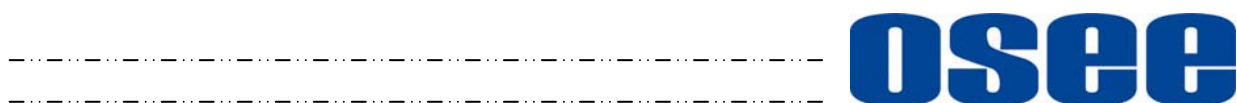


HMV160 High-definition Multi-viewer Display Processor

USER MANUAL



Product Information

Model: HMV160 High-definition Multi-viewer Display Processor
Version: V010001
Release Date: January 1st, 2011

Company

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HMV160 High-definition Multi-viewer Display Processor

Chapter 1 HMV160 Main Unit

1.1 Introduction

HMV160 High-definition Multi-viewer Display Processor is the specialized high-end image processing equipment, which can simultaneously display multiple dynamic images on one single high resolution output display.

It is designed for the occasions that need the high-quality and multiple video screen display.

HMV160 provides the ideal and practical solution for the occasions of command centre, video conference, multimedia and multi-function hall.

HMV160 is based on module structure, and can be flexibly configured. One frame can be equipped with many groups of multi-image system. It supports up to 64 pieces of images display.

1RU Frame: For the maximum, it supports 16 channel inputs and 4 channel outputs.

3RU Frame: For the maximum, it supports 64 channel inputs and 32 channel outputs.

HMV160 supports multiple input/output formats. For video input signal, it supports analog composite, SD-SDI and HD- SDI video signal. For video output signal, It supports VGA, DVI, HDMI video signal. For audio signal, it supports embedded audio and analog audio monitoring, and can display multiple audio display windows. Moreover, it supports LTC input, and equips with GPIO port, which can be flexibly configured.

HMV160 supports circle clock, digital time and digital date. It also supports timer up and timer down. Furthermore, it can display image files.

Compared to the traditional upper computer control system, the HMV160 control system provides users with more flexible and practical settings. Application of the embedded system, it realizes more user-friendly interface. The user can set the board parameters via the mouse and keyboard.

The unit supports user-definable function of hardware and software. Support Ethernet control. Support flexible setups of alarm, time code, GPIO and so on.

According to the needs of user, HMV160 can group different scales of display system to meet the occasions of different monitoring scale and different applications. The multiple-in-one mode makes the user to monitor multiple signals on one output display in real time. The user can send any signal to any display, in any position and scale, without the restriction of the signal source grouping.

1.2 Features

- Any combination of auto sense HD-SDI/ SD-SDI /Composite.
- Signal path based on operation system for 24/7 mission critical application.
- The user can send any signal to any display, in any position and scale, without the restriction of the signal source grouping.
- The maximum resolution of output display is wuxga: 1920*1200.
- Support 1080P50 output format for 50Hz input signal application.

- Strong signal monitoring function. Support multiple outputs in single frame; Support up to 64 pieces of images display. Simple windows setup and control via mouse.
- Supporting analog audio input. Supporting the stereo audio monitoring of embedded audio and external audio.
- Up to 8 audio meter display per window.
- Supporting multiple audio display windows for audio monitoring only.
- 16:9/4:3 aspect, various marker supported.
- Supporting the Ethernet control.
- Image files display supported.
- Embedded TC code display supported.
- Multiple analog clock and/or digital clock.
- Supporting timer up and timer down.
- Supporting user-definable function of hardware and software.
- Supporting flexible time code setup. Supporting GPIO port with flexible configuration.
- Supporting video and audio alarming. Supporting flexible alarm setup.
- The board modules are hot-swappable.
- Dual power supply for 1RU and 3RU frame.
- The excellent cooling system effectively reduces the temperature of the frame.

FCC Caution:

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

1.3 Function Block Diagram

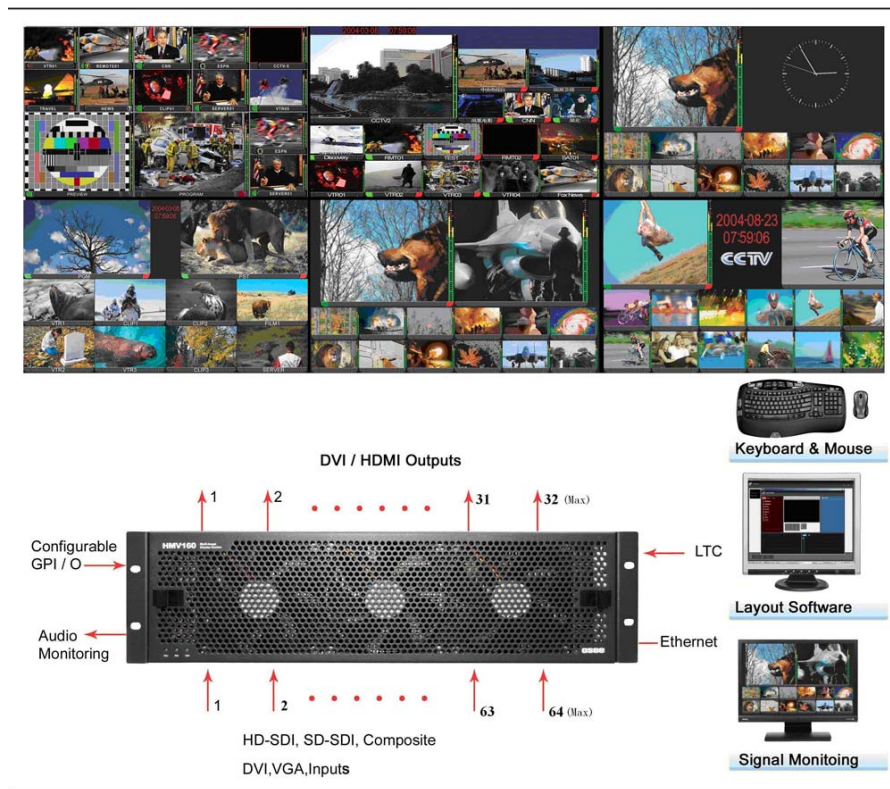


Figure 1-1 HMV160 System Diagram

1.4 Frame Introduction



Model	Appearance	Description
HMV160-FR1	1RU Frame	The 1RU main processor of HMV160 can house up to 4 modules, dual power supply and air cooling system.
HMV160-FR3	3RU Frame	The 3RU main processor of HMV160 can house up to 16 modules, dual power supply and air cooling system.

Front panel

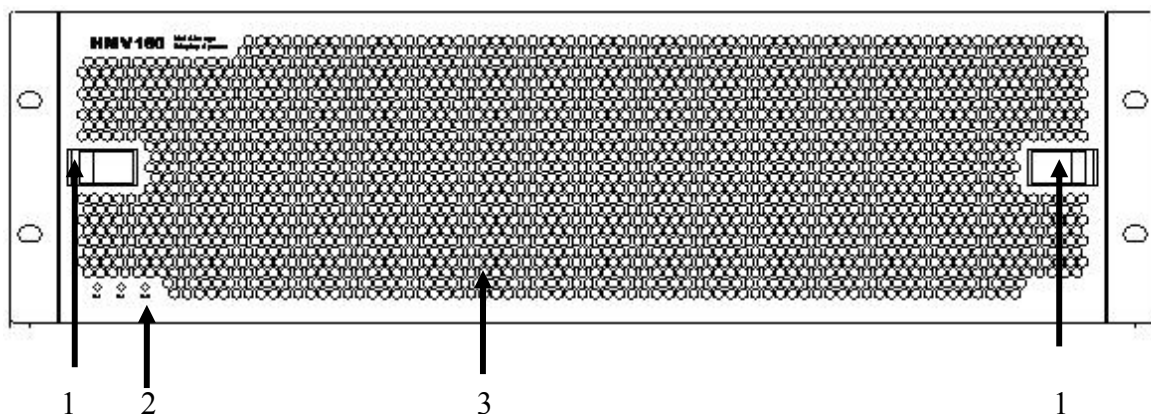


Fig.1-2 the front panel of HMV160

The description of front panel is as follows:

- 1: Dual orientation locks.
- 2: They are the indicators lamps of power supply and fan.
PS1、PS2: the indicators lamps of dual power supply;
FAN: the indicator lamp of fan.
- 3: The fan and air vents

Rear panel

For the HMV160-FR3 frame, it includes two power connectors and can house up to 16 modules. For the connecting descriptions, please refer to the following sections.

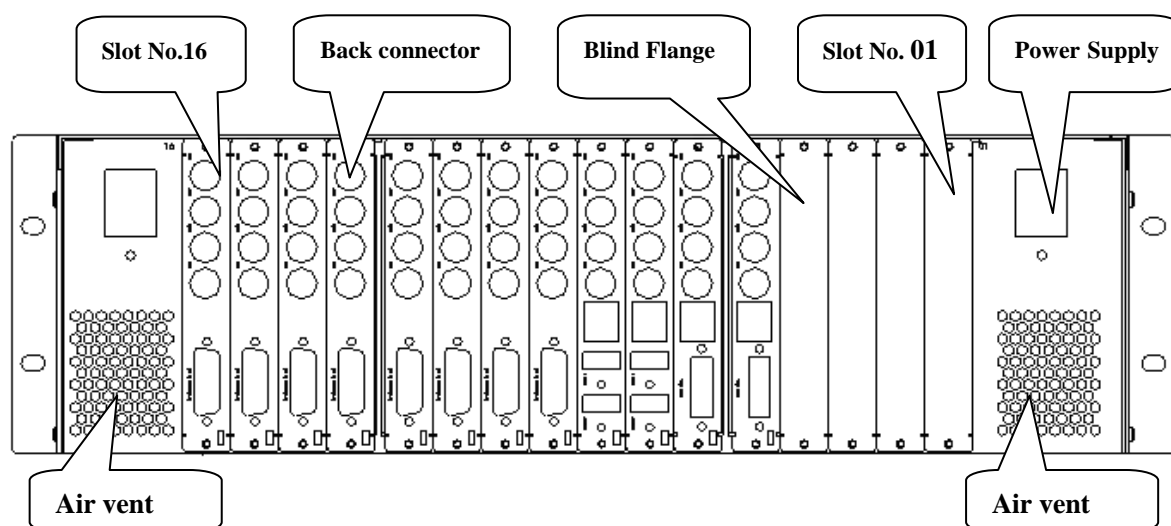


Fig.1-3 the rear panel of HMV160

Chapter 2 Installation

2.1 Maximum Power Ratings for Frame

Tab. 2-1 Maximum Power Consumption

Frame	Maximum Voltage	Redundant Power Supplies	Numbers of Slots
HMV160-FR3	480W	Yes	16

2.2 Unpacking the Module

2.2.1 Check the Packing List

The packing list includes one or more models of HMV160 unit, user manual, warranty card and the other accessories.

2.2.2 Preparing the Product for Installation

Check the packing list. Contact your dealer right now if any items are missing.

Follow the procedures below before installing the module:

- Check the equipment for any damage that may have occurred during transit.
- Confirm all the items listed on the packing list have been received.
- Remove all the packing material including electrostatic-resistant packing.
- Retain these packing for future use.

2.3 Installing the Power Supply Module

The HMV160 equips with two power supply modules.

Follow the procedures below before installing the power supply module:

1. Make sure the frame stands firmly, and then unpack the fan section of the front panel.(For the operation, please refer to the description of section 2.5 Step 1)
2. As shown below, on both sides of the front panel, make sure the power connector is installed toward inside with the swivel handle of the fan side downward. And then push gently the power supply module into the frame along the slot out of frame.



3. Make sure the power supply module has been pushed inside completely, and the power connector rightly corresponds to the power hole of the frame. Fasten the screws under the power connector to fix the module.



2.4 Rack Installation

Install the frame to the rack.

Via the ear holder on both sides of the frame, install the HMV160 frame into a standard 19" rack, using the proper screws and washers, which are not included in the packing list.

For proper ventilation, make sure the air vents of the side panel and top panel are not blocked.

2.5 Installing the Board Module

Caution: Static electricity may cause sensitive semiconductor out of order. Avoid installing or removing the module in the electrostatic-induced environment.

Follow the next steps to install the module:

Step 1: Open the front panel of the frame, as shown below:

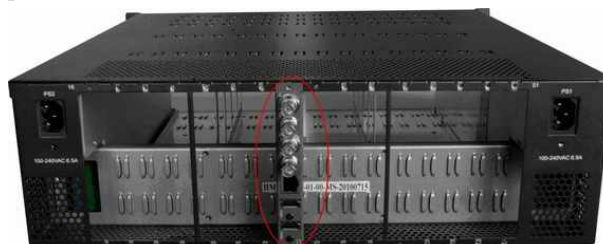
In order to open the front panel, firstly push the two orientation locks inward, as shown below.



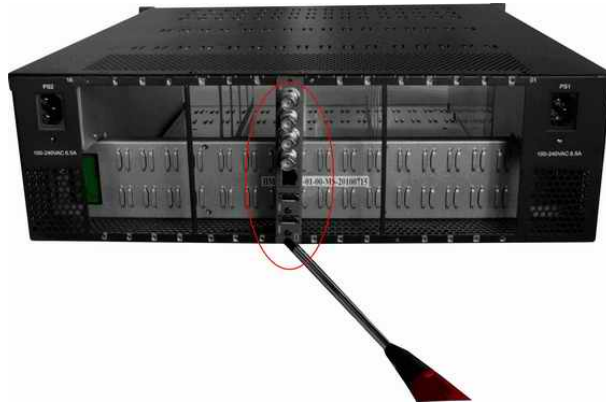
Secondly pull it out to remove the fan section, as shown below.



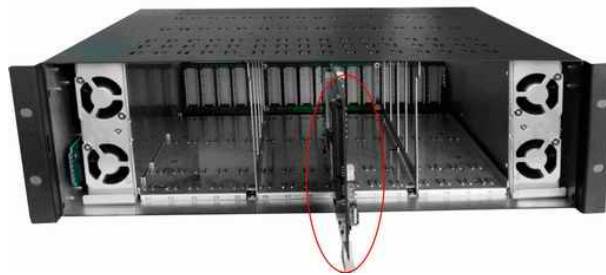
Step 2: Locate the position for back connector and insert the back connector.



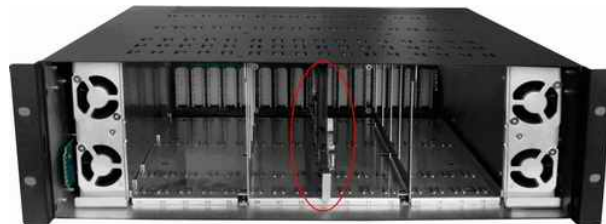
Step3: Fasten the screws to fix the back connector.



Step4: Locate the slot for module.



Step 5: Get the module installed in the slot, push the module slightly along the slot, press module again to confirm that the module is installed firmly and then close swivel handle.



Step6: Install the front panel.



Fig. 2-1 Installation of 3RU Frame of HMV160 Series

2.6 Making the Connections

Please connect signals based on chapter 3.

Notes: while connecting the cables, please pay attention to the cable weighs so as to avoid the damage to the back connector.

2.7 Removing the Board Module

Follow the following steps to remove board module:

1. Open the front panel.
2. Press the swivel handle of the main board.



3. First make sure that the frame stands firmly, and then gently pull the module along the slot out of frame.
4. Install the front panel.
5. Loosen the screws of back connector, and remove the back connector.
6. Install the Blind Flange.

Notes:

1. When the power is turned on, do not remove the front panel too long. If the user must remove the front panel for a long time, please make disconnect the power supply.
2. Do not block any ventilation openings.
3. If the user needs to remove the back connector, please install the Blind Flange.
If there is no Blind Flange, please do not remove back connector.
4. Please do not remove the back connector when the power is turned on.

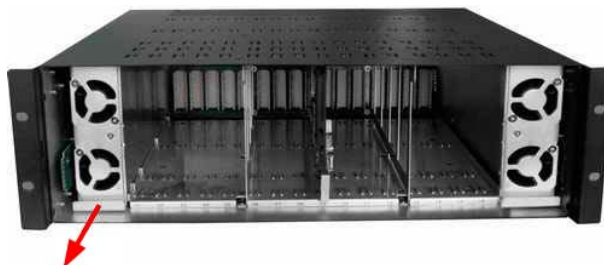
2.8 Remove the Power Supply Module

There are two power supply modules in the HMV160. Please refer to the following methods to remove the power supply module.

- a) Cut off the power supply.
- b) Disconnect the power cord, and remove the screw under the power connector.



- c) Make sure that the frame stands firmly, and then gently pull the power supply module along the slot out of frame.



Chapter 3 Signal and Control Connections

HMV160 Processor: The 3RU main processor of HMV160 equips with dual power supply, multiple input boards, output boards, and so on.

The internal bus is used to connect the processing module and the power supply. All modules are fixed in the 3RU frame. Every processing module works with the corresponding back connector.

3.1 Rear panel of HMV160

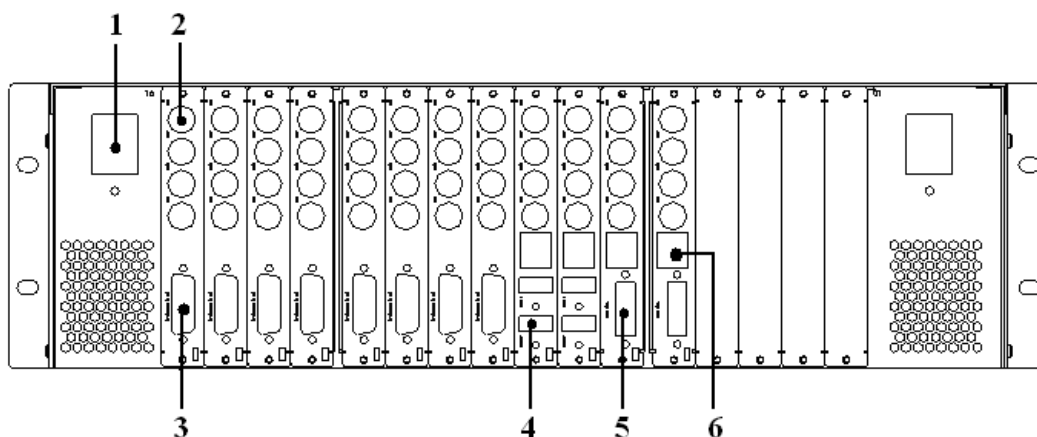


Fig.3-1 the rear panel of HMV160

1. Power input connector
2. Video input connector (BNC)
3. GPIO connector (DB26)
 - Stereo input /output connector (DB26)
 - LTC input connector (DB26)
4. HDMI output connector
5. DVI/VGA output connector (DVI-I)
6. Ethernet port (RJ45): 10M/100M autosensing.

3.2 Introduction of HMV160 Board Series

Board model	Appearance	Description
HMV160-I4A8G8	Board	<ul style="list-style-type: none"> 4-Ch autosensing inputs on HD/SD/Composite (BNC); 1DB26 connector, which includes 8 Stereo audio inputs and 8 GPI/O.
HMV160-I4AOG16T	Board	<ul style="list-style-type: none"> 4-Ch autosensing inputs on HD/SD/Composite (BNC); 1DB26 connector, which includes 1 Stereo audio output, 16 GPI/O and 1 LTC input.

Board model	Appearance	Description
HMV160-I4O1E	Board	<ul style="list-style-type: none"> • 4-Ch autosensing inputs on HD/SD/Composite (BNC); • 1-Ch DVI +1 Ch VGA output (DVI-I); dual discrete video outputs; • 1-Ch 10M/100M autosensing Ethernet port.
HMV160-I4O2E	Board	<ul style="list-style-type: none"> • 4-Ch autosensing inputs on HD/SD/Composite (BNC); • 2-Ch HDMI outputs (HDMI); dual discrete video outputs; • 1-Ch 10M/100M autosensing Ethernet port.

3.3 Signal Connection Instruction of HMV160 Board Series

3.3.1 Main board

Fig.3-2 Input main board

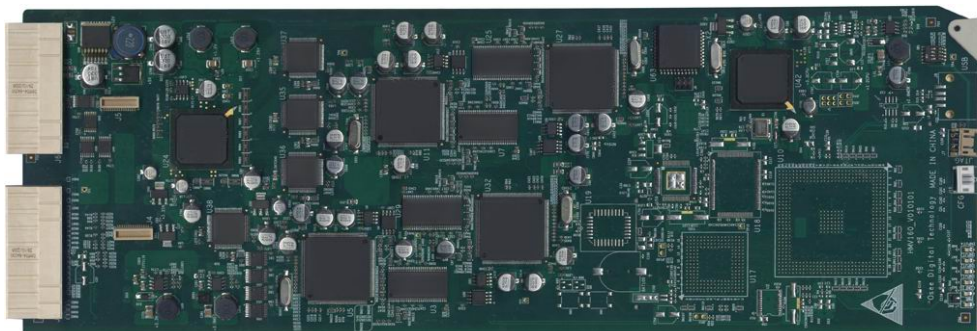
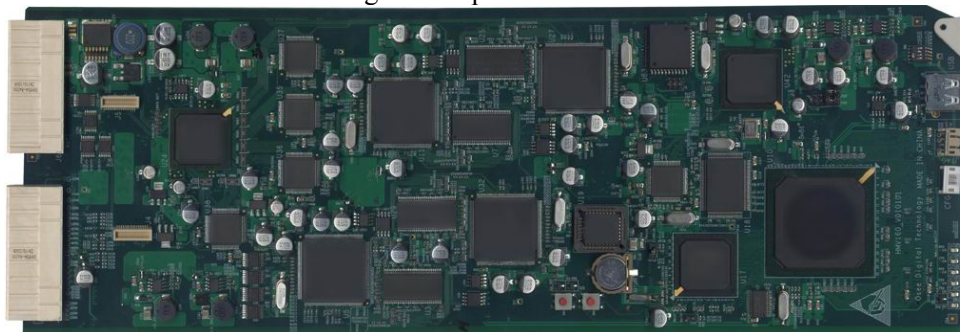


Fig.3-3 Output main board



3.3.2 Model of Back Connector: HMV160-I4A8G8 and HMV160-I4AOG16T

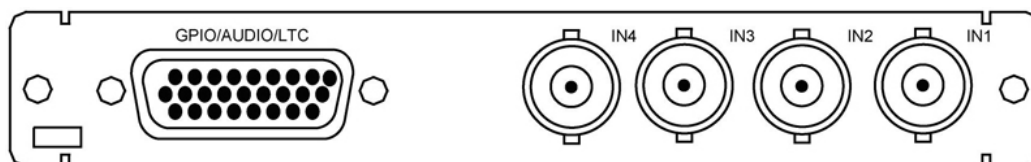


Fig.3-4 Back connector 1

1. IN1~IN4 Connectors

Used for HD-SDI/ SD-SDI /Composite video and embedded audio input.

2. GPIO/AUDIO/LTC Connector

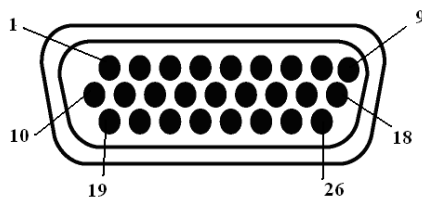


Fig.3-5 DB26 connector (mail)

✓ **For board model: HMV160-I4A8G8**

- AIN01~AIN16: Analog audio input connector from No.1 to No.16.
- GPIO17~GPIO24: GPIO connector from No.1 to No.8.

Used as GPI or GPO, it can be flexibly configured.

Table Description of DB26 PIN (For board model: HMV160-I4A8G8)

PIN	Signal Name	Description	PIN	Signal Name	Description
1	AIN01	Analog audio Input 1	14	AIN14	Analog audioInput14
10	AIN02	Analog audio Input 2	23	AIN15	Analog audio Input15
19	AIN03	Analog audio Input 3	6	AIN16	Analog audio Input16
2	AIN04	Analog audio Input4	7	GPIO17	GPI or GPO
11	AIN05	Analog audio Input5	16	GPIO18	GPI or GPO
20	AIN06	Analog audio Input6	25	GPIO19	GPI or GPO
3	AIN07	Analog audio Input7	8	GPIO20	GPI or GPO
12	AIN08	Analog audio Input8	17	GPIO21	GPI or GPO
21	AIN09	Analog audio Input9	26	GPIO22	GPI or GPO
4	AIN10	Analog audio Input10	9	GPIO23	GPI or GPO
13	AIN11	Analog audio Input11	18	GPIO24	GPI or GPO
22	AIN12	Analog audio Input12	15	GROUND	
5	AIN13	Analog audio Input13	24	GROUND	

✓ **For board model: HMV160-I4AOG16T**

- GPIO01~GPIO16: GPIO ports, which can be flexibly configured
- GPIO18: Left audio channel output of the monitored audio.

- GPIO22: Right audio channel output of the monitored audio.
- GPIO17: LTC input. For the LTC input connector, it is the Time Code input, which makes the internal time be synchronized with the system time. The LTC must comply with the standard of SMPTE12M (EBU-3259-E).
- GPIO19: Serial interface TXD+
- GPIO23: Serial interface TXD-
- GPIO20: Serial interface RXD+
- GPIO24: Serial interface RXD-

Table Description of DB26 PIN (For board model: HMV160-I4AOG16T)

PIN	Signal Name	Description	PIN	Signal Name	Description
1	GPIO01	GPI or GPO	14	GPIO14	GPI or GPO
10	GPIO02	GPI or GPO	23	GPIO15	GPI or GPO
19	GPIO03	GPI or GPO	6	GPIO16	GPI or GPO
2	GPIO04	GPI or GPO	7	GPIO17	LTC input
11	GPIO05	GPI or GPO	16	GPIO18	Left audio channel output of the monitored audio
20	GPIO06	GPI or GPO	26	GPIO22	Right audio channel output of the monitored audio
3	GPIO07	GPI or GPO	25	GPIO19	Serial interface TXD+
12	GPIO08	GPI or GPO	9	GPIO23	Serial interface TXD-
21	GPIO09	GPI or GPO	8	GPIO20	Serial interface RXD+
4	GPIO10	GPI or GPO	18	GPIO24	Serial interface RXD-
13	GPIO11	GPI or GPO	17	GPIO21	
22	GPIO12	GPI or GPO	15	GROUND	
5	GPIO13	GPI or GPO	24	GROUND	

3.3.3 Model of Back Connector: HMV160-I4O1E

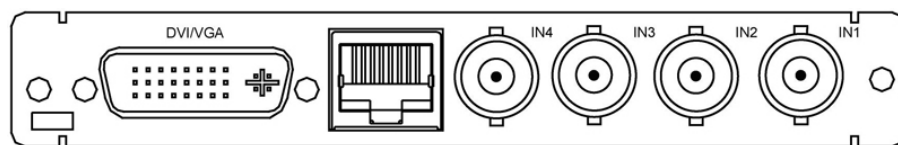


Fig.3-6 Back connector 2

➤ IN1~IN4 Connectors

Used for HD-SDI/ SD-SDI /Composite video and embedded audio input.

➤ Ethernet port (RJ45)

The Ethernet port is 10M/100M autosensing, and used with the control software.

Please refer to the user manual of control software for the details.

➤ DVI/VGA Connector

1 channel DVI +1 channel VGA output (DVI-I); dual discrete video outputs.

3.3.4 Model of Back Connector: HMV160-I4O2E

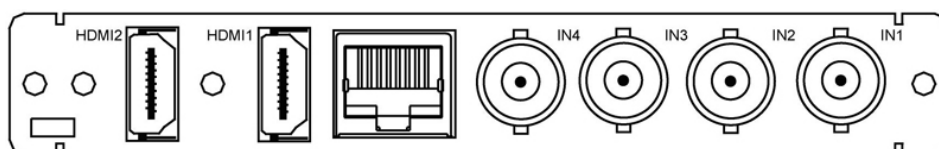


Fig.3-7 Back connector 3

➤ **IN1~IN4 Connectors**

Used for HD-SDI/ SD-SDI /Composite video and embedded audio input.

➤ **Ethernet port (RJ45)**

The Ethernet port is 10M/100M autosensing, and used with the control software.
Please refer to the user manual of control software for the details.

➤ **HDMI1、HDMI2 Connector**

1 channel DVI +1 channel VGA output (DVI-I); dual discrete video outputs.
2 channels HDMI outputs (HDMI); dual discrete video outputs;

Chapter 4 Operation Instruction

The HMV160 is used with the control software.

The whole process is finished under the control of system control software. HMV160 control software is divided into two parts.

- One part is installed in the embedded processor. It is used to control HMV160 main processor to process and integrate with information of various signal source.
- The other is installed in the remote computer. It is used to control HMV160 main processor to change the display mode in real time.

HMV160 combines information of multiple sources together, and make them become one signal string which can display on a screen.

The HMV160 also provides the editing software. For HMV160 main processor, it can set the parameters of display window quantity, window size, window location, program name, audio source selection, audio source display mode, clock, and so on. The editing software can download the set parameters to the main processor for preservation or real-time use.

For the detailed operation instruction of remote control software and editing software, please refer to the HMV160 Control Software User Manual.

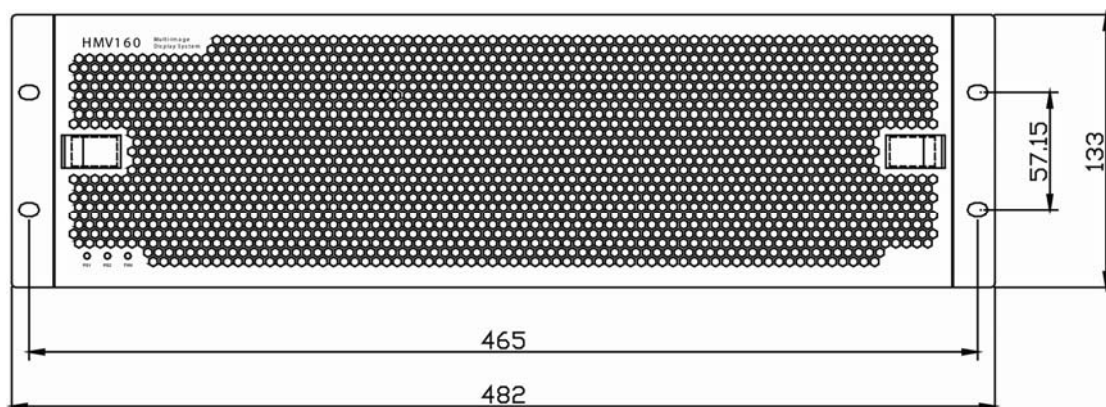
Chapter 5 LED Indicators

There are three LED indicators on the front of the panel.

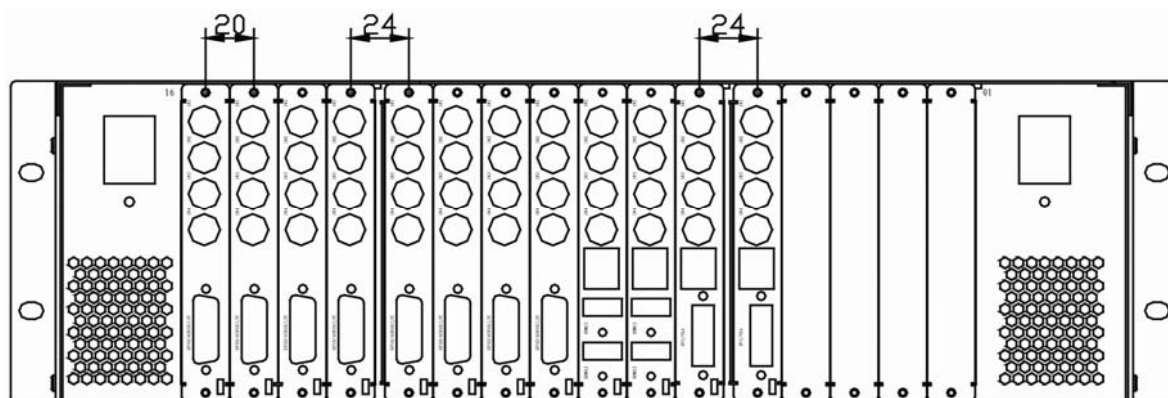
Indicators	Description
PS1、PS2	The indicators lamps of dual power supply. <ul style="list-style-type: none"> • Green: the power supply works normally; • Red: the power supply errors.
FAN	The indicator lamp of fan. <ul style="list-style-type: none"> • Green: the fan works normally; • Red: the fan errors.

Chapter 6 Dimensions

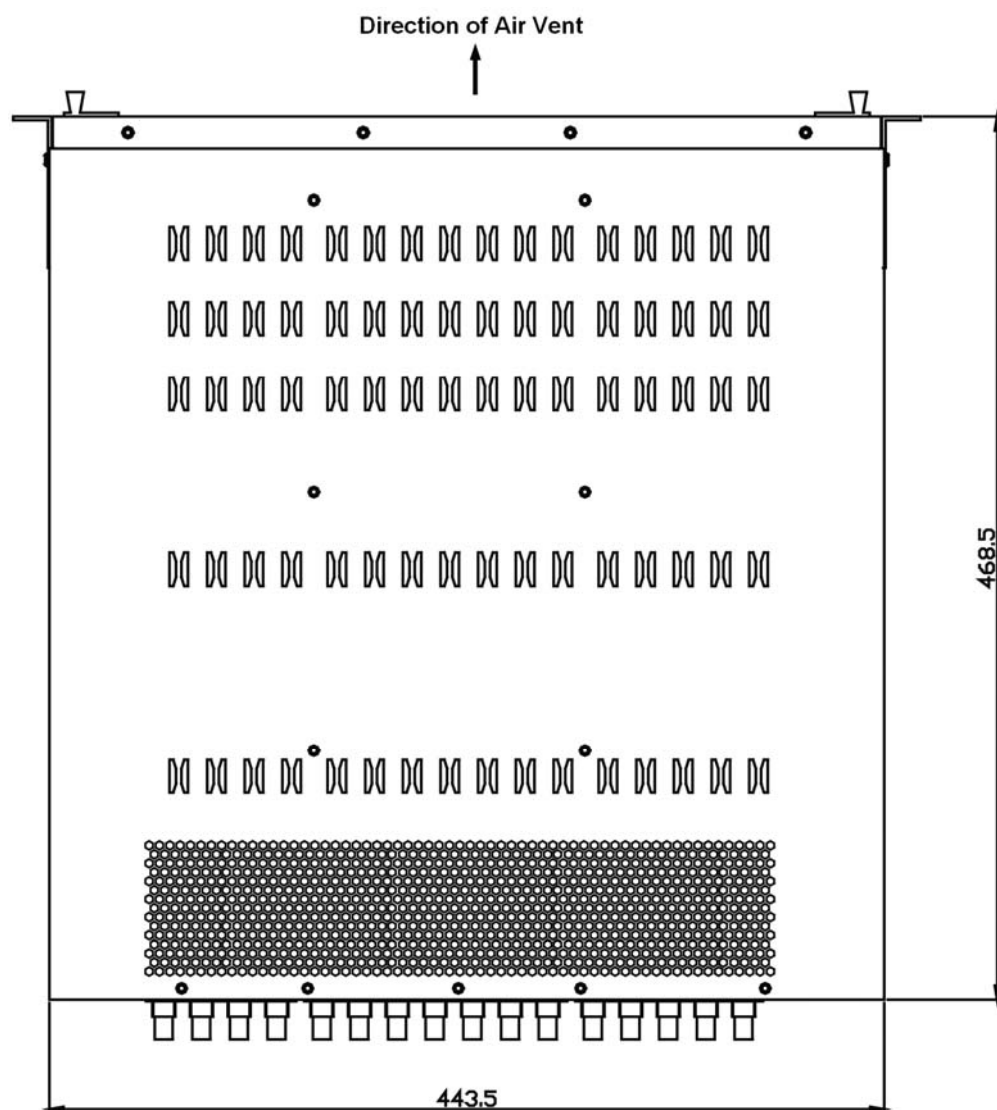
Front View (Unit: mm)



Rear View (Unit: mm)



Top Side View (Unit: mm)



Chapter 7 Specification

7.1 The Input and Output Connectors

Board model	Description
HMV160-I4A8G8	4-Ch autosensing inputs on HD/SD/Composite (BNC); 8 Stereo audio inputs (DB26); 8 GPI/O (DB26).
HMV160-I4AOG16T	4-Ch autosensing inputs on HD/SD/Composite (BNC); 1 Stereo audio output (DB26); 16 GPI/O (DB26); 1 LTC input (DB26).
HMV160-I4O1E	4-Ch autosensing inputs on HD/SD/Composite (BNC); 1-Ch DVI +1 Ch VGA output (DVI-I); 1-Ch 10M/100M autosensing Ethernet port.

Board model	Description
HMV160-I4O2E	4-Ch autosensing inputs on HD/SD/Composite (BNC); 2-Ch HDMI outputs (HDMI); 1-Ch 10M/100M autosensing Ethernet port.

7.2 Analog Composite Input

Standard: PAL、NTSC

Impedance: 75Ω

Return Loss: 35 dB to 5.75 MHz

Connector: BNC

7.3 HD-SDI Digital Video Input

Standard: SDI1080i50, SDI1080i60, SDI1080sf24, SDI1080p24, SDI1080p25, SDI1080p30, SDI1080p50, SDI1080p60, SDI720p24, SDI720p25, SDI720p30, SDI720p50, SDI720p60, SDI1035i60

Impedance: 75Ω

Cable Length: 100 m (Belden 8281)

Return Loss: > 15 dB (5 MHz to 750 MHz)
> 10 dB (750 MHz to 1.5GHz)

Connector: BNC

7.4 SD-SDI Digital Video Input

Standard: SDI525I, SDI625I

Impedance: 75Ω

Cable Length: 100 m (Belden 8281)

Return Loss: > 15 dB to 270 MHz

Connector: BNC

7.5 Analog Audio Input

Standard: 8-channel balanced stereo analog audio or 16-channel balanced monophonic analog audio

Impedance: 20KΩ balanced, 10KΩ single ended,

Peak Ballistic: Rise Time: 10 ms; Fall Time: -20dB/s

VU Ballistic: 300ms

Scales: 0 to -72dB

Maximum Level: +24dBu

Connector: DB26 (male)

7.6 The Frame

Type:	Redundant power supply
Voltage:	100-240VAC
Frequency:	50/60Hz
Power:	480W Max
Working temperature:	0-40°C
Dimension:	3RU frame (482 mm (W) × 468.5 mm (D) × 133 mm (H))

Note: *Specifications are subject to change without notice.*