

**SONY**<sup>®</sup>

SWITCHER PROCESSOR PACK

**MVS8000SF-C**

MULTI FORMAT SWITCHER PROCESSOR

**MVS-8000SF**

MKS-8110HD MKS-8110SD MKS-8160HD MKS-8160SD  
MKS-8170HD MKS-8170SD MKS-8210HD MKS-8210SD  
MKS-8440HD MKS-8440SD HK-PSU04

OPERATION MANUAL English

1st Edition

## WARNING

**To prevent fire or shock hazard, do not expose the unit to rain or moisture.**

**To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.**

**THIS APPARATUS MUST BE EARTHED.**

### For the customers in the USA

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

### (MKS-8110HD/8110SD/8160HD/8160SD/8170HD/8170SD/8210HD/8210SD/8440HD/8440SD/HK-PSU04 only)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### For customers in Canada (MKS-8110HD/8110SD/8160HD/8160SD/8170HD/8170SD/8210HD/8210SD/8440HD/8440SD/HK-PSU04 only)

This Class A digital apparatus complies with Canadian ICES-003.

### Pour les utilisateurs au Canada (MKS-8110HD/8110SD/8160HD/8160SD/8170HD/8170SD/8210HD/8210SD/8440HD/8440SD/HK-PSU04 uniquement)

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

**WARNING: THIS WARNING IS APPLICABLE FOR USA ONLY.**

If used in USA, use the UL LISTED power cord specified below.  
DO NOT USE ANY OTHER POWER CORD.

Plug Cap	Parallel blade with ground pin (NEMA 5-15P Configuration)
Cord	Type SJT, three 16 or 18 AWG wires
Length	Less than 2.5 m (8 ft 3 in)
Rating	Minimum 10 A, 125 V

Using this unit at a voltage other than 120V may require the use of a different line cord or attachment plug, or both. To reduce the risk of fire or electric shock, refer servicing to qualified service personnel.

**WARNING: THIS WARNING IS APPLICABLE FOR OTHER COUNTRIES.**

- 1 Use the approved Power Cord (3-core mains lead)/Appliance Connector/Plug with earthing-contacts that conforms to the safety regulations of each country if applicable.
- 2 Use the Power Cord (3-core mains lead)/Appliance Connector/Plug conforming to the proper ratings (Voltage, Ampere).

If you have questions on the use of the above Power Cord/ Appliance Connector/Plug, please consult a qualified service personnel.

## VORSICHT

**Um Feuergefahr und die Gefahr eines elektrischen Schlages zu vermeiden, darf das Gerät weder Regen noch Feuchtigkeit ausgesetzt werden.**

**Um einen elektrischen Schlag zu vermeiden, darf das Gehäuse nicht geöffnet werden. Überlassen Sie Wartungsarbeiten stets nur qualifiziertem Fachpersonal.**

**DIESES GERÄT MUSS GEERDET WERDEN.**

## AVERTISSEMENT

**Afin d'éviter tout risque d'incendie ou d'électrocution, ne pas exposer cet appareil à la pluie ou à l'humidité.**

**Afin d'écarter tout risque d'électrocution, garder le coffret fermé. Ne confier**

## **l'entretien de l'appareil qu'à un personnel qualifié.**

## **CET APPAREIL DOIT ÊTRE RELIÉ À LA TERRE.**

### **For the customers in Europe (MVS-8000SF only)**

This product with the CE marking complies with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community. Compliance with these directives implies conformity to the following European standards:

- EN60950: Product Safety
- EN55103-1: Electromagnetic Interference (Emission)
- EN55103-2: Electromagnetic Susceptibility (Immunity)

This product is intended for use in the following Electromagnetic Environment: E4 (controlled EMC environment, ex. TV studio).

### **Für Kunden in Europa (nur MVS-8000SF)**

Dieses Produkt besitzt die CE-Kennzeichnung und erfüllt sowohl die EMV-Direktive (89/336/EEC) als auch die Direktive Niederspannung (73/23/EEC) der EG-Kommission. Die Erfüllung dieser Direktiven bedeutet Konformität für die folgenden Europäischen Normen:

- EN60950: Produktsicherheit
- EN55103-1: Elektromagnetische Interferenz (Emission)
- EN55103-2: Elektromagnetische Empfindlichkeit (Immunität)

Dieses Produkt ist für den Einsatz unter die folgende elektromagnetische Bedingung ausgelegt: E4 (kontrollierter EMV-Bereich, z.B. Fernsehstudio).

### **Pour les clients européens (MVS-8000SF uniquement)**

Ce produit portant la marque CE est conforme à la fois à la Directive sur la compatibilité électromagnétique (EMC) (89/336/CEE) et à la Directive sur les basses tensions (73/23/CEE) émises par la Commission de la Communauté européenne.

La conformité à ces directives implique la conformité aux normes européennes suivantes:

- EN60950: Sécurité des produits
- EN55103-1: Interférences électromagnétiques (émission)
- EN55103-2: Sensibilité électromagnétique (immunité)

Ce produit est prévu pour être utilisé dans l'environnement électromagnétique suivant: E4 (environnement EMC contrôlé ex. studio de télévision).

### **For the customers in Europe (MKS-8110HD/8110SD/8160HD/8160SD/8170HD/8170SD/8210HD/8210SD/8440HD/8440SD/HK-PSU04 only)**

This product with the CE marking complies with the EMC Directive (89/336/EEC) issued by the Commission of the European Community.

Compliance with this directive implies conformity to the following European standards:

- EN55103-1: Electromagnetic Interference (Emission)

- EN55103-2: Electromagnetic Susceptibility (Immunity)

This product is intended for use in the following Electromagnetic Environment: E4 (controlled EMC environment, ex. TV studio).

### **Für Kunden in Europa (nur MKS-8110HD/8110SD/8160HD/8160SD/8170HD/8170SD/8210HD/8210SD/8440HD/8440SD/HK-PSU04)**

Dieses Produkt besitzt die CE-Kennzeichnung und erfüllt die EMV-Direktive (89/336/EEC) der EG-Kommission.

Die Erfüllung dieser Direktive bedeutet Konformität für die folgenden Europäischen Normen:

- EN55103-1: Elektromagnetische Interferenz (Emission)
- EN55103-2: Elektromagnetische Empfindlichkeit (Immunität)

Dieses Produkt ist für den Einsatz unter die folgende elektromagnetische Bedingung ausgelegt: E4 (kontrollierter EMV-Bereich, z.B. Fernsehstudio).

### **Pour les clients européens (MKS-8110HD/8110SD/8160HD/8160SD/8170HD/8170SD/8210HD/8210SD/8440HD/8440SD/HK-PSU04 uniquement)**

Ce produit portant la marque CE est conforme à la Directive sur la compatibilité électromagnétique (EMC) (89/336/CEE) émise par la Commission de la Communauté européenne. La conformité à cette directive implique la conformité aux normes européennes suivantes:

- EN55103-1: Interférences électromagnétiques (émission)
- EN55103-2: Sensibilité électromagnétique (immunité)

Ce produit est prévu pour être utilisé dans l'environnement électromagnétique suivant: E4 (environnement EMC contrôlé ex. studio de télévision).

### **Periodic inspections**

To guarantee safe long-term operation, periodic inspections are recommended. Please contact your Sony representative for detailed information about the content and cost of periodic inspections.

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# Overview

The MVS8000SF-C Switcher Processor Pack is a high-performance, multi-function processor for use in a MVS-8000 Multi Format Switcher system. It has a wide range of application, being usable in live production systems in studios and ENG/OB vans as well as in postproduction editing systems.

The MVS8000SF-C is a generic name of the switcher processor unit having two or one M/E (mix/effects) option item installed in it.

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## Features

### Multi format support

By exchange of system boards, this unit supports both HDTV and SDTV signal formats.

Between HDTV signal formats or between SDTV signal formats, switching can be made easily from the center control panel of the MVS-8000 system without exchanging system boards. The wide range of supported signal formats allows the unit to be used in many different video production environments. The following signal formats are supported.

- SDTV formats: 480i/59.94, 576i/50
- HDTV formats: 1080i/50, 1080i/59.94, 1080i/60, 1080p/23.976, 1080p/24, 1080p/25, 1080p/29.97, 1080p/30

### Highly expandable system configuration

By combining option boards, you can configure the optimum system for your requirements, selecting HDTV or SDTV, the number of inputs and outputs, and the number of M/E banks. The system's flexibility guarantees its ability to meet future expansion requirements.

### High-performance keyers

Each M/E bank is equipped with four high-performance keyers that provide the following standard functions.

- Ability to apply transitions to keyers independently of the background
- Chroma key and color vector keys in each keyer
- FineKey™, and key borders up to 8H
- Color mixable matte generator available for both key fill and key borders

### Simultaneous output of four programs

Each M/E bank is able to handle four simultaneous program outputs, with the ability to apply any of the four keys to program output. This gives the system the ability to handle a wide range of operating situations, for example simultaneous transmission of four programs.

### Powerful preview functions

The system supports simultaneous output of look-ahead previews (next preview) and key previews, and also transition previews.

### Powerful frame memory functions

Up to 58 HDTV still frames and 222 SDTV still frames can be stored in frame memory, and up to eight frames can be called up for use simultaneously. Frames are called up instantly, making it possible to achieve animation effects. Image movement and paint functions are also possible. Still pictures from frame memory can be stored on the internal hard disk drive of the center control panel, and still pictures can be imported from and exported to PCs and other external devices.

### Links to DME functions

By connecting the unit to an MVE-8000 DME processor Pack with a special cable, you can apply DME wipes and processed keys and a wide variety of other DME functions as if they were native switcher functions. All DME functions can be controlled from the center control panel of the MVS-8000 system.

### Optional backup power supply

By installing two optional HK-PSU04 Power Supply Units, in addition to the two power supplies fitted as standard, this provides a 2:2 fully redundant power supply. Installing a single HK-PSU04 option provides a 2:1 backup system. The system can operate from any two of the three power supplies, reducing the risk of power failure, and increasing the reliability of live broadcasts.

## Overview of the MVS-8000 Series Components

### MVS-8000SF Multi Format Switcher Processor

This is a cabinet (size: EIA 8 RU) in which to install option items to provide multi-format switcher processing capabilities. The following option boards and option power supply unit can be installed for HDTV or SDTV systems.

#### HDTV system:

Board Name	Maximum installable number of boards
MKS-8110HD	2
MKS-8160HD	2
MKS-8170HD	1
MKS-8210HD	2
MKS-8440HD	1
HK-PSU04	2

#### SDTV system:

Board Name	Maximum installable number of boards
MKS-8110SD	2
MKS-8160SD	2
MKS-8170SD	1
MKS-8210SD	2
MKS-8440SD	1
HK-PSU04	2

### MKS-8110HD 17 Input Board

A 17-input board for HDTV. Up to two boards can be installed in the system.

### MKS-8110SD 17 Input Board

A 17-input board for SDTV. Up to two boards can be installed in the system.

### MKS-8160HD 8 Output Board

An 8-output board for HDTV. Up to two boards can be installed in the system.

### MKS-8160SD 8 Output Board

An 8-output board for SDTV. Up to two boards can be installed in the system.

### MKS-8170HD DME Interface Board

An interface board for input and output of HDTV signals with the MKS-8800 Multi Format DME Processor. Installation of this board allows up to two MKS-8800 units to be connected to the MVS-8000SF.

### MKS-8170SD DME Interface Board

An interface board for input and output of SDTV signals with the MKS-8800 Multi Format DME Processor. Installation of this board allows up to two MKS-8800 units to be connected to the MVS-8000SF.

### MKS-8210HD Mix/Effect Board Set

An M/E (mix/effects) board set for HDTV. Systems can be configured with one or two M/E board sets.

### MKS-8210SD Mix/Effect Board Set

An M/E (mix/effects) board set for SDTV. Systems can be configured with one or two M/E board sets.

### MKS-8440HD Frame Memory Board Set

A frame memory board set for HDTV. Up to 58 HDTV pictures can be stored and recalled in real time.

### MKS-8440SD Frame Memory Board Set

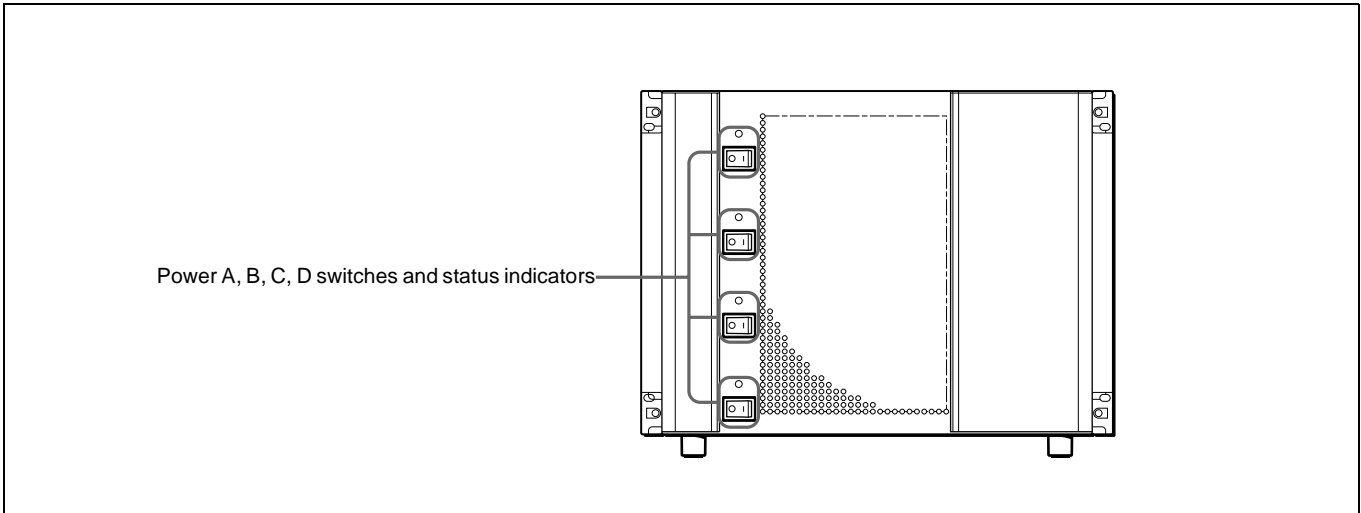
A frame memory board set for SDTV. Up to 222 SDTV pictures can be stored and recalled in real time.

### HK-PSU04 Power Supply Unit

This is a backup power supply unit. The MVS-8000SF is equipped with two power supplies as standard, but installing two HK-PSU04 units provides a fully redundant power supply. Installing a single HK-PSU04 unit provides a total of three power supplies, and allows the system to operate even if one of the power supplies fails.

# Location and Function of Parts

## Front Panel



### Power A, B, C, D switches and status indicators

The POWER switches turn the unit on and off. The unit is powered on when the POWER switches are on the “I” side, and powered off when the POWER switches are on the “O” side. The status indicators light in green when the unit is powered on.

Depending on the configuration of your unit, the HK-PSU04 Power Supply Unit may not be installed. In this case, only the POWER A and POWER B switches are available. There is no POWER C or POWER D switch. The unit does not operate until two of the four (A, B, C and D) power switches are on.

When using the unit provided with a 2:2 fully redundant power supply, turn all the four power switches on.

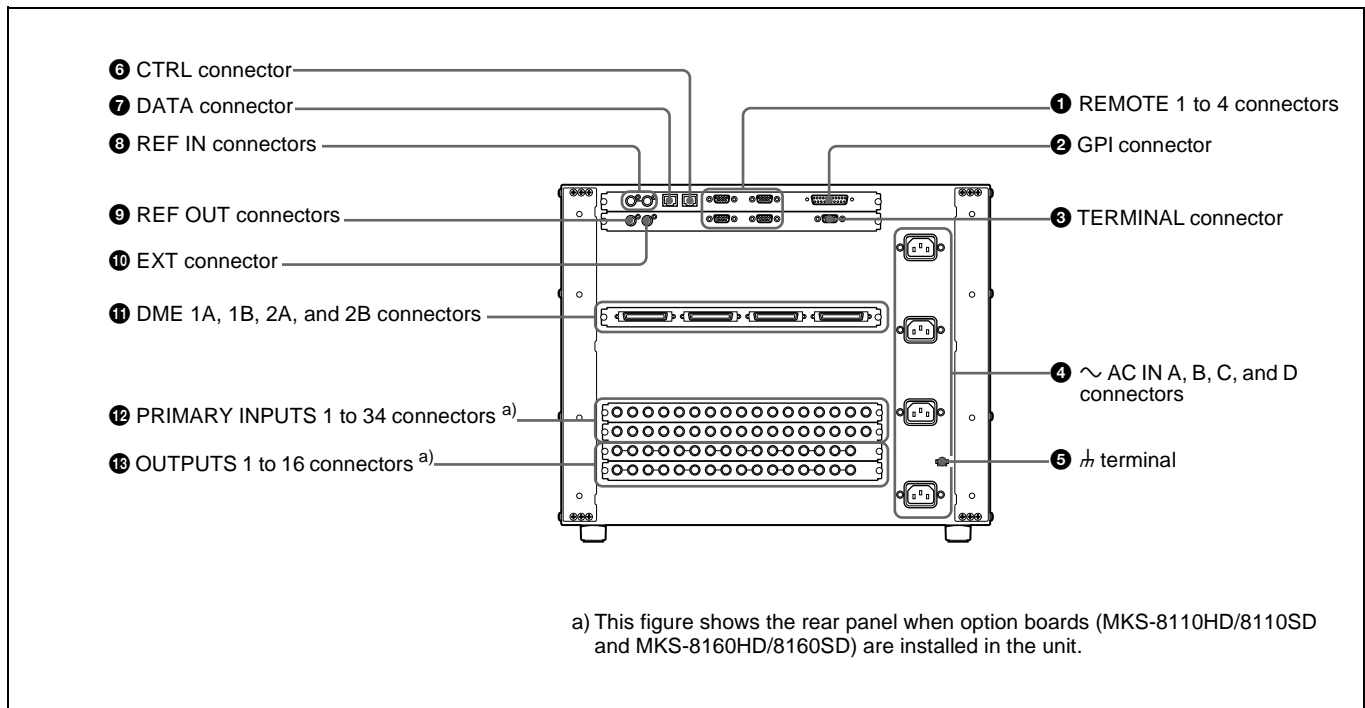
### Caution

When installing the HK-PSU04 in your unit, be sure to contact your Sony service representative.

### Note

If a status indicator does not light when you turn a POWER switch on, there may be a fault in the power circuits. Turn the POWER switch off and contact your Sony service representative.

## Rear Panel



### 1 REMOTE 1 to 4 connectors (D-sub 9-pin, RJ-45)

These connectors are used to control the auxiliary bus of the MVS-8000 series from external devices, or to operate the MVS-8000SF from editing control systems such as the BVE-9100.

Define the types of the connected devices on the center control panel.

### 2 GPI (General Purpose Interface) connector (D-sub 25-pin)

Connect to external devices for input and output of trigger signals. Up to eight inputs and eight outputs are possible, with input and output conditions set on the center control panel.

### 3 TERMINAL connector (D-sub 9-pin, RS-232C)

This connector is used for factory adjustments.

### 4 ~ AC IN (AC power input) A, B, C, and D connectors (3-pin)

Connect to 100 to 240 V AC power supply with the optional AC power cords.

Depending on the configuration of your unit, the HK-PSU04 Power Supply Unit may not be installed. In that case, the AC IN C and AC IN D connectors are not used. When using the unit provided with a 2:2 fully redundant power supply, connect all the four connectors (A, B, C and D) to the 100 to 240 V AC power supply.

### Caution

For information about installing an HK-PSU04 Power Supply Unit, contact your Sony service representative.

### 5 h (signal ground) terminal

Connect to the system ground.

### 6 CTRL (control) connector (RJ-45)

Connect to an Ethernet switch\*.

The MKS-8800 Multi Format DME processor and the MVS-8000 system's center control panel are connected in the same way to the Ethernet switch to form a network for exchange of signals between the devices.

This network is used primarily to control the various devices from the center control panel.

\* For information about Ethernet switches that can be used in an MVS system, contact your Sony service representative.

\* Ethernet is a trademark of Xerox Corporation.

*For more information about Ethernet switch connectors, see "MVS-8000 System Configuration" (page 10).*

*For detailed information about setting up the Ethernet switch, refer to the documentation supplied with the switch.*

### Caution

When using a LAN cable: For safety, do not connect to a connector for peripheral device wiring that might have excessive voltage.

### 7 DATA connector (RJ-45)

Connect to an Ethernet switch.

The MKS-8800 Multi Format DME processor and the MVS-8000 system's center control panel are connected in the same way to the Ethernet switch to form a network for exchange of signals between the devices.

This network is used primarily for exchange of various types of data (key frame effects, snapshots, etc.) and still pictures of frame memory.

#### Caution

When using a LAN cable: For safety, do not connect to a connector for peripheral device wiring that might have excessive voltage.

### 8 REF IN (reference video input) connectors (BNC type)

If you wish to synchronize this unit to an external reference signal, input the reference signal. For an HDTV system, input an HD tri-level sync signal, black burst signal, or analog sync signal. For an SDTV system, input a black burst signal or analog sync signal.

The two connectors have a loop-through configuration. Signal input to one connector can be output from the other connector. If you will not be using the loop-through output, be sure to terminate the unused connector with the supplied 75Ω terminator.

### 9 REF OUT (reference video output) connectors (BNC type)

These connector output reference video signals. In an HDTV system, they output HD tri-level sync signal or analog sync signal. In an SDTV system, they output analog sync signal.

### 10 EXT (extension) connector (BNC type)

Connect to a device such as an HDS-X3000 series routing switcher to increase the number of inputs.

### 11 DME (Digital Multi Effects input and output) 1A, 1B, 2A, and 2B connectors (MDR 68-pin)

Connect to the MVE-8000 with the special cable supplied with the MKS-8800.

You can connect up to two MVE-8000 units. Connect the first unit to the DME 1A/1B connectors and the second unit to the DME 2A/2B connectors.

### 12 PRIMARY INPUTS 1 to 34 connectors (BNC type) (MKS-8110HD/8110SD)

These connectors allow you to input up to 34 serial digital video signals.

The number of these connectors depends on the number of MKS-8110HD/8110SD boards that are installed in the unit.

### 13 OUTPUTS 1 to 16 connectors (BNC type) (MKS-8160HD/8160SD)

These connectors output serial digital signals. You can assign them freely as program output, preview output, AUX output, and so on.

Each output has two connectors.

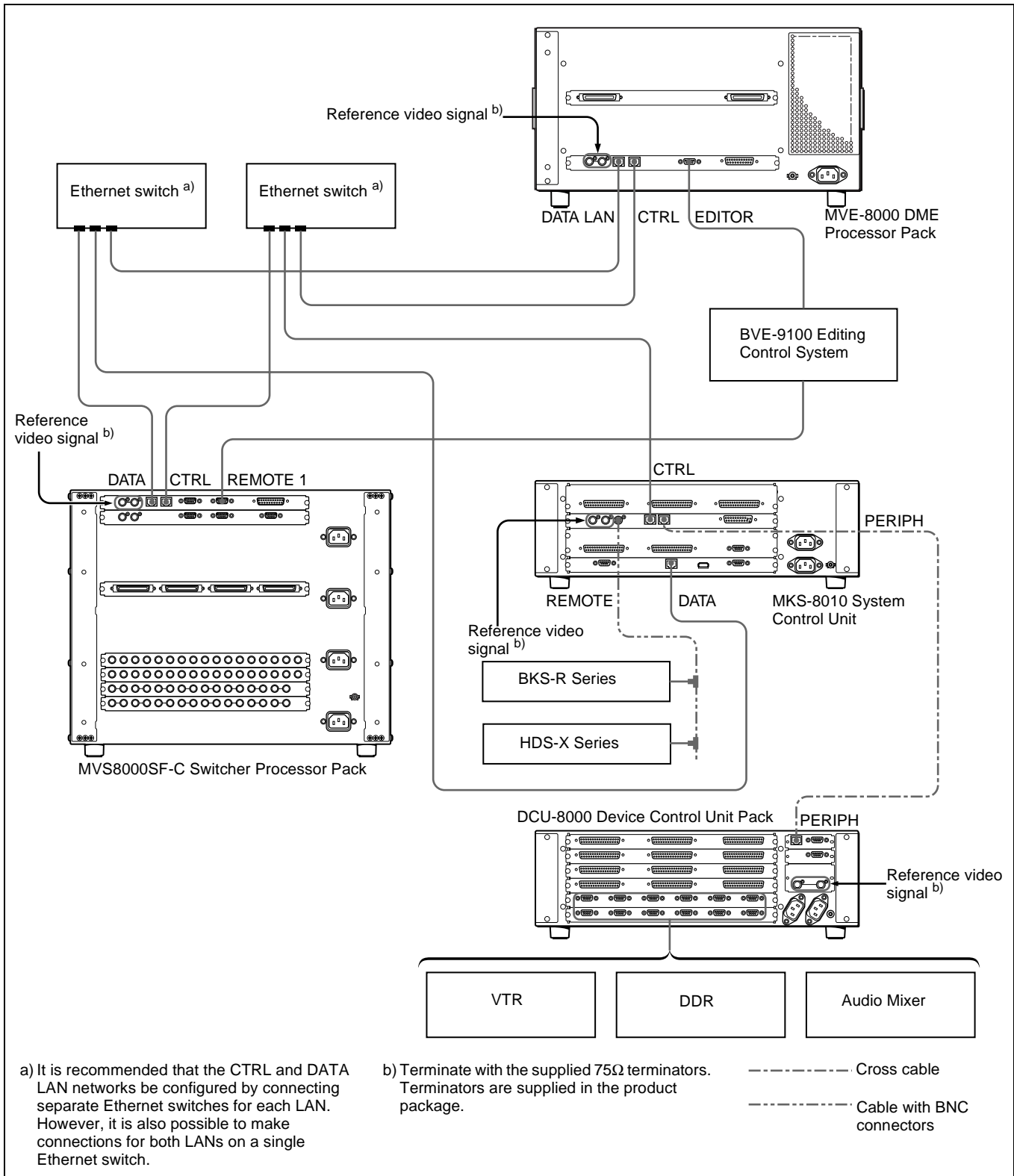
Make output assignments on the MVS-8000 system center control panel.

The number of these connectors depends on the number of MKS-8160HD/8160SD boards that are installed in the unit.

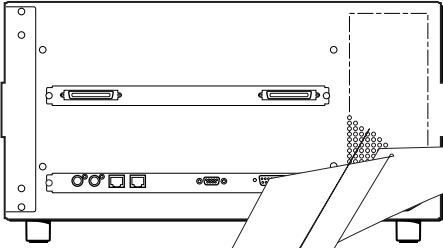
*Refer to the Operation Guide for information about signals that may be assigned.*

# Example System Configuration

## MVS-8000 System Configuration



# Flow of Video Signals



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# Power Supply Unit Status Indicators

The power supply unit status indicators show the status of the power supply unit during operation and when the unit is powered on. Whenever a power error is detected, it is reflected immediately by the indicator.

Meaning of status indicator displays

Indicator color	Status	Description	Steps to take
Green	Lit	Operating normally	–
Red	Lit	Power supply unit fan fault	Exchange the fan unit
–	Not lit	Power supply unit fault	Exchange the power unit

## Notes

- When the unit is powered on, the status indicators may light momentarily in red and a whining sound may be heard. This is not a malfunction.
- Power all of the installed power supply units on. When some of the power supply units are off and some are on, the status indicators of the units which are off may light in red. This is not a malfunction.

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# Specifications

The following specifications show the reference performance for this unit and individual option boards/units.

Design and specifications are subject to change without notice.

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## MVS-8000SF Multi Format Switcher Processor

### General

#### Power requirements

100 to 240 V AC, 50/60 Hz

#### Power consumption

100 V: 10 A, 240 V: 4.2 A

#### Operating temperature

5°C to 40°C (41°F to 104°F)

#### Peak inrush current

- (1) Power ON, current probe method:  
60 A (100 V), 110 A (230 V)
- (2) Hot switching inrush current, measured in accordance with European standard EN55103-1: 40 A (230 V)

#### Performance guaranteed temperature

10°C to 35°C (50°F to 95°F)

#### Storage temperature

-20°C to +60°C (-4°F to +140°F)

#### Operating humidity

10% to 90%

#### Dimensions (w/h/d, excluding projections)

482×354×520 mm  
(19×14×20<sup>1</sup>/<sub>2</sub> inches)

#### Mass

Approx. 45 kg (99 lb 3 oz)  
(when equipped with all installable option boards and option power supply unit)

### Remote Control connectors

CTRL	RJ-45 Complies with 100Base-TX standard
DATA	RJ-45 Complies with 100Base-TX standard
REMOTE 1, 2, 3, 4	D-sub 9-pin, female Comply with RS-422A standard Data transfer rate: 38.4 Kbps
GPI	D-sub 25-pin, female TTL inputs: 8

TERMINAL	Relay contact outputs: 4 (30 V AC/DC, 0.1 A) Open collector outputs: 4 D-sub 9-pin, female Complies with RS-232C standard
EXT	Data transfer rate: 9600 bps BNC type, 75Ω S-BUS data transfer rate: 312/1250 Kbps

### Reference input and output

REF IN	BNC type, 75Ω with loop-through output HDTV systems: HD tri-level sync/SDTV analog black burst/SDTV analog sync SDTV systems: Analog black burst/analog sync
REF OUT	BNC type, 75Ω HD tri-level sync (HDTV systems only) Signal level 300 mV ±10% Analog sync Signal level 300 mV ±10% Phase variation range -90H to +90H

### AC input

AC IN A, B, C, D	3-pin AC connector
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### Accessories supplied

75Ω terminator (1)  
Operation Manual (1)  
Installation Manual (1)

### Accessories not supplied

AC power cord (for USA and Canada only) (125 V 10 A 2.4 m (8 ft)) (Part No.: 1-557-377-11)  
AC power cord (for Europe only) (250 V 10 A 2.4 m (8 ft)) (Part No.: 1-782-929-21)

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## MKS-8110HD 17 Input Board

### General

Power requirements	12 V DC
Power consumption	Max. 10 W
Dimensions (w/d)	274×94 mm (10 <sup>7</sup> / <sub>8</sub> ×3 <sup>3</sup> / <sub>4</sub> inches)
Mass	Approx. 1 kg (2 lb 3 oz)

### Input

Inputs	17 (BNC type)
Signal format	SMPTE292M
Signal level	0.8 V p-p ±10%
Signal transfer rate	1.5 Gbps
Return loss	15 dB
Cable length	100 m (5C-FB cable, BELDEN1694 or equivalent)

### Accessories supplied

Operation and Installation Guide (1)  
(supplied only when product is purchased separately)

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## MKS-8110SD 17 Input Board

### General

Power requirements	12 V DC
Power consumption	Max. 10 W
Dimensions (w/d)	274×94 mm (10 <sup>7</sup> / <sub>8</sub> ×3 <sup>3</sup> / <sub>4</sub> inches)
Mass	Approx. 1 kg (2 lb 3 oz)

### Input

Inputs	17 (BNC type)
Signal format	SMPTE259M-C
Signal level	0.8 V p-p ±10%
Signal transfer rate	270 Mbps
Return loss	15 dB
Cable length	200 m (5C-FB cable, BELDEN8281 or equivalent)

### Accessories supplied

Operation and Installation Guide (1)  
(supplied only when product is purchased separately)

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## MKS-8160HD 8 Output Board

### General

Power requirements	12 V DC
Power consumption	Max. 110 W
Dimensions (w/d)	OUT board: 317×380 mm (12 <sup>1</sup> / <sub>2</sub> ×15 inches) CN board: 274×94 mm (10 <sup>7</sup> / <sub>8</sub> ×3 <sup>3</sup> / <sub>4</sub> inches)
Mass	Approx. 3 kg (6 lb 9 oz)

### Output

Outputs	8 (BNC type), each with 2 outputs
Signal format	SMPTE292M
Signal level	0.8 V p-p ±10%
Signal transfer rate	1.5 Gbps

### Accessories supplied

Operation and Installation Guide (1)  
(supplied only when product is purchased separately)

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## MKS-8160SD 8 Output Board

### General

Power requirements	12 V DC
Power consumption	Max. 80 W
Dimensions (w/d)	OUT board: 317×380 mm (12 <sup>1</sup> / <sub>2</sub> ×15 inches) CN board: 274×94 mm (10 <sup>7</sup> / <sub>8</sub> ×3 <sup>3</sup> / <sub>4</sub> inches)
Mass	Approx. 3 kg (6 lb 9 oz)

### Output

Outputs	8 (BNC type), each with 2 outputs
Signal format	SMPTE259M-C
Signal level	0.8 V p-p ±10%
Signal transfer rate	270 Mbps

### Accessories supplied

Operation and Installation Guide (1)  
(supplied only when product is purchased separately)

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## MKS-8170HD DME Interface Board

### General

Power requirements	12 V DC
Power consumption	Max. 50 W
Dimensions (w/d)	DIF board: 317×380 mm (12 <sup>1</sup> / <sub>2</sub> ×15 inches) CN board: 274×94 mm (10 <sup>7</sup> / <sub>8</sub> ×3 <sup>3</sup> / <sub>4</sub> inches)
Mass	Approx. 1 kg (2 lb 3 oz)

### Input and output (DME 1A, DME 1B, DME 2A, DME 2B)

Connector	MDR 68-pin
Signal format	LVDS

### Accessories supplied

Operation and Installation Guide (1)  
(supplied only when product is purchased separately)

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## MKS-8170SD DME Interface Board

### General

Power requirements	12 V DC
Power consumption	Max. 50 W
Dimensions (w/d)	DIF board: 317×380 mm (12 <sup>1</sup> / <sub>2</sub> ×15 inches) CN board: 274×94 mm (10 <sup>7</sup> / <sub>8</sub> ×3 <sup>3</sup> / <sub>4</sub> inches)
Mass	Approx. 1 kg (2 lb 3 oz)

### Input and output (DME 1A, DME 1B, DME 2A, DME 2B)

Connector	MDR 68-pin
Signal format	LVDS

### Accessories supplied

Operation and Installation Guide (1)  
(supplied only when product is purchased separately)

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## MKS-8210HD Mix/Effect Board Set

Power requirements	12 V DC
Power consumption	Max. 250 W
Dimensions (w/d)	MIX board: 317×380 mm (12 <sup>1</sup> / <sub>2</sub> ×15 inches) KPC board: 317×380 mm (12 <sup>1</sup> / <sub>2</sub> ×15 inches) DI board: 317×380 mm (12 <sup>1</sup> / <sub>2</sub> ×15 inches) DO board: 317×380 mm (12 <sup>1</sup> / <sub>2</sub> ×15 inches)
Mass	Approx. 5 kg (11 lb)
Accessories supplied	Operation and Installation Guide (1) (supplied only when product is purchased separately)

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## MKS-8210SD Mix/Effect Board Set

Power requirements	12 V DC
Power consumption	150 W
Dimensions (w/d)	MIX board: 317×380 mm (12 <sup>1</sup> / <sub>2</sub> ×15 inches) KPC board: 317×380 mm (12 <sup>1</sup> / <sub>2</sub> ×15 inches) DI board: 317×380 mm (12 <sup>1</sup> / <sub>2</sub> ×15 inches) DO board: 317×v380 mm (12 <sup>1</sup> / <sub>2</sub> ×15 inches)
Mass	Approx. 5 kg (11 lb)
Accessories supplied	Operation and Installation Guide (1) (supplied only when product is purchased separately)

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## MKS-8440HD Frame Memory Board Set

### Power requirements

12 V DC

### Power consumption

Max. 70 W

### Dimensions (w/d)

MY board: 317×380 mm  
(12<sup>1</sup>/<sub>2</sub>×15 inches)

DIO board: 317×380 mm  
(12<sup>1</sup>/<sub>2</sub>×15 inches)

Mass Approx. 2 kg (4 lb 6 oz)

### Accessories supplied

Operation and Installation Guide (1)  
(supplied only when product is  
purchased separately)

Accessories supplied

Installation Guide (1) (supplied only  
when product is purchased separately)

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## MKS-8440SD Frame Memory Board Set

### Power requirements

12 V DC

### Power consumption

Max. 50 W

### Dimensions (w/d)

MY board: 317×380 mm  
(12<sup>1</sup>/<sub>2</sub>×15 inches)

DIO board: 317×380 mm  
(12<sup>1</sup>/<sub>2</sub>×15 inches)

Mass Approx. 2 kg (4 lb 6 oz)

### Accessories supplied

Operation and Installation Guide (1)  
(supplied only when product is  
purchased separately)

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## HK-PSU04 Power Supply Unit

### Power requirements

100 to 240 V AC, 50/60 Hz

Output power 12 V DC ±0.5 V

### Power consumption

100 V: 10 A, 240 V: 5 A

### Secondary power supply

Max. 60 A

### Peak inrush current

- (1) Power ON, current probe method:  
60 A (100 V), 110 A (230 V)
- (2) Hot switching inrush current,  
measured in accordance with  
European standard EN55103-1: 40 A  
(230 V)

### Dimensions (w/h/d)

94×83×396 mm (3<sup>3</sup>/<sub>4</sub>×3<sup>3</sup>/<sub>8</sub>×15<sup>5</sup>/<sub>8</sub> inches)

Mass Approx. 3 kg (6 lb 9 oz)

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