PRO-8X8-DVI

8X8 DVI Router

User Manual

WUXGA 1920 x 1200

dvi digital visual interface

CE FC RoHS Compliance

Made in Taiwan **rev.1008**

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Safety and Notice

The PESA **PRO-8X8-DVI 8X8 DVI Router** has been tested for conformance to safety regulations and requirements, and has been certified for international use. However, like all electronic equipments, the PRO-8X8-DVI should be used with care. Please read and follow the safety instructions to protect yourself from possible injury and to minimize the risk of damage to the unit.

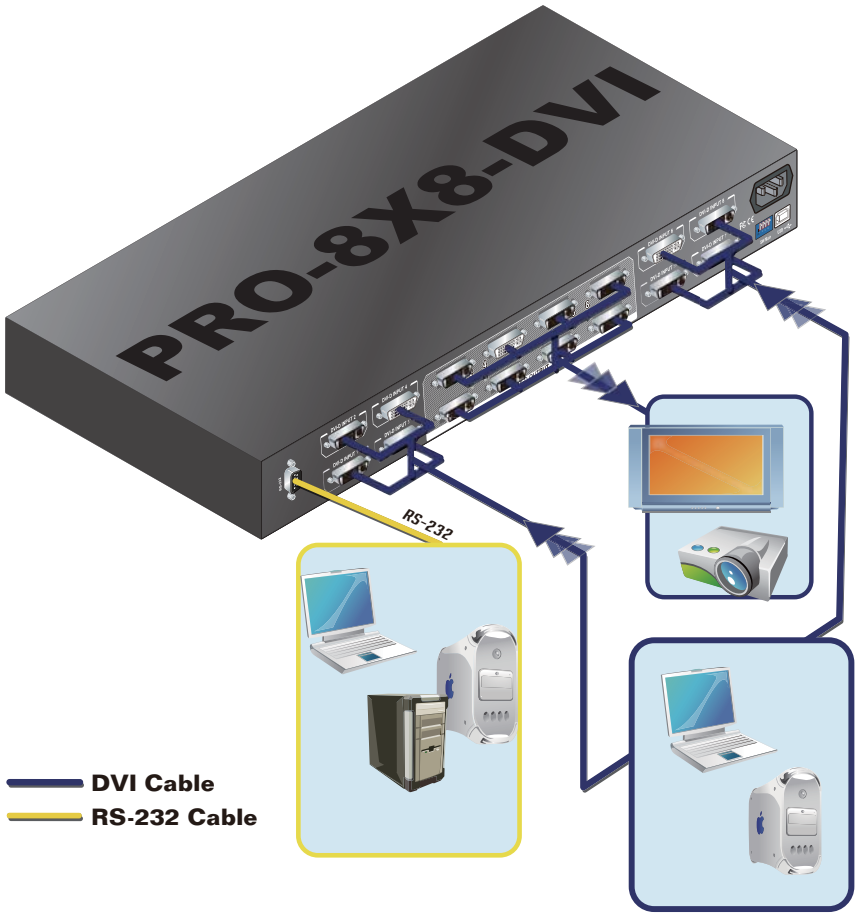
- Follow all instructions and warnings marked on this unit.
- Do not attempt to service this unit yourself, except where explained in this manual.
- Provide proper ventilation and air circulation and do not use near water.
- Keep objects that might damage the device and assure that the placement of this unit is on a stable surface.
- Use only the power adapter and power cords and connection cables designed for this unit.
- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.

Warranty Information

PESA Switching Systems, Inc., (PESA) warrants this equipment against defective workmanship or materials for a period of one (1) year from date of shipment. The sole warranty responsibility of PESA, shall be to replace or repair product proved to be defective. During the warranty period, defective parts will be replaced at no charge. Labor to repair or replace defective parts covered under the warranty will be performed at no charge at PESA. This warranty covers only products manufactured by PESA, and the components used in their manufacture. The warranty on assembled products sold by PESA., but manufactured by others shall be that of the original manufacturer. This warranty does not include shipping damage or damage caused by abuse, neglect, tampering by unauthorized personnel, damage inadvertently caused by the user, preventative maintenance, or any equipment or part thereof whose serial number has been removed or defaced. Neither the seller nor the manufacturer shall be liable for any injury, loss or damage, direct or consequential, arising out of the inability to use the product. Before using, user shall determine the suitability of the product for the intended use, and user assumes all risk and liability whatsoever in connection therewith. This warranty is effective only at the PESA factory in Huntsville, Alabama, USA. If possible, retain the original packing material for use in the unlikely event that your equipment must be returned to the PESA factory. When shipping your equipment, the shipping charges must be prepaid. The repaired unit will be returned to you, freight prepaid. This warranty is exclusive and in lieu of all other warranties, whether expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose.

INTRODUCTION

The PESA **PRO-8X8-DVI 8X8 DVI Router** provides the most flexible and cost effective solution in the market to route high definition video sources from any of the eight DVI source devices to any eight digital displays at the same time. This solution is well suited for digital signage, conference room presentation systems, or other similar setting or application.



Features

- DVI single link compliant
- Allows any source to be displayed on multiple displays at the same time
- Allows any DVI display to view any DVI source at any time
- Supports default DVI EDID and learns the EDID of displays
- The router can switch every output channel to any DVI input by push button control, IR remote control, USB or RS-232 serial control
- Easy installation with 1RU rack-mounting designs
- Fast response time – 2~5 seconds for channel switch

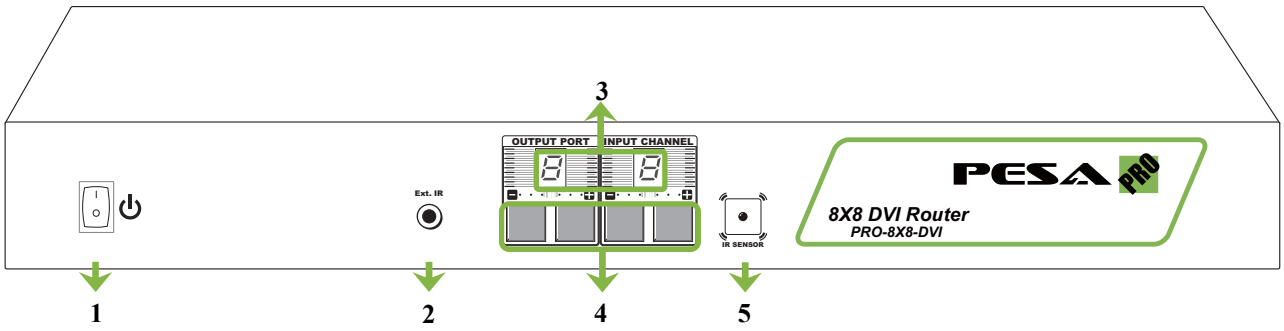
Specifications & Package Contents

Model Name		PRO-8X8-DVI
Technical		
Role of usage		8x8 router / matrix
DVI compliance		Yes
HDCP compliance		No
Video bandwidth		Single-link 165MHz (4.95Gbps)
Video support		VGA 640x480 ~ WUXGA 1920x1200, 480p ~ 1080p
ESD protection		Human body – ±19kV air-gap discharge & ±12kV contact discharge Core chipset – ±8kV
PCB stack-up		4-layer board (impedance control – differential 100Ω; single 50Ω)
Input		8x DVI + 1x RS-232 + 1x USB + 1x 3.5mm for IR receiver
Output		8x DVI
DVI Input selection		Push button / IR / RS-232 / USB
IR remote control		Electro-optical characteristics: τ = 25° / Carrier frequency: 38kHz
DVI connector		Type DVI-I (29-pin female)
RS-232 connector		DE-9 [9-pin D-sub female]
USB connector[3]		Standard type-B [square shape]
3.5mm connector		Earphone jack for IR receiver
DIP switch		4-pin for operation & firmware update
Mechanical		
Housing		Metal enclosure
Dimensions L x W x H	Model	1RU - 1’5”x7.9”x1.7” / 440x200x44mm
	Package	11”x1’10”x1’5” / 280x550x420mm
Weight	Model	5.9 lbs / 2675g
	Package	8.8 lbs / 4kg
Fixedness		1RU rack mounting
Power supply		AC Power 100-240V
Power consumption		60 Watts (max)
Operation temperature		32-104°F / 0-40°C
Storage temperature		-4-140°F / -20-60°C
Relative humidity		20-90% RH (no condensation)
Package Contents		**1x PRO-8X8-DVI** **1x IR receiver cable** **1x IR remote control** **2x 1RU rack mounting ear** **1x UL AC C13 power cord** **1x Installation CD** **1x User manual**

USB or RS-232 control must be connected either one at a time. Connecting both types of cables may cause command confusion..

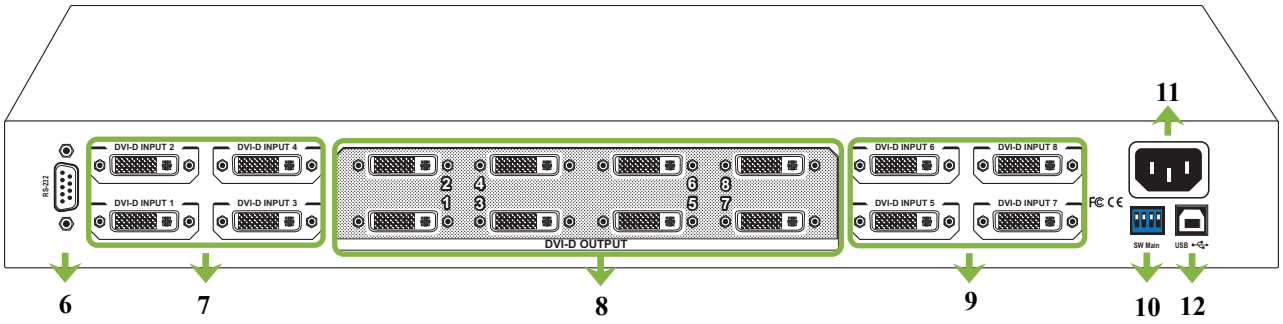
PANEL DESCRIPTION

Front Panel



1. Power on/off control switch
2. 3.5mm IR socket for plugging in the external IR receiver
3. LED indicators for output port and input channel mapping display
4. Front panel push buttons for selecting desired input channel and output port
5. IR sensor to receive IR command signals

Rear Panel



6. RS-232 port for serial channel control via PC
7. DVI-D inputs for connecting to each source device via a DVI cable
8. DVI-D outputs for connecting to each display via a DVI cable or a DVI extender
9. DVI-D inputs for connecting to each source device via a DVI cable
10. 4-pin DIP switch for operation & firmware update (see DIP SWITCH section)
11. 100-240V AC Power to connect to C13 power cord
12. USB control port for serial channel control via PC

SW Main for firmware update (for technical support only)

DIP Switch Position		Pin no.1	Pin no.2	Pin no.3	Pin no.4
Normal operation via RS-232 port[1]		Off (↑)	Off (↑)	On (↓)	Off (↑)
Normal operation via USB port[2]		Off (↑)	Off (↑)	On (↓)	On (↓)
Firmware update[3]	Block A – main	On (↓)	Off (↑)	On (↓)	Off (↑)
	Block B – remote	On (↓)	On (↓)	On (↓)	Off (↑)

Note

1. Factory default for SW Main is pin no.1 at off (↑), pin no.2 at off (↑), pin no.3 at on (↓), and pin no.4 at off (↑). PLEASE MAINTAIN THIS SETTING AT ANYTIME FOR REGULAR USE VIA RS-232 CONTROL!
2. Factory default for SW Main is pin no.1 at off (↑), pin no.2 at off (↑), pin no.3 at on (↓), and pin no.4 at on (↓). PLEASE MAINTAIN THIS SETTING AT ANYTIME FOR REGULAR USE VIA USB CONTROL!
3. Sequence for firmware update

WARNING!

Firmware update only can be done via RS-232 port and connection to PC set at COM1

1. Turn off the PRO-8X8-DVI. Execute the firmware update program on your PC via COM1 port connection to the RS-232 port of the PRO-8X8-DVI.
2. Set the pin no.1 of **SW Main** at on (↓) for firmware update mode.
3. Set pin no.2 and pin no.3 at respective positions to assign which Block to be updated.
4. Turn on the PRO-8X8-DVI. The firmware update program should begin this update sequence automatically. If not, please check the RS-232 connection status between PC and PRO-8X8-DVI.
5. After the OK message shows up to indicate the firmware update sequence for designated Block is complete, please turn off the PRO-8X8-DVI.
6. Repeat step 3 ~ step6 if you want to update the firmware of the remaining Block.
7. Set the **SW Main** switch position to Normal Operation Mode.
8. Turn on the PRO-8X8-DVI.

3.5mm IR Socket

Ext. IR: Plug the IR receiver here to receive all IR command signals from the IR remote control

INSTALLATION

1. Connect all sources to DVI-D inputs on the PRO-8X8-DVI.
2. Connect all displays to DVI-D outputs on the PRO-8X8-DVI.
3. Connect the IR receiver to the **Ext. IR** jack on the front panel of PRO-8X8-DVI and direct the IR receiver to where it can receive IR commands from the IR remote reliably.
4. Connect the UL AC C13 power cord to the power jack on the PRO-8X8-DVI.
5. Turn on all DVI devices.
6. Turn on the PRO-8X8-DVI.

Diagram

CHANNEL CONTROL

Method A: Push Button

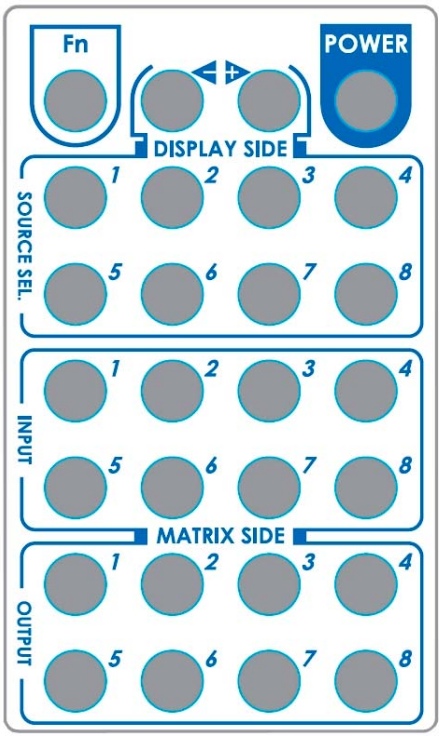
1. Press the buttons on **OUTPUT PORT** to select which port to be changed.
   "**+**": change selected output port in ascending order
   "**—**": change selected output port in descending order
2. Press the buttons on **INPUT CHANNEL**. The source will be sequentially changed. After few seconds, the setting will be active.

Method B: IR Remote Control

a. Firstly please push one of the **INPUT** buttons to choose which DVI input source you are going to setup. After that, you can ha6ve multiple outputs playing the same content from the selected **INPUT 1** to **INPUT 8** by pushing the corresponding **OUTPUT** buttons. The setting will be effective in a couple of seconds.

INPUT & OUTPUT MAPPING

INPUT 1	DVI input port 1
INPUT 2	DVI input port 2
INPUT 3	DVI input port 3
INPUT 4	DVI input port 4
INPUT 5	DVI input port 5
NPUT 6	DVI input port 6
INPUT 7	DVI input port 7
INPUT 8	DVI input port 8
OUTPUT 1	DVI output port 1
OUTPUT 2	DVI output port 2
OUTPUT 3	DVI output port 3
OUTPUT 4	DVI output port 4
OUTPUT 5	DVI output port 5
OUTPUT 6	DVI output port 6
OUTPUT 7	DVI output port 7
OUTPUT 8	DVI output port 8

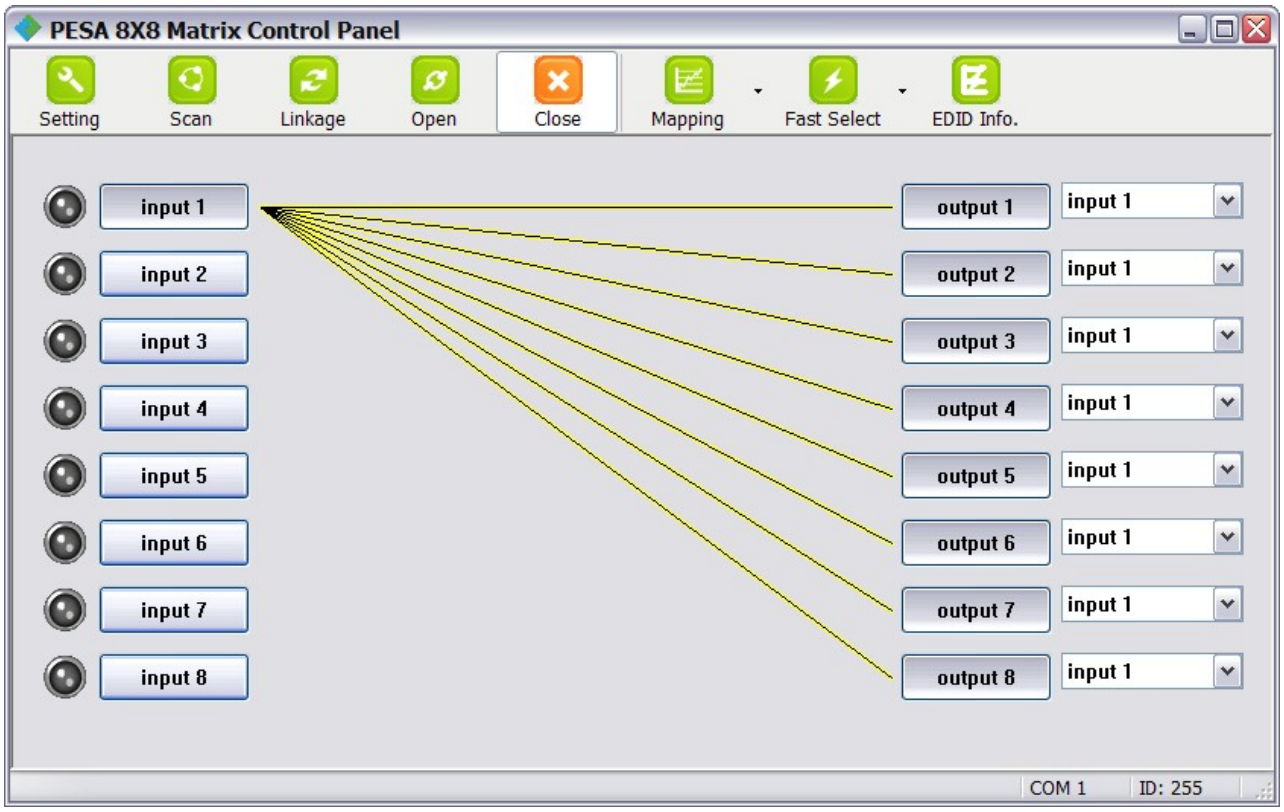


FUNCTION KEY

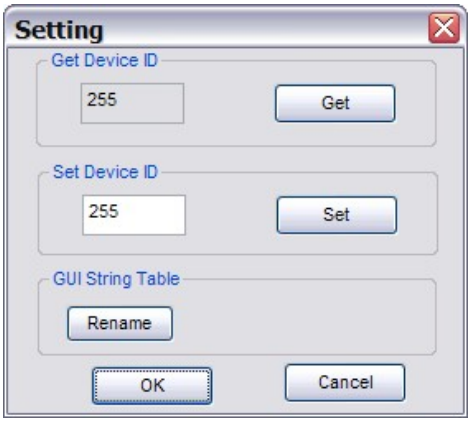
	Function
FN + SOURCE SEL. 1	Escape System LOCK
FN + SOURCE SEL. 2	Enter System LOCK (most buttons, IR control, and RS-232 control become inactive, except Escape System LOCK command)

Method C: Software Control through RS-232 or USB

Software Control Panel



1. **Setting**



Click on **Get** to read back device ID.

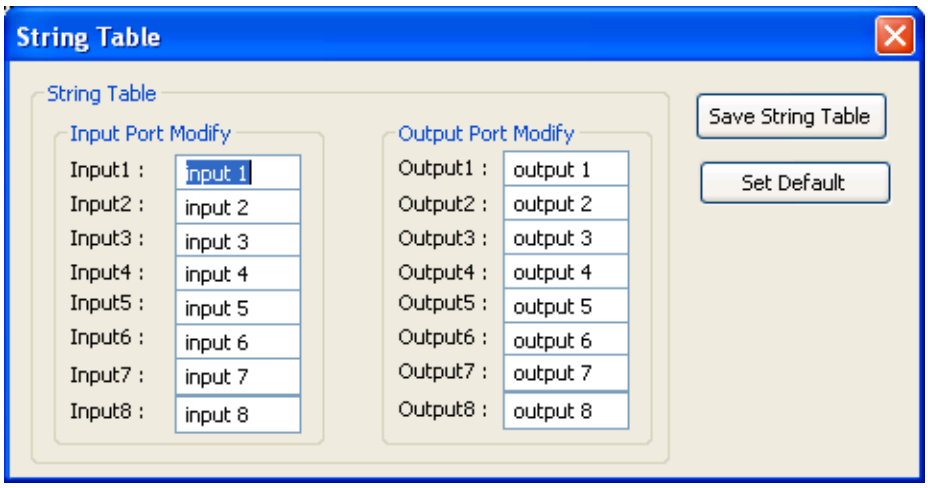
Click on **Set** to write device ID.

Click on **Rename** to open the String Table.

In the String Table, assign the captions for each input and output port for easy recognition.

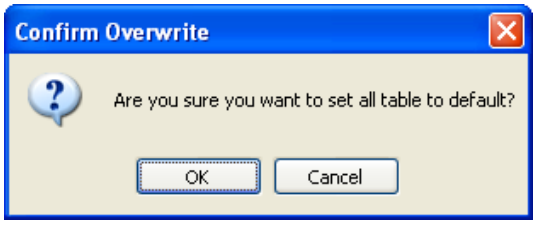
For example:

Rename the Input1 to “Desktop PC1”, Input2 to “Laptop2,” input3 to “PC3,” input4 to “PC4,” input5 to “Laptop5,” … etc., and rename output1 to “Conf. RM1,” output2 to “Conf. RM2,” output3 to “Lobby,” output4 to “Main projector,” … etc.

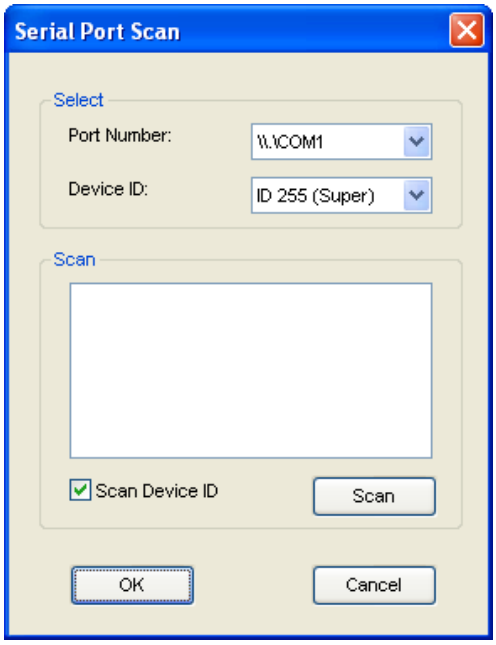


Click on **Save String Table** to save the caption setting (turn effective after program restart)

Click on **Set Default** to pop up the confirmation message below to erase the captions and reset the string table back to default setting. (turn effective after program restart)



2. **Scan**



Serial Port Scan:

Click on **Scan**, the machine will scan the all COM port and show them.

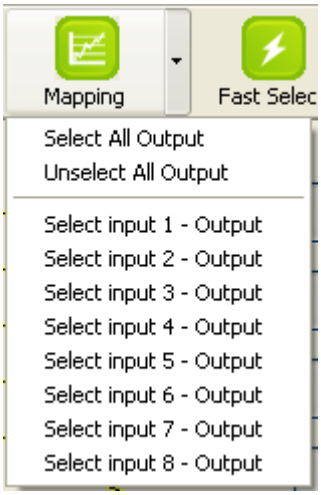
Select the RS232 serial port connected to the router unit.
And set device ID 255 is for all device.
Only the same device id or 255 can get the command you sent.

Click on **OK**. Get the new status from the router unit for the port you select.

3. **Linkage:** Click on **Linkage** to read back all status.

4. **Open/Close:** Click on **Open** or **Close** to close or open COM port.

5. **Mapping**



Select All Output

Click on **Select All Output**", and then select the source on main menu. You can quickly set all output to the same source.

Unselect All Output:

Release output selection.

Select Input1~8-Output:

Select Input Source. Then select the output port icon.

For example:

Select input source 1. Then select output ports one and two. The video and audio will be sent to ports one and two.

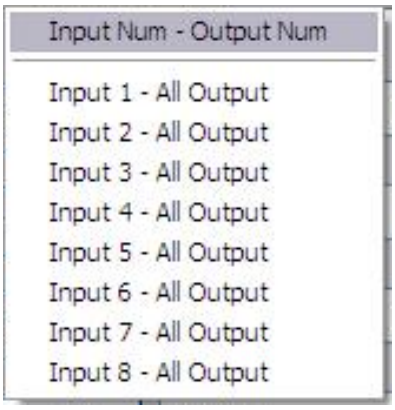
6. **Fast Select**

Click on **Fast Select**. Quick setting.

Input one > Output Port one

Input two > Output Port two

…..



Click on **Fast Select** pull down menu.

Select Input Num-Output Num

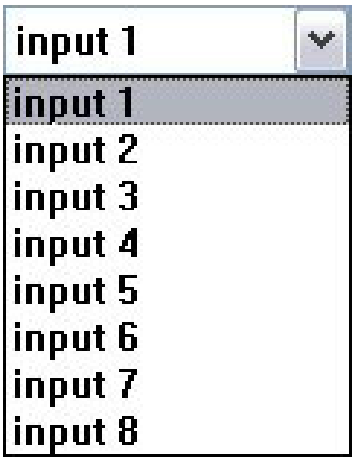
Input source #1 > Output port #1

Input source #2 > Output port #2 …..

Select Input* - All Output

Send the same source to all output.

7. Output Port:
   Pull down menu and select which source to be sent to this output port.



One by one setting

On main menu screen.

First select input source. Then select the output ports which you want to send the video and audio from this source. When you select the input source, the source will change to gray. When you select the output port one by one, the selected output port will change to gray.

The linking line will change to yellow.

Group setting

First select output ports one by one. Then select the input source. The selected output ports change the setting at the same time.

Terminal Settings:

Baud rate:	9600
Data length:	8bit
Parity check:	No
Stop bit:	1

Command Set:

COMMAND	ACTION	COMMAND	ACTION
ST	System Status	**VR**	Firmware Version
A1	Output A selects Input 1	**E1**	Output E selects Input 1
A2	Output A selects Input 2	**E2**	Output E selects Input 2
A3	Output A selects Input 3	**E3**	Output E selects Input 3
A4	Output A selects Input 4	**E4**	Output E selects Input 4
A5	Output A selects Input 5	**E5**	Output E selects Input 5
A6	Output A selects Input 6	**E6**	Output E selects Input 6
A7	Output A selects Input 7	**E7**	Output E selects Input 7
A8	Output A selects Input 8	**E8**	Output E selects Input 8
B1	Output B selects Input 1	**F1**	Output F selects Input 1
B2	Output B selects Input 2	**F2**	Output F selects Input 2
B3	Output B selects Input 3	**F3**	Output F selects Input 3
B4	Output B selects Input 4	**F4**	Output F selects Input 4
B5	Output B selects Input 5	**F5**	Output F selects Input 5
B6	Output B selects Input 6	**F6**	Output F selects Input 6
B7	Output B selects Input 7	**F7**	Output F selects Input 7
B8	Output B selects Input 8	**F8**	Output F selects Input 8
C1	Output C selects Input 1	**G1**	Output G selects Input 1
C2	Output C selects Input 2	**G2**	Output G selects Input 2
C3	Output C selects Input 3	**G3**	Output G selects Input 3
C4	Output C selects Input 4	**G4**	Output G selects Input 4
C5	Output C selects Input 5	**G5**	Output G selects Input 5
C6	Output C selects Input 6	**G6**	Output G selects Input 6
C7	Output C selects Input 7	**G7**	Output G selects Input 7
C8	Output C selects Input 8	**G8**	Output G selects Input 8
D1	Output D selects Input 1	**H1**	Output H selects Input 1
D2	Output D selects Input 2	**H2**	Output H selects Input 2
D3	Output D selects Input 3	**H3**	Output H selects Input 3
D4	Output D selects Input 4	**H4**	Output H selects Input 4
D5	Output D selects Input 5	**H5**	Output H selects Input 5
D6	Output D selects Input 6	**H6**	Output H selects Input 6
D7	Output D selects Input 7	**H7**	Output H selects Input 7
D8	Output D selects Input 8	**H8**	Output H selects Input 8

EDID LEARNING

The PRO-8X8-DVI has a built-in EDID profiles designed to cover most of the widely used resolutions for the ease of installation.

Default EDID

Native/preferred timing: 1680 x 1050p at 60Hz (16:9)

Detailed timing #1: 1920 x 1200p at 60Hz (16:9)

Standard timings supported:

1920 x 1080p at 60Hz
1600 x 1200p at 60Hz
1440 x 900p at 60Hz
1360 x 765p at 60Hz
1280 x 1024p at 60Hz, 75Hz
1280 x 960p at 60Hz
1280 x 800p at 60Hz
1152 x 870p at 75Hz
1152 x 864p at 75Hz
1024 x 768p at 60Hz, 70Hz, 75Hz, 87Hz
800 x 600p at 56Hz, 60Hz, 72Hz, 75Hz
720 x 400p at 70Hz
640 x 480p at 60Hz, 67Hz, 72Hz, 75Hz

Learning EDID from front panel

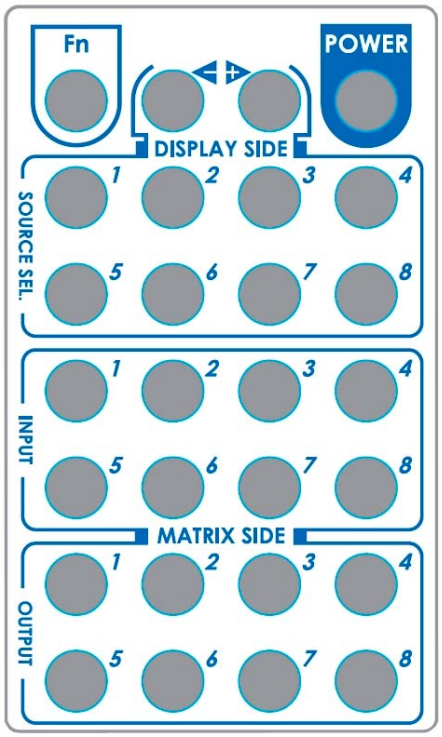
The EDID learning function is only necessary whenever you encounter any display on the DVI output port that cannot play video properly. Because the DVI source devices and displays may have various level of capability in playing video, the general principle is that the source device will output the lowest standards in video resolutions to be commonly acceptable among all DVI displays. In this case, a 1024x768 output would probably be the safest choice. Nevertheless, the user can force the router to learn the EDID of the lowest capable DVI display among others to make sure all displays are capable to play the DVI signals normally by performing the procedures from the front panel of PRO-8X8-DVI:

1. Select the desired **Output Port** and **Input Channel** that the EDID of the display connected to this specified output port can be learned for the specified input channel.
2. Press the "**+**" button of the **Output Port** and "**—**" button of the **Input Channel** at the same time for 2 seconds.
3. Release these two buttons. The EDID of the display connected to the chosen output will be written to the chosen input.
4. If the operation is successful, the LED of **Input Channel** will show  (OK). If the operation is not successful, it will show (failure).

If the user wants to restore the default EDID profile to any specified input, please follow the steps:

1. Select the desired input that needs to restore the default EDID profile matching the LED on the **Output Port** (not **Input Channel!**).
2. Press the "**+**" button of the **Output Port** and the "**+**" button of the **Input Channel** at the same time for 2 seconds.
3. Release these two buttons. The default EDID profile will be restored to the input port selected and display on the LED of **Output Port**. If the operation is successful, the LED of **Input Channel** will show  (OK). If the operation is not successful, it will show  (failure).

***Default Custom Code* — IR2 Code: 00 FF**



Function **0x17**	**0x0A**	**0x0C**	POWER **0x02**
SOURCE SEL. 1 **0x54**	SOURCE SEL. 2 **0x55**	SOURCE SEL 3 **0x56**	SOURCE SEL. 4 **0x01**
SOURCE SEL. 5 **0x57**	SOURCE SEL. 6 **0x58**	SOURCE SEL. 7 **0x59**	SOURCE SEL. 8 **0x06**
INPUT 1 **0x18**	INPUT 2 **0x5B**	INPUT 3 **0x19**	INPUT 4 **0x07**
INPUT 5 **0x1B**	INPUT 6 **0x5A**	INPUT 7 **0x1A**	INPUT 8 **0x04**
OUTPUT 1 **0x0E**	OUTPUT 2 **0x0D**	OUTPUT 3 **0x12**	OUTPUT 4 **0x05**
OUTPUT 5 **0x1C**	OUTPUT 6 **0x1D**	OUTPUT 7 **0x1F**	OUTPUT 8 **0x1E**

***Custom Code* — IR3 Code: 0x12 0x21**

Custom Code: 0x12 0x21								
	Output 1	Output 2	Output 3	Output 4	Output 5	Output 6	Output 7	Output 8
Source 1	**0xA1**	**0xB1**	**0xC1**	**0xD1**	**0xE1**	**0xF1**	**0x11**	**0x21**
Source 2	**0xA2**	**0xB2**	**0xC2**	**0xD2**	**0xE2**	**0xF2**	**0x12**	**0x22**
Source 3	**0xA3**	**0xB3**	**0xC3**	**0xD3**	**0xE3**	**0xF3**	**0x13**	**0x23**
Source 4	**0xA4**	**0xB4**	**0xC4**	**0xD4**	**0xE4**	**0xF4**	**0x14**	**0x24**
Source 5	**0xA5**	**0xB5**	**0xC5**	**0xD5**	**0xE5**	**0xF5**	**0x15**	**0x25**
Source 6	**0xA6**	**0xB6**	**0xC6**	**0xD6**	**0xE6**	**0xF6**	**0x16**	**0x26**
Source 7	**0xA7**	**0xB7**	**0xC7**	**0xD7**	**0xE7**	**0xF7**	**0x17**	**0x27**
Source 8	**0xA8**	**0xB8**	**0xC8**	**0xD8**	**0xE8**	**0xF8**	**0x18**	**0x28**

***Custom Code* — IR4 Code: 0x13 0x31**

Custom Code: 0x13 0x31								
	Output 1	Output 2	Output 3	Output 4	Output 5	Output 6	Output 7	Output 8
Source 1	**0xAE**	**0xBE**	**0xCE**	**0xDE**	**0xEE**	**0xFE**	**0x1E**	**0x2E**
Source 2	**0xAD**	**0xBD**	**0xCD**	**0xDD**	**0xED**	**0xFD**	**0x1D**	**0x2D**
Source 3	**0xAC**	**0xBC**	**0xCC**	**0xDC**	**0xEC**	**0xFC**	**0x1C**	**0x2C**
Source 4	**0xAB**	**0xBB**	**0xCB**	**0xDB**	**0xEB**	**0xFB**	**0x1B**	**0x2B**
Source 5	**0xAA**	**0xBA**	**0xCA**	**0xDA**	**0xEA**	**0xFA**	**0x1A**	**0x2A**
Source 6	**0xA9**	**0xB9**	**0xC9**	**0xD9**	**0xE9**	**0xF9**	**0x19**	**0x29**
Source 7	**0xA8**	**0xB8**	**0xC8**	**0xD8**	**0xE8**	**0xF8**	**0x18**	**0x28**
Source 8	**0xA7**	**0xB7**	**0xC7**	**0xD7**	**0xE7**	**0xF7**	**0x17**	**0x27**

Note: Using terminal to set Custom Code

Example: Set custom code from 0x01 0xEE to 0x13 0x31
>>IR4 ---------- command (using RS-232 terminal command mode)
>>IR4 ---------- echo

Command	Custom Code
IR2	0x00 0xFF
IR3	0x12 0x21
IR4	0x13 0x31

For further information, please check the installation CD.

NOTICE

USB or RS-232 control must be connected either one at a time. Connecting both types of cables may cause command confusion.

TROUBLESHOOTING

1. **Why the buttons on the front panel and remote control are all out of control?**
   It might be because of a function called System Lock which can prevent unnecessary misusage after installation. Please refer to the CHANNEL CONTROL section to know how to unlock.

2. **Can every HDMI monitor or projector work with the DVI router?**
   Basically, the answer is YES. But if your HDMI display cannot support 1920x1200 or 1920x1080, please refer the EDID LEARNING section to learn EDID from the monitor or projector.

3. **What is EDID? Why do I need to learn EDID?**
   EDID contains the whole information of the display such as the resolution and audio setting which this display can support. Therefore, based on the EDID information, media player will pick up the most suitable resolution and audio setting to the display. In order to faithfully transmit the EDID information from display to the media player, learning EDID from display to this device is necessary.

4. **What should I do to learn EDID for the router?**
   Due to the limitation of DVI, the source device can only output one video resolution at any given time. The mechanism of EDID Learning is to pick up the DVI display with the lowest capability among the ones you would use for this input source. For example, if user would like to play the input-2 upon output-3, output-5 and output-8, and only output-5 cannot support 1920x1200 (support up to 1024x768 only), please learn the EDID from the display connected to the output-5 at the input-2 port. Of course, if output-5 could get the DVI signals from every DVI input, please learn EDID information from output5 to all eight DVI inputs. For more information about EDID Learning, please refer to EDID LEARNING section.

PRO-8X8-DVI

8X8 DVI Router

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