FOR.A
INNOVATIONS IN VIDEO
and AUDIO TECHNOLOGY

OPERATION MANUAL

HVS-490

Digital Video Switcher

HVS-492OU
HVS-492WOU
HVS-492ROU

Operation Unit

4th Edition - Rev. 1

FOR-A COMPANY LIMITED

Edition Revision History

Edit.	Rev.	Date	Description	Section/Page
1	-	2017/06/28	First edition	
1	1	2017/07/28	Supported tally units.	Sec. 25-2-5
2	-	2017/09/28	Added HVS-49SSD240G option. Added HVS-49ED option. Supported external device connections (Editor, VTR and VDCP) Added menus to Web-based control pages.	16-4 25-6 to 25-8 Appendix 3-6, 3-8 to 3-12
3	-	2017/12/01	Supported HVS-492ROU Added option cards (HVS-100AI and HVS-100AO). Supported additional video formats. Supported sequence operation.	 7-2, 7-3 20
3	1	2018/01/31	Added 4K mode.	22-6-1, 26, Appendix 4
4	-	2018/03/29	Added HVS-49DVE option. Added HVS-49SD option. Supported V-RAM.	13, 26-2, 30-1 7, 8-3, 30-1 17, 22
4	1	2018/05/09	Added HVS-49AES option.	3-3-2, 7-8, 30-1

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.

OpenSSL
This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (http://www.openssl.org/)

Freetype
Portions of this software are copyright © 2005 The FreeType Project (www.freetype.org). All rights reserved.

Qt GUI Toolkit v4.8: LGPLv2.1 + Qt Company Qt LGPL Exception version 1.1
Copyright © 2015, The Qt Company Ltd.
Copyright © 1991, 1999 Free Software Foundation, Inc.

VeraBd.ttf
Copyright © 2003 by Bitstream, Inc. All Rights Reserved.

Lighttpd
Copyright © 2004, Jan Kneschke, incremental. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

- Neither the name of the 'incremental' nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

* All other trademarks are trademarks or registered trademarks of their respective owners.

Upon Receipt

Digital Video Switcher HVS-490 units and their accessories are fully inspected and adjusted prior to shipment. Operation can be performed immediately upon completing all required connections and operational settings.
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.

A dedicated control panel is required for HVS-490 operations.

◆ **HVS-490 Box**

ITEM	QTY	REMARKS
HVS-490	1	Main Unit (MU)
AC Cord	1 set	(Including AC cord retaining clip)
Rack Mount Brackets	1 set	EIA standard type
CD-ROM	1	HVS-490/OU user manuals (PDF file)
Quick Setup Guide	1	

Options

HVS-100DI-A	1-2	HD/SD-SDI input expansion card
HVS-100AI	1-2	Analog input card
HVS-100PCI	1-2	PC input card
HVS-100DO	1-2	HD/SD-SDI output expansion card
HVS-100AO	1-2	Analog output card
HVS-100PCO	1-2	PC output card
HVS-49IO	1	16-input / 9-output (SDI: 8ch, HDMI: 1ch) expansion card
HVS-49PSM	1 set	Redundant Power Supply Unit for HVS-490
HVS-49SSD240G	1	SSD Option (Capacity: 240 GB)
HVS-49ED	1	Editor Control Software
HVS-49EXP4K	1	4K Format Option Software
HVS-49DVE	1	2.5D DVE expansion card
HVS-49SD	1	SD Format Option Software
HVS-49AES	1	Digital Audio I/O Card

* Up to 2 input/output HVS-100 Series expansion cards can be installed.

◆ **HVS-492OU/492WOU/492ROU Box**

ITEM	QTY	REMARKS
HVS-492OU HVS-492WOU HVS-492ROU (*1)	1	Switcher Control Panel (OU)
Control cable	1	For MU and OU connection, 10 m
AC Cord	1 set	(Including AC cord retaining clip)

(*1) Up to 3 control panels are configurable.

Options

HVS-490PSO	1 set	Redundant Power Supply Unit for operation units
Rack Mount Brackets	1 set	

◆ **Other Option Units**

ITEM	REMARKS
HVS-AUX16A/16B/32A/64A (*1)	Auxiliary Unit (Ethernet LAN connection)
HVS-TALR20/32 (*2)	Tally Control Unit (Relay type) (Hanabi Series Option) (RS-422 connection)
HVS-TALOC20/32 (*2)	Tally Control Unit (Open Collector type) (Hanabi Series Option) (RS-422 connection)

(*1) Up to 12 units can be connected to the switcher LAN.
(*2) Multiple HVS-TALOC / HVS-TALR configurations possible; up to 5 units max.

Optional devices or software are basically provided with the installation manuals (except factory- installed ones) or specific operation manuals.

About This Manual

This manual is intended to help the user easily operate this product and make full use of its functions during operation. Before connecting or operating your unit, read this operation manual thoroughly to ensure you understand the product. Afterwards, it is important to keep this manual in a safe place and available for reference.

Font Conventions
The following conventions are used throughout this manual:

- Text enclosed by a square (such as KEY1) indicates control panel **buttons**.
- Bold text (such as **SETUP**) indicates menu tabs and buttons in the menu screen.
- Shaded text (such as ON) indicates a **parameter setting**.
- Text enclosed by square brackets (such as [SETUP > SYSTEM > FORMAT]) indicates the **menu name**

Table of Contents

1. Prior to Starting

1-1. Overview

HVS-490 is a Hanabi Series newest 2M/E switcher, which offers a rich feature set making it ideal for live staging, event applications, sports, news studios, OB vans, editorial offices, presentation venues and more.

1-2. Features

Well-chosen standard features as well as various expansion options

- 4M/E capability: 2 M/E + 2 MELite
- HD-SDI 16-input / 8-output and 1 HDMI output standard
- Input/output expansion options:
  40-input / 18-output (16 SDI + 2 HDMI)
  36-input / 20-output (18 SDI + 2 HDMI)
  32-input / 22-output (20 SDI + 2 HDMI)
- 12 Auxiliary buses

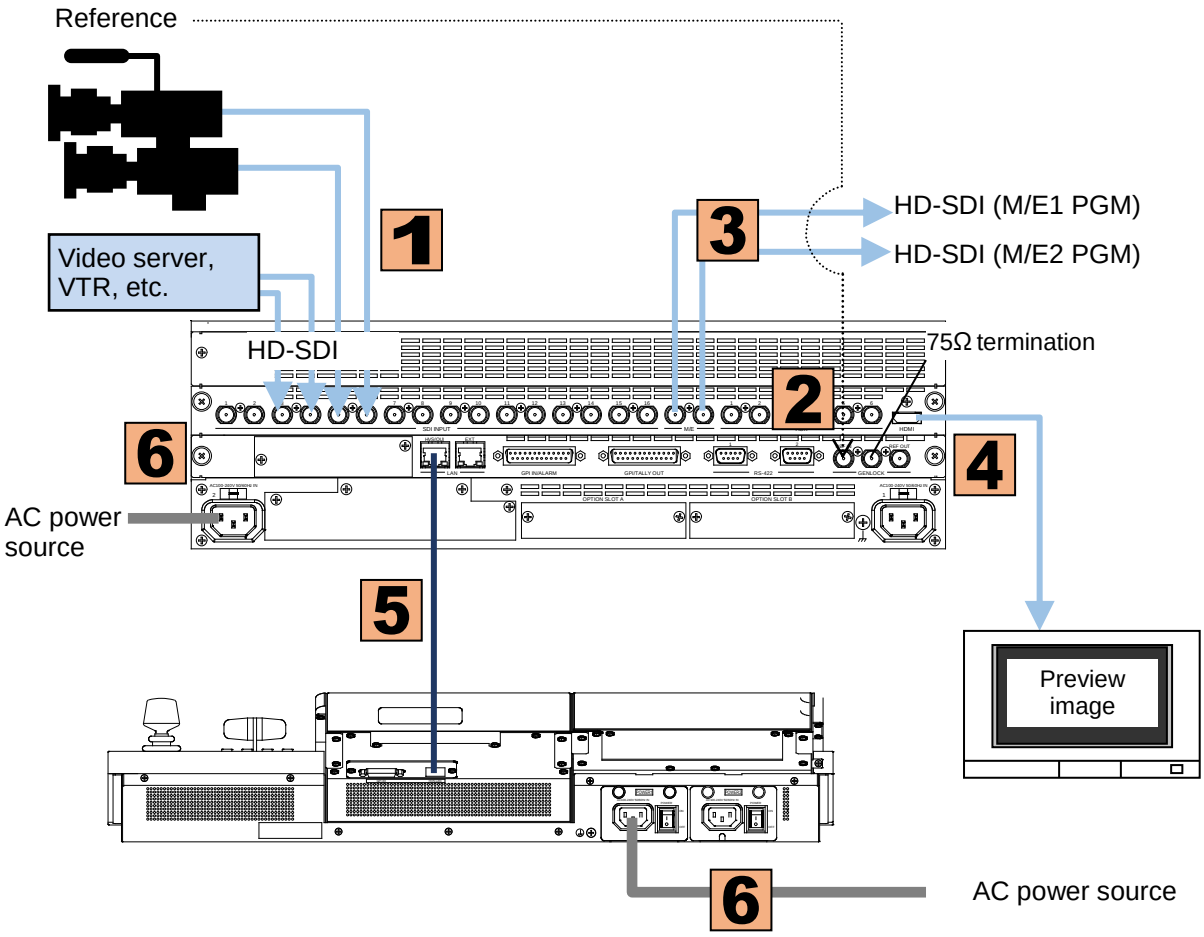
Item		Standard	Option
M/E		2 M/E 2 MELite	2 MELite (w/ HVS-49IO option)
Input		SDI x 16	Expandable configurations: 40-input / 18-output (16 SDI + 2 HDMI) 36-input / 20 output (18 SDI + 2 HDMI) 32-input / 22 output (20 SDI + 2 HDMI)
Output		SDI (M/E) x 2 SDI (AUX) x 6 HDMI x 1	
Keyer	M/E1	KEYER x 4	
	M/E2	KEYER x 4	
		FLEXaKEY x 4	
DVE channel		2.5D DVE x 16	
Multiviewer		x 3	

- HDMI and SD-SDI formats optionally supported
- Control panel with RGB color buttons and 7-inch touch panel GUI.
- 3 independent multiview channels, supporting 2/4/5/7/9/10/11/13/16-window views with title, tally and audio meter display
- All inputs have FS with Still image store and capture
- More than 130 of WIPE and DVE type transition patterns
- 2.5 DVE effects simultaneously available on all KEYER and FLEXaKEY buses.
- Transition effects when loading events and switching AUX signals
- Chromakey generator and mixer
- 4 Color Correction channels per M/E
- Safety area markers
- Internal color-bar generator
- 4 image or movie channels available (up to 15 sec in HD). Image data upload possible
- Various control interfaces
  -RS-422 for router
  -Ethernet LAN for web-based control and image data transfer from Windows and Mac computers or on tablets
- Redundant power supply for main and operational units (optional)

2. Connection and Basic Operation

2-1. Basic Connection Example

(1) Connect video sources (SDI signals) from cameras or other video devices to the Main Unit.
(2) Input a reference signal. Terminate the other connector with a 75-ohm terminator if it is not looped-through.
(3) Connect downstream devices to provide combined output video (PGM images in SDI format).
(4) Connect a monitor with the HDMI connector (for monitoring preview or multiview images).
(5) Connect the Main Unit (MU) and Control Panel (OU) using the supplied control cable.
(6) Supply AC power to the Main Unit and Control Panel using the provided power cords.



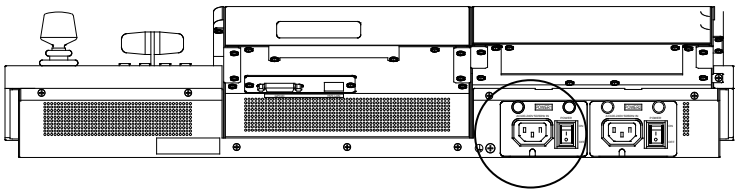
2-2. Power ON

Before powering on the system, verify that all system connections have been properly connected according to the previous section.

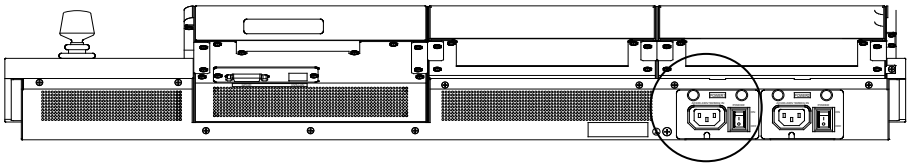
◆ **Control Panel Power supply**

Supply AC power to the control panel using the provided power cord and turn on the power switch located at the rear panel of your control panel.

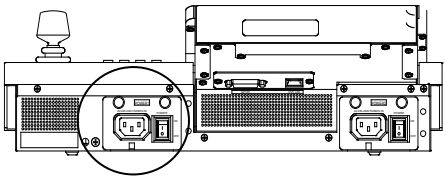
- HVS-492OU



- HVS-492WOU

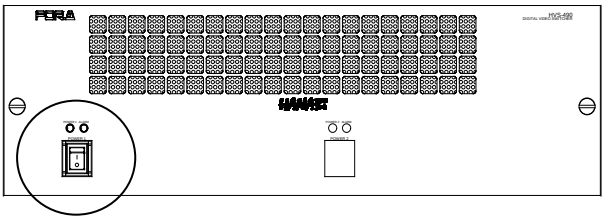


- HVS-492WOU



◆ **MU (Main Unit) Power supply**

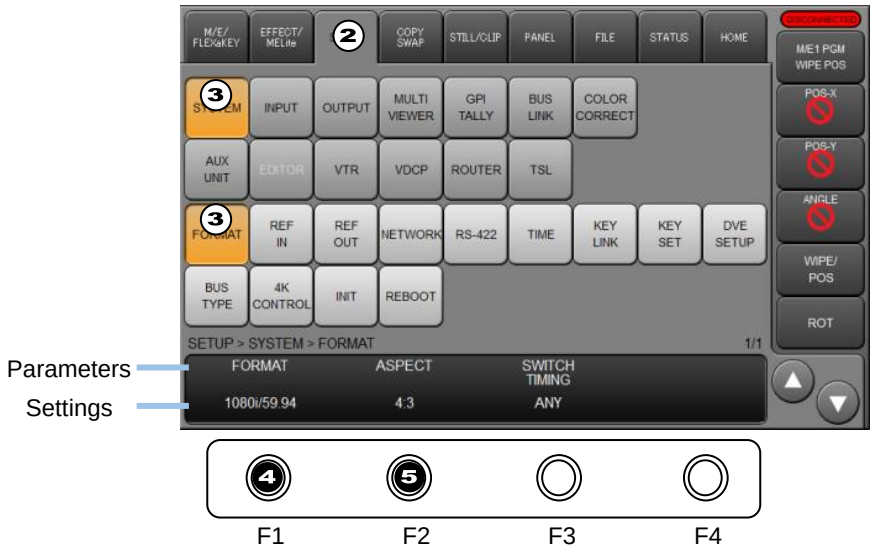
Supply power to the MU using the provided power cable and turn on the power switch located on the front panel. If a redundant power supply option is installed, turn on both power switches.



2-3. Selecting System Signal Format

When powering on your unit for the first time, select a signal format as shown below.

(1) A menu will appear on the screen when the system is powered on.
(2) Tap the **SETUP** tab.
(3) Tap **SYSTEM**, then **FORMAT** to display the menu as shown below
(4) Turn control knob F1 to select the signal format used in the switcher. Then press F1 to confirm the setting.
(5) Turn F2 to select the aspect ratio.



(6) After settings, tap **REBOOT**.
(7) Turn F1 to set REBOOT to MU, then press F1. Tap on **YES** on the confirmation dialog to reboot the system. The selected format and aspect ratio are applied after restarting the switcher.

TIPS

When the switcher is powered ON for the first time, set the date and time if it is improperly set. (See Sec. 23-4. "Setting Date and Time.")

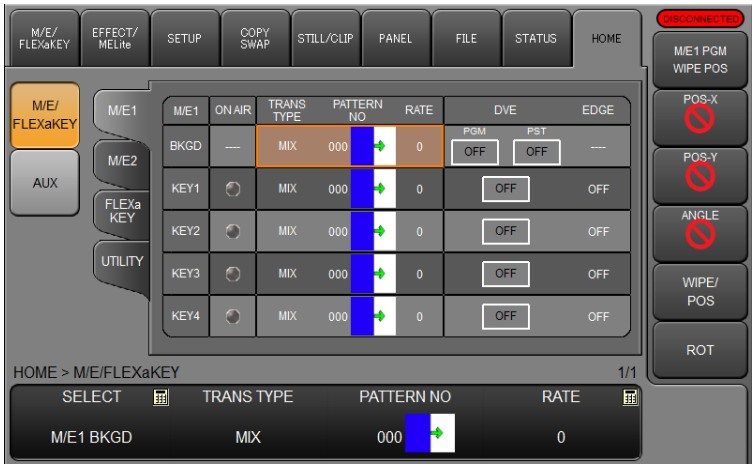
2-4. Verifying Current Status

The HOME screen allows you to verify the M/E, FLEXaKEY and STILL status.
In addition, some of these parameters can also be changed in the HOME screen.

◆ [HOME > M/E/FLEXaKEY] screen

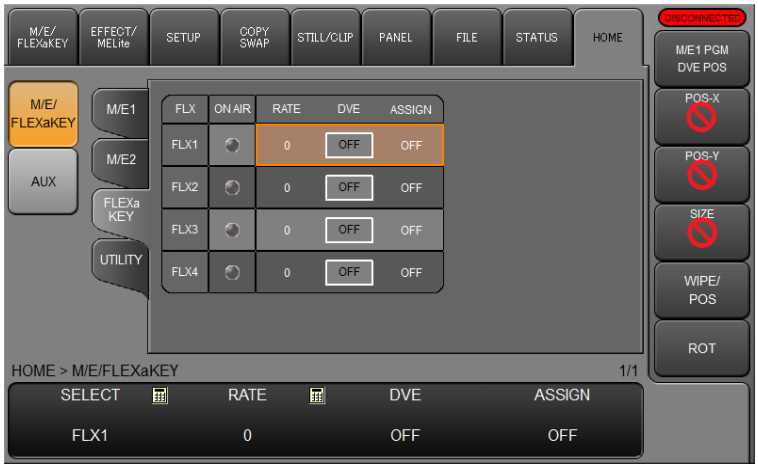
Open the [HOME > M/E/FLEXaKEY] screen.
Tap the M/E1, M/E2, FLEXaKEY or UTILITY tab to display the tab screen

- M/E1 / M/E2 tab screen



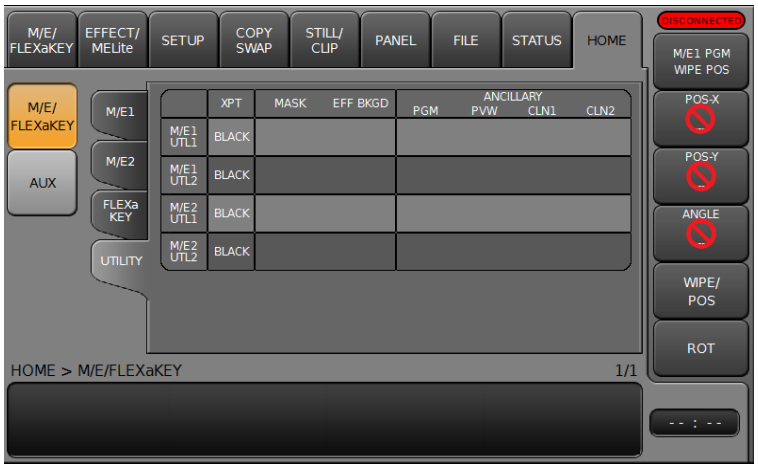
Parameter	ON AIR	TRANS TYPE	PATTERN NO	RATE	DVE	EDGE
Description	Lit red: On-air Unlit: Off-air	Transition settings			Channel type when using DVE	Key edge type
Refer to Sec.	11-4	11-3, 11-7 and 1-12-11			13	12-6

- FLEXaKEY tab screen



Parameter	ON AIR	RATE	DVE	ASSIGN
Description	Lit red: On-air Unlit: Off-air	Transition rate	Channel type when using DVE	Output destination
Refer to	11-4	1-12-11	13	12-7-1

- UTILITY tab screen



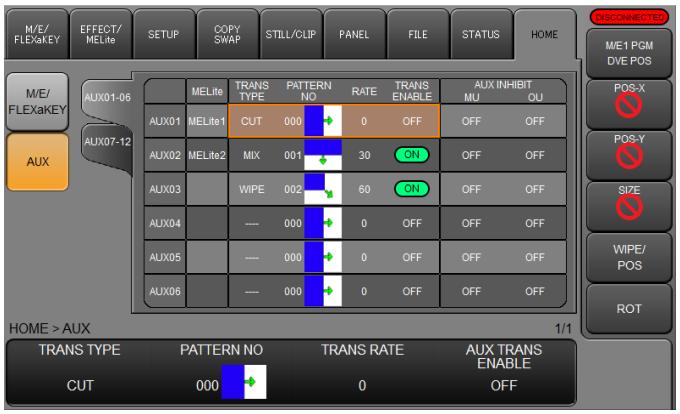
Parameter	XPT	MASK	EFF BKGD	ANCILLARY
Description	Signal selection	Usage status (See the table below.)		
Refer to	6-6	12-5-2, 11-12-8, 8-6		

Symbol	Meaning
✓	This is being used.
X	Unavailable in the current setting.
---	Unavailable
	Available

◆ [HOME > AUX] Screen

To open the [HOME > AUX] screen, tap the **AUX01-06** or **AUX07-12** tab to display the tab screen.

- AUX01-06 / AUX07-12 tab

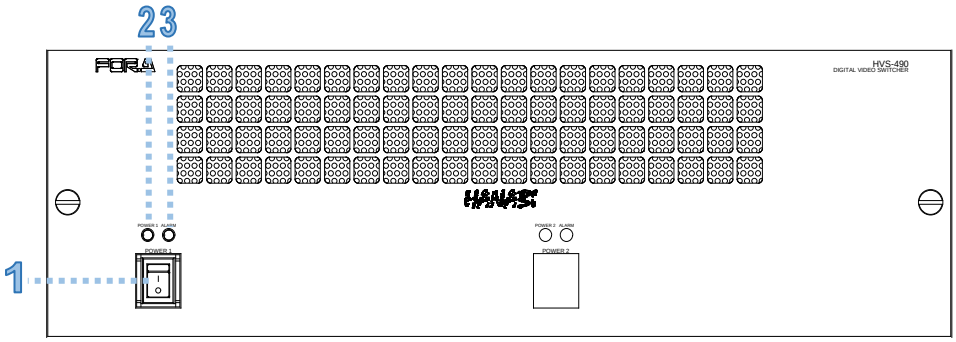


Parameter	MELite	TRANS TYPE	PATTERN NO	RATE	TRANS ENABLE	AUX INHIBIT
Description	Assigned MELite mix signal.	Transition settings				Inhibit status
Refer to	10-1	11-11				8-2

3. Panel Descriptions

3-1. HVS-490

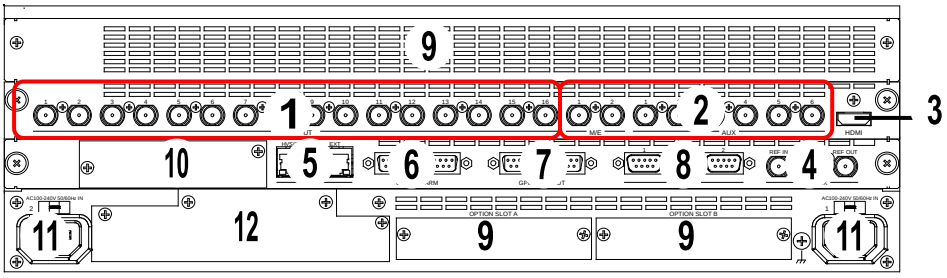
◆ **Front Panel**



No.	Name	Description	
1	Power switch 1, 2	Used to turn each power unit On/Off. Turns on all active power units.	
2	POWER indicator 1, 2	Lit green	Power is supplied to the unit.
		Unlit	Power is not supplied to the unit. Or power unit is not installed.
3	ALARM indicator 1, 2	Power and fan alarm. Lit red when an error occurs. In such cases, power off the unit and consult your FOR-A supplier. The indicator is normally unlit.	

* Power Supply Unit 1 is standard and Unit 2 is optional.

◆ **Rear Panel**



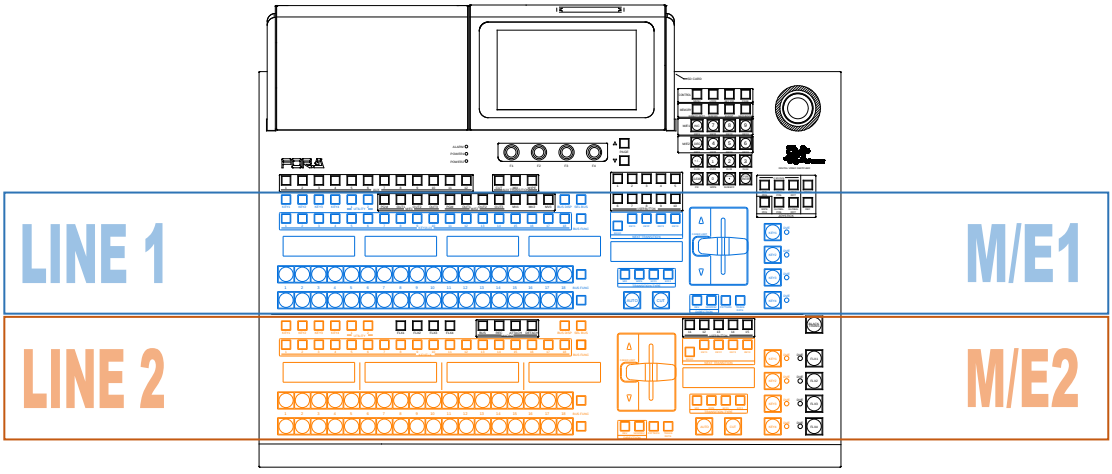
No.	Name		Description	Refer to
1	SDI INPUT		Used to input video signals: HD-SDI x 16 (BNC)	6
2	SDI OUTPUT		Used to output video signals: HD-SDI x 8 (M/E1-2 and AUX1-6) (BNC)	8
3	HDMI		Used to output video in HDMI format: HDMI x 1	8-3
4	GENLOCK (REF IN REF OUT)		Used to input and output a genlock signal; tri-level sync or black burst. The other REF IN connector is used as a loop-through output connector. It must be 75-ohm terminated if not looped-through. (BNC)	2
5	LAN	HVS(OU)	Used for control panel (HVS-492OU/ 492WOU/ 492ROU) connection. (RJ-45) Use the control cable supplied with the OU to connect to the HVS LAN port on the OU.	
		EXT	Uses for additional LAN connection (RJ-45)	
6	GPI IN/ALARM		Used for GPI input. (25-pin D-sub, female)	3-4-2

7	GPI /TALLY OUT	Used for GPI output and Tally output. (25-pin D-sub, female)	3-4-3
8	RS-422	Used to connect external devices such as router. 2 ports (9-pin D-sub, female)	3-4-1
9	Option Slots	Used to install optional input/output expansion cards.	3-3
10	Option Slot	Used for HVS-49SSD240G.	3-3
11	AC IN1	Standard power supply unit (Power 1). Use the supplied power cords to supply AC power to the unit. (AC100V-240V 50/60Hz) A ground terminal is supplied and should be connected to earth ground. Cord retaining clips are also supplied and should be used to secure the cords to the panel.	
	AC IN2	Optional power supply unit for redundant configuration (HVS-49PSM).	
12	Option Slot	Used for HVS-49AES.	3-3

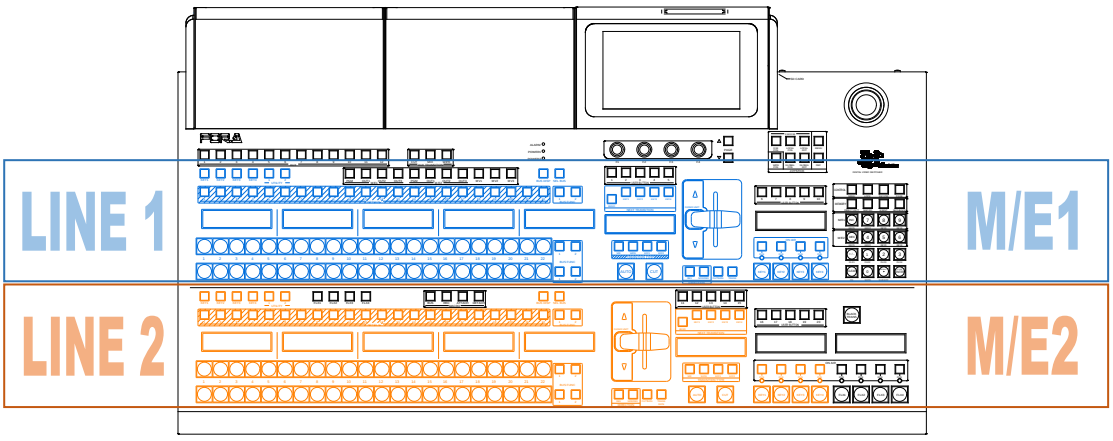
3-2. Control Panel

The control panel HVS-492OU/492WOU/492ROU is comprised of two M/E controllers (Line 1 and 2) and other sections. As factory default, **Line 1** is assigned to **M/E1**, **Line 2** to **M/E2**.
"M/E" stands for "Mix Effect buses", in which video sources are mixed and transitioned. In many cases, M/E buses are fixed in position, however in these control panels, M/E buses are not fixed but capable of changing their position.

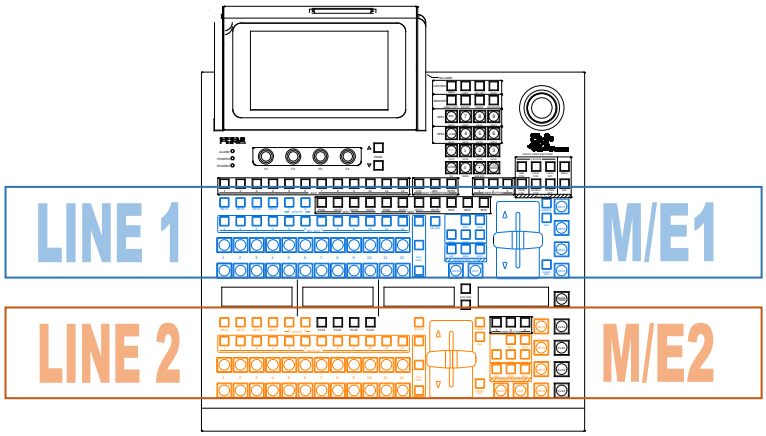
◆ **HVS-492OU**



◆ **HVS-492WOU**

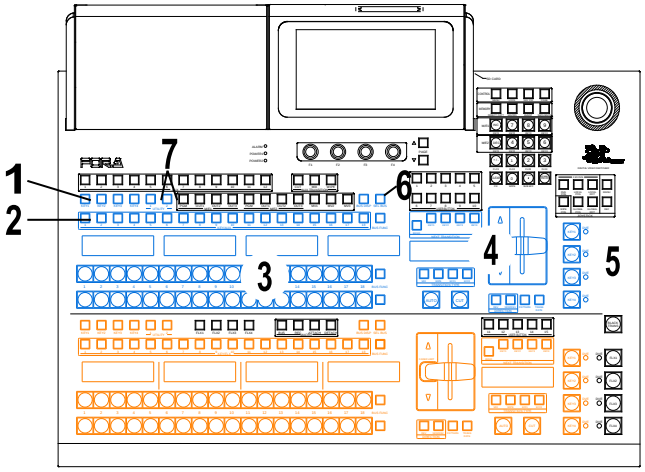


◆ **HVS-492ROU**

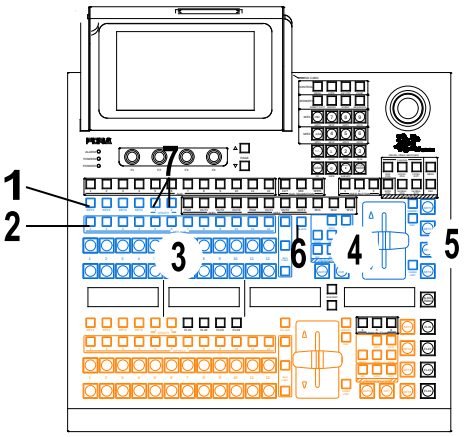


◆ **LINE1**

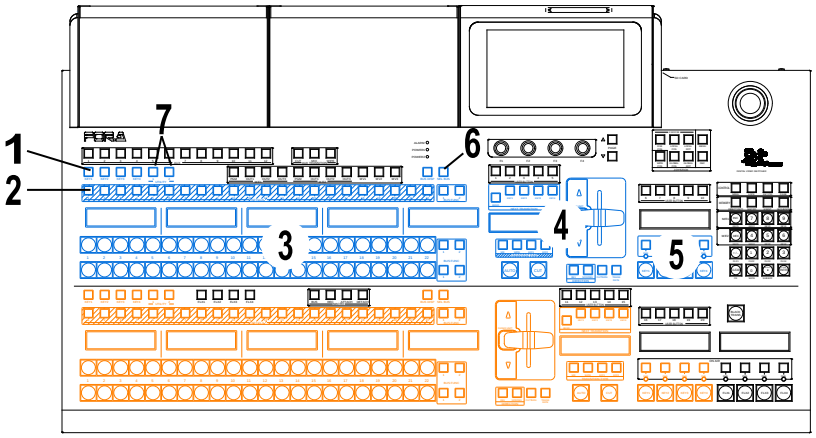
HVS-492OU



HVS-492ROU



HVS-492WOU

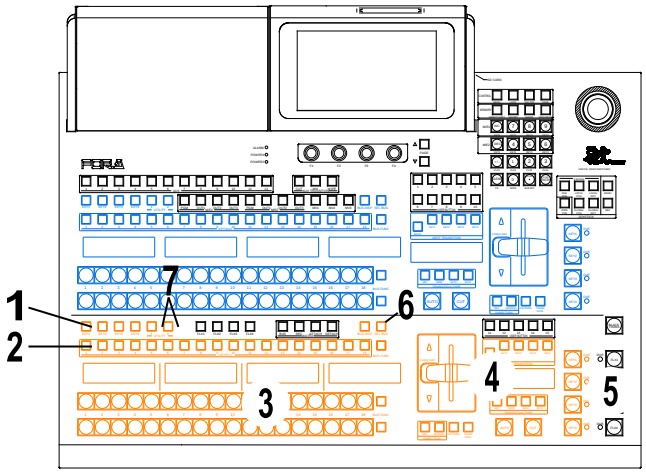


No.	Name	Description	Refer to Sec.
1	LINE1 KEY1-4	Key selection buttons. Press a key button and select its fill video on the KEY/AUX bus just below the buttons.	12
2	LINE1 KEY/AUX bus	Used to select Insert/Source video for KEY1-4 and background video sources for AUX outputs.	6-2, 8-2, 12

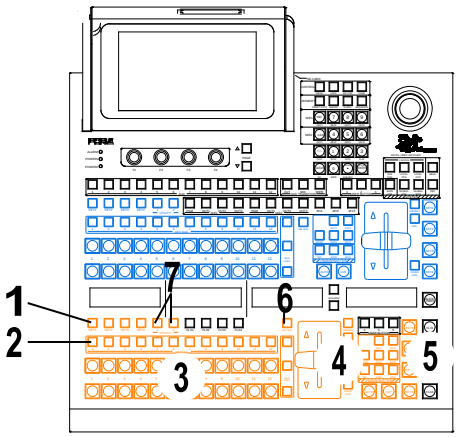
3	LINE1 M/E bus	Used to select background video sources for an M/E that is assigned to LINE 1. (Default setting: M/E1)	6
4	LINE 1 transition block	Used to set up and perform background and / or key transitions in LINE 1.	11-3
5	LINE 1 KEY transition block	Used to KEY1-4 transitions in LINE 1.	11-4
6	SEL BUS button	Used to assign an M/E to LINE 1.	9-1-1
7	LINE1 UTL1-2	UTILITY 1-2 buttons. Selecta a UTILITY bus and select its video source in the KEY/AUX bus buttons.	6-6

◆ **LINE2**

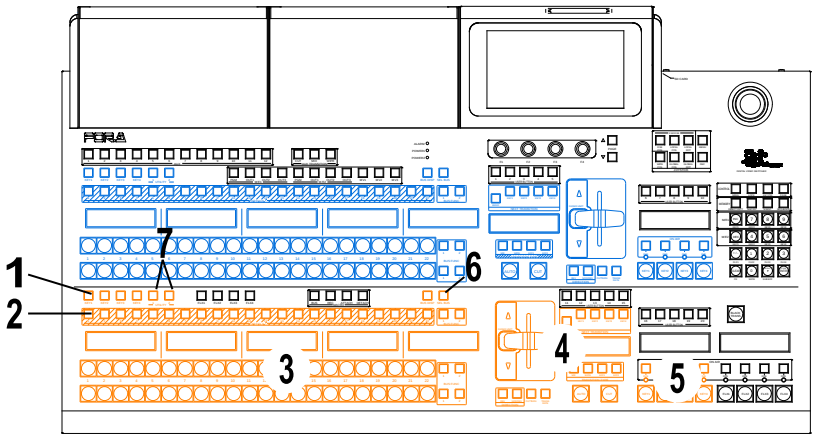
HVS-492OU



HVS-492ROU



HVS-492WOU

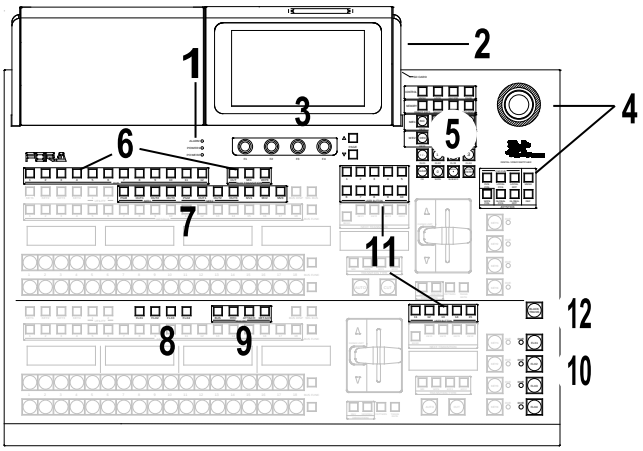


No.	Name	Description
1	LINE2 KEY1-4	Key selection buttons. Press a key button and select its fill video on the KEY/AUX bus just below the buttons.
2	LINE2 KEY/FLX bus	Used to select a fill video for KEY1-4 and FLXaKEY1-4.
3	LINE 2 M/E bus	Used to select background video sources for an M/E that is assigned to LINE 2. (Default setting: M/E2) (See Sec. 6. “Setting up Video Sources.”)
4	LINE 2 transition block	Used to set up and perform background and / or key transitions in LINE 2.
5	LINE 2 KEY transition block	Used to KEY1-4 transitions in LINE 2.
6	SEL BUS button	Used to assign an M/E to LINE 2.

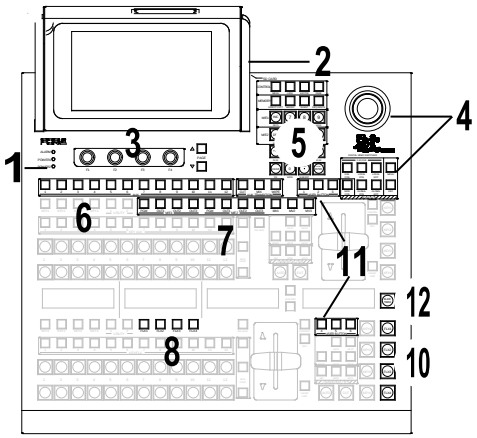
7	LINE2 UTL1-2	UTILITY 1-2 buttons. Selecta a UTILITY bus and select its video source in the KEY/FLX bus buttons.

◆ **Other blocks**

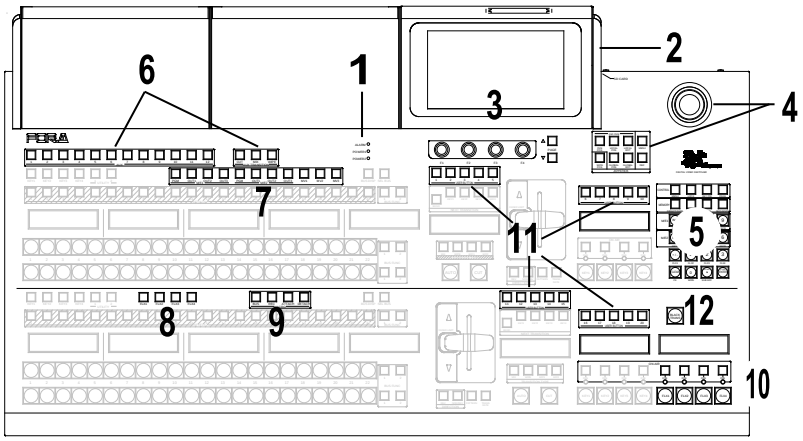
HVS-492OU



HVS-492ROU



HVS-492WOU

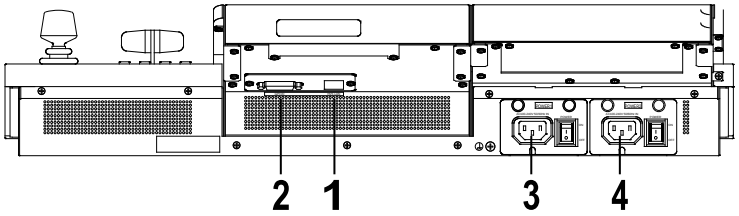


No.	Name	Description	Refer to.
1	ALARM indicator POWER 1 indicator POWER 2 indicator	**ALARM** indicates the fan alarm status in the main unit. The indicator blinks red when an alarm occurs. In such a case, power off the system and consult your FOR-A supplier. The indicator is normally unlit. **POWER 1 and 2** indicators light up green when the power is properly supplied.	27-1
2	SD card slot	Used to insert an SD card for image file import and export or system setting backup.	22
3	Menu control block	This block is composed of a 7-inch touch panel, menu control push-buttons (F1 to F4) and page navigation buttons.	5
4	Joystick block	Used to adjust DVE image positioning and size.	
5	CONTROL block MEMORY block keypad	Multi-function keypad. Four memory buttons (DIRECT PATT, MACRO, EVENT and SEQUENCE) and four control buttons (MENU, LOCK, KEY PRI, PAGE) above the keypad change the keypad mode.	11-8, 19, 20, 21
6	AUX1-12	AUX bus selection buttons. Press an AUX button and select its background video on the KEY/AUX bus just below the buttons. The AUX transition type selection is also possible.	8-2

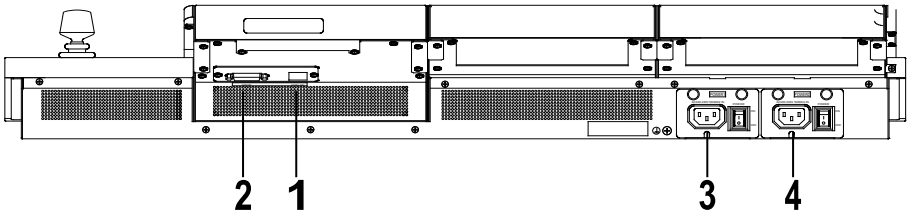
7	M/E or multiview video buttons	Used to select an M/E mixed or multiview video for an AUX bus or KEY1-4.	8-1-1, 8-2
8	FLEXaKEY 1-4	FLEXaKEY selection buttons. Press a key button and select its fill video on the KEY/FLX bus just below the buttons.	12-7
9	MACRO operation buttons	Pressing a button changes the KEY/FLX bus to macro EXE buttons. (HVS-492OU/492WOU only)	21
10	FLEXaKEY transition block	Used to perform FLEXaKEY transitions.	12-7
11	USER BUTTON	User assignable buttons. Menu shortcuts or functions can be assigned to these buttons.	24-3
12	BLACK TRANS	Used to perform black transitions.	11-2

◆ **Rear Panel**

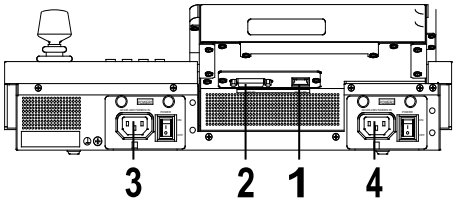
HVS-492OU



HVS-492WOU



HVS-492ROU



No.	Name	Description	Refer to Sec.
1	HVS LAN	Used for Main Unit (HVS-490) connection. (RJ-45) Use the control cable supplied with the OU to connect to the LAN HVS port on the OU.	2-1
2	GPI I/O	Used for GPI input/output and tally output. (15-pin D-sub, female)	3-4-4
3	POWER 1	Standard power supply unit (Power 1). Use the supplied power cord to supply AC power to the unit. (AC100V-240V 50/60Hz)	
4	POWER 2	Used to install an optional power supply unit (HVS-49PSO).	

3-3. Option Slots

All expansion cards for HVS-490 can be configured as shown below.
Function expansion card modules should be installed into front side slots and I/O expansion cards into rear side slots.

IMPORTANT

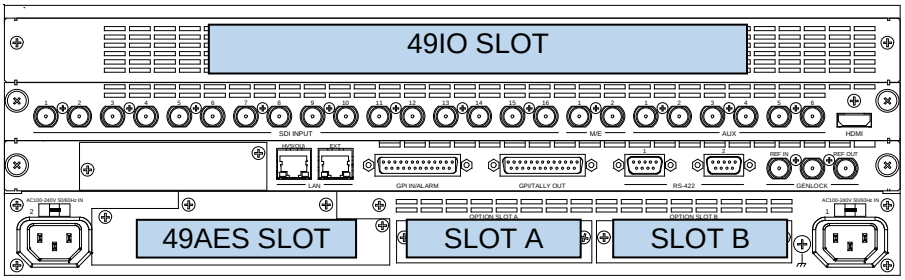
For further details on system expansion (optional cards) and fan replacement, contact your FOR-A supplier.

3-3-1. Main Unit Front Side

HVS-49PSM, a redundant power supply unit, can be installed onto the front panel.

3-3-2. Main Unit Rear Side

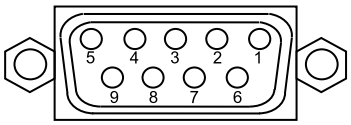
The following expansion cards can be installed into empty slots on the rear panel.



Option Slot	Available card	Expandable inputs and outputs	Refer to
49IO SLOT	HVS-49IO	SDI input x 16 SDI output x 8 HDMI output x 1	7-7
SLOT A SLOT B	HVS-100DI-A	HD/SD-SDI input x 4	7-1
	HVS-100AI	Analog input (Composite, Component) x 2	7-2
	HVS-100PCI	HDMI input x 2 Analog RGB input x 1	7-3
	HVS-100DO	SDI output x 2	7-4
	HVS-100AO	Analog output (Composite, Component) x 2	7-5
	HVS-100PCO	HDMI output x 2 Analog RGB output x 1	7-6
49AES SLOT	HVS-49AES	AES 8-channel audio input AES 8-channel audio output (Balanced or unbalanced)	7-8

3-4. Interfaces

3-4-1. RS-422



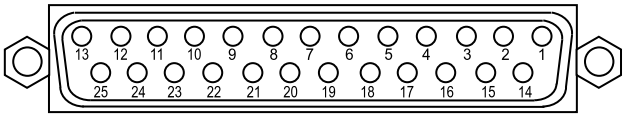
9-pin D-sub (female)
with inch screws

◆ **Connector Pin Assignment Table**

Pin No.	Signal Name	In/Out	Description
1	FG		Frame ground
2	R-	In	Receive data (-)
3	T+	Out	Transmit data (+)
4	SG		Signal ground
5	NC		Not used
6	SG		Signal ground
7	R+	In	Receive data (+)
8	T-	Out	Transmit data (-)
9	FG		Frame ground

RS-422 ports are used for external device connections. See the associated chapters to configure connections.
Router: See Sec. 25-3. “Router Control.”
Editor: See Sec. 25-6. “Editor Control”.
VTR: See Sec. 25-7. “VTR Control”.
VDCP: See Sec. 25-8. “VDCP Operation”.

3-4-2. GPI IN/ALARM



25-pin D-sub (female)
with inch screws

◆ **Connector Pin Assignment Table**

Pin No.	Description
1	M/E1 BKGD AUTO TRANS (default setting)
2	M/E1 KEY1 AUTO TRANS (default setting)
3	M/E1 KEY2 AUTO TRANS (default setting)
4	M/E1 KEY3 AUTO TRANS (default setting)
5	M/E1 KEY4 AUTO TRANS (default setting)
6	M/E2 BKGD AUTO TRANS (default setting)
7	M/E2 KEY1 AUTO TRANS (default setting)
8	M/E2 KEY2 AUTO TRANS (default setting)
9	M/E2 KEY3 AUTO TRANS (default setting)
10	M/E2 KEY4 AUTO TRANS (default setting)
11	Signal ground
12	FAN ALARM output
13	FAN ALARM output (Common)
14-22	Not used (default setting)
23	Signal ground
24	POWER ALARM output
25	POWER ALARM output (Common)

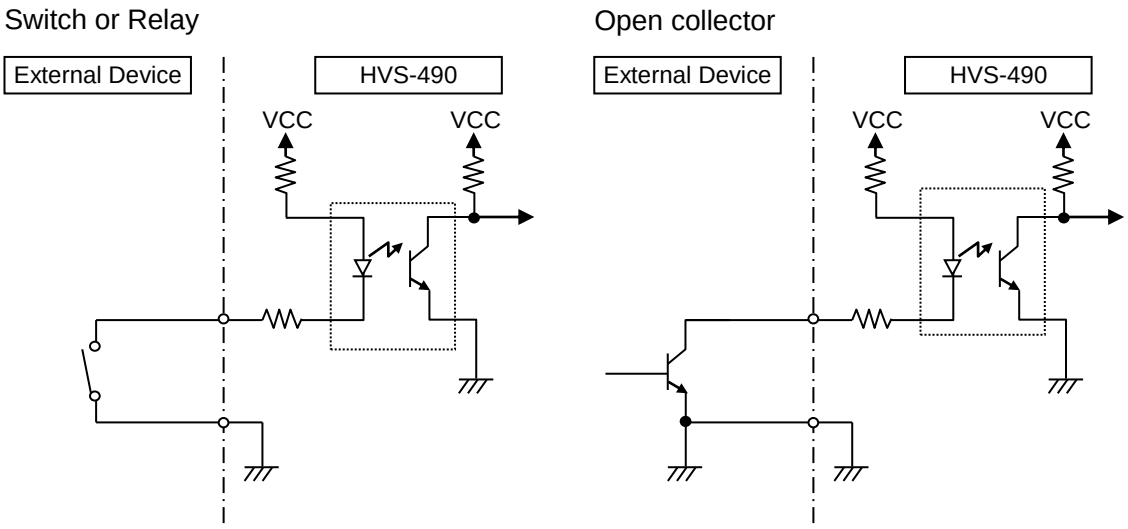
The pin functions are freely assignable. (See Sec. 25-1-1. “GPI IN.”)

* Maximum rating current for each pin is 0.5 A.

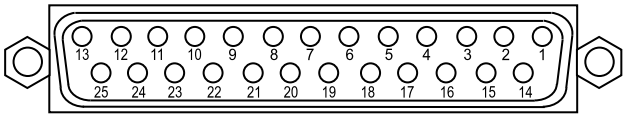
FAN ALARM
Pin 12 and 13 are shorted if a fan failure occurs.

POWER ALARM
Pin 24 and 25 are shorted if a power failure occurs (or the unit is normally powered off).

◆ **GPI IN/ALARM Circuit**



3-4-3. GPI / TALLY OUT



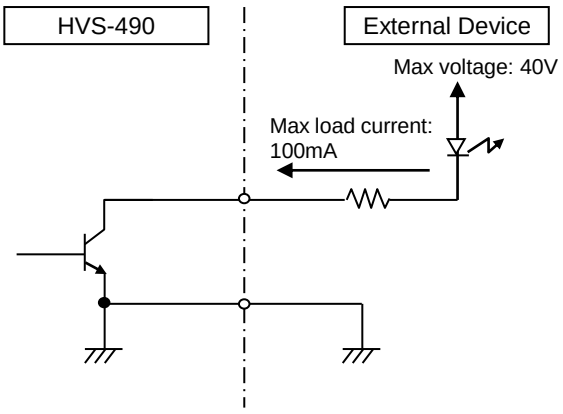
25-pin D-sub (female)
with inch screws

◆ **Connector Pin Assignment Table (25-pin D-sub, female)**

Pin No.	Description
1-22	RED TALLY-IN01-IN22 (default setting)
23-24	GND
25	+5V output (MAX 0.3A)

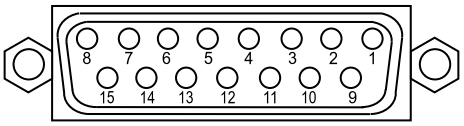
Pin functions are freely assignable. (See Sec. 25-1-2. “GPI OUT” and 25-2 .”Tally Output.”)

◆ **GPI / TALLY OUT Circuit**



3-4-4. GPI I / O (Control Panel)

As factory default, the connector pin assignments are set as shown in the table below.



15-pin D-sub (female)
with inch screws

◆ **Connector Pin Assignment Table (15-pin D-sub, female)**

Pin No.	IN/OUT	Description
1	IN	M/E1 BKGD AUTO TRANS (default setting)
2	IN	M/E1 KEY1 AUTO TRANS (default setting)
3	IN	M/E1 KEY2 AUTO TRANS (default setting)
4	IN	M/E1 KEY3 AUTO TRANS (default setting)
5	IN	M/E1 KEY4 AUTO TRANS (default setting)
6	IN	M/E2 BKGD AUTO TRANS (default setting)
7	IN	Signal ground
8	IN	Signal ground
9	OUT	M/E1 BKGD TRANS STS (default setting)
10	OUT	M/E1 KEY1 TRANS STS (default setting)
11	OUT	M/E1 KEY2 TRANS STS (default setting)
12	OUT	M/E1 KEY3 TRANS STS (default setting)
13	OUT	M/E1 KEY4 TRANS STS (default setting)
14	OUT	M/E2 BKGD TRANS STS (default setting)
15	–	+5V output (MAX 0.3A)

See the previous sections for GPI IN/ALARM and GPI /TALLY OUT circuit details.
(See Sec. 25-1-3. "GPI I / O (Control Panel)")

4. Switcher System Configuration

HVS-490 (MU) and control panel (OU) units should be connected via LAN, directly or using a network hub. Use a network hub if adding external devices such as AUX units or computers to the switcher system.

Direct Connection

Use the supplied LAN cable to connect the HVS-490 LAN (HVS) port to the control panel HVS LAN port. (See Sec. 2-1. Basic Connection Example.)

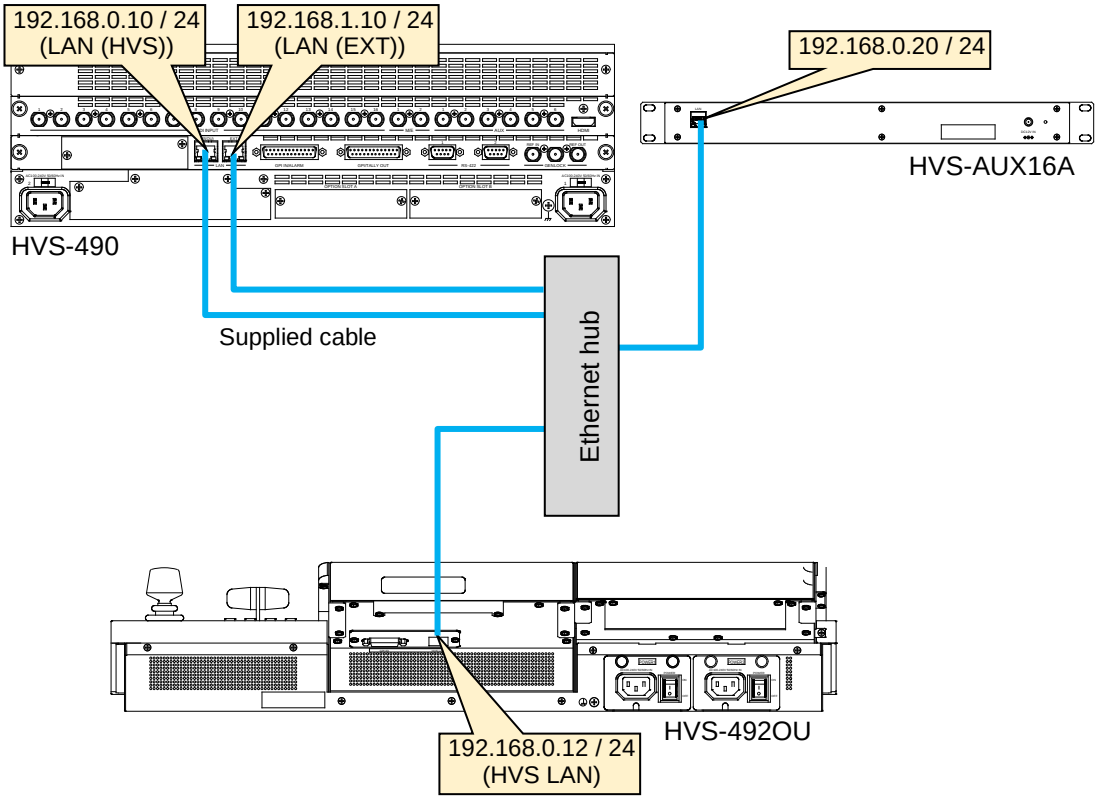
Using a Network Hub

(1) Use the supplied LAN cable to connect the HVS-490 LAN (HVS) to a network hub.
(2) Use the user-supplied LAN cables to connect the control panel LAN (HVS) to the hub.
(3) To connect external devices, use the user-supplied LAN cables to connect the devices to the HVS-490 LAN (EXT) port via the hub.

4-1. Network Settings

4-1-1. Factory Default IP Addresses

As factory default, IP addresses and netmask are set as shown in the figure below. To change these settings, open each relevant menu page. To apply changes, reboot the system. (See Sec. 24-4. "Reboot and Initialization.")



When connecting to an existing network, consult your network administrator regarding the LAN settings. Use the appropriate cables, hubs and configuration settings.

4-1-2. HVS-490 (MU)

Open the [SETUP > SYSTEM > NETWORK] menu and configure LAN (HVS) settings in PAGE 1 and LAN (EXT) settings in PAGE 2.

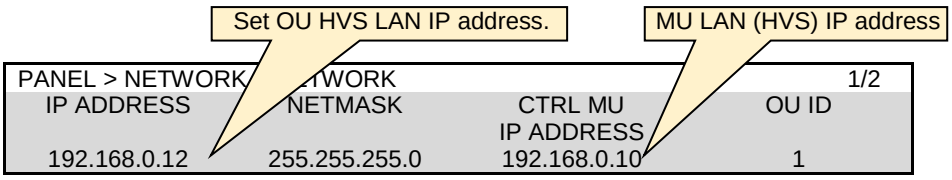
SETUP > SYSTEM > NETWORK			1/2
LAN1(HVS)	LAN1(HVS)	LAN1(HVS)	LAN1(HVS)
IP ADDRESS	NETMASK	GATEWAY	MAC ADDRESS
192.168.0.10	255.255.255.0	192.168.0.1	XXXXXXXXXXXX

SETUP > SYSTEM > NETWORK			2/2
LAN2(EXT)	LAN2(EXT)	LAN2(EXT)	LAN2(EXT)
IP ADDRESS	NETMASK	GATEWAY	MAC ADDRESS
192.168.1.10	255.255.255.0	192.168.0.1	XXXXXXXXXXXX

To change IP ADDRESS or GATEWAY, press F1 to F3 to enter a new address, then press **Enter**.
To change NETMASK, turn F2 to change the number and press F2.

4-1-3. Control Panel

Open the [PANEL > NETWORK > NETWORK] menu and set the control panel LAN (HVS) address under IP ADDRESS and specify the HVS-490 to be controlled using LAN1 address under CONTROL MU IP ADDRESS. To configure multiple operation units to the switcher, each unit must have a unique IP address and OU ID. Up to 3 controllers can be configured.
The Mac Address of the control panel (OU) LAN port is displayed in PAGE 2.



To change IP ADDRESS, press F1 to F3 to enter a new address, then press **Enter**.
To change NETMASK or OU ID, use F2 or F4 to change values then press F2 or F4.

5. Menu Operation

5-1. Opening Menu Pages

Menu access buttons in the touch panel are arranged in hierarchical order from top to bottom. Select a tab menu tab, then access level buttons to open a menu page where up to 4 parameters can be displayed.

5-1-1. Menu Access Buttons

Pressing or quickly pressing twice the following buttons on the control panel allows you to navigate the relevant menu.

Section	Button	
M/E1 and M/E2 bus blocks	MATTE1-2 (*1)	
	STILL1-4 (*1)	
	LINE DVE	
BUS SELECT block (Above the KEY/AUX bus)	M/E1 KEY1-4	M/E1 UTL1-2
	M/E2 KEY1-4	M/E2 UTL1-2
	AUX1-12	FLX1-4
	MV1-3	OUT1-3 (M/E1, M/E2)
M/E1 transition block M/E2 transition block	BKGD	
	KEY1-4	
	MIX	
	WIPE	
	EFF1-2	
	FADER LIMIT	
Joystick block	DVE POS	
	LOCAL POS	
	LOCAL ROT	
	GLOBAL POS	
	GLOBAL ROT	
	WIPE POS	

(*1) Note that MATTE1-2 and STILL1-4 buttons represent the bus buttons assigned to MATTE1, MATTE2 and STILL1 to STILL4 signals on M/E1 and M/E2.

◆ **To Disable Menu Access Buttons**

Open [PANEL > UTILITY > UTILITY] menu PAGE 3 and turn **MENU SHORTCUT** to OFF.

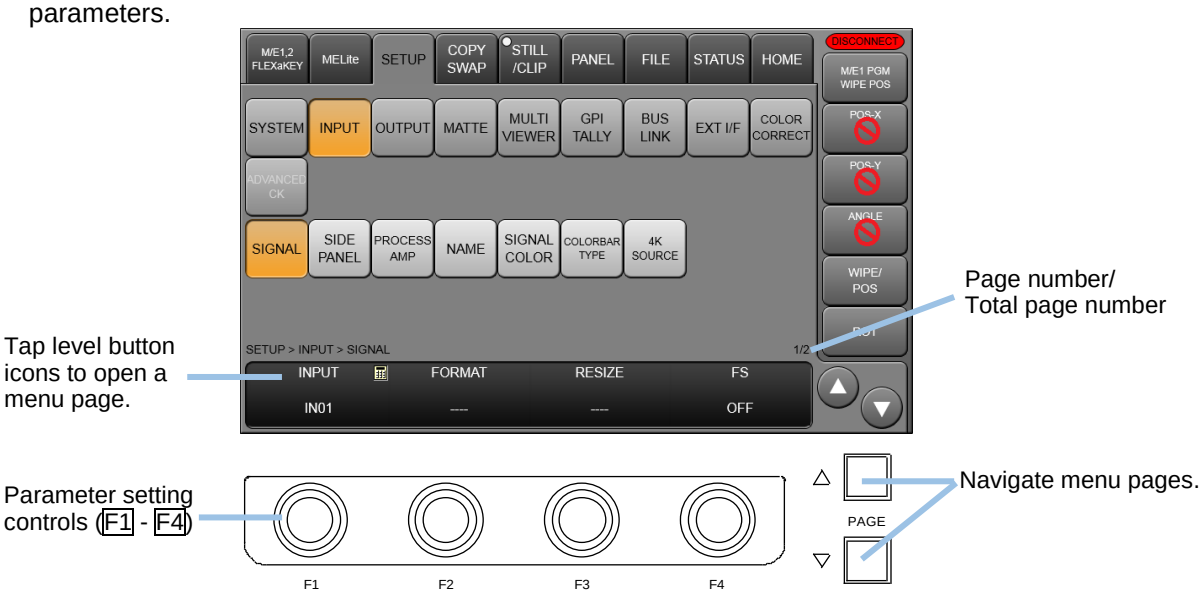
PANEL > UTILITY > UTILITY			3/3
LOCK MODE	THUMBNAIL	MENU SHORTCUT	KEY BUS SELECT LINK
WAVE	MANUAL	OFF	OFF

5-1-2. User Buttons (assigning Menu Shortcuts)

Versatile user buttons on the control panel can be used as menu access buttons by assigning desired menu pages. See Sec. 24-3. “USER Button” and “Appendix 1. User Button Functions.”

5-2. Setting Menu Parameters

[SETUP > INPUT > SIGNAL] menu PAGE 1 is shown in the figure below. This menu page has 4 parameters.



Four menu control push-button (F1 - F4) just below the parameter bar allow you to change parameter settings. For example, to change INPUT from IN01 to IN02, turn F1 clockwise incrementally.

In addition, tapping on a parameter with a keypad icon displays a pop-up keypad to enter numbers.

◆ **Moving between pages**

The [SETUP > INPUT > SIGNAL] menu has two pages. Tapping on the arrow icons (▲▼) allows you to navigate between pages.

5-2-1. Function Button Settings

Function button (F1 to F4) behavior can be modified as shown in [PANEL > UTILITY > UTILITY] menu.

PANEL > UTILITY > UTILITY			1/3
RENC TYPE	RENC SPEED	BUZZER VOLUME	BUZZER TONE
NORMAL	NORMAL	0	LOW

RENC TYPE	Allows you to change the button twisting direction.
RENC SPEED	Allows you to increase / decrease the electrical response speed.

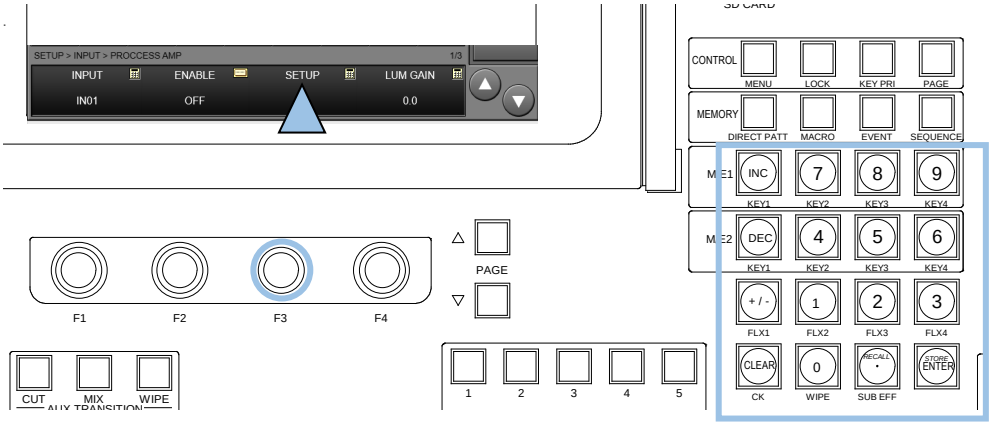
5-2-2. Using a Pop-up Keypad

Instead of turning F1-F4, a pop-up keypad can be used to numerically input parameters.

(1) For example, to change the SETUP value in the example on the right, press F3 or tap on **SETUP**.
(2) A numeric keypad will pop-up. Enter a number.
(3) Press **Enter** to confirm the setting.

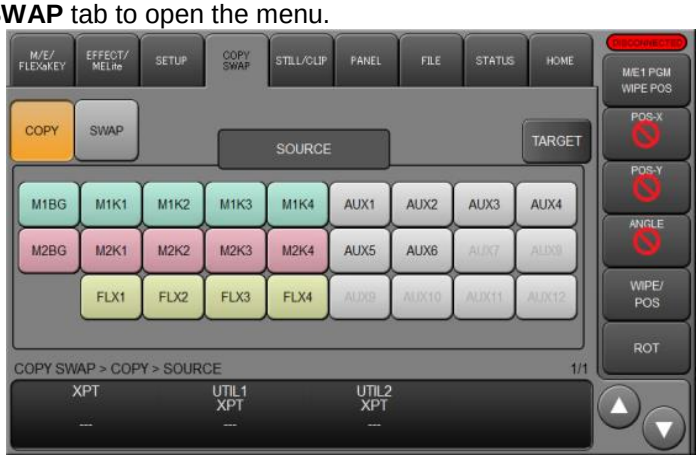
You can also enter the number using the multi-pad on the control panel and press STORE to confirm the setting.

- Pressing **CLR** (CLEAR) cancels the changes just made.
- To enter a negative number, enter a number, then a minus sign and press **Enter** (STORE).



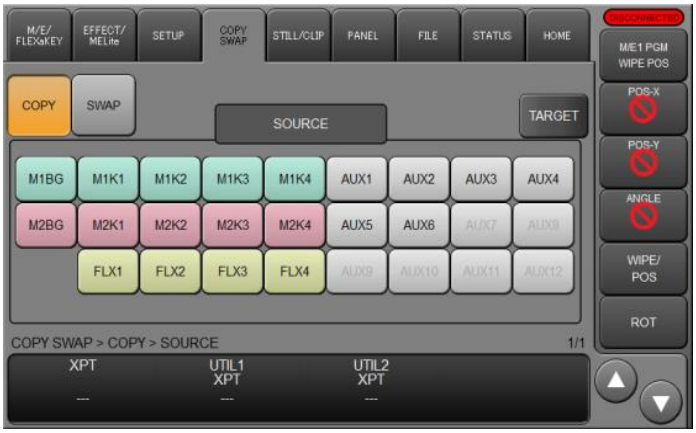
5-3. Copying / Swapping Settings

The [COPY SWAP] menu allows you to copy or swap settings between MEs, MELites or, KEYs. Tap the **COPY SWAP** tab to open the menu.



◆ **Ex.1: Copying Settings from M/E1BKGD to M/E2BKGD**

(1) Tap **COPY**.
(2) Tap **M1BG**.
(3) Tap **TARGET**.
(4) Tap **M2BG**. A confirmation dialog will appear.
(5) Tap **YES** to copy settings.



TIPS

Setting **XPT**, **UTL1 XPT** and **UTL2 XPT** to ON also copies the BKGD, KEY, AUX, UTILITY1 and UTILITY2 video selections.

Multiple bus data such as BKGD and KEYs can be copied simultaneously between M/E1 and M/E2.

◆ **Ex. 2: Swapping Settings between M/E1KEY3 and FLEXaKEY4**

(1) Tap **SWAP**.
(2) Tap **M1K3**.
(3) Tap **TARGET**.
(4) Tap **FLX4**. A confirmation dialog will appear.
(5) Tap **YES** to swap settings.

5-4. Returning Menu Settings to Default

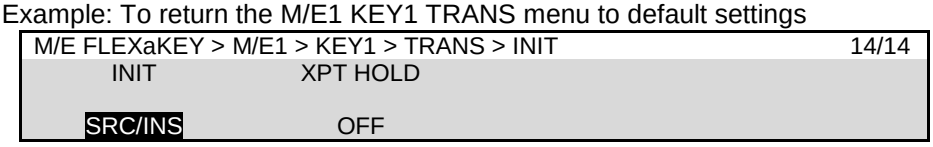
5-4-1. Returning Parameters to Default

- Press and hold the menu control push-button (F1 - F4) below each parameter to return their settings to factory default.
- If you need to reset parameters controllable from the JOYSTICK block to factory default, display parameters and press the DEF button. These parameters are returned to factory default all together.

5-4-2. Returning Menus to Default

Using INIT parameters
Some menus have an INIT parameter in the menu top page. Selecting INIT and pressing the control push-button returns all parameters in the menu to their default setting. Turn the related push-button to select ALL or a category you want to return to default if INIT can be set, and then press the push-button to reset the parameters.

Example: To return the M/E1 KEY1 TRANS menu to default settings



5-5. How to Back up Settings

◆ **MU**
One of the following three operations backs up panel settings and loads them automatically at startup. It is recommended to do any one of these operations after changing menu settings.

- Rebooting (Be sure to reboot the switcher instead of turning the power off then on. See Sec. 24-4. “Reboot and Initialization.")
- Move from the **SETUP** or **PANEL** tab to another menu tab.
- Saving / loading an event.

Background and key settings can be automatically loaded to the panel at startup.
See Sec. 19-6. "Loading an Event at Start-up" for details.

◆ **OU**
Menu settings are automatically backed up after changing any of the following menu items. Do not power off the switcher during backup (about 5 seconds). A buzzer sound will be heard when the backup is completed

- Items in the [PANEL > NETWORK > NETWORK] menu.
- **AUTO/CUT BTN LAYOUT** in [PANEL > TRANS CONTROL > AUTO/ CUT] menu PAGE 1
- Items in [PANEL > TRANS CONTROL > FADER] menu PAGE 7
- **BUZZER**, **BRIGHTNESS** or **LOCK MODE** in the [PANEL > UTILITY > UTILITY] menu
- Control panel lock ON/OFF

6. Setting up Video Sources

6-1. Adjusting Input Signal Levels

6-1-1. Proc Amp

The HVS-490 switcher provides the following Proc Amp features.

(1) Open the [SETUP > INPUT > PROCESS AMP] menu.
(2) Turn F1 to select the input to be adjusted.
(3) Turn F2 to turn ENABLE to ON and enable the PROCESS AMP feature.
(4) Adjust the black level under SETUP.
(5) Adjust luminance gain (white level) under LUM GAIN.

SETUP > INPUT > PROCESS AMP			1/3
SELECT	ENABLE	SETUP	LUM GAIN
IN01	OFF	0.0	0.0

(6) Go to PAGE 2.
(7) Adjust chrominance gain (level) under CHROMA GAIN.
(8) Adjust the color under HUE.

SETUP > INPUT > PROCESS AMP			2/3
SELECT	CHROMA GAIN	HUE	
IN01	0.0	0.0	

6-1-2. Video Level Clip

To maintain desired signal levels after adjusting video levels with the Proc Amp, use the Video Level Clip function to adjust the upper and lower YPbPr color space limits. Note that Video Level Clip can be applied only when the Proc Amp is enabled.

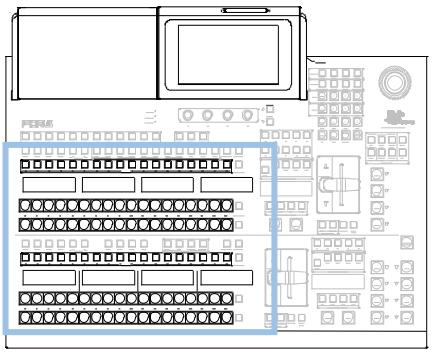
(1) Open [SETUP > INPUT > PROCESS AMP] menu PAGE 3.
(2) Turn F1 to select an input signal to be corrected.
(3) Signal level limits can be set under WHITE-Lv, BLACK-Lv and CHROMA respectively.

SETUP > INPUT > PROCESS AMP			3/3
SELECT	WHITE-Lv	BLACK-Lv	CHROMA
IN01	109.0	-7.0	111.0

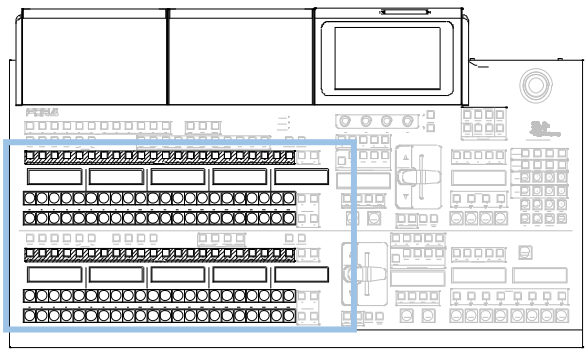
6-2. Mapping Video Sources to Bus Buttons

Bus button rows, comprising 18 buttons for each row on HVS-492OU units, 22 buttons on HVS-492WOU and 12 buttons on HVS-492ROU, are used to select video sources. Primary and optional video inputs, internally generated signals (black, mattes, etc.) can be freely assigned to any buttons in the M/E1, M/E2 and AUX1-12 bus rows.

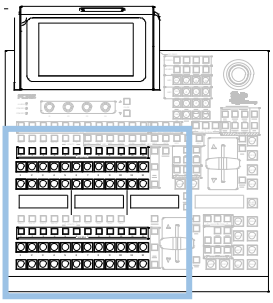
HVS-492OU



HVS-492WOU



HVS-492ROU



▶ Note that MELite1-2 must be assigned to LINE1 and LINE2 before use. See Sec. 9-1-1. “Assigning an M/E to a LINE” for more details.

(1) Tap the **PANEL** tab, then **BUS ASSIGN** and **LEVEL1** buttons to display the [PANEL > BUS ASSIGN > LEVEL1] menu page.
(2) Tap a button in the right side of the menu screen to select a bus row.
(3) Turn F1 to select a bus button.
(4) Turn F2 to select a video source.

PANEL > BUS ASSIGN > LEVEL1			1/2
BUTTON	SIGNAL	INHIBIT	COLOR PALETTE
01	BLACK	ON	PALETTE

(5) Users can inhibit operation of specific bus buttons. First, turn INHIBIT to ON for each button Then, set **BUTTON INHIBIT** to ENABLE in the [PANEL > BUS ASSIGN > ALL LEVEL] menu to inhibit bus buttons. The INHIBIT setting has no effect on the KEY/AUX and KEY/FLX rows.

PANEL> BUS ASSIGN > ALL LEVEL	1/1
BUTTON INHIBIT	
ENABLE	

6-2-1. Using Different Mappings between M/Es

Different source mappings can be set for M/E1-2 and AUX1-12 bus rows.
For example, to change M/E2 button assignments to different ones, proceed as follows.

(1) Open the [PANEL > BUS ASSIGN > LEVEL1] menu and set M/E2 to ON and others to OFF. (To enter the same button assignments for all bus rows, set ALL to ON.)

(2) Assign video sources to bus buttons as described in the previous page.

NOTE

Note that if M/E1 is assigned to LINE 1, the M/E1 source/button configuration is set. If M/E2 or AUX1-12 is assigned to LINE 1, each source/button configuration is applied, and to LINE 2.

6-2-2. Using Shift Levels

The switcher allows the bus buttons to have up to **4 shift levels** so that up to **64 crosspoints** can be assigned to 18 physical buttons on HVS-492OU units, up to **84 crosspoints** to 22 physical buttons on HVS-492WOU and up to **40 crosspoints** to 12 physical buttons on HVS-492ROU. For example, you can use LEVEL1 for backgrounds and LEVEL2 for keys. LEVEL2-4 ON/OFF functions can also be assigned to these bus buttons or BUS FUNC buttons.
The following procedures show how to use **LEVEL2** as an example by mapping video sources to LEVEL2 buttons and assign **LEVEL2 ON/OFF** to Button **22**.

◆ **How to set up LEVEL2**

(1) Open the [PANEL > BUS ASSIGN > LEVEL1] menu.
(2) Tap a button in the right side of the menu screen to select a bus row.
(3) Turn F1 to select 22. Turn F2 to select SHIFT LEVEL2. Doing so assigns LEVEL2 ON/OFF to Button 22.

To use the BUS FUNC button, see Sec. 9-3. “Selecting a Function to BUS FUNC Buttons.”

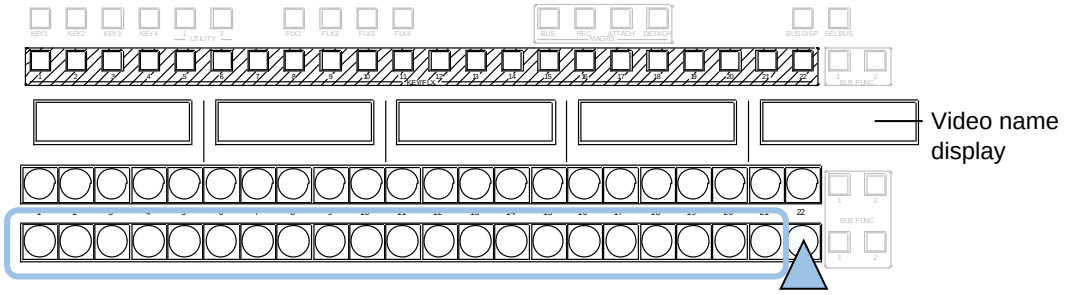
(4) Open the [PANEL > BUS ASSIGN > LEVEL2] menu. Assign video sources to buttons in the same way as those for LEVEL1.

PANEL> BUS ASSIGN > LEVEL2			1/2
BUTTON	SIGNAL	INHIBIT	COLOR PALETTE
1	BLACK	OFF	PALETTE00

◆ **How to use LEVEL1 and 2**

(1) Press a bus button to activate the LEVEL1 setting.

(2) Press and hold down 22 on the PST bus. (LEVEL2 settings are displayed on video name displays while 22 is pressed down.)
Press 1 to 21 with 22 pressed to select LEVEL2 settings.
Release 22 to return bus buttons to LEVEL1.



◆ **SHIFT LEVEL mode setting**

LEVEL button modes can be set under SHIFT SELECT in [PANEL > BUS CONTROL > SHIFT] menu.

PANEL > BUS CONTROL > SHIFT	6/11
SHIFT SELECT	
PUSH	

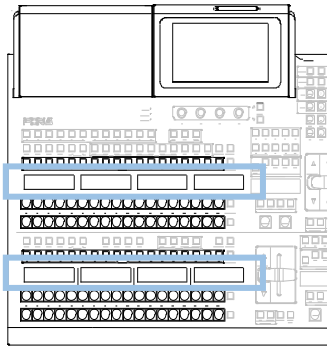
Setting	Description
OFF	Disables the Level Shift function.
TOGGLE	Levels are changed by pressing level buttons.
PUSH	Levels are changed while holding down level buttons.
TOGGLE ALL	Levels are changed in all rows by pressing level buttons.
PUSH ALL	Levels are changed in all rows while holding down level buttons.

6-3. Changing Video Source Names

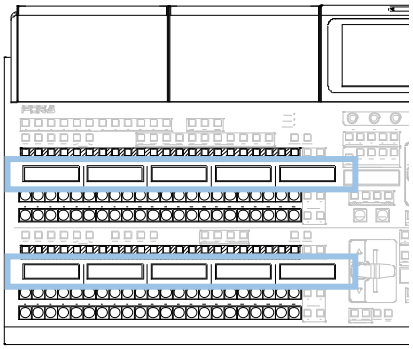
Input or internally generated video sources have default names (such as IN01-IN40, MATTE1, BLACK, COLOR BAR, etc.), which can be freely changed by the user. These source names are displayed on the video name displays and as titles in multiview images.
To change video source names, proceed as follows.

> Holding down a BUS DISP button allows you to temporarily display the previous names before change. Releasing the button recalls the current names.

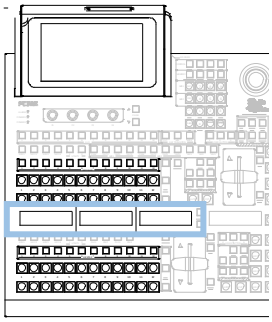
HVS-492OU



HVS-492WOU



HVS-492ROU



(1) Open the [SETUP > INPUT > NAME] menu.
(2) Turn F1 to select a video source. (See the next page.)
(3) To change names, press F2 or tap on **NAME** for a keyboard pop up, enter a new name, (up to 8 characters) then tap **Enter**.

SETUP > INPUT > NAME			1/1
SELECT	NAME	BITMAP	
IN01			

6-3-1. Setting Video Source Name Display Mode

The display mode for video source names above the control panel bus buttons can be set for each level as shown below.

(1) Open the [PANEL > BUS ASSIGN > LEVEL1] menu PAGE 2.
(2) Tap a button in the right side of the menu screen to select a bus row.
(3) Turn F1 to select a bus button.
(4) Turn F3 to select a display type under TYPE.
(5) If **DISPLAY INVERT** is set to ON, a name shows in reverse video.

PANEL > BUS ASSIGN > LEVEL1			2/2
BUTTON	SIGNAL	DISPLAY TYPE	DISPLAY INVERT
BTN01	BLACK	OFF	OFF

Parameter	Setting range	Description
BUTTON	1-18 1-22	Selects a bus button.
DISPLAY TYPE	OFF	Displays nothing.
	NAME	Displays signal names
	BITMAP	Displays bitmap images. (Resolution: 31 x 24 pixels) (*1)
DISPLAY INVERT	OFF	Displays text or images in normal video.
	ON	Displays text or images in reverse video.

(*1) Monochrome images (1-bit bitmap) are available. Save images in an SD card, insert the SD card to the slot and press F3 in the [SETUP > INPUT > NAME] menu. When a File Select dialog appears, select an image file and press **LOAD** to load the image.

6-4. Frame Synchronizer

A video frame synchronizer is provided for all standard and optional inputs and is used to synchronize asynchronous signals. Users can select whether to apply frame synchronization to input signals (for each signal) as shown in the procedure below.

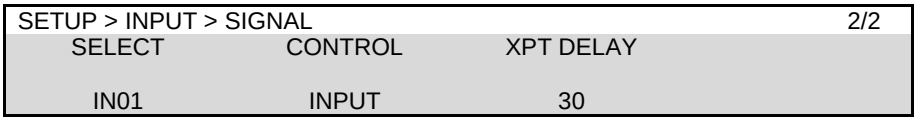
(1) Open the [SETUP > INPUT > SIGNAL] menu.
(2) Turn F1 to select an input signal
(3) Turn F4 to set FS to ON.

Ancillary data in input video cannot be passed through if **FS** (input frame synchronizer) is set to ON or **RESIZE** is enabled. To pass ancillary data, input the video synchronized with the genlock signal and set **FS** to OFF.

6-5. XPT DELAY

The XPT DELAY (crosspoint delay) feature allows you to add a time delay until a signal is changed after pressing a bus button. To enable the feature, proceed as follows:

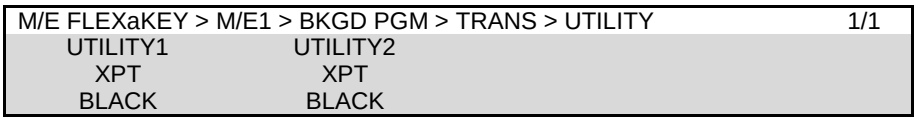
(1) Display the [SETUP > INPUT > SIGNAL] menu PAGE 2.
(2) Turn F1 to select an input signal. IN01 is selected in the menu example below.
(3) Turn F3 to set the delay value in frames.



Try to press IN01 (the bus button to which IN01 is assigned) on the M/E2 PGM bus. The PGM image is switched to the IN01 image 30 frames after the bus button is pressed.

6-6. UTILITY1-2

Two accessory internal buses, UTILITY 1 and UTILITY 2, are equipped respectively with M/E1 and M/E2 and can be used for COLOR MIX and applied to key masks. To select a video source for these buses, use UTL1 and UTL2 buttons on BUS SELECT blocks, or open the [M/E FLEXaKEY > M/E1(2) > BKGD PGM (PST) > TRANS > UTILITY] menu.



6-7. Matte Color Images

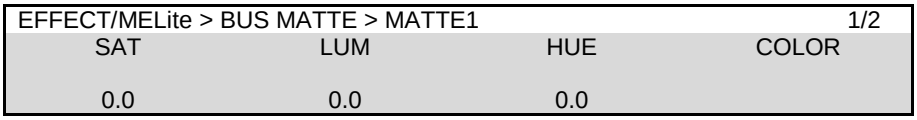
Two matte color and one gradient matte signals (MAT1, MAT2 and GMAT) can be used as video sources and assigned to all bus buttons.

IMPORTANT

Before adjusting a color, display the matte on a monitor. To assign MATTE1 to Button 10, for example, select BTN10 under BUTTON and MAT1 under SIGNAL. Pressing AUX1, then 10 in the KEY/AUX bus will display MATTE1 on the AUX1 output.

6-7-1. Setting Matte Colors

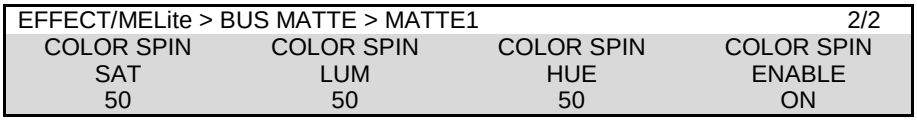
(1) Open the [EFFECT/MELite > BUS MATTE > MATTE1] menu.
(2) Set a color using SAT, LUM and HUE parameters or select a color by tapping on COLOR.



Set the MATTE 2 color in the [EFFECT/MELite > BUS MATTE > MATTE2] menu in the same way.

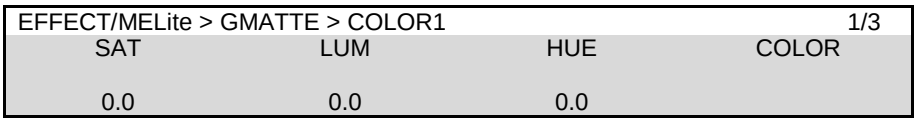
◆ **MATTE SPIN Effect**

The MATTE SPIN effect automatically changes matte color values (SAT, LUM and HUE) using set speeds. Go to PAGE 2 and adjust speeds and set SPIN to ENABLE to see how the color changes.

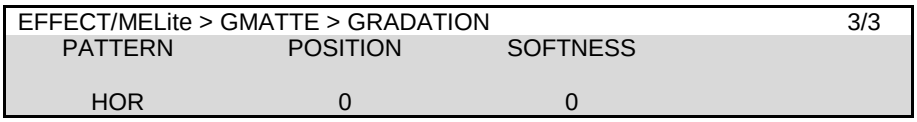


6-7-2. Creating a Gradient Color Image

(1) Set a color in the [EFFECT/MELite > GMATTE > COLOR1] menu.
(2) Set the other color in the [EFFECT/MELite > GMATTE > COLOR2] menu.



(3) Adjust the gradient color image in the [EFFECT/MELite > GMATTE > GRADATION] menu



Parameter	Description
PATTERN	**HOR**: Displays a horizontal gradient from COLOR1 to COLOR2. **VER**: Displays a vertical gradient from COLOR1 to COLOR2. **H/V**: Displays a diagonal gradient from COLOR1 to COLOR2.
POSITION	Adjusts position.
SOFTNESS	Adjusts the softness gradient

6-8. Changing the Side Panel Image

The side panel image of 4:3 video can be changed as shown in the procedure below.

(1) Open [SETUP > INPUT > SIDE PANEL] menu PAGE1.
(2) Turn F1 to select an input to which side panels are to be added.
(3) Turn F2 to select a video signal used for side panels.

SETUP > INPUT > SIDE PANEL			1/2
SELECT	SIGNAL	UTILITY	
IN1	BLACK	STILL1	

If a UTILITY bus is selected under SIGNAL:
Turn F3 to select a video signal assigned to UTILITY.

If SIDE MATTE is selected under SIGNAL:
To change the side panel color, go to PAGE 2. Use the SAT, LUM and HUE or tap COLOR to set the side panel color.

SETUP > INPUT > SIDE PANEL			2/2
SAT	LUM	HUE	COLOR
0.0	0.0	0.0	

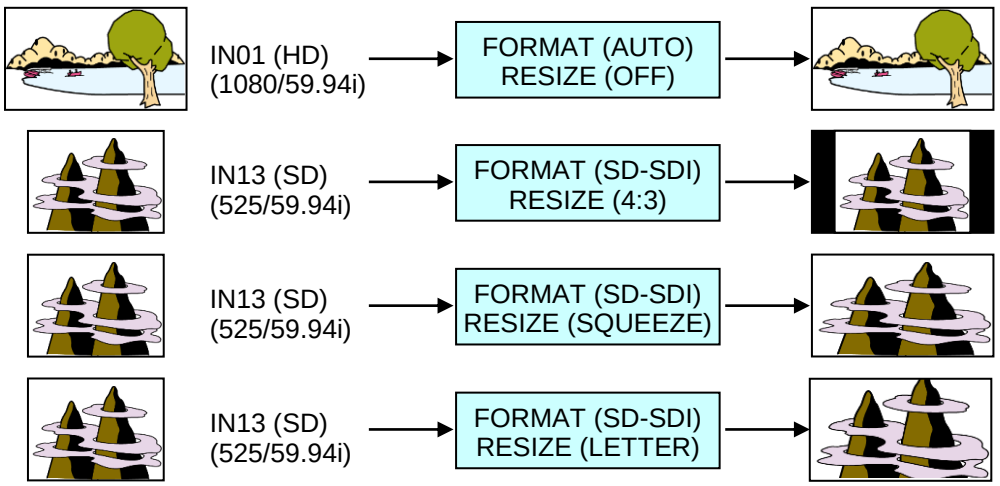
6-9. Resize Function

A resize function allows users to input **SD signals** at the same frame-rate **as that in HD mode**, and enlarge them to use as **HD images**.

◆ **Resizable Inputs**
IN13 to IN16 (4 inputs)
HVS-49IO (option card): IN29 to IN32 (4 inputs)
HVS-100DI-A (option card): Ch1, Ch2 (2 inputs)
HVS-100AI (option card): Ch1, Ch2 (2 inputs)

(1) Display the [SETUP > INPUT > SIGNAL] menu.
(2) Turn F1 to select an input signal for resizing.
(3) Turn F2 to set AUTO or SD-SDI for **FORMAT**.
(4) Turn F3 to select an aspect ratio under **RESIZE**.

SETUP > INPUT > SIGNAL				1/2
SELECT	FORMAT	RESIZE	FS	
IN13	SD-SDI	4:3	ON	



IMPORTANT

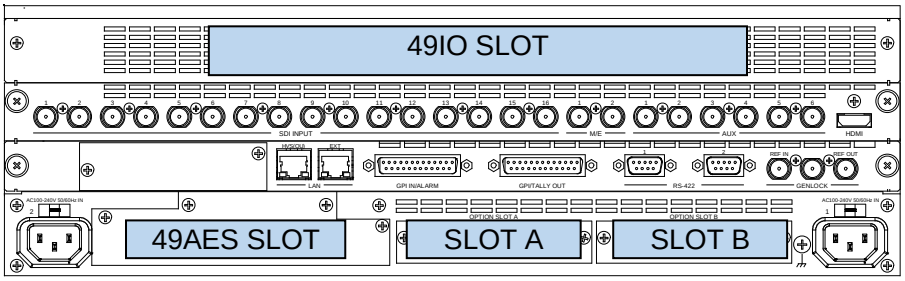
The Resize function is automatically enabled when SD signals are input to the switcher in HD mode, and FORMAT in the [SETUP > INPUT > SIGNAL] menu is set to SD-SDI. (Ensure the Resize function stays disabled if HD-SDI is set for FORMAT.)

The side panel color or image can be changed in 4:3 mode.

▶ See section 6-8 "Changing the Side Panel Image."

7. Setting up Additional Inputs

Additional input/output cards can be installed into SLOT A, SLOT B and 49IO SLOT.
Install an HVS-49AES card to the dedicated 49AES SLOT.



Each channel of expansion cards can be independently set.
Sequence numbers are given to signal names in the order of 49IO SLOT, SLOT A and SLOT B optional inputs (although they can be changed). Use these names to set up additional input signals.
Output bus numbers are fixed to AUX13-20, as shown in the above table. Use these numbers to set up additional output signals.

- ▶ See Sec. 6-3. "Changing Video Source Names" for details on signal name changes.
- ▶ See Sec. 6-2. "Mapping Video Sources to Bus Buttons" for signal source assignments.

SLOT	Input	Signal name	Output	Bus number
49IO SLOT	HVS-49IO	IN17-32	HVS-49IO	AUX7-12
SLOT A	HVS-100DI-A	IN33-36	HVS-100DO	AUX13-14
	HVS-100AI	IN33-34	HVS-100AO	AUX13-14
	HVS-100PCI	IN33-34	HVS-100PCO	AUX13-14
SLOT B	HVS-100DI-A	IN37-40	HVS-100DO	AUX17-18
	HVS-100AI	IN37-38	HVS-100AO	AUX17-18
	HVS-100PCI	IN37-38	HVS-100PCO	AUX17-18

◆ **Proc Amp, Frame Synchronizer, Input Still and Side Panel**

Almost the same functions as those for standard inputs can be applied to additional inputs, such as Frame Synchronizer and Input Still.

- ▶ See Sec. 6-1. "Mapping Video Sources to Bus Buttons" for signal level adjustments.
- ▶ See Sec. 6-4. "Frame Synchronizer."
- ▶ See Sec. 17-3. "Still Image Display using FS Buffer (INPUT STILL)."

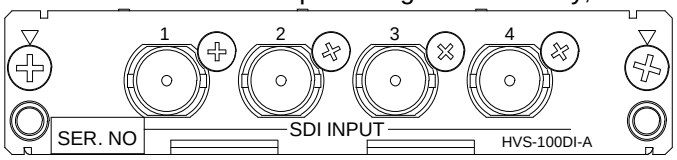
◆ **Proc Amp, Safety Area Marker and Color Correction**

Almost the same functions as those for standard outputs can be applied to additional outputs, such as Proc Amp, Safety Area Marker, and Color Correction.

- ▶ See Sec. 8-4. "Adjusting Output Signal Levels" to 8-7. "BUS LINK Function" for details.

7-1. HVS-100DI-A

HVS-100DI-A cards accept SDI signals. Normally, no menu settings are required for the cards.

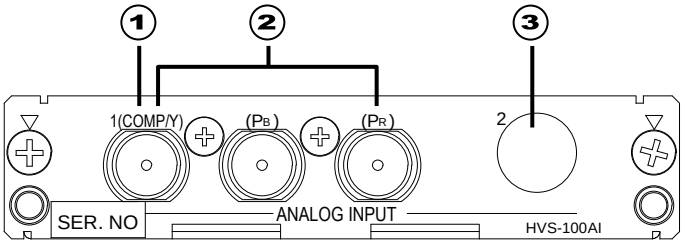


◆ **Resize function**

The cards allow you to automatically enlarge SD images input to CH1 and CH2 to use as HD images in HD mode. This function is available only when the SD-SDI signals have the same frame rate as that of the current video format (e.g. if the switcher operates at 59.94i, the applicable SD-SDI format is 525/60 (59.94i)).

7-2. HVS-100AI

HVS-100AI cards accept analog signals. Specify the analog signal format for each input in the menu.



(1) Open the [SETUP > INPUT > SIGNAL] menu.
(2) Turn F1 to select an input signal name. (See previous page.)
(3) Turn F2 to specify the signal format.

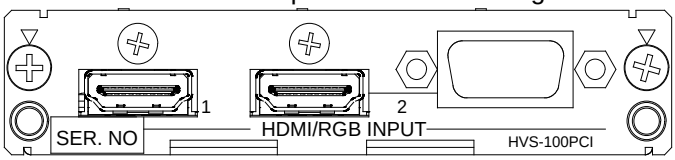
SETUP > INPUT > SIGNAL			1/2
SELECT	FORMAT	RESIZE	FS
IN33	Composite	---	OFF

NO	Connector	Signal format	FORMAT setting
①	BNC	Composite	HD Component SD Component Composite
②		HD/SD component (Y/PB/PR)	
③	Mini-DIN (7-pin) (*1)	HD/SD component (Y/PB/PR) or composite	

(*1) Use the supplied conversion cable (PC-3275) to input a signal. Secure the Mini-DIN connector of the conversion cable to the card connector with the supplied connector retainer.

7-3. HVS-100PCI

HVS-100PCI cards accept HDMI and VGA signals. Select a signal for **Ch2** in the menu.



IMPORTANT

The HDMI ports are not HDCP-compliant and cannot accept inputs from HDCP-protected devices such as Blu-ray players.

NORMAL, FULL or ZOOM can be selected under **RESIZE** for 4:3 (aspect ratio) input signals.

SETUP > INPUT > SIGNAL			1/2
SELECT	FORMAT	RESIZE	FS
IN38	HDMI	NORMAL	OFF

Available signal formats vary depending on the system video format. See the table below.

HVS-100PCI supported format

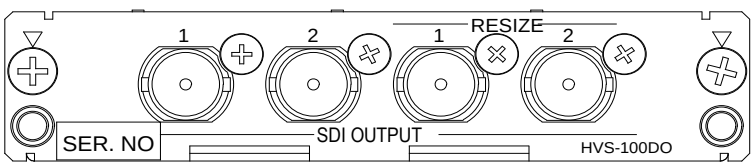
✓: Available
: Unavailable

System signal format		Video resolution					
		VGA SVGA SDTV	XGA	SXGA WXGA	UXGA	WUXGA	HDTV
1080p	23.98						✓
	24						✓
	25						✓
	29.97						✓
1080i	59.94		✓	✓	✓	✓	✓
	50		✓	✓	✓	✓	✓
1080PsF	25		✓	✓	✓	✓	✓
	29.97		✓	✓	✓	✓	✓
720p	59.94		✓	✓			✓
	50		✓	✓			✓
525i (NTSC)	60	✓					
625i (PAL)	50	✓					

The system format means the format specified in the [SETUP > SYSTEM > FORMAT] menu.

7-4. HVS-100DO

HVS-100DO cards output SDI signals.
The left two connectors provide signals in the system format. Do not use the right two connectors.



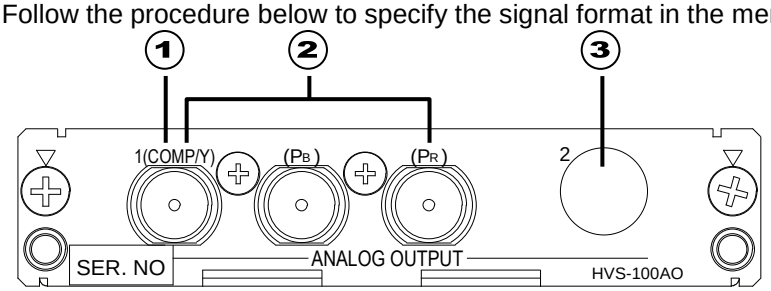
Open the [SETUP > OUTPUT > AUX OUT] menu and select video signals.
Open the [SETUP > OUTPUT > AUX OUT] menu PAGE 2 and set the aspect ratio for simultaneous output in HD mode.
Refer to Sec. 8-2. "Changing AUX Output Images (AUX Transitions)" for other AUX bus settings.

SETUP > OUTPUT > AUX OUT			1/3
SELECT	OUTPUT XPT	OUTPUT INHIBIT	AUX TRANS ENABLE
AUX13 (SLOTA-1)	BLACK	OFF	- - - -

SETUP > OUTPUT > AUX OUT			1/3
SELECT	OUTPUT XPT	OUTPUT INHIBIT	AUX TRANS ENABLE
AUX14 (SLOTA-2)	BLACK	OFF	- - - -

7-5. HVS-100AO

The 100AO card outputs analog signals.
Use the supplied conversion cable for AUX14 and AUX18.
Follow the procedure below to specify the signal format in the menu.



NO	Channel	Connector	Output signal	Connection
①	AUX13 AUX17	BNC	Analog composite	Use the leftmost BNC connector.
②			HD/SD analog component (Y/Pb/Pr)	Use three (Y/Pb/Pr) BNC connectors.
③	AUX14 AUX18	Mini-DIN (7-pin) (*1)	HD/SD analog component (Y/Pb/Pr) or analog composite	Use the supplied cable (PC-3275).

(*1) Secure the Mini-DIN connector of the conversion cable to the card connector with the supplied retainer.

Open the [SETUP > OUTPUT > AUX OUT] menu PAGE 2 to select the video format.

SETUP > OUTPUT > AUX OUT			2/3
SELECT	FORMAT	ASPECT	
AUX13 (SLOTA-1)	COMPOSITE	4:3	

HVS-100AO Supported Signals

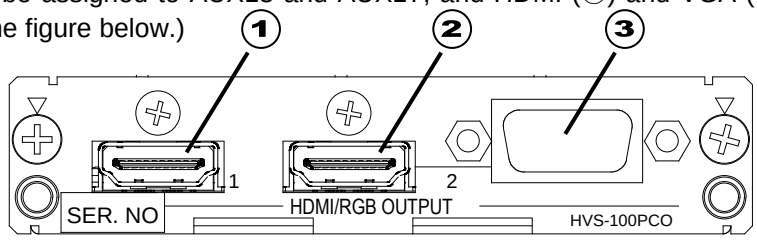
✓: Available
: Unavailable

System format	HD Component	Composite	Component SMPTE	Component BetaCam	Component
1080/59.94i 1080/29.97PsF 720/59.94p	✓	✓ (*1) (*2)	✓ (*2)	✓ (*1) (*2)	
1080/50i 1080/25PsF 720/50p	✓	✓ (*2)			✓ (*2)
525/60		✓ (*1)	✓	✓ (*1)	
625/50		✓			✓
Other than those above	✓				

The system format means the format specified in the [SETUP > SYSTEM > FORMAT] menu.
(*1): If 7.5% Setup is added to a signal, the symbol "+" follows immediately after the name of the signal.
(*2): You can select 4:3, SQUEEZE or LETTER under ASPECT.

7-6. HVS-100PCO

HVS-100PCO cards output HDMI signals.
HDMI (①) can be assigned to AUX13 and AUX17, and HDMI (②) and VGA (③) to AUX14 and AUX18. (See the figure below.)



Resolution, Aspect ratio and Audio output settings for the card can be set in the [SETUP > OUTPUT > AUX OUT] menu PAGE 2.

SETUP > OUTPUT > AUX OUT			2/3
SELECT	FORMAT	ASPECT	
AUX13 (SLOTA-1)	1280x1024 (SXGA)	4:3	

Available signal formats vary depending on the system video format. See the table below.

HVS-100PCO supported signals

✓: Available
: Unavailable

System signal format		Video resolution							ASPECT setting
		SVGA	SDTV	SXGA	UXGA	WXGA	WSXGA WUXGA	HDTV	
1080p	23.98							✓ *	
	24							✓ *	
	25			✓	✓		✓	✓ *	4:3, LETTER (SXGA, UXGA)
	29.97			✓	✓		✓	✓ *	
1080i	59.94			✓	✓		✓	✓	4:3, LETTER (SXGA, UXGA)
	50			✓	✓		✓	✓	
1080PsF	25			✓	✓		✓	✓	
	29.97			✓	✓		✓	✓	
720p	59.94			✓		✓		✓	4:3, 16:9 (SVGA)
	50			✓		✓		✓	
525i (NTSC)	60	✓	✓ *						4:3, 16:9 (SVGA)
625i (PAL)	50	✓	✓ *						

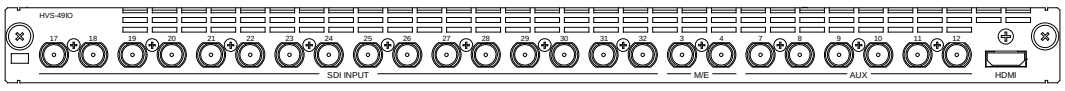
The system format means the format specified in the [SETUP > SYSTEM > FORMAT] menu.
* VGA output is unavailable

You can choose between 60 Hz and 50 Hz for the output frequency if the switcher is running in 50 Hz mode (1080/50i or 25PsF). In such cases, no signal outputs from VGA.

SETUP > OUTPUT > AUX OUT			3/3
SELECT	HDMI FREQUENCY	HDMI AUDIO	
AUX13 (SLOTA-1)	50Hz	OFF	

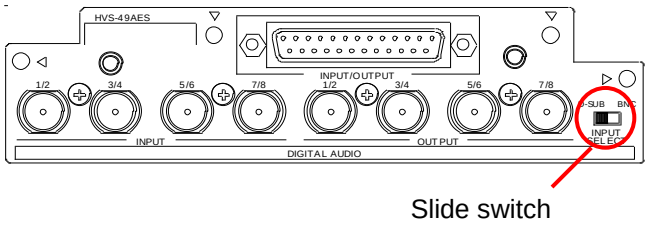
7-7. HVS-49IO

The HVS-49IO expansion card allows you to add 16-input / 8-output of HD-SDI and an HDMI output to the switcher. A frame synchronizer is provided respectively for all inputs and 2 additional MELites are available.



7-8. HVS-49AES

The card supports AES/EBU audio 4 stereo inputs (**8 channels**) and 4 stereo outputs (**8 channels**). Select between balanced (D-sub) or unbalanced (BNC) input using the slide switch on the card. An internal sampling rate converter enables to sync audio input to the system. Audio inserted on IN1-40, PGM, AUX outputs and CLIP1-4 can also be output from AES ports on the card. AES input audio can be embedded onto SDI signals output from AUX. Note that the card does not support non-PCM audio.

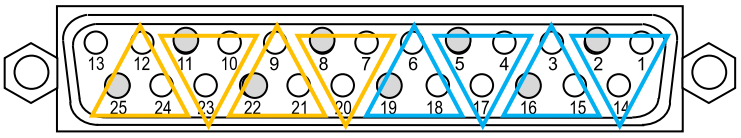


Slide switch

(Specifications)		Balanced input/output	Unbalanced input/output
Connector		D-sub	BNC
Impedance		110Ω	75Ω
Sampling	In	16 to 24-bit 32／44.1／48 kHz	
	Out	24-bit 48 kHz	

If balanced input/output is used:

Refer to the pin assignments and diagram below to connect audio hot pins to + (plus) pins on the card connector and cold pins to - (minus) pins.



25-pin D-sub connector
(Female, w/ inch screws)
Pin 13: No connection

	IN+	IN-	IN COM	OUT+	OUT-	OUT COM
CH1/2	Pin 24	Pin 12	Pin 25	Pin 18	Pin 6	Pin 19
CH3/4	Pin 10	Pin 23	Pin 11	Pin 4	Pin 17	Pin 5
CH5/6	Pin 21	Pin 9	Pin 22	Pin 15	Pin 3	Pin 16
CH7/8	Pin 7	Pin 20	Pin 8	Pin 1	Pin 14	Pin 2

◆ Audio input settings

Open the [SETUP > AUDIO > AES IN] menu and select an audio input channel pair. Set L/R GAIN, DELAY, STEREO and POLARITY, as necessary. See the table below for the STEREO setting.

SETUP > AUDIO > AES IN			1/2
SELECT	L-GAIN	R-GAIN	
IN1/2	0.0 dB	0.0 dB	

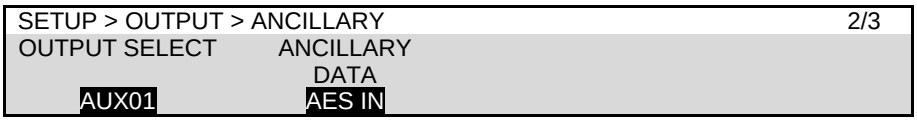
SETUP > AUDIO > AES IN			2/2
SELECT	DELAY	STEREO	POLARITY
IN1/2	0 msec	NORMAL	NORMAL

STEREO	**NORMAL**: Passes through channel pairs without processing. **SWAP**: Swaps the left and right audio channels. **L-MONO** / **R-MONO**: Passes through only the left / right channel. **LR-SUM**: Mixes the left and right channels.

◆ **HVS-49AES input audio >> AUX outputs (AUX1-12)**

(1) Open [SETUP > OUTPUT > ANCILLARY] menu PAGE 2.

(2) Turn F1 to select an AUX output and turn F2 to select AES IN.



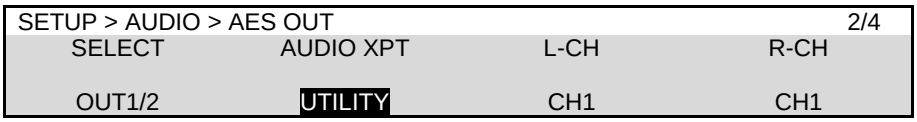
◆ **IN1-40, PGM and AUX embedded audio >> HVS-49AES output**

(1) Open the [SETUP > AUDIO > AES OUT] menu.

(2) **To output IN1-40, PGM, AUX embedded audio**

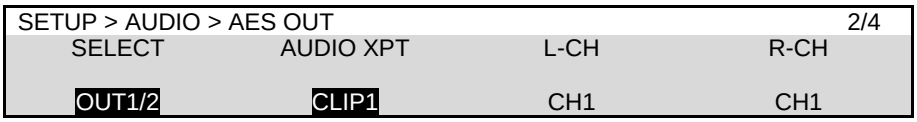
Turn F1 to select an SDI signal on which the desired audio source is embedded

Go to PAGE 2, select an AES output channel pair and select UTILITY under AUDIO XPT.

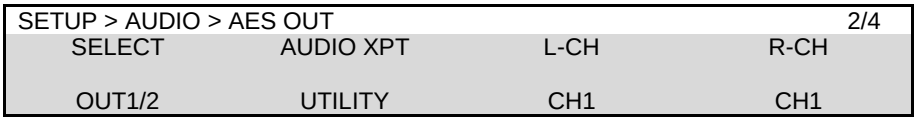


To output CLIP associated audio

Go to PAGE 2 and select an AES output channel pair and a clip for audio source.

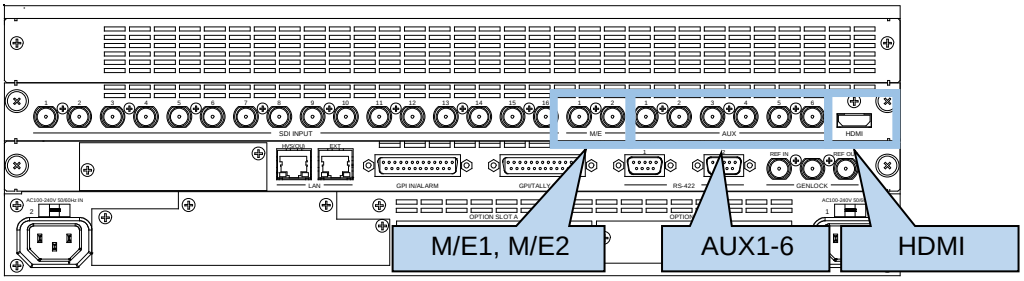


(3) Select a channel pair from CH1 to CH16 in the selected audio source.
Setting AES OUT to ENABLE enables AES audio output.
Set L/R GAIN, DELAY, STEREO and POLARITY, as necessary. See the table in the previous page for the STEREO setting.



8. Video Outputs

Three output types are provided: M/E1 and M/E2 ports are for combined M/E images and both AUX1-6 and HDMI ports can output input video sources as well as combined M/E and multiview images.



8-1. Selecting Video for M/E OUT 1-2

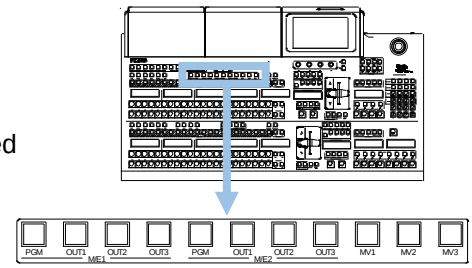
M/E1 and M/E2 ports on the MU rear panel are dedicated to output combined M/E video images. Select M/E images for OUT1-4 in the menu as shown below.

(1) Open the [SETUP > OUTPUT > M/E OUT] menu.
(2) Turn F1 to select OUT1.
(3) Turn F2 to select a combined image.

SETUP > OUTPUT > M/E OUT		1/1
SELECT	OUTPUT XPT	
OUT1	M/E2PGM	

8-1-1. Selecting OUT 1-3 Images on M/E 1-2

Combined M/E1 and M/E2 images can be easily assigned to AUX or KEY buses by using buttons M/E1PGM to M/E1OUT3 and M/E2PGM to M/E2OUT3 and various types of mixed M/E images, including PGM, PVW, CLEAN1, CLEAN2 and KEY OUT, can be assigned to the M/E1OUT1-3 and M/E2OUT1-3 buses.



(1) Open the [PANEL > BUS CONTROL > M/E OUT] menu.
(2) If setting the menu as shown below, the PVW image is assigned to the M/E1OUT1 bus.

PANEL > BUS CONTROL > M/E OUT			7/11
M/E1 OUT1	M/E1 OUT2	M/E1 OUT3	
M/E1 PVW	M/E1 CLN1	M/E1 CLN2	

If setting the menu as shown below, the PVW image is assigned to the M/E2OUT1 bus.

PANEL > BUS CONTROL > M/E OUT			8/11
M/E2 OUT1	M/E2 OUT2	M/E2 OUT3	
M/E2 PVW	M/E2 CLN1	M/E2 CLN2	

8-1-2. PREVIEW, CLEAN 1 and CLEAN 2 Images

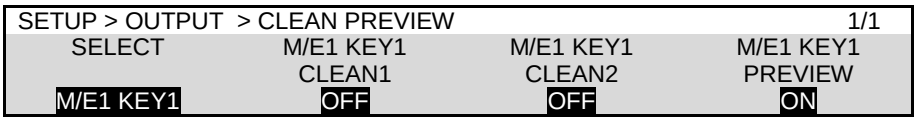
Although preview images normally display next composited images, the images allow you to select the background and displayed key images, as well as clean images.
The switcher does not provide dedicated preview or clean outputs. To output PREVIEW, CLEAN 1 and CLEAN 2, assign them to AUX, M/E 1 or M/E 2 output ports.

◆ Setting up PREVIEW, CLEAN 1 and CLEAN 2 output images

Follow the procedure below to select a background and keys to be displayed on PREVIEW, CLEAN 1 and CLEAN 2 images.

(1) Open the [SETUP > OUTPUT > CLEAN PREVIEW] menu.
(2) For example, to add M/E1KEY1 to the PREVIEW image, turn F1 to select M/E1KEY1, then use F4 to turn ON under PREVIEW.
KEY2-4 and FLX1-4 can be set in the same way as M/E1KEY1.

If a key (KEY1-4 or FLX1-4) is selected under SELECT:

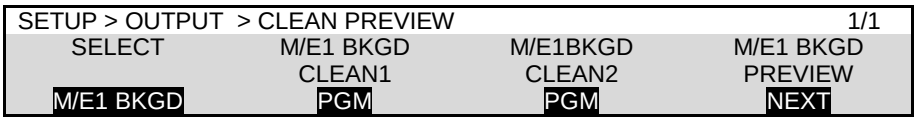


Setting	CLEAN 1/2	PREVIEW
OFF	The selected key is not displayed.	The selected key is not displayed.
ON	The selected key is displayed when it is displayed on the PGM image.	The selected key is always displayed.
NEXT	-	The selected key is displayed when it remains or goes to on-air at the NEXT TRANSITION.

IMPORTANT

If PRE COMBINER is enabled, KEY1-4 CLEAN outputs display background and key images.. (See Sec. 11-5-1. “PRE COMBINER.”)

If a background is selected under SELECT:



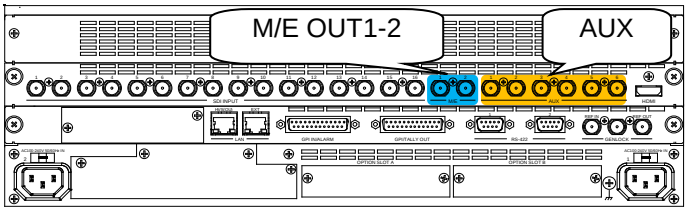
CLEAN 1/2 setting		PREVIEW setting	
PGM	Displays the selected image as background.	OFF	Displays the PGM image.
PST		ON	Displays the PST image.
UTL1		NEXT	Displays the PST image when it is set for NEXT TRANSITION (BKGD button is lit), and in other cases, the PGM image.
UTL2			

TIPS

These images can also be set in the M/E FLEXaKEY menu tab. ([M/E FLEXaKEY > M/E1 > KEY1 > CLN/PRN > CLEAN PREVIEW] menu, for example).

8-1-3. KEY OUT Signals

KEY OUT signals (switcher processed key cut signals) can be assigned to AUX outputs and M/E OUT1 and 2. Various kinds of key cut signals can be used for KEY OUT sources. KEY OUT signals are useful for purposes such as checking key signals while processing chroma keys.



The following procedure examples show how to output KEY OUT signals: M/E1 PGM key signal from AUX1 and M/E2 PST key signal from M/E OUT2.

(1) Set the [SETUP > OUTPUT > AUX OUT] and [SETUP > OUTPUT > M/E OUT] menus as shown below.

SETUP > OUTPUT > AUX OUT			1/3
SELECT	OUTPUT XPT	OUTPUT INHIBIT	AUX TRANS ENABLE
AUX01	M/E1 KEY	OFF	OFF

SETUP > OUTPUT > M/E OUT		1/1
SELECT	OUTPUT XPT	
OUT2	M/E2 KEY	

(2) Select a key signal in the [SETUP > OUTPUT > KEY OUT] menu.

SETUP > OUTPUT > KEY OUT		1/3
SELECT	KEY OUT	
M/E1	PGM BUS	

SETUP > OUTPUT > KEY OUT		1/3
SELECT	KEY OUT	
M/E2	PST BUS	

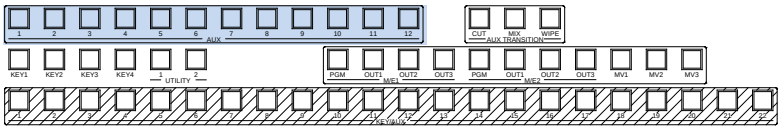
Available KEY OUT signals	Description
PGM BUS	Key signal of PGM using DVE
PST BUS	Key signal of PST using DVE
A BUS	Key signal of A-bus using DVE
B BUS	Key signal of B-bus using DVE
KEYER	Key signal of each key using DVE To change key, go to PAGE 2 or 3.

8-2. Changing AUX Output Images (AUX Transitions)

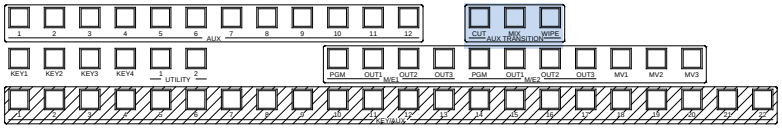
AUX output images can be selected from all video sources, program, preview, clean and key out signals. In addition, simple video effects can be applied to AUX video switching.
See Sec. 10-2 "XPT Re-entry" for details on re-entry video layers.
See Sec. 11-11. “AUX Image Transitions.”

8-2-1. Selecting a Video Using Bus Buttons

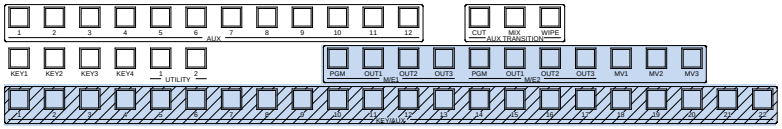
(1) Press a button to select an AUX bus in the BUS SELECT block.



(2) Press a button to select a transition type in the AUX TRANSITION block.



(3) Press a button to select an output video in the KEY/AUX block.



NOTE

If AUX transitions do not take effects, turn AUX TRANS ENABLE to ON in the [SETUP > OUTPUT > AUX OUT] menu.

A hundred WIPE patterns are available: No. 0～99.
The duration of MIX and WIPE transitions can also be set in the menu.

Example 1) To change the AUX1 image to IN01 by Cut:
Press AUX1, CUT, then 1 (IN01).

Example 2) To change the AUX2 image to M/E1 PGM by WIPE:
Press AUX2, WIPE, then PGM for M/E1.

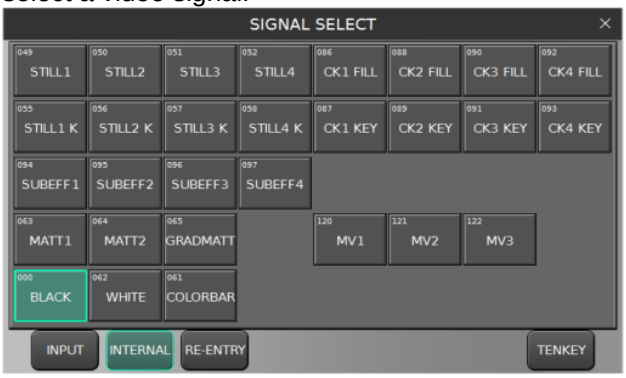
Users can inhibit AUX video switching on the control panel.
To do so, set **AUX CTRL INHIBIT** to ON for an AUX button in the [PANEL > BUS CONTROL > AUX INHIBIT] menu.

8-2-2. Selecting a Video Using the Menu

(1) Open the [SETUP > OUTPUT > AUX OUT] menu.
(2) Turn F1 to select an AUX bus.
(3) Turn F4 to set AUX TRANS ENABLE to ON. The set transition type in AUX TRANSITION block on the control panel is applied.
(4) Select a video under OUTPUT XPT to change the AUX video image.

SETUP > OUTPUT > AUX OUT			1/3
SELECT	OUTPUT XPT	OUTPUT INHIBIT	AUX TRANS ENABLE
AUX01	BLACK	OFF	ON

Tapping **OUTPUT XPT** opens the following pop-up window and allows you to easily select a video signal.



If turning OUTPUT INHIBIT to ON, the AUX video image is fixed and cannot be changed.

8-3. HDMI Output

HDMI output ports on the switcher is set as shown below. (1080/23.98PsF and 24PsF formats unsupported)

(1) Open [SETUP > OUTPUT > HDMI OUT] menu.
(2) Turn F1 to select HDMI OUT1.
(3) Turn F2 to select a video image.
(4) The HDMI ports can output dual-channels of audio. Turn F3 to select a channel pair.

SETUP > OUTPUT > HDMI OUT			1/3
SELECT	OUTPUT XPT	AUDIO	UHD 4-SPLIT MODE
HDMI OUT1	M/E1 OUT1	CH1/2	OFF

(5) In PAGE 3, the signal color format can be selected under COLOR SPACE. Select a color space according to your monitor.

SETUP > OUTPUT > HDMI OUT		3/3
SELECT	COLOR SPACE	
HDMI OUT1	RGB (LIMITED)	

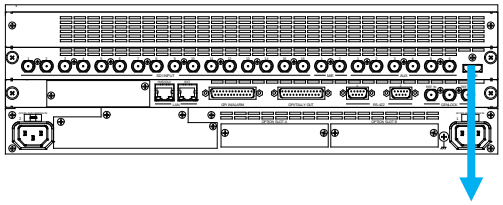
◆ **UHD Output Mode (2K x 4) (720/59.94p, 720/50p, 525/60i, 625/50i unsupported)**

If changing **UHD 4-SPLIT MODE** to ON in PAGE 1 by turning F4, the selected image is distributed into four HD outputs.
4K video can be output and displayed in Square Division quad split method by assigning HD source images in PAGE 2. In this case, use a monitor that has an HDMI port supporting HDMI 2.0 Level-B (YUV 4:2:0).

For example, to output a UHD image composed of MV1 to MV3 and M/E2 PGM pictures from HDMI OUT1, set the menu parameters as shown below.

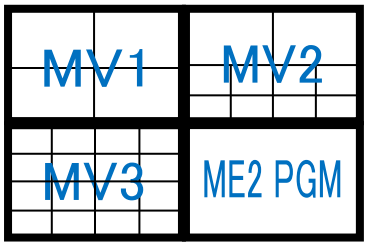
SETUP > OUTPUT > HDMI OUT			1/3
SELECT	OUTPUT XPT	AUDIO	UHD 4-SPLIT MODE
HDMI OUT1	IN01	CH1/2	ON

SETUP > OUTPUT > HDMI OUT			2/3
SELECT	UHD SPLIT XPT2	UHD SPLIT XPT3	UHD SPLIT XPT4
HDMI OUT1	IN02	IN03	IN04



OUTPUT XPT	UHD SPLIT XPT2
UHD SPLIT XPT3	UHD SPLIT XPT4

Output layout



8-4. Adjusting Output Signal Levels

8-4-1. Proc Amp

The switcher provides the following Proc Amp features, allowing you to adjust output signal levels.

(1) Open the [SETUP > OUTPUT > PROCESS AMP] menu.
(2) Turn F1 to select the output to be adjusted.
(3) Turn F2 to turn ENABLE ON to enable the PROCESS AMP feature.
(4) Adjust the black level under SETUP.
(5) Adjust the luminance gain (white level) under LUM GAIN.

SETUP > OUTPUT > PROCESS AMP			1/3
SELECT	ENABLE	SETUP	LUM GAIN
AUX01	ON	0.0	0.0

(6) Go to PAGE 2.
(7) Adjust the chrominance gain (level) under CHROMA GAIN.
(8) Adjust the color under HUE.

SETUP > OUTPUT > PROCESS AMP			2/3
SELECT	CHROMA GAIN	HUE	
AUX01	0.0	0.0	

8-4-2. Video Level Clip

To maintain the desired signal level after adjusting video levels with the Proc Amp, use the Video Level Clip function to adjust the upper and lower limits of YPbPr color space. Note that Video Level Clip can be applied only when the Proc Amp is enabled.

(1) Open [SETUP > OUTPUT > PROCESS AMP] menu PAGE 3.
(2) Turn F1 to select an output signal to be corrected.
(3) Signal level limits can be set under WHITE-Lv, BLACK-Lv and CHROMA respectively.

SETUP > OUTPUT > PROCESS AMP			3/3
SELECT	WHITE-Lv CLIP	BLACK-Lv CLIP	CHROMA CLIP
AUX01	109.0	-7.0	111.0

8-5. Safety Area Markers

Various markers for the safety area and screen center can be displayed on the desired output.

(1) Open the [SETUP > OUTPUT > MARKER] menu.

SETUP > OUTPUT > MARKER			1/3
SELECT	MARKER ENABLE	MARKER TYPE	CENTER CROSS
AUX01	OFF	OFF	OFF

(2) Turn F1 to select an output bus.
(3) Turn MARKER ENABLE to ON to enable the marker display function.
(4) Turn F3 to select a safety area mark type.

MARKER TYPE

OFF	No safety markers are displayed. Set to OFF if SIDE CUT ENABLE is set to ON.
BOX1	Displays a safety area in a box-shaped frame. Set BOX1 under **AREA1** and BOX2 under **AREA2**.
BOX2	
HOOK1	Displays a safety area with four corner marks. Set HOOK1 under **AREA1** and HOOK2 under **AREA2**.
HOOK2	
BOX+HOOK	Displays two safety areas: box and hook. Set BOX under **AREA1** and HOOK under **AREA2**.
BOX+BOX	Displays two box-type areas. Set the size and aspect ratio in PAGE 2 and 3.

(5) The center point will be added if **CENTER CROSS** is set to ON.
(6) Set AREA1 and AREA2 size and aspect ratio.

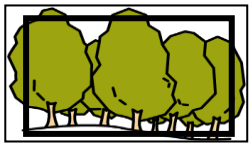
SETUP > OUTPUT > MARKER			3/3
MARKER AREA1 ASPECT	MARKER AREA1 SIZE	MARKER AREA2 ASPECT	MARKER AREA2 SIZE
4:3	0%	4:3	0%

◆ **Side Cut Display (HD mode only)**

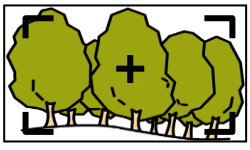
To check the Side Cut image converting the aspect ratio from 16:9 to 4:3, go to PAGE 2 and select the SIDE CUT TYPE from LINE, BLACK or HALF. Then turn SIDE CUT ENABLE to ON.

SETUP > OUTPUT > MARKER			2/3
SELECT	SIDE CUT ENABLE	SIDE CUT TYPE	
AUX01	ON	LINE	

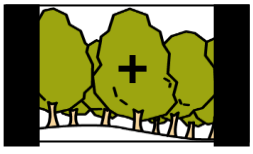
◆ **Marker Display Examples**



MARKER TYPE: BOX1
AREA1 SIZE: 85%
AREA1 ASPECT: 16:9



MARKER TYPE: HOOK1
AREA1 SIZE: 85%
AREA1 ASPECT: 16:9
CENTER CROSS: ON



MARKER TYPE: OFF
SIDE CUT TYPE: BLACK
CENTER CROSS: ON

8-6. Ancillary Data

Ancillary data embedded in SDI input signals can be erased or passed through to outputs. (SD formats will be supported in the future.) As factory default, ancillary data, including audio, is set to pass through all combined M/E outputs, but **not** to pass through all AUX outputs.

IMPORTANT

Ancillary data in input video cannot be passed through if input frame synchronizers are set to ON for SDI input. To pass ancillary data to video output, input the video that is synchronized with the genlock signal and set **FS** to OFF in the [SETUP > INPUT > SIGNAL] menu.
Note that ancillary data in SD inputs cannot be used when the switcher operates in HD mode.

(1) Open the [SETUP - OUTPUT - ANCILLARY] menu. (Set the M/E combined outputs in PAGE 1 and AUX outputs in PAGE 2)
(2) Turn F1 to select an output bus.
(3) If a **combined M/E output** is selected:
Turn F2 to select OFF (blank), EACH (pass-through), a UTILITY signal (UTL1 or UTL2). If a UTILITY signal is selected, ancillary data in combined M/E signals are replaced with ancillary data in the UTILITY signal. (See Sec. 6-6. "UTILITY 1-2.")
If EACH is selected, turn F3 to select the data switching point during video transitions.

SETUP > OUTPUT > ANCILLARY			1/2
M/E SELECT	ANCILLARY DATA	ANCILLARY CHANGE	
M/E1 PGM	EACH	0%	

If an **AUX output** is selected:
Turn F2 to select OFF (blank), THROUGH (pass-through) or another output (AUX).

SETUP > OUTPUT > ANCILLARY		2/2
OUTPUT SELECT	ANCILLARY DATA	
AUX01	OFF	

8-7. BUS LINK Function

The BUS LINK function allows you to link video switches between any two buses among M/E PGM, PST and AUX outputs. Two bus link types are available: **BUS (video) LINK** and **TRANS (transition) LINK**.

8-7-1. BUS LINK

The BUS LINK function allows images to be switched synchronously. For example, when you change the AUX1 image, the AUX2 image will automatically change accordingly. In this example, AUX1 is called **Master Bus** and AUX2 **Slave Bus**. Let's set up bus link examples that meet the following conditions.

◆ **Required Link Conditions**

When M/E1PGM selects IN01, M/E1PST automatically selects IN05.
When M/E1PGM selects IN02, M/E1PST automatically selects IN06.
When AUX1 selects IN01, AUX2 automatically selects IN05.
When AUX1 selects IN02, AUX2 automatically selects IN06.

(1) Open the [SETUP > BUS LINK > BUS LINK] menu PAGE 2.
(2) Set MASTER BUS to M/E1PGM and SLAVE BUS to M/E1PST as shown below.
(3) Set LINK MODE to NORMAL.

SETUP > BUS LINK > BUS LINK			2/4
LINK NO	LINK MODE	MASTER BUS	SLAVE BUS
LINK1	NORMAL	M/E1PGM	M/E1PST

LINK MODE Setting

NORMAL	When the video image is changed in a Master Bus, the paired image is automatically applied to its Slave Bus.
SYNC	When the video image is changed in a Master Bus, the same image is automatically applied to its Slave Bus.

(4) Go to PAGE 3. Select pair images for LINK1.
  (a) Select IN01 for MASTER XPT, and IN05 for SLAVE XPT.
  (b) Turn F2 to change the pair number to No.02. Select IN02 for MASTER XPT, and IN06 for SLAVE XPT.

SETUP > BUS LINK > BUS LINK			3/4
LINK NO	XPT PAIR NO	MASTER XPT	SLAVE XPT
LINK1	No.01	IN01	IN05

SETUP > BUS LINK > BUS LINK			3/4
LINK NO	XPT PAIR NO	MASTER XPT	SLAVE XPT
LINK1	No.02	IN02	IN06

(5) Go back to PAGE 2. Change the link number to LINK2, and select AUX1 for MASTER BUS, AUX2 for SLAVE BUS and NORMAL for LINK MODE.

SETUP > BUS LINK > BUS LINK			2/4
LINK NO	LINK MODE	MASTER BUS	SLAVE BUS
LINK2	NORMAL	AUX1 PGM	AUX2 PGM

(6) Refer to Step (4) to select pair images for LINK2.
(7) Then turn BUS LINK ENABLE to enable all bus (video) links in PAGE 1.

SETUP > BUS LINK > BUS LINK	1/4
BUS LINK	
ENABLE	

◆ **Copying BUS LINK Setting**

(1) Open [SETUP > BUS LINK > BUS LINK] menu PAGE 4.
(2) Turn F1 to select a destination link number (LINK3, for example).
(3) Turn F2 to select a source link number (LINK1, for example), then press F2. Select YES in the confirmation dialog.
  LINK1 setting is copied to LINK3.

SETUP > BUS LINK > BUS LINK			4/4
LINK NO	XPT COPY FROM	LINK INIT	
LINK3	LINK1	OFF	

◆ **Resetting Bus Links**

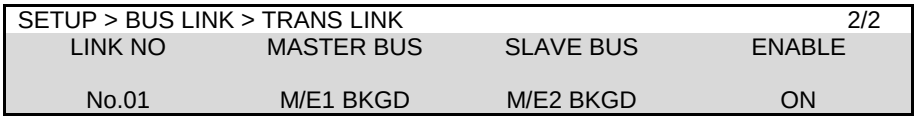
(1) Open [SETUP > BUS LINK > BUS LINK] menu PAGE 4.
(2) Turn F3 to select CURRENT LINK or ALL INIT, then F3.

8-7-2. TRANS LINK

The TRANS LINK function allows you to perform synchronous transitions. When a transition is performed on a master bus, the same transition is automatically performed on its slave bus. The following transition settings are shared.

-CUT or AUTO transition
-Transition Type, Pattern number and Transition Rate
-Fader Level and Fader Limit

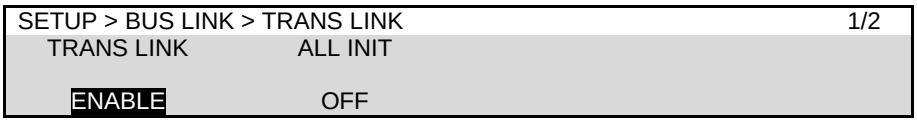
(1) Open [SETUP > BUS LINK > TRANS LINK] menu PAGE 2.



(2) Turn F1 to select a link number.
(3) Turn F2 to select a master bus. Turn F3 to select a slave bus.
(4) Turn F4 to enable the trans link.

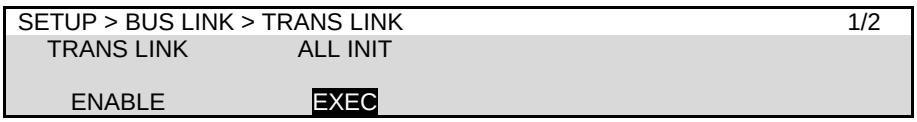
◆ **Enabling/Disabling All Trans Links**

Open [SETUP > BUS LINK > TRANS LINK] menu and turn **TRANS LINK** to ENABLE / DISABLE.



◆ **Resetting Trans Links**

Open [SETUP > BUS LINK > TRANS LINK] menu and turn F2 to set **ALL INT** to EXEC, then press F2.



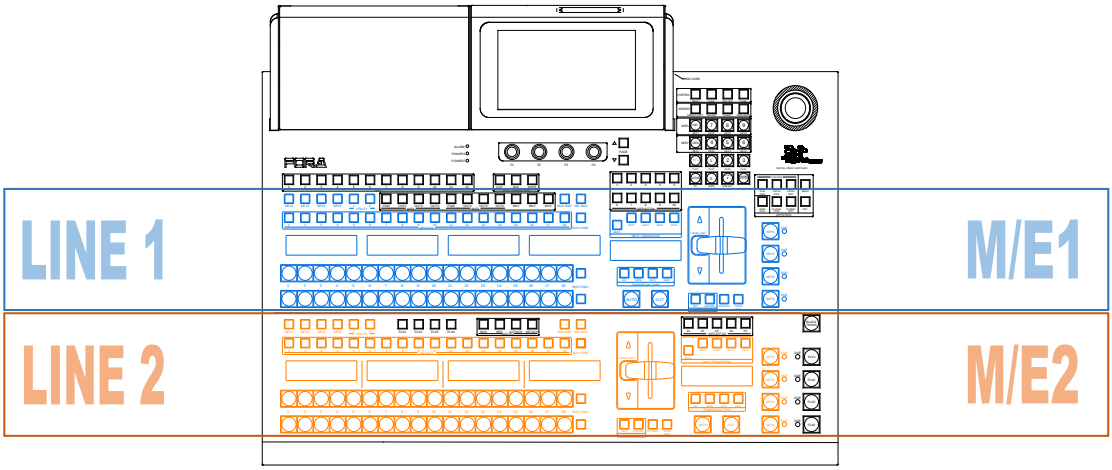
9. Bus Operation

9-1. Control Panel

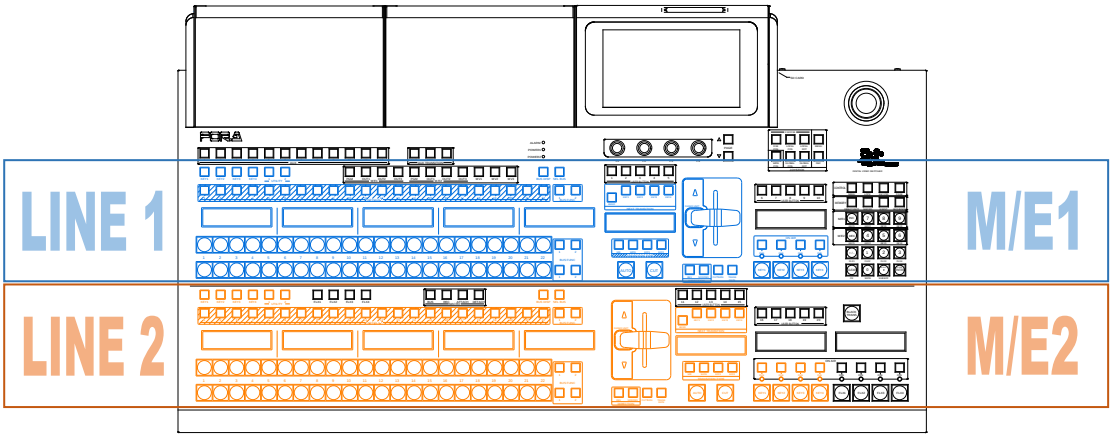
HVS-492OU/492WOU/492ROU units are composed of two M/E controllers (LINE 1 and 2) and menu control or other blocks.

►See Sec. 3-2. “Control Panel” for details.

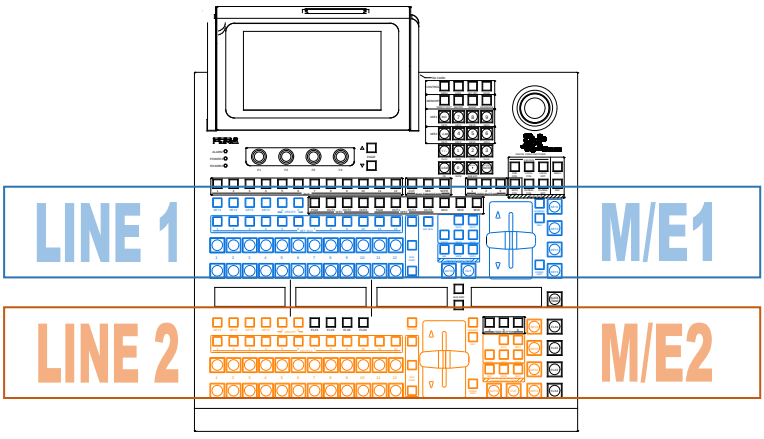
HVS-492OU



HVS-492WOU



HVS-492ROU



LINE 1 is assigned to M/E1 and LINE 2 to M/E2 as factory default. These assignments, however, can be changed.

◆ **To Lock the Control Panel**

Pressing the LOCK button in the CONTROL block disables the control panel operation and GUI control, except the LOCK button.
To unlock the control panel and GUI, press and hold down LOCK.

9-1-1. Assigning M/Es to LINEs

M/E1, M/E2 and MELite1-2 can be assigned to LINE 1 and LINE2.
For example, to **use LINE 2 as M/E1**, proceed as follows:

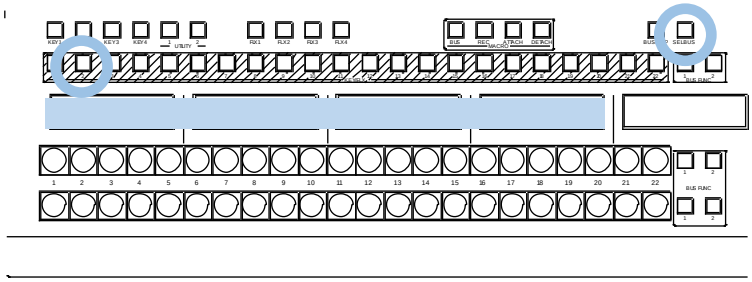
◆ **Using the Menu**

(1) Open the [PANEL > LINE CONTROL > LINE CONTROL] menu.
(2) Turn F2 to select M/E1.

PANEL > LINE CONTROL > LINE CONTROL			1/1
LINE1 CONTROL	LINE2 CONTROL	SEL BUS BUTTON INHIBIT	
M/E1	M/E1	OFF	

◆ **Using the Panel Buttons**

(1) Press and hold down SEL BUS in LINE 2.
(2) Selectable bus names (NONE, M/E1, M/E2 and AUX1-12) are displayed below the KEY/FLX row. Press the KEY/FLX button just above “M/E1.”



M/E1 operation can now be performed in LINE 2.
The current assigned M/E name is displayed at the right end of the bus display block.

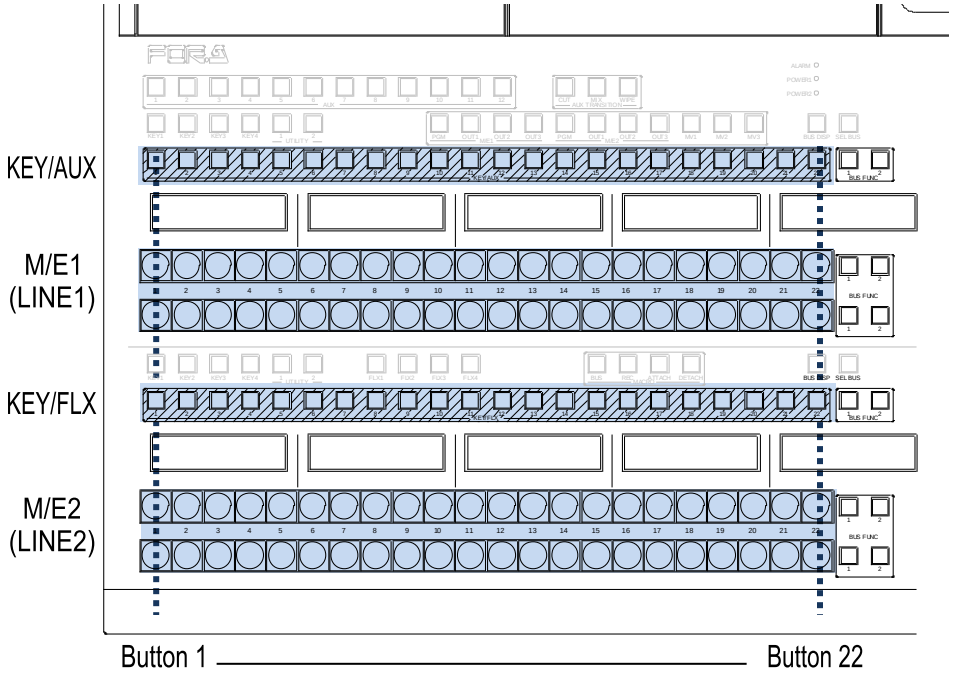
To disable the SEL BUS button, turn **SEL BUS BUTTON INHIBIT** to in the [PANEL > LINE CONTROL > LINE CONTROL] menu.

IMPORTANT

If you assign an M/E to both LINE 1 and LINE 2, the LINE 1 transition block is automatically disabled to prevent operational mistakes, and LINE 1 is fixed to LEVEL 1 and LINE 2 to LEVEL 2.

9-2. Selecting Video Sources

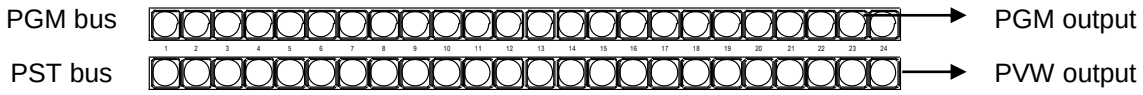
Bus button rows on the control panel facilitate video source selection in the switcher.
A single bus row comprises 18 bus buttons for HVS-492OU units, 22 for HVS-492WOU and 12 for HVS-492ROU and an M/E has three bus rows: PGM, PST and KEY/AUX for M/E1 and PGM, PST and KEY/FLEX for M/E2.



Button and video source assignments can be freely set and changed. In addition, each button can be inhibited to prevent operational mistakes.
Button and video signal assignments are shared by all M/Es, although different assignments for each M/E is also allowed.
► See Sec. 6-2. “Mapping Video Sources to Bus Buttons.”

9-2-1. M/E Bus Type

An M/E bus has two bus rows: **PGM** and **PST** (when set to **P/P**: factory default setting).
The PGM bus is the **upper** row and outputs program (on-air) video.
The PST bus is the **bottom** row and outputs the next video.

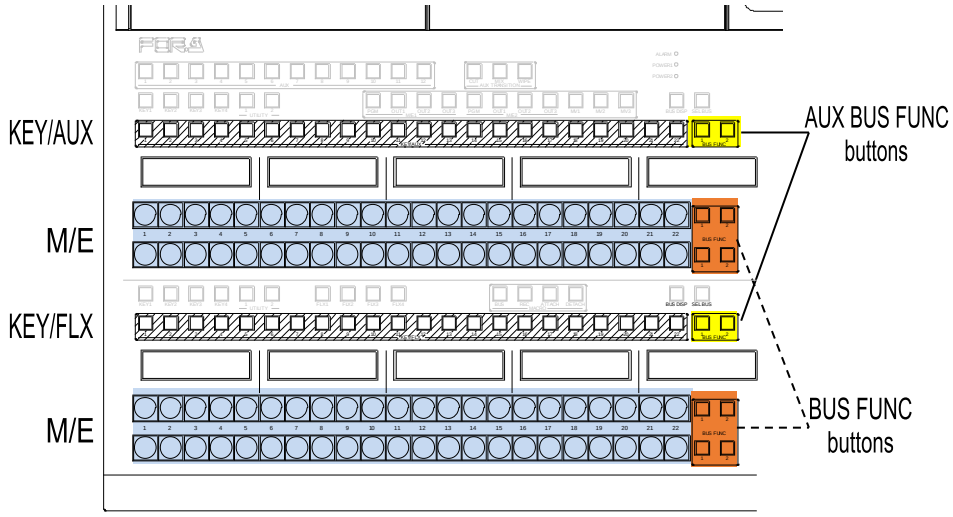


The BUS TYPE can be selected for each M/E under BUS TYPE in the [SETUP > SYSTEM > BUS TYPE] menu from the following three options.

P/P (PGM/PST) (Default)	Source selections in the PGM and PST buses are switched when transitions occur and users can always select the next background signal (PST image) in the bottom row.
A/B	Source selections in the PGM and PST buses do not switch when transitions occur and the next signal must be selected in the accompanying bus after each transition.
P/P Reverse	PST/PGM mode. PGM and PST buses are placed in the reverse order of **P/P(PGM/PST)** and users can always select the on-air background signal (PGM image) in the bottom row.

9-3. Selecting a Function to BUS FUNC Buttons

The function for BUS FUNC buttons can be selected as shown below.



(1) Open [PANEL > BUS CONTROL > BUS FUNC] menu.
(2) Turn F1 to F4 to select a function for BUS FUNC buttons.

PANEL > BUS CONTROL > BUS FUNC			5/11
BUS FUNC1	BUS FUNC2	AUX BUS FUNC1	AUX BUS FUNC2
XPT HOLD	NONE	NONE	NONE

BUS FUNC setting	Function	Lit indication
XPT HOLD	Allows you to recall events without changing signal selections on the M/E bus. Signal selections for KEY and FLEXaKEY signals are also locked when using the AUX BUS FUNC button.	HOLD ON: Lit orange HOLD OFF: Unlit
INHIBIT	Allows you to enable/disable (Inhibit OFF/Inhibit ON) button operation on the M/E, KEY/AUX or KEY/FLX bus. Also allows you to enable/disable each button operation by pressing the button with BUS FUNC held down.	M/E ON: Lit orange M/E OFF: Unlit
SHIFT LEVEL2-4	Allows you to apply LEVEL2-4 signal assignments.	LEVEL2-4 ON: Lit orange LEVEL2-4 OFF: Unlit
TALLY (BUS FUNC1-2 only)	Allows you to indicate whether RED Tally is being sent.	Tally-out: Lit orange No tally-out : Unlit

9-4. Bus Button Colors

Bus buttons on the control panel can be changed to any desired color with the COLOR PALETTE menu. Before changing button colors, create and save colors to the color palette or to signals.

9-4-1. Creating and Saving Colors

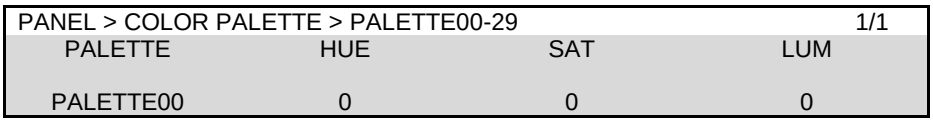
◆ **Registering Colors to Color Palettes**

(1) Open the [PANEL > COLOR PALETTE > PALETTE00-29/30-59] menu.
(2) Turn F1 to select a color number in the palette from 00-59.

TIPS

Sixty preset colors (No. 00-59) are available for all bus buttons, on the other hand, PALETTE OTHER colors are used for specific purposes such as BLANK, TALLY or PGM SELECT.

(3) Turn F2, F3 and F4 to create and save a color.



◆ **Registering Signal Colors**

Signal colors can also be applied to bus buttons. To create signal colors proceed as follows:

(1) Open the [SETUP > INPUT > SIGNAL COLOR] menu.
(2) Turn F1 to select a signal, then Turn F2, F3 and F4 to create and save a color.

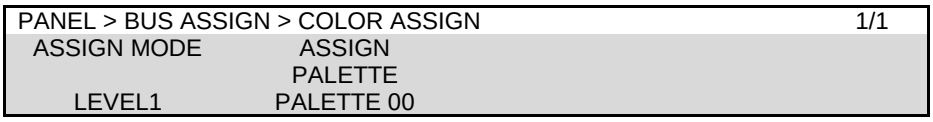
9-4-2. Applying Colors to Bus Buttons

(1) Open the [PANEL > BUS ASSIGN] menu.
(2) Select an M/E.
(3) Open the [PANEL > BUS ASSIGN > LEVEL1] menu.
(4) Turn F1 to select a bus button, then Turn F4 to select a color number in the color palette. To apply a signal color, select SIGNAL.

◆ **Simultaneously Applying a Color to Multiple Bus Buttons**

To apply a color to multiple buttons, use the COLOR ASSIGN menu as shown below.

(1) Open the [PANEL > BUS ASSIGN > COLOR ASSIGN] menu.
(2) Turn F2 to select a color number in the palette.
(3) Turn F1 to select a level.

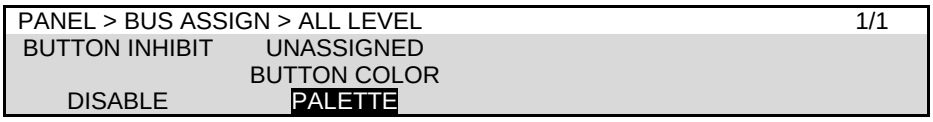


(4) With these settings, press buttons. The set color (ASSIGN PALETTE setting) is simultaneously applied to the buttons.

◆ Applying a Color to Unassigned Bus Buttons

A desired light color can be set for a button to which no signal is assigned.

(1) Open the [PANEL > BUS ASSIGN > ALL LEVEL] menu.
(2) Turn F2 to select PALETTE or BLANK.
If PALETTE is selected, select a specific color for each bus button under COLOR PALETTE in the [PANEL > BUS ASSIGN > LEVEL1-4] menu.
If BLANK is selected, a color set for BLANK is applied to all unassigned bus buttons. (See 9-4-1. “Creating and Saving Colors.)



10. MELite Operations

MELites, simplified M/Es, can be assigned to LINE1 or LINE2. First, attach an AUX bus to an MELite. MELite mixed images can also be used as input sources on M/E1 and M/E2 (re-entry).
FLEXaKEY1-4 can be displayed on MELite mixed images. Therefore the switcher can provide up to 4 M/E with a key for each. (If the HVS-49IO expansion card is installed, MELite3 and 4 are added to the switcher and a 6 M/Es equivalent system becomes available.)

See the table below for MELite configuration details.

M/E	Available AUX outputs	Available keys
MELite1	AUX1-6	FLEXaKEY1-4
MELite2		
MELite3 (*1)	AUX7-12	
MELite4 (*1)		

(*1) If HVS-49IO options installed

IMPORTANT

MELite re-entries are available on M/E1 and M/E2, but not on MELite.

10-1. Setting up an MELite

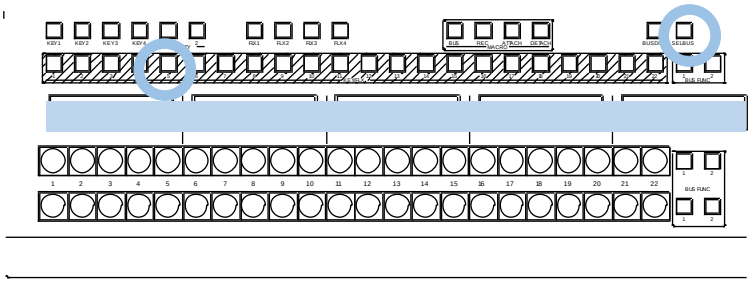
1. **Attach an AUX bus to an MELite**
2. **Use the SEL BUS button to assign the AUX bus (MELite assigned) to LINE 1 or LINE2.**

The following example shows how to attach **AUX5** to **MELite1** and assign AUX5 to **LINE2**.

(1) Open the [SETUP > OUTPUT > MELite] menu. Turn F1 to select AUX05 for MELite1 ASSIGN.

SETUP > OUTPUT > MELite			1/1
MELite1	MELite2	MELite3	MELite4
ASSIGN	ASSIGN	ASSIGN	ASSIGN
AUX05	OFF	---	---

(2) Press and hold down SEL BUS in the LINE 2. Selectable names (M/E1, M/E2 and AUX1-12) are displayed above the KEY/FLX row. Press the button above “AUX05 (MELite1).”

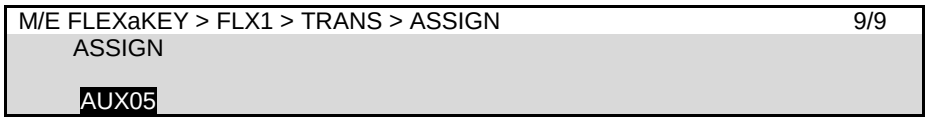


MELite1 operation can now be performed in LINE 2.

◆ **MELite1 Mixed Images**
MELite1 PGM and PVW images can be assigned to any outputs including Multiview images except ME mixed outputs.
MELite 1 signal selection and transitions can be performed as the LINE 2 background bus.

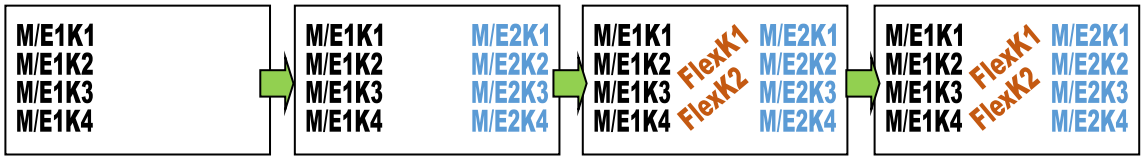
10-1-1. Displaying Key Images

MELites can display up to 4 key images (FLEXaKEY1-4) in total.
Open the [M/E FLEXaKEY > FLX1 > TRANS > ASSIGN] menu. Turn F1 to select MELite1. Selecting AUX05 for FLX2-4 in the same way allows you to display 4 keys on the mixed MELite1 images.



10-2. XPT Re-entry

The switcher allows you quadruple crosspoint re-entry.
For example, M/E2 uses M/E1 combined video as a source, in turn, MELite1 uses the M/E1 combined video as a source, then MELite1 combined video with a triple re-entry source is directed through AUX5.



M/E1 PGM image | M/E2 PGM image | MELite1 PGM image | AUX5 output image

◆ **Available Re-entry Combinations**

Available re-entry combinations are as shown in the table below. First and second mixed re-entry images can be also output for each bus.

Mixed image	Re-entry	Dual re-entry	Triple re-entry	Quadruple re-entry
MELite (*1)	M/E1	M/E2	MELite	AUX
M/E1	M/E2	MELite	AUX	-
MELite (*1)	M/E1	M/E2	AUX	-
MELite (*1)	M/E1	MELite	AUX	-
MELite (*1)	M/E2	MELite	AUX	-
M/E1	M/E2	AUX	-	-
MELite (*1)	M/E1	AUX	-	-
MELite (*1)	M/E2	AUX	-	-
M/E1	MELite	AUX	-	-
M/E2	MELite	AUX	-	-

(*1) Note that an ME Lite image displayed on M/E 1, M/E 2 or FLEXaKEY1-4 output video, as a re-entry, is shifted below by one horizontal line.

11. Transitions

<Transitions on LINE 1 and LINE 2 >

Background, KEY1-4 and FLEXaKEY1-4 transitions can be performed on each M/E.
If AUX1-12 are assigned to LINE 1-2, background and FLEXaKEY1-4 transitions are possible.

* Transitions setup by next transition bus selection
* Transitions using the CUT, AUTO button or fader lever
* CUT and MIX buttons dedicated to each keyer
* On-Air indicators for keys
* More than 100 types of various preset patterns

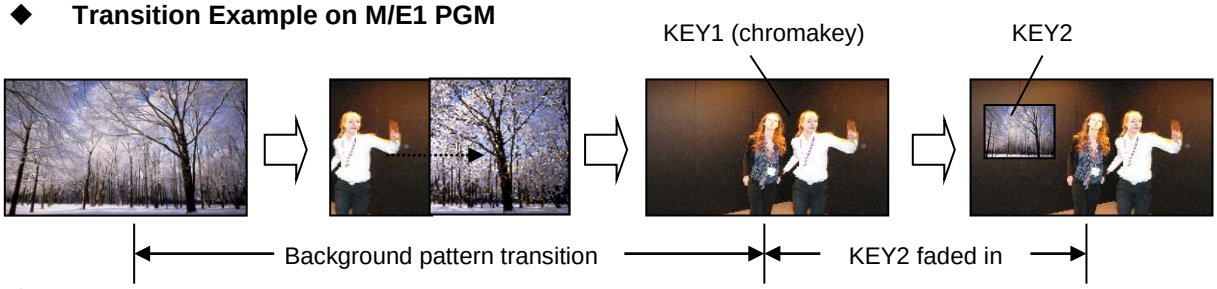
<AUX Transitions>

Video switches on AUX buses are allowed to use simple effects.
AUX bus transitions are performed using the menu or AUX bus, AUX TRANS and KEY/AUX bus blocks on the control panel.

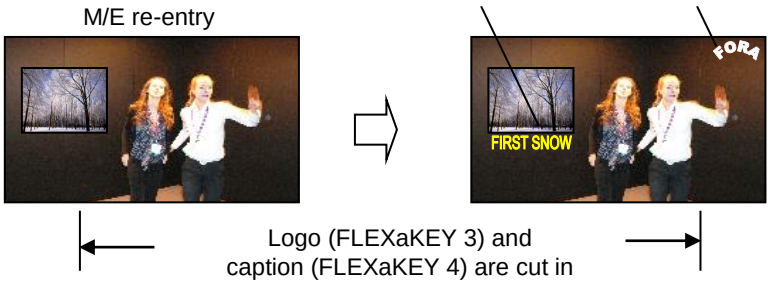
<Transitions using Event Recall >

When recalling events, images can be faded in and out. (See Sec. 19-2-3. “Transitions Using Event Recall”)

◆ **Transition Example on M/E1 PGM**



◆ **AUX Output Example using M/E re-entry**



Operation bus	Operation block	Output bus	Output connector	Effects	Keys	BLACK TRANS
M/E1	LINE 1 (default) LINE 2	M/E1PGM M/E1OUT1-3	M/E OUT1-2 AUX1-6	CUT MIX PATTERN	M/E1KEY1-4 FLX1-4	No
M/E2	LINE 1 LINE 2(default)	M/E2PGM M/E2OUT1-3	M/E OUT1-2 AUX1-6		M/E2KEY1-4 FLX1-4	Yes
AUX1-6	LINE1 LINE2 AUX bus block KEY/AUX bus	AUX1-6	AUX1-6	CUT MIX WIPE	FLX1-4	No

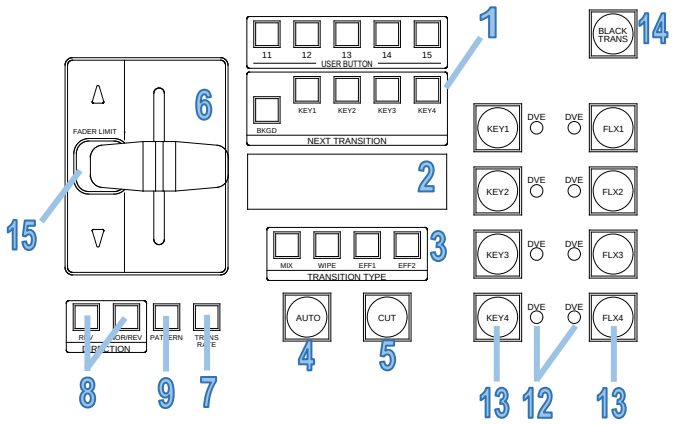
◆ **HVS-49IO option**

Operation bus	Operation block	Output bus	Output connector	Effects	Keys	BLACK TRANS
M/E1	LINE1 (default) LINE2	M/E1PGM M/E1OUT1-3	M/E OUT3-4 AUX7-12	CUT MIX PATTERN	M/E1KEY1-4 FLX1-4 (LINE1)	No
M/E2	LINE1 LINE2(default)	M/E2PGM M/E2OUT1-3	M/E OUT3-4 AUX7-12		M/E2KEY1-4 FLX1-4	Yes
AUX7-12	LINE1 LINE2 AUX bus block KEY/AUX bus	AUX7-12	AUX7-12	CUT MIX WIPE	FLX1-4	No

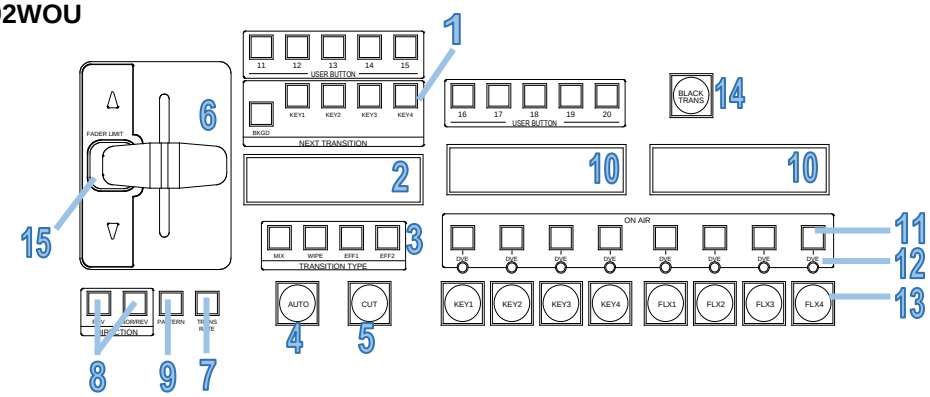
11-1. Transition Block

LINE 1 and LINE 2 transition blocks have essentially the same functions and buttons. (BLACK TRANS is available only on LINE2.)

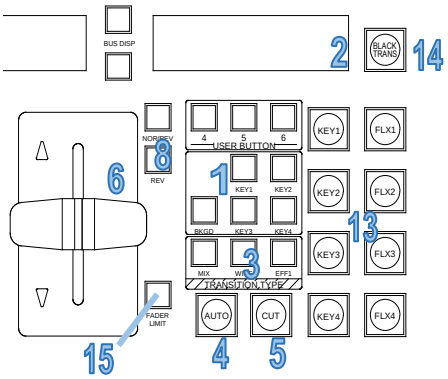
HVS-492OU



HVS-492WOU



HVS-492ROU



◆ **LINE1 and LINE2 transition blocks**

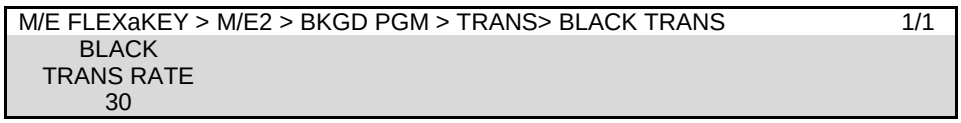
No.	Description	Refer to
1	Next transition bus selection	11-3 11-4 11-5
2	Transition type and rate display for BKGD and KEY1-4 (HVS-492OU/492WOU)	
	Displays BKGD, KEY and FLX transition rates and types on LINE1 and LINE2. (HVS-492ROU)	
3	Transition type selection	
4	AUTO transition button for BKGD and KEY1-4	
5	CUT transition button for BKGD and KEY1-4	
6	Fader lever for BKGD and KEY transitions	
7	HOME menu display (HVS-492OU/492WOU)	11-7
8	Transition pattern directional setting	
9	Quick pattern recall (HVS-492OU/492WOU)	11-8
10	Transition type and Insert signal name display for KEY1-4, FLX1-4 (HVS-492WOU)	11-10
11	ON AIR (CUT) transition buttons for KEY1-4, FLX1-4 (HVS-492WOU)	
12	DVE indicators for KEY1-4, FLX1-4 (HVS-492OU/492WOU)	
13	AUTO (MIX) transition buttons for KEY1-4, FLX1-4	
14	BLACK TRANS button for M/E2	11-2
15	BKGD fader limit ON/OFF button	11-12-2

11-2. Black Transitions

Pressing the BLACK TRANS button executes a BLACK transition. Pressing the button initiates a fade to black of the currently displayed source video. Pressing the button again starts another fade from black to the previous video.
Black transitions are available on the M/E2PGM output.

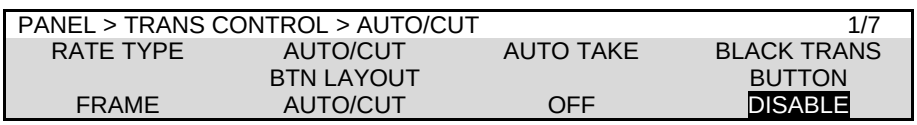
◆ **Setting Black Transition Rate**

(1) Open the [M/E FLEXaKEY > M/E2 > BKGD PGM > TRANS > BLACK TRANS] menu.
(2) Set the transition rate.



◆ **Disabling Black Transitions**

In [PANEL > TRANS CONTROL > AUTO/CUT] menu, change **BLACK TRANS BUTTON** to DISABLE.

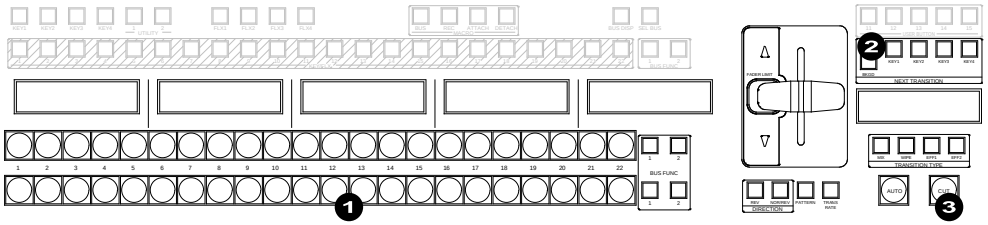


11-3. Background Transitions

This chapter explains how to perform background transitions using the M/E2 background assigned to LINE 2 as an example.

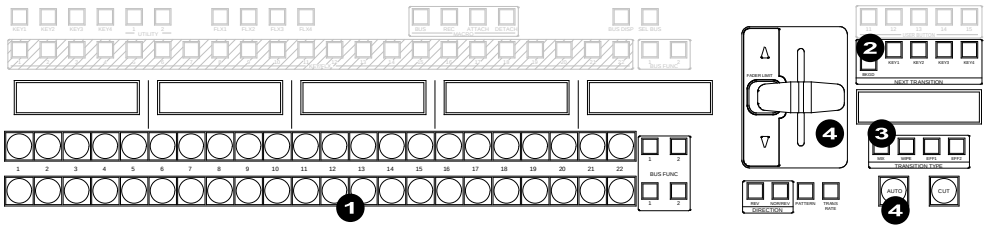
◆ **CUT Transition**

(1) Select a video source in the PST bus block.
(2) Press the BKGD button in the TRANSITION block.
(3) Press CUT to perform the background CUT transition.



◆ **MIX Transition**

(1) Select a video source in the PST bus block.
(2) Press the BKGD button in the TRANSITION block.
(3) Press MIX in the TRANSITION TYPE block.
(4) Press AUTO or move the fader lever to perform the background MIX transition.

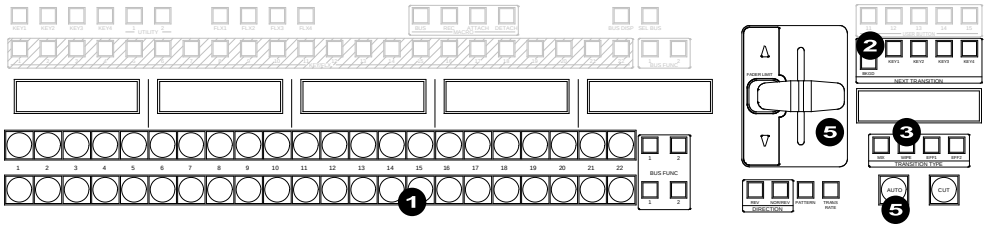


◆ **Pattern Transition**

(1) Select a video source in the PST bus block.
(2) Press the BKGD button in the TRANSITION block.
(3) Quickly press WIPE twice in the TRANSITION TYPE block.
WIPE will light up and the [M/E FLEXaKEY > M/E2 > BKGD > TRANS > TRANS] menu will appear.
(4) Turn F4 to select a pattern.

M/E FLEXaKEY > M/E2 > BKGD PGM> TRANS > TRANS			1/4
TRANS RATE	FADER LIMIT	FADER LEVEL	PATTERN NO.
30	OFF	0.0	

(5) Press AUTO or move the fader lever to perform the background transition.



► See Sec. 11-7. “Pattern (WIPE/DVE) Transitions.”
► See Sec. 11-12-1. “Transition Rate.”
► See Sec. 11-12-2. “Using Fader Limit.”

◆ **Checking Next Video and Transition**

To check the next video, monitor the Preview video by assigning M/E2PVW to an output.
To check the current background video, monitor the Clean video by assigning M/E2CLN1 or M/E2CLN2 to an output.

► See Sec. 8-1. “Selecting Video for M/E OUT1-2.”

11-4. KEY Transitions

Key images are displayed on each M/E output screen. This chapter explains how to perform key transitions using M/E1KEY1 as an example.

(1) Perform key setup for the KEY. (See Sec. 12. “KEY/FLEXaKEY.”)
(2) Perform a desired transition referring to the below procedures.

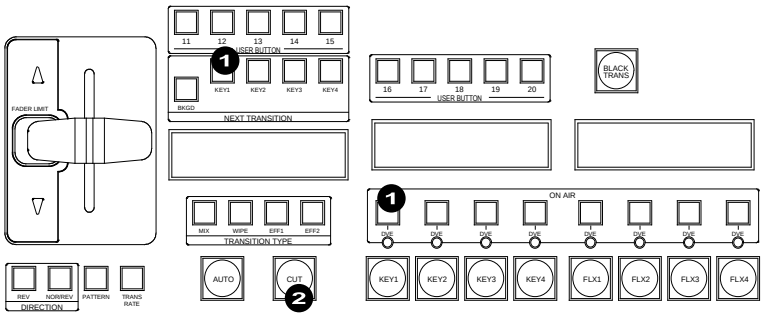
◆ CUT Transition

<Method 1>

(1) Press KEY1 in the TRANSITION block.
(2) Press CUT to perform a key CUT transition.

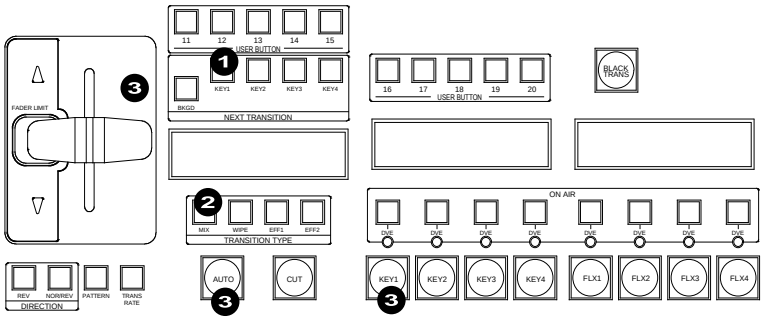
<Method 2 (HVS-492WOU) >

(1) Press KEY1 ON AIR to insert KEY1 onto the M/E1 program video. Press the button again to remove KEY1 from the screen. (See Sec. 11-10.” KEY IN/OUT Using Cut or Fade.”



◆ MIX Transition

(1) Press KEY1 in the TRANSITION block.
(2) Press MIX in the TRANSITION TYPE block.
(3) Press AUTO or KEY1 AUTO, or move the fader lever to perform the KEY1 MIX transition.



NOTE

The KEY1 AUTO button behaves the same as the AUTO button when selecting KEY1 for the next transition. For example, if MIX is set as the KEY1 transition type under the NEXT TRANSITION, the KEY1 mix transition is performed when KEY1 AUTO is pressed and a KEY1 wipe transition is performed if WIPE is set as the transition type.

◆ **Pattern transition**

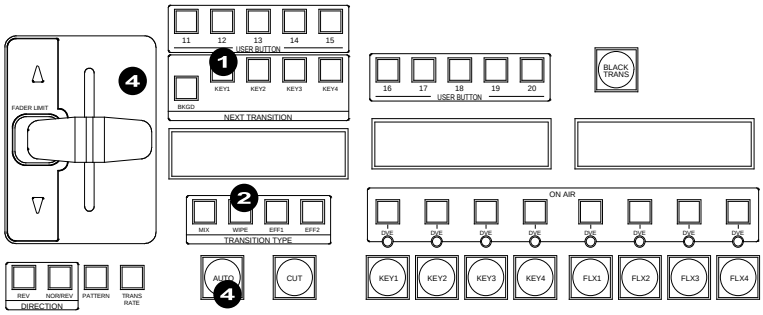
(1) Press KEY1 in the TRANSITION block.

(2) Quickly press WIPE twice in the TRANSITION TYPE block.
WIPE will light up and the [M/E FLEXaKEY > M/E1 > KEY1 > TRANS > TRANS] menu will appear.

(3) Turn F4 to select a pattern.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > TRANS			1/1
TRANS RATE	FADER LIMIT	FADER LEVEL	PATTERN NO.
30	OFF	0.0	

(4) Press AUTO or KEY AUTO, or move the fader lever to perform the pattern transition.

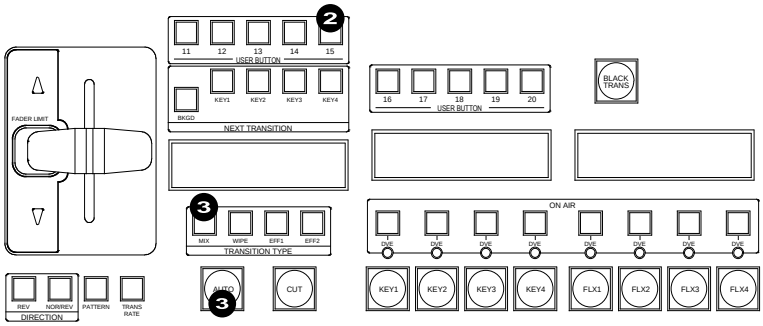


► See Sec. 11-7. “Pattern (WIPE/DVE) Transitions.”
► See Sec. 11-12-1. “Transition Rate.”
► See Sec. 11-12-2. “Fader Limit.”

◆ **FLEXaKEY Transition (If output target is set to M/E1 or 2)**

Only CUT and MIX are available for FLEXaKEY transitions. FLEXaKEY transitions are explained here using an example where FLEXaKEY3 is set to output from M/E2.

(1) Assign FLEXaKEY3 NEXT to a USER button on M/E2 (LINE2), USER BUTTON 15 in this example. (See Sec. 24-3. “USER Button.”)



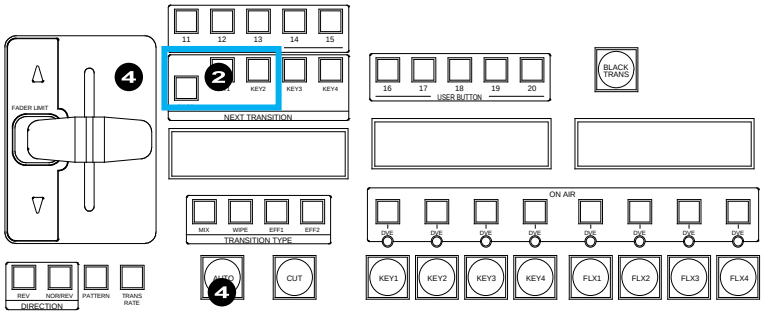
(2) Press USER BUTTON 15. The button will turn on and FLEXaKEY3 is assigned to the next transition.

(3) Then, perform a transition in the same manner as other keys. Press MIX, then AUTO to fade in the key on the PGM image.

11-5. Simultaneous BKGD and Key Transitions

Background and key transitions can be performed simultaneously. This chapter explains how to perform simultaneous BKGD, KEY1 and KEY2 transitions as an example.

(1) Set transition types for the background, KEY1 and KEY2 to MIX or WIPE respectively. Select a pattern using the menu if set to WIPE. (See the note below.)
(2) Press BKGD, KEY1 and KEY2 simultaneously to light up the buttons.
(3) Set the transition rate or direction, if necessary.
(4) Press AUTO, or move the fader lever to perform a simultaneous transition.



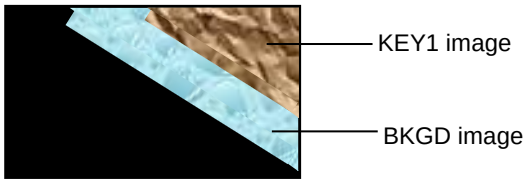
WIPE or DVE Pattern Use Limitations

LINE DVE and DVE patterns (No. 100 and later) cannot be used simultaneously on a bus. In 1080/59.94p or 50p mode, up to 8 channels of DVE patterns (No.100 or later) can be used simultaneously. See Sec. 11-7. “Pattern (WIPE/DVE) Transitions” for details on transition settings.

11-5-1. PRE COMBINER

Although BKGD and KEY transitions can be simultaneously performed, they are handled independently and their transition patterns can differ from each other. If PRE COMBINER is enabled, however, all transitions are done together like a single image using the BKGD transition type. It is very effective for using DVE transitions. See Sec, 11-5. “Simultaneous BKGD and Key Transitions” for more details.
PRE COMBINER can be enabled in the [SETUP > PRE COMBINER] menu.

◆ **Ex.) Simultaneous transition of BKGD(Pattern 128) and KEY1 (Pattern 0)**



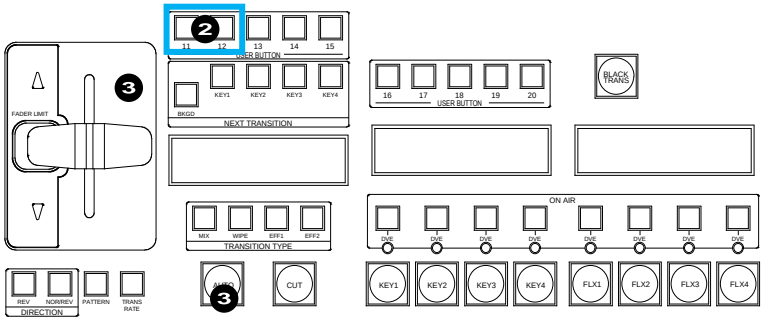
PRE COMBINER: ENABLE

PRE COMBINER: DISABLE

11-6. Simultaneous Transition of M/Es (ONStage)

The ONStage feature allows you to perform transitions of multiple M/E buses (M/E1, M/E2 and AUX1-12) simultaneously. The procedure example below shows how to perform **M/E2** and **AUX1** transitions at the same time.

(1) Assign M/E2 and AUX1 to USER buttons located. USER 11 and 12 are used in this example. (See Sec. 18 “USER Button” for details on USER button assignments.)
(2) Simultaneously press USER 11 and 12 to turn them on.
(3) Press AUTO or move the fader lever to perform the transition. The two M/E transitions will occur simultaneously.



11-7. Pattern (WIPE/DVE) Transitions

Pattern transitions are available for M/E background and keys. This section explains how to perform pattern transitions.

(1) Select a next background video on the PST bus. Before performing a key transition, perform keyer setup.
(2) Press BKGD or KEY1 to KEY4 in the NEXT TRANSITION section to select a bus to be transitioned. A simultaneous transition of multiple buses is also possible. (See Sec. 11-5. “Simultaneous BKGD and Key Transitions“.)
(3) Press WIPE twice, quickly.

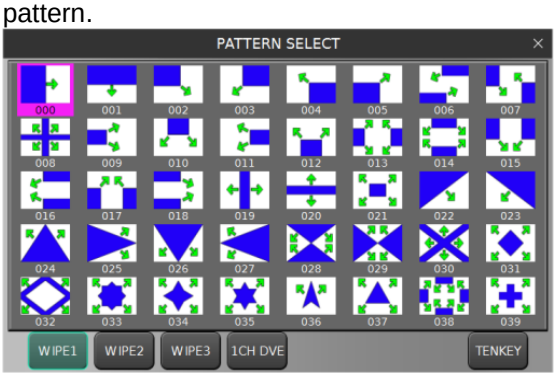
If the WIPE button does not light up...

DVE patterns (No. 100 and later) cannot be used while a bus is being performed LINE DVE operation. If in 1080/59.94p or 50p mode, DVE cannot be used for all channels simultaneously, see Sec. 13. “Assigning DVE Channels” for more details.

(4) Turn F4 to select a pattern, or use the DIRECT PATTERN function (See Sec. 11-8. “Direct Pattern Function”).

M/E FLEXaKEY > M/E1 > BKGD PGM > TRANS > TRANS			1/4
TRANS RATE	FADER LIMIT	FADER LEVEL	PATTERN NO.
30	OFF	0.0	000 →

Tapping **PATTERN NO.** opens the following pop-up window and allows you to easily select a pattern.



(5) Users can modify the pattern here to add a border, change the aspect ratio, the start position, and so on.

▶ See Sec. 11-9. “Modifying Patterns” for more details. Note that Direct Patterns can save/load modified pattern data.

(6) Set the direction of transition using the direction buttons.

Transition direction	NOR/REV button	REV button
Always Normal	Unlit	Unlit
Always Reverse	Unlit	Lit
Normal at Normal/Reverse operation	Lit	Unlit
Reverse at Normal/Reverse operation	Lit	Lit

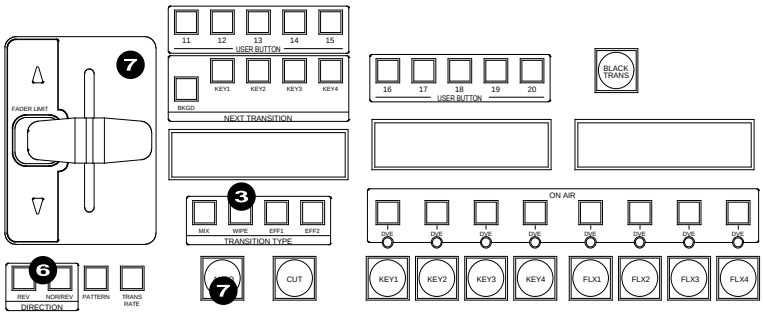
Transition Rate

The AUTO transition duration (Transition Rate) can be set in the menu.
See Sec. 11-12-1. “Transition Rate.”

Fader Limit

When performing transitions there may be times when you want the transition to the next signal to only complete to a certain degree instead of fully switching from one picture to another. In such case, change the Fader Level value in the menu and turn on FADER LIMIT. See Sec. 11-12-2. "Using Fader Limit."

(7) Press AUTO or move the fader lever to perform the background pattern transition.
The KEY AUTO buttons are available for KEY1-4 pattern transitions.



11-8. Direct Pattern Function

The Direct Pattern Selection feature uses the number buttons (0-9) on the MEMORY block, to which patterns (WIPE or DVE type) previously registered can be recalled at the touch of a button. Up to 20 patterns can be registered. Pattern modification data can be added to direct patterns. The feature is useful for assigning frequently used patterns to number buttons. This chapter explains how to save, recall and clear direct patterns.

11-8-1. Registering Direct Patterns

DIRECT PATTERN data is copied from BKGD or KEY pattern buffers, so that modification information stored in buffers can be copied to DIRECT Patterns. The following example saves **Pattern 120** for **M/E2 BKGD** to **DIRECT PATTERN 10**.

◆ **Selecting Pattern 120 for M/E2 BKGD**

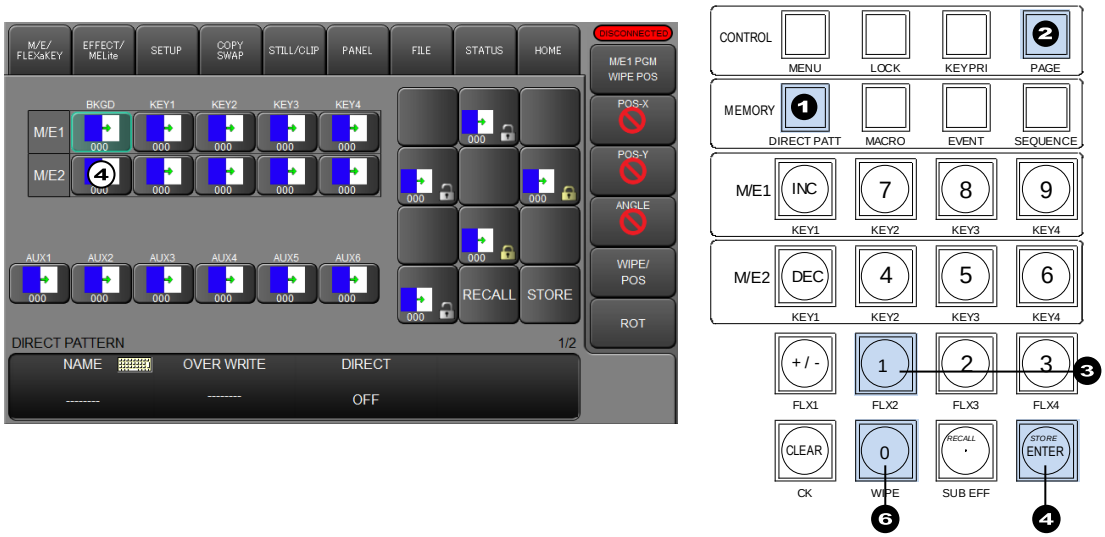
(1) Quickly press BKGD twice in the M/E2 TRANSITION block to open the [M/E FLEXaKEY > M/E2 > BKGD PGM > TRANS > TRANS] menu.
(2) Turn F4 to select Pattern 120.
(3) Modify the pattern, if necessary. (See Sec. 11-9. "Modifying Patterns.")

◆ **Saving Pattern 120 to DIRECT PATTERN 10**

(1) Press DIRECT PATT in the MEMORY block. The [DIRECT PATTERN] menu appears and the multi-pad changes to DIRECT PATTERN mode.
(2) Press PAGE in the CONTROL block.
(3) Press 1 to select PAGE1. (PAGE0 contains DIRECT PATTERN 0-9 and PAGE1 DIRECT PATTERN 10-19.)
(4) Press STORE in the keypad.
(5) Tap **M/E2 BKGD** on the menu screen, or press BKGD in the M/E2 TRANSITION block on the control panel.
(6) Press 0 in the keypad to save BKGD and Pattern 120 to DIRECT PATTERN10.

NOTE

Once the keypad changes to DIRECT PATTERN mode, the number buttons onto which patterns are already saved light up. If a user presses a lit button to save a pattern, the number button will blink. To overwrite the pattern, press the number button again. (To cancel the overwriting procedure, press STORE.)



If a number button (lit red) cannot be overwritten:

Cancel the operation, change OVERWRITE from DISABLE to ENABLE in the [DIRECT PATTERN] menu, then overwrite the pattern setting.

11-8-2. Loading a Direct Pattern

Let's load **DIRECT PATTERN10**, which is saved in the previous chapter, to **M/E2 KEY1**.

(1) Press DIRECT PATT in the MEMORY block.
(2 Press PAGE, then 1 in the CONTROL block to select PAGE1.
(3) Press 0 in the keypad.
(4) Tap on **M/E2 KEY1** button on the menu screen to specify the target.
(5) Press RECALL in the keypad. The M/E2 KEY1 pattern is changed to PATTERN 120 and the transition type to WIPE.

TIPS

If DIRECT in the [DIRECT PATTERN] menu is set to ON, direct patterns can be recalled by pressing number buttons without pressing RECALL.

11-8-3. Clearing Direct Patterns

◆ **Clearing a Direct Pattern Individually**

(1) Press DIRECT PATT in the MEMORY block.
(2) Press the number button to be deleted. (Press PAGE, then 1 first, if deleting 10-19.)
(3) Turn F1 to change **DELETE** to ON, then press F1.

◆ **Clearing a Direct Pattern Page**

(1) Press DIRECT PATT in the MEMORY block to display the menu, then go to PAGE 2.
(2) Turn F2 to select a page (0 or 1), then press F2.

◆ **Clearing all Direct Patterns**

(1) Press DIRECT PATT in the MEMORY block to display the menu.
(2) Turn F3 to turn ALL CLEAR to ON, then press F3.

IMPORTANT

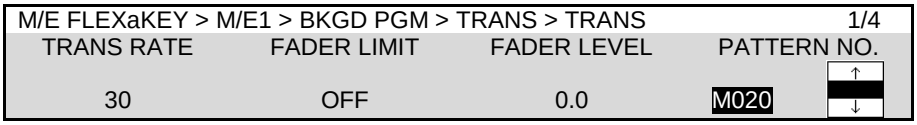
Before clearing a direct pattern registration, set **DIRECT** to OFF. Otherwise, the selected pattern is loaded immediately when pressing the number button.

11-9. Modifying Patterns

Preset patterns for pattern transitions can be changed or modified from their original patterns. There are two types of preset patterns, WIPE and DVE, which undergo different image processing methods and algorithms and provide different MODIFY menus: WIPE MODIFY and DVE MODIFY.

11-9-1. Modified Pattern Data

When a next transition button (such as BKGD) is pressed twice, a transition menu (such as [M/E FLEXaKEY > M/E1 > BKGD PGM > TRANS > TRANS]) is displayed and the selected pattern is shown in the menu page. If the pattern is modified, the letter "M' is added in front of the pattern number.

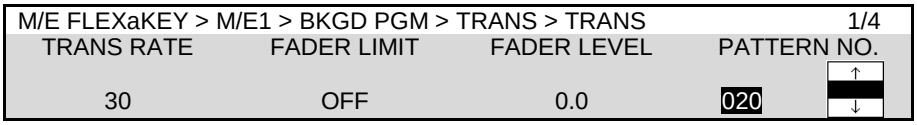


A pattern can be differently modified for the background and KEY1-4 buses, because each bus has two temporary buffers to store WIPE and DVE pattern data. Note that, however, modified data will be lost if another pattern is selected for a bus.
The DIRECT patterns allow you to store “pattern and modified information” and to load the data as needed. (See Sec. 11-8. “Direct Pattern Function.")

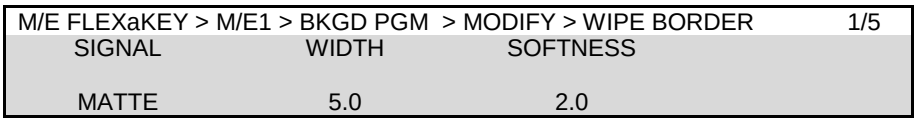
11-9-2. WIPE Modify Example

This modification example adds a border effect to the M/E1 background transitions using Pattern 20.

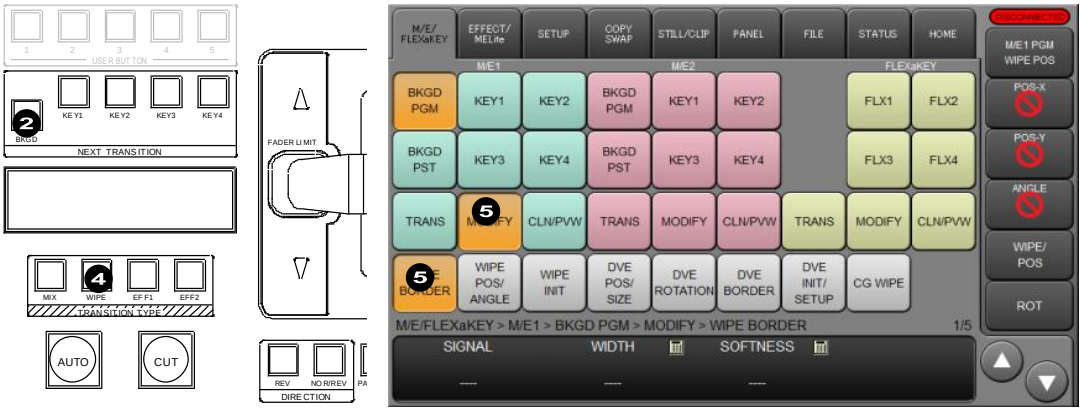
(1) Select a desired video on the M/E1 PST bus.
(2) Quickly press BKGD twice in the M/E1 TRANSITION block to display the [M/E FLEXaKEY > M/E1 > BKGD PGM > TRANS > TRANS] menu.
(3) Press F4, then type **20** and press **Enter** in the pop-up keypad.



(4) Press WIPE to set the M/E1 BKGD transition type to WIPE.
(5) Tap **MODIFY**, then **WIPE BORDER** in the menu screen to display the [M/E FLEXaKEY > M/E1 > BKGD PGM > MODIFY > WIPE BORDER] menu.
(6) Turn F1 to select a video signal used for borders. Select MATTE in this example. Set the border width under WIDTH and border softness under SOFTNESS.



(7) Go to the next page in the menu to select a MATTE color.



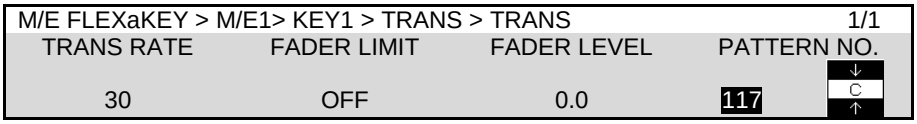
11-9-3. DVE Modify Example

The following modification example is applied to M/E1KEY1 transitions using Pattern 117.

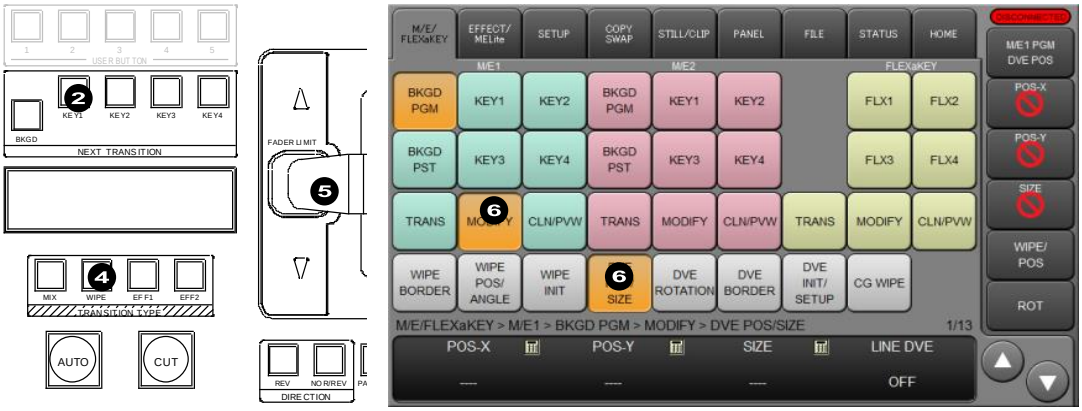
IMPORTANT

When a bus selects a DVE type pattern, a DVE channel (2 DVE channels for Pattern 200 and later) is assigned to the bus, regardless of pattern modification. See Sec. 13. “Assigning DVE Channels.”

(1) Refer to Sec. 12. “KEY and FLEXaKEY” to set up M/E1 KEY1.
(2) Quickly press KEY1 twice in the M/E1 TRANSITION block.
The [M/E FLEXaKEY > M/E1 > KEY1 > TRANS > TRANS] menu will appear.
(3) Press F4, then type **117** and press **Enter** in the pop-up keypad.



(4) Press WIPE to set the M/E1 BKGD transition type to WIPE.
(5) Use the fader to perform the KEY1 pattern transition.
Let’s modify the pattern while monitoring the screen.
(6) Tap **MODIFY** then **DVE POS/SIZE** to display the [M/E FLEXaKEY > M/E1> KEY1> MODIFY > DVE POS/SIZE] menu page.
See Sec. “14. “DVE Effects” for details on available DVE effects.



◆ **Saving the Modify Pattern to a DIRECT Pattern**

The modified pattern can be saved to a DIRECT Pattern. Then let's save Pattern 117 that was modified for M/E1KEY1 to DIRECT PATTERN 07.

(1) Press DIRECT PATT in the MEMORY block. The [DIRECT PATTERN] menu appears and the multi-pad changes to DIRECT PATTERN mode.
(2) Press PAGE, then 0 in the CONTROL block to select PAGE 0.
(3) Press STORE in keypad.
(4) Tap **M/E1 KEY1** on the menu screen.
(5) Press 7 in keypad.

See Sec. 11-8. "Direct Pattern Function" for more details.

11-9-4. Resetting Modified Pattern

The INIT parameters in the menu allow you to reset all or a subset of modified data.

◆ **Resetting a Subset of Modified Data**

(1) Tap the **M/E FLEXaKEY** tab on the menu screen.
(2) Tap a bus button from **BKGD PGM, KEY1-4** and **FLX1-4.**
(3) Tap on **MODIFY**.
(4) Tap on **WIPE INIT** for WIPE types, or **DVE INIT/SETUP** for DVE types.
(5) Turn F1 to select a subset to be reset, then press F1. Tap **YES** on the confirmation dialog.

◆ **Resetting all modified settings**

(1) Turn F1 to select ALL in the [MODIFY > WIPE INIT] or [MODIFY > DVE INIT] menu. Press F1.
(2) Tap **YES** on the confirmation dialog.

11-10. KEY IN/OUT Using Cut or Fade

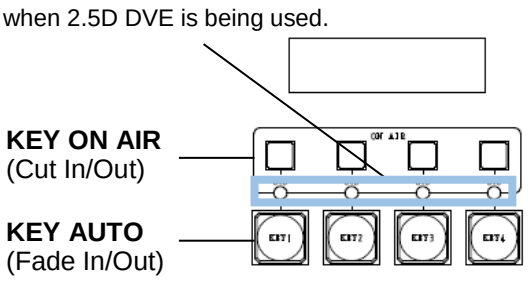
Key transitions can be performed not only through the BKGD AUTO button and fader lever, but also through key ON AIR and key AUTO buttons. (See figure below.)

◆ **KEY1-4 ON AIR buttons (HVS-492WOU)**

Pressing a button cuts in a key onto the PGM image.
Pressing the button again cuts out the key from the PGM image.

◆ **KEY1-4 AUTO buttons**

Pressing a button fades in a key onto the PGM image.
Pressing the button again fades out the key from the PGM image.



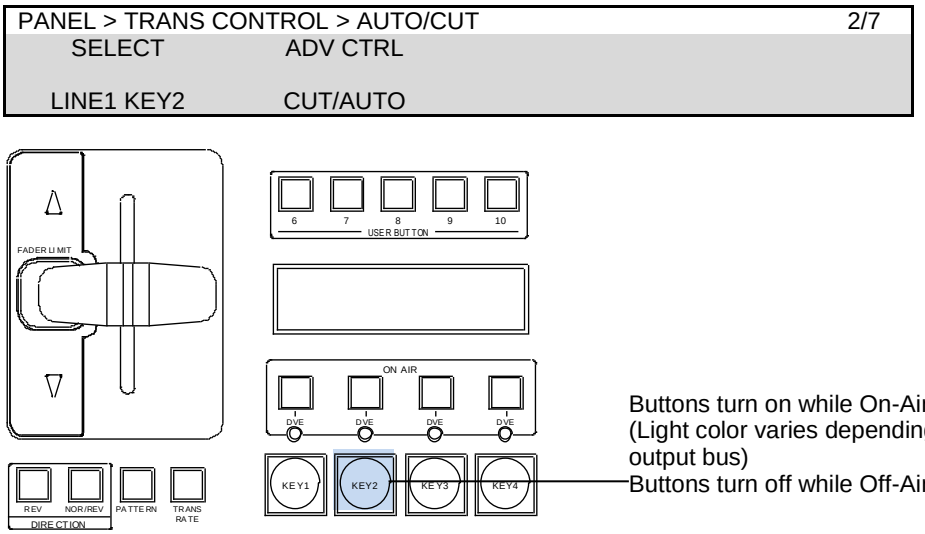
◆ **KEY AUTO and KEY ON AIR buttons and DVE lamp Indications**

The KEY AUTO and KEY ON AIR buttons turn on while On-Air and turn off when Off-Air.
The light color for FLEX1-4 KEY AUTO varies depending on the output bus.

11-10-1. Setting the KEY AUTO Button Function

The KEY AUTO buttons are set to AUTO (MIX) as factory default.
To change the KEY2 AUTO button function on M/E2 so that CUT transitions can be performed by briefly pressing the button and KEY2 AUTO (MIX) transitions can be performed by pressing and holding down the button, proceed as follows:

(1) Open the [PANEL > TRANS CONTROL > AUTO/CUT] menu PAGE 2.
(2) Turn F1 to select LINE1 KEY2 under **SELECT**.
(3) Turn F2 to select CUT/AUTO.



◆ **KEY AUTO Button Function Settings**

Item	Setting	Description
ADV CTL	AUTO	Always performs MIX transitions regardless of how long the button is pressed.
	CUT/AUTO	Performs Cut transitions when button is briefly pressed. Performs MIX transitions when button is pressed and held down.
	OFF	Disables the button function.

The transition time for MIX transitions can be set under **TRANS RATE** in the [M/E FLEXaKEY > M/E2 > TRANS > TRANS] menu. See Sec. 11-12-1. "Transition Rate" for details.

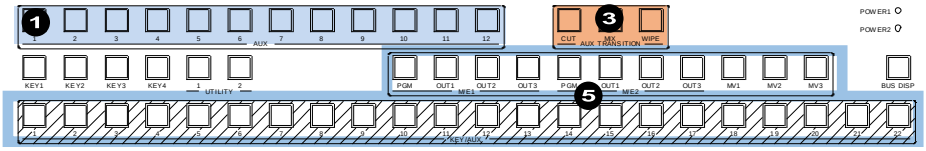
11-11. AUX Image Transitions

AUX bus images can be switched using simple effects, such as fade and horizontal, vertical and both directional slides. The switcher provides wipe patterns from No. 0 to 99. The following example shows how to fade in/out AUX 1 images in 30 frames.

(1) Quickly press AUX1 twice in the AUX block on the control panel. AUX1 turns on and the [SETUP > OUTPUT > AUX OUT] menu is displayed.
(2) Turn F4 to set AUX TRANS ENABLE to ON to enable AUX1 transitions.

SETUP > OUTPUT > AUX OUT			1/3
SELECT	OUTPUT XPT	OUTPUT INHIBIT	AUX TRANS ENABLE
AUX01	BLACK	OFF	ON

(3) Quickly press MIX twice in the AUX TRANSTION block. The [EFFECT/MELite > AUX1 > TRANS] menu will appear.



(4) Turn F1 to set RATE to 30.

EFFECT/M/Elite > AUX1 > TRANS			1/4
TRANS RATE	FADER LIMIT	FADER LEVEL	PATTERN NO.
30	OFF	0.0	000 →

(5) Press a bus button on the KEY/AUX bus (or select [SETUP > OUTPUT > AUX OUT] menu in PAGE 1). The AUX1 image is switched to the new one with fade-in/fade-out effect.

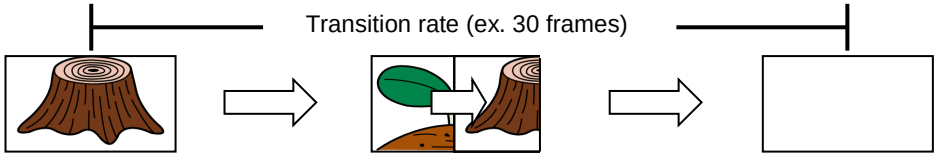
Note that AUX transitions are disabled if an MELite output is assigned to the AUX bus.
The following transition settings can be set in the [EFFECT/MELite > AUX1 > TRANS] menu.

- Transition rate (See Sec. 11-12-1. “Transition Rate.”)
- Fader limit (11-12-2. “Using Fader Limit.”)

11-12. Advanced Transition Settings

11-12-1. Transition Rate

The transition rate setting determines how long transitions take in frames to complete and is effective only for AUTO transitions.



(1) Press a next transition button (such as BKGD), twice, quickly, to display the transition menu for the bus.
(2) Turn F1 to set the TRANS RATE. Or, press F1 or tap **TRANS RATE** to display the keypad, enter the value and press **Enter**.

M/E FLEXaKEY > M/E2 > BKGD PGM > TRANS > TRANS			1/4
TRANS RATE	FADER LIMIT	FADER LEVEL	PATTERN NO.
30	OFF	0.0	000 →

Set the transition rate for KEY1-4, AUX1-12 in the same manner. The setting range is 0 to 999 frames.

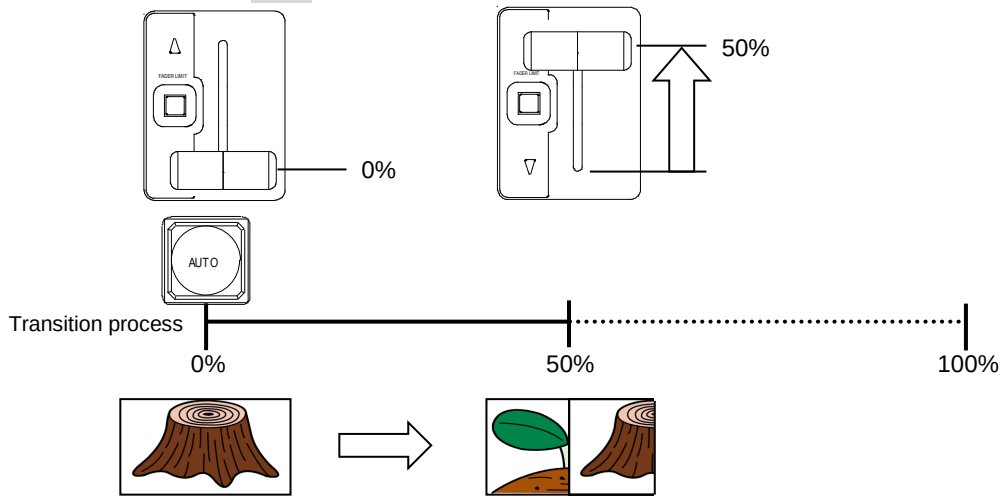
◆ **Changing Transition Rate Units**

Transition rates are displayed in frames as factory default. To change the rate display to seconds, go to [PANEL > TRANS CONTROL > AUTO/CUT] menu PAGE 1 and change **RATE TYPE** to SECOND.

PANEL > TRANS CONTROL > AUTO/CUT			1/7
RATE TYPE	AUTO/CUT BTN LAYOUT	AUTO TAKE	BLACK TRANS BUTTON
SECOND	AUTO/CUT	OFF	DISABLE

11-12-2. Using Fader Limit

Fader Limit allows you to set how far transitions can proceed. When performing transitions (mix or wipe) there may be times when you want the transition to the next signal to only complete to a certain degree instead of fully switching from one picture to another. In such case, you will need to set the **FADER LEVEL** setting, turn **FADER LIMIT** to **ON** and perform transitions using the AUTO button or fader lever. The figure below shows the case in which FADER LEVEL is set to 50%.



(1) Press a next transition button (such as BKGD), twice, quickly, to display the transition menu for the bus.

(2) Set the fader limit value under FADER LEVEL. Default is 50.0. With this setting, transitions are completed midway in the switching process. (See the figure in the previous page.)

(3) Set FADER LIMIT ON/OFF to enable/disable the FADER LEVEL setting.
The FADER LIMIT button to the left of the fader (to the right of the fader on HVS-492ROU) can also turn on/off the BKGD fader limit.

M/E FLEXaKEY > M/E2 > BKGD PGM > TRANS > TRANS			1/4
TRANS RATE	FADER LIMIT	FADER LEVEL	PATTERN NO.
30	ON	50.0	000 →

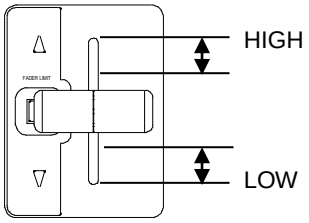
TIPS

The Fader Limit function is also available on keys and AUX buses in the same manner.

◆ **To Obtain the Current Fader Level**

You can quickly set the fader level for a background transition by first physically setting the fader lever to the point that you want the transition to finish. With the fader at this position, press and briefly hold down the FADER LIMIT button. This will set the FADER LEVEL setting to the current fader position.

11-12-3. Adjusting Fader Offset



Fader Offset allows you to adjust mechanical play at both extremes of fader movement.
A value less than 1 shortens the fader offset distance.

(1) Open the [PANEL > TRANS CONTROL > FADER] menu PAGE 7.
(2) In LINE1 (upper fader), use F1 and F2 to respectively set the upper and lower offsets.
In LINE2 (bottom fader), use F3 and F4 to set the offsets in the same manner.

PANEL > TRANS CONTROL > FADER			7/7
LINE1 FADER OFFSET HIGH	LINE1 FADER OFFSET LOW	LINE2 FADER OFFSET HIGH	LINE2 FADER OFFSET LOW
0.00	0.00	0.00	0.00

11-12-4. Disabling Faders (Fader Inhibit)

Fader Inhibit allows you to disable fader control. If set to ON under M/E1, the fader cannot be used in the M/E1. This may be useful to prevent concurrent control of the switcher from different control panels.

(1) Open the [PANEL > TRANS CONTROL > FADER] menu PAGE 3.
(2) To disable the M/E1 fader, use F1 to turn ON **M/E1 FADER INHIBIT**. Go to PAGE3 for M/E1 and M/E2 fader settings, and PAGE4 to 6 for AUX(MELite)1-12 fader settings.

PANEL > TRANS CONTROL > FADER		3/7
M/E1 FADER INHIBIT	M/E2 FADER INHIBIT	
OFF	OFF	

11-12-5. EFF1 and EFF2 Buttons

Transition type effects can be assigned to EFF1 and EFF2 buttons.

M/E FLEXaKEY > M/E1 > BKGD PGM> TRANS > TRANS		2/4
EFF1 BUTTON	EFF2 BUTTON	.
MIX	MIX	

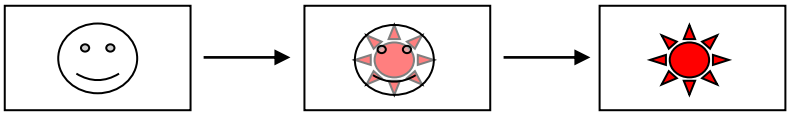
11-12-6. COLOR MIX

This effect allows you to mix a color or image to the transition image during background MIX transitions. COLOR MIX is effective only for background transitions.

M/E FLEXaKEY > M/E1 > BKGD PGM> TRANS > TRANS			3/4
EFF BKGD	COLOR MIX ONCE MODE	COLOR MIX POINT	.
MATTE	OFF	50.0	

Parameter	Default	Settings	Description
EFF BKGD	MATTE	(See Sec 11-12-8.)	Specifies a color or image to be mixed.
COLOR MIX ONCE MODE	OFF	OFF, ON	Setting to **ON** sets the transition type back to the previous one before color mix transitions.
COLOR MIX POINT	50.0	0.1 to 99.9	Specifies the signal insertion point.

Background MIX transition



PGM image　The video is switched while overlapping.　PGM image

Background COLOR MIX transition (EFF1 or EFF2)

Black is mixed from the middle of the transition (if POINT is set to 50.0 and EFF BKGD is Black).

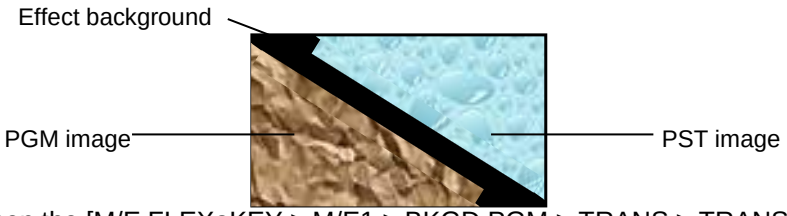
11-12-7. Endpoint Processing for DVE Transitions

In DVE operations, differences in video delay times when entering and exiting DVE effects can cause the video to appear choppy. This choppiness can be reduced by menu setting so that the DVE effect always exits at the transition start and end points (**TRANSITION EDGE** to DVE OFF in the [SETUP > SYSTEM > DVE SETUP] menu).

SETUP > SYSTEM > DVE SETUP			1/1
TRANSITION EDGE	POS/SIZE STEP	ROTATION STEP	.
DVE_OFF	1/1000	1/360	

11-12-8. Background Layer of DVE Images (Effect Background)

The bottom effect background layer, below the DVE effects, is used to fill gaps between PGM and PST DVE images, which occasionally arise when two DVE channels are used for backgrounds.



(1) Open the [M/E FLEXaKEY > M/E1 > BKGD PGM > TRANS > TRANS] menu in PAGE 3.
(2) Go to PAGE 2.
(3) Turn F1 to select the Effect Background video from MATTE, UTILITY1 and UTILITY2. Images used for internal buses UTILITY1 and 2 should be selected in the menu. (See Sec. 6-6. “UTILITY1-2".)
If MATTE is selected, set the color in PAGE 4.

M/E FLEXaKEY > M/E1 > BKGD PGM > TRANS > TRANS			3/4
EFF BKGD	COLOR MIX ENABLE	COLOR MIX POINT	.
MATTE	OFF	50.0	

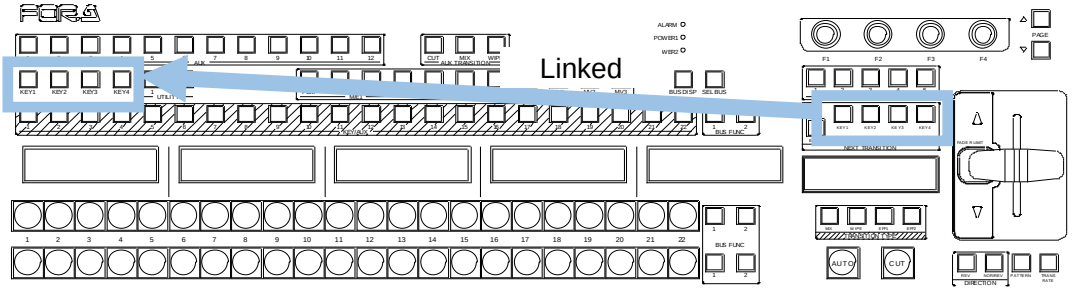
11-12-9. Swapping the AUTO and CUT Buttons

The AUTO and CUT buttons in the TRANSITION block can be swapped using the menu. To do this, go to [PANEL > TRANS CONTROL > AUTO/CUT] menu PAGE 1 and turn F2 to change the setting to CUT/AUTO.

PANEL > TRANS CONTROL > AUTO/CUT			1/7
RATE TYPE	AUTO/CUT BTN LAYOUT	BLACK TRANS BUTTON	
FRAME	CUT/AUTO	DISABLE	

11-12-10. Linking KEY Selection Buttons to KEY Transitions

This function automatically selects a key button in the BUS SELECT block when it is assigned to NEXT TRANSITION (when the key button is lit in the TRANSITION block).



To do this, go to [PANEL > UTILITY > UTILITY] menu PAGE 3 and change **KEY BUS SELECT LINK** to NEXT.

PANEL > UTILITY > UTILITY			3/3
LOCK MODE	THUMBNAIL	MENU SHORTCUT	KEY BUS SELECT LINK
WAVE	MANUAL	OFF	NEXT

12. KEY and FLEXaKEY

The key feature enables you to superimpose titles and images onto background signals. **Four key channels** are provided for **each M/E** and **four key types** are available in all keyers: Luminance Key, Full Key, Bus Key and Chroma Key. Key Invert, Mask and DVE effects can also be added to keys. Furthermore, **FLEXaKEY 1-4**, whose background buses can be freely selected, are equipped as downstream keyers.

KEY/FLEXaKEY features

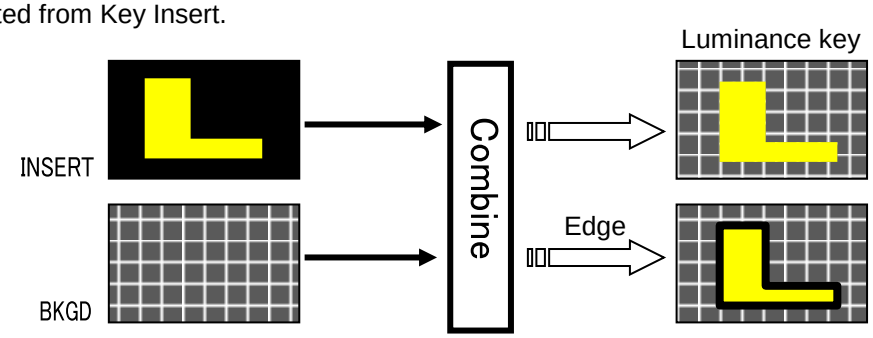
Feature	KEY1-4	FLEXaKEY1-4(*2)	Refer to
Luminance key	Available	Available	12-1
Full key	Available	Available	12-1
Bus key	Available	Available	12-2
Chroma key	Available	Available	12-4
Key invert	Available	Available	12-5-1
Box mask	Available	Available	
Pattern mask	Available	-	12-5-2
Utility mask	Available	-	
Edge effect	Available	-	12-6
Pattern transition	Available	-	11-7
M/E1 and M/E2 selection (re-entry)	Available (*1)	Available	10-2
M/E1 output	Available	Available	12-7
M/E2 output	Available	Available	12-7
MELite1-2 output	-	Available	10
AUX output	-	Available	12-7

(*1) Except when destination backgrounds are the same.
(*2) An ME Lite image displayed on FLEXaKEY buses, as a re-entry, is shifted below by one horizontal line.

This chapter describes the key setup and adjustment using M/E1 KEY1 as an example.

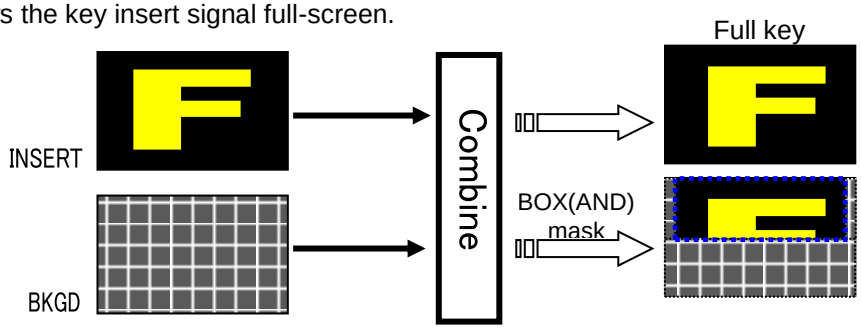
◆ Luminance Key

Luminance Key, also called Self Key, uses the same image for Key Source and Key Insert. This image is selected from Key Insert.



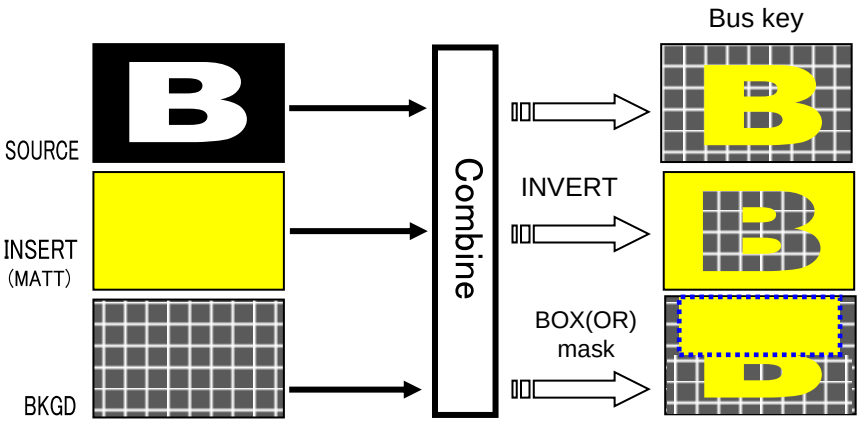
◆ **Full Key**

Full Key displays the key insert signal full-screen.



◆ **Bus Key**

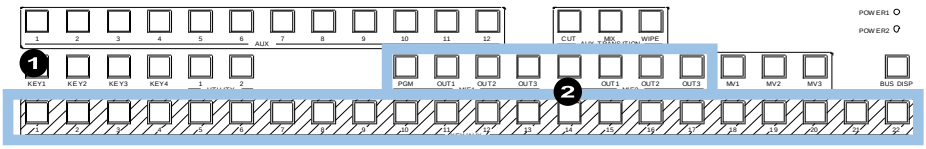
Bus Key, also called External Key, uses different images for Key Source and Key Insert. The background signal is cut out using Key Source and Key Insert fills in the cut out part of the signal.



12-1. Creating a Luminance Key and Full Key

(1) Press the M/E1 KEY1 button in BUS SELECT.

(2) Select a signal for Key Insert in the KEY/AUX bus.



(3) Quickly press KEY1 twice in BUS SELECT to display the [M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS] menu. Turn F1 to select LUM for TYPE.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS			1/14
KEY TYPE	INSERT TYPE	INSERT SIGNAL	SOURCE SIGNAL
LUM	BUS	IN01	IN01

To setup a full key, set TYPE to FULL.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS			1/14
KEY TYPE	INSERT TYPE	INSERT SIGNAL	SOURCE SIGNAL
FULL	BUS	IN01	IN01

► See Sec. 11-4. “KEY Transitions” and 11-10.” KEY IN/OUT Using Cut or Fade” for details on transitions.

► See Sec. 12-3. "Adjusting Key Signal" for details on making fine adjustments.

Key edge, invert, mask and DVE effects can be applied to these keys.

12-2. Creating Bus Keys

Bus Keys use different signals for the INSERT SIGNAL and SOURCE SIGNAL. To create a Bus Key, select key insert and key source signals in the menus. Since selecting both signals in the menu takes time, the switcher KEY LINK function allows you to select an insert and source signal pair by selecting only an insert signal. See Sec. 12-2-1. "Key Link" for details.

(1) Press the M/E1 KEY1 button in BUS SELECT to display the menu.
(2) Turn F1 to select BUS for TYPE.
(3) Turn F3 to select a key insert video.
(4) Turn F4 to select a key source video.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS			1/14
KEY TYPE	INSERT TYPE	INSERT SIGNAL	SOURCE SIGNAL
BUS	BUS	IN01	IN02

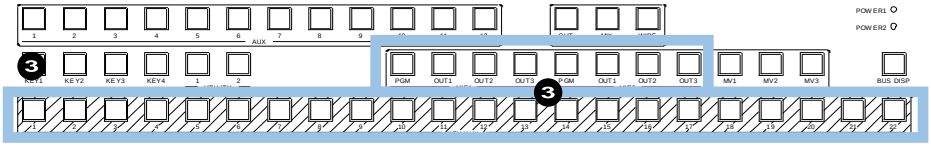
Using a MATTE for KEY INSERT

The internally generate matte signal can be used as key fill (KEY INSERT).To do so, INSERT TYPE to MATTE and select the color in PAGE 4.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS			1/14
KEY TYPE	INSERT TYPE	INSERT SIGNAL	SOURCE SIGNAL
BUS	MATTE	---	IN02

◆ **To select KEY INSERT/SOURCE using panel buttons**

(1) Press KEY1 in BUS SELECT.
(2) To select the Key Insert signal, press a button in the KEY/AUX bus.
(3) To select the Key Source signal, press and hold down KEY1, then press a button in the KEY/AUX bus.



► See Sec. 11-4. “KEY Transitions” and 11-10.” KEY IN/OUT Using Cut or Fade” for details on transitions.
► See Sec. 12-3. "Adjusting Key Signal" for details on making fine adjustments.

Key edge, invert, mask and DVE effects can be applied to these keys.

12-2-1. Key Link

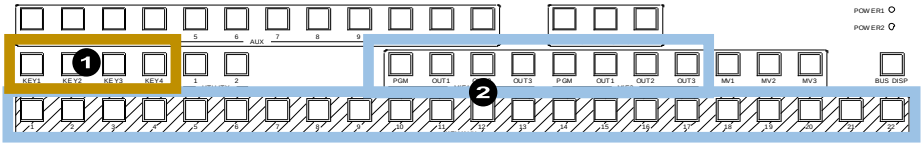
If KEY LINK is on, a paired Key Source video is automatically selected when a Key Insert video is selected. The INSERT/SOURCE signal pairs for Bus keys are automatically set once they are selected for a key. To reassign a signal assignment, select the INSERT/SOURCE signal pair again for the key or another key. The same assignments are shared among all keys of KEY1-4. Key Link is enabled as factory default.

◆ **If Key Link is enabled:**

First, turn LINK to ON in [SETUP > SYSTEM > KEY LINK] menu PAGE 2. Then, successively select key insert and source pair signals as necessary for a BUS key in PAGE 1 to save key link pairs.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS			1/14
KEY TYPE	INSERT TYPE	INSERT SIGNAL	SOURCE SIGNAL
BUS	BUS	IN01	IN02

(1) Press a key bus button in M/E1 or M/E2 to select a key.
(2) Once a key insert is selected on the KEY/AUX bus, the paired source is automatically set.



12-2-2. Key Quick Recall (KEY SET: INPUT)

If KEY SET is changed from KEYER to INPUT, key setups can be quickly recalled by selecting corresponding KEY INSERT signals. Open the [SETUP> SYSTEM > KEY SET] menu to change the KEY SET setting for each key, as needed.

◆ **KEY SET Setting**

INPUT	KEY TYPE, Key CLIP, GAIN, FAM ON/OFF and Chromakey adjustment settings are stored in each **input** set for KEY INSERT and are **not saved** to events and sequences.
KEYER	KEY TYPE, Key CLIP, GAIN, FAM ON/OFF and Chromakey adjustment settings are stored in each **key** and are **saved** to events and sequences.

◆ **Operation Example**

To quickly recall key settings, which are set up in M/E1KEY1 and M/E1KEY2, to M/E2KEY2, proceed as follows.

(1) Open the [SETUP > SYSTEM > KEY SET] menu. Change KEY SET to INPUT under M/E1KEY1, M/E1KEY2 and M/E2KEY2.

SETUP > SYSTEM > KEY SET			1/3
M/E1 KEY1 SET	M/E1 KEY2 SET	M/E1 KEY3 SET	M/E1 KEY4 SET
INPUT	INPUT	KEYER	KEYER

(2) Create a logo for M/E1KEY1 using IN01 (KEY INSERT).
(3) Create a chromakey for M/E1KEY2 using IN02 (CK SIGNAL).
(4) Select IN01(KEY INSERT) for M/E2KEY2. The logo key set for M/E1KEY1 is recalled. Then, select IN02 to recall the chromakey set for M/E1KEY2.

This function (KEY SET: INPUT) is very useful for live broadcast, streaming, or recording purposes, however , note that these settings are not saved to events.

12-3. Adjusting Key Signal

Clip and Gain allows users to adjust the key signal and its composition over the background. Key transparency can also be adjusted. Adjust these parameters while monitoring keys on the screen by displaying keys on the Program, Preview or Clean video.

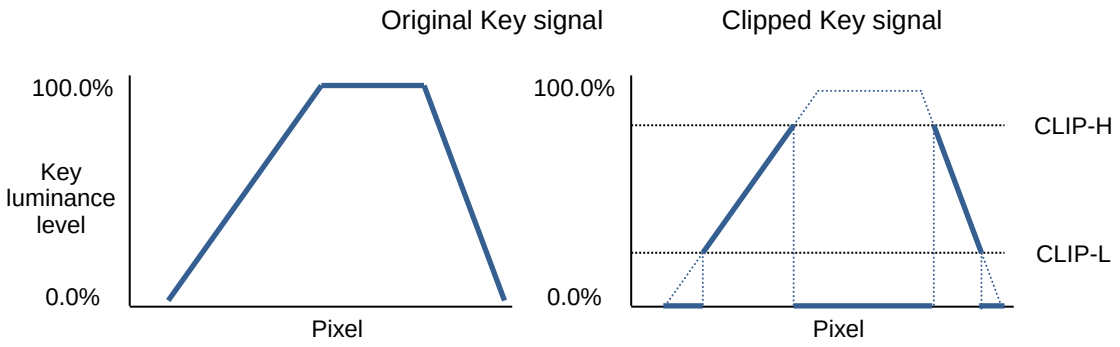
(1) Open [M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS] menu PAGE 2.
(2) Turn F1 to adjust GAIN.
(3) Then, turn F2 to CLIP while monitoring the screen.
(4) Turn F3 to set the key transparency. Increasing the value makes the key more transparent.
(5) If set FAM to ON, the key will created using Full Additive Mix.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS			2/14
GAIN	CLIP	TRANSP	FAM
1.0	0.0	0.0	OFF

For Bus type keys, key luminance thresholds can be adjusted.
Go to PAGE 3, set the upper and lower luminance levels for clipping, and turn F4 to set CLIP ENABLE to ON, then press F4.

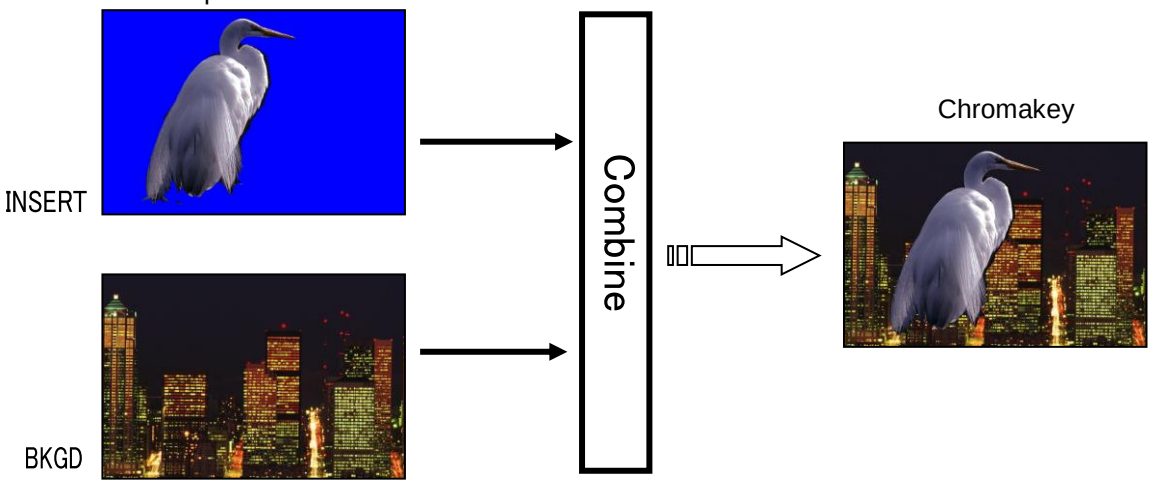
M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS			3/14
KEY INVERT	CLIP LEVEL HIGH	CLIP LEVEL LOW	CLIP ENABLE
OFF	100.0	0.0	OFF

◆ **Clip Example**



12-4. Chroma Key Setup

The built-in Chromakeyer has 4 channels in HD/SD mode and 3 channels in 1080/59.94p, 50p mode. Chroma keying allows key signal creation using a chroma component instead of a luminance component. This feature is mostly used to composite moving subjects such a person in a virtual background. For example, to place a person onto a background graphic, first film the person standing in front of a blue screen background. The blue colored area of the filmed image is detected and will be used to create the key signal. This chapter explains how to set up chromakeys using CK1 as an example.



12-4-1. Creating a Chroma Key

(1) Select a background signal in the M/E1 PGM bus.
(2) Press KEY1 twice quickly to display the [M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS] menu.
(3) Turn F1 to select BUS.
(4) Turn F2 to select BUS.
(5) Turn F3 to select CK1 FILL.
(6) Turn F4 to select CK1 KEY.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS			1/14
KEY TYPE	INSERT TYPE	INSERT SIGNAL	SOURCE SIGNAL
BUS	BUS	CK1 FILL	CK1 KEY

(7) Press KEY1 AUTO in the M/E1 transition block to display the KEY1 image onto the M/E1PGM screen.
(8) Open the [EFFECT/MELite > CK1 > AUTO CK > SIGNAL] menu.
(9) Turn F1 to select a video signal used for chromakey.

EFFECT/MELite > CK1 > AUTO CK > SIGNAL	1/13
SIGNAL	
IN01	

(10) Go to PAGE 2.
(11) Turn F4 to turn CURSOR to ON to display the crosshair cursor.

EFFECT/MELite > CK1 > AUTO CK > POSITION			2/13
POS X	POS Y	SELECT (Push F3 to pick)	CURSOR
0	0	SAMPLE1	ON

The KEY1 image and crosshair will be displayed on the M/E1 PREVIEW screen and the current cursor position is displayed under POSITION X and Y.

TIPS

To make a crosshair cursor also appear on the M/E1 PGM screen, turn PGM OUT to ON in PAGE 3.

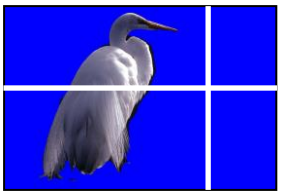
(12) Move the joystick up, down, left, or right to move the crosshair cursor onto the desired color.

TIPS

Tap the upper left corner of the menu screen to pop-up the Joystick menu. Tapping the **FINE** button will help you fine tune the adjustment.
To enter a precise position, press F1 or F2, enter the values directly into **POSITION X** and **Y** using the numeric keypad and then press ENTER. Selecting a darker color makes adjustment easier.

(13) Turn F3 to select SAMPLE1 and press F3 to create a chromakey.
(14) Turn **CURSOR** to OFF to clear the cursor from the screen.

EFFECT/MELite > CK1 > AUTO CK > POSITION			2/13
POS X	POS Y	SELECT (Push F3 to pick)	CURSOR
0	0	SAMPLE1	OFF



Press F3 to create a chromakey.

PREVIEW image

<If color evenness occurs in the background>
A chroma keyer has three color sample buffers, in which different back colors can be stored, and the final chromakey is produced by using a color averaged from these two or three colors (BACK COLOR). This method is helpful when unwanted color unevenness occurs in the background. To create the second or third sample, follow the procedure below.
(1) Open [EFFECT/MELite > CK1 > AUTO CK > SIGNAL] menu PAGE 3.
(2) Turn F1 to select the number of samples (2 or 3).

EFFECT/MELite > CK1 > AUTO CK > POSITION			3/13
SAMPLE COUNT	CLEAR	PGM OUT	
2	OFF	OFF	

(3) Go to PAGE 2.
(4) Turn F3 to select SAMPLE2.

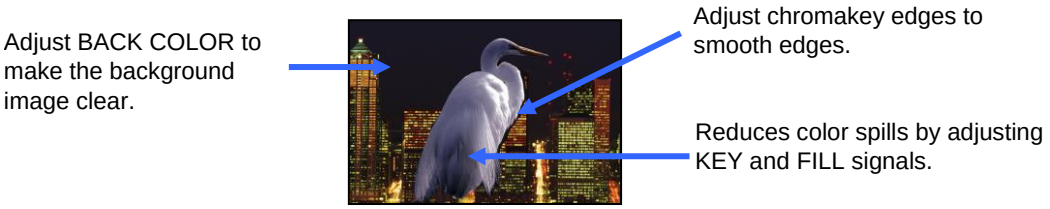
EFFECT/MELite > CK1 > AUTO CK > POSITION			2/13
POS X	POS Y	SELECT (Push F3 to pick)	CURSOR
0	0	SAMPLE2	ON

(5) Repeat Steps from (11) to (13) above to specify the SAMPLE2 color and create a chromakey by using the averaged color. Use SAMPLE3 in the same manner.

<Resetting SAMPLE colors>
To reset colors in SAMPLE1-3, turn **CLEAR** to ON in [EFFECT/MELite > CK1 > AUTO CK > POSITION] menu PAGE 3.

12-4-2. Chroma Key adjustments

If the desired result is not achieved using the automatic chroma key generation procedure, fine adjustments can be made as follows:



◆ Adjusting the BACK COLOR

Adjust the BACK COLOR in the [EFFECT/MELite > CK1 > MATTE > BACK COLOR] menu.

EFFECT/MELite > CK1 > MATTE > BACK COLOR			4/13
SAT	LUM	HUE	COLOR
0	0	0	

◆ Adjusting KEY (MATTE) and FILL (FOREGROUND) signals

KEY (MATTE) signals are generated using the adjusted BACK COLOR. The [EFFECT/MELite > CK1 > MATTE > MATTE ADJUST] menu allows you to refine MATTE images.
Increasing / decreasing the MATTE adjustment parameters widens / reduces the keyed area.
MATTE signals can be adjusted as a whole or per color component.

The [EFFECT/MELite > CK1 > FOREGROUND > FG ADJUST] menu allows you to refine FILL signals as a whole or per color component.

MATTE (KEY) adjustment parameters	FG (FILL) adjustment parameters	Description
MATTE GAIN	FG GAIN	Adjusts the signal level as a whole.
MATTE SOFT	FG SOFT	Adjusts edge softness. To soften edges, increase the MATTE SOFT value especially.
MATTE SAT	FG SAT	Adjusts the SAT (Saturation) level.
MATTE HUE	FG HUE	Adjusts the HUE level.
MATTE WHITE	FG WHITE	Adjusts Luminance level for higher than the BACK COLOR luminance value.
MATTE BLACK	FG BLACK	Adjusts Luminance level for lower than the BACK COLOR luminance value.

The following parameter reduces the reflection in the foreground images.

Parameter	Description
FG SUPPRESSION	Toggles FG CC/CS to ON/OFF.
FG CC/CS	Setting to 0 works as color cancellation, which reduces the adjusted chromakey color from each pixel in foreground images. Setting to 100 works as color suppression, which reduces the color level. If background spills are noticeable on the foreground image, decrease the value. If no spills appear but the hue is shifted, increase the value.

◆ **Adjusting chromakey edges**

<MATTE (KEY) >

[EFFECT/MELite > CK1 > MATTE > FILTER] menu

Parameter	Description
MATTE FILTER H	Applies H/V filter in the LOW, HIGH or MID levels.
MATTE FILTER V	
MATTE RECURSIVE FILTER	Applies recursive temporal filter.

[EFFECT/MELite > CK1 > MATTE > EDGE SHRINK] menu

Parameter	Description
MATTE EDGE SHRINK TOP	Reduces the upper or lower MATTE edge by 1 line.
MATTE EDGE SHRINK BOTTM	
MATTE EDGE SHRINK LEFT	Reduces the right or left MATTE edge by a half pixel.
MATTE EDGE SHRINK RIGHT	

<FG (foreground)>

[EFFECT/MELite > CK1 > FOREGROUND > REPLACE] menu

Parameter	Description
FG EDGE REPLACE TOP	Replaces foreground side edges with internal colors.
FG EDGE REPLACE BOTTOM	
FG EDGE REPLACE LEFT	
FG EDGE REPLACE RIGHT	

[EFFECT/MELite > CK1 FOREGROUND > FILTER] menu

Parameter	Description
FG RECURSIVE FILTER	Applies recursive temporal filter.

12-4-3. Masking Chromakeys

A box mask (unkeyed area) can be applied to chromakeys in the [EFFECT/MELite > CK1 > MASK] menu.

PAGE 13

Parameter	Description
BOX MASK	Toggles BOX MASK ON /OFF.
INVERT	Toggles BOX MASK inversion ON /OFF.
GAIN	Adjusts the BOX MASK gain.
EDGE SOFT	Applies the BOX MASK edge softness in pixels.

PAGE 14

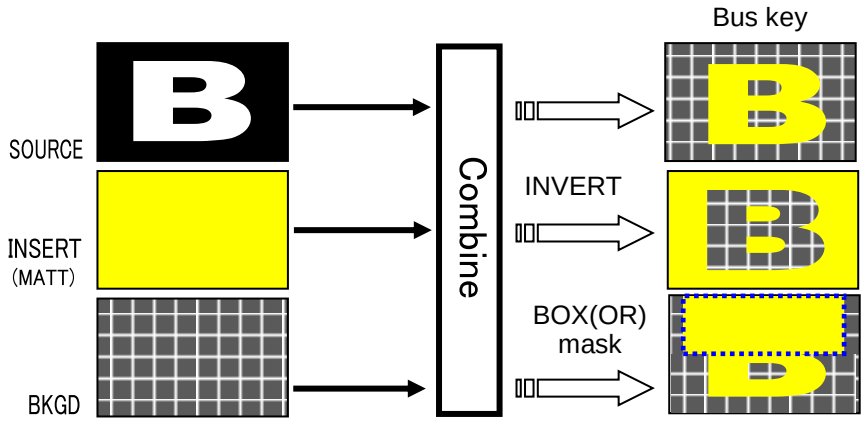
BOX MASK TOP	Specifies the BOX MASK top, bottom, left and right positions.
BOX MASK BOTTOM	
BOX MASK LEFT	
BOX MASK RIGHT	

12-4-4. Resetting Chromakey Channels

(1) Open the [EFFECT/MELite > CK1 > INIT] menu.
(2) To preserve the signal selection, turn F2 to turn XPT HOLD to ON.
(3) Turn F1 to select EXEC and press F1. Tap **YES** in the confirmation dialog.

12-5. Mask and Invert

Mask and Invert can be used for all keys.



12-5-1. Inverting Key and Background (INVERT)

Setting Invert to On inverts the key and the background images.
Display the [M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS] menu PAGE 3. Set KEY INVERT to ON.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > SRC/INS			3/14
KEY INVERT	CLIP LEVEL HIGH	CLIP LEVEL LOW	CLIP ENABLE
ON	109	6	OFF

12-5-2. Key Masks

◆ **BOX Mask**

Box-shaped masks can be applied to all keys and can also be inverted so that the keyed area inside the box becomes invisible.

(1) Create an M/E1 KEY1.
(2) Quickly press KEY1 twice in BUS SELECT to display the [M/E FLEXaKEY > M/E1 > KEY1 > TRANS > MASK] menu.
(3) Select BOX under MASK TYPE.

If MASK & KEY is set to AND, the area where Key Source and Box Mask overlap is used as the key signal. If set to OR, both Key Source and Box Mask are used as the key signal. To invert the box mask, turn BOX MASK INVERT to ON.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > MASK			5/14
MASK TYPE	BOX&UTL/PAT	MASK & KEY	BOX MASK INVERT
BOX		AND	OFF

(4) Go to the next page and set the mask size.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > MASK			6/14
BOX MASK TOP	BOX MASK BOTTOM	BOX MASK LEFT	BOX MASK RIGHT
0	0	0	0

◆ UTILITY MASK

Video inputs can be used for mask signals instead of Box. Inputs used for masks must be assigned to UTILITY1 or UTILITY2. Combined video signals such as program or multi-view cannot be used.

(1) Create M/E1 KEY1.
(2) Quickly press KEY1 twice in BUS SELECT to display the [M/E FLEXaKEY > M/E1 > KEY1 > TRANS > MASK] menu.
(3) Select UTILITY1 or UTILITY2 under MASK TYPE.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > MASK			5/14
MASK TYPE	BOX&UTL/PAT	MASK & KEY	BOX MASK INVERT
UTILITY1		AND	OFF

TIPS

The UTILITY 1 and 2 images should be selected in each ME menu: [M/E FLEXaKEY > M/E1 > BKGD PGM > TRANS > UTILITY] or [M/E FLEXaKEY > M/E2 > BKGD PGM > TRANS > UTILITY] menu. (See Sec. 6-6. “UTILITY1-2.")

◆ PATTERN MASK

WIPE patterns can be used for mask signals for keys.

(1) Create M/E1 KEY1.
(2) Quickly press KEY1 twice in BUS SELECT to display the [M/E FLEXaKEY > M/E1 > KEY1 > TRANS > MASK] menu.
(3) Select PATTERN under MASK TYPE.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > MASK			5/14
MASK TYPE	BOX&UTL/PAT	MASK & KEY	BOX MASK INVERT
PATTERN		AND	OFF

(4) Go to PAGE 7. Select a mask pattern and level.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > MASK			7/14
PATTERN		PAT MASK LEVEL	UTL/PAT MASK INVERT
51		0.0	OFF

(5) Modify the pattern in the following pages if necessary.

M/E FLEXaKEY > M/E1 > KEY1 > TRANS > MASK			8/14
PAT MASK POS X	PAT MASK POS Y	PAT MASK ANGLE	PAT MASK ASPECT
0	0	0.0	0.0

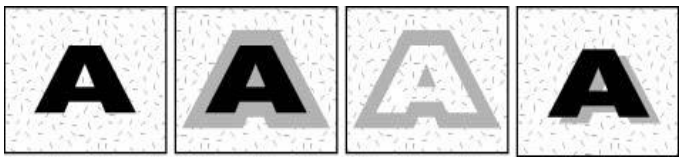
M/E FLEXaKEY > M/E1 > KEY1 > TRANS > MASK			9/14
PAT MASK MULTI X	PAT MASK MULTI Y	PAT MASK ANGLE SPIN	PAT MASK SOFTNESS
1	1	0	0.0

TIP

Mixed mask signals using BOX, UTILITY and PATTERN are also available and can be selected under MASK TYPE in the [M/E FLEXaKEY > M/E1 > KEY1 > TRANS > MASK] menu.

12-6. Key Edge

The EDGE function allows users to add border type edges on KEY1-4. Three types of edges are available: Normal, Outline and Drop Shadow. The width, transparency, and color can be set for the edges. Shadow effects can also be added by changing the position of the edges. This chapter shows how to add a key edge using M/E1 KEY1 as an example.



(None) Normal edge Outline edge Drop shadow

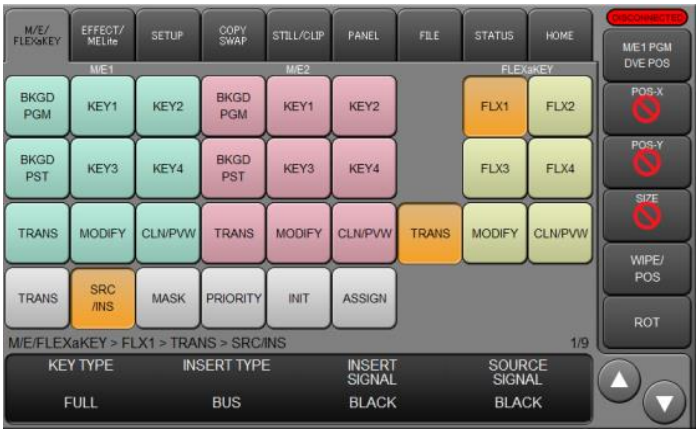
(1) Open the [M/E FLEXaKEY > M/E1 > KEY1 > EDGE] menu.
(2) Turn F1 to select NORMAL, OUT LINE or DROP SHADOW.
Selecting NORMAL allows users to add edges. OUT LINE allows users to display outlines without key fill images.

M/E FLEXaKEY > M/E1 > KEY1 > EDGE			10/14
TYPE	SOFT	TRANSP	WIDTH
NORMAL	0	0.0	1.0

(3) The SOFT (SOFTNESS) parameter is used to set softness, TRANSP (TRANSPARENCY) is to set transparency, and WIDTH to set edge width.
(4) Go to the next page and change the X and Y values to set the edge position.
(5) Go to the next page and set the edge color.

12-7. FLEXaKEY1-4

To create FLEXaKEY1-4, use the [M/E FLEXaKEY > FLX1 (FLX2-4) > TRANS > SRC/INS] menus. PAGE 1-6 FLEXaKEY menu settings are the same as those for KEY1-4.

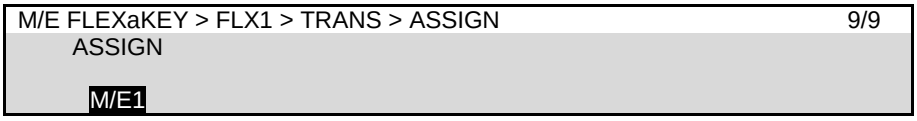


Note that FLEXaKEY1-4 do not support Edge, UTILITY or PATTERN masks.

12-7-1. Where FLEXaKEY1-4 Appear

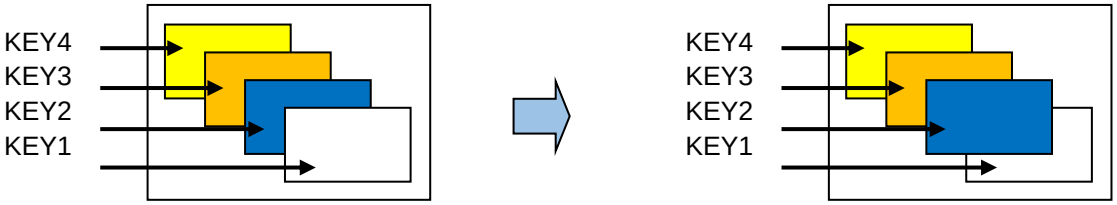
FLEXaKEY1 and 2 images appear on combined M/E1 images and FLEXaKEY3 and 4 on M/E2 as factory default. Users can change the destination of FLEXaKEY1-4 to another bus. To do so, follow the procedure below.

(1) Open the [M/E FLEXaKEY > FLX1-4 > TRANS > ASSIGN] menu.
(2) Go to PAGE 9. Turn F1 to select an output destination.
Select the destination for other keys in the same way.



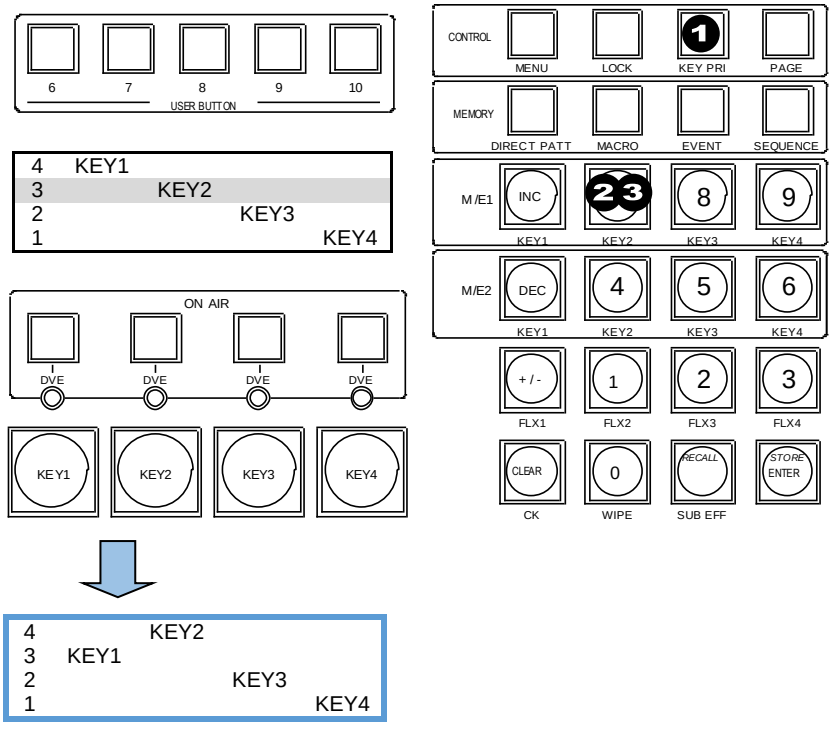
12-8. Changing Key Layer Order

Layer order for Keys or FLEXaKEYs can be changed respectively in M/E1 and M/E2.
This chapter explains how to switch the KEY2 and KEY1 layers on the M/E1 as an example.



◆ **Using the KEY PRI button**

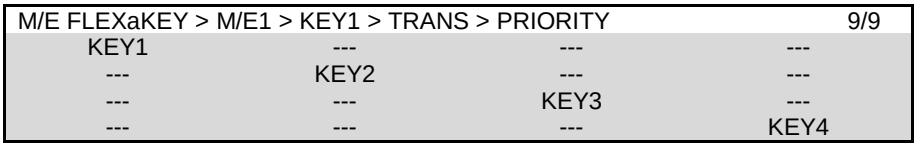
(1) Press and hold the KEY PRI button on the CONTROL block. While holding down KEY PRI, a key layer matrix is displayed on the KEY information display. Layer 1 is the bottom layer and located just above the background.
(2) If the M/E1 KEY1-KEY4 buttons are not lit, press KEY2 to select the KEY2 layer line.
(3) Press KEY2 again to move up the layer stack.



◆ **Using the PRIORITY menu**

(1) Open the [M/E FLEXaKEY > M/E1 > KEY1 > TRANS > PRIORITY] menu.

(2) Use F1 to F4 to set the key layer order. The top line represents the highest layer.



13. Assigning DVE Channels

The HVS-490 has 16 DVE (2.5D DVE) modules as standard. (The number of available DVE channels depends on the system signal format.) These modules are applied to BKGD or Key buses as a DVE channel or DVE pattern to allow various advanced effects. However, DVE pattern and LINE DVE cannot be used simultaneously on a bus.
An HVS-49DVE (2.5D DVE) option card allows you to double the number of available DVE channels if using 1080p signals, or to increase available channels in 4K mode. (See the following tables.)

System signal format	HVS-49DVE option	
	Uninstalled (Standard)	Installed
1080i, 1080PsF, 720p, 1080p/ 29.97, 25, 24, 23.98 (1.5G-SDI), NTSC, PAL	16 channels	16 channels (Same as standard configuration)
1080p/59.94, 50 (3G-SDI)	8 channels (*)	16 channels

* 2 channels for M/E1 PGM, M/E1 PST, FLX1 and FLX2
2 channels for M/E2 PGM, M/E2 PST, FLX3 and FLX4
2 channels for M/E1 KEY1, M/E1 KEY2, M/E1 KEY3 and M/E1 KEY4
2 channels for M/E2 KEY1, M/E2 KEY2, M/E2 KEY3 and M/E2 KEY4

◆ **4K mode (HVS-49EXP4K and HVS-49IO required)**

System signal format	HVS-49DVE option	
	Uninstalled (Standard)	Installed
1080p/29.97, 25, 24, 23.98 (Dual Link 3G-SDI)	4 channels	5 channels
1080p/59.94, 50 (Quad Link 3G-SDI)	2 channels	4 channels

13-1. Pattern Transitions with DVE Types

A DVE channel is required for transitions with a DVE pattern (PATTERN 100 and later, 2 channels required for PATTERN 200 and later) regardless of whether the pattern is modified or not. For example, two DVE channels are used if BKGD and KEY1 DVE transitions are performed using PATTERN 100.
See Sec. 11-7. ”Pattern (WIPE/DVE) Transitions” for details on pattern transitions.

◆ **To Release a DVE Channel from a Bus**

Change the pattern for the bus from DVE to WIPE type (or transition type from WIPE to MIX or CUT). Or, turn LINE DVE to OFF for the bus.

13-2. Assigning DVE Channels to Buses (LINE DVE)

LINE DVE is a function that applies DVE effects to individual buses, not patterns, and applies reduction, enlargement, movement, rotation, lighting, and other effects using the DVE MODIFY menu. It can be used for the PGM, PST, KEY and FLEXaKEY buses.

For example, LINE DVE allows you to create PinP images as shown below, by turning on LINE DVE on the PGM bus, reducing the PGM video size and moving it to the lower-right corner.

M/E output image

See Sec. 14. ”DVE Effects” for details on DVE effects.

13-2-1. LINE DVE ON/OFF Button

Assign the LINE DVE ON/OFF function to a bus button.
In this example, the function is assigned to bus button 1 .

(1) Open the [PANEL > BUS ASSIGN > LEVEL1] menu.
(2) Turn F1 to select BUTTON 1. Turn F2 to select L-DVE under SIGNAL, then press F2.

NOTE

Note that if in the [PANEL > BUS ASSIGN] menu, all M/E selection buttons are lit in the right side of the menu screen, Button 1 in all bus rows including M/E1 PGM/PST, KEY/FLX, M/E2 PGM/PST and KEY/AUX have the LINE DVE ON/OFF function.

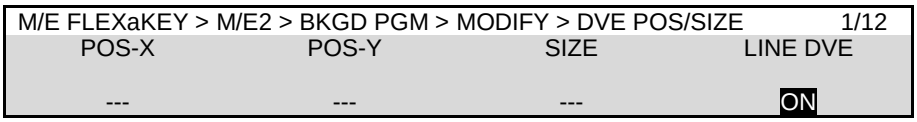
13-2-2. Enabling LINE DVE on a BUS

Assume that the LINE DVE ON/OFF function is assigned to Bus Button 1:

◆ **To Enable LINE DVE on PGM or PST Bus**

Press Button 1 to turn on the button light on the PGM (or PST) bus row.
To disable LINE DVE, press the button again to turn the bus off.

To do this in the menu, turn **ON**/**OF**F the **LINE DVE** parameter in [M/E FLEXaKEY > M/E1 (M/E2) > BKGD PGM (PST) MODIFY > DVE POS/SIZE] menu PAGE 1.



◆ **To Enable LINE DVE for KEY1-4**

(1) Press KEY1 or (KEY2-4) in BUS SELECT.
(2) Press Button 1 to turn on the button light on the KEY/AUX (or KEY/FLX) bus row.

To do this in the menu, turn **ON**/**OFF** the **LINE DVE** parameter in [M/E FLEXaKEY > M/E1 (M/E2) > KEY1 (KEY2-4) > MODIFY > DVE POS/SIZE] menu PAGE 1.

◆ **To Enable LINE DVE for FLEXaKEY1-4**

(1) Press FLX1 or (FLX2-4) in BUS SELECT.
(2) Press Button 1 to turn on the button light on the KEY/FLX bus row.

To do this in the menu, turn **ON**/**OFF** the **LINE DVE** parameter in [M/E FLEXaKEY > FLX1 (FLX2-4) > MODIFY > DVE POS/SIZE] menu PAGE 1.

13-3. DVE Channel Status Indication

To verify how many DVE channels are being used on which buses, check the indicators and button indications as shown below.

◆ **Background (M/E) Bus indications**

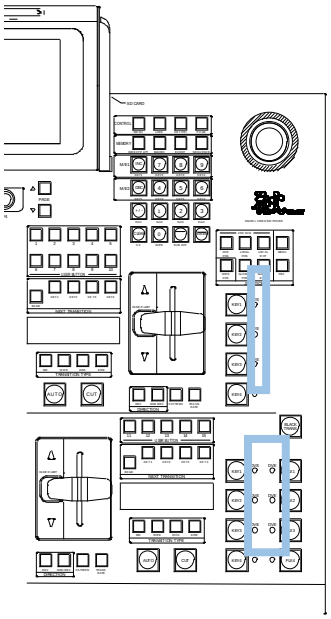
If a DVE type pattern is selected for the background and WIPE in the transition block is lit, one DVE channel is used.

Or, if LINE DVE is being set to ON (LINE DVE ON/OFF button on the bus row is lit), this indicates a DVE channel is being used.

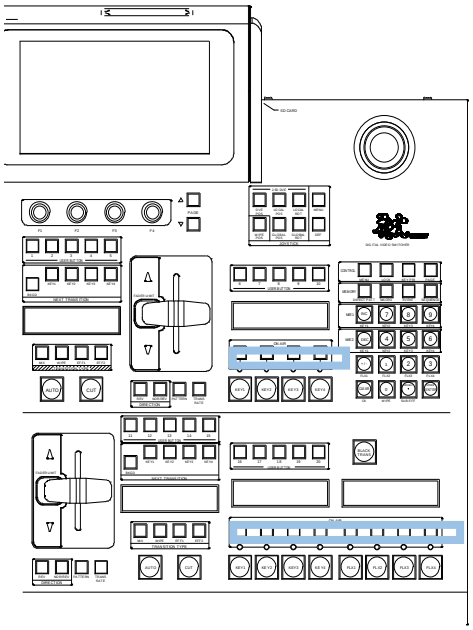
◆ **KEY DVE Indicators**

If a DVE channel is used on KEY1-4 or FLEXaKEY1-4, the relevant DVE indicator will light. (HVS-492OU/492WOU)

HVS-492OU



HVS-492WOU



14. DVE Effects

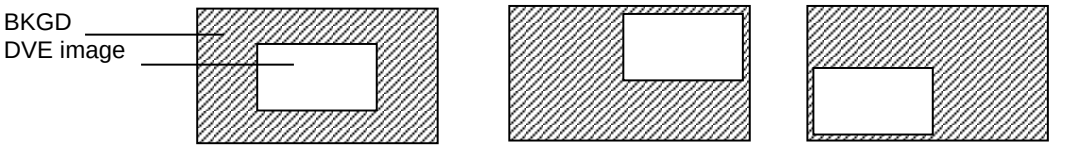
This chapter shows how to apply DVE effects to M/E2KEY1 as an example. Assume that LINE DVE is set to ON for M/E2KEY1. (See Sec. 13-2-2. “Enabling LINE DVE on a BUS.") In this example, the **KEY1 image**, to which DVE effects is applied, is called “**DVE image**.”

14-1. Changing Position and Size

Let’s change the position and size of a DVE image using the menu or joystick.

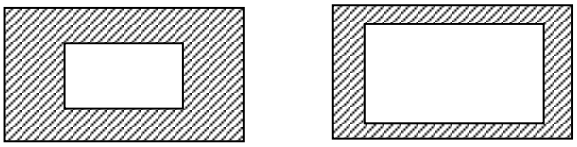
◆ **Using the Joystick**

Open the [M/E FLEXaKEY > M/E2 > KEY1> MODIFY > DVE POS/SIZE] menu.
To change the DVE image position, move the joystick up, down, left, or right.
To change the DVE image size, twist the joystick clockwise or counter-clockwise.



POSITION (0, 0) POSITION (200, 200) POSITION (-200,-200)

The figures below are examples when POSITION (X, Y) is set to (0, 0).



SIZE (500) SIZE (750)

◆ **Using the Menu**

(1) Open the [M/E FLEXaKEY > M/E2 > KEY1> MODIFY > DVE POS/SIZE] menu.
(2) Turn F1 and F2 to change the DVE image position.
(3) Turn F3 to change the DVE image size.

M/E FLEXaKEY > M/E2 > KEY1 > MODIFY > DVE POS/SIZE			1/12
POS-X	POS-Y	SIZE	LINE DVE
0	0	500	ON

TIP

The base POSITION of the DVE image is originally the center of the output screen. You can set the position of the image by specifying X and Y coordinates, with the origin of the axes located at screen-center.

Setting the size allows users to change the size of key images while retaining aspect ratios. If the value is 1,000, the key images will be full-screen size.

The **POS/SIZE STEP** parameter in [M/E FLEXaKEY > M/E1 > BKGD PGM > MODIFY >DVE INIT/SETUP] menu PAGE 12 allows you to change increments to 1/1000 or 1/4096 to enable finer settings.

14-1-1. How to Use the Joystick

The joystick controls Position and Size in the WIPE MODIFY and DVE MODIFY menus. The following example shows how to set bus and parameter settings using the joystick.

◆ **Changing POSITION X, Y and SIZE for M/E2KEY1 in the DVE MODIFY menu**

(1) Tap on the button in the upper right corner of the menu screen to pop-up the JOYSTICK MENU window.

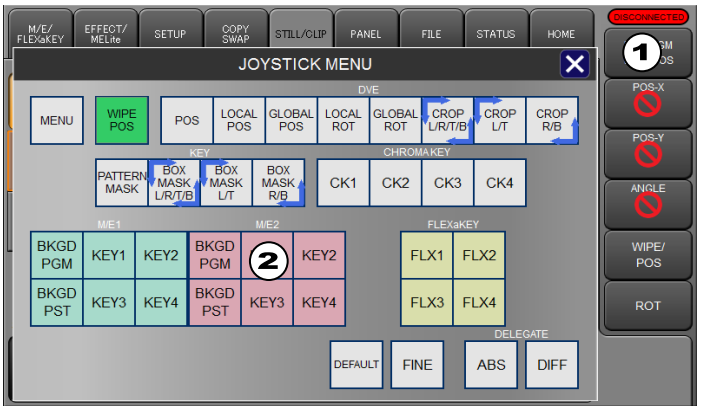
(2) To select a bus to be set, tap on **M/E2 KEY** in this example.

If controlling multiple buses, the one last selected becomes the master bus. In such cases, if **ABS** (absolute) is set in the DELEGATE block and a parameter is changed in the master bus, the master parameter value is applied to other bus parameters. If **DIFF** (difference) is set, the difference between before and after a change in the master bus parameter is applied to other bus parameters.

Another way to specify a joystick control bus is by pressing a NEXT TRANSITION button. In this example, press KEY1 to light the LED in the M/E2 transition block.

NOTE

Note that when the joystick controls multiple buses and cannot change master bus parameters, other bus parameters will remain unchanged.

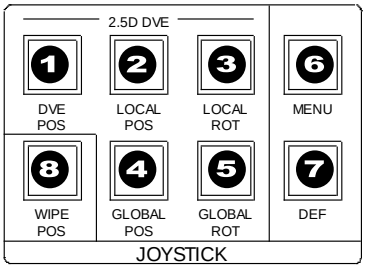


(3) Change the DVE image position by turning the joystick to move up, down, left, or right. Change the DVE image size by twisting the joystick clockwise or counter-clockwise.

Tapping on the **POS_X**, **POS_Y** or **SIZE** parameter button on the right edge of the screen will display a prohibited sign on the button and the parameter setting is disabled. Holding down the button will reset the parameter to factory default.

In addition, tapping **FINE** in the JOYSTICK MENU pop-up window allows you to fine tune parameters.

The following buttons in the JOYSTICK block allow you to select target parameters for the joystick.



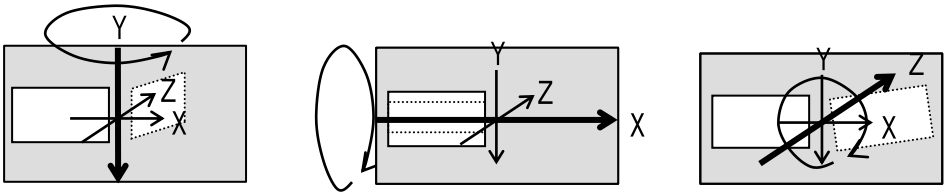
No.	Item	Description
1	DVE POS	Allows you to change the DVE POSITION and SIZE parameters using the joystick even if another menu page is opened.
2	LOCAL POS	Allows you to change the DVE LOCAL POSITION parameters using the joystick even if another menu page is opened.
3	LOCAL ROT	Allows you to change the DVE LOCAL ROTATION parameters using the joystick even if another menu page is opened.
4	GLOBAL POS	Allows you to change the DVE GLOBAL POSITION parameters using the joystick even if another menu page is opened.
5	GLOBAL ROT	Allows you to change the DVE GLOBAL ROTATION parameters using the joystick even if another menu page is opened.
6	MENU	Allows you to change parameters displayed in the menu using the joystick if they are changeable by the joystick.
7	DEF	Press the button while lit allows you to reset parameters being set by the JOYSTICK to factory default values.
8	WIPE POS	Allows you to change the WIPE POSITION parameters using the joystick even if another menu page is opened.

14-2. Rotation

In addition to position and size changes, users can add rotational effects to DVE images.
Tap on **ROTATION** in the bottom menu buttons to display the menu.
Remember that DVE images are located at their POSITION X and Y coordinates, with the origin of the axes located at the center of the screen.

◆ **GLOBAL ROTATION**

Rotates DVE images **around the center of the screen** up to approximately eight times in the positive or negative direction.



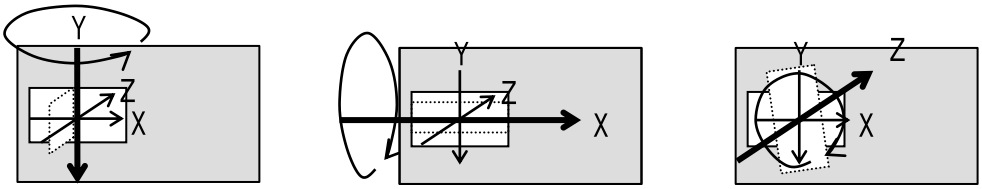
X rotation　　Y rotation　　Z rotation

◆ **GLOBAL POSITION**

Sets the GLOBAL axis position for DVE images.

◆ **LOCAL ROTATION**

Rotates DVE images **around the center of the DVE image** (GLOBAL POSITION values) up to approximately eight times in the positive or negative direction.



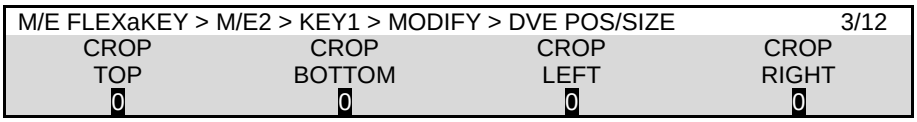
X rotation　　Y rotation　　Z rotation

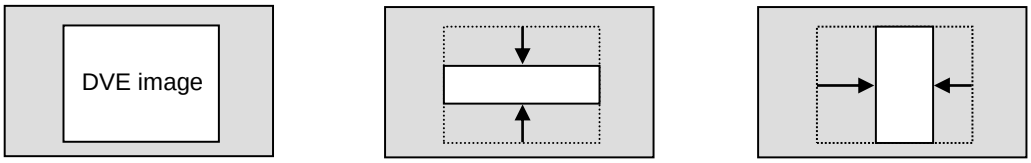
◆ **LOCAL POSITION**

Sets the LOCAL axis position for DVE images.

14-3. CROP

PAGE 3 of the DVE MODIFY menu allows users to trim DVE images from all four directions. The background image then only remains visible in the cropped area.



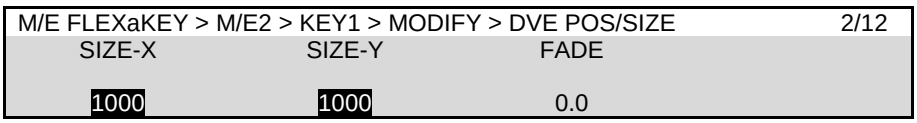


Top/bottom clips　　Left/right clips

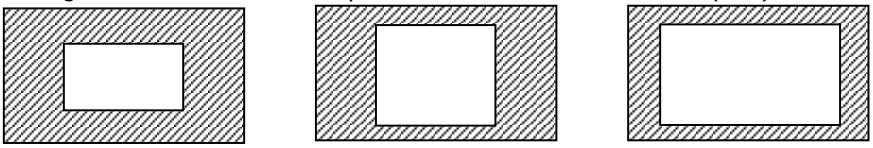
14-4. SIZE(X, Y) and FADE

◆ **SIZE (X, Y)**

SIZE X, Y in PAGE 2 allows you to change the aspect ratio of DVE images.



The figures below show examples when POSITION is set to (0, 0) and SIZE 1,000.



(500,500) (500, 750) (750, 750)

◆ **FADE Effect**

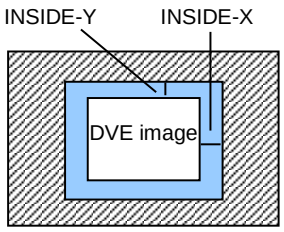
FADE in PAGE 2 allows you to add an effect to make backgrounds transparent. The higher the value, the clearer the background becomes.

14-5. BORDER

Borders can be added to a DVE image. Inside border and outside borders can be adjusted independently.

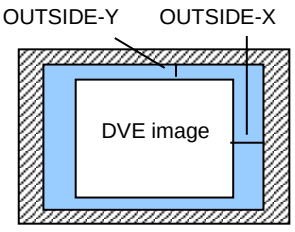
(1) Tap on DVE BORDER to display the [M/E FLEXaKEY > M/E2 > KEY1 > MODIFY > DVE BORDER] menu.
(2) To use the inside border, set the width under INSIDE X and Y.
To use the outside border, set the width under OUTSIDE X and Y.
(3) Go to the next page and adjust the edge softness under SOFTNESS parameters.
(4) Go to the next page and set the border color.

Inside Borders



W/ border

Outside borders



W/ border

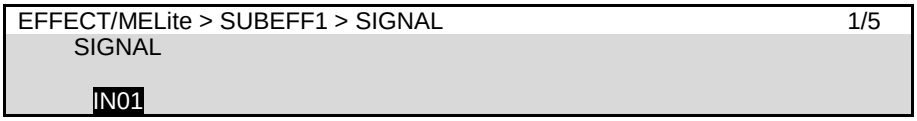
15. SUB EFFECT

Sub effects such as Mono Color, Defocus, Paint and Mosaic can be added to video images. Up to 4 Sub Effect channels are available in HD/SD mode. Sub Effect channels can be output from AUX buses by assigning as SUBEFF1-4, and used for video sources such as Key Source/Insert and Background images. Up to 3 Sub Effect channels are available in 1080/59.94p, 50p mode.

► See Sec. 6-2. “Mapping Video Sources to Bus Buttons.”
► See Sec. 8-2-2. “Selecting a Video Using the Menu.”

15-1. Assigning a SUB EFFECT Channel to a Bus

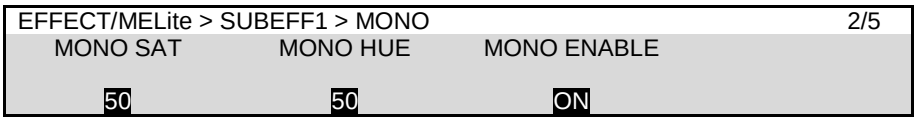
(1) To use the SUB EFF1 channel, open the [EFFECT/MELite > SUBEFF1 > SIGNAL] menu.
(2) Turn F1 to select a signal to be applied to.



15-2. Applying Sub Effects

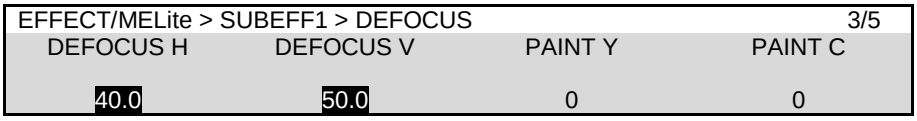
◆ **MONO COLOR**

Monochrome effects can be configured via the following menu page.
Turn MONO ENABLE to ON and set a color using SAT and HUE.



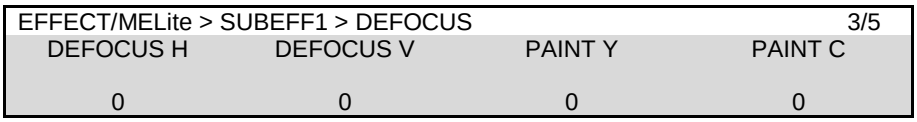
◆ **DEFOCUS**

Defocus allows you to add an effect that will blur the image.
Set the horizontal defocus level under DEFOCUS H.
Set the vertical defocus level under DEFOCUS V.



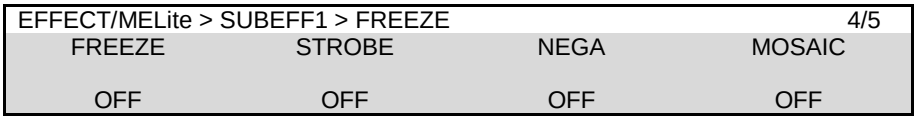
◆ **PAINT COLOR (*1)**

The Paint Color effect allows you to add an effect, which makes the image look like a painting. Increasing the value decreases the degree of gradation, so the image resembles a painting.
Set the luminance level under PAINT Y and chrominance level under PAINT C.



◆ **FREEZE, STROBE (*1), NEGA and MOSAIC**

Freeze, Strobe, Nega and Mosaic effects are also available by turning each parameter ON under the setting.

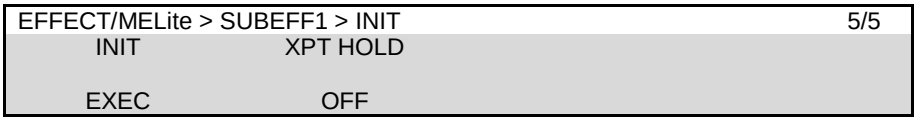


Parameter	Description
FREEZE	Allows users to enable the freeze effect function. Users can select either frame freeze or field freeze.
STROBE	Allows users to enable strobe effects. Increasing the value increases the light flashing interval. If set to FILM A or FILM B, a different film effect is applied
NEGA	Setting to ON makes an image negative by reversing all luminance levels.
MOSAIC	Allows users to use a mosaic effect. Increasing the value enlarges the size of mosaic cells.

(*1) PAINT COLOR and FILM B cannot be used simultaneously.

15-3. Resetting Sub Effects

(1) To reset the SUB EFF1 channel, open the [EFFECT/MELite > SUBEFF1 > INIT] menu.
(2) To remain the SIGNAL setting unchanged, turn F2 to toggle XPT HOLD to ON.
(3) Turn F1 to select EXEC, then press and hold down F1.



16. Color Correction

The switcher provides 4 color correction channels that can be assigned to inputs. In addition, Clip adjustment allows users to set signal level limits for all color correction outputs. The following features are available:

- Max. 4 color correction channels
- Separate or group adjustment for RGB White/Black/Gamma levels.
- Three Color Correction modes available: BAL (balanced), DIF (differential) and SEPIA.
- Two Clip modes available: YBR and RGB (GBR)

16-1. Assigning a Color Correction Channel

(1) Open the [SETUP > COLOR CORRECT > CC1] menu.
(2) Use F1 and F2 to select a signal to assign to a color correction channel. For example, to assign a channel to STILL1, select STILL1 under **SIGNAL** and INPUT under **TYPE**. (See the table below for more details.)
(3) Use F3 to turn **ENABLE** to ON to enable the color correction channel.

SETUP > COLOR CORRECT > CC1			1/7
TYPE	SIGNAL	ENABLE	
INPUT	STILL1	OFF	

TYPE setting	SIGNAL setting
INPUT (Settings are stored per INPUT.)	IN01 - 40 STILL1 - 4
CH (Settings are stored per CHANNEL.)	

16-2. Adjusting Colors

Now the selected video signal can be processed using Color Correction. Check and adjust the signal using a waveform monitor and vector scope. Also use an SDI monitor to compare pre- and post-processed images.

◆ **Selecting a Correction Mode**

(1) Open [SETUP > COLOR CORRECT > CC1] menu PAGE 2.
(2) Turn F4 to select the mode from BALANCE, DIFFERENTIAL and SEPIA.

<If BALANCE or DIFFERENTIAL selected>

Set signal levels for WHITE, BLACK and GAMMA in PAGE 2 to 4. Set levels for R, G and B components respectively using F1 to F3 for each. In the CC GAMMA menu, turning F4 allows you to select the gamma curve type.

SETUP > COLOR CORRECT > CC1				2/7
WHITE LEVEL R	WHITE LEVEL G	WHITE LEVEL B	MODE	
100%	100%	100%	BALANCE	

SETUP > COLOR CORRECT > CC1			3/7
BLACK LEVEL R	BLACK LEVEL G	BLACK LEVEL B	
100%	100%	100%	

SETUP > COLOR CORRECT > CC1				4/7
GAMMA LEVEL R	GAMMA LEVEL G	GAMMA LEVEL B	GAMMA CURVE	
100%	100%	100%	CENTER	

Page	Parameter	Description	Default	Setting range
Page 2 WHITE	R / G / B	Adjusts R, G and B.	100%	0% to 200%
Page 3 BLACK	R / G / B	Adjusts R, G and B.	100%	0% to 200%
Page 4 GAMMA	CURVE	Selects gamma curve.	CENTER	CENTER, BLACK, WHITE
	R / G / B	Adjusts R, G and B.	100%	0% to 200%

<If Sepia is selected>

Use F1 and F3 to adjust **SAT** and **HUE** in PAGE 2.

SETUP > COLOR CORRECT > BUS CC M/E1 CH1			2/7
SEPIA LEVEL	---	SEPIA LEVEL	MODE
SAT		HUE	
25	---	-160	SEPIA

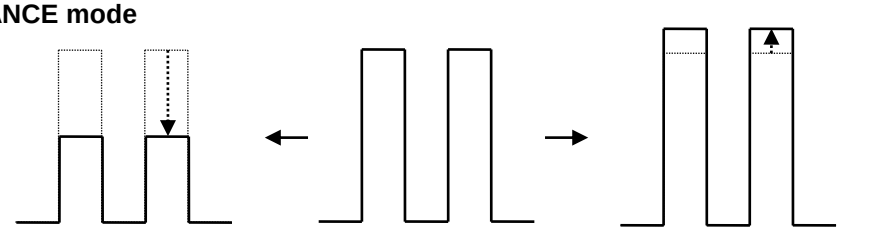
Page	Parameter	Description	Default	Setting range
Page 2 SEPIA	SAT	Adjusts R, G and B.	25	0 to 100
	HUE	Adjusts hue.	-160	-179 to 180

◆ **Balance and Differential Modes**

When adjusting a video signal in balanced or in differential mode, the associated waveforms will appear differently as shown below. A 100% color bar signal is used in the following example.

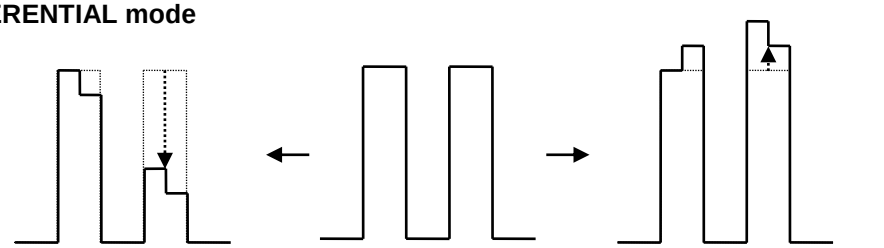
(1)The figures below illustrate the change of the signal waveform when the WHITE level is adjusted along the R axis. This also applies to the G or B axis.

BALANCE mode



When set to a negative value: Default When set to a positive value:

DIFFERENTIAL mode

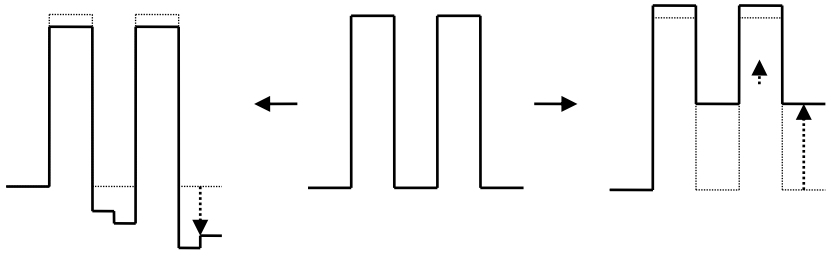


When set to a negative value: Default When set to a positive value:

Notice that on vectorscope displays the signal level transition in the above example is different between balanced and differential modes when observing the R, G or B axis positive territories.

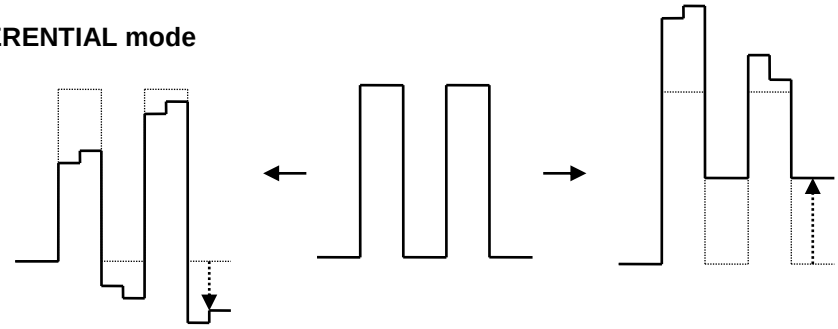
(2) The figures below illustrate the change in signal waveform when the BLACK level is adjusted along the R axis in balanced or differential mode. These changes will also be applied to the G or B axis.

BALANCE mode



When set to a negative value: Default When set to a positive value:

DIFFERENTIAL mode

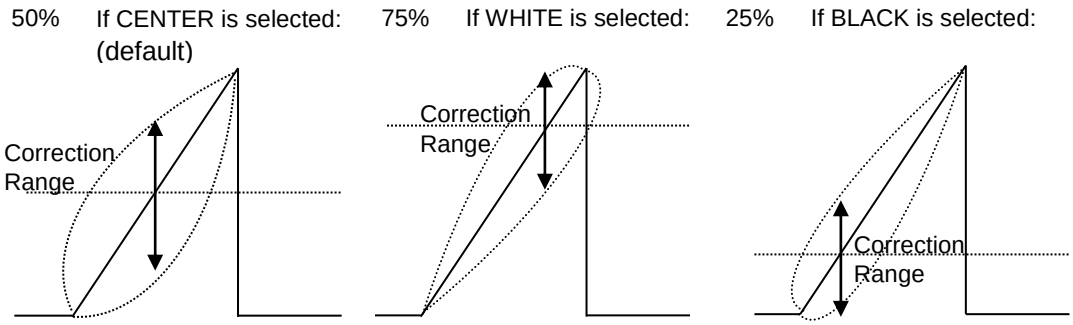


When set to a negative value: Default When set to a positive value:

◆ **Gamma Curve**

When performing gamma corrections, the following three adjustment type are available:

Center: Gamma curve is weighted toward mid tones (near 50%).
White: Gamma curve is weighted toward Highlights (near 75%).
Black: Gamma curve is weighted toward Shadows (near 25%)



Gamma Correction Curve Adjustments

16-3. Clip Adjustment

Signal level thresholds for all color correction outputs (Clip adjustment) can be adjusted in Y/C (YBR) or RGB mode. If Clip adjustment is disabled (ENABLE to OFF), default values are applied to output signals.

<To Set Clip in Y/C Mode>

(1) Open [SETUP > COLOR CORRECT > CC1] menu PAGE 5.
(2) Turn F4 to select YBR.

SETUP > COLOR CORRECT > BUS CC M/E1 CH1			5/7
Y/C CLIP	Y/C CLIP	Y/C CLIP	CLIP ENABLE
YW	YB	C	
100%	-7%	111%	YBR

(3) Turn F1 to F3 to set each parameter limit respectively.

SETUP > COLOR CORRECT > CC1			5/7
Y/C CLIP	Y/C CLIP	Y/C CLIP	CLIP ENABLE
YW	YB	C	
109%	-7%	111%	YBR

Parameter	Description	Default	Setting
YW	Sets the WHITE limit in Y signal.	109%	50% to 109%
YB	Sets the BLACK limit in Y signal.	-7%	-7% to 50%
C	Sets the WHITE limit in C signal.	111%	50% to 111%

<To Set Clip in RGB Mode>

(1) Open [SETUP > COLOR CORRECT > CC1] menu PAGE 5.
(2) Turn F4 to select RGB.
(3) Turn F1 to F3 to set each R, G and B limit for WHITE in PAGE 5 and for BLACK in PAGE 6.

SETUP > COLOR CORRECT > CC1			5/7
RGB WHITE CLIP R	RGB WHITE CLIP G	RGB WHITE CLIP B	CLIP ENABLE
300%	300%	300%	RGB

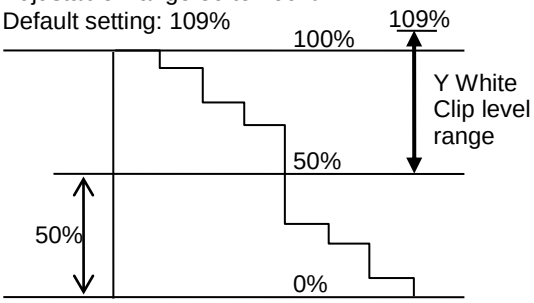
SETUP > COLOR CORRECT > CC1			6/7
RGB BLACK CLIP R	RGB BLACK CLIP G	RGB BLACK CLIP B	
300%	300%	300%	

	Parameter	Description	Default	Setting
WHITE	R / G / B	Sets the WHITE limit using R, G and B.	300%	50% to 300%
BLACK	R / G / B	Sets the WHITE limit using R, G and B.	-200%	-200% to 50 %

◆ **Y/C mode**

Y White Clip

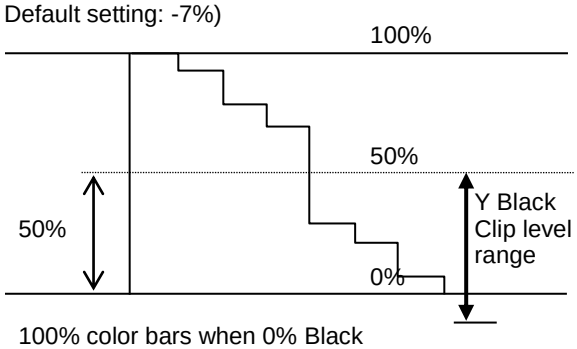
Adjustable Range 50 to 109%
Default setting: 109%



100% color bars when 100% white

Y Black Clip

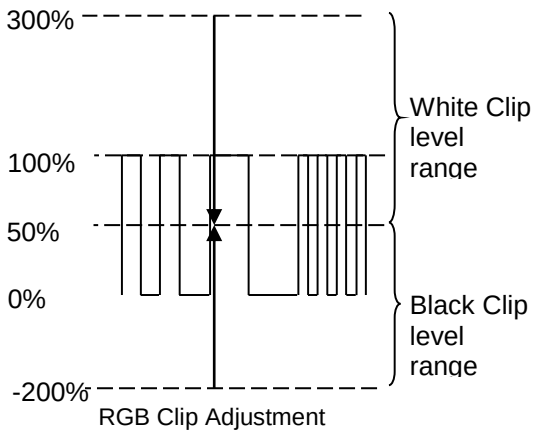
Adjustable range: -7 to 50%
Default setting: -7%)



100% color bars when 0% Black

◆ **RGB mode**

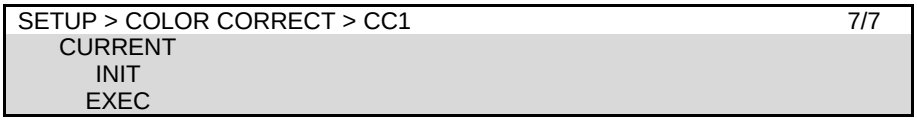
Once "RGB" mode is selected for clips, YPbPr input signals are converted to RGB signals in the switcher. The converted RGB signals are processed so as not to exceed the RGB gamut range set per RGB White and Black Clip menu parameters.
The processed RGB signals are then converted again to YPbPr format. This correction is used to eliminate out-of RGB gamut problems.



RGB Clip Adjustment

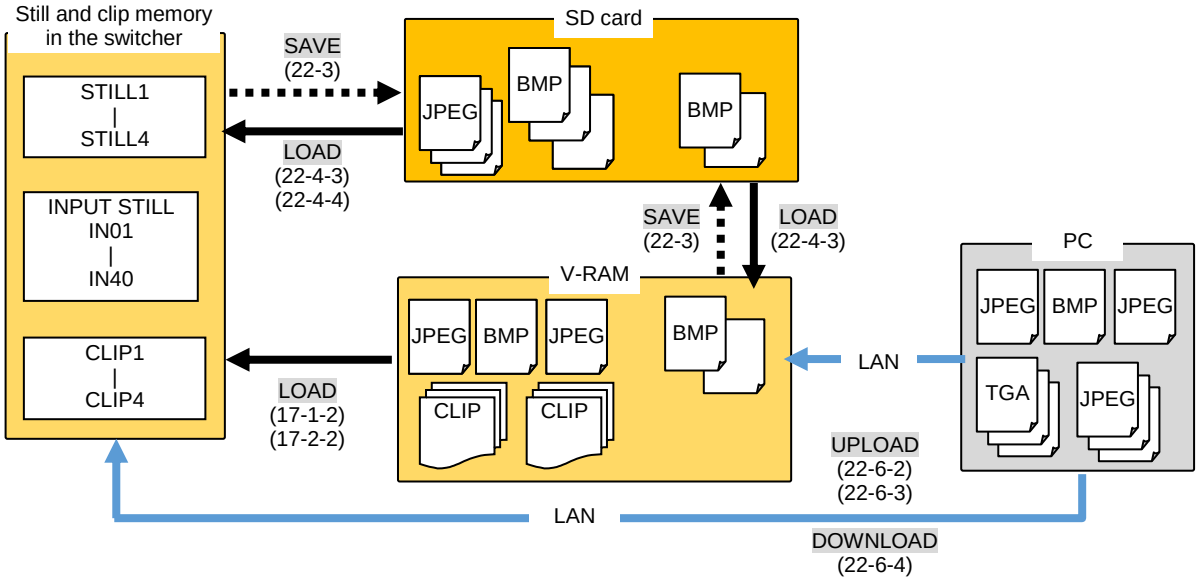
16-4. Resetting a Color Corrector Channel

(1) Open [SETUP > COLOR CORRECT > CC1] menu PAGE 7.
(2) Turn F1 to select EXEC.
(3) Tap **YES** in the confirmation dialog. Color Corrector Channel Settings are reset excluding SIGNAL and ENABLE items.



17. Still and Clip Store

The switcher can capture and memorize still images from the switcher input and output video, and record and play back the output video as video clips. In addition, input video can display frozen images by capturing an input video and saving it to the Frame Synchronizer buffer. (INPUT STILL function) (See Sec. 22. "File Operations.")
SD cards can be used to backup and upload still pictures. V-RAM (a built-in video random access memory) can temporarily hold large video data for still pictures and video clips.



17-1. Still Images (STILL)

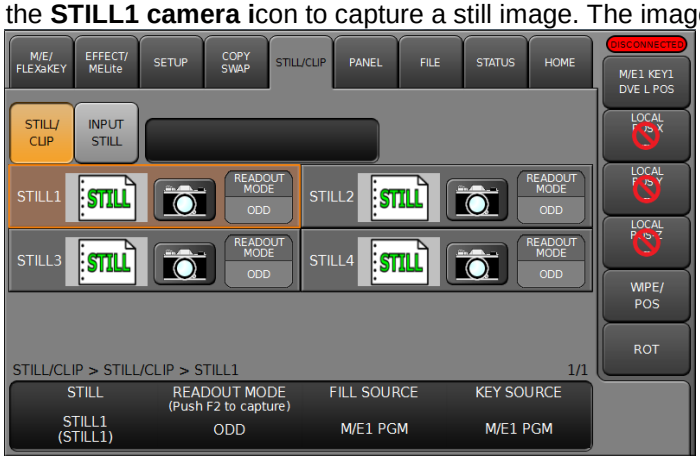
17-1-1. Capturing Still Images

Up to 4 Video and Key still pictures can be stored.
Let's capture M/E1 program images using STILL1 as follows:

(1) Open the [STILL/CLIP > STILL/CLIP > STILL1] menu.
(2) Turn F3 and F4 to set both FILL SOURCE and KEY SOURCE to M/E1PGM.

STILL/CLIP > STILL/CLIP > STILL1			1/1
STILL	READOUT MODE (Push F2 to capture)	FILL SOURCE	KEY SOURCE
STILL1 (STILL1)	ODD	M/E1 PGM	M/E1 PGM

(3) Tap on the **STILL1 camera i**con to capture a still image. The image is saved to STILL1.



To automatically update thumbnails, select **AUTO** under THUMBNAIL in [PANEL > UTILITY > UTILITY] menu PAGE 3.

TIP

They can be loaded to still memory buffers from SD cards. (See Sec. 22. “File Operations.”)

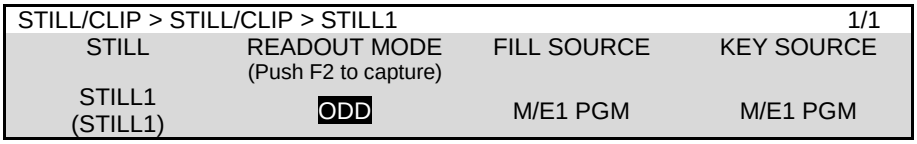
17-1-2. Selecting Still Images in V-RAM

Still images can be loaded directly from V-RAM. The following procedure shows how to load a still image stored in V-RAM to STILL 2.

(1) Open the [STILL/CLIP > STILL/CLIP] menu.
(2) Tap the **STILL** icon in STILL2.
(3) Tap to select a still image in the pop-up dialog. The image will be immediately loaded to STILL 2 if **DIRECT LOAD** is checked.
(4) Otherwise, tap **LOAD**. The image will be loaded.

17-1-3. Displaying Still Images

To display the STILL1 image stored in Sec. 17-1-1, select STILL1 for the M/E, AUX or a key insert video in the menu. Or, assign STILL1 on a bus button and press the button to select it. The read out mode of still images can be changed. Select it from FRAME, ODD or EVEN. For example, to load the STILL1 image in odd mode, tap on STILL1 and turn F2 to select ODD.



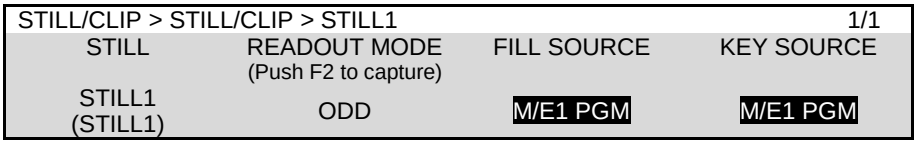
17-2. Video Clips (CLIP)

Output images can be recorded as Video and Key clips. STILL1-4 buses are used for recording and playing video clips, however, they are stored in different internal memory buffer.
Two or more channels cannot be recorded simultaneously in SD formats.

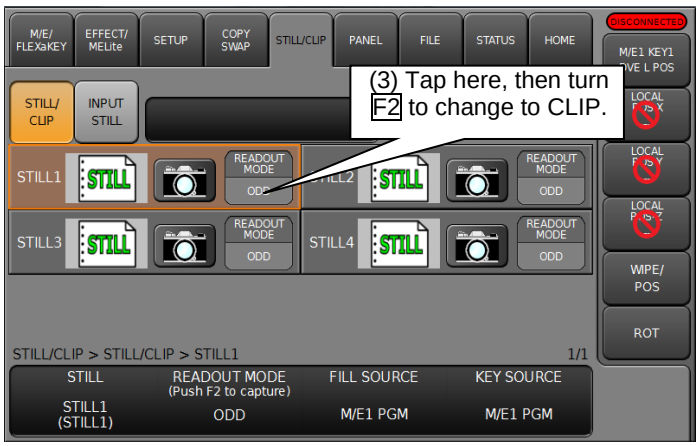
17-2-1. Recording Video Clips

Let's record M/E1 program images using STILL1 as follows:

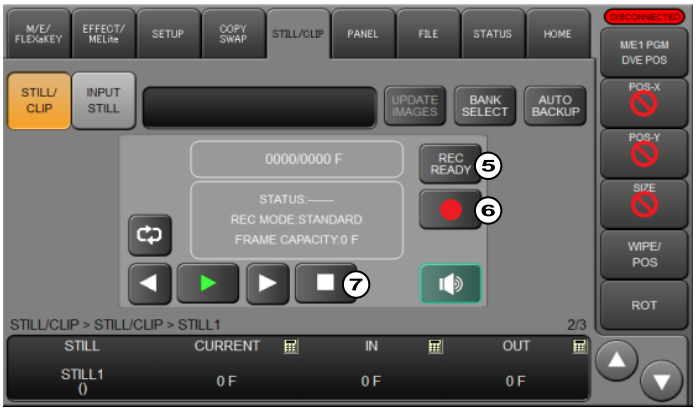
(1) Open the [STILL/CLIP > STILL/CLIP > STILL1] menu
(2) Turn F3 and F4 to set both FILL SOURCE and KEY SOURCE to M/E1 PGM.



(3) Tap on STILL1 **READ OUT MODE**, then turn F2 to select CLIP.



(4) Go to PAGE 2.
(5) Tap on **REC READY** to be on recording standby. (If the number of recording frames are predetermined, turn F4 to set the number under OUT.)
(6) Tap on **RECORD** (red circle) to start recording.
(7) Tap on **STOP** (square) to stop recording. (If the number is set under OUT, the recording will automatically stop.)



TIP

Clip data can be loaded to the switcher memory from SD cards. (See Sec. 22. “File Operations.”)

◆ **Recording Mode (REC MODE)**

The recording mode can be changed. To start recording with no standby (without tapping REC READY), turn F2 to change REC MODE from STANDARD to DIRECT.

◆ **Loop Mode**

The loop mode setting is shared by both recording and playback. Tapping the Loop button to enable the loop mode. (The button becomes lit.)
When the switcher is recording in loop mode and the buffer is full, the recording will loop back to the beginning, overwrite the previous recording and continue recording until the STOP button is pressed.

17-2-2. Selecting Video Clips in V-RAM

Video clips can be loaded directly from V-RAM. The following procedure shows how to load a clip stored in V-RAM to STILL 2.

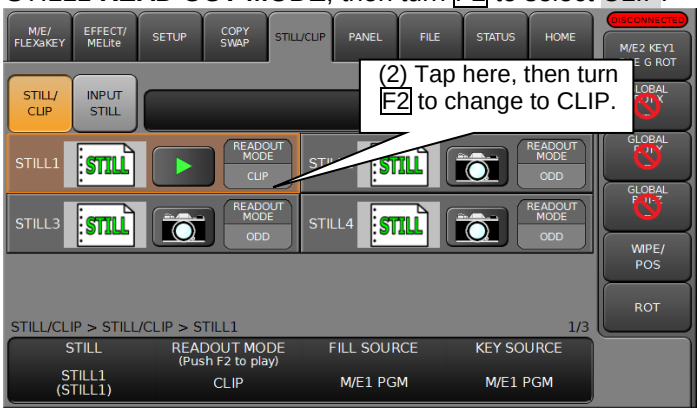
(1) Open the [STILL/CLIP > STILL/CLIP] menu.

(2) Tap the **CLIP** icon in STILL2.
(3) Tap to select a clip in the pop-up dialog. The clip will be immediately loaded to STILL 2 if **DIRECT LOAD** is checked.
(4) Otherwise, tap **LOAD**. The clip will be loaded.

17-2-3. Playing Video Clips

This example shows how to play the M/E1PGM clip recorded above on the M/E2 background through STILL1. Assume that STILL 1 is assigned to the bus button 10

(1) Open the [STILL/CLIP > STILL/CLIP] menu.
(2) Tap on STILL1 **READ OUT MODE**, then turn F2 to select CLIP.



(3) Go to PAGE 2.
(4) Press 10 on the M/E2 PGM bus. (The start frame will be displayed on the M/E2 program screen.)
(5) Tap **PLAY** (green arrow) to start playback. (The screen returns to a stopped state when playback is complete.)

◆ **Simultaneous Playback of Video and Audio Clips**

If a video clip is set up with an audio file, video and audio are simultaneously played back. See Sec. 22-4-5. "Adding Audio to Sequential Image Files."

To adding audio to video, tap the AUDIO button (with a speaker symbol) to turn on the button light and pass through the ancillary data of the output bus. (See Sec. 8-6. "Ancillary Data.")

17-2-4. CG WIPE

CG Wipes are video effects that allow you to play movie files according to background transitions. CG Wipes can be created using a modified pattern. CG WIPE videos are composed using an M/E key.
The procedure example below shows how to play a CG WIPE on the M/E1 background under the conditions listed in the table. The CG clip should be stored in the switcher by capturing video or uploading from an SD card.

Item	Setting example
Channel	STILL1
Pattern	No. 51
Key used for CG	M/E1KEY1
Play time	60 frames
BKGD transition type	WIPE
BKGD transition pattern (preset or modified)	WIPE No. 51

◆ **CG Settings**

(1) Open the [M/E FLEXaKEY > M/E1 > BKGD PGM > MODIFY > CG WIPE] menu.
(2) Set ENABLE to ON to enable CG WIPE mode.
(3) Select STILL1 under **CG**.
(4) To select clips in V-RAM, tap SOURCE and select a clip in the pop-up dialog.
(5) Set DURATION (CG playback time) to 60 frames.

◆ **KEY and Background Settings**

(1) Go to PAGE 2. Select KEY1 KEYER SELECT.
(2) Set the delay time from the start of the CG WIPE to setting the key ON under KEYER DELAY(f).
(3) Set TRANS END to KEY_OFF to clear KEY1 from the screen after CG playback is finished.
(In CG WIPE operations, a key is cut into and cut out from the screen after the specified time elapses.)
(4) Go to PAGE 3. Set the BKGD transition type to WIPE under TRAMS TYPE.
(Note that NOR/REV, the WIPE direction button, on the control panel must be OFF. In other cases, CG wipes may be improperly performed.)
(5) Set the delay time from the start of the CG WIPE to the start of the background transition under TRANS DELAY(f).
(6) Set the BKGD transition rate under TRANS RATE.

◆ **Executing the CG WIPE**

(1) Press the BKGD button in the TRANSITION block.
(2) On the control panel transition block, verify that the transition type is set to WIPE and Pattern 51 is selected for the BKGD in the menu.
(3) Press AUTO to perform the CG WIPE effect.

◆ **Fader Operation Setting**

The FADER setting allows you to isolate CG WIPE and Fader operations.
(1) Open [M/E FLEXaKEY > M/E1 > BKGD PGM > MODIFY > CG WIPE] menu PAGE3.
(2) Turn F4 to select the fader operation from CG, MIX and WIPE.

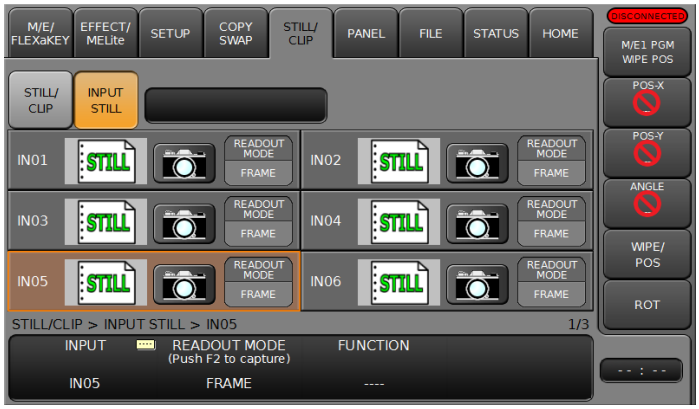
FADER Setting	Description
CG	Moring fader performs CG Wipes in the same way as AUTO transitions.
MIX	Moving fader performs MIX transitions. CG Wipes are not performed.
WIPE	Moving fader performs WIPE transitions. CG Wipes are not performed.

17-3. Still Image Display Using FS Buffer (INPUT STILL)

The switcher standard inputs can display still images by capturing input video or uploading still images to frame synchronizer buffers (INPUT STILL) from SD cards. (See Sec. 22. “File Operations.”)
The following example shows how to capture and display a still image on IN05.

17-3-1. Capturing Still Images

(1) Tap on **INPUT STILL** to open the [STILL/CLIP > INPUT STILL] menu.
(2) Tap on **INPUT**, type **5** then tap **Enter** on the pop-up keypad.



(3) To change read out mode, turn F2 to select from ODD, EVEN and FRAME.

STILL/CLIP > INPUT STILL > IN05		1/3
INPUT	READOUT MODE (Push F2 to capture)	
IN05	FRAME	

IMPORTANT

Input Stills use the frame synchronizer buffer memory. Therefore, the frame synchronizer is inoperable while an INPUT STILL is displayed or enabled. (See Sec. 6-4. “Frame Synchronizer.”)

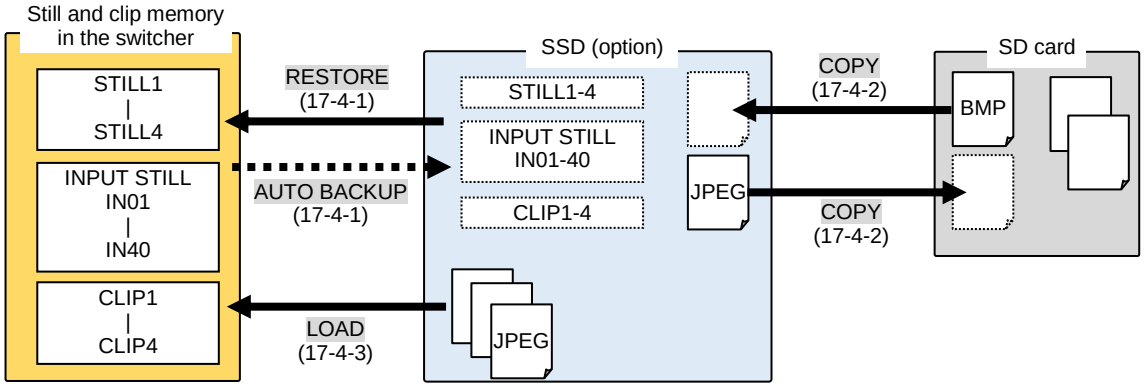
17-3-2. Returning to Input Video Display

To return IN05 to input video, open [SETUP > INPUT > SIGNAL] menu PAGE 2, and turn F2 to change CONTROL from STILL to INPUT.

SETUP > INPUT > SIGNAL			2/2
SELECT	CONTROL	XPT DELAY	
IN01	INPUT	0	

Another way to return to input video signals is as follows:
Open the [STILL/CLIP > INPUT STILL] menu, select **CLEAR** under FUNCTION and press F3.

17-4. Storing Still and Video Images (HVS-49SSD240G)



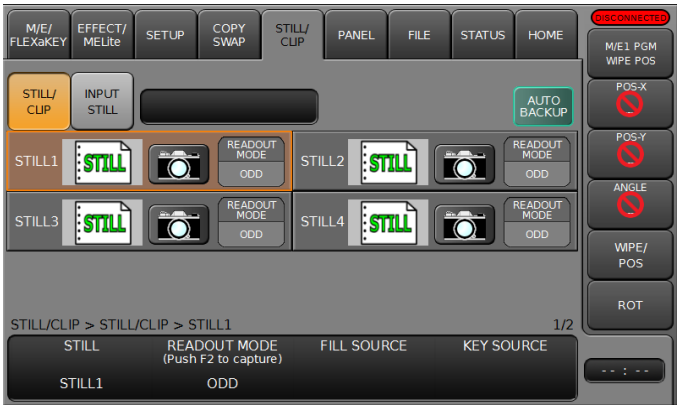
17-4-1. Auto Backup

The HVS-49SSD240G option allows you to automatically back up still pictures and video clips. Whenever a still picture is captured, a video clip is recorded, or image data is loaded to the switcher from an SD card, the image data is automatically backed up to the SSD. Backed-up data can be used for restoring STILL and CLIP data when the switcher is restarted.

◆ **Enabling Auto Backup**

(1) Open the [STILL/CLIP] menu.

(2) Tap **AUTO BACKUP**. Once the auto backup is enabled and image data is loaded to the switcher memory (STILL, INPUT STILL or CLIP) using the [FILE > LOAD] menu, it is also saved in the SSD. In the same manner, capturing still images updates the backup data in the SSD.



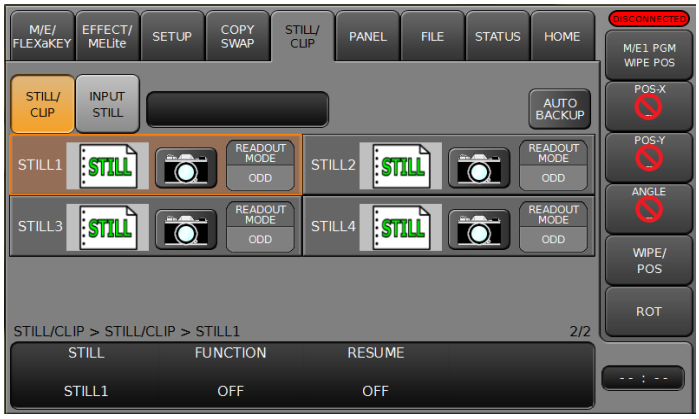
◆ **Restoring SSD Backup Images**

(1) Open [STILL/CLIP > STILL/CLIP] menu or [STILL/CLIP > INPUT STILL] menu.

(2) Turn F1 to select a still channel or turn F2 to select a clip channel.

(3) Go to PAGE 2 for stills or PAGE 4 for clips.

(4) Select RESTORE under **FUNCTION** and press F2 (F3 for INPUT STILL or CLIP). Tap **YES** in the pop-up dialog box to restore the image.



◆ **Loading SSD Backup Images on Startup**

(1) Open [STILL/CLIP > STILL/CLIP] menu or [STILL/CLIP > INPUT STILL] menu.
(2) Turn F1 to select a still channel or turn F2 to select a clip channel.
(3) Go to PAGE 2 for stills or PAGE 4 for clips.
(4) Set **RESUME** to ON to load the still images at startup.

17-4-2. Copying Stills/Clips (between SD Card and SSD)

Still pictures and video clips can be copied between SD cards and the SSD. The following procedure shows an example of copying the **FILE.jpg** file to the **DATA** folder in the SSD.

(1) Open the [FILE > DATA BACKUP] menu.
(2) Turn F2 to select STILL.
(3) Turn F3 to change **MODE** to SOURCE. Tap the **SD** icon on the menu screen to select the SD card.

FILE > DATA BACKUP			1/1
SELECT	TYPE	MODE	EXEC
FILE.jpg	STILL	SOURCE	COPY

(4) Turn F3 to change **MODE** to TARGET. Tap the **SSD** icon in the menu screen and select the **DATA** folder in the SSD.
(5) Turn F4 to select COPY and press F4.

FILE > DATA BACKUP			1/1
SELECT	TYPE	MODE	EXEC
DATA	STILL	TARGET	COPY

The data stored in the SSD can be renamed or deleted in the same manner as shown in Sec. 22-5.

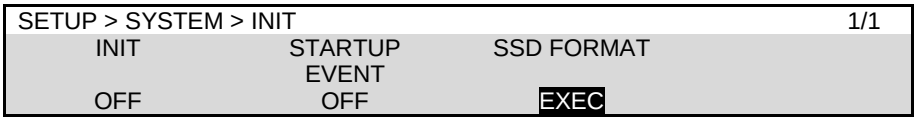
17-4-3. Loading Stills and Clips (from SSD to Switcher)

Still pictures and video clips can be loaded from the SSD to the STILL or CLIP memory in the switcher in the same manner as described in Sec. Let's load the still image copied from the SD card to STILL 3.

(1) Open the [FILE > LOAD] menu.
(2) Turn F2 to select STILL and press F2.
(3) Tap the **SSD** icon on the menu screen to select **FILE.jpg** in the **DATA** folder.
(4) Turn F3 to select STILL3 to load the still image to **STILL3**.

17-4-4. Resetting the SSD

(1) Open the [SETUP > SYSTEM > INIT] menu.
(2) Turn F3 to select EXEC under **SSD FORMAT** and press F3.



(3) Tap to select **YES** in the pop-up dialog box to reset the SSD.

18. Multiview Output

The multiviewer allows you to monitor multiple images such as video sources input to the switcher and internally generated or combined images on the same screen. The switcher provides **3 multiviewer channels (MV1-MV3*)**, with each output having various types of split displays: **2, 4, 5, 7, 9, 10, 11, 13 and 16 way**.
This chapter use MV1 as an example, but other MV channel operations are the same.
Note that the multiviewer outputs are **delayed by one frame** relative to the program output.
* 2 channels are available in SD formats.

The setup procedure for the multiviewer is as follows:

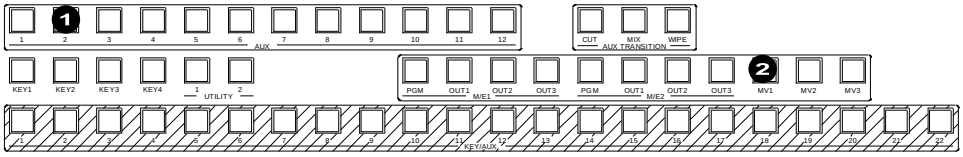
1. **Assign a multiviewer video to an AUX output bus.**
2. **Select a split-screen type.**
3. **Select video for each split area. (Clock display available instead of video)**
4. **Add titles, audio level meters, safety area markers, on-air tallies and frame borders.**

18-1. Assigning a Multiview Image to an AUX Bus

The multiviewer channels can be assigned to any AUX or HDMI outputs.
To assign to AUX outputs, use the buttons in BUS SELECT block on the control panel, or set on the [SETUP > OUTPUT > AUX OUT] menu.
To assign to HDMI outputs, set on the [SETUP > OUTPUT > HDMI OUT] menu.

◆ **Assigning MV1 to AUX2 using the BUS SELECT Buttons**

(1) Press AUX2 in the BUS SELECT block.
(2) Press MV1 above the KEY/AUX bus.



◆ **Assigning MV1 to AUX2 using the Menu**

(1) Quickly press AUX2 twice in the BUS SELECT block.
(2) The [SETUP > OUTPUT > AUX OUT] menu opens. Turn F2 to select MV1 OUT.

SETUP > OUTPUT > AUX OUT			1/3
AUX	OUTPUT XPT	OUTPUT INHIBIT	AUX TRANS ENABLE
AUX02	MV1 OUT	OFF	OFF

◆ **Assigning MV1 to HDMI OUT1 using the Menu**

(1) Open [SETUP > OUTPUT > HDMI OUT] menu PAGE 1.
(2) Turn F1 to select HDMI OUT1.
(3) Turn F2 to select MV1 OUT.

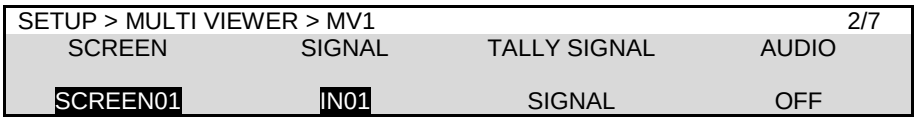
SETUP > OUTPUT > HDMI OUT			1/2
SELECT	OUTPUT XPT	AUDIO	UHD 4-SPLIT MODE
HDMI OUT1	MV1 OUT	OFF	OFF

18-2. Selecting the Screen Layout

(1) Quickly press MV1 twice in the KEY/AUX block to display [SETUP > MULTI VIEWER > MV1] menu PAGE 1.
(2) Turn F1 to select the screen layout.

18-3. Assigning Video to Sub-screens

(1) Open [SETUP > MULTI VIEWER > MV1] menu PAGE 2.
(2) Turn F1 to select the sub-screen number under SCREEN.
(3) Turn F2 to select a video to be displayed on the sub-screen. Available video images are as shown in the table below.



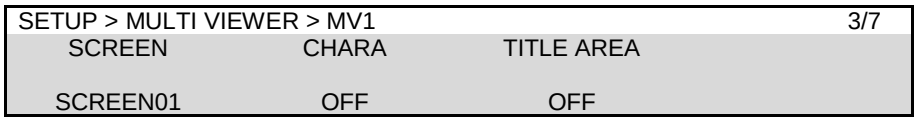
Available images for MV1 to MV3	IN01-IN40, BLAK(BLACK), STL1- STL4, ST1K-ST4K, MATTE1, MATTE 2, GMATT, CB(Color bar), WHIT (WHITE) CK1K-CK4K, M/E1 PGM, M/E1 PVW, M/E1 CLN1-2, M/E1 KEY, M/E2 PGM, M/E2 PVW, M/E2 CLN1-2, M/E2 KEY, MELite1-4, AUX1-AUX20, MELite1 PVW-MELite4 PVW, CK1F-CK4F, SUBEFF1-4

(4) Repeat steps (2) and (3) to assign images to the multiviewer sub-screens.

18-4. Setting up Each Sub-screen

18-4-1. Titles (Signal Names)

(1) Quickly press MV1 twice in the KEY/AUX block to display [SETUP > MULTI VIEWER > MV1] menu. Go to PAGE3.



(2) Turn F1 to select a sub-screen.
(3) Turn F2 to select NAME.

CHARA setting	Description
OFF	Displays no titles.
NAME	Displays titles using input or output signal names.
NAME w/ OUT XPT	Displays titles using output and source signal names for AUX outputs or using input or output signal names for other outputs.

Input signal names displayed on sub-screens can be changed in the [SETUP > INPUT > NAME] menu. (See Sec. 6-3. “Changing Video Source Names.")
Output signal names displayed on sub-screens can be changed in the [SETUP > OUTPUT > NAME] menu. (See “Changing Output Signal Names." below)

(4) Turn F3 to select background and position of titles.

TITLE AREA setting	Description
WIDE	Spreads the title background to the width of the screen.
NORMAL	Adjusts the width of the title background to fit the title.
OFF	Title Backgrounds are not displayed.

(5) Go to PAGE4 and turn F2 to select the title font size and use F3 and F4 to adjust the horizontal and vertical positions.

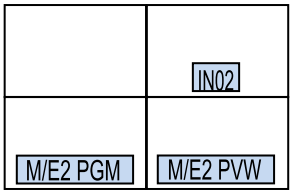
SETUP > MULTI VIEWER > MV1			4/7
SCREEN	TITLE SIZE	TITLE POS-X	TITLE POS-Y
SCREEN01	AUTO	0	0

FONT SIZE setting	Description
AUTO	Automatically changes the font size according to the sub-screen size.
SMALL	Small font size to fit to a 1/16 size sub-screen.
MIDDLE	Middle font size to fit to a 1/9 size sub-screen.
LARGE	Large font size to fit to a 1/4 size sub-screen.

◆ **Setting Example**

In the following setting example, the multiview image is displayed as shown at right.
(Names are default settings.)

SCREEN	SIGNAL	CHARA	TITLE AREA
1	IN01	OFF	NORMAL
2	IN02	NAME	
3	ME2PGM	NAME	
4	ME2PRV	NAME	



◆ **Changing Output Signal Names**

Open the [SETUP > OUTPUT > NAME] menu and change output names as needed.

SETUP > OUTPUT > NAME	1/1
SELECT	NAME
AUX01	AUX01

18-4-2. Audio Level Meter

A Level Meter for embedded audio can be displayed on each screen in multiviewer video. Select 2- or 4-channel for audio type to be displayed, which can be set for each screen on MV1 and MV2.

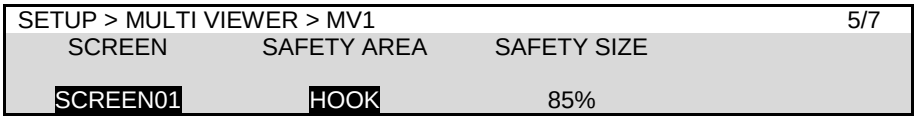
(1) Open [SETUP > MULTI VIEWER > MV1] menu PAGE 2.
(2) Turn F1 to select a sub-screen.
(3) Turn F4 to select audio channels to be displayed.

SETUP > MULTI VIEWER > MV1			2/7
SCREEN	SIGNAL	TALLY SIGNAL	AUDIO
SCREEN01	IN01	SIGNAL	CH1/2

AUDIO setting	Description
OFF	Displays no level meters.
Ch1/2, Ch3/4, Ch5/6, Ch7/8	Displays level meters for two channels.
Ch1-4, Ch5-8	Displays level meters for four channels.

18-4-3. Safety Area

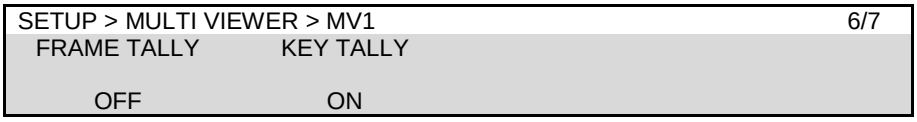
(1) Open [SETUP > MULTI VIEWER > MV1] menu PAGE 5.
(2) Turn F1 to select a sub-screen.
(3) Turn F2 to select HOOK or BOX for the screen.
(4) Turn F3 to select the safety area size.



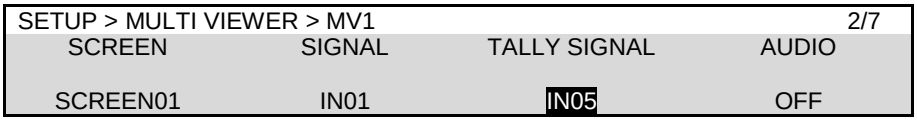
18-4-4. On-air Tally Indications

Tally information allows you to indicate which video is currently On-air (output from the program) and which is set to be the next output using sub-screen frame colors.

(1) Open [SETUP > MULTI VIEWER > MV1] menu PAGE 6.
(2) If FRAME TALLY is set to ON, the tally is indicated on the sub-screen frame.
(3) If KEY TALLY is set to ON, the key tally is also indicated.



To display the tally indication of another video, set the video signal under TALLY SIGNAL in PAGE 2 of the [SETUP > MULTI VIEWER > MV1] menu.



18-4-5. Frame Border Color

Frame Border that divide sub-screens can be enabled and its color can be changed in the menu. (The border color is the same for MV1 to MV3.)

(1) To display frame borders, open [SETUP > MULTI VIEWER > MV1] menu PAGE 1 and turn on BORDER.

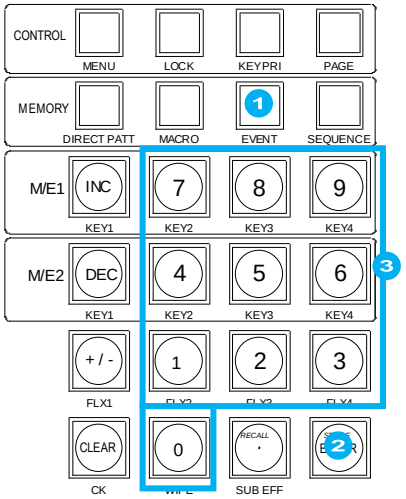
(2) To change the frame border color, go to PAGE 7. Use the SAT, LUM and HUE or tap BORDER COLOR to set the border color.

19. Event Memory

The switcher can save settings as a data set. This function is called Event Memory. Event Memory allows you to quickly recall saved panel settings at any time when needed. The MEMORY block is used to save and recall events. In addition, data to be stored to or loaded from events can be selected in the menu.
Event memory data can be backed up to SD cards. (See Sec. 22. “File Operations”)
In addition, the RATE item in the EVENT menu allows users to perform transitions by loading events. (See Sec. 19-2-3. "Transitions Using Event Recall.")

19-1. Storing Events

Event memory can store control panel settings.
Up to 100 events (10 memory pages,
with 10 events per page) can be stored in memory.



◆ **To Store Events (basic):**

(1) Press EVENT in the MEMORY block.
(2) Press STORE on the numeric keypad.
(3) Press a number button (0-9) on the numeric keypad to store the event.

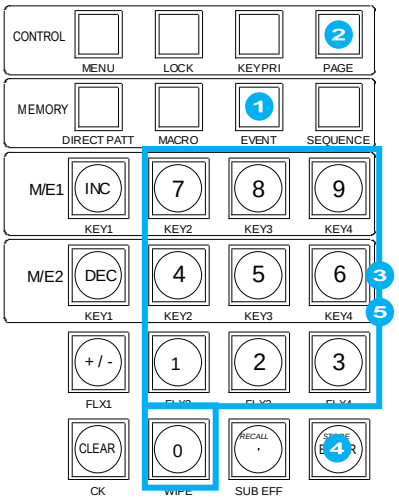
Ex) To Save Settings to EVENT 03
Successively press EVENT > STORE > 3.
(Note that, in this case, the settings are saved to 3 of the current page (PAGE 0).)

◆ **Storing Events (detailed):**

(1) Press EVENT in the MEMORY block.
The [EVENT MEMORY] menu is displayed and the keypad switches to EVENT mode.
(2) Press PAGE above the keypad.
(3) Select a page by pressing a number button.

PAGE 0 has EVENT0-9.
PAGE 1 has EVENT10-19…and the last page,
PAGE 9 has EVENT90-99.

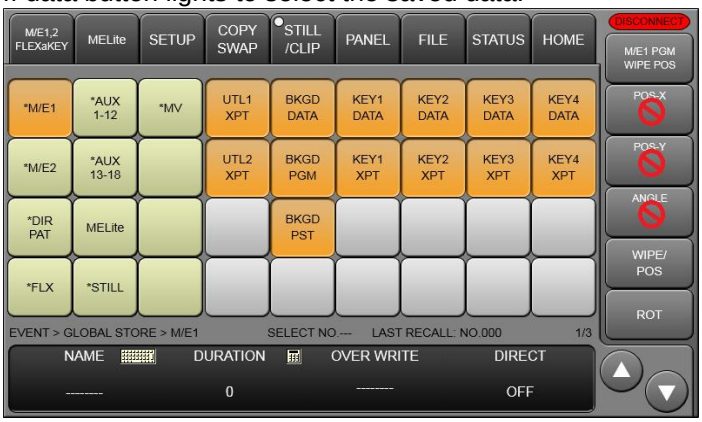
(4) Press STORE.
The button will flashes green and the [EVENT STORE] menu will appear.
This menu allows you to fine-select the data to be saved. (See the next page.)
(5) Press a numeric key on the keypad to save the settings to the event number.



Ex) To Save Settings to EVENT 23
Successively press EVENT > PAGE > 2 > STORE > (Select data in the menu.) > 3.

If Events are Already Saved:
When EVENT is pressed, the number buttons light up if events are saved. If you press a button where an event is already saved, it flashes. Pressing the button again overwrites the event. If you press another button that has no event already saved before overwriting, the event will be saved to that button.
If you cannot overwrite data, change OVERWRITE to ENABLE in the menu. (See Sec. 19-3. "Overwrite Protection.")

<Detailed Data Selection when Saving Events>
Tap to turn On/Off data button lights to select the saved data.



◆ **Items NOT stored in events**

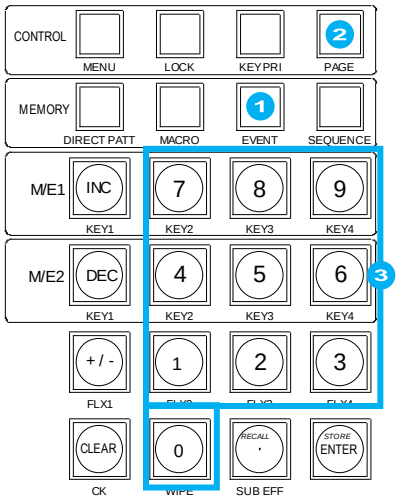
All SETUP menu items	STILL images
All FILE menu items	PANEL menu items

19-2. Recalling Events

19-2-1. DIRECT Mode

Events can most quickly be recalled in Direct Operation mode. However, loaded data cannot be selected while recalling events. To use Direct Operation mode, set **DIRECT** to ON in the EVENT menu before recalling events.

(1) Press EVENT in the MEMORY block.
(2) Press PAGE above the keypad.
Select a page by pressing a number button.
(3) Press the number button where the needed data is stored.
The selected event will be applied to the panel.

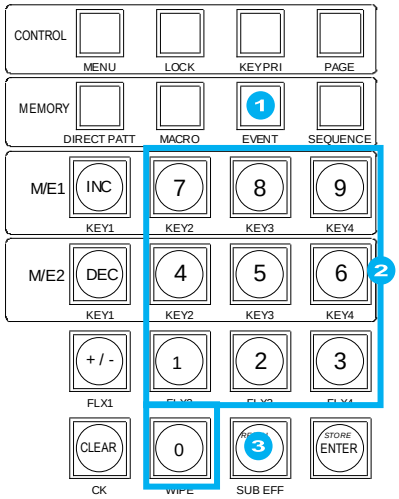


Once an event is loaded, the event number is displayed under LAST RECALL in the [EVENT MEMORY] menu, which will help you to identify the last recall event number.

19-2-2. Using the RECALL Button

◆ **To Recall Events (fastest method):**

(1) Press EVENT in the MEMORY block.
(2) Press the number button where the needed data is stored.
(3) Press RECALL.
The selected event will then be applied to the panel.

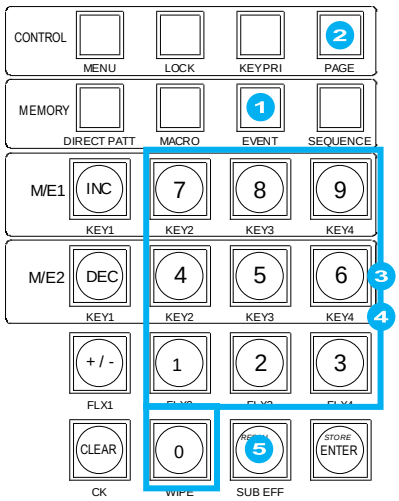


Ex) To Recall EVENT 03

Successively press EVENT > 3 > RECALL.
(Note that In this case, 3 of the current page (PAGE 0) is recalled.)

◆ **To Recall Events (detailed):**

(1) Press EVENT in the MEMORY block.
The [EVENT MEMORY] menu will appear and the keypad changes to EVENT mode.
(2) Press PAGE above the keypad.
(3) Select a page by pressing a number button.
(4) Press the number button where the needed data is stored. The saved data details will be displayed on the menu screen.
(5) At this time users can select to recall all saved data or specific data within the event by selecting on the menu screen (for example, loading data excluding M/E2 settings)
(6) Press RECALL to load the settings.



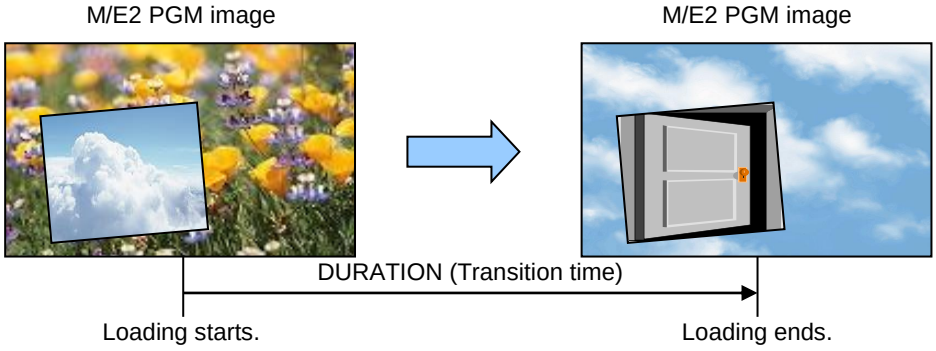
Ex) To Load EVENT 23

Successively press EVENT > PAGE > 2 > 3 > (Select data in the menu.) > RECALL

Note that the current event page is displayed under SELECT NO in the EVENT menu.

19-2-3. Transitions Using Event Recall

The DURATION parameter in the EVENT menu allows users to set the time duration (transition rate) it takes to load events. With this time duration, transition sequences of two steps (statuses before and after recalling events) can be performed. The two images (keyframes) before and after recalling events that appear on program screens are automatically interpolated to create a smooth transition in the same way as the Sequence feature. The DURATION time can be set for each event. It can also be set and changed when events are recalled.



◆ **Operation Example**

The following operation example shows an event that is saved to EVENT No. 10 with 150 frames for DURATION and it is recalled while changing DURATION to 30 frames.

To Save EVENT 10

(1) Press EVENT in the MEMORY block to display the [EVENT MEMORY] menu.
(2) Press PAGE and press 1 to select PAGE1 (that contains EVENT 10-19).
(3) Press STORE to display the [EVENT > STORE] menu.
(4)Tap on **DURATION** to type 150, then tap **Enter** on the pop-up keypad.

EVENT > STORE			1/1
NAME	DURATION	OVERWRITE	DIRECT
EVENT 10	150	ENABLE	OFF

If changing DURATION to 150, the initial DURATION value of events hereafter stored, will always be 150.

(5) Press 0 on the MEMORY block to save the panel settings to EVENT 10

To Load EVENT 10

(1) Press EVENT to display the [EVENT MEMORY] menu.
(2) Press PAGE and press 1 to select PAGE1.
(3) Press 0 to select EVENT10. The RECALL menu will be displayed.
(4) Turn F2 to change DURATION from 150 to 30.

EVENT > RECALL			1/2
NAME	DURATION	OVERWRITE	DIRECT
EVENT10	30	ENABLE	OFF

(5) Press RECALL. EVENT 10 data is loaded in 30 frames.

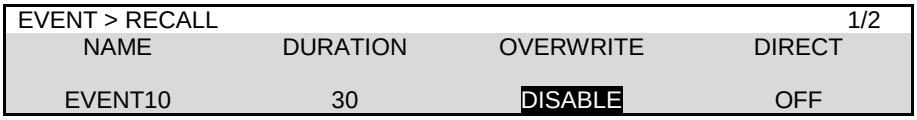
19-3. Overwrite Protection

(1) Press EVENT in the MEMORY block.
(2) Turn **DIRECT** to OFF so as not to load events.
(3) Press the number (memory) button to be set. The button goes from lit to flashing the [EVENT RECALL] appears.

TIP

When EVENT is pressed, number buttons light up if they have setting data.

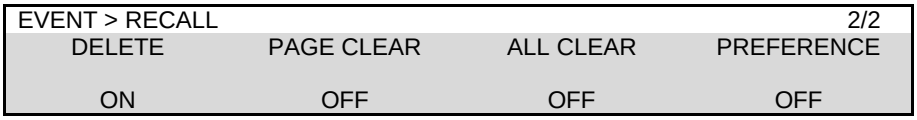
(4) Turn F3 to set OVERWRITE to DISABLE.



19-4. Deleting Event Data

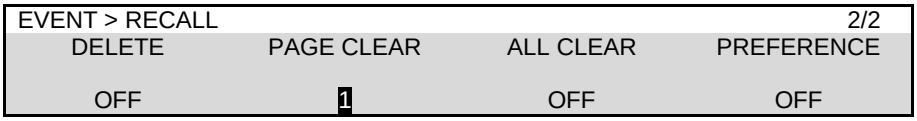
◆ **To Delete Data for an Event**

(1) Press EVENT in the MEMORY block.
(2) Turn **DIRECT** to OFF so as not to load events.
(3) Press the number (memory) button. The button goes from lit to flashing the [EVENT RECALL] appears.
(4) Go to [EVENT MEMORY] menu PAGE 2.
(5) Turn F1 to turn DELETE to ON, then press F1 to delete the event data.



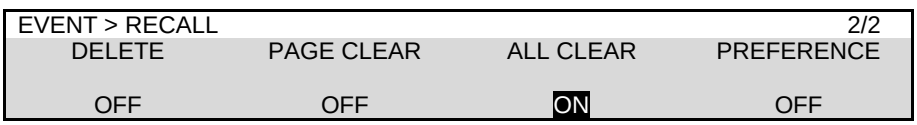
◆ **To Delete Data for an Event Page**

(1) Press EVENT in the MEMORY block to display the [EVENT MEMORY] menu.
(2) Go to [EVENT MEMORY] menu PAGE 2.
(3) Turn F2 to select a page number.
(4) Press F2 to delete the event page data.



◆ **To Delete All Event Data**

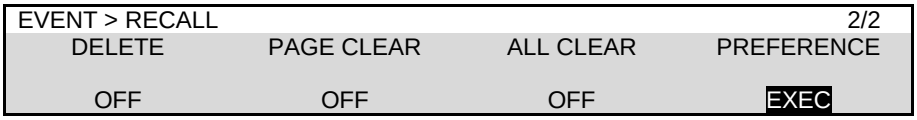
Press F3 to turn ALL CLEAR to ON in the [EVENT MEMORY] menu. Press F3 to delete all event data.



19-5. User Default Setting

The event store data can be changed from the factory default settings (M/E1 and M/E2).

(1) Press EVENT in the MEMORY block to display the [EVENT MEMORY] menu.
(2) Press STORE in the keypad.
(3) Select data to be stored in the menu screen.
(4) Go to [EVENT MEMORY] menu PAGE 2.
(5) Turn F4 to change PREFERENCE to EXEC and press F4.
(6) Select **YES** in the pop-up dialog to save the current settings as default store data.



19-6. Loading an Event at Start-up

The settings made for the background and key buses on the control panel are cleared when powering off the switcher. You can, however, recall the desired panel setup whenever the switcher starts by setting in the [SETUP - SYSTEM - INIT] menu as shown in the procedure below.

(1) Open the [SETUP > SYSTEM > INIT] menu.

(2) Turn F2 to select the desired panel setup in the table below.

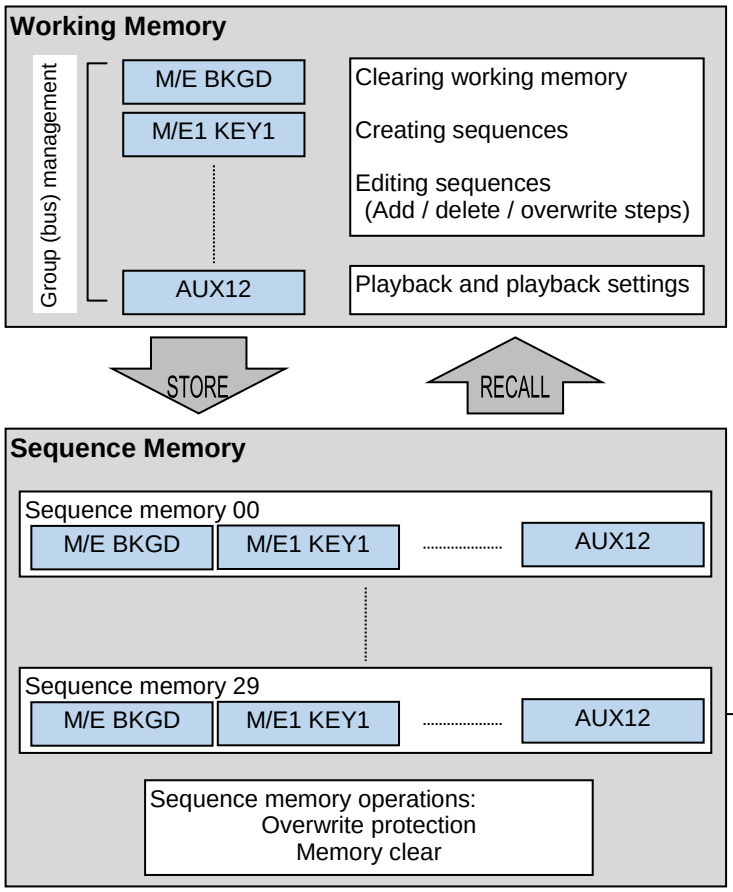
STARTUP EVENT setting	Description
OFF	The switcher starts with Last Saved Settings. "Last Saved Settings" are automatically saved when the unit is rebooted or SETUP is pressed.
LAST	The switcher starts with the last loaded event. Note that to enable the Last Load function, an event must be loaded after setting to LAST.
0-99	The switcher starts with a selected event (0-99) loaded.

20. Sequence Function

A sequence is a function for joining individual images into a sequential video and recalling it for playback in a single operation. Each sequence is composed of video frames called steps. To make sequences, create an initial step and save it to the sequence working memory, then create the next step and to save to the working memory and so on. Although the sequence data saved in the working memory is cleared and lost when the switcher is powered off, it can be kept and recalled by storing it to sequence memory. Up to 30 sequences (20 steps at most for each bus) can be saved to sequence memory. Sequence data can also be backed up to SD cards and loaded to the switcher from SD cards. (See Sec. 22. “File Operations.”)

Note that the sequence data is not a sequential video itself but a series of states on the control panel as of when the images were saved as steps. Therefore, the images that are displayed on the monitor during sequence playback may be different from those that appeared when the sequence was stored, if the input videos were different. However, the switch timings and 3D effects such as picture-in-picture display will remain the same.

The flow diagram below shows the basic series of sequence operations.



20 steps at most for each bus

Available functions and data	
M/E1 BKGD M/E2 BKGD	XPT data
	Transition settings
	Pattern modify settings
	LINE-DVE settings
	BKGD MATT settings
M/E1 KEY1-4 M/E2 KEY1-4	XPT data
	Transition settings
	Pattern modify settings
	LINE-DVE settings
	KEYER settings
FLEXaKEY1-4	XPT data
	Transition settings
	LINE-DVE setting
	KEYER settings
AUX1-12	XPT data
	Transition settings

Functions and Information Available for Sequence Control	
XPT information for each bus	Bus Matte color information
Transition type settings for each bus	Key setting information
Transition direction settings	Pattern modify settings
PGM output bus information	Pattern number settings of bus assignments
NEXT TRANSITION settings	

Functions and Information Not Available for Sequence Control	
Event memory	Direct patterns
Still Store	SETUP menu settings
File operation	USER TRANS and ADV CTRL settings in the TRANS menu

20-1. Basic Sequence Operations

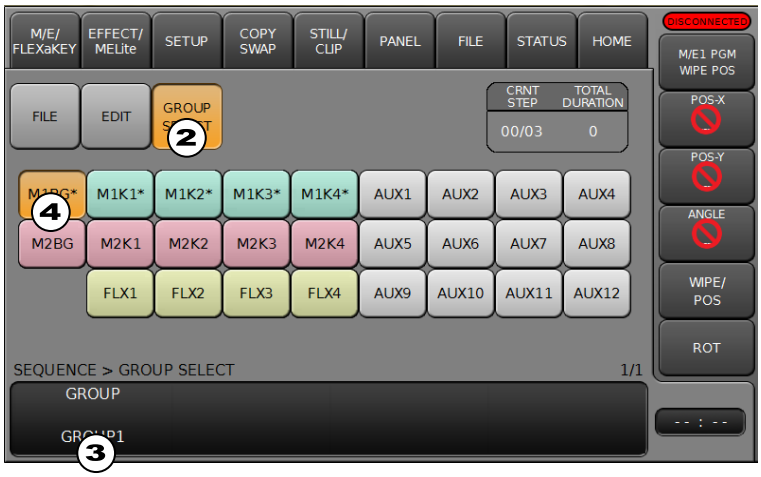
The HVS-490 allows you to create sequences based on which buses are to be used.
For example, to create sequences of the M/E1, create **a group** of **M/E1 BKGD** and **M/E1 KEY1 to 4,** then create and store sequences based on the group.
This chapter explains basic sequence operations: how to create, store, load and play sequences using only one bus, M/E1 BKGD. Then, the next chapter (Sec. 20-2) describes the details on sequence group management.

20-1-1. Creating New Sequences

This chapter shows how to create a sequence of M/E1 BKGD in three steps as an example.

◆ **Selecting M/E1 BKGD**

(1) Press SEQUENCE in the memory block to open the SEQUENCE menu.
(2) Go to the [SEQUENCE > GROUP SELECT] menu.
(3) Turn F1 to select GROUP1. (See Sec. 20-2 for details on sequence groups.)
(4) Tap **M1BG**. If buttons other than **M1BG** are lit, turn them off.



◆ **Creating Steps**

(1) Open the [SEQUENCE > EDIT] menu PAGE 1.
(2) Turn F1 to select GROUP1.
(3) Tap **NEW** to clear the M/E1 BKGD block in the working memory.
(4) Create “Video A.” Press **ADD** to save it to Step 1.
(5) Create “Video B.” Press **ADD** to save it to Step 2.
(6) Create “Video C.” Press **ADD** to save it to Step 3.

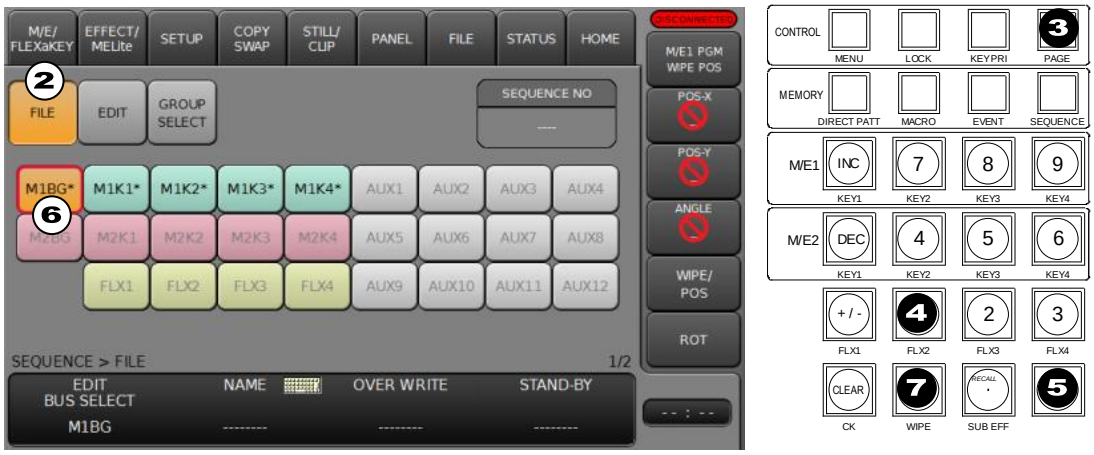
Now the sequence is created and saved in the working memory.

Note that DVE channel switching may cause video distortion. The switches will happen in cases when turning LINE-DVE On/Off, or changing the transition type or pattern.

20-1-2. Storing Sequences

The following procedure shows how to store the **M/E1 BKGD sequence** just created to **Sequence Memory 10**.

(1) Press SEQUENCE in the memory block to open the SEQUENCE menu.
(2) Open the [SEQUENCE > FILE] menu.
(3) Press PAGE in the MEMORY block.
(4) Press 1 on the keypad to select PAGE 1.
(5) Press STORE on the keypad.
(6) Verify that **M1BG** is selected in the [SEQUENCE > FILE] menu.
(7) Press 0 on the keypad.
The sequence data in the working memory is stored to **Sequence Memory 10**.

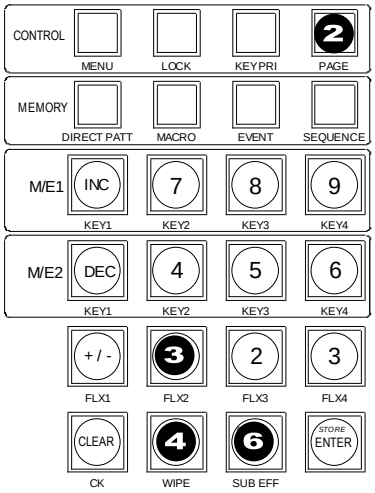


Although the sequence data saved in the working memory is cleared and lost when the switcher is powered off, it can be kept and recalled by storing it to sequence memory. Up to 30 sequences (10 x 3 pages) of 20 steps at most for each bus can be saved to sequence memory. Sequence data can also be backed up to SD cards and loaded to the switcher from SD cards. (See Sec. 22. “File Operations.”)

◆ **If Sequences are Already Saved:**
When SEQUENCE is pressed, the number buttons light up if sequences are saved. If you press a button where a sequence is already saved, it flashes. Pressing the button again overwrites the sequence. If you press another button that has no data before overwriting, the sequence will be saved to that button.
If you cannot overwrite data, change **OVERWRITE** to ENABLE in the menu.

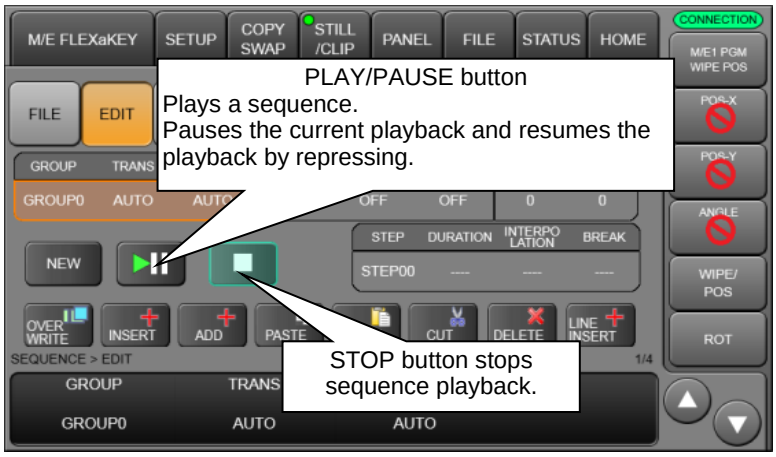
20-1-3. Playing Back Sequences

The following procedure shows how to load and play the sequence stored in **Sequence Memory 10**.



(1) Open the [SEQUENCE > FILE] menu.
(2) Press PAGE in the MEMORY block.
(3) Press 1 on the keypad to select PAGE 1.
(4) Press 0 on the keypad
(5) Verify that **M1BG** is selected in the [SEQUENCE > FILE] menu.
(6) Press RECALL on the keypad.
The M1BG block data in **Sequence Memory 10** is loaded to the M1BG block in the working memory.

(7) Open the [SEQUENCE > EDIT] menu.
(8) Tap **PLAY/PAUSE**.
To stop the sequence playback, press **STOP**.



◆ **Quick Recall (DIRECT mode)**

In DIRECT mode, sequences can be loaded just pressing a memory button without pressing RECALL.
To recall **Sequence Memory 0** in DIRECT mode:

(1) Open [SEQUENCE > FILE] menu PAGE2.
(2) Turn F4 to turn **DIRECT** to ON.

SEQUENCE > FILE			2/2
DELETE BUS OFF	DELETE CRNT SEQ NO ON	ALL CLEAR OFF	DIRECT ON

(3) Open the [SEQUENCE > FILE] menu.
(4) Press 0 on the keypad

20-1-4. Playing Back Sequences Using Advanced Settings

Playback settings can be set in the [SEQUENCE > EDIT] menu pages, PAGE1-3.

The following settings are available:

Parameter	Menu page	Setting	Description
XPT	1/4	OFF	Bus video signals are not changed during playback.
		AUTO (default)	Uses bus video signals stored in sequences.
		MANUAL	Uses bus video signals set on the control panel.
TRANS (*1)	1/4	OFF	Transitions are not performed during playback.
		AUTO (default)	Performs transitions automatically during playback.
		MANUAL	Performs transitions manually using a fader or AUTO button.
DIR (*2)	2/4	NOR (default)	Plays sequences in the normal direction.
		REV	Plays sequences in the reverse direction.
FADER (*3)	2/4	OFF	Automatically plays sequences without fader.
		M/E1	Manually plays sequences using the ME1 fader.
		M/E2	Manually plays sequences using the ME2 fader.
LOOP (*4)	2/4	OFF (default)	Disables loop playback.
		ON	Enables loop playback.
PRE OFFSET (*5)	3/4	0-999	Sets the offset time of sequence start. Playback starts when the pre time is elapsed.
PST OFFSET (*5)	3/4	0-999	Sets the offset time of sequence end. Playback ends when the post time is elapsed.

(*1) If **FADER** is set to M/E1 or M/E2, bus operations are not performed, even if **TRANS** is set to AUTO or MANUAL.

(*2) Note that **PRE OFFSET** and **PST OFFSET** are arranged reversely to each other in reverse play mode. When changing to reverse play mode, be sure to check the sequence operation, since certain settings may be applied differently.

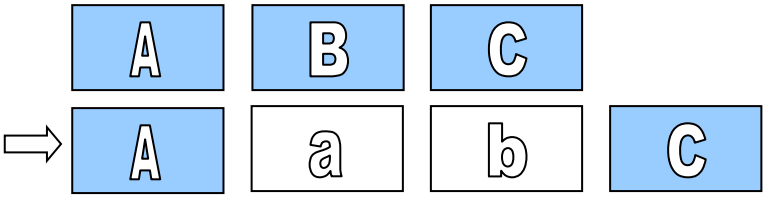
(*3) If **FADER** is set to M/E1 or M/E2, **PRE OFFSET** and **PST OFFSET** time periods are included in sequence playback.
If **FADER** is set to M/E1 or M/E2, loop playback and break points (see Sec. 20-1-7) are disabled.
If **FADER** is set to M/E1 or M/E2, moving a fader from end to end plays sequences one time.

(*4) In loop playback mode, **PRE OFFSET** and **PST OFFSET** time periods are included in sequence playback.
In loop playback mode, to make transitions between the last and first steps look smoother, use the same data for the first and last steps.

(*5)Offset time settings are useful to adjust start timing of multiple buses.
In loop playback mode, offset time settings are useful to adjust end timing of multiple buses that have different steps, since the offset time is included in loop playback.

20-1-5. Editing Sequences (Adding or Inserting Steps)

This chapter explains how to copy, paste and delete steps. The operational example below shows how to load **Sequence Memory 10** (created in Sec. 20-1-1) and edit the sequence by adding and overwriting steps.



Sequence Memory 10 data

Store the edited sequence to Sequence Memory 1.

◆ **Loading the Sequence**

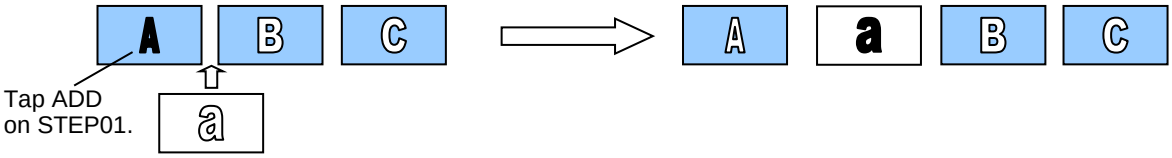
(1) Refer to Sec. 20-1-3. “Playing Back Sequences” to load **Sequence Memory 10**.

◆ **Adding a Step**

(2) Open [SEQUENCE > EDIT] menu PAGE 4.

(3) Verify that STEP01 is selected. (If not, turn F1 to select STEP01.)

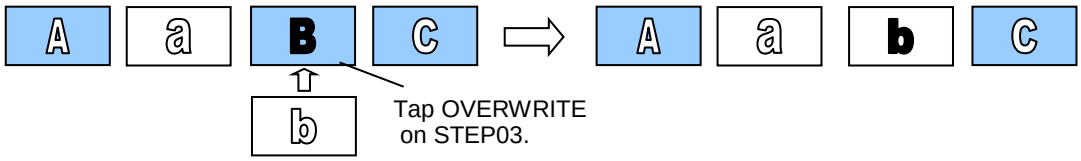
(4) Create **“Video a**”. Tap **ADD** to add “**Video a**” to the sequence.

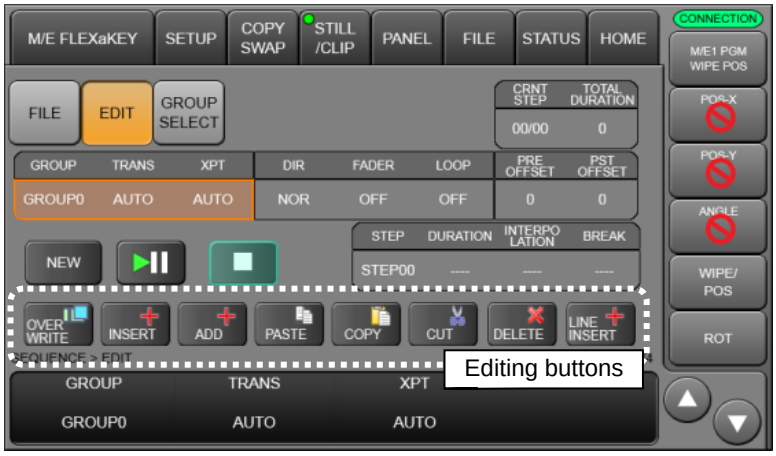


◆ **Replacing the Step**

(5) Turn F1 to go to STEP03.

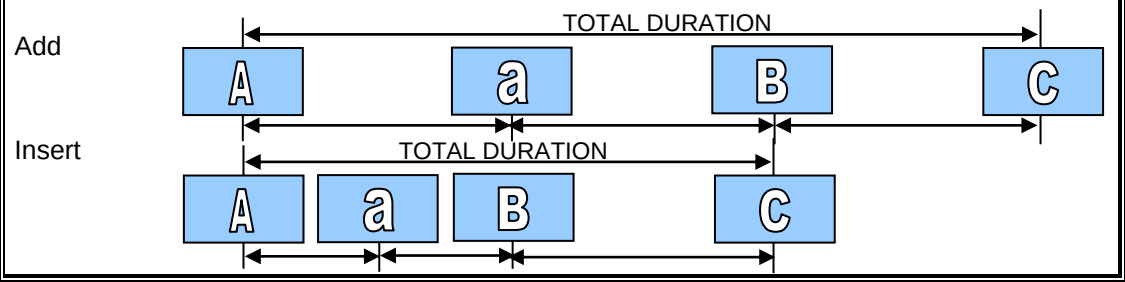
(6) Create **“Video b**”. Tap **OVERWRITE** to replace “**Video B**” with “**Video b**”.





SEQUENCE > EDIT			4/4
STEP	DURATION	INTERPOLATION	BREAK
STEP01	30	SMOOTH	OFF

Tapping ADD adds a step behind the current step and the total duration is increased.
Tapping INS add a step behind the current step but the total duration is the same as before.



◆ **Playing the Sequence**

(7) Tap **PLAY/PAUSE** to play the edited sequence.

◆ **Storing the Edited Sequence**

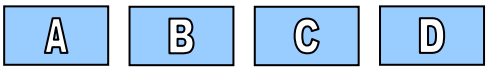
(8) Refer to Sec. 20-1-2. “Storing Sequences” to store the edited sequence to **Sequence Memory 1**.

20-1-6. Editing Sequences (Step Copy and Step Delete)

The following procedure example creates a sequence having 4 steps, then shows how to copy & paste, cut & paste and delete steps.

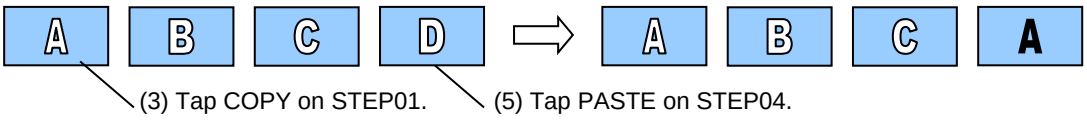
◆ **To create a New Sequence:**

Refer to Sec 20-1-1. “Creating New Sequences” to create a sequence with 4 steps.

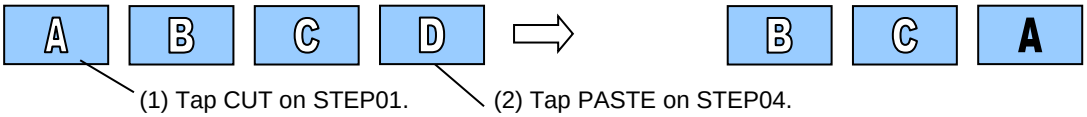


◆ **To copy STEP01 then paste it to STEP04 (Overwrite):**

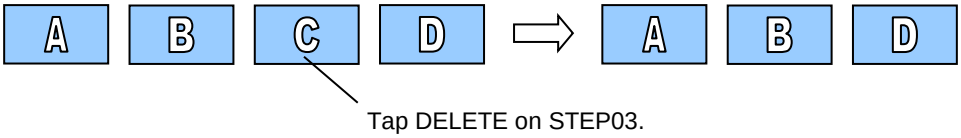
(1) Open [SEQUENCE > EDIT] menu PAGE 4.
(2) Turn F1 to go to STEP01.
(3) Tap **COPY** to copy the STEP01 data.
(4) Turn F1 to go to STEP04.
(5) Tap **PASTE** to replace STEP04 with the STEP01 data.



◆ **To cut STEP01 then paste it to STEP04 (Overwrite):**



◆ **To delete STEP02:**



Deleting a step using DELETE automatically closes the intervals in front and back of the step. Deleting a step using CUT keeps the intervals in front and back of the step.

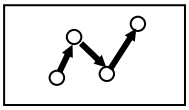
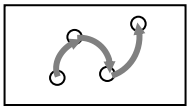
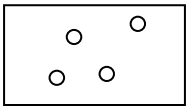
20-1-7. Editing Sequences (Step Settings)

In the [SEQUENCE > EDIT] (4/4) menu, detailed step settings can be performed.

SEQUENCE > EDIT			4/4
STEP	DUR	INTERP	BREAK
STEP01	30	SMOOTH	OFF

◆ **INTERPOLATION mode between Steps**

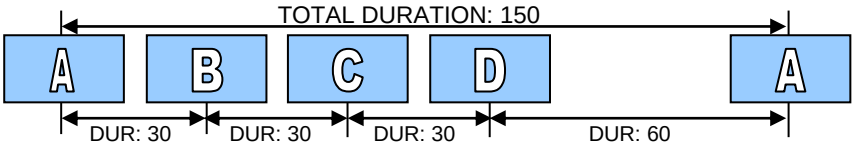
The INTERPOLATION mode allows you to smooth movements between steps.

LINE (Default)	SMOOTH	CUT
		
Linear interpolation between steps (default)	Curve interpolation between steps (smooth switching)	No interpolation between steps (CUT switching)

◆ **Changing Playback Time (DURATION)**

As factory default, durations between steps (keyframes) are defined as 30 frames (for video in 60 Hz format) or 25 frames (for video in 50 Hz format). Each duration, however, can be changed.

For example, if the STEP04 duration in the following sequence is changed to 60 (frames), the total duration is summed up to 150 (frames).



◆ **Break Points**

If **BREAK** is set to ON for a step, the sequence play will pause on the step. Retapping **PLAY/PAUSE** resumes the sequence play.

Note that BREAK settings are disabled in loop playback mode. See Sec 20-1-4. “Playing Back Sequences Using Advanced Settings.”

20-2. Sequence Group Operation

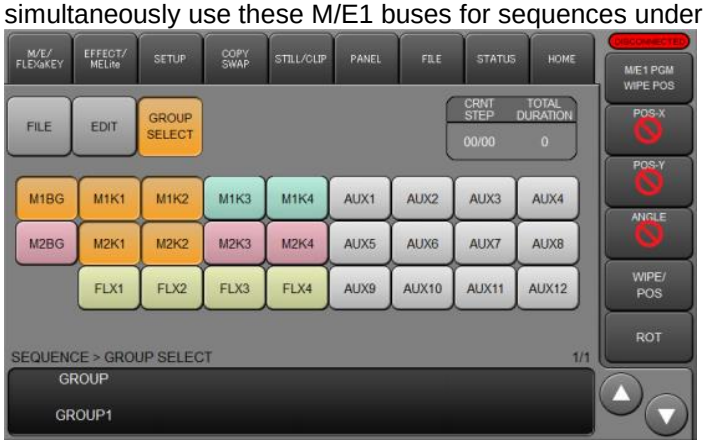
Sequence Group in the HVS-490 is a strong tool for sequence bus operations and allows you to flexibly manage video buses in sequences. Once buses are grouped, sequence operations using multiple buses can be performed only by selecting a group.
In the previous chapter, sequences are operated with only one bus, M/E1 BKGD). This chapter, however, shows how to operate sequences having multiple buses using the following operation examples:

- **M/E1 BKGD** and **M/E1KEY1 to M/E1KEY4** are grouped in **Group 1**. (See Sec. 20-2-1.)
- **M/E2 BKGD** and **M/E2KEY1 to M/E2KEY4** are grouped in **Group 2**. (See Sec. 20-2-1.)
- Create and store sequences based on **Group 1** or **Group 2**. (See Sec. 20-2-2)
- Select to **narrow down the bus data** while storing or loading sequences. (See Sec. 20-2-3.)

20-2-1. Assigning Buses to a Group

◆ **Assigning five M/E1 buses to GROUP 1**

(1) Open the [SEQUENCE > GROUP SELECT] menu.
(2) Turn F1 to select GROUP1.
(3) Tap **M1BG**, **M1K1**, **M1K2**, **M1K3** and **M1K4** to select 5 buses. This allows you to simultaneously use these M/E1 buses for sequences under GROUP 0.



◆ **Assigning five M/E2 buses to GROUP 2**

(1) Turn F1 to select GROUP2.
(2) Tap **M2BG**, **M2K1**, **M2K2**, **M2K3** and **M2K4** to select 5 buses. This allows you to simultaneously use these M/E2 buses for sequences under GROUP 2.

20-2-2. Creating, Editing and Playing Sequences

Once group settings are complete, select GROUP1 or GROUP2 in the [SEQUENCE > EDIT] menu, then create, edit and play sequences in the same manner as described in Sec 20-1.
If GROUP1 is selected, five M/E1 buses can be simultaneously used for sequence operations.
If GROUP2 is selected, five M/E2 buses can be simultaneously used for sequence operations.

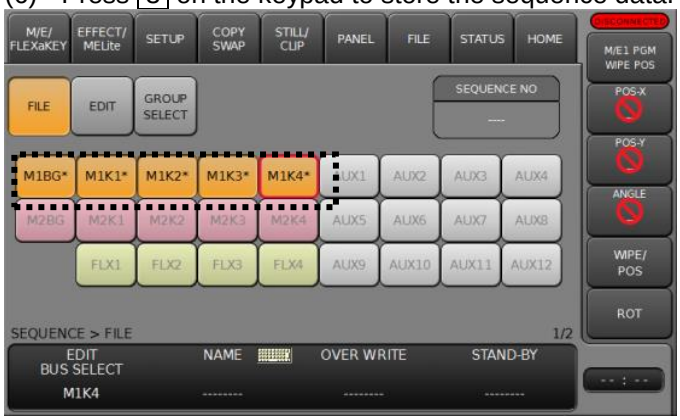
SEQUENCE > EDIT			1/4
GROUP	TRANS	XPT	
GROUP1	AUTO	AUTO	

Note that group bus assignments are not fixed and able to change accordingly.
Be careful, however, that a video bus cannot belong to two or more groups, but to only one group simultaneously, although buses can be assigned to any group.

20-2-3. SEQUENCE Memory Operation

◆ **A sequence having multiple bus data to Sequence Memory 3**

(1) Open the [SEQUENCE > FILE] menu.
(2) Press PAGE in the MEMORY block.
(3) Press 0 on the keypad.
(4) Press STORE on the keypad.
(5) Verify that all required buses are selected in the [SEQUENCE > FILE] menu.
Note that only buses whose data is saved in the working memory are active in STORE mode.
(6) Press 3 on the keypad to store the sequence data.

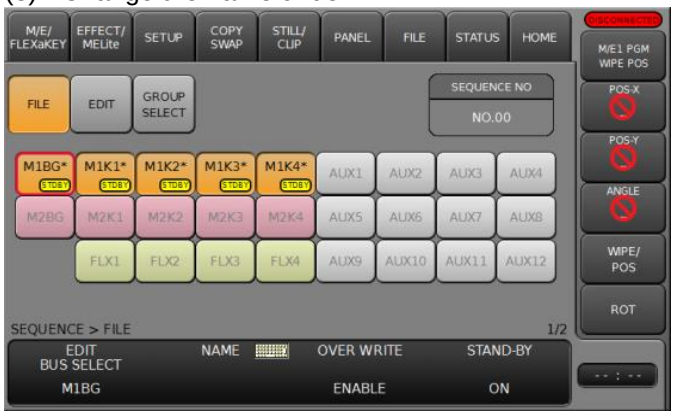


◆ **Loading Data in Sequence Memory 3**

(1) Open the [SEQUENCE > FILE] menu.
(2) Press 3 on the keypad.
(3) Multiple bus data will be displayed in the [SEQUENCE > FILE] menu.
If there is an unneeded bus, deselect the bus.
(4) Press RECALL on the keypad to load the sequence.

◆ **Changing Sequence Names**

(1) Open [SEQUENCE > FILE] menu PAGE1.
(2) Turn F1 to select a bus whose name to be changed.
The selected bus under **EDIT BUS SELECT** is framed in red in the STORE/RECALL BUS block.
(3) Change the name under **NAME**.



Sequence names (NAME) and write protection (OVER WRITE) and STAND-BY settings can be changed for each bus. First, turn F1 to select a bus to be edited under **EDIT BUS SELECT** or in the **FILE EIDT BUS** block. If **STORE/RECALL BUS** block is displayed in the center of the menu screen, tap **EDIT BUS** to switch the display to **FILE EIDT BUS**.

SEQUENCE > FILE			1/2
EDIT BUS SELECT	NAME	OVER WRITE	STAND-BY
M1BG	M1BG S00	DISABLE	ON

Parameter	Setting	Description
EDIT BUS SELECT	(Available buses)	Selects a bus for editing.
NAME	---	Changes bus names. (See the previous page.)
OVER WRITE	DISABLE (default)	Disables overwriting of bus data. A locked key icon is displayed on bus buttons in the STORE/RECALL BUS block.
	ENABLE	Enables overwriting of bus data.
STAND-BY	ON	Enters playback standby mode (STEP01 is cued) when the sequence is loaded. A STDBY mark is displayed on bus buttons in the STORE/RECALL BUS block.
	OFF	Not ready for playback (STEP01 is not cued) when the sequence is loaded.

20-3. Deleting Sequence Memory Data

PAGE 2 of the [SEQUENCE > FILE] menu allows you to clear sequence memory data.

SEQUENCE > FILE			2/2
DELETE BUS	DELETE CNT SEQ NO	ALL CLEAR	DIRECT
OFF	OFF	OFF	ON

◆ **Deleting a bus data in Sequence Memory 10**

(1) Refer to Sec. 20-1-3 to load Sequence Memory 10.
(2) Turn F1 to select a bus.
(3) Press F1 to delete the bus data from the Sequence Memory 10.

◆ **Deleting all data in Sequence Memory 10**

(1) Refer to Sec. 20-1-3 to load Sequence Memory 10.
(2) Turn F2 to select ON.
(3) Press F2 to clear Sequence Memory 10.

◆ **Deleting all Sequence Memory data**

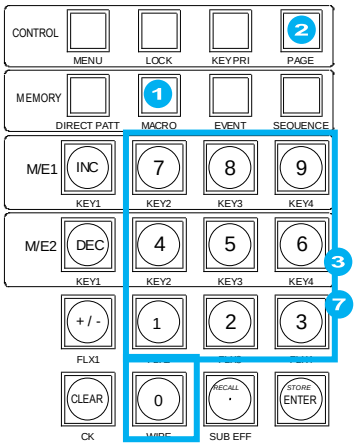
(1) Turn F3 to select ON.
(2) Press F3 to clear all Sequence Memory data.

21. Macro Operations

The Macro function allows users to perform a sequence of recorded operations with the single push of a button. The keypad is used to record and execute macros. Macro memory data can be backed up and restored from SD cards. See Sec. 22 "File Operations" for more details. Macros cannot be edited in the menu screen, but in web browser control screens. (See Appendix 4-6 “Macro.”)

21-1. Recording Macros

Max of 100 macros (10 pages with 10 macros per page) can be stored in memory.
No. **0-89** macros can hold up to **30** actions for each and No. **90-99** up to **300**. Use No. 90-99 when using the fader or joystick, because these operations involve many actions.



◆ **Recording Macros**

(1) Press MACRO in the MEMORY block to display the MACRO menu and change the Keypad to MACRO mode.
(2) Press PAGE in the MEMORY block.
(3) Press a number button (0-9) to select a page.
(4) Press REC in the MACRO block (or STORE in the MEMORY block) to start recording.
(5) Perform operations you need to record as a macro.
(6) Press REC (or STORE) to stop recording.
(7) Press a number button (0-9) to store the macro.

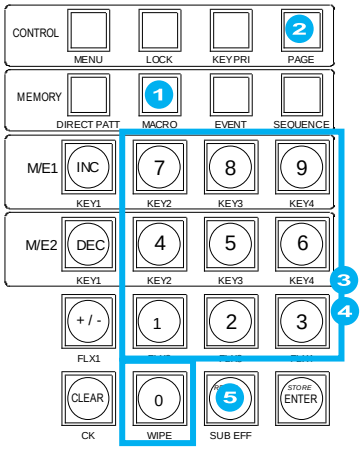
Ex) To Save a “Select IN01 on M/E1 PST” action to MACRO 12
Successively press MACRO > PAGE > 1 > REC > (IN01 on M/E1 PST) > REC > 2

When MACRO is pressed, the number buttons light up if they have data. To overwrite the data to a lit button, press the button so that it changes from lit to flashing, then press the button again.
Before recording, the duration can be set under **REC DURATION** in MACRO menu PAGE.

21-2. Executing Macros

(1) Press MACRO in the MEMORY block.
(2) Press PAGE.
(3) Press a number button to select a page.
(4) Press a number (macro) button.
(5) Press RECALL to execute the macro.

Ex) To Execute MACRO 12
Successively press MACRO > PAGE > 1 > 2 >RECALL.



TIP

If DIRECT is set to ON in MACRO menu PAGE 3, macros are executed by simply pressing number buttons without pressing RECALL.
A macro number button turns on red during execution. Pressing the lit red button pauses the macro execution. Re-pressing the button resumes the execution.
To stop macro executions, press CLEAR.

Note that macros hold only values that are changed during recording. For fader movements, which are successively changed, macros memorize the last stopped position. Therefore, to perform the same actions as those recorded with a fader, return the fader to its previous position before a macro is executed. Also note that macros cannot record the position of two faders at the same time.

21-3. Macro Memory Operation

21-3-1. Overwrite Protection

(1) Press MACRO in the MEMORY block to display the MACRO menu.
(2) Press PAGE above the MEMORY block, then press 0 or 1 to specify the memory page.
(3) Press the memory (number) button.
(4) Go to PAGE 2.
(5) Turn F4 to select DISABLE. Then press F4 to set write protection on the macro.

MACRO			2/5
MACRO NO	NAME	BITMAP	OVER WRITE
NO.00	MACRO0000		DISABLE

21-3-2. Naming Macros

Macros are named as **MACRO0000 to MACRO0099** by default. Names for registered macros can be changed following the steps shown below. Alphanumeric and symbol characters are available.

(1) Press MACRO in the MEMORY block to display the MACRO menu.
(2) Go to PAGE 2.
(3) Turn F1 to select a macro number.
(4) Tap **NAME** to type a name, then tap **Enter** on the pop-up keyboard.

21-3-3. Deleting Macro Data

◆ **To Delete Macro Data**

(1) Press MACRO in the MEMORY block to display the MACRO menu.
(2) Go to PAGE 2.
(3) Turn F1 to select a macro number.
(4) Go to PAGE 3.
(5) Turn F1 to turn DELETE to ON, then press F2 to delete the macro.

MACRO			3/5
DELETE	PAGE CLEAR	ALL CLEAR	DIRECT
ON	OFF	OFF	ON

◆ **To Delete a Macro Page**

(1) Press MACRO in the MEMORY block to display the MACRO menu.
Go to PAGE 3.

(2) Turn F2 to select a page, then press F2.

◆ **To Delete All Macro Data**

Turn F2 to select ON under PAGE CLEAR, then press F3.

21-3-4. Copying, Moving and Exchanging Macro Data

◆ **To Copy Macro Data**

(1) Press MACRO in the MEMORY block to display the MACRO menu.
(2) Go to PAGE 4.
(3) Turn F1 to select a macro number to be copied.
(4) Turn F2 to select a target macro number.
(5) Turn F3 to select COPY, then press F3.
No. 00 macro is copied to No. 01 in the example below.

◆ **To Move Macro Data**

Selecting MOVE instead of COPY, the macro data is moved.

◆ **To Exchange Macro Data**

Selecting SWAP instead of COPY, the macros are exchanged.

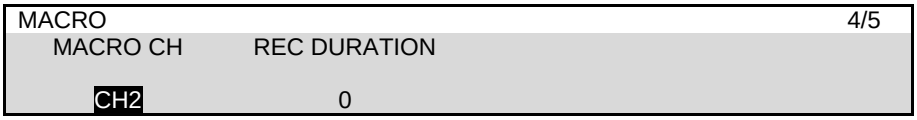
NOTE

Copying, moving or exchanging macros between No.90-99 and No.00-89, only the first 30 actions are used.

21-3-5. Macro Play Channel

Three play channels are provided to macros and able to execute macros simultaneously on different controllers. For example, the HVS-492OU (keypad) plays a macro using CH1 while the Web GUI plays another macro using CH2. The macro execution channel can be changed in the menu.

(1) Open MACRO menu PAGE 5.
(2) Turn F4 to change the execution channel used on the keypad.



Select channels for macro execution buttons in the [PANEL > MACRO ATTACH > MACRO CH] menu.

21-4. Macro Execution Buttons

21-4-1. Assigning Macros to KEY/FLX Bus Buttons

Macros can be assigned to KEY/FLX bus buttons.
The example below shows how to execute Macro 00 using Bus Button 1

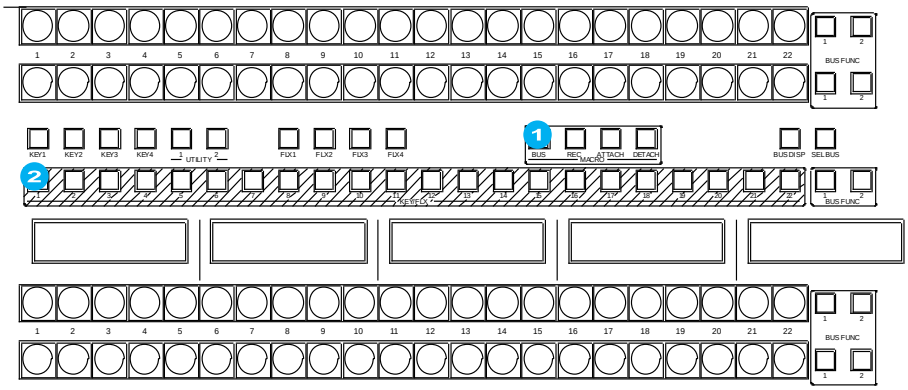
◆ **Assigning Macro 00 to Bus Button 1**

(1) Open the [PANEL > MACRO BUS ASSIGN > LEVEL1] menu.
(2) Turn F1 to select BUTTON01 (KEY/FLX bus button).
(3) Turn F2 to select MACRO NO.00.

PANEL > MACRO ASSIGN > LEVEL1			1/1
BUTTON NO	MACRO NO	TYPE	INVERT
BTN01	NO.00	NAME	OFF

◆ **Executing MACRO00**

(1) Press BUS in the MACRO block to change the KEY/FLX bus to MACRO mode.
The assigned macro numbers are displayed in the upper line of the KEY/FLX bus display block and signal names in the bottom line.
(2) Press 1 on the KEY/FLX bus to execute Macro 00.



In addition to macros, **PAUSE**, **ABORT** and **SHIFT2-4** functions can be assigned to bus buttons.
Pressing PAUSE while executing a macro stops the macro. Re-pressing PAUSE restarts and resumes the macro.
Pressing PAUSE while executing a macro aborts the macro.
Pressing SHIFT2 to SHIFT4 allows you to change button function levels and increase the number of available assignments up to about fourfold.

IMPORTANT

Note that video signals cannot be selected on the KEY/FLX bus in Macro mode.
To exit from Macro mode, press a bus button (KEY1-4 or FLX1-4) above the KEY/FLX bus.
The PGM and PST bus signals can be selected as usual, regardless of KEY/FKX mode.
Press BUS DISP to change display contents.

21-4-2. Directly Recording Macros to KEY/FLX Bus Buttons

(1) Press BUS in the MACRO block to change the KEY/FLX bus to MACRO mode.
(2) Press REC in the MACRO block (or STORE in the MEMORY block) to start recording.
(3) Perform the operations you want to record as a macro.
(4) Press REC (or STORE) to stop recording.

(5) Press a KEY/FLX bus button to store the macro data under the corresponding number. The bus button also becomes the macro execution button.

When bus buttons are pressed, they light up if they have data. To overwrite the data to a lit button, press the button so that it changes from lit to flashing, then press the button again.

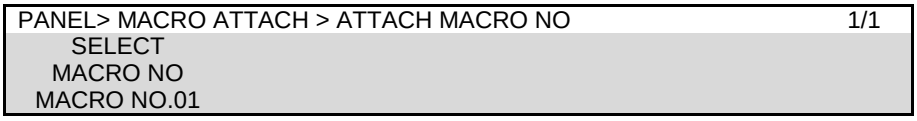
21-4-3. Macro Attach and Macro Detach

Any button on the control panel can be used as a macro execution button. To do so, assign a macro to a button (Macro Attach). Once a macro is attached to a button, the macro is executed whenever the button is pressed. Macro Detach allows you to remove macros from buttons. This chapter shows how to attach Macro 01 to AUTO in the M/E1 transition as an example.

◆ **To Assign Macro 01 to M/E1 AUTO**

(1) Press ATTACH in the MACRO block to display the [PANEL > MACRO ATTACH > ATTACH MACRO NO] menu.

(2) Turn F1 to select MACRO NO.01.



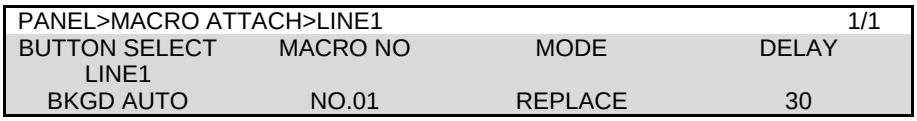
(3) While holding down ATTACH in the MACRO block, press AUTO in the M/E1 transition.

Now, pressing AUTO executes Macro 01.

◆ **To Set Macro Attach Button (AUTO) Properties**

(1) Open the [PANEL > MACRO ATTACH > LINE1] menu.

(2) Turn F1 to select a macro attach button.
Select LINE1 BKGD AUTO in this example. Set MODE and Delay.



Press the BKGD AUTO button. MACRO01 will be executed in the specified mode, with a set delay.

If a macro is assigned to a bus button in a background or key bus, a triangle is displayed in the bottom left of the corresponding display.

◆ **To Remove the Macro from AUTO**

(1) Press MACRO in the MEMORY block.

(2) While holding down DETACH in the MACRO block, press AUTO in the M/E1 transition.

22. File Operations

The switcher is capable of storing operational data, such as system and bus setting data, still images, WIPE and DVE modifications and event data, to SD cards and of recalling and downloading previously saved data for application to production operations.

22-1. Notes on SD Cards

- Gentrly insert/remove an SD card with its label facing upwards.
- Do NOT remove the SD card when it is storing or reading data. Otherwise, it cause malfunction or data loss.

Media format	SDHC
Capacity	Up to 32 GB
File system	FAT32

22-2. Setting and Image Files

Supported Menu Setting Files and Image Files

File Name (*1)	Extension	File Data Description
DATA	all	ALL data including System data, all WIPE/DVE data and all event and macro memory data
SYSTEM	msy	System data (SETUP and CURRENT menus and three control panel data)
	osy	Active control panel data
EVENT	eal	All event data
	evt	Each event data
MACRO	mal	All macro data
	mcr	Each macro data
SEQUENCE	pbkd	BKGD sequence data
	pkey	KEYER sequence data
	pflx	FLEXaKEY sequence data
	paux	AUX sequence data
	seq	All bus sequence data
STILL1-4	jpg	Still images in JPEG format JPEG images (standard RGB)
	tga	Still images in TARGA format 8-, 24- and 32-bit TARGA images (uncompressed RGB and RLE encoded)
	bmp	Still images in BITMAP format 24-bit BITMAP images (uncompressed RGB)

Note that file names are limited to max. 16 characters in length (ASCII code).

(*1) Files are automatically named to their correct name as shown in the table above when saving to SD cards.

22-3. Saving Data (from Switcher to SD Card)

This section explains how to save all switcher settings to SD cards as an example.

(1) Insert an SD card into the card slot.
(2) Open the [FILE > SAVE] menu.
(3) Turn F1 or tap the folder icon to select SD/ (SD card to which the data is to be backed up).
(4) Turn F2 to select ALL.
(5) Press F4.
(6) Tap on **YES** on the confirmation dialog to save the data to the SD card.

Do not remove the SD card while the access lamp is flashing. The time at which data is saved to an SD card is also recorded according to the switcher internal clock. Set the date and time if it is improperly set. (See Sec. 23-4. “Setting Date and Time.”)

TIPS

If files are listed in random order, tap **NAME SORT** at the right side of the menu screen to sort the file names.

22-4. Loading Data (from SD Card to Switcher)

22-4-1. Loading ALL Data

The following example shows how to load panel settings from an SD card to the switcher in which all data is saved as shown in the previous page.

(1) Insert the SD card in which the all data is stored, into the card slot.
(2) Open the [FILE > LOAD] menu.
(3) Turn F1 to select SD/ (the folder to which the file is stored), then press F1.
(4) Turn F2 to select ALL, and press F2.
(5) Turn F1 to select DATA.all and press F4.(Or, tap **DATA.all** on the menu screen.)
(6) Tap **YES** to load all setting data.
(7) Reboot the system. (See Sec. 24-4. "Reboot and Initialization".)

IMPORTANT

Once the saved system data (files with "all" or "sys" extension) finishes loading, you will have to restart the switcher. (The unit should be powered off then powered ON.) The system data is applied only after the switcher is restarted.

22-4-2. Loading Event, Macro or Sequence Files

(1) Insert the SD card in which your file is stored, into the card slot.
(2) Open the [FILE > LOAD] menu.
(3) Turn F1 to select SD/ (the folder in which the file is stored) and press F1.
(4) Turn F2 to select EVENT, MACRO or SEQUENCE under **TYPE**, and press F2.
(5) Turn F3 to select the memory number.
If loading sequence files:
If loading sequence files for each bus, turn F4 to select the target bus.
(6) Turn F1 to select a data source and press F4.
(Or, tap a data source on the menu screen.)
(7) Tap **YES** on the pop-up screen to load the selected data.

22-4-3. Loading Image Files

JPEG. TARGA or BITMAP image files can be loaded to STILL1-4 and INPUT STILL buffers using SD cards. The following procedure explains how to download a JPEG file to STILL1 as an example.

(1) Insert the SD card in which the JPG file is stored, into the card slot.
(2) Open the [FILE > LOAD] menu.
(3) Turn F1 to select SD/ (the folder in which the file is stored) and press F1.
(4) Turn F2 to select STILL, and press F2.
(5) Turn F3 to select STILL1.
(6) Tap a JPEG file in the menu screen.
(7) Tap **YES** on the pop-up screen to load the file to STILL1.

◆ **Image File Upload Targets**

Upload Target	Description
STILL1-STILL4	Loads to each still buffer. Once an image is uploaded, the previous image is replaced with this.
IN01-IN40 (INPUT STILL)	Loads to each input frame buffer. Once an image is uploaded, the input bus automatically displays the image instead of input video. To recover the input video display, change CONTROL to INPUT in the [SETUP > INPUT > SIGNAL] menu. (See Sec. 17-3-2. “Returning to Input Video Display.”)
V-RAM	Stores into the built-in video memory.

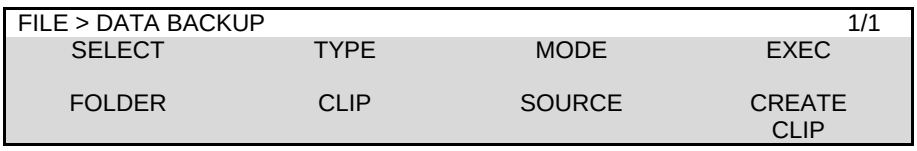
TIPS

Tapping **STILL THUMB** in the right side of the menu screen allows you to display in thumbnail mode.
Tapping **UPDATE IMAGES** allows you to create thumbnails for still images in the page, (This will take several minutes.) and save cache files (.490cache) in the SD cards.

22-4-4. Loading Sequential Image Files

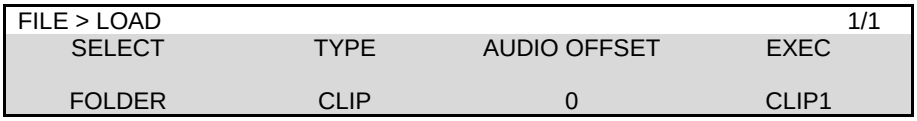
JPEG. TARGA or BITMAP sequential image files can be uploaded to the switcher and used as clips as shown below.

(1) Insert the SD card in which sequential image files (with up to 16 file names) are stored, into the card slot.
(2) Open the [FILE > DATA BACKUP] menu. Turn F2 to select CLIP, then press F2.
(3) Turn F1 or tap on the menu screen to specify the folder that contains the image files.
(4) Turn F4 to select CREATE CLIP, then press F4.



(5) Open the [FILE > LOAD] menu and turn F2 to select CLIP, then press F2.
(6) Turn F4 to select a load destination.
(7) Turn F1 to specify the folder specified in Step (3) and press F4. (Or, tap the folder on the menu screen.)

(8) Tap **YES** on the pop-up screen to load the files to the switcher as a clip.



◆ **Sequential Image File Names**

Folder name	XXXXXXXX
XXXXXXXX	Up to 16 alphanumeric characters (Files whose name have 17 or more characters cannot be loaded.)

Prepare sequential file names in the following name format.

File name	[XXXXXXXX-yyyy.zzz]
XXXXXXXX	Up to 16 alphanumeric characters (File names must be within 16 characters and excess characters are truncated on the right.)
-	Hyphen
yyyy	Serial numbers starting from 0
zzz	File extension (bmp, jpg or tga)

IMPORTANT

If a clip file with the same name already exists in the V-RAM, the old file is overwritten by the new one.

TIPS

When loading a clip, tapping **ABORT** at the right side of the menu screen allows you to abort clip loading.

22-4-5. Adding Audio to Sequential Image Files

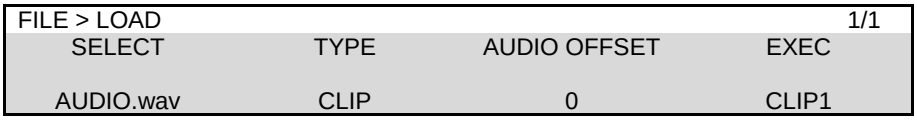
Loading an audio with sequential image files allows you to add the audio data to the created clip. The following procedure shows how to upload an audio file and multiplex it to a clip. WAV files (Windows standard audio files) can be used as audio sources.

IMPORTANT

Load an audio file first, then a create clip. Otherwise the audio is not inserted to the clip. Once the audio is multiplexed to the clip, the audio file is removed.

◆ **Loading an audio file**

(1) Insert the SD card, in which sequential image files and an audio file are stored, into the card slot. Follow Step (1) to (4) in the previous chapter to create a clip from the sequential files.
(2) Open the [FILE > LOAD] menu.
(3) Turn F2 to select CLIP, and press F2.
(4) Turn F1 or tap on the folder to select SD/ (SD card to which the file is to be stored), then the WAV file in it.
(5) Turn F3 to set the audio delay under **AUDIO OFFSET**. To add the audio from the beginning of the clip, leave the value at zero.
(6) Turn F4 to select a destination and press F4.
(7) Tap **YES** on the pop-up screen to load the audio file.



◆ **Loading the created clip**

(8) In the same menu page, turn F1 to select the created clip by specifying the folder.
(9) Press F4. Tap **YES** on the pop-up screen to load the clip to the destination where the audio file was loaded.

◆ **Audio Files**

Format	WAV or WAVE（RIFF waveform Audio Format） Filenames are allowed only alphanumeric characters.
Sampling frequency	48kHz, 20/24-bit
Upload EXEC	CLIP1-4

- If the duration of audio is longer than that of video, the gap in between is filled with black video.
- Clips are backed up to the internal hard disk drive with audio and loaded whenever the switcher is restarted. The audio inserting position, however, is reset to zero (not stored).
- Clips cannot be stored with audio as files.
- Uploaded audio can be output as digital audio. (See Sec. 7-8.)

22-5. Editing Data in SD Card

The data contained in the SSD (option) or SD card mounted on the switcher can be edited in the menu. Copying, moving, deleting and renaming files and creating folders and clips are possible.

(1) Insert an SD card into the card slot.
(2) Open the [FILE > DATA BACKUP] menu.
(3) Turn F2 to select the data type.
(4) To copy or move data, turn F3 to change **MODE** to SOURCE and turn F1 to select a source file or folder. Turn F3 to change **MODE** to TARGET and turn F1 to select a destination file or folder. In other operations, leave **MODE** unchanged and turn F1 to select a file or folder to be edited.
(5) Turn F4 to select an operation then press F4 to perform the operation. See the table below for more details on editing operations.

EXEC setting	Description
COPY	Copies the file or folder selected under **SOURCE** to the one selected under **TARGET**.
MOVE	Moves the file or folder selected under **SOURCE** to the one selected under **TARGET**.
DELETE	Deletes the selected file or folder.
RENAME	Renames the selected file or folder.
MAKE FOLDER	Creates a new folder in the current folder.
CREATE CLIP (If CLIP is set for TYPE)	Creates a clip form sequential image files. See Sec. 22-4-4. “Loading Sequential Image Files.”

TIPS

When a file or folder is selected, tapping **DETAIL** in the bottom right of the menu screen allows you to show the file size (file only) and last modification date.

22-6. Sending / Receiving Data to/from PC

The switcher can send and receive still images and Event, Macro, All, System and Control Panel data files to/from PCs, and send video clips in the clip memory and INPUT STILL images to computers, through an Ethernet
The FTP protocol is used for transferring files between the switcher and computers. The main unit (HVS-490) works as an FTP server.

22-6-1. Setup before Connection

◆ **PC Requirements**

An Ethernet port (100BASE-TX/1000BASE-T) and FTP client function are required for the personal computer.

◆ **Network Setting**

IP Address	192. 168. 1. 10 (default)	Main unit
Subnet mask	255. 255. 255. 0 (default)	

IP Address	192. 168. 1. 1 to 192. 168. 1. 254 (Do not set the same IP as the main unit)	Computer
Subnet mask	255. 255. 255. 0	

IMPORTANT

Although you can change the IP address of the main unit, normally change the IP of the computer. If you want to connect the computer and the switcher to the existing LAN, be sure to consult the network administrator before connecting to the LAN and use suitable cables and settings.

◆ **Supported Image files**

Image File Format: JPEG, TARGA and BITMAP (See the table below.)
Image Size: Less than 1920 x 1080 [pixels]
File Name Format: (any file name).jpg, (any file name).tga and (any file name).bmp
Use the three-letter extension after the period. Any length of any characters can be used for file names.

See Sec. 22-2 "Setting and Image Files" for details on supported files.

◆ **Still Directory Structure in the Main Unit**

(Root)

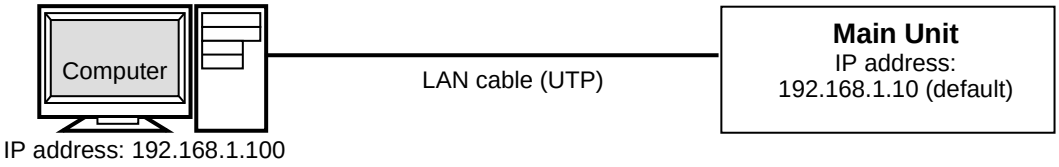
(still1)---------	still.jpg still.tga still.bmp	Still images for STILL1 are stored in JPEG, TGA and BMP formats. To send image files to STILL1, specify this directory.
(still2)---------	still.jpg still.tga still.bmp	Still images for STILL2 are stored in JPEG, TGA and BMP formats. To send image files to STILL2, specify this directory.
(still3)---------	still.jpg still.tga still.bmp	Still images for STILL3 are stored in JPEG, TGA and BMP formats. To send image files to STILL3, specify this directory.
(still4)---------	still.jpg still.tga still.bmp	Still images for STILL4 are stored in JPEG, TGA and BMP formats. To send image files to STILL4, specify this directory.

(clip1)		Used for uploading movie files to STILL1.
(clip4)		Used for uploading movie files to STILL4
(INPUT_STILL)		
	(STILL_IN01)	Used for uploading still image files (INPUT STILL) for IN01
	(STILL_IN40)	Used for uploading still image files (INPUT STILL) for IN40
(EVT)		
	000	Event No. 000 data is stored. To upload the Event No. 000 data, specify this folder.
	099	Event No. 099 data is stored. To upload the Event No. 099 data, specify this folder.
(SEQ)		
	000	Sequence No. 000 data is stored. To upload the Sequence No. 000 data, specify this folder.
	029	Sequence No. 029 data is stored. To upload the Sequence No. 029 data, specify this folder.
(MCR)		
	000	Marco No. 000 data is stored. To upload the Marco No. 000 data, specify this folder.
	099	Marco No. 099 data is stored. To upload the Marco No. 099 data, specify this folder.
(OU)		
	1	Control Panel (ID) 1 setting data is stored. To upload OU data to OU ID1, specify this folder.
	3	Control Panel (ID) 3 setting data is stored. To upload OU data to OU ID3, specify this folder.
(4K_STILL1)	still.jpg still.tga still.bmp	4K Still images for STILL1 are stored in JPEG, TGA and BMP formats. To send image files to STILL1, specify this directory.
(4K_CLIP1)		Used for uploading movie files to 4K STILL1.

(4K_STILL_INPUT)	
(STILL_IN01)	Used for uploading 4K still image files (INPUT STILL) for IN01
(STILL_IN10)	Used for uploading 4K still image files (INPUT STILL) for IN10
(STILL)	To send image files to V-RAM, specify this folder.
(CLIP)	Video clip upload folder to be stored in V-RAM
(SSD)	SSD storage (HVS-49SSD240G option)
(4K_STILL)	To send 4K image files to V-RAM, specify this folder.
(4K_CLIP)	4K Video clip upload folder to be stored in V-RAM

22-6-2. Sending / Receiving Still Images

(1) Directly connect a PC Ethernet port and LAN (EXT) on the Main Unit via LAN.



(2) Use the following information to enter the FTP server.

FTP server: **192.168.1.10**
Username: **hvs490** (Username cannot be changed.)
Password: **fora** (Password cannot be changed.)

(3) Once you have accessed the FTP server, the following folders will be displayed in the window.

STILL1 to STILL4
CLIP1 to CLIP4
STILL_INPUT
EVT
MCR

NOTE

Use PING or other network commands for checking if any connection problem occurs.
Only one client can simultaneously connect to the FTP server. File transfer between the control panel and PC is not allowed while connecting to the FTP server.

Uploading Images to the Switcher

(1) Open the folder where your images are stored.

(2) Select the image to be uploaded and drag and drop it to a still folder (**STILL1** to **STILL4**) of the FTP server. It takes about 30 seconds to complete receiving data. Then display the still image in the monitor by operating the switcher to check that the still image is properly sent.

Downloading Still Images from the Switcher

Open a still folder (**STILL1** to **STILL4**) of the FTP server. Select an image file to be downloaded. Drag and drop it to any folder of your computer.

22-6-3. Sending Images to Clip Memory

(1) Open the folder on the PC, in which sequential files are stored. See Sec. 22-4-4. “Loading Sequential Image Files” for details on sequential image file naming rules.
(2) To add audio to clips, set **AUDIO OFFSET** and drag & drop audio files into **CLIP folders (CLIP1-4)** in the FTP server.
(3) Select all sequential files to be uploaded and drag and drop them to a clip folder (**CLIP1-4**) of the FTP server. Data of 60 image files can be transferred in about 3 minutes.

22-6-4. Sending / Receiving Setting Data

All, System, Event, Macro and Control Panel data files can be transferred between the switcher and PCs.

◆ **All, System, Event and Macro data files**

These files are stored in the root directory in the FTP server (on the switcher).
To download files, drag & drop files from the FTP server to PCs.
To upload files, drag & drop files in the reverse way.

◆ **Individual Event or Macro number data files**

Individual data can be downloaded / uploaded by specifying the number.
Login to the FTP server (on the switcher) and open the **EVT** folder for events or the **MCR** folder for macros.
Each data is stored in its number folder, for example, the folder named “001” stores the Event (Macro) 1 data. Drag & drop files in between the server and the PC to download / upload them.

◆ **Control Panel data files**

Login to the FTP server (on the switcher) and open the **OU** folder. Each data is stored in its number folder, for example, the folder named “1” stores Control Panel 1 data.
Drag & drop files in between the server and the PC to download / upload them.

* See Sec. 4-1-3. “Control Panel” for more details on control panel identification number (OU ID).

23. System Setup Settings

23-1. Selecting a System Mode (Signal Format)

(1) Open the [SETUP > SYSTEM > FORMAT] menu.
(2) Turn F1 to select a signal format and press F1.
(3) Turn F2 to select an aspect ratio.

(4) Tap on **REBOOT** to display the [SETUP > SYSTEM > REBOOT] menu.
(5) Turn F1 to set REBOOT to MU, then press F1. Tap on **YES** on the confirmation dialog. The selected format and aspect ratio are applied after restarting the switcher.

23-2. Crosspoint Switch Timing

The switcher can be set when and where crosspoints are switched.
(1) Open the [SETUP - SYSTEM - FORMAT] menu.
(2) Turn F3 to set the switcher timing under **SWITCH TIMING**.

Signal Format	Setting	Description
1080i/59.94, 50 525/60i, 625/50i	ODD	Switches crosspoints in odd fields.
	EVEN	Switches crosspoints in even fields.
	ANY	Switches crosspoints at any time when the commands are issued.
1080p/29.97, 25, 24, 23.98 720p/59.94, 50	No1	Switches crosspoints in odd frames.
	No2	Switches crosspoints in even frames.
	ANY	Switches crosspoints at any time when the commands are issued.
1080PsF/29.97, 25, 24, 23.98	---	Switches crosspoints at the same time regardless of setting.

23-3. Reference Signal Settings

The HVS-490 switcher provides reference input, loop-through and output connectors in the GENLOCK section on the rear panel.

◆ Adjusting input signal timing

Horizontal correction range of SDI input signals can be shifted by changing the H PHASE setting. In this case, the SDI output signal timing (delay) against REF IN is also changed accordingly.

If H PHASE is set to 0:

SDI Signal format	SDI output minimum delay referring to REF IN	SDI signal correction range
1080-line format	Approx. 1.4H	-0.5H to +0.5H
720p/59.94	Approx. 1.7H	
720p/50	Approx. 1.8H	
SD	Approx. 2.6H	

To set SDI minimum delay against REF IN to 1H (NTSC/PAL to 2H):

SDI signal format	H PHASE setting	SDI signal correction range
1080/59.94i	-930	-0.9H to +0.1H
1080/50i	-1150	-0.9H to +0.1H
1080/24PsF	-1200	-0.9H to +0.1H
1080/23.98PsF	-1200	-0.9H to +0.1H
1080/29.97p	-930	-0.9H to +0.1H
1080/25p	-1150	-0.9H to +0.1H
1080/24p	-1200	-0.9H to +0.1H
1080/23.98p	-1200	-0.9H to +0.1H
720/59.94p	-1230	-1.25H to -0.25H
720/50p	-1670	-1.35H to -0.35H
1080/59.94p	-840	-0.9H to +0.1H
1080/50p	-1060	-0.9H to +0.1H
525/60i (NTSC)	-530	-1.1H to -0.1H
625/50i (PAL)	-517	-1.1H to -0.1H

(1) Open the [SETUP > SYSTEM > REF IN] menu.
(2) Turn F1 to select a reference input signal and press F1.
(3) Adjust the horizontal phase under H PHASE.

◆ **Adjusting output signal timing**

(1) Open the [SETUP > SYSTEM > REF OUT] menu.
(2) Turn F1 to select a reference output signal and press F1.
(3) Adjust the horizontal and vertical phases, as necessary.

23-4. Setting Date and Time

The date and time are used for the multiviewer clock and recording data backup time. Note that if the switcher is turned OFF within 100 hours (or less if it is not fully charged), date and time data will be cleared. In such case, reset the date and time.
Set the date in [SETUP> SYSTEM > TIME] menu PAGE 1, time in PAGE 2.

23-4-1. Setting Time Using SNTP (Time) Server

The switcher time can be synchronized to a time (SNTP) server using the Simple Network Time Protocol (SNTP).
To synchronize the time to a SNTP server time, enter the IP address of your SNTP server, set the time zone, then update the time manually. After time settings are completed, it is recommended to turn on automatic updates (at start-up and/or fixed time).

SNTP server time may not be correct due to a network delay or other reasons. To improve time precision, locate an SNTP server in your local network zone.

◆ **Setting the IP address of SNTP Server**

(1) Open [SETUP > SYSTEM > TIME] menu PAGE 3.
(2) Press F3, enter an IP address and press Enter.

SETUP > SYSTEM > TIME			3/4
TIME ZONE	SUMMER TIME	SNTP SERVER IP ADDRESS	UPDATE
UTC[+09:00]	OFF	0.0.0.0	

◆ **Time Zone Setting**

The SNTP server provides the UTC (Coordinated Universal Time). To display the correct local time, set your time zone
(1) Open [SETUP > SYSTEM > TIME] menu PAGE 3.
(2) Turn F1 to set the time zone offset value.

◆ **Manual Time Update**

(1) Open [SETUP > SYSTEM > TIME] menu PAGE 3.
(2) Press F4. A short-beep sound will be heard and the switcher time will be updated.

◆ **Automatic Time Update**

Sets the automatic update in [SETUP > SYSTEM > TIME] menu PAGE 4.

SETUP > SYSTEM > TIME			4/4
UPDATE ON STARTUP	UPDATE TIME	INTERVAL	
ON	12:00	3HOUR	

To update time at switcher start-up:
Set **UPDATE ON STARTUP** to ON.

To update time at fixed intervals:
Set the update time under **UPDATE TIME**.
The **INTERVAL** parameter allows you to set OFF, 1HOUR, 3HOUR, 6HOUR, 12HOUR and 1DAY, and to update the time at the set interval starting from the time set in the **UPDATE TIME**.

◆ **Summer Time Setting**

If **SUMMER TIME** is set to ON in [SETUP > SYSTEM > TIME] menu PAGE 3, the time will be set one-hour advanced relative to the standard (non-summer) time.

24. Control Panel Setup

For bus button assignments, refer to Sec. 6-2. “Mapping Video Sources to Bus Buttons.”
For control panel connection, refer to Sec. 4. “Switcher System Configuration.”

24-1. Buzzer

(1) Open the [PANEL > UTILITY > UTILITY] menu.
(2) Use F3 and F4 to adjust buzzer volume and tone.

PANEL > UTILITY > UTILITY			1/3
RENC TYPE	RENC SPEED	BUZZER VOLUME	BUZZER TONE
NORMAL	NORMAL	0	LOW

24-2. Brightness

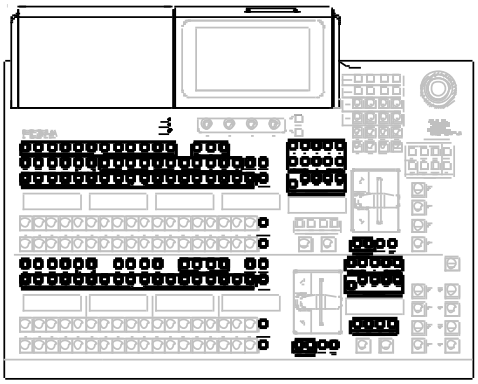
(1) Open [PANEL > UTILITY > UTILITY] menu PAGE 2.
(2) Adjust brightness of the panel, buttons and display.

PANEL > UTILITY > UTILITY			2/3
PANEL BRIGHTNESS	OLED BRIGHTNESS	DISPLAY BRIGHTNESS	HALF LED
0	0	0	OFF

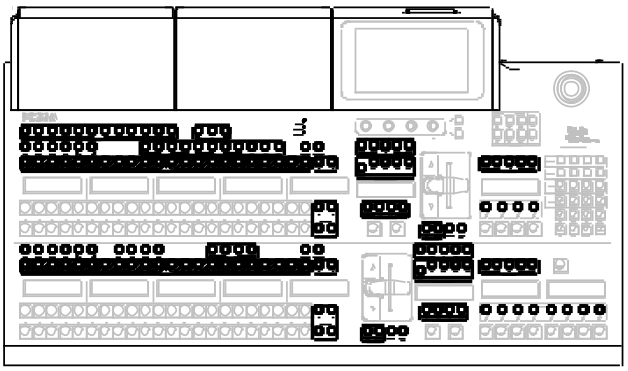
PANEL > UTILITY > UTILITY			3/3
LOCK MODE	THUMBNAIL	MENU SHORTCUT	KEY BUS SELECT LINK
WAVE	MANUAL	OFF	OFF

Parameter	Description
PANEL BRIGHTNESS	Brightness setting for control panel buttons
OLED BRIGHTNESS	Brightness setting for displays on M/E bus blocks.
DISPLAY BRIGHTNESS	Brightness settings for the menu screen
HALF LED	Half lighting ON/OFF for the buttons shown in the drawings below.
LOCK MODE	Lighting setting in Lock mode.

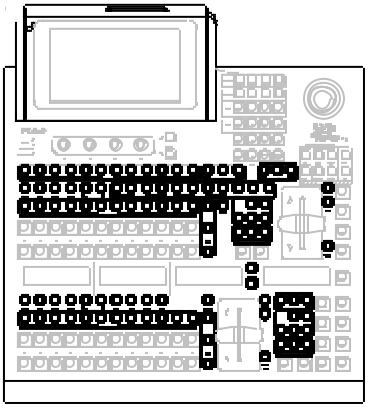
HVS-492OU



HVS-492WOU



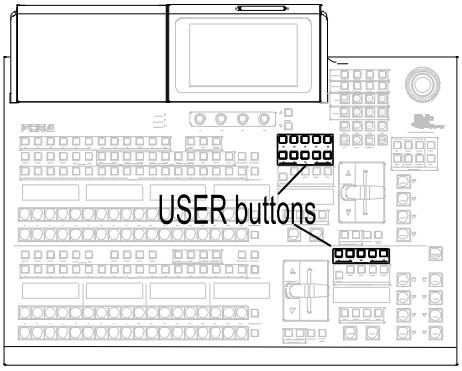
HVS-492ROU



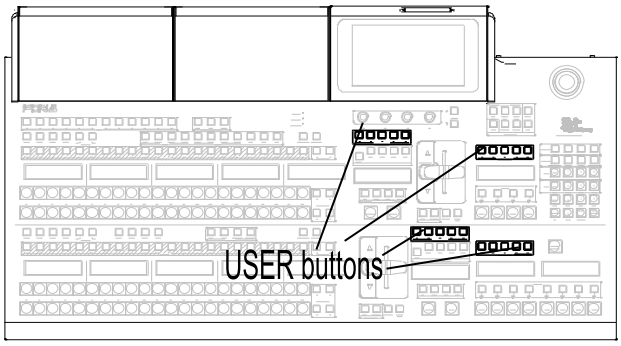
24-3. USER Button

User buttons can be assigned to specific menu pages and used as shortcuts or specific function buttons.
The following 15 user buttons on HVS-492OU, 20 on HVS-492WOU and 6 on HVS-492ROU are available.

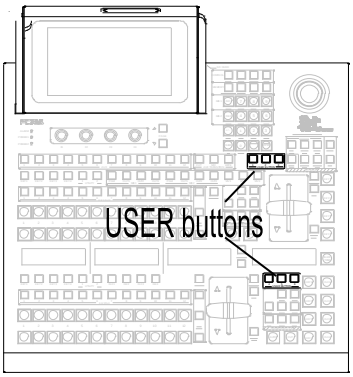
HVS-492OU



HVS-492WOU



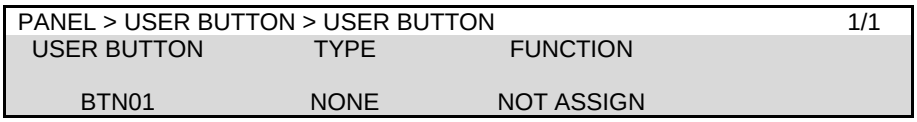
HVS-492ROU



24-3-1. Assigning Pages or Functions to USER Buttons

(1) Open the [PANEL > USER BUTTON > USER BUTTON] menu.
(2) Turn F1 to select a USER button for use.
(3) Turn F2 to select MENU or the function type (AUX, GPIO, KEYER, STILL, EVENT or OTHER).

(4) Turn F3 to select a menu page or a function, then press F3.



◆ **If Menu Shortcut is Set:**

Pressing the button opens the assigned menu page.

◆ **If Function is Set:**

Pressing the button that half-lights switches the assigned function On and Off. The button can also be set as a menu shortcut by pressing the button twice quickly.

See the Appendix 1 “User Button Functions” for details on assignable menu pages and functions.

24-4. Reboot and Initialization

◆ **Rebooting the System**

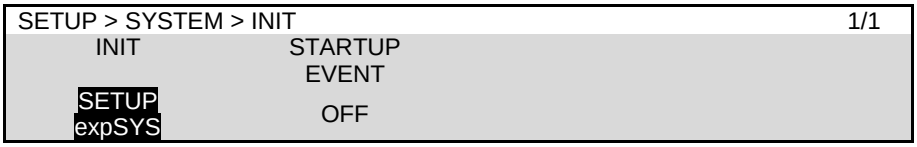
(1) Open the [SETUP > SYSTEM > REBOOT] menu.

(2) To reboot the MU, turn F1 to select MU, then press F1. Tap on **YES** on the confirmation dialog to reboot the system.
To reboot the OU, turn F1 to select OU, then press F1. Tap on **YES** on the confirmation dialog to reboot the system.

◆ **Initialization**

(1) Open the [SETUP > SYSTEM > INIT] menu.

(2) Turn F1 to select an option under INIT, then press F1. Tap **YES** in the confirmation dialog.



INIT setting	Description
CURRENT	Resets the BKGD, KEY and MATTE data.
SETUPexpSYS	Resets the SETUP menu data excluding system settings.
CUR&SETUP	Resets the CURRENT and SETUP(expSYS) setting data.
PANEL	Resets the OU excluding network settings.
MEMORY	Resets the EVENT, MACRO, STILL and memory data.
FACTORY	Resets all menu data.

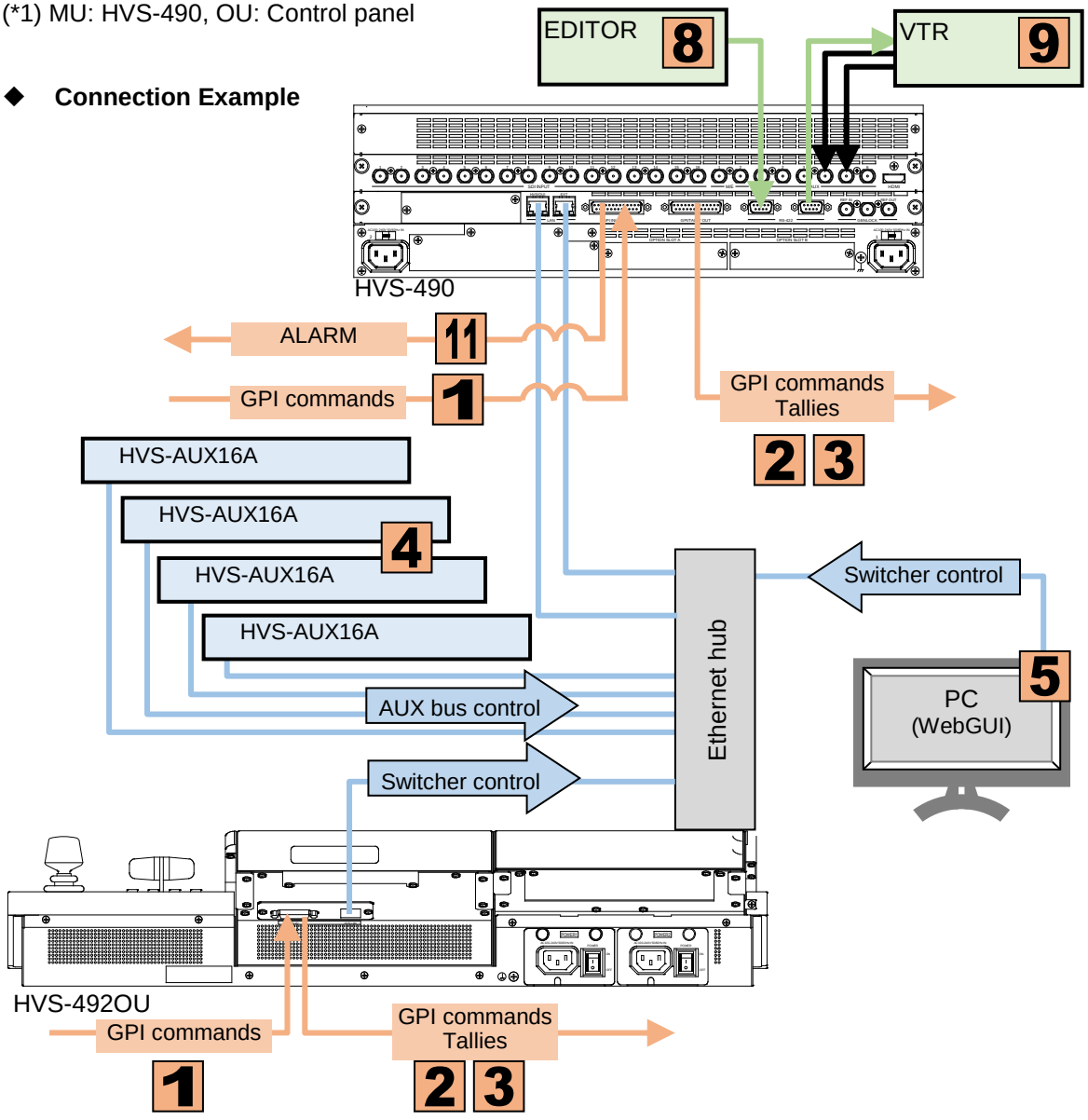
25. External Device Connections

Connect external devices to the switcher using RS-422, LAN or GPI interfaces.

No.	Connection	Connector	MU/OU (*1)	Refer to
1	Receiving GPI commands (GPI IN/ALARM)	GPI IN/ALARM	MU	25-1-1
		GPI I / O	OU	25-1-3
2	Sending GPI commands (GPI OUT)	GPI/TALLY OUT	MU	25-1-2
		GPI I / O	OU	25-1-3
3	Sending tallies (TALLY OUT)	GPI/TALLY OUT	MU	25-2-2
		GPI I / O	OU	25-1-3
4	AUX box (switcher control)	LAN (HVS)	MU	25-5
5	PC (switcher control)	LAN (EXT)	MU	Appendix 3
6	TSL UMD 5.0 protocol	LAN (EXT)	MU	25-4
7	Router control	LAN (EXT)	MU	25-3
		RS-422	MU	
8	Editor	RS-422	MU	25-6
		LAN (EXT)	MU	
9	VTR	RS-422	MU	25-7
10	VDCP	RS-422	MU	25-8
		LAN (EXT)	MU	
11	Sending alarms (ALARM)	GPI IN/ALARM	MU	3-4-2

(*1) MU: HVS-490, OU: Control panel

◆ **Connection Example**



25-1. GPI Control

The switcher can control external devices or can be controlled by external devices via the GPI interface. Tally output is also possible. GPI input and output functions and tallies are freely assignable to the GPI IN/ALARM and GPI/TALLY OUT connectors on the HVS-490.
Pin assignments are also available for the OU GPI I / O connector on the control panel.

25-1-1. GPI IN

The GPI IN connector on the switcher provides GPI inputs. (See Sec. 3-4-2. “GPI IN/ALARM Connector.") Assign GPI IN functions as shown below.
Two or more functions can be assigned to a GPI input pin. For example, the positive edge pulse of PIN 01 input sets KEY1 to ON and its negative edge pulse sets KEY1 to OFF. Up to 60 pairs of pin and function can be set.

(1) Open the [SETUP > GPI TALLY > GPI IN] menu.
(2) Set the number under **RULE**. (This number becomes the pin and function registration number.)
(3) Select a pin number.
(4) Select POSITIVE or NEGATIVE logic under **TRIGGER**.
(5) Select the function type under **FUNCTION**.
(6) Select a function under **TARGET**. (See “GPI IN Functions in Appendix 2 for assignable options.)
(7) Turn **ENABLE** to ON to activate this GPI input.
(8) Repeat the above steps to assign and enable functions to other pins.

SETUP > GPI TALLY > GPI IN			1/2
RULE	ENABLE	PIN	TRIGGER
1	ON	PIN01	POSITIVE

SETUP > GPI TALLY > GPI IN			2/2
RULE	FUNCTION	TARGET	
1	NONE	NONE	

25-1-2. GPI OUT

The GPI/TALLY OUT connector on the HVS-490 provides GPI outputs. (See Sec. 3-4-3. “GPI/TALLY OUT Connector.")

(1) Open the [SETUP > GPI TALLY > GPI OUT] menu.
(2) Select the pin number or flag number under **PIN/FLAG**.
(3) Select FUNC for TYPE.
(4) Select the function type under **FUNC**/COL and a function under **TARGET**/XPT. (See “GPI OUT Functions” in Appendix 2 for assignable options.)

SETUP > GPI TALLY > GPI OUT			1/2
PIN/FLAG	TYPE	FUNC/COL	TARGET/XPT
PIN01	FUNC	NONE	NONE

(5) Go to PAGE 2 and select a signal type under ACTIVE between LOW and HIGH.
(6) Repeat the above steps to assign functions to other pins.

SETUP > GPI TALLY > GPI OUT		2/2
PIN/FLAG	ACTIVE	
PIN01	LOW	

TIPS

The status of user flags can be viewed in the [SETUP > GPI TALLY > USER FLAG] menu.

25-1-3. GPI I / O (Control Panel)

To assign GPI functions to GPI IN/TALLY OUT connector pins on the Control Panel, proceed as follows. (See Sec. 3-4-4. "GPI I / O (Control Panel).")

◆ **GPI IN**

Open the [PANEL > OU GPI I/O > GPI IN] menu.
Refer to Sec 25-1-1. "GPI IN" for details on pin assignments.

PANEL > OU GPI I/O > GPI IN			1/2
RULE	ENABLE	PIN	TRIGGER
1	OFF	PIN01	POSITIVE

SETUP > GPI TALLY > GPI IN			2/2
RULE	FUNCTION	TARGET	
1	NONE	NONE	

◆ **GPI OUT**

Open the [PANEL > OU GPI I/O > GPI OUT] menu.
Refer to Sec 25-1-2. "GPI OUT" for details on pin assignments.

PANEL > OU GPI I/O > GPI OUT			1/2
PIN	TYPE	FUNC/COL	TARGET/XPT
09	FUNC	NONE	NONE

PANEL > OU GPI I/O > GPI OUT		2/2
PIN	ACTIVE	
09	LOW	

25-2. Tally Output

Tally information can be output from the GPI /TALLY OUT connectors. Tallies can be assigned to the GPI/TALLY OUT connector on the HVS-490. (See Sec. 25-2-2. "Tally Output Settings (GPI /TALLY OUT)." for details on settings.)
Tally information can also be output via the GPI I/O connector on the control panel.

25-2-1. Tally Color Settings

(1) Open the [SETUP > GPI TALLY > TALLY COLOR] menu.
(2) Turn F1 to select a bus (M/E1 PGM in the below example).
(3) Turn ON the color to be used for the bus: RED, GREEN, or COLOR1-24.

Set colors for M/E1 PST, M/E2 PGM, M/E2 PST, AUX buses and EXT TALLY in the same manner.

SETUP > GPI TALLY > TALLY COLOR			1/9
SELECT	RED	GREEN	
M/E1 PGM	OFF	OFF	

SETUP > GPI TALLY > TALLY COLOR			2/9
SELECT	COLOR01	COLOR02	COLOR03
M/E1 PGM	OFF	OFF	OFF

SETUP > GPI TALLY > TALLY COLOR			9/9
SELECT	COLOR22	COLOR23	COLOR24
M/E1 PGM	OFF	OFF	OFF

Tally Color settings made in this menu are shared with those for the GPI I/O connector.

◆ **Tally Color Memory**

Up to 30 sets of tally color settings can be saved to Tally Color Memory.

SETUP > GPI TALLY > TALLY COLOR MEMORY		1/1
STORE	RECALL	
NO.01	NO.01	

Saving Tally Color Settings

(1) Open the [SETUP > GPI TALLY > TALLY COLOR MEMORY] menu.
(2) Turn F1 to select a memory number.
(3) Press F1. A confirmation dialog will appear. Tap **YES** to save the current tally color settings to the memory number. Once data is saved, an asterisk "*" is added after the number such as "No.01*".

Loading Tally Color Settings

(1) Open the [SETUP > GPI TALLY > TALLY COLOR MEMORY] menu.
(2) Turn F2 to select a memory number.
(3) Press F2. A confirmation dialog will appear. Tap **YES** to load the tally color settings to the switcher.

25-2-2. Tally Output Settings (GPI /TALLY OUT)

To change GPI/TALLY OUT connector pin assignments (See Sec. 3-4-3. “GPI I/O Connector“), proceed as follows.

(1) Set tally colors for output buses. (See Sec. 25-2-1. “Tally Color Settings.”)
(2) Open the [SETUP > GPI TALLY > GPI OUT] menu.
(3) Turn F1 to select the pin number.
(4) Turn F2 to select TALLY under **TYPE**.
(5) Select a tally color under FUNC/**COL** and a tally signal under TARGET/**XPT**. (See “GPI OUT/TALLY Functions in Appendix 2.)

SETUP > GPI TALLY > GPI OUT			1/2
PIN/FLAG	TYPE	FUNC/COL	TARGET/XPT
PIN01	TALLY	NONE	NONE

◆ **Tally Control Example**

The setting example in the tables below shows how to configure tally settings to perform the following operations: Pin 1 and 2 send On-air tallies and Pin 9 and 10 send Next tallies.

Conditions

- A RED tally is used to indicate On-Air (M/E1 PGM bus).
- A GREEN tally is used to indicate a next background signal (M/E1 PST bus).
- Pin 1 and 2 output RED tallies for IN01-IN02 respectively.
- Pin 9 and 10 output GREEN tallies for IN01-IN02 respectively.

TALLY COLOR menu settings

Parameter	SELECT	RED	GREEN	(Other colors)
Setting	M/E1 PGM	ON	OFF	OFF
	M/E1 PST	OFF	ON	OFF

GPI OUT menu settings

Parameter	PIN/FLAG	TYPE	FUNC/COL	TARGET/XPT
Setting	1	TALLY	RED	IN01
	2	TALLY	RED	IN02
	9	TALLY	GREEN	IN01
	10	TALLY	GREEN	IN02

25-2-3. Tally Output Settings (GPI I/O)

To change pin assignments of the GPI I/O connector on the control panel (See Sec. 3-4-3. “GPI I/O Connector“), proceed as follows.

(1) Set tally colors for output buses. (See above.)
(2) Open the [PANEL > OU GPI I/O > GPI OUT] menu.
(3) Turn F1 to select the pin number.
(4) Turn F2 to select TALLY under **TYPE**.
(5) Select a tally color under FUNC/**COL** and a tally signal under TARGET/**XPT**. (See “GPI OUT/TALLY Functions in Appendix 2.)

PANEL > OU GPI I/O > GPI OUT			1/2
PIN	TYPE	FUNC/COL	TARGET/XPT
14	TALLY	NONE	NONE

25-2-4. EXT TALLY

Five external tallies allow users to freely notify the system information to external devices. Their tally colors are also set in the [SETUP > GPI TALLY > TALLY COLOR] menu.

(1) Open the [SETUP > GPI TALLY > EXT TALLY] menu.
(2) Turn F1 to select an EXT TALLY number.
(3) Turn F2 to select an EXT TALLY control method.
(4) Turn F3 to select a signal.
Verify each signal status under **TALLY**.
To change the signal state manually, turn F4 to select a state.

SETUP > GPI TALLY > EXT TALLY			1/1
TALLY NO	EXT TALLY CTRL	SELECT	TALLY
1	EDITOR	IN01	OFF

Parameter	Setting	Description
EXT TALLY CTRL	EDITOR	Controls EXT TALLY via an editor.
	TSL RED	Controls EXT TALLY via TSL RED signals.
	TSL GREEN	Controls EXT TALLY via TSL GREEN signals.
	TSL AMBER	Controls EXT TALLY via TSL AMBER signals.

25-2-5. Tally Output Settings (Tally Units)

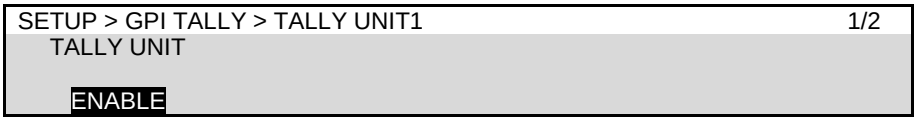
Up to 5 tally units can be connected. This section explains how to set up TALLY1 (the tally unit 1) as an example.

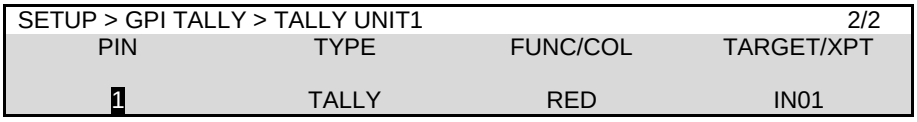
◆ **Selecting Tally Color for an Output Bus**

See Sec. 25-2-1 "Tally Color Settings." The Tally Color settings made in this menu are shared with those for the GPI/TALLY OUT connectors and Tally Units.

◆ **Setting Pin Assignments for TALLY1**

(1) Open the [SETUP > GPI TALLY > TALLY UNIT1] menu.
(2) Go to PAGE 2. Turn F1 to select the pin number.
(3) Turn F2 to select TALLY under TYPE.
(4) Turn F3, F4 to select a tally color and signal.
(5) Assign tallies to other pins in the same manner.
(6) Go back to PAGE 1. Set TALLY UNIT to ENABLE to enable TALLY UNIT1.



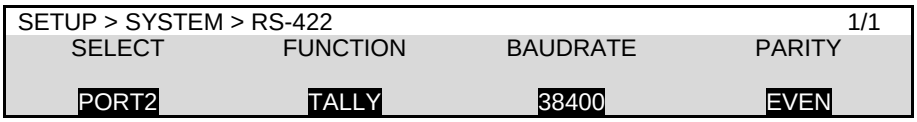


Setup other tally units. See the HVS-TALOC/TALR 20/32 operation manual for details on tally connection and operation.

◆ **Connection Settings with Tally Units (RS-422 port setting)**

Tally units are connected in series to the switcher via RS-422 port (Port 2 in this example). The connection settings with Tally Units are set in the menu as shown below.

(1) Open the [SETUP > SYSTEM > RS-422] menu.
(2) Turn F1 to select PORT2.
(3) Turn F2 to select TALLY. Set the parity to EVEN. Set the baud rate to **38,400** bps.
(4) Reboot the HVS-490. (See Sec. 24-4. Reboot and Initialization.)



25-3. Router Control

The switcher can connect and control a router. Router crosspoint switches can be performed on the switcher's control panel. The router control is based on the HARRIS Pass-Through protocol.
In addition to router control, video titles on the router can be handed to the switcher if a FOR-A MFR series router is connected. (*1)

Manageable number of sources, destinations and levels are:

Manageable max. number	
Level	16
Source	1,024
Destination	256

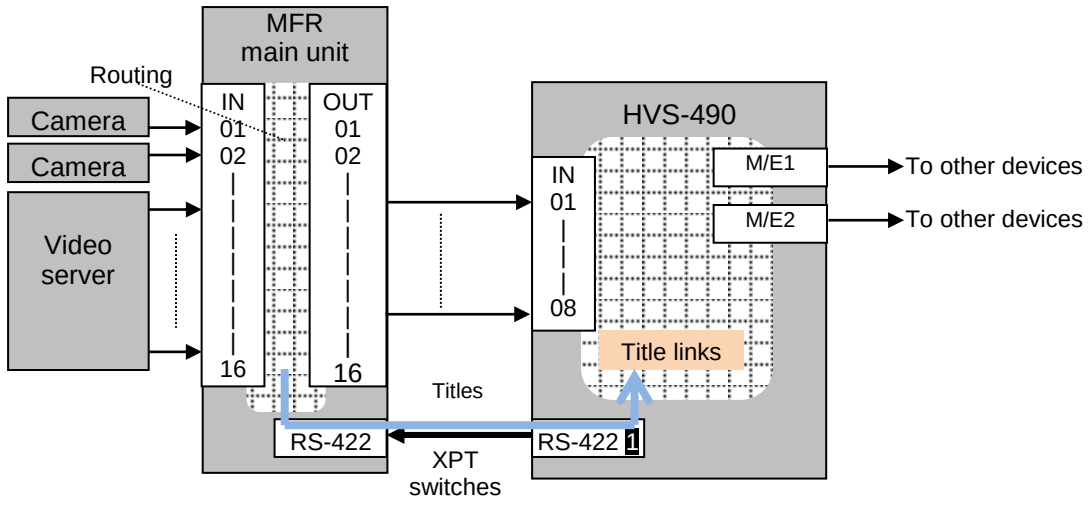
Connect a router to an RS-422 port on the switcher using an RS-422 straight-through cable. Then configure the RS-422 port for router control. Refer to the MFR Series Operation Manual for details on MFR router settings.

*1 Although MFR routers will be fully supported in the future, limited control over MFR routers is possible at present by selecting **HVS-2000** under Switcher in the [Tally System Settings > Device Select] in the MFR Web-based Control menu.

Bus control limitations

Unavailable bus	CK1-4, SUB_EFF1-4, AUX13-20
Unselectable bus (HVS-490 unsupported bus)	IN41-48, ME3, MV4, MELITE5-6, AUX1-12 (SOURCE)

<Connection example: Connecting MFR Main unit to HVS-490>



25-3-1. Assigning a Router Channel to an RS-422 port

(1) Display the [SETUP > SYSTEM > RS-422] menu
(2) Turn F1 to select a port for connecting a router.
(3) Turn F2 to select ROUTER.
(4) Set **BAUDRATE** and **PARITY** according to the router.

SETUP > SYSTEM > RS-422			1/1
PORT	FUNCTION	BAUDRATE	PARITY
1	ROUTER	38400	NONE

Setting **BAUDRATE** to 38400 may cause a malfunction in some cases. In such cases, take any one of the following measures and reconnect the router.

- Change Stop Bit to 1.5 or 2 in the router
- Change the switcher baudrate to 39300.

25-3-2. Setting MFR Link

MFR Link is enabled only when connecting to FOR-A MFR series routers.

When the title link display is set to ON, the switcher accepts video titles with video signals from a router and displays them on the control panel according to the associated crosspoint switches on the router.

(1) Open the [SETUP > ROUTER > NAME LINK] menu.
(2) Turn F1 to select MFR and then press F1.
(3) Title link should be set respectively for each video. First, turn F2 to select a video, then turn F3 to set the title link display to ON or OFF.

SETUP > ROUTER > NAME LINK			1/1
LINK	INPUT	DISPLAY	
MFR	IN01	ON	

25-3-3. Crosspoint Switches Using the Menu

To execute the following commands:

Select a router level.
Connect Source channel 2 to Destination channel 1.
Connect Source channel 4 to Destination channel 2.

Proceed as follows:

(1) Display the [SETUP > ROUTER > MANUAL CONTROL] menu.
(2) Turn F1 to select a level.
(3) Turn F2 to select 1 under **DST** (destination). The currently connected source is displayed under **SRC** (source).
(4)Turn F3 to select 2, and press F3 to switch the source. The HVS-490 sends the crosspoint switch command to the router.
(5) The switcher displays 2 under **SRC** after receiving a successful response from the router.

SETUP > ROUTER > MANUAL CONTROL			1/2
LEVEL	DST	SRC	
1	1	2	

(6) In the same way, select 2 under **DST** and 4 under **SRC**.

SETUP > ROUTER > MANUAL CONTROL			1/2
LEVEL	DST	SRC	
1	2	4	

25-3-4. Crosspoint Switches using Bus Buttons

To execute the following commands using Bus Buttons on LINE 2:

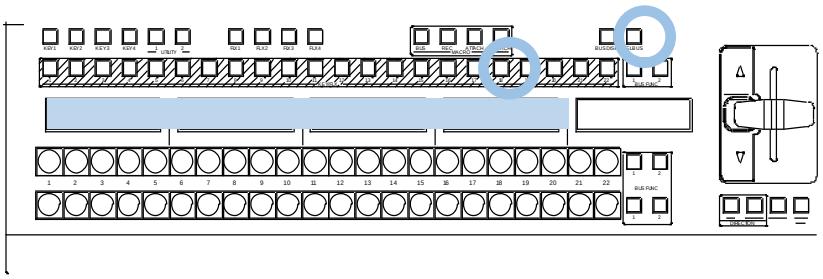
Select a router level.
Connect Source channel 2 to Destination channel 1.
Connect Source channel 4 to Destination channel 2.

* Router Level setting in the menu is applied to bus button crosspoint switches.

First change LINE 2 to ROUTER mode, then switch crosspoints.

◆ **Changing LINE 2 to Router mode**

(1) Hold down SEL BUS in the LINE2 section on the control panel. The "NONE", "M/E1", "M/E2", "AUX1-12" and "ROUTER" indications are displayed beneath the KEY/FLX row.
(2) Press the button above the "ROUTER" indication on the KEY/FLX row.



◆ **To connect Source channel 2 to Destination channel 1**

(1) Press D001 (Default 1) on the PGM bus. The button light will turn on.
(2) Press S002 (Default 12) on the PGM bus.
(3) When S002 turn on, Source 2 is connected to Destination 1 on the router.

◆ **To connect Source channel 4 to Destination channel 2**

(1) Press D002 (Default 2) on the PGM bus. The button light will turn on.
(2) Press S004 (Default 14) on the PGM bus.
(3) When S004 turns on, Source 4 is connected to Destination 2 on the router.

Destination (DXXX), Source (SXXX) or other router function names are shown on the displays above bus buttons. Functions in the top row are assigned to the PGM bus buttons, and functions in the bottom row to the PST bus buttons.

<Changing Router Function Assignments>

(1) Open the [PANEL > ROUTER BUS ASSIGN > ABUS(BBUS)] menu.
(2) Turn F1 to select a button.
(3) Turn F2 to select DST (destination) or SRC (source).
(4) Turn F3 to select a channel number.

PANEL > ROUTER BUS ASSIGN > ABUS			1/1
BUTTON	SELECT	NUMBER	
A BUS01	DST	1	

25-3-5. Simultaneous Switching (TAKE function)

Multiple crosspoints (destination/source pairs) can be switched simultaneously in the menu using stored crosspoint data.

◆ **Simultaneous switching using the menu**

(1) Open the [ROUTER > MANUAL CONTROL] menu PAGE 2.
(2) Turn F1 to select a level.
(3) Turn F2 to select a destination. If a crosspoint has been set for the destination, its source is displayed under **SRC**.
(4) Turn F3 to select a source for the destination. Press F3 to confirm the selection.
(5) Repeat Steps (3) and (4) to save crosspoint settings.
(6) Turn F4 to select EXEC, then press F4 to perform switches.

SETUP > ROUTER > MANUAL CONTROL			2/2
PRESET LEVEL	PRESET DST	PRESET SRC	TAKE
1	2	4	EXEC

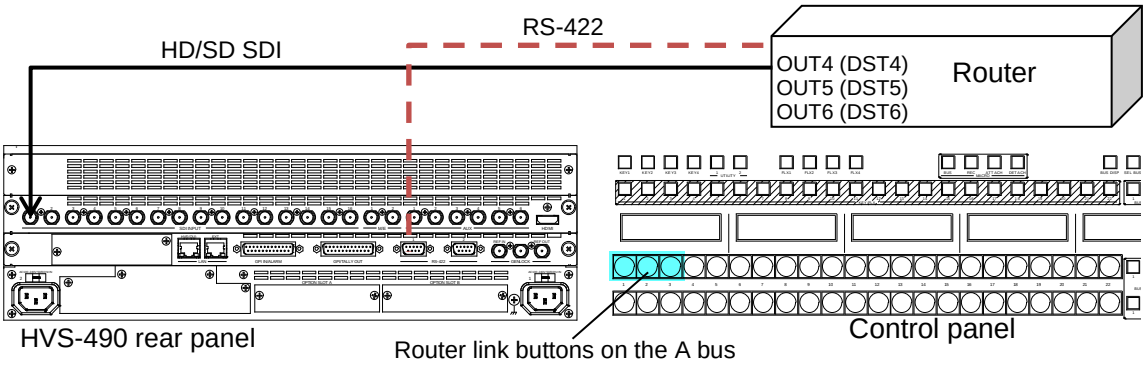
◆ **Simultaneous switching using the bus buttons**

(1) Refer to Sec. 25-3-4 to change a LINE (M/E) to ROUTER mode.
(2) Hold down AUTO in the transition block. AUTO will blink and the TAKE function is enabled.
(3) Select a destination channel, then a source channel on the M/E bus. The source channel button will blink.
(4) Repeat Step (3) to save crosspoints.
(5) Press BKGD AUTO (flashing) to execute simultaneous switching. When all crosspoints are switched on the router, TAKE function is automatically disabled.

* To keep the TAKE function enabled, press EFF2 in the transition block (TAKE DIRECT ON). To disable the TAKE function, re-press EFF2 (TAKE DIRECT OFF).

25-3-6. ROUTER LINK

The Router Link function allows you to switch a crosspoint on a router by pressing a switcher bus button when inputting video from the router.
The following example will help to explain how to set up and use this function.
In the connection example below, the **DST4** video is input to the switcher **INPUT1**. The system will be set up so that if the switcher bus button **1**, **2** or **3** is pressed, **SRC7**, **SRC8** or **SRC9** video is respectively sent to the switcher.
If Router Link is enabled, pressing a linked bus button sends a signal switch command to a router and the switcher receives the specified video from a router even if a different video is assigned to the associated destination channel on the router.



* Router Link function can be applied to each bus. If assignments are different for A, B, PGM and PST buses, to use the ROUTER LINK function in another bus, a router connection is required. (See Sec. 9-2-1. “M/E Bus Type.”)

◆ **Router Link Settings**

(1) Open [SETUP > ROUTER > XPT LINK] menu PAGE 1.
Turn **XPT LINK** to ON. Set up **RTR XPT** (router crosspoint) and **SRC** (source) pairs as shown below.

SETUP > ROUTER > XPT LINK			1/2
XPT LINK	RTR XPT	RTR SRC	
ENABLE	RX001	7	

SETUP > ROUTER > XPT LINK			1/2
XPT LINK	RTR XPT	RTR SRC	
ENABLE	RX002	8	

SETUP > ROUTER > XPT LINK			1/2
XPT LINK	RTR XPT	RTR SRC	
ENABLE	RX003	9	

(2) Open the [PANEL > BUS ASSIGN > LEVEL1] menu. Assign crosspoints, RX001, RX002 and RX003, to bus buttons, 1, 2 and 3, as shown below.

PANEL > BUS ASSIGN > LEVEL1			1/2
BUTTON	SIGNAL	INHIBIT	COLOR PALETTE
BTN01	RX001	OFF	PALETTE00

PANEL > BUS ASSIGN > LEVEL1			1/2
BUTTON	SIGNAL	INHIBIT	COLOR PALETTE
BTN02	RX002	OFF	PALETTE00

PANEL > BUS ASSIGN > LEVEL1			1/2
BUTTON	SIGNAL	INHIBIT	COLOR PALETTE
BTN03	RX003	OFF	PALETTE00

(3) Open [SETUP > ROUTER > XPT LINK] menu PAGE 2.
Select M/E1 A BUS under **BUS SELECT**. Set the switcher input and the router destination channel as shown below.

SETUP > ROUTER > XPT LINK			2/2
BUS SELECT	INPUT	RTR DST	
M/E1 A BUS	IN01	4	

* The router level set in the [SETUP > ROUTER > MANUAL CONTROL] menu is applied to this procedure.

◆ **Router Link Operation**

Pressing Bus Button 1 on the switcher M/E1 A bus displays the SRC7 image on the M/E output.
Pressing Bus Button 2 on the switcher M/E1 A bus displays the SRC8 image on the M/E output.
Pressing Bus Button 3 on the switcher M/E1 A bus displays the SRC9 image on the M/E output.

<Available Bus for Router Link (Selectable bus under BUS SEL)>
(M/E1, M/E2, AUX1-12) A BUS, (M/E1, M/E2, AUX1-12) B BUS,
KEY1-4INS, KEY1-4SRC, FLX1-4INS, FLX1-4SRC,
AUX13-20

◆ **Router Crosspoints**

The maximum number of available router crosspoints: **256**
The maximum number of available router sources: **1024**
The maximum number of available router destinations: **256**

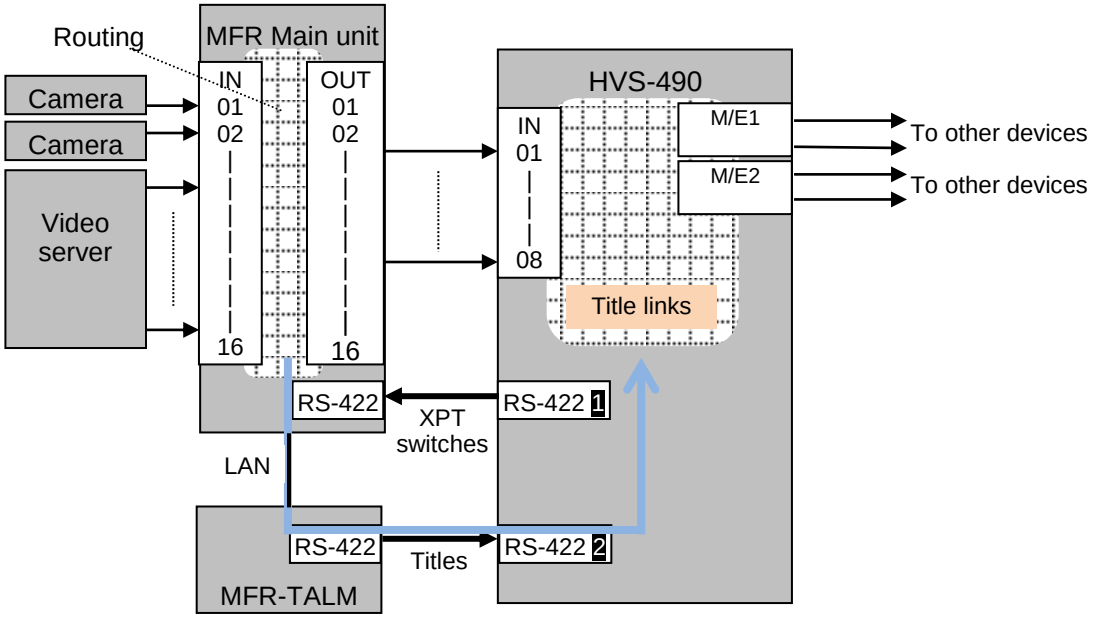
25-3-7. MFR-TALM Connection

When working with a FOR-A MFR Series router, MFR-TALM Tally Manager allows you to accelerate tally and title (video name) links. If configuring an MFR-TALM, crosspoint switching is performed between the switcher and router, and tally and title links are made between the switcher and tally manager. The tally manager should be connected directly to the switcher through an RS-422 connection, independently from the router connection.
See below for MFR router and tally manager configuration and communication settings on the switcher. Refer to the operation manual bundled with the tally manager for the connection settings on the tally manager.

IMPORTANT

A direct router connection is unnecessary if you do not perform router's crosspoint switching from the switcher. In such cases, only connect a tally manager to the switcher via RS-422.

Connection example: Connecting MFR Main unit and MFR-TALR to HVS-490>



◆ **MFR Router and MFR-TALM Connection Settings**

(1) Display the [SETUP > SYSTEM > RS-422] menu
(2) Turn F1 to select a port on the switcher to which the MFR main unit is connected.
(3) Turn F2 to select ROUTER XPT.

SETUP > SYSTEM > RS-422			1/1
SELECT	FUNCTION	BAUDRATE	PARITY
PORT1	ROUTER XPT	----	NONE

(4) F1 to select a port on the switcher to which the MFR-TALM is connected.
(5) F2 to select ROUTER NAME.
(6) Set **BAUDRATE** and **PARITY** according to the router.

SETUP > SYSTEM > RS-422			1/1
SELECT	FUNCTION	BAUDRATE	PARITY
PORT2	ROUTER NAME	----	NONE

25-4. TSL UMD Protocol

The switcher supports the TSL UMD 5.0 protocol, through which tally export and signal name import/export over Ethernet are available. FOR-A multi-viewer units can receive tally information sent from HVS-490 units. The HVS-490 can receive signal names from FOR-A MFR Series routers. Use the LAN EXT port on the HVS-490 units for sending / receiving TSL messages.

◆ **Receiving Signal Names (TSL IN)**

The HVS-490 can receive source signal names using TSL UMD 5.0 by setting in the [SETUP > TSL > TSL IN] menu.

SETUP > TSL > TSL IN			1/2
TSL IN	LAN2(EXT) IP ADDRESS	LAN2(EXT) PORT	SCREEN NO
DISABLE	192.168.1.10	8901	0

SETUP > TSL > TSL IN			2/2
DISPLAY ID OFFSET	NAME LINK	DLE OPTION	
0	OFF	OFF	

Parameter	Description
TSL IN	Setting to ENABLE starts receiving TSL commands.
LAN2(EXT) IP ADDRESS	Displays MU LAN2 (EXT) IP address.
LAN2(EXT) PORT	Displays MU LAN2(EXT) port number
SCREEN NO	Sets a TSL screen number.
DISPLAY ID OFFSET	Sets the Display ID start position. (See the table below.)
NAME TYPE	Turing ON applies received signal names to the switcher signal names.
DLE OPTION	Turns Data Link Escape on/off.

Display ID numbers are defined as shown below.
To change Display ID numbers, specify the start position under DISPLAY ID OFFSET.

Signal name	INPUT 01-40	AUX 01-12	M/E1 PGM	M/E1 PVW	M/E1 CLN1	M/E1 CLN2	M/E2 PGM	M/E2 PVW	M/E2 CLN1	M/E2 CLN2	AUXPST 01-12
ID	0-39	50-61	70	71	72	73	80	81	82	83	100-111

◆ **Sending Tally Information and Signal Names (TSL OUT)**

To send signal names and RED/GREEN tallies through TSL UMD 5.0, set in the [SETUP > TSL > TSL OUT] menu. As factory default, the port is set up as shown below.

SETUP > TSL > TSL OUT			1/2
TSL OUT	DLE OPTION	SCREEN NO	DISPLAY ID OFFSET
DISABLE	OFF	0	0

SETUP > TSL > TSL OUT		2/2
TARGET IP ADDRESS	TARGET PORT	
192.168.0.13	8901	

Parameter	Description
TSL OUT	Setting to ENABLE starts sending TSL commands, in which input source names, and AUX and M/E OUT output tally information are included for FOR-A switchers (input source names, and Mode 1 tally information for FOR-A multi-viewers)
DLE OPTION	Turns Data Link Escape on/off.
SCREEN NO	Sets the TSL screen number.
DISPLAY ID OFFSET	Sets the Display ID start position.
TARGET IP ADDRESS	Specify the target IP address.
TARGET PORT	Specify the target port number.

25-5. AUX Bus Control Box (HVS-AUX16A/16B /32A/64A)

HVS-AUX16A/16B/32A/64A units allow users to remotely change AUX output signals or recall events of the switcher. A single AUX Box can manage all AUX outputs. Up to 16 (32 with SHIFT) actions can be assigned to buttons on HVS-AUX16A/16B, 32 (64 with SHIFT) on HVS-AUX32A and 64 on HVS-AUX64A. Up to 12 AUX units can be connected to the switcher.

A LAN cable is required for the AUX box connection.

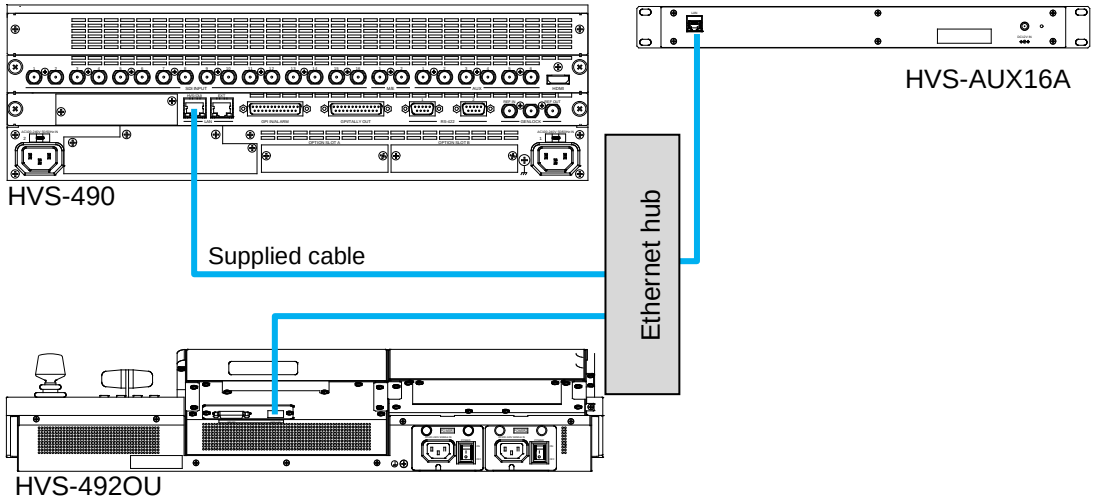
25-5-1. Connecting AUX Boxes

AUX boxes should be connected to the switcher using an Ethernet hub and LAN cables.

◆ **AUX ID Number**

AUX ID numbers from 1 to 255 are used to uniquely identify an AUX box.
To connect to HVS-490 units, use **ID1 to ID12**. (Default setting: ID1)
The ID numbers should not be duplicated when connecting to a switcher.
In an AUX box, specify the IP address of the **HVS (OU)** port on the HVS-490 as a switcher IP address. (Default: 192.168.0.10)

▶ See the "HVS-AUX16A/16B/32A/64A Operation Manual" for more details.

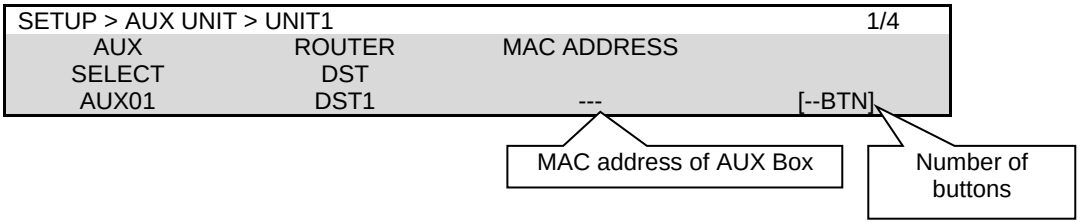


◆ **Checking AUX Box Connection**

The following example shows how to check the connection between AUX Box and the switcher.

(1)Open [SETUP > AUX UNIT > UNIT1(UNIT2-12)] menu PAGE 1. (Select the Unit ID assigned to the AUX unit. **UNIT1** in this operation example)

(2) Once the connection is established, the product MAC address and the number of buttons are displayed as shown below.



25-5-2. Assigning Actions to AUX Box Buttons

Actions can be assigned to AUX Box buttons. (Ex 1)
An AUX Box can change crosspoints on the router connected to the switcher. (Ex 2)

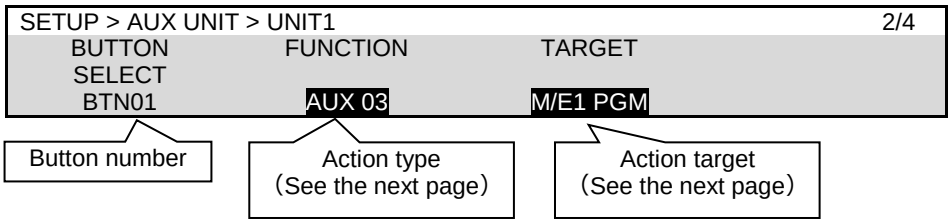
Example 1) To assign the action "Output the M/E1PGM video from the AUX3 bus"
Two methods are available:

- Perform the action by assigning the action to a button
- Perform the action by assigning the action, "Select AUX3" to a button and the action, "Select the M/E1 PGM signal" to another button.

The following operations show these two methods by using BUTTON 1 and BUTTON 2 on UNIT 1

◆ **Using One Button**

(1) Open [SETUP > AUX UNIT > UNIT1] menu PAGE 2.
(2) Set **BTN01** as shown below.



(3) Press Button 1 on the UNIT 1 AUX box. The AUX 3 output signal is changed to M/E1 PGM.

◆ **Using Two Buttons**

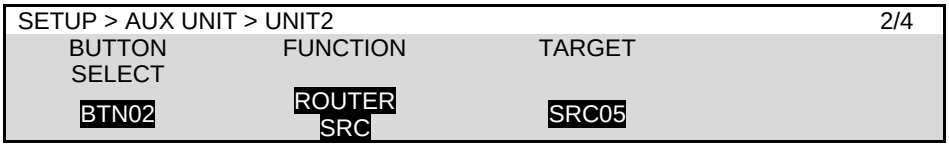
(1) Open [SETUP > AUX UNIT > UNIT1] menu PAGE 2.
(2) Set **BTN01** and **BTN02** as shown below.

(3) Press Button 1, then Button 2 on the UNIT 1 to change AUX3 signal to M/E1 PGM.

Example 2) To assign the action "Select SRC5 for DST3 on the connected router" to Button 2 on UNIT02 (AUX02):

(1) Open [SETUP > AUX UNIT > UNIT2] menu PAGE 1
(2) Select DST3 under **ROUTER DST**.

(3) Go to PAGE 2 and set Button 2 on UNIT 2 as shown below.



(4) Press Button 2 on the UNIT 2 AUX box. The DST (Destination) 3 is switched to SRC (Source) on the connected router.

◆ FUNCTION and TARGET Settings

AUX Box buttons light as shown below to indicate the status.

When an action is assigned to a button: **Dim-lit**

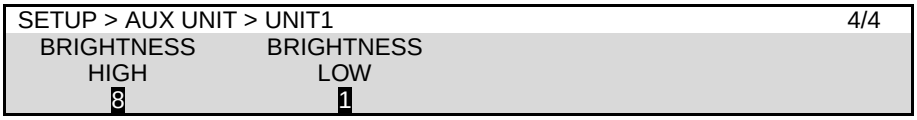
When an action is being performed: **Lit green**

FUNCTION (action type) setting	TARGET (action) setting	Description
NONE	(NOT ASSIGN)	
AUX SELECT	AUX01-20 AUX01-12 PST M/E1 PGM M/E1 PST M/E1 ABUS M/E1 BBUS M/E1 KEY1-4 INSERT M/E1 KEY1-4 SOURCE M/E2 PGM M/E2 PST M/E2 ABUS M/E2 BBUS M/E2 KEY1-4 INSERT M/E2 KEY1-4 SOURCE FLX1-4 INSERT FLX1-4 SOURCE	Selects a bus.
AUX XPT	BLACK IN01-40 STILL1-4 STILL1-4 KEY COLOR BAR WHITE MATTE1-2 GMAT CK1-4 FILL CK1-4 KEY SUBEFF1-4 M/E1-2 PGM M/E1-2 PVW M/E1-2 CLN1 M/E1-2 CLN2 M/E1-2 KEY MELite1-2 PGM MELite1-2 PST MV1-3 RX001-256	Selects a signal for the current AUX bus. The bus should be selected by the AUX SELECT action, otherwise currently selected in the menu (**AUX SELECT** in the [SETUP >AUX UNIT > UNIT1(2-12)] menu PAGE 1)
AUX01-AUX20 AUX01 PST-AUX12 PST	BLACK IN01-40 STILL1-4 STILL1-4 KEY COLOR BAR WHITE MATTE1-2 GMAT CK1-4 FILL CK1-4 KEY SUBEFF1-4 M/E1-2 PGM M/E1-2 PVW M/E1-2 CLN1 M/E1-2 CLN2 M/E1-2 KEY MELite1-2 PGM MELite1-2 PST MV1-3	Selects a signal for the selected bus.
AUX TRANS	AUX1-12	Turns the AUX bus transition ON/OFF.
AUX CUT AUX MIX AUX WIPE	AUX1-12	Selects the AUX bus transition type.
EVENT RECALL	EVENT NO.0-99	Loads an event.
MACRO RECALL	MACRO NO.0-99	Recalls a macro.

M/E1-2 PGM M/E1-2 PST M/E1-2 A BUS M/E1-2 B BUS M/E1-2 KEY1-4 INSERT M/E1-2 KEY1-4 SOURCE FLX1-4 INSERT FLX1-4 SOURCE	BLACK IN01-40 STILL1-4 STILL1-4 KEY COLOR BAR WHITE MATTE1-2 GMAT CK1-4 FILL CK1-4 KEY SUBEFF1-4 M/E1-2 PGM M/E1-2 PVW M/E1-2 CLN1 M/E1-2 CLN2 M/E1-2 KEY MELite1-2 PGM MELite1-2 PST MV1-3	Selects the output signal.
AUTO TRANS CUT TRANS	M/E1 BKGD M/E1 KEY1-4 M/E2 BKGD M/E2 KEY1-4 FLX1-4 AUX01-12	Performs a CUT or AUTO transition.
TRANS TYPE MIX TRANS TYPE WIPE		Selects the transition type.
USER FLG PUSH USER FLG TOGGLE	USER FLG 1-60	Turns a user flag ON/OFF. (Same operation can be performed under **ROUTER DST** in [SETUP >AUX UNIT > UNIT 1 (2-12)] menu PAGE 1.
ROUTER DST	DST 1-256	Selects a destination on the router.
ROUTER SRC	SRC 1-1024	Selects a source on the router.

25-5-3. Adjusting Light Levels for AUX Box Buttons

Light levels for AUX Box buttons can be adjusted in [SETUP AUX UNIT > UNIT1(UNIT2-12)] menu PAGE 4 as shown below.



Parameter	Default	Setting	Description
BRIGHTNESS HIGH	8	5-8	Adjusts the normal lighting level.
BRIGHTNESS LOW	1	1-4	Adjusts the dim lighting level.

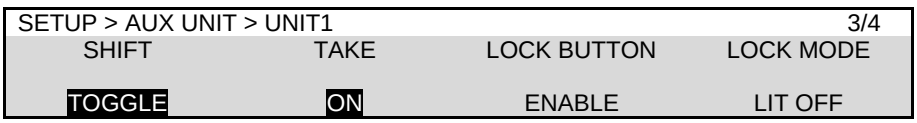
25-5-4. Assigning the SHIFT or TAKE Function

HVS-AUX16A/16B/32A units can use additional 16/32 buttons by using the SHIFT function. In addition, HVS-AUX16A/16B/32A/64A units can use the TAKE (confirmation) function.

Note that the SHIFT and TAKE functions cannot be used simultaneously. The TAKE function is always enabled by setting TAKE to ON in the menu regardless of SHIFT state.

◆ **Using the SHIFT function**

(1) Open [SETUP > AUX UNIT > UNIT1(UNIT2-12)] menu PAGE 3.
(2) Select TOGGLE or PUSH under **SHIFT**.
(3) Set **TAKE** to OFF.



With these settings, HVS-AUX16A / 16B / 32A units can use additional 16/32 buttons using the SHIFT/TAKE button. Refer to the table below for details on how to use this button.

Parameter	Default	Setting	Description
SHIFT	OFF	OFF	Additional buttons cannot be used.
		TOGGLE	Pressing the SHIFT/TAKE button enables SHIFT and pressing the button again disables SHIFT.
		PUSH	SHIFT is enabled while the SHIFT/TAKE button is pressed.

◆ **Using the TAKE (Confirmation) function**

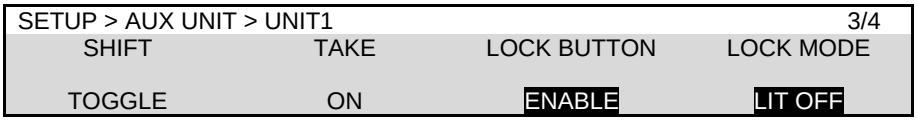
(1) Open [SETUP > AUX UNIT > UNIT 1 (UNIT 2-12)] menu PAGE 3.

(2) Set TAKE to ON.

Parameter	Default	Setting	Description
TAKE	OFF	OFF	An action is immediately executed (by pressing the action button) without pressing TAKE.
		ON	An action is executed by pressing TAKE after pressing the action button. Press TAKE within 5 seconds after pressing an action button. Otherwise, the operation will be canceled.

25-5-5. Setting LOCK Button on AUX Boxes

Open [SETUP - AUX UNIT > UNIT 1 (UNIT 2-12)] menu PAGE 3 to enable/disable the LOCK button on AUX Boxes.



Parameter	Default	Setting	Description
LOCK BUTTON	DISABLE	DISABLE ENABLE	Enables/disables the LOCK button.
LOCK MODE	LIT OFF	LIT OFF	Button lights are turned off while the AUX box is locked.
		LIT ON	Button lights are turned on while the AUX box is locked.

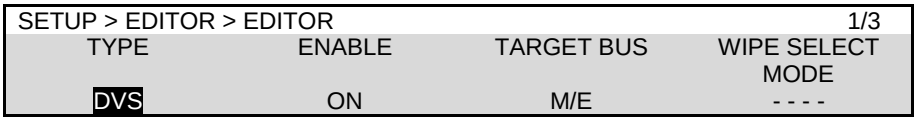
25-6. Editor Control

The switcher can be controlled from an editor through an RS-422 interface.

> The HVS-2000ED software option is required for editor control.

25-6-1. Editor Control Settings

(1) Open the [SETUP > EDITOR > EDITOR] menu.
(2) Select a protocol under **TYPE** between DVS (SONY DVS/BVS series compatible) and GVG-K/Z.



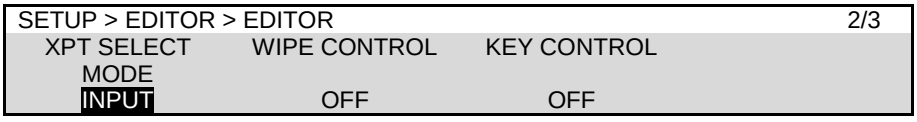
If DVS is used:
Specify a bus to be controlled from the editor under **TARGET BUS**. If PREV, PREV ON or ALL is set, AUX1 will be the edit preview bus and with crosspoint number is 35. Set your editor accordingly.

Setting	Description
M/E	Controls the M/E bus when **ENABLE** is ON.
PREV	Controls the preview bus when **ENABLE** is ON.
ALL	Controls both M/E bus and preview bus when **ENABLE** is ON.
M/E ON	Always controls the M/E bus regardless of **ENABLE** setting. Controls both M/E bus and preview bus when **ENABLE** is ON.
PREV ON	Always controls the preview bus regardless of **ENABLE** setting. Controls both M/E bus and preview bus when **ENABLE** is ON.

If G-K/Z (GVG protocol) is used:
Select a pattern control mode between the two below at **WIPE SELECT MODE**.

Setting	Description
NORMAL	Same wipe pattern numbers (0-99) as in the switcher are used in the editor. (default setting)
LIST	Twenty wipe patterns saved to Direct Pattern memory are used in the editor as Direct Pattern No. 80-99. (GVG-Protocol only)

(3) Turn **ENABLE** to ON to enable the editor control.
(The Editor Control On/Off function can be assigned to a USER button. See section 24-3. "USER Button.")
(4) Select the crosspoint control mode under **XPT SELECT MODE** in PAGE 2.



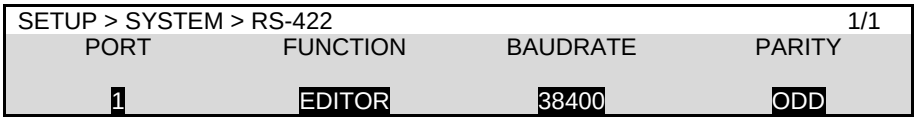
Setting	Description
INPUT	Uses input numbers for crosspoint switches on editors. (Default setting) See a separate manual on HVS-49ED protocol commands for more details.
BUTTON	Uses button numbers crosspoint switches on editors. Button 1-22 on editors correspond to Bus Buttons 1-22 in Level 1.

(5) Turn **WIPE CONTROL** ON/OFF.

(6) Turn **KEY CONTROL** ON/OFF in the same page. (Note that KEY will not turn automatically OFF if the switcher receives ALL STOP.)

25-6-2. Editor Connection Settings (RS-422 port)

(1) Open the [SETUP > SYSTEM > RS-422] menu.
(2) Turn F1 to select an RS-422 port for editor connection.
(3) Turn F2 to select EDITOR.
(4) Turn F3 to select the baudrate.
(5) Turn F4 to select the parity.



25-6-3. STATUS REPORT

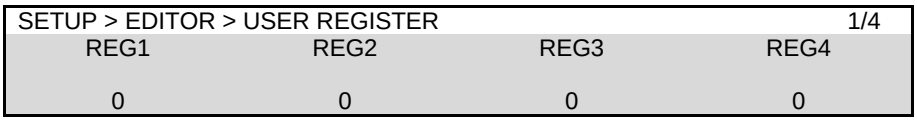
Status reports are available via DVS protocol. When the Status Report feature is enabled, crosspoint or transition type changes on the HVS-490 switcher are notified to the editor.
See a separate manual on HVS-49ED protocol commands for more details.

To enable the Status Report feature, go to [SETUP > EDITOR > EDITOR] menu PAGE 3 and set **STATUS REPORT** to ON.

25-6-4. USER REGISTER

User registers can hold values between 0 and 255 and 16 registers are available. They are used by external systems such as GearLink, an integrated control software for FOR-A devices.

(1) Open the [SETUP > EDITOR > USER REGISTER] menu.
(2) Set a value in each register.

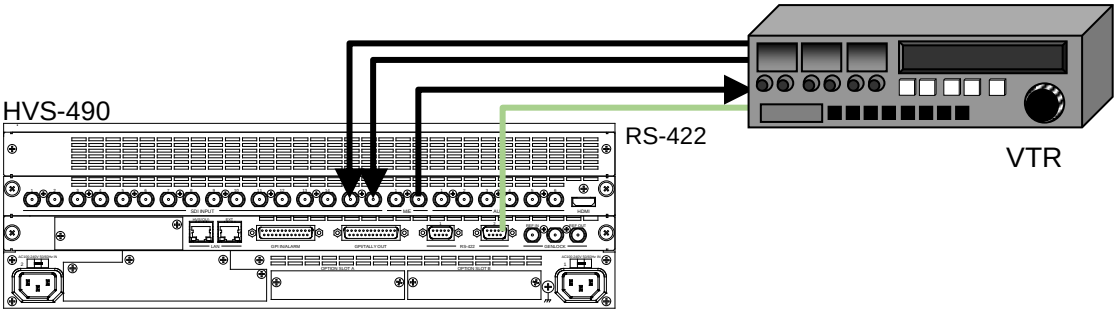


25-7. VTR Control

The switcher can control video tape or video disk recorders via RS-422 using the VTR (Sony 9-pin) protocol. Up to 2 channels are available. Connect a device to a desired RS-422 port, configure the port and select a channel for VTR following the procedures in this chapter.

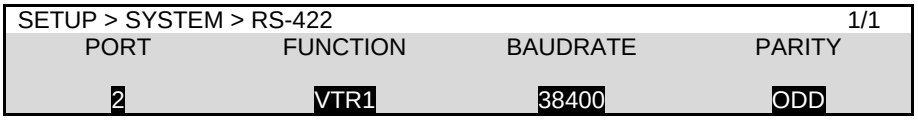
◆ **System Configuration Example**

(1) Connect HVS-490 to a VTR using an RS-422 port and configure the port.
(2) Assign a VTR channel to the RS-422 port. (See Sec. 25-7-1.)
(3) Control the VTR using the VTR menu (see Sec. 25-7-2) or using USER buttons (see Sec. 24-3).



25-7-1. Assigning VTR Channel to an RS-422 Port

(1) Open the [SETUP > SYSTEM > RS-422] menu.
(2) Turn F1 to select the RS-422 port number.
(3) Turn F2 to assign a VTR channel (VTR1 to 4) to the port.
(4) Set BAUDRATE and PARITY according to your VTR device.

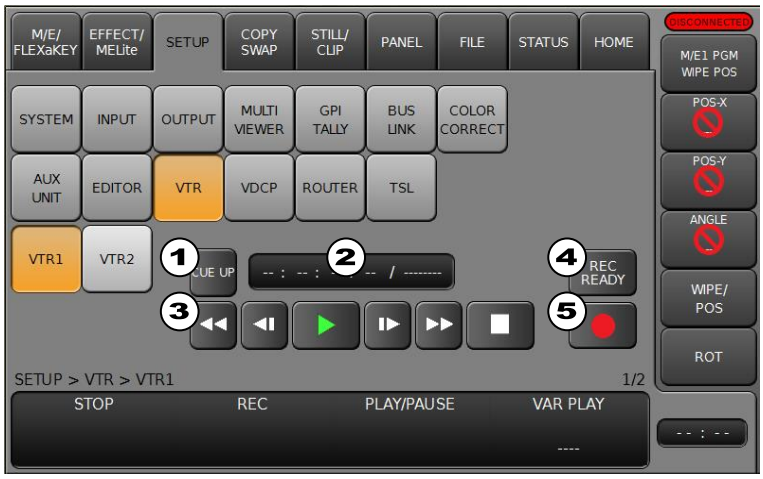


Setting **BAUDRATE** to 38400 may cause a malfunction in some cases. In such cases, take any one of the following measures and reconnect the router.

- Change Stop Bit to 1.5 or 2 in the router
- Change the switcher baudrate to 39300.

25-7-2. VTR Control

Open the [SETUP > VTR > VTR1 (VTR2)] menu.



NO	Item	Description
1	CUE UP button	Sets the CUE UP time in PAGE 2. To set the time, turn F1 to set the time, then tap the **CUE UP** button.
2	Timecode / playback status	Displays the current VTR state on the left side and playback state on the right side.
3	VTR control buttons	**REW**, **JOG-REV** (one step forward), **PLAY** (**PAUSE** while playing), **JOG-FWD** (one step backward), **FF** and **STOP** from the left.
4	REC READY button	Toggles the READY mode On/Off. Lit when ready and unlit when not ready.
5	RECORD button	Starts recording when pressed while recording is ready.

25-7-3. Assigning VTR Functions to USER Buttons

The following VTR functions can be assigned to user buttons.

- Shortcut to the VTR menu
- VTR channel On/Off
  VTR 1 SELECT
  VTR 2 SELECT
- VTR operations
  REW, PLAY/PAUSE, FWD, STOP, REC, GOTO TOP

See Sec. 24-3. "USER Button" for details on function assignments.
See Appendix 1. User Button Functions for details on available functions.

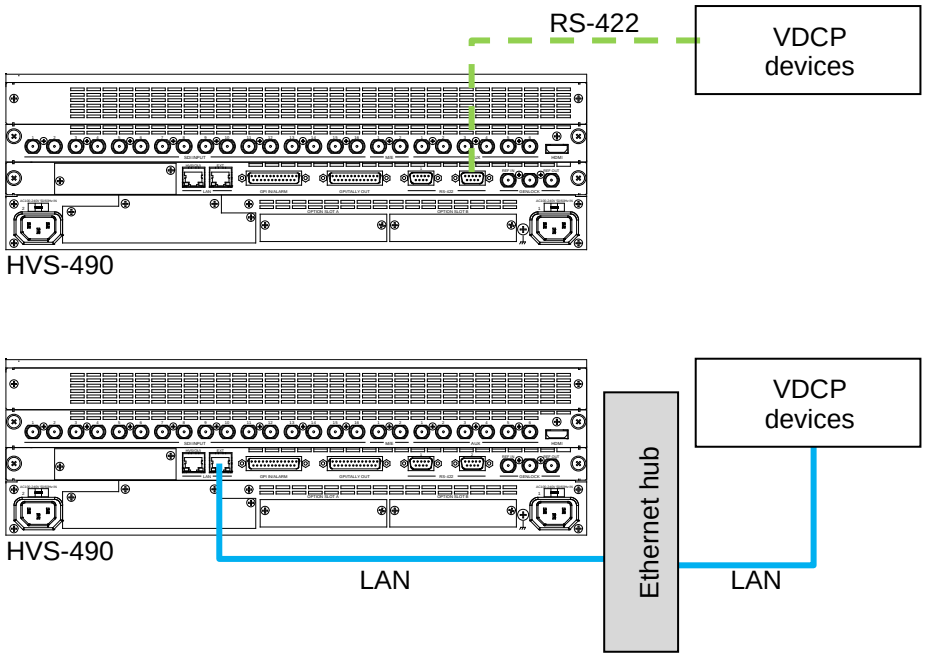
25-8. VDCP Operation

The switcher can control a VCR or Video Disk Recorder through RS-422 or LAN using VDCP protocol. Up to 4 channels (device connections) are available. Follow the procedure below to perform VDCP communication and RS-422 port settings.

- System Configuration Example

(1) Connect a VDCP device to HVS-490 via RS-422 or LAN.
If using RS-422, assign a VDCP channel to an RS-422 port and set communication settings.
If using LAN, change the VTR connection to LAN (Ethernet) and configure LAN connection between the HVS-490 and VDCP device.

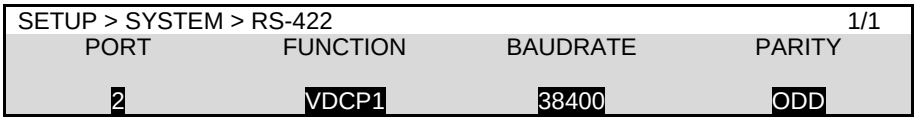
(2) Operate the VDCP device using the VDCP menu (see Sec. 0), or using User buttons (see. Sec. 24-3. "USER Button.")



25-8-1. RS-422 Connection Settings

To use an RS-422 connection, assign a VDCP channel to an RS-422 port on the switcher, then set communication settings as shown below:

(1) Open the [SETUP > SYSTEM > RS-422] menu.
(2) Turn F1 to select an RS-422 port for VDCP channel connection.
(3) Turn F2 to select a VDCP channel (VDCP1-4).
(4) Set **BAUDRATE** and **PARITY** according to the VDCP device.



Setting **BAUDRATE** to 38400 may cause a malfunction in some cases. In such cases, change Stop Bit to 1.5 or 2 in the router

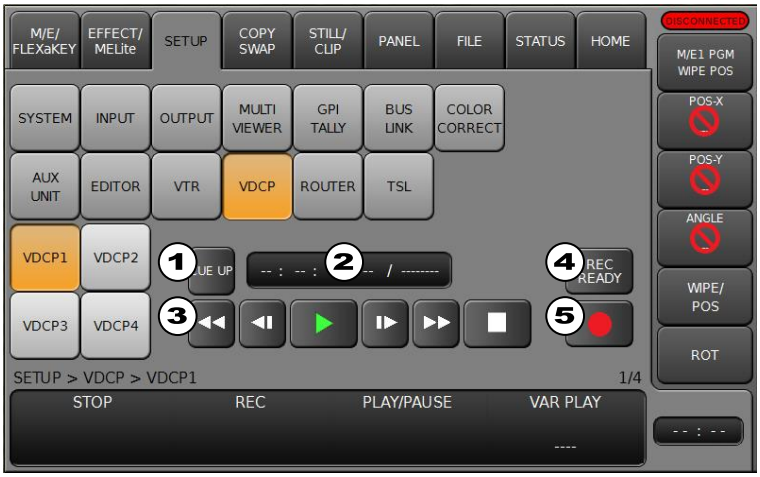
25-8-2. Changing to LAN Connection

Default VDCP connection is set to RS-422. To change connection to LAN, proceed as follows:

(1) Open the [SETUP > VDCP > VDCP1 (VDCP2-4)] menu PAGE 4.
(2) Turn F1 to change to LAN.
Turn F2 to specify the IP address of your VDCP device.
Turn F3 to specify the TCP/UDP port number for your VDCP device.

25-8-3. VDCP Control

Open the [SETUP > VDCP > VDCP1 (VDCP2-4)] menu.



NO	Item	Description
1	CUE UP	Moves to the set IN point. Set the IN and OUT points in PAGE 3, then press **CUE UP**.
2	Current timecode	Displays the current timecode on the VDCP device.
3	VDCP control buttons	**REW**, **JOG-REV** (one step forward), **PLAY** (**PAUSE** while playing), **JOG-FWD** (one step backward), **FF** and **STOP** from the left.
4	REC READY	Toggles the READY mode On/Off. Lit when ready and unlit when not ready.
5	RECORD button	Starts recording when pressed while recording is ready.

25-8-4. Selecting a Clip

Tap **CLIP SELECT in** [SETUP > VDCP > VDCP1 (VDCP2-4) menu **PAGE 3**. A pop-up window as shown below will appear.

NO	Item	Description
1	Clip list	Clips saved in the VDCP device are displayed.
2	PREV	Goes to next page.
3	NEXT	Goes to previous page.
4	RENAME	Changes clip names using up to 8 characters.
5	DELETE	Deletes a clip.
6	LOAD	Loads the selected clip.

25-8-5. Assigning VDCP Functions to USER Buttons

The following VDCP functions can be assigned to user buttons.

- Shortcut to the VTR menu
- VTR channel On/Off
  VDCP 1 SELECT
  VDCP 2 SELECT
  VDCP 3 SELECT
  VDCP 4 SELECT
- VDCP operations
  REW, PLAY/PAUSE, FWD, STOP, REC, GOTO TOP

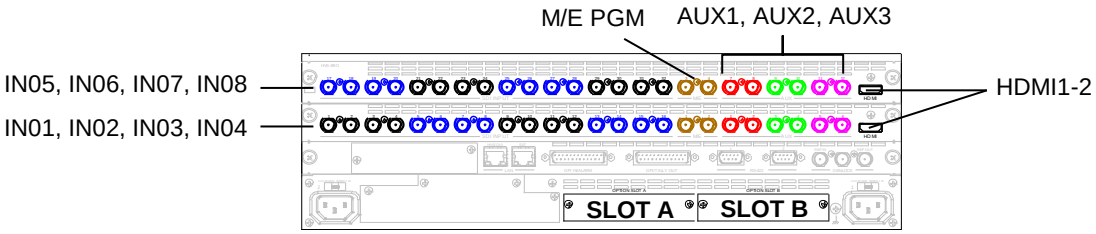
Refer to Sec. 24-3. "USER Button" for details on function assignments.
See Appendix 1. User Button Functions for details on available functions.

26. 4K (UHD) Mode

HVS-49EXP4K and HVS-49IO options enables 4K(UHD) mode support and allow you to input, output and switch 4K signals and to use various effects for them. See Sec 26-2. “4K Mode Specifications” for the details on 4K mode.

◆ **4K Input / Output Ports**

4K input and output ports are assigned as shown below. One 4K input or output requires four ports for and one port for HDMI.
4K inputs: 8 (IN01-08)
4K outputs: 6 (OUT1 (M/E PGM), AUX1-3 and HDMI1-2



◆ **Adding Two 4K Inputs (IN09 and IN10) or 4K output (AUX4)**

Install option I/O cards as shown below.

SLOT A	SLOT B	Signal Name
HVS-100DI-A	HVS-100DI-A	IN09, IN10
HVS-100PCI	HVS-100PCI	IN09 (SQD only)

SLOT A	SLOT B	Bus number
HVS-100DO	HVS-100DO	AUX4
HVS-100PCO	HVS-100PCO	AUX4 (SQD only)

26-1. Switching to 4K Mode

(1) Open the [SETUP > SYSTEM > 4K CONTROL] menu.
(2) Turn F1 to select SQD or 2SI under **4K CONTROL**, then press F1.
(3) A pop-up dialog appears asking if you would like to reset parameters. Tap YES.
Menu parameters on M/E1, M/E2, AUX, etc. are reset to factory default settings. (See Sec. 26-2 "4K Mode Specifications.")

Note that 4K (UHD) signals cannot be selected directly under **FORMAT**. Select 1080i, 1080p or 1080PsF under **FORMAT**, then set **4K CONTROL**.

◆ **M/E Banks**

Only **M/E1** and **AUX1-3** transition blocks are available.

◆ **Keys**

Two KEYERs (for M/E output) and one FLEXaKEY (for M/E or AUX output) are available.

26-2. 4K Mode Specifications (HVS-49EXP4K Option)

4K UHD (3840 x 2160)	**59.94 / 50p** Quad Link 3G-SDI Level-A/B-DL (2SI/SQD) 4:2:2 YCbCr 10-bit * Level-B-DL input signals are output as Level-A signals. **29.97 / 25 / 24 / 23.98p** Dual Link 3G-Level-B-DS (2SI) 4:2:2 YCbCr 10-bit Quad Link 1.5G-SDI (SQD) 4:2:2 YCbCr 10-bit **29.97 / 25 / 24 / 23.98 PsF** **59.94 / 50i** Quad Link 1.5G-SDI (SQD) 4:2:2 YCbCr 10-bit
SDI input	8 inputs (Max 10 inputs) * Frame synchronizer on each input
SDI output	4 outputs (Max 5 outputs)
HDMI output	2 outputs HDMI2.0 Level-B (YUV 4:2:0)
WIPE pattern	Available (limited patterns) (See "Appendix 4 Transition Patterns.")
WIPE modify	Same manner as working in normal (HD) mode (Only borders available in SQD mode)
Transition	Execution: Fader lever, AUTO or CUT button Type: MIX and WIPE
DVE	Available in 2SI mode 4 channels (2 channels for 1080/59.94p and 50p signals) * With HVS-49DVE card installed: 5 channels (4 channels for 1080/59.94p and 50p signals)
KEYER	2 channels (KEY1 and KEY2) Luminance, Full, and Bus keying and Box mask Pattern mask and EDGE (Available in 2SI mode)
FLEXaKEY	One channel Luminance, Full, and Bus key Displayed on M/E or AUX
Chromakey	1 channel (59.94p, 50p unsupported)
Sub Effects	1 channel (59.94p, 50p unsupported) Mosaic and Defocus available only in 2SI mode.
Color Corrector	1 channel
Multiviewer	3 channels (2K output) Layout patterns limited * See “Multiviewer function in 4K mode.”
UTILITY	1 channel
STILL	1 channel INPUT STILL available for all inputs
Event memory	100 events: Crossfade switching available during event recall * Event data in Normal mode are unavailable.
Macro	Same as in normal mode
Genlock Input	
System Phase Adjust	
Genlock Output	
I/O Delay	
Unavailable functions	Side panel MELite re-entry into M/E, KEYER or M/E FLEXaKEY is disabled in SQD mode.
Parameters to be reset by switching to 4K mode	M/E 1, M/E 2, AUX and MELite settings KEY LINK and FLEXaKEY settings Side Panel, MV and Standard Color Corrector settings

◆ **Quad Link 4K Input / Output**

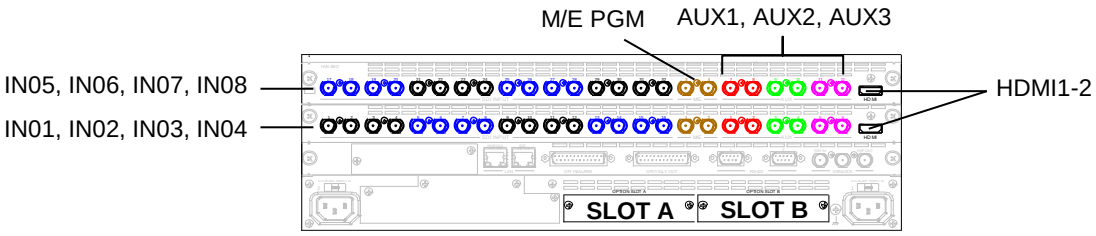
59.94 / 50p (3G-SDI)

29.97 / 25 / 24 / 23.98 p/PsF (1.5G-SDI)

59.94 / 50i (1.5G-SDI)

Input / Output	Signal name	Connector			
SQD		Top-left	Top-right	Bottom-left	Bottom-right
2SI		Link 1	Link 2	Link 3	Link 4
SDI input	IN01	IN1	IN2	IN3	IN4
	IN02	IN5	IN6	IN7	IN8
	|	|	|	|	|
	IN10	IN37	IN38	IN39	IN40
SDI output	OUT1 (*1)	M/E1	M/E2	M/E3	M/E4
	AUX01	AUX1	AUX2	AUX7	AUX8
	AUX02	AUX3	AUX4	AUX9	AUX10
	AUX03	AUX5	AUX6	AUX11	AUX12
	AUX04	AUX13	AUX14	AUX17	AUX18
HDMI output	HDMI 1 HDMI 2	HDMI 1 HDMI 2			

(*1) M/E1 PGM only



◆ **Dual Link 4K Input / Output**

29.97 / 25 / 24 / 23.98 p (3G-SDI)

Input / Output	Signal name	Connector	
2SI		Link 1	Link 2
SDI input	IN01	IN1	IN3
	IN02	IN5	IN7
	|	|	|
	IN10	IN37	IN39
SDI output	OUT1 (*1)	M/E1	M/E3
	AUX01	AUX1	AUX7
	AUX02	AUX3	AUX9
	AUX03	AUX5	AUX11
	AUX04	AUX13	AUX17

(*1) M/E1 PGM only

◆ Multiviewer Function in 4K Mode

The multiviewer function is restricted in SQD mode

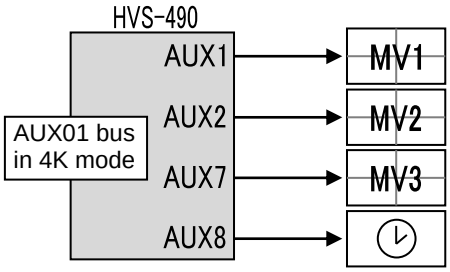
✓: Available, ---: Unavailable

Function	4K-SQD mode	4K-2SI mode
Number of windows	1, 2, 4	2, 4, 5, 7, 9, 10, 11, 13, 16
Audio Level Meter	---	✓
Border	---	✓
Tally	---	✓
Clock	✓	✓

Multiview output

To display multiview images in 4K mode using an AUX bus, select **MV1 OUT** (only one selection) for signal, then four HD images (MV1, MV2, MV3 and Clock) are output from four AUX ports.

AUX bus	Connector			
	MV1	MV2	MV3	Clock
AUX01	AUX1	AUX2	AUX7	AUX8
AUX02	AUX3	AUX4	AUX9	AUX10
AUX03	AUX5	AUX6	AUX11	AUX12
AUX04	AUX13	AUX14	AUX17	AUX18



The MV output format is the same as that set in the [SETUP > SYSTEM > FORMAT] menu.

26-3. Payload ID (3G-SDI (2SI))

In 3G-SDI (2SI) mode, payload identifiers, which enables to identify SDI payloads (video content), are available. The switcher can verify the 4K input content using payload ID codes and insert or pass-through payload ID codes into 4K output signals.

◆ Verifying 4K Input Signal Status

The [STATUS > 4K-2SI LINK STATUS] menu allows you to verify the 4K input status. Errors are indicated if no or incorrect signals are input.

Item	Display	Description
IN01-10	OK	Correct 4K 2SI signals are input.
	L 1, L 2, L 3, L 4	Incorrect link channels are highlighted.
	---	Indicates one of the following conditions. - No signal is present. - Other than 4K 2SI signal is present.

◆ Inserting Payload ID Codes into 4K Output Signals

PAYLOAD ID in [SETUP > OUTPUT > ANCILLARY] menu PAGE 3 allows you to select the payload information and its location to be inserted suitable to the input signal content.

For example, if 4K video signals have payload identification codes in Y data and audio in C data, select **THROUGH** or **SET (Y)**.

Setting	Description
SET (Y)	Inserts generated payload ID codes into Y data streams.
SET (Y/C)	Inserts generated payload ID codes into both Y and C data streams.
THROUGH	Passes through input payload ID codes into output.

27. Status Information

The STATUS menu indicates the current status of the cooling fan and power and the versions of hardware and software.

27-1. Checking Verifying Versions

To verify software/firmware versions, open the [STATUS > VERSION] menu. Before upgrading the switcher, be sure to check the relevant versions in this menu.

Device	Item		Description
HVS-492OU HVS-492WOU HVS-492ROU	OU SOFT	OU GUI	Software version
	OU HARD	FPGA1-2	FPGA firmware version
HVS-490	S/N		Serial Number
	MU SOFT	MAIN WEB BOOT LOADER APP OS MV FONT	Software version
	MU HARD	CPU CONFIG GENLOCK INPUT OUTPUT M/E1-2 EFF1-2 MV1-2	FPGA firmware version

27-2. Checking Alarm Status

Open the [STATUS > ALARM] menu.

MU/OU	Item	Display	Description
OU	POWER SUPPLY1 POWER SUPPLY2	SUPPLIED	Indicates that power works properly.
		ERROR	Indicates that power has failed. Power off the switcher and consult your FOR-A reseller.
		NOT INSTALLED	Indicates that the power unit is not installed.
MU	POWER SUPPLY1 POWER SUPPLY2	SUPPLIED	Indicates that power works properly.
		ERROR	Indicates that power has failed. Power off the switcher and consult your FOR-A reseller.
		NOT INSTALLED	Indicates that the power unit is not installed.
	FAN1-6	NORMAL	Indicates fans are working properly.
		ERROR	Indicates a fan has failed. Power off the switcher and consult your FOR-A reseller.
	GENLOCK	EXTERNAL LOCKED	Genlock signal is present and locks video signals.
		INTERNAL LOCKED	The switcher operates in free-running. A genlock signal is not present or incorrect signal is input.

27-3. Installed Options

Open the [STATUS > OPTION] menu to verify the installed optional cards and software.

MU H/W	Display	Description
HVS-49IO	NOT INSTALLED	No card installed in the slot.
	INSTALLED	The card is installed in the slot.
IN SLOT-A IN SLOT-B	NOT INSTALLED	No card installed in the slot.
	(Card name)	A card is installed and its name is displayed.
HVS-49DVE HVS-49SSD	NOT INSTALLED	No card installed in the slot.
	INSTALLED	The card is installed in the slot.

MU S/W License	Display	Description
HVS-49EXP4K HVS-49SD HVS-49ED	NOT INSTALLED	No optional software is installed.
	INSTALLED	The option software is installed.

28. Updating the System Software

Consult your FOR-A supplier in order to update or upgrade your switcher.

29. Troubleshooting

If any of the following problems occur while operating your system, proceed as indicated below to see if the problem can be corrected, first before assuming a unit malfunction has occurred.

Problem	Check	Action
Cannot control the switcher.	Power switch / cord	Refer to Sec. 2-2. ”Power ON” to supply AC power and turn on power switches.
	MU/OU connection	Refer to Sec. 2-1. Basic Connection Example to connect the MU and OU with control cable supplied with the OU.
	Are IP addresses set correctly?	If DISCONNECTED is displayed at the upper right corner of the menu screen, refer to Sec. 4-1-3. “Control Panel” to set the OU IP address and MU IP address. If using a network hub, do not duplicate IP addresses.
	Is LOCK flashing ?	Press and hold LOCK to unlock the LOCK mode.
Abnormal video images	System video format setting	Refer to Sec. 23-1. “Selecting a System Mode” to set your system video format.
ALARM indicator lit red.	Does a fan stop?	Refer to Sec. 27-2. “Checking Alarm Status” to check the alarm status.
Very slow touch panel response	Is a protective film still on the screen?	Remove the protective film.

30. Specifications and Dimensions

30-1. Specifications

M/E buses	2M/E
Control panels	HVS-492WOU: 2M/E 22 buttons HVS-492OU: 2M/E 18 buttons HVS-492ROU: 2M/E 12 buttons
Video formats	1.5G-SDI: 1080/59.94i, 1080/50i, 1080/29.97PsF, 1080/29.97p, 1080/25PsF, 1080/25p, 1080/24p, 1080/24PsF, 1080/23.98p, 1080/23.98PsF, 720/59.94p, 720/50p 3G-SDI : 1080/59.94p, 1080/50p (Level-A)
HVS-49SD	SD-SDI: 525/60 (NTSC), 625/50 (PAL)
Video inputs	HD-SDI: 1.5 Gbps or 3G-SDI : 3 Gbps 75Ω BNC x 16, (frame synchronizer x 16, scaler x 4)
Video inputs (optional)	
HVS-49SD	SD-SDI: 270 Mbps
HVS-49IO	HD-SDI: 1.5 Gbps or 3G-SDI : 3 Gbps 75Ω BNC x 16 (frame synchronizer x 16, scaler x 4)
HVS-100DI-A	HD-SDI (1.5 Gbps) or 3G-SDI : 3 Gbps 75Ω BNC x 4
HVS-100AI	HD/SD analog component or analog composite 1.0 Vp-p 2 inputs BNC
HVS-100PCI	HDMI 1.2 (TYPE A) x 2, VGA x 1 1080p: HDTV 1080i, 1080PsF: XGA to WUXGA, HDTV 720p: XGA to WXGA, HDTV SD: VGA, SVGA, SDTV
Number of video input	Standard: 16 (SDI only) / Max.: 40 (varies depending on optional configuration)
Video outputs	HD-SDI: 1.5 Gbps or 3G-SDI : 3 Gbps 75Ω BNC x 8, (PGM x 2, AUX x 6), HDMI 2.0 Level-B (TYPE A) x 1 (HDCP-incompatible. AUDIO support)
Video outputs (optional)	
HVS-49SD	SD-SDI: 270 Mbps
HVS-49IO	HD-SDI: 1.5 Gbps or 3G-SDI : 3 Gbps 75Ω BNC x 8 (PGM x 2, AUX x 6), HDMI 2.0 Level-B (TYPE A) x 1 (HDCP-incompatible. AUDIO support)
HVS-100DO	HD-SDI (1.5 Gbps) or 3G-SDI (3 Gbps), BNC x 2, 75Ω
HVS-100AO	HD/SD analog component or analog composite 1.0 Vp-p 2 outputs BNC
HVS-100PCO	HDMI 1.2 (TYPE A) x 2, VGA x 1
(HDMI)	1080p: SXGA to WUXGA (1080p/25, 29.97), HDTV 1080i, 1080PsF: SXGA to WUXGA, HDTV 720p: SXGA, WXGA, HDTV SD: SVGA, SDTV
(VGA)	1080i, 1080PsF: SXGA to WUXGA, HDTV 720p: SXGA, WXGA, HDTV SD: SVGA
Number of video outputs	Standard: 9 (SDI x 8 + HDMI x 1) / Max.: 22 (varies depending on optional configuration)
AUX	Standard: 6, Max.: 12 * Effect transitions available for all AUX signal changes
Processing	4:2:2, digital component
Quantization	3G/HD/SD-SDI: 10-bit

Multi viewer	Output channels: 3 (SD formats: 2) Split display: 2/4/5/7/9/10/11/14/15/16 (Max. 49 via HDMI 2.0 Level B) Display: Title, tally, audio level meter
Process amplifier	Equipped with all inputs
Still/clip store	4 channels
2.5D DVE	16 channels (8 channels in 1080/59.94p, 50p with bus restrictions) * 16 channels with HVS-49DVE option
Transitions	Available controller: Fader controller, AUTO button, CUT button Type: MIX or WIPE (DVE included)
Genlock input	BB: 0.429 Vp-p (NTSC)/0.45 Vp-p (PAL) or Tri-level sync: ±0.3 Vp-p, 75 Ω, BNC x1, loop-through (to be terminated with 75Ω terminator, if unused)
Genlock output	BB: 0.429 Vp-p (NTSC)/0.45 Vp-p (PAL) or Tri-sync: 0.6 Vp-p, 75Ω, BNC x 1
System phase adjustment	Horizontal: -1/2H to +1/2H
Video I/O delay	Minimum delay (Approx. 1.4H) * 720/59.94p (Approx. 1.7H), 720/50p (Approx. 1.8H), SD (Approx. 2.6H) 0 to 1 frames + Minimum delay (when FS or input re-sizing engine used) 1 to 2 frames + Minimum delay (when FS or input re-sizing engine plus DVE used) 2 to 3 frames + Minimum delay (when FS or input re-sizing engine plus output re-sizing engine plus DVE used)
External memory	SD-CARD slot
Audio Input (optional)	
HVS-49AES (AES/EBU)	Balanced, 0.2-7 Vp-p, 110Ω, 25-pin D-Sub (female) x 1, input/output, 4 stereo channel pairs, 32/44.1/48 kHz, 16-bit to 24-bit or Unbalanced, 1.0 Vp-p, 75Ω, BNC x 4, 4 stereo channel pairs, 32/44.1/48 kHz, 16-bit to 24-bit
Audio Output (optional)	
HVS-49AES (AES/EBU)	Balanced, 3.3 Vp-p, 110Ω, 25-pin D-Sub (female) x 1, input/output, 4 stereo channel pairs, 48 kHz, 24-bit Unbalanced, 1.0 Vp-p, 75Ω, BNC x 4, 4 stereo channel pairs, 48 kHz, 24-bit
Audio Delay	0 - 85 ms (adjustable in 1 ms steps)
Audio Processing Functions	Sampling rate converter (SRC), Gain control
Interface	
LAN HVS (OU) LAN EXT	10/100BASE-TX, RJ-45 x 2 For OU and other external control unit connection
GPI IN/ALARM	25-pin D-sub (female) x 1 (inch screw) 19 inputs
GPI/TALLY OUT	25-pin D-sub (female) x 1 (inch screw) 22 outputs
RS-422	9-pin D-sub (female) x 2 (inch screw) *For router connection
HVS LAN	HVS-492OU/492WOU/492ROU: 10/100BASE-TX, RJ-45 x 1
GPI I/O	HVS-492OU/492WOU/492ROU: 15-pin D-sub (female) x 1 (inch screw), 6 inputs/6 outputs
Temperature/humidity	0°C to 40°C/10% to 90% (no condensation)
Power	AC 100 V to 240 V±10%, 50/60 Hz
Consumption	HVS-490 (standard): 508 W (at 100-120 V), 452 W (at 220-240 V) HVS-490 (full option): 780 W (at 100-120 V), 723 W (at 220-240 V) HVS-492OU: 27 W (at 100-120 V), 28 W (at 220-240 V) HVS-492WOU: 30 W (at 100-120 V), 28 W (at 220-240 V) HVS-492ROU: 20 W (at 100-120 V), 18 W (at 220-240 V)

Size/weight	HVS-490: 429 (W) mm x 132 (H) mm x 490 (D) mm HVS-492OU: 646 (W) mm x 510 (H) mm x 132 (D) mm HVS-492WOU: 844 (W) mm x 484 (H) mm x 132 (D) mm HVS-492ROU: 430 (W) mm x 474 (H) mm x 132 (D) mm	
Weight	HVS-490 : 17 kg (With all options: 23 kg) HVS-492OU : 11 kg (With redundant power supply: 11 kg) HVS-492WOU : 12 kg (With redundant power supply: 13 kg) HVS-492ROU: 7 kg (With redundant power supply: 8 kg)	
Consumables	HVS-490	Power supply unit: Replace every 5 years. Cooling fans: Replace every 4 years.
	HVS-492OU	Power supply unit: Replace every 5 years.
	HVS-492WOU	Power supply unit: Replace every 5 years.
	HVS-492ROU	Power supply unit: Replace every 5 years.

4K Mode

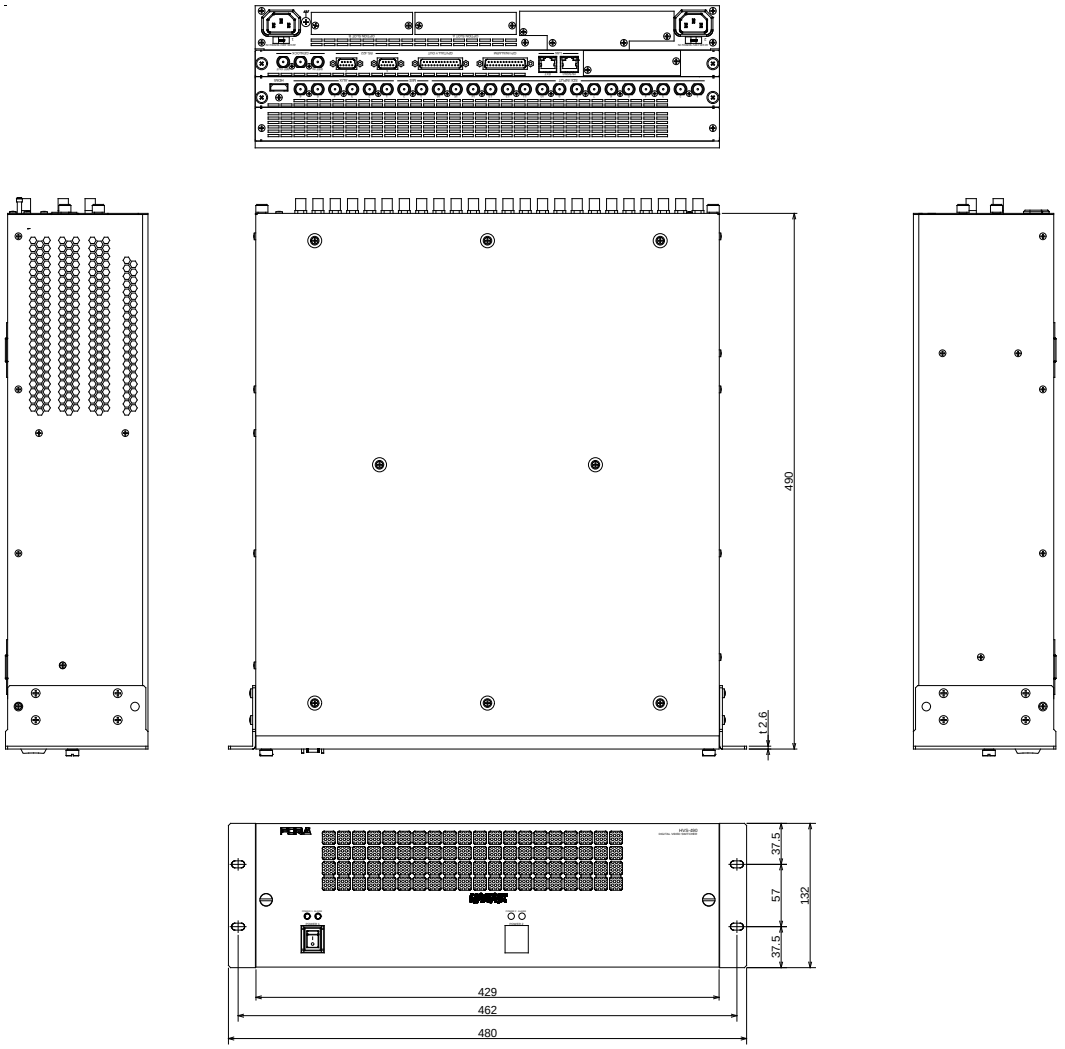
4K UHD (3840 x 2160)	**59.94 / 50p** Quad Link 3G-SDI Level-A/B-DL (2SI/SQD) 4:2:2 YCbCr 10-bit * Level-B-DL input signals are output as Level-A signals. **29.97 / 25 / 24 / 23.98p** Dual Link 3G-Level-B-DS (2SI) 4:2:2 YCbCr 10-bit Quad Link 1.5G-SDI (SQD) 4:2:2 YCbCr 10-bit **29.97 / 25 / 24 / 23.98 PsF** **59.94 / 50i** Quad Link 1.5G-SDI (SQD) 4:2:2 YCbCr 10-bit
SDI input	8 inputs (Max 10 inputs) * Frame synchronizer on each input
SDI output	4 outputs (Max 5 outputs)
HDMI output	2 outputs HDMI2.0 Level-B (YUV 4:2:0)
WIPE pattern	Available (limited patterns)
WIPE modify	Same manner as working in normal (HD) mode (Only borders available in SQD mode)
Transition	Execution: Fader lever, AUTO or CUT button Type: MIX and WIPE
DVE	Available in 2SI mode 4 channels (2 channels for 1080/59.94p and 50p signals) * With HVS-49DVE option installed 5 channels (4 channels for 1080/59.94p and 50p signals)
KEYER	2 channels (KEY1 and KEY2) Luminance, Full, and Bus keying and Box mask Pattern mask and EDGE (Available in 2SI mode)
FLEXaKEY	One channel Luminance, Full, and Bus key Displayed on M/E or AUX
Chromakey	1 channel (59.94p, 50p unsupported)
Sub Effects	1 channel (59.94p, 50p unsupported) Mosaic and Defocus available only in 2SI mode.
Color Corrector	1 channel
Multiviewer	3 channels (2K output) Layout patterns limited
UTILITY	1 channel
STILL	1 channel INPUT STILL available for all inputs
Event memory	100 events: Crossfade switching available during event recall * Event data in Normal mode are unavailable.
Macro	Same as in normal mode
Genlock Input	Same as in normal mode

System Phase Adjust	Same as in normal mode
Genlock Output	Same as in normal mode
I/O Delay	Same as in normal mode
Unavailable functions	Side panel MELite re-entry into M/E, KEYER or FLEXaKEY is disabled in SQD mode.
Parameters to be reset by switching to 4K mode	M/E 1, M/E 2, AUX and MELite settings KEY LINK and FLEXaKEY settings Side Panel, MV and Standard Color Corrector settings

30-2. External Dimensions

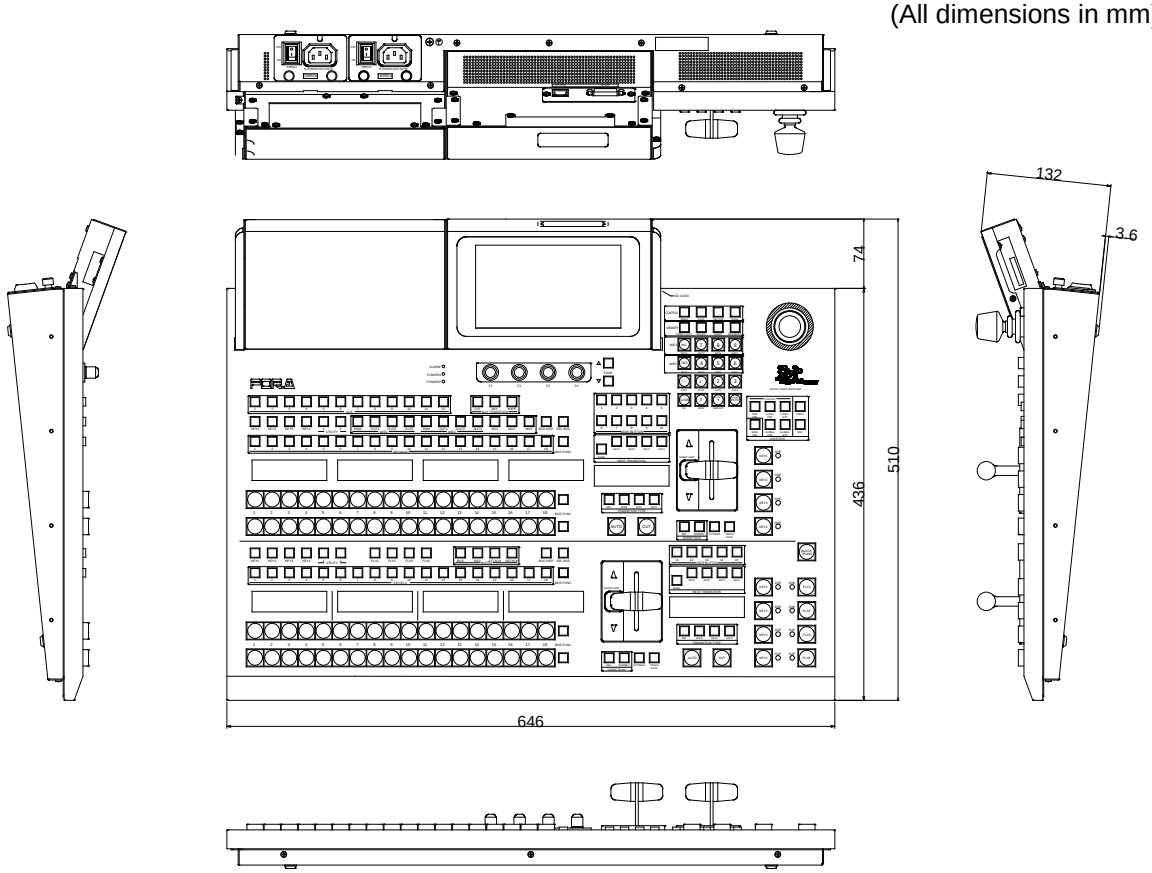
30-2-1. HVS-490

(All dimensions in mm)



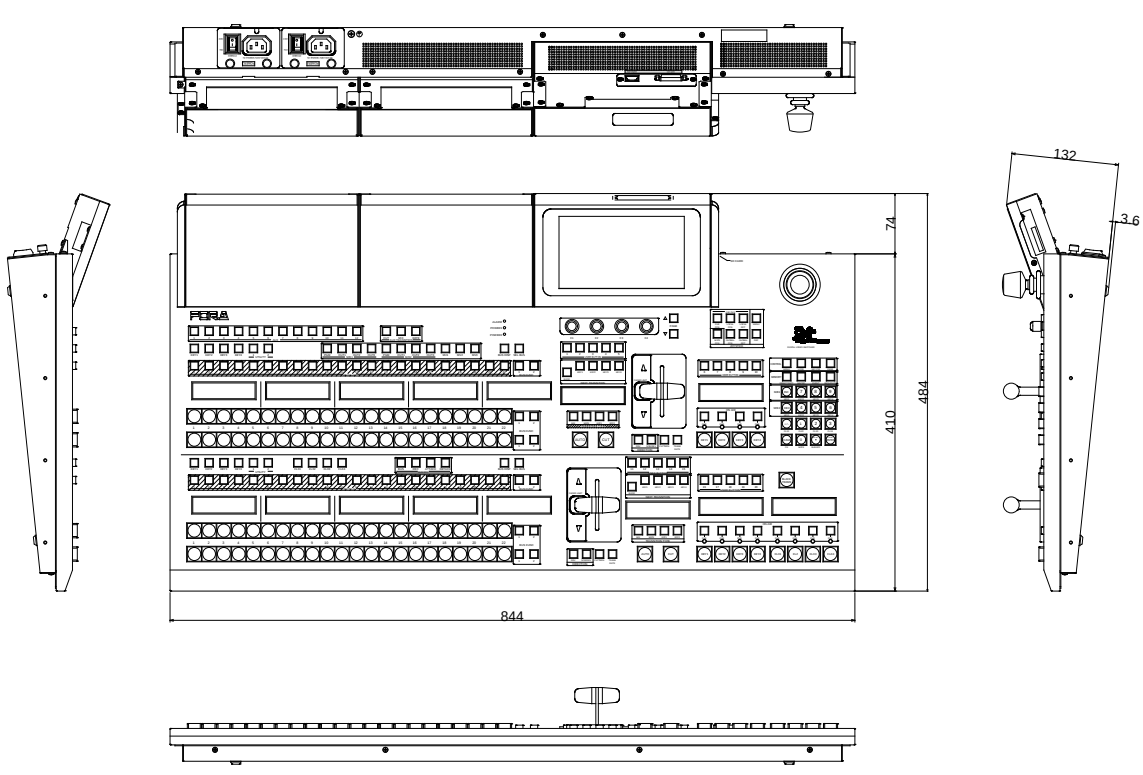
30-2-2. HVS-492OU

(All dimensions in mm)



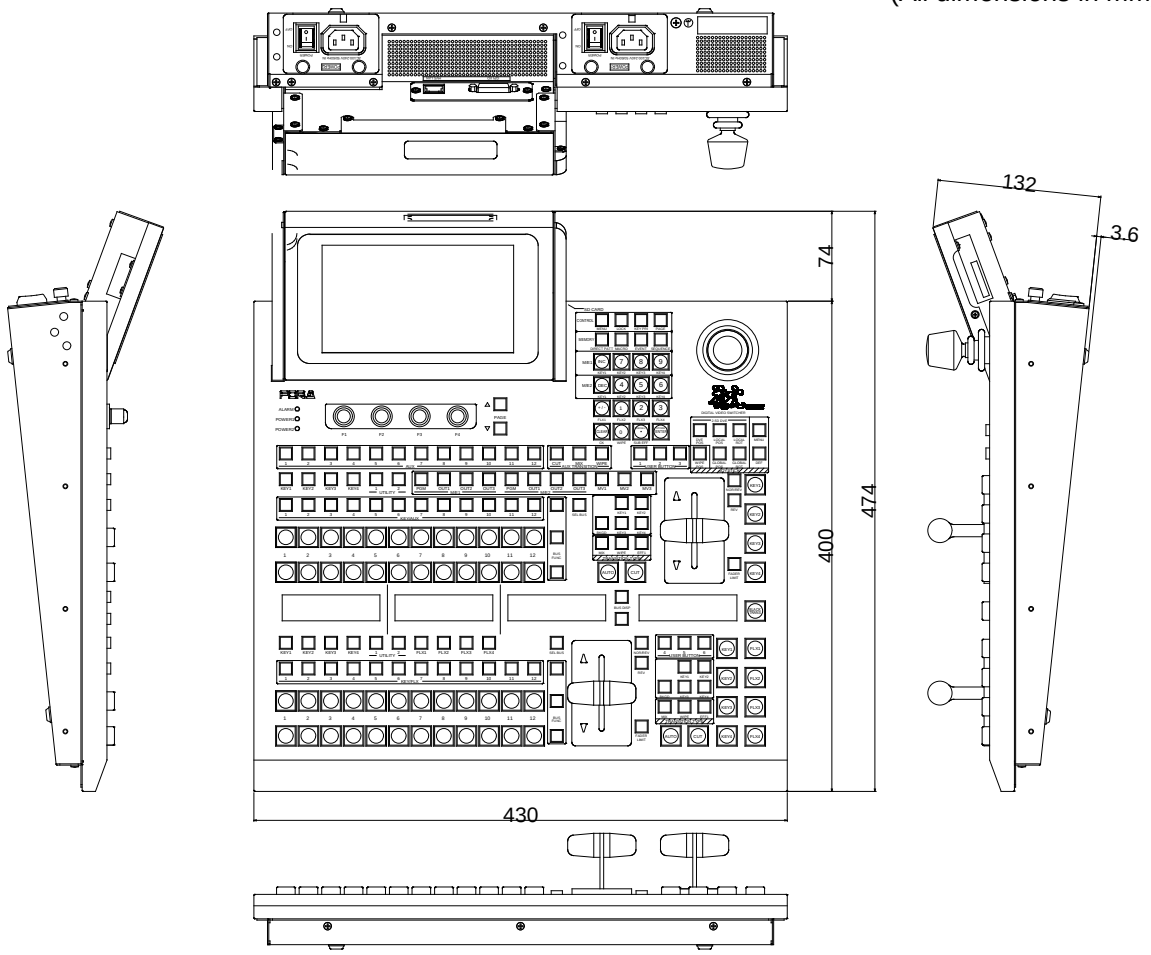
30-2-3. HVS-492WOU

(All dimensions in mm)



30-2-4. HVS-492ROU

(All dimensions in mm)



Appendix 1. User Button Functions

◆ **Assignable Menu Pages**

When MENU is selected for TYPE:	
FUNC setting	Setting (menu page)
HOME - HOME	HOME
SYSTEM	[SETUP > SYSTEM]
SYSTEM - RS-422	[SETUP > SYSTEM > RS-422]
SYSTEM - KEY SET	[SETUP > SYSTEM > KEY SET]
SYSTEM - INIT	[SETUP > SYSTEM > INIT]
PANEL – TRANS CONTROL	[PANEL > TRANS CONTROL]
PANEL – BUS CONTROL	[PANEL > BUS CONTROL]
PANEL - BUS ASSIGN	[PANEL > BUS ASSIGN]
PANEL - COLOR PALETTE	[PANEL > COLOR PALETTE]
PANEL - USER BUTTON	[PANEL > USER BUTTON]
PANEL - MACRO ASSIGN	[PANEL > MACRO ASSIGN]
PANEL - MACRO ATTACH	[PANEL > MACRO ATTACH]
INPUT - SIGNAL	[SETUP > INPUT > SIGNAL]
INPUT - PROCESS AMP	[SETUP > INPUT > PROCESS AMP]
INPUT - NAME	[SETUP > INPUT > NAME]
INPUT - SIGNAL COLOR	[SETUP > INPUT > SIGNAL COLOR]
OUTPUT - CLEAN PREVIEW	[SETUP > OUTPUT > CLEAN PREVIEW]
OUTPUT - MARKER	[SETUP > OUTPUT > MARKER]
OUTPUT - ANCI	[SETUP > OUTPUT > ANCILLARY BYPASS]
OUTPUT – AUX OUT	[SETUP > OUTPUT > AUX OUT]
OUTPUT - PROCESS AMP	[SETUP > OUTPUT > PROCESS AMP]
OUTPUT - NAME	[SETUP > OUTPUT > NAME]
MULTI VIEWER - MULTI VIEWER1	[SETUP > MULTI VIEWER > MV1]
MULTI VIEWER - MULTI VIEWER2	[SETUP > MULTI VIEWER > MV2]
MULTI VIEWER - MULTI VIEWER3	[SETUP > MULTI VIEWER > MV3]
GPI TALLY - TALLY COLOR	[SETUP > GPI TALLY > TALLY COLOR]
GPI TALLY - GPI IN	[SETUP > GPI TALLY > GPI IN]
GPI TALLY - GPI OUT	[SETUP > GPI TALLY > GPI OUT]
GPI TALLY - TALLY UNIT	[SETUP > GPI TALLY > TALLY UNIT]
GPI TALLY - USER FLAG	[SETUP > GPI TALLY > USER FLAG]
GPI TALLY - EXT TALLY	[SETUP > GPI TALLY > EXT TALLY]
BUS LINK - BUS LINK	[SETUP > BUS LINK > BUS LINK]
BUS LINK - TRANS LINK	[SETUP > BUS LINK > TRANS LINK]
COLOR CORRECT1	[SETUP > COLOR CORRECT > CC1]
COLOR CORRECT2	[SETUP > COLOR CORRECT > CC2]
COLOR CORRECT3	[SETUP > COLOR CORRECT > CC3]
COLOR CORRECT4	[SETUP > COLOR CORRECT > CC4]
AUDIO - AES IN	[SETUP > AUDIO > AES IN]
AUDIO - AES OUT	[SETUP > AUDIO > AES OUT]
EDITOR - EDITOR	[SETUP > EDITOR > EDITOR]
EDITOR - USER REGISTER	[SETUP > EDITOR > USER REGISTER]
VTR1	[SETUP > VTR > VTR1]
VTR2	[SETUP > VTR > VTR2]
VDCP1	[SETUP > VDCP > VDCP1]
VDCP2	[SETUP > VDCP > VDCP2]
VDCP3	[SETUP > VDCP > VDCP3]
VDCP4	[SETUP > VDCP > VDCP4]
FILE - DATA BACKUP	[FILE > DATA BACKUP]

FILE - LOAD	[FILE > LOAD]
FILE - SAVE	[FILE > SAVE]
STATUS - VERSION	[STATUS > VERSION]
STATUS - ALARM	[STATUS > ALARM]
STATUS - OPTION	[STATUS > OPTION]
TRANS - TRANS	[TRANS]
TRANS - BLACK TRANS	[BLACK TRANS]
KEYER - SRC INS	[SRC INS]
KEYER - MASK	[MASK]
KEYER - EDGE	[EDGE]
KEYER - PRIORITY	[PRIORITY]
KEYER - INIT	[INIT]
FLEXaKEY ASSIGN	[M/E/FLEXaKEY > FLX1 > TRANS > ASSIGN]
WIPE MODIFY - BORDER	[MODIFY > WIPE BORDER]
WIPE MODIFY - POS/ANGLE	[MODIFY > WIPE POS/ANGLE]
WIPE MODIFY - INIT	[MODIFY > WIPE INIT]
DVE MODIFY - POS/SIZE	[MODIFY > DVE POS/SIZE]
DVE MODIFY - ROTATION	[MODIFY > DVE ROTATION]
DVE MODIFY - BORDER	[MODIFY > DVE BORDER]
DVE MODIFY - INIT	[MODIFY > DVE INIT]
CG WIPE MODIFY	[MODIFY > CG WIPE MODIFY]
AUX TRANS	[EFFECT/MELite > AUX1(2-12) > TRANS]
MELite	[SETUP > OUTPUT > MELite]
SUB EFFECT1	[EFFECT/MELite > SUB EFFECT1]
SUB EFFECT2	[EFFECT/MELite > SUB EFFECT2]
SUB EFFECT3	[EFFECT/MELite > SUB EFFECT3]
SUB EFFECT4	[EFFECT/MELite > SUB EFFECT4]
CHROMA KEY1	[EFFECT/MELite > CHROMA KEY1]
CHROMA KEY2	[EFFECT/MELite > CHROMA KEY2]
CHROMA KEY3	[EFFECT/MELite > CHROMA KEY3]
CHROMA KEY4	[EFFECT/MELite > CHROMA KEY4]
MATTE	[EFFECT/MELite > MATTE1]
GRADIENT MATTE	[SETUP > MATTE > GRADIENT MATTE COLOR1]
COPY SWAP - COPY	[COPY SWAP]
COPY SWAP - SWAP	[COPY SWAP]
STILL - STILL CLIP	[STILL/CLIP > STILL CLIP]
STILL - INPUT	[STILL/CLIP > INPUT STILL]
SEQUENCE - FILE	[SEQUENCE > FILE]
SEQUENCE - EDIT	[SEQUENCE > EDIT]

◆ **Assignable functions**

When AUX is selected for TYPE:		
Setting	Function	Button Indication
AUX1-20 MARKER ENABLE	Displays safety area markers.	ON: Lit orange, OFF: Half-lit
AUX1-12 TRANS ENABLE	Enables AUX bus transitions.	

When GPIO is selected for TYPE:		
Setting	Function	Button Indication
USER FLAG1-60(PUSH)	Represents the ON/OFF setting for each USER FLAG1-60 assigned to a connector pin. The function is enabled whenever the relevant USER button is pressed.	Lit when pushed, unless Half-lit.
USER FLAG1-60(TOGGLE)	Represents the ON/OFF setting for each USER FLAG1-60 assigned to a connector pin. The function is enabled or disabled each time the relevant USER button is pressed.	ON: Lit orange, OFF: Half-lit

When KEYER is selected for TYPE:		
Setting	Function	Button Indication
M/E1-2 KEY1-4 LINE DVE ENABLE	Enables LINE DVE.	ON: Lit orange, OFF: Half-lit
FLEXaKEY1-4 LINE DVE ENABLE		
M/E1-2 KEY 1-4 BOX MASK AND	Sets AND type BOX MASK On/Off.	
FLEXaKEY 1-4 BOX MASK AND		
M/E1-2 KEY 1-4 BOX MASK OR	Sets OR type BOX MASK On/Off.	
FLEXaKEY 1-4 BOX MASK OR		
M/E1-2 KEY 1-4 EDGE NORMAL	Sets Normal Edge On/Off.	
M/E1-2 KEY 1-4 EDGE OUTLINE	Sets Outline Edge On/Off.	
M/E1-2 KEY 1-4 EDGE SHADOW	Sets Drop Shadow On/Off.	
CURRENT LINE KEY1-4 LINE DVE	Enables LINE DVE.	

When STILL is selected for TYPE:		
Setting	Function	Button Indication
STILL1-4 STORE	Performs still captures.	Always lit orange
INPUT STILL1-40 STORE	Captures and saves a still image for INPUT STILL 1 to 40. To cancel the still display and restore video, long press a button.	INPUT STILL ON: Lit orange INPUT STILL OFF: Half-lit
CLIP 1-4 PLAY	Begins to play the recorded clip or pauses the playback/recording.	Always lit orange
CLIP 1-4 STOP	Stops clip playback and cues to IN point.	
CLIP 1-4 REC	Begins to record video.	
INPUT STILL CAPTURE	To capture and display INPUT STILL images (ON) press an input button (IN1-40) on the KEY/AUX or KEY/FLX bus with this button held down. To cancel the still display and restore video, long press a button (IN1-40).	Lit orange while capturing, unless half-lit

When EVENT is selected for TYPE:		
Setting	Function	Button Indication
EVENT NO.00-99 RECALL	Loads an event.	Event stored: Lit Event not stored: Half-lit

When VTR/VDCP is selected for TYPE:		
Setting	Function	Button Indication
VTR1-2 SELECT	Selects a VTR channel. The current control connection is cancelled.	Lit orange while selected, unless half-lit.
VTR REW	Operates the VTR through the control channel.	Functioning: Lit orange unless half-lit
VTR PLAY		
VTR PAUSE		
VTR FWD		
VTR STOP		
VTR REC		
VTR GOTO TOP		
VDCP1-4 SELECT	Selects a VDCP channel. The current control connection is cancelled.	Lit orange while selected, unless half-lit.
VDCP REW	Operates the VDCP device through the control channel.	Functioning: Lit orange unless half-lit
VDCP PLAY		
VDCP PAUSE		
VDCP FWD		
VDCP STOP		
VDCP REC		
VDCP GOTO TOP		

<table>
<tr><td colspan="4">When OTHER is selected for TYPE:</td></tr>
<tr><th>Setting</th><th colspan="2">Function</th><th>Button Indication</th></tr>
<tr><td>FLEXaKEY1-4 NEXT BUTTON</td><td colspan="2">Selects FLEXaKEY1-4 as the next transition.</td><td rowspan="5">NEXT ON: Lit orange
NEXT OFF: Half-lit</td></tr>
<tr><td>ONSTAGE NEXT SELBUS M/E</td><td colspan="2">Set the M/E bus assigned to the LINE as the ONStage next transition</td></tr>
<tr><td>ONSTAGE NEXT M/E1</td><td colspan="2" rowspan="3">Sets the M/E bus to the ONStage next transition.</td></tr>
<tr><td>ONSTAGE NEXT M/E2</td></tr>
<tr><td>ONSTAGE NEXT AUX1-12</td></tr>
<tr><td>M/E1 CG WIPE ENABLE</td><td colspan="2" rowspan="2">Enables CG WIPE.</td><td rowspan="5">ON: Lit orange,
OFF: Half-lit</td></tr>
<tr><td>M/E2 CG WIPE ENABLE</td></tr>
<tr><td>EDITOR ENABLE</td><td colspan="2">Enables editor control.</td></tr>
<tr><td>BUTTON INHIBIT ENABLE</td><td colspan="2">Disables the bus buttons located in the same LINE (M/E) of the user button.</td></tr>
<tr><td>BUS LINK ENABLE</td><td colspan="2">Enables BUS LINK.</td></tr>
<tr><td>TRANS LINK ENABLE</td><td colspan="2">Enables TRANS LINK.</td><td></td></tr>
<tr><td>MACRO ATTACH DISABLE</td><td colspan="2">Temporarily disables an attached macro.</td><td>Flashing orange while disabled</td></tr>
<tr><td>LINE CONTROL SELECT M/E1</td><td colspan="2" rowspan="3">Assigns an M/E to the selected LINE.</td><td rowspan="3">Lit green while selected, unless half-lit.</td></tr>
<tr><td>LINE CONTROL SELECT M/E2</td></tr>
<tr><td>LINE CONTROL SELECT AUX1-12</td></tr>
<tr><td>JOYSTICK DVE CROP L/T</td><td>Enables DVE CROP TOP/LEFT operation using a joystick.</td><td rowspan="2">Enables DVE CROP L/T/R/B operation by pressing both together.</td><td rowspan="4">Lit orange while selected, unless half-lit.</td></tr>
<tr><td>JOYSTICK DVE CROP R/B</td><td>Enables DVE CROP BOTTOM/RIGHT operation using a joystick.</td></tr>
<tr><td>JOYSTICK BOX MASK L/T</td><td>Enables BOX MASK TOP/LEFT operation using a joystick.</td><td rowspan="2">Enables BOX MASK L/T/R/B operation by pressing both together.</td></tr>
<tr><td>JOYSTICK BOX MASK R/B</td><td>Enables BOX MASK BOTTOM/RIGNT operation using a joystick.</td></tr>
</table>

Appendix 2 GPI/GPO/TALLY Function Lists

◆ **GPI IN Functions**

FUNCTION setting	TARGET setting	Triggers
NONE	NONE	No function is assigned.
AUTO TRANS	M/E1 BKGD M/E1 KEY1-4 M/E2 BKGD M/E2 KEY1-4 FLEXaKEY1-4 AUX1-12 M/E1-2 NEXT AUX1-12 NEXT	Performs AUTO transitions.
CUT TRANS		Performs CUT transitions.
CUT/AUTO TRANS		Holding down AUTO performs AUTO transitions. Pressing AUTO performs CUT transitions.
KEY ON	M/E1 KEY1-4 M/E2 KEY1-4 FLEXaKEY1-4	KEY ON
KEY OFF		KEY OFF
TRANS TYPE MIX	M/E1 BKGD M/E1 KEY1-4 M/E2 BKGD M/E2 KEY1-4 FLEXaKEY1-4 AUX1-12 M/E1-2 NEXT AUX1-12 NEXT	Changes transition type to MIX.
TRANS TYPE WIPE	M/E1 BKGD M/E1 KEY1-4 M/E2 BKGD M/E2 KEY1-4 AUX1-12	Changes transition type to WIPE.
TRANS TYPE FAM	M/E1 BKGD M/E1 KEY1-4 M/E2 BKGD M/E2 KEY1-4	Changes transition type to FAM.
TRANS TYPE NAM		Changes transition type to NAM.
TRANS TYPE PRESET BLACK	M/E2 BKGD	Changes transition type to PRESET BLACK.
BLACK TRANS	M/E2	Performs BLACK transitions.
AUX TRANS ENABLE	AUX01-12	Enables AUX transitions.
AUX TRANS DISABLE		Disables AUX transitions.
AUX TRANS CUT	AUX01-12	Sets AUX transition type to CUT.
AUX TRANS MIX		Sets AUX transition type to MIX.
AUX TRANS WIPE		Sets AUX transition type to WIPE.
FLX1 ASSIGN	M/E1, 2 AUX01-12	Changes FLEXaKEY1 output target.
FLX2 ASSIGN		Changes FLEXaKEY2 output target.
FLX3 ASSIGN		Changes FLEXaKEY3 output target.
FLX4 ASSIGN		Changes FLEXaKEY4 output target.
MELite1 ASSIGN	AUX01-06	Changes MELite assignments.
MELite2 ASSIGN		
MELite3 ASSIGN	AUX07-12	
MELite4 ASSIGN		
EDITOR ENABLE	ON, OFF	Enables/disables editor control.
USER FLAG ON	1-60	Turns USER FLAG to ON.
USER FLAG OFF		Turns USER FLAG to OFF.
USER FLAG TOGGLE		Turn USER FLAG ON/OFF.
MACRO PLAY (CH1-4)	0-99	Executes macros. (CH4 is dedicated for remote control.)
EVENT RECALL	0-99	Recalls events.

M/E1 PGM XPT	XPT	Changes M/E1 PGM signal selection.
M/E1 PST XPT		Changes M/E1 PST signal selection.
M/E2 PGM XPT		Changes M/E2 PGM signal selection.
M/E2 PST XPT		Changes M/E2 PST signal selection.
AUX01-20 XPT		Changes AUX01-20 signal selection.
AUX01-16 PST XPT		Changes AUX01-16 PST signal selection.

◆ **GPI OUT Functions**

FUNCTION setting	TARGET setting	Description
NONE	NONE	No function is assigned
TRANS PROC	M/E1 BKGD M/E1 KEY1-4 M/E2 BKGD M/E2 KEY1-4 FLEXaKEY1-4 AUX1-12	Outputs while TARGET transition is being performed.
AUTO TRANS PROC		Outputs while TARGET AUTO transition is being performed.
KEY ON	M/E1 KEY1-4 M/E2 KEY1-4 FLEXaKEY1-4	Outputs while the TARGET key is on-air.
TRANS TYPE MIX	M/E1 BKGD M/E1 KEY1-4 M/E2 BKGD M/E2 KEY1-4 FLEXaKEY1-4 AUX1-12	Outputs when the TARGET transition TYPE is set to MIX.
TRANS TYPE WIPE	M/E1 BKGD M/E1 KEY1-4 M/E2 BKGD M/E2 KEY1-4 AUX1-12	Outputs when the TARGET transition TYPE is set to WIPE.
TRANS TYPE FAM	M/E1 BKGD M/E1 KEY1-4 M/E2 BKGD M/E2 KEY1-4	Outputs when the TARGET transition TYPE is set to FAM.
TRANS TYPE NAM		Outputs when the TARGET transition TYPE is set to NAM.
TRANS TYPE PRESET BLACK	M/E2 BKGD	Outputs when the TARGET transition TYPE is set to PRESET BLACK.
ASPECT	16 : 9 4 : 3	Outputs when the TARGET aspect ratio is set.
FLX1 ASSIGN	M/E1,2 AUX1-12	Outputs when FLEXaKEY1 is assigned to TARGET.
FLX2 ASSIGN		Outputs when FLEXaKEY2 is assigned to TARGET.
FLX3 ASSIGN		Outputs when FLEXaKEY3 is assigned to TARGET.
FLX4 ASSIGN		Outputs when FLEXaKEY4 is assigned to TARGET.
ALARM	ALL FAN PS1,2 FPGA	Outputs when the TARGET alarm occurs.
USER FLAG	1-60	Outputs depending on the TARGET user flag state.
CUT TRANS PROC	M/E1 BKGD M/E1 KEY1-4 M/E2 BKGD M/E2 KEY1-4 FLEXaKEY1-4 AUX1-12	Outputs while the TARGET is in CUT transition.
FADER TRANS PROC		Outputs while the TARGET is in transition using a fader.

◆ **Tallies**

COLOR setting	XPT setting	Description
RED	XPT	Outputs RED tally when the specified signal is output from a REC color bus.
GREEN		Outputs GREEN tally when the specified signal is output from a GREEN color bus.
COLOR1-24		Outputs COLOR1-24 tally when the specified signal is output from a COLOR1-24 color bus.

Appendix 3. Web-based Control

3-1. Setup

◆ PC System Requirements

The Web GUI needs a user-prepared computer, which must meet the following system requirements.

Operation System	Windows 8.1 or 10 iOS 6.1.3
Processor	Depends on the browser used.
Web browser	Google Chrome (Internet Explorer is not supported.)
RAM	Depends on the browser used.
Display	Resolution of 1024 x 768 pixels or higher 24-bit full-color
Network Port	Ethernet, at least 1 port 100BASE-TX/1000BASE-T
Network Cable	100BASE-TX: Category 5 or higher 1000BASE-T: Enhanced Category 5 or Category 6
Max. number of connection to an HVS-490 unit	3

◆ Computer Network Settings

To connect to the switcher, set the IP address of your computer as follows:

IP Address	192.168.1.1 to 192.168.1.254 (excluding 192.168.1.10)
Subnet Mask	255.255.255.0

◆ Connecting to the switcher

1. Launch your web browser (Google Chrome).
2. Enter "**http://192.168.1.10**" (default) in the address box and connect to the HVS-490.

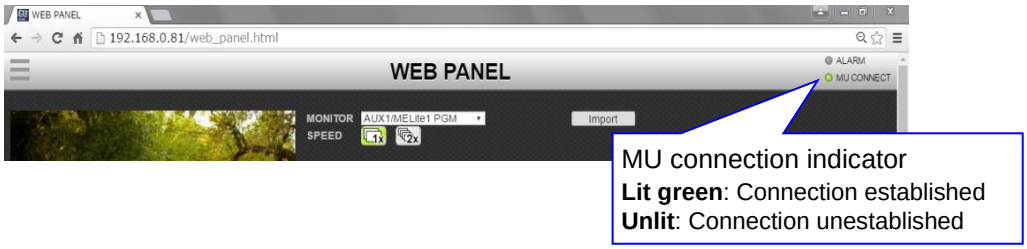
IMPORTANT

If you have changed the IP address of HVS-490 LAN (EXT) port, enter the changed address.

3. When a login screen appears, enter the User ID and password, and tap **LOGIN**.

Default settings
User ID: hvs490
Password: fora

4. Verify that the connection indicator in the upper right corner is lit green.



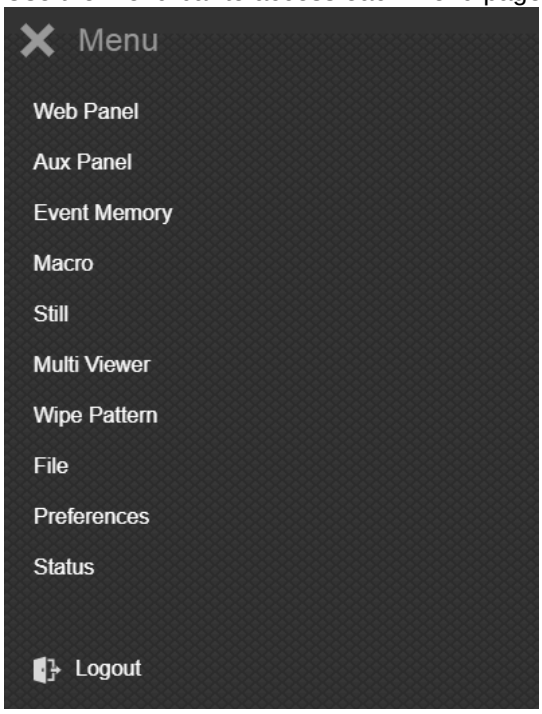
IMPORTANT

Note that web browsers cannot automatically reconnect to HVS-490 units after the units have rebooted (the connection indicator may be unlit). In such cases, reconnect to the unit or refresh the HVS-490 control page on the web browser to re-establish the connection.

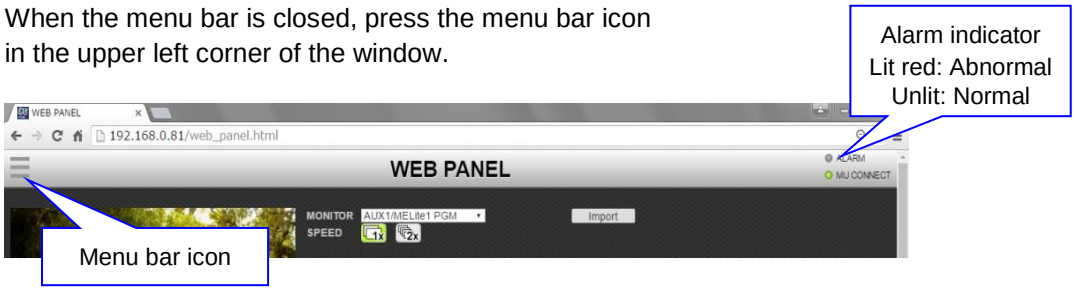
3-2. Accessing Menu Pages

◆ **Menu bar**

Use the menu bar to access each menu page.



When the menu bar is closed, press the menu bar icon in the upper left corner of the window.



◆ **Alarm Indicator**

The alarm indicator turns on red if a power or fan alarm occur in the Main Unit.

If you change the switcher menu settings on the web browser, they are immediately sent and applied to the switcher.

See the switcher manual main pages for details on switcher features.
The shaded text "
>> Manual" indicates references to sections in the operation manual.

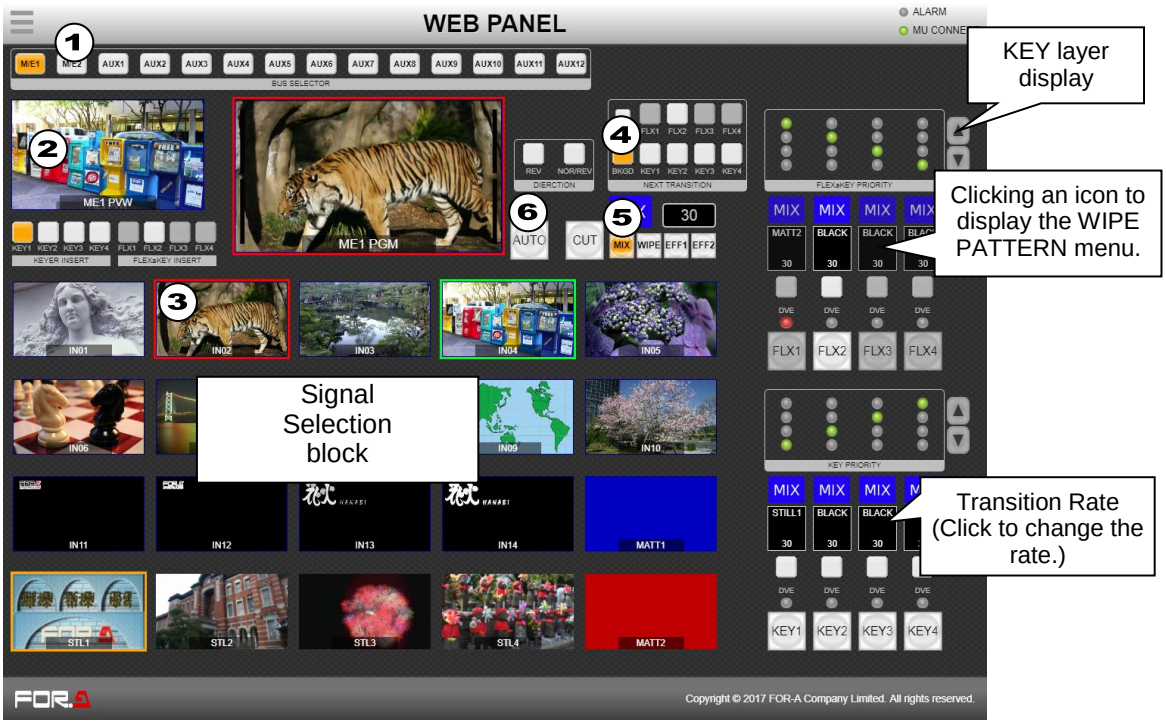
3-3. Web Panel

>> Manual Sec. 11. Transitions

This page allows you to perform bus transitions in the same manner as on the control panel and display MV3 assigned video images.

NOTE

To display images in the Web Panel page, set the number of windows to **16**.in the [SETUP > MULTI VIEWER > MV3] menu PAGE 1.



◆ **Performing transitions**

If performing M/E2 BKGD pattern transitions…

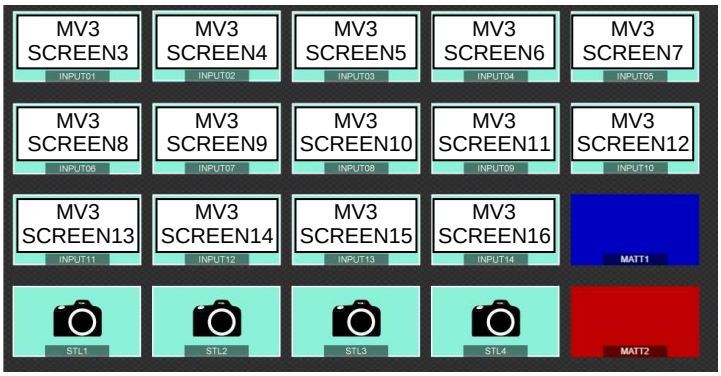
(1) Select **M/E2** in the BUS SELECTOR block.
(2) Select **M/E2 PVW**.
(3) Select a video signal, **INPUT02**, in this example.
(4) Select **BKGD** in the NEXT TRANSITION block.
(5) Click **WIPE** to select a pattern.
(6) Click **AUTO** to perform a transition.

NOTE

PGM and PVW images in the Signal Selection block respectively represent SCREEN01 and SCREEN02 in the MV3 image. If selecting another M/E in the BUS SELECTOR block, SCREEN01 and SCREEN02 pictures in the MV3 image are also changed accordingly.

◆ **Images in the Signal Selection block**

Images in the Signal Selection block show SCREEN 03-16 in the MV 3 image as shown below. Therefore, images can be changed in [SETUP > MULTI VIEWER > MV3] menu PAGE 2 after setting **DIV** to **16** in PAGE 1.



◆ **To perform simultaneous multiple bus transitions**

Clicking **TIE**, then multiple bus buttons allows you to perform TIE transitions.

◆ **KEY layer display**

Key layer display allows you to verify the layer order of KEY1-4 or FLEXaKEY1-4. The top-most key in the key layer display represents the upper-most layer in the screen. To change layer order, click a line and press arrow keys.

◆ **WIPE and PATTERN icons**

Clicking **WIPE** or each pattern icon opens the relevant PATTERN menu.

◆ **Transition Rate display**

Clicking the transition rate value opens the transition rate setting menu.
Enter the value and press the **Enter** key or click anywhere outside the Transition Rate field to apply the change.

Restrictions on AUX signal change

To change an AUX bus signal (AUX1-12), the AUX bus should be assigned to LINE1 or LINE2. Otherwise, signal selection and transitions using AUTO or CUT are disabled in this page.

3-4. Event Memory

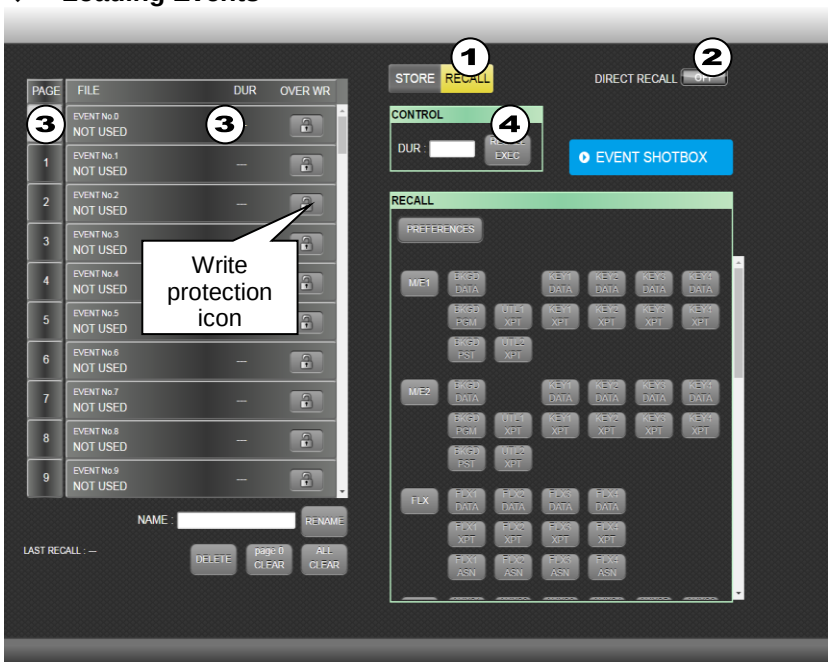
>> Manual Sec. 19. "Event Memory"

◆ Storing Events

(1) Click **STORE**.
(2) Select an event number from the event list on the left side.
(3) Select the data to be stored in the STORE block, as needed.
(4) Click **STORE EXEC** to store the event. To change the DURATION value and save the event, change the value under DUR and click **RECALL EXEC**.

Clicking **REFERENCES** in the STORE block and clicking **YES** in the pop-up dialog allows you to change preset data to be stored to the current selection items.

◆ Loading Events



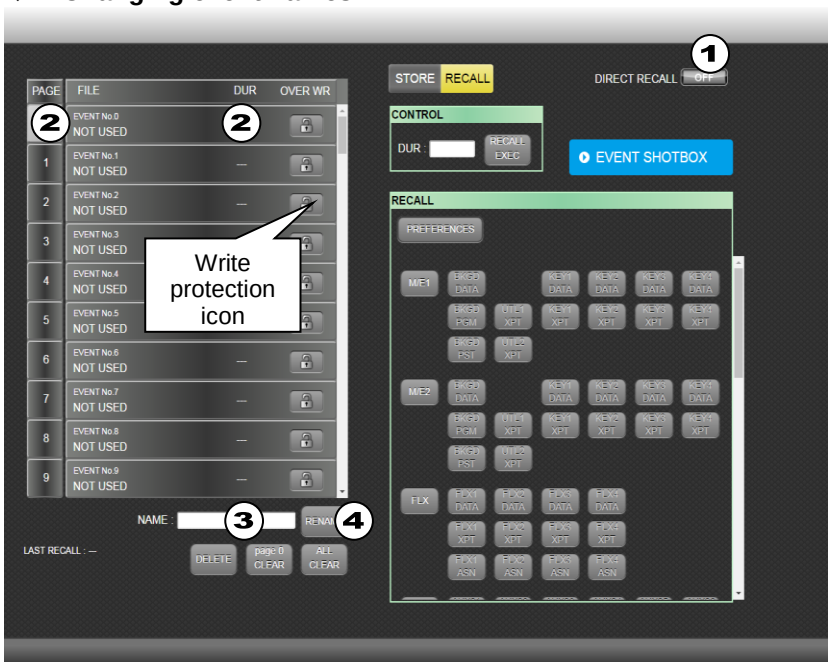
(1) Click **RECALL**.
(2) Set **DIRECT RECALL** to **ON** if enabling DIRECT mode

(3) Select an event from the event list on the left side. The event will be loaded if in Direct mode. If Direct mode is **OFF**, the data stored in the event will be displayed. Select data to be loaded.
(4) Click **RECALL EXEC** to load the event.
To change the DURATION value and load the event, change the value under DUR and click **RECALL EXEC**.

EVENT SHOTBOX

Clicking **EVENT SHOTBOX** at the upper right corner of the screen opens the EVENT SHOTBOX menu, in which quick event recalls are possible using 64 event buttons.

◆ **Changing event names**



(1) To change event names in the EVENT RECALL menu, turn **OFF** DIRECT RECALL.
(2) Select an event in the left side.
(3) The current name is displayed under NAME. Enter a new name in the NAME field.
(4) Click **RENAME** to change the event name.

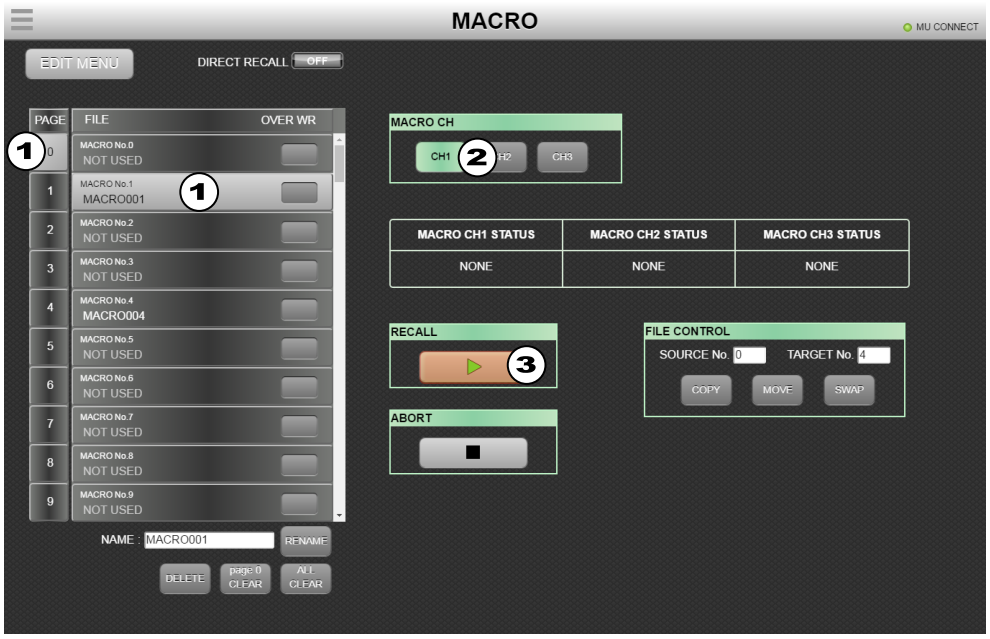
3-5. Macro

>> Manual Sec. 21. "Macro Operations"

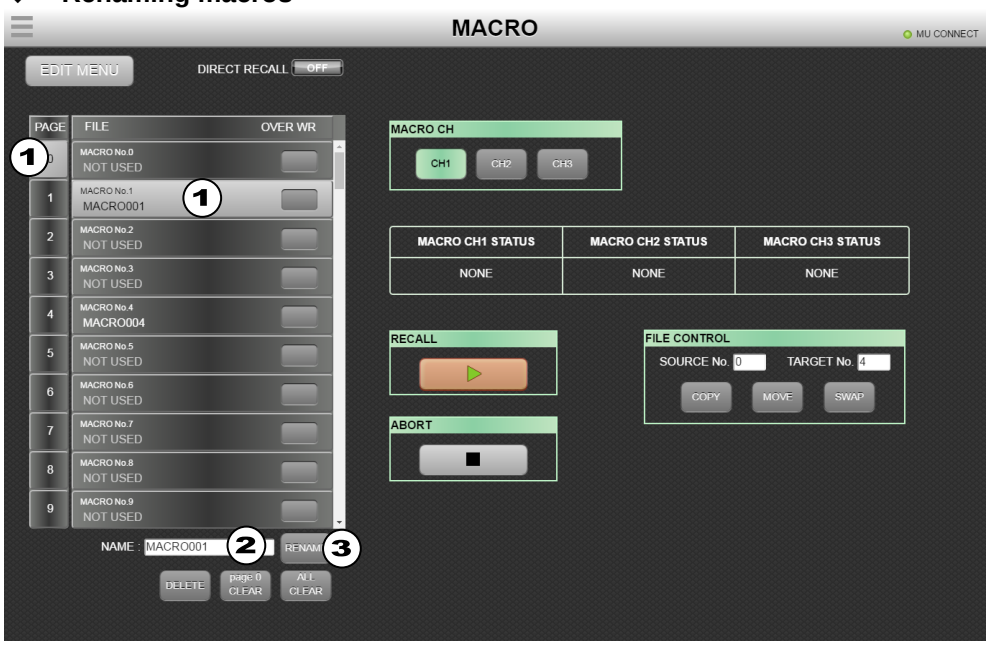
◆ Playing Macros

(1) Select a macro number from the macro list on the left side.
(2) Change the macro channel, as needed. (See Sec 21-3-5.)
(3) Click **RECALL** to play the macro.

To pause the play, click **RECALL**, and restart the play, click **RECALL**.
To stop the macro play, click **ABORT**.



◆ Renaming macros



(1) Select a macro number from the macro list on the left side.
(2) The current name is displayed under NAME. Enter a new name in the NAME field.
(3) Click **RENAME** to change the macro name.

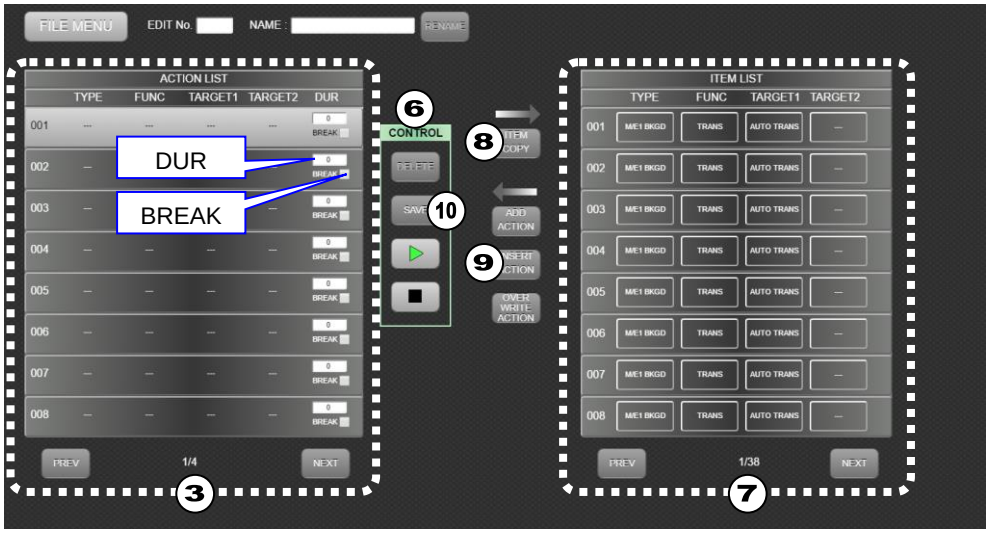
◆ **Copying, moving and swapping macros**

Select **SOURCE No** and **TARGET No** in the FILE CONTROL block. Click **COPY** (a), **MOVE** (b) or **SWAP**(c) to copy, overwrite or swap macros.

◆ **Editing macros**

(1) Select a macro number from the macro list on the left side.

(2) Click **EDIT MENU** in the top of the screen to display the EDIT menu.



(3) The action list of the selected macro is displayed in the left side of the screen. Select an action.

(4) Set the duration time to the next action under **DUR**.

(5) Checking a **BREAK** box stops the macro play at the corresponding action.

(6) Clicking **DELETE** in the CONTROL area deletes the selected action from the macro. Play and Stop buttons allow you to verify the edited macro operation.

(7) Macro actions can be stored in the ITEM LIST in the right side of the screen.

(8) Clicking **ITEM COPY** copies the selected action to the ITEM LIST.

(9) To add or replace actions to the macro, use **ADD ACTION**, **INSERT ACTION** or **OVER WRITE ACTION** (add backward, add backward or replace.

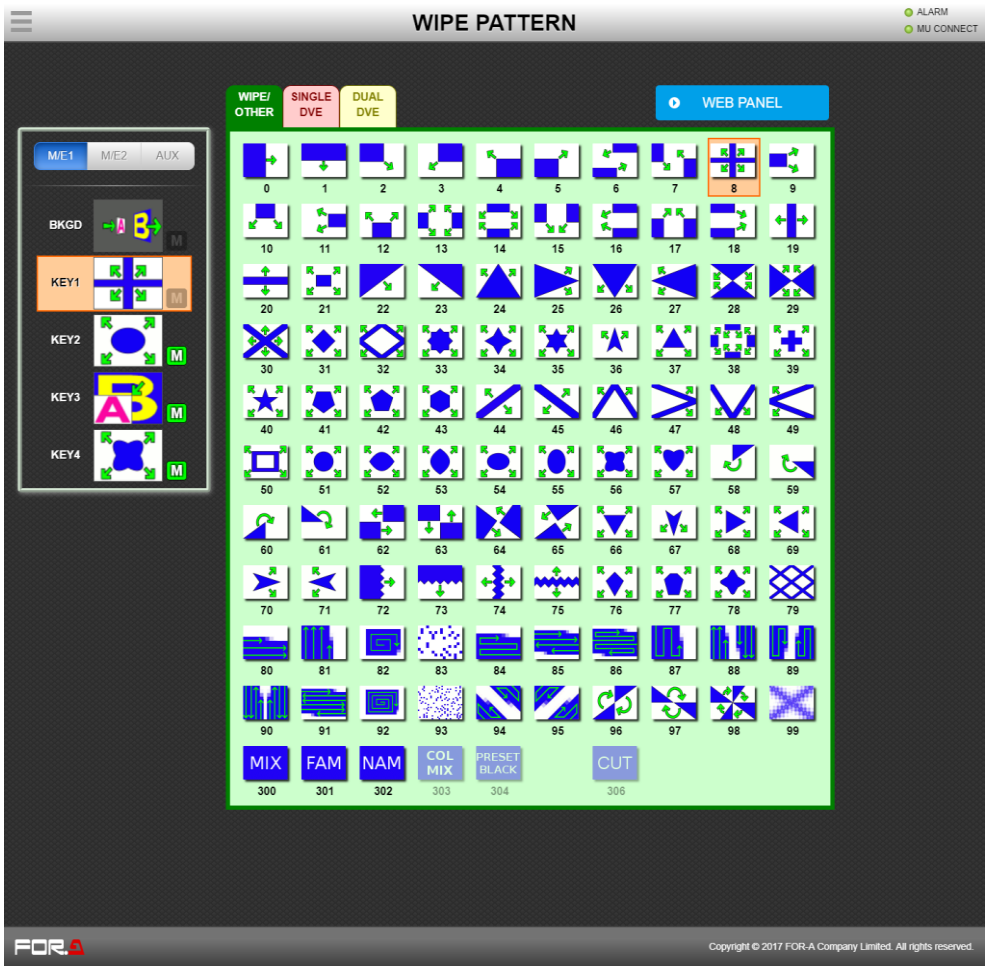
(10) Click **SAVE** in the CONTROL area to save the edited macro.

3-6. Wipe Pattern

>> Manual Sec. 11-7. “Pattern (WIPE/DVE) Transitions”
>> Manual Sec. Appendix 4 “Transition Patterns”

This page allows you to select transition types for background and key buses.

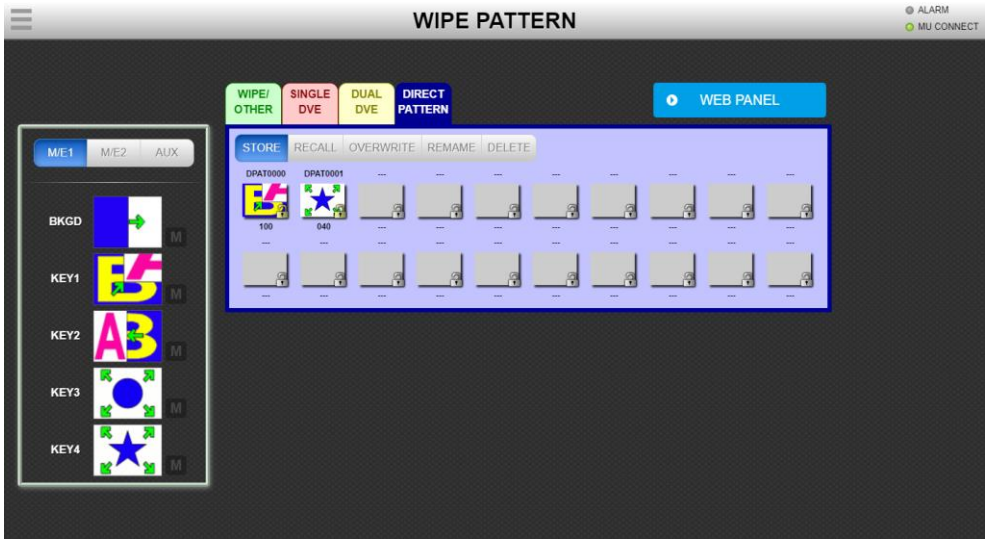
In the WIPE/OTHER, SINGLE DVE and DUAL DVE tab screens, patterns can be assigned to buses by clicking to select a bus then a pattern.



FAM, **NAM**, **COL MIX** and **PRESET BLACK** are available only when they are assigned to EFF1 or EFF2 on the selected bus.
CUT is available only when an AUX bus is selected and changes **AUX TRANS TYPE** to **CUT**.

3-6-1. WIPE PATTERN - DIRECT PATTERN

Clicking the **DIRECT PATTERN** tab as shown below, in which patterns can be easily added (or assigned) to or removed from the DIRECT Pattern list or bus channels.

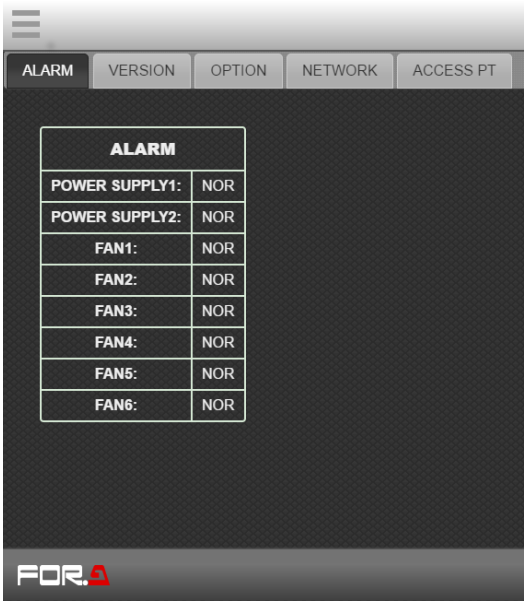


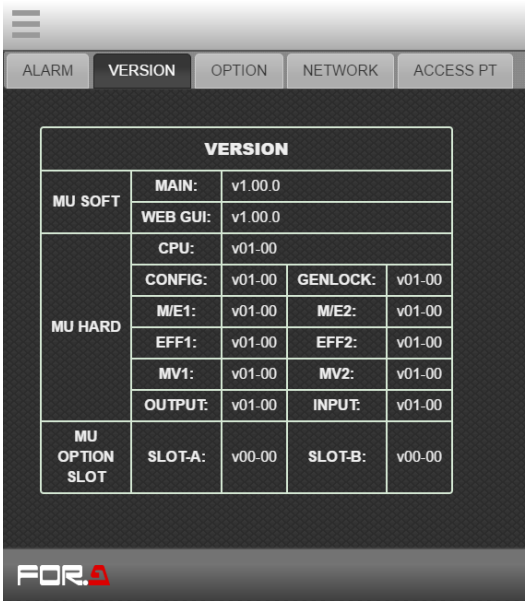
Menu	Description
STORE	Allows you to add a pattern to the pattern list: To do this, select a bus-assigned pattern in the left side of the screen and selects a box in the pattern list.
RECALL	Allows you to assign a pattern to the bus. To do this, select a bus in the left side of the screen and select a pattern in the pattern list.
OVERWRITE	Allows you to toggles pattern protection on/off.
RENAME	Allows you to change pattern names.
DELETE	Allows you to remove patterns from the pattern list or buses.

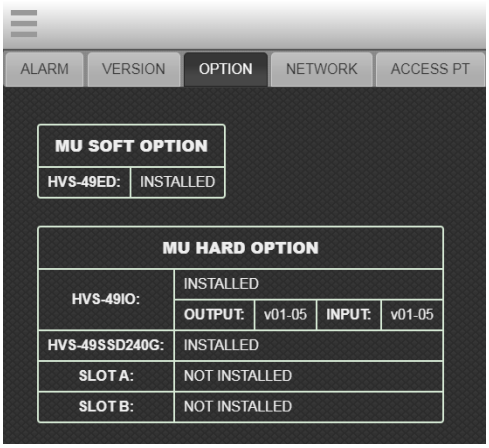
3-7. Status

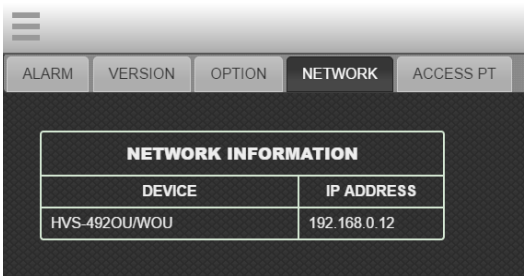
>> Manual Sec. 26. "Status Information"

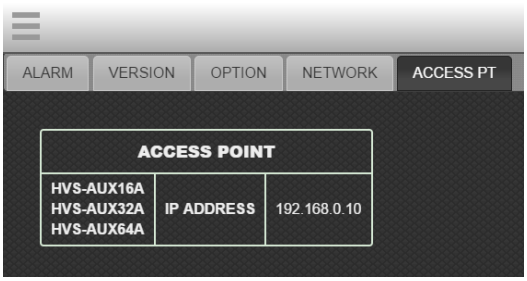
The ALARM, VERSION, OPTION, NETWORK and ACCESS PT buttons allow you to navigate to the relevant section.







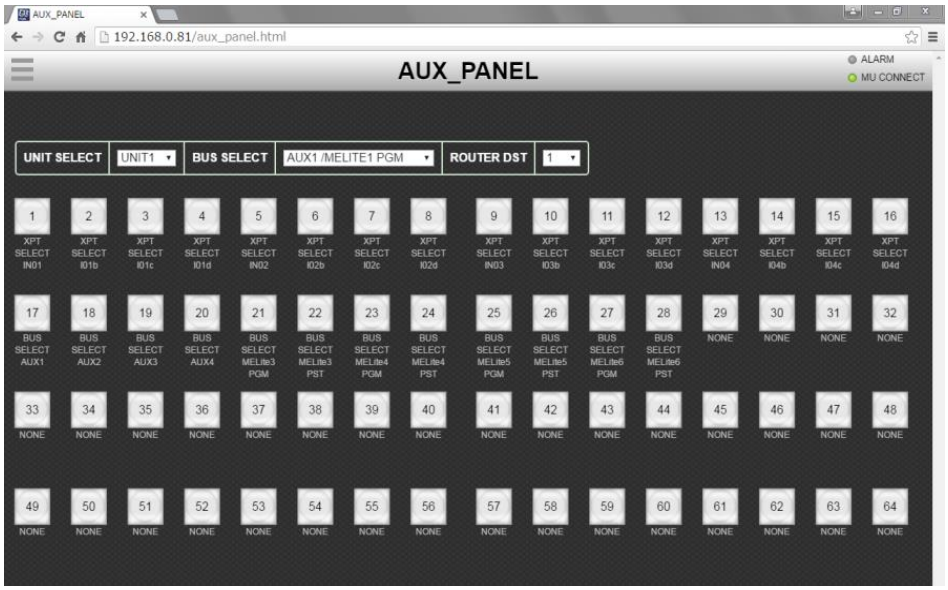




3-8. Aux Panel

>> Manual Sec 25-5. "AUX Bus Control Box (HVS-AUX16A/16B /32A/64A)"

This page works as an AUX Box to control AUX buses on the switcher. To use these buttons, specify button functions in the [SETUP > AUX UNIT > UNIT1-12] menu.

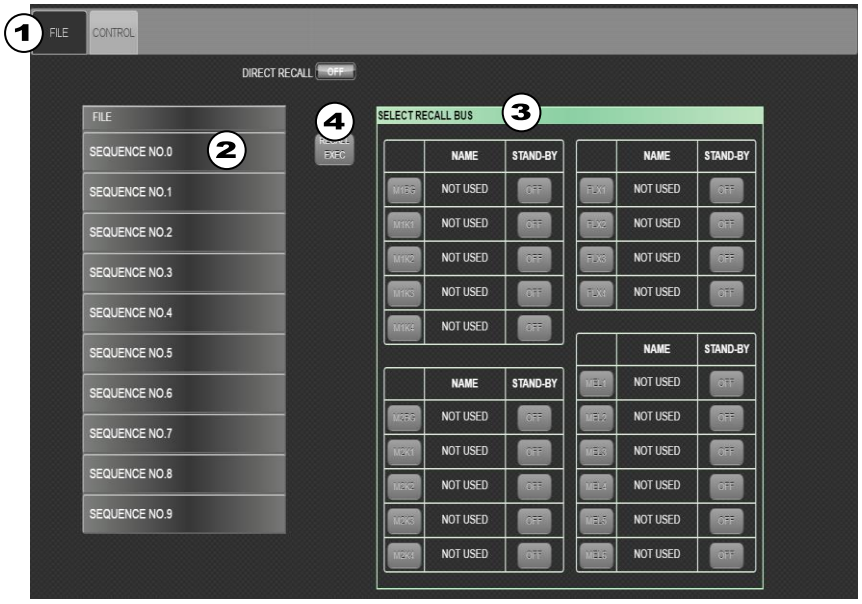


3-9. Sequence (Support Planned)

>> Manual Sec. 20 "Sequence Function"

◆ **Loading Sequences**

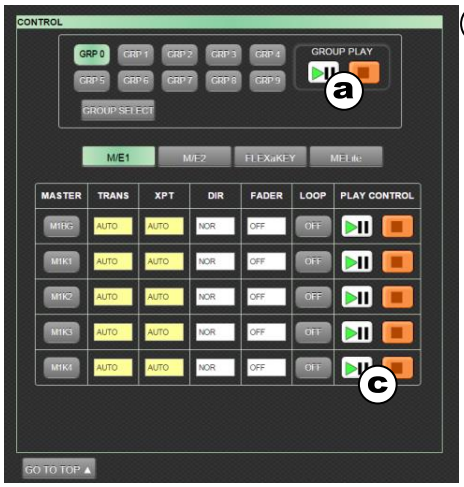
(1) Tap the **FILE** tab.
(2) Select a sequence number.
(3) Deselect unnecessary data, as needed
(4) Tap **RECALL EXEC** to load the sequence.

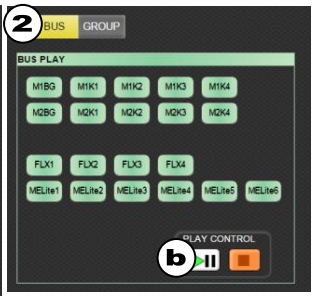


◆ **Playing Sequences in BUS mode**

(1) Tap the **CONTROL** tab.

(2) Selecting **BUS** in the top of the screen changes the screen to the Bus play mode.
Selecting **GROUP** in the bottom of the screen changes the screen to the Group play mode.



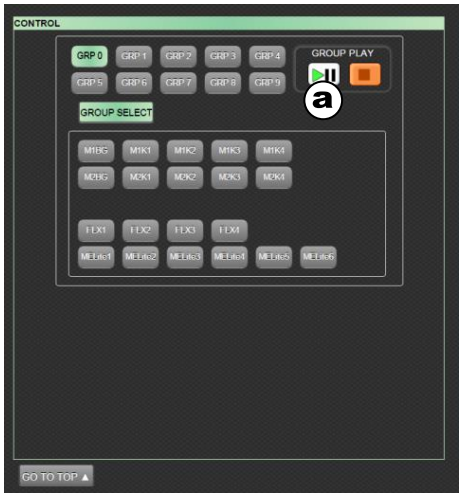


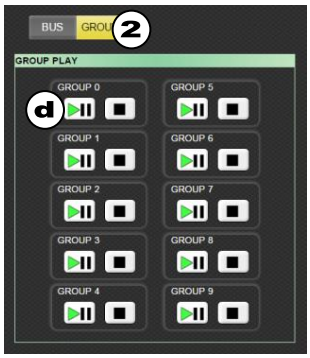
(a) Tap the **PLAY/PAUSE** button to play the sequence using all bus movements included in GROUP0 in the figure at left.

(b) Select only necessary buses without using groups, then tap the **PLAY/PAUSE** button to play the selected bus movements in the sequence.

(c) This block allows you to set playback settings and play each bus sequence.
See Sec. 20-1-4 for more details on playback settings.

◆ **Playing Sequences in GROUP mode**





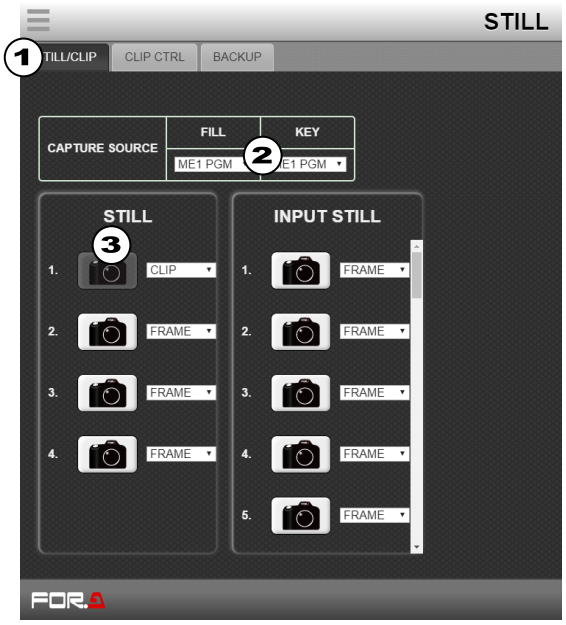
(d) Directly select a group, then tap the **PLAY/PAUSE** button to play the grouped bus movements in the sequence.

3-10. Still

>> Manual Sec. 17. "Still and Clip Store"
This page allows you to save still images, save and play clips and backs up the still memory data.

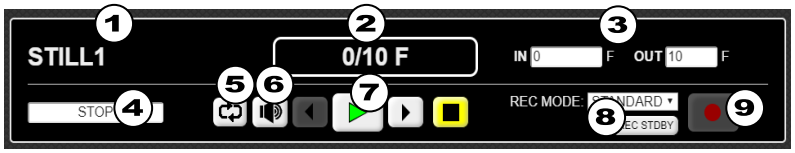
3-10-1. Capturing Still Images

(1) Tap the **STILL/CLIP** tab at the top of the screen.
(2) Specify signals under **FILL** and **KEY** in CAPTURE SOURCE.
(3) Tap **STORE** to save the captured still image.



3-10-2. Playing / Recording Video Clips

Tap the **CLIP CTRL** tab at the top of the screen.



No	Description
(1)	Displays the STILL number and clip file name.
(2)	Displays the current / total durations.
(3)	Displays the IN and OUT points
(4)	Displays the current playback status on the progress bar.
(5)	Turns Loop playback On/Off.
(6)	Turns Mute On/Off.
(7)	One-frame backward, Play, One-frame forward, Stop
(8)	Selects REC MODE. **STANDARD**: Starts recording by pressing **REC STDBY**, then **REC**. **DIRECT**: Directly starts recording by pressing only **REC**.
(9)	Starts and stops recording.

◆ **To Record Clips**

Select **CLIP** in the desired still and specify signals under **FILL** and **KEY** in CAPTURE SOURCE.

Tap **REC** (9) on the control panel to start recording. Re-tap **REC** to stop recording.

If in STANDARD mode, tap **REC STANDBY** (8), then **REC** (9).

◆ **To Play Clips**

A clip loaded to a still can be played back using **PLAY** (7) on the control panel.

3-10-3. Storing Still and Movie Images (HVS-49SSD240G Option)

>> Manual Sec. 17-4. “Storing Still and Video Images (HVS-49SSD240G)”.

If HVS-49SSD240G is configured, still and movie image data can be backed up to the SDD.

Tap the **BACKUP** tab at the top of the screen.

(a) Enabling Auto Backup

Turn **ON** AUTO BACKUP.

(b) Restoring SSD Backup Images

Tap **RESTORE** in the desired still block.

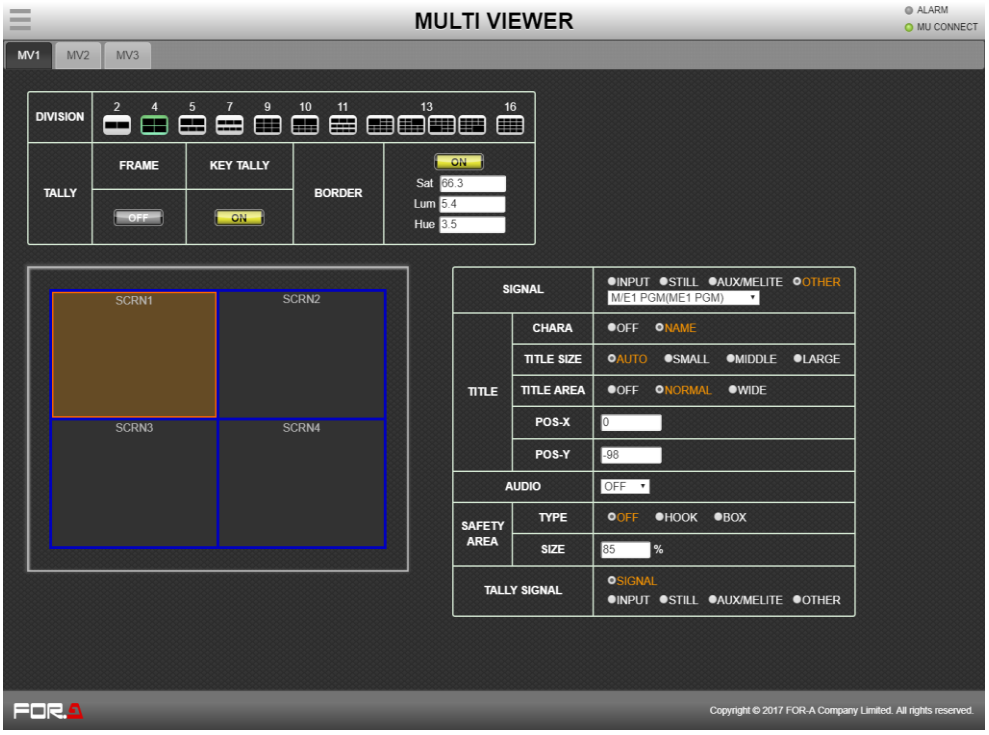
(c) Loading SSD Backup Images on Startup

Turn RESUME to **ON** in the desired still block.

3-11. Multi Viewer

>> Manual Sec. 18. "Multiview Output"

Select an MV tab to set a multiview image.



3-12. User Authentification

◆ **Login**

(1) Open the Web GUI page to display the Login screen.

(2) Enter the User ID and password and tap **LOGIN**.

Default settings:
User ID: hvs490
Password: fora

◆ **Logout**

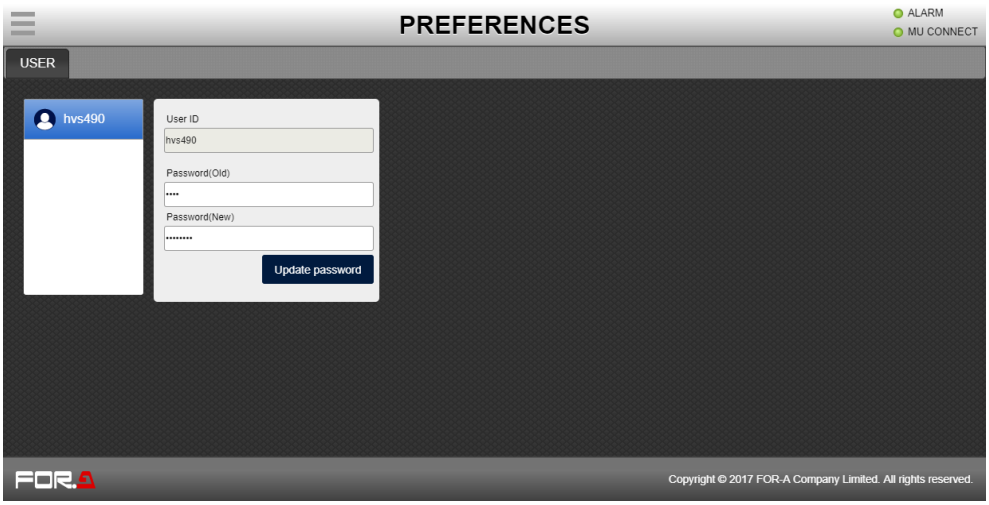
Tap **Logout** in the menu bar.

◆ **Changing your password**

(1) Open the PREFERENCES menu.
(2) Enter the current password under Password(Old).
(3) Enter the new password under Password(New).
(4) Tap **Update password** to update your password. Enter the new password at next login.

NOTE

User ID cannot be changed.

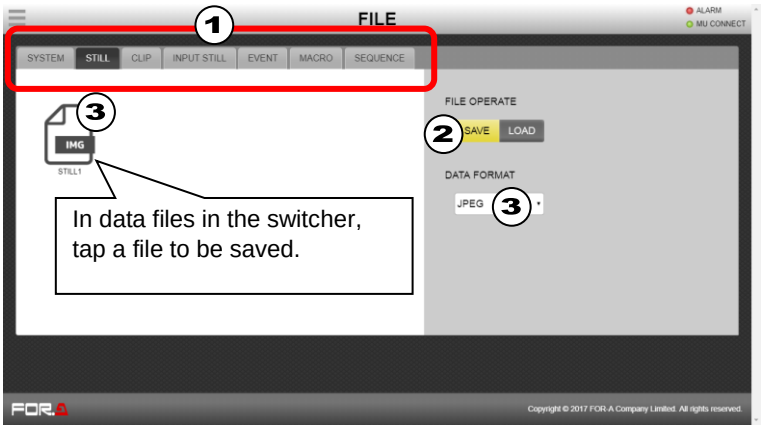


3-13. FILE

Saves and loads setting and image files.
Refer to Sec. 22-2. “Setting and Image Files” for more details.

◆ Saving switcher data (file) to the PC

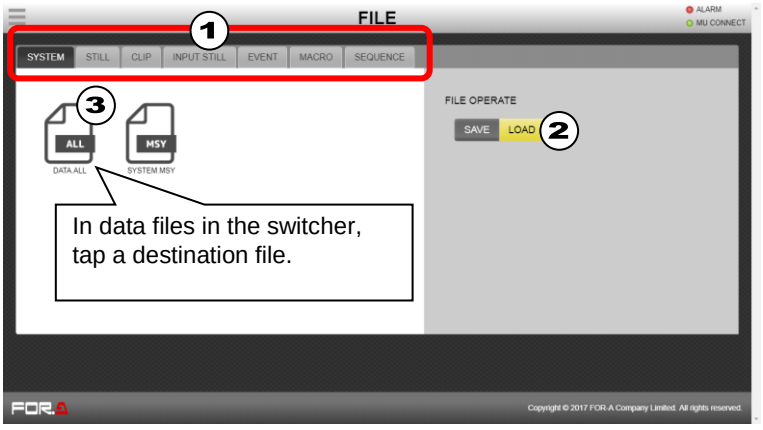
Various switcher data can be saved into the PC. Note that clip and input still images cannot be saved.



(1) Select a tab for data type on the top of the screen.
(2) Tap **SAVE**.
(3) Tap a file icon. If icons are greyed out, no data is stored in buffers.
To save STILL data:
Select the data format, then tap a file icon.
To save SEQUENCE data:
Select a bus(es) in the pop-up dialog.
(4) A dialog window will pop up. Select a file destination and tap **SAVE**.

◆ Loading switcher data from the PC to the switcher

Various data can be loaded from the PC to the switcher.

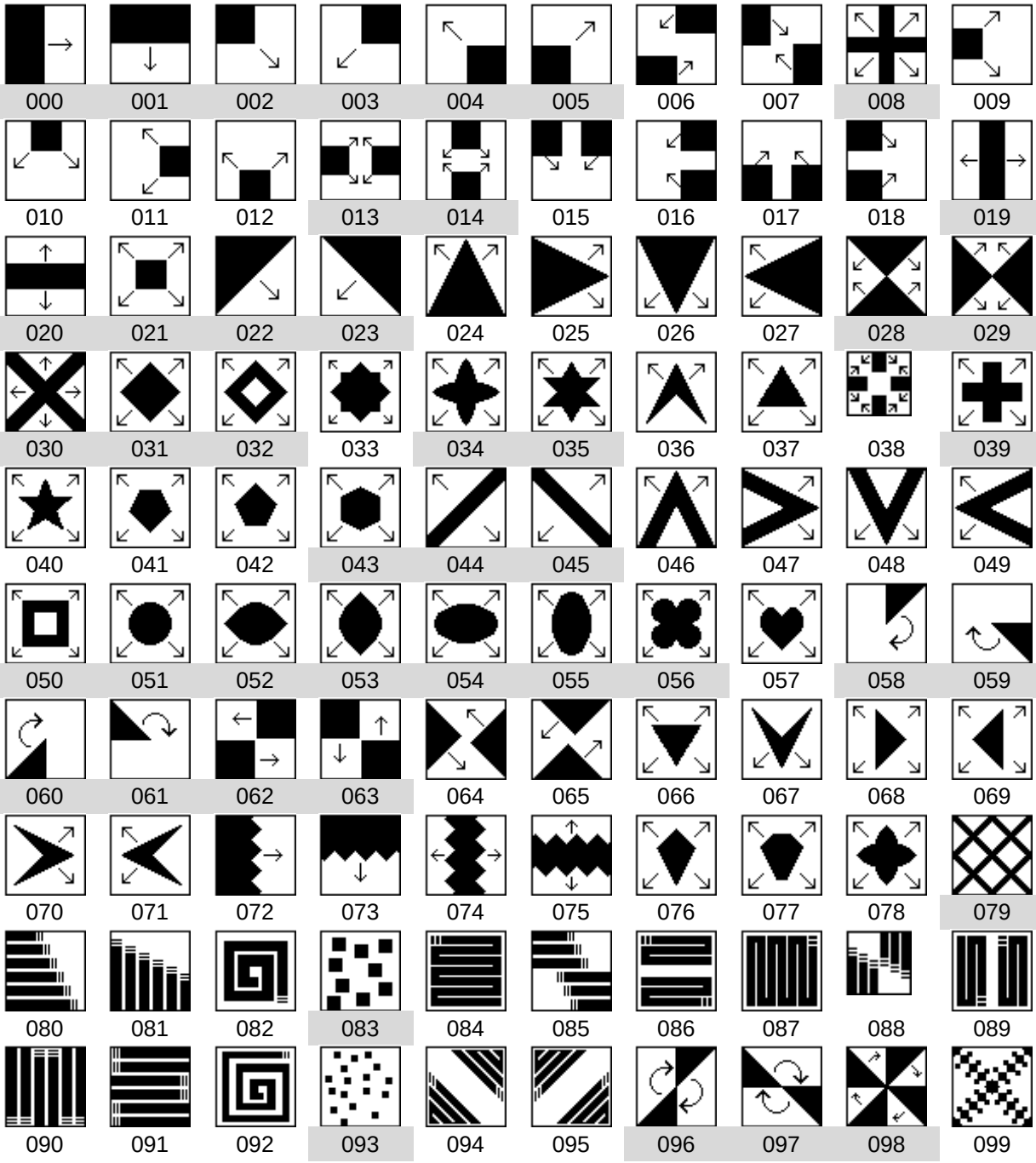


(1) Select a tab for data type on the top of the screen.
(2) Tap **LOAD**.
(3) Tap a destination file to which new data is loaded.
To load SEQUENCE data to the switcher:
Select a bus(es) in the pop-up dialog.
(4) A dialog window will pop up. Select a source file to be loaded.

Appendix 4 Transition Patterns

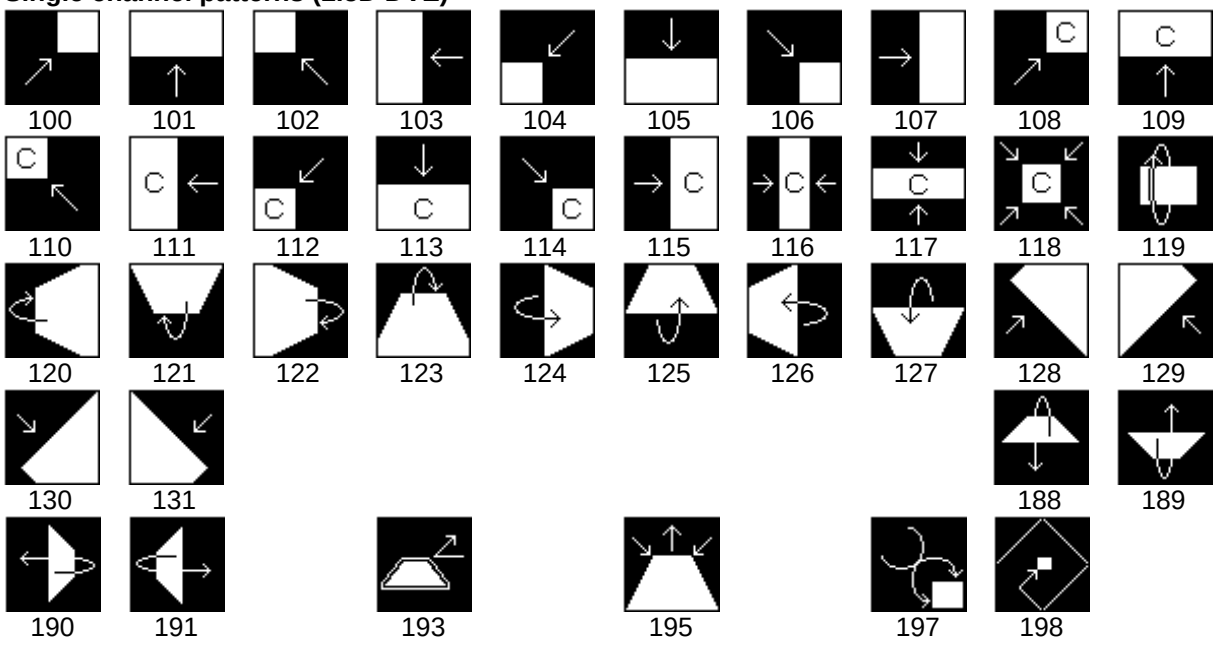
4-1. WIPE Type Patterns

Patterns with a shaded number are available in 4K-SQD mode.

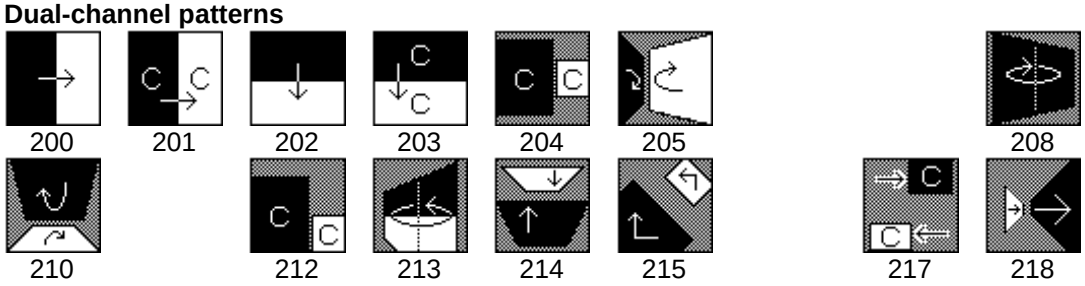


4-2. DVE Type Patterns

Single channel patterns (2.5D DVE)



Dual-channel patterns



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.

May 7, 2018 Printed in Japan

FOR-A COMPANY LIMITED

Head Office	3-8-1 Ebisu, Shibuya-ku, Tokyo 150-0013, Japan
Overseas Division	Tel: +81(0)3 3446 3936 Fax: +81(0)3 3445 5116
Japan Branch Offices	Osaka/Okinawa/Fukuoka/Hiroshima/Nagoya/Sendai/Sapporo
R&D/Production	Sakura Center/Sapporo Center

FOR-A Corporation of America
11155 Knott Ave., Suite G&H, Cypress, CA 90630, USA.
Tel: +1 714 894 3311 Fax: +1 714 894 5399

FOR-A Corporation of America East Coast Office
2 Executive Drive, Suite 670, Fort Lee Executive Park, Fort Lee, NJ 07024, USA
Tel: +1 201 944 1120 Fax: +1 201 944 1132

FOR-A Corporation of America Distribution & Service Center
2400 N.E. Waldo Road, Gainesville, FL 32609, USA
Tel: +1 352 371 1505 Fax: +1 352 378 5320

FOR-A Corporation of America Miami Office
8333 North West 53rd Street Suite 427 Doral, FL 33166, USA
Tel: +1 305 931 1700 Fax: +1 714 894 5399

FOR-A Europe S.r.l.
Via Volturno 37, 20861 Brugherio MB, Italy
Tel: +39 039 91 64 811 Fax: +39 039 878 140

FOR A UK Limited
Trident Court, 1 Oakcroft Road, Chessington, KT9 1BD, UK
Tel: +44 (0)20 3044 2935 Fax: +44(0)20 3044 2936

FOR-A Italia S.r.l.
Via Volturno 37, 20861 Brugherio MB, Italy
Tel: +39 039 881 086/103 Fax: +39 039 878 140

FOR-A Corporation of Korea
1007, 57-5, Yangsan-ro, Yeongdeungpo-gu, Seoul 150-103, Korea
Tel: +82 (0)2 2637 0761 Fax: +82 (0)2 2637 0760

FOR-A China Limited
708B Huateng Building, No. 302, 3 District, Jinsong, Chaoyang, Beijing 100021, China
Tel: +86 (0)10 8721 6023 Fax: +86 (0)10 8721 6033

FOR-A Middle East-Africa Office
Dubai Media City, Aurora Tower, Office 1407, P.O. Box 502688, Dubai, UAE
Tel: +971 (0)4 551 5830 Fax: +971 (0)4 551 5832

Agiv (India) Private Limited (FOR-A India)
2nd Floor, Valecha Chambers, Link Road, Andheri(W), Mumbai 400053
Tel: +91-22-26733623 Fax: +91-22-26393415