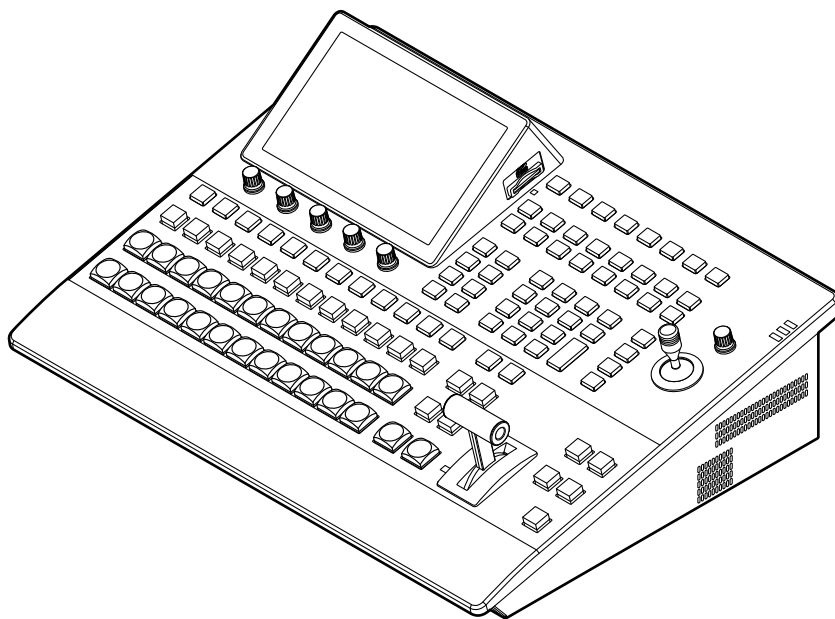


## Operating Instructions <Basics>

Live Switcher

Model No. **AV-HS410E**

- Die Bedienungsanleitung in Deutsch ist als PDF-Datei in der CD-ROM enthalten.
- Le mode d'emploi en français est fourni sous forme de fichier PDF sur le CD-ROM.
- Le istruzioni per l'uso in italiano sono contenute in un file PDF sul CD-ROM.
- Las instrucciones de funcionamiento en español se encuentran en un archivo PDF del CD-ROM.
- Документ Инструкция по эксплуатации на русском языке находится в виде PDF-файла на диске CD-ROM.



Before operating this product, please read the instructions carefully and save this manual for future use.

### • How the Operating Instructions are configured

#### <Basics> (this manual):

This <Basics> describes the procedure for connection with the required equipment and for installation. Before installing this unit, be sure to take the time to read through <Basics> to ensure that the unit will be installed correctly.

This manual <Basics> is also contained as a PDF file on the CD-ROM supplied with the unit.

#### <Operations and Settings>:

The <Operations and Settings> describes how to operate the unit and how to establish its settings. The <Operations and Settings> is contained as a PDF file on the CD-ROM supplied with the unit.

### • Adobe® Reader® is required to read PDF files.

It can be downloaded from the home page of Adobe Systems.

## ENGLISH

- **How to open the operating instruction manual PDF files**

Discontinue installation if the installation screen of the software opens as a result of inserting the CD-ROM. When [INDEX.pdf] on the CD-ROM is opened, a list of the operating instruction manuals will be displayed. Click on the document name of the manual to be opened.

- **Adobe® Reader® is required to read PDF files. It can be downloaded from the home page of Adobe Systems.**

## DEUTSCH

- **Öffnen der PDF-Dateien der Bedienungsanleitung**

Brechen Sie die Installation ab, falls beim Einlegen der CD-ROM der Installationsbildschirm der Software erscheint.

Wenn [INDEX.pdf] auf der CD-ROM geöffnet wird, erscheint eine Liste der Bedienungsanleitungen. Klicken Sie auf den Dokumentennamen der zu öffnenden Anleitung.

- **Zum Lesen der PDF-Dateien benötigen Sie Adobe® Reader®. Dieses Programm kann von der Homepage von Adobe Systems heruntergeladen werden.**

## FRANÇAIS

- **Comment ouvrir les fichiers PDF des manuels du mode d'emploi**

Arrêter l'installation si l'écran d'installation du logiciel s'ouvre quand le CD-ROM est inséré.

Quand [INDEX.pdf] sur le CD-ROM s'ouvre, la liste des manuels du mode d'emploi s'affiche.

Cliquer sur le nom du document correspondant au manuel à consulter.

- **Adobe® Reader® est nécessaire pour lire les fichiers PDF. Ce logiciel peut être téléchargé depuis la page d'accueil d'Adobe Systems.**

## ITALIANO

- **Come aprire i file dei manuali di istruzioni per l'uso**

Se inserendo il CD-ROM si apre la schermata di installazione del software, interrompere l'installazione. Aprendo [INDEX.pdf] sul CD-ROM, viene visualizzato un elenco di manuali di istruzioni per l'uso. Fare clic sul nome del documento corrispondente al manuale da aprire.

- **Per leggere i file PDF è necessario Adobe® Reader®. Il programma può essere scaricato dal sito Web di Adobe Systems.**

## ESPAÑOL

- **Modo de abrir los archivos PDF que contienen el manual de las instrucciones de funcionamiento**

Interrumpa la instalación si la pantalla de instalación del software se abre como resultado de insertar el CD-ROM. Cuando se abra [INDEX.pdf] en el CD-ROM se visualizará una lista de los manuales de instrucciones de funcionamiento.

Haga clic en el nombre de documento del manual que va a abrir.

- **Para leer los archivos PDF se necesita el programa Adobe® Reader®. Este programa se puede descargar de la página inicial de Adobe Systems.**

## РУССКИЙ

- **Как открыть PDF-файлы инструкции по эксплуатации**

Прекратите установку, если в результате загрузки диска CD-ROM появилось окно установки программного обеспечения.

При открытии файла [INDEX.pdf] на диске CD-ROM будет отображен список инструкций по эксплуатации.

Щелкните название документа руководства, чтобы открыть его.

- **Для чтения PDF-файлов потребуется Adobe® Reader®. Данное программное обеспечение можно скачать с домашней страницы Adobe Systems.**

#### ● Information on software for this product

1. Included with this product is software licensed under the GNU General Public License (GPL) and GNU Lesser General Public License (LGPL), and users are hereby informed that they have the right to obtain, change and redistribute the source codes of this software.

To obtain the source codes, go to the following home page:

<http://pro-av.panasonic.net/>

The manufacturer asks users to refrain from directing inquiries concerning the source codes they have obtained and other details to its representatives.

2. Included with this product is software which is licensed under MIT-License.
3. This product includes software which is licensed under ImageMagic license.

Details on the above software can be found on the CD provided with the unit. Refer to the folder called "LDOC". (Details are given in the original (English language) text.)

#### Trademarks and registered trademarks

- Microsoft®, Windows® XP, Windows Vista®, Windows® 7 and Internet Explorer® are either registered trademarks or trademarks of Microsoft Corporation in the United States and other countries.
- Intel® and Intel® Core™ are trademarks or registered trademarks of Intel Corporation in the United States and other countries.
- Adobe® and Reader® are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.
- SDHC Logo is a trademark of SD-3C, LLC.
- Primatte® is a registered trademark of IMAGICA DIGIX Inc.
- The copyrights of Primatte® belong to IMAGICA DIGIX Inc.
- The patents for Primatte® belong to IMAGICA DIGIX Inc.
- Other names of companies and products contained in these Operating Instructions may be trademarks or registered trademarks of their respective owners.

#### About copyright and licence

Distributing, copying, disassembling, reverse compiling, reverse engineering, and also exporting in violation of export laws of the software provided with this unit are expressly prohibited.

#### Abbreviations

The following abbreviations are used in this manual.

- Microsoft® Windows® 7 Professional SP1 32/64-bit is abbreviated to "Windows 7".
- Microsoft® Windows Vista® Business SP2 32-bit is abbreviated to "Windows Vista".
- Microsoft® Windows® XP Professional SP3 and Microsoft® Windows® XP Home Edition SP3 are abbreviated to "Windows XP".
- Windows® Internet Explorer® 8.0 is abbreviated to "Internet Explorer".
- In this manual, model AV-HS410E is given as "AV-HS410".
- Both SD memory cards and SDHC memory cards are described as "memory cards" in this manual. When individual descriptions are provided, they are featured individually.
- Personal computers are referred to as "computers".

#### Illustrations and screen displays featured in the manual

- What is shown in the manual's illustrations and screen displays may differ from how it is actually appears.

# Read this first!

## **WARNING:**

This equipment must be earthed.

To ensure safe operation, the three-pin plug must be inserted only into a standard three-pin power point which is effectively earthed through the normal household wiring.

Extension cords used with the equipment must have three cores and be correctly wired to provide connection to the earth. Wrongly wired extension cords are a major cause of fatalities.

The fact that the equipment operates satisfactorily does not imply that the power point is earthed or that the installation is completely safe. For your safety, if you are in any doubt about the effective earthing of the power point, please consult a qualified electrician.

## **WARNING:**

- To reduce the risk of fire or electric shock, do not expose this equipment to rain or moisture.
- To reduce the risk of fire or electric shock, keep this equipment away from all liquids. Use and store only in locations which are not exposed to the risk of dripping or splashing liquids, and do not place any liquid containers on top of the equipment.

## **WARNING:**

Always keep memory cards or accessories out of the reach of babies and small children.

## **CAUTION:**

Do not remove panel covers by unscrewing. To reduce the risk of electric shock, do not remove the covers. No user serviceable parts inside. Refer servicing to qualified service personnel.

## **CAUTION:**

To reduce the risk of fire or electric shock, refer mounting of the optional interface boards to qualified service personnel.

## **CAUTION:**

To reduce the risk of fire or electric shock and annoying interference, use the recommended accessories only.

## **CAUTION:**

In order to maintain adequate ventilation, do not install or place this unit in a bookcase, built-in cabinet or any other confined space. To prevent risk of electric shock or fire hazard due to overheating, ensure that curtains and any other materials do not obstruct the ventilation.

## **CAUTION:**

The mains plug of the power supply cord shall remain readily operable.

The AC receptacle (mains socket outlet) shall be installed near the equipment and shall be easily accessible. To completely disconnect this equipment from the AC mains, disconnect the power cord plug from the AC receptacle.

## **CAUTION:**

A coin type battery is installed inside of the unit. Do not expose the unit to excessive heat such as sunshine, fire or the like.

 indicates safety information.

EEE Yönetmeliğine Uygundur.  
EEE Complies with Directive of Turkey.

# Read this first!

## EMC NOTICE FOR THE PURCHASER/USER OF THE APPARATUS

### 1. Applicable standards and operating environment

#### The apparatus is compliant with:

- standards EN55103-1 and EN55103-2 2009, and
- electromagnetic environments E4.

In a residential, commercial, light industrial and urban outdoors environment, this product may cause radio interference.

### 2. Pre-requisite conditions to achieving compliance with the above standards

#### <1> Peripheral equipment to be connected to the apparatus and special connecting cables

- The purchaser/user is urged to use only equipment which has been recommended by us as peripheral equipment to be connected to the apparatus.
- The purchaser/user is urged to use only the connecting cables described below.

#### <2> For the connecting cables, use shielded cables which suit the intended purpose of the apparatus.

- Video signal connecting cables  
Use double shielded coaxial cables, which are designed for 75-ohm type high-frequency applications, for SDI (Serial Digital Interface).  
Coaxial cables, which are designed for 75-ohm type high-frequency applications, are recommended for analog video signals.
- Audio signal connecting cables  
If your apparatus supports AES/EBU serial digital audio signals, use cables designed for AES/EBU.  
Use shielded cables, which provide quality performance for high-frequency transmission applications, for analog audio signals.
- Other connecting cables (IEEE1394, USB)  
Use double shielded cables, which provide quality performance for high-frequency applications, as connecting cables.
- When connecting to the DVI signal terminal, use a cable with a ferrite core.
- If your apparatus is supplied with ferrite core(s), they must be attached on cable(s) following instructions in this manual.

### 3. Performance level

The performance level of the apparatus is equivalent to or better than the performance level required by these standards. However, the apparatus may be adversely affected by interference if it is being used in an EMC environment, such as an area where strong electromagnetic fields are generated (by the presence of signal transmission towers, cellular phones, etc.). In order to minimize the adverse effects of the interference on the apparatus in cases like this, it is recommended that the following steps be taken with the apparatus being affected and with its operating environment:

1. Place the apparatus at a distance from the source of the interference.
2. Change the direction of the apparatus.
3. Change the connection method used for the apparatus.
4. Connect the apparatus to another power outlet where the power is not shared by any other appliances.



# Read this first!

## Caution for AC Mains Lead

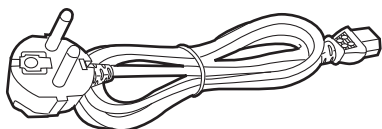
**FOR YOUR SAFETY PLEASE READ THE FOLLOWING TEXT CAREFULLY.**

**This product is equipped with 2 types of AC mains cable. One is for continental Europe, etc. and the other one is only for U.K.**

Appropriate mains cable must be used in each local area, since the other type of mains cable is not suitable.

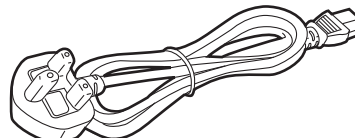
### FOR CONTINENTAL EUROPE, ETC.

Not to be used in the U.K.



### FOR U.K. ONLY

If the plug supplied is not suitable for your socket outlet, it should be cut off and appropriate one fitted.



### FOR U.K. ONLY

This appliance is supplied with a moulded three pin mains plug for your safety and convenience.

A 13 amp fuse is fitted in this plug.

Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 13 amps and that it is approved by ASTA or BSI to BS1362.

Check for the ASTA mark  or the BSI mark  on the body of the fuse.

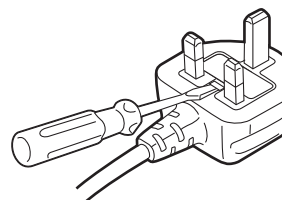
If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.

If you lose the fuse cover the plug must not be used until a replacement cover is obtained.

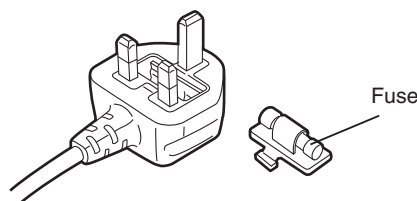
A replacement fuse cover can be purchased from your local Panasonic Dealer.

### How to replace the fuse

1. Open the fuse compartment with a screwdriver.



2. Replace the fuse.



 indicates safety information.

Declaration of Conformity  
with the requirements of Technical Regulation on the Restriction Of the use of certain Hazardous  
Substances in Electrical and Electronic Equipment  
(adopted by Order №1057 of Cabinet of Ministers of Ukraine)

The Product is in conformity with the requirements of Technical Regulation on the Restriction Of the use of certain  
Hazardous Substances in electrical and electronic equipment (TR on RoHS).

The content of hazardous substance with the exemption of the applications listed in the Annex №2 of TR on RoHS:

1. Lead (Pb) – not over 0,1 % or 1000wt ppm;
2. Cadmium (Cd) – not over 0,01 % or 100wt ppm;
3. Mercury (Hg) – not over 0,1 % or 1000wt ppm;
4. Hexavalent chromium (Cr<sup>6+</sup>) – not over 0,1 % or 1000wt ppm;
5. Polybrominated biphenyls (PBBs) – not over 0,1 % or 1000wt ppm;
6. Polybrominated diphenyl ethers (PBDEs) – not over 0,1 % or 1000wt ppm.

Pursuant to at the directive 2004/108/EC, article 9(2)

**Panasonic Testing Centre**

**Panasonic Service Europe, a division of Panasonic Marketing Europe GmbH**

Winsbergring 15, 22525 Hamburg, F.R. Germany

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# Before use

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## ■ Overview

This unit is a 1 ME digital video switcher which supports a multiple number of HD and SD formats.

Despite its compact size, it comes with eight SDI inputs, one DVI-D input, five SDI outputs and one DVI-D output.

The unit comes with a luminance key and chroma keys provided as keyers in addition to the background transitions based on the cut, mix and wipe functions.

It also has one DSK line and two PinP lines for enabling video recording, playback and a host of other video production functions.

Furthermore, using the multi view display settings, the screen of a monitor can be split into a number of sections to accommodate up to sixteen images, enabling the number of monitors to be reduced and a space-saving system to be configured at low cost.

## ■ Concerning the ratings display

The unit's name, model number and electrical ratings are indicated on its side panel.

## ■ Disclaimer of warranty

IN NO EVENT SHALL Panasonic Corporation BE LIABLE TO ANY PARTY OR ANY PERSON, EXCEPT FOR REPLACEMENT OR REASONABLE MAINTENANCE OF THE PRODUCT, FOR THE CASES, INCLUDING BUT NOT LIMITED TO BELOW:

- ① ANY DAMAGE AND LOSS, INCLUDING WITHOUT LIMITATION, DIRECT OR INDIRECT, SPECIAL, CONSEQUENTIAL OR EXEMPLARY, ARISING OUT OF OR RELATING TO THE PRODUCT;
- ② PERSONAL INJURY OR ANY DAMAGE CAUSED BY INAPPROPRIATE USE OR NEGLIGENT OPERATION OF THE USER;
- ③ UNAUTHORIZED DISASSEMBLE, REPAIR OR MODIFICATION OF THE PRODUCT BY THE USER;
- ④ INCONVENIENCE OR ANY LOSS ARISING WHEN IMAGES ARE NOT DISPLAYED, DUE TO ANY REASON OR CAUSE INCLUDING ANY FAILURE OR PROBLEM OF THE PRODUCT;
- ⑤ ANY PROBLEM, CONSEQUENTIAL INCONVENIENCE, OR LOSS OR DAMAGE, ARISING OUT OF THE SYSTEM COMBINED BY THE DEVICES OF THIRD PARTY;
- ⑥ ANY INCONVENIENCE, DAMAGES OR LOSSES RESULTING FROM ACCIDENTS CAUSED BY AN INADEQUATE INSTALLATION METHOD OR ANY FACTORS OTHER THAN A DEFECT IN THE PRODUCT ITSELF;
- ⑦ LOSS OF REGISTERED DATA CAUSED BY ANY FAILURE;
- ⑧ ANY DAMAGE OR CLAIMS DUE TO LOSS OR LEAKAGE OF IMAGE DATA OR SETTING DATA SAVED ON THIS UNIT OR ON A MEMORY CARD OR COMPUTER.

## ■ Network security

The unit also has functions which are used when it is connected to a network. Using the unit when it has been connected to a network may possibly give rise to the following issues.

- ① Leakage or theft of information through this unit
- ② Use of this unit for illegal operations by persons with malicious intent
- ③ Interference with or stoppage of this unit by persons with malicious intent

It is your responsibility to take precautions such as those described below to protect yourself against the above network security risks.

- Use this unit in a network secured by a firewall, etc.
- If this unit is connected to a network that includes computers, make sure that the system is not infected by computer viruses or other malicious entities (using a regularly updated antivirus program, anti-spyware program, etc.).

The following points should be borne in mind as well.

- 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.
- Do not choose an installation location where the unit, cables and other parts will be easily damaged.



# Features

## Compact design, wide variety of input/output signals

- HD/SD-SDI input and output signals are supported as a standard option, and a frame synchronizer (FS) is incorporated for all inputs. In addition, there are four up-converter (UC) lines and eight video process lines.
- The unit is provided with two option slots for input/output applications. When an option board designed for input applications is installed, the number of input lines can be extended up to 13; similarly, when an option board designed for output applications is installed, the number of output lines can be extended up to 10.

## Multiple formats supported

- The signal formats listed below are supported.

HD format:	SD format:
1080/59.94i, 1080/50i, 1080/24PsF*1, 1080/23.98PsF*1, 720/59.94p, 720/50p	480/59.94i, 576/50i, DVI*2

\*1: The following option boards are not supported:

AV-HS04M1, AV-HS04M2, AV-HS04M3, AV-HS04M4,  
AV-HS04M5, AV-HS04M6, AV-HS04M7

\*2: The standard DVI-D IN connector and DVI-D OUT connector support the input and output of DVI-D signals.  
The AV-HS04M3 board supports the input of DVI-I signals.  
The AV-HS04M5 board supports the output of DVI-I signals.  
The AV-HS04M8 board supports the input of DVI-D signals.

## Frame synchronizer system

- A frame synchronizer is incorporated for each of the inputs so that asynchronous video signals can be selected with no accompanying shocks.
- A genlock function is provided so that external synchronization systems using external sync signals (BB or TRI signals) as a reference are also supported.

## 4-channel up-converter, 8-channel Dot by Dot function and 8-channel video process function

- An up-converter is incorporated in SDI IN 5 to SDI IN 8.
- A Dot by Dot function is incorporated for all the SDI input connectors (SDI IN 1 to SDI IN 8).  
By using this function and the PinP function together, SD materials can be embedded in HD images with no deterioration in the image quality.
- The video process function is incorporated in all the SDI input connectors (SDI IN 1 to SDI IN 8) to make it possible to adjust the colors at the input stage of the switcher.

## Sophisticated multi view display function

- One channel is provided for the multi view display function. The user can select whether the screen is to be split into 16, 10, 9, 6, 5 or 4 sections.
- Materials such as PGM, PVW and AUX as well as a clock can be allocated to the split screens in addition to the input materials.
- The level of the embedded audio signals superimposed on the SDI input signals can be displayed.

## Many different effect functions incorporated

- Along with the standard wipe, mix and cut functions, the switcher can provide size reduction, slide and other DVE transitions.
- Any of the following keys can be selected as the keyers.

Linear key, luminance key, chroma key

One DSK line is also provided as a keyer.

- The unit is equipped with two PinP lines and four AUX bus lines.

Not only cut but mix transitions can be selected as the bus transition function (effects produced by switching the materials using the PinP and AUX buses).  
(AUX1 only for AUX bus)

## High-quality chroma keys using Primatte® algorithms

The Primatte® algorithm, which has proven to be very popular in many non-linear editors as a plug-in software, has been put to practical use in a linear editing system for the chroma keys. High chroma key image quality can be achieved through some simple operations.

## Recording and playback of video memory data (2 systems: still images and movie clips) with key signals attached possible

- The still images (STILL) and movie clips (CLIP) stored in the video memory can be selected as the bus materials.
- Movie clips with two lines of key signals attached can be recorded and played back.  
(Up to 20 seconds/600 frames when the 59.94i system is used)
- Still images and movie clips can be sent from memory cards to the video memories.

# Features

---

## Shot memory and event memory functions featured

- The background, key transition pattern, PinP size, border width and other effects can be registered in the internal memory, and called from the memory.
- The shot memory function makes it possible to vary the switching from the current image to an image registered in the memory more smoothly when the effect dissolve effect is set.
- When a multiple number of video effect key frames are registered, the event memory function makes it possible to continuously play back these frames.
- The unit also incorporates a memory preview function so the user can check what is going to be played back before the data is actually played back.

## Supports SD memory cards and SDHC memory cards.

- Still image data (in the BMP or TARGA format) and movie clip data (in the original format; converter\*) can be read from memory cards into the unit's video memory and used as background images, key materials or video sources. In addition, the images and setting data in the unit's video memories can be stored on the memory cards.

\*: The converter can be obtained from "Service and Support" on the home page whose address is provided below:

**<http://pro-av.panasonic.net/>**

For the installation procedure, follow the steps in the directions which are contained in the download file.

## This unit comes with a built-in 178.0 mm (7-inch)\* color display.

(\*: 178.0 mm effective picture area measured diagonally.)

- The setting menus are viewed on this display.
- The display shows images (PGM, PVW, MV) of the input signals and output signals as well as waveforms (WFM).
- Thumbnails of the images stored on memory cards can be displayed.

## Straightforward, flexible operability

- The straightforward panel layout with its two rows of 12 crosspoint buttons (and up to 22 buttons when the SHIFT function is used) — one for bus A and the other for bus B — and other controls that enable the functions to be operated directly make it possible to initiate speedy live transmissions.
- The functions are set and registered by displaying the setting menus on the built-in display.
- Various functions can be allocated to the eight user buttons.

## Plug-in software applications supported

- Plug-in software applications can be developed and new functions can be added to the unit.
- For detailed information on the plug-in API (Application Program Interface) specifications and SDK (Software Development Kit), contact the dealer from whom you purchased the unit.

# Accessories

Check that the following accessories are present and accounted for.

- After removing the product from its container, dispose of the power cable cap and packing materials in an appropriate manner.

CD-ROM ..... 1

- Operating Instructions <Basics>
- Operating Instructions <Operations and Settings>
- User Guide “AV-HS410 Image Transmission Software”
- DVI input level adjustment file (BW.bmp)
  - ☞ Refer to “2-1-13. Automatic adjustment of the black level and white level (analog input signals)” (<Operations and Settings> Operating Instructions).
- Image Transmission Software (ImageTrans.exe)

Power cable (2 m) ..... 2

## ■Option boards (sold separately)

Model number	Board	Function	Supported slots	
			SLOT A	SLOT B
AV-HS04M1	SDI Input Board	SDI input ×2 lines	✓	✓
AV-HS04M2	Analog Input Board	Analog component input ×2 lines	✓	✓
AV-HS04M3	DVI Input Board	DVI-I input ×2 lines	✓	✓
AV-HS04M4	Analog Output Board	Analog component output ×2 lines	✓	✓
AV-HS04M5	DVI/Analog Output Board	DVI-I output ×1 line Analog component output ×1 line	✓	✓
AV-HS04M6	Analog Composite Input Board	Analog composite input ×2 lines	✓	✓
AV-HS04M7	SDI Output Board	SDI output ×2 lines	✓	✓
AV-HS04M8	Full-HD DVI Input Board	DVI-D input ×2 lines	✓	✓

✓: Supported

# Required computer environment

Use a host computer that satisfies the following conditions.

CPU	Intel® Core™2 DUO 2.4 GHz or faster recommended
Memory	Microsoft® Windows® XP: 1 GB or more recommended Microsoft® Windows Vista®, Microsoft® Windows® 7: 2 GB or more recommended
Network function	10BASE-T or 100BASE-TX
Image display function	Resolution: 1024 × 768 pixels or more Color generation: True Color (24 bits or more)
Supported operating system	Microsoft® Windows® XP, Microsoft® Windows Vista®, Microsoft® Windows® 7
Hard disk drive	At least 50 MB of free memory
Other	CD-ROM drive (for using the Operating Instructions and various software)  Adobe® Reader® (for browsing the Operating Instructions on the CD-ROM)

# Precautions for use

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- **Handle carefully.**

Do not drop the product, or subject it to strong shock or vibration.  
Do not carry or move the product by the fader lever. This is important to prevent malfunctioning or accidents.

- **Use the product in an ambient temperature of 0 °C to 40 °C.**

Avoid using the product at a cold place below 0 °C or at a hot place above 40 °C because extremely low or high temperature will adversely affect the parts inside.

- **Power off before connecting or disconnecting cables.**

Before plugging or unplugging the cables, be sure to switch power off.

- **Avoid humidity and dust.**

Avoid using the product at a humid, dusty place because much humidity and dust will cause damage to the parts inside.

- **Maintenance**

Turn off the unit's power and wipe the product using a dry cloth. To remove stubborn dirt, dip a cloth into a diluted solution of kitchen detergent (neutral), wring it out well, and wipe the product gently. Then, after wiping the product with a moist cloth, wipe it again with a dry cloth.

**Caution**

- Avoid using benzene, paint thinners and other volatile fluids.
- If a chemical cleaning cloth is to be used, carefully read through the precautions for its use.

- **Precaution to be observed during production**

This product's image switching and image effect functions can be used to produce images which flicker rapidly or images which change rapidly.  
However, bear in mind when using these functions in production that the kinds of images produced may have an adverse effect on the viewer's physical well-being.

- **Built-in display (LCD monitor)**

Leaving the built-in display on with the same image over a long period of time may result in temporary afterimage (burn-in).  
Such afterimages are usually resolved when ordinary moving images are displayed for a while.

The liquid crystal parts are highly precise with 99.99 % of the pixels effective. This leaves less than 0.01 % of pixels that may not light or may remain on all the time.  
These phenomena are normal and will have no effect on the images you shoot.

Condensation may form if you use the unit where temperatures fluctuate. Wipe dry with a soft, dry cloth.

When the unit has completely cooled down, the display on the LCD monitor appears slightly darker than usual immediately after the power has been turned on. Once the internal temperature of the unit rises, the display returns to the normal brightness.

- **When the product is to be discarded**

When the product is to be discarded at the end of its service life, ask a specialized contractor to dispose of it properly in order to protect the environment.

- **Concerning the consumable parts**

**Cooling fan:**

This is a consumable part.  
As a general rule, replace it every 5 years or so (when the unit has been operated for 15 hours a day).

**Power supply unit:**

This is a consumable part.  
As a general rule, replace it every 5 years or so (when the unit has been operated for 15 hours a day).

The period when the consumable parts need to be replaced will differ depending on the operating conditions.  
**When the time comes to replace one of these parts, be absolutely sure to ask your dealer to do the job.**

# Installation and connections

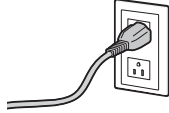
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## ■ Installation precautions

● In addition to heeding the points presented in the “Read this first!”, observe the following precautions as well.

### Connecting the power supply

- Be absolutely sure to use only the power cable supplied with the unit.
- The power cable supplied with the unit has a 3-pin plug with a grounding terminal.  
Connect to a 3-pin AC outlet which is equipped with a grounding terminal.
- Be absolutely sure to connect the ground terminal (SIGNAL GND) at the rear of the unit to the system ground.
- When the unit is not going to be used for a prolonged period of time, turn off its power, and disconnect the power plug from the AC outlet.



### Handle carefully!

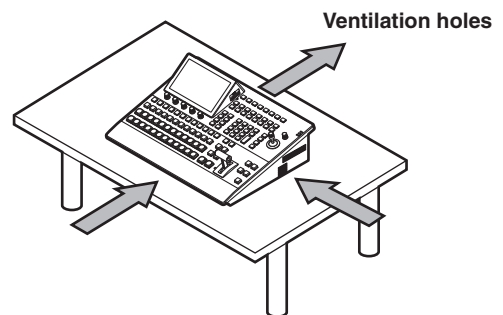
- Dropping the unit or subjecting it to strong impact or vibration may cause trouble and/or malfunctioning.

### Do not allow any foreign objects to enter inside the unit!

- Allowing water, metal items, scraps of food or other foreign objects inside the unit may cause a fire and/or electric shocks.

### Choosing the best installation location

- Install the unit on a sufficiently strong, stable and level surface for use.
- Ensure a space of at least 100 mm around the unit's vents to avoid obstructing ventilation.  
In particular, ensure sufficient space between ventilation and wiring when using mounted in a panel or table.
- Do not install the unit in a manner in which its cables and other accessories can be easily damaged.
- Avoid installing the unit where it will be exposed to direct sunlight or to the hot air that is blown out from other products.
- Installing the unit in a very humid, dusty or vibration-prone location may give rise to trouble.



# Installation and connections (Be sure to ask your dealer.)

## ■ How to install the option boards

For details, refer to the operating instructions of the option board concerned.

- The instructions set forth in the operating instructions of the option boards listed below describe the steps to take when the boards are to be installed in the AV-HS400AN or AV-HS400AE.  
When reading these instructions, change the wording used for all references to this model and its slots with the actual model and actual slots.

### <Changes in the wording given for option slots and signal lines>

Option boards and wording used in operating instructions			When the option boards are to be installed in the AV-HS410	
AV-HS04M1, AV-HS04M2, AV-HS04M3, AV-HS04M6	SLOT 1	INPUT 5, INPUT 6	SLOT A	IN A1, IN A2
	SLOT 2	INPUT 7, INPUT 8	SLOT B	IN B1, IN B2
AV-HS04M4, AV-HS04M5, AV-HS04M7	SLOT 1	OUTPUT 3, OUTPUT 4	SLOT A	OUT A1, OUT A2
	SLOT 2	OUTPUT 5, OUTPUT 6	SLOT B	OUT B1, OUT B2

### <Changes in wording used for setting switch SW501 of AV-HS04M6>

Wording used in operating instructions		When the option board is to be installed in the AV-HS410	
Switch No.		Switch No.	
1	Y/C separation mode	1	Y/C separation mode
2	(INPUT5, 7)	2	(IN A1, IN B1)
3	Y/C separation mode	3	Y/C separation mode
4	(INPUT6, 8)	4	(IN A2, IN B2)
5	NTSC SETUP	5	NTSC SETUP
6		6	
7	Reserved	7	Reserved
8		8	

When an option board (AV-HS04M1, AV-HS04M2 or AV-HS04M6) has been installed in the unit, the settings established by the selection positions for the following switches are not reflected.

Select the settings using the unit's setting menus.

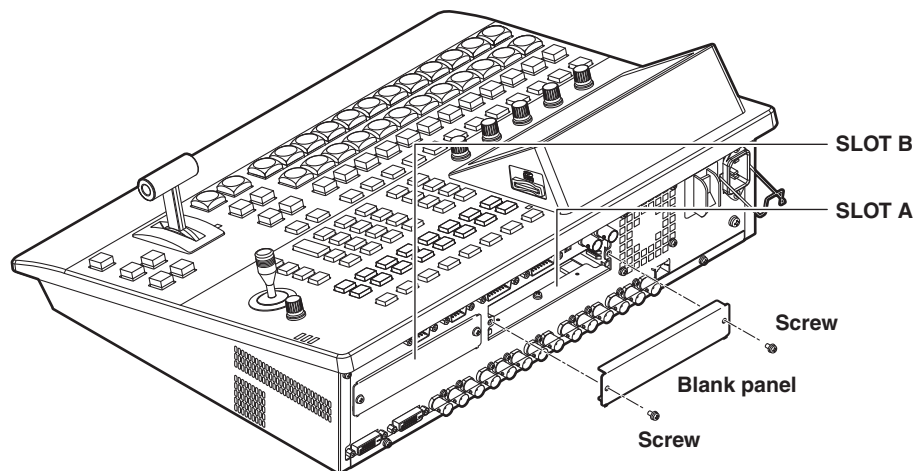
Wording used in operating instructions		AV-HS410 setting menu
Switch No.		Input menu → Up Converter2 sub menu
4	Screen position	Edge Crop Pos
6	Gamut limiter	Limiter
7		

### Notes

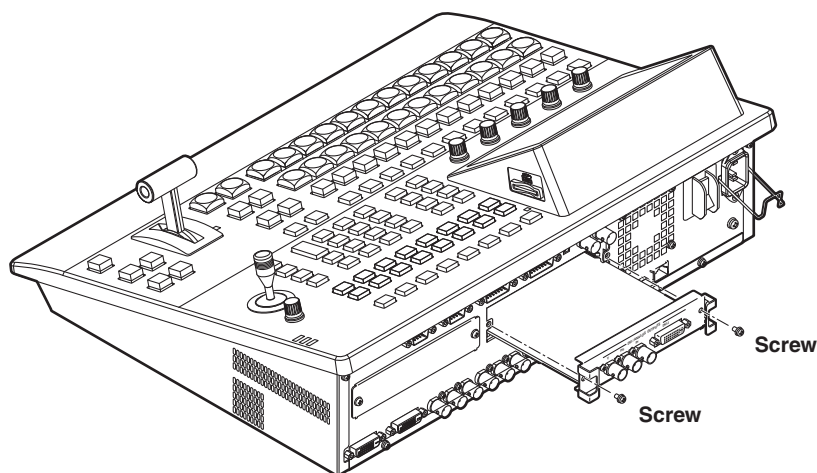
- Before installing or removing an option board, turn off the power, and disconnect the power plug.
- Before coming into physical contact with the option board, touch your hand to metal that has been grounded to discharge the static electricity in your body.  
A safe way to proceed is to wear an anti-static wrist strap.  
The option board may be damaged if you touch the board with static still in your body.
- Avoid damage to the option board by not dropping it or subjecting it to strong shocks or vibrations.
- After removing an option board, be absolutely sure to attach the blank panel.
- When installing or removing an option board, take care not to hurt yourself on the edges or metal parts of the board.

# Installation and connections (Be sure to ask your dealer.)

- ① Turn off the power of the unit, and disconnect the power cable.
- ② Loosen the two screws of SLOT A or SLOT B at the back of the unit, and remove the blank panel.



- ③ Align the option board with the guide rails, and insert it slowly.  
Insert it until it will go no further. Take care not to exert excessive force while doing this since that may damage the connector inside.
- ④ Mount the option board in place using the two screws.  
**Clamping torque: 0.7 N•m**



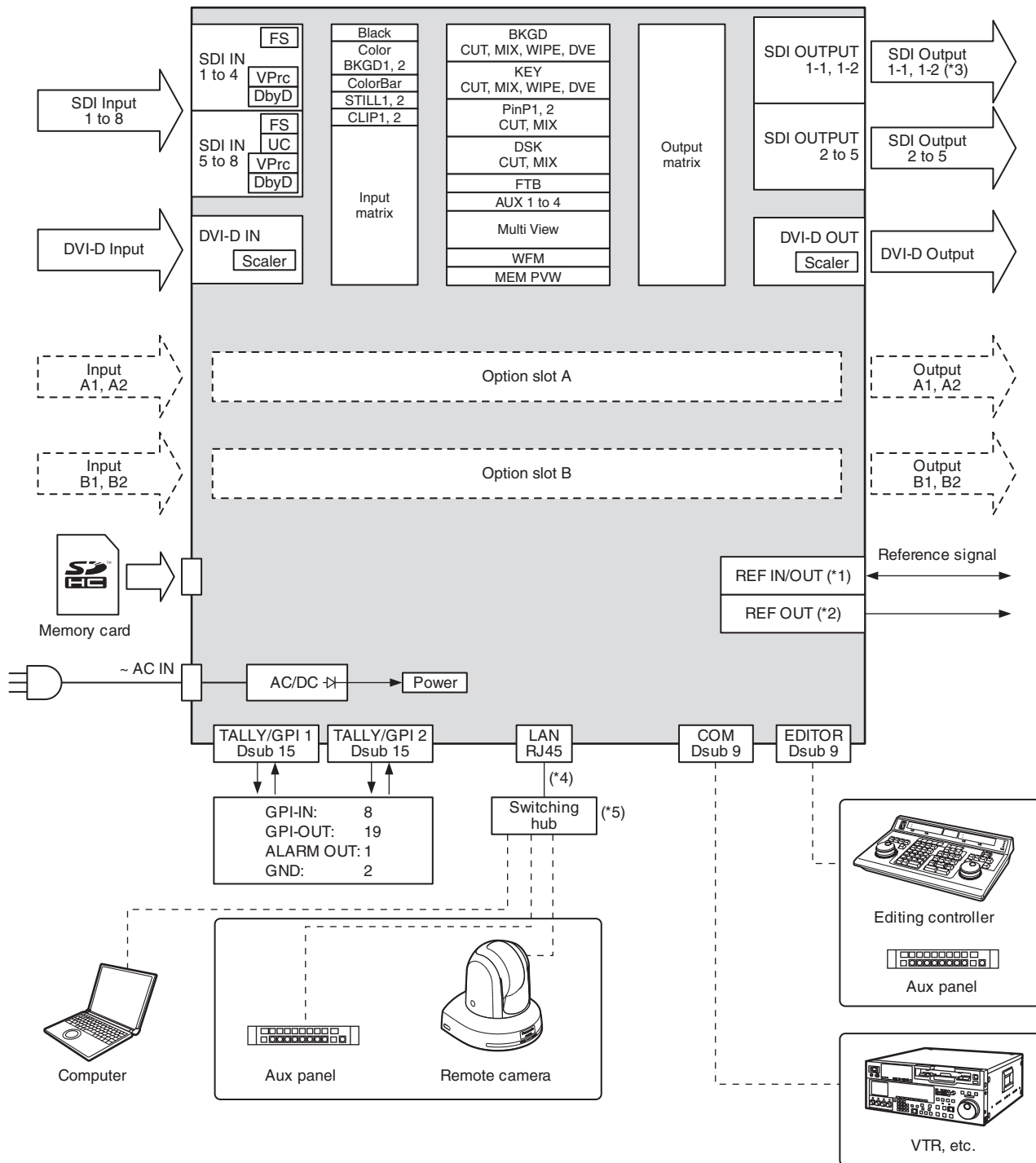
- ⑤ After connecting the necessary cables, plug the power cable into the power outlet, and turn on the power.



# Installation and connections

## ■ Connections with other devices

### ● Block diagram



**\*1:** When external synchronization is selected as the reference signal setting, the reference signal is input.

When internal synchronization is selected, the reference signal is output.

**\*2:** When external synchronization is selected as the reference signal setting, the signals are looped through and output.

When internal synchronization is selected, the reference signal is output.

**\*3:** Two sets of the same output signals are distributed from SDI OUTPUT 1.

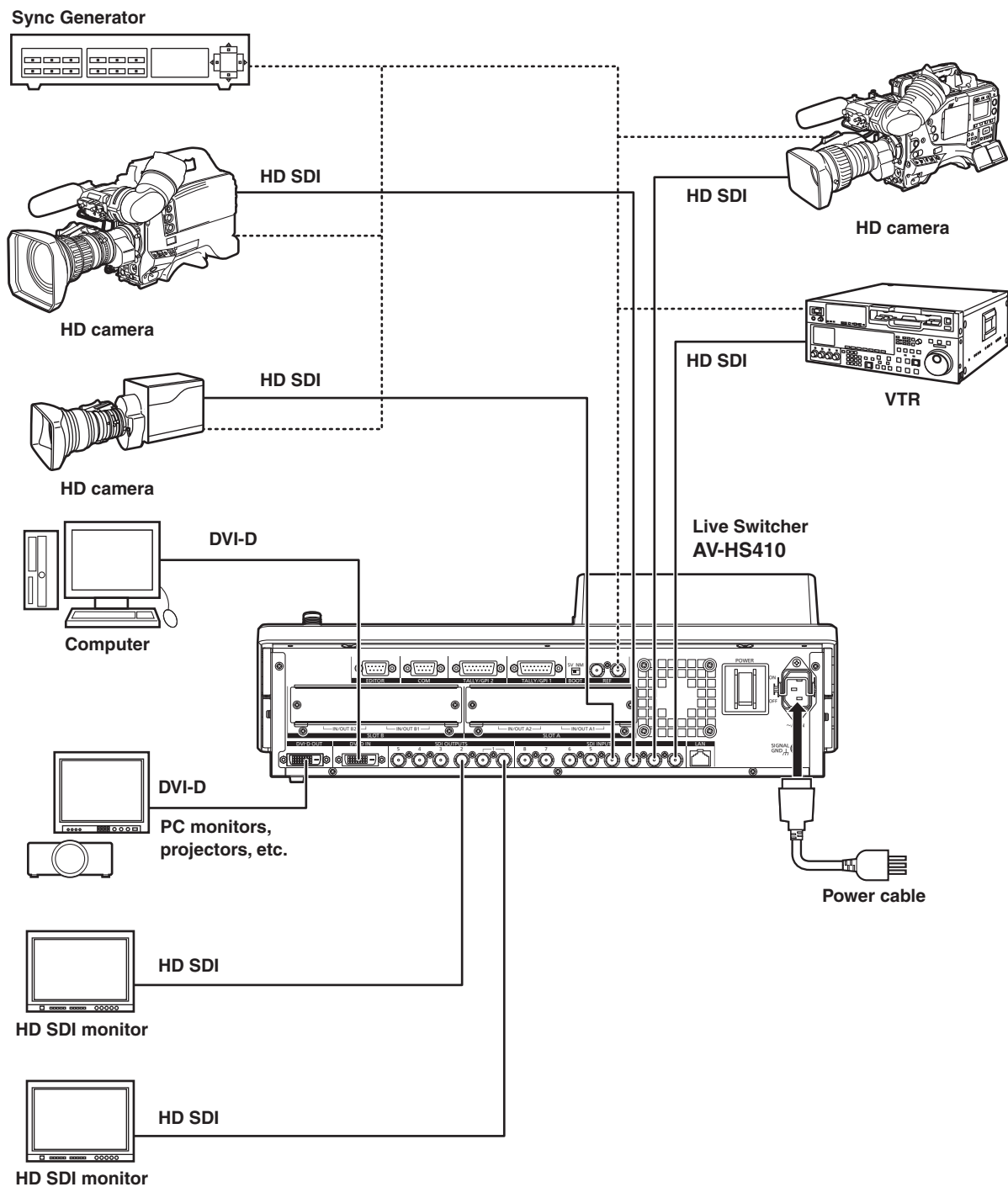
**\*4:** Use a crossover cable when connecting the unit and another device on a 1:1 basis without going through a switching hub.

**\*5:** Use a switching hub.

Proceed with the connections after reading the section entitled "Network security" (on page 8).

# Installation and connections

## ● Connections when implementing gen-lock (frame synchronizer OFF)



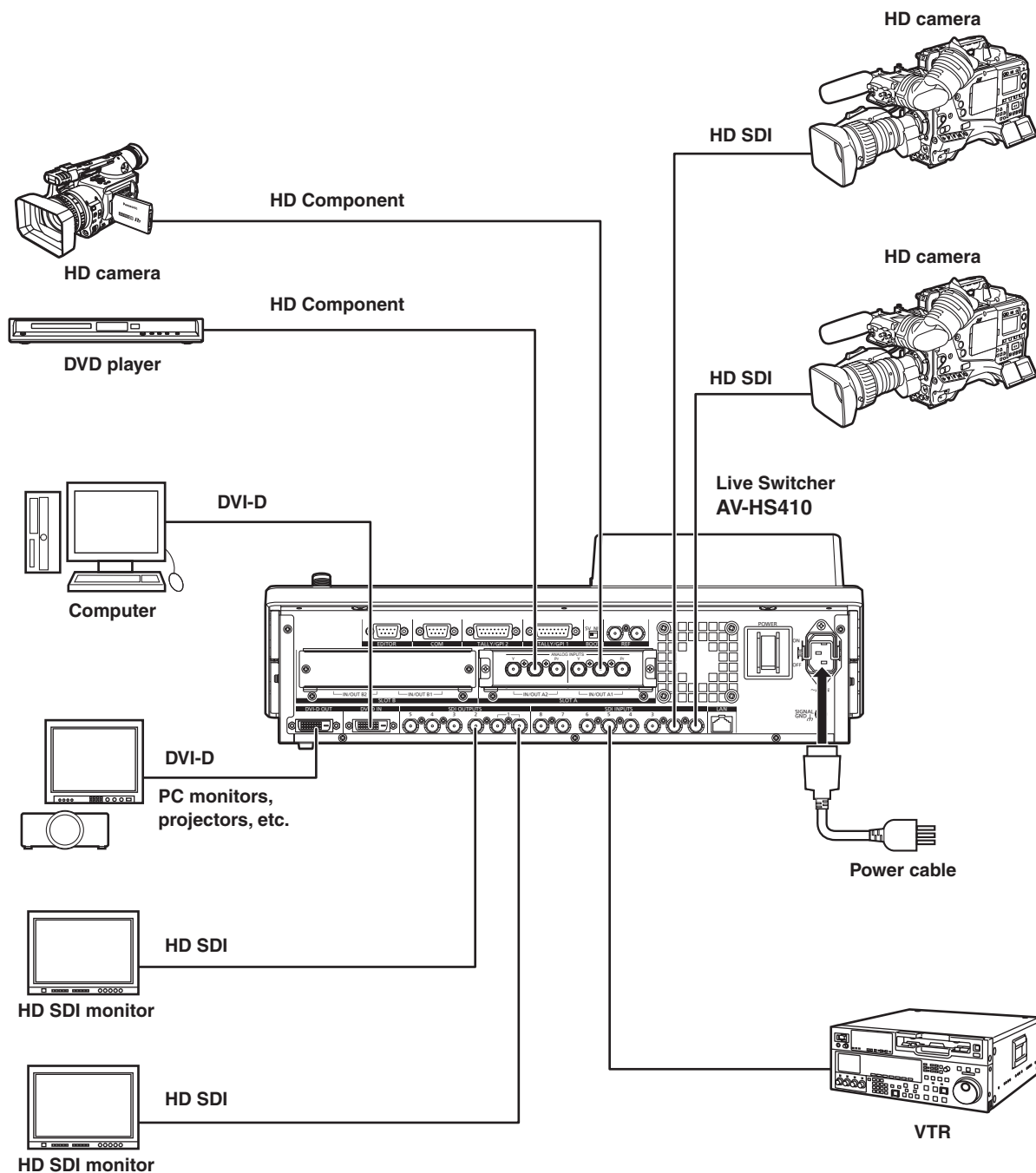
- Use a 3-point power outlet as the power source in order to earth the unit securely.

# Installation and connections

## ● Connections when not implementing gen-lock (frame synchronizer ON)

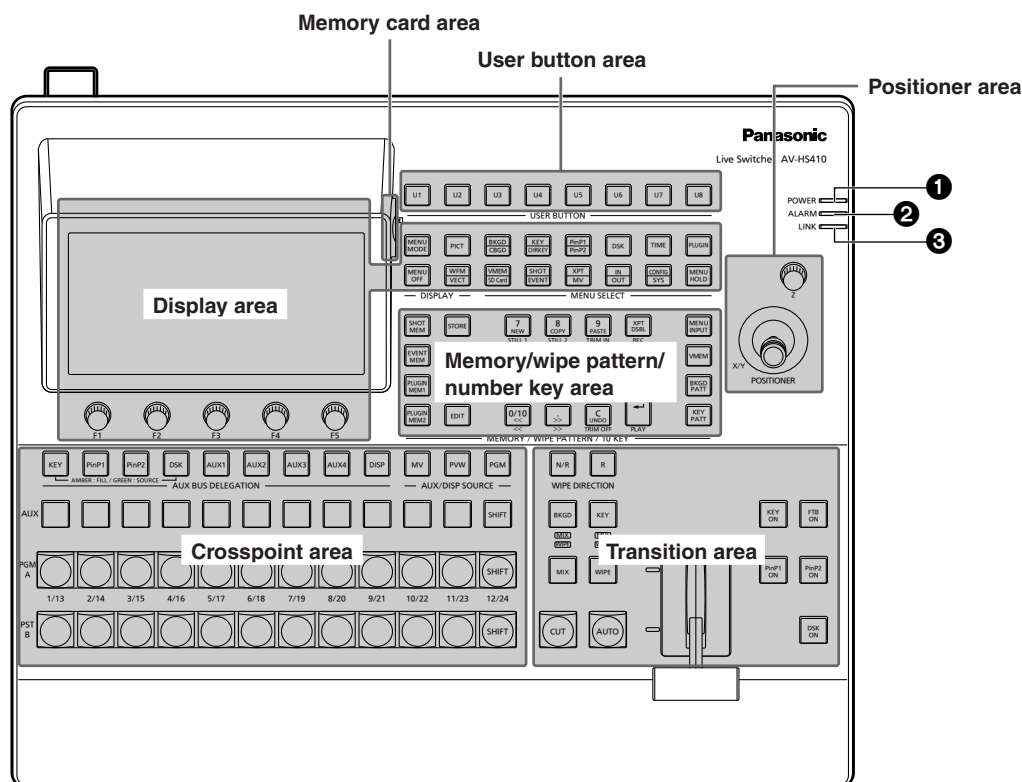
Example where the option board is used

SLOT A: Analog Input Board (AV-HS04M2)



# 1. Parts and their functions

## 1-1. Control panel



### ① POWER indicator [POWER]

This indicator lights when the power switch (Ⓒ) on the rear panel is set to ON while power is supplied to the AC power input socket (Ⓔ).

### ② ALARM indicator [ALARM]

This indicator lights up when any of the following types of trouble has occurred.

- When the cooling fan has stopped operating
- When something is wrong with the power supply (a drop in the voltage)
- When high temperatures are reached inside the unit

When any of these events has occurred, an alarm message is displayed on the built-in display.

When an alarm has occurred, details of the trouble concerned can be checked by selecting the System menu followed by the Alarm sub menu.

The alarm information can be output from the TALLY/GPI connector (Ⓓ) on the rear panel to an external device.

For further details, refer to “3-7-2. Alarm message” in the <Operation and Settings> Operating Instructions.

When an alarm has occurred, stop using the unit immediately, and be absolutely sure to contact your dealer. Continuing to use the unit even after an alarm has occurred could damage the unit.

### ③ LINK indicator [LINK]

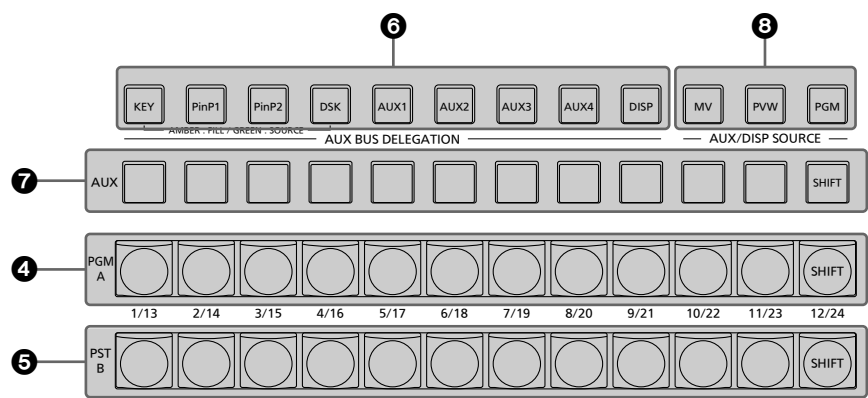
While the unit is linked with an external device, this indicator lights up when the unit is controlled by a plug-in software application.

For the settings used when the unit is to be controlled by a plug-in software application, check out the specifications of the application concerned.

For the settings to be performed for the external device, refer to the operating instructions of the device concerned.

# 1. Parts and their functions

## 1-1-1. Crosspoint area



### ④ PGM/A bus crosspoint buttons

#### [PGM/A 1 to 12]

These are used to select the PGM/A bus video signals. Buttons 1 to 24 can be selected using the [SHIFT] button.

☞ Refer to “1-1-2. Selecting the bus using the SHIFT function” (<Operations and Settings> Operating Instructions).

“A/B”, “PGM-A/PST-B” or “PGM-B/PST-A” can be selected as the Bus Mode item by selecting the Config menu following by the Operate sub menu.

☞ Refer to “1-1-3. Selecting the bus mode” (<Operations and Settings> Operating Instructions).

When one of the crosspoint buttons (④, ⑤, ⑦) is held down, the name of the input material and the number of the crosspoint button are displayed.

### ⑤ PST/B bus crosspoint buttons

#### [PST/B 1 to 12]

These are used to select the PST/B bus video signals. Buttons 1 to 24 can be selected using the [SHIFT] button.

☞ Refer to “1-1-2. Selecting the bus using the SHIFT function” (<Operations and Settings> Operating Instructions).

“A/B”, “PGM-A/PST-B” or “PGM-B/PST-A” can be selected as the Bus Mode item by selecting the Config menu following by the Operate sub menu.

☞ Refer to “1-1-3. Selecting the bus mode” (<Operations and Settings> Operating Instructions).

### ⑥ AUX bus selector buttons

#### (AUX BUS DELEGATION)

Select the bus to be operated using the AUX bus crosspoint buttons (⑦).

The selected button lights.

#### [KEY]:

This button is used to change the AUX bus crosspoint buttons (⑦) into the source selector buttons for the key fill buses or key source buses.

Each time it is pressed, the selector button function is switched between the key fill buses and key source buses.

Amber	Key fill buses
Green	Key source buses

#### [PinP1], [PinP2]:

These buttons are used to change the AUX bus crosspoint buttons (⑦) into the source selector buttons for the PinP1 and PinP2 bus sources.

#### [DSK]:

This button is used to change the AUX bus crosspoint buttons (⑦) into the source selector buttons for the DSK fill buses or DSK source buses.

Each time it is pressed, the selector button function is switched between the DSK fill buses and DSK source buses.

Amber	DSK fill buses
Green	DSK source buses

#### [AUX1] to [AUX4]:

These buttons are used to change the AUX bus crosspoint buttons (⑦) into the selector buttons for the sources of the AUX buses.

#### [DISP] (built-in display):

This button is used to change the AUX bus crosspoint buttons (⑦) into the source selector buttons for the DISP buses (for the images which are shown on the built-in display).

# 1. Parts and their functions

---

## ⑦ AUX bus crosspoint buttons

These buttons are used to select the source of the bus which was selected by the AUX bus selector button (⑥). Buttons 1 to 24 can be selected using the [SHIFT] button.

☞ Refer to “1-1-2. Selecting the bus using the SHIFT function” (<Operations and Settings> Operating Instructions).

## ⑧ Crosspoint buttons exclusively for AUX/DISP buses (AUX/DISP SOURCE)

These buttons are used to select the AUX bus sources while the [AUX1 to AUX4] buttons among the AUX bus selector buttons (⑥) are lit.

These buttons are used to select the DISP bus sources while the [DISP] button among the AUX bus selector buttons (⑥) is lit.

The buttons light up in amber when they are pressed.

### [MV]:

This is used to select the multi view display signals for the AUX buses or DISP buses.

### [PVW]:

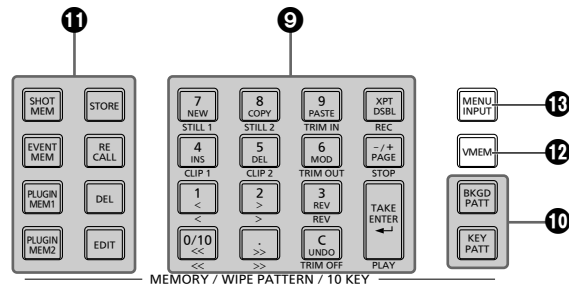
This is used to select the PVW signals for the AUX buses or DISP buses.

### [PGM]:

This is used to select the PGM signals for the AUX buses or DISP buses.

# 1. Parts and their functions

## 1-1-2. Memory/wipe pattern/number key area



### 9 Number keys

When the following buttons are pressed and lit, they serve as buttons for executing their corresponding functions.

10 BKGD, KEY pattern selector buttons	[BKGD PATT] [KEY PATT]
11 Memory operation buttons	[SHOT MEM] [EVENT MEM] [PLUGIN MEM1] [PLUGIN MEM2]
12 Video memory operation button	[VMEM]
13 Numeric input mode button	[MENU INPUT]

### 10 BKGD, KEY pattern selector buttons [BKGD PATT], [KEY PATT]

When the [BKGD PATT] button is pressed and lit, the wipe patterns for the background transitions can be selected using the number keys.

When the [KEY PATT] button is pressed and lit, the wipe patterns for the key transitions can be selected using the number keys.

When both the [BKGD PATT] and [KEY PATT] buttons are lit, the pattern selection menu is displayed on the built-in display.

When the [F1] (33) is rotated, the pattern page is changed.

☞ Refer to “1-2. Wipe” (<Operations and Settings> Operating Instructions).

### 11 Memory operation buttons

#### [SHOT MEM], [EVENT MEM]:

These buttons are used to select the memory type. The number keys (1 to 10) are used to carry out operations and register and call settings.

#### [PLUGIN MEM1], [PLUGIN MEM2]:

Press these buttons to use plug-in software, and use the number keys (1 to 10) to carry out operations and to register and call settings.

For information about button control methods, check the plug-in API specifications.

#### [STORE]:

Press this to register data in the memory.

#### [RECALL]:

Press this to recall data from the memory.

#### [DEL]:

Press this to delete data in the memory.

#### [EDIT]:

Press this to edit the event memory.

☞ Refer to “1-10. Memory” (<Operations and Settings> Operating Instructions).

### 12 Video memory operation button [VMEM]

When the [VMEM] button is pressed and lit, video memory operations such as recording and playback can be performed using the number keys.

☞ Refer to “1-11. Video memories” (<Operations and Settings> Operating Instructions).

### 13 Numeric input mode button [MENU INPUT]

While the [MENU INPUT] button is blinking, numerical values for the menus can be input using the number keys.

☞ Refer to “2-2. Basic menu operations”.



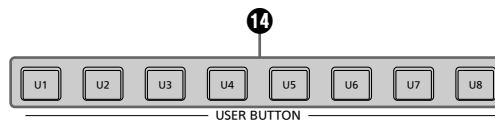
# 1. Parts and their functions

## 1-1-3. User button area

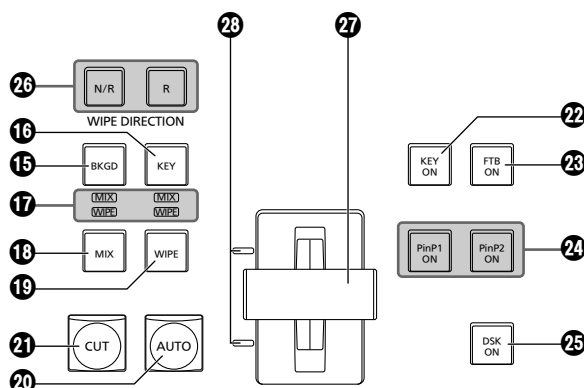
### 14 User buttons (USER BUTTON) [U1 to U8]

These are used to assign some functions of the menu settings to the [U1] to [U8] buttons on the Config menu.

Refer to “3-3-1. Setting the user buttons” (<Operations and Settings> Operating Instructions).



## 1-1-4. Transition area



### 15 [BKGD] button

This executes the background transition when the [AUTO] button (20) or fader lever (27) has been operated.

When the [BKGD] button is pressed and it is selected, its indicator lights in amber.

If the [KEY] button (16) is now pressed, the indicator goes off, and the de-selected status is established.

When the [BKGD] button and [KEY] button (16) are pressed at the same time, both buttons are set to the selected status.

### 16 [KEY] button

This executes the key transition when the [AUTO] button (20) or fader lever (27) has been operated.

When the [KEY] button is pressed and it is selected, its indicator lights in amber.

If the [BKGD] button (15) is now pressed, the indicator goes off, and the de-selected status is established.

When the [BKGD] button (15) and [KEY] button are pressed at the same time, both buttons are set to the selected status.

### 17 MIX, WIPE selection status LEDs

These light up to indicate whether MIX or WIPE has been selected when background transitions or key transitions are executed.

### 18 [MIX] button

This is used to switch the A and B bus images while making them overlap.

During the transition, the A and B bus output total is kept at 100 %.

When the [MIX] button is pressed and it is selected, its indicator lights in amber.

If the [WIPE] button (19) is now pressed, it goes off, and the de-selected status is established.

### 19 [WIPE] button

This is used to execute the transition using the pattern selected by the number key (9).

When the [WIPE] button is pressed and it is selected, its indicator lights in amber.

If the [MIX] button (18) is now pressed, it goes off, and the de-selected status is established.

# 1. Parts and their functions

---

## 20 [AUTO] button

This is used to automatically execute transitions (auto transition) using the transition time which has been set on the Time menu.

During auto transition its indicator lights in amber.

When the button is pressed again during auto transition, the auto transition operation is suspended, and the indicator lights in green. When it is pressed again while auto transition is suspended, the remaining transition is executed.

The indicator goes off when auto transition is completed. When the [AUTO] button is pressed while the fader lever (27) is at an interim setting, the transition is executed in the time remaining from the interim setting.

## 21 [CUT] button

This button is used to execute transitions instantly.

Its indicator lights in amber during a transition, and it goes off when the transition is completed.

## 22 [KEY ON] button

This button is used to execute the key transition for the transition time which has been set on the Time menu.

## 23 [FTB ON] button

This button is used to execute fade-out to a black screen or fade-in from a black screen for the transition time which has been set on the Time menu.

## 24 PinP button [PinP1 ON] [PinP2 ON]

This button is used to execute fade-in or fade-out of the picture in picture for the transition time which has been set on the Time menu.

## 25 [DSK ON] button

This button is used to execute fade-in or fade-out of downstream key for the transition time which has been set on the Time menu.

## 26 Wipe direction selection buttons (WIPE DIRECTION) [N/R], [R]

These buttons are used to select the direction in which to wipe for executing background transitions.

**When the [R] indicator is off:**

Wiping proceeds in the normal direction.

**When the [R] indicator is lit:**

Wiping proceeds in the reverse direction.

**When the [N/R] indicator is lit:**

The normal direction is replaced with the reverse direction (or vice versa) when the transition is completed.

(The lit and extinguished statuses of the [R] button are also switched in line with the direction of the wiping.)

## 27 Fader lever

This is used to execute background or key transitions.

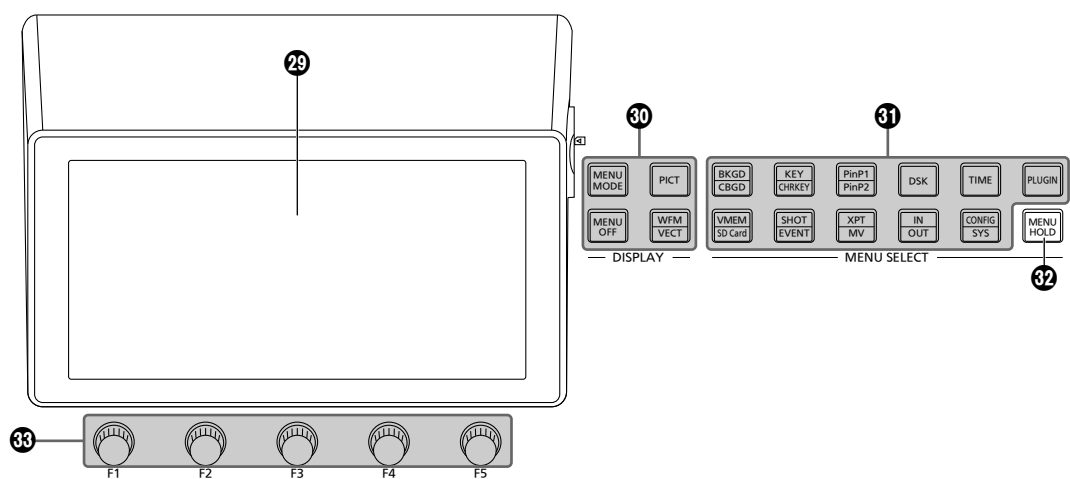
When it is moved as far as it will go, the transition is completed. When it has been operated during auto transition, auto transition will be switched to manual operation as soon as the fader position overtakes the amount of the transition being executed.

## 28 Bus tally LEDs

These indicate the output statuses of the A bus and B bus. The LED corresponding to the bus whose program signals (PGM) are being output lights.

# 1. Parts and their functions

## 1-1-5. Display area



### 29 Built-in display

The images, waveforms and menus are displayed by operating the display mode buttons (30) and menu selection buttons (31).

To show images on the built-in display, press the [DISP] button of the AUX bus selector buttons (6) and light its indicator. MV, PVW and PGM images can be displayed.

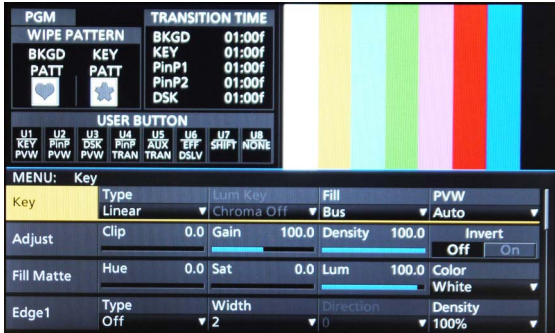
### 30 Display mode buttons (DISPLAY)

These buttons are used to select what is to be displayed on the built-in display.

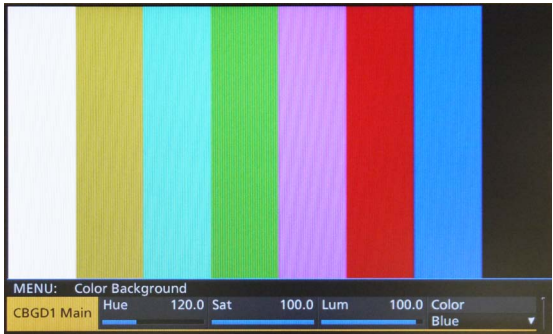
#### [MENU MODE]:

Each time this button is pressed, the menu mode is switched.

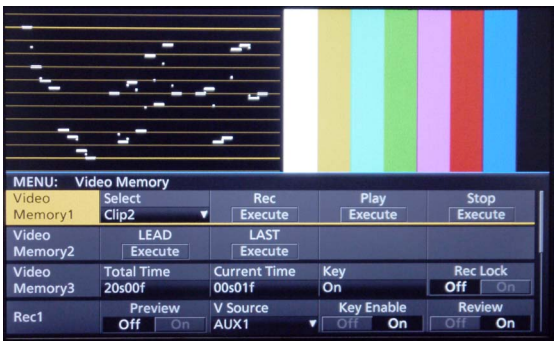
- Menu-only display
- Menu display/Subscreen/Image display



- 1 line of menu display and full-screen image display



- Menu display/WFM display (or VECTOR display)/ Image display



The image display and the WFM display (or VECTOR display) displayed in the upper portion of the built-in display can be switched by pressing the [PICT] button or the [WFM/VECT] button.

# 1. Parts and their functions

## [MENU OFF]:

This button clears the menu display and switches to the image-only display.

## [PICT]:

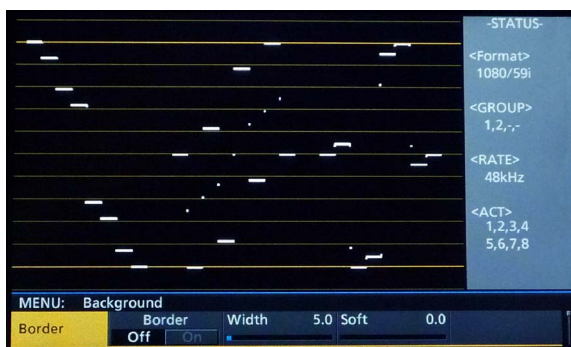
When this button is pressed and lit, images are displayed on the built-in display.

## [WFM/VECT]:

When this button is pressed and lit, waveforms (WFM: waveform monitor) or vectors (VECTOR: vectorscope) are displayed on the built-in display.

Each time the button is pressed, the display switches between WFM and VECTOR.

- WFM (waveform monitor) display



- VECTOR (vectorscope) display



## ③① Menu selection buttons (MENU SELECT)

Each time one of these buttons is pressed, the menu of the function indicated at the top or bottom of the button is selected.

The button of a selected menu lights up in amber.

## ③② [MENU HOLD] button

This button is used to keep a menu on the display.

When it is pressed while a menu is displayed, the menu displayed will not be switched to another menu even when one of the menu selection buttons is pressed.

While the [MENU HOLD] button is pressed, the [MENU HOLD] button lights up in amber.

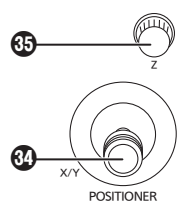
## ③③ Rotary encoders [F1] to [F5]

These are used to set the parameters which are displayed on the built-in display.

☞ Refer to “2-2. Basic menu operations”.

# 1. Parts and their functions

## 1-1-6. Positioner area



### 34 Positioner (POSITIONER) [X/Y]

These are used when performing the settings below.

- PinP1, PinP2 position settings
- Wipe start position setting

**Target patterns:**

WIPE1: 5

WIPE2: 4, 5, 6, 7

SQ1: 5

SQ2: 4, 5, 6, 7

Refer to “1-2. Wipe” (<Operations and Settings> Operating Instructions).

- Flying key position setting
- Chroma key marker position setting

### 35 Rotary encoder [Z]

This is used to set the PinP size, flying key size or to select the chroma key area.

In each case, the settings take effect only when the following menu items have been selected.

In each case, the settings take effect only when the following menu items have been selected.

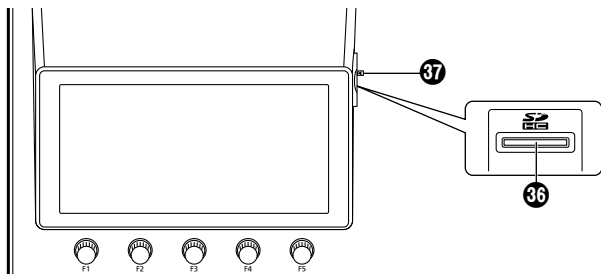
**Note**

During the time it takes for the unit to start up after its power is turned on, the unit detects the positions of the positioners and sets them to their center positions. Do not touch the positioners until the unit has started up.

	Positioner	Rotary encoder		Valid menu
	X/Y	Z	Switch	
PinP1, PinP2	Position adjustments	Size adjustments (size increased by rotating the encoder clockwise and reduced by rotating it counterclockwise)	Hold switch down to restore initial values (X/Y, Z).	All PinP1 and PinP2 menus
WIPE (BKGD)	Start position adjustments	—	Hold switch down to restore initial values (X/Y).	Background/WIPE Position Background/SQ Position
WIPE (KEY)	Start position adjustments	—	Hold switch down to restore initial values (X/Y).	Key/WIPE Position Key/SQ Position
Chroma key	Selection position adjustments	Selected area size adjustments (size increased by rotating the encoder clockwise and reduced by rotating it counterclockwise)	Execute sampling Hold switch down to restore size to initial values.	Chroma Key
Flying key	Position adjustments	Size adjustments (size increased by rotating the encoder clockwise and reduced by rotating it counterclockwise)	Hold switch down to restore initial values (X/Y, Z).	Key: Flying Key

# 1. Parts and their functions

## 1-1-7. Memory card area



### 36 Memory card slot

Insert an SD memory card (purchased separately) or an SDHC memory card (purchased separately) into this slot.

### 37 Memory card access LED

This LED lights while the data on the memory card is being accessed.

Do not turn off the unit's power or eject the memory card while the access LED is lit.

Doing so can damage the data on the memory card.

### ● Concerning memory cards

Memory cards used with the unit should conform to SD or SDHC standards.

Be sure to format cards using the unit.

Memory cards with the following capacity can be used for the unit.

SDXC memory cards are not available for this product.

**SD (from 8 MB to 2 GB)**

**SDHC (from 4 GB to 32 GB)**

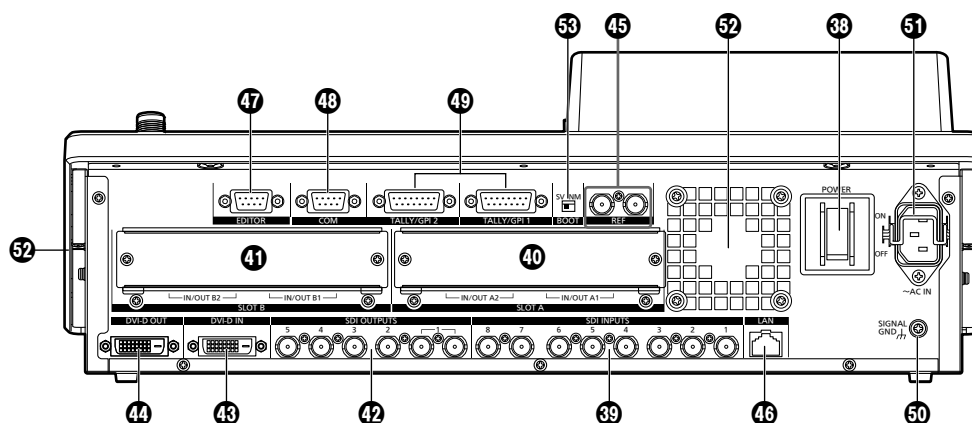
For the latest information not available in the Operating Instructions, visit the following Web sites.

<http://pro-av.panasonic.net/>

- Memory cards must not be used or stored in an environment where they may be
  - **Exposed to high temperatures/humidities;**
  - **Exposed to water droplets; or**
  - **Electrically charged.**

# 1. Parts and their functions

## 1-2. Rear panel area



### 38 Power switch [POWER]

When the power switch is turned on, the POWER indicator (1) lights up, and the unit can be operated.

### 39 SDI signal input connectors [SDI INPUTS 1 to 8]

The up-converter function can be used for the SDI INPUT 5 to SDI INPUT 8 connectors.

### 40 Option slot SLOTA [IN/OUT A1, IN/OUT A2]

### 41 Option slot SLOTB [IN/OUT B1, IN/OUT B2]

Each of these is an input/output option slot.

A DVI input board, analog output board or other option board can be installed in these slots.

For details, refer to "How to install the option boards" (on page 14) and the operating instructions of the board concerned.

### 42 SDI signal output connectors [SDI OUTPUTS 1 to 5]

These can be allocated by the menus.

- Two sets of the same output signals are distributed from the SDI OUTPUT 1 connector.

### 43 DVI-D input connector [DVI-D IN]

Connect to the computer with the DVI-D cable.

- The DVI-I connector cable cannot be used.

### 44 DVI-D output connector [DVI-D OUT]

Connect a monitor that supports DVI-D.

It can be allocated by the menus.

- The DVI-I connector cable cannot be used.

### 45 Reference input connector/BB output connector [REF]

Loop-through output in the external sync mode.

If the loop-through output is not going to be used, provide a 75-ohm termination.

BB signals output from both connectors in the internal sync mode.

### 46 LAN connector [LAN] (RJ-45) (10/100 Base-TX)

Refer to "4. External interfaces" (<Operations and Settings> Operating Instructions).

### 47 EDITOR connector [EDITOR]

(RS-422, D-sub 9-pin, female, inch screw)

### 48 COM connector [COM]

(RS-422, D-sub 9-pin, female, inch screw)

Refer to "4. External interfaces" (<Operations and Settings> Operating Instructions).

### 49 TALLY/GPI input/output connectors [TALLY/GPI 1, TALLY/GPI 2]

(D-sub 15-pin, female, inch screw)

Refer to "4. External interfaces" (<Operations and Settings> Operating Instructions).

### 50 Ground connector [SIGNAL GND]

Connect to the system's earth ground.

### 51 AC power input socket [~ AC IN] (AC 100 V to 240 V, 50/60 Hz)

Connect one end of the supplied power cable to this socket and the other end to the AC outlet.

The supplied power cable comes with a 3-pin power plug.

Be absolutely sure to plug it into a 3-point power outlet as the power source in order to earth the unit securely.

If a 3-point power outlet is not available for this connection, be absolutely sure to consult your dealer.

### 52 Cooling fan

### 53 BOOT switch [BOOT]

This switch is used for maintenance purposes.

For normal operations, select the "NM" (normal) position.



## 2. Preparations

---

### 2-1. Turning the unit's power on and off

#### ● Turning on the power

##### **1 Set the power switch to the ON position.**

When power is supplied to the unit, the POWER indicator lights.

- ① After several seconds, the crosspoint buttons light up.
- ② Several seconds after the crosspoint buttons have lit up, the opening screen appears on the built-in display. At this point, it becomes possible to select the crosspoints.



- ③ Menu operations can be performed when the opening screen is cleared.

#### ● Turning off the power

##### **1 Set the power switch to the OFF position.**

The unit's power is turned off, and the POWER indicator goes off.

## 2. Preparations

### 2-2. Basic menu operations

This section describes the basic operations of the menus which are displayed on the built-in display.

For more details, refer to <Operations and Settings>.

For the menu configuration, refer to “5. Setting menu table” in <Operations and Settings>.

#### 2-2-1. Menu configuration and operations

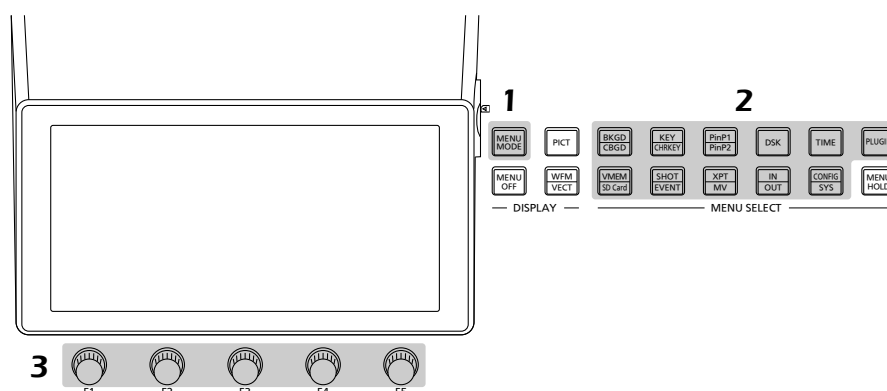
##### 1 Press the [MENU MODE] button to show the menu on the built-in display.

☞ Refer to “1-1-5. Display area”.

##### 2 Select the menu for each function using the menu selection buttons (MENU SELECT) that corresponds to the function concerned.

Each time the button is pressed, the menu of the function displayed at the top of the button and the menu of the function displayed at the bottom are switched.

The button of a selected menu lights up in amber.

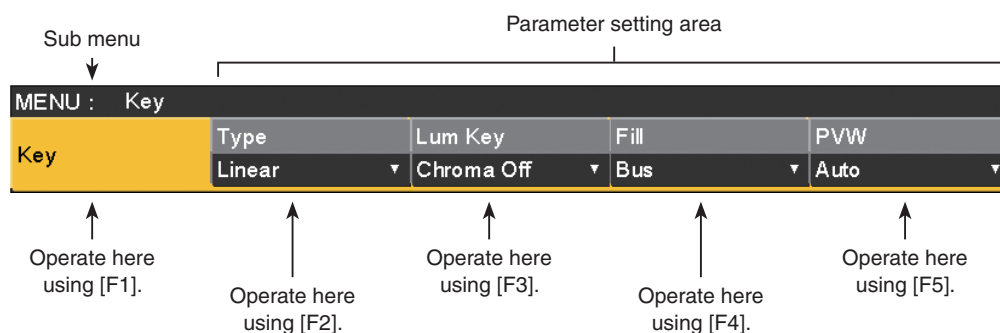


##### 3 Use the rotary encoders [F1] to [F5] to select more detailed settings.

[F1] : Turn this rotary encoder to select the sub menu.

[F2] to [F5] : Use (press or turn) these rotary encoders to set the parameters.

For further details, refer to the next page.



- The Input and Output menus will differ depending on whether an option board has been installed in the unit.

## 2. Preparations

### List box:



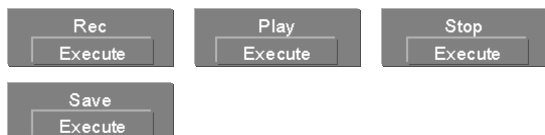
- ① Press [F2] to [F5] to display the list box.
- ② Turn [F2] to [F5] clockwise or counterclockwise to select the setting.
  - The setting of an item whose selected setting does not blink will be reflected in the unit as soon as it has been selected.
  - The setting of an item whose selected setting blinks is reflected in the unit by pressing [F2] to [F5].
- ③ Press [F2] to [F5] again to close the list box.

### Selector button:



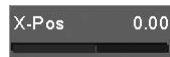
When a rotary encoder [F2] to [F5] is pressed, the setting is switched between “On” and “Off.”

### Execution buttons:



When a rotary encoder [F2] to [F5] is pressed, the corresponding function is executed.

### Numeric value input box:



Turn a rotary encoder [F2] to [F5] to change the numeric value.

When a rotary encoder [F2] to [F5] is held down, the numeric value is returned to its initial value.

A numeric value bar is displayed and its display is linked to the numeric value.

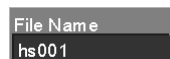
#### Inputting numeric values using the number keys

- ① Press [F2] to [F5] to establish the mode in which numeric values can be input using the number keys.
  - Use the button to input the decimal point. If a numeric value has a decimal point which is not input, it will be treated as an integer, and its decimal places will be set to zero (“0”).
  - Press the button to switch the numeric value between a positive and negative value. Each time this button is pressed, the numeric value is switched from positive to negative (or vice versa).
  - If the button is pressed when a numeric value has been input, the numeric value will be returned to the value prior to the change.
- ② Input the numeric values using the number keys, and press the [TAKE ENTER] button.

The values which have been input are entered and reflected in the unit.

  - When a numeric value is input using the number keys and a rotary encoder from [F1] to [F5] is operated, the input value is cleared, and the numeric value prior to input is restored.

### Character input box:



When a rotary encoder [F2] to [F5] is pressed, the keyboard screen is displayed.

Use rotary encoders [F1] to [F5] to input the characters.

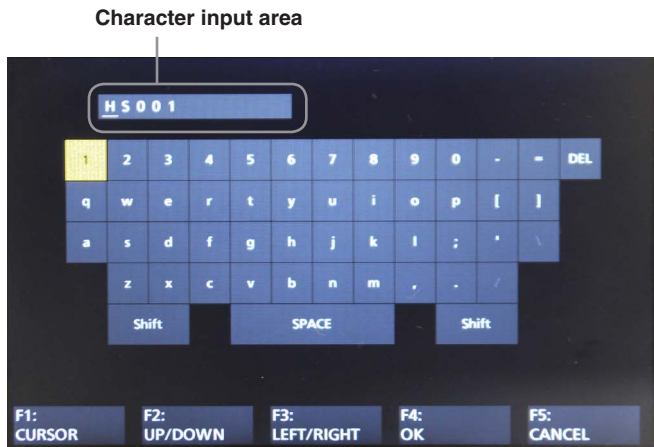
Refer to “2-2-2. Keyboard screen operations”.

# 2. Preparations

## 2-2-2. Keyboard screen operations

When a name such as the name of the input signal material, name of the memory or name of the data to be saved on an memory card is to be changed, display the keyboard screen, and input the characters.

When the rotary encoder [F2] to [F5] that corresponds to the item (character input box) whose name is to be changed is pressed, the keyboard screen appears on the built-in display.



When the keyboard screen is displayed, use rotary encoders [F1] to [F5] to input the characters (alphanumerics and symbols).

### [F1]: CURSOR

Turn [F1] to move the cursor inside the character input area.

### [F2]: UP/DOWN, [F3]: LEFT/RIGHT

When selecting characters on the keyboard, turn [F2] to move up or down, or turn [F3] to move to the left or right. When [F2] or [F3] is then pressed, the character selected is entered.

The character selected is reflected in the character input area.

- When **Shift** is selected and pressed, the keyboard display is switched (between upper-case letters, lower-case letters and symbols).

### [F4]: OK

When [F4] is pressed, the name which has been input is entered, and reflected in the unit.

At this point, the keyboard screen is cleared, and the original screen is restored.

### [F5]: CANCEL

When [F5] is pressed, the name which has been input is canceled.

At this point, the keyboard screen is cleared, and the original screen is restored.


## 2-2-3. Menu delegation function

When the buttons listed below are double-clicked, the specified menu is selected. (The menu delegation function)  
The operation corresponding to the button pressed is also executed.

Button	Menu selected
Crosspoint area (AUX bus selector buttons)	
KEY	Key menu/Adjust sub menu  When the chroma key is selected: Chroma Key menu/Adjust sub menu
PinP1	PinP1 menu/Position sub menu
PinP2	PinP2 menu/Position sub menu
DSK	DSK menu/Adjust sub menu
Transition area	
BKGD	Time menu/BKGD sub menu
KEY	Time menu/Key sub menu
WIPE	Background menu/Border sub menu

### <Menu delegation setting>

This setting is used to enable (turn on) or disable (turn off) the menu delegation function.

- Press the  button to light its indicator, and display the Config menu.
- Use [F1] to display the Operate sub menu.

MENU : Config				
Operate	Bus Mode PGM-A/PS-T-B	Key Link Off	Time Unit Sec	Delegation Off On


- Use [F5] to set enable or disable for the menu delegation function at the Delegation item.

On	Enable
Off	Disable

# 2. Preparations

## 2-2-4. Setting the system format

One system format (input/output signal) can be selected.

- ① Press the  button to light its indicator, and display the System menu.
- ② Use [F1] to display the Format sub menu.



- ③ Use [F2], select the format using the Format item, and press the [F2] to enter the selection.

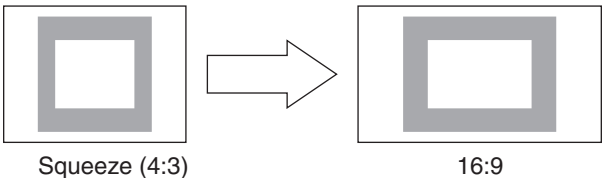
### Setting the 16:9 squeeze mode

When the 16:9 squeeze mode is selected, a border width (wipe or PinP) is established that considers cases where SD format images are to be converted into the 16:9 aspect ratio and used.  
This setting is possible when SD is selected as the system format setting.

On the Format sub menu, use [F4] to select whether to support the squeeze mode using the 16:9 Squeeze item.

On	The squeeze mode is supported.
Off	The squeeze mode is not supported.


Border width (graphical representation) when the squeeze mode is supported

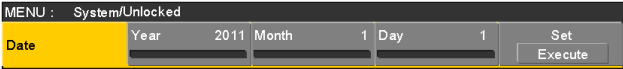


## 2-2-5. Setting the date and time

The user can set the date and time to be used as the memory card's time stamp.  
Be absolutely sure to set them when an memory card is to be used.

### Setting the date

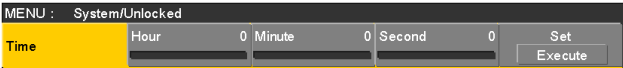
- ① Press the  button to light its indicator, and display the System menu.
- ② Use [F1] to display the Date sub menu.



- ③ Use [F2] to set the year using the Year item.
- ④ Use [F3] to set the month using the Month item.
- ⑤ Use [F4] to set the day using the Day item.
- ⑥ Press the [F5] to enter the year/month/day.

### Setting the time

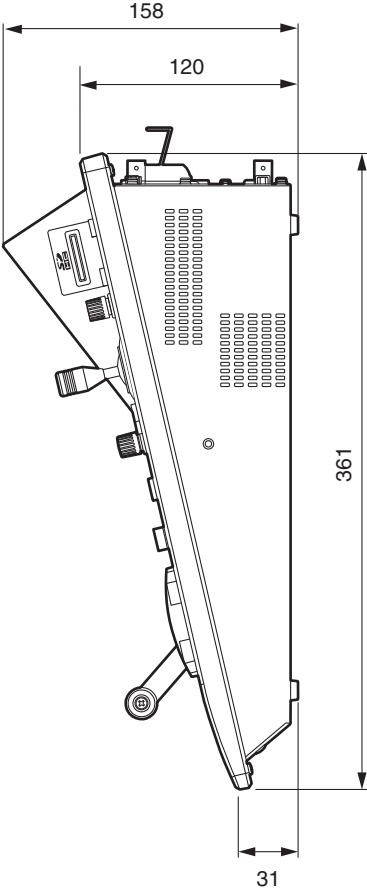
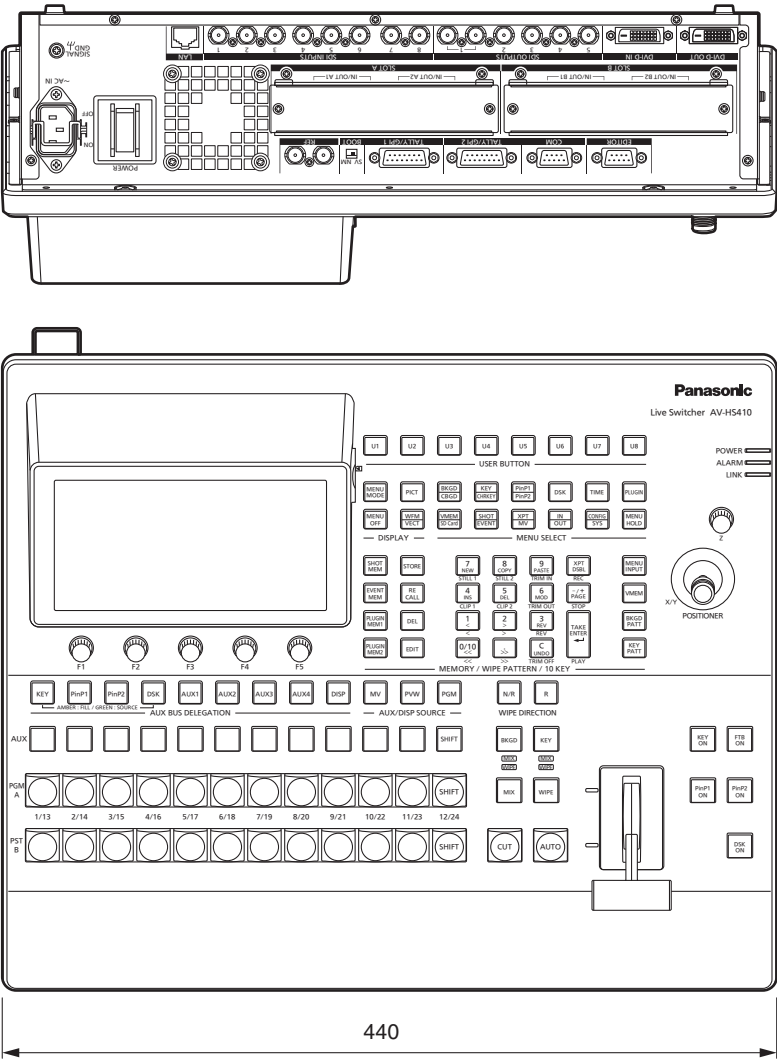
- ① On the System menu, use [F1] to display the Time sub menu.



- ② Use [F2] to set the hour using the Hour item.
- ③ Use [F3] to set the minutes using the Minute item.
- ④ Use [F4] to set the seconds using the Second item.
- ⑤ Press the [F5] to enter the hour/minutes/seconds.

# 3. Appearance

Unit: mm



## 4. Specifications

**Power supply:** AC 100 V to 240 V, 50/60 Hz

**Power consumption:** 88 W

 indicates safety information.

Video inputs (13 signal lines, maximum)	Standard SDI: 8 signal lines (SDI INPUT 1 to SDI INPUT 8) <ul style="list-style-type: none"><li>The up-converter function can be used for the SDI INPUT 5 to SDI INPUT 8 connectors.</li></ul>		BNC ×8
	Standard DVI-D: 1 signal line		DVI-D ×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 (SDI OUTPUT 1 to SDI OUTPUT 5 ×1 line each, 2 distributed outputs for SDI OUTPUT 1 only)		BNC ×6
	Standard DVI-D: 1 signal line		DVI-D ×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.)		
	<ul style="list-style-type: none"><li>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.</li><li>CLN can be pre-selected from KEY or DSK using a menu.</li></ul>		
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: <div>AV-HS04M1, AV-HS04M2, AV-HS04M3, AV-HS04M4, AV-HS04M5, AV-HS04M6, AV-HS04M7</div>	
Signal processing	Y:PB:PR 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 <ul style="list-style-type: none"><li>0.8 V [p-p] ±10 % (75 Ω)</li><li>Automatic equalizer More than 100 m (when 1.5 Gbps/5C-FB cable is used)</li></ul>		
	SD: SMPTE 259M standard complied with <ul style="list-style-type: none"><li>0.8 V [p-p] ±10 % (75 Ω)</li><li>Automatic equalizer 200 m (when 5C-2V cable is used)</li></ul>		



## 4. Specifications

<b>SDI outputs</b>	HD-SDI: HD Serial digital (SMPTE 292M) SD-SDI: SD Serial digital (SMPTE 259M)
	5 signal lines, standard: OUT1 ×2; OUT2 to OUT5 ×1 each 9 signal lines, maximum: OUT A1, OUT A2, OUT B1, OUT B2 (When two AV-HS04M7 boards are used)
	HD: SMPTE 292M (BTA S-004B) standard complied with <ul style="list-style-type: none"> <li>• Output level 0.8 V [p-p] ±10 %</li> <li>• Rise time HD: Less than 270 ps</li> <li>• Fall time HD: Less than 270 ps</li> <li>• Difference between rise time and fall time HD: Less than 100 ps</li> <li>• Alignment jitter HD: Less than 0.2 UI (130 ps)</li> <li>• Timing jitter HD: Less than 1.0 UI</li> <li>• Eye aperture ratio More than 90 %</li> <li>• DC offset 0 ±0.5 V</li> </ul>
	SD: SMPTE 259M standard complied with <ul style="list-style-type: none"> <li>• Output level 0.8 V [p-p] ±10 %</li> <li>• Rise time Less than 1.5 ns</li> <li>• Fall time Less than 1.5 ns</li> <li>• Difference between rise time and fall time Less than 0.5 ns</li> <li>• Jitter Less than 0.2 UI</li> </ul>
<b>Composite input (Option board)</b>	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)
<b>Analog input (Option board)</b>	SD/HD analog component Y/PB/PR (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)
<b>Analog output (Option board)</b>	SD/HD analog component Y/PB/PR (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.
<b>DVI-I input (Option board)</b>	Analog/digital RGB: XGA (1024×768), WXGA (1280×768), SXGA (1280×1024) 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)
<b>DVI-I output (Option board)</b>	Analog/digital RGB: XGA (1024×768), WXGA (1280×768), SXGA (1280×1024), WSXGA+* (1680×1050), UXGA* (1600×1200), WUXGA* (1920×1200) *: 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)
<b>DVI-D input (Option board)</b>	Digital RGB: XGA (1024×768), WXGA (1280×768), SXGA (1280×1024), WSXGA+ (1680×1050), UXGA (1600×1200), WUXGA (1920×1200) 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.

## 4. Specifications

<b>DVI-D input/output</b>	Digital RGB: XGA (1024×768), WXGA (1280×768), SXGA (1280×1024), WSXGA+ (1680×1050), UXGA (1600×1200), WUXGA (1920×1200) 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 <ul style="list-style-type: none"> <li>• The input and output of analog signals are not supported.</li> <li>• 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.)</li> <li>• This connector does not support the HDCP technologies.</li> </ul>		
	Standard input/output: 1 line each (DVI-D IN, DVI-D OUT) <ul style="list-style-type: none"> <li>• The DVI-I connector cable cannot be used.</li> <li>• For the DVI-D connector cable, use a cable with a length of up to 5 m.</li> </ul>		
<b>Reference input/output</b>	In gen-lock mode: Black burst or Tri-level Sync input signals (with loop-through) In internal sync mode: Black burst output signals ×2 <ul style="list-style-type: none"> <li>• Same field frequencies as those of the system formats supported.</li> <li>• With the 1080/24PsF format, only gen-lock mode supported.</li> <li>• With the 1080/23.98PsF format, black burst with 10F-ID (SMPTE318M standard met) or TRI signals supported.</li> </ul>		
<b>Video delay time</b>	When the frame synchronizer setting is "Off" and the up-converter setting is "Off".		1 line (H)
	When the frame synchronizer setting is "On" or the up-converter setting is "On".		1 frame (F)
	<ul style="list-style-type: none"> <li>• 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.</li> </ul>		
<b>Control I/O</b>	LAN	10BASE-T/100BASE-TX (For IP control) Connecting cable: LAN cable (category 5 or above), max. 100 m, STP (Shielded Twisted Pair) cable recommended <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul>	RJ-45
	EDITOR	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	D-sub, 9-pin, female

## 4. Specifications

<b>Control I/O</b>	COM	Used to control an external device RS-422 control connector Communication format (selected using a menu) <ul style="list-style-type: none"> <li>Mode: 1 (default setting) Baud rate : 9600 bps Character length: 8 bit Parity : None Stop bit : 1 bit Flow control : None</li> <li>Mode: 2 Baud rate : 38400 bps Character length: 8 bit Parity : Odd Stop bit : 1 bit Flow control : None</li> <li>Mode: 3 Baud rate : 38400 bps Character length: 8 bit Parity : None Stop bit : 1 bit Flow control : None</li> </ul>	D-sub, 9-pin, female
	TALLY/GPI 1 TALLY/GPI 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)	D-sub, 15-pin, female (×2)
<b>Other</b>	BOOT switch [SV/NM (service/normal)] (for maintenance purposes) Normally, this switch is used as the “NM” position.		
<b>Ambient operating temperature</b>	0 °C to 40 °C		
<b>Humidity</b>	10 % to 90 % (no condensation)		
<b>Dimensions (W × H × D)</b>	440 mm × 158 mm × 361 mm [excluding protrusions]		
<b>Mass</b>	Approx. 6.2 kg [excluding accessory parts when no options have been installed] Approx. 6.6 kg [excluding accessory parts when all the possible options have been installed]		

Inrush current, measured according to European standard EN55103-1,  
on initial switch-on: 3 A, after a supply interruption of 5 s: 7.5 A

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<b>U</b>	
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## Information for Users on Collection and Disposal of Old Equipment and used Batteries



These symbols on the products, packaging, and/or accompanying documents mean that used electrical and electronic products and batteries should not be mixed with general household waste.

For proper treatment, recovery and recycling of old products and used batteries, please take them to applicable collection points, in accordance with your national legislation and the Directives 2002/96/EC and 2006/66/EC. By disposing of these products and batteries correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling.

For more information about collection and recycling of old products and batteries, please contact your local municipality, your waste disposal service or the point of sale where you purchased the items.

Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.



### For business users in the European Union

If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.



### Information on Disposal in other Countries outside the European Union

These symbols are only valid in the European Union. If you wish to discard these items, please contact your local authorities or dealer and ask for the correct method of disposal.

### Note for the battery symbol (bottom two symbol examples):

This symbol might be used in combination with a chemical symbol. In this case it complies with the requirement set by the Directive for the chemical involved.