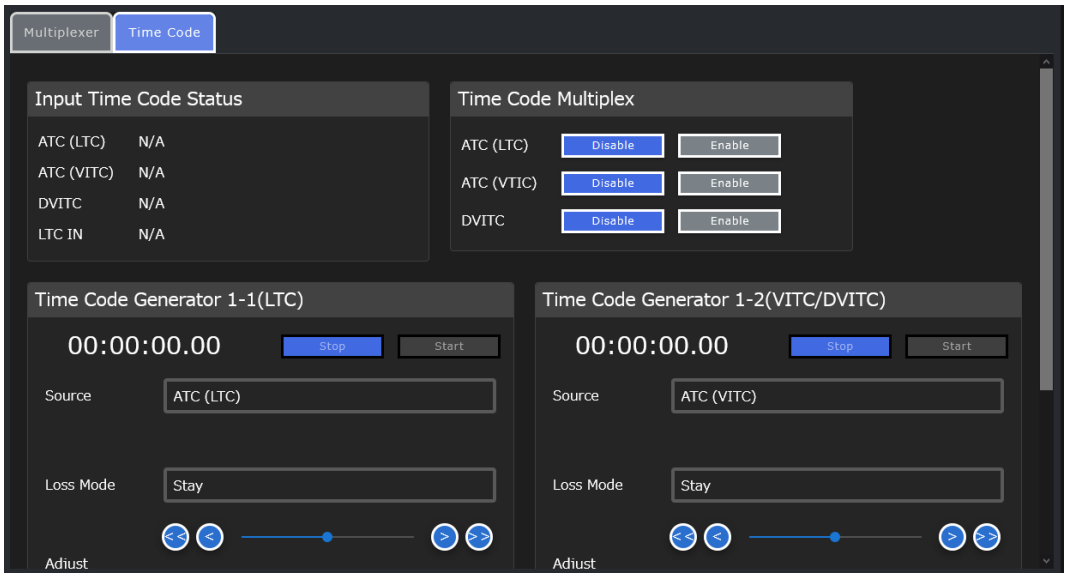
Press the **Line Select** button to display the dialog box. (Windows GUI only)

Item	Default	Setting	Description
SD (525/59.94i)	Line 17/280	Line 12/275 - 19/282	Selects the line number into which the user packet is inserted under the output format.
SD (625/50i)	Line 17/330	Line 8/321 - 22/335	
720p	Line 17	Line 9 - 25	
1080i/PsF/2160PsF	Line 17/579	Line 9/571 - 20/582	
1080p/2160p(1.5G)	Line 17	Line 9 - 41	
1080p/2160p(3G-A)	Line 17	Line 9 - 41	
1080p/2160p(3G-B)	Line 17/579	Line 9/571 - 20/582	

12-2-6-2. If Time Code Selected:

[Windows GUI]

[Web GUI] (Scrolling up and down to go through the page.)



◆ Input Time Code Status

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

◆ Time Code Multiplex

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. 12-2-6-1. "If Multiplexer Selected" for details on H/V ANC settings.)

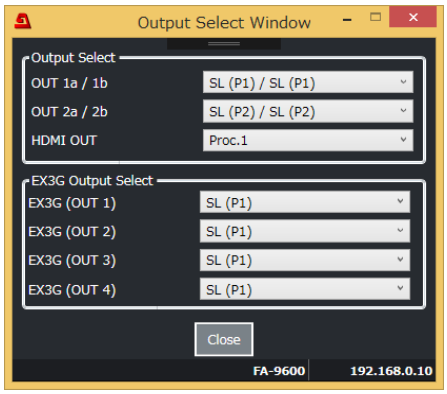
Item	Default	Setting	Description
Source	ATC (LTC)	ATC(LTC) ATC(VITC) DVITC LTC IN Generator	Selects the timecode source. **S12M-1 ATC(LTC):** ATC(LTC) timecode in the SDI input **S12M-1 ATC(VITC):** ATC(VITC) timecode in the SDI input **DVITC:** DVITC timecode in the SD-SDI input **LTC IN:** LTC input (FA-96DIN4-CBL required) **Generator:** Generator's timecode If the selected source is unavailable due to format conversion, a message, "Cannot use with current I/O formats," is displayed on the menu.
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.

12-2-7. Output Select

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

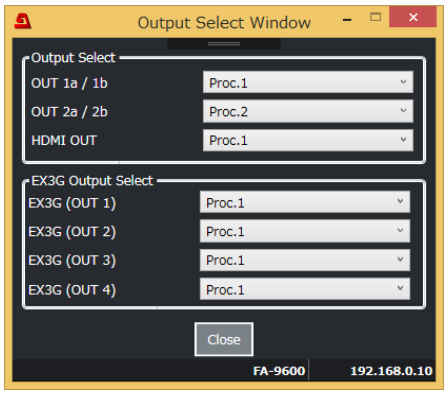
<Simultaneous 4K/HD mode>

[Windows GUI]

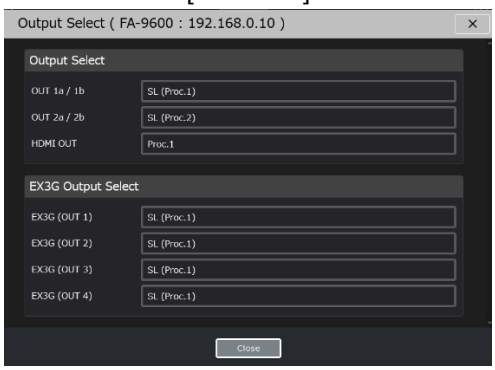


<Dual HD mode>

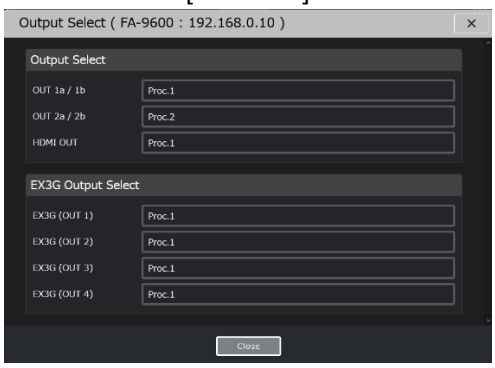
[Windows GUI]



[Web GUI]



[Web GUI]



<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.
FA-964K required for **DL** or **QL**.

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 (SFP or SFP+ module required)

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)

FA-964K required for **DL** or **QL**.

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 (SFP or SFP+ module required)

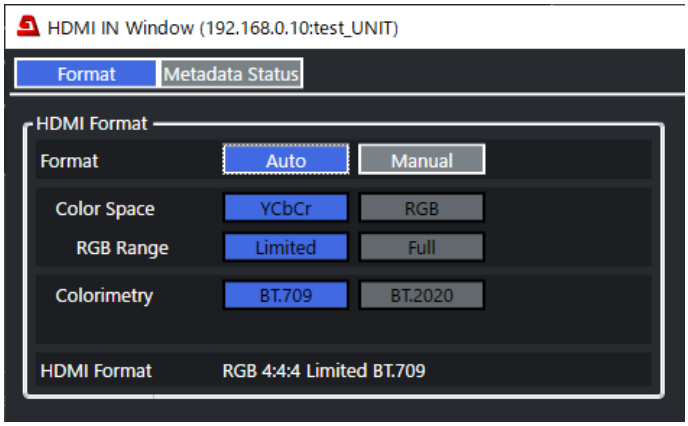
Item	Default	Setting	Description
UHD Link	-	Single Link	SDI Link format of FA-96SFPC4 output. (Fixed)
OUT 1/2	Proc.1	Proc.1 Proc.2 Proc.1 / Proc.2 Proc.2 / Proc.1	Selects an output signal.
OUT 3/4	Proc.1		Selects an output signal.

12-2-8. HDMI IN

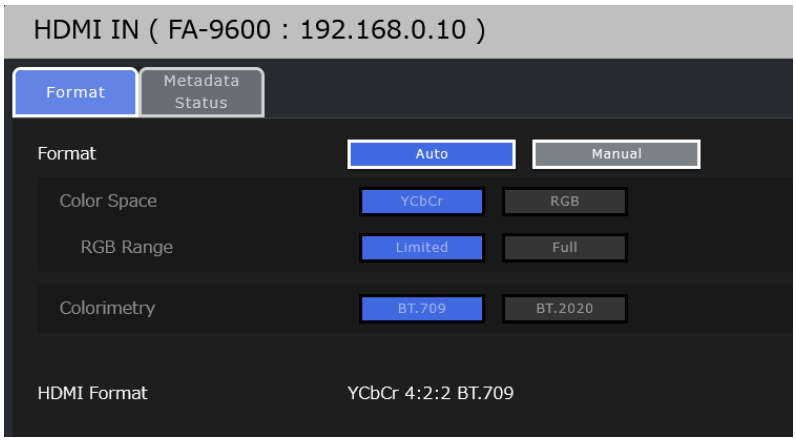
Click **HDMI IN** in the Video Block to display the menu. Use **Format** and **Status** buttons at the top of the window to display submenus.

12-2-8-1. If Format Selected

[Windows GUI]



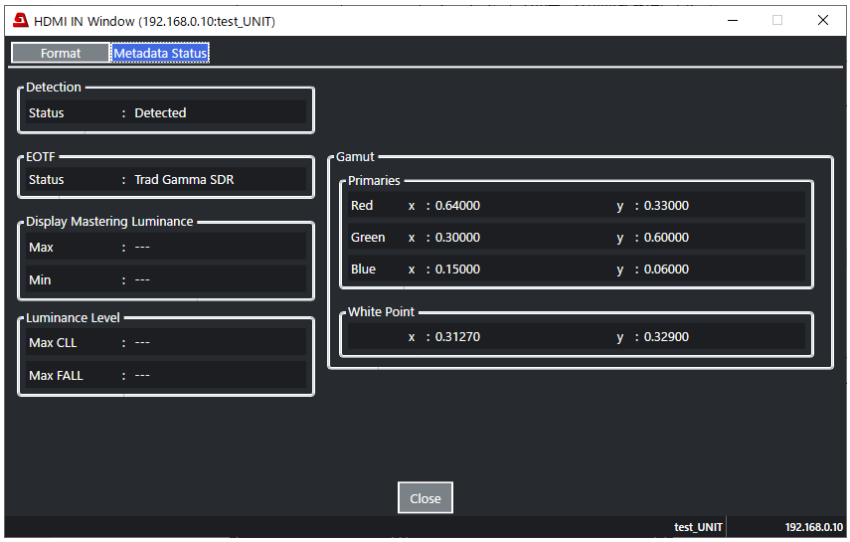
[Web GUI]



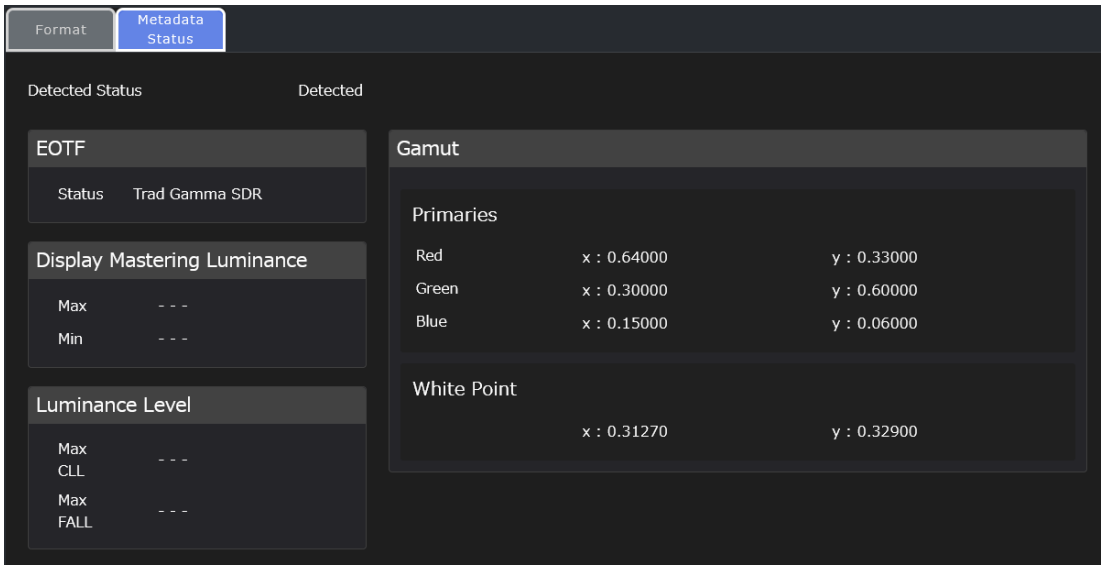
Item	Default	Setting	Description
Format	Auto	Auto Manual	Selects the color format setting mode for HDMI signal.
HDMI Format	-	–	Displays the HDMI signal color format.
If Format is set to **Manual**, set the following items.			
Color Space	YCbCr	YCbCr RGB	Selects an HDMI color mode.
RGB Range	Limited	Limited Full	If **RGB** (8-bit for each) is set, selects the data range for HDMI input. **Limited**: Limited Range between 16-235. **Full**: Full Range between 0-255.
Colorimetry	BT.709	BT.2020 BT.709	Selects a color gamut. (SD-SDI signals are processed using BT.601.)

12-2-8-2. If Metadata Status Selected

[Windows GUI]



[Web GUI]



The HDR metadata status of HDMI input is indicated under **Detection Status** as shown below.

None	Invalid data
Unknown	All data values are zero (0).
Detected	Properly detected. HDR metadata values are displayed.
---	No metadata

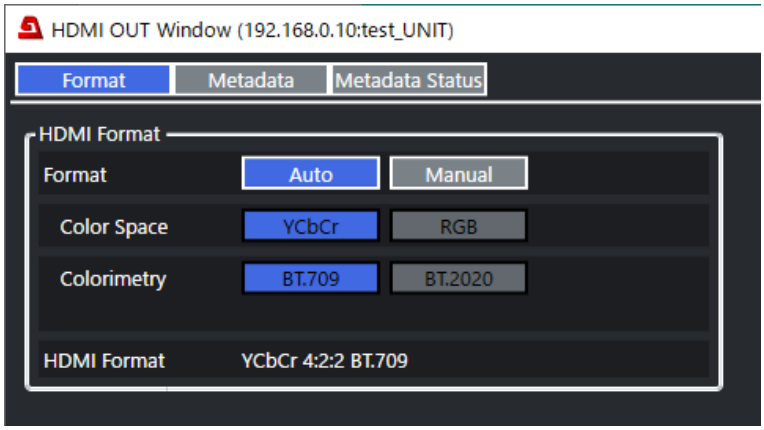
See Sec. 12-2-9-2. “If Metadata Selected” for more details on metadata status

12-2-9. HDMI OUT

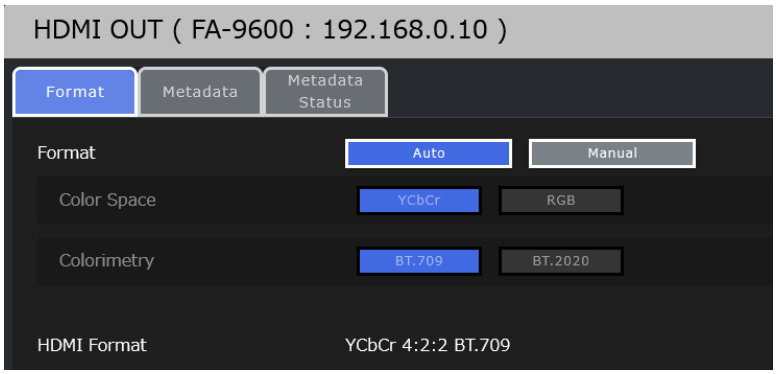
Click **HDMI OUT** in the Video Block to display the menu as shown below. Use **Format**, **Metadata** and **Metadata Status** buttons at the top of the window to display submenus.

12-2-9-1. If Format Selected

[Windows GUI]



[Web GUI]

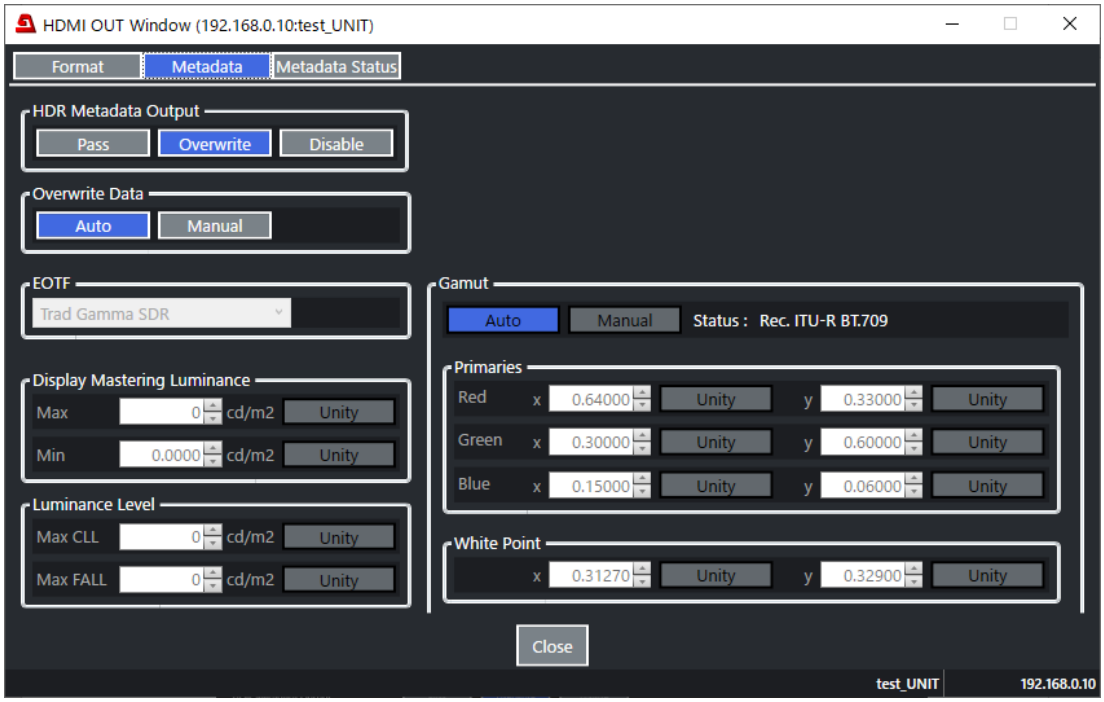


Item	Default	Setting	Description
Format	Auto	Auto Manual	**Auto**: HDMI output color format is obtained from EDID data of the connecting device such as monitors. (Default: YCbCr / BT.709). **Manual**: HDMI output color format is manually set using the following items.
HDMI Format	-	–	Displays the HDMI signal color format.
If Format is set to **Manual**, set the following items.			
Color Space	YCbCr	YCbCr RGB	Selects the HDMI output color mode.
Colorimetry	BT.709	BT.2020 BT.709	Selects the HDMI output color gamut. (SD-SDI signals are processed using BT.601.)

The video format of HDMI output is selected in the Output Select menu. (See Sec. 12-2-7.)
The HDMI output signal range is fixed to **limited** range.
Audio channels to be embedded into the HDMI output are selected in the Audio OUT (FS 1 / FS 2 / HDMI / Option) menu. (See Sec. 12-3-9.)

12-2-9-2. If Metadata Selected

[Windows GUI]



[Web]

Item	Default	Setting	Description
HDR Metadata Output	Overwrite	Pass Overwrite Disable	Selects the HDR metadata to be inserted into HDMI OUT. **Pass**: HDMI IN inserted metadata (Enabled only when INPUT SELECT is set to **HDMI IN** and in other cases, same data as **Overwrite > Auto** setting.) **Overwrite**: Metadata set under "Overwrite Data" below. **Disable**: No metadata is inserted.
Overwrite Data is enabled only when HDR Metadata Output is set to **Overwrite**.			
Overwrite Data	Auto	Auto Manual	**Auto**: Inserts metadata set in the Color Correction Process (Sec. 12-2-5). But, metadata values for Display Mastering Luminance, and Luminance Level are those inserted in the HDMI IN. If such values are not inserted, "**0**" is inserted. **Manual**: Uses metadata set in the following items.

The following items are enabled only when Overwrite is set to **Manual**.

Item		Default	Setting	Description
EOTF		Trad Gamma SDR	Trad Gamma SDR Trad Gamma HDR SMPTE 2084 (PQ) Hybrid Log-Gamma Reserved[4] Reserved[5] Reserved[6] Reserved[7]	Selects an EOTF of HDMI receiver.
Display Mastering Luminance	Max	100	1 - 65535	Sets the maximum and minimum luminance levels (in cd/m^2).
	Min	0.0001	0.0001 - 6.5535	
Luminance Level	Max CLL	100	1 - 65535	Sets the maximum content luminance level (in cd/m^2.
	Max FALL	100	1 - 65535	Sets the maximum Frame Average Light Level (in cd/m^2).
Gamut		Auto	Auto Manual	Sets color space data (Primaries and White Point). **Auto**: Data set under Color Correction post Process (Sec. 12-2-5). But if Dynamic Range Converter is set to **Bypass**, data inserted in the HDMI input. If no data in the HDMI input, data of Horizontal Ancillary Settings. **Manual**: Manually set data using (See below.)

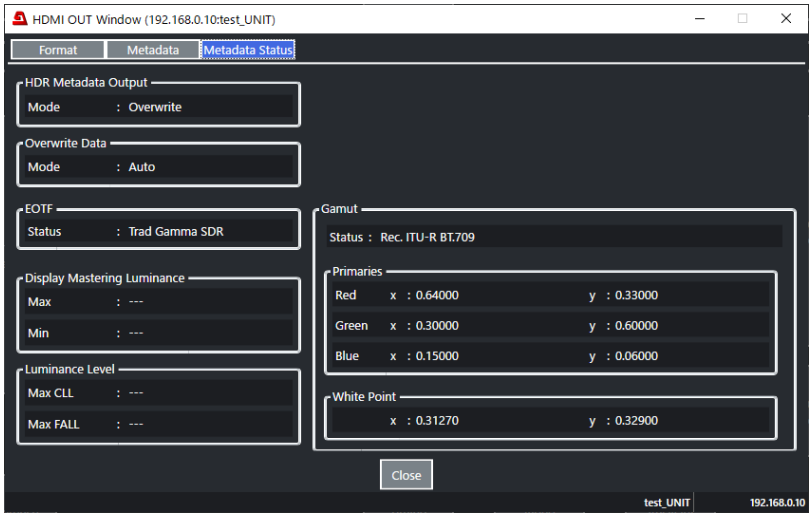
Auto is selected for Gamut, the information of color space for use is displayed in the GUI.
Rec. ITU-R BT.709, **Rec. ITU-R BT.2020**, **Follow Input** (HDMI input data example)

Manual is selected for Gamut, the following parameters are displayed for setting data.

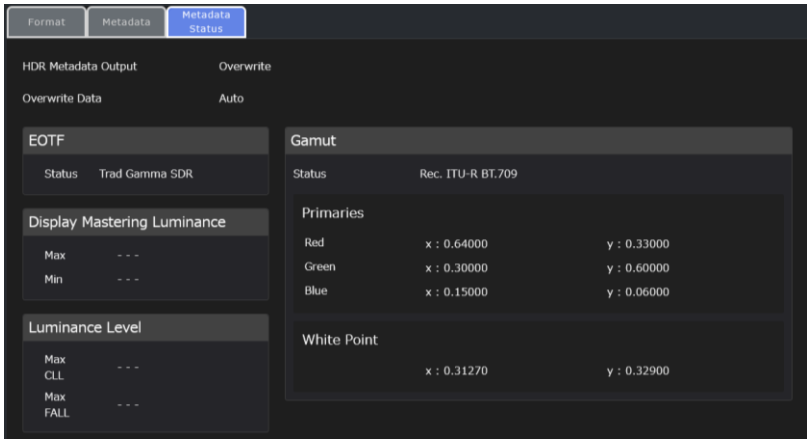
Item		Default	Setting (step)	Description
Primaries	Red	x: 0.6400, y: 0.3300	0.00000 to 1.00000 (0.00002)	Specifies R, G and B x, y coordinates in the CIE chromaticity diagram.
	Green	x: 0.3000, y: 0.6000		
	Blue	x: 0.1500, y: 0.0600		
White Point		x: 0.3127, y: 0.3290	0.00000 to 1.00000 (0.00002)	Specifies the White Point x, y coordinates in the CIE chromaticity diagram.

12-2-9-3. If Metadata Status Selected

[Windows GUI]



[Web GUI]



The Status menu shows the following metadata values that should be inserted into the HDMI OUT.

EOTF

Display Mastering Luminance ---- Max., Min.

Luminance Level ---------- Max CLL, Max FALL

Gamut ---------- Status

Primaries --------- RGB (x, y)

White Point ------ (x, y)

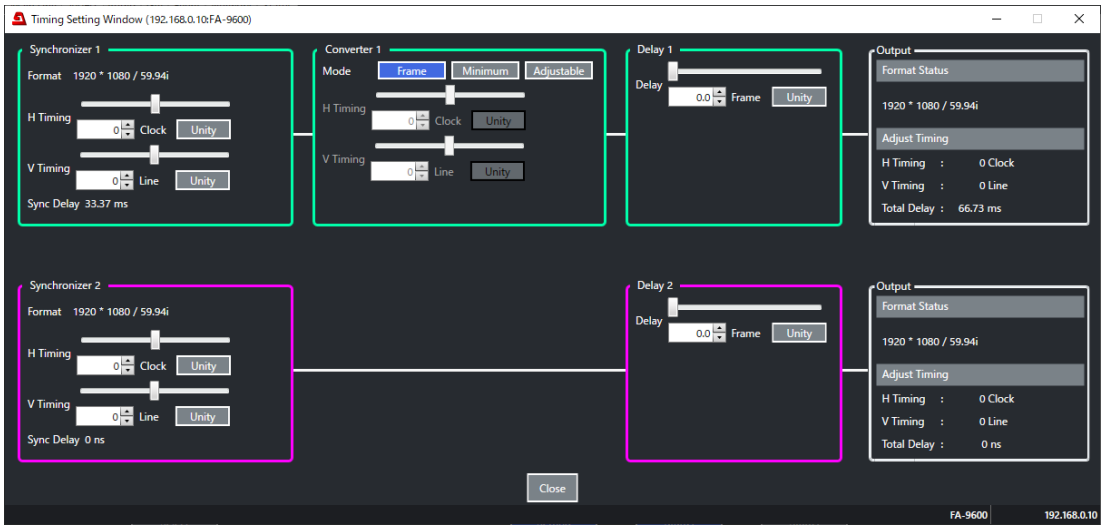
The menu also shows where the metadata is derived from.

HDR Metadata Output setting	Overwrite setting	Inserted metadata
PASS	---	HDMI IN inserted metadata (Enabled only when INPUT SELECT is set to **HDMI IN** and in other cases, same data as **Overwrite > Auto** setting.)
Disable	---	No metadata is inserted.
Overwrite	Auto	Metadata set in the Color Correction Process (Sec. 12-2-5). But, metadata values for Display Mastering Luminance, and Luminance Level are those inserted in the HDMI IN. If such values are not inserted, "**0**" is inserted.
	Manual	Metadata values manually set in the Metadata menu.

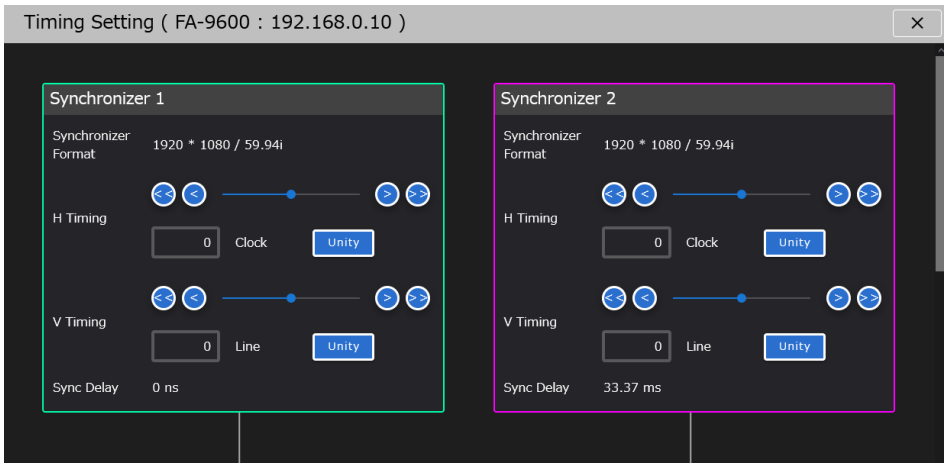
12-2-10. Timing Setting

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

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)



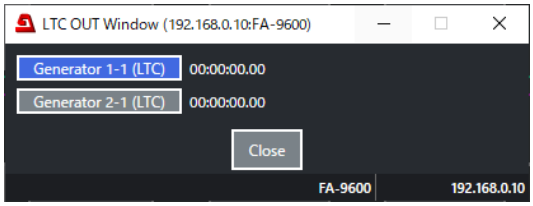
The path of the current processing flow, which varies depending on Color Processor Source Select settings, is displayed and different process timings can be adjusted in the window.

- **Synchronizer**
  See Sec. 5-37. “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**.
  If the Delay function has no effect due to format conversion, a message, “Cannot use with current I/O formats”, is displayed on the menu.
  See Sec. 5-39. “FRAME DELAY” and Sec. 12-1-1 “Selecting MU Modes.”

12-2-11. LTC OUT Select (FA-96DIN4-CBL)

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

[Windows GUI]



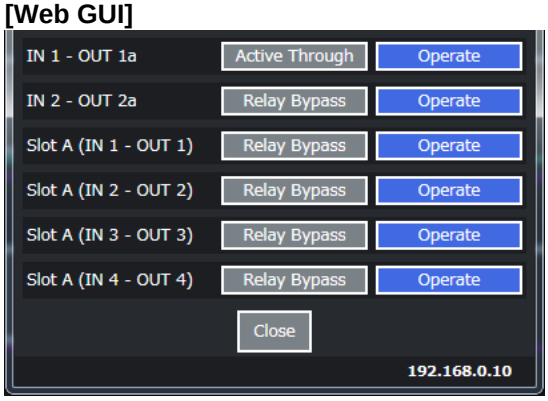
[Web GUI]

The LTC OUT on FA-96DIN4-CBL outputs an internally generated timecode.
This menu selects which timecode generator to be used.
If LTC OUT is unavailable due to format conversion, a message, “Cannot use with Generator”, is displayed on the menu.

12-2-12. Bypass

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

[Windows GUI]
[Web GUI]



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.

12-2-13. Reference Select

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

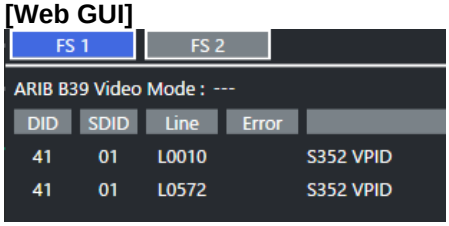
[Windows GUI]
[Web GUI]

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

12-2-14. Ancillary Status

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

[Windows GUI]
[Web GUI]

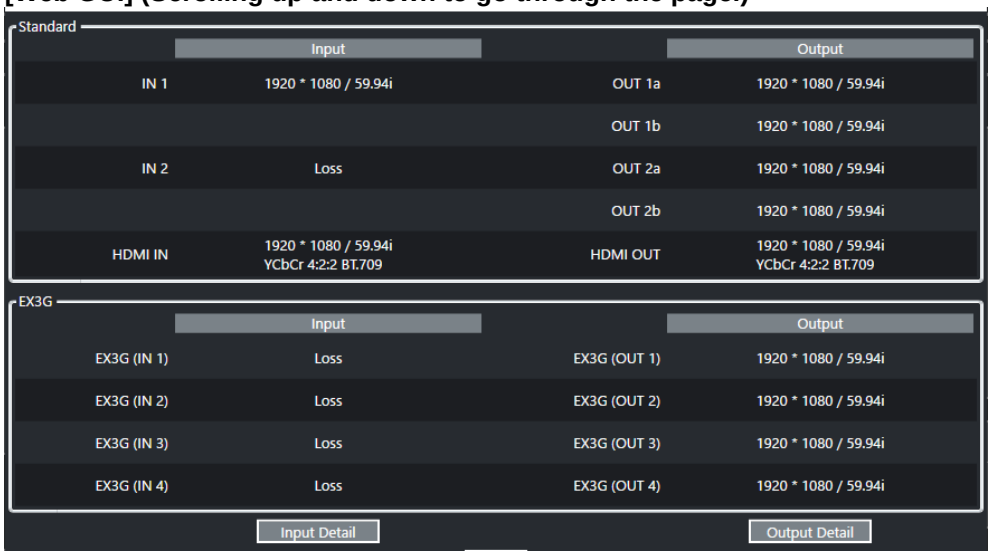


This menu allows you to check ancillary data inserted in the SDI input signal.
If a checksum error occurs, “Error” is displayed.

12-2-15. Video Status

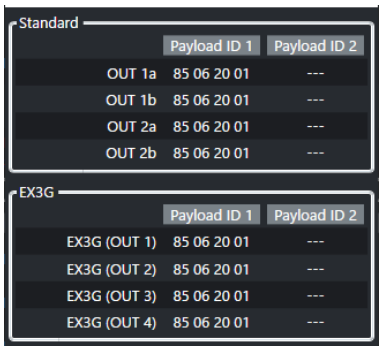
Click **Video Status** in the Video Block to display the menu as shown below.

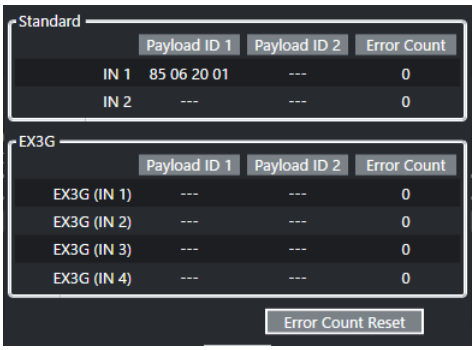
[Windows GUI]
[Web GUI] (Scrolling up and down to go through the page.)



Input signal status is displayed on the left side and output signal status on the right side.

Clicking **Input Detail** displays the input payload ID information and error counts. To reset error counts click **Error Count Reset**.
Clicking **Output Detail** displays the output payload ID information. Refer to Sec. 5-48. "Payload ID (FA-96EX3G44-R / FA-96SFPC4)" for details on payload identifiers.

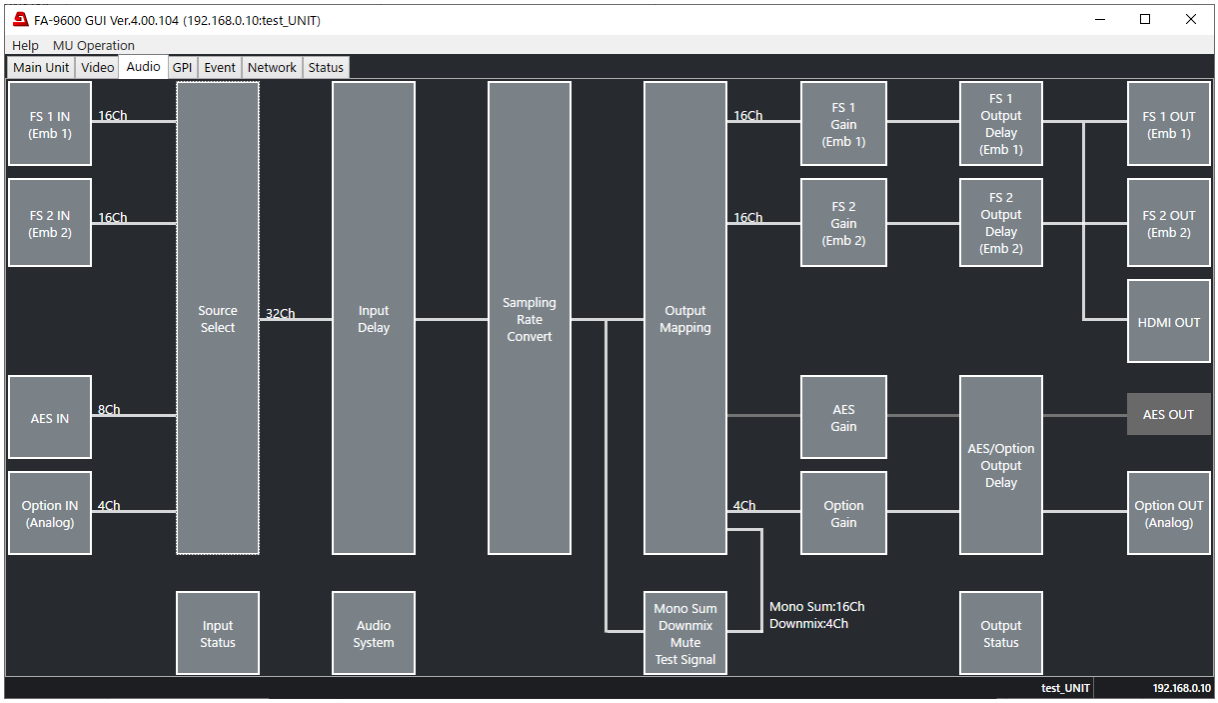




12-3. Audio Settings

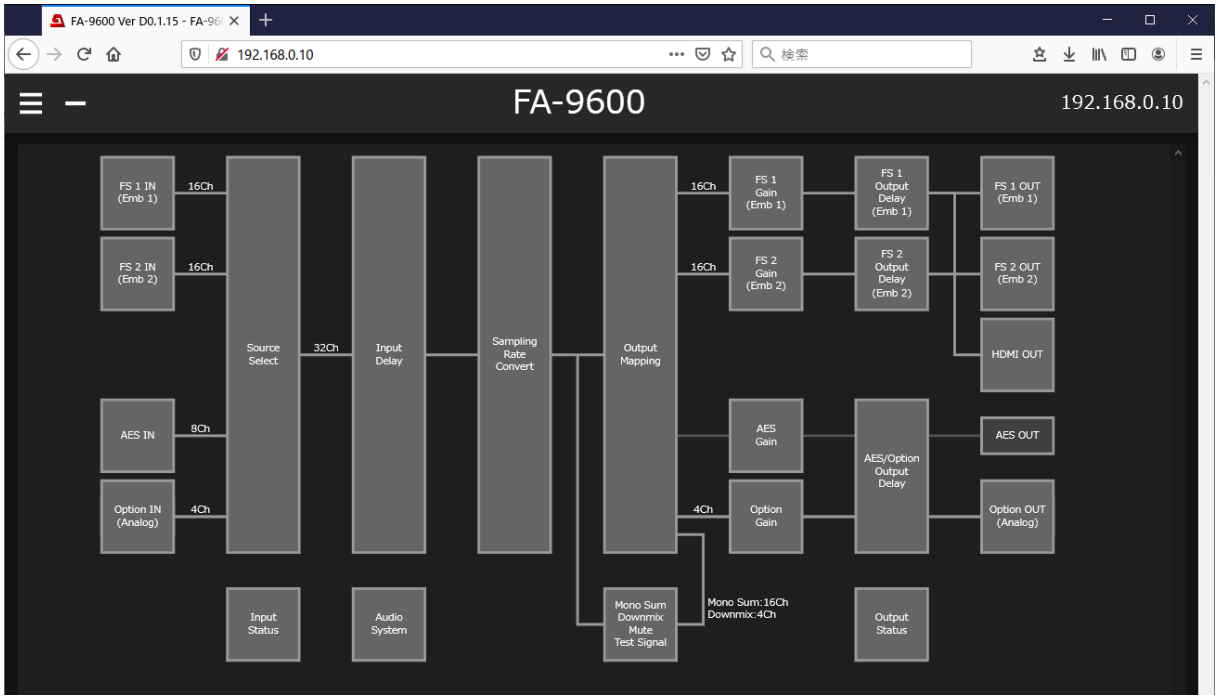
[Windows GUI]

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



[Web GUI]

Click **Audio** in the page list to display the Audio Block diagram.

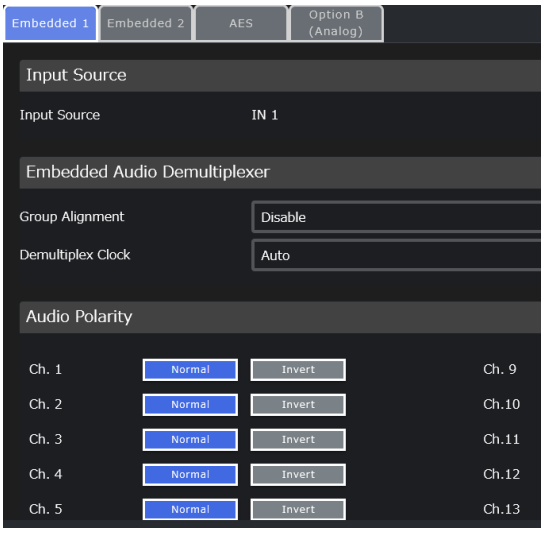


12-3-1. Audio IN (FS 1 / FS 2 / AES / Option)

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.

12-3-1-1. Embedded Audio

[Windows GUI] **[Web GUI] (Scrolling up and down to go through the page.)**



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.

12-3-1-2. AES Audio

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

[Windows GUI]

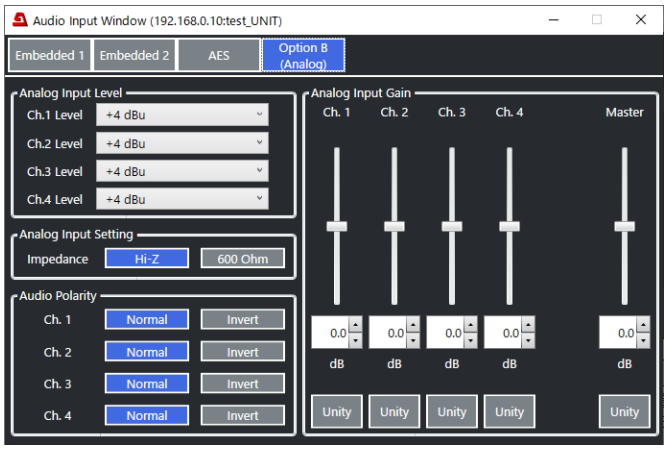
[Web GUI] (Scrolling up and down to go through the page.)

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.

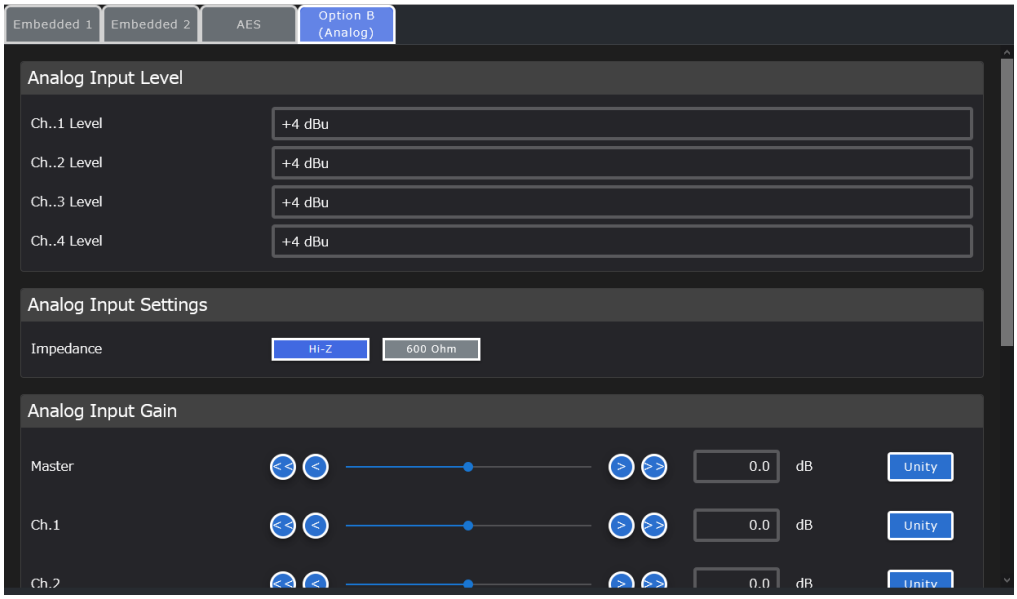
(*1) If the reference audio is lost, the next smallest channel pair is used. Timing adjustment ranges within ±0.25 samples. Channel pairs in a group should be the same sampling rate and synchronized with each other.

12-3-1-3. Analog

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)

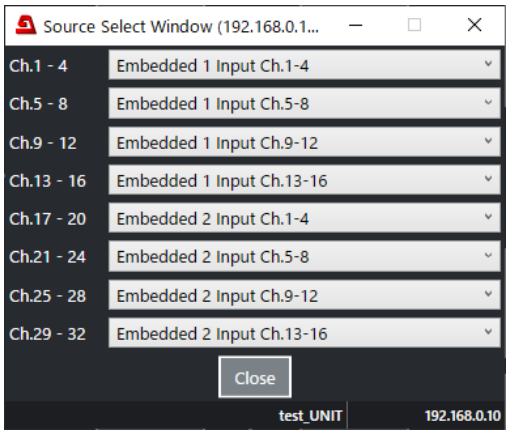


Item	Default	Setting	Description
Analog Input Level Ch.1-4 Level	+4 dBu	-10 dBu 0 dBu +4 dBu +8 dBu	Sets the signal level for each analog audio input channel.
Audio Input Setting Impedance	Hi-Z	Hi-Z 600 Ohm	Sets the analog audio input impedance.
Audio Polarity Ch.1-4	Normal	Normal Invert	Selects the 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.

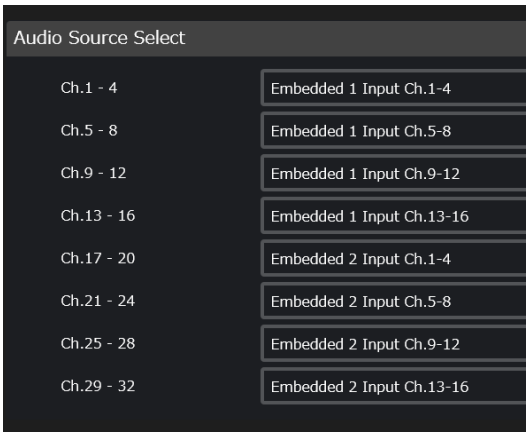
12-3-2. Source Select

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

[Windows GUI]



[Web GUI]



<table>
<tr><th>Item</th><th>Default</th><th>Setting</th><th>Description</th></tr>
<tr><td>Ch.1-4</td><td>Embedded 1 Input Ch.1-4</td><td rowspan="4">Embedded 1 Input Ch.1-4 to Ch.13-16
Embedded 2 Input Ch.1-4 to Ch.13-16
AES Input Ch.1-4
AES Input Ch.5-8
Option(AES) Input Ch.1-4
Option(AES) Input Ch.5-8
Option(Analog) Input Ch.1-4
Option(MADI) Input Ch.1-4 to Ch.61-64
Option(Dante) Input Ch.1-4 to Ch.29-32</td><td rowspan="8">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.

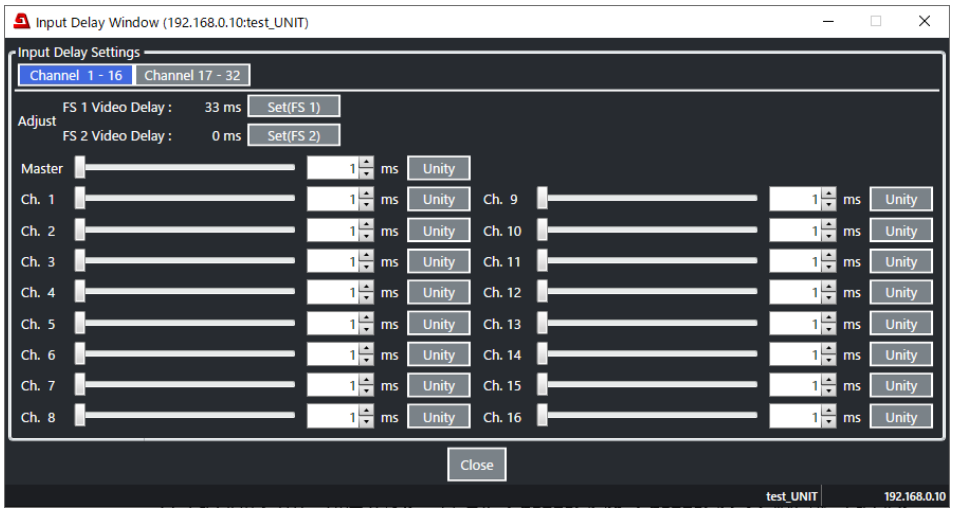
Option(MADI) Ch.1-64: Require FA-96MADI.

Option(Dante) Input Ch.1-32: Require FA-96DNT.</td></tr>
<tr><td>Ch.5-8</td><td>Embedded 1 Input Ch.5-8</td></tr>
<tr><td>Ch.9-12</td><td>Embedded 1 Input Ch.9-12</td></tr>
<tr><td>Ch.13-16</td><td>Embedded 1 Input Ch.13-16</td></tr>
<tr><td>Ch.17-20</td><td>Embedded 2 Input Ch.1-4</td><td rowspan="4">Embedded 1 Input Ch.1-4 to Ch.13-16
Embedded 2 Input Ch.1-4 to .13-16
Option(Analog) Input Ch.1-4
Option(MADI) Input Ch.1-4 to Ch.61-64
Option(Dante) Input Ch.1-4 to .29-32</td></tr>
<tr><td>Ch.21-24</td><td>Embedded 2 Input Ch.5-8</td></tr>
<tr><td>Ch.25-28</td><td>Embedded 2 Input Ch.9-12</td></tr>
<tr><td>Ch.29-32</td><td>Embedded 2 Input Ch.13-16</td></tr>
</table>

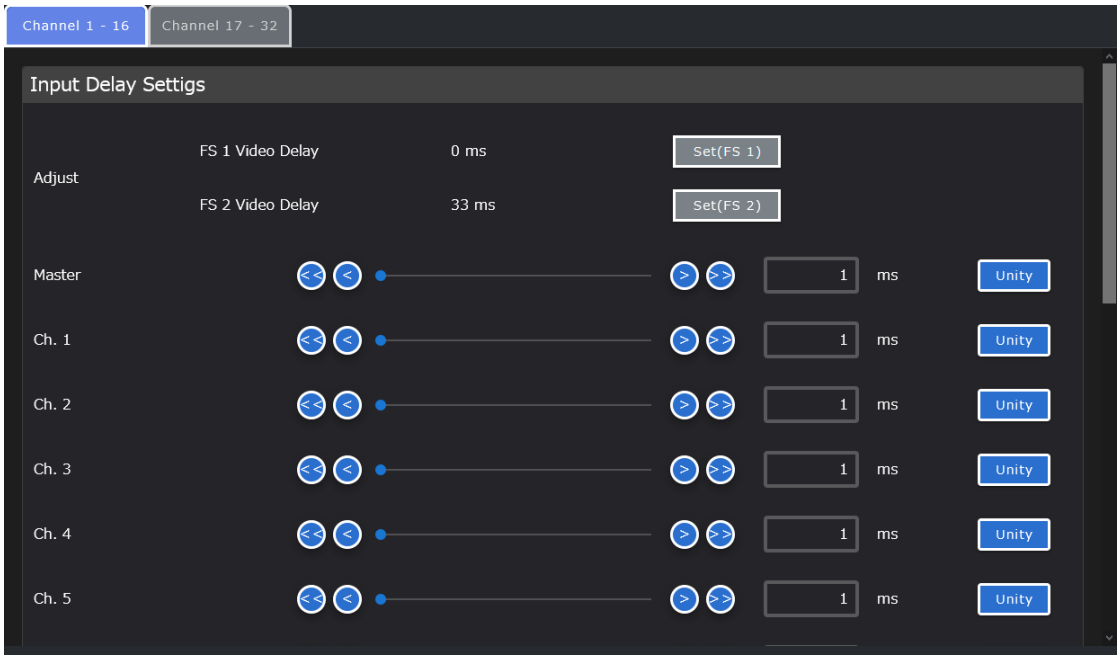
12-3-3. Input Delay

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

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)



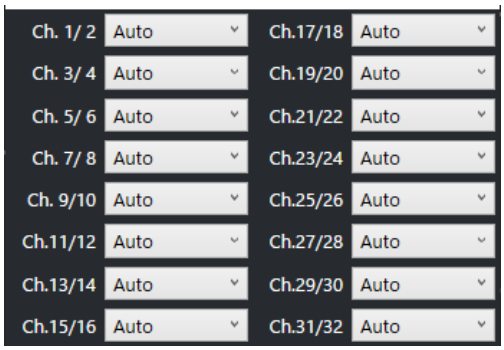
Allows you to add delay to the selected 32 audio source channels by using the **Channel 1-16** and **Channel 17-32** buttons to switch channels.

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.

12-3-4. Sampling Rate Converter

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

[Windows GUI]



[Web GUI]

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 and Dante 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. 12-3-9.)

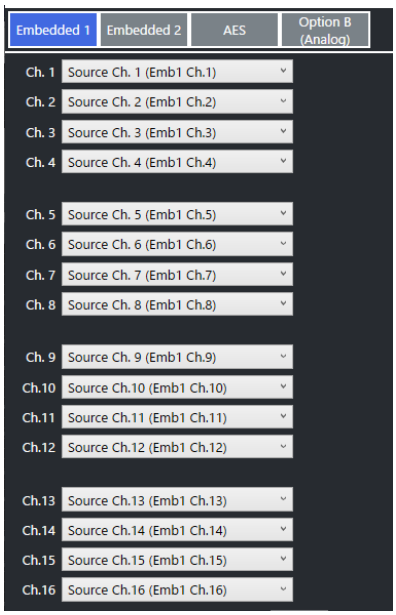
Pass audio channels through the SRC if they are used for HDMI, analog or MADI and Dante output.

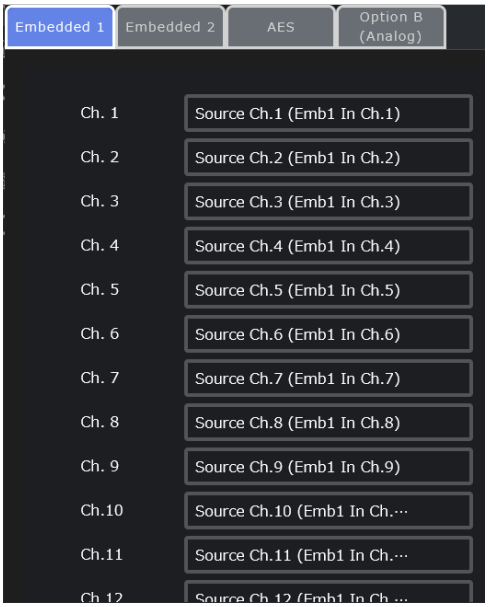
12-3-5. Output Mapping

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

For FS1 SDI embedded audio, click **Embedded 1**.
For FS2 SDI embedded audio, click **Embedded 2**.
For AES audio of standard and FA-96AES-UBLC option, click **AES**.
For FA-96AES-UBL, FA-96ANA-AUD, FA-96MADI or FA-96DNT, click **Option B**.

[Windows GUI] **[Web GUI] (Scrolling up and down to go through the page.)**





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		
Option B(Dante) Ch.1-32 (FA-96DNT)	Source Ch.1-32		

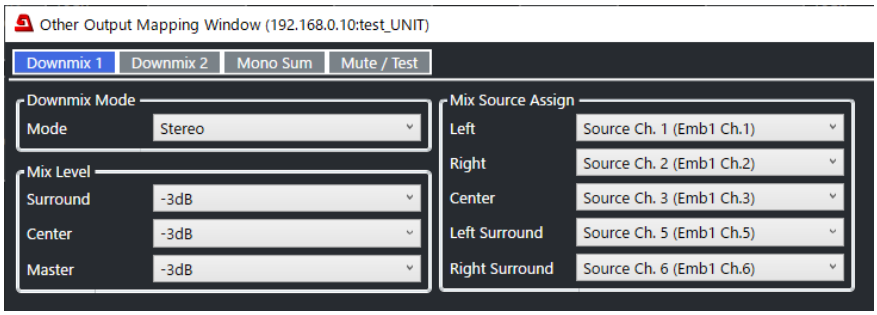
(*1) Channel names shown in parentheses after channel numbers indicate original audio input names. Sec. 12-3-2. “Source Select.”

12-3-6. Mono Sum/Downmix/Mute/Test Signal

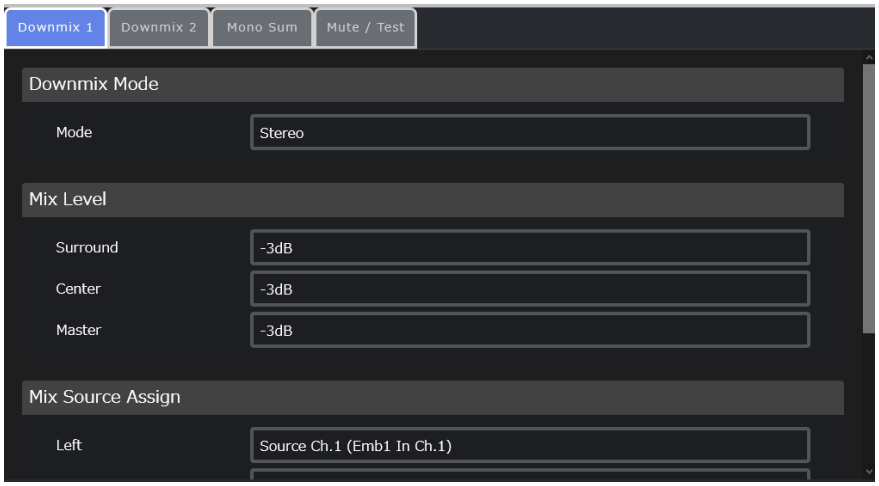
Click **Mono Sum Downmix Mute Test signal** in the Audio Block to display the Other Output Mapping menu. Use **Downmix 1**, **Downmix 2**, **Mono Sum** or **Mute/Test** to open submenus.

12-3-6-1. If Downmix 1 or Downmix 2 Selected

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)



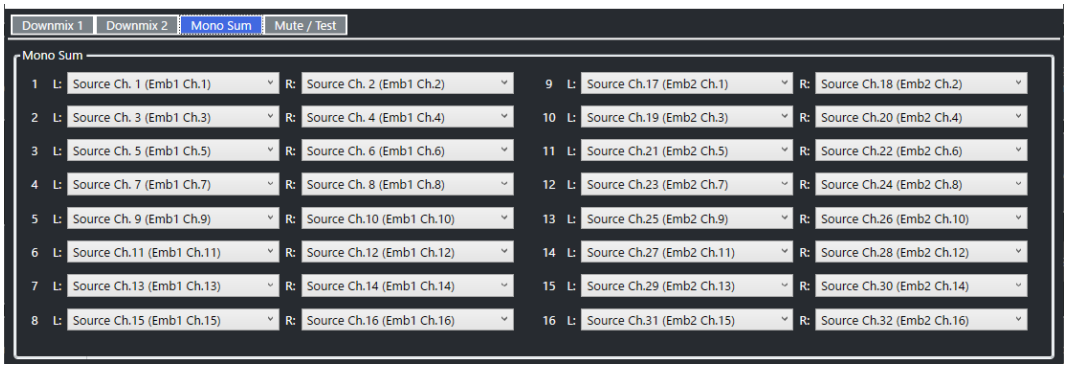
Item	Default	Setting	Description
Downmix Mode	Stereo	Stereo Surrou nd Monau ral	Selects the Downmix mode.
Mix Level Surround	-3dB	-3dB -6dB -9dB Off	Sets the Ls/Rs (Surround channels) level. Setting to **Off** removes the Ls/Rs channels from mixing sources.
Mix Level Center	-3dB	-3dB -4.5 dB -6dB	Sets 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		

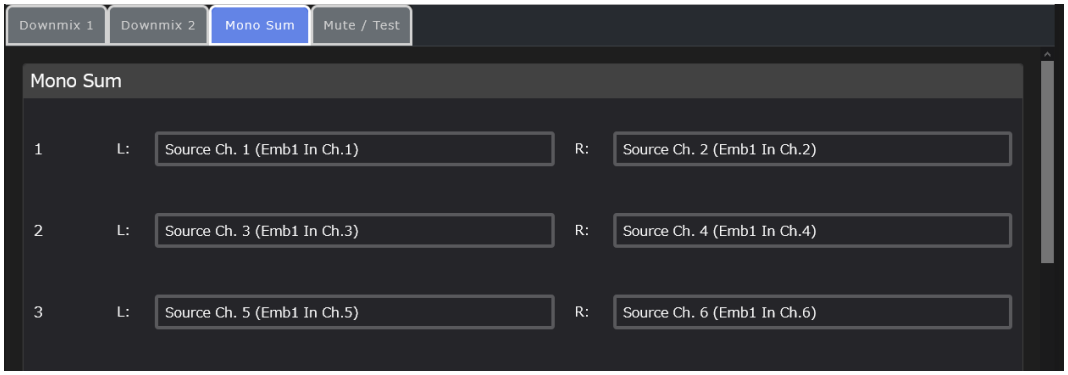
(*1) Channel names shown in parentheses after channel numbers indicate original audio input names. Sec. 12-3-2. “Source Select.” See Sec. 6-9 "AUDIO DOWNMIX 1 and 2."

12-3-6-2. If Mono Sum Selected

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)

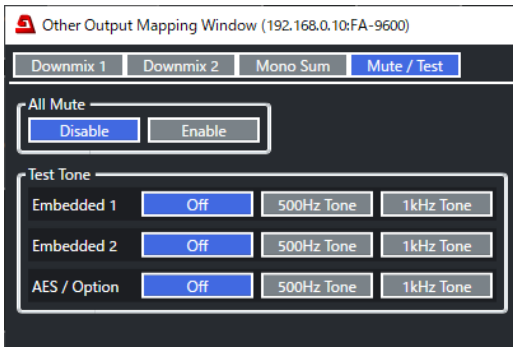


Item	Default	Setting	Description
Mono Sum 1-16 L	Source Ch.1-31 (Odd channel)	Source Ch. 1-32 (*1)	Selects an audio source channel input to each Mono Sum L and R.
Mono Sum 1-16 R	Source Ch.2-32 (Even channel)		

(*1) Channel names shown in parentheses after channel numbers indicate original audio input names. Sec. 12-3-2. “Source Select.” See Sec. 6-9 "AUDIO DOWNMIX 1 and 2."

12-3-6-3. If Mute / Test Selected

[Windows GUI]



[Web GUI]

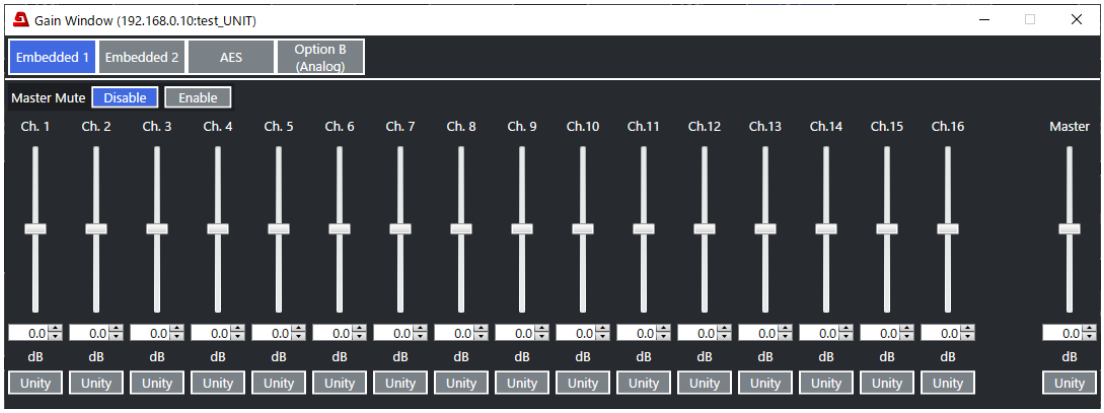
Item	Default	Setting	Description
All Mute	Disable	Disable Enable	Allows you to mute all output audio channels.
Test Tone Embedded 1	Off	Off 500Hz Tone 1kHz Tone	Allows you to assign an audio test signal to the embedded audio on the FS1 SDI output.
Test Tone Embedded 2	Off		Allows you to assign an audio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

12-3-7. 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.

For FS1 SDI embedded audio, click **Embedded 1**.
For FS2 SDI embedded audio, click **Embedded 2**.
For AES audio of standard and FA-96AES-UBLC option, click **AES**.
For FA-96AES-UBL, FA-96ANA-AUD, FA-96MADI or FA-96DNT, click **Option B**.

[Windows GUI]



[Web GUI] (Scrolling up and down to go through the page.)

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.

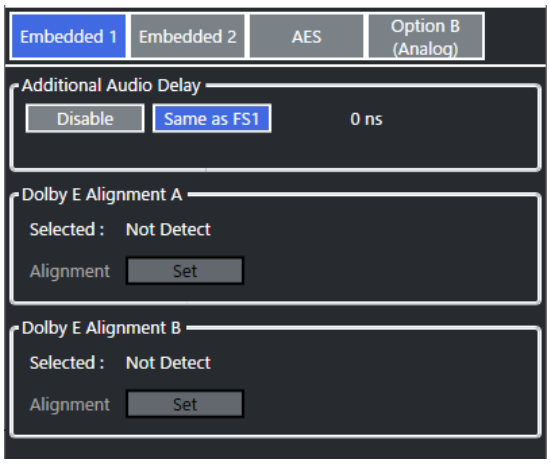
12-3-8. Audio Delay (FS 1 / FS 2 / AES / Option)

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.

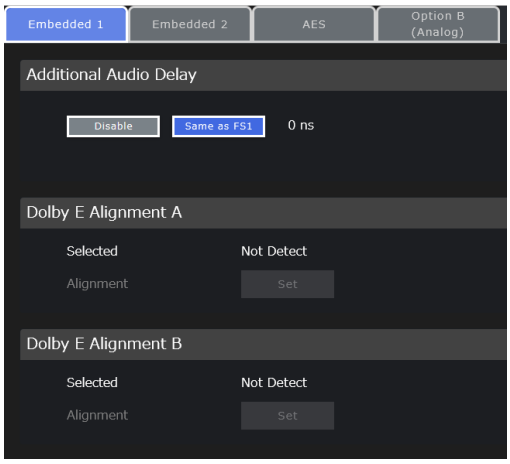
For FS1 SDI embedded audio, click **Embedded 1**.
For FS2 SDI embedded audio, click **Embedded 2**.
For AES audio of standard and FA-96AES-UBLC option, click **AES**.
For FA-96AES-UBL, FA-96ANA-AUD, FA-96MADI or FA-96DNT, click **Option B**.

12-3-8-1. Embedded Audio

[Windows GUI]



[Web GUI]



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. If Audio Delay function has no effect due to format conversion, a message “Cannot use with current I/O formats” is displayed.
Additional Audio Delay	Same as FS2	Disable Same as FS2	(See above.)

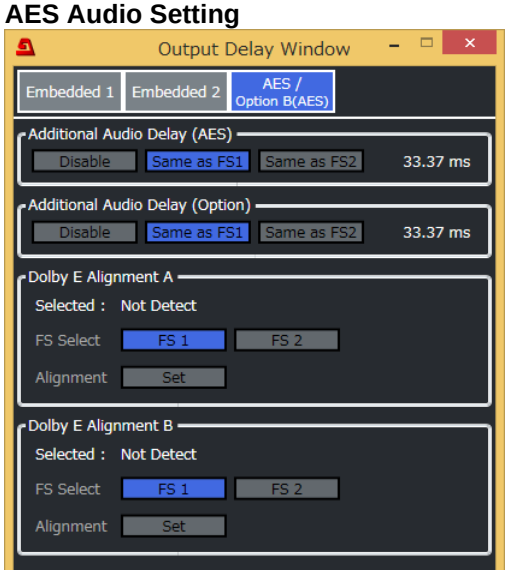
Item		Description
Dolby E Alignment A	Selected	Displays the channel number and status of audio source automatically assigned to Dolby E Alignment. (1st system)
	Set	Pressing the button adjusts the audio delay.
Dolby E Alignment B	Selected	Displays the channel number and status of audio source automatically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

See Sec. 6-26. “Dolby E ALIGNMENT” for more details.

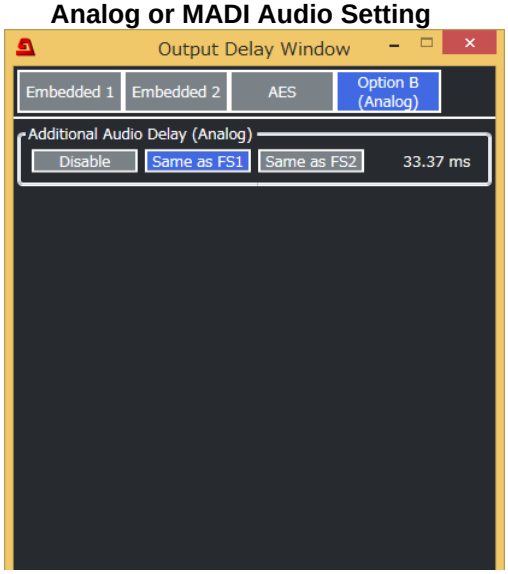
12-3-8-2. AES / Analog / MADI / Dante Audio

[Windows GUI]

AES Audio Setting

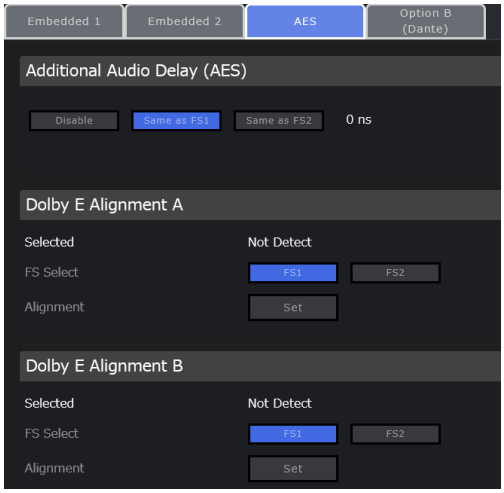


Analog or MADI Audio Setting

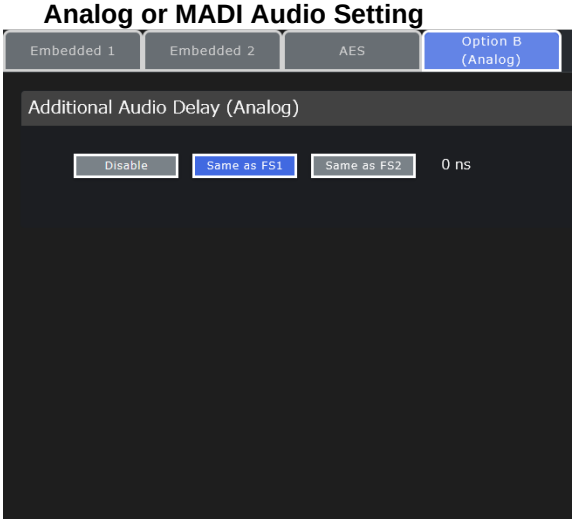


[Web GUI]

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. If Audio Delay function has no effect due to format conversion, a message “Cannot use with current I/O formats” is displayed.
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)
Additional Audio Delay(Dante)			Optional Dante 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.

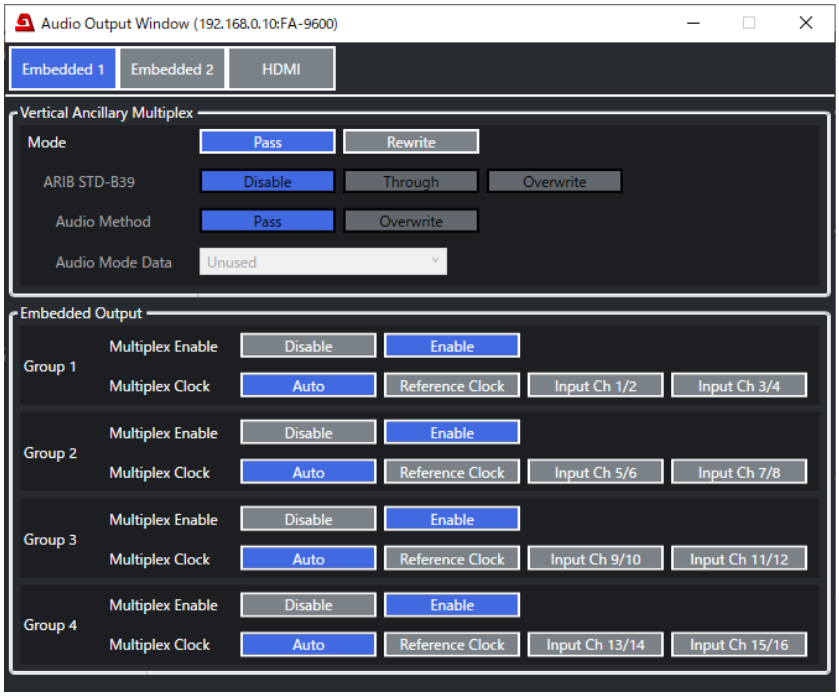
See Sec. 6-26. “Dolby E ALIGNMENT” for more details.

12-3-9. Audio OUT (FS 1 / FS 2 / HDMI / Option)

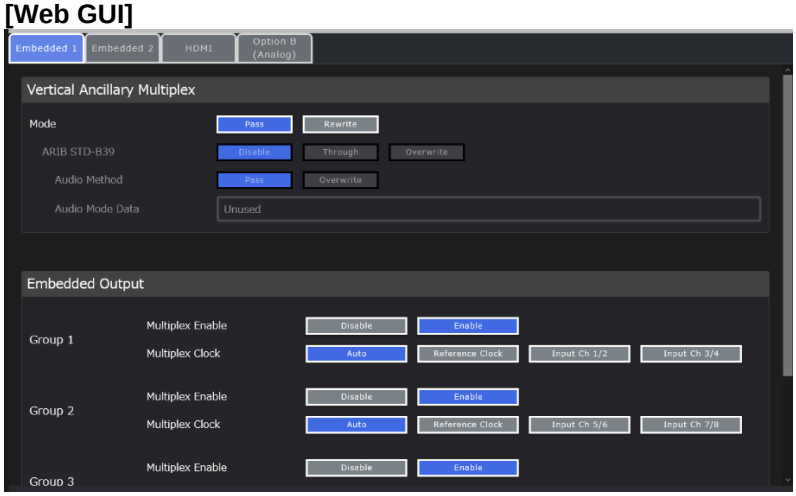
Click **FS 1 OUT**, **FS 2 OUT**, **HDMI OUT** or **Output OUT** in the Audio Block to display the Audio Output Window, in which audio output can be set.

12-3-9-1. Embedded Audio

[Windows GUI]



[Web GUI]



Vertical Ancillary Multiplex

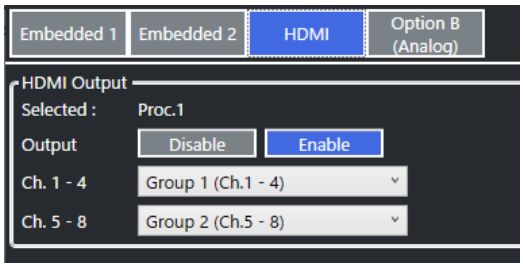
Item	Default	Setting	Description
Mode	Pass	Pass Rewrite	Selects VANC data insertion mode. See the Mode setting in Vertical Ancillary Multiplex (Sec. 12-2-6-1. "If Multiplexer Selected.")
ARIB STD-B39	Overwrite	Disable Through Overwrite	Selects the ARIB STD-B39 payload identifier insertion mode. See the ARIB STD-B39 setting in Vertical Ancillary Multiplex (Sec. 12-2-6-1. "If Multiplexer Selected.")
Audio 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.
Audio Mode Data	Unused	(See Sec. 6-4)	Selects the Audio Mode data from the table in Sec 6-4.

Embedded Output

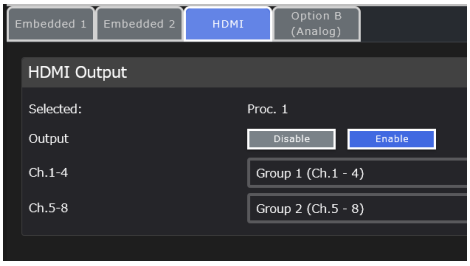
Item	Default	Setting	Description
Group1-4 Multiplex Enable	Enable	Disable Enable	**Disable:** Inserts no audio channels. **Enable:** Inserts audio channels.
Group1-4 Multiplex Clock	Auto	Auto Reference Clock Input Ch X/X Input Ch X/X	Selects a reference clock for each audio group that is used for SDI 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). **Input 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.

12-3-9-2. HDMI Audio

[Windows GUI]



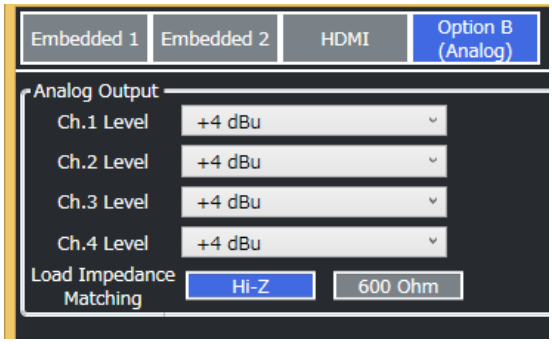
[Web GUI]



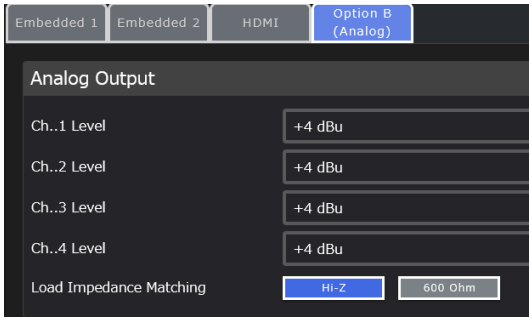
Item	Default	Setting	Description
Selected	-	-	Displays a process to which the HDMI output belongs (Proc.1 or Proc.2).
Output	Enable	Disable Enable	Enables/disables HDMI audio output.
Ch.1 - 4	Group 1(Ch.1-4)	Group 1(Ch.1-4) Group 2(Ch.5-8) Group 3(Ch.9-12) Group 4(Ch.13-16)	Selects audio sources per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

12-3-9-3. Analog Audio

[Windows GUI]



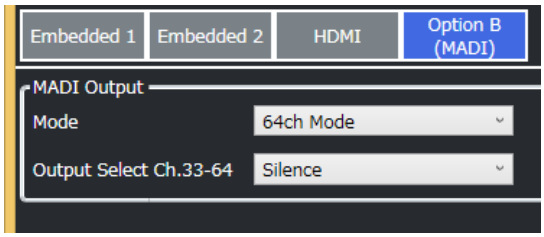
[Web GUI]



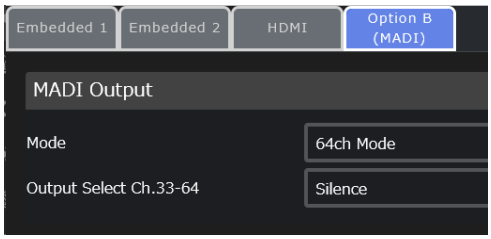
Item	Default	Setting	Description
Ch.1-4 Level	+4 dBu	-10 dBu 0 dBu +4 dBu +8 dBu	Sets the audio level for each analog output channel.
Load Impedance Matching	Hi-Z	Hi-Z 600 Ohm	Sets the input impedance of the downstream device that receives the analog audio signals from FA-9600. FA-9600 adjusts the audio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

12-3-9-4. MADI Audio

[Windows GUI]



[Web GUI]



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.

12-3-10. Audio System

Click **Audio System** in the Audio Block to set audio output signals.

12-3-10-1. Common Settings

[Windows GUI]

[Web GUI]

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.

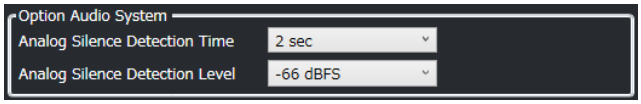
Error Fade	Disable	Disable Enable	Selects the way to handle output audio when an error is detected in the input audio. **Disable:** Passes through input audio without using any effects. **Enable:** Fades out and mutes audio when an input error is detected and fades in when recovered. (*2)
Silence Detection 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 input delay (See Sec. 12-3-3. “Input Delay”) must be set to 5 ms or more.

12-3-10-2. Analog Audio

[Windows GUI]

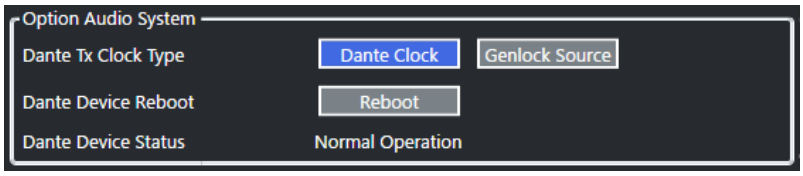


[Web GUI]

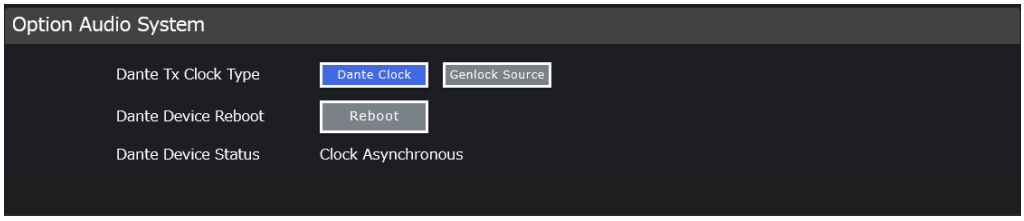
Item	Default	Setting	Description
Silence Detection Time	2 sec	1-10 sec	Sets the duration to determine analog audio input is silent.
Silence Detection Level	-66 dBFS	-66 dBFS -60 dBFS -54 dBFS -48 dBFS	Sets the audio level to determine the analog audio input is silent.

12-3-10-3. Dante Audio

[Windows GUI]



[Web GUI]

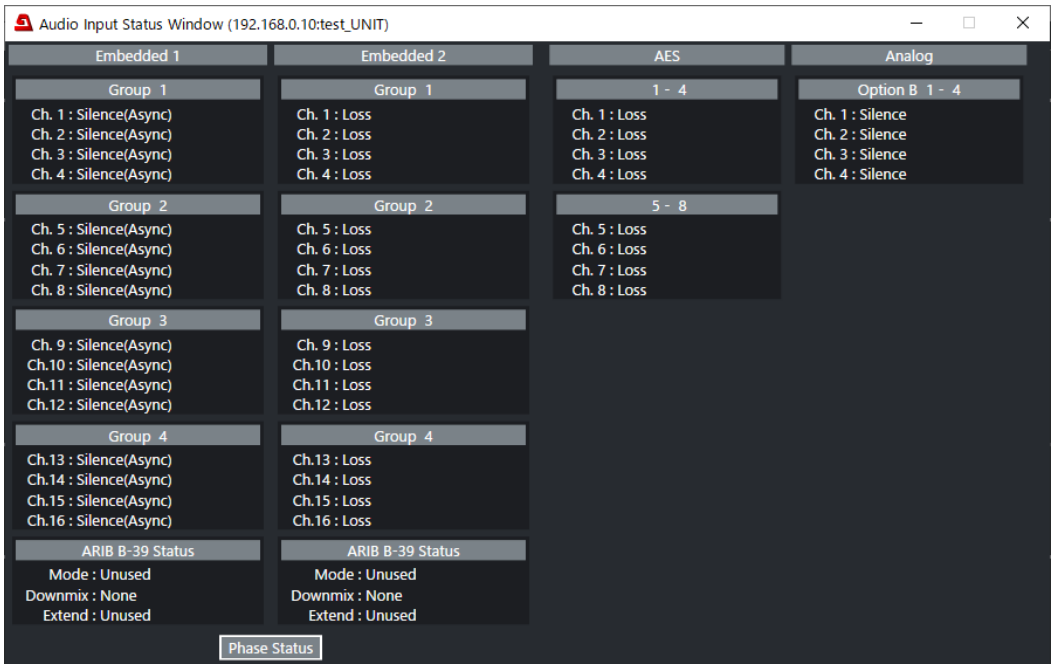


Item	Default	Setting	Description
Dante Tx Clock Type	Dante Clock	Dante Clock Genlock Source	**Dante Clock**: Transmits Dante audio synced with the Dante network. **Genlock Source**: Transmits Dante audio synched with the SDI output. To use this setting, set Clock Settings for FA-9600 to **Enable Sync to External** in the Dante Controller.
Dante Device Reboot	–		Reboots the Dante device (FA-9600). Use this if reboot is required by changes in Dante Controller.
Dante Device Status	Normal operation Clock asynchronous Reset state Failsafe mode		Displays the FA-9600 status as a Dante device. **Clock asynchronous** indicates the device operates normally, but is not synced with the Dante network clock. **Reset state** indicates rebooting or sleeping

12-3-11. Input Status

Click **Input Status** in the Audio Block to display the audio channel output status.

[Windows GUI]



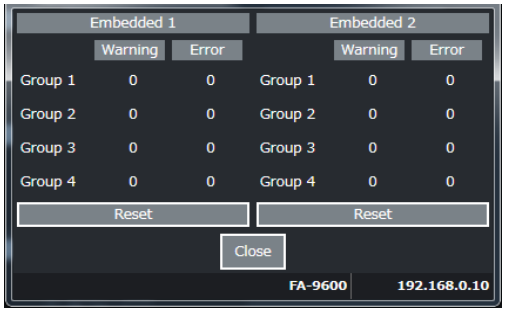
[Web GUI] (Scrolling up and down to go through the page.)

- 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.
- FA-96DNT audio status is displayed under Dante (Option B).
  Clicking **Input Detail** allows you to check each channel status.

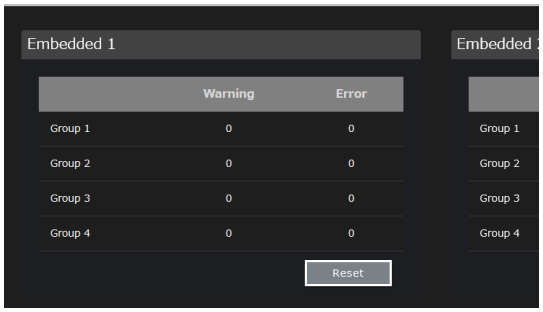
12-3-11-1. Phase Status

Click **Phase Status** in the **Input Status** window displays the audio output phase status.

[Windows GUI]



[Web GUI]



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.

12-3-12. Output Status

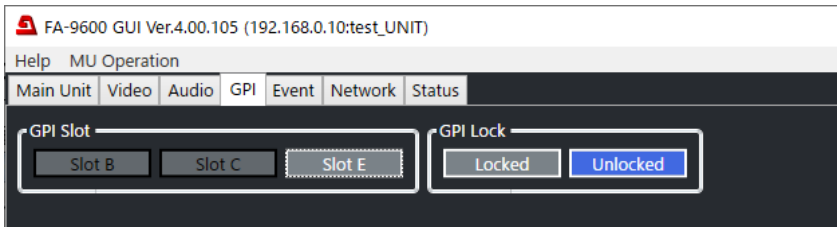
Click **Output Status** in the Audio Block to display the audio channel output status.

- 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.
- FA-96DNT audio status is displayed under Dante (Option B)
  Clicking **Output Detail** allows you to check each channel status.

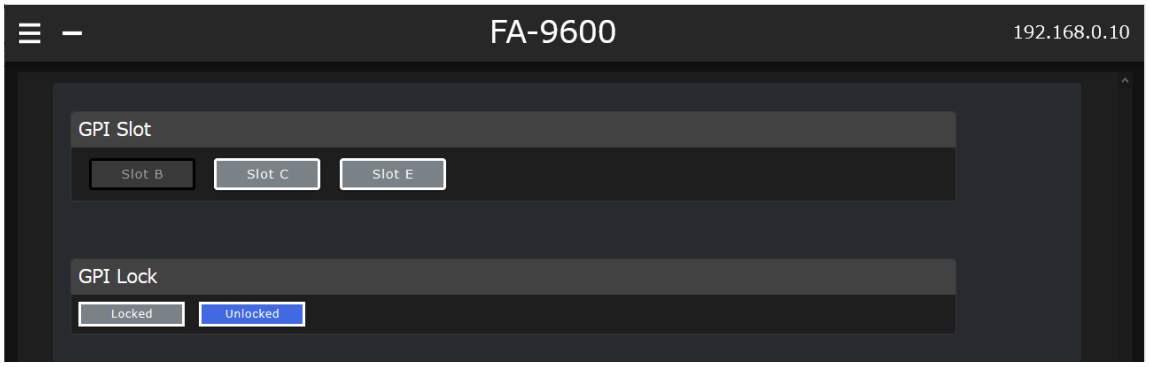
12-4. GPI Settings

Click the **GPI** tab in the GUI screen to display the menu as shown below.

[Windows GUI]



[Web GUI]



◆ **GPI Slot**

The FA-96GPI installed slot is active (Slot C and E in the above example) in the menu.
Click the active slot to display the setting screen. (See Sec. 12-4-1. GPI Setting Screen.”)

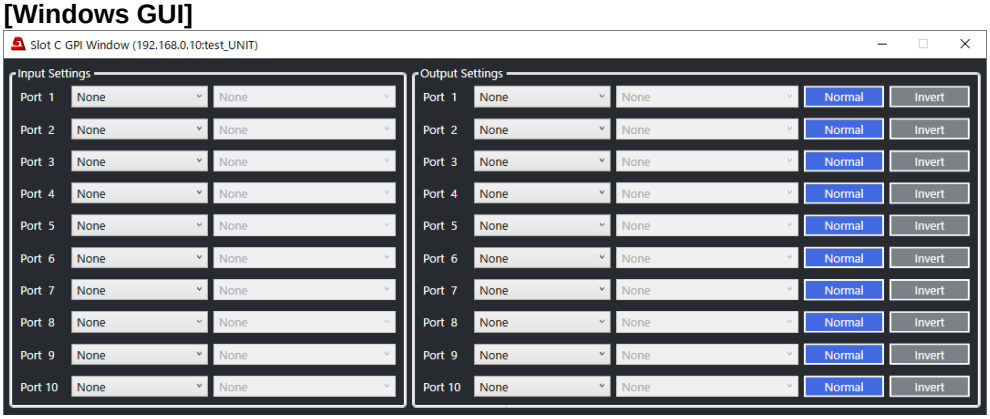
◆ **GPI Lock**

If setting to **Locked**, GPI inputs are disabled.
To unlock GPI control using the GUI, click **Unlocked** in the GPI tab menu.
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.

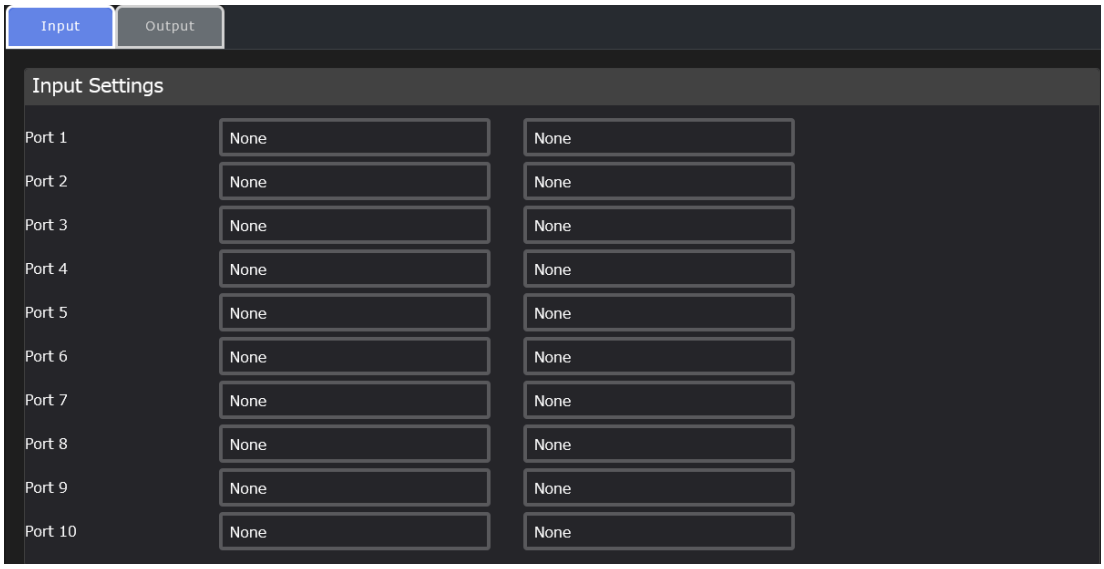
12-4-1. GPI (Slot B or Slot C)

Click **Slot B** or **Slot C** in the **GPI** tab to display the setting menu.

[Windows GUI]



[Web GUI]



◆ **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**

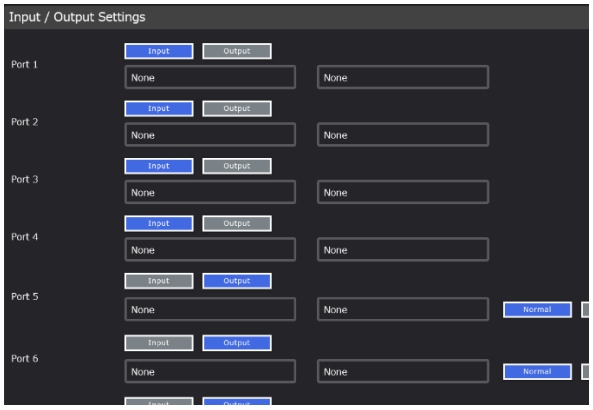
Port 1-10	None	None Unit Alarm Video In Audio In Event Tally	Assigns output functions to GPI pins. **None**: No function **Unit Alarm**: Selects alarms for status notification. **Video In**: Selects a video input for status notification. **Audio In**: Selects an audio input for status notification. **Event 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

12-4-2. GPI (Slot E)

Click **Slot E** in the **GPI** tab to display the setting menu.

[Windows GUI]

[Web GUI] (Scrolling up and down to go through the page.)



◆ **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**

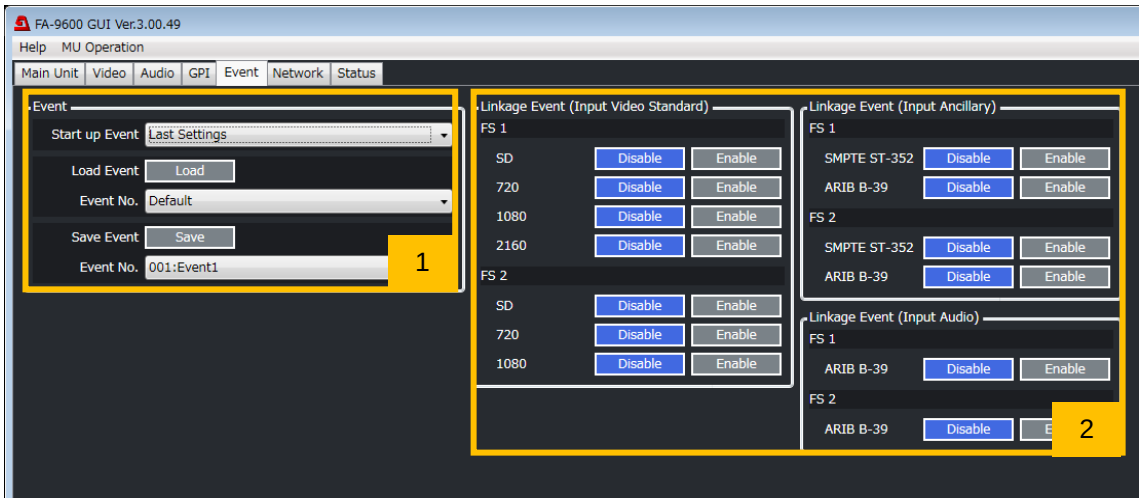
Port 1-7	None	None Unit Alarm Video In Audio In Event Tally	Assigns output functions to GPI pins. **None**: No function **Unit Alarm**: Selects alarms for status notification. **Video In**: Selects a video input for status notification. **Audio In**: Selects an audio input for status notification. **Event 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

12-5. Event Operation

Windows and Web GUI event menus. Some functions such as Import and Export events are available only on the Web GUI.

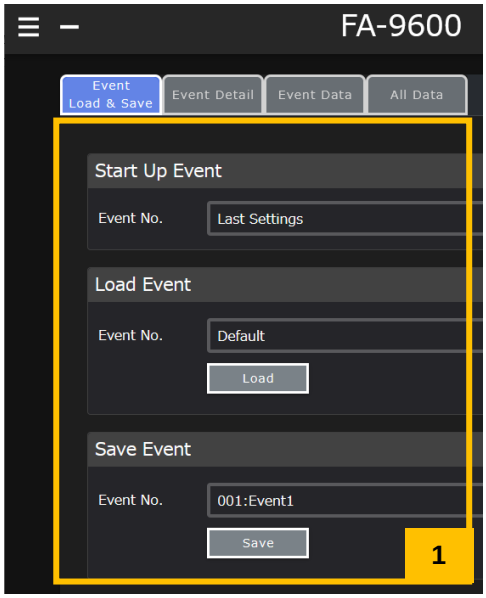
- Frame 1 menus (**Start up Event, Event Load, Event Save**) in the figures below are **common** to the Windows GUI and Web GUI.
- Frame 2 menus (**Linkage Event**) are **common** to the Windows GUI and Web GUI.
- Frame 2 menu (**Event Save Limit**) is available **only on the Web GUI**.
- Menus in the **Event Data** and **All Data** tabs are available **only on the Web GUI**.

[Windows GUI]
Click the **Event** tab in the GUI screen to display the event operation menu.

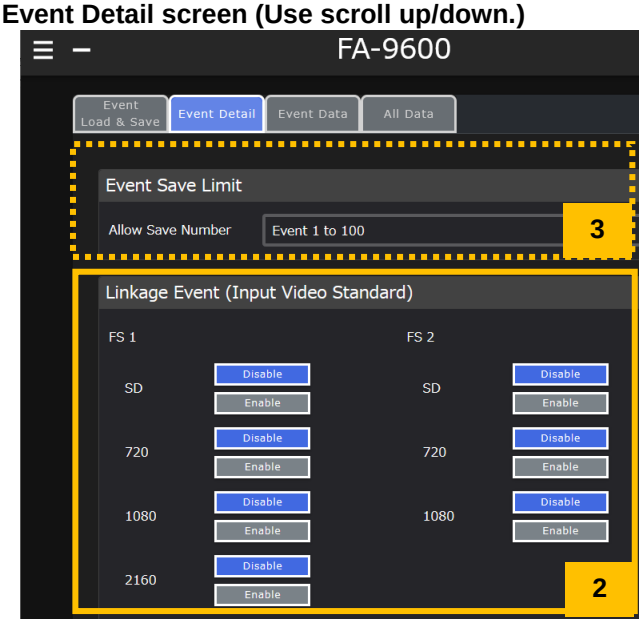


[Web GUI]
Click **Utility** in the page list to display the event operation menu.

Event Load & Save screen



Event Detail screen (Use scroll up/down.)



12-5-1. Start Up Event / Event Load / Event Save

The Event feature of FA-9600 allows you to save almost all current setting states in FA-9600 to an Event memory buffer. Up to 100 events can be stored. Once an event (all settings of FA-9600) is stored to the event memory, FA-9600 can be restored to the states when the event was saved by loading the 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.

12-5-2. Linkage Event

Linkage Event (Input Video Standard)
Linkage Event (Input Ancillary)
Linkage Event (Input Audio)

To use auto (linkage) event load, a corresponding event should be created and uploaded in advance. (See Sec. 12-5-4-2 “Uploading Linkage Events.”)

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. (FA-964K required) (Ineffective for Dual HD mode)
	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. 12-3-11. “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.

12-5-3. Event Save Limit (Web GUI)

This menu allows you to restrict the available event numbers. Click the **Event Detail** tab in the **Event** page to display the menu.

Event Save Limit is enabled under the following Event Save operations:

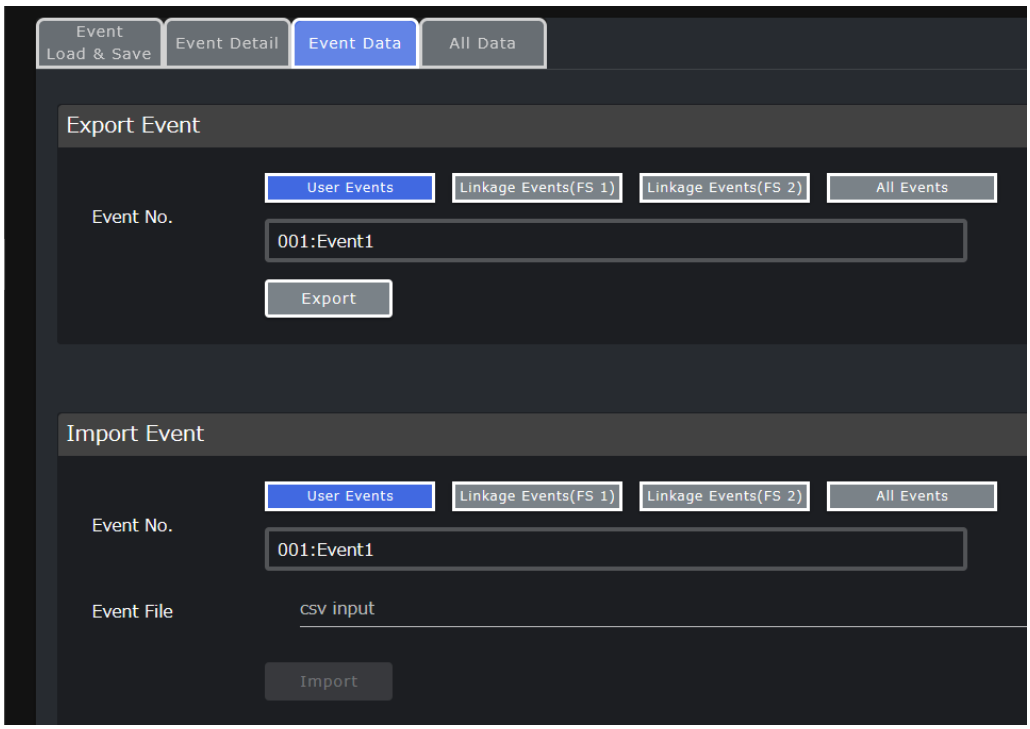
- Saving events on the FA-9600 front panel
- Saving events in the Windows GUI / Web GUI
- Saving events on the Remote controller (FA-10RU) front panel
  (Only for events saved in FA-9600)

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.

12-5-4. Event Import / Event Export (Web GUI)

This menu allows you to import and export event data. Click the **Event Data** tab in the **Event** page to display the menu.



12-5-4-1. Importing / Exporting Events

◆ **Event Export (User Events / All Events buttons)**

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 （User Events/All Events button）**

Replace FA-9600 event data with local data stored in files.

▶ See “Appendix 2: Event Data List” for details on event data.

▶ See Sec 13. “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.

- In macOS, “All events data import” may not be correctly processed by web browsers except Chrome. Even in such cases, each event data import is possible by unzipping exported all events data and extracting an individual data (csv file) from it. To manage all events data in a single action, use the backup and restore function of all data. (See 12-5-5. “All Data (Web GUI).”)
- 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. 13. “Event Data (CSV File)” for more details on file editing.

12-5-4-2. Uploading Linkage Events

Linkage events means:

Events that can be automatically loaded setting data according to the input signal information. See the following sections for more details on linkage events.

INPUT LINKAGE PROCESS (VIDEO) (See Sec. 5-16.)
INPUT LINKAGE PROCESS (AUDIO) (See Sec. 5-17.)
VIDEO PAYLOAD ID LINKAGE (See Sec. 5-28.)

Operation Example 1: Linking with Video Format

The procedure example below shows how to automatically load an appropriate event when 2160-line signal is 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 2: Event Data List” for details on event data.
    ▶ See Sec 13. “Event Data (CSV File)” for details on event data editing.
(3) Open the **Web GUI** and go to **Utility > Event Data** page.
(4) Press the **Linkage Events(FS1)** button in the **Event Import** block. Select **F1 Video Standard >> F1 2160 Lines** as an upload destination in the context menu. See the table below for more details on upload destinations.
(5) Select the created event (csv) file under Event File.
(6) Click **Import** to save the linkage 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.

Front panel Menu	Linked item	Upload destination (Event Import setting in Web GUI)	Sample event data
INPUT LINKAGE PROCESS (VIDEO)	Video Standard ＋ SD		
	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)	Colorimetry +		Rec.709 and Rec.2020 sample data supplied on the CD-ROM (*2)
	Rec.709	SDR, HLG and PQ and sample data supplied on the CD-ROM (*2)	
	VANC	F1 Colorimetry >> F1 VANC	
	UHDTV	F1 Colorimetry >> F1 UHDTV	
	Unknown	F1 Colorimetry >> F1 Unknown	
	Transfer characteristics +		SDR, HLG and PQ sample data supplied on the CD-ROM (*2)
	SDR TV	F1 Transfer characteristics >> F1 SDR-TV	
	HLG	F1 Transfer characteristics >> F1 HLG	
	PQ	F1 Transfer characteristics >> F1 PQ	
	Unspecified	F1 Transfer characteristics >> F1 Unspecified	
INPUT LINKAGE PROCESS (AUDIO)	ARIB STD-B39 Audio Mode +		
	M	F1 ARIB STD-B39 Audio Mode >> F1 M	
	2M(D)	F1 ARIB STD-B39 Audio Mode >> F1 2M(D)	
	|	|	
	22.2+5.1	F1 ARIB STD-B39 Audio Mode >> F1 22.2+5.1	
	22.2+5.1+S	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

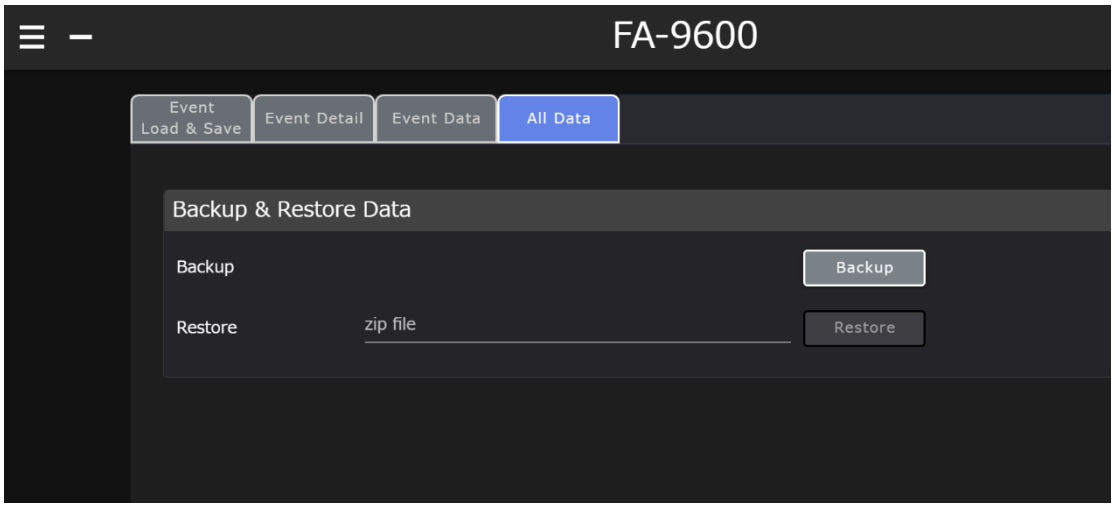
Operation Example 2: Linking with Video Payload ID Information

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**. (Or, set to **Enable** in the Windows GUI Event tab or Utility > Event Detail tab in the Web GUI.)
(2) Open the **Web GUI** and go to **Utility > Event Data** page.
(3) Press the **Linkage Events(FS1)** button in the **Event Import** block. Select **F1 Colorimetry >> F1 UHDTV** as an upload destination in the context menu. See the table above for more details on upload destinations.
(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 13. “Event Data (CSV File)” for event data editing.)
(5) Click **Import** to save the event in the FA-9600.

12-5-5. All Data (Web GUI)

Allows you to backup and restore all current settings of FA-9600.



Backing up FA-9600 Settings

Click **Backup**. In some seconds, all current settings of the FA-9600 are stored in the backup file named "fa9600_parameter.zip."

Restoring Settings to FA-9600

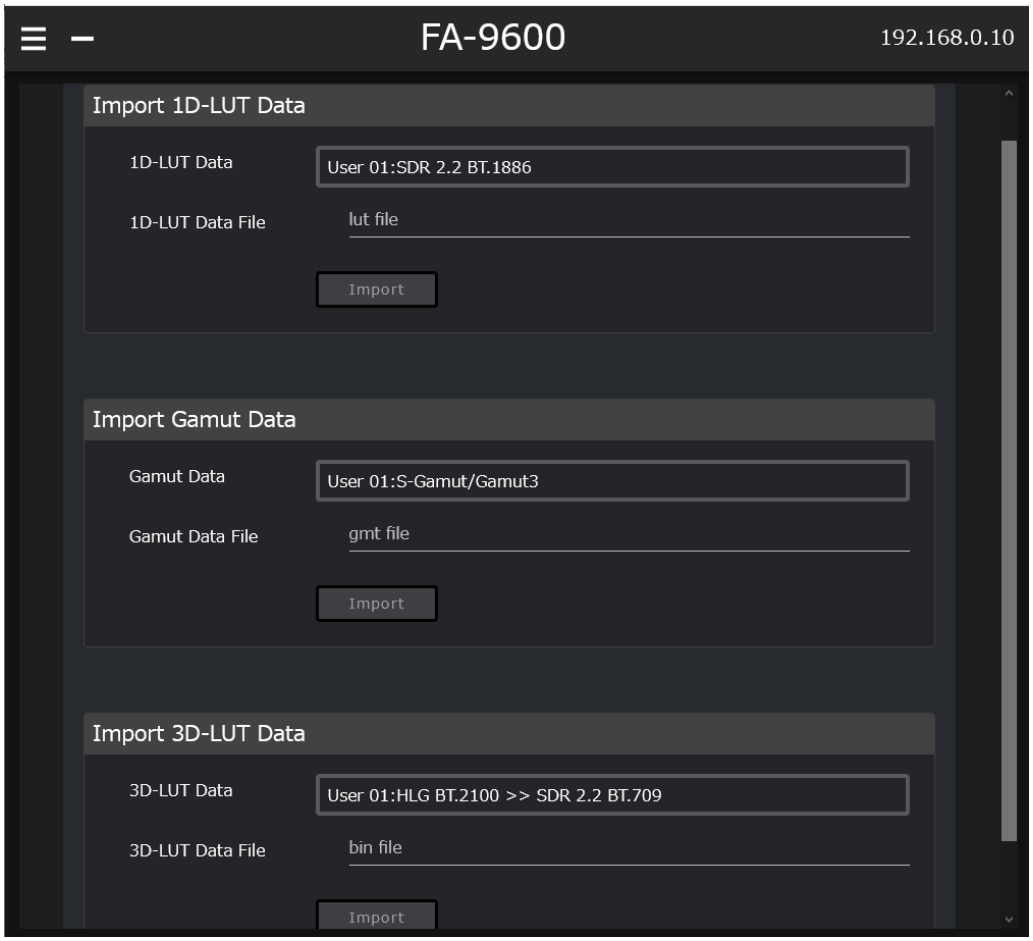
(1) Click a **zip file** to specify the backup file.
(2) Click **Restore**.
(3) When the message window prompting the restart appears, restart the FA-9600 to restore all settings.

IMPORTANT

Restoring settings from the backup file require the FA-9600 restart. Before restoring from backup, remember that all data including network settings and event memory data is changed after restoration.

12-6. Data Page (Web GUI)

Click **Data** in the Web GUI page list to display the menu.



Allows you to import the following data from Web GUI to FA-9600.

1D-LUT data (User 1-10)
>> See Gamma Curve(EOTF/OETF in Sec. 5-4. “INPUT / OUTPUT GAMMA / COLOR.”
Gamut data (User 1-5)
>> See **Color Space** in Sec. 5-4. “INPUT / OUTPUT GAMMA / COLOR.”
3D-LUT data (User 1-13)
>> See **3D-LUT** in Sec. 5-7 “IN/OUT GAMMA/COLOR.”

◆ **1D-LUT Data Import**

Upload local gamma curve data stored as a 1D-LUT (lut file) to FA-9600.
(1) Click **Browse…** to select a lut file.
(2) Select a User 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 number.
(3) Click **Import** to upload the file data to the selected number.

◆ **3D-LUT Data Import (FA-96AHDR/ADHR2 required)**

Upload local 3D-LUT data stored as a bin file to FA-9600.

(1) Click **Browse…** to select a bin file.
(2) Select a User number.
(3) Click **Import** to upload the file data to the selected number.

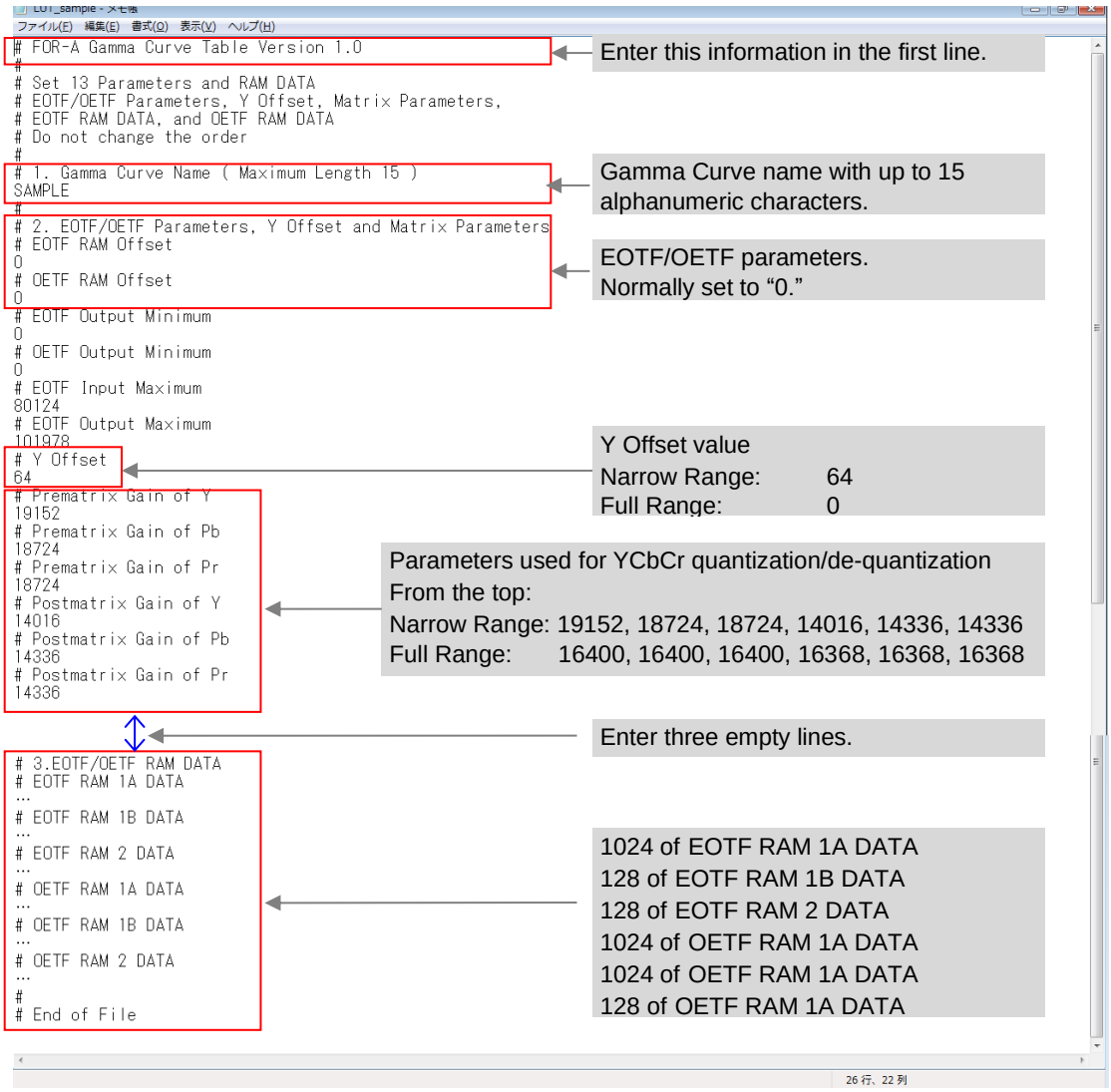
12-6-1. LUT and GMT Files

Lut (1D-LUT) and gmt (Gamut) files referred in Sec. 12-6. “Data Page (Web GUI)” 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.

◆ **1D-LUT**

A 1D-LUT 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

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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.

Excerpted from https://www.itu.int/dms_pubrec/itu-r/rec/bt/R-REC-BT.709-6-201506-I!!PDF-E.pdf

2 Picture characteristics

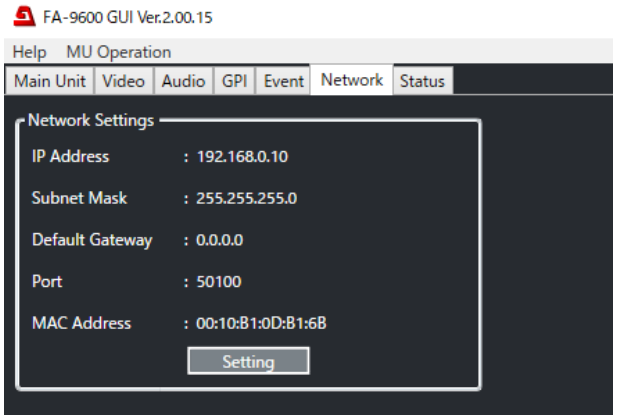
Item	Parameter	System Values
2.1	Aspect ratio	16:9
2.2	Samples per active line	1 920
2.3	Sampling lattice	Orthogonal
2.4	Active lines per picture	1 080
2.5	Pixel aspect ratio	1:1 (square pixels)

12-6-2. BIN (3D-LUT) File

BIN (3D-LUT) files referred in Sec. 12-6. “Data Page (Web GUI)” can be created using the LUT Converter software provided in the supplied CD-ROM. See the “LUT Converter” separate manual for more details.

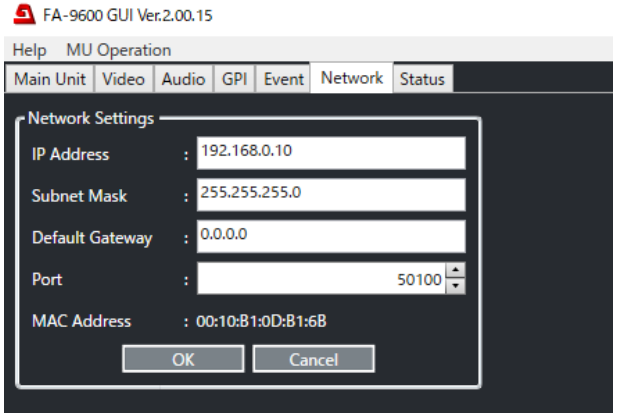
12-7. Network Settings (Windows GUI)

Click the **Network** tab in the GUI screen to display the menu as shown below.
The current network settings are displayed in the screen.



Item	Default	Description
IP Address	192.168.0.10	IP address, netmask and default gateway of FA-9600 LAN port.
Subnet Mask	255.255.255.0	
Default Gateway	0.0.0.0	
Control Port	50100	TCP port number used for Windows GUI or Remote Control Unit connection.
Ext. Control Port	60000	UDP port number used for sessions with external devices (for sending status change messages and event tallies)

Click **Setting** displays the following menu and allows you to change network settings.



After changing settings, click **OK**. A confirmation dialog will appear.
Click **OK** to confirm changes.

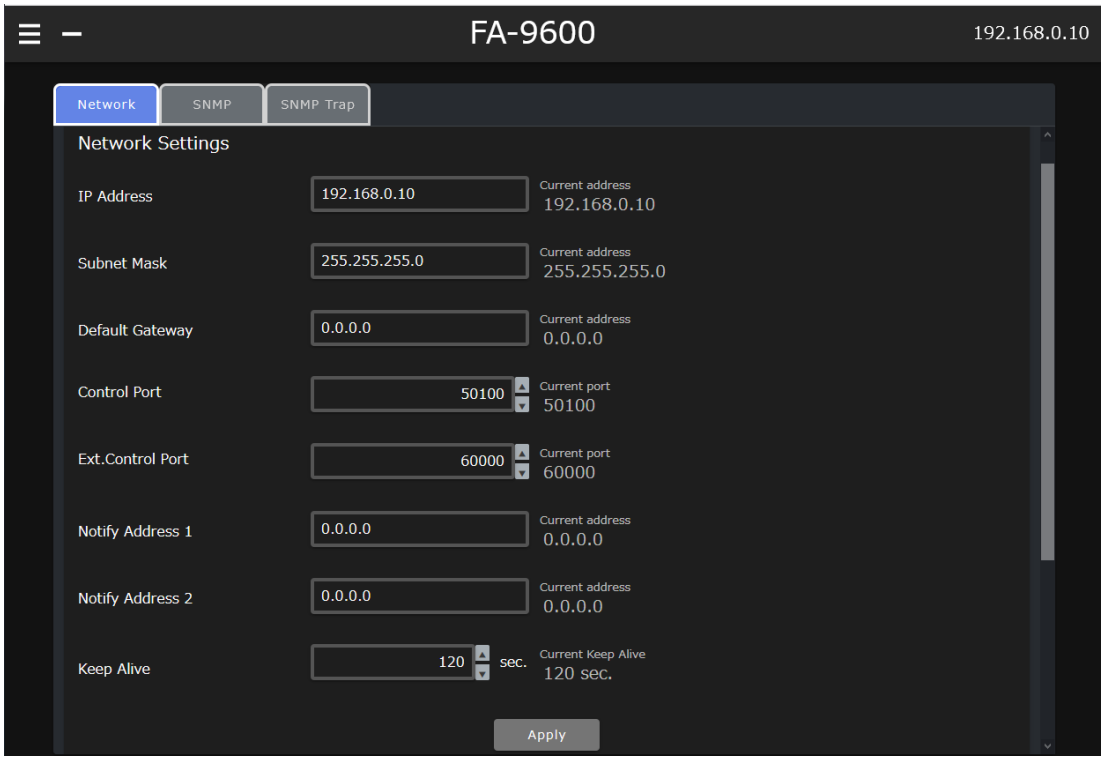
IMPORTANT

Note that network changes are applied after restart.

12-8. Network Page (Web GUI)

Click the **Network** tab in the Web GUI to display the menu, in which FA-9600 network and SNMP settings can be checked and changed.

12-8-1. Network Tab

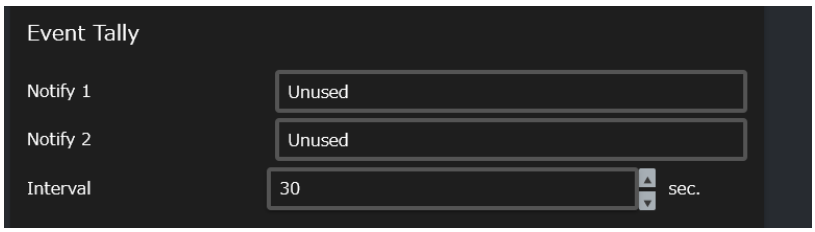


◆ **Network Setting**

Item	Default	Description
IP Address	192.168.0.10	IP address, netmask and default gateway of FA-9600 LAN port.
Subnet Mask	255.255.255.0	
Default Gateway	0.0.0.0	
Control Port	50100	TCP port number used for Windows GUI or Remote Control Unit connection.
Ext. Control Port	60000	UDP port number used for sessions with external devices (for sending status change messages and event tallies)
Notify Address 1, 2	0.0.0.0	Destination IP address 1 and 2 for status change messages and event tallies
Keep-Alive	120 Sec	Time duration from TCP connection start to sending a Keep-Alive message. (Setting range: 10-180 sec.)

After changing settings, click **Apply**. A confirmation message will appear and changes are indicated in yellow. In the same time, a message is displayed and prompts you to restart the FA-9600. Restart the FA-9600 to confirm changes.
See the separate manual “FA-9600 Commands” for available commands and messages.

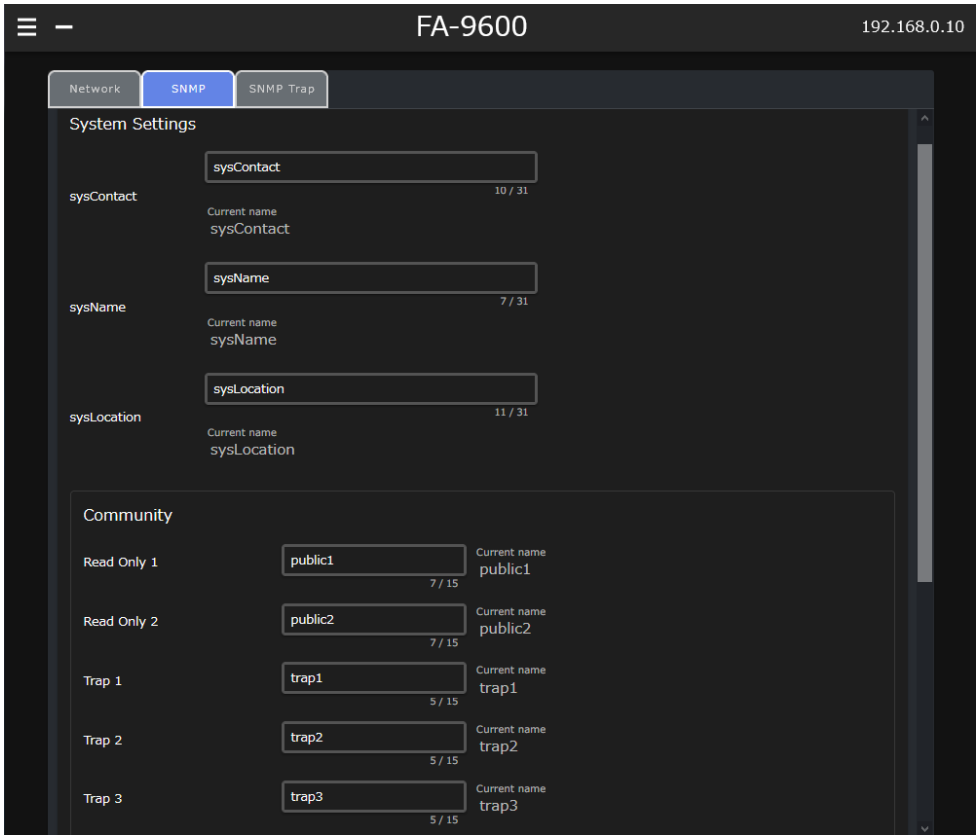
◆ **Event Tally (At the bottom of the menu page. Scroll down to display)**



Item	Default	Description
Notify 1, 2	Unused	Event number to be monitored by event tally.
Interval	30 Sec	Time interval between two regularly sent tallies (Setting range: 5-255 sec.)

Pressing **Apply** is not needed for changing settings. See Sec. 13-4. “Event Tally.”

12-8-2. SNMP Tab



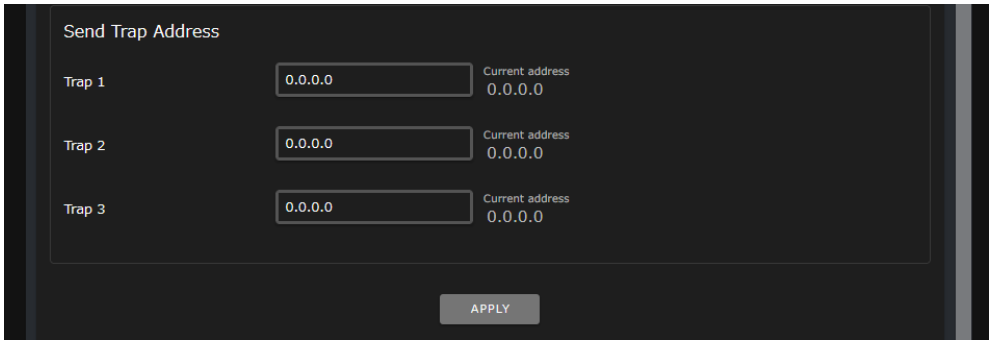
◆ **System Settings**

Item	Number of characters	Description
SysContact	1-31 (Alphabet, numbers and symbols excluding “%” and “\”)	Device manager’s name
SysName		Device name
SysLocation		Comment such as device location

◆ **Community**

Read Only1	Community	1-15 (Alphabet, numbers and symbols excluding “%” and “\”)	SNMP read only community name
Read Only2	Community		
Trap1-3	Community		Community name of SNMP manager to which traps are sent.

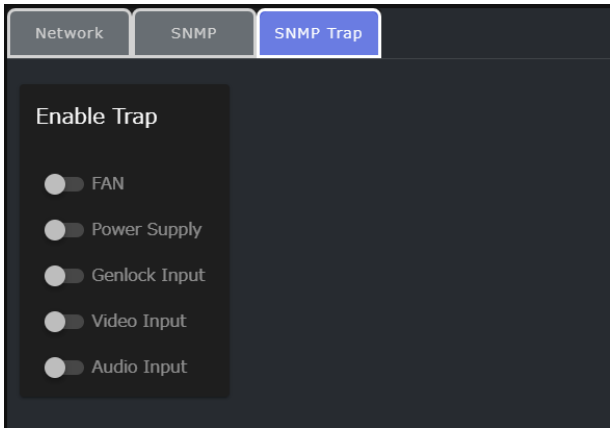
◆ **Send Trap Address (At the bottom of the menu page. Scroll down to display)**



Item	Default	Description
Trap1-3	0.0.0.0	IP address of SNMP manager to which traps are sent.

After changing settings, click **Apply**. A confirmation message will appear and changes are indicated in yellow. In the same time, a message is displayed and prompts you to restart the FA-9600. Restart the FA-9600 to confirm changes.

12-8-3. SNMP Trap Tab



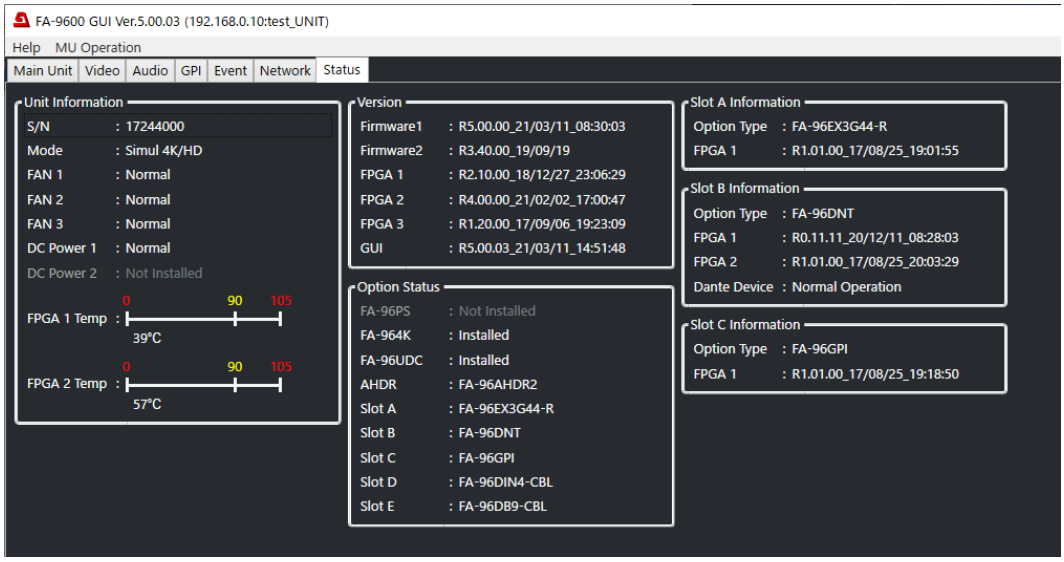
◆ **Enable Trap**

Turn to blue to enable traps for use.

Trap name	When a trap is issued
FAN	When a cooling fan status changes
Power Supply (FA-96PS required)	When a power unit status changes
Genlock Input	When a Genlock input status changes
Video Input	When the video input status changes
Audio Input	When the audio input status changes

12-9. Status

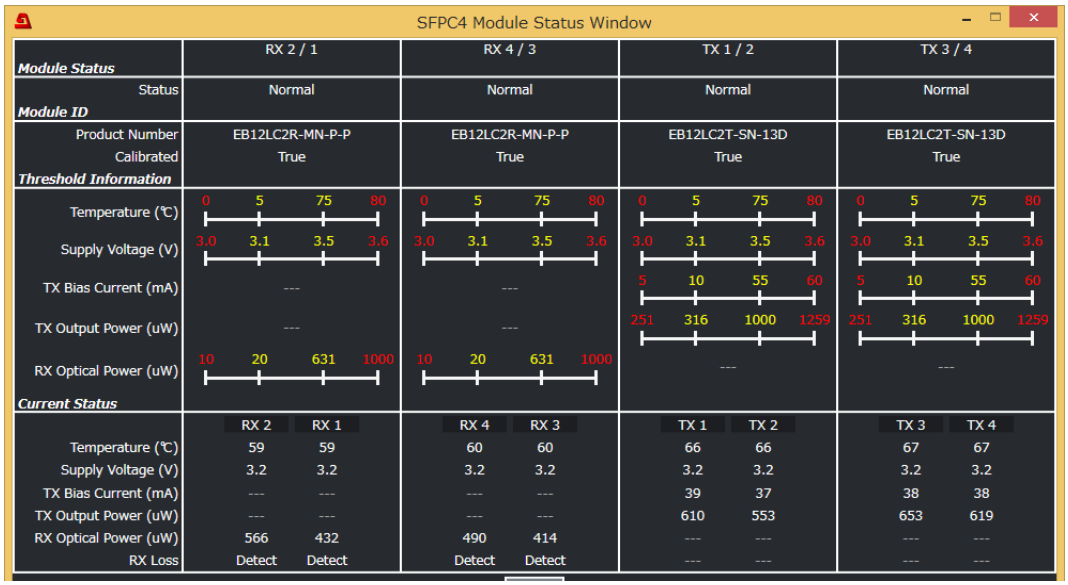
[Windows GUI]
Click the **Status** tab in the GUI screen to display the menu.



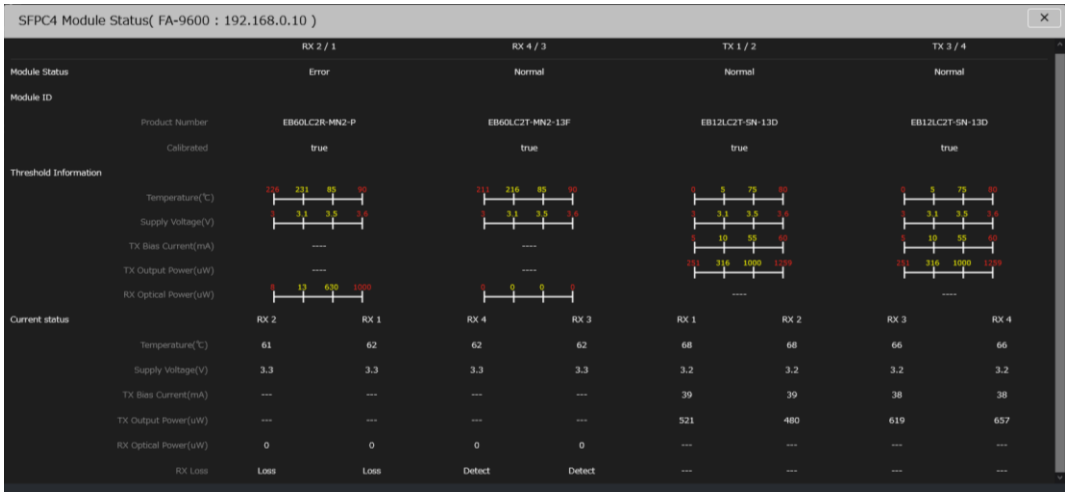
[Web GUI]
Click **Unit Status** in the page list to display the menu.

Product Number, MAC address, Versions and option status for the FA-9600 are displayed
If 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.

[Windows GUI]



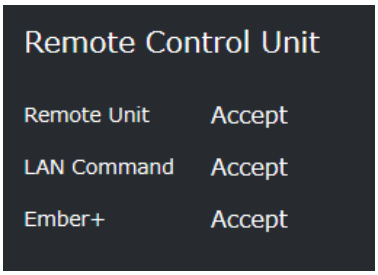
[Web GUI]



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.

Remote Control status (Web GUI)

Whether to accept control of dedicated remote controllers (FA-10RU and 10DCCRU), external commands and Ember+ are displayed.



13. 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 2: Event Data List” for details on event contents.

13-1. 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 2: Event Data List.”)
* CSV files must be encoded as **7-bit ASCII** files.

13-2. Event Data Editing Example (Value Change)

For example, to change **FS1 Video Level** (see Sec. 5-1. “VIDEO PRE-/POST-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 2: 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. 12-5-4-1. "Importing / Exporting Events" 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. 12-5-4-1. "Importing / Exporting Events" 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)

13-3. 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
* 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. 12-5-4-1. "Importing / Exporting Events" for how to import events to the FA-9600.

◆ **If using an existing event file:**

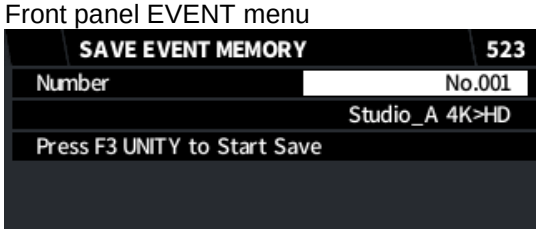
(1) Export an event file from the FA-9600 to the Web GUI. Open the file using a text editor.
(See Sec. 12-5-4-1. "Importing / Exporting Events" for how to export events to the Web GUI.)

(2) Type the text above anywhere in the csv file.

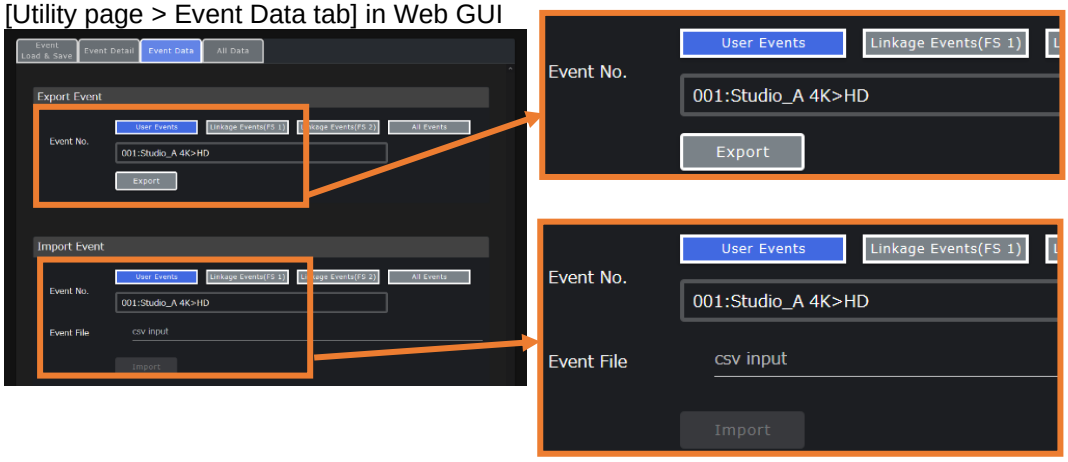
(3)(4) (Same as above)

The event name will be displayed as shown below when it is successfully applied:

Front panel EVENT menu



[Utility page > Event Data tab] in Web GUI



13-4. 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.

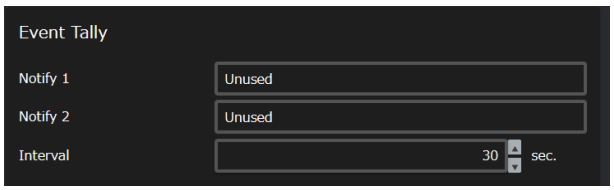
◆ **Communication Specifications**

Communication	Interface	Ethernet: IEEE802.3u (100BASE-TX)
	Protocol	UDP/IP
	Sending port for tallies	60000 (Default setting) (*1)
Tally	Event tallies (Diff or Same) are periodically sent. (Default setting: 30 sec. interval) (*1) .	
	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.

13-4-1. Event Tally Setup (Web GUI)

1) Connect to FA-9600 from Web GUI. (See Sec. 11-3. “Starting the Web GUI.”)
2) Click the **Network Settings** tab and set the following items in the tab window. (See Sec. 12-8-1. ”Network.”)
3) Click **Apply** after changing settings. Click **OK** to confirm in the confirmation dialog.
   A message appears and prompts you to restart the FA-9600. Click **OK** to restart the FA-9600 and apply changes.



Item	Default	Description
Ext. Control Port (*1)	60000	Sets the port number for sending tallies.
Notify Address 1, 2 (*1)	0.0.0.0	Sets event tally destination addresses 1 and 2.
Keep-Alive (*1)	120 Sec	Sets the idle timeout period for event tally sessions.
Apply button	-	Confirm changes for above three items. Two items below do not need Apply for changes.
Event Tally Notify 1, 2 (*1)	Unused	Specifies two events for change monitoring.
Event Tally Interval	30 Sec	Sets the interval time for sending tallies from 5 to 255.

(*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.

13-4-2. 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.

13-5. FA-9600 Event Editor

◆ **System Requirements**

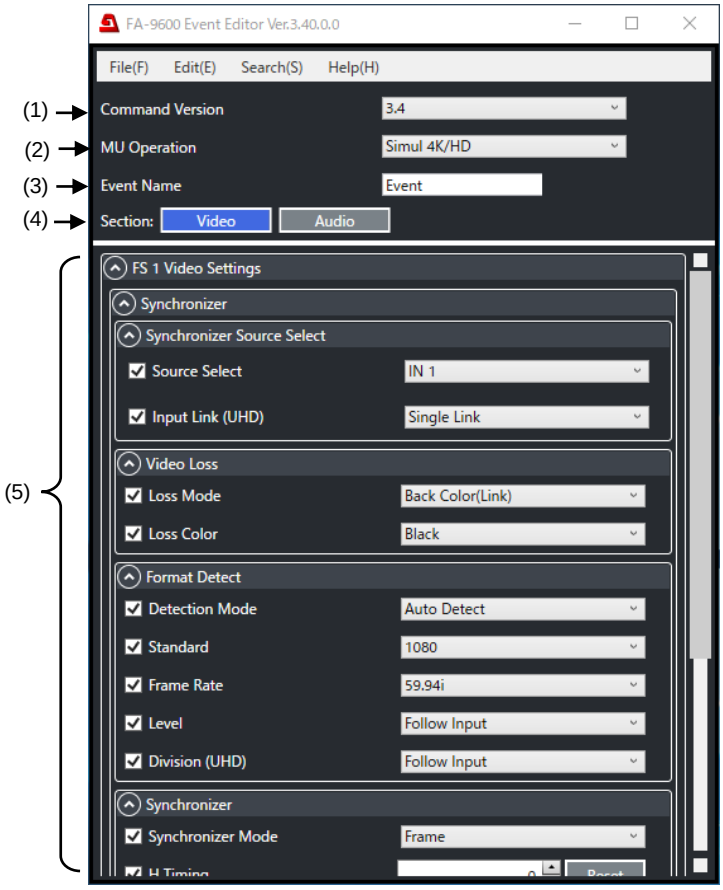
The Event Editor can run in the same system as FA-9600 Windows GUI. (See Sec. 9-1. “System Requirements.”)

◆ **Installing 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.

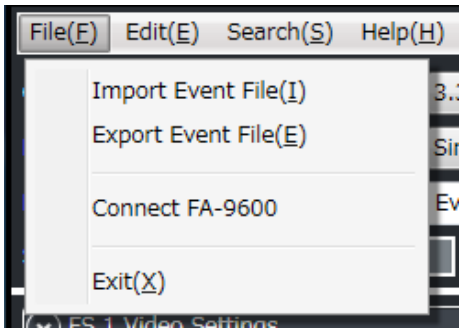
(2) After installation, double-click the Event Editor icon on the desktop to start the Event Editor.

◆ **Editor Screen**



No	Item	Description
(1)	Command Version	Specifies the event version for use. (Normally use the latest version (default setting))
(2)	MU Operation	MU Main mode for the event. (See Sec. 1-3 “Three MU Main Mode” for more details.)
(3)	Event Name	Enters the event name for editing. (See Sec. 13-3. Event Data Editing Example (Event Name Change).”)
(4)	Section	Selects Video or Audio to display menu items (5) below.
(5)	Menu parameters check box	Allows you to set menu item settings and select items to save to the event using check boxes.

◆ **File Menu (Loading / saving event files)**

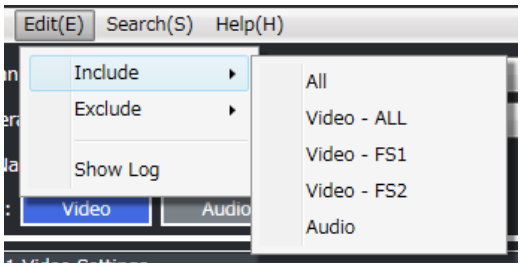


Menu	Description
Import Event File	Loads an event file stored in the PC to the Event Editor.
Export Event File	Saves the edited event items to an event file in the PC.
Connect FA-9600	Opens the FA-9600 communication window. (See next page.)
Exit	Closes the Event Editor.

◆ **Edit Menu (Item group selection)**

<Include / Exclude>

Position the cursor on **Include** or **Exclude** opens a submenu as shown below.



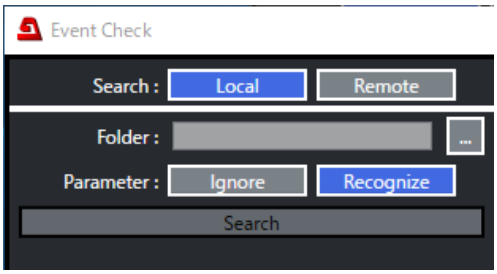
For example, selecting **Video-ALL** in **Include** includes all video items to the event.
For example, selecting **Audio** in **Exclude** excludes all audio items from the event.

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.

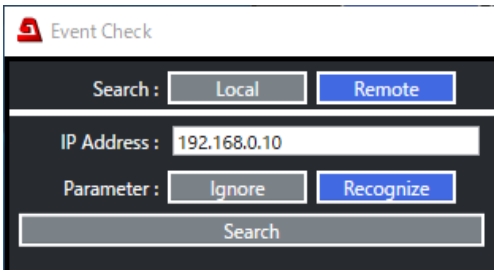
<Show Log>
Displays a log when loading a file.

◆ **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



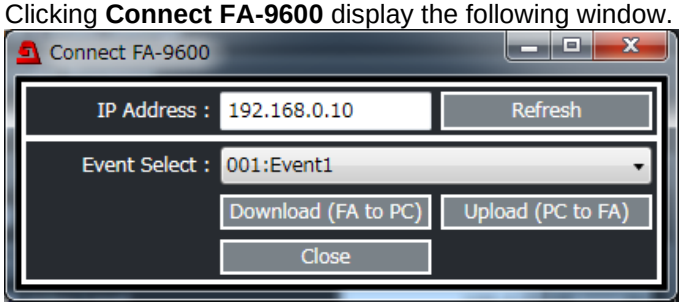
Remote Search



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 (Download / upload event data in 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 2: Event Data List” for details on event items.

14. 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. 12-8-2 "SNMP Tab" and Sec. 12-8-3. “SNMP Trap Tab” for details about the SNMP network settings.

◆ GET List (SET commands unavailable)

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	FA-9600	1	OCTET STRING		
	Product Code	fa9600ProductCode	1026701	2	INTEGER		
	Unit Name	fa9600UnitName	(Set name)	3	OCTET STRING		
	Serial Number	fa9600SerialNumber	1706XXXX	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	Not Installed FA-96EX3G44-R FA-96EX12G06 FA-96SFPC4	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	Not Installed FA-96AES-UBL FA-96AES-UBLC FA-96GPI FA-96ANA-AUD FA-96MADI FA-96DNT	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	Not Installed FA-96AES-UBLC FA-96GPI	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	See Sec. 14-1	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	See Sec. 14-1	1	OCTET STRING	✓	
	Input SDI2 Status	fa9600InputVideoStatusSdi2	See Sec. 14-1	2	OCTET STRING	✓	

	Input HDMI Status	fa9600InputVideoStatusHdmi	See Sec. 14-2	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	See Sec. 14-1	1	OCTET STRING		
		fa9600OutputVideoStatusSdi1B	See Sec. 14-1	2	OCTET STRING		
	Output SDI2 Status	fa9600OutputVideoStatusSdi2A	See Sec. 14-1	3	OCTET STRING		
		fa9600OutputVideoStatusSdi2B	See Sec. 14-1	4	OCTET STRING		
	Output HDMI Status	fa9600OutputVideoStatusHdmi	See Sec. 14-2	5	OCTET STRING		
Output Status	Output SDI1 Status	fa9600OutputVideoStatusSdi1A	See Sec. 14-1	1	OCTET STRING		
		fa9600OutputVideoStatusSdi1B	See Sec. 14-1	2	OCTET STRING		
	Output SDI2 Status	fa9600OutputVideoStatusSdi2A	See Sec. 14-1	3	OCTET STRING		
		fa9600OutputVideoStatusSdi2B	See Sec. 14-1	4	OCTET STRING		
	Output HDMI Status	fa9600OutputVideoStatusHdmi	See Sec. 14-2	5	OCTET STRING		

Object group	Item name	Object name in MIB file	Value	OID	Type	Trap	Note
OID : 1.3.6.1.4.1.20175.1.338.1.2.3 (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.(1-16)	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.(1-16)	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.(1-16)	INTEGER		*1*2
	Audio Status	fa9600EmbeddedAudioInputChannelStatus2	(Same as Emb1)	11.(1-16)	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.(1-8)	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.(1-8)	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	See Sec. 14-1	1	OCTET STRING	✓	
	Input SDI Status2	fa96Ex3G44RInputSdiStatus2	See Sec. 14-1	2	OCTET STRING	✓	
	Input SDI Status3	fa96Ex3G44RInputSdiStatus3	See Sec. 14-1	3	OCTET STRING	✓	
	Input SDI Status4	fa96Ex3G44RInputSdiStatus4	See Sec. 14-1	4	OCTET STRING	✓	
	Output SDI Status1	fa96Ex3G44ROutputSdiStatus1	See Sec. 14-1	11	OCTET STRING		
	Output SDI Status2	fa96Ex3G44ROutputSdiStatus2	See Sec. 14-1	12	OCTET STRING		
	Output SDI Status3	fa96Ex3G44ROutputSdiStatus3	See Sec. 14-1	13	OCTET STRING		
	Output SDI Status4	fa96Ex3G44ROutputSdiStatus4	See Sec. 14-1	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	See Sec. 14-1	1	OCTET STRING		
	Output SDI Status2	fa96Ex12G06ROutputSdiStatus2	See Sec. 14-1	2	OCTET STRING		
	Output SDI Status3	fa96Ex12G06ROutputSdiStatus3	See Sec. 14-1	2	OCTET STRING		
	Output SDI Status4	fa96Ex12G06ROutputSdiStatus4	See Sec. 14-1	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.(1-4)	INTEGER		*1*2
	SFP Rx Signal Status	fa96Sfpc4RxVideoStatus	See Sec.14-3	2.(1-4)	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.(1-4)	INTEGER		*1*2
	SFP Tx Status	fa96Sfpc4TxVideoStatus	See Sec.14-3	2.(1-4)	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.(1-8)	INTEGER		*1*2
	Audio Status	fa96AesUblInputChannelStatus	(Same as Audio AES)	11.(1-8)	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.(1-4)	INTEGER		*1*2
	Audio Status	fa96AnaAudStatusBChannelStatus	0: silence 1: present	11.(1-4)	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	1-64	2.1.1.(1-64)			*1*2
	Audio Status	fa96MadiInputChannelStatus	0: loss 1: present 2: silence 3: nonPcm	2.1.11.(1-64)	INTEGER	✓	*1
OID: 1.3.6.1.4.1.20175.1.338.1.2.4.2.4 (FA-96DNT Status(Slot B))							
FA-96DNT Status	Device Status	fa96DntDeviceStatus	0: normalOperation 1: clockAsynchronous 2: resetState 3: failsafeMode	1	INTEGER		
	Channel	fa96DntInputChannel	1 – 32	11.1.1.(1-32)			*1*2
	Audio Status	fa96DntInputChannelStatus	0: loss 1: present44k1 2: present48k 3: silence44k1 4: silence48k 5: nonPcm	11.1.11.(1-32)	INTEGER	✓	*1
OID : 1.3.6.1.4.1.20175.1.338.1.2.4.3 (Slot C Option Status)							

*1 Shaded numbers in the OID column stands for channel numbers. For example, 1.(1-16) indicates 1.1, 1.2, 1.3…or 1.16.

*2 Obtainable only with Traps.

◆ TRAP List

Object group	Item name	When trap is sent:	Object name in MIB file	OID	Reference object	
OID : 1.3.6.1.4.1.20175.1.338.0						
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
	Dante Device Status	Dante module's Device Status change	fa96DntDeviceStatusChanged	2401	fa96DntDeviceStatus	
	Dante Input Status	Each FA-96DNT channel input status change	fa96DntInputChannelStatusChanged	2402	fa96DntInputChannel	fa96DntInputChannelStatus

14-1. SDI Video Status Information Examples

SDI video status information is sent or received as character strings.
Note that while changing the video format, the incorrect format status may be sent (within some seconds) until the format change is confirmed.
The following list shows SDI status information examples. Formats that are not supported in FA-9600 may be reported in some cases.

Loss	2048x1080/48p [Level-A]	3840x2160/24p [Level-B] SQD
Bypass	2048x1080/48p [Level-B]	3840x2160/23.98p [Level-B] 2SI
Not supported format	2048x1080/47.95p [Level-A]	3840x2160/23.98p [Level-B] SQD
Unknown	2048x1080/47.95p [Level-B]	3840x2160/30PsFsF [Level-B] SQD
525/59.94i	2048x1080/30p	3840x2160/29.97PsF [Level-B] SQD
625/50i	2048x1080/29.97p	3840x2160/25PsF [Level-B] SQD
1280x720/60p	2048x1080/25p	3840x2160/24PsF [Level-B] SQD
1280x720/59.94p	2048x1080/24p	3840x2160/23.98PsF [Level-B] SQD
1280x720/50p	2048x1080/23.98p	4096x2160/60p [Level-A] 2SI
1280x720/30p	2048x1080/60i	4096x2160/60p [Level-A] SQD
1280x720/29.97p	2048x1080/59.94i	4096x2160/60p [Level-B] 2SI
1280x720/25p	2048x1080/50i	4096x2160/60p [Level-B] SQD
1280x720/24p	2048x1080/24PsF	4096x2160/59.94p [Level-A] 2SI
1280x720/23.98p	2048x1080/23.98PsF	4096x2160/59.94p [Level-A] SQD
1920x1080/60p [Level-A]	2048x1080/30PsF	4096x2160/59.94p [Level-B] 2SI
1920x1080/60p [Level-B]	2048x1080/29.97PsF	4096x2160/59.94p [Level-B] SQD
1920x1080/59.94p [Level-A]	2048x1080/25PsF	4096x2160/50p [Level-A] 2SI
1920x1080/59.94p [Level-B]	3840x2160/60p [Level-A] 2SI	4096x2160/50p [Level-A] SQD
1920x1080/50p [Level-A]	3840x2160/60p [Level-A] SQD	4096x2160/50p [Level-B] 2SI
1920x1080/50p [Level-B]	3840x2160/60p [Level-B] 2SI	4096x2160/50p [Level-B] SQD
1920x1080/48p [Level-A]	3840x2160/60p [Level-B] SQD	4096x2160/48p [Level-A] 2SI
1920x1080/48p [Level-B]	3840x2160/59.94p [Level-A] 2SI	4096x2160/48p [Level-A] SQD
1920x1080/47.95p [Level-A]	3840x2160/59.94p [Level-A] SQD	4096x2160/48p [Level-B] 2SI
1920x1080/47.95p [Level-B]	3840x2160/59.94p [Level-B] 2SI	4096x2160/48p [Level-B] SQD
1920x1080/30p	3840x2160/59.94p [Level-B] SQD	4096x2160/47.95p [Level-A] 2SI
1920x1080/29.97p	3840x2160/50p [Level-A] 2SI	4096x2160/47.95p [Level-A] SQD
1920x1080/25p	3840x2160/50p [Level-A] SQD	4096x2160/47.95p [Level-B] 2SI
1920x1080/24p	3840x2160/50p [Level-B] 2SI	4096x2160/47.95p [Level-B] SQD
1920x1080/23.98p	3840x2160/50p [Level-B] SQD	4096x2160/30p [Level-B] 2SI

1920x1080/60i	3840x2160/48p [Level-A] 2SI	4096x2160/30p [Level-B] SQD
1920x1080/59.94i	3840x2160/48p [Level-A] SQD	4096x2160/29.97p [Level-B] 2SI
1920x1080/50i	3840x2160/48p [Level-B] 2SI	4096x2160/29.97p [Level-B] SQD
1920x1080/24PsF	3840x2160/48p [Level-B] SQD	4096x2160/25p [Level-B] 2SI
1920x1080/23.98PsF	3840x2160/47.95p [Level-A] 2SI	4096x2160/25p [Level-B] SQD
1920x1080/30PsF	3840x2160/47.95p [Level-A] SQD	4096x2160/24p [Level-B] 2SI
1920x1080/29.97PsF	3840x2160/47.95p [Level-B] 2SI	4096x2160/24p [Level-B] SQD
1920x1080/25PsF	3840x2160/47.95p [Level-B] SQD	4096x2160/23.98p [Level-B] 2SI
2048x1080/60p [Level-A]	3840x2160/30p [Level-B] 2SI	4096x2160/23.98p [Level-B] SQD
2048x1080/60p [Level-B]	3840x2160/30p [Level-B] SQD	4096x2160/30PsFsF [Level-B] SQD
2048x1080/59.94p [Level-A]	3840x2160/29.97p [Level-B] 2SI	4096x2160/29.97PsF [Level-B] SQD
2048x1080/59.94p [Level-B]	3840x2160/29.97p [Level-B] SQD	4096x2160/25PsF [Level-B] SQD
2048x1080/50p [Level-A]	3840x2160/25p [Level-B] 2SI	4096x2160/24PsF [Level-B] SQD
2048x1080/50p [Level-B]	3840x2160/25p [Level-B] SQD	4096x2160/23.98PsF [Level-B] SQD

14-2. HDMI Video Status Information Examples

HDMI video status information is sent or received as character strings.
Note that while changing the video format, the incorrect format status may be sent (within some seconds) until the format change is confirmed.

Color format data is added at the end of the video format information that is the same as those for SDI. See Sec. 14-1. “SDI Video Status Information Examples”.

<Video Status Information Format>
RGB signals: **<Video format>_<Color Space>_<RGB Range>_<Colorimetry>**
YCbCr signals: **<Video format>_<Color Space>_<Colorimetry>**

“_” indicates a space character.
<Color Space> values: **RGB**, **YCbCr**
<RGB Range> values: **Limited**, **Full**
<Colorimetry> values: **BT.709**, **BT.2020**, **BT.601**

14-3. SFPC4 Video Status Information Examples

SFPC4 video status information is sent or received as character strings.
Note that while changing the video format, the incorrect format status may be sent (within some seconds) until the format change is confirmed.
When the video format can be detected, the status is sent in the same format as that of SDI. See Sec. 14-1. “SDI Video Status Information Examples.”
When the video format cannot be detected, the following information (bitrate) is reported.

Loss	270MHz	1.5GHz
3GHz	6GHz	12GHz
Other		

15. Specifications and Dimensions

15-1. Specifications

Basic specifications

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 480 (W) (Including rack mount brackets)
Weight	3.5 kg (w/ full options)
Consumables (at 24-hour operation)	Power unit: Recommended replacement period: 5 years Cooling fan: Recommended replacement period: 6 years [FAN1] FPGA (Arria10) blower fan P-1588 (109BC12GC7-1 SANYO DENKI CO., LTD) [FAN2] Front fan on the left-hand side P-1608 (9GA0412P3H01 SANYO DENKI CO., LTD) [FAN3] Front fan on the right-hand side P-1586-2 (9GA0412P7G001 SANYO DENKI CO., LTD.)

Technical specifications

SDI 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 Single-Link 3G-SDI Dual-Link HD-SDI Single-Link HD-SDI
SDI optional video format (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-SDI Single-Link 6G-SDI Dual-Link 6G-SDI (output) Dual-Link 3G-SDI Quad-Link 3G-SDI (output) (FA-96EX3G44-R or 96SFPC4 required for input) Quad-Link HD-SDI (output) (FA-96EX3G44-R or 96SFPC4 required for input)
(FA-964K) (FA-96EX3G44-R) (FA-96SFPC4)	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-Link 3G-SDI (Level-A/B, SQD/2SI) Dual-Link 3G-SDI (Level-A/B, SQD/2SI) Quad-Link HD-SDI (SQD)
HDMI video format	1080/60p, 59.94p, 50p, 30p, 29.97p, 25p, 24p, 23.98p (If output format is set to 3G-SDI Level-B, HDMI output displays black.) 1080/60i (30PsF), 59.94i (29.97PsF), 50i (25PsF), 24PsF, 23.98PsF 720/60p, 59.94p, 50p 525/59.94i, 625/50i

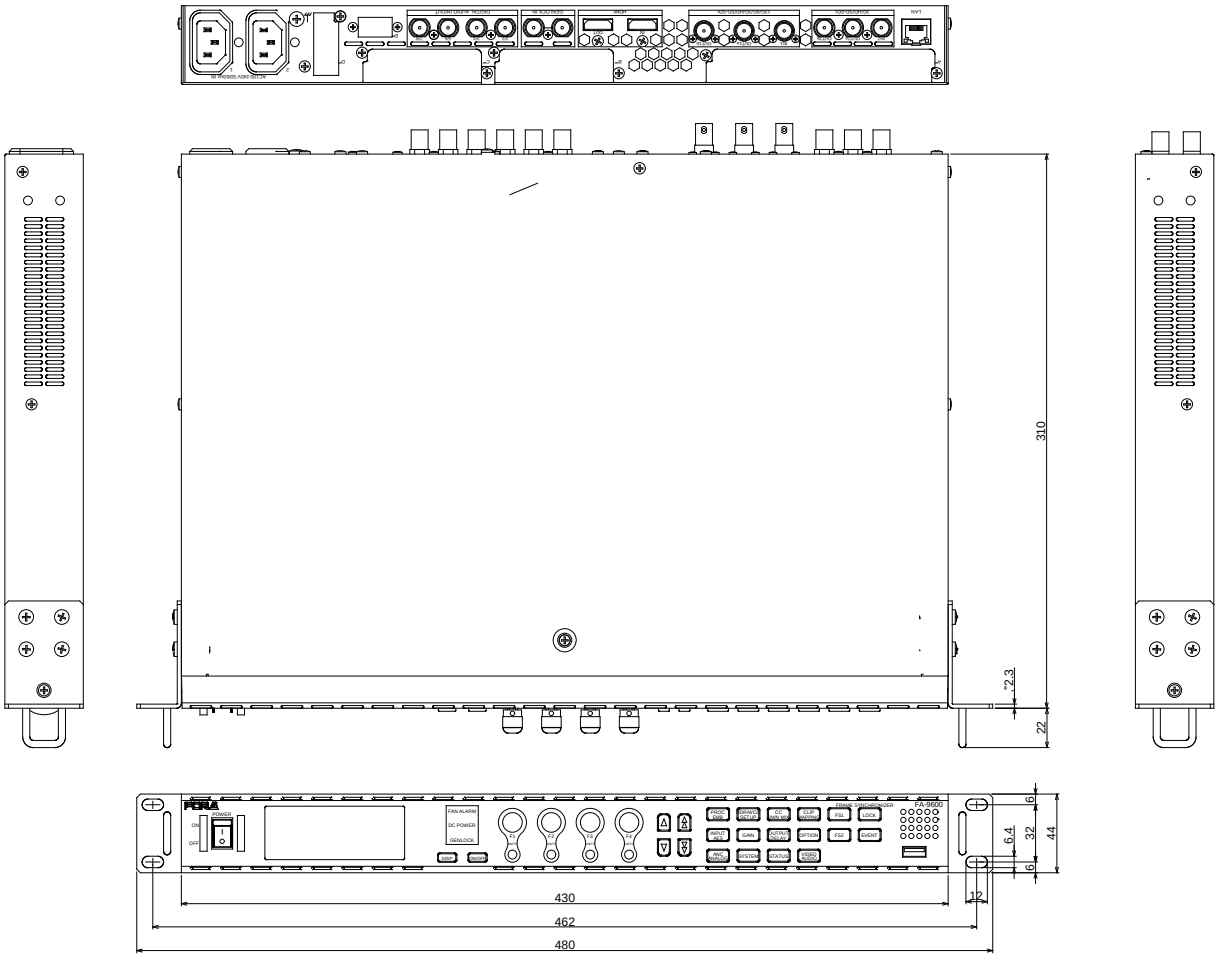
HDMI optional video format (FA-964K)	3840 x 2160/60p, 59.94p, 50p, 30p, 29.97p, 25p, 24p, 23.98p (If output format is set to SQD or Level-B, HDMI output displays black.)
Video input	3G-SDI: 3Gbps (Level-A/B) HD-SDI: 1.5 Gbps or SD-SDI: 270 Mbps 75Ω BNC x 2 (IN2 to OUT2a pass-through possible)
(FA-96EX3G44-R)	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: 8/10/12-bit 4:2:2 (Internal processing: 10-bit) RGB color sampling: 8-bit 4:4:4 Limited Range / Full Range 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: 10-bit 4:2:2 RGB color sampling: 8-bit 4:4:4 Limited Range Output resolution: 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/6G/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, Easy frame rate conversions
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, Easy frame rate conversions (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 HDMI audio output	8 channels 48kHz 16- to 24-bit synchronous 8 channels 48kHz 16/20/24-bit synchronous
AES audio input AES audio output (W/ FA-96AES-UBL) (W/ FA-96AES-UBLC)	1.0 Vp-p unbalanced 75Ω 32/44.1/48 kHz 16- to 24-bit 1.0 Vp-p unbalanced 75Ω 48 kHz 16/20/24-bit BNC x 8 (AES/EBU input or output) 16 channels (8 stereo pairs) 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 Analog audio output (W/ FA-96ANA-AUD)	4 channels (2 stereo pairs) Hi-Z or 600 ohm balanced 4 channels (2 stereo pairs) 100-ohm balanced 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)
MADI audio input MADI audio output (W/ FA-96MADI)	In x 1 (BNC coaxial 75-ohm) (Max. processed channels: 32) 56 / 64 channels 32/44.1/48kHz, 16- to 24-bit, PCM only Out x 1 (BNC coaxial 75-ohm) (Max. processed channels: 32) 56 / 64 channels 48kHz, 16/20/24-bit, PCM only
Dante audio input Dante audio output (W/ FA-96DNT)	32 channels, 16/24-bit PCM 44.1 kHz (Input only) or 48 kHz R-45 x 2 (Primary / Secondary) 1000BASE-T Path redundancy, redundant or daisy-chain connection available
Audio delay adjustment	1 ms to 1,000 ms
Audio processing	SRC (Sample Rate Converter), Gain control, Downmix, Remap, Mute (processed per channel pair)
Interface	
Ethernet	100BASE-TX RJ-45 x1

15-2. External Dimensions

(All dimensions in mm.)



Appendix 1: Video Format Conversions

Appendix 1-1: Available Conversions on Converter 1 (FS1)

Black video is output when any signal that is not listed in the above tables is specified for converter input or output.

<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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<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 conversions).

<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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<From 59.94 Hz to 50 Hz >

✓: 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	2160/59.94p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	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 conversions).

<From 59.94 Hz to 60 Hz>

✓: 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	2160/59.94p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<From 50 Hz to 59.94 Hz>

✓: 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	2160/50p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
	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 conversions).

<From 50 Hz to 60 Hz>

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

<From 60 Hz to 59.94 Hz>

✓: 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	2160/60p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
	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 conversions).

<From 60Hz to 50Hz>

✓: 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	2160/60p (*)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	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 conversions).

Appendix 1-2: Available Conversions on Converter 2 (FS2)

- Black video is output when any signal that is not listed in the above tables is specified for converter input or output.
- 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.

<59.94 Hz family>

		Output									
	✓: Available conversion	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>

		Output						
	✓: Available conversion	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	▲	▲	▲	▲	✓	✓	▲	▲	✓

<From 59.94 Hz to 50 Hz>

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

<From 59.94 Hz to 60 Hz>

✓: 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	1080/59.94p(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	▲	▲	▲	▲	✓	✓	▲	▲	✓

<From 50 Hz to 59.94 Hz>

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

<From 50 Hz to 60 Hz >

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

<From 60 Hz to 59.94 Hz>

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

<From 60 Hz to 50 Hz>

✓:Available conversion		Output						
		1080/50p(A)	1080/50p(B)	1080/25p	1080/50i(25PsF)	720/50p	720/25p	625/50i (SD-SDI)
Input	1080/60p(A)	✓	✓	✓	✓	▲	▲	
	1080/60p(B)	✓	✓	✓	✓	▲	▲	
	1080/30p	✓	✓	✓	✓	▲	▲	
	1080/60i(30PsF)	✓	✓	✓	✓	▲	▲	
	720/60p	▲	▲	▲	▲	✓	✓	
	720/30p	▲	▲	▲	▲	✓	✓	
	1080/24p	✓	✓	✓	✓	▲	▲	
	1080/24PsF	✓	✓	✓	✓	▲	▲	
	720/24p	▲	▲	▲	▲	✓	✓	

Appendix 1-3: Output Delay and Phase in Converter Minimum Delay Mode

Output Phase and Delay for 59.94 and 29.97Hz signals

Top row in each cell indicates Delay (in µsec or in msec).
Bottom row in each cell indicates Phase (in lines).

<Input> \ <Output>					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	29.63 µs (2)	88.94 µs (3)	8.082 ms (545)	8.127 ms (274)	56.2 µs (2)	8.124 ms (274)	56.2 µs (2)	8.201 ms (553)	8.275 ms (279)	8.242 ms (278)	8.242 ms (278)	8.242 ms (278)	24.93 ms (371)	24.98 ms (-188)	25.09 ms (-130)
				B	59.3µs (3)	59.29 µs (2)	8.112 ms (546)	8.156 ms (275)	100.7 µs (3)	8.109 ms (273)	100.7 µs (3)	8.245 ms (555)	8.245 ms (278)	8.287 ms (279)	8.287 ms (279)	8.287 ms (279)	24.93 ms (371)	24.98 ms (-188)	25.09 ms (-130)
			2SI	A	8.082 µs (545)	8.127 ms (274)	29.63 µs (2)	88.94 µs (3)	8.124 ms (274)	56.2µs (2)	8.124 ms (274)	163.1 µs (11)	237.2 µs (8)	234.2 µs (8)	234.2 µs (8)	234.2 µs (8)	16.88 ms (9)	16.97 ms (-368)	17.15 ms (-255)
				B	8.112 ms (546)	8.156 ms (275)	59.3µs (3)	59.29 µs (2)	8.109 ms (273)	100.7 µs (3)	8.109 ms (273)	192.8 µs (12)	237.2 µs (8)	219.3 µs (7)	219.3 µs (7)	219.3 µs (7)	16.88 µs (9)	16.97 ms (-368)	17.15 ms (-255)
	p	29.97	SQD	(B)	16.73 ms (3)	16.79 ms (-559)	24.69 ms (540)	24.77 ms (-290)	59.26 µs (2)	16.16 ms (545)	16.7 ms (-562)	24.83 ms (549)	24.89 ms (-286)	16.4ms (553)	24.85 ms (-287)	33.04 ms (-11)	41.55 ms (368)	49.87 ms (371)	41.87 ms (134)
			2SI	(B)	16.76 ms (5)	16.79 ms (-559)	16.73 ms (3)	16.79 ms (-559)	16.16 ms (545)	59.26 µs (2)	32.8 ms (-19)	16.88 ms (13)	16.97 ms (-553)	326.2 µs (11)	16.93 ms (-554)	16.97 ms (-553)	33.59 ms (10)	33.81 µs (10)	33.87 ms (8)
	PsF	29.97	SQD	(B)	16.73 ms (3)	16.79 ms (-559)	24.75 ms (544)	24.83 ms (-288)	16.19 ms (546)	16.22 ms (547)	59.26 µs (2)	24.89 ms (553)	24.95 ms (-284)	16.46 ms (555)	24.91 ms (-285)	33.1 ms (-9)	41.64 ms (372)	49.92 ms (372)	41.87 ms (134)
1080	p	59.94		(A)	8.379 ms (-560)	8.453 ms (285)	341.1 µs (23)	415.2 µs (14)	8.45 ms (285)	412.1 µs (14)	8.45 ms (285)	29.63 µs (2)	88.94 µs (3)	56.2 µ s (2)	56.2 µ s (2)	56.2 µ s (2)	16.97 ms (13)	17.01 ms (-367)	17.21 ms (-254)
				(B)	8.408 ms (-560)	8.453 ms (285)	370.7 µs (24)	415.2 µs (14)	8.435 ms (284)	397.3 µs (13)	8.435 ms (284)	59.3 µs (3)	59.29 µs (2)	100.7 µs (3)	100.7 µs (3)	100.7 µs (3)	16.97 ms (13)	17.01 ms (-367)	17.21 ms (-254)
	p	29.97			25.06 ms (-560)	25.09 ms (-279)	17.03 ms (23)	17.06 ms (-550)	16.76 ms (-560)	682.1 µs (23)	33.4 ms (1)	16.72 ms (2)	16.79 ms (-559)	59.26 µs (2)	16.76 ms (-560)	16.7 ms (-562)	33.63 ms (12)	33.9 ms (12)	33.93 ms (9)
	i	59.94			25.11 ms (-557)	25.18 ms (-276)	17.07 ms (26)	17.18 ms (-546)	25.18 ms (-276)	17.14 ms (-547)	25.18 ms (-276)	16.76 ms (5)	16.82 ms (-558)	16.79 ms (-559)	59.26 µs (2)	59.26 µs (2)	33.68 ms (14)	33.7 ms (8)	33.93 ms (9)
	PsF	29.97			25.11 ms (-557)	26.18 ms (-276)	17.07 ms (26)	17.18 ms (-546)	25.18 ms (-276)	17.14 ms (-547)	25.18 ms (-276)	16.76 ms (5)	16.82 ms (-558)	16.79 ms (-559)	59.26 µs (2)	59.26 µs (2)	33.68 ms (14)	33.7 µs (8)	33.93 ms (9)
720	p	59.94			25.11 ms (-557)	25.18 ms (-276)	17.07 ms (26)	17.18 ms (-546)	25.18 ms (-276)	17.14 ms (-547)	25.18 ms (-276)	16.95 ms (18)	17.06 ms (-550)	17.02 ms (-551)	17.02 ms (-551)	17.02 ms (-551)	44.43 µs (2)	66.68 µs (2)	17.28 ms (-253)
	p	29.97			50.11 ms (4)	50.19 ms (-558)	42.07 ms (-538)	42.15 ms (296)	50.21 ms (-557)	34.14 ms (26)	66.85 ms (4)	41.96 ms (-546)	42.03 ms (292)	33.9 ms (18)	42 ms (291)	50.54 ms (-546)	25.05 ms (-374)	133.4 µs (3)	42.26 ms (140)
525 (SD NTSC)	i	59.94			41.95 ms (-547)	41.98 ms (290)	33.91 ms (36)	33.94 ms (19)	41.95 ms (289)	33.91 ms (18)	41.95 ms (289)	33.79 ms (28)	33.82 ms (15)	33.79 ms (14)	33.79 ms (14)	33.79 ms (14)	33.82 ms (20)	33.84 ms (11)	127 µs (2)

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

Output Phase and Delay for 50 and 25Hz signals

Top row in each cell indicates Delay (in µsec or in msec).
Bottom row in each cell indicates Phase (in lines).

<Input> \ <Output>					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	35.53 µs (2)	106.6 µs (3)	9.689 ms (545)	9.742 ms (274)	65.03 µs (2)	9.736 ms (274)	65.03 µs (2)	9.831 ms (553)	9.956 ms (280)	9.878 ms (278)	9.878 ms (278)	9.878 ms (278)	29.89 ms (371)	29.94 ms (-188)	69.94 ms (-157)
				B	71.1 µs (3)	71.08 µs (2)	9.724 ms (546)	9.742 ms (274)	118.4 µs (3)	9.718 ms (273)	118.4 µs (3)	9.884 ms (555)	9.92 ms (279)	9.932 ms (279)	9.932 ms (279)	9.932 ms (279)	29.86 ms (370)	29.89 ms (-189)	69.94 ms (-157)
			2SI	A	9.689 ms (545)	9.742 ms (274)	35.53 µs (2)	106.6 µs (3)	9.736 ms (274)	65.03 µs (2)	9.736 ms (274)	195.5 µs (11)	320 µs (9)	278.4 µs (8)	278.4 µs (8)	278.4 µs (8)	20.24 ms (9)	20.29 ms (-369)	20.4 ms (-306)
				B	9.724 ms (546)	9.742 ms (274)	71.1 µs (3)	71.08 µs (2)	9.718 ms (273)	118.4 µs (3)	9.718 ms (273)	231.1 µs (12)	320 µs (9)	260.6 µs (7)	260.6 µs (7)	260.6 µs (7)	20.24 ms (9)	20.29 ms (-369)	20.4 ms (-306)
	p	25	SQD	(B)	20.06 ms (3)	20.13 ms (-559)	29.6 ms (540)	29.73 ms (-289)	71.06 µs (2)	19.38 ms (545)	20.02 ms (-562)	29.76 ms (549)	29.83 ms (-286)	19.66 ms (553)	29.79 ms (-287)	39.61 ms (-11)	49.84 ms (369)	59.79 ms (371)	49.97 ms (156)
			2SI	(B)	20.09 ms (5)	20.13 ms (-559)	20.06 ms (3)	20.13 ms (-559)	19.38 ms (545)	71.06 µs (2)	39.32 ms (-19)	20.23 ms (13)	20.34 ms (-553)	391.1 µs (11)	20.3 ms (-554)	20.34 ms (-553)	40.29 ms (10)	40.53 ms (10)	40.44 ms (7)
	PsF	25	SQD	(B)	20.06 ms (3)	20.13 ms (-559)	29.67 ms (544)	29.8 ms (-287)	19.41 ms (546)	19.45 ms (547)	71.06 µs (2)	29.83 ms (533)	29.9 ms (-284)	19.73 ms (555)	29.86 ms (-285)	39.68 ms (-9)	49.89 ms (371)	59.84 ms (372)	50.1 ms (158)
1080	p	50		(A)	10.04 ms (-560)	10.17 ms (286)	408.9 µs (23)	533.3 µs (15)	10.09 ms (284)	491.7 µs (14)	10.09 ms (284)	35.53 µs (2)	106.6 µs (3)	65.03 µs (2)	65.03 µs (2)	65.03 µs (2)	20.34 ms (13)	20.4 ms (-367)	20.47 ms (-305)
				(B)	10.1 ms (-558)	10.13 ms (285)	444.4 µs (24)	533.3 µs (15)	10.15 ms (285)	473.9 µs (13)	10.15 ms (285)	71.1 µs (3)	71.08 µs (2)	118.4 µs (3)	118.4 µs (3)	118.4 µs (3)	20.34 ms (13)	20.4 ms (-367)	20.47 ms (-305)
	p	25			30.01 ms (-562)	30.08 ms (-279)	20.39 ms (22)	20.45 ms (-550)	20.09 ms (-560)	817.7 µs (23)	40.04 ms (1)	20.02 ms (1)	20.13 ms (-559)	71.06 µs (2)	20.09 ms (-560)	20.02 ms (-562)	40.32 ms (12)	40.59 ms (11)	40.44 ms (7)
	i	50			30.1 ms (-557)	30.22 ms (-275)	20.46 ms (26)	20.59 ms (-546)	30.15 ms (-277)	20.55 ms (-547)	30.15 ms (-277)	20.09 ms (5)	20.16 ms (-558)	20.12 ms (-559)	71.06 µs (2)	71.06 µs (2)	40.4 ms (15)	40.45 ms (9)	40.5 ms (8)
	PsF	25			30.1 ms (-557)	30.22 ms (-275)	20.46 ms (26)	20.59 ms (-546)	30.15 ms (-277)	20.55 ms (-547)	30.15 ms (-277)	20.09 ms (5)	20.16 ms (-558)	20.12 ms (-559)	71.06 µs (2)	71.06 µs (2)	40.4 ms (15)	40.45 ms (9)	40.5 ms (8)
720	p	50			30.1 ms (-557)	30.22 ms (-275)	20.46 ms (26)	20.59 ms (-546)	30.15 ms (-277)	20.55 ms (-547)	30.15 ms (-277)	20.32 ms (18)	20.45 ms (-550)	20.41 ms (-551)	20.41 ms (-551)	20.41 ms (-551)	53.28 µs (2)	79.94 µs (2)	20.47 ms (-305)
	p	25			60.04 ms (2)	60.16 ms (-558)	50.4 ms (-540)	50.53 ms (296)	60.16 ms (-558)	40.89 ms (25)	80.11 ms (3)	50.26 ms (-548)	50.38 ms (292)	40.6 ms (17)	50.34 ms (291)	60.55 ms (-547)	30.03 ms (-374)	159.9 µs (3)	50.49 ms (164)
625 (SD PAL)	i	50			50.3 ms (-546)	50.36 ms (291)	40.69 ms (38)	40.76 ms (21)	50.32 ms (290)	40.72 ms (20)	50.32 ms (290)	40.54 ms (30)	40.62 ms (17)	40.57 ms (16)	40.57 ms (16)	40.57 ms (16)	40.6 ms (22)	40.68 ms (12)	127.9 µs (2)

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

Output Phase and Delay for 60 and 30Hz signals

Top row in each cell indicates Delay (in µsec or in msec).
Bottom row in each cell indicates Phase (in lines).

<Input> \ <Output>					2160							1080				720	
					p				p		PsF	p		p	PsF	p	p
					60				30		30	60		30	30	60	30
					SQD		2SI		SQD	2SI	SQD						
					(A)	(B)	(A)	(B)	(B)	(B)	(B)	(A)	(B)				
2160	p	60	SQD	(A)	29.6 µs (2)	88.85 µs (3)	8.074 ms (545)	8.118 ms (274)	56.14 µs (2)	8.115 ms (274)	56.14 µs (2)	8.193 ms (553)	8.267 ms (274)	8.234 ms (278)	8.234 ms (278)	24.91 ms (371)	24.95 ms (-188)
				(B)	59.25 µs (3)	59.23 µs (2)	8.104 ms (546)	8.148 ms (275)	100.6 µs (3)	8.101 ms (273)	100.6 µs (3)	8.237 ms (555)	8.237 ms (278)	8.278 ms (279)	8.278 ms (279)	24.91 ms (371)	24.95 ms (-188)
			2SI	(A)	8.074 ms (545)	8.118 ms (274)	29.6 µs (2)	88.85 µs (3)	8.115 ms (274)	56.14 µs (2)	8.115 ms (274)	162.9 µs (11)	237 ms (8)	233.9 µs (8)	233.9 µs (8)	16.86 ms (9)	16.95 ms (-368)
				(B)	8.104 ms (546)	8.148 ms (275)	59.25 µs (3)	59.23 µs (2)	8.101 ms (273)	100.6 µs (3)	8.101 ms (273)	192.6 µs (12)	237 µs (8)	219.1 µs (7)	219.1 µs (7)	16.86 ms (9)	16.95 ms (-368)
	p	30	SQD	(B)	16.71 ms (3)	16.77 ms (-559)	24.67 ms (540)	24.74 ms (-290)	59.2 µs (2)	16.15 ms (545)	16.68 ms (-562)	24.8 ms (549)	24.86 ms (-286)	16.39 ms (553)	33.01 ms (-11)	41.51 ms (368)	49.82 ms (371)
			2SI	(B)	16.74 ms (5)	16.77 ms (-559)	16.71 ms (3)	16.77 ms (-559)	16.15 ms (545)	59.2 µs (2)	32.77 ms (-19)	16.86 ms (13)	16.95 ms (-553)	325.9 µs (11)	16.95 ms (-553)	33.56 ms (10)	33.78 ms (10)
	PsF	30	SQD	(B)	16.71 ms (3)	16.77 ms (-559)	24.73 ms (544)	24.8 ms (-288)	16.18 ms (546)	16.21 ms (547)	59.2 µs (2)	24.86 ms (553)	24.92 ms (-284)	16.44 ms (555)	33.07 ms (-9)	41.6 ms (372)	49.87 ms (372)
1080	p	60		(A)	8.37 ms (-560)	8.444 ms (285)	340.7 µs (23)	414.8 µs (14)	8.441 ms (285)	411.7 µs (14)	8.441 ms (285)	29.6 µs (2)	88.85 µs (3)	56.14 µs (2)	56.14 µs (2)	16.95 ms (13)	17 ms (-367)
				(B)	8.4 ms (-559)	8.444 ms (285)	370.4 µs (24)	414.8 µs (14)	8.427 ms (284)	396.9 µs (13)	8.427 ms (284)	59.25 µs (3)	59.23 µs (2)	100.6 µs (3)	100.6 µs (3)	16.95 ms (13)	17 ms (-367)
	p	30			25.04 ms (-560)	25.07 ms (-279)	17.01 ms (23)	17.04 ms (-550)	16.74 ms (-560)	681.4 µs (23)	33.36 ms (1)	16.7 ms (2)	16.77 ms (-559)	59.2 µs (2)	16.68 ms (-562)	33.6 ms (12)	33.87 ms (12)
	PsF	30	(60i)		25.08 ms (-557)	25.16 ms (-276)	17.05 ms (26)	17.16 ms (-546)	25.15 ms (-276)	17.13 ms (-547)	25.15 ms (-276)	16.74 ms (5)	16.8 ms (-558)	16.77 ms (-559)	59.2 µs (2)	33.64 ms (14)	33.67 ms (8)
720	p	60			25.08 ms (-557)	25.16 ms (-276)	17.05 ms (26)	17.16 ms (-546)	25.15 ms (-276)	17.13 ms (-547)	25.15 ms (-276)	16.94 ms (18)	17.04 ms (-550)	17.01 ms (-551)	17.01 ms (-51)	44.39 µs (2)	66.61 µs (2)
	p	30			50.06 ms (4)	50.14 ms (-558)	42.03 ms (-538)	42.11 ms (296)	50.16 ms (-557)	34.1 ms (26)	66.79 ms (4)	41.91 ms (-546)	41.99 ms (292)	33.87 ms (18)	50.49 ms (-546)	25.02 ms (-374)	133.3 µs (3)

Output Phase and Delay for 47.95 and 23.98Hz signals

Top row in each cell indicates Delay (in µsec or in milli-sec).
Bottom row in each cell indicates Phase (in lines).

<Output> / <Input>					2160							1080		720
					p				p		PsF	p	PsF	p
					47.95				23.98		23.98	23.98	23.98	23.98
					SQD		2SI		SQD	2SI	SQD			
					(A)	(B)	(A)	(B)	(B)	(B)	(B)			
2160	p	47.95	SQD	(A)	37.05 µs (2)	111.2 µs (3)	10.1 ms (545)	10.16 ms (274)	67.32 µs (2)	10.15 ms (274)	67.32 µs (2)	10.3 ms (278)	10.3 ms (278)	31.23 ms (-188)
				(B)	10.14 ms (546)	74.12 µs (2)	10.14 ms (546)	10.16 ms (274)	126.7 µs (3)	10.17 ms (274)	126.7 µs (3)	10.36 ms (279)	10.36 ms (-188)	31.26 ms (-188)
			2SI	(A)	10.1 ms (545)	10.16 ms (274)	37.05 µs (2)	111.2 µs (3)	10.15 ms (274)	67.32 µs (3)	10.15 ms (274)	289.8 µs (8)	289.8 µs (8)	21.17 ms (-369)
				(B)	10.14 ms (546)	10.16 ms (274)	77.84 µs (3)	74.12 µs (2)	10.17 ms (274)	126.7 µs (3)	10.17 ms (274)	274.9 µs (7)	274.9 µs (7)	21.19 ms (-369)
	p	23.98	SQD	(B)	20.91 ms (3)	20.99 ms (-559)	30.87 ms (540)	31 ms (-289)	74.09 µs (2)	20.21 ms (545)	20.87 ms (-562)	20.5 ms (553)	41.3 ms (-11)	62.34 ms (371)
			2SI	(B)	20.93 ms (4)	21.02 ms (-558)	20.91 ms (3)	20.99 ms (-559)	20.21 µs (545)	74.09 ms (2)	41 Ms (-19)	407.8 µs (11)	21.21 ms (-553)	42.26 ms (10)
	PsF	23.98	SQD	(B)	20.91 ms (3)	20.99 ms (-559)	30.94 ms (544)	31.07 ms (-287)	20.24 ms (546)	20.28 ms (547)	74.09 µs (2)	20.58 ms (555)	41.37 ms (-9)	62.4 ms (372)
1080	p	23.98			31.29 ms (-562)	31.37 ms (-279)	21.26 ms (22)	21.32 ms (-550)	20.95 ms (-560)	852.6 µs (23)	41.75 ms (1)	74.09 µs (2)	20.87 ms (-562)	42.32 ms (11)
	PsF	23.98			31.39 ms (-557)	31.52 ms (-275)	21.43 ms (26)	21.47 ms (-546)	31.43 ms (-277)	21.42 ms (-547)	74.09 µs (2)	20.98 ms (-559)	74.09 µs (2)	42.14 ms (8)
720	p	23.98			62.58 ms (1)	62.66 ms (-560)	52.55 ms (-540)	52.61 ms (294)	62.73 ms (-558)	42.64 ms (25)	83.53 ms (3)	42.34 ms (17)	63.14 ms (-547)	166.8 µs (3)

Output Phase and Delay for 48 and 24Hz signals

Top row in each cell indicates Delay (in µsec or in milli-sec).
Bottom row in each cell indicates Phase (in lines).

<Output> / <Input>					2160							1080		720
					p				p		PsF	p	PsF	p
					48				24		24	24	24	24
					SQD		2SI		SQD	2SI	SQD			
					(A)	(B)	(A)	(B)	(B)	(B)	(B)			
2160	p	48	SQD	(A)	37.01 µs (2)	111.1 µs (3)	10.09 ms (545)	10.15 ms (274)	67.25 µs (2)	10.14 ms (274)	67.25 µs (2)	10.29 ms (278)	10.29 ms (278)	31.26 ms (-188)
				(B)	77.76 µs (3)	74.05 µs (2)	10.13 ms (546)	10.15 ms (274)	126.5 µs (3)	10.16 ms (274)	126.5 µs (3)	10.35 ms (279)	10.35 ms (279)	31.22 ms (-188)
			2SI	(A)	10.09 ms (545)	10.15 ms (274)	37.01 µs (2)	111.1 µs (3)	10.14 ms (274)	67.25 µs (2)	10.14 ms (274)	289.5 µs (8)	289.5 µs (8)	21.15 ms (-369)
				(B)	10.13 ms (546)	10.15 ms (274)	77.76 µs (3)	74.05 µs (2)	10.16 ms (274)	126.5 µs (3)	10.16 ms (274)	274.7 µs (7)	274.7 µs (7)	21.17 ms (-369)
	p	24	SQD	(B)	20.89 ms (3)	20.97 ms (-559)	30.84 ms (540)	30.97 ms (-289)	74.02 µs (2)	20.19 ms (545)	20.85 ms (-562)	20.48 ms (553)	41.26 ms (-11)	62.28 ms (371)
			2SI	(B)	20.91 ms (4)	21 ms (-558)	20.89 ms (3)	20.97 ms (-559)	20.19 ms (545)	74.02 µs (2)	40.96 ms (-19)	407.4 µs (11)	21.19 ms (-553)	42.22 ms (10)
	PsF	24	SQD	(B)	20.89 ms (3)	20.97 ms (-559)	30.91 ms (544)	31.04 ms (-287)	20.22 ms (546)	20.26 ms (547)	74.02 µs (2)	20.56 ms (555)	41.33 ms (-9)	62.33 ms (372)
1080	p	24			31.26 ms (-562)	31.34 ms (-279)	21.24 ms (22)	21.3 ms (-550)	20.93 ms (-560)	851.8 µs (23)	41.7 ms (1)	74.02 µs (2)	20.85 ms (-562)	42.28 ms (11)
	PsF	24			31.35 ms (-557)	31.48 ms (-275)	21.32 ms (26)	21.45 ms (-546)	31.4 ms (-277)	21.4 ms (-547)	31.4 ms (-277)	20.85 ms (-562)	74.02 µs (2)	42.09 ms (8)
720	p	24			62.52 ms (1)	62.6 ms (-560)	52.5 ms (-540)	52.56 ms (294)	62.67 ms (-558)	42.59 ms (25)	82.44 ms (3)	42.3 ms (17)	63.07 ms (-547)	166.6 µs (3)

Appendix 2: 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.		13-3
Process 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)	FA-96AHDR/96AHDR2	
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	5-6
		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	
		SDR(SONY)	4	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	1	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%		5-8
		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	10	10 - 100	Setting value is one-hundredth of input value. Ex) 15 => 0.15		
		Knee Point	960	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	1090	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.
YCbCr Clip							
	FS1/FS2						
		YCbCr 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	1130	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 W/o FA-964K	2	0 1 2 8 9 10 11	0: Back Color (W/ FA-964K) 1: Back Color (Sep) (W/ FA-964K) 2: Back 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)	
		Loss Mode W/ FA-964K	0				
		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)		5-36
		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 (FS1)	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		5-38
		Sync Mode	0	0 1 2 3	0: Frame 1: Line 2: AVDL 3: Line(Min)		5-37
		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)		5-39

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		5-26
		H ANC PayloadId	0	0 1	0: Pass 1: Overwrite		5-27
		H ANC VPID DR/CS Mode	0	0 1 2	0: Auto 1: Manual 2: Auto(Keep Value)		
		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		5-29
		H ANC VITC OUT					
		H ANC DVITC OUT					
		V ANC MUX Mode	1	1 2	1: Pass 2: Rewrite		5-26
		V ANC User Packet Detect DID	50	50-5F	User packet DID value (Support planned)		5-33
		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		5-34
		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)		5-35
		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)	5-30
		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)	5-31
		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		5-41
	VSYS						
		Genlock Source	0	0 1 2 3	0: GENLOCK IN 1: FS1 2: FS2 3: Free Run		5-37
		SDI1 Bypass	1	0 1	0: Bypass 1: Operate		5-40
		SDI2 Bypass					
		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		
		HDMI Input Format	0	0 1	0: Auto 1: Manual		5-42
		HDMI Input Color Space	0	0 1	0: YCC 1: RGB		
		HDMI Input Range	0	0 1	0: Limited 1: Full		
		HDMI Input Colorimetry	0	0 1	0: BT.709 1: BT.2020		
		HDMI Output Format	0	0 1	0: Auto 1: Manual		
		HDMI Output Color Space	0	0 1	0: YCC 1: RGB		
		HDMI Output Colorimetry	0	0 1	0: BT.709 1: BT.2020		5-43
		HDMI Out HDR Meta Mode	1	0 1 2	0: Pass 1: Overwrite 2: Disable		
		HDMI Out HDR Meta Overwrite	0	0 1	0: Auto 1: Manual		12-2-9-2
		HDMI Out HDR Meta EOTF	0	0 1 2 3 4	0: Trad Gamma SDR 1: Trad Gamma HDR 2: SMPTE 2084 (PQ) 3: Hybrid Log-Gamma 4: Reserved		
		HDMI Out HDR Meta Gamut	0	0 1	0: C.C. Proc (C.C. Color Space) 1: Custom		
		HDMI Out HDR Meta Red X	32000	0 – 50000	Setting value is a fifty-thousandth of input value. Ex) 32000 => 0.64000		
		HDMI Out HDR Meta Red Y	16500	0 – 50000	Setting value is a fifty-thousandth of input value. Ex) 32000 => 0.64000		
		HDMI Out HDR Meta Green X	15000	0 – 50000	Setting value is a fifty-thousandth of input value. Ex) 32000 => 0.64000		
		HDMI Out HDR Meta Green Y	30000	0 – 50000	Setting value is a fifty-thousandth of input value. Ex) 32000 => 0.64000		
		HDMI Out HDR Meta Blue X	7500	0 – 50000	Setting value is a fifty-thousandth of input value. Ex) 32000 => 0.64000		
		HDMI Out HDR Meta Blue Y	3000	0 – 50000	Setting value is a fifty-thousandth of input value. Ex) 32000 => 0.64000		
		HDMI Out HDR Meta White Point X	15635	0 – 50000	Setting value is a fifty-thousandth of input value. Ex) 32000 => 0.64000		
		HDMI Out HDR Meta White Point Y	16450	0 – 50000	Setting value is a fifty-thousandth of input value. Ex) 32000 => 0.64000		
		HDMI Out HDR Meta Disp Lum MAX	100	1 - 65535	Input value is used without change.		
		HDMI Out HDR Meta Disp Lum MIN	1	1 - 65535	Setting value is a ten-thousandth of input value. Ex) 65535 => 6.5535		
		HDMI Out HDR Meta MaxCLL	100	1 - 65535	Input value is used without change.		

Category	Target	Item	Default	Value	Description	Required	Ref.
		HDMI Out HDR Meta MaxFALL	100	1 - 65535	Input value is used without change.		
FA-96UDC							
	FS1/FS2						
		Converter1 Source (FS1)	0	0 1	0: Synchronizer1 1: Synchronizer2	FA-96UDC	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)	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)		5-39
		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		5-24-1
		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		5-24-2
		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.		

Category						
Target						
Item	Default	Value	Description	Required	Ref.
Enhance V Low	1	0 - 10	Sets the lower vertical enhance level from 0.03 to 0.17.		
Directional Interpolation (FS1)	0	0 1	0: Disable 1: Enable	FA-96UDC FA-964K	5-25
Edge Detect Level (FS1)	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 63)	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	5-24-3
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		6-19
Audio Source Select V2							
	ASEL						
		Ch1-4	0	0 – 41	0: EMB1 In Ch.1-4 1: EMB1 In Ch.5-8 2: EMB1 In Ch.9-12 3: EMB1 In Ch.13-16 8: EMB2 In Ch.1-4 9: EMB2 In Ch.5-8 10: EMB2 In Ch.9-12 11: EMB2 In Ch.13-16 12: AES In Ch.1-4 13: AES In Ch.5-8 (W/ FA-96AES- UBL) 14: OP(AES) In Ch.1-4 15: OP(AES) In 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 (W/ FA-96DNT) 34: OP(DNT) In Ch.1-4 35: OP(DNT) In Ch.5-8 36: OP(DNT) In Ch.9-12 37: OP(DNT) In Ch.13-16 38: OP(DNT) In Ch.17-20 39: OP(DNT) In Ch.21-24 40: OP(DNT) In Ch.25-28 41: OP(DNT) In Ch.29-32	(FA-96 AES-UBLC) (FA-96 AES-UBL) (FA-96 ANA-AUD) (FA-96 MADI) (FA-96DNT)	6-6
		Ch5-8	1				
		Ch9-12	2				
		Ch13-16	3				
		Ch17-20	8	0 – 41 (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		6-17
		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		6-18
		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		6-20
		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		6-20
		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		6-24
		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		6-25
Audio Dolby Alignment							
	AES						
		FS Select A	0	0 1	0: FS1 1: FS2		6-26
		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		6-27
		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	6-30
		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)		6-11
		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		5-40
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	6-17
		Hysteresis Ch3/4						
		Hysteresis Ch5/6						
		Hysteresis Ch7/8						
		Polarity Ch1 | Polarity Ch8		0	0 1	0: Normal 1: Invert		6-19
		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		6-20
		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		1	0 1 2	0: Disable 1: Same as FS1 2: Same as FS2		6-27
		Terminal Ch1		0	0 1	0: Input 1: Output		6-18
		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	6-28
		OutputLevel Ch1 | OutputLevel Ch4	2				
		Polarity Ch1 | Polarity Ch4	0	0 1	0: Normal 1: Invert		6-29
		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		6-21
		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)		6-21
		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	1	0 1 2	0: Disable 1: Same as FS1 2: Same as FS2		6-27
		Input Impedance	1	0 1	0: 600 Ohm 1: Hi-Z		6-30
		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)		6-22
		Output Conv. Delay	1	0 1 2	0: Disable 1: Same as FS1 2: Same as FS2		6-27
		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		6-16
FA-96DNT							
	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-96DNT	6-15
		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				
		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		6-23

Category						
	Target					
		Item	Default	Value	Description	Required	Ref.
		Gain Ch1 | Gain Ch32	0	-400 - 400	Setting value is one-tenth of input value. Channel total gain = (Master Gain value) + (channel gain value)		
		Output Conv. Delay	1	0 1 2	0: Disable 1: Same as FS1 2: Same as FS2		6-27
		Tx Clock Type	0	0 1	0: Dante Clock 1: Genlock Source		7-4
FA-96DIN4CBL							
	SlotD						
		LtcOutSrc	0	0 1	0: Generator 1 1: Generator 2	FA-96 DIN4-CBL	5-32

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.

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