Gefen®

4x1 DisplayPort Switcher

EXT-DP-441

User Manual

www.gefen.com

ASKING FOR ASSISTANCE

Technical Support:

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

Technical Support Hours:
8:00 AM to 5:00 PM Monday thru Friday.

Write To:

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

www.gefen.com
support@gefen.com

Notice

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

4x1 DisplayPort Switcher is a trademark of Gefen LLC

CONTENTS

INTRODUCTION

Congratulations on your purchase of the 4x1 DisplayPort Switcher. Your complete satisfaction is very important to us.

Gefen

Gefen delivers innovative and progressive computer and electronics add-on solutions that harness integration, extension, distribution, and conversion technologies. Gefen's reliable plug-and-play products supplement cross-platform computer systems, professional audio/video environments, and HDTV systems of all sizes with hard-working solutions that are easy to install and simple to operate.

The Gefen 4x1 DisplayPort Switcher

Easily switch between four computers using DisplayPort with the 4x1 DisplayPort Switcher.

The rack-mountable 4x1 DisplayPort Switcher offers an economical solution for switching between four different computers to one display location at the touch of a button.

Eliminating the need to purchase many displays in a studio or professional environment, this versatile solution saves money, supports both Mac and PC-type computers, and offers uncluttered and increased desktop space.

This Switcher can be controlled using front panel discrete switching, the included IR Remote control, IP control, or the RS-232 port for switching automation.

The 4x1 DisplayPort Switcher is compatible with all operating systems using DisplayPort.

How It Works

Connect the four included 6-foot DisplayPort cables between the computers and the Switcher inputs. Connect the Switcher output to the monitor using a DisplayPort cable. Connect the included 5V DC locking power supply to the 4x1 Switcher and connect the AC power cord to an available electrical outlet. The currently selected source will be displayed.

READ THESE NOTES BEFORE INSTALLING OR OPERATING THE 4X1 DISPLAYPORT SWITCHER

- The 4x1 DisplayPort Switcher supports Pass-through EDID. The Switcher will use the EDID from the currently connected monitor.
- Dual Link resolutions up to 2560 x 1600 are supported.
- HDCP content is not supported.
- This Switcher does not support DHCP.
- The default IR channel for both the Switcher and the IR Remote Control Unit is channel 0. See page 10 for more information.

FEATURES

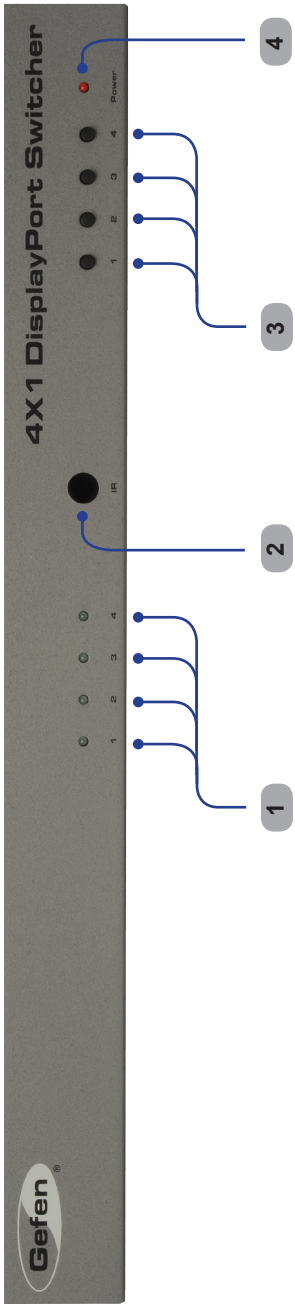
Features

- Switches a single Hi-Def display between four DisplayPort-equipped sources.
- Supports HD resolutions up to 1080p Full HD
- Supports 1080p Full HD at 120Hz and dual-link resolutions up to 2560 x 1600 (WQXGA)
- Supports RGB and YCbCr color spaces
- RS-232 control
- Ethernet / Telenet Control
- IR remote control
- Jack for external IR Receiver
- Saves space on your desktop
- Rack-mountable

Package Includes

(1) 4x1 DisplayPort Switcher
(4) 6ft. DisplayPort Cables
(1) IR Remote Control Unit
(1) 5V DC Locking Power Supply
(1) Set of Rack Ears
(1) User Manual

Front Panel



FRONT PANEL DESCRIPTIONS

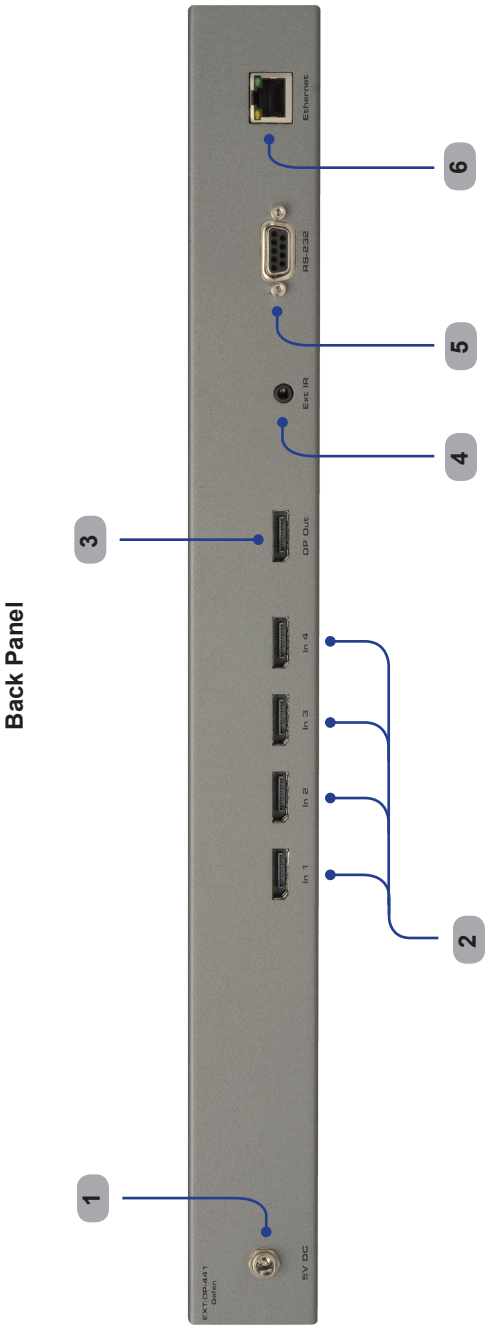
1 Input Indicators (1 - 4)
Each of these LED indicators glows bright blue according to the input selection (see *Input Buttons*, below)

2 IR
Receives IR signals from the included IR Remote Control Unit.

3 Input Buttons (1 - 4)
Pressing each of these buttons selects the desired input source (1-4).

4 Power
This LED indicator will glow bright red when the unit is powered.

BACK PANEL LAYOUT



BACK PANEL DESCRIPTIONS

1 5V DC

Connect the included 5V DC locking power supply to this receptacle.

2 DP In 1 - DP In 4

Each of these ports will accept a standard DisplayPort source device.

3 DP Out

This port will accept a single standard DisplayPort output device. The currently selected DisplayPort input source will be output via this port.

4 Ext IR

Connect an IR extender cable to this port.

5 RS-232 Serial Port

This port is used for serial communication using an RS-232 control device. For details, refer to page 14.

6 Ethernet

Connect the Switcher to a network in order to communicate via Telnet.

Layout and Description

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

2 Source Selection Buttons (1 - 4)
These buttons are used to select which source is routed to a monitor.

NOTE: An Activity Indictor that flashes quickly while holding down any one of the four buttons indicates a low battery. Replace the IR Remote Control battery as soon as possible.

Installing the RMT-4IR Battery

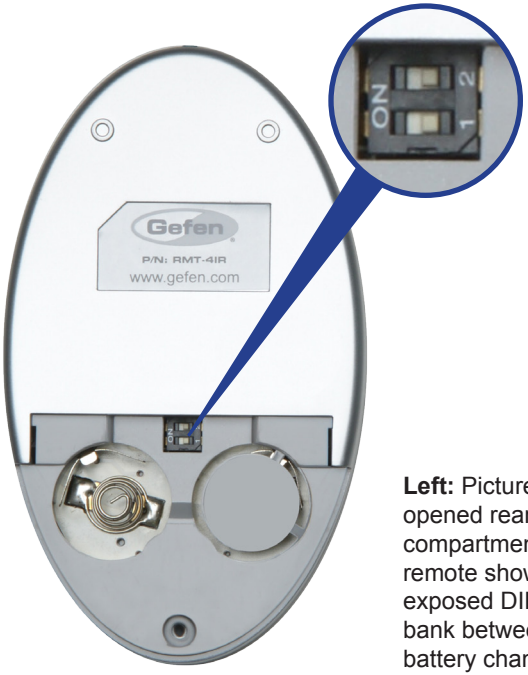
1. Remove the battery cover on the back of the IR Remote Control Unit.
2. Insert the included battery into the open battery slot. The positive (+) side of the battery should be facing up.
3. Replace the battery cover.

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.

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.



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

Corresponding DIP Switch Settings for each IR Channel

IR Channel 0 (default)

IR Channel 1

IR Channel 2

IR Channel 3

It is important that the IR channel on the Remote Control unit, matches the IR channel set on the 4x1 DisplayPort Switcher. For example, if both DIP switches on the IR Remote Control unit are set to IR channel 0 (both DIP switches down), then the 4x1 DisplayPort Switcher must also be set to IR channel 0. See page 21 on how to change the IR channel on the 4x1 DisplayPort Switcher.

How to Connect the 4x1 DisplayPort Switcher

1 Connect up to four (4) DisplayPort source devices to the DisplayPort inputs on the back panel of the Switcher using DisplayPort cables.

2 Connect a DisplayPort-supported display to the DisplayPort output on the back panel of the Switcher.

a OPTIONAL: To use the RS-232 communication feature, connect an RS-232 cable between the Switcher and RS-232 host controller.

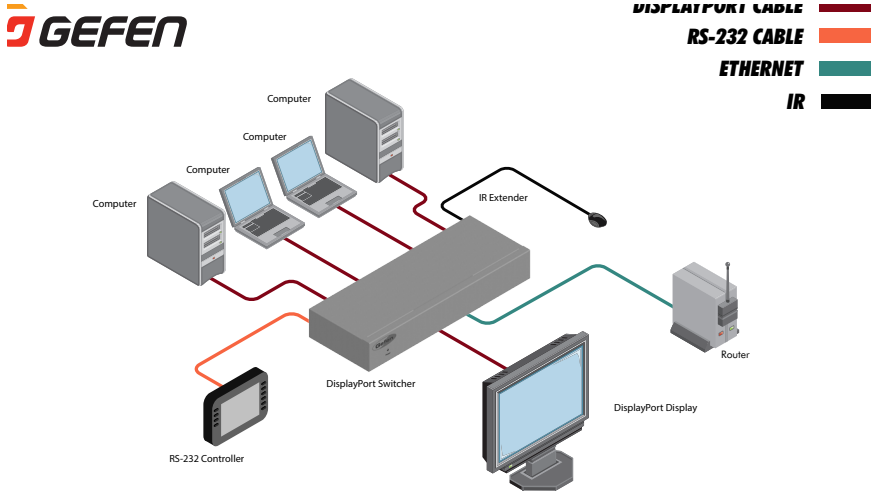
b OPTIONAL: To communicate with the Switcher using Telnet, connect an Ethernet cable from the Ethernet jack on the back of the Switcher to the network. See page 24 for more information on using the Telnet feature.

c OPTIONAL: To extend the range of the IR control, connect an IR Extender (Gefen part no. EXT-RMT-EXTIR) to the back of the Switcher.

3 Connect the included 5V locking power supply to the power receptacle on the 4x1 DisplayPort Switcher

4 Connect the opposite end of the power supply to an open wall socket power source.

Wiring Diagram for the 4x1 DisplayPort Switcher



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

Front Panel Buttons and LED Indicators

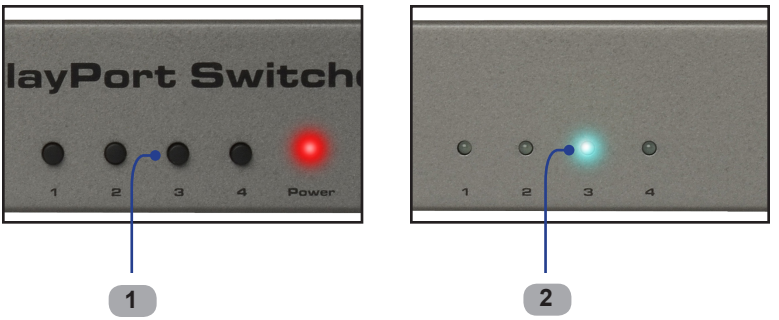
The front panel of the 4x1 DisplayPort Switcher has a set of four (4) LED indicators, displaying which input (source) is being displayed. Each of these LED indicators corresponds to one of the push-buttons on the front panel.

Switching sources using the front panel buttons

Example: Switch to input 3 using the front panel buttons:

1 Press button 3 on the front panel of the 4x1 DisplayPort Switcher.

2 The LED indicator for input 3 will glow bright blue on the front panel.

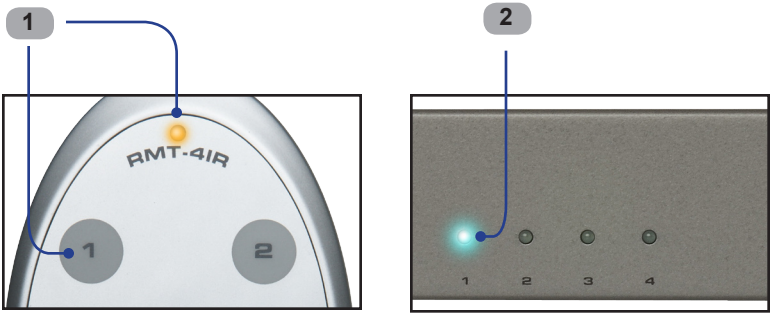


Switching sources using the IR Remote Control

Example: Switch to Input 1 using the IR Remote Control:

1 Press button 1 on the IR Remote Control Unit. The Activity Indicator on the IR Remote Control Unit will glow yellow, indicating that a button was pressed.

2 The LED indicator for input 1 will glow bright blue.



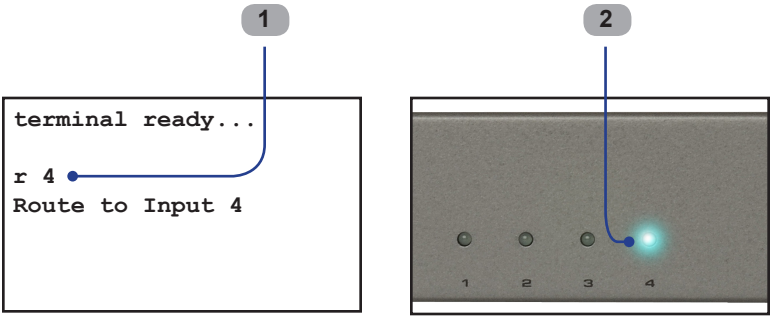
Switching sources using RS-232

Configure the Switch for use with RS-232 (see page 14 for details).

Example: Switch to input 4 using RS-232

1 Use the command `r 4` to route the Switcher to Input 4. See page 14 - 15 for important information on RS-232 commands. RS-232 commands are case-sensitive.

2 The LED indicator for Input 4 will glow bright blue on the front panel.



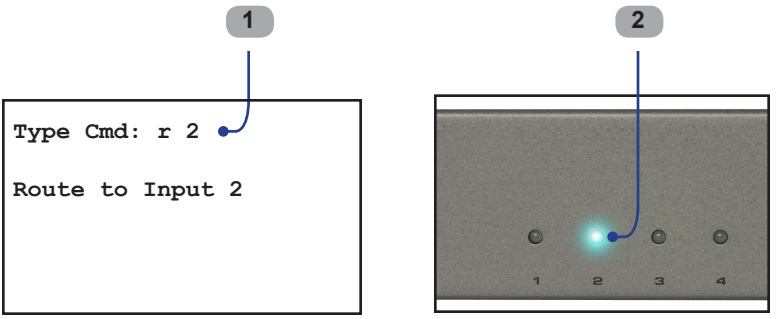
Switching sources using Telnet

Configure the Switch for use with Telnet. See page 24 for details.

Example: Switch to Input 2 using the Telnet protocol

1 Use the command `r 2` to route the Switcher to Input 2.

2 The LED indicator for Input 2 will glow bright blue.



Only pins 2 (Receive), 3 (Transmit), and 5 (Ground) are used for communication. A null-modem adapter should not be used with this product.

Only Pins 2 (RX), 3 (TX), and 5 (Ground) are used on the RS-232 serial interface

Serial Port Settings

Bits per second 19200

Data bits 8

Parity ..... None

Stop bits 1

Flow Control ..... None

NOTE: Only pins 2 (Receive), 3 (Transmit), and 5 (Ground) are used for communication. A null-modem adapter should *not* be used with this product.

Command Syntax

All RS-232 commands are case-sensitive and must be entered in lowercase. Each command must be preceded by the '#' character. A carriage return must also be appended to *every* command.

Example:

#set_http_port *80*[CR]

IP Configuration

Command	Description
#get_pass	Prompts for the Telnet password
#get_user_name	Prompts for the Telnet username
#ipconfig	Displays all TCP/IP settings
#rstip	Sets IP configuration to default settings
#set_http_port	Sets the Web server listening port
#set_pass	Sets the Telnet password
#set_telnet_port	Sets the Telnet listening port
#set_user_name	Sets the Telnet user name
#sgateway	Specifies the new gateway
#sipadd	Specifies a new IP address
#snetmask	Specifies a new net mask
#use_telnet_pass	Toggles Telnet password prompt

#GET_PASS Command

The #GET_PASS command prompts for the Telnet password.

Syntax:

```
#get_pass
```

Parameters:

None

#GET_USER_NAME Command

The #GET_USER_NAME command prompts for the Telnet username.

Syntax:

```
#get_user_name
```

Parameters:

None

#IPCONFIG Command

The #IPCONFIG command displays all TCP/IP settings.

Syntax:

```
#ipconfig
```

Parameters:

None

#RSTIP Command

The #RSTIP command resets the IP configuration to the default settings.

Syntax:

```
#rstip
```

Parameters:

None

#SET_HTTP_PORT Command

The #SET_HTTP_PORT command sets the Web server listening port.

Syntax:

```
#set_http_port param1
```

Parameters:

param1	Port	[0 - 255]

#SET_PASS Command

The #SET_PASS command sets Telnet password.

Syntax:

```
#set_pass param1
```

Parameters:

param1	String

Notes:

The maximum length of the password string is 20 characters.

#SET_TELNET_PORT Command

The #SET_TELNET_PORT command sets the Telnet server listening port.

Syntax:

```
#set_telnet_port param1
```

Parameters:

param1	Port	[0 - 255]

#SET_USER_NAME Command

The #SET_USER_NAME command sets the Telnet user name.

Syntax:

```
#set_user_name param1
```

Parameters:

param1	String

Notes:

The maximum length of the username string is 20 characters.

#SGATEWAY Command

Specifies the new IP gateway. Dot-decimal notation must be used when specifying the IP address. A reboot is required after the new IP gateway address has been assigned.

Syntax:

```
#sgateway param1.param2.param3.param4
```

Parameters:

param1	Gateway address	[0 - 255]
param2	Gateway address	[0 - 255]
param3	Gateway address	[0 - 255]
param4	Gateway address	[0 - 255]

Example:

```
#sgateway 192.168.1.1
```

#SIPADD Command

The #SIPADD command specifies a new IP address. Dot-decimal notation must be used when specifying the IP address. A reboot is required after the new IP address is set.

Syntax:

```
#sipadd param1.param2.param3.param4
```

Parameters:

param1	IP address	[0 - 255]
param2	IP address	[0 - 255]
param3	IP address	[0 - 255]
param4	IP address	[0 - 255]

Example:

```
#sipadd 192.168.2.240
```

#SNETMASK Command

The #SNETMASK command specifies a new net mask. Dot-decimal notation must be used when specifying the IP address. A reboot is required after the new IP address is set.

Syntax:

```
#snetmask param1.param2.param3.param4
```

Parameters:

param1	IP address	[0 - 255]
param2	IP address	[0 - 255]
param3	IP address	[0 - 255]
param4	IP address	[0 - 255]

Example:

```
#snetmask 255.255.255.0
```

#USE_TELNET_PASS Command

The #USE_TELNET_PASS command enables / disabled the use of a Telnet password during the login process.

Syntax:

```
#use_telnet_pass param1
```

Parameters:

param1 State [0 - 1]

Value	Meaning
0	Disable password
1	Enable password

General Commands

Command	Description
#activebolo	Activates the bootloader
#fadefault	Resets the Switcher to the default routing state
#irrmtadd	Sets the IR address for the Switcher
#lockpower	Toggles the lock power state
#stbymode	Toggles Standby (power OFF) Mode

#ACTIVEBOLO Command

The #ACTIVEBOLO function activates the bootloader. This command is required to be executed in order begin the firmware update procedure.

Syntax:

```
#activebolo
```

Parameters:

None

Notes:

This command must be executed *twice*, in order to active the bootloader.

#FADEFAULT Function

The #FADEFAULT function will reset the Switcher to the default routing settings.

Syntax:

```
#fadefault
```

Parameters:

None

#IRRMTADD Command

The #IRRMTADD sets the IR channel. The IR channel for the Switcher and the IR Remote Control Unit must be the same.

Syntax:

```
#irrmtadd param1
```

Parameters:

param1 State [0 - 3]

Value	Meaning
0	IR channel 0
1	IR channel 1
2	IR channel 2
3	IR channel 3

#LOCKPOWER Command

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

Syntax:

```
#lockpower param1
```

Parameters:

param1 State [0 - 1]

Value	Meaning
0	Disable Power Lock
1	Enable Power Lock

#STBYMODE Command

The #STBYMODE command toggles the Standby Mode state. When the Switcher is powered OFF (not unplugged), then the unit is in Standby Mode. Executing this command from Standby Mode will power ON the Switcher.

Syntax:

```
#stbymode param1
```

Parameters:

param1 Mode [0 - 1]

Value	Meaning
0	Normal Mode
1	Standby Mode

Routing and Extender Commands

The following commands *do not* require the '#' character. A carriage return must be added to the end of each command.

Command	Description
R	Routing command

R Command

The R command switches to the specified input.

Syntax:

```
r param1
```

Parameters:

param1	DisplayPort Input	[1 - 4]

The Gefen 4x1 DisplayPort Switcher supports Telnet for controlling the Switcher over a network. To access this feature, an IP address, subnet, gateway, and port numbers need to be set correctly. Consult the network administrator to obtain the proper IP address and settings for this product to properly communicate with the Switcher over a network.

The Telnet control must be configured using RS-232 commands. Once properly configured, enter the IP address that was assigned to the Switcher using a terminal program or other Telnet client.

1. Connect the Switcher to a computer using RS-232.

2. Use a terminal emulation program (e.g. HyperTerminal, PuTTY, Indigo, etc.) to connect to the Switcher. See page 14 for information on RS-232 configuration.

IMPORTANT: When using HyperTerminal under Windows XP, the LF (line feed) character option *must* be enabled.

3. Apply power to the Switcher. Information similar to the following will be displayed in the terminal window:

```
==================================================
GEFEN
DISPLAY PORT 441
FW version: 1.3
==================================================
```

4. Use the `#ipconfig` command to display the current IP settings. The factory (default) settings are displayed below:

```
#ipconfig

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

MAC addr                = 00:1C:91:02:40:00
IP addr                 = 192.168.0.70
Net Mask                = 255.255.255.0
Gateway                 = 192.168.0.1
Web Server Port         = 80
Telnet Server Port      = 23
Telnet password on login is set to ON
```

Note that the Telnet password is set to ON. A user name and password can be set for additional security. This option can also be disabled. See page 20 for details.

5. Use the `#sipadd` command to set the IP address for the Control System. Check with a network administrator to obtain an available address, if necessary. DHCP is not supported by this Switcher.

```
#sipadd 192.168.2.234

New IP set to: 192.168.2.234
```

After setting the IP address, power-cycle the Switcher for the changes to take effect.

IMPORTANT: All IP configuration changes will require the Switcher to be power-cycled.

6 Specify the IP of the Control System in the Telnet client. In this example, the IP address is set to 192.168.2.234. Once connected to the Control System, the Telnet client will display a screen similar to the following:

```
---------- Welcome to DP441 Telnet Server ----------
You are user number 1 of 3 allowed.
You will be disconnected after 10 minutes of inactivity.

Login: Admin
Password: Admin

Type Cmd:
```

By default, the user name and password options are enabled by use of the `#use_telnet_pass` command (see page 20). Once this command is enabled, the Switcher will prompt for both the user name and password. The password cannot be disabled from the login process. Once logged in, the `Type Cmd` prompt will be displayed.

The Telnet interface uses the same commands and syntax that are used with RS-232 control. See the command list, starting on page 15.

SPECIFICATIONS

Maximum Pixel Clock.....360 MHz

Input Connector.....(4) DisplayPort, female

Output Connector.....(1) DisplayPort, female

RS-232 Connector.....(1) DB-9, female

Ethernet Connector..... (1) RJ-45, shielded

IR Extender Connector..... (1) 3.5 mm mini-stereo

Power Supply ..... 5V DC

Power Consumption ..... 10W (max.)

Dimensions..... 17.1” W x 1.75” H x 4.25” D

Shipping Weight ..... 4 lbs.

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 A6

20600 Nordhoff St., Chatsworth CA 91311
1-800-545-6900 818-772-9100 fax: 818-772-9120
www.gefen.com support@gefen.com

This product uses UL listed power supplies.