3GSDI to HDMI Scaler

GEF-3GSDI-2-HDS

User Manual

Release A6

GefenPRO®

Important Safety Instructions

GENERAL SAFETY INFORMATION

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this product near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install or place this product near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. To reduce the risk of electric shock and/or damage to this product, never handle or touch this unit or power cord if your hands are wet or damp. Do not expose this product to rain or moisture.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. Batteries that may be included with this product and/or accessories should never be exposed to open flame or excessive heat. Always dispose of used batteries according to the instructions.

RACK MOUNT SAFETY INFORMATION

1. Maximum recommended ambient temperature: 40 ˚C (104 ˚F).
2. Increase the air flow as needed to maintain the recommended temperature inside the rack.
3. Do not exceed maximum weight loads for the rack. Install heavier equipment in the lower part of the rack to maintain stability.

Warranty Information

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.

Contacting Gefen Technical Support

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c/o Customer Service
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Telephone: (818) 772-9100
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Email: support@gefenpro.com

Visit us on the Web: www.gefenpro.com

Technical Support Hours: 8:00 AM to 5:00 PM Monday - Friday, Pacific Time

For 24 / 7 support, see the back of the product for the support number

3GSDI to HDMI Scaler is a trademark of Gefen, LLC.

Important Notice

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

HDMI, the HDMI logo, and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing in the United States and other countries.

Operating Notes

- The built-in On-Screen Display (OSD) provides convenient operation of the Scaler. The supplied IR Remote control operates the OSD.
- The IR Remote Control IR channel must be identical to that of the Scaler.
- The 3GSDI to HD Scaler supports many input and output resolutions. For a complete list of supported formats, see Supported Video and Graphic Formats.
- Supports SMPTE standards 259M, 292M, SMPTE 274M, SMPTE 296M, ITU-R BT.656 and ITU-R BT.601. Handles 3G-SDI SMPTE 425-A and 425-B / formats 1080P 50/59.94/60.
- Supports HDMI 1.3 with 225 MHz Video Bandwidth, 10-bit Deep Color (RGB & YCbCr 4:4:4 only), and up to 8 channels of converted SDI audio embedded into HDMI.
- Internal software (firmware) may be upgraded via the built-in Serial or USB ports. The included DB-9 cable is provided for this purpose. Note that software updates performed on the USB port will be quicker due to its higher data transfer rate.

Features and Packing List

Features

- Maximum image output resolution supported: 2048 x 1080p (2K)
- Pattern generation of color bars, and cross-hatch patterns
- 10-bit Deep Color support at when using YCbCr 4:4:4 or RGB 4:4:4 output color spaces
- Four aspect ratio modes (Full Screen, Panoramic, Letter/Pillar Box, Extract/Crop)
- Film Mode (produces a progressively scanned output image from an interlaced scanned input image accounting for cadence (e.g. 3:2 / 2:2 pull-down)
- Configuration of clean aperture size and position
- SDI audio channel selection for audio output
- Fully integrated sprite-based Menu System
- Supports 8-Channel PCM audio and Dolby® Digital / DTS® AC3-encoded audio
- Custom frame rate and/or video timings on output
- Digital audio output (S/PDIF Coax)
- RS-232 port for automation
- Rack-mountable

Packing List

The 3GSDI to HDMI Scaler ships with the items listed below. If any of these items are not present in your box when you first open it, immediately contact your dealer or Gefen.

- 1 x 3GSDI to HDMI Scaler
- 1 x IR remote contol unit
- 1 x AC power cord
- 1 x Set of rack ears
- 1 x Quick-Start Guide

Table of Contents

01 Getting Started

02 Operating the 3GSDI to HDMI Scaler

03 Advanced Operation

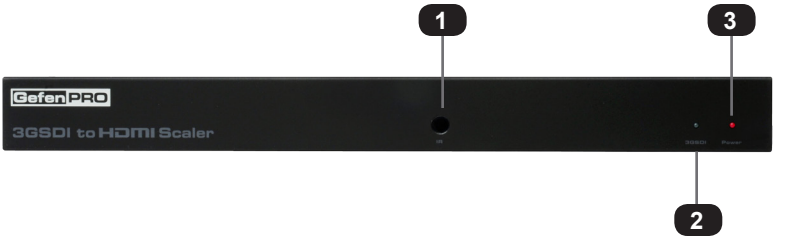
04 Appendix

3GSDI to HDMI Scaler

01 Getting Started

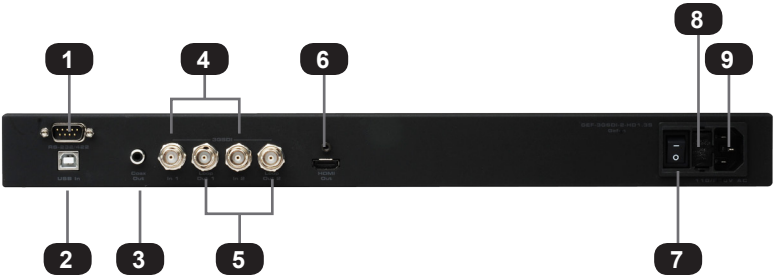
Panel Layout

Front Panel



ID	Name	Description
1	IR	This IR sensor receives signals from the IR remote control unit (not included).
2	3GSDI	This LED will glow blue when 3GSDI signals are detected on the output.
3	Power	This LED indicator will glow bright red when the scaler is powered ON.

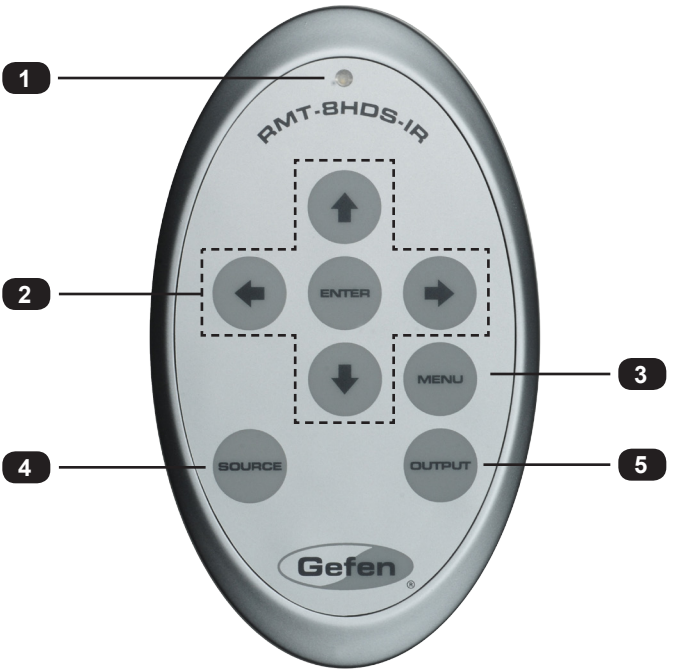
Back Panel



ID	Name	Description
1	RS-232-422	Connect the included RS-232 cable between this port and the RS-232 control device. See RS-232 Configuration for more information.
2	USB In	This USB port is used to update the firmware on the scaler. See Firmware Update Procedure for more information.
3	Coax Out	Connect a coax cable from this S/PDIF port to an amplifier or other A/V device.
4	In 1 / In 2	Connect a 3GSDI source to these BNC connectors.
5	Loop Out 1 / Loop Out 2	Connect 3GSDI displays to these BNC connectors to monitor the input signal.
6	HDMI Out	Connect an HDTV display (or other sink device) to this HDMI port.
7	Power switch	Use this switch to power ON or power-OFF the scaler.
8	Fuse drawer	The power receptacle houses a fuse drawer which contains one 250V fuse. See Fuse Replacement for information on replacing the fuse.
9	110 / 220V AC	Connect the included AC power cord from this receptacle to an available electrical outlet.

IR Remote Control Unit

Front



ID	Name	Description
1	Activity indicator	This LED glows bright orange when a key is pressed on the remote.
2	←/↓/→/↑/ENTER	Used to control features in the On-Screen Display. See The On-Screen Display for details.
3	MENU	Displays / hides the On-Screen Display
4	SOURCE	This button has no function.
5	OUTPUT	Consecutively press this button to cycle through the available output resolutions. See Supported Video and Graphic Formats for a list of available formats.

Back
(shown with cover removed)

ID	Name	Description
1	DIP switch bank	Use these DIP switches to set the IR channel of the remote. See Setting the IR Channel for details.
2	Primary battery slot (shown without battery)	Holds the battery for operating the remote. Use only 3V CR2032-type batteries. Make sure that the positive (+) side of the battery is facing up.
3	Alternate battery slot	Allows for the installation of secondary (backup) battery.

Installing the Battery

The IR remote control unit ships with two batteries. Only one battery is required for operation. The second battery is a spare. Use only 3V CR2032-type batteries.

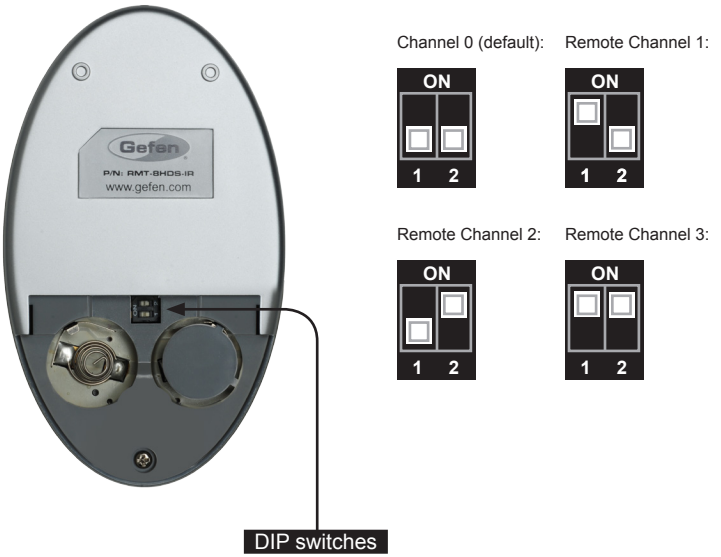
1. Remove the back cover the IR Remote Control unit.
2. Insert the included battery into the primary battery slot. The positive (+) side of the battery should be facing up.
3. Replace the back cover.

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

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

Setting the IR Channel

In order for the included IR remote control to communicate with the 3GSDI to HDMI Scaler, the IR remote control must be set to the same channel as the scaler. Use the `#remotechan` command to set the IR channel of the scaler.



Installation

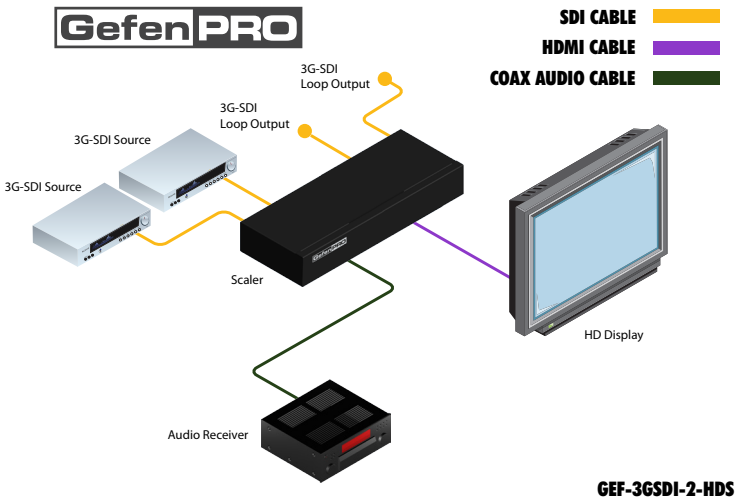
Connecting the 3GSDI to HDMI Scaler

1. Use the included locking HDMI cable to connect a Hi-Def source to the **HDMI In** port on the scaler.
2. Connect a BNC-type cable from the **Ref In** connector, on the scaler, to an external clock reference.
3. Connect a coax cable from the **Coax Out** connector to an external audio amplifier.
4. Connect a BNC-type cable from the Out A / Out B connector(s) to the 3GSDI destination.

> **NOTE:** In order to output dual link 1080p Full HD, when using HD-SDI, both Out A and Out B must be connected to the destination.

5. Connect the included AC power cord from the power supply to an available electrical outlet.

Sample Wiring Diagram



> **WARNING:** This product should always be connected to a grounded electrical AC outlet.

3GSDI to HDMI Scaler

02 Operating the 3GSDI to HDMI Scaler

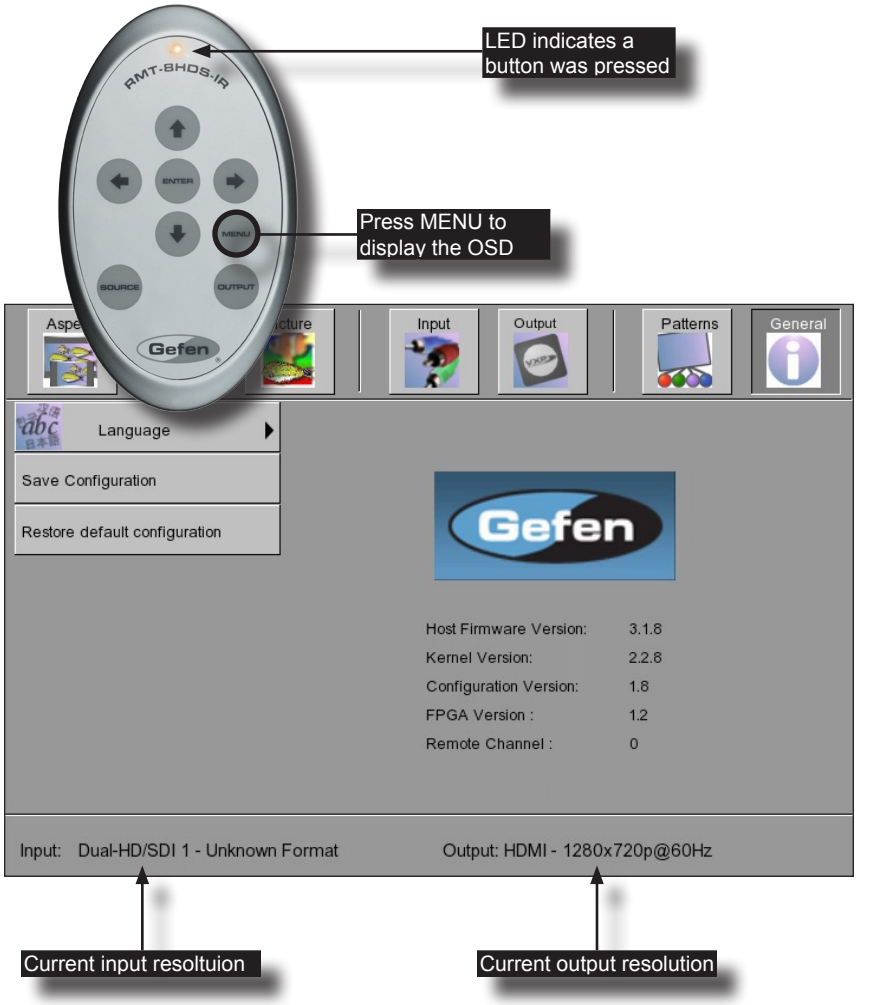
The On-Screen Display

Accessing the On-Screen Display

The *3GSDI to HDMI* Scaler uses a built-in OSD (On-Screen Display) to manage and control all scaler features. To access the OSD, point the included IR remote control unit at the IR sensor on the front panel of the scaler and press the MENU button. Press the MENU button again to dismiss the OSD.

The OSD contains seven menu buttons, each of which contains one or more set of functions for controlling the scaler. Each time the OSD is displayed, the General menu button is automatically selected.

The bottom of the OSD will always display the current input and output resolution.

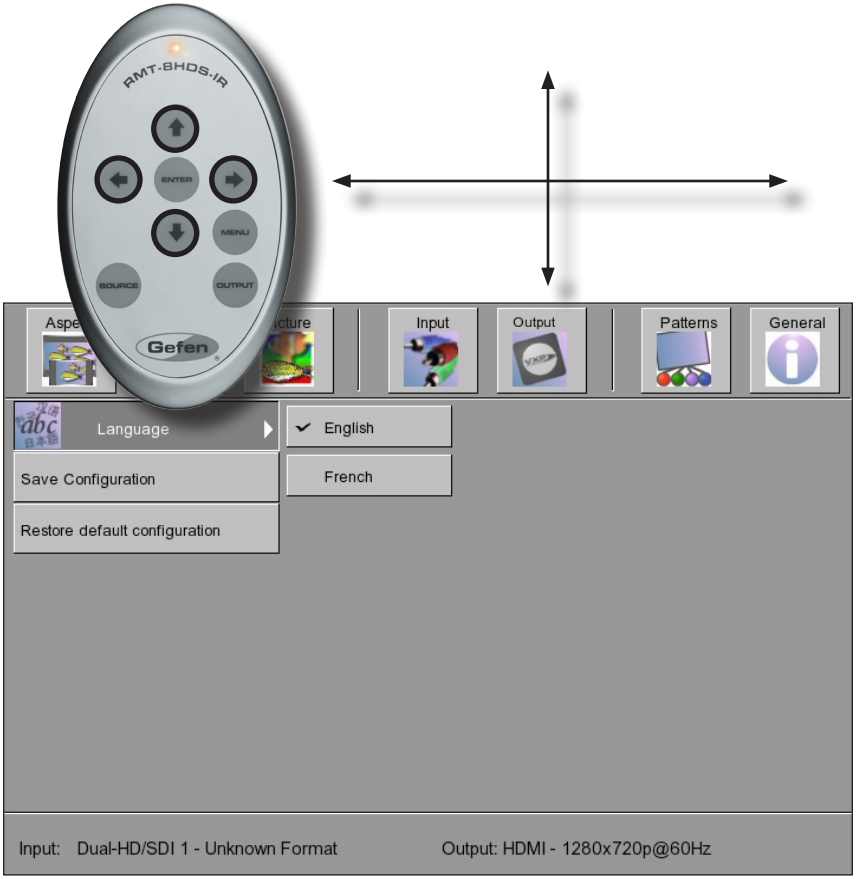


Moving Around in the OSD

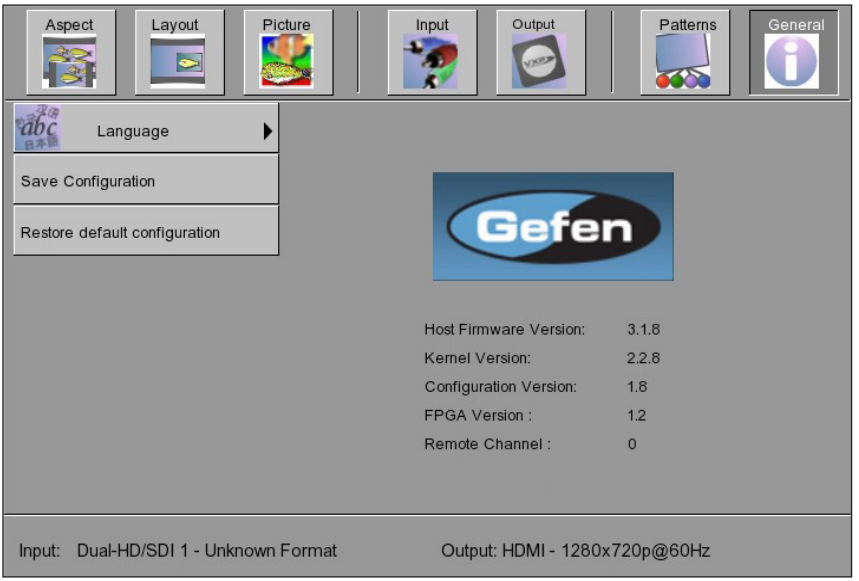
Use the ← / → buttons on the IR remote control unit to move left and right between each of the tabs. Once the desired menu is selected, press the ↓ / ↑ buttons to access each feature within the menu.

Most of the submenus have an ► symbol, indicating that there are additional options. If one of these menus is selected, it will automatically be expanded to show all the options.

Some submenus have check marks (as shown below), requiring the feature to be enabled or disabled. In this case, select the item using the arrow keys, then press the ENTER key to select then enable or disable the feature.



General Menu



General ► Language

Sets the language of the OSD. Select the desired language and press the ENTER key.

Options	Description
English (default)	Sets the OSD in English
French	Localizes the OSD in French

General ► Save Configuration

Saves the current configuration of the scaler. The current configuration of the scaler is saved in memory.

General ► Restore default configuration

Restores the factory-default settings of the scaler.

Patterns Menu

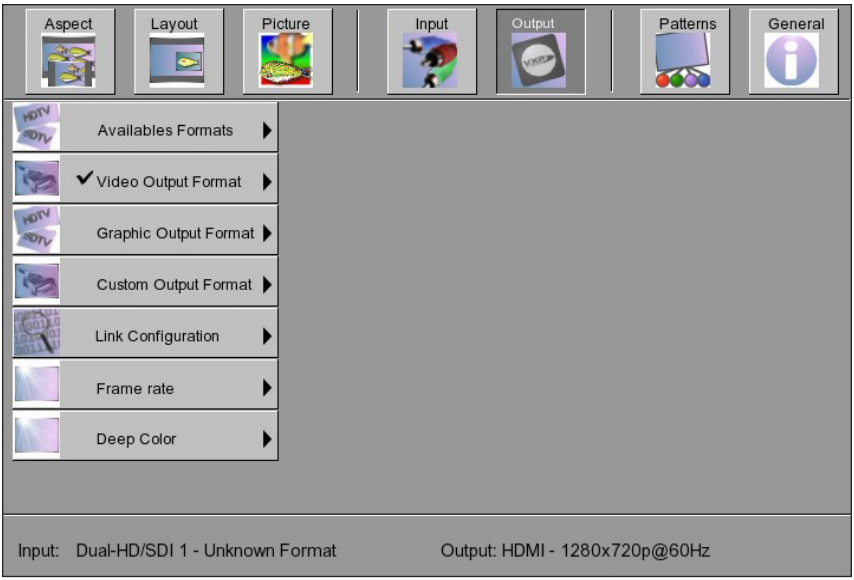
Patterns ► Color Bars

Produces a color bar pattern, similar to a standard SMPTE bar pattern used for color calibration. After selecting this option, press the ENTER button to enable / disable the color bar pattern. When the color bar pattern is enabled, no video output will be displayed.

Patterns ► Cross Hatch

Produces a color bar pattern, similar to a standard SMPTE bar pattern used for color calibration. After selecting this option, press the ENTER button to enable / disable the color bar pattern. When the color bar pattern is enabled, no video output will be displayed.

Output Menu



Output ► Available Formats

If this option is set to Monitor Supported, then only output resolutions found in the EDID of the display can be selected. If set to All, then any of the available output resolutions, provided by the scaler, can be selected.

Options	Description	Default
`All`	All output formats available	All
`Monitor Supported`	Only monitor-supported resolutions are selectable	

Output ► Video Output Format

Selects the video output resolution. See Supported Video and Graphic Formats for a list of available output formats.

Output ► Graphic Output Format

Selects the graphic (VESA) output resolution. See Supported Video and Graphic Formats for a list of available output formats.

Output ► Custom Output Format

This option customized the output format.

Options	Description
HTotal	Total Horizonal Lines
HActive	Active Horizontal Lines
HSync Back Porch	Horizontal Back Porch
HSync Width	Horizontal Sync Width
VTotal	Total Vertical Lines
VActive	Active Vertical Lines
VSync Back Porch	Vertical Back Porch
VSync Width	Vertical Sync Width
Refresh Rate	Refresh (Frame) Rate

The following table lists the formulas for obtaining the minimum and maximum values for each settings. The minimum and maximum values depend upon the current output format.

Options	Minimum Value	Maximum Value
HTotal	HActive - HSync Back Porch	3500
HActive	1	HTotal - HSync Back Porch
HSync Back Porch	1	HTotal - HActive
HSync Width	1	HSync Back Porch
VTotal	VActive + VSync Back Porch	3500
VActive	1	VTotal - VSync Back Porch*
VSync Back Porch	1	VTotal - VActive
VSync Width	1	VSync Back Porch
Refresh Rate	0	13

*If the maximum VActive value reaches 2048, then the maximum value is set to 2048.

(continued on next page)

The following table lists the Refresh Rates and their corresponding values (0 - 13).

Value	Refresh (frame) rate	Value	Refresh (frame) rate
0	23.98	7	59.94
1	24	8	60
2	25	9	65
3	29.97	10	70
4	30	11	75
5	48	12	80
6	50	13	85

Output ► Link Configuration

Selects the output link configuration with respect to color space.

Options	Default
RGB 4:4:4	RGB 4:4:4
YCbCr 4:4:4	
YCbCr 4:2:2	

Output ► Frame Rate

Selects the frame rate of the output signal.

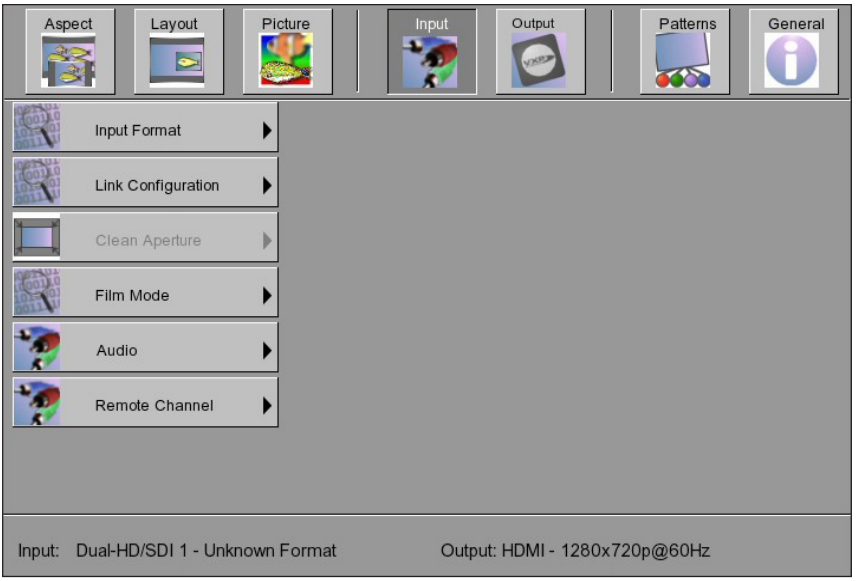
Options	Default
Default	60 Hz
48 Hz	
50 Hz	
59.95 Hz	
60 Hz	
75 Hz	
85 Hz	

Output ► Deep Color

Sets the deep color mode. When set to `Automatic`, the deep color is programmed according to the EDID of the sink device.

Options	Description	Default
`Automatic`	EDID-specified color	Automatic
`Force 8 bits`	Forces 8-bit color	

Input Menu



Input ► Input Format

Selects the resolution and timing of the input format. By default, this is set to Auto Detect which automatically senses the resolution and timing of the input signal. The available resolutions under this menu are in SD and HD format.

Input ► Link Configuration

Selects the link configuration. This option is not available for all formats.

Options	Default
Single Link	Single Link
Dual Link YCbCr (4:4:4)	
Dual Link RGB (4:4:4)	
Dual Link 1080p/576p/480p	

Input ► Clean Aperture

Allows adjustment of the input signal position. The clean aperture parameters allow an area within the production aperture to be defined. The minimum clean aperture size is 0 pixels by 0 lines. If the Non-Standard Sync option is enabled, then the input is set to DFP sync.

Options	Description	Range	Default
Horizontal Size	Sets Horizontal size	1 ... 100	100
Vertical Size	Sets Vertical size	1 ... 100	100
Horizontal Position	Sets Horizontal position	1 ... 100	50
Vertical Position	Sets Vertical position	1 ... 100	50

Input ► Film Mode

When enabled, produces a progressive output signal from an interlaced input signal. This feature automatically detects repeated field sequences present in interlaced signals, such as 50 Hz or 60 Hz field sequences (no repeated fields), 60 Hz 3:2 pull-down, including broken or edited sequence detection, 60 Hz 2:2: pull-down, 50 Hz 2:2 pull-down, static frames, and multi-directional and inter-field motion.

Options	Description
Enable	Enables film mode
Disable (default)	Disables film mode

Input ► Audio

Sets the number of audio channels. Range: [1 ... 8]. The default value is 1.

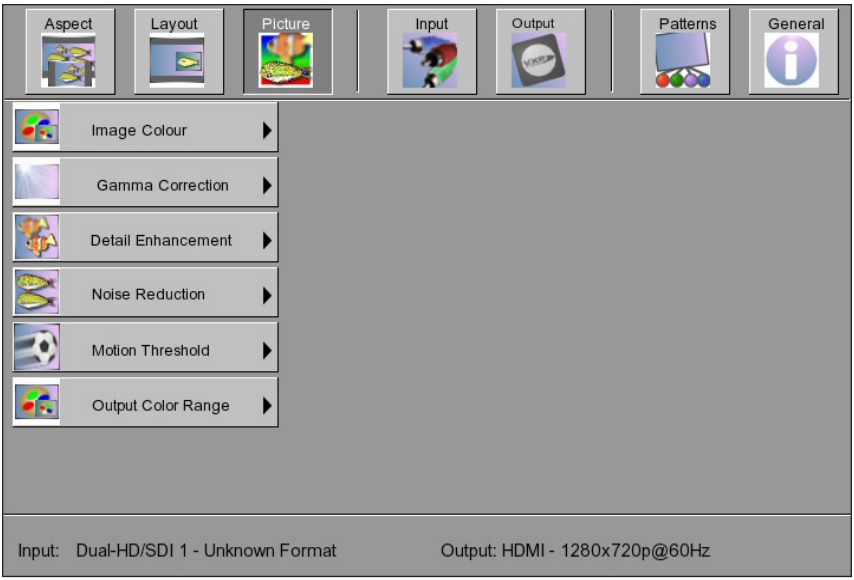
(continued on next page)

Input ► Remote Channel

This option changes the IR channel to between 0 and 3. When the remote channel of the Scaler is changed, the DIP switches on the IR remote must be changed to the corresponding IR channel in order to operate the Scaler. See Setting the IR Channel for details on how to set the IR channel on the IR remote control unit.

Options	Description
0 (default)	IR channel 0
1	IR channel 1
2	IR channel 2
3	IR channel 3

Picture Menu



Picture ► Image Colour

Allows individual adjustment of the Red, Green, and Blue color components, brightness, and black level (RGB/Y Output Offset) of the image.

Options	Description	Range	Default
Contrast Red	Red contrast	0 ... 255	50
Contrast Green	Green contrast	0 ... 255	50
Contrast Blue	Blue contrast	0 ... 255	50
Brightness Red	Red brightness	0 ... 255	50
Brightness Green	Green brightness	0 ... 255	50
Brightness Blue	Blue brightness	0 ... 255	50
RGB/Y Output Offset	Black level	0 ... 1023	0

Picture ► Gamma Correction

Adjusts the Gamma coefficient. Two predefined tables are available: Default and sRGB. The `User Table` setting will use the Gamma Lookup Table (LUT) currently stored in the EEPROM. Use the `Custom` setting in order to define a Gamma LUT. See the Gamma Look-up Table for more information.

Options	Description	Range	
`Default (default)`	Default Gamma coefficient	-	-
`sRGB`	For computers, cameras, and printers	-	-
`User Table`	Uses the Gamma LUT	-	-
`Custom`	Defines a custom Gamma LUT	-	-
`Gamma Coefficient`	Gamma coefficient	0.3 ... 3.0	1.0

Picture ► Detail Enhancement

These parameters processes the input data in either progressive or interlaced format. Changes to the detail enhancement are implemented at the start of the next frame of video.

Options	Description	Range	Default
`Detail Enhancement`	Detail enhancement	0 ... 100	0
`Noise Threshold`	Noise threshold	0 ... 100	0

Picture ► Noise Reduction

This is an adaptive noise reduction function which processes the input data in either progressive or interlaced format. Enabling the Noise Reduction to noisy interlaced signals can optimize de-interlacer performance. Range: [0 ... 100]. The default value is 0.

Picture ► Motion Threshold

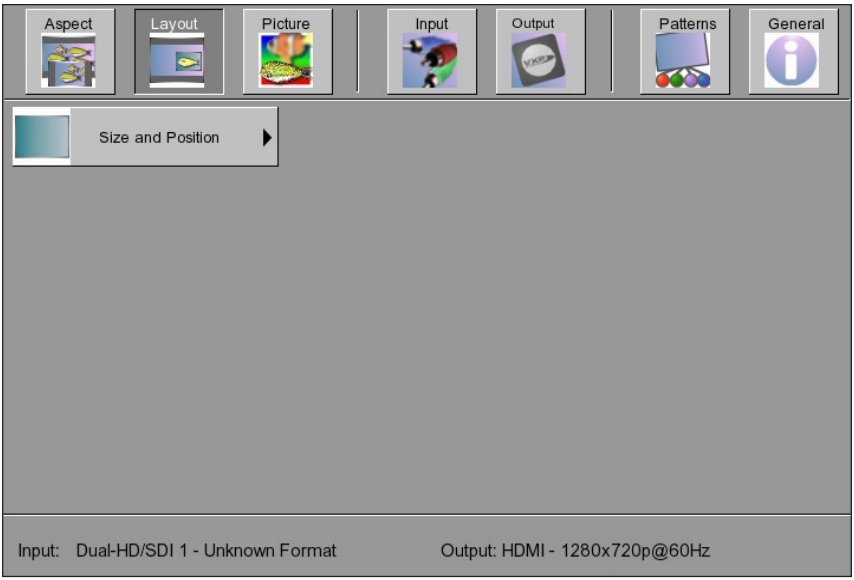
Sets the intraframe motion detection threshold for the de-interlacer on the VXP processor. Video artifacts can be created when de-interlacing (creating interlaced fields from progressive fields). This function allows adjustment of the threshold used by the de-interlacer motion detection algorithm, removing / minimizing motion artifacts in the converted video. Range: [0 ... 15]. The default value is 4.

Picture ► Output Color Range

The RGB output color range may be set to limited (16 - 235) or to full (0 - 255).

Options	Description
Auto (default)	Use color range of output signal
16 - 235	Color range of output signal is limited
0 - 255	Output color is expanded to full-range

Layout Menu



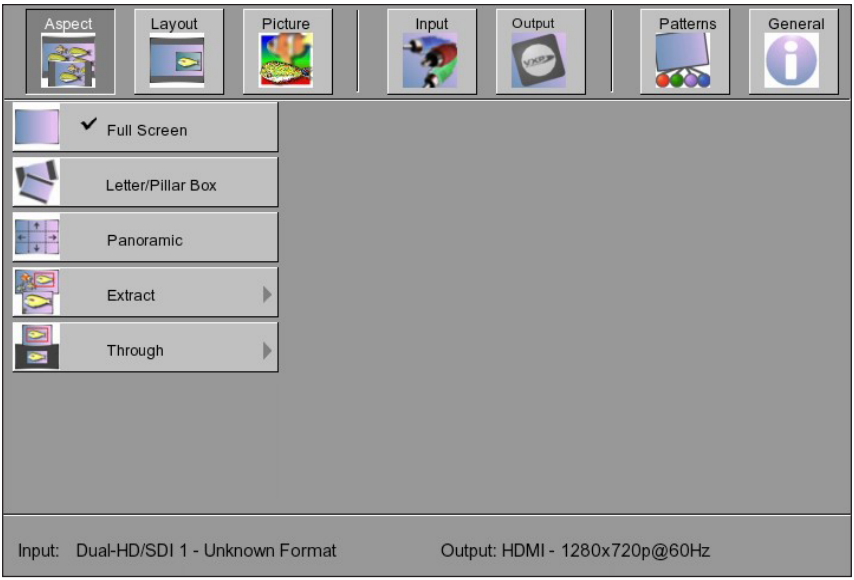
Layout ► Size and Position

Set the size and the position of the image. Note that this option is not available in the panoramic aspect mode.

Options	Description	Range	Default
Horizontal Size	Horizontal size	See below	Current H. res.
Vertical Size	Vertical size	See below	Current V. res.
Horizontal Position	Horizontal position	See below	0
Vertical Position	Vertical position	See below	0

Setting	Min	Max
Horizontal Size	1	(Current H. res.) - (Current H. pos.)
Vertical Size	1	(Current V. res.) - (Current V. pos.)
Horizontal Position	0	(Current H. res.) - (Current H. size)
Vertical Position	0	(Current V. res.) - (Current V. size)

Aspect Menu



Aspect ► Full Screen

Stretches the output signal to fill the display. This is the default setting.

Aspect ► Letter / Pillar Box

Sets the aspect ratio to fit a letter or pillar box format.

Aspect ► Panoramic

Sets the output signal to panoramic format.

Aspect ► Extract

This a function allows the Scaler to zoom in on a subset of the input video signal. This feature allow you to zoom on one selected section of the input picture.

Options	Description	Range	Default
Extract Size	Size (%)	0 ... 100	100
Horizontal Position	Horizontal position	0 ... 100	50
Vertical Position	Vertical position	0 ... 100	50

Aspect ► Through

This function defines a sub-window that is always centered on the screen. The position is the relative position of the window within the full picture. This feature allows you to display one selected section of the input picture without modifying its size.

Options	Description	Range	Default
Horizontal Size	Horizontal size	1 ... 100	-
Vertical Size	Vertical size	1 ... 100	-
Horizontal Position	Horizontal position	0 ... 100	-
Vertical Position	Vertical position	0 ... 100	-

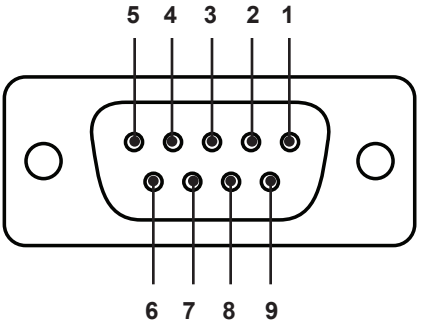
NOTE: When changing the input format, the scaler will try and apply the current settings to the new input format. If this is not possible (e.g. the value is beyond the zoom limit), then the default value (100% size) will be used.

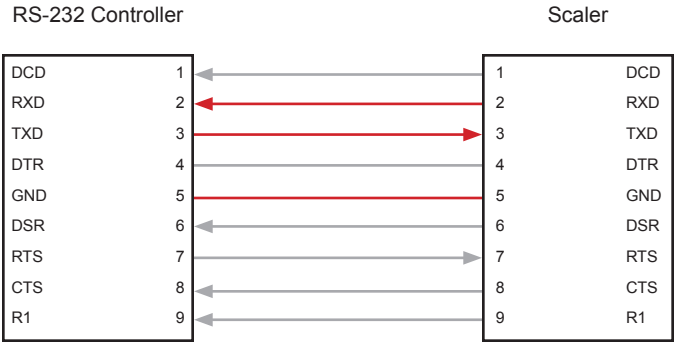
3GSDI to HDMI Scaler

03 Advanced Operation

RS-232 Configuration

RS-232 Interface





Only TXD, RXD, and GND pins are used.

RS-232 Settings

Description	Setting
Baud rate	115200
Data bits	8
Parity	None
Stop bits	1
Hardware 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 each parameter.

RS-232 Commands

Command	Description
#aspect	Sets the aspect ratio of the output signal
#audio	Changes the audio channel
#autolock	Enables / disables automatic Genlock
#blacklev	Sets the black level of the output signal
#bright	Sets the brightness of the specified color component
#cleanaper	Defines an area within the production aperture
#colrange	Sets the color range to limited or full
#contrast	Sets the contrast of the specified color component
#custom	Modifies the output format
#deepcolor	Sets the deep color mode
#devtype	Returns the device type that is connected
#deversion	Displays the current hardware and software version
#enhance	Sets the enhancement detail of the output signal
#extract	Zooms-in on specified are of the input video signal
#filmmode	Enables / disables film mode
#frame	Set the frame rate of the output signal
#gamma	Sets the gamma correction mode
#input	Sets the input timing for the source signal
#insel	Sets the input channel
#key	Used to emulate the IR remote control unit using RS-232
#language	Set the OSD to the specified language
#linkconf	Sets the link configuration
#motionthres	Sets the intraframe motion detection threshold
#noisereduc	Sets the noise reduction value
#noisethres	Sets the noise threshold value
#outconf	Sets the output link configuration
#outconf	Sets the output resolution of the output signal
#pattern	Displays the specified test pattern
#rb	Reboots the scaler
#remotechan	Sets the IR channel of the scaler
#restore	Resets the scaler to factory-default settings
#save	Saves all current settings to the PROM
#sizepos	Sets the size and position of the output signal
#through	Defines an area of the output image with cropping
#version	Displays the current firmware, kernel, and configuration

#aspect

The `#aspect` command sets the aspect ratio of the output signal.

Syntax:

```
#aspect param1
```

Parameters:

param1 Aspect ratio [1 ... 5]

Value	Description
1	Full screen
2	Letter / Pillar box
3	Panoramic
4	Extract
5	Through

Notes:

If the Extract or Through mode is selected, the default values are used. To modify the parameters for Extract or Through mode refer to these commands in this manual.

#audio

The `#audio` command changes the audio channel. The default setting for *param1* is 1.

Syntax:

```
#audio param1
```

Parameters:

param1 Audio channel [1 ... 8]

#autolock

The `#autolock` command enables or disables the Genlock mode. The default setting for *param1* is 0.

Syntax:

```
#autolock param1
```

Parameters:

param1 Aspect ratio [0 ... 1]

Value	Description
0	Disable
1	Enable

#blacklev

The `#blacklev` command sets the black level of the output signal. This is the equivalent of adjusting the RGB/Y Output Offset using the OSD. Refer to the Picture Menu for more information. The default setting is 0.

Syntax:

```
#blacklev param1
```

Parameters:

param1 Level [0 ... 1023]

#bright

The `#bright` command sets the color brightness for the specified color component. The default setting for *param2* is 50.

Syntax:

```
#bright param1 param2
```

Parameters:

param1 Color [0 ... 2]

Value	Description
0	Red
1	Green
2	Blue

param2 Color level [0 ... 100]

#cleanaper

The #cleanaper command allows adjustment of the input signal position. Each parameter allows an area within the production aperture to be defined. The minimum clean aperture size is 0 pixels by 0 lines.

Syntax:

```
#cleanaper param1 param2 param3 param4
```

Parameters:

param1	Horizontal size (default = 100)	[1 ... 100]
param2	Vertical size (default = 100)	[1 ... 100]
param3	Horizontal position (default = 50)	[1 ... 100]
param4	Vertical position (default = 50)	[1 ... 100]

#colrange

The `#colrange` command sets the color range to limited (16 - 235) or full (0 - 255). Full color range (0 - 255) is only available for RGB 4:4:4 output link configuration. The default setting for *param1* is 0.

Syntax:

```
#colrange param1
```

Parameters:

param1 Color range [0 ... 1]

Value	Description
0	Limited (16 - 235)
1	Full (0 - 255)

#contrast

The `#contrast` command sets the contrast level for the specified color component. The default value for *param2* is 50.

Syntax:

```
#contrast param1 param2
```

Parameters:

param1 Color [0 ... 2]

Value	Description
0	Red
1	Green
2	Blue

param2 Contrast [0 ... 100]

#custom

The `#custom` command modifies the output format. The minimum and maximum values depend upon the current output format. The attribute is specified by *param1*. Use *param2* to set the value of the attribute, specified by *param1*.

Syntax:

```
#custom param1 param2
```

Parameters:

param1 Value [0 ... 8]

Value	Description
0	Horizontal Total
1	Horizontal Active
2	Horizontal Back Porch
3	Horizontal Sync Width
4	Vertical Total
5	Vertical Active
6	Vertical Sync Back Porch
7	Vertical Sync Width
8	Refresh Rate

param2 Value for *param1*

Notes:

Use the following table to calculate the minimum and maximum values for each attribute, when specifying *param2*.

Description	Min. Value	Max. Value
Horizontal Total	H. Active + H. Sync Back Porch	3500
Horizontal Active	1	H. Total - H. Sync Back Porch
Horizontal Back Porch	1	H. Total - H. Active
Horizontal Sync Width	1	H. Sync Back Porch

(continued on next page)

Description	Min. Value	Max. Value
Vertical Total	V. Active + V. Sync Back Porch	3500
Vertical Active	1	V. Total - V. Sync Back Porch*
Vertical Sync Back Porch	1	V. Total - V. Active
Vertical Sync Width	1	V. Sync Back Porch
Refresh Rate	0	13

*If this value reaches 2048, then the maximum value is set to 2048.

Example:

In the following example, the Vertical Total is set to 2000 lines:

```
#custom 4 2000
```

The following table lists the Refresh Rates and their corresponding values (0 - 13).

Value	Refresh (frame) rate
0	23.98
1	24
2	25
3	29.97
4	30
5	48
6	50
7	59.94
8	60
9	65
10	70
11	75
12	80
13	85

#deepcolor

The `#deepcolor` command sets the deep color mode. The default value for *param1* is Automatic (*Auto*).

Syntax:

```
#deepcolor param1
```

Parameters:

param1 Value [0 ... 1]

Value	Description
0	Auto
1	Force 8-bit

#devtype

The `#devtype` command displays the type of device that is connected. This command is used by the update program, when updating the firmware, but can be executed for any reason.

Syntax:

```
#devtype
```

Parameters:

None

Example:

```
#devtype

#DEVTYPE HDMITO3GSDI
```

#deversion

The `#deversion` command displays the current hardware (card) and software version in the format: `CARD_VERSION?SOFTWARE_VERSION`.

Syntax:

```
#deversion
```

Parameters:

None

Example:

```
#deversion

#DEVERSION 1?3.2.6
```

#enhance

The `#enhance` command improves the detail of the output signal. The default value for *param1* is 0.

Syntax:

```
#enhance param1
```

Parameters:

param1	Level	[0 ... 100]

#extract

The `#extract` command zooms-in on specified are of the input video signal. The default value for *param1* is 100. The default value for *param2* and *param3* is 50.

Syntax:

```
#extract param1 param2 param3
```

Parameters:

param1	Extract size	[1 ... 100]
param2	Horizontal position	[1 ... 100]
param3	Vertical position	[1 ... 100]

#filmmode

The `#filmmode` command, when enabled, produces a progressive output signal from an interlaced input signal. This feature automatically detects repeated field sequences present in interlaced signals, such as 50 Hz or 60 Hz field sequences (no repeated fields), 60 Hz 3:2 pull-down, including broken or edited sequence detection, 60 Hz 2:2: pull-down, 50 Hz 2:2 pull-down, static frames, and multi-directional and inter-field motion.

Syntax:

```
#filmmode param1
```

Parameters:

param1 Value [0 ... 1]

Value	Description
0	Disable film mode
1	Enable film mode

#frame

The `#frame` command sets the frame rate of the output signal.

Syntax:

```
#frame param1
```

Parameters:

param1 Value [see table]

Value	Description
5	48 Hz
6	50 Hz
7	59.94 Hz
8	60 Hz
11	75 Hz
13	85 Hz

#gamma

The `#gamma` command sets the gamma correction mode of the output signal.

Syntax:

```
#gamma param1 param2
```

Parameters:

param1 Gamma setting [0 ... 3]

Value	Description
0	Default
1	sRGB
2	Custom
3	User table

param2 Mode [see below]

Notes:

If the *Custom* mode is used, then set the gamma coefficient value in the second parameter. If *User Table* is used, then set *param2* = 1 to use the table currently saved in the EEPROM. To write a new gamma LUT (Look-Up Table) file, you must use the updater with the following command:

```
updater %comport% gamma [filename].csv
```

Example: `updater com1 gamma mygamma.csv`

If the *Default* or *sRGB* mode is used, then set *param2* = 0. See the Gamma Look-up Table for details on the gamma LUT format.

#input

The `#input` command sets the input timing for the source signal. See Supported Video and Graphic Formats for a list of available input formats and their associated values.

Syntax:

```
#input param1
```

Parameters:

param1 Value

#insel

The `#insel` command sets the input channel. The default setting is Channel A.

Syntax:

```
#insel param1
```

Parameters:

param1 Value [1 ... 2]

Value	Description
1	Channel A
2	Channel B

#key

The `#key` command emulates the same control used on the IR remote control. Either the full word or the first letter of the word can be used.

Syntax:

```
#key param1
```

Parameters:

param1 String

Value	Description
`menu`	MENU button
`up`	↑ (Up arrow button)
`down`	↓ (Down arrow button)
`left`	← (Left arrow button)
`right`	→ (Right arrow button)
`enter`	ENTER button
`source`	SOURCE button
`output`	OUTPUT button

#language

The `#language` command sets the OSD to the specified language.

Syntax:

```
#language param1
```

Parameters:

param1 Language [0 ... 1]

Value	Description
`0`	English
`1`	French

#linkconf

The `#linkconf` command sets the link configuration. The link configuration is set on the input. This feature is not valid for all formats. The default valus is 0 (Single link).

Syntax:

```
#linkconf param1
```

Parameters:

param1 Value [0 ... 3]

Value	Description
0	Single link YCbCr (4:2:2)
1	Dual link YCbCr (4:4:4)
2	Dual link RGB (4:4:4)
3	Dual link 1080p / 576p / 480p

Notes:

The following table lists the video formats which are supported for dual link YCbCr and RGB configurations. The values in the right-hand column are for use with the `#outconf` command.

Timing	Value
720p / 23.98	15
720p / 24	14
720p / 25	13
720p / 30	11
720p / 50	10
720p / 59.94	9
720p / 60	8
1035i / 59.94	17
1035i / 60	16
1080i / 50	24
1080i / 50M	25

(continued on next page)

Timing	Value
1080i / 59.94	23
1080i / 60	22
1080sf / 23.98	35
1080sf / 24	33
1080sf / 25	31
1080sf / 29.97	29
1080sf / 30	27
1080p / 23.98	34
1080p / 24	32
1080p / 25	30
1080p /29.97	28
1080p / 30	26
2K-sf / 23.97	73
2K-sf / 24	74
2Kp / 23.98	75
2Kp / 24	76

Some formats automatically set the link configuration to progressive dual link 4:2:2. The table, below, lists these video formats. The values in the right-hand column are for use with the `#outconf` command.

Dual link 1080p / 576p / 480p	Value
1080p / 60	18
1080p / 59.94	19
1080p / 50	20
480p / 59.94	6
576p / 50	7

3G Level-B	Value
1080p / 60	18
1080p / 59.94	19
1080p / 50	20

#motionthres

The `#motionthres` command sets the intraframe motion detection threshold for the de-interlacer on the VXP processor. Video artifacts can be created when de-interlacing (creating interlaced fields from progressive fields). This function allows adjustment of the threshold used by the de-interlacer motion detection algorithm, removing / minimizing motion artifacts in the converted video. The factory-default setting is 4.

Syntax:

```
#motionthres param1
```

Parameters:

param1	Value	[0 ... 15]

#noisereduc

The `#noisereduc` command sets the noise reduction value.

Syntax:

```
#noisereduc param1
```

Parameters:

param1	Value	[0 ... 100]

#noisethres

The `#noisethres` command sets the noise threshold.

Syntax:

```
#noisethres param1
```

Parameters:

param1	Value	[0 ... 100]

#outconf

The `#outconf` command sets the output link configuration. The default value is RGB 4:4:4.

Syntax:

```
#outconf param1
```

Parameters:

param1	Value	[0 ... 2]

Value	Description
0	RGB 4:4:4
1	YCbCr 4:4:4
2	YCbCr 4:2:2

#output

The `#output` command sets the resolution of the output signal. See Supported Video and Graphic Formats for list of available resolutions. Use the associated value in the table to specify an output resolution.

Syntax:

```
#output param1
```

Parameters:

param1	Value	[see table]

#pattern

The `#pattern` command displays the specified test pattern. The original output signal is masked when the test pattern is displayed.

Syntax:

```
#pattern param1
```

Parameters:

param1	Value	[0 ... 2]

Value	Description
0	No pattern
1	Color bar
2	Cross hatch

#rb

The `#rb` command reboots the scaler.

Syntax:

```
#rb
```

Parameters:

None

#remotechan

The `#remotechan` command sets IR channel of the scaler. The specified IR channel must match the IR channel of the included IR remote control unit. See Setting the IR Channel for instructions on setting the IR channel on the IR remote control unit.

Syntax:

```
#remotechan param1
```

Parameters:

param1	IR channel	[0 ... 3]

#restore

The `#restore` command resets the *3GSDI to HDMI Scaler* to factory-default settings.

Syntax:

```
#restore
```

Parameters:

None

#save

The `#save` command saves all the current parameter settings to the PROM.
These parameters will be reloaded upon the next boot up.

Syntax:

```
#save
```

Parameters:

None

#sizepos

The `#sizepos` command sets the size and the position of the image. This option is not available when the Aspect Mode is set to Panoramic.

Syntax:

```
#sizepos param1 param2 param3 param4
```

Parameters:

param1	Horizontal size	[1 ... max]
param2	Vertical size	[1 ... max]
param3	Horizontal position	[0 ... max]
param4	Vertical position	[0 ... max]

Notes:

Use the following formulas to calculate the maximum values for each parameter:

param1:	Current horizontal resolution - current horizontal position
param2:	Current vertical resolution - current vertical position
param3:	Current horizontal resolution - current horizontal size
param4:	Current vertical resolution - current vertical size

#through

The `#through` command defines a sub-window that is always centered on the screen. The position of the sub-window is relative to the size and position of the original output signal.

Syntax:

```
#through param1 param2 param3 param4
```

Parameters:

param1	Horizontal size	[1 ... 100]
param2	Vertical size	[1 ... 100]
param3	Horizontal position	[0 ... 100]
param4	Vertical position	[0 ... 100]

#version

The `#version` command displays the current version of host firmware, Kernel, and the configuration version.

Syntax:

```
#version
```

Parameters:

None

3GSDI to HDMI Scaler

04 Appendix

Supported Video and Graphic Formats

The following table contains all supported video and graphic formats supported by the *3GSDI to HDMI Scaler*. The Value column contains a list of parameters used by RS-232.

Input		Output	
Format	Value	Format	Value
480i	0	480i	0
480p / 59.94 Hz	6	480p / 59.94 Hz	6
576i	1	576	1
576p / 50 Hz	7	576p	7
720p / 23.97 Hz	15	720p / 23.97	15
720p / 24 Hz	14	720p / 24	14
720p / 25	13	720p / 25	13
720p / 29.97	12	720p / 29.97	12
720p / 30	11	720p / 30	11
720p / 50	10	720p / 50	10
720p / 60	8	720p / 60	8
720p / 59.94	9	720p / 59.94	9
1035i / 59.94	64	1035i / 59.94	64
1035i / 50	63	1035i / 50	63
1080i / 50	24	1080i / 50	24
1080i / 50M	25	1080i / 50M	25
1080i / 59.94	23	1080i / 59.94	23
1080i / 60	22	1080i / 60	22
1080p / 23.98	34	1080p / 23.98	34
1080p / 24	32	1080p / 24	32
1080p / 25	30	1080p / 25	30
1080p / 29.97	28	1080p / 29.97	28
1080p / 30	26	1080p / 30	26
1080p / 50	20	1080p / 50	20
1080p / 50M	21	1080p / 50M	21
1080p / 59.94	19	1080p / 59.94	19
1080p / 60	18	1080p / 60	18
1080sf /23.98	35	2K-p / 23.98	75
1080sf / 24	33	2K-p / 24	76

Supported Video and Graphic Formats

Input		Output	
Format	Value	Format	Value
1080sf / 25	31	640 x 350 / 85 Hz	36
1080sf / 29.97	29	640 x 400 / 85 Hz	37
1080sf / 30	27	640 x 480 / 60 Hz	38
2K-p / 23.98	73	640 x 480 / 75 Hz	39
2K-p / 24	74	640 x 480 / 85 Hz	40
2K-sf / 23.98	75	800 x 600 / 60 Hz	41
2K-sf / 24	76	800 x 600 / 75 Hz	42
Auto Detect	255	800 x 600 / 85 Hz	43
		1024 x 768 / 60 Hz	44
		1024 x 768 / 75 Hz	45
		1024 x 768 / 85 Hz	46
		1280 x 854	65
		1152 x 864 / 75 Hz	47
		1280 x 768 / 60 Hz	48
		1280 x 960 / 60 Hz	49
		1280 x 960 / 85 Hz	50
		1280 x 1024 / 60 Hz	51
		1280 x 1024 / 75 Hz	52
		1280 x 1024 / 85 Hz	53
		1360 x 768 / 60 Hz	54
		1366 x 768 / 60 Hz	56
		1366 x 923 / 50 Hz	55
		1440 x 900 / 60 Hz	66
		1440 x 1080 / 60 Hz	67
		1600 x 1024	68
		1600 x 1200 / 60 Hz	57
		1600 x 1200 / 65 Hz	58
		1600 x 1200 / 70 Hz	59
		1600 x 1200 / 75 Hz	69
		1680 x 1050 / 60 Hz	70
		1920 x 1200 / 60 Hz	71
		2048 x 1080	72

Uploading an EDID

The 3GSDI to HDMI Scaler allows a custom EDID to be uploaded and read by the display / sink device. Use the instructions below to upload an EDID. The EDID must be `.bin` format.

1 Download the 3GSDI-2-HDS firmware file from the Gefen Web site.

2 Extract the contents of the `.zip` file to the desired directory.

3 Copy the EDID file, to be uploaded, into the same directory as the extracted files.

4 Open the `Updater.ini` file and locate the `[Device Firmware]` section.

```
[Device Firmware]
device1=Device1.bin
device5=Device5.bin
FPGA=3GSDI-2-HDMI-SCALER.bin
Micro=appMain.mot
EDID=EDID.bin
```

5 Replace the `EDID=EDID.bin` line with the name of the EDID to be uploaded.

For example:

```
EDID=Dell_EDID.bin
```

6 Locate the `[Force Update]` section and change the values to the following:

```
[Force Update]
device1=0
device5=0
FPGA=0
Micro=0
EDID=1
```

7 Run the `GefenUpdater.exe` file.

Gamma Look-up Table

The Gamma Look Up Table (LUT) can be programmed using the `GefenUpdater.exe` program from the Gefen software package. To do this, following the instructions below:

1 Create the Gamma LUT.

2 Create a standard ASCII text file with the following line:

```
GefenUpdater GAMMA filename.csv
```

where `filename.csv` is the name of the Gamma LUT file.

3 Save the file as `UpdateGamma.bat`. Make sure that the `GefenUpdater.exe` file resides in the same directory (or is in the path) as the `UpdateGamma.bat` file.

4 Connect a USB cable from the computer to the *3GSDI to HDMI Scaler*.

5 Power on the *3GSDI to HDMI Scaler*. Once the scaler has powered up, run the `UpdateGamma.bat` file.

The LUT is a standard .CSV file. Each line contains Red, Green and Blue values separate by comma ",". A value must be between 0 and 1023. A file must contain 1024 lines:

```
1023,0,0        (Line 1)
1023,0,0
1023,0,0
1023,0,0
1023,0,0
1023,0,0
1023,0,0
…
…
1023,0,0        (Line 1024)
```

Mounting Plate Installation

Rack mount ears are provided for installation of this unit into a 1U rack mount space.

1. Locate the side screws on the unit.
2. Remove the front 2 screws that are located closest to the front of the unit.
3. Using the removed screws, screw the rack mounting bracket into the unit.
4. Repeat the procedure on the opposite side of the unit.

1

2

3

4

Fuse Replacement

The *3GSDI to HDMI Scaler* contains a fuse as part of the internal power supply. This fuse can easily be replaced by using the following steps.

> **STOP:** Before installing modules and prevent the risk of possible electrical shock, unplug the AC power cord from back of the scaler.

1. Disconnect the power AC power cord from the IEC connector on the scaler.
2. Locate the fuse door, between the IEC connect and the power switch, on the back of the unit.
3. Use a small flat-head screwdriver to gently pry the locking mechanism, on the fuse door, from the scaler.

4. Remove the fuse door.

5. Remove the fuse from the C-cradle on the fuse door.

6. Replace the fuse. Only use a 5mm x 20mm 250V / 2A fuse.

> **ATTENTION:** Do not use a fuse other than the type specified by the manufacturer. Replacement of an incorrect fuse can result in electrical fire and damage to the scaler, which will void the warranty.

7. Gently replace the fuse drawer until it locks into place. Do not force the fuse drawer into place. If the fuse drawer does not lock into place, the fuse may not be centered in the C-cradle. In this case, rotate the scaler on its side and reinstall the fuse drawer. This will allow the fuse to stay centered as the fuse drawer is installed.

Firmware Update Procedure

The following items are required to update firmware:

- GefenPRO 3GSDI to HDMI Scaler
- Firmware files (downloaded from the Gefen Web site)
- Computer running Windows® XP or better.
- USB cable (A-B)

1. Make sure the scaler is powered ON. It is unnecessary to disconnect any source and SDI devices during the update procedure.

2. Extract the contents of the .ZIP file to a folder on the Windows Desktop.

3. Connect the USB cable between the computer and the scaler. Once the USB cable is connected, a virtual COM port will be created.

4. Open the `Updater.ini` file, located in the firmware files folder.

5. Locate the `[Setup]` section within the `Updater.ini` file.

6. Change the COM port setting to the virtual COM port. For example:

   ```
   [Setup]
   comport=COM5
   ```

   If the virtual COM port is not known, use *Control Panel ► Device Manager* (under Windows®) and locate the *Ports* section. The virtual COM port will be listed as *Silicon Labs CP210x USB to UART Bridge.*

7. Save the `Updater.ini` file.

8. Execute the `GefenUpdater.exe` file.

9. The update process will take several minutes.

   ```
   Successfully open the com port COM5
   Wait...
   Usb device : CP2103.
   Flash already programmed...Updating firmware
   ...
   ...
   Total Time : 0 minutes 1 seconds.

   Reset Device.

   Com port closed.

   Exit updater.
   Press any key to continue . . .
   ```

10. If any portion of the update process fails, run the `GefenUpdater.exe` again.

Specifications

Supported Formats	
Output Resolution (max.)	• 2048 x 1080p (2K)
Input Video Bandwidth	• 2 x 2.97 Gbps (max.) (two 3G-SDI BNC connectors)

Electrical	
Maximum Pixel Clock	• 225 MHz
Power Indicator	• 1 x LED, blue
3GSDI Indicator	• 1 x LED, green
Power Switch	• 1 x Rocker-type

Connectors	
Video Input	• 2 x BNC, female
Video Loop Output	• 2 x BNC, female
Video Output	• 1 x HDMI Type A 19-pin, female
Audio Output	• 1 x S/PDIF
USB	• 1 x Type-B (USB 2.0, used for firmware update)
RS-232	• 1 x DB-9, female

Operational	
Power Input	• 100 - 240V AC (50/60 Hz)
Power Consumption	• 20W (max.)

Physical	
Rack Size	• 1U
Dimensions (W x H x D)	• 17” x 1.73” x 7.7” (432mm x 44mm x 195mm)
Unit Weight	• 2.8 lbs (1.3 kg)

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This product uses UL or CE listed power supplies.