GefenPRO®

1080P PROGRESSIVE

dvi digital visual interface

16x16 DVI Matrix w/ Push Button Control

GEF-DVI-16416-PB

User Manual

www.gefenpro.com

ASKING FOR ASSISTANCE

Technical Support:

Telephone	(818) 772-9100 (800) 545-6900
Fax	(818) 772-9120

Technical Support Hours:

8:00 AM - 5:00 PM Monday through Friday, Pacific Time
For 24 / 7 support, see the front panel of the product for the support number

Write To:

Gefen, LLC
c/o Customer Service
20600 Nordhoff St
Chatsworth, CA 91311

www.gefenpro.com
support@gefenpro.com

Notice

Gefen, LLC reserves the right to make changes in the hardware, packaging, and any accompanying documentation without prior written notice.

16x16 DVI Matrix w/ Push Button Control
is a trademark of Gefen LLC

CONTENTS

INTRODUCTION

Congratulations on your purchase of the GefenPRO 16x16 DVI Matrix w/ Front Panel Push Button Control. Your complete satisfaction is very important to us.

GefenPRO

In the realm of video distribution, certain features are invaluable in a commercial or broadcast environment. Accommodations such as a build-in power supply and flat black rack-mount enclosures set GefenPRO apart from our traditional products. Complex distribution units allow for professional DVI, 3G-SDI, and HDMI signals to be routed and converted easily and seamlessly, while being backed up by a renowned and dependable technical support team. Gefen invites you to explore the GefenPRO product line and hopes that you find the solution that fits your needs.

The GefenPRO 16x16 DVI Matrix w/ Front Panel Push Button Control

Simplify the process of routing up to 16 DVI sources to any of 16 DVI monitors without losing quality or resolution. This Matrix provides a simple, reliable, and highly effective method of streamlining any installation using multiple sources and outputs, taking the hassle out of managing multiple connections. Each DVI source is accessible at all times by any monitor using the front-panel buttons, IR remote unit, built-in RS-232 or using IP control.

How It Works

Connect 16 sources to the DVI input ports on the Matrix using the supplied DVI cables. Connect 16 monitors to the Matrix. Power on the source devices and the monitors. Plug in the power cord and power on the Matrix. Use the push buttons on the front panel for routing each DVI source to the desired display. The connected monitors will display video according to the routing state.

NOTE: This Matrix only supports DVI-D. The DVI connectors on the Matrix all have 29 pins.

OPERATION NOTES

READ THESE NOTES BEFORE INSTALLING OR OPERATING THE GEFENPRO 16X16 DVI MATRIX W/ FRONT PANEL PUSH BUTTON CONTROL

- The 16x16 DVI Matrix w/ Push Button Control does not support HDCP content.
- Make sure that a DVI monitor is powered and connected to one of the DVI outputs on the 16x16 DVI Matrix w/ Push Button Control before applying power. By default, the Local EDID is read from the connected monitor and is copied to all 16 DVI inputs once the Matrix has been turned on. If a monitor is not detected by the Matrix at power-on, a default (internal) EDID of 640x480 will be used. This functionality can be disabled using the Secure Local EDID function using RS-232 or IP control.
- There is no internal scaling in the 16x16 DVI Matrix w/ Push Button Control. Each monitor attached to the Matrix must be able to display the resolutions output by the source device(s).
  For maximum compatibility it is recommended that only one common resolution be used by each source device.
- Advanced EDID features and IP configuration features are accessible through the RS-232 serial command set.
- Routing and EDID features can be managed using the built-in IP control feature.
- This matrix supports Dynamic EDID. See page 60 for details.
- The Gefen Syner-G Software Suite is a free downloadable application from Gefen that provides automatic download and installation of firmware upgrades for this product.

  Download the application here: http://www.gefen.com/support/download.jsp

- The Gefen Matrix Switcher Keyboard Controller is a free downloadable application from Gefen that allows a computer keyboard to be used to switch between sources. This application uses the Telnet protocol to control any Gefen switcher or matrix that uses IP control.

  Download the application here: http://www.gefen.com/support/download.jsp

IMPORTANT: If the unit is installed in a closed or multi-rack assembly, do not block the ventilation holes of the enclosure.

FEATURES

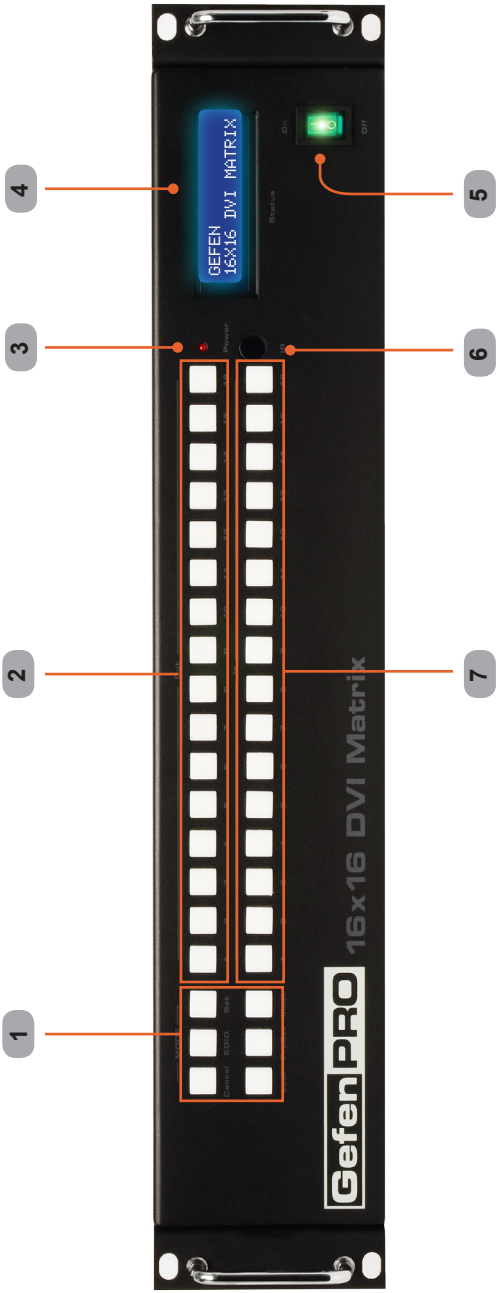
Features

- Supports resolutions up to 1920 x 1200
- Front-panel push buttons for local switching
- Front-panel LCD Display
- Switching is controlled via front panel buttons, IR remote, IP, or RS-232 commands
- Compatible with the Gefen Keyboard Controller software
- Advanced EDID management
- Programmable routing presets
- Standby mode
- Output masking control
- IP control and configuration with built-in Web server
- Internal power supply
- Rack-mountable

Package Includes

(1) GefenPRO 16x16 DVI Matrix w/ Front Panel Push Button Control
(16) 6 ft. DVI cables (M-M)
(1) IR Remote Control Unit
(1) AC Power Cord
(1) Quick-Start Guide

Front Panel


4
5
3
6
2
7
1
GEFEN
16X16 DVI MATRIX
On
Off
Status
Power
Cancel
EDID
Set
16x16 DVI Matrix
GefenPRO

PANEL DESCRIPTIONS

Front Panel

1 Mode Buttons
These buttons are used to control routing, masking, presets on the matrix. See the information beginning with page 12 for more information.

2 Output Buttons (1 - 16)
Used for routing an Input to an Output. Each of these buttons represents an Output. See page 13 for more information on routing DVI sources.

3 Power Indicator
This LED indicator will glow red when the power is turned on.

4 LCD Display
Displays the current routing status of the Matrix and is also used to manage source routing.

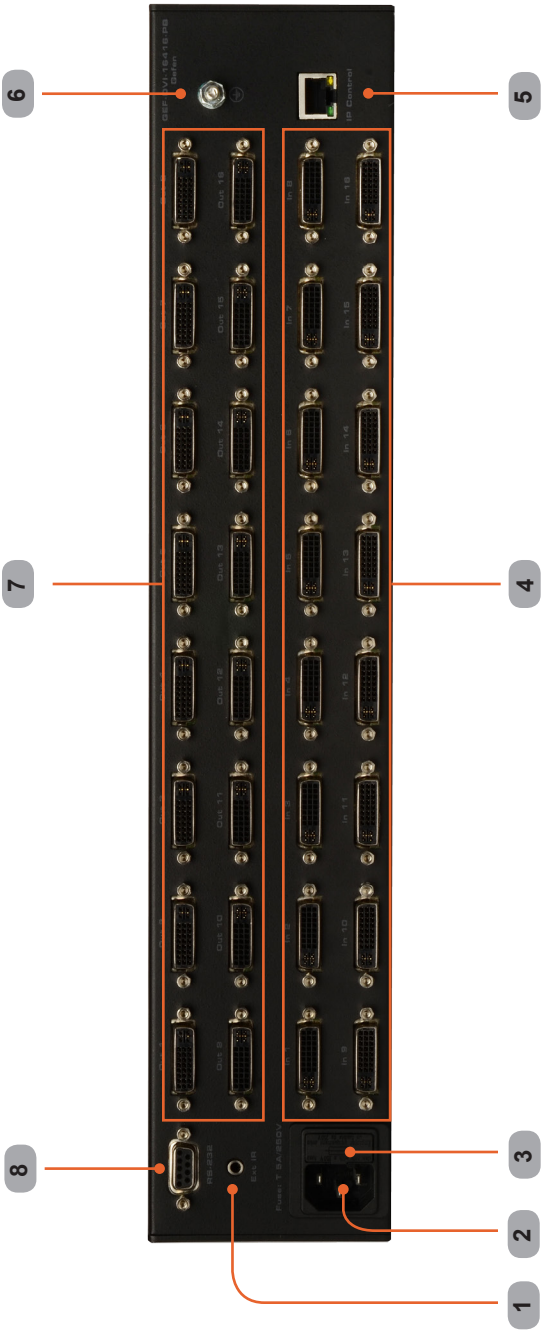
5 Power
Used to power ON and power OFF the matrix.

6 IR Window
Receives signals from the IR Remote Control unit.

7 Input Buttons (1 - 16)
Used for routing an Input to an Output. Each of these buttons represents an Input. See page 13 for more information on routing DVI sources.

PANEL LAYOUT

Back Panel



PANEL DESCRIPTIONS

Back Panel

1 IR Extender Port
Connect an optional IR extender to this port.

2 AC 110 / 220 V AC (50/60 Hz) Power Cable Receptacle
Connect the included AC power cord from this receptacle to an available electrical outlet.

3 Fuse Drawer
Each power receptacle houses a fuse drawer. Within each fuse drawer are two (2) 250 V fuses. One fuse is active and the other is a spare.

4 DVI Input Ports (1 - 16)
Connect DVI source devices to these ports.

5 IP Control Interface
Connect to this port to control the 16x16 DVI Matrix w/ Push Button Control using IP Control. See page 31 for more information.

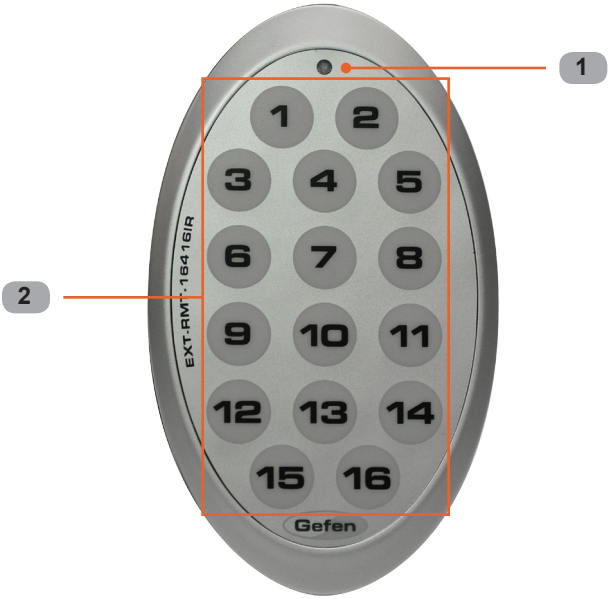
6 Grounding Terminal
Provides a discharge path to ground in case a short circuit occurs between the “hot” lead of the power supply and the enclosure of the Matrix. The grounding wire should be attached from the grounding terminal to an approved ground path.

7 DVI Output Ports (1 - 16)
Connect DVI monitors to these ports.

8 RS-232 Serial Port
Connects to the RS-232 control device. The 16x16 DVI Matrix w/ Push Button Control may be switched remotely using this port. See page 30 for more information.

IR REMOTE DESCRIPTION

RMT-16416IR
Remote Control Unit



1 ***Activity Indicator***
This LED will be activated momentarily each time a button is pressed.

2 ***Display and Source Selection Buttons (1 - 16)***
These buttons are used to select which source is routed to a monitor.

Routing Sources using the Remote Control unit

Issuing a routing command is a two step process. The first step is to select the monitor (1-16) to which the source will be routed. The second step is to select the source (1-16).

Example:
Route the source device connected to In 6 to the monitor connected to Out 4.

1. Press button 4 (Out 4) on the IR remote control unit.

2. Press button 6 (In 6) on the IR remote control unit.

The source connected to In 6 will be routed to the monitor connected to Out 4.

IR REMOTE INSTALLATION

Installing the RMT-16416IR Battery

1. Remove the battery cover on the back of the IR Remote Control unit.
2. Insert the included battery into the open battery slot. The positive (+) side of the battery should be facing up.
3. Replace the battery cover.

The Remote Control unit ships with two batteries. One battery is required for operation and the other battery is a spare.

WARNING: Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

IR REMOTE CONFIGURATION

How to Resolve IR Code Conflicts

In the event that IR commands from other remote controls interfere with the supplied IR Remote Control unit, changing the IR Remote Control's IR channel will fix the problem. The IR Remote Control unit has a bank of DIP switches used for setting the IR channel.

The DIP switch bank is located underneath the battery cover.

Remote Channel 0: Default

Remote Channel 1:

Remote Channel 2:

Remote Channel 3:

Left: Picture of the opened rear battery compartment of the IR remote showing the exposed DIP Switch bank between the battery chambers.

It is important that the IR channel on the Remote Control unit, matches the IR channel set on the 16x16 DVI Matrix w/ Push Button Control. For example, if both DIP switches on the IR Remote Control unit are set to IR channel 0 (both DIP switches down), then the 16x16 DVI Matrix w/ Push Button Control must also be set to IR channel 0. See page 53 on how to change the IR channel on the 16x16 DVI Matrix w/ Push Button Control.

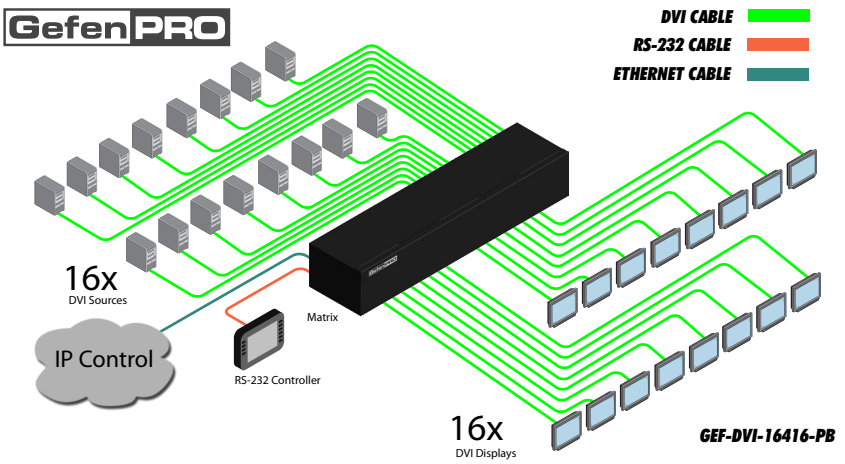
How to Connect the 16x16 DVI Matrix w/ Push Button Control

1. Connect up to 16 DVI source devices to the DVI inputs on the rear panel of the 16x16 DVI Matrix w/ Push Button Control using the supplied DVI cables.

2. Connect up to 16 DVI displays to the DVI outputs on the rear panel of the 16x16 DVI Matrix w/ Push Button Control using DVI cables.

3. Connect the included AC power cable to the power receptacle on the rear panel of the 16x16 DVI Matrix w/ Push Button Control. Connect the opposite end of the cable into an available electrical outlet.

Wiring Diagram

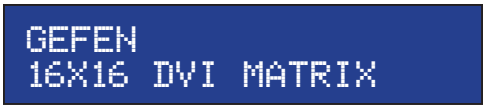


ATTENTION: This product should always be connected to a grounded electrical socket.

Main Display

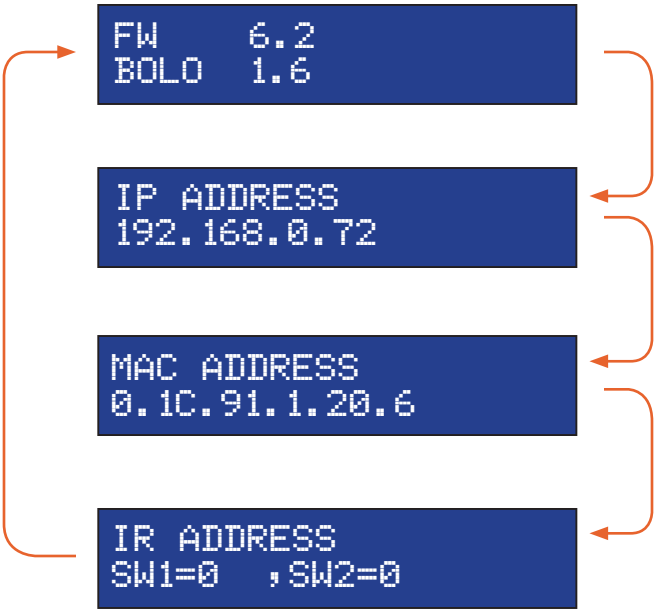
The **Main Display** of the 16x16 DVI Matrix w/ Push Button Control is a 16 character 2 line display. This display will show the Standby Screen and will also be used to aid in performing routing commands. When the unit is powered on, the following screen is displayed:

After a few moments, the *standby screen* is displayed. The *standby screen* is shown below:



Displaying Additional Information

Pressing the **Cancel** button, consecutively, will cycle through other screens such as firmware version and boot loader version:



Routing Inputs to Outputs

The following example illustrates the routing process. An input may be routed to a single or multiple outputs. Multiple inputs cannot be routed to a single output. For this example, we will route Input 6 to the following outputs: Output 3, Output 6, Output 7, and Output 9.

1. Press the **Set** button on the front panel. Pressing the **Set** button tells the matrix that we want to perform a routing, masking, or preset operation. The **Set** button will glow bright blue, indicating that it has been pressed.

2. The front-panel display will indicate that routing mode is active.

3. First, we need to specify the outputs. Press buttons 3, 6, 7, and 9. The selected buttons will glow bright blue.

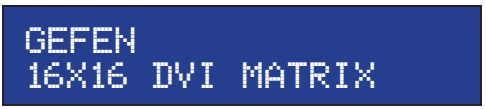
4. Select the desired input (source) button (1 - 16). For this example, we want to route the source connected to Input 6 to each of the outputs in step 3. Therefore, press button 6 on the bottom row. The selected input will glow bright blue.

> **NOTE:** Only one input can be routed at a time. If the wrong input button is accidentally pressed, then continue by pressing the correct input button. The previous input button will automatically be deselected.

5. Press the **Set** button on the front panel, again, to complete the routing operation.

   The front panel display will indicate that the routing process has been completed.

6. After a few moments, the selected buttons on the front panel will turn off and the matrix will return to the *standby screen*.



Getting the Current Routing Status of an Input

To display the current routing status of an input, press the desired input button on the front panel of the matrix. Once the input button is pressed, the routed outputs will be displayed.

From our previous routing example, we already know that Input 6 is routed to Output 3, 6, 7, and 9. Let's use this to illustrate how to retrieve the current routing status of an input.

(continued on next page)

1. Press the button for Input 6 on the matrix.

2. The current routing status for Input 6 will be displayed by the front panel buttons:

3. After a few moments the buttons will automatically turn off.

   To immediately dismiss the routing status and return to the *standby screen*, press the **Cancel** button.

Getting the Current Routing Status of an Output

To display the current routing status of an output, press the desired output button on the front panel of the matrix. Once the output button is pressed, the associated input will be displayed. We'll continue with the previous example.

1. Press the button for Output 3 on the matrix.

2. The current routing status for Output 3 will be displayed by the front panel buttons:

3. After a few moments the buttons will automatically turn off.

   To immediately dismiss the routing status and return to the *standby screen*, press the **Cancel** button.

One-to-One Routing

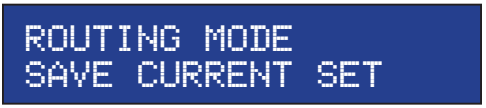
When an input-output pair share the same number, it is called "one-to-one" routing.
By default, the 16x16 DVI Matrix w/ Push Button Control is shipped in "one-to-one" mode.
This means that Input 1 is routed to Output 1, Input 2 is routed to Output 2, and so on.

Saving the Current Routing State

The 16x16 DVI Matrix w/ Push Button Control allows routing (and masking) states to be saved to internal non-volatile memory. Each routing state can be recalled at a later time (see Recalling a Saved Routing State). Even if the matrix is powered OFF, the presets will be retained in memory.

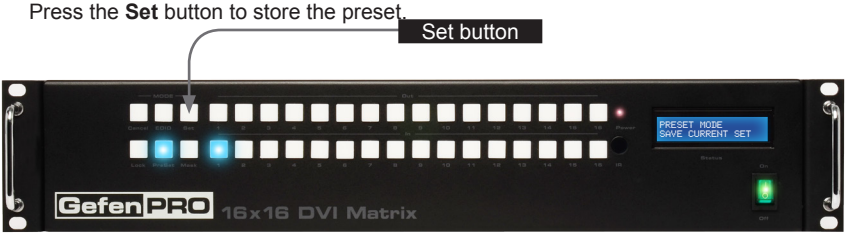
We'll illustrate an example by saving the routing state of Input 6, which we created on page 13.

1. Press the **PreSet** button, *twice*. The **PreSet** button will glow bright blue, indicating that it has been pressed. The front-panel display will indicate that the matrix is in "save preset" mode:



2. Select a preset memory location by pressing any of the first eight input buttons (1 - 8). The matrix supports up to eight preset locations. For this example, press the button **1**.

3. Press the **Set** button to store the preset.



(continued on next page)

4. The **Set** button will flash momentarily and the front-panel display will indicate that the preset has been saved.

5. After a few moments, the front-panel display will display the *standby screen*.

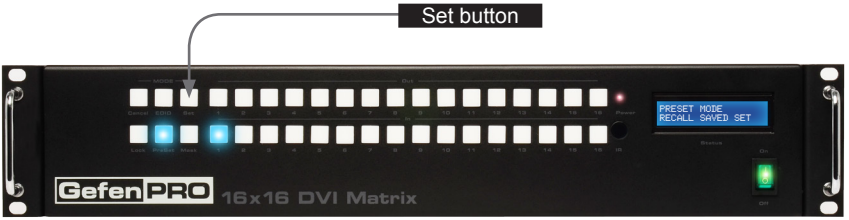
Recalling a Saved Routing State

The 16x16 DVI Matrix w/ Push Button Control allows saved routing (and masking) states to be recalled from memory for instant access. In this example, we will recall the routing preset that we stored in the previous example. In order to clearly see how this process works, try changing the routing state of Input 6 to Output 2. Then, use the steps below to recall the original routing state.

1. Press the **PreSet** button, *once*. The **PreSet** button will glow bright blue, indicating that it has been pressed. The front-panel display will indicate that the matrix is in "recall preset" mode:

2. Since we stored our preset in Preset 1, press the button for Input 1 to recall the routing state.

3. Press the **Set** button to recall the routing state from the selected location.



4. The **Set** button will flash momentarily and the front-panel display will indicate that the preset has been recalled.

```
PRESET MODE
COMPLETE
```

5. After a few moments, the front-panel display will display the *standby screen*.


```
GEFEN
16X16 DVI MATRIX
```

Masking Outputs

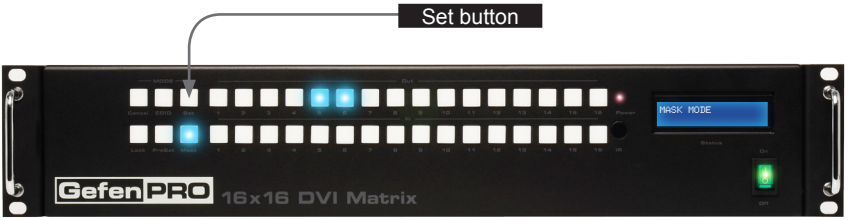
"Masking" prevents the output device (display, etc) from receiving an output signal. Instead of powering-down or disconnecting the output device, individual or multiple outputs can be masked. Inputs cannot be masked.

To illustrate masking, we'll use our original routing example from the section Routing Inputs to Outputs.

1. Press the **Mask** button. The Mask button will glow bright blue and the front-panel display will indicate that the matrix is in mask mode.

2. Select the desired outputs to be masked. In this example, we will select Output 5 and Output 6. Each output button will glow bright blue as they are pressed.

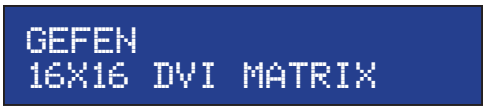
3. Press the **Set** button to mask the selected outputs. The **Set** button will flash momentarily.



(continued on next page)

4. Once the **Set** button is pressed, the front-panel display will indicate that the masking process was successful:

5. After a few moments, the selected buttons will turn off and the front-panel display will return to the *status screen*.



Getting the Current Masking Status

If the masking state is unknown, it can be queried using the **Mask** button. Alternatively, the masking state can be retrieved through the Web Interface or by using the `m` command.

1. Press the **Mask** button. The Mask button will glow bright blue and the front-panel display will indicate that the matrix is in mask mode.

   If any outputs are currently masked, they will be indicated on the front panel. For example, since we recently masked Output 5 and Output 6, these buttons will glow bright blue, as shown below.

2. After a few moments, the selected buttons will turn off and the front-panel display will return to the *standby screen*.

Unmasking Outputs

Once an output (or multiple outputs) has been masked, it can be unmasked. Unmasking an output will allow the video signal to be displayed after a masking operation.

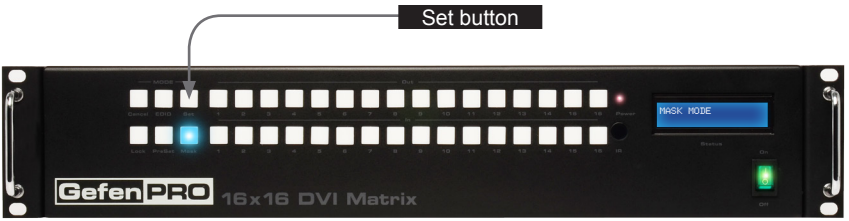
We'll continue with our previous example and unmask Output 5 and Output 6.

1. Press the **Mask** button. The **Mask** button will glow bright blue and the front-panel display will indicate that the matrix is in mask mode.

   Once the mask button is pressed, any outputs that have been masked will be indicated on the front panel.

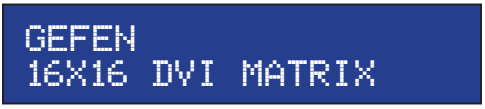
2. Press the desired output button(s) to unmask the output. In our case, we will select both Output 5 and Output 6. Each button will turn off as it is pressed.

3. Press the **Set** button. The **Set** button will flash momentarily.



4. Once the **Set** button is pressed, the front-panel display will indicate that the unmasking process was successful:

5. After a few moments, the matrix will return to the *standby screen*.

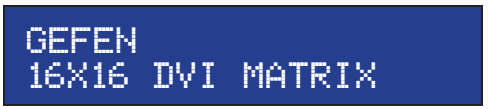


LOCKING THE MATRIX

Locking the matrix will prevent any changes by disabling all buttons (except the **Lock** button) on the front panel. This feature is useful in preventing routing or other changes caused by accidentally pressing the buttons on the front panel.

1. Press the **Lock** button. The **Lock** button will glow bright blue, indicating that the matrix is now locked. The front-panel display will also indicate that the matrix has been locked.

2. To unlock the matrix, press the **Lock** button again. The **Lock** button will turn off and the front-panel display will return to the *standby screen*.



The 16x16 DVI Matrix w/ Push Button Control incorporates EDID management support. Basic EDID functions, such as storing EDID data to inputs can be performed using the buttons on the front panel. Advanced EDID management features are controlled through the Web interface or by using EDID Management commands.

Saving the Downstream EDID to an Input

1. Press the **EDID** button, *once*. The **EDID** button will glow bright blue and the front-panel display will indicate that the matrix is ready to copy the downstream EDID.

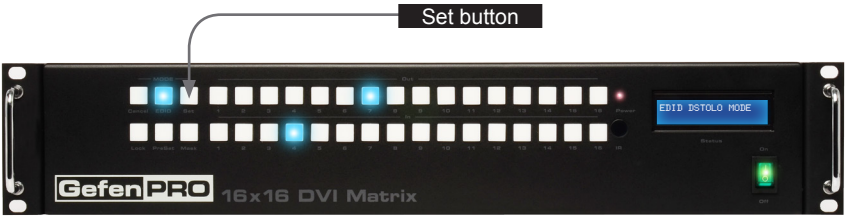
DSTOLO is an abbreviation for “DownStream TO LOcal”.

2. Press the desired output. For this example, we are going to use the EDID of the display that is connected to Output 7. Therefore, we will press the button for Output 7.

(continued on next page)

3. Select the desired input where the EDID will be stored. We will arbitrarily select Input 4, by pressing button **4**.

4. Press the **Set** button. The **Set** button will flash momentarily.



5. Once the **Set** button is pressed, the matrix will begin copying the downstream EDID from the display (or other sink) to the EDID from the selected output to the specified input.

   The front-panel display will indicate that the matrix is copying the EDID:

6. After the EDID has been successfully copied to the selected input, the front-panel display will show the following message:

Saving the Default EDID to an Input

There may be instances when the downstream EDID data is corrupt or the EDID is not being read correctly by the matrix. On the other hand, it may be desirable to use a "generic" EDID as opposed to the downstream EDID. In any case, the matrix provides a default (internal) EDID that can be used. Let's look at an example.

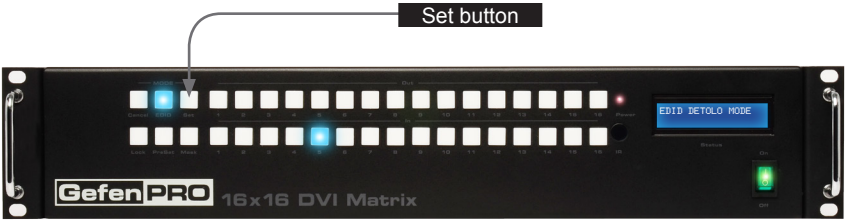
1. Press the **EDID** button, *twice*. The EDID button will glow bright blue and the front-panel display will indicate that the matrix is ready to copy the default EDID to the specified input.

DETOLO is an abbreviation for "DEfault TO LOcal".

2. Select the input where the default EDID will be copied. For this example, we will copy the default EDID to Input 5. Therefore, we will press the button for Input 5.

(continued on next page)

3. Press the **Set** button. The Set button will flash momentarily.



4. Once the **Set** button is pressed, the matrix will begin copying the default EDID to the specified input.

   The front-panel display will indicate that the matrix is copying the EDID:

```
EDID LOADING
PLEASE WAIT
```

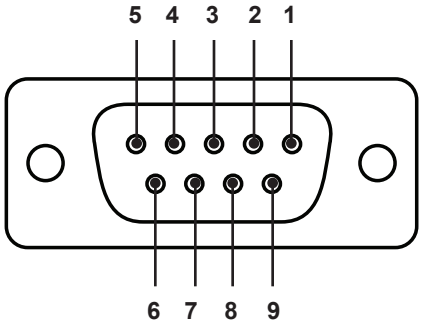
5. After the EDID has been successfully copied to the selected input, the front-panel display will show the following message:

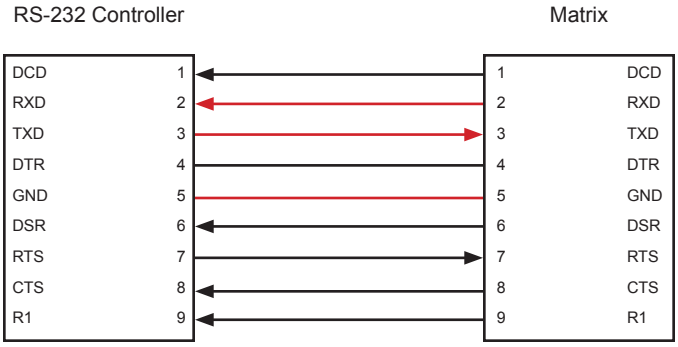
```
EDID LOADING
COPY COMPLETE
```

6. After a few moments, the selected buttons will turn off and the front-panel display will return to the *status screen*.

```
GEFEN
16X16 DVI MATRIX
```

RS-232 Interface





Only TXD, RXD, and GND are used.

RS232 Settings

Baud rate 19200
Data bits 8
Parity bits ..... None
Stop bits 1
Flow Control ..... None

IMPORTANT: When sending RS-232 commands, a carriage return must be included at the end of the command. A space *must* be included between the command and the parameter.

IP Configuration

The *16x16 DVI Matrix w/ Push Button Control* supports IP-based control using Telnet, UDP, or the built-in Web-based GUI. To set up IP control, the network settings for the *16x16 DVI Matrix w/ Push Button Control* must be configured via RS-232. The default network settings for the matrix are as follows:

IP Address:	192.168.1.72	HTTP Port:	80
Subnet:	255.255.255.0	Telnet Port:	23
Gateway:	192.168.1.254		

1. Connect an RS-232 cable from the PC to the *16x16 DVI Matrix w/ Push Button Control*. Also make sure that an Ethernet cable is connected between the matrix and the network.

2. Launch a terminal emulation program (e.g. HyperTerminal) and use the RS-232 settings listed on page 30.

> **NOTE:** Depending upon the network, all related IP, Telnet, and UDP settings will need to be assigned. Consult your network administrator to obtain the proper settings.

3. Set the IP address for the matrix using the `#sipadd` command (see page 43 for details).

4. Set the subnet mask using the `#snetmask` command (see page 43 for details).

5. Set the gateway (router) IP address using the `#sgateway` command (see page 42 for details).

6. Set the Telnet listening port using the `#set_tcp_term_port` command (see page 40 for details).

7. Set the HTTP listening port using the `#set_http_port` command (see page 39 for details).

8. Power-cycle the matrix to reboot and complete all IP setting changes.

9. Type the IP address that was specified in step 3, in a web browser to access the Web GUI or use the same IP address to Telnet to the matrix.

UDP Configuration

1. Set the UDP remote IP address for the matrix using the `#set_udp_rip` command (see page 41 for details).

2. Set the UDP listening port for the matrix using the `#set_udp_port` command (see page 40 for details).

3. Set the UDP remote port for the matrix using the `#set_udp_rport` command (see page 41 for details).

EDID Management

Command	Description
#dynamic_edid	Enables / disables dynamic EDID
#ediidbatolo	Read downstream EDID and stores in any Local Input
#ediiddetolo	Sets Local EDID to Default EDID
#ediiddstoba	Read downstream EDID and stores in EDID Bank
#ediiddstolo	Read downstream EDID and stores into a Local EDID
#lock_edid	Secures Local EDID
#prbaedid	Read EDID from an EDID bank and sends to serial port
#prdsedid	Read downstream EDID and sends to serial port
#predidst	Prints EDID details
#prloedid	Read Input Local EDID and sends to serial port

#dynamic_edid Command

The #dynamic_edid command provides the ability to route any downstream EDID to any input. When enabled, the EDID is copied to all inputs from the last selected active output. When disabled, the EDID is copied to all inputs from the first active display detected, starting from Output 1.

Syntax:

```
#dynamic_edid param1
```

Parameters:

param1 Value [0 ... 1]

Value	Meaning
0	Disable
1	Enable

Default:
Disabled

#edidbatolo Command

The #edidbatolo command reads the downstream EDID and stores it to any local input.

Syntax:

```
#edidbatolo param1 param2 [param3...param9]
```

Parameters:

param1	EDID bank offset	[1 ... 5]
param2	Input	[1 ... 16]

Notes:

If *param2 = 0*, then the EDID in the specified bank is copied to all eight inputs.

#ediddetolo Command

The #ediddetolo command stores the Default EDID (640x480) in the specified Local EDID inputs.

Syntax:

```
#ediddetolo param1 param2 param3...param9
```

Parameters:

param1	Input	[1 ... 16]

Notes:

If *param1 = 0*, then all 16 DVI inputs will be set to the Default EDID.

#ediddstoba Command

The #ededdstoba command reads the downstream EDID and stores it to a specified EDID bank.

Syntax:

```
#ediddstoba param1 param2
```

Parameters:

param1	A downstream monitor	[1 ... 16]
param2	EDID bank offset	[1 ... 3]

#ediddstolo Command

The #ediddstolo command reads the downstream EDID and stores it to a Local EDID input.

Syntax:

```
#ediddstolo param1 param2 [param3...param9]
```

Parameters:

param1	A downstream monitor	[1 ... 16]
param2	Input list	[1 ... 16]

Notes:

If *param2 = 0*, then the downstream EDID is stored to all 16 DVI inputs. If more than eight inputs need to be specified in order to receive the downstream EDID, the #ediddstolo command must be executed twice.

Example:

```
#ediddstolo 2 1 2 3 4 5 6 7 8 9 10 11
```
(not permitted!)

Instead, run the function twice:

```
#ediddstolo 2 1 2 3 4 5 6 7 8
```

```
#ediddstolo 2 9 10 11
```

#lock_edid Command

The #lock_edid command secures the Local EDID and disables the automatic loading of the downstream EDID after the matrix is powered on. This feature can also be controlled using the Web Interface (see page 68).

Syntax:

```
#lock_edid param1
```

Parameters:

param1 Input [0 ... 1]

Value	Meaning
0	Disable
1	Enable

#prbaedid Command

The #prbaedid command reads the EDID file from the specified bank and sends it to the serial port.

Syntax:

```
#prbaedid param1
```

Parameters:

param1 EDID bank [1 ... 3]

#prdsedid Command

The #prdsedid command reads the downstream EDID and sends it to the serial port.

Syntax:

```
#prdsedid param1
```

Parameters:

param1 A downstream monitor [1 ... 16]

#predidst Command

The #predidst command reads the downstream EDID. This command displays a table containing details relating to the Local EDID and the monitor name.

Syntax:

```
#predidst
```

Parameters:

None

#prloedid Command

The #prloedid command reads the local EDID of a specified input and spools it to the serial port.

Syntax:

```
#prloedid param1
```

Parameters:

param1	Input	[1 ... 16]

IP Configuration

Command	Description
#ipconfig	Displays all TCP/IP settings
#resetip	Resets IP configuration to factory settings
#set_http_port	Sets the Web server listening port
#set_tcp_term_pass	Sets the TCP terminal password
#set_tcp_term_port	Sets the Telnet listening port
#set_udp_port	Sets the local UDP listening port
#set_udp_rip	Sets the remote UDP IP address
#set_udp_rport	Sets the remote UDP port
#sgateway	Sets the IP gateway address
#show_tcp_term_pass	Displays the current TCP password for login
#sipadd	Sets the IP address of the matrix
#snetmask	Sets the IP network mask
#use_tcp_term_pass	Enables / disables password prompt for TCP sessions
#use_udp_access	Enables / disables UDP listening

#ipconfig Command

The #ipconfig command displays all TCP/IP settings on the matrix.

Syntax:

```
#ipconfig
```

Parameters:

None

Example:

```
#ipconfig

 -------------- TCP/IP settings -------------

MAC add  = 00:1C:91:01:01:01
IP add   = 192.168.1.72
Net Mask = 255.255.255.0
Gateway  = 192.168.1.254
Web Server Port = 80
TCP Terminal Server Port = 23
TCP Terminal password at login is set to ON
UDP Server Port = 25665
UDP Remote IP = 110.0.255.255
UDP Remote Port = 26989
UDP Access = Disabled
```

#resetip Command

The #resetip command resets all TCP/IP settings to factory defaults.

Syntax:

```
#resetip
```

Parameters:

None

Notes:

The matrix must be rebooted after executing this command.

#set_http_port Command

The #set_http_port command sets the Web server listening port. The default port is 80.

Syntax:

```
#set_http_port param1
```

Parameters:

param1	Port	[0 ... 65535]

Notes:
The matrix must be rebooted after executing this command.

#set_tcp_term_pass Command

The #set_tcp_term_pass command sets the TCP password. The maximum length of the password is 20 characters and is case-sensitive. The default password is *Admin*.

Syntax:

```
#set_tcp_term_pass param1
```

Parameters:

param1	Current password
param2	New password
param3	New password (confirm)

Notes:
The matrix must be rebooted after executing this command.

Example:

```
#set_tcp_term_pass Admin reindeer reindeer
TCP Terminal password updated to: reindeer
```

#set_tcp_term_port Command

The #set_tcp_term_port command sets the Telnet listening port. The default port value is 23.

Syntax:

```
#set_tcp_term_port param1
```

Parameters:

param1	Port	[1 ... 65535]

Notes:
The matrix must be rebooted after executing this command.

Example:

```
#set_tcp_term_port 20
New TCP Terminal port set to: 20
```

#set_udp_port Command

The #set_udp_port command sets the local UDP listening port. The default port value is 8.

Syntax:

```
#set_udp_port param1
```

Parameters:

param1	Port	[1 ... 65535]

Notes:
The matrix must be rebooted after executing this command.

Example:

```
#set_udp_port 10
New UDP listening port set to: 10
```

#set_udp_rip Command

The #set_udp_rip command sets the remote UDP IP address. The default port value is 8.

Syntax:

```
#set_udp_rip param1
```

Parameters:

param1 IP Address

Notes:
The matrix must be rebooted after executing this command.

Example:

```
#set_udp_rip 192.168.1.20
New remote UDP IP address set to: 192.168.1.20
```

#set_udp_rport Command

The #set_udp_rport command sets the remote UDP port.

Syntax:

```
#set_udp_rport param1
```

Parameters:

param1 Port

Notes:
The matrix must be rebooted after executing this command.

Syntax:

```
#set_udp_rport 4096
New remote UDP port set to: 4096
```

#sgateway Command

The #sgateway sets the IP gateway (router) address. Dot-decimal notation must be used when specifying the IP address. The default gateway is 192.168.1.254.

Syntax:

```
#sgateway param1
```

Parameters:

param1	IP gateway

Notes:
The matrix must be rebooted after executing this command.

Example:

```
#sgateway 192.168.1.1
New IP Gateway set to: 192.168.1.1
```

#show_tcp_term_pass Command

The #show_tcp_term_pass command displays the current TCP password for login (if required).

Syntax:

```
#show_tcp_term_pass
```

Example:

```
#show_tcp_term_pass
TCP Terminal password: reindeer
```

#sipadd Command

The #sipadd command sets the IP address of the matrix. Dot-decimal notation must be used when specifying the IP address.

Syntax:

```
#sipadd param1
```

Parameters:

param1	IP address

Notes:
The matrix must be rebooted after executing this command.

Example:

```
#sipadd 192.168.1.239
New IP set to: 192.168.1.239
```

#snetmask Command

The #snetmask command sets the IP network mask. Dot-decimal notation must be used when specifying the IP network mask.

Syntax:

```
#snetmask param1
```

Parameters:

param1	Network mask

Notes:
The matrix must be rebooted after executing this command.

Example:

```
#snetmask 255.255.255.0
New IP Mask set to: 255.255.255.0
```

#use_tcp_term_pass Command

The #use_tcp_term_pass command enables / disables the password prompt at the beginning of a session. The default setting is *disabled*. This feature can also be enabled or disabled through the Web GUI (see page 70).

Syntax:

```
#use_tcp_term_pass param1
```

Parameters:

param1 State [0 ... 1]

Value	Meaning
0	Disable password
1	Enable (force) password

Example:

```
#use_tcp_term_pass 1
TCP Terminal password at login is set to ON
```

#use_udp_access Command

The #use_udp_access command enables / disables UDP listening.

Syntax:

```
#use_udp_access param1
```

Parameters:

param1 State [0 ... 1]

Value	Meaning
0	Disable password
1	Enable (force) password

Example:

```
#use_udp_access 1
UDP access is set to ON
```

Routing

Command	Description
#callpreset	Recalls a routing / mask preset
#prpreset	Displays the preset table
#savepreset	Saves the current routing/masking state to a preset
r	Routes the specified inputs to the specified outputs
s	Routes the specified input to all outputs

#callpreset Command

The #callpreset command recalls a routing preset. Any masked outputs will also be re-called.

Syntax:

```
#callpreset param1
```

Parameters:

param1	Preset	[1 ... 16]

#prpreset Command

The #prpreset command displays the preset table.

Syntax:

```
#prpreset
```

Parameters:

None

Example:

```
#prpreset
PreSet|Out1| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10| 11| 12| 13| 14| 15| 16
------|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---
  1   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
  2   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
  3   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
  4   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
  5   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
  6   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
  7   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
  8   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
  9   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
 10   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
 11   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
 12   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
 13   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
 14   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
 15   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
 16   |M 0 |M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0|M 0
------|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---
```

#savepreset Command

The #savepreset command saves the current routing state to the specified preset. Any masked outputs will also be saved as part of the current routing state.

Syntax:

```
#savepreset param1
```

Parameters:

param1	Preset	[1 ... 16]

r Command

The r command routes the specified input to the specified outputs.

Syntax:

```
r param1 param2[...param17]
```

Parameters:

param1	Input	[1 ... 16]
param2	Outputs	[1 ... 16]

Notes:

If *param2* = 0, then the specified input is routed to all outputs.

Examples:

```
r 7 3 4 5 6 10 12
Input 7 is routed to outputs: 3 4 5 6 10 12

r 2 0
All outputs are routed to Input 2
```

s Command

The s command routes the specified input to all outputs.

Syntax:

```
s param1
```

Parameters:

param1	Input	[1 ... 16]

Example:

```
s 1
All outputs are routed to Input 1
```

Masking

Command	Description
#maskout	Masks the selected (video) output(s)
#unmaskout	Unmasks the selected output(s)

#maskout Command

The #maskout command allows blanking of the specified outputs.

Syntax:

```
#maskout param1 param2
```

Parameters:

param1 Output [1 ... 16]

param2 State [0 ... 1]

Value	Meaning
0	Unmask
1	Mask

Notes:

If param1 = 0, then all outputs will be masked.

The current masking state will be lost if power is interrupted or if the masking state is not saved (see #savepreset on page 47).

#unmaskout Command

The #unmaskout command unmasks the specified outputs.

Syntax:

```
#unmaskout param1...param8
```

Parameters:

param1	Output	[1 ... 16]

Notes:

If *param1* = 0, then all outputs will be unmasked.

Examples:

```
#unmaskout 3 8 10
Activate outputs: 3 8 10

#unmaskout 0
Activate all outputs
```

Miscellaneous

Command	Description
#fadefault	Resets the matrix to factory default routing
#help	Displays all available commands
#lock_fo	Toggles the +5V lock power state
#set_input_name	Specifies a name for an input
#set_ir	Sets the IR channel of the matrix
#set_output_name	Specifies a name for an output
#show_temp	Displays the board temperatures
#show_user_name	Displays the TCP user name
#show_ver_data	Displays the current hardware
#show_voltage	Displays the board voltages
f	Toggles / displays +5V input
m	Displays the current routing status in tabular form

#fadefault Command

The #fadefault command disables the EDID lock state, sets the default routing state (1-1, 2-2, 3-3, etc.) and resets the input and output names to the default names (e.g. Output 1, Input 1).

Syntax:

```
#fadefault
```

Parameters:

None

#help Command

The #help command displays help on the specified command. If *param1* is not specified, then the full list of commands is displayed.

Syntax:

```
#help [param1]
```

Parameters:

param1	Command name

Example:

```
#help #callpreset

Cmd #callpreset: Recall a routing and mask state preset
Syntax: #callpreset param1
Param1 = 1-16 (preset)
 e.g: #callpreset 2
```

#lock_fo Command

The #lock_fo enables/disables the power lock state. Enabling this feature will store the +5V status for each input prior to shutting down the matrix. This preserves the +5V state when the unit is restarted.

Syntax:

```
#lock_fo param1
```

Parameters:

param1 State [0 ... 1]

Value	Meaning
0	Disable power lock
1	Enable power lock

Example:

```
#lock_fo 0
Disable Lock power mode
```

#set_input_name Command

The #set_input_name command provides a name to the selected input. For example, “Input 1” could be renamed as “Computer 1”. The maximum string length for *param2* is 15 characters. Special characters and spaces are not permitted. If required, use the underscore character (“_”) to separate characters.

Syntax:

```
#set_input_name param1 param2
```

Parameters:

param1	Input	[1 ... 16]
param2	Name	

Example:

```
#set_input_name 5 computer1
computer1 is assigned to input 5
```

#set_ir Command

The #set_ir set the IR channel for the matrix. The associated DIP switch settings for the IR remote control unit are returned. See page 10 for details on setting the IR channel for the IR remote control.

Syntax:

```
#set_ir param1
```

Parameters:

param1	Channel	[0 ... 3]

Example:

```
#set_ir 2
RMT_IR - SW1=0,SW2=1
```

#set_output_name Command

The #set_output_name command provides a name to the selected output. For example, “Output 1” could be renamed as “HDDisplay”. The maximum string length for *param2* is 15 characters. Special characters and spaces are not permitted. If required, use the underscore character (“_”) to separate characters.

Syntax:

```
#set_output_name param1 param2
```

Parameters:

param1	Output	[1 ... 16]
param2	Name	

Example:

```
#set_output_name 3 display_3
display_3 is assigned to output 3
```

#show_temp Command

The #show_temp command displays the board temperatures to the screen.

Syntax:

```
#show_temp
```

Parameters:

None

Example:

```
#show_temp
Temperature near cross point top side is 50
Temperature near cross point bottom side is 44 C degree
Temperature on input board  is 43 C degree
```

#show_user_name Command

The #show_user_name command displays the current TCP terminal user name.

Syntax:

```
#show_user_name
```

Parameters:

None

Example:

```
#show_user_name
TCP Terminal login: Administrator
```

#show_ver_data Command

The #show_ver_data command displays the hardware and firmware version ot the screen.

Syntax:

```
#show_ver_data
```

Parameters:

None

Example:

```
#show_ver_data
Hardware version 2
Firmware Release version 6.2
Release date: Jan 21 2013
Release time: 16:38:56
Boot loader version 1.6
```

#show_voltage Command

The #show_voltage command displays board voltages to the screen.

Syntax:

```
#show_voltage
```

Parameters:

None

Example:

```
#show_voltage
Analog voltage 3.3 , measured 3262 mV
Analog voltage 1.8 , measured 1781 mV
Analog voltage 1.2 , measured 1180 mV
```

f Command

The `f` command enables / disables the +5V on the specified input. Do not precede this command with the "#" symbol.

WARNING: Use caution when applying power to inputs. If the source device supplies +5V on the input, then enabling the +5V may cause damage to the source and/or the 16x16 DVI Matrix w/ Push Button Control.

Syntax:

```
f param1 param2
```

Parameters:

param1	Input	[1 ... 16]
param2	State	[0 ... 1]

Value	Meaning
0	Disable
1	Enable

Notes:

If *param1* = 0, then all inputs will be affected.

Examples:

```
f 15 1
Enable F0 15

f 0 1
Enable All FO
```

m Command

The m command displays the routing status in tabular form. Do not precede this command with the "#" symbol.

Syntax:

```
m
```

Parameters:

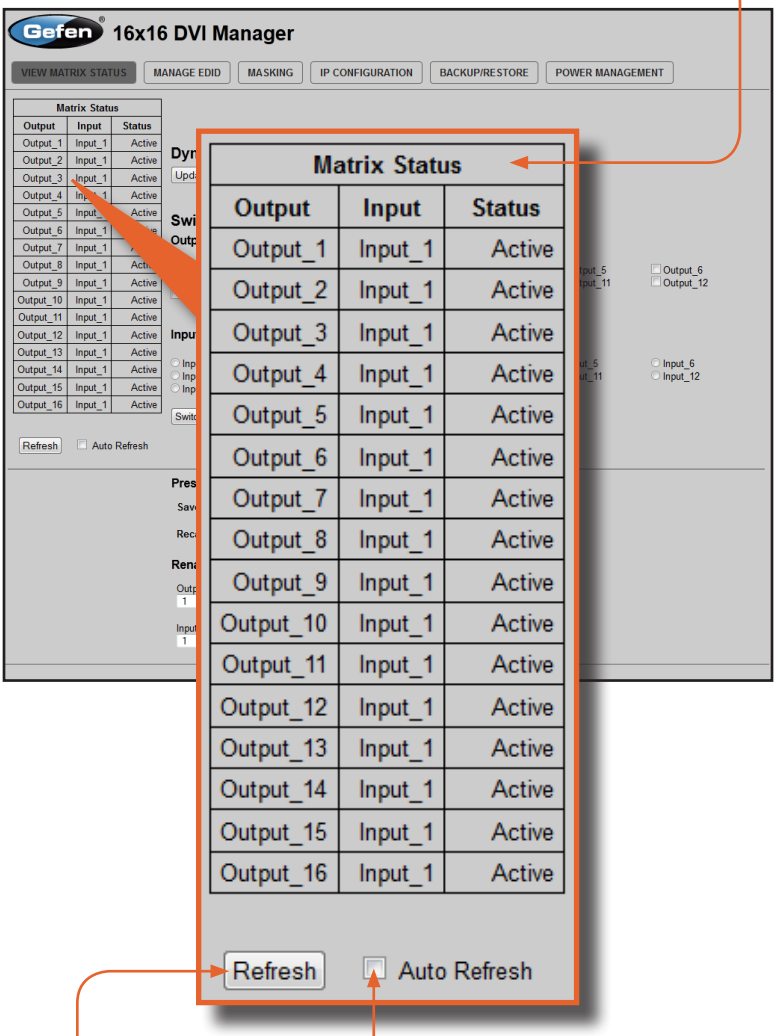
None

Example:

```
m
 Output          |   Input         |  HPD  | Status
-----------------|-----------------|-------|--------
         Output_1|          Input_1|   LOW | ACTIVE
         Output_2|          Input_1|   LOW | ACTIVE
         Output_3|          Input_1|   LOW | ACTIVE
         Output_4|          Input_1|   LOW | ACTIVE
         Output_5|          Input_1|   LOW | ACTIVE
         Output_6|          Input_1|   LOW | ACTIVE
         Output_7|          Input_1|   LOW | ACTIVE
         Output_8|          Input_1|   LOW | ACTIVE
         Output_9|          Input_1|   LOW | ACTIVE
        Output_10|          Input_1|   LOW | ACTIVE
        Output_11|          Input_1|   LOW | ACTIVE
        Output_12|          Input_1|   LOW | ACTIVE
        Output_13|          Input_1|   LOW | ACTIVE
        Output_14|          Input_1|   LOW | ACTIVE
        Output_15|          Input_1|   LOW | ACTIVE
        Output_16|          Input_1|   LOW | ACTIVE
-----------------|-----------------|-------|--------
GEFEN PRO
Dynamic EDID mode
RMT_IR - SW1=0,SW2=0
```

View Matrix Status

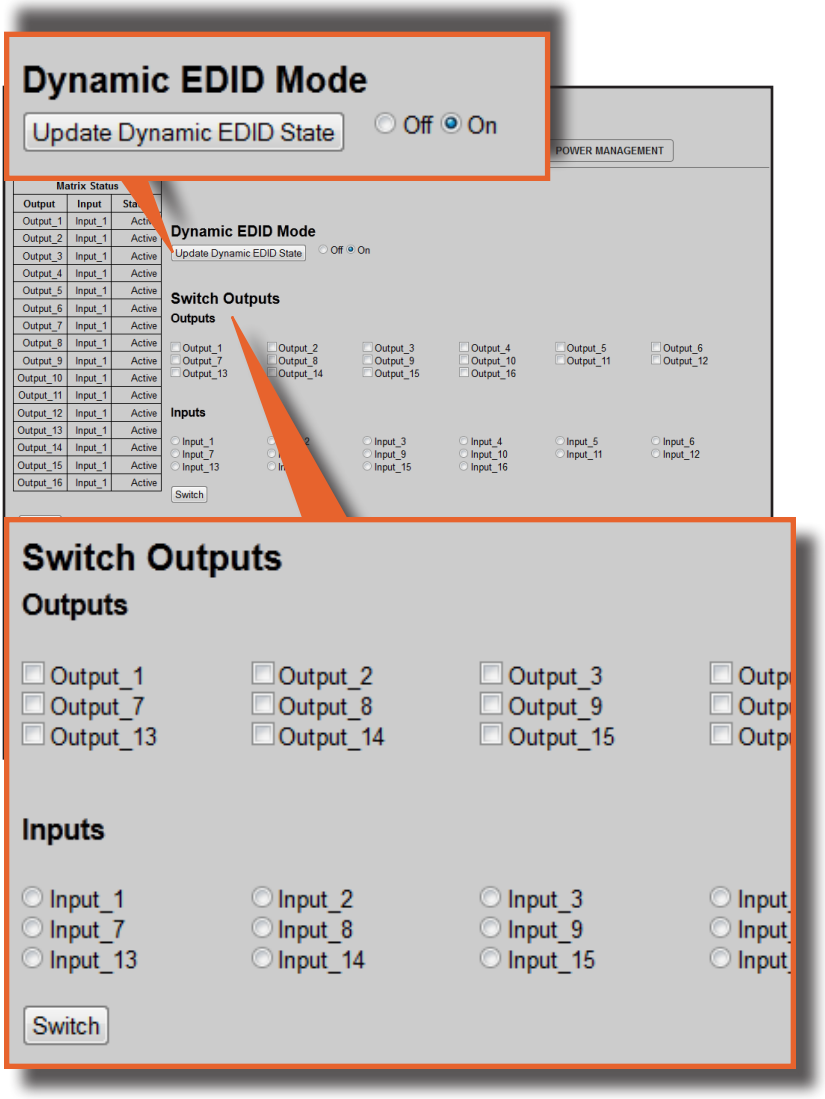
Matrix Status
Displays the current routing status of each input and output on the matrix.



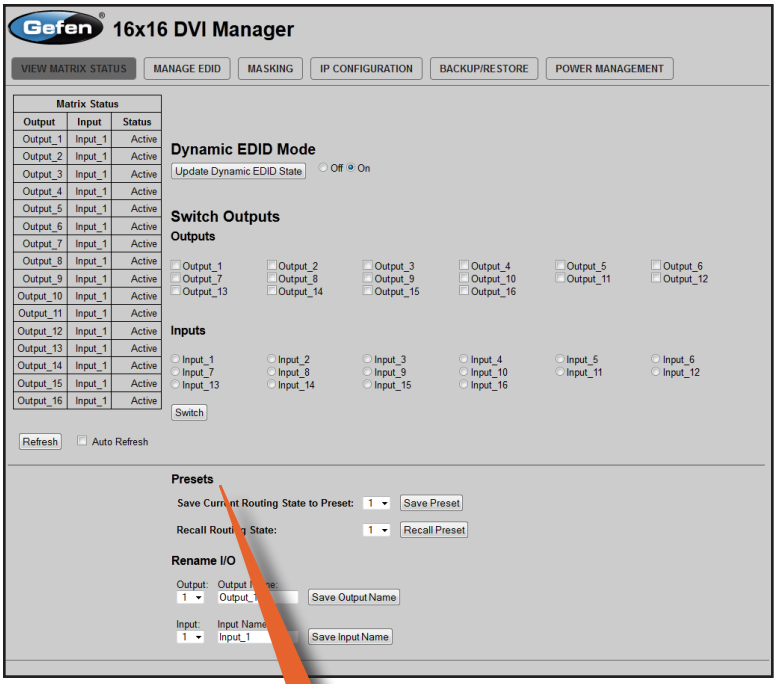
Refresh
Click to refresh the Matrix Status screen

Auto Refresh
Check this box to enable Auto Refresh. The Auto Refresh function automatically refreshes the interface every 10 seconds.

Dynamic EDID Mode
Routes any downstream EDID to any input. See #dynamic_edid on page 32 for details on this feature. Options: On, Off. Click the Update Dynamic EDID State button after selecting either On or Off.



Switch Outputs
Used to route the specified input to the selected output(s). To route a source, place a check mark next to each Output. Next, click the radio button next to the desired Input. Press the Switch button to apply the routing change.

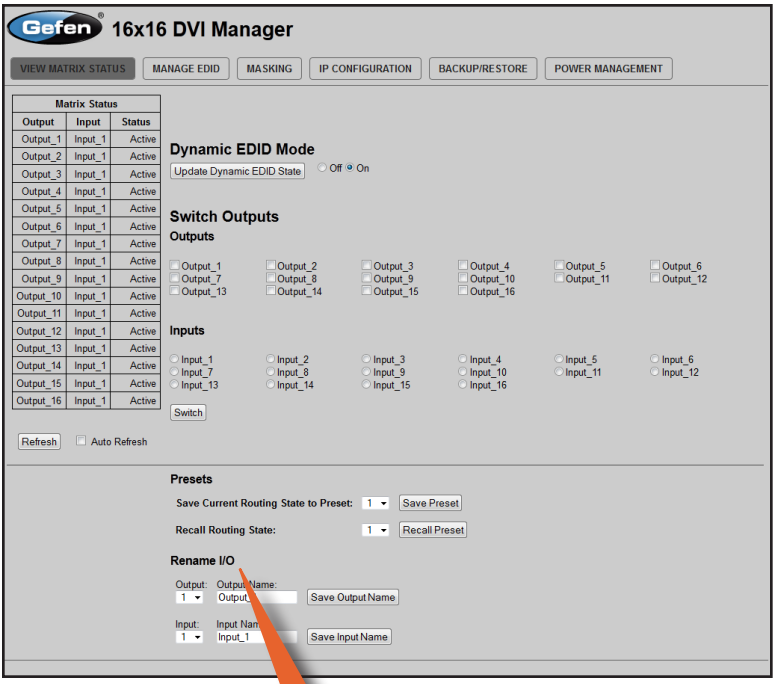


Presets
Provides saving and recalling of routing states.

Pull-down list

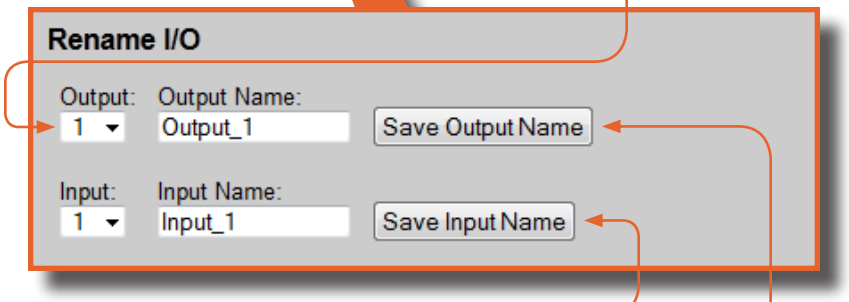
Recall Preset
Click the down-arrow on the pull-down list to select the routing state (1-16) to recall. Click the Recall Preset button to recall the preset.

Save Preset
Click the down-arrow on the pull-down list to select the preset location (1-16). Click the Save Preset button to save the preset.



Rename I/O
Provides custom naming of each input and output on the matrix.

Pull-down list

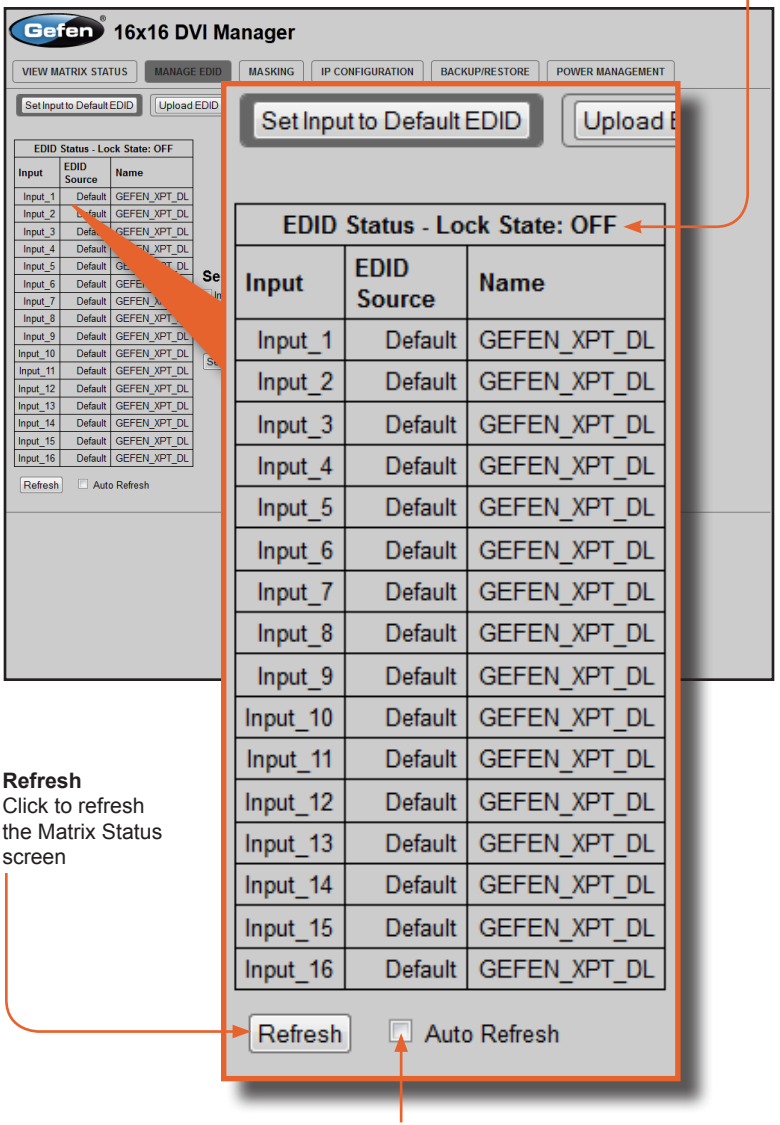


Input
Select the DVI input to rename from the pull-down list. Type the name of the input in the Input Name field. Click the Save Input Name button to save changes. See page 53 for naming restrictions.

Output
Select the DVI output to rename from the pull-down list. Type the name of the output in the Output Name field. Click the Save Output Name button to save changes. See page 54 for naming restrictions.

Manage EDID

EDID Status
Displays the current EDID status for each input on the matrix. See page 35 for more information on locking the EDID.

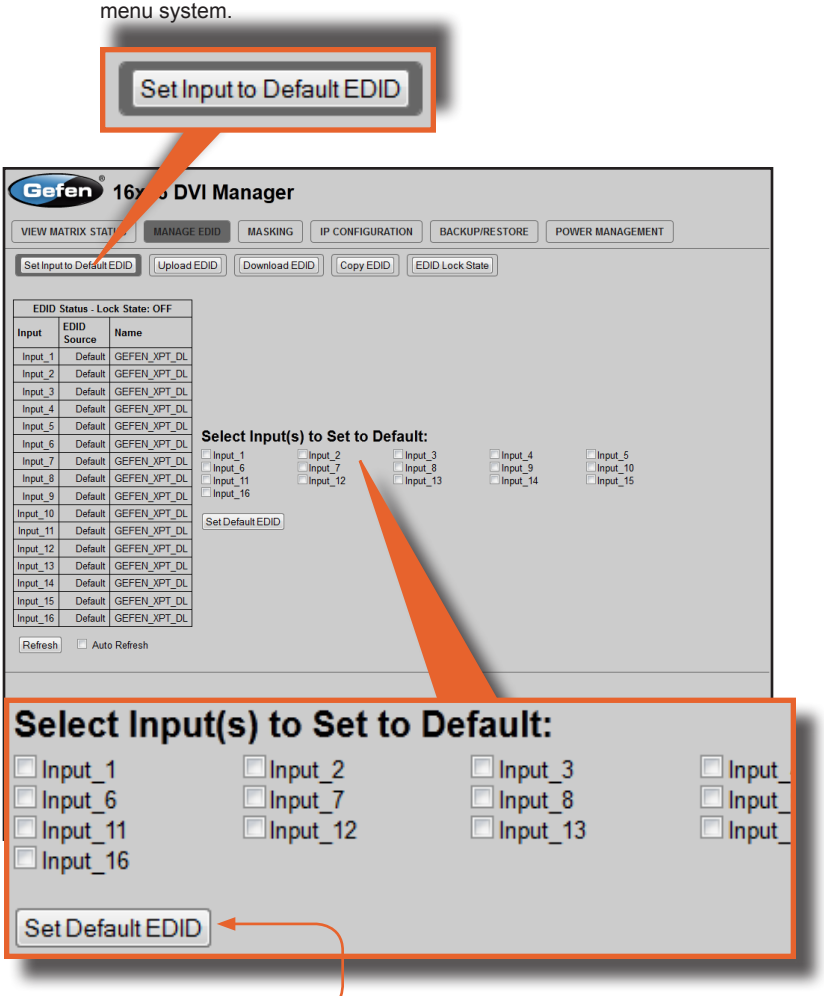


Refresh
Click to refresh the Matrix Status screen

Auto Refresh
Check this box to enable Auto Refresh. Auto Refresh will automatically update the screen every 10 seconds.

Set Input to Default EDID

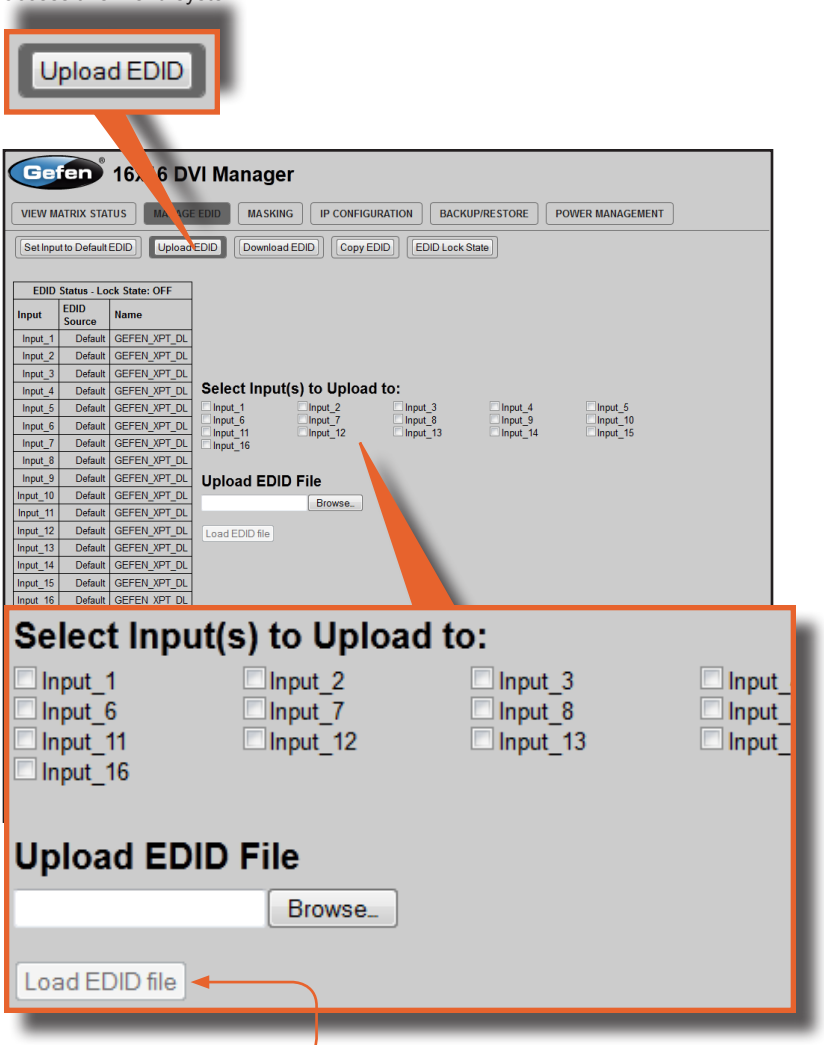
Set Input to Default EDID
Press this button from the Manage EDID screen to access this menu system.



Set Default EDID
Place a check mark next to the input(s) that should be set to the default EDID. Click the Set Default EDID button to apply the default EDID to the selected inputs.

Upload EDID

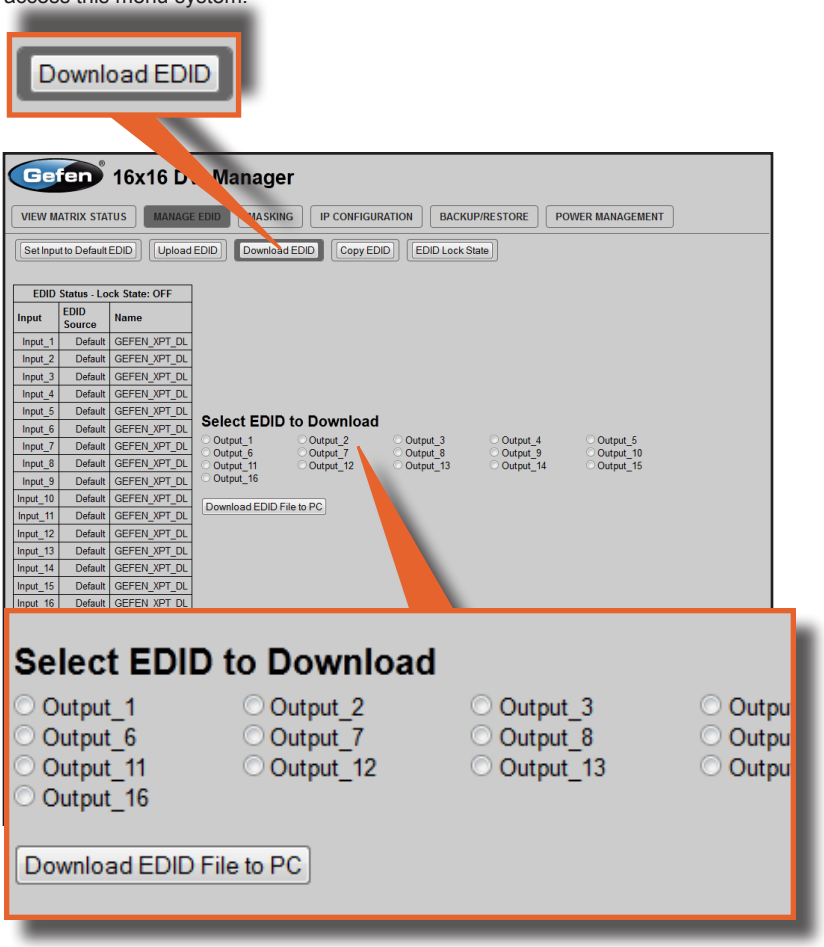
Upload EDID
Press this button from the Manage EDID screen to access this menu system.



Load EDID file
Place a check mark next to the input(s) that will receive the EDID data from the file. The EDID file must be in .bin format. Click the Browse button to locate the EDID on the computer. Click the Load EDID file button to upload the EDID file to the matrix.

Download EDID

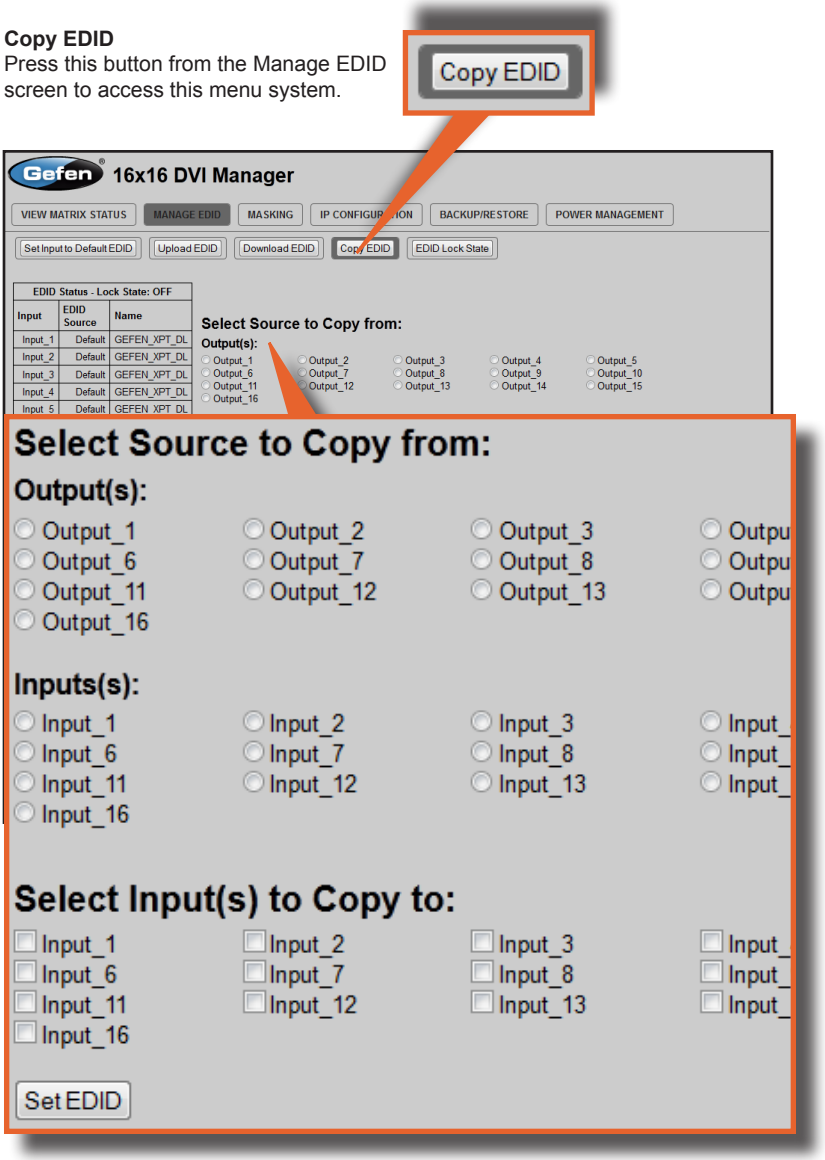
Download EDID
Press this button from the Manage EDID screen to access this menu system.



Download EDID File to PC
Select the radio button next to the output, containing the EDID to be downloaded. Click the Download EDID File to PC button to confirm the change. The downloaded EDID file will be in .bin format.

Copy EDID

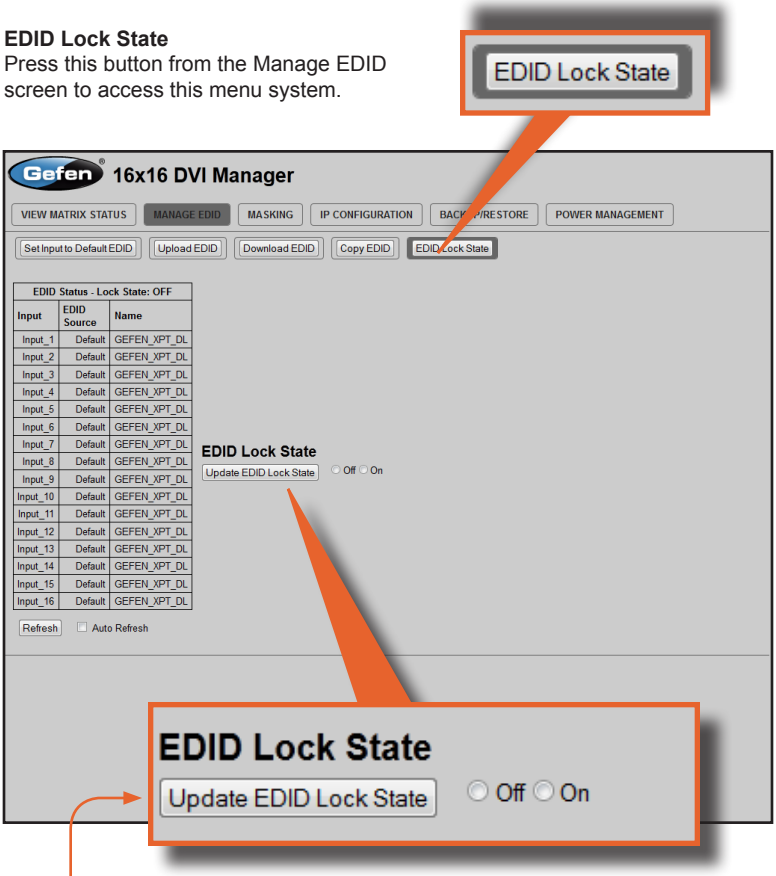
Copy EDID
Press this button from the Manage EDID screen to access this menu system.



Select Source to Copy from / Select Input(s) to Copy to
Click the radio button next to the input or output containing the EDID to copy. Note that only a single input or output can be selected at a time. Place a check mark next to the input(s) where the EDID will be copied. Click the Set EDID button to confirm the operation.

EDID Lock State

EDID Lock State
Press this button from the Manage EDID screen to access this menu system.

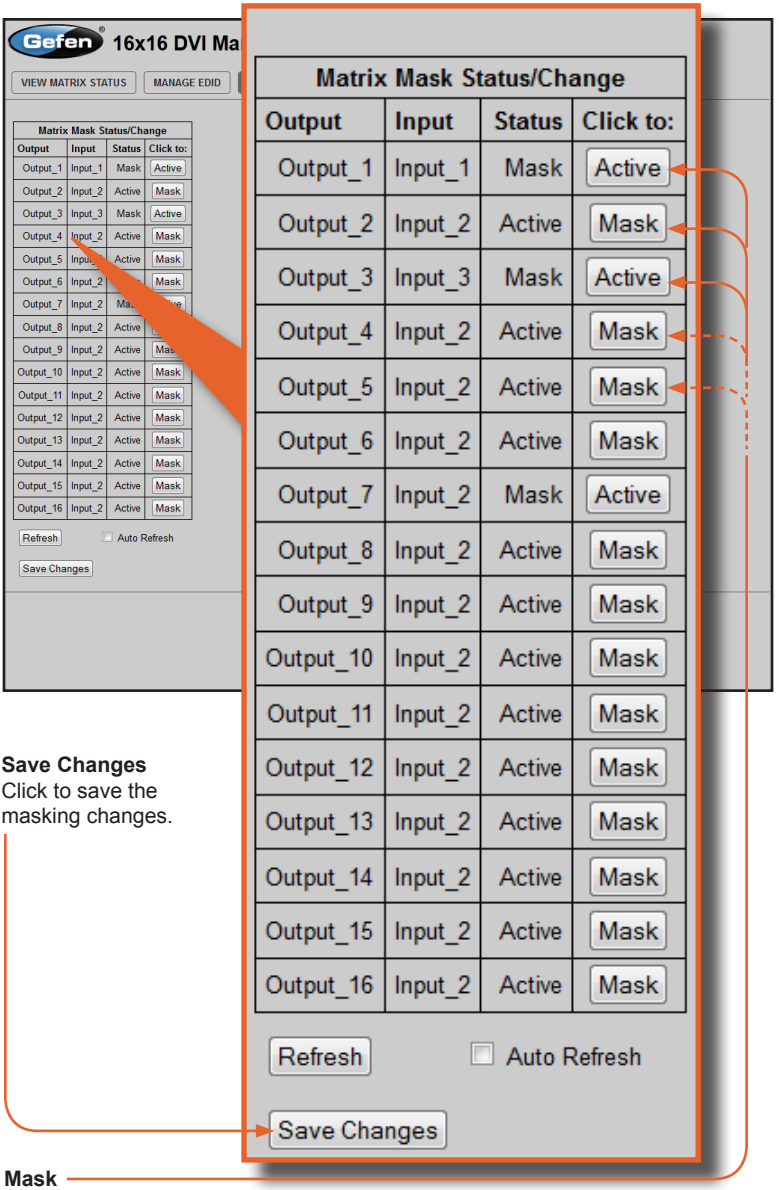


Update EDID Lock State
Secures the Local EDID and disables the automatic loading of the downstream EDID after the Matrix is powered on. Select the radio button next to the Off or On option then click the Update EDID Lock State button to apply the change.

The EDID Lock State has no effect when the Dynamic EDID function is activated.

Masking

Matrix Mask Status / Change
Displays the current masking status for each output.



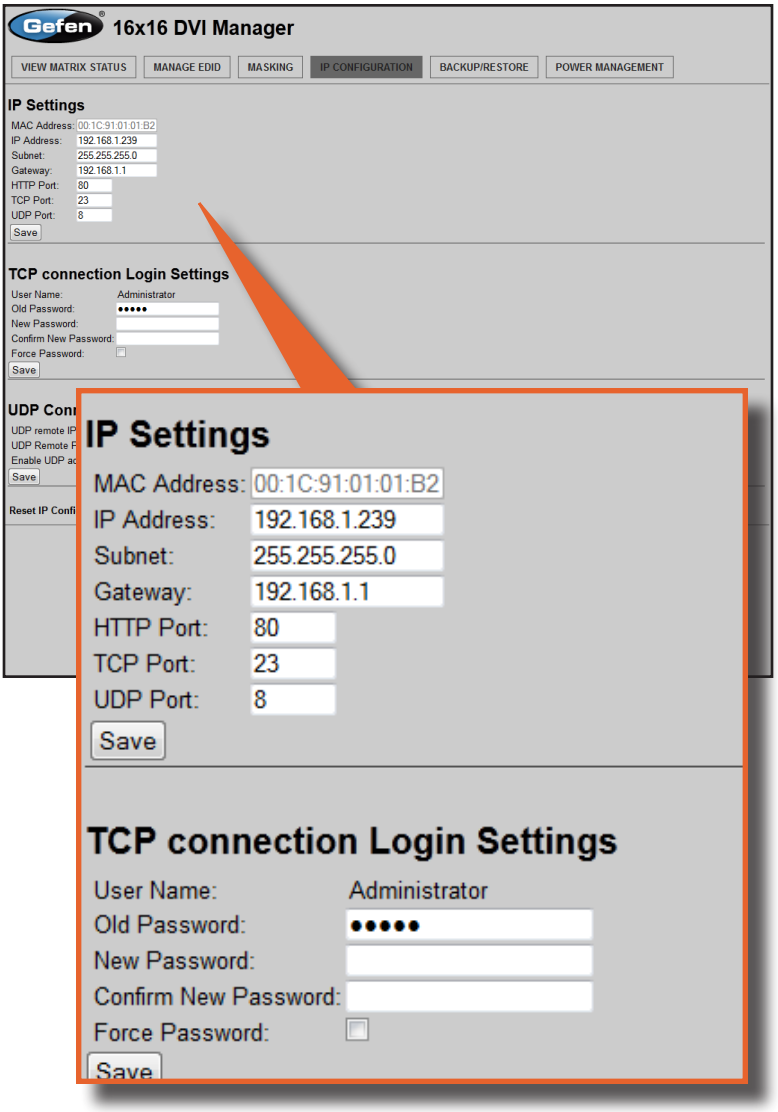
Save Changes
Click to save the masking changes.

Mask
Click the Mask button to mask the selected output. If the output is already masked then the button will read “Active” (enabled). Click the (“Active”) button again to toggle the masking state to “Mask” (disabled).

IP Configuration

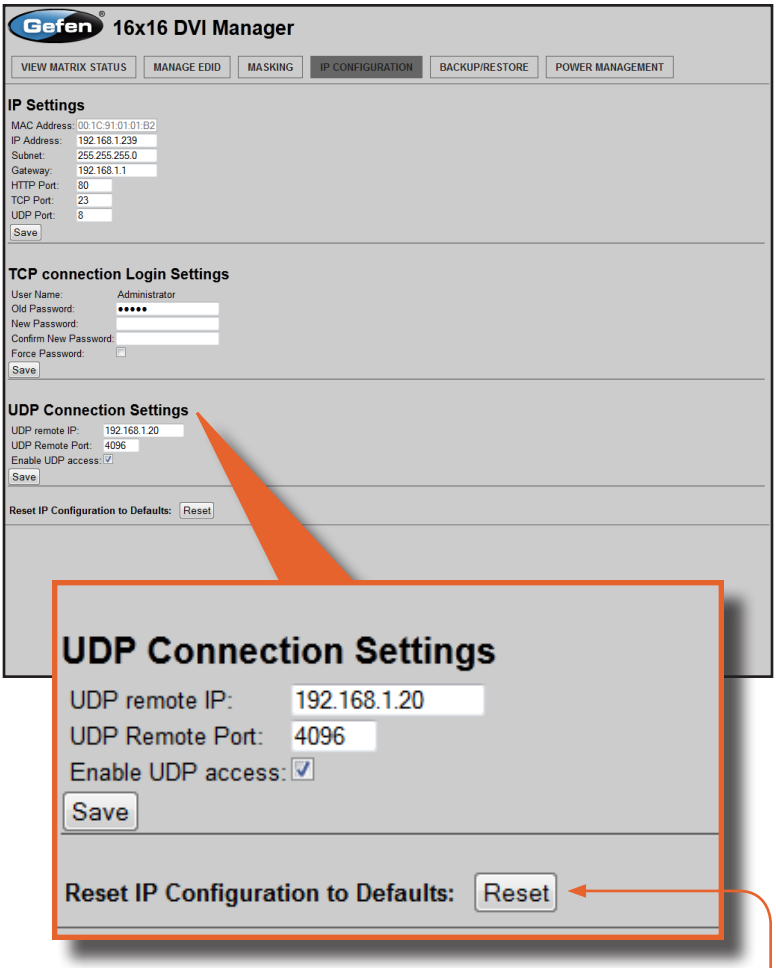
IP Settings

Assigns IP address, subnet, gateway, HTTP listening port, and Telnet port. Note that the MAC address can not be changed. Click the Save button to apply changes. The matrix must be rebooted for the changes to take effect.



Telnet Login Settings

Sets the user name and password for Telnet sessions to the matrix. Click the Save button to apply changes.

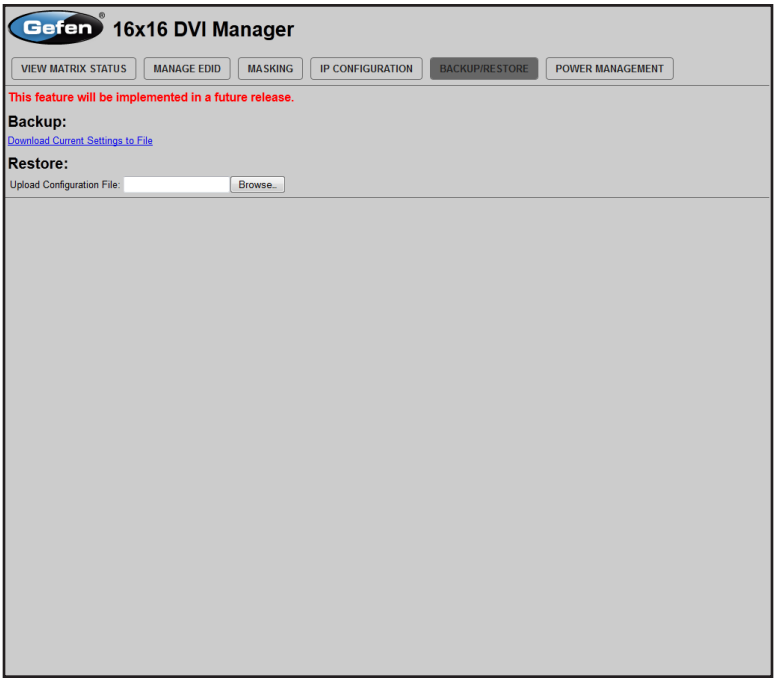


UDP Connection Settings
Sets UDP remote IP and remote port. Also enables or disables UDP access to the matrix. Click the Save button to apply changes.

Reset
Click the Reset button to restore the factory-default IP settings.

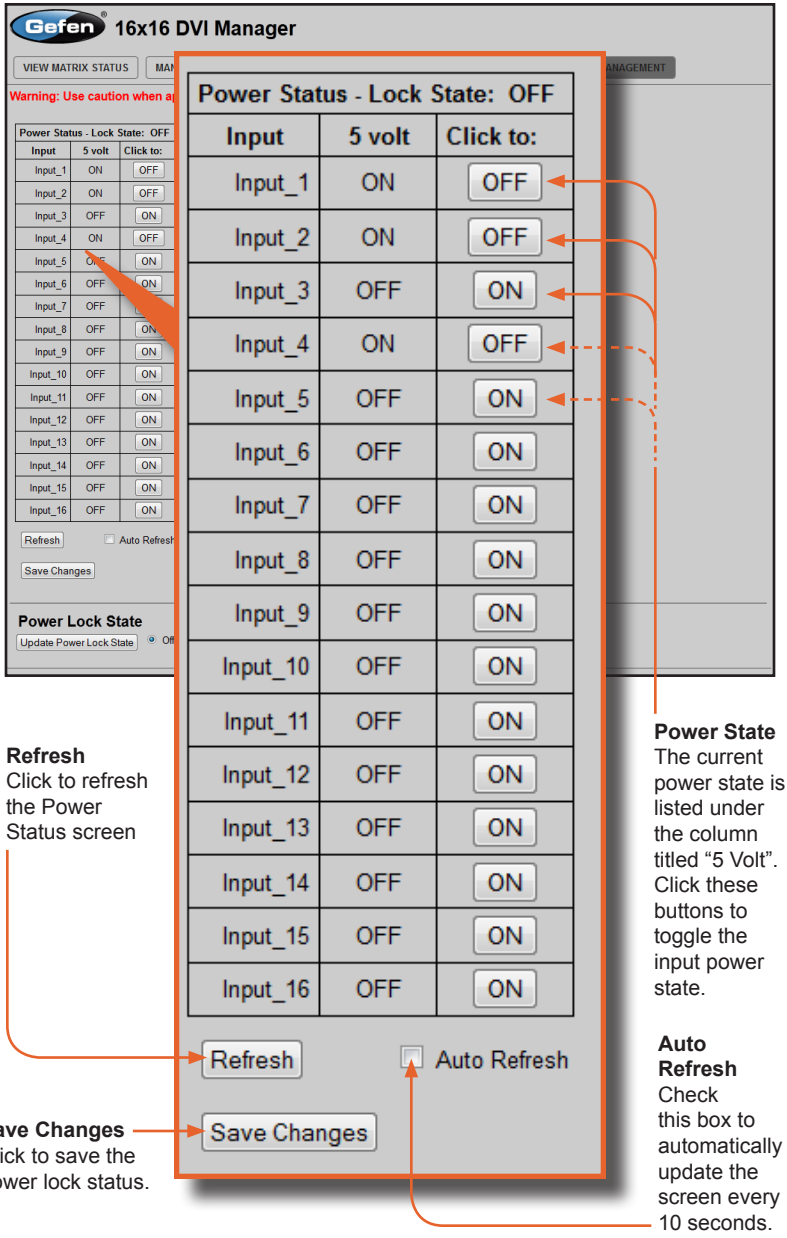
Backup / Restore

The Backup / Restore feature for the 16x16 DVI Matrix w/ Push Button Control is not currently implemented and will be available in a future release of the firmware.



Power Management

Power Status
Enabling this feature will store the +5V status for that input prior to shutting down the matrix. This preserves the +5V state when the unit is restarted.

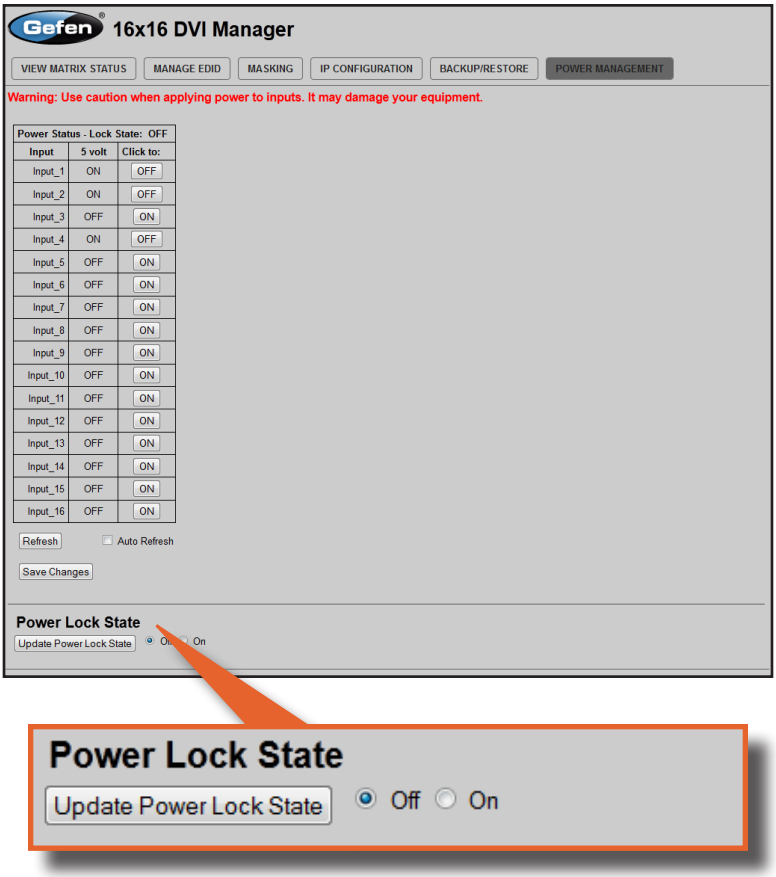


Refresh
Click to refresh the Power Status screen

Power State
The current power state is listed under the column titled “5 Volt”. Click these buttons to toggle the input power state.

Auto Refresh
Check this box to automatically update the screen every 10 seconds.

Save Changes
Click to save the power lock status.

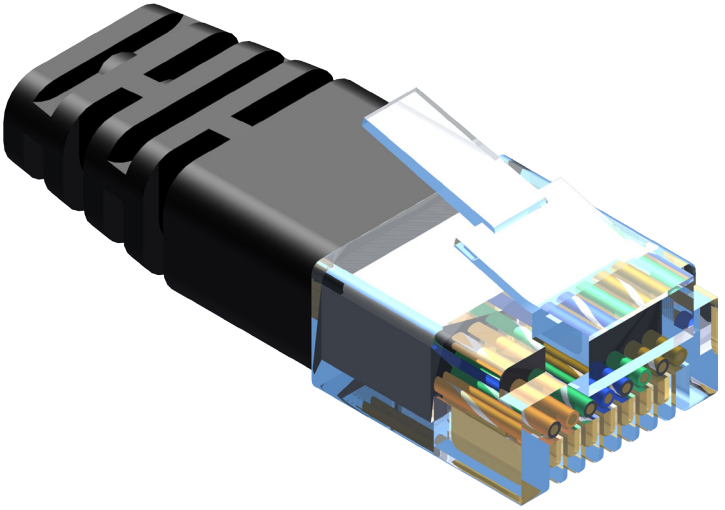


Power Lock State
In the case of an accidental power loss to the matrix, the +5V state for each input can be preserved.

Set the specified Power Status buttons (see previous page) and click the radio button next to ON. Click the Update Power Lock State button to apply changes.

By default, this option is set to Off.

NETWORK CABLE WIRING DIAGRAM



Gefen recommends the TIA/EIA-568-B wiring option. Please adhere to the table below when field-terminating the cable for use with Gefen products.

Pin	Color
1	Orange / White
2	Orange
3	Green / White
4	Blue
5	Blue / White
6	Green
7	Brown / White
8	Brown

Cabling comes in stranded and solid core types. Gefen recommends using solid core cabling.

It is recommended to use one continuous run from one end to the other. Connecting through a patch is not recommended.

a. Maximum recommended ambient temperature: 45 ˚C (104 ˚F).

b. Increase the air flow as needed to maintain the recommended temperature inside the rack.

c. Do not exceed maximum weight loads for the rack. Install heavier equipment in the lower part of the rack to maintain stability.

d. Connect a bonding wire between an approval safety ground stud on the chassis.

SPECIFICATIONS

Maximum Pixel Clock	165 MHz
Input Video Signal	1.2 Volts p-p
Video Input Connectors	(16) DVI-I 29-pin, female (digital only)
Video output Connectors	(16) DVI-I 29-pin, female (digital only)
IR Extender	3.5 mm mini-stereo
RS-232 Interface	DB-9 serial, female
Ethernet (IP control) port	RJ-45 (100BaseT)
Power Supply	100 ~ 240 V AC
Power Consumption	90 Watts (max.)
Operating Temperature	+32 to +104 ˚F (0 to +40 ˚C)
Storage Temperature	-4 to +140 ˚F (-20 to +60 ˚C)
Relative Humidity	20 to 90% RH (no condensation)
Dimensions (W x H x D)	17.25'' x 3.5" x 12" (438mm x 89mm x 305mm)
Rack-mountable	2U rack space, rack ears included
Shipping Weight	30 lbs. (13.6 kg)

WARRANTY

Gefen warrants the equipment it manufactures to be free from defects in material and workmanship.

If equipment fails because of such defects and Gefen is notified within two (2) years from the date of shipment, Gefen will, at its option, repair or replace the equipment, provided that the equipment has not been subjected to mechanical, electrical, or other abuse or modifications. Equipment that fails under conditions other than those covered will be repaired at the current price of parts and labor in effect at the time of repair. Such repairs are warranted for ninety (90) days from the day of reshipment to the Buyer.

This warranty is in lieu of all other warranties expressed or implied, including without limitation, any implied warranty or merchantability or fitness for any particular purpose, all of which are expressly disclaimed.

1. Proof of sale may be required in order to claim warranty.

2. Customers outside the US are responsible for shipping charges to and from Gefen.

3. Copper cables are limited to a 30 day warranty and cables must be in their original condition.

The information in this manual has been carefully checked and is believed to be accurate. However, Gefen assumes no responsibility for any inaccuracies that may be contained in this manual. In no event will Gefen be liable for direct, indirect, special, incidental, or consequential damages resulting from any defect or omission in this manual, even if advised of the possibility of such damages. The technical information contained herein regarding the features and specifications is subject to change without notice.

For the latest warranty coverage information, refer to the Warranty and Return Policy under the Support section of the Gefen Web site at www.gefen.com.

PRODUCT REGISTRATION

Please register your product online by visiting the Register Product page under the Support section of the Gefen Web site.

LICENSING

This product uses software that is subject to open source licenses, including one or more of the General Public License Version 2 and Version 2.1, Lesser General Public License Version 2.1 and Version 3, BSD, and BSD-style licenses. Distribution and use of this product is subject to the license terms and limitations of liability provided in those licenses. Specific license terms and Copyright Notifications are provided in the source code. For three years from date of activation of this product, any party may request, and we will supply, for software covered by an applicable license (e.g. GPL or LGPL), a complete machine-readable copy of the corresponding open source code on a medium customarily used for software interchange. The following software and libraries are included with this product and subject to their respective open source licenses:

- lwIP
- freeRTOS
- jQuery

lwIP is licenced under the BSD licence:

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

3. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Rev A10

20600 Nordhoff St., Chatsworth CA 91311

1-800-545-6900 818-772-9100 fax: 818-772-9120

www.gefenpro.com support@gefenpro.com