

2ME Live Switcher – AV-HS6000 –



2ME Live Switcher

AV-HS6000 Series Composition

		Model no.
Mainframe	Redundant Power Supply Model	AV-HS60U2
	Redundant Power Supply Model	AV-HS60C2
Control Panel	Redundant Power Supply Model	AV-HS60C2
	Redundant Power Supply Model	AV-HS60C4
Menu Panel		AV-HS60C3G
Storage Module		AV-HS60D1G
Chroma Key Software		AV-SFU60G

2 ME	34 Inputs	16 Outputs	4 Keys Per ME
4 DSK	4 USK	4 P-in-P Per ME (dual-use with keys)	
4ch MultiViewer	16 Aux Buses	Redundant Power Supply	

2ME Live Switcher with complete system adaptability, intuitive operations, high reliability, and advanced 4K compatibility*

• Supports a range of video formats including, 2160/59.94p, 50p (4K mode)*, 1080/59.94p, 50p (3G mode), 1080/59.94i, 1080/50i, 480/59.94i and 576/50i.

- 32 SDI and two DVI-D inputs, and 16 SDI with two outputs.
- All inputs are provided with a 10 bit frame synchronizer. Eight inputs equipped with color corrector. Four inputs equipped with frame delay.
- Four outputs equipped with color correctors, and two with downconverters.
- 4 ch of 3D DVE and 2 ch of 2D DVE systems are provided to support background and keys for each ME.
- A luminance key, linear key, chroma key, full key, and PinP are provided for 4 ch per ME (8 ch in total), plus 4 ch of DSK and 4 ch of upstream key (USK).
- Comes with event memory, shot memory and macro memory for recording complex operations.
- Multi-Selection Panel for each ME. The switch-style panel helps in operations by providing a direct, tactile response.
- Crosspoint buttons can be grouped with any eight colors, and bitmap characters can be displayed on the label display panel (OLED).
- 10.1-type(256.5 mm) Menu Panel with touch screen allows quick and easy menu operation
- Operation of up to three control panels is possible through an IP connection.
- System settings and memory information can be stored on an SD card, PCs, and optional storage module.
- Functions are scalable using plug-in software.

* Firmware Ver. 4 or later required. For details, see "Service and Support" on the Panasonic website (<http://pro-av.panasonic.net/en/>).

Control Panel

Control Panel AV-HS60C2

• 24 XPT, Width: 980 mm (38-19/32 inches)



Control Panel AV-HS60C4

• 16 XPT, Width: 656 mm (25-13/16 inches)



Rear Panel

Mainframe



Control Panel



3G/4K format compatibility (Advanced support for high-definition)



This advanced switcher can be used to produce 4K*1 high-definition video as well as HD/SD-SDI and 3G-SDI by switching between three use modes.

*1: Firmware Ver. 4 or later required. For details, see "Service and Support" on the Panasonic website (<http://pro-av.panasonic.net/en/>).

Functions supported by format

		Standard mode	3G mode	4K mode
Input function	Number of SDI inputs	32	16(3G Level A/B ²)	8(SQD/2SI Level A/B ² × 4)
	Number of DVI inputs	2	Not possible	Not possible
	Number of up-converter channel	4	-	8
	Dot by Dot	Possible	-	-
	Number of delay function channel	4	2	-
	Number of color corrector channel	8	4	-
Output function	Number of upstream keyer channel	4	2	-
	Number of SDI output	16	8	3 (SQD 3G Level B × 4)
	Number of down-converter channel	2	2 ³	2 ⁴
ME1 function	Number of color corrector channel	4	2	-
	Number of utility bus	2	1	1
	BKGD transition pattern	MIX / WIPE / DVE	MIX / WIPE	MIX / WIPE
ME2 function	IMAGE	Possible	Not possible	Not possible
	Number of keyer	4	Not possible	Not possible
	Number of utility bus	2	Not possible	Not possible
	Number of utility bus	2	Not possible	Not possible
Number of DSK keyer		4	2	2 ⁵
Number of still image (Still) memory channel		4	2	2 ⁵
Moving image (Clip) memory function	Number of channel	4	2	2 ⁵
	Recording time per channel (standard image quality)	Approximately 60 seconds	Approximately 30 seconds	Approximately 30 seconds
Number of MultiViewer	Recording time per channel (high image quality)	Approximately 30 seconds	Approximately 15 seconds	Approximately 15 seconds
	Number of utility bus	4	2	2 ⁵
Number of AUX		16	8	8 ⁵

*2: When FS function is active and 3G-SDI Level A signal is input, it is converted to Level B signal to perform signal processing. When FS function is off and 3G-SDI Level A signal is input, a black screen will be displayed. FS function is always ON when in 4K mode. *3: SDI OUT 14 outputs down-converted HD-SDI signal of SDI OUT 13, and SDI OUT 16 outputs down-converted HD-SDI signal of SDI OUT 15. *4: Same video output on SDI OUT 13(3GSDI) and SDI OUT 14(HD-SDI). Same video output on SDI OUT 15(3G-SDI) and SDI OUT 16(HD-SDI). *5: 2K resolution video scaled to 4K resolution.

Easy Direct Switching by Touch and Mouse Operations

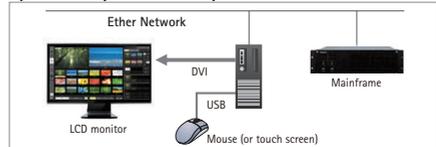
Software Control Panel AV-SF6000G

(Free download for Mac and Windows)

The AV-HS6000 control panel is also available as a PC based application software. Equipped with the MJPEG codec, it allows display of video and image in the application. Intuitive and simple operations while viewing source video or using the display as a sub-panel is possible.

* For information on downloading software control panel, see "Software download" on the Panasonic website (<http://pro-av.panasonic.net/en/>).

System Composition Example



Mode selection part

- Switches between Control Mode, Menu Panel, and Video Status modes.
- Displays mainframe communications status and error status.
- Switches between connected mainframes by inputting the IP address.
- Allows free arrangement of sources displayed on the input and output windows.

Control Mode screen



Operation menu part

- Switches ME to be operated.
- Selects PST, PGM, UTIL 1 to 2, and KEY 1 to 4.

Source assignment part

- Selects movie to be assigned to the bus selected with operation menu part.
- A total of 54 sources can be displayed on three pages by displaying 18 sources on one page and switching pages.
- Displays tally status in red and green frames.



Input and output windows

- Displays PGM and PST for the selected ME.
- Displays DSK PGM1 for PGM when PGM (+DSK) button is selected.
- Displays Next Transition setting status superimposed on window for PST.

Page button

- Switches display of operation panel part.

Operation panel part-1

- Operates transitions (fader, AUTO, CUT).
- Selects key type and transition type for KEY 1 to 4 and sets transition time.
- Sets key type for DSK 1 to 4.
- Displays thumbnail for source assigned to KEY and DSK.

Operation panel part-2

- Controls shot memory, event memory, and macro memory.
- Video memory (still/clip) can be controlled.
- Stills and clips can be loaded from the built-in SSD or a PC.

System Composition Example

Menu Panel screen



Displays menu panel operation display, showing ME1, ME2 and PGM on left side. It is possible to operate menu panel or to check the result while checking the PGM output.

Video Status screen



Video sources of all inputs, all outputs, ME/DSK/AUX buses, and MultiView screen are displayed in a list.

Macro Edit screen



Added editing function which are adding and deleting operations, wait time setting, etc., recorded Macro memory for more convenience.

AV-HS6000 Main Features

*For information on other switchers, see Specification & Function Comparison on page 64-67.

Ample Input / Output Functions

Inputs and outputs are provided with frame synchronizer, freeze, frame delay, format converter, dot by dot, color corrector and video process functions. The AV-HS6000 supports incorporation of asynchronous signals, virtual system delay difference compensation, and color correction based on differences in camera and display device characteristics, for a smoother program production process.

Multi-Format Support

The AV-HS6000 supports multiple HD/SD formats including 1080/24PsF and 1080/23.98PsF to enable digital cinema production and worldwide operation. It is also compatible with the 3G/4K format*1.

Various Keyers for Flexible Operations

The AV-HS6000 comes with luminance key, linear key, chroma key and full key as well as keyers that can be used with P-in-P. Chroma keying employs the Primatte® algorithm, which is widely used as a plug-in for nonlinear editors. Superior blue-spill processing naturally combines translucent objects, such as silk and glass, with background colors, making it possible to faithfully reproduce extremely fine objects such as individual strands of hair at a very high level of detail. It also comes with upstream and downstream keyers to support a wide range of video renderings. In addition, the preset function lets you register key settings for each DSK keyer and the keyers for each ME.

P-in-P Examples



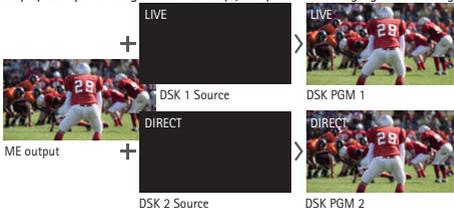
Primatte® High-Quality Chroma Key (picture simulated)



Display Example of Using Upstream Key



Display Example of using Downstream Key (Example of multi-language broadcasting)



Diverse DVE Transitions

In addition to wipe, mix and cut transitions, 3D DVE effects such as page turn or DVE transitions using dual channel squeeze can be performed. Various renderings of image effects are also possible, including mosaic and defocus.

Transitions and Effects Display Example

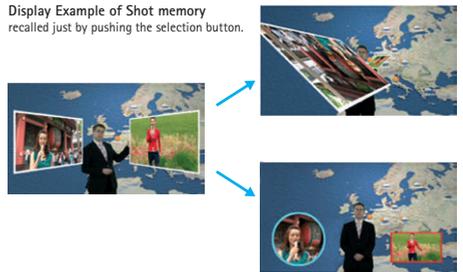


Memory Functions

Using memory function, setting, video and effects can be easily stored and recalled. It allows quick operation of switching and recalling effects in live video production, supports efficient operation and making it easy to perform video effects for more complicated operations.

- Shot memory: This function recalls background transition patterns or other video effects, including PinP size, position, border width, and key on. Effect dissolve can be set to ensure smooth switching from the current effect to the next effect registered in shot memory.

Display Example of Shot memory recalled just by pushing the selection button.



- Event memory: This function allows continuous image effects to be registered and played back in a timeline.

- Macro memory: This function allows record and playback of a series of operations on the Control Panel. It can also record and play back setting information, such as input/output and keyers. Multi-Selection Panel shot memory and event memory operations can also be recorded in macro memory. Macro memories can be played back by assigning them to the cross point buttons, such as macro bus, PGM, and PST.

- Video memory: Moving images (Clip) and still images (Still) can be recorded for use as video sources. Up to 60 seconds of moving images can be saved in standard mode, and up to 30 seconds in high image quality mode.

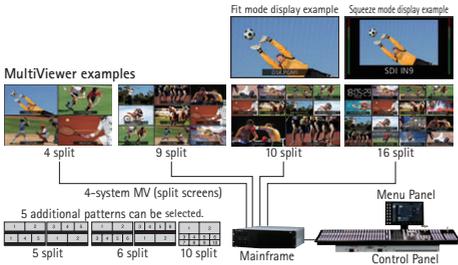
- **Animation wipe:** Animation wipes can be easily created using moving images (clips) recorded in video memory. Playback linked to a fader transition is also possible.

Animation Wipe Examples



MultiViewer Function

PGM, PVW and video from all sources can be displayed on a single screen as split frames with the MultiViewer function. Display source names, tallies, audio level meters, clocks and safety markers. You can also select between fit mode and squeeze mode.



Multi-Selection Panel

A color panel that can display thumbnail images with high visibility. The switches provide a tactile response which allows quick and precise memory operation.

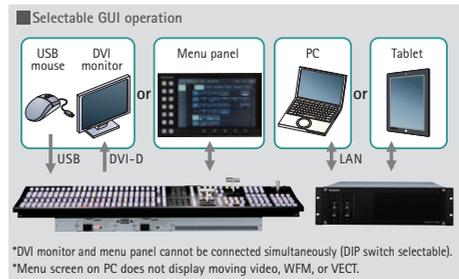


Wipe Pattern

Video memory
(Clip: moving images)

Flexible System Scalability

- **Aux buses are provided.** Bus transition functions include not only Cut but the Mix transition as well. Combined with M/E sections, various operations are possible in a variety of scenarios.
- **Menu operations can be performed from a PC or tablet via a network connection.**
- **Features a range of external interfaces for plug-ins created with the SDK*2, providing flexible functional scalability through the installation of plug-ins.** Seven plug-in software is provided. In addition, the software development kit (SDK) provided by Panasonic makes it possible for software to be freely developed by third parties and SI providers.



Backup System for Peace of Mind

- **The redundant power supply increases reliability for use at live events.**
- **Operation of up to two control panels is possible through an IP connection.**
- **ME rows can be switched by swapping the ME panel and changing the output of the system when ME faults.**
- **Web server function allows access to the GUI menu from a web browser of PC.**
- **Settings and memory information can be exported and saved as a project file on internal mainframe storage*3 or on an external SD memory device or PC.**

*1: Firmware Ver. 4 or later required.

*2: Contact your dealer for more details.

*3: The AV-HS6000 requires an optional AV-HS60D1G storage module.

*For more details, see Specification & Function Comparison on page 64-67.



Multi-Format Live Switcher

AV-HS450

1 ME	Max. 20 Inputs*1	Max. 10 Outputs*2	1 Keyer	2 DSK
2 P-in-P	2ch MultiViewer	4 Aux Buses	Redundant Power Supply	

This high-performance switcher handles the switching needs of broadcast studios, OB vans and multi-camera systems anywhere.

- 16 SDI inputs, four SDI outputs and two DVI-D outputs.
- Luminance and chroma keying, two DSK channels, two P-in-P buses and two DVE channels.
- Supports a variety of HD/SD formats, including 1080/24PsF*3 as standard.
- A wide range of optional boards also allows the input and output of analog component and various other signals. (For details, see the list of optional boards below.)
- Equipped with an SD/HD up-converter function for four standard inputs, and a dot by dot function for 16 standard inputs.
- A video processing function with color correction is also provided for eight inputs.
- Aux 1 bus equipped with Mix transition function.
- Panel layout offers direct control of functions with 16 crosspoint buttons and pattern select buttons.
- Six user buttons.
- Mounting the optional AV-HS04M7D 3D SDI Output Board provides 3D compatibility. Switch up to Nine 3D Image Inputs.

Rear Panel

Mainframe



Control Panel



Live Switcher

AV-HS410

1 ME	Max. 13 Inputs*1	Max. 10 Outputs*2	1 Keyer
1 DSK	2 P-in-P	1ch MultiViewer	4 Aux Buses

This compact, integrated unit includes levels of performance and function that approach many high-end switchers.

- Eight SDI inputs, one DVI-D input, five SDI outputs and one DVI-D output.
- Supports a variety of HD/SD formats, including 1080/24PsF, as standard.
- A wide range of optional boards also allows the input and output of analog component and various other signals. (For details, see the list of optional boards below.)
- Equipped with an SD/HD up-converter function for four standard inputs, and a dot by dot function for eight inputs.
- A video processing function with brightness, pedestal level, saturation, and color phase correction is also provided for eight inputs.
- The Memory Preview function lets you preview shot memory and event memory content. It allows image effects to be easily confirmed while on-air with this 1 M/E switcher.
- Two inputs for still (STILL) and moving (CLIP) images can be saved in Video Memory, and selected as bus footage.
- A 178 mm (seven inches) color LCD monitor with WVGA (800 x 480) resolution is built into the control panel. It can be switched to a wide variety of display modes, including setting menu, image monitoring and waveform/vectorscope.
- 12 crosspoint buttons in each A bus and B bus (for a maximum of 22 with the Shift function) provide direct control. Also comes with eight user buttons.
- Plug-ins allow flexible expansion of software-based functions.

Rear Panel



Input

Option Boards



AV-HS04M1
SDI Input Board
SDI (HD/SD) x 2 (BNC)
(Built-in Up-converter)



AV-HS04M2
Analog Component Input Board
HD/SD Analog Component x 2 (Y/Pa/Pb)
(Built-in Up-converter)



AV-HS04M3
DVI Input Board
DVI-I x 2 (Built-in Scaler)



AV-HS04M6
Analog Composite Input Board
Analog Composite x 2
(Built-in Up-converter)



AV-HS04M8
Full HD DVI Input Board
DVI-D x 2
(compatible with WUXGA)

Output

Option Boards



AV-HS04M4
Analog Output Board
HD/SD Analog Component x 2
(Y/Pa/Pb)



AV-HS04M5
DVI/Analog Output Board
DVI-I x 1, HD/SD Analog
Component x 1 (Y/Pa/Pb)



AV-HS04M7
SDI Output Board
SDI (HD/SD) x 2
(Each one has 2 outputs)
(BNC) (Built-in Down-converter)



AV-HS04M7D
3D SDI Output Board
SDI (HD/SD) x 2
(Each one has 2 outputs)
(BNC) (Built-in Down-converter)



Compact Live Switcher

AW-HS50

1 ME	5 Inputs	3 Outputs	1 Keyer
1 P-in-P	1ch MultiViewer	1 Aux Buses	

Highly functional live switcher in compact, half-rack-size package.

- Four SDI inputs, one DVI-D input, two SDI outputs and one DVI-D output.
- The AW-HS50 is equipped with an SD/HD up-converter function for two inputs.
- All four inputs equipped with a dot by dot function and a video processing function for brightness, pedestal level, saturation and color phase correction.
- Transitions: 13 wipe patterns and mixes.
- Two 8 bit still images can be saved in Frame Memory, and used as bus footage.
- Five crosspoint buttons in each A bus and B bus (for a maximum of 10 with the Shift function), a Cut button, a P-in-P button, a Key button and an FTB button allow direct control with this simple panel layout.
- two user buttons (for a maximum of four with the Shift function).
- Linking the AW-HS50 to the optional AW-RP50 Remote Camera Controller with an IP connection**4 over a network makes remote operation of Panasonic HD Integrated Cameras and other devices possible.

Rear Panel



*1: When using two input boards. *2: When using two output boards. *3: 1080/24PsF (or 23.98PsF) input signals are supported only by the standard input terminals of the AW-HS450. These signals are not supported by the optional AW-HS04M1/M2/M3/M4/M5/M6/M7/M7D/M8 boards. *4: Only one AW-RP50 can be connected to the switcher via an IP connection. And connection is not possible with a public network.

Live Switcher Specification Comparison

		AV-HS6000*1	AV-HS450
ME		2ME	
Video Format	4K/3G	2160/59.94p (4K mode)**, 2160/50p (4K mode)**, 1080/59.94p (3G mode), 1080/50p (3G mode)	—
	HD	1080/59.94i, 1080/50i, 1080/24PsF, 1080/23.98PsF, 1080/25PsF, 1080/29.97PsF, 720/59.94p, 720/50p	1080/59.94i, 1080/50i, 1080/24PsF**, 1080/23.98PsF**, 720/59.94p, 720/50p
	SD		
Video Processing	Y:P _s :P _a	4 : 2 : 2 10 bit	4 : 2 : 2 10 bit (8 bit for FMEM)
	RGB		
Video Input	Input	34 signal lines	16 signal lines, standard 20 signal lines, maximum
	SDI	32 lines, BNC x 32 HD (SMPTTE292M)/3G (SMPTTE424M)/SD (SMPTTE259M) standard, 0.8 V [p-p] ± 10 % (75 Ω)	Standard SDI: 16 lines, BNC x 16 HD (SMPTTE292M)/SD (SMPTTE259M) standard, 0.8 V [p-p] ± 10 % (75 Ω)
	DVI-D/DVI-I	2 signal line DVI-D x 2 Digital RGB: XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024), WSXGA+ (1680 x 1050), UXGA (1600 x 1200), WUXGA (1920 x 1200) Vertical frequency: 60 Hz Video format inputs: 1080/59.94p, 1080/50p, 1080/59.94i, 1080/50i, 720/59.94p, 720/50p	—
	Optional Board	—	Maximum of 4 inputs (IN A1, A2, B1, B2)(Up to 2 optional)
Video Output	Output	16 signal lines	6 signal lines, standard 10 signal lines, maximum
	SDI	16 lines, BNC x 32 (2 distributed outputs per line) HD (SMPTTE292M)/3G (SMPTTE424M)/SD (SMPTTE259M) standard, 0.8 V [p-p] ± 10 %	Standard SDI: 4 lines, BNC x 5 (2 output distribution for OUT 1) HD (SMPTTE292M)/SD (SMPTTE259M) standard, 0.8 V [p-p] ± 10 % (75 Ω)
	DVI-D	—	Standard DVI-D: 2 lines, DVI-D x 2, (OUT 5, 6) Digital RGB: XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024), WSXGA+ (1680 x 1050), UXGA (1600 x 1200), WUXGA (1920 x 1200) Vertical frequency: 60 Hz Video format outputs: 1080/50P, 1080/59.94P (Analog output signals are not supported)
	Optional Board	—	Maximum of 4 outputs (OUT A1, A2, B1, B2)(Up to 2 optional)
Reference Input/Output		Mainframe BNC GENLOCK mode: Black burst or Tri-level Sync input signals (with loop-through) • Same field frequencies as those of the system formats supported. • With the 1080/23.98PsF, 1080/24PsF format, only GENLOCK mode supported. • With the 1080/23.98PsF format, black burst with 10F-ID (SMPTTE318M standard met) or TRI signals supported. Internal sync mode: Black burst output signals x 2	
Interface	PANEL/MAIN-FRAME	RJ45 x 1, Compatible with 100Base-TX and AUTO-MDIX (to connect between the mainframe and the control panel)	RJ45 x 1, 100 Mbps (to connect between the mainframe and the control panel)
	EDITOR	—	Mainframe, D-sub 9 pin x 1, RS-422 (GVG protocol compatible)
	COM	Mainframe, D-sub 9 pin x 4, RS-422*3 Control Panel: D-sub 9 pin x 2 (RS-422 x 1, RS-232C x 1)	Mainframe, D-sub 9 pin x 1, RS-422 (pan-tilt system control)
	TALLY/GPI	Mainframe: D-sub 25 pin x 1 GPI IN x 18 (general-purpose, photocoupler sensing), GPIOUT x 48 (selected from general purpose, tally, Open collector output), ALARM OUT x 1 (open collector output, negative logic) Control Panel: D-sub 25 pin x 1 GPI IN x 8 (general-purpose, photocoupler sensing), GPIOUT x 10 (selected from general purpose, tally, Open collector output), ALARM OUT x 1 (open collector output, negative logic)	Mainframe: D-sub 50 pin x 1 GPI IN x 8 (general-purpose, photocoupler sensing), GPI OUT x 31 (general-purpose, selected from R/G tally, open collector output), ALARM OUT x 1 (open collector output, negative logic) Control Panel: D-sub 25 pin x 1 GPI IN x 8, GPI OUT x 8, ALARM OUT x 1
	LAN	Mainframe: Compatible with 100Base-TX and AUTO-MDIX (For IP control)	Mainframe, RJ45 x 1, 10 BASE-T/100 BASE-TX
Control Panel	Discrete (menu DVI-D output; USB mouse menu control)		Discrete
Menu Panel	Discrete		
Multi-Selection Panel	Provided for each ME		
Removable Media	SD Memory Card Supported by the control panel, Capacity: Maximum 32 GB (SDHC Memory Card compatible) Still image file/movie clip file/PROJECT file (including memories): Loading/saving, Software: Loading, Log data: saving		SD Memory Card Supported by the control panel, Capacity: Maximum 32 GB (SDHC Memory Card compatible) Still image file: Loading/saving, setup data: backup

*1: For information on 4K/3G mode, see page 59.

*2: Firmware Ver. 4 or later required. For details, see "Service and Support" on the Panasonic website ([http:// pro-av.panasonic.net/en/](http://pro-av.panasonic.net/en/)).

AV-HS410	AW-HS50
1ME	
—	—
1080/59.94i, 1080/50i, 1080/24PsF ⁴ , 1080/23.98PsF ⁴ , 720/59.94p, 720/50p	1080/59.94i, 1080/50i, 1080/24PsF, 1080/23.98PsF, 720/59.94p, 720/50p
480/59.94i, 576/50i	
4 : 2 : 2 10 bit (8 bit for video memory)	4 : 2 : 2 10 bit (8 bit for FMEM)
4 : 4 : 4 , 8 bit	
9 signal lines, standard 13 signal lines, maximum	5 signal lines
Standard SDI: 8 lines, BNC x 8 (IN 1 to 8) HD (SMPTE292M)/SD (SMPTE259M) standard, 0.8 V [p-p] ±10 % (75 Ω)	4 lines, BNC x 4 HD (SMPTE292M)/SD (SMPTE259M) standard, 0.8 V [p-p] ± 10 % (75 Ω)
Standard DVI-D: 1 signal line, DVI-D x 1 Digital RGB: XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024), WSXGA+ (1680 x 1050), UXGA (1600 x 1200), WUXGA (1920 x 1200) Vertical frequency: 60 Hz Video format inputs: 1080/50p, 1080/59.94p (Analog input signals are not supported)	
boards may be inserted into the 2 input/output optional slots)	—
6 signal lines, standard 10 signal lines maximum	3 signal lines
Standard SDI: 5 lines, BNC x 6 (2 output distribution for OUT 1) HD (SMPTE292M)/SD (SMPTE259M) standard, 0.8 V [p-p] ±10 % (75 Ω)	SDI: 2 lines, BNC x 3 (2 output distribution for OUT1) HD (SMPTE292M)/SD (SMPTE259M) standard, 0.8 V [p-p] ±10 % (75 Ω)
Standard DVI-D: 1 lines, DVI-D x 1 Digital RGB: XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024), WSXGA+ (1680 x 1050), UXGA (1600 x 1200), WUXGA (1920 x 1200) Vertical frequency: 60 Hz Video format outputs: 1080/50p, 1080/59.94p, 1080/50i, 1080/59.94i, 720/50P, 720/59.94p (Analog output signals are not supported)	Standard DVI-D: 1 lines, DVI-D x 1 Digital RGB: XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024), WSXGA+ (1680 x 1050), UXGA (1600 x 1200), WUXGA (1920 x 1200) Vertical frequency: 60 Hz Video format outputs: 1080/50p, 1080/59.94p (Analog output signals are not supported)
boards may be inserted into the 2 input/output optional slots)	—
GENLOCK mode: Black burst or Tri-level Sync input signals (with loop-through) • Same field frequencies as those of the system formats supported. • With the 1080/24PsF format, only GENLOCK mode supported. • With the 1080/23.98PsF format, black burst with 10F-ID (SMPTE318M standard met) or TRI signals supported. Internal sync mode: Black burst output signals x 2	—
—	—
D-sub 9 pin x 1, RS-422	—
D-sub 9 pin x 1, RS-422	—
D-sub15 pin x 2 GPI IN x 8 (general-purpose, photocoupler sensing), GPI OUT x 19 (general-purpose, selected from R/G tally, open collector output), ALARM OUT x 1 (open collector output, negative logic)	D-sub 15 pin x 1, GPI IN x 5 (photocoupler sensing), GPI OUT x 7 (open collector output, negative logic)
RJ45, 10 BASE-T/100 BASE-TX	
Integrated	
Integrated	
—	
SD Memory Card Capacity: Maximum 32 GB (SDHC Memory Card compatible) Still image file/movie clip file/shot memory/ event memory: Loading/saving, Setup data: backup	—

*3: Switchable between master connection and slave connection via menu

*4: 1080/24PsF and 23.98PsF are not supported with the AV-HS04M option board series.

Live Switcher Function Comparison

		AV-HS6000	AV-HS450
BKGD	Wipe	17	12
	Squeeze	16	11
	Slide	8	8
	3D	13	12
	2ch Squeeze	7	4
	2ch Slide	8	4
	2ch 3D	1	4
	Transition Type	Cut, Mix, Wipe (including DVE), EMEMLINK	
Image	Image effect: PGM/A, PST/B Bus	Effect: Mosaic, Defocus, Mono, Paint	
Keyer	Number of Keys	8	
	Key Type	Linear key, Luminance key, Chroma key*, Full key	Linear key, Luminance key, Chroma key, Full key
	Transition Type	Cut, Mix, Wipe (including DVE)	
	Wipe/DVE Pattern	Wipe x 12, Squeeze x 11, Slide x 9, 3D x 12	
USK	Number of Keys	4	
	Key Type	Linear key, Luminance key, Full key	
	Transition Type	Cut	
DSK	Number of Keys	4	2
	Key Type		Linear key, Luminance key
P in P	Transition Type	Cut, Mix	
	Number of PinP	8 ^{*2}	
AUX Bus		AUX Bus 1 to 16 ^{*3}	AUX Bus
Input Function	Frame Synchronizer	SDI IN 1 to 32, DVI IN 1, 2	SDI IN 1 to 16 ^{*7}
	Freeze	SDI IN 1 to 32, DVI IN 1, 2	SDI IN 1 to 16 ^{*7}
	Frame Delay	SDI IN 27, 28, 31, 32	
	Dot by Dot	SDI IN 1 to 32	SDI IN 1 to 16
	Up-Converter	SDI IN 27, 28, 31, 32	SDI IN 13 to 16 ^{*7}
	Color Corrector	SDI IN 25 to 32	SDI IN 9 to 16
	Video Processing	SDI IN 25 to 32	SDI IN 9 to 16
Output Function	MultiViewer	4 ch, Labels, Tally indication, Audio level meter, Safety marker, Split-screen (10 Patterns: 4, 5a/5b, 6a/6b, 9, 10a/10b, 12 and 16 sections)	2 ch, Labels, Tally indication, Split-screen (4 Patterns: 4, 9, 10 and 16 sections) ^{*8}
	Down-Converter	SDI OUT 14, 16	SDI output
	Color Corrector	SDI OUT 13 to 16	
	Other Function	Phase adjustment, Chroma key sample marker	OSD (PVW and several MULTI outputs), Phase adjustment, Chroma key sample marker
Memory Function	Frame Memory	—	4 channels (save to flash memory on mainframe; data retained even when power off)
	Video Memory	Still (still images): 4 systems (save to volatile memory on mainframe; data erased when power off) ^{*4} Clip (movie clips): 4 systems (save to volatile memory on mainframe; data erased when power off) ^{*4}	—
	Shot Memory	Register 81 shots (effect dissolve function)	Register 10 shots
	Event Memory	Register 64 events in 81 memories	—
	Macro Memory	Register 81 memories (can remember a total of 3,000 procedure operations)	
	BKGD/Wipe Memory	—	Register 10 memories
	P in P Memory	—	Register 10 memories
	Camera Memory	—	Register 10 memories ^{*9}
Key Preset	Register 4 presets for 1 keyer		
Other Function	Project Management Function	✓ (Save/retrieve current settings and memory data as batch file)	
	Plug-in Function	✓ (Register plug-in software created with SDK to add functions/ external interface function)	—
	Redundant Power Supply	✓ (Redundant power model for mainframe and control panel)	✓
	Multiple Panel Connection	✓ (1 mainpanel, 2 subpanels) ^{*5}	
	Web Browser Function	✓ (Menu operations from local PC) ^{*5}	

*1: Chroma keying only available on the Key 1 bus; additions possible by installing the optional AV-SFU60G.

*2: Dual use with keyer; Rotation available only on Key 1 and Key 2 buses.

*3: Mix transition available on Aux 1-4 buses.

*4: Data in volatile memory can be exported and saved on the internal mainframe storage (optional), an SD memory card or LAN port-connected PC.

*5: The subcontrol panel and local PC connects to the mainframe LAN port.

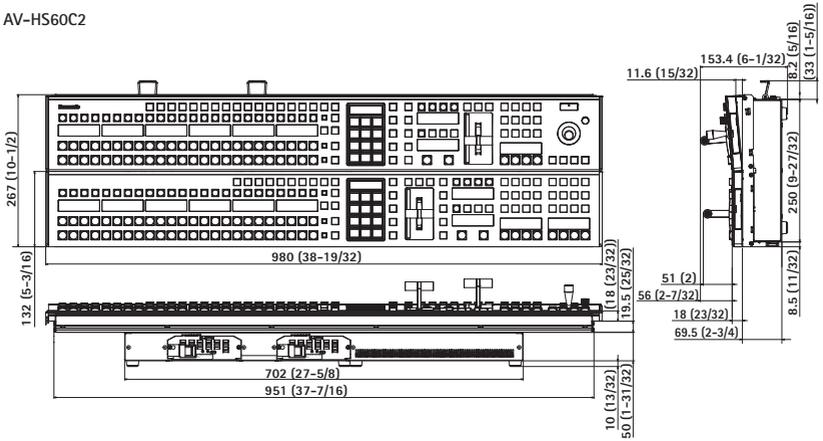
*6: Mix transition available on Aux 1 buses.

Live Switcher Dimensions

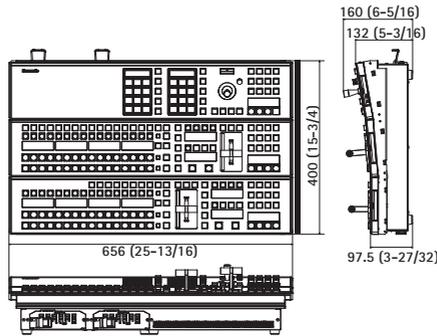
AV-HS6000

Unit: mm(inches)

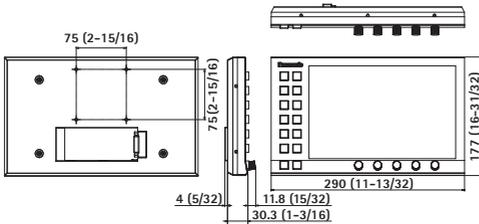
Control Panel AV-HS60C2



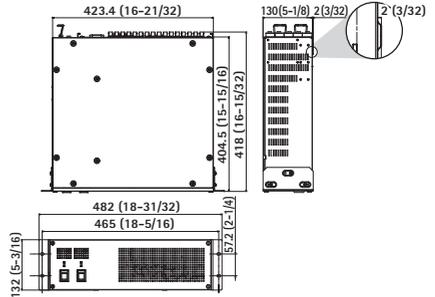
Control Panel AV-HS60C4



Menu Panel



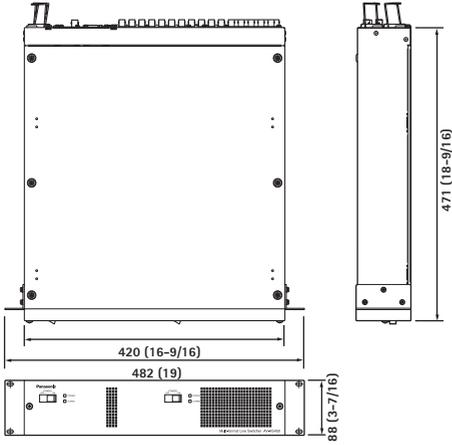
MainFrame



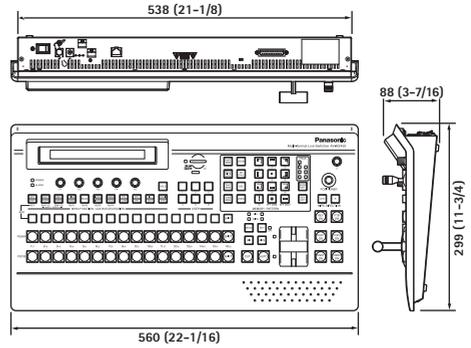
AV-HS450

Unit: mm(inches)

MainFrame

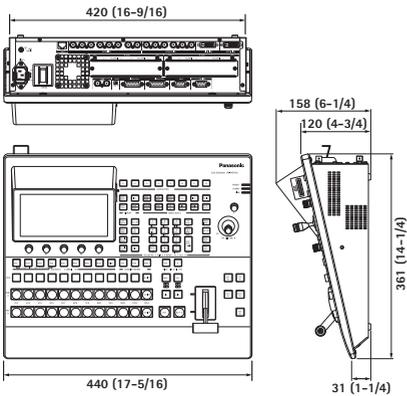


Control Panel



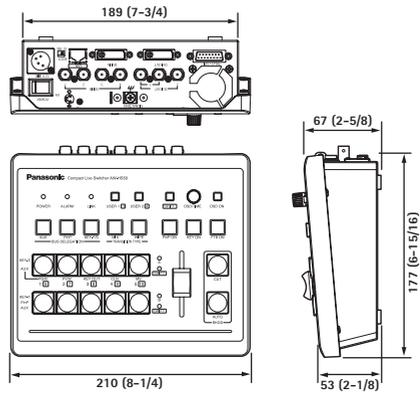
AV-HS410

Unit: mm(inches)



AW-HS50

Unit: mm(inches)



Live Switcher – Specifications

AV-HS6000

■ Mainframe [AV-HS60U2P/E]

General	
Power Supply	AC100 V to 240 V, 50 Hz/60 Hz (AV-HS60U2 supports redundant power supply)
Power Consumption	110 W
Ambient Operating Temperature	0°C to 40°C (32°F to 104°F)
Operating Ambient Humidity	10% to 90% (no condensation)
Storage Temperature	0°C to 40°C (32°F to 104°F)
Storage Humidity	10% to 90% (no condensation)
Weight	Approx. 13.5 kg(29.7 lbs.) [excluding accessories]
Dimensions (W x H x D)	482 mm x 132 mm x 418 mm (18-31/32 inches x 5-3/16 inches x 16-15/32 inches) [excluding protrusions]

Video Terminal

SDI IN 1 to SDI IN 32 Terminals	During Standard mode 32 lines <ul style="list-style-type: none"> Connectors: BNCx32 SDI IN 27, SDI IN 28, SDI IN 31, SDI IN 32 terminals are equipped with up-converters. SDI IN 25 to SDI IN 32 terminals are equipped with color correctors.
	HD-SDI SMPTE292M (BTA S-004) standard compliant • 0.8 V [p-p] ± 10% (75 Ω) • Automatic equalizer more than 100 m (328 ft) (when 1.5 Gbps/5C-FB cable is used)
	SD-SDI SMPTE259M standard compliant • 0.8 V [p-p] ± 10% (75 Ω) • Automatic equalizer 200 m (656 ft) (when 5C-2V cable is used)
During 3G mode 16 lines <ul style="list-style-type: none"> Connector: BNCx16 (only the odd numbered terminals can be used) The even numbered terminals <SDI IN 2>, <SDI IN 4>, ..., <SDI IN 32> cannot be used. <SDI IN 25>, <SDI IN 27>, <SDI IN 29>, and <SDI IN 31> terminals are equipped with color correctors. During 4K mode 4K signal x 8 lines <ul style="list-style-type: none"> Connector: BNC x 32 (3G-SDI x 4 SDD / 2SI) 	3G serial digital, SMPTE424M standard compliant • 0.8 V [p-p] ± 10% (75 Ω) • Automatic equalizer 100 m (328 ft) (when 3 Gbps/5C-FB cable is used) • 3G SDI Level B • 3G SDI Level A (FS ON)
	DVI-D IN 1 to DVI-D IN 2 Terminals
SDI OUT 1 to SDI OUT 16 Terminals	During Standard mode 16 lines (2 distributed outputs per line) <ul style="list-style-type: none"> Connectors: BNC x 32 ME1PGM, ME1PWW, ME1CLN, ME1KEYPWW, ME2PGM, ME2PWW, ME2CLN, ME2KEYPWW, DSKPGM1, DSKPGM2, DSKPWW1, DSKPWW2, DSK1CLN, DSK2CLN, DSK3CLN, DSK4CLN, SEL KEYPWW, MV1 to MV4, and AUX1 to AUX16 can be assigned.
	HD-SDI SMPTE292M (BTA S-004) standard compliant • Output level: 0.8 V [p-p] ± 10%
	SD-SDI SMPTE259M standard compliant • Output level: 0.8 V [p-p] ± 10%
During 3G mode 3G-SDI output: 8 lines (2 distribute outputs per line) HD-SDI output: 2 lines (2 distribute outputs per line) <ul style="list-style-type: none"> Connector 3G-SDI: BNCx16 (odd numbered terminals only) HD-SDI: BNCx4 (<SDI OUT 14> and <SDI OUT 16> terminals only) • 3G-SDI signal is not output from the even numbered terminals. – No signal is output from the <SDI OUT 2>, <SDI OUT 4>, ..., <SDI OUT 12> terminals. – The HD-SDI signal converted to the 1080i format is output from the <SDI OUT 14> and <SDI OUT 16> terminals. This signal is converted to the 1080i format by decimating the 1080p signal from the <SDI OUT 13> and <SDI OUT 15> terminals.	

SDI OUT 1 to SDI OUT 16 Terminals	<ul style="list-style-type: none"> <SDI OUT 13> and <SDI OUT 15> terminals are equipped with color correctors. The same color corrector setting is also applied to <SDI OUT 14> and <SDI OUT 16> terminals. ME1PGM, ME1PWW, ME1CLN, ME1KEYPWW, ME2PGM, ME2PWW, ME2CLN, DSKPGM1, DSKPGM2, DSKPWW1, DSKPWW2, DSK1CLN, DSK2CLN, SEL KEYPWW, MV1 to MV2, and AUX1 to AUX8 can be assigned. During 4K mode 4K signal output: 3 lines (two distribute outputs per line) 2K signal output: 2 lines (two distribute outputs per line) <ul style="list-style-type: none"> Connector 3G-SDI (for 4K signal): BNC x 24 (terminal number 1 to 12) 3G-SDI (for 2K signal): BNC x 4 (terminal number 13 and 15) HD-SDI (for 2K signal): BNC x 4 (terminal number 14 and 16) <ul style="list-style-type: none"> The 4K signal is output in SDD format. The HD-SDI signal converted to the 1080i format is output from the <SDI OUT 14> and <SDI OUT 16> terminals. This signal is converted to the 1080i format by decimating the 1080p signal output from the <SDI OUT 13> and <SDI OUT 15> terminals. ME1PGM, ME1PWW, ME1CLN, ME1KEYPWW, ME2PGM, ME2PWW, ME2CLN, DSKPGM1, DSKPGM2, DSKPWW1, DSKPWW2, DSK1CLN, DSK2CLN, SEL KEYPWW, MV1 to MV2, and AUX1 to AUX8 can be assigned. 	
	Signal Formats	3G-SDI 3G serial digital, SMPTE424M standard compliant • Output level: 0.8 V [p-p] ± 10% • 3G-SDI Level B Mapping
		SD 480/59.94i, 576/50i HD 1080/59.94i, 1080/50i, 720/59.94p, 720/50p, 1080/24PsF, 1080/23.98PsF, 1080/25PsF, 1080/29.97PsF
		3G 1080/59.94p, 1080/50p <Level B> 4K 2160/59.94p, 2160/50p <SDD>
Signal Processing	Y:Pe:Ph 4:2:2 10 bit R:G:B 4:4:4 8 bit	
ME Number	2 ME	

Synchronous Terminal

REF Terminal	<ul style="list-style-type: none"> Connectors: BNC Same field frequencies as those of the system formats supported in Genlock mode: Black burst or Tri-level Sync input signals (with loop-through) If the loop-through output is not used, provide a 75 Ω termination. In the 1080/24PsF and 1080/23.98PsF formats, only Genlock mode supported In the 1080/23.98PsF format, black burst signals with 10 Field ID (SMPTE318M standard compliant) or Tri-level Sync signals supported In the 1080/24PsF format, Tri-level Sync signals supported in internal sync mode: Black burst output signal x 2
	LTC IN Terminal
Video Delay Time	During 3G mode 2 line (H) When the frame synchronizer is set to [Off] 2 frame (V) When the frame synchronizer is set to [On] • Maximum of 2 frame delay is added to each when passed through PinP, DVE, or MultiView.

Control Terminal

LAN Terminal	Compatible with 100Base-TX and AUTO-MDIX (For IP control) <ul style="list-style-type: none"> Connection cable: LAN cable (CAT5E), max. 100 m (328 ft), STP (Shielded Twisted Pair) cable recommended Connector: RJ-45
PANEL Terminal	Compatible with 100Base-TX and AUTO-MDIX (For Control Panel AV-HS60C2/AV-HS60C4 connection) <ul style="list-style-type: none"> Connection cable (supplied with AV-HS60C2/AV-HS60C4): LAN cable (CAT5E), straight cable, STP (Shielded Twisted Pair), 10 m (32.8 ft) Connector: RJ-45
COM1(M)/COM2(M)/COM3(M) Terminals	RS-422 Control Terminal For master connection for controlling external devices <ul style="list-style-type: none"> Connector: D-sub 9-pin (female) x 3, inch screw
COM4(M/S) Terminal	RS-422 Control Terminal For master/slave connection for controlling external devices <ul style="list-style-type: none"> Connector: D-sub 9-pin (female), inch screw Switchable between master connection and slave connection via menu
GPI IN Terminal	GPI IN: 18 inputs, general-purpose, photocoupler sensing ALARM OUT: 1 output, open collector output (negative logic) <ul style="list-style-type: none"> Connector: D-sub 25-pin (female), inch screw

GPI OUT1/GPI OUT 2 terminal	GPI OUT: 48 outputs, selected from general purpose, tally Open collector output <ul style="list-style-type: none"> Connector: D-sub 25-pin (female) x 2, inch screw
-----------------------------	---

Accessories

AC cable -AV-HS60U2P: 2 cables -AV-HS60U2E: 4 cables
Rack-mounted rear panel support bracket
Screws for the rack-mounted rear panel support bracket: 8 screws
Operating Guide for the AV-HS6000 series (Excerpted Version)

Control Panel [AV-HS60C2P/E]

General	
Power Supply	AC100 V to 240 V, 50 Hz/60 Hz (AV-HS60C2 supports redundant power supply)
Power Consumption	40 W
Operating Ambient Temperature	0°C to 40°C (32°F to 104°F)
Operating Ambient Humidity	10% to 90% (no condensation)
Storage Temperature	0°C to 40°C (32°F to 104°F)
Storage Humidity	10% to 90% (no condensation)
Weight	Approx. 13.9 kg (30.6 lbs.) (excluding accessories)
Dimensions (W x H x D)	980 mm x 153.4 mm x 267 mm (38-1/32 inches x 6-1/32 inches x 10-1/2 inches) (excluding protrusions)

Control Terminal	
Mainframe Terminal	Compatible with 100Base-TX and AUTO-MDIX (For Mainframe AV-HS60U2 connection) Connection cable (supplied with AV-HS60C2): LAN cable (CAT5E), Straight cable, STP (Shielded Twisted Pair), 10 m (32.8 ft) <ul style="list-style-type: none"> Connector: RJ-45 When connected to the <LAN> terminal, no video will be displayed on the Menu Panel AV-HS60C3G.
MENU PANEL Terminal	Used only for the Menu Panel AV-HS60C3G <ul style="list-style-type: none"> Connector: DVI-D Because an independent signal format is used, cannot be displayed on a DVI-D monitor. Cannot be used concurrently with a DVI-D monitor (computer) connected to the <DVI-D> terminal. Select with the display selector switch.
DVI-D Terminal	Used for displaying menus to the DVI monitor (computer) <ul style="list-style-type: none"> Connector: DVI-D Monitor resolution: 1366 x 768 compatible monitor Cannot be used concurrently with the <MENU PANEL> terminal. Select with the display selector switch.
USB Terminal	For DVI monitor (computer) menu operation <ul style="list-style-type: none"> Connector: USB (type A, female) Cannot be used for the Menu Panel AV-HS60C3G.
Display Selector Switch	Switch for selecting <MENU PANEL> terminal or <DVI-D> terminal
COM1(M) Terminal	RS-422 Control Terminal For master connection for controlling external devices <ul style="list-style-type: none"> Connector: D-sub 9-pin (female), inch screw
COM2(RS-232) Terminal	RS-232 Control Terminal For master/slave connection for controlling external devices <ul style="list-style-type: none"> Connector: D-sub 9-pin (male), inch screw
GPI I/O Terminal	GPI IN: 8 inputs, general-purpose, photocoupler sensing ALARM OUT: 1 output, open collector output (negative logic) GPI OUT: 10 outputs, selected from general purpose, tally Open collector output <ul style="list-style-type: none"> Connector: D-sub 25-pin (female), inch screw
ME Number	2 ME

Accessories	
AC Cable -AV-HS60C2P: 2 cables -AV-HS60C2E: 4 cables	
LAN cable: 1 cable (used to connect with the Mainframe AV-HS60U2)	
Switch blank cap (large): 24 caps Switch blank cap (small): 12 caps	

Control Panel AV-HS60C4P/E

General	
Power Supply	AC100 V to 240 V, 50 Hz/60 Hz (Supports redundant power supply)
Power Consumption	40 W
Operating Ambient Temperature	0°C to 40°C (32°F to 104°F)
Operating Ambient Humidity	10% to 90% (no condensation)
Storage Temperature	0°C to 40°C (32°F to 104°F)
Storage Humidity	10% to 90% (no condensation)
Weight	Approx. 15.0 kg (33.0 lbs.) (excluding accessories)
Dimensions (W x H x D)	656 mm x 160 mm x 400 mm (25-53/64 inches x 6-19/64 inches x 15-3/4 inches) (excluding protrusions)

Control Terminal	
Mainframe Terminal	Compatible with 100Base-TX and AUTO-MDIX (For Mainframe AV-HS60U2 connection) Connection cable (supplied with AV-HS60C4): LAN cable (CAT5E), Straight cable, STP (Shielded Twisted Pair), 10 m (32.8 ft) <ul style="list-style-type: none"> Connector: RJ-45 When connected to the <LAN> terminal, no video will be displayed on the Menu Panel AV-HS60C3G.
MENU PANEL Terminal	Used only for the Menu Panel AV-HS60C3G <ul style="list-style-type: none"> Connector: DVI-D Because an independent signal format is used, cannot be displayed on a DVI-D monitor. Cannot be used concurrently with a DVI-D monitor connected to the <DVI-D> terminal. Select with the display selector switch.
DVI-D Terminal	Used for displaying menus to the DVI monitor <ul style="list-style-type: none"> Connector: DVI-D Monitor resolution: 1366x768 compatible monitor Cannot be used concurrently with the <MENU PANEL> terminal. Select with the display selector switch.
USB Terminal	For DVI monitor menu operation <ul style="list-style-type: none"> Connector: USB (type A, female) Cannot be used for the Menu Panel AV-HS60C3G.
Display Selector Switch	Switch for selecting <MENU PANEL> terminal or <DVI-D> terminal
COM1(M) Terminal	RS-422 Control Terminal For master connection for controlling external devices <ul style="list-style-type: none"> Connector: D-sub 9-pin (female), inch screw
COM2(RS-232) Terminal	RS-232 Control Terminal For external device control connections <ul style="list-style-type: none"> Connector: D-sub 9-pin (male), inch screw
GPI I/O Terminal	GPI IN: 8 inputs, general-purpose, photocoupler sensing ALARM OUT: 1 output, open collector output (negative logic) GPI OUT: 10 outputs, selected from general purpose, tally Open collector output <ul style="list-style-type: none"> Connector: D-sub 25-pin (female), inch screw
ME Number	2 ME

Accessories	
AC Cable: 2 cables LAN Cable: 1 cable (used to connect with the Mainframe AV-HS60U2)	
Switch blank cap (large): 16 caps Switch blank cap (small): 8 caps	

Menu Panel [AV-HS60C3G]

General	
Power Supply	DC12 V/0.54 A (Supplied from AV-HS60C2/AV-HS60C4 using the supplied cable)
Power Consumption	6.48 W
Operating Ambient Temperature	0°C to 40°C (32°F to 104°F)
Operating Ambient Humidity	10% to 90% (no condensation)
Storage Temperature	0°C to 40°C (32°F to 104°F)
Storage Humidity	10% to 90% (no condensation)
Weight	Approx. 1.7 kg (3.7 lbs.) (excluding accessories)
Dimensions (W x H x D)	290 mm x 177 mm x 46.1 mm (11-13/32 inches x 6-31/32 inches x 1-13/16 inches) (excluding protrusions) 4RU
Control Terminal	
Control Panel Terminal	Used only for the Control Panel AV-HS60C2/AV-HS60C4 <ul style="list-style-type: none"> Connectors: DVI-D Because an independent signal format is used, DVI-D source cannot be displayed. Cannot be used concurrently with a DVI-D monitor connected to the <DVI-D> terminal of the Control Panel AV-HS60C2/AV-HS60C4. Set the display selector switch of the Control Panel AV-HS60C2/AV-HS60C4 to the <MENU PANEL> terminal side.

Accessories	
Connecting cable (with ferrite core) for the Control Panel AV-HS60C2/AV-HS60C4: 1 cable	
Bracket for mounting the Control Panel AV-HS60C2/AV-HS60C4	
Screws for the bracket for mounting the Control Panel AV-HS60C2/AV-HS60C4: 6 screws	

Storage Module [AV-HS60D1G]

General	
Weight	Approx. 7.0 g (0.3 ozs.)
Dimensions (W x H x D)	29.85 mm x 4.0 mm x 50.8 mm (1-3/16 inches x 5/32 inches x 2 inches)
Accessories	
AV-HS60D1 Installation Guide	

Due to device characteristics, the storage module AV-HS60D1G is subject to data damage and overwriting restrictions. Backup of important data is recommended.

*For information on "AV-HS6000 Block Diagrams", see page 77.

Live Switcher – Specifications

AV-HS450

■ Mainframe [AV-HS450U1N/E]

General	
Power Supply	AC 100 V to 120 V, 50/60 Hz • Redundant power supply standard supported
Power Consumption	120 W
Ambient Operating Temperature	0 °C to 40 °C (32 °F to 104 °F)
Humidity	10 % to 90 % (no condensation)
Dimensions (W x H x D)	2RU size 482 x 88 x 471 mm (19" x 3-7/16" x 18-9/16") [excluding protrusions]
Weight	9.8 kg (21.605 lbs.) [excluding accessory parts when no options have been installed]
	10.3 kg (22.707 lbs.) [excluding accessory parts when all the possible options have been installed]
Video Terminal	
Video Inputs (20 signal lines, maximum)	Standard SDI: 16 signal lines BNC x 16 (IN1 to IN16) Optional: Up to 4 additional signal lines (IN A1, IN A2, IN B1, IN B2) (Up to two option boards can be installed in the two input/output slots.)
	Standard SDI: 4 signal lines BNC x 5 (OUT1 to OUT4 x 1 line each, 2 distributed outputs for OUT1 only) Standard DVI-D: 2 signal lines DVI-D x 2 (OUT5, OUT6) Optional: Up to 4 additional lines (OUT A1, OUT A2, OUT B1, OUT B2) (Up to two option boards can be installed in the two input/output slots.)
Video Outputs (10 signal lines, maximum)	• PGM, PVW, AUX1 to AUX4, MV1 (MULTI_PVW1), MV2 (MULTI_PVW2), CLN and KEYOUT can be allocated to each output. • CLN can be pre-selected from KEY, DSK1 or DSK2 using a menu.
Signal Formats	SD 480/59.94i, 576/50i 1080/59.94i, 1080/50i, 720/59.94p, 720/50p, 1080/24PsF*, 1080/23.98PsF* *The following option boards are not supported: AV-HS04M1, AV-HS04M2, AV-HS04M3, AV-HS04M4, AV-HS04M5, AV-HS04M6, AV-HS04M7, AV-HS04M7D
	HD
Signal Processing	Y-Cb-Cr 4: 2: 2, 10 bit (8 bits for frame memory) RGB 4:4:4, 8 bit
ME Number	1ME
SDI Inputs	HD: Serial digital component (SMPT2 292M) SD: Serial digital component (SMPT2 259M) 16 signal lines, standard: IN1 to IN16 20 signal lines, maximum: IN A1, IN A2, IN B1, IN B2 (When two AV-HS04M1 boards are used; with active through) HD [SMPT2 292M (BTA S-004B) standard complied with] • 0.8 V [p-p] ± 10 % (75 Ω) • Input return loss More than 15 dB (5 MHz to 750 MHz) More than 10 dB (750 MHz to 1.5 GHz) • Automatic equalizer 100 m (328 ft.) [when 5C-FB cable is used]
	SD [SMPT2 259M standard complied with] • 0.8 V [p-p] ± 10 % (75 Ω) • Input return loss More than 15 dB (5 MHz to 270 MHz) • Automatic equalizer 200 m (656 ft.) [when 5C-2V cable is used]
SDI Outputs	HD: Serial digital component (SMPT2 292M) SD: Serial digital component (SMPT2 259M) 4 signal lines, standard: OUT1 x 2; OUT2, OUT3, OUT4 x 1 each 8 signal lines, maximum: OUT A1, OUT A2, OUT B1, OUT B2 (When two AV-HS04M7 boards are used) HD [SMPT2 292M (BTA S-004B) standard complied with] • Output return loss More than 15 dB (5 MHz to 750 MHz) More than 10 dB (750 MHz to 1.5 GHz) • Output level 0.8 V [p-p] ± 10 % (75 Ω) • Rise time Less than 270 ps • Fall time Less than 270 ps • Difference between rise time and fall time Less than 100 ps • Alignment jitter Less than 0.2 UI (130 ps) • Timing jitter Less than 1.0 UI • Eye aperture ratio More than 90 % • DC offset 0±0.5 V

SDI Outputs	SD [SMPT2 259M standard complied with] • Output return loss More than 15 dB (5 MHz to 270 MHz) • Output level 0.8 V [p-p] ± 10 % (75 Ω) • Rise time Less than 1.5 ns • Fall time Less than 1.5 ns • Difference between rise time and fall time Less than 0.5 ns • Jitter Less than 0.2 UI
Composite Input (Option)	Analog composite signal (NTSC/PAL) (1.0 V [p-p], 75 Ω) 4 signal lines, maximum: IN A1, IN A2, IN B1, IN B2 (When two AV-HS04M6 boards are used; with loop-through)
Analog Input (Option)	SD/HD analog component Y/Pb/Pk (1.0 V [p-p], 75 Ω) 4 signal lines, maximum: IN A1, IN A2, IN B1, IN B2 (When two AV-HS04M2 boards are used)
Analog Output (Option)	SD/HD analog component Y/Pb/Pk (1.0 V [p-p], 75 Ω) 4 signal lines, maximum: OUT A1, OUT A2, OUT B1, OUT B2 (When two AV-HS04M4 boards are used) • 2 signal lines (OUT A1, OUT B1) when two AV-HS04M5 boards are used
DVI-I Input (Option)	Analog/digital RGB: XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024) Vertical frequency: 60 Hz 4 signal lines, maximum: IN A1, IN A2, IN B1, IN B2 (When two AV-HS04M3 boards are used)
	Analog/digital RGB: XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024), WSXGA+ (1680 x 1050), UXGA (1600 x 1200), WUXGA (1920 x 1200) *Selectable only when digital signals are output Vertical frequency: 60 Hz
DVI-I Output (Option)	2 signal lines, maximum: OUT A2, OUT B2 (When two AV-HS04M5 boards are used) Digital RGB: XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024), WSXGA+ (1680 x 1050), UXGA (1600 x 1200), WUXGA (1920 x 1200) Vertical frequency: 60 Hz Digital RGB: 1080/50P, 1080/59.94P *This board is incompatible with the HDCP (High-bandwidth Digital Content Protection). • Analog input signals are not supported.
	4 signal lines, maximum: IN A1, IN A2, IN B1, IN B2 (When two AV-HS04M8 boards are used) • The DVI-I connector cable cannot be used. • For the DVI-D connector cable, use a cable with a length of up to 5 m (16.4 ft.).
DVI-D Input (Option)	Digital RGB: XGA (1024 x 768), WXGA (1280 x 1024), WSXGA+ (1680 x 1050), UXGA (1600 x 1200), WUXGA (1920 x 1200) Vertical frequency: 60 Hz Digital RGB: 1080/50P, 1080/59.94P (The vertical frequency is the same as that of the system format. When the system format is 1080/23.98PsF or 24PsF, the images cannot be output.) • Analog output signals are not supported. • High-resolution multi view mode supported: Signals are also output with a high resolution even when SD has been selected as the system mode. With this mode setting, MV1 is output to OUT5 and MV2 to OUT6; MV1 and MV2 cannot be output to any other outputs.
	2 lines, standard: OUT5, OUT6 • The DVI-I connector cable cannot be used. • For the DVI-D connector cable, use a cable with a length of up to 5 m (16.4 ft.).

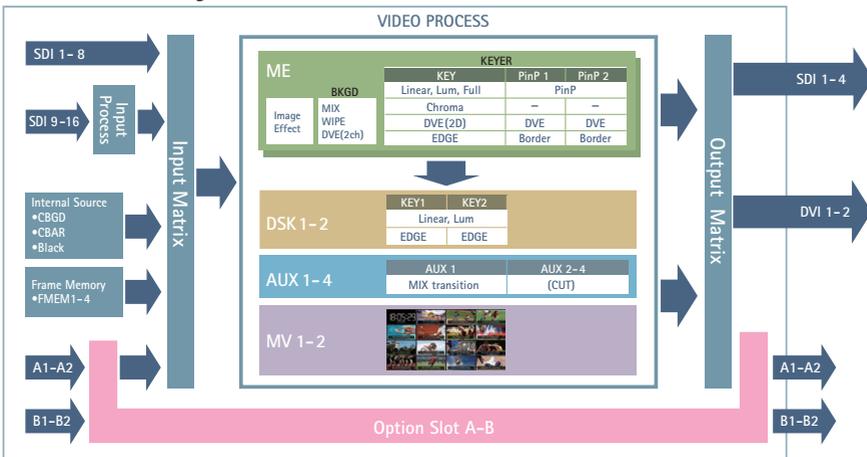
Synchronous Terminal	
Reference Input/Output	In gen-lock mode: Black burst or Tri-level Sync input signals (with loop-through) In internal sync mode: Black burst output signals x 2 <ul style="list-style-type: none"> Same field frequencies as those of the system formats supported With the 1080/23.98PsF and 24PsF formats, only GENLOCK mode supported With the 1080/23.98PsF format, black burst with 10F-ID (SMPTE318M standard met) or TRI signals supported
Video Delay Time	FS OFF, U/C OFF 1 line (H) FS ON or U/C ON 1 frame (F) <ul style="list-style-type: none"> When the signals have passed through DVE, multi view, down-converter, DVI-IN or DVI-OUT, a maximum delay of 1 frame is applied in each case.

Control Terminal	
PANEL	RJ45 x 1 100 Mbps <ul style="list-style-type: none"> When the control panel is connected
LAN	RJ45 x 1 100/10 Mbps <ul style="list-style-type: none"> Used for maintenance purposes
EDITOR	D-sub, 9-pin, female RS-422 control connector <ul style="list-style-type: none"> GVG standard protocol subset supported
COM	D-sub, 9-pin, female RS-422 control connector <ul style="list-style-type: none"> For Panasonic pan-tilt head system control, etc.
TALLY/GPI	D-sub, 50-pin, female INPUT: 8 inputs, general-purpose, photocoupler sensing OUTPUT: 31 outputs; selected from R/G tally, general-purpose ALARM: 1 output, open collector output (negative logic)

Control panel [AV-HS450C1N/E]

General	
Power Supply	DC 12 V, 0.8 A <ul style="list-style-type: none"> Redundant operation enabled by connecting two AC adaptors Power consumption when using the AC adaptor: AC 14 W Supplied AC adaptor Input: AC 100 V to 240 V, 1.3 A, 47-63 Hz Output: DC 12 V, 3.5 A, 42 W Supplied power cable Maximum rating: AC 125 V <ul style="list-style-type: none"> Use within AC 100 V to 120 V.
Ambient Operating Temperature	0 °C to 40 °C (32 °F to 104 °F)
Humidity	10 % to 90 % (no condensation)
Dimensions (W x H x D)	560 x 88 x 299 mm (22-1/16" x 3-7/16" x 11-3/4") [excluding protrusions]
Weight	3.9 kg (8.598 lbs.) [excluding accessory parts]
Control Terminal	
MAINFRAME	RJ45 x 1 100 Mbps <ul style="list-style-type: none"> For connecting the mainframe
TALLY/GPI	D-sub, 25-pin, female INPUT: 8 inputs OUTPUT: 8 outputs ALARM: 1 output
Other	
SD Memory Cards	Memory size supported: Max. 32 GB (SDHC memory cards supported) Still image files: Load, save Setup data: Backup
Accessories	
Operating instructions, CD-ROM (Operating instructions/Image transmission software), AC adaptors (for control panel), Power cords (for mainframe and AC adaptor), CAT5E cable (STP, straight cable, 10 m (32.8 ft.) long)	

AV-HS450 Block Diagram



Live Switcher – Specifications

AV-HS410 [AV-HS410N/E]

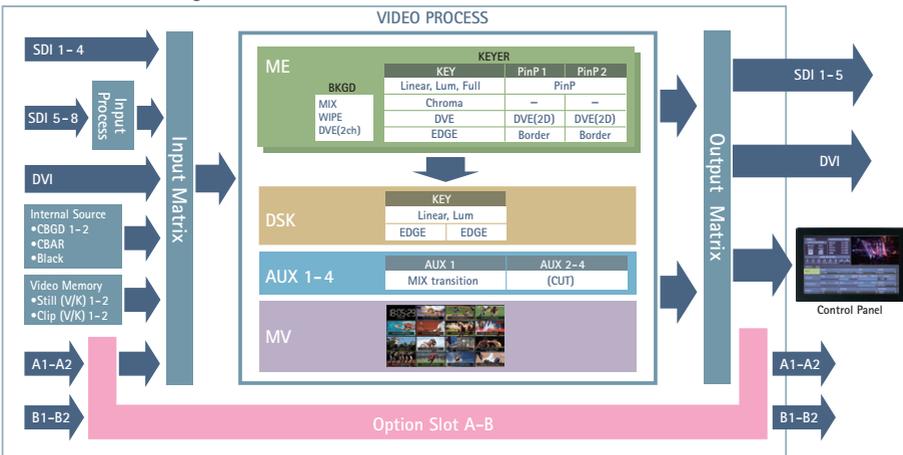
General	
Power Supply	AC 100 V to 240 V, 50/60 Hz
Power Consumption	88 W
Ambient Operating Temperature	0 °C to 40 °C (32 °F to 104 °F)
Humidity	10 % to 90 % (no condensation)
Dimensions (W x H x D)	440 mm x 158 mm x 361 mm (17-5/16 inches x 6-7/32 inches x 14-7/32 inches) [excluding protrusions]
Mass	Approx. 6.2 kg (13.669 lb) [excluding accessory parts when no options have been installed] Approx. 6.6 kg (14.550 lb) [excluding accessory parts when all the possible options have been installed]
Video Terminal	
Video Inputs (13 signal lines, maximum)	Standard SDI: 8 signal lines BNC x 8 (SDI INPUT 1 to SDI INPUT 8) • The up-converter function can be used for the SDI INPUT 5 to SDI INPUT 8 connectors.
	Standard DVI-D: 1 signal line DVI-D x 1 Optional: Up to 4 additional signal lines (IN A1, IN A2, IN B1, IN B2) (Up to two option boards can be installed in the two input/output slots.)
Video Outputs (10 signal lines, maximum)	Standard SDI: 5 signal lines BNC x 6 (SDI OUTPUT 1 to SDI OUTPUT 5 x 1 line each, 2 distributed outputs for SDI OUTPUT 1 only) Standard DVI-D: 1 signal line DVI-D x 1 Optional: Up to 4 additional lines (OUT A1, OUT A2, OUT B1, OUT B2) (Up to two option boards can be installed in the two input/output slots.)
	• PGM, PVW, AUX1 to AUX4, MV (MULTI_VIEW), CLN, KEYOUT and MEM PVW can be assigned to SDI OUTPUT 1 to SDI OUTPUT 5, DVI-D OUT, OUT A1, OUT A2, OUT B1 and OUT B2. • CLN can be pre-selected from KEY or DSK using a menu.
Signal Formats	SD 480/59.94i, 576/50i
	HD 1080/59.94i, 1080/50i, 720/59.94p, 720/50p, 1080/24PsF*, 1080/23.98PsF* *The following option boards are not supported: AV-HS04M1, AV-HS04M2, AV-HS04M3, AV-HS04M4, AV-HS04M5, AV-HS04M6, AV-HS04M7
Signal Processing	Y:Ps:Ph 4: 2: 2, 10 bit (8 bits for video memory) RGB 4:4:4, 8 bit
ME Number	1ME
SDI Inputs	HD-SDI: HD Serial digital (SMPTE 292M) SD-SDI: SD Serial digital (SMPTE 259M) 8 signal lines, standard: IN1 to IN8 12 signal lines, maximum: IN A1, IN A2, IN B1, IN B2 (When two AV-HS04M1 boards are used; with active through)
	HD: SMPTE 292M (BTA S-004B) standard complied with • 0.8 V [p-p] ± 10 % (75 Ω) • Automatic equalizer More than 100 m (328 ft) (when 1.5 Gbps/SC-FB cable is used) SD: SMPTE 259M standard complied with • 0.8 V [p-p] ± 10 % (75 Ω) • Automatic equalizer 200 m (656 ft) (when 5C-2V cable is used)
SDI Outputs	HD-SDI: HD Serial digital (SMPTE 292M) SD-SDI: SD Serial digital (SMPTE 259M) 5 signal lines, standard: OUT1 x 2; OUT2 to OUT5 x 1 each 9 signal lines, maximum: OUT A1, OUT A2, OUT B1, OUT B2 (When two AV-HS04M7 boards are used)

SDI Outputs	HD: SMPTE 292M (BTA S-004B) standard complied with • Output level 0.8 V [p-p] ± 10 % • Rise time HD: Less than 270 ps • Fall time HD: Less than 270 ps • Difference between rise time and fall time HD: Less than 100 ps • Alignment jitter HD: Less than 0.2 UI (130 ps) • Timing jitter HD: Less than 1.0 UI • Eye aperture ratio More than 90 % • DC offset 0 ± 0.5 V
	SD: SMPTE 259M standard complied with • Output level 0.8 V [p-p] ± 10 % • Rise time Less than 1.5 ns • Fall time Less than 1.5 ns • Difference between rise time and fall time Less than 0.5 ns • Jitter Less than 0.2 UI
Composite Input (Option board)	Analog composite signal (NTSC/PAL) (1.0 V [p-p], 75 Ω) 4 signal lines, maximum: IN A1, IN A2, IN B1, IN B2 (When two AV-HS04M6 boards are used; with loop-through)
Analog Input (Option board)	SD/HD analog component Y/Ps/Ph (1.0 V [p-p], 75 Ω) 4 signal lines, maximum: IN A1, IN A2, IN B1, IN B2 (When two AV-HS04M2 boards are used)
Analog Output (Option board)	SD/HD analog component Y/Ps/Ph (1.0 V [p-p], 75 Ω) 4 signal lines, maximum: OUT A1, OUT A2, OUT B1, OUT B2 (When two AV-HS04M4 boards are used) • 2 signal lines (OUT A1, OUT B1) when two AV-HS04M5 boards are used.
DVI-I Input (Option board)	Analog/digital RGB: XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024) Vertical frequency: 60 Hz • This connector does not support the HDCP technologies. 4 signal lines, maximum: IN A1, IN A2, IN B1, IN B2 (When two AV-HS04M3 boards are used)
DVI-I Output (Option board)	Analog/digital RGB: XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024), WSXGA+* (1680 x 1050), UXGA* (1600 x 1200), WUXGA* (1920 x 1200) *Selectable only when digital signals are output. Vertical frequency: 60 Hz • This connector does not support the HDCP technologies. 2 signal lines, maximum: OUT A2, OUT B2 (When two AV-HS04M5 boards are used)
DVI-D Input (Option board)	Digital RGB: XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024), WSXGA+ (1680 x 1050), UXGA (1600 x 1200), WUXGA (1920 x 1200) Vertical frequency: 60 Hz Digital RGB: 1080/50p, 1080/59.94p • Analog input signals are not supported. • This connector does not support the HDCP technologies.
	4 signal lines, maximum: IN A1, IN A2, IN B1, IN B2 (When two AV-HS04M8 boards are used) The DVI-I connector cable cannot be used. • For the DVI-D connector cable, use a cable with a length of up to 5 m (16.4 ft).
DVI-D Input/Output	Digital RGB: XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024), WSXGA+ (1680 x 1050), UXGA (1600 x 1200), WUXGA (1920 x 1200) Vertical frequency: 60 Hz Video format inputs: Digital RGB: 1080/50p, 1080/59.94p Vertical frequency: Same as system formats Video format outputs: Digital RGB: 1080/50p, 1080/59.94p, 1080/50i, 1080/59.94i, 720/50p, 720/59.94p • The input and output of analog signals are not supported. • Output support the high-resolution multi view mode: Signals are output with a high resolution even when SD is set as the system mode. (When high-resolution multi view mode has been enabled, MV is selected as the DVI-D OUT output, and it is not possible to select MV with SDI OUT.) • This connector does not support the HDCP technologies.
	Standard input/output: 1 line each (DVI-D IN, DVI-D OUT) • The DVI-I connector cable cannot be used. • For the DVI-D connector cable, use a cable with a length of up to 5 m (16.4 ft).

Synchronous Terminal	
Reference Input/Output	In gen-lock mode: Black burst or Tri-level Sync input signals (with loop-through) In internal sync mode: Black burst output signals x 2 <ul style="list-style-type: none"> Same field frequencies as those of the system formats supported. With the 1080/24PsF format, only gen-lock mode supported. With the 1080/23.98PsF format, black burst with 10F-ID (SMPTE318M standard met) or TRI signals supported.
Video Delay Time	1 line (H) When the frame synchronizer setting is "Off" and the up-converter setting is "Off". 1 frame (F) When the frame synchronizer setting is "On" or the up-converter setting is "On". <ul style="list-style-type: none"> When the signals have passed through PinP, DVE, multi view, down-converter, DVI-IN or DVI-OUT, a maximum delay of 1 frame is applied in each case.
Control Terminal	
LAN	RJ-45 x 1 10BASE-T/100BASE-TX (For IP control) Connecting cable: LAN cable (category 5 or above), max. 100 m (328 ft), STP (Shielded Twisted Pair) cable recommended <ul style="list-style-type: none"> When connecting to a hub (switching hub), use a straight cable. Use a crossover cable when connecting the unit and computer on a 1:1 basis without going through a hub. Use with the same segment is recommended for the equipment which is connected to the unit. If the unit is connected to equipment whose segments are different, events dependent upon the settings inherent to the network equipment, for instance, may occur so thoroughly check the connections with the equipment to which the unit will be connected prior to the start of operation.

EDITOR	D-sub, 9-pin, female Used to control an editor RS-422 control connector Communication format Baud rate: 38400 bps Character length: 8 bit Parity: Odd Stop bit: 1 bit Flow control: None
COM	D-sub, 9-pin, female Used to control an external device RS-422 control connector Communication format (selected using a menu) <ul style="list-style-type: none"> Mode: 1 (default setting) Baud rate: 9600 bps Character length: 8 bit Parity: None Stop bit: 1 bit Flow control: None Mode: 2 Baud rate: 38400 bps Character length: 8 bit Parity: Odd Stop bit: 1 bit Flow control: None Mode: 3 Baud rate: 38400 bps Character length: 8 bit Parity: None Stop bit: 1 bit Flow control: None
TALLY/GPI 1 TALLY/GPI 2	D-sub, 15-pin, female (x 2) Input: 8 inputs, general-purpose, photocoupler sensing Output: 19 outputs; selected from R/G tally, general-purpose Alarm: 1 output, open collector output (negative logic)
Other	
BOOT switch [SV/NM (service/normal)] (for maintenance purposes) Normally, this switch is used as the "NM" position.	
Accessories	
CD-ROM (Operating Instructions <Basics>, Operating Instructions <Operations and Settings>, User Guide "AV-HS410 Image Transmission Software", DVI input level adjustment file (BW.bmp), Image Transmission Software (ImageTrans.exe)), Power cable (2 m [6.6 ft])	

AV-HS410 Block Diagram



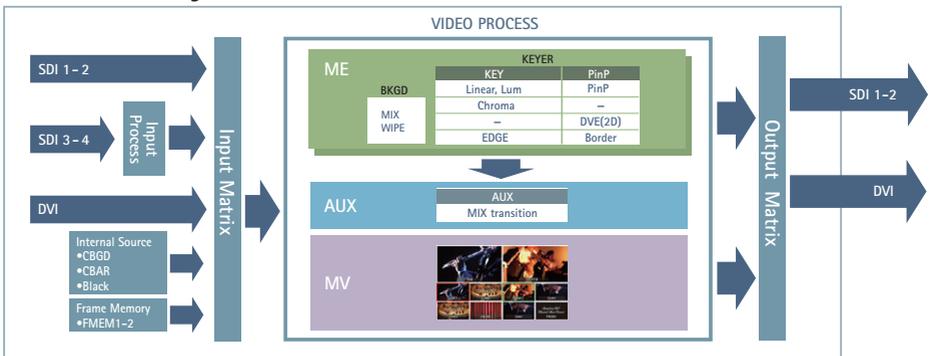
Live Switcher – Specifications

AW-HS50 [AW-HS 50N/E]

General	
Power Requirements	DC 12 V \pm 10% (AC adaptor provided)
Current Consumption	2.0 A (DC 12 V)
Ambient Operating Temperature	0 °C to 40 °C (32 °F to 104 °F)
Humidity	10% to 90% (no condensation)
Dimensions (W x H x D)	210 x 67 x 177 mm (8-1/4" x 2-5/8" x 6-15/16") [excluding protrusions]
Mass	1.4 kg (3.08 lbs.)
Video Terminal	
Inputs	5 video lines SDI 4 signal lines: SDI IN 1 to SDI IN 4 DVI-D 1 signal line: DVI IN
Outputs	3 video lines, 4 outputs SDI 2 signal lines: SDI OUT 1, SDI OUT 2 (Only the SDI OUT 1 signals are split into two) DVI-D 1 signal line: DVI OUT
Signal Formats	SD 480/59.94i, 576/50i HD 1080/59.94i, 1080/50i, 720/59.94p, 720/50p, 1080/24PsF, 1080/23.98PsF
Signal Processing	Y:Cb:Cr 4:2:2, 10 bit (8 bits for frame memory) RGB 4:4:4, 8 bit
ME Number	1ME
SDI Inputs	HD: Serial digital component (SMPT 292M) SD: Serial digital component (SMPT 259M) 4 signal lines: SDI IN 1 to SDI IN 4 HD: SMPTE 292M (BTA S-004B) standard complied with • 0.8 V [p-p] \pm 10% (75 Ω) • Input return loss More than 15 dB (5 MHz to 1.5 GHz) • Automatic equalizer 100 m (328 ft.) (when 5C-FB cable is used)
	SD: SMPTE 259M standard complied with • 0.8 V [p-p] \pm 10% (75 Ω) • Input return loss More than 15 dB (5 MHz to 270 MHz) • Automatic equalizer 200 m (656 ft.) (when 5C-2V cable is used)
DVI-D Input	Digital RGB (Vertical frequency: 60 Hz): XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024), WSXGA+ (1680 x 1050), UXGA (1600 x 1200), WUXGA (1920 x 1200) Digital RGB: 1080/50p, 1080/59.94p • Analog input signals are not supported.
SDI Outputs	HD: Serial digital component (SMPT 292M) SD: Serial digital component (SMPT 259M) 2 signal lines: SDI OUT 1, SDI OUT 2 (Only the SDI OUT 1 signals are split into two)

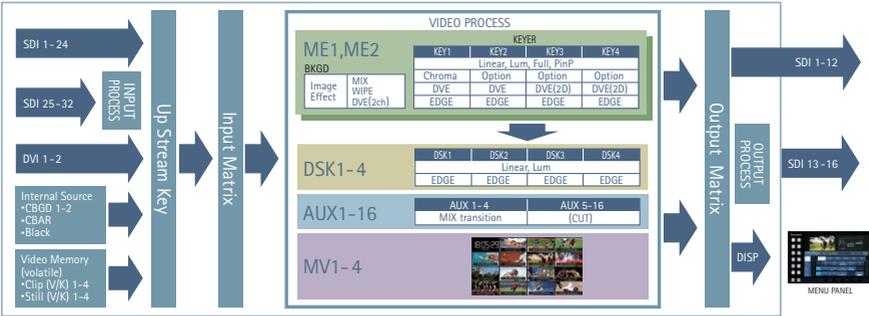
SDI Outputs	HD: SMPTE 292M (BTA S-004B) standard complied with • Output return loss More than 15 dB (5 MHz to 1.5 GHz) • Output level 0.8 V [p-p] \pm 10% (75 Ω) • Rise time Less than 270 ps • Fall time Less than 270 ps • Difference between rise time and fall time Less than 100 ps • Alignment jitter Less than 0.2 UI (130 ps) • Timing jitter Less than 1.0 UI • Eye aperture ratio More than 90% • DC offset 0 \pm 0.5 V
	SD: SMPTE 259M standard complied with • Output return loss More than 15 dB (5 MHz to 270 MHz) • Output level 0.8 V [p-p] \pm 10% (75 Ω) • Rise time Less than 1.5 ns • Fall time Less than 1.5 ns • Difference between rise time and fall time Less than 0.5 ns • Jitter Less than 0.2 UI
DVI-D Output	Digital RGB (Vertical frequency: 60 Hz): XGA (1024 x 768), WXGA (1280 x 768), SXGA (1280 x 1024), WSXGA+ (1680 x 1050), UXGA (1600 x 1200), WUXGA (1920 x 1200) Digital RGB: 1080/50p, 1080/59.94p • High-resolution multi view mode supported: Signals are also output with a high resolution even when SD has been selected as the system mode. <div style="border: 1px solid black; padding: 2px;">When the high-resolution multi view mode is enabled, MV is assigned to the DVI OUT connector, and MV cannot be assigned to the SDI OUT 1 connectors or SDI OUT 2 connector.</div> • Analog output signals are not supported.
Synchronous Terminal	
Video Delay Time	1 frame (F) • Video signals that have passed through the PinP, multi view display, DVI-D input or DVI-D output will be delayed in each case by up to one frame.
Control Terminal	
LAN	RJ-45 x 1 10BASE-T/100BASE-TX (For IP control) Connecting cable: LAN cable (category 5 or above), max. 100 m [328 ft.], STP (Shielded Twisted Pair) cable recommended • When connecting to a hub (switching hub), use a straight cable. • Use a crossover cable when connecting the unit and another device on a 1:1 basis without going through a hub.
TALLY/GPI	D-sub 15-pin, female, inch thread INPUT: 5 inputs, photocoupler sensing OUTPUT: 7 outputs, open collector output (negative logic)
Other	
Other	SERVICE switch [SV/NM] (for maintenance purposes) Normally, this switch is used as the "NM" position.
Accessories	
Operating Instructions <Basics> (this manual), CD-ROM (Operating Instructions <Basics>, Operating Instructions <Operations and Settings>, Data Transmission Software), AC adaptor, Power cable (2 m [6.6 ft.]	

AW-HS50 Block Diagram

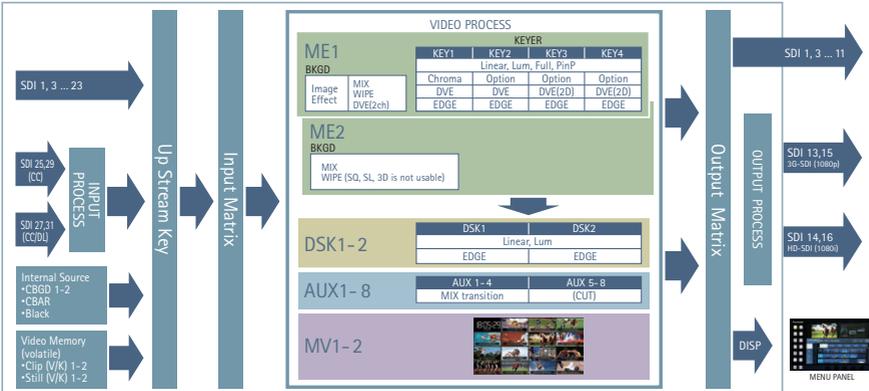


AV-HS6000 Block Diagrams

AV-HS6000 Block Diagram (Standard mode)

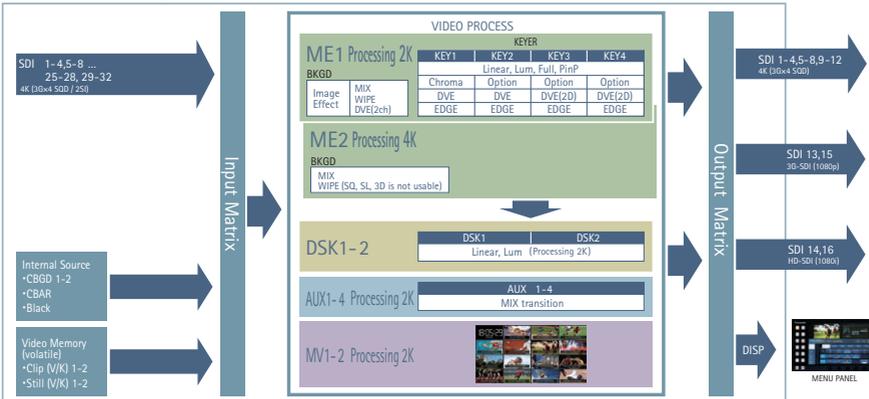


AV-HS6000 Block Diagram (3G mode)



*Input and output is by odd-numbered terminals only. *1080i format signals where half of the lines are thinned out from OUT13 and OUT15 (1080p) format signals are output from OUT14 and OUT16 terminals.

AV-HS6000 Block Diagram (4K mode)



*1080i format signals where half of the lines are thinned out from OUT13 and OUT15 (1080p) format signals are output from OUT14 and OUT16 terminals.