

Live Switcher
AV-HS410
IP Interface Specifications
(HS410_IF)

Document No.
Version 1.00
December 11, 2013

AVC Networks Company
Panasonic Corporation

Change History

Date	Description	Version
13.12.11	Issued the first edition.	1.00

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[Total: 30 pages]

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1. Configuration outline

These interface specifications describe the interface protocol between the AV-HS410 (live switcher) and external devices.

To use this function, you must install the plug-in software for external interface control.

The interface enables bus switching and control of AUTO transition and other functions from an application which runs on the PC connected to the AV-HS410 through the network.

2. Switcher control

2.1. Communication settings

The configuration settings for communication with the AV-HS410 are given below.

- 10Base-T/100Base-T
- IPv4
- TCP/IP
- IP Address: Adjustable by menu (Factory setting: 192.168.0.8)
- Subnet Mask: Adjustable by menu (Factory setting: 255.255.255.0)
- Port No.: 60040
(fixed: connection to up to 4 ports concurrently is possible for the purposes of external control)
- Minimum command interval:
1 frame or more

For details on the configuration of the communication commands, refer to chapter 2, for details on the commands of the functions, refer to chapter 3.

2.2. Command configuration

One packet starts with [STX]0x02 and ends with [ETX]0x03.

A command consists of 4 characters which are followed by a colon (:) and the data.

With some commands, multiple sets of data follow one command, in which case the sets of data are each separated by a colon (:).

Numerical data is also sent using the ASCII format.

2.3. Command sequence

2.3.1. Control commands

Example: Execution of auto transition

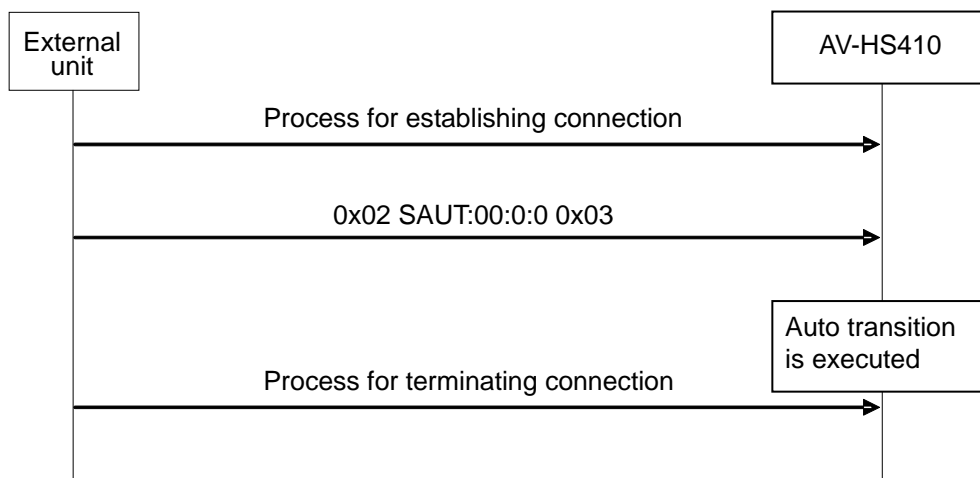


Fig. 2.3.1.1. Sequence of control commands 1

Example: Bus crosspoint control (Normal)

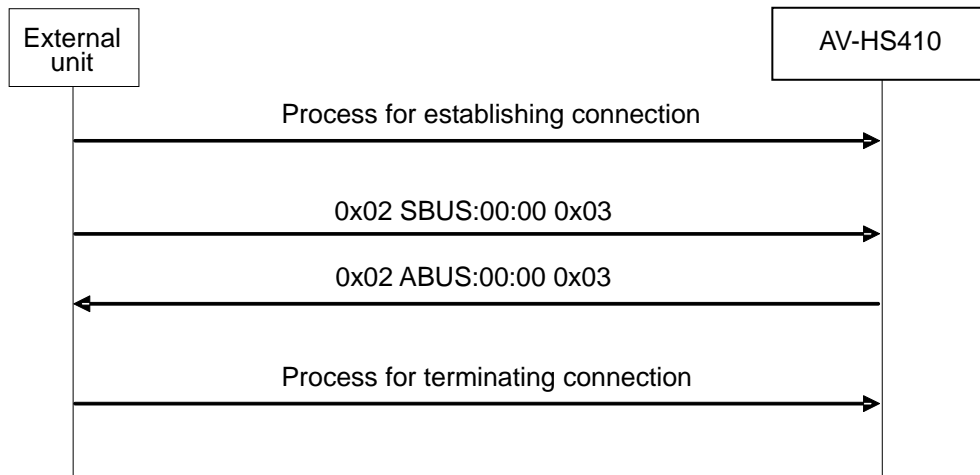


Fig. 2.3.1.2. Sequence of control commands 2

Example: Bus crosspoint control (Abnormal: Parameter out of range)

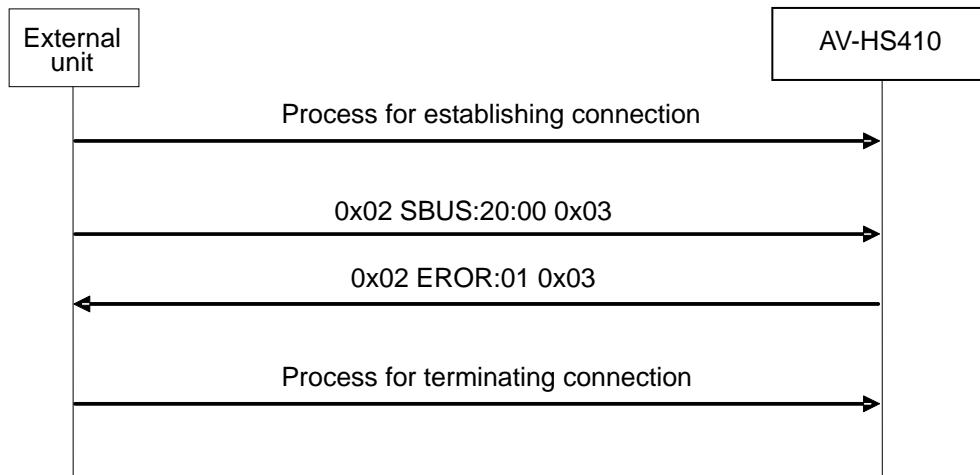


Fig. 2.3.1.3. Sequence of control commands 3

Example: Bus crosspoint control (Abnormal: Abnormal message)

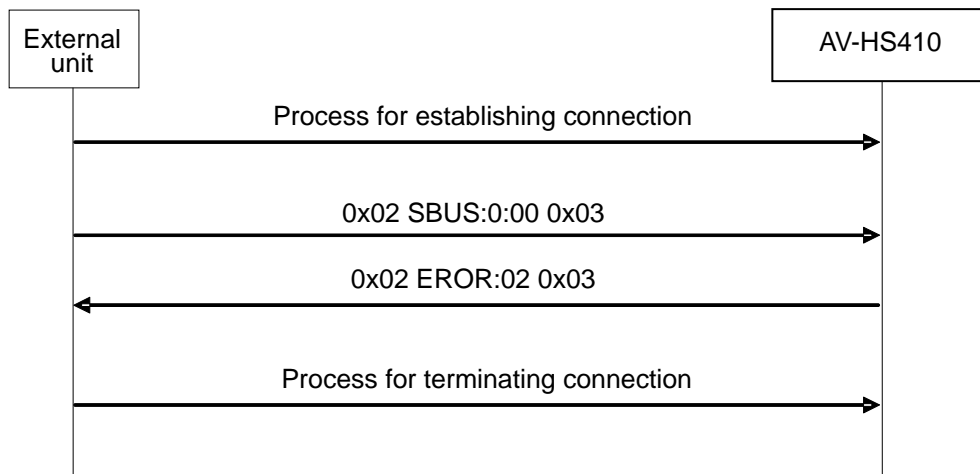


Fig. 2.3.1.4. Sequence of control commands 4

2.3.2. Query commands

Example: Bus status query (XPT)

When XPT1 is set for bus A and a query is made when the tally is in the "Off" status:

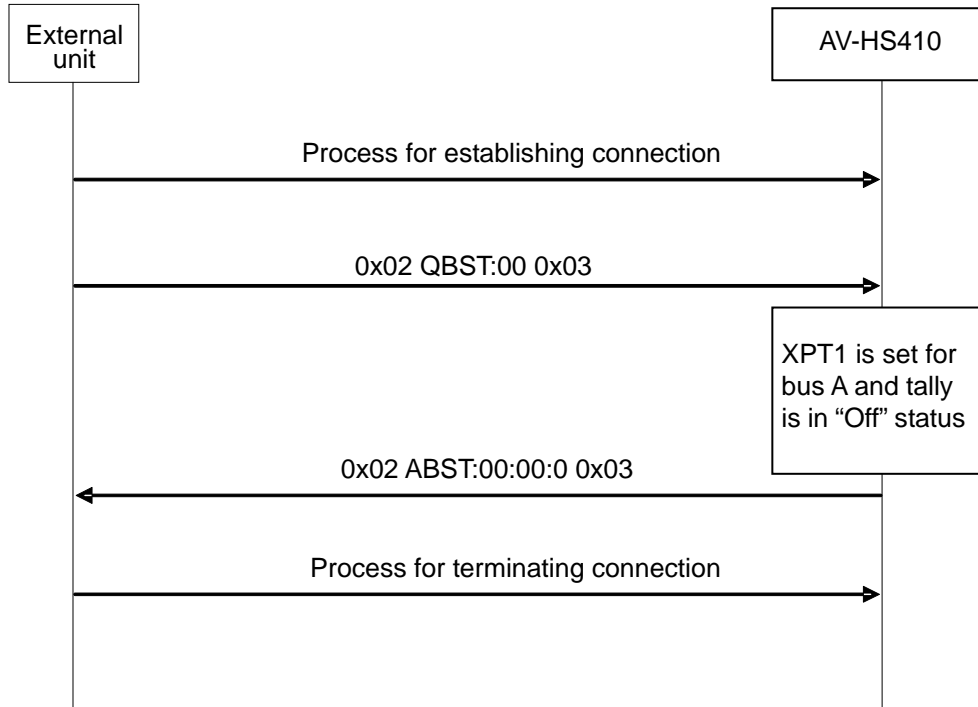


Fig. 2.3.2. Sequence of query commands

3. Command details

The command format for reception and transmission is given below.

3.1. Command format

Format

<STX> Command name [:Parameter 1] [:Parameter 2] [:Parameter 3] <ETX>

Format description

<STX>..... Start Of Text(=0x02)

Command name..... Refer to the table of commands below (each command consists of 4 letters).

[:Parameter 1]..... Refer to the parameter values of the commands.

[:Parameter 2]..... Refer to the parameter values of the commands.

[:Parameter 3]..... Refer to the parameter values of the commands.

<ETX>..... End Of Text(=0x03)

3.2. List of commands

Table 3. List of commands

Command name		Function	Communication port
3.3	EROR	Error response	60040
3.4	SBUS	Bus crosspoint control	60040
	ABUS	Bus crosspoint response	60040
3.5	QBST	Bus crosspoint query	60040
	ABST	Bus crosspoint response	60040
3.6	QBSC	Bus materials query	60040
	ABSC	Bus materials response	60040
3.7	SAUT	Auto transition control	60040
3.8	SCUT	Cut transition control	60040
3.9 3.10	QTIM	Auto transition time query	60040
	ATIM	Auto transition time response/return	60040
	STIM	Auto transition time control	60040
3.11 3.12	QBTI	Bus transition settings status query	60040
	ABTI	Bus transition settings status response/return	60040
	SBTI	Bus transition settings	60040
3.13 3.14	QPAT	Transition pattern query	60040
	APAT	Transition pattern response/return	60040
	SPAT	Transition pattern control	60040
3.15 3.16	QPNP	PinP parameter status query	60040
	APNP	PinP parameter response/return	60040
	SPNP	PinP parameter control	60040
3.17 3.18	QSBS	Side-by-side status query	60040
	ASBS	Side-by-side response/return	60040
	SSBS	Side-by-side control	60040

3.3. Error response

If an error occurs when a control message that has a response is sent, the switcher returns an error response.

Command name	Category	Command	Parameter value	Setting	Remarks
Error response	Response	EROR [:Parameter 1]	[:Parameter 1] :01 :02	Abnormality details Parameter out of range Abnormal message (when unrecognized)	This response is used when an error occurs for control that involves a response.

3.4. Bus crosspoint control

This command exercises bus crosspoint control.

Command name	Category	Command	Parameter value	Setting	Remarks
Bus crosspoint control	Control	SBUS [:Parameter 1] [:Parameter 2]	[:Parameter 1] :00 :01 :02 :03 :04 :05 :06 :07 :08 :09 :10 :11 :12 :13 :14 :15 [:Parameter 2] :00 to 23 :50 to 62 :70 :71 :72 :73 :74 :75 :76 :77 :78 :79 :80 :81 :82 :90 :91 :92 :93 :94 :95 :96	Select the bus command Bus A (top side regardless of mode) Bus B (bottom side regardless of mode) PGM (PGM column regardless of mode) PVW (PVW column regardless of mode) KEY-Fill KEY-Source DSK-Fill DSK-Source --- --- PinP1 PinP2 AUX1 AUX2 AUX3 AUX4 Materials XPT1 to XPT24 Input1 to Input13 Color bars Color background 1 Black Still1V Still2V Clip1V Clip2V PGM PVW KeyOut CLN Multi View --- --- M-PVW Still1K Still2K Clip1K Clip2K Color background 2	The QBST command or QBSC command is used when the current bus selection is to be acquired.
	Response	ABUS [:Parameter 1] [:Parameter 2]	[:Parameter 1] :00 :01 :02 :03 :04 :05 :06 :07 :08 :09 :10 :11	Select the bus command Bus A (top side regardless of mode) Bus B (bottom side regardless of mode) PGM (PGM column regardless of mode) PVW (PVW column regardless of mode) KEY-Fill KEY-Source DSK-Fill DSK-Source --- --- PinP1 PinP2	

			:12	AUX1	
			:13	AUX2	
			:14	AUX3	
			:15	AUX4	
			[:Parameter 2]	Materials	
			:00 to 23	XPT1 to XPT24	
			:50 to 62	Input1 to Input13	
			:70	Color bars	
			:71	Color background 1	
			:72	Black	
			:73	Still1V	
			:74	Still2V	
			:75	Clip1V	
			:76	Clip2V	
			:77	PGM	
			:78	PVW	
			:79	KeyOut	
			:80	CLN	
			:81	Multi View	
			:82	---	
			:90	---	
			:91	M-PVW	
			:92	Still1K	
			:93	Still2K	
			:94	Clip1K	
			:95	Clip2K	
			:96	Color background 2	

Caution!

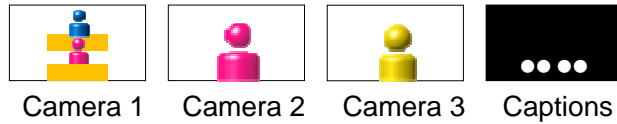
1. Even for image materials for which crosspoint is not set (unassigned status), if an input number and material name are selected by using Parameter 2 of the SBUS command, crosspoint selection is possible. In this case, the crosspoint button on the operating panel will be unlit.
2. If you select a crosspoint number for image materials for which crosspoint is not set (unassigned status) by using Parameter 2 of the SBUS command, the unassigned crosspoint will not be selected, and the previous crosspoint will be enabled.

3.4.1. Crosspoint control command

Example: Crosspoint control of PGM bus

When the output image is switched from Camera 1 (Input1) to Camera 2 (Input2).

Example input materials



Crosspoint status

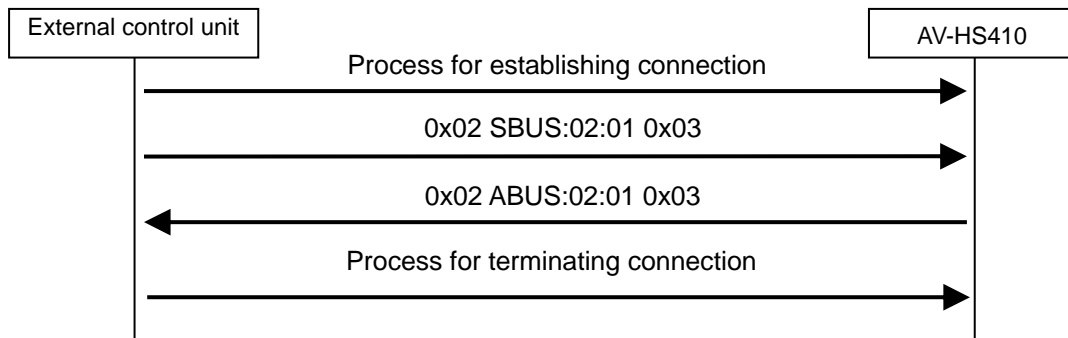
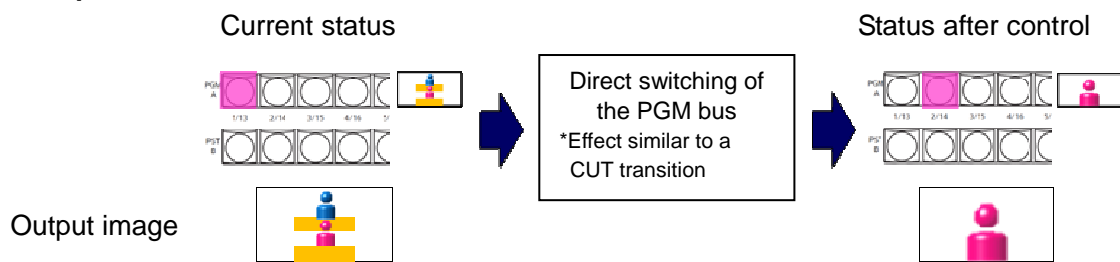


Fig. 3.4.1. Sequence of the PGM bus switching command

3.5. Bus crosspoint query

This command queries the crosspoints which have been taken by the buses.

Command name	Category	Command	Parameter value	Setting	Remarks
Bus crosspoint query	Request	QBST [:Parameter 1]	[:Parameter 1] :00 :01 :02 :03 :04 :05 :06 :07 :08 :09 :10 :11 :12 :13 :14 :15	Select the bus command Bus A (top side regardless of mode) Bus B (bottom side regardless of mode) PGM (PGM column regardless of mode) PVW (PVW column regardless of mode) KEY-Fill KEY-Source DSK-Fill DSK-Source --- --- PinP1 PinP2 AUX1 AUX2 AUX3 AUX4	This command, which is the crosspoint query command, is returned by ABST. To ascertain the status of materials, use the QBSC command instead.
	Response	ABST [:Parameter 1] [:Parameter 2] [:Parameter 3]	[:Parameter 1] :00 :01 :02 :03 :04 :05 :06 :07 :08 :09 :10 :11 :12 :13 :14 :15 [:Parameter 2] :00 to 23 :99 [:Parameter 3] :0 :1	Select the bus command Bus A (top side regardless of mode) Bus B (bottom side regardless of mode) PGM (PGM column regardless of mode) PVW (PVW column regardless of mode) KEY-Fill KEY-Source DSK-Fill DSK-Source --- --- PinP1 PinP2 AUX1 AUX2 AUX3 AUX4 Crosspoint XPT1 to XPT24 No selection Tally information Tally Off Tally On	This command is returned in response to the QBST command.

3.6. Bus materials query

This command queries the materials which have been taken by the buses.

Command name	Category	Command	Parameter value	Setting	Remarks
Bus materials query	Request	QBSC [:Parameter 1]	[:Parameter 1] :00 :01 :02 :03 :04 :05 :06 :07 :08 :09 :10 :11 :12 :13 :14 :15	Select the bus command Bus A (top side regardless of mode) Bus B (bottom side regardless of mode) PGM (PGM column regardless of mode) PVW (PVW column regardless of mode) KEY-Fill KEY-Source DSK-Fill DSK-Source --- --- PinP1 PinP2 AUX1 AUX2 AUX3 AUX4	This command, which is the materials query command, is returned by ABSC. To ascertain the status of crosspoints, use the QBST command instead.
	Response	ABSC [:Parameter 1] [:Parameter 2] [:Parameter 3]	[:Parameter 1] :00 :01 :02 :03 :04 :05 :06 :07 :08 :09 :10 :11 :12 :13 :14 :15 [:Parameter 2] :50 to 62 :70 :71 :72 :73 :74 :75 :76 :77 :78 :79 :80 :81 :82 :90 :91 :92 :93	Select the bus command Bus A (top side regardless of mode) Bus B (bottom side regardless of mode) PGM (PGM column regardless of mode) PVW (PVW column regardless of mode) KEY-Fill KEY-Source DSK-Fill DSK-Source --- --- PinP1 PinP2 AUX1 AUX2 AUX3 AUX4 Materials Input1 to Input13 Color bars Color background 1 Black Still1V Still2V Clip1V Clip2V PGM PVW KeyOut CLN Multi View --- --- M-PVW Still1K Still2K	This command is returned in response to the QBSC command.

			:94 :95 :96 [:Parameter 3] :0 :1	Clip1K Clip2K Color background 2 Tally information Tally Off Tally On	
--	--	--	---	--	--

3.7. Auto transition control

This command controls the AUTO transitions (issues the triggers).

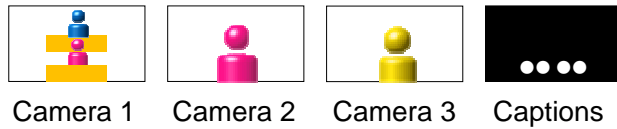
Command name	Category	Command	Parameter value	Setting	Remarks
AUTO transitions control (issues the triggers)	Control	SAUT [:Parameter 1] [:Parameter 2] [:Parameter 3]	[:Parameter 1] :00 :01 :04 :05 :06 :07 [:Parameter 2] :0 :1 [:Parameter 3] :0 :1 :2	Materials BKGD KEY PinP1 PinP2 FTB DSK Effects when BKGD is selected for Parameter 1 MIX WIPE Operation setting Trigger On (issued when the regular AUTO button is pressed) On Take (transition from Off→On) (Except when BKGD is selected) Off Take (transition from On→Off) (Except when BKGD is selected)	This command results in the same operation as when the corresponding buttons on the panel have been pressed.

3.7.1. Background mix auto transition control command

Example: Mix auto transition of BKGD

When XPT2 (Camera 2) is selected for the PVW bus, and switching is performed by using a mix transition of 15 frames (approximately 0.5 seconds).

Example input materials



Crosspoint status

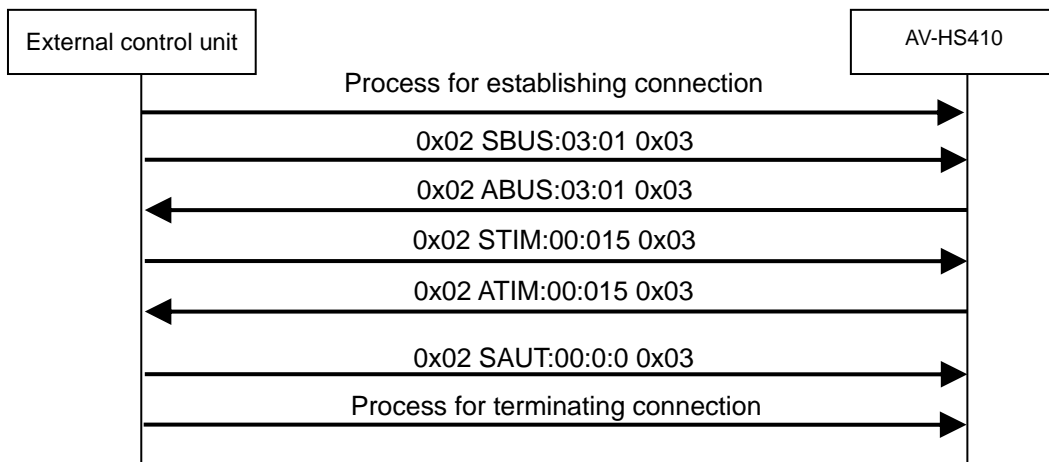
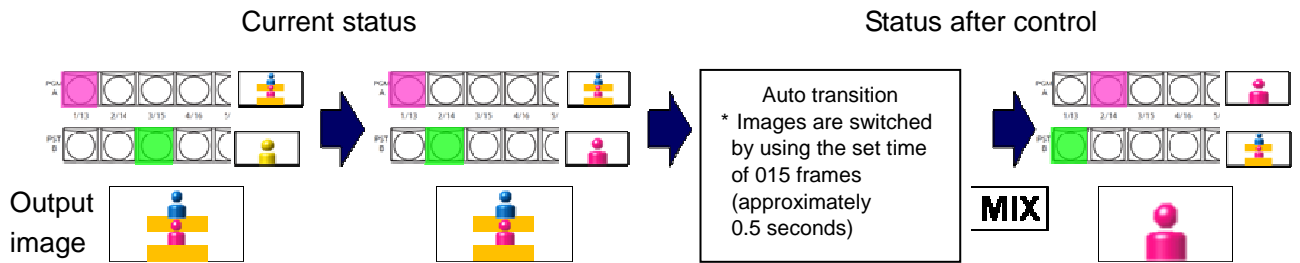


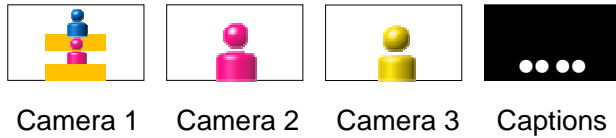
Fig. 3.7.1. Sequence of the BKGD mix auto transition command

3.7.2. Picture-in-picture auto transition control command

Example: Release of picture-in-picture (PinP) images

When a picture-in-picture image that is displayed on a background image is released in 0 frames (cut effect).

Example input materials



Crosspoint status

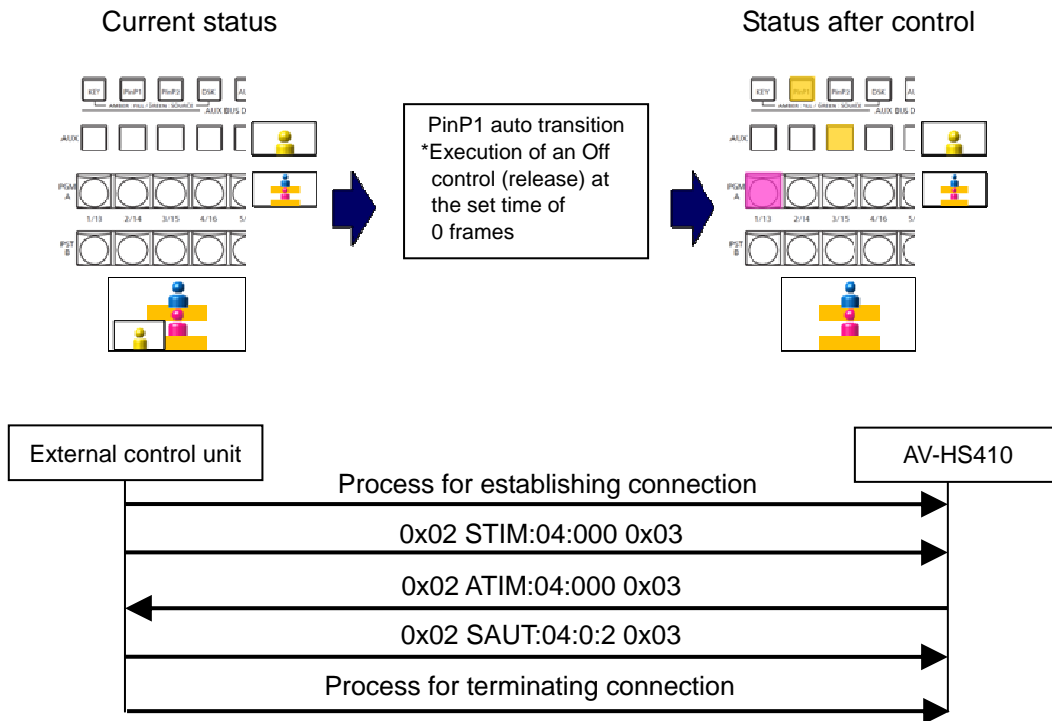


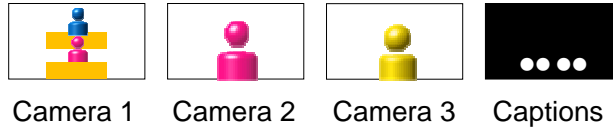
Fig. 3.7.2. Sequence of the PinP off auto transition command

3.7.3. KEY auto transition control command

Example: Releasing key (closed captioning) images

When a closed captioning key on top of a background image is released in 0 frames (cut effect).

Example input materials



Crosspoint status

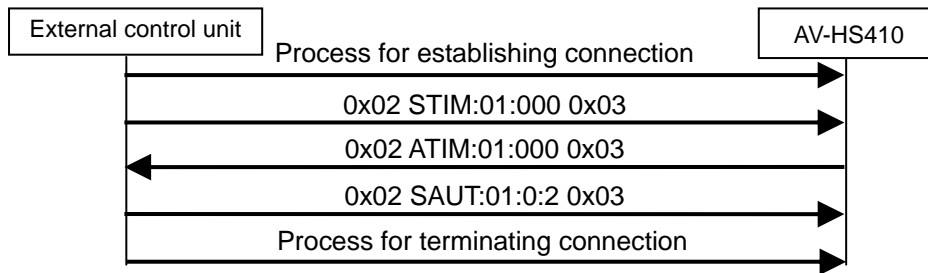
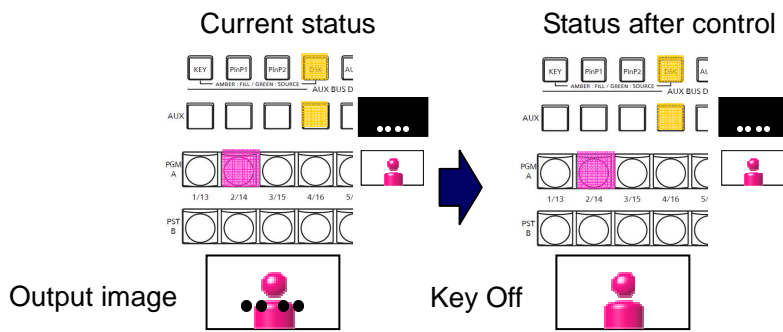


Fig. 3.7.3. Sequence of the key off auto transition command

3.8. Cut transition control

This command controls the cut transitions (issues the triggers).

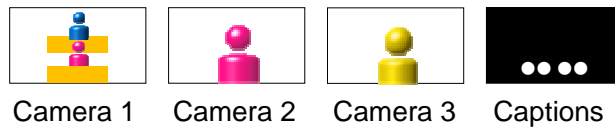
Command name	Category	Command	Parameter value	Setting	Remarks
CUT transitions control (issues the triggers)	Control	SCUT [:Parameter 1]	[:Parameter 1] :00 :01 :04 :05 :06 :07	Materials BKGD KEY PinP1 PinP2 FTB DSK	

3.8.1. Background cut transition control command

Example: Cut transition control of background images

When XPT3 (camera image 3) is selected for the PVW bus, and a cut transition is executed.

Example input materials



Crosspoint status

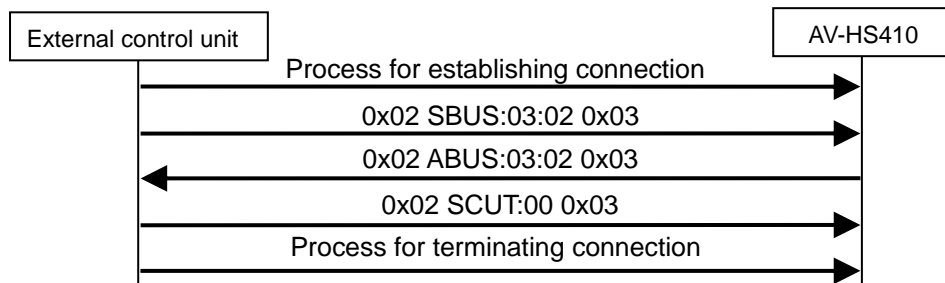
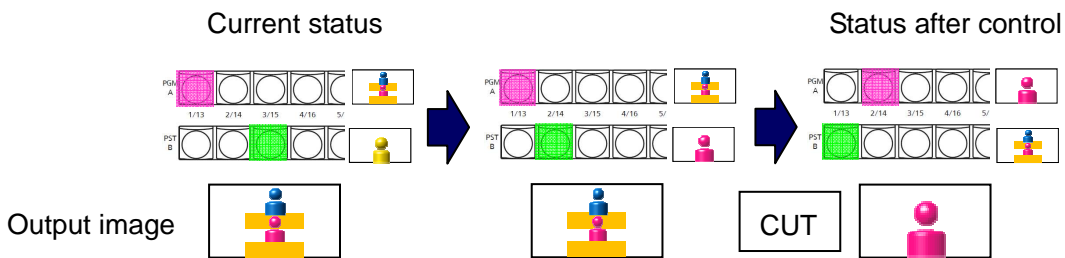


Fig. 3.8.1. Sequence of the BKGD cut transition command

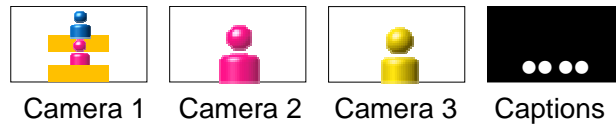
3.8.2. Picture-in-picture cut transition control command

Example: Inserting a picture-in-picture (PinP) image

When XPT3 (Camera 3) is selected for PinP, and a PinP image is inserted onto a background image.

Note: For details about releasing PinP images, refer to the section describing auto transition control.

Example input materials



Crosspoint status

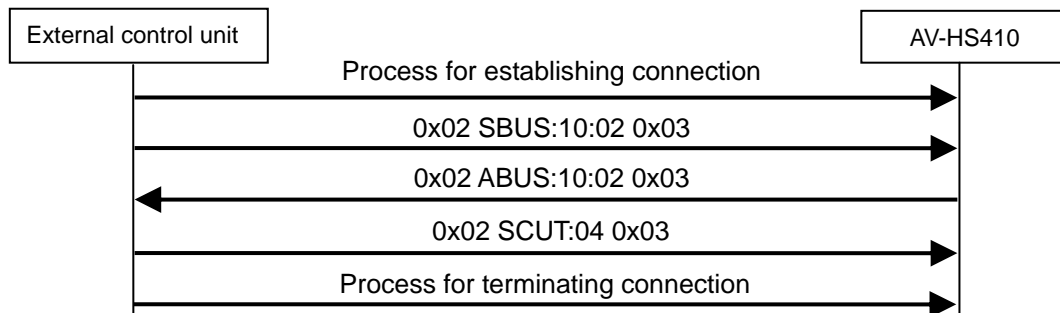
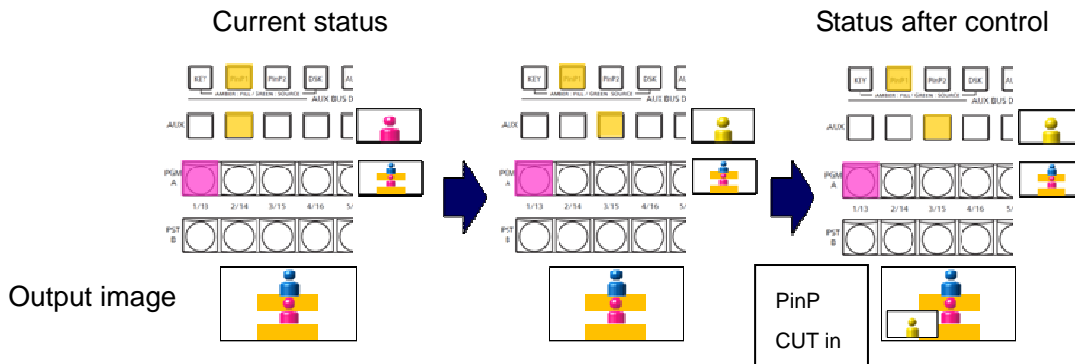


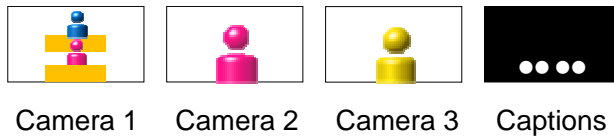
Fig. 3.8.2. Sequence of the PinP CUT in command

3.8.3. Key cut transition control command

Example: Inserting a key CUT in

When XPT4 images are used as key material for a CUT in insertion of closed captioning on a background image.

Example input materials



Crosspoint status

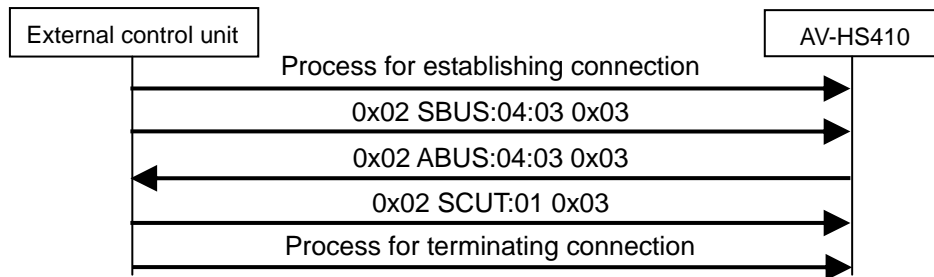
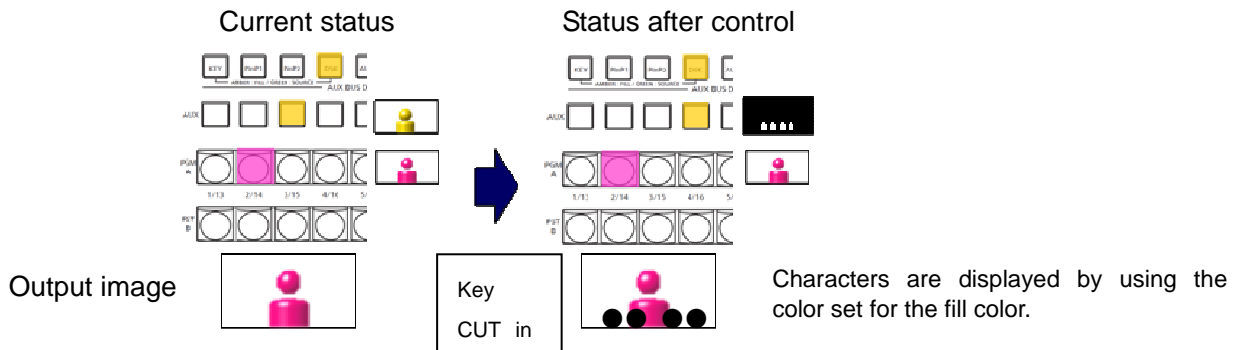


Fig. 3.8.3. Sequence of the key CUT in insertion command

3.9. Auto transition time query

This command queries the auto transition time.

Command name	Category	Command	Parameter value	Setting	Remarks
Auto transition time query	Request	QTIM [:Parameter 1]	[:Parameter 1] :00 :01 :04 :05 :06 :07	Transition target settings BKGD KEY PinP1 PinP2 FTB DSK	
	Response	ATIM [:Parameter 1] [:Parameter 2]	[:Parameter 1] :00 :01 :04 :05 :06 :07 [:Parameter 2] :000 to 999	Transition target settings BKGD KEY PinP1 PinP2 FTB DSK Times (in frame units) 000 to 999 frames	This command is returned in response to the QTIM command.

3.10. Auto transition time control

This command controls the time for each auto transition.

Command name	Category	Command	Parameter value	Setting	Remarks
Auto transition time control/ response	Control	STIM [:Parameter 1] [:Parameter 2]	[:Parameter 1] :00 :01 :04 :05 :06 :07 [:Parameter 2] :000 to 999	Transition target settings BKGD KEY PinP1 PinP2 FTB DSK Times (in frame units) 000 to 999 frames	
	Response	ATIM [:Parameter 1] [:Parameter 2]	[:Parameter 1] :00 :01 :04 :05 :06 :07 [:Parameter 2] :000 to 999	Transition target settings BKGD KEY PinP1 PinP2 FTB DSK Times (in frame units) 000 to 999 frames	This command is returned in response to the STIM command.

3.11. Query of the bus transition settings status

This command queries the settings status of the bus transitions (mix effects) for the AUX1, PinP1, and PinP2 buses.

Command name	Category	Command	Parameter value	Setting	Remarks
Query of bus transition settings status	Request	QBTI [:Parameter 1]	[:Parameter 1] :01 :02 :03	Bus type AUX1 PinP1 PinP2	
	Response	ABTI [:Parameter 1] [:Parameter 2] [:Parameter 3]	[:Parameter 1] :01 :02 :03 [:Parameter 2] :01 :02 [:Parameter 3] :000 to 999	Bus type AUX1 PinP1 PinP2 Enable/Disable Enable Disable Times (in frame units) 000 to 999 frames	This command is returned in response to the QBTI command.

3.12. Bus transition settings

This command sets the bus transitions (mix effects) for the AUX1, PinP1, and PinP2 buses.

Command name	Category	Command	Parameter value	Setting	Remarks
Bus transition settings	Control	SBTI [:Parameter 1] [:Parameter 2] [:Parameter 3]	[:Parameter 1] :01 :02 :03 [:Parameter 2] :01 :02 [:Parameter 3] :000 to 999	Bus type AUX1 PinP1 PinP2 Enable/Disable Enable Disable Times (in frame units) 000 to 999 frames	
	Response	ABTI [:Parameter 1] [:Parameter 2] [:Parameter 3]	[:Parameter 1] :01 :02 :03 [:Parameter 2] :01 :02 [:Parameter 3] :000 to 999	Bus type AUX1 PinP1 PinP2 Enable/Disable Enable Disable Times (in frame units) 000 to 999 frames	This command is returned in response to the SBTI command.

3.13. Transition pattern query

This command queries the transition pattern.

Command name	Category	Command	Parameter value	Setting	Remarks
Transition pattern query	Request	QPAT [:Parameter 1]	[:Parameter 1] :01 :02	Type BKGD KEY	
	Response	APAT [:Parameter 1] [:Parameter 2]	[:Parameter 1] :01 :02 [:Parameter 2] :01 to 09 :11 to 19 : :61 to 69	Type BKGD KEY Pattern WIPE01 to 09 WIPE11 to 19 : WIPE61 to 69	This command is returned in response to the QPAT command.

3.14. Transition pattern control

This command controls the transition patterns.

Command name	Category	Command	Parameter value	Setting	Remarks
Transition pattern control/ response	Control	SPAT [:Parameter 1]	[:Parameter 1] :01 :02 [:Parameter 2] :01 to 09 :11 to 19 : :61 to 69	Type BKGD KEY Pattern WIPE01 to 09 WIPE11 to 19 : WIPE61 to 69	
	Response	APAT [:Parameter 1] [:Parameter 2]	[:Parameter 1] :01 :02 [:Parameter 2] :01 to 09 :11 to 19 : :61 to 69	Type BKGD KEY Pattern WIPE01 to 09 WIPE11 to 19 : WIPE61 to 69	This command is returned in response to the SPAT command.

Caution!

If you select one of the 11 wipe pattern numbers below, the previous wipe pattern will be enabled, without changing the wipe wave effect.

WIPE 2: No.18, No.19

SQ 2: No.33, No.39

SL: No.45

3D 2: No.64 to No.69

3.15. PinP parameter status query

This command queries the PinP parameters.

Command name	Category	Command	Parameter value	Setting	Remarks
PinP parameter query	Request	QPNP [:Parameter 1]	[:Parameter 1] :1 :2	Target setting PinP1 PinP2	
	Response	APNP [:Parameter 1] [:Parameter 2] [:Parameter 3] [:Parameter 4] [:Parameter 5] [:Parameter 6]	[:Parameter 1] :1 [:Parameter 2] :2 [:Parameter 3] [:Parameter 4] :-10000 to [:Parameter 5] :+10000 [:Parameter 3] :-10000 to [:Parameter 4] :+10000 [:Parameter 4] :00000 to [:Parameter 5] :10000 [:Parameter 5] :0 :1 :2 :3 :4 [:Parameter 6] :0 :1 :2 :3 :4	Target setting PinP1 PinP2 Center X position -100.00 to +100.00 Note: Fixed at 6 digits +00000/-00000 Center Y position -100.00 to +100.00 Note: Fixed at 6 digits +00000/-00000 Size 000.00 to 100.00 Note: Fixed at 5 digits (e.g., 10.00 becomes 01000) Border width None Small Medium Large Other Border color White Gray 1 Gray 2 Black Other	This command is returned in response to the QPNP command.

3.16. PinP parameter control

This command controls the PinP parameters.

Command name	Category	Command	Parameter value	Setting	Remarks
PinP parameter control/response	Control	SPNP	[:Parameter 1] :1 [:Parameter 2] :2 [:Parameter 3] [:Parameter 4] [:Parameter 5] [:Parameter 6] :1 :2 :3 :4 [:Parameter 6] :0 :1 :2 :3 :4	Target setting PinP1 PinP2 Center X position -100.00 to +100.00 Note: Fixed at 6 digits +00000/-00000 Center Y position -100.00 to +100.00 Note: Fixed at 6 digits +00000/-00000 Size 000.00 to 100.00 Note: Fixed at 5 digits (e.g., 10.00 becomes 01000) Border width None Small Medium Large No change Border color White Gray 1 Gray 2 Black No change	
	Response	APNP	[:Parameter 1] :1 [:Parameter 2] :2 [:Parameter 3] [:Parameter 4] [:Parameter 5] [:Parameter 6] :1 :2 :3 :4 [:Parameter 6] :0 :1 :2 :3 :4	Target setting PinP1 PinP2 Center X position -100.00 to +100.00 Note: Fixed at 6 digits +00000/-00000 Center Y position -100.00 to +100.00 Note: Fixed at 6 digits +00000/-00000 Size 000.00 to 100.00 Note: Fixed at 5 digits (e.g., 10.00 becomes 01000) Border width None Small Medium Large Other Border color White Gray 1 Gray 2 Black Other	This command is returned in response to the SPNP command.

3.17. Side-by-side status query

This command queries the side-by-side status.

Command name	Category	Command	Parameter value	Setting	Remarks
Side-by-side status query	Request	QSBS			
	Response	ASBS [:Parameter 1]	[:Parameter 1] :0 :1	Status OFF ON	This command is returned in response to the QSBS command.

3.18. Side-by-side control

This command executes side-by-side control.

Command name	Category	Command	Parameter value	Setting	Remarks
Side-by-side control	Control	SSBS [:Parameter 1]	[:Parameter 1] :0 :1	Control OFF ON	*Off control will return the material to BKGD.
	Response	ASBS [:Parameter 1]	[:Parameter 1] :0 :1	Status OFF ON	This command is returned in response to the SSBS command.

Note: When the side-by-side setting is on, the picture-in-picture settings below will be applied.

Also, when the side-by-side setting is off, the picture-in-picture settings will return to the values that they were set to previously.

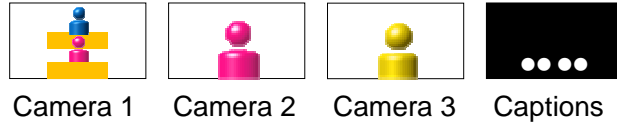
- (1) Position setting
 - Left (PinP1): X: -25, Y: 00, S: 100
 - Right (PinP2): X: 25, Y: 00, S: 100
- (2) Border setting
 - Left/Right: Border "ON", Width: 1, Color: White
- (3) Trim setting
 - Left/Right: Trim: Manual, Manual: Free
 - Left (PinP1):
 - Left -25, Right 25, Top 50, Bottom -50
 - Right (PinP2):
 - Left -25, Right 25, Top 50, Bottom -50
- (4) Priority setting
 - Priority 1: Key
 - Priority 2: PinP1
 - Priority 3: PinP2
- (5) Shape/Density setting
 - Shape: Square, Density: 100

3.18.1. Side-by-side execution control command

Example: Display images side-by-side (split over 2 screens)

Displays XPT2 (Camera 2: left side) and XPT3 (Camera 3: right side) on 2 screens.

Example input materials



Crosspoint status

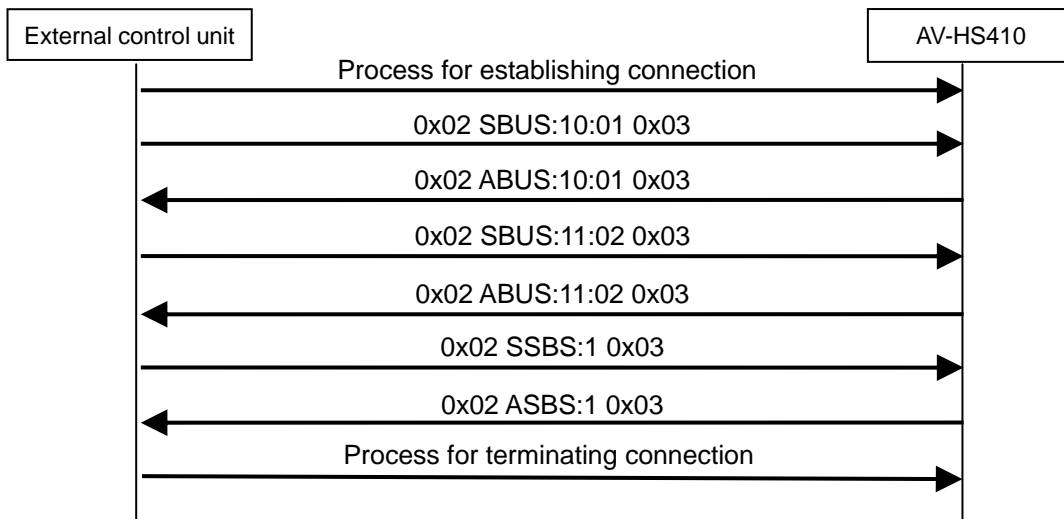
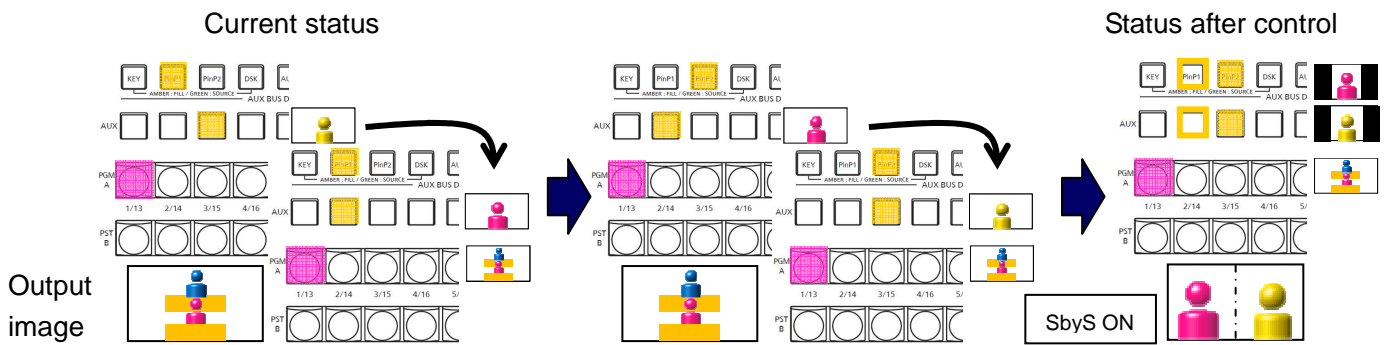


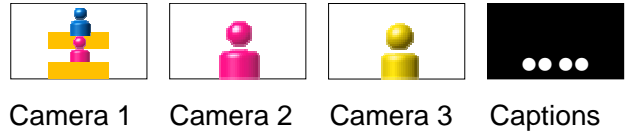
Fig. 3.18.1. Sequence of the side-by-side execution command

3.18.2. Side-by-side release control command

Example: Releasing the side-by-side setting

When the side-by-side display is released and a background image is displayed.

Example input materials



Crosspoint status

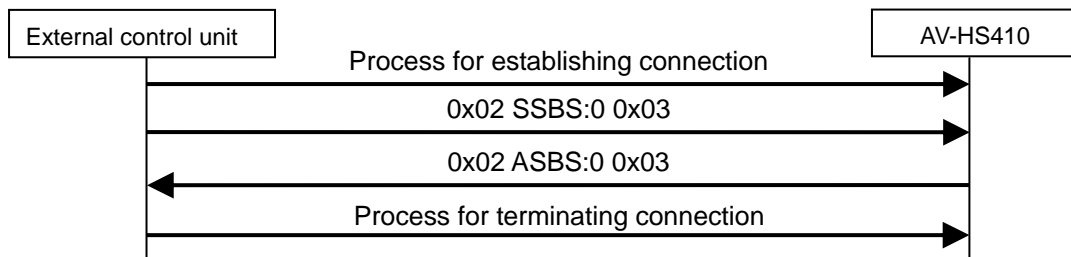
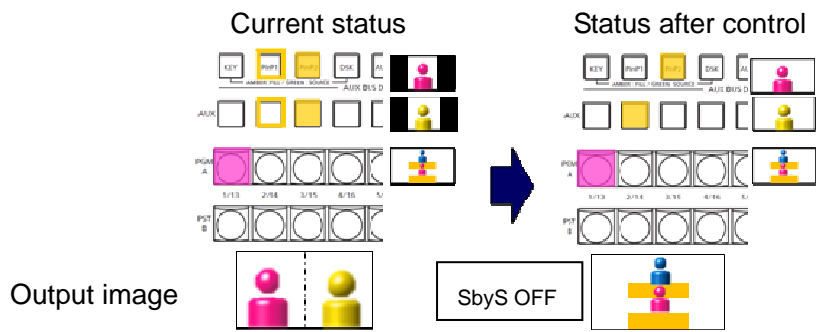


Fig. 3.18.2. Sequence of the side-by-side release command