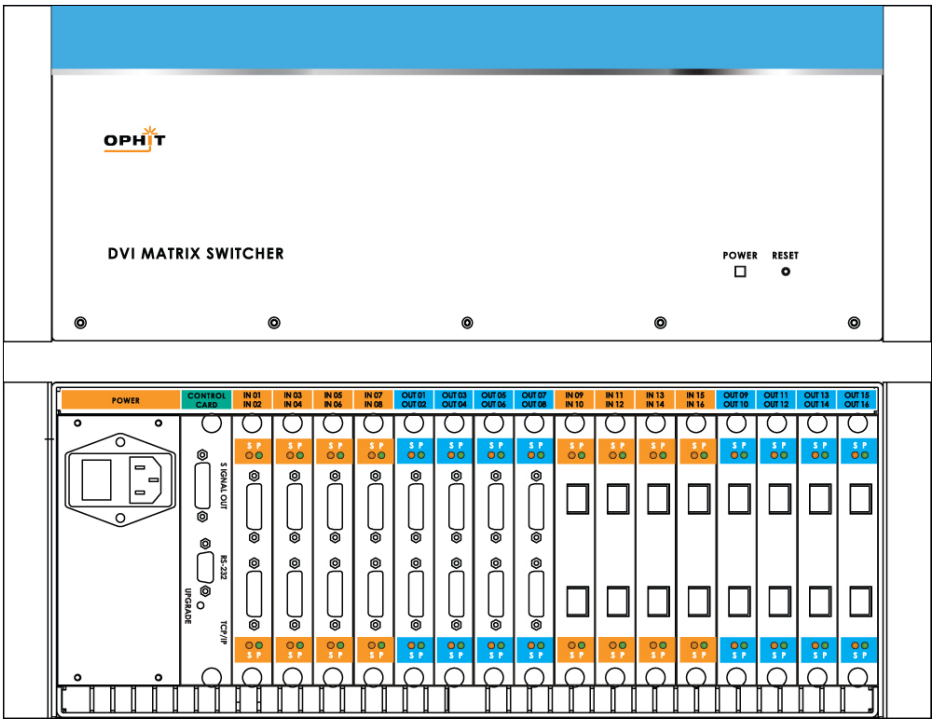
DMS-H1616



APPROVAL		
DRAWN	CHECKED	APPROVED
09.07.27		09.07.27

OPHIT Co., Ltd.
3F, Suntechnovil,5-27,Mangpo-Dong,
Yeongtong-Gu, Suwon-City, Kyungki-Do, Korea

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   7.1 Packing

Symbol Definitions

The following symbols appear on the product. its labeling, or the product packing. Each symbol carries a special definition, as defined below

V~ **AC Voltage source**

Dangerous : High Voltage.

Consult accompanying documents.

Indicates protective earth ground.

| **Switch Power ON**

O **Switch Power OFF**

Medical Equipment is in accordance with UL60601-1/CAN/CSA C22.2 No.601.1 in regard to electric shock, fire hazards, and mechanical hazard.

Laser caution label.

Safety Instructions

⚠ Warning

External equipment intended for connection to signal input, signal output or other connectors, shall comply with relevant IEC standard(e.g.,IEC60950 for IT equipment and IEC60601 series for medical electrical equipment).
In addition, all such combination-system-shall comply with the standard IEC 60601-1-1, safety requirements for medical electrical systems. Any person who connectors has formed at system and is therefore responsible for the system to comply with the requirements of IEC 60601-1-1.
if, in doubt, contact qualified technician or your local representative.

WARNING : To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

WARNING : Appliance inlet shall be used for mains disconnection.

- Do not dismantle the housing or modify the product.
Dismantling the housing or modifying the product may result in electrical shock or burn.

- Refer all servicing to qualified service personnel.
Do not attempt to service this product yourself as opening or removing housing may expose you to dangerous voltage or other hazards.

- Keep the product away from liquids.
Spilling into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls/spills into the housing, unplug the product immediately. Have the product checked by a qualified service engineer before using it again.

- Do not touch the Product with wet hands.
Touching the housing and plug with wet hands is dangerous and can cause electrical shock.

- Do not to touch signal input, signal output or other connectors, and the patient simultaneously.

Caution

This symbol alerts the user that important literature concerning the operation of this unit has been included. Therefore, it should be read carefully in order to avoid potential problems.

This symbol warms user that un-insulated voltage within the unit the may have sufficient magnitude to cause electrical shock. Therefore, it is dangerous to make contact with any part inside the unit. To reduce the risk of electric shock, DO NOT remove cover (or back). There are no user serviceable parts inside. Refer servicing to qualified service personal.

To prevent fire or shock hazards, do not expose this unit to rain or moisture. Also, do not use this unit's polarized plug with an extension cord receptacle or other outlets unless the prongs can be fully inserted. The display is designed to meet the medical safety requirements for a patient vicinity device.
This device may not be used in connection with life support equipment.

Underwriters Laboratories (UL) Classification:

UL safety Compliance:
This Matrix Switcher is U.L. Classified WITH RESPECT TO ELECTRIC SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL 60601-1/CAN/CSA C22.2 NO. 601.1

EEC Safety Compliance:
This display unit meets the requirements of EN-60601-1 so as to conform to the Medical Device Directive 93/42/EEC (general safety information).

This monitor complies to the above standards only when used with the supplied medical grade power supply. RPS-160 Series (Mean well)

Caution:

Make sure the power cord is the correct type that is required in your area.
This **DMS-H1616** has a universal power supply that allows operation in either 100-120V AC or 200-240V AC voltage areas (no user adjustment is required).

Use the proper power cord with correct attachment plug type. If the power source is 120 V AC, use a power cord which is a Hospital Grade Power Cord with NEMA 5-15 style plug, labeled for 125 volts AC with UL and C-UL approvals. If the power source is a 240 V AC supply, use the tandem (T blade) type attachment plug with ground conductor power cord that meets the respective European country's safety regulations.

The hospital-grade plug for medical products intended for use in Denmark has DEMKO approval and is rated 13 amps at 250Vac. Plug is recommended for use in medical applications and specifications are being added to the standard SB 107-2-D1. Plug mates with maker's Danish hospital-grade socket. Hospital sockets have slightly different shaped openings allowing only the hospital plug, not the standard Danish plug, to be inserted, to protect the ac circuit in specific medical settings.

Servicing

Do not attempt to service the apparatus yourself as opening or removing covers may expose you to dangerous voltages or other hazards, and will void the warranty. Refer all servicing to qualified service personnel.
Unplug the apparatus from its power source and refer servicing to qualified personnel under the following conditions:
- If the power cord or plug is damaged or frayed.
- If liquid has been spilled into the apparatus.
- If objects have fallen into the apparatus.
- If the apparatus has been exposed to rain or moisture.
- If the apparatus has been subjected to excessive shock by being dropped.
- If the cabinet has been damaged.
- If the apparatus seems to be overheated.
- If the apparatus emits smoke or abnormal odor.
- If the apparatus fails to operate in accordance with the operating instructions.

Accessories

Use only accessories specified by the manufacturer, or sold with the apparatus.

Classification
- Protection against electric shock : Class I
- Applied Parts : No Applied Parts
- Degree of safety in the presence of flammable anesthetics mixture with air or with oxygen or with nitrous oxide.
Not suitable for use in the presence of a flammable anesthetics mixture with oxygen or with nitrous oxide.
- Mode of operation : Continuous.

Cleaning and Maintenance

This product needs to be check and clean every one month as below;

▪ Make sure the fan is operating normally.

If the fan does not operate normally, serious problems will occur such as overheating.

Cleaning

1. Turn off the power.
2. Separate each card from the body.
3. Clean with dry cloth inside of the body after each card is separated.
4. Remove foreign substance on the surface of each card with air gun.
5. Install each car back to the body.
6. Clean with dry cloth outside of the body.

FCC Information

This equipment has been tested and found to comply with the limits of a Class A digital device, pursuant to Part 15 of the FCC rules.

These limits are designed to provide reasonable protection against interference. This monitor can radiate radio frequency energy and, if not installed and used in accordance with the instructions, it may interfere with other radio communications equipment. There is no guarantee that interference will not occur in a particular installation.

If this equipment is found to cause harmful interference to radio or television reception, the user is encouraged to try to correct the interference by carrying out one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the distance between the color monitor and the subject of interference.
3. Plug the monitor into a outlet on a different electrical circuit than \that to which the subject of interference is connected.
4.Consult the dealer or an experienced radio/TV technician for help.

NOTICES TO USER :
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.

FCC WARNING :
This equipement geneates or uses radio frequency energy. Changes or modifications to this equipement may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose authority to operate this equipment if an unauthorized change or modification is made.

Manufacturer's declaration

Manufacturer's declaration - electromagnetic emission

Emission test	Compliance	Electromagnetic environment-guidance
RF emissions FCC Part15 Subpart B	Class A	The model **DMS-H1616** uses RF energy only for its internal function Therefore. Its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment

1. Overview

1.1 Scope

The **DMS-H1616** Matrix Switcher shall be a new matrix switcher systems designed to satisfy the needs of small scale installations. Also, **DMS-H1616** Matrix Switcher is an integrated product which has a number of independent DVI and optical switch, which has easy field configuration modular (which is a truly modular) frame.

The **DMS-H1616** is specially designed for switching up to 16-input DVI signals to up to 16 output destinations (16 input DVI signal allows switching up to 16 output signals). Fiber solution is used for long distance transmission (the max. distance 300m at WUXGA (1920x1200).
This multi-mode 1 fiber cable makes it possible to use DVI transmission and compatibility with our DSL products. Using the RS232 port for control of external equipment, and intuitive control for WEB control is possible. In addition, the web is to upgrade the Firmware.

1.2 Revision History

Date	Paragraph	Change Description
09.07.27	1.0	Preliminary release

2. General Features

2.1 General Description

Item	Description
Model	**DMS-H1616**
Input Signal	16 x DVI (**DMS-CARD-CI**) 16 x Optical DVI (**DMS-CARD-FI**)
Output Signal	16 x DVI (**DMS-CARD-CO**) 16 x Optical DVI (**DMS-CARD-FO**)
Power Supply	100-240V~, 50/60Hz, 2.0-1.1A
Control	RS-232, TCP/IP (**DMS-1616CC**)
Classification	- Protection against electric shock : Class I - Applied Parts : No Applied Parts - Mode of operation : Continuous
Unit Dimension	483mm×176mm×302mm(4U)

3. Product Specification

3.1 Electrical Specifications

3.1.1 Matrix Switcher

DVI Input	
Format	DVI single link
Number of	2 or 16 input channels
Pixel clock	Up to 165MHz
Equalization	40dB automatically
DVI Output	
Format	DVI single link
Number of	2 or 16 input channels
Pixel clock	Up to 165MHz
+5V current	500mA / DVI output via pin 14
Control	
Serial	RS-232 9600 baud Rx
Network	Ethernet TCP/IP 10/100 base TX (Auto sensing)
Optical Input and Output	1 fiber per channel
Fiber	Multimode 50/125 or 62.5/125 glass fiber
Transmission distance	1600 ft
Connector	
Copper Input and Output	29 pin DVI-I female connector
Optic Card	SC
Power	IEC Power Inlet
RS-232	9p sub D female
LAN	RJ45
General	
Dimensions (including rack ears)	4U, 19” rack-mountable enclosure, 19(W) x 7(H) x 22(D) inch
Weight (with the boards all installed)	9.5kg
Power	100-240V~, 50/60Hz, 2.0-1.1A
Compliance	UL, FCC

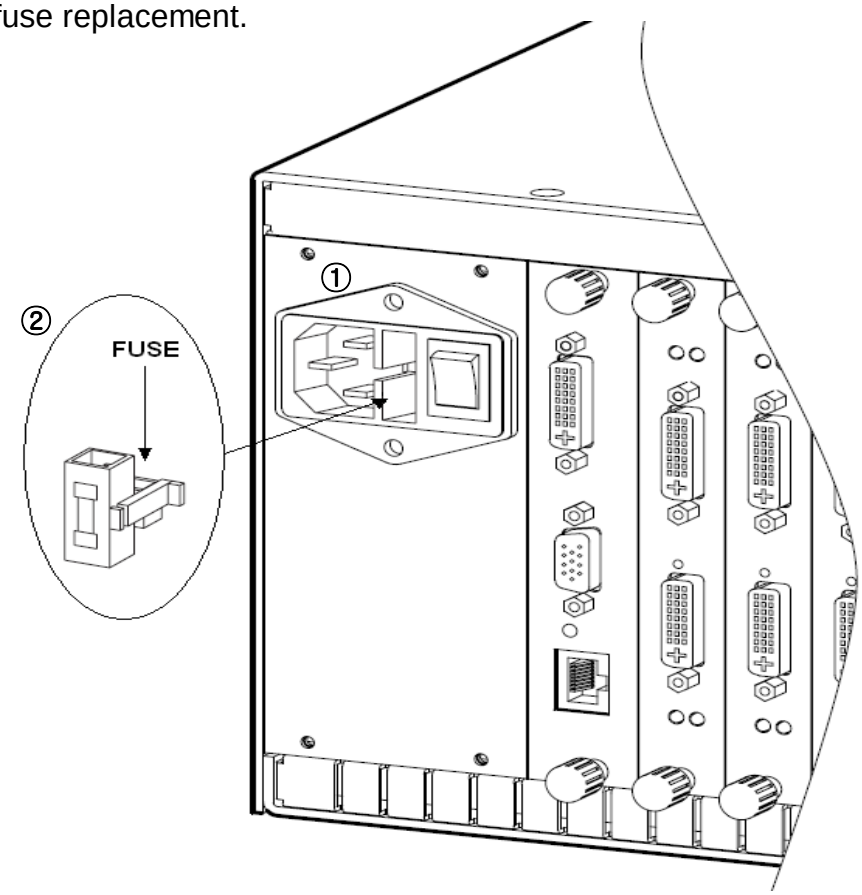
3.1.2 Power supply

Item		Specification			
		Min	Typ	Max	Unit
Model No		RPS-160-5			
Description		SMPS			
Input	Rated Voltage	100		240	Vac
	Frequency	50		60	Hz
	Current	2.0 -1.1A			
Output		+5V/30A			

3.1.3 Fuse Replacement

DANGER

To avoid risk of electric shock, always disconnect the plug from the system prior to fuse replacement.

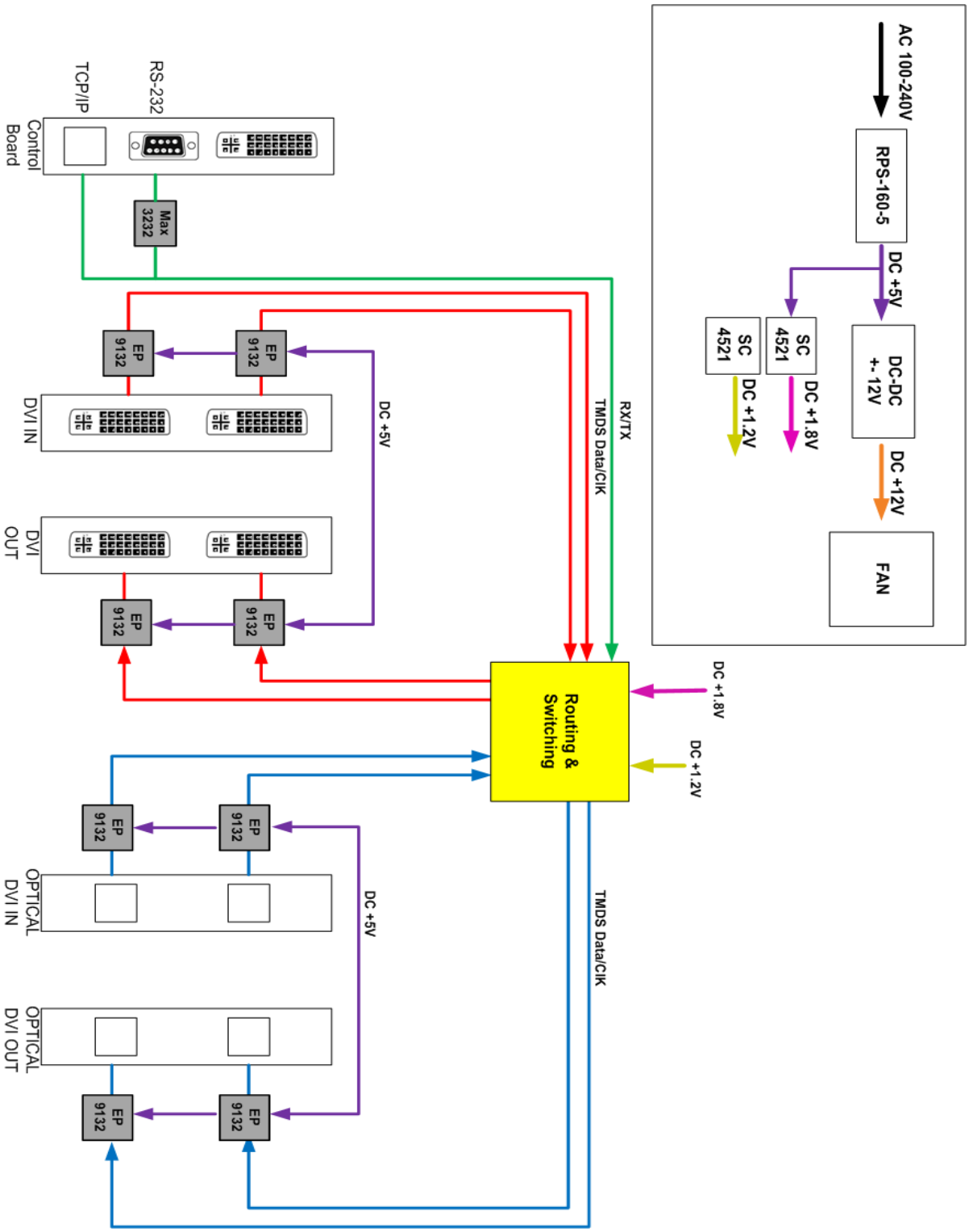


1. Turn off the system and disconnect the system power cord from the wall outlet. (See①)
2. Press the fuse holder in the direction of the arrow and pull it out. (See②)
3. Remove the old fuse and replace it with a new one.
4. After installing the new fuse, connect the plug to the system.

Fuse information is shown in the following table.

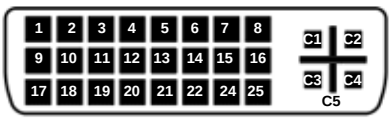
Input Ratings	Fuse Ratings	Maker	Order No.
100-240VAC	T3.15AL/250V	Littelfuse	0218 3.15

3.2 Entire System Block Diagram



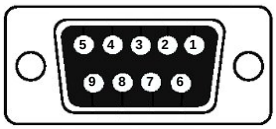
3.3 Signal connector PIN assignments

▣ DVI In, Out



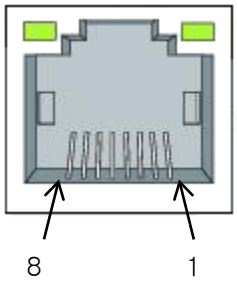
Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2 Shield	11	T.M.D.S. Data1 Shield	19	T.M.D.S. Data0 Shield
4	No Connect	12	No Connect	20	No Connect
5	No Connect	13	No Connect	21	No Connect
6	DDC Clock	14	+5V Power	22	T.M.D.S Clock Shield
7	DDC Data	15	Ground (for +5V)	23	T.M.D.S Clock+
8	No Connect	16	Hot Plug Detect	24	T.M.D.S Clock-
C1	No Connect	C2	No Connect	C3	No Connect
C4	No Connect	C5	No Connect		

▣ RS-232



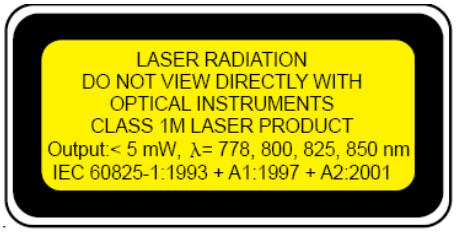
Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	DCD	4	DTR	7	RTS
2	TXD	5	Ground	8	CTS
3	RXD	6	DSR	9	RI

▣ TCP/IP



Pin	Signal Assignment	Pin	Signal Assignment
1	TX+	2	TX-
3	RX+	4	NC
5	NC	6	RX-
7	NC	8	NC

▣ Optical Port (In, Out)



Port	Signal Assignment
1	TMDS DATA/CLK

3.4 Environmental and Reliability (TBD)

Item		Description
Operating Conditions	**Temperature**	5℃~ 40℃
	Humidity	5% ~ 85%, non-condensing
Storage Conditions	**Temperature**	-20℃~ 60℃
	Humidity	10% ~ 85%, non-condensing

Reliability Specifications

MTBF : TBD
Reliability specification and items : TBD

4. Regulatory

4.1 EMC & Safety Agency Approvals

UL Safety Compliance:
This **DMS-H1616** is U.L Classified with respect to electric shock, fire and mechanical hazards only in accordance with UL 60601-1.

The **DMS-H1616** complies with Part 15 of the FCC Rules. Operation is subject it 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.

The **DMS-H1616** (DMS-CARD-FO) has been designed and tested to comply with IEC 60825-1 requirements.

5. Features

5.1 Main Features

5.1.1 Main Function

- Support 16 DVI-D Single-link input channel and 16 DVI-D Single-link output channels.
- The EDID parameter of the monitor can be preset or default.
- Power-off status protection.
- Save the last operation parameters when power suddenly shut off.
- Input signal monitor and indication.
- Output load monitor and indication.
- Support RS-232 control.
- Support Network control based on TCP/IP.
- Support WEB control.
- Built in signal generator for testing and debugging systems.

5.1.2 Features

Input connector:	DVI-D / Optical
Output connector:	DVI-D / Optical
Network connector:	RJ45
RS-232 connector:	DB9 male
Enclosure dimension:	483mm×176mm×302mm(4U)
Weight:	9.5 Kg

5.1.3 Performance

Input resolution:	Up to 1600×1200×60Hz
Input signal Timing standard:	DVI Version 1.0
Output signal Timing standard:	According to Input Timing Standard
Pixel clock frequency:	25M Hz -165M Hz
Long-distance control:	RS232 or TCP/IP
Power supply:	100-240Vac, 50/60Hz, 2.0-1.1A
Max output current of each channel	100mA
Max output current each DVI Output	500mA
Power:	< 150W

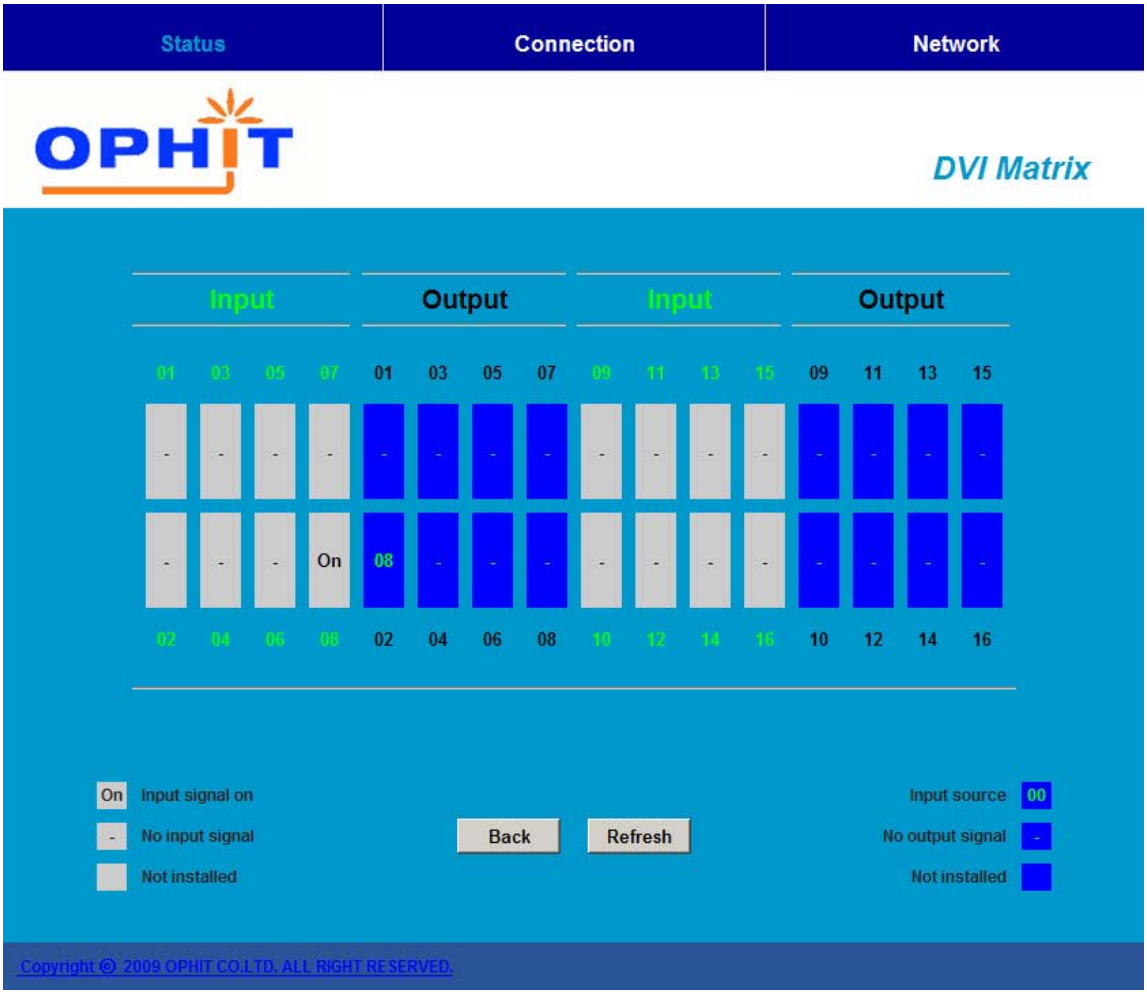
5.2 OPERATION (Web Control)

- **Setting up the system**
  The system has default IP address 192.168.0.100
  If the existing network is used different local IP address,
  like 192.168.0.123, set up a new IP address 192.168.0.XXX to belong to your network via RS-232 communication.

- **Viewing the Password of connection**
  IP 192.168.0.100 connection at browser, password insert.
  See below picture .
  Password : admin (Small letter)

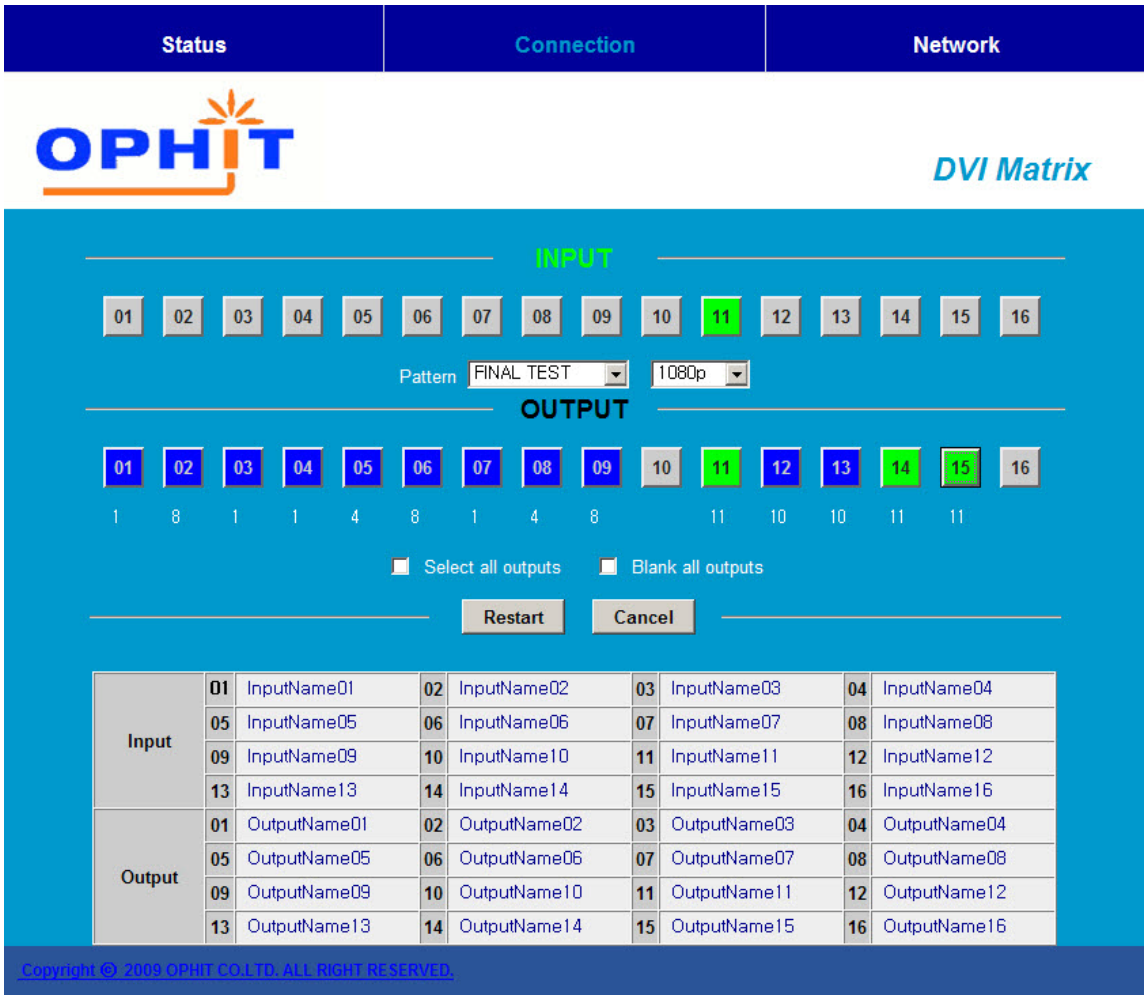
- **Viewing the status of connection**

  After login, DMS-H1616 state menu see below picture.



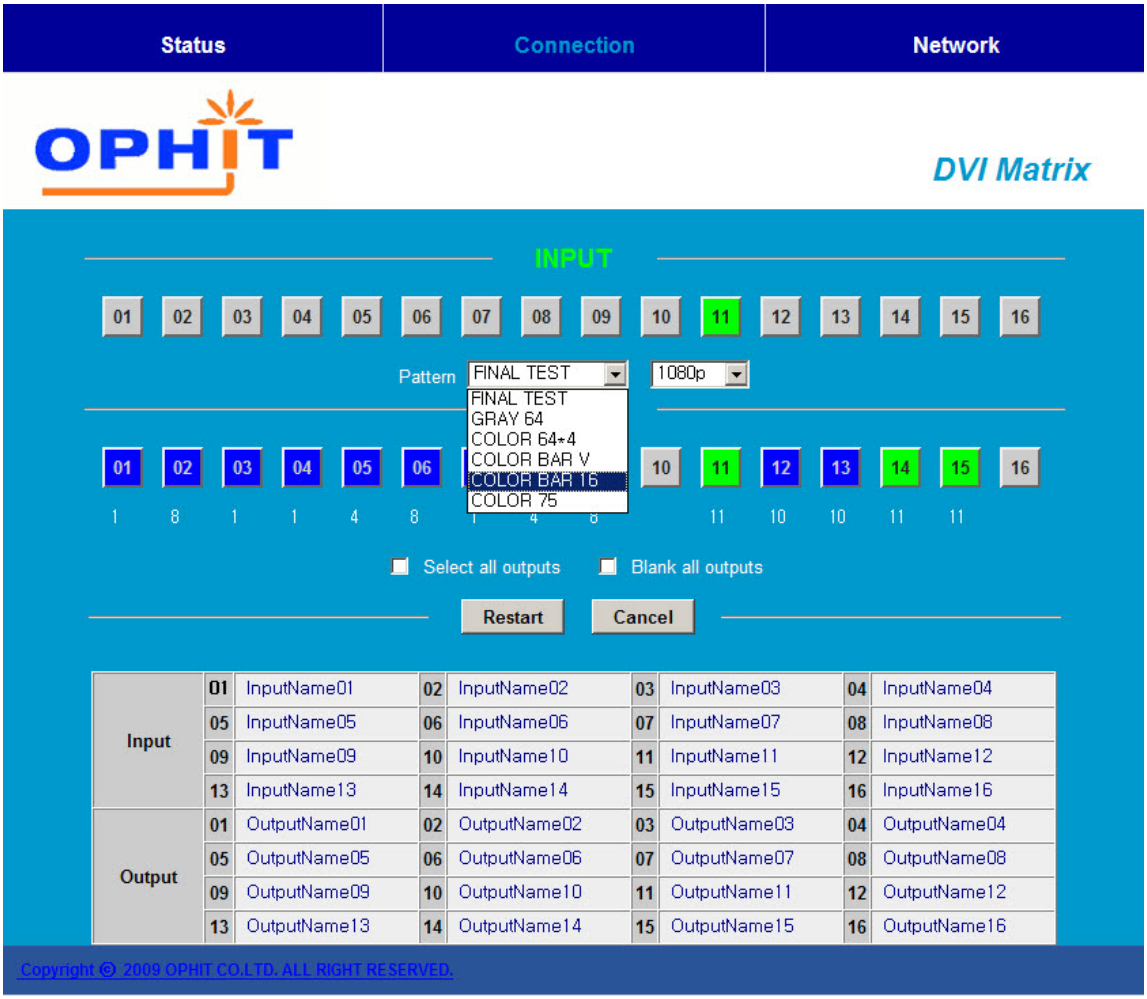
5.2.1 New connection

To make a new connection, select input channel firstly, then select or deselect output channels. After setting completely, press Restart button.



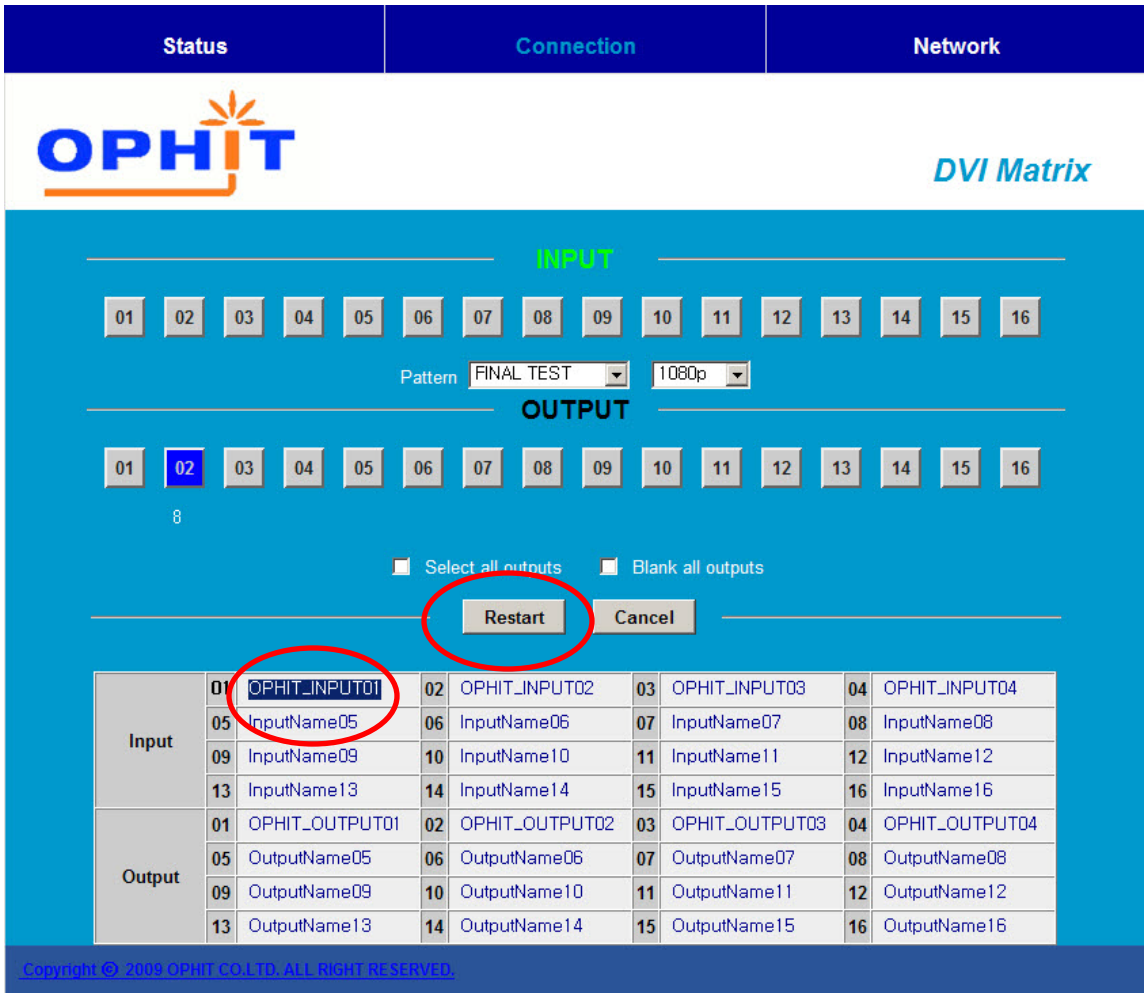
5.2.2 Pattern

The system has built in pattern generator module for testing and debugging systems.
- Resolution : VGA, SVGA, XGA, SXGA, UXGA, WUXGA, 1080P
- Pattern : FINAL TEST, 64 GRAY, 64*4 COLOR, V COLOR BAR, 16 COLOR BAR, 75% COLOR



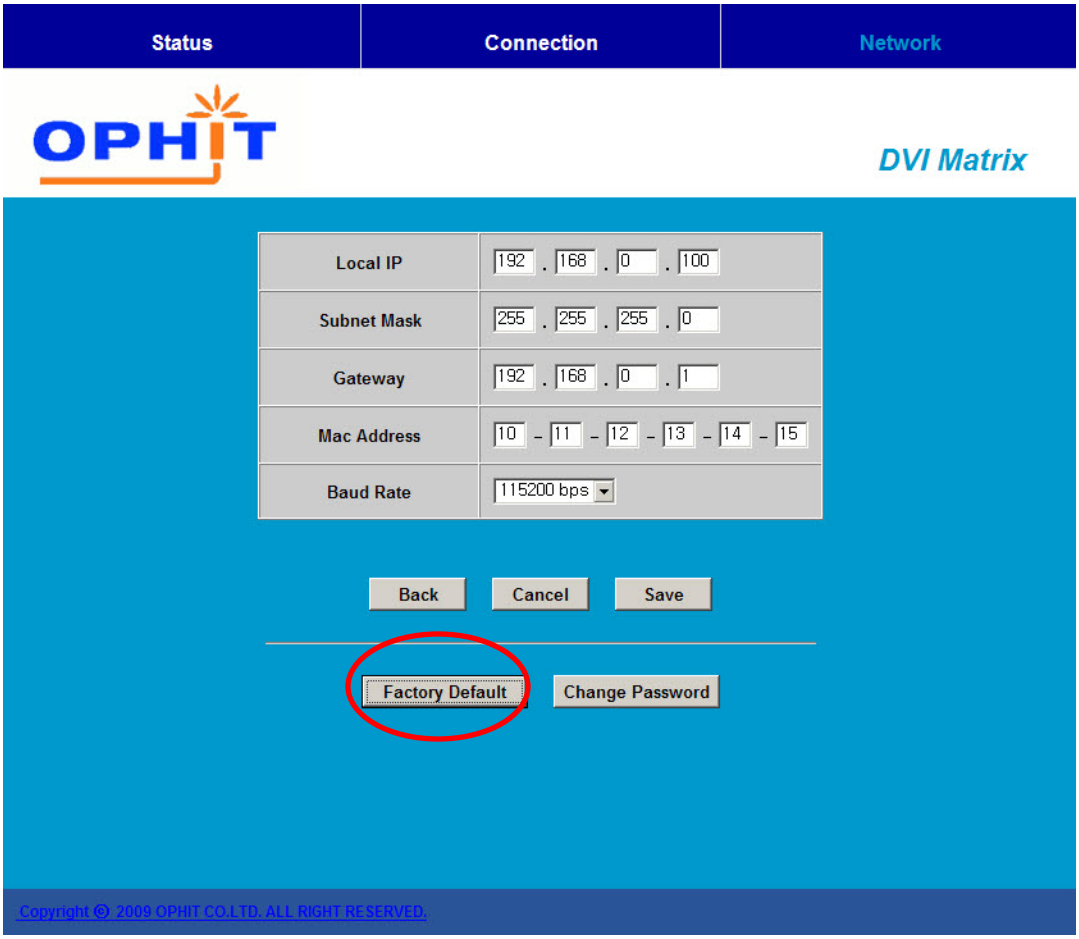
5.2.3 Rename

User can change the name of input / output channels directly, then press Restart button.



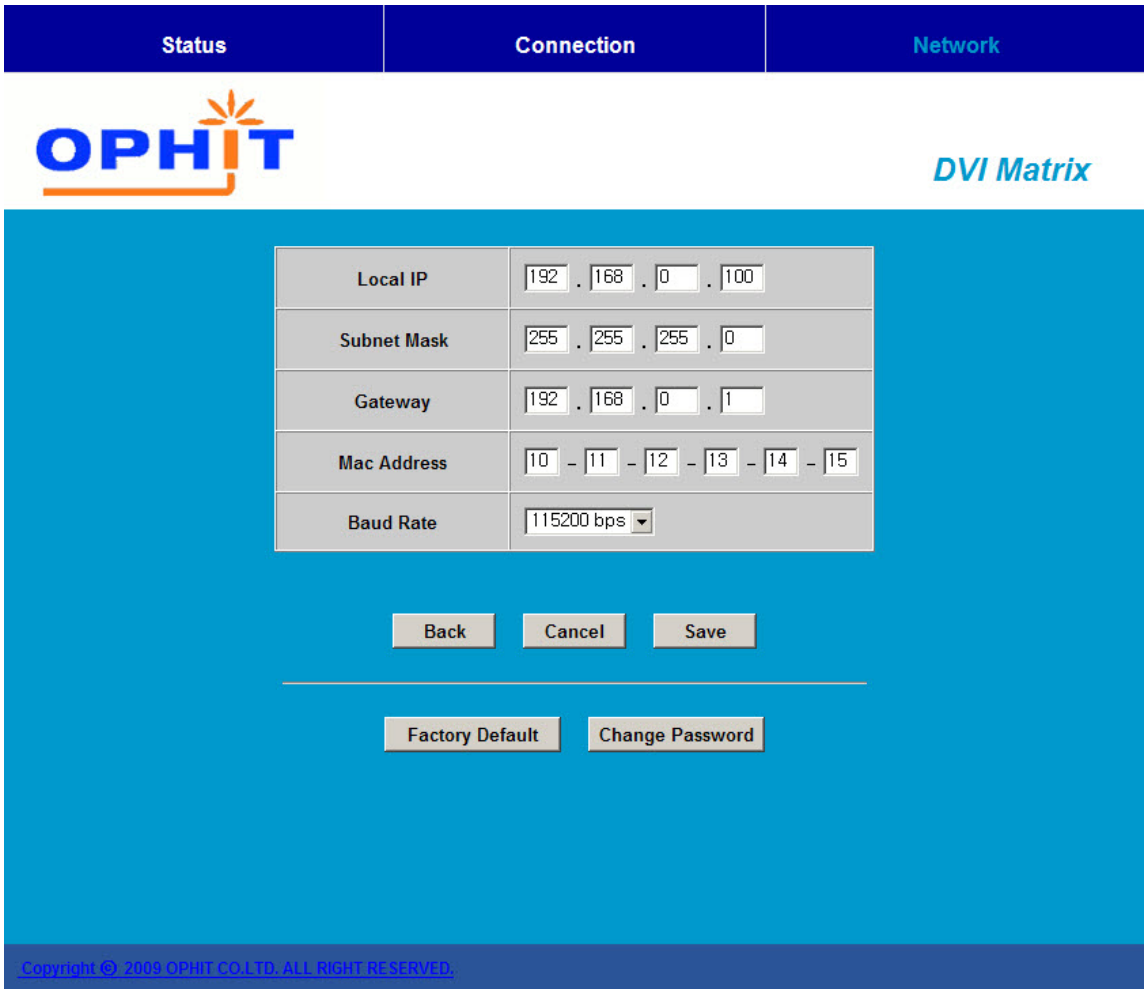
•**Reset**

In case the system has to be initialized, press ‘Factory Default’ button.
The system will go back to factory default.



5.2.4 Network Configuration

Enter IP address, Subnet Mask, Gateway, and Mac Address appropriately, then press Save button.
The default baud rate is 115,200bps.
User can change baud rate from 9,600 to 115,200 bps.



5.3 RS-232 Serial Communication Commands for switching

SW	Switch (Tie) Input to Output Syntax: SW:<Input>*<Output> Input = 0-16, 0 Blank Output (special case). Routing input less than 1 or greater than 16 to an output will blank that output. Output = 1-16
MULTI	Multi switch. Tie multiple inputs to multiple outputs as specified in list. Syntax: MULTI:<Input>*<Output>, <Input>*<Output> etc.
EVERY	Tie an input to all outputs. Syntax: EVERY:<Input>
TPRES	Set test pattern resolution (7 Types). Syntax: TPRES:<horizontal resolution>X<vertical resolution> ☞ Indicated in Appendix
TPPAT	Set test pattern design. Syntax: TPPAT:<design> ☞ Indicated in Appendix
BLANKALL	Blank all outputs Syntax: BLANKALL
INSIG	Query presence of video signal on input. Same reply sent automatically if status changes (e.g. source unplugged from input). Syntax: INSIG:<Input>
OUTLOAD	Query presence of load on output. Same reply sent automatically if status changes (e.g. monitor unplugged from output). Syntax: OUTLOAD:<Output>

5.3 RS-232 Serial Communication Commands for switching

INPUTCARDS	Query system for list of input cards (and locations?) Syntax: INPUTCARDS
FIBER INPUTCARDS	Query system for list of fiber input cards (and locations?) Syntax: FIBERINPUTCARDS
COPPER INPUTCARDS	Query system for list of copper input cards (and locations?) Syntax: COPPERINPUTCARDS
OUTPUTCARDS	Query system for list of output cards (and locations?) Syntax: OUTPUTCARDS
FIBER OUTPUTCARDS	Query system for list of fiber output cards (and locations?) Syntax: FIBEROUTPUTCARDS
COPPER OUTPUTCARDS	Query system for list of copper output cards (and locations?) Syntax: COPPEROUTPUTCARDS
SHWRT	Show current routing of output. (Return 0 if Blank) Syntax: SHWRT:<Output>
EDID	Set EDID of input to output or DEFAULT. Syntax: EDID:<Output>*<Input> or EDID:DEFAULT*<Input>
EDALL	Set EDID of all inputs to output or DEFAULT. Syntax: EDALL:<Output> or EDALL:DEFAULT

5.4 Commands for network setting

IP	Change IP Address Syntax: IP:<IPAddr0>.<IPAddr1>.<IPAddr2>.<IPAddr3>
SUBNET	Change Subnet Mask Syntax: SUBNET:<SubnetAddr0>.<SubnetAddr1>.<SubnetAddr2>. <SubnetAddr3>
GATEWAY	Change default gateway Syntax: GATEWAY:<GWAddr0>.<GWAddr1>.<GWAddr2>. <GWAddr3>
MAC	Change MAC Address Syntax: MAC:<MacAddr0>.<MacAddr1>.<MacAddr2>.<MacAddr3>. <MacAddr4>.<MacAddr5>
INNAME	Name Syntax: INNAME:<InputPortNum>,<InputPortName> <InputPortNum> = 1-16 <InputPortName> = Max Length 16
OUTNAME	Name Syntax: OUTNAME:<OutputPortNum>,<OutputPortName> <OutputPortNum> = 1-16 <OutputPortName> = Max Length 16
BAUDRATE	Change RS232 Baudrate Syntax: BAUDRATE:<baudrate> <baudrate> = 9600 / 19200 / 38400 / 57600 / 115200
FACTORYSET	GDM Matrix switch has been returned to the factory defaults

5.5 UPGRADE(Upgrade Firmware)

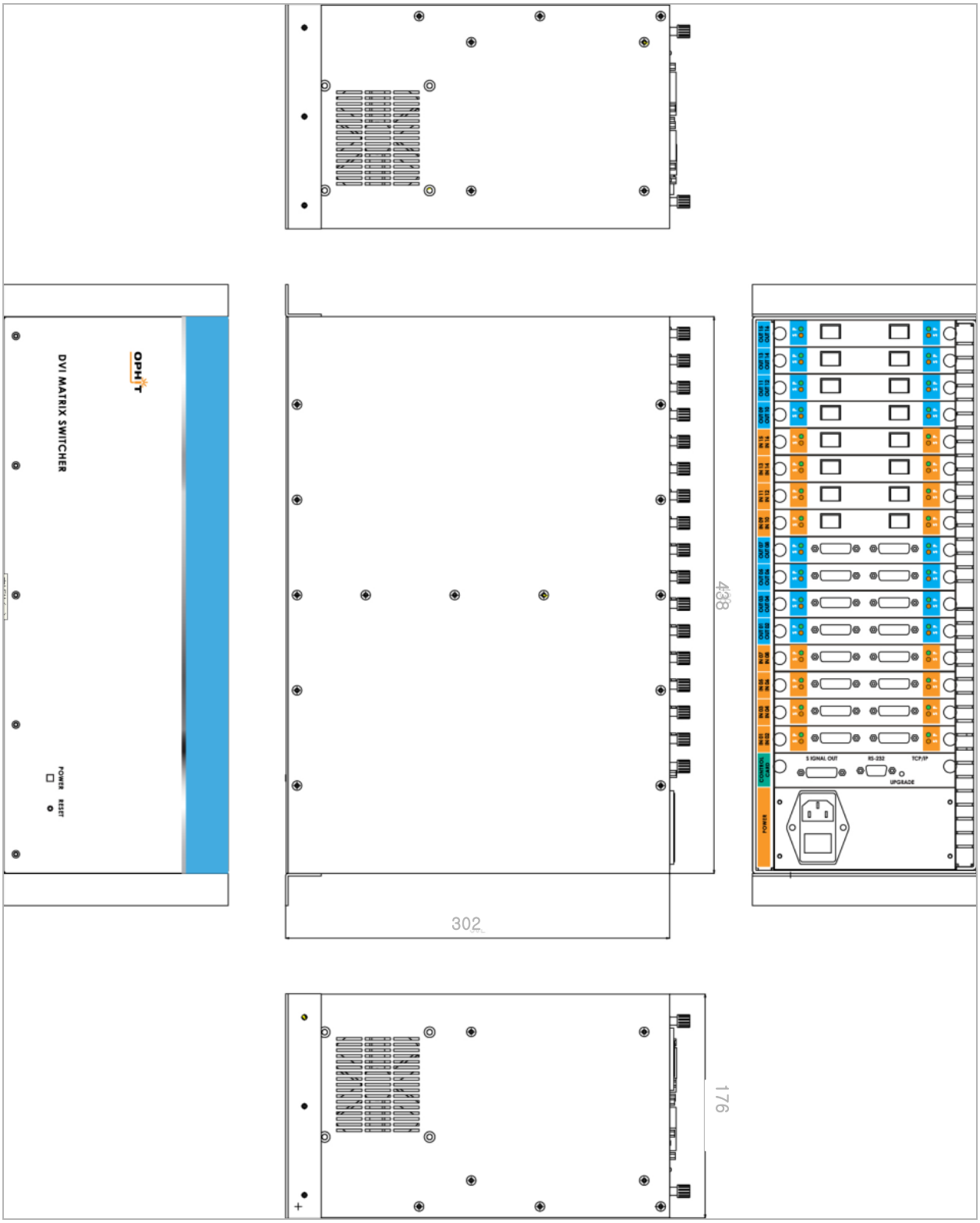
a. Turn off the system.
b. Turn on the system as the upgrade button is pushed.
c. Enter IP address of the system on web browser. (eg. 192.168.0.100)
d. Select a program file (XXX.bin) to upload, then press ‘send file’ button.

e. Click ‘Jump to new program’ , press ‘validate’ button.

f. Refresh the web browser to finish upgrading the switch control program.

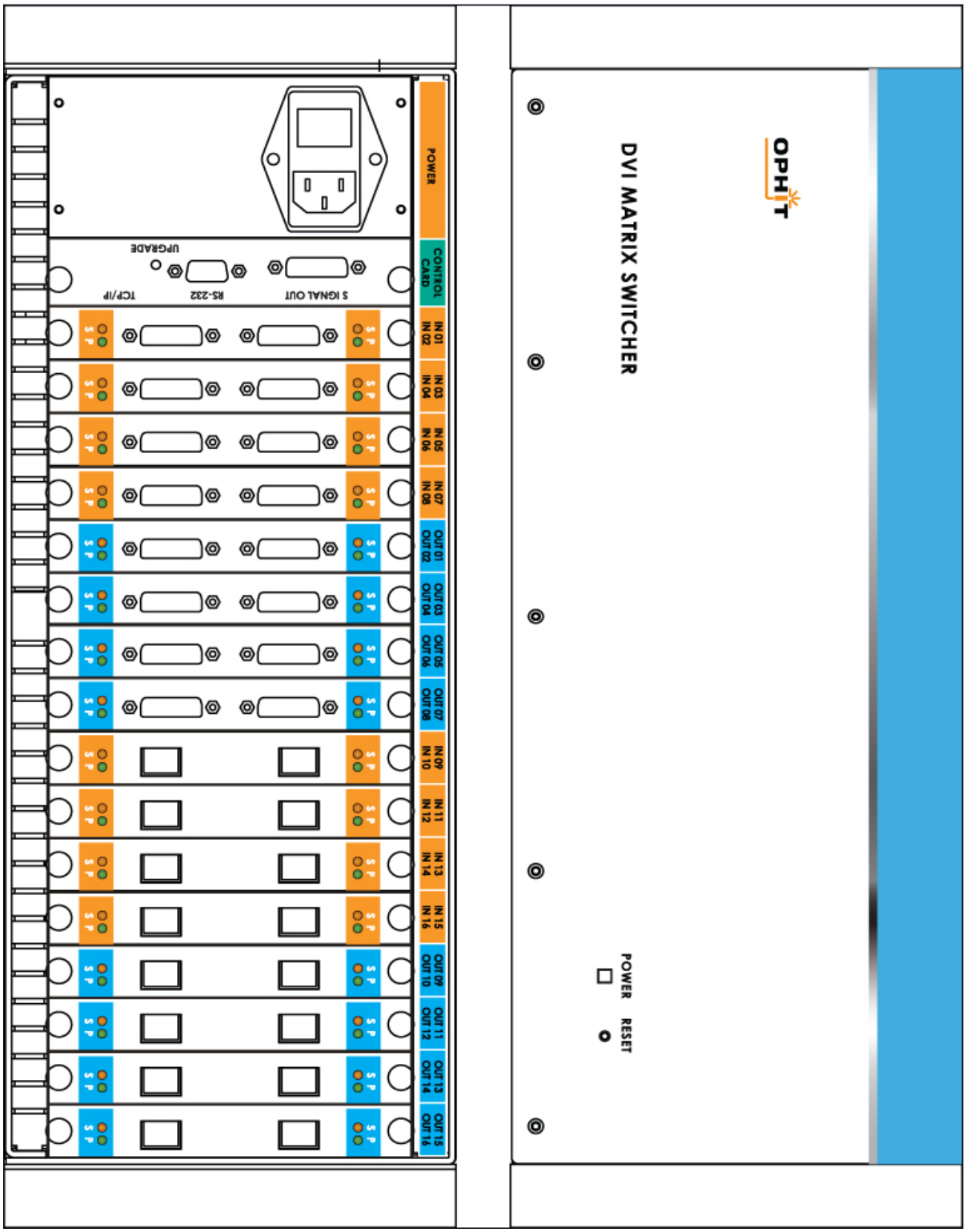
6. Mechanical Specifications

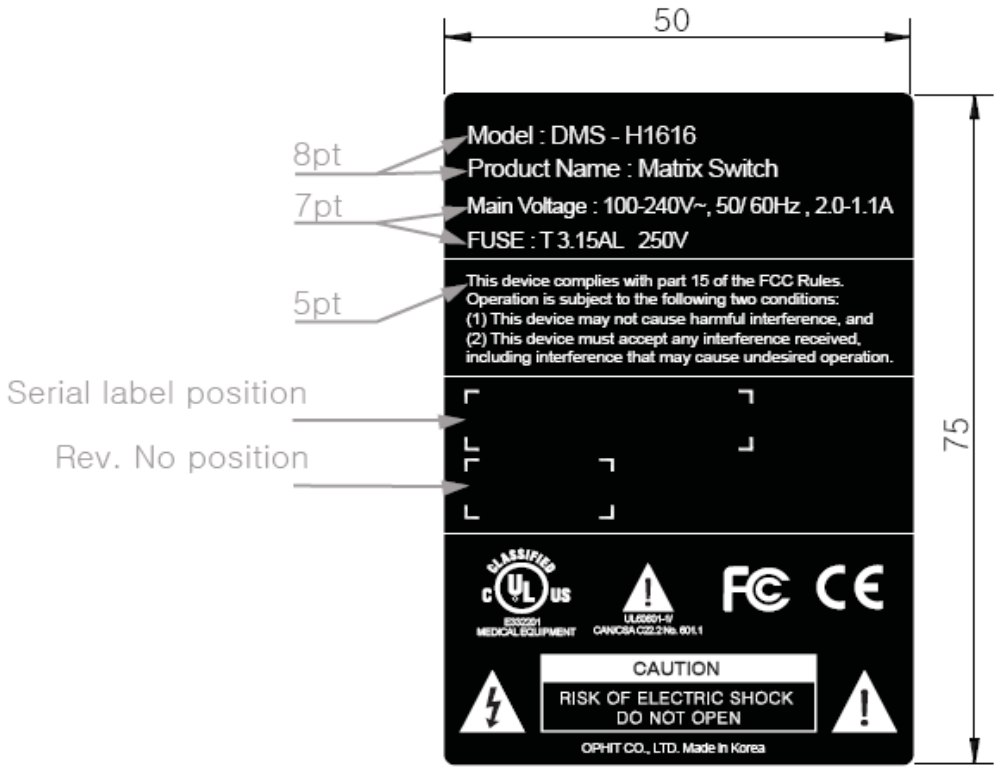
6.1 Product dimension



6.2 Label dimension (TBD)

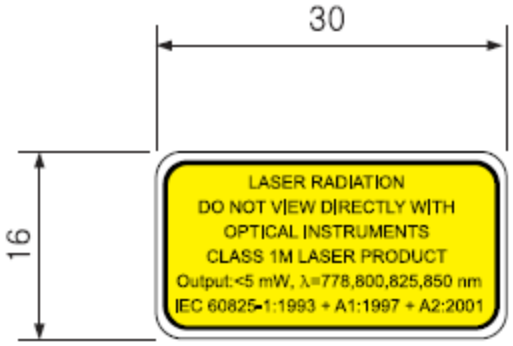
6.2.1 Function label





NOTE

1. Material : Eunmudedeurong(Silver Polyester film)
2. Polyester thickness 50 Demicron
3. Polyester manufacturer : SKC.Ltd.,
4. Adhesion matter : clear acrylic
5. Clear acrylic thickness : 21 Demicron
6. Clear acrylic manufacturer : Llm Duck chem.Co.,Ltd
7. Back ground color : Black
8. Printing color : Pantone 877(Silver)
9. Label Back : Adhesion
10. Label Cutting type Rool type
11. TEXT : ARIAL, SIZE AS INDICATED



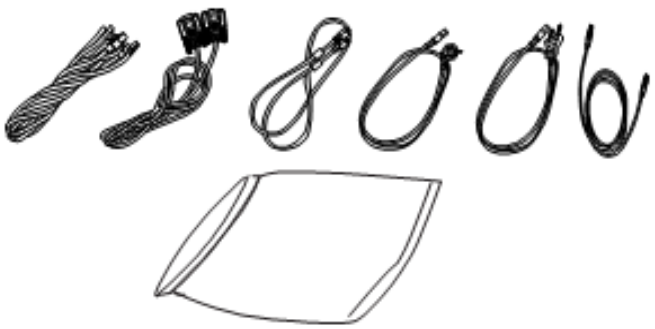
NOTES

1. material : Enumudedeurong(Silver Polyester Film)
2. back ground color : white
3. label back : adhesion
4. label Cutting type : Rool type
5. Color
   - PANTONE Process Coated Black C
   - PANTONE Process Coated Yellow C

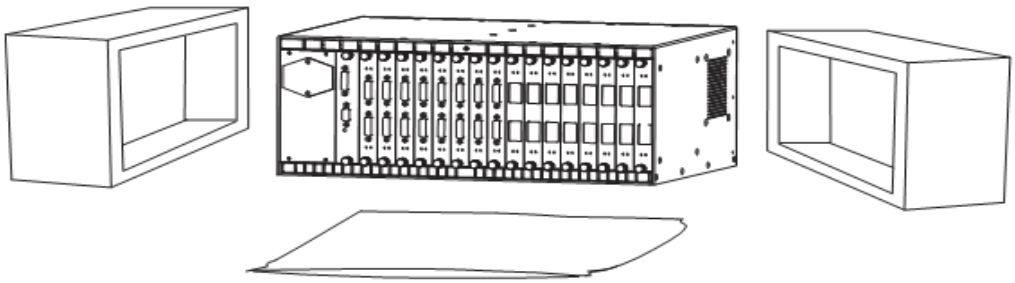
7.1 Packing

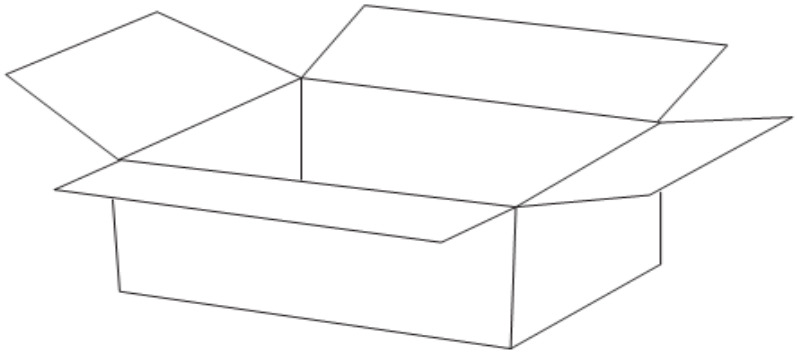
7.1.1 Dimension (individual)

Set(Unpacking, GDMS-1616A only)	438.4(W) x 176.25(H) x 304.7(D)mm	9.04kg
Package(1set, individual packing)	525(W) x 455(H) x 285(D)mm	



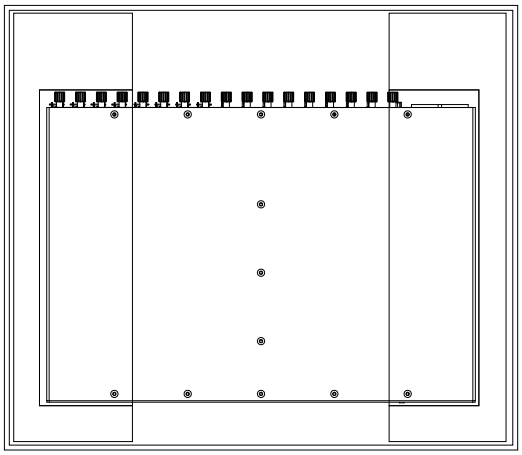
Include Item	Count
RS-232 Serial Cable	1 ea
LAN (TCP/IP) Cable	1 ea
Power Cable (Normal AC 220V)	1 ea
Power Cable (Medical grade AC 110V)	1 ea
DVI Copper Cable	1 ea
USB Cable	1 ea
Rack mount (Ear rack) Fixing Bolts	2 ea 6 ea
Manual Book	1 ea



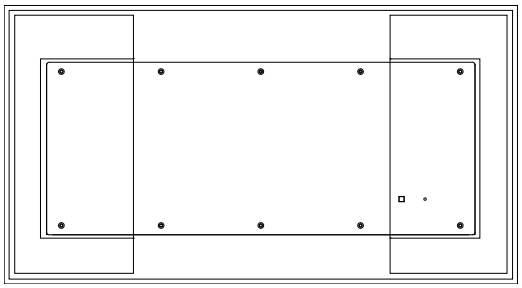


7.1.2 Composition of Pallet

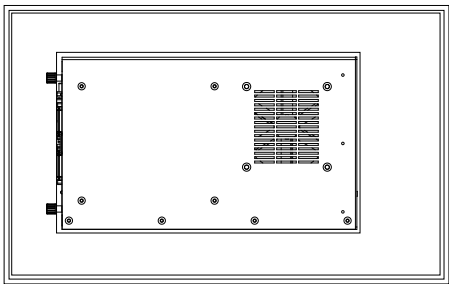
Package(1set, individual packing)	525(W) x 455(H) x 285(D)mm	



Top View



Front View



SIDE View

Rev. 1.0