OptiScale User Manual

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Revision History

Revision	Date	Originator and Comments
Product Preview (PP)[1] rev MKT-0014-UMN-1.001	October 25, 2004	Andreea Rotaru- first release
MKT-0014-UMN-1.002	December 14, 2004	Andreea Rotaru has made the following changes: - changed Figure 2 on page 3 - changed the OSD Menu Controls information in the On-Screen Display chapter

1. Revision types: Product Preview (PP), Advanced Information (AI), and Production Data (PD)

Copyright and Trademark Information

Preface

Limited Warranty

All Silicon Optix Inc. systems products are designed and tested to the highest standards and backed by a two year parts and labor warranty. Warranties are effective upon the first delivery date to the end user customer and are non-transferable.

Warranty related repairs include parts and labor, but do not include repair of faults resulting from user negligence, special modifications, abuse (mechanical damage), shipping damage, and/or other unusual damages.

The customer shall pay shipping charges when the unit is returned for repair. Silicon Optix will pay shipping charges for return shipments to customers.

Silicon Optix does not assume responsibility for consequential damages, expenses or loss of revenue, inconvenience or interruption in operation experienced by the customer. Warranty service shall not automatically extend the warranty period.

No other warranty, expressed or implied, shall apply.

Return Material Authorization (RMA)

In the event that a product needs to be returned for repair, please call your closest Silicon Optix Inc. office and ask for an Applications Engineer to issue a Return Material Authorization number.

RMA Conditions

- Prior to returning any item, you must receive a Return Material Authorization (RMA) number.
- All RMA numbers must appear on the return-shipping label.
- All RMA numbers are valid for ten (10) days from the issue date.
- All shipping and insurance charges in all RMAs must be prepaid by the customer.

About this Manual

This manual describes the functionality of Silicon Optix OptiScale and contains the following chapters:

- **Chapter 1**, **Introduction**, describes the OptiScale product and gives specifications.
- **Chapter 2**, **Installation**, lists the components supplied in the package and provides installation and "getting started" instructions.
- **Chapter 3**, **OptiScale Interface**, describes the interfaces used in the OptiScale system.
- **Chapter 4**, **On-Screen Display**, provides a menu-by-menu description of the on-screen display.
- **Chapter 5**, **Loading Firmware**, describes the remote loading of firmware.
- **Chapter 6**, **RS232/422/485 Protocols**, describes the communications protocol used in the OptiScale system.
- **Chapter 7**, **Troubleshooting**, provides troubleshooting procedures for typical setup problems that might be encountered.
- **Glossary**, presents a glossary of terms and abbreviations used in this manual.
- **Index**, presents a complete alphabetical listing of keywords and topics provided in this manual.

Audience

This user guide is designed for people who will be installing the OptiScale video/graphics scaler.

Book Style Conventions

This book includes the following style conventions:

- *Italic* type is used occasionally for emphasis in the text. Italics also indicate cross-references within this manual, or references to other documents.
- **Bold** type indicates labels in windows, dialog boxes, menus, menu options, list boxes, text boxes, check boxes, control buttons, option buttons, and so on.
- **Bold** type, between *greater than, less than brackets (< >)* is also used to indicate keys on your keyboard (for example <**Ctrl**> for the Control key).
- The carriage-return key, sometimes marked as a bent arrow on your keyboard, is called <**Enter**>.

FCC Statement

NOTE: This equipment has been tested and found to comply with the limits for Class B digital devices, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential/office installation. The equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful

interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced Radio/TV technician for help.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Safety

Important Safety Instructions

This symbol warns the user of uninsulated voltage within the unit that can cause dangerous electric shocks.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

This symbol alerts the user that there are important operating and maintenance instructions in the literature accompanying this unit.

WARNING: Read the User Guide carefully and completely before operating the unit. Be sure to keep the User Guide in a near-at-hand location for future reference. Strictly follow all warnings and cautions in this User Guide, as well as the following safety suggestions.To prevent electric shock or injury, follow these safety instructions in the installation, use, and servicing the unit.

Installation

Attachments - Do not use attachments not recommended by the manufacturer, as they may result in the risk of fire, electric shock, or injury to persons.

Water and Moisture - Do not use this unit near water; for example, near a bathtub, washbasin, kitchen sink or laundry tub, in a wet basement, or near a swimming pool, water spa, or the like.

Heat - Do not use this unit near sources of heat, including heating vents, stoves, or other appliances that generate heat. Also, do not be place this product in temperature environments greater than 45^{o}C (104^{o}F).

Mounting Surface - If not installing the unit in a standard equipment rack using the recommended mounting brackets, place the unit on a flat, even surface. Do not place the unit on an unstable cart, stand, tripod, bracket, or table. The unit may fall causing serious injury to a person and/or serious damage to the appliance.

Portable Cart - An appliance and cart combination should be moved with extreme care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

Ventilation - Locate the unit with adequate space around it so that proper heat ventilation is assured. Allow 10 cm (4 in) clearance from the rear and top of the unit, and 5 cm (2 in) from each side.

Slots and openings in the unit's case are provided for ventilation to ensure reliable operation of the unit and to prevent overheating. These openings must not be blocked or covered. The openings should never be blocked by operating the unit while placed on a bed, sofa, rug, or similar surface. This unit should not be placed in a built-in installation such as a bookcase unless adequate ventilation is provided.

Entry of Foreign Objects and Liquids - Never push foreign objects of any kind into this unit through the ventilation slots as they may touch dangerous voltage points or short-circuit electrical/electronic parts that could result in fire, or electric shock, or both. Never spill liquid of any kind onto the unit.

Electric Power - Only operate the unit from the type of electric power source indicated on the unit's labeling. If you are not sure of the type of power supply that is available in your home or workplace, consult your appliance supplier or local power company.

Grounding or Polarization - This unit is provided with a 3-pin, grounded, alternating current line plug. This plug will fit into the power outlet only one way. This is a safety feature. Do not try to defeat the safety purpose of the plug.

Power Cord Protection - Route power supply cords so that they are not likely to be walked on or pinched by placing items upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.

Overloading - Do not overload wall power outlets, extension cords, or integral convenience receptacles as this can result in a risk of fire or electric shock.

Lightning - For added protection for this unit during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the power outlet. This will prevent damage to the unit due to lightning or power surges.

Maintenance

Cleaning - Unplug this unit from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Only use a soft cloth dampened with a mild detergent solution. Do not use strong solvents such as alcohol, benzine, or paint thinner.

Damage Requiring Service - Unplug this unit from the power outlet and refer servicing to qualified service personnel under the following conditions:

- When the power cord or plug is damaged.
- If liquid has been spilled or foreign objects have fallen into the unit.
- If the unit has been exposed to rain or water.
- If the unit does not operate normally, following the operating instructions. Adjust only those controls that are covered by the operating instructions as improper adjustment of other controls may result in damage and may require extensive work by a qualified technician to restore the unit to normal operation.
- If the unit has been dropped or the case has been damaged.
- When the unit exhibits a distinct change in performance - this indicates a need for service.

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

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Chapter 1
Introduction

General

The Silicon Optix OptiScale™ (see **Figure 1**) is a high performance video and graphics image scaler. OptiScale combines best-in-class image processing with unique image geometry correction features to provide the A/V professional and amateur enthusiast with unprecedented image scaling quality.

Figure 1: Silicon Optix OptiScale Video/Graphics Scaler

The OptiScale scaler offers an extensive set of selectable input signals. Never before has the ability to process so many different types of video signals - RGB graphics (from analog or DVI sources), SDTV (in all popular signal formats: composite, S-Video and component in NTSC, PAL, and SECAM), and analog HDTV - been integrated in one small package.

OptiScale can be simultaneously controlled by front panel switches, IR remote, and RS232/422/485 serial communication.

The OptiScale scaler is available in a compact desktop package, which can also be used in rack-mount configurations with the optional rack mount installation brackets.

Front/Rear Projection System Applications

- Pro-AV Installation
- Staging and Special Events
- Home Theater
- Advertising Displays

Physical Characteristics

- **DIMENSIONS**: 15 in. x 8.5 in. x 1.75 in.
- **WEIGHT**: 7 lbs
- **POWER**: 100 - 240 VAC, 47 - 63 Hz, 35 W.

Features and Specifications

Advanced Functionality

The following is a list of the OptiScale advanced functional features:

- Advanced image scaling with 65-tap image filter
- Accepts graphics inputs from VGA - SXGA
- Accepts 720p and 1080i HD inputs
- Accepts composite, S-video, and component SDTV inputs
- High-quality de-interlacing for HDTV and SDTV
- Supports SECAM, PAL-60, 4.43 NTSC, PAL-M, and PAL-N international video standards
- Provides output to VGA, SVGA, XGA, 720p, SXGA, and SXGA+ projectors
- Provides output to 852x480 and 1366x768 plasma displays
- Output GenLock

Flexibility and Ease-of-Use

The following OptiScale features demonstrate the product flexibility and ease-of-use:

- Magnify, scroll, and pan through all inputs
- Aspect ratio conversion for 16:9 and 4:3
- Control via front-panel, IR remote, or serial link
- Adjustments for contrast, brightness, hue, gamma, saturation, and color temperature
- Compact size (1U height) and rack-mountable

Sophisticated Software

OptiScale uses the following software:

- PC Loader (standard) enables field upgrades of firmware
- Serial Control Panel

Panel Diagrams

Figure 2 illustrates the Silicon Optix OptiScaleOptiScale front panel controls and indicators and **Figure 3** illustrates the rear panel connectors.

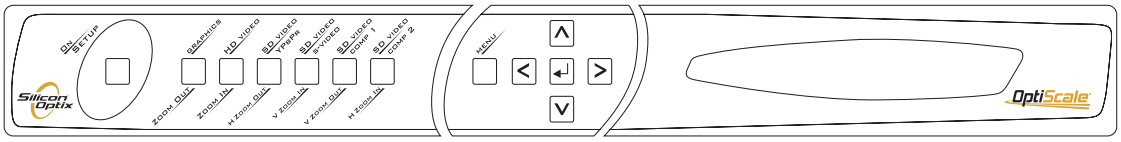


Figure 2: OptiScale Front Panel

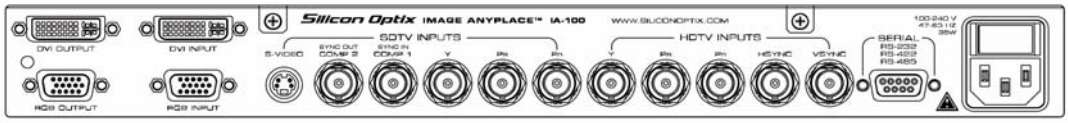


Figure 3: OptiScale Rear Panel

Typical OptiScale Application

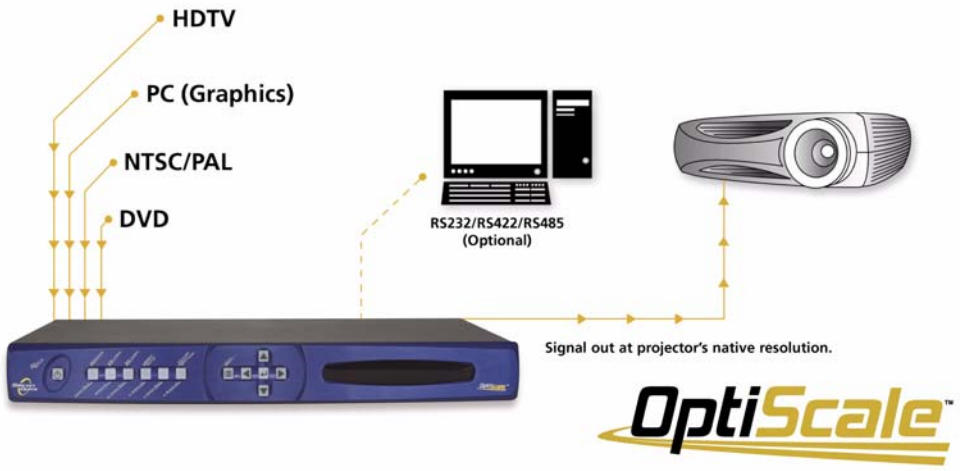


Figure 4: Typical OptiScale Application

Ordering Options and Accessories

Table 1: Ordering Options and Accessories

Item	Part Number	Description
OptiScale	OS-100	Video/graphics scaler without geometry correction for projection onto flat surfaces
eWARP Designer	IA-100_eWARP KEY	Optional software for expanding OptiScale's capabilities to project onto any surface (curved, cylindrical, and so on). May be ordered to upgrade a previously purchased Image AnyPlace

Table sheet 1 of 2

Item	Part Number	Description
Image AnyPlace-EX	IA-100_EX	Image AnyPlace shipped with IA-100_eWARP KEY software pre-loaded
Cables	IA-100_CABLE	Optional package of cables
Rack-Mount Adapter Kit	IA-100_RM	Optional rack-mount installation brackets
Infra-Red Remote	IA-100_RM	Extra remote control
Image AnyPlace-BEX	IA-100_BEX	Image AnyPlace with edge blending and IA-100_eWARP software pre-loaded
Cinema AnyPlace	CA-100_EX	Image AnyPlace_EX with anamorphic lens

Table sheet 2 of 2

Chapter 2
Installation

List of Standard Components

The OptiScale scaler ships with a number of standard components. When unpacking your unit, please ensure that all of the following items are included:

- OptiScale unit (Qty 1)
- AC power cord (Qty 1)
- Infrared remote control (Qty 1)
- BNC to RCA adapter plugs (Qty 4 total)
- User Guide (Qty 1)
- OptiScale software CD (Qty 1)
- VGA cable (6 ft DB15M to DB15M; Qty 1)
- RS232 cable (DB9M -> DB9F; Qty 1)

Optional Accessories

In addition to the standard components listed above, Silicon Optix offers several optional accessory packages available to customers for purchase separately, depending upon the intended application. The optional components are listed below:

Cable Kit

Users may choose to purchase the optional cable package which provides all the cables necessary for connecting to the OptiScale unit in any of its possible configurations. The cable package includes the following:

- DVI-D (male) single link cable (Qty 1)
- Component video (6 ft 3RCA -> 3RCA) cables (Qty 2)
- S-Video 6 ft cable (Qty 1)
- Composite video (6 ft BNC to RCA) cables (Qty 2)
- VGA (6 ft DB15M to DB15M) cable (Qty 1)
- BNC-to-RCA adapters (Qty 10)

The order code/part number for this kit is **IA-100_CABLE**.

Rack-Mount Installation Kit

An optional Rack-Mount Adapter Kit is available for users wishing to use the OptiScale unit in a rack-mount configuration. The order code/part number for purchasing this kit is IA-100_RM.

Setting up OptiScale

To set up your OptiScale unit, follow the steps below:

1. Connect the OptiScale unit to the video input source.
2. Connect the OptiScale unit to the projector.
3. To power up the unit, on the OptiScale unit, press the **Power** switch located on the rear of the unit, close to the power cord. The **Power** switch may be left on in normal operation. The Standby button on the front pannel may be used to put the unit into a low-power state.
4. Select the output resolution by placing the unit in stand-by mode and selecting the connect resolution using the arrow keys on the right side of the front panel.
5. Select the appropriate input from the remote control or the OptiScale front pannel buttons.
6. Power on the projector according to the manufacturer's instructions.
7. Depending upon the specific input and output resolutions, select the proper Aspect Ratio from the OptiScale OSD main screen.
8. If you are unable to obtain a keystone-corrected image, see the troubleshooting guide in the **Troubleshooting** chapter.

Chapter 3
OptiScale Interface

OptiScale Operational Modes

The OptiScale unit has two modes of operation: **Operate** and **Setup**. You can select either of these modes of operation via the front panel interface or the RS232 control interface.

Operate Mode

In **Operate** mode, the video output signals are activated and you may control all the OptiScale parameters (except for **Setup** restricted parameters) from the front panel, IR remote control, or serial communication commands. In **Operate** mode, all controls may be used simultaneously (that is, you may open a menu with a front panel button and make a selection using the IR remote control, and so on). The Front panel and IR remote commands invoke the OSD, and user feedback is provided for all actions. In **Operate** mode, the OptiScale 16 x 2 front panel display indicates the following information:

(SELECTED INPUT CONNECTOR) = (Input Signal)
OUT=(Output Resolution)

The front panel and IR remote control are designed to be identical in control function; that is, each button on the IR remote control corresponds directly in function to a button on the front panel. You will find a complete list of front panel and IR remote controls and OSD operations in the **On-Screen Display** chapter. When controlling OptiScale by serial communications, all actions are performed without invoking the OSD. A complete description of the serial communications protocol is provided in the **RS232/422/485 Protocols** chapter.

OptiScale powers-up in **Operate** mode. All operational parameters are retained from the previous session. A Factory Reset returns all parameters to the default state (described in detail in the **On-Screen Display** chapter), except for the input signal. The input signal most recently used is retained as the power-up input signal.

Setup Mode

In **Setup** mode the OptiScale is in a low-power state. The output signals are de-activated and the IR remote controls (except for activate **Operate** mode) are disabled. The Setup mode is provided so that critical operational controls (such as selected output resolution) are not disturbed by inadvertent IR commands. The setup mode is indicated by the following message appearing on the bottom line of the OptiScale 16 x 2 front panel display:

OptiScale

Setup

You can only adjust the Setup Mode parameters by front panel control (except for the selection of Output Resolution which may be controlled by both front panel control and serial communication control). To select the Setup mode parameters, press the **Menu** button on the front panel control. Up and down arrows now cycle between the Setup Mode parameters. Left and right arrows adjust the value of each of these parameters.

Table 2 lists the **Setup** parameters.

Table 2: Setup Parameters

Parameter	Description
BAUD = #####	Lets you choose a baud rate of 1200, 9600, 19200, or 57600.
Serial No #####	Indicates the Serial Number of the OptiScale unit.
RS232 ADDR = ##	Selects the serial communications address (from 1-32) at which this particular OptiScale unit will respond. Address '00' is reserved as a broadcast address. All OptiScale units in a system will respond to commands sent to address '00'. Please note that although you can only create a multiple unit OptiScale system if you are using the RS422 or RS485 communications schemes, you must still ensure that you correctly set the Serial Communication Box Address to agree with your control software.
RS422 Disabled/Enabled	Enables the serial communications for RS422/485 operation. If RS422 is disabled, the port is configured for RS232.
OUT= XXX ##Hz	Cycles through all of the available OptiScale modes (see **Table 3**). In addition to control by the front panel, the OptiScale Output Mode may also be controlled by serial communications (see the **RS232/422/485 Protocols** chapter for serial communications protocols information).
No lockout/IR lockout/KB lockout/IR + KB lockout	Allows the user to disable the front panel (KB) and /or the infrared (IR) remote inputs.
GenLock	GenLock can be enabled as a Slave or a Master or can be disabled. When enabled as a Master, the OS-100 drives the output timeline vertical sync out of the composite sync #2 connector (COMP2). When enabled as a Slave, the OS-100 expects to receive an external vertical sync one the composite sync #1 connector (COMP1). When in Slave mode, the OS-100 will buffer the external sync from COMP1 and drive it on the COMP2 connector (allowing units to be daisy chained). When disbled, the OS-100 accepts SDTV composite inputs on the COMP1 and COMP2 connectors.
Fornt Panel Display Brightness	The brightness is adjusted by pressing the Graphics button (to increase) or the HD Video button (to decrease).

Table 3: OptiScale Output Modes

Output Mode	Comments
SXGA@60 Hz	VESA Standard
XGA@60 Hz	VESA Standard
XGA@50 Hz	1344x806@54.17 MHz
VGA@60 Hz	VESA Standard
SVGA@60 Hz	VESA Standard
720p@60 Hz	SMPTE Standard
720p@59.94 Hz	SMPTE Standard
720p@50 Hz	SMPTE Standard
SXGA+ 1400x1050@60 Hz	JVC Standard
SXGA+ 1400x1050@50 Hz	JVC Standard
WXGA 1366x768 @60 Hz	1800x795@85.86 MHz
WVGA 852x480 @60 Hz	1064x497@31.728 MHz

Chapter 4
On-Screen Display

OSD Menu Structure

The On-Screen Display (OSD) menu is the primary way of controlling and selecting functions in the OptiScale system. The OptiScale system is initially in a factory default state. Many OptiScale control parameters can be saved to OptiScale memory and retained for use in later sessions. Performing a factory reset erases these saved parameters and returns the system to the default state.

Two slightly different OSD menus are invoked, depending upon whether the currently selected Output Resolution Aspect Ratio is 16:9 or 4:3. The biggest difference between them has to do with the way that aspect ratios are treated (see the **Aspect Ratio** section later in this chapter).

OSD Menu Controls

The OSD can be invoked in two ways, as follows: using the Front Panel Buttons or using the IR remote. The Front Panel and IR Remote have the same buttons. The buttons are:

- On/Setup
- Graphics/Zoom Out
- HD Video/Zoom In
- SD Video YPbPr/H Zoom Out
- SD Video S-Video/V Zoom In
- SD Video Comp 1/V Zoom Out
- SD Video Comp 2/H Zoom In
- Menu
- Up Arrow
- Down Arrow
- Left Arrow
- Right Arrow
- Enter

When pressed, the On/Setup button will toggle between Operate and Setup modes. In Setup mode, the output display of OptiScale is inactive. Setup mode is used to select OptiScale parameters that are infrequently changed (communications parameters, output resolution and lockouts), and that can cause severe effects by inadvertent selection.

The Graphics/Zoom Out button has two functions. In normal operation, this button is used as a quick select for the Graphics inputs. Pressing this button repeatedly will toggle between DVI and RGB Graphics input. The last channel selected is remembered. If Magnify is selected from the Geometry menu, the button is temporarily re-assigned as a Zoom Out control (constant aspect ratio of Zoom Out).

The HD Video/Zoom In button has two functions. In normal operation, this button is used as quick select for the HD Video input. Pressing this button repeatedly will toggle between RGB and YPbPr color space treatment on the HD Video input. The last color space selected is remembered. If Magnify is selected from the Geometry menu, the button is temporarily re-assigned as a Zoom In control (constant aspect ratio of Zoom In).

The SD Video YPbPr / H Zoom Out button has two functions. In normal operation, this button is used as quick select for the SDTV YPbPr input. If Magnify is selected from the Geometry menu, the button is temporarily re-assigned as a Horizontal Zoom Out control.

The SD Video S-Video / V Zoom In button has two functions. In normal operation, this button is used as quick select for the SDTV S-Video input. If Magnify is selected from the Geometry menu, the button is temporarily re-assigned as a Vertical Zoom In control.

The SD Video Comp 1 / V Zoom Out button has two functions. In normal operation, this button is used as quick select for the SDTV Comp 1 input. If Magnify is selected from the Geometry menu, the button is temporarily re-assigned as a Vertical Zoom Out control.

The SD Video Comp 2 / H Zoom In button has two functions. In normal operation, this button is used as quick select for the SDTV Comp 2 input. If Magnify is selected from the Geometry menu, the button is temporarily re-assigned as a Horizontal Zoom In control.

The Menu button is used to invoke the OSD main menu.

The Up Arrow button is used to navigate the OSD.

The Down Arrow button is used to navigate the OSD.

The Right Arrow button is used to navigate the OSD.

The Left Arrow button is used to navigate the OSD.

The Enter button is used to activate an OSD menu selection.

OSD Menu Levels (4:3 Output)

Table 4 summarizes the structure of the OSD system for the 4:3 output resolution aspect ratio.

Table 4: OSD Menu Levels (4:3 Output)

OSD Menu Levels (4:3 Output)				Functionality
Level 1	**Level 2**	**Level 3**	**Level 4**	
Input Signals	Graphics - RGB			Selects analog graphics as input.
	Graphics - DVI			Selects DVI graphics as input.
	HDTV - YPbPr			Selects HDTV - YPbPr as input.
	HDTV - RGB			Selects HDTV - RGB as input.
	SDTV Composite 1			Selects Composite SDTV 1 as input.
	SDTV Composite 2			Selects Composite SDTV 2 as input.
	SDTV S-Video			Selects S-Video SDTV as input.
	SDTV Component			Selects Component SDTV as input.
Picture	Brightness	0 - 100 (default 50) (default 16 for HDTV)		Adjusts brightness in: SDTV; HDTV; Analog Graphics. Not supported for DVI Graphics.
	Contrast	0 - 100 (default 50)		Adjusts contrast in SDTV; HDTV; Analog Graphics. Not supported for DVI Graphics.
Table sheet 1 of 5				

Table 4: OSD Menu Levels (4:3 Output)

OSD Menu Levels (4:3 Output)				Functionality
Level 1	**Level 2**	**Level 3**	**Level 4**	
Picture	Sharpness	0 - 10 (default 5)		Adjusts sharpness (10 is maximum sharpness).
	Color	0 - 100 (default 50)		Adjusts color saturation in HDTV YPbPr and SDTV NTSC. Not supported for HDTV RGB (dimmed); SDTV PAL/SECAM (dimmed); and Graphics (dimmed).
	Tint	0 - 360 (default 0)		Adjusts tint in HDTV YPbPr and SDTV NTSC. Not supported for HDTV RGB (dimmed); SDTV PAL/SECAM (dimmed); and Graphics (dimmed).
	SDTV De-interlacing	Auto (default)		Automatically chooses de-interlacing method in SDTV mode through FLI2200.
		3:2 (2:2) Pull Down		Chooses 3:2 (2:2) pull down in FLI2200.
		Static Mesh		Chooses static mesh in FLI2200.
		V/T De-Interlacing		Chooses vertical/temporal de-interlacing in FLI2200.
	Color Temp	Linear (default)		Chooses linear color temperature.
		5500K		Chooses 5500K color temperature.
		6500K		Chooses 6500K color temperature.
		9300K		Chooses 9300K color temperature.
		User	Red, Green, and Blue scroll bars	Manually adjusts color temperature ALL: 0 - 255 (default 255).
	Gamma Correction	Linear (1.0) (default)		Chooses linear gamma correction.
		Gamma 1 (1.5)		Chooses 1.5 gamma correction factor.
		Gamma 2 (2.2)		Chooses 2.2 gamma correction factor.
		Gamma 3 (2.8)		Chooses 2.8 gamma correction factor.
	Auto Sync			Automatically adjusts sync for Analog graphics and HDTV. Not supported for SDTV (dimmed) or DVI (dimmed).
	Clock	Clock = ?		Manually adjusts the clock for Analog graphics and HDTV. Not supported for SDTV (dimmed) or DVI (dimmed).
	Phase	Phase = ?		Manually adjusts the phase for Analog graphics and HDTV. Not supported for SDTV (dimmed) or DVI (dimmed).
	Position	H = ? Y = ?		Adjusts the horizontal and vertical image position.
	Reset			Reverts to factory defaults for all items in Picture sub-menus.
Table sheet 2 of 5				

Table 4: OSD Menu Levels (4:3 Output)

OSD Menu Levels (4:3 Output)				Functionality
Level 1	**Level 2**	**Level 3**	**Level 4**	
Advanced	Video System	Auto (default)		SDTV only - automatically selects the video system input.
		NTSC		SDTV only - forces NTSC video decoding.
		PAL		SDTV only - forces PAL video decoding.
		SECAM		SDTV only - forces SECAM video decoding.
		4.43 NTSC		SDTV only - forces 4.43 NTSC video decoding.
		PAL - M		SDTV only - forces PAL-M video decoding.
		PAL - N		SDTV only - forces PAL-N video decoding.
		PAL - 60		SDTV only - forces PAL-60 video decoding.
	OSD Position	X=? Y=?		Adjusts OSD vertical and horizontal position.
	Lamp Timer Reset	Are you sure?	No (default)	Does not reset the lamp timer.
			Yes	Resets the lamp timer to zero.
	DPMS	On (default)		Enables DPMS low power mode. Selecting this option causes OptiScale to *hibernate* if no I/P signal is detected for 3 minutes. O/P signals are shut down.
		Off		Disables DPMS low power mode. Output signals are always on.
	Test Pattern			Displays a Test Pattern for alignment.
	Status Screen	Input Source		Shows the current input source.
		Resolution = ?		Shows the current input resolution.
		H Frequency = ? kHz		Shows the current input horiz. frequency.
		V Frequency = ? Hz		Shows the current input vert. frequency.
		Pixel Clock = ? MHz		Shows the current input pixel clock.
		HSYNC Polarity = ?		Shows the current input H sync polarity.
		VSYNC Polarity = ?		Shows the current input V sync polarity.
		Lamp Hours = ?		Shows the current lamp timer since the last lamp timer reset.
		FPGA Revision: ?		Shows the FPGA version.
		HDTV FPGA Revision: ?		Shows the HDTV FPGA Revision number.
		CPLD Revision: ?		Shows the CPLD Revision number.
		Firmware Revision:?		Shows the firmware version.
		Serial Number: ? eWARP: (On/Off)		Shows the serial number and status of eWARP Designer.
	Reset			Reverts to factory resets for all items in Advanced sub-menus, except for lamp timer.

Table sheet 3 of 5

Table 4: OSD Menu Levels (4:3 Output)

OSD Menu Levels (4:3 Output)				Functionality
Level 1	**Level 2**	**Level 3**	**Level 4**	
Geometry	Magnify	Zoom Horizontal Pan Vertical Pan		Enables magnification of a smaller area.
	Projection	Front Tabletop (default)		Sets the picture to display normally.
		Front Ceiling		Sets the picture to display upside down (flip along the horizontal axis, for front projection upside down from the ceiling).
		Rear Tabletop		Sets the picture to display backwards (flip along the vertical axis, for rear projection).
		Rear Ceiling		Sets the picture to display upside down and backwards (flip along horizontal and vertical axes for rear projection, upside down from the ceiling).
	Reset			Reverts to Front Tabletop and Horizontal keystone = 0, Vertical keystone = 0.
Aspect Ratio	4:3 Standard	default		SDTV - treated as 4:3 input and shown full screen. Graphics - treated as 4:3 input and shown full screen. HDTV - treated as 16:9 input and shown as a letter box.
	Crop			SDTV - not supported (dimmed). Graphics - not supported (dimmed). HDTV - 16:9 input is cropped to 4:3 on sides.
	Anamorphic Input			SDTV - treated as full screen 16:9 input and shown as a letter box. Graphics - not supported (dimmed). HDTV - not supported (dimmed).
	Reset			Revert to 4:3 Standard setting
Table sheet 4 of 5				

Table 4: OSD Menu Levels (4:3 Output)

OSD Menu Levels (4:3 Output)				Functionality
Level 1	**Level 2**	**Level 3**	**Level 4**	
Language	English			Chooses English as the OSD language.
	Japanese			Chooses Japanese as the OSD language.
	Français			Chooses French as the OSD language.
	Italiano			Chooses Italian as the OSD language.
	Español			Chooses Spanish as the OSD language.
	Deutsch			Chooses German as the OSD language.
	Korean			Chooses Korean as the OSD language.
	Chinese			Chooses Chinese as the OSD language.
Factory Reset				Resets all settings to the factory default.
Table sheet 5 of 5				

OSD Menu Levels (16:9 Output)

Table 5 summarizes the structure of the OSD system for the 16:9 output resolution aspect ratio.

Table 5: OSD Menu Levels (16:9 Output)

OSD Menu Levels (16:9 Output)				Functionality
Level 1	**Level 2**	**Level 3**	**Level 4**	
Input Signals	Graphics - RGB			Selects analog graphics as input.
	Graphics - DVI			Selects DVI graphics as input.
	HDTV - YPbPr			Selects HDTV - YPbPr as input.
	HDTV - RGB			Selects HDTV - RGB as input.
	SDTV Composite 1			Selects Composite SDTV 1 as input.
	SDTV Composite 2			Selects Composite SDTV 2 as input.
	SDTV S-Video			Selects S-Video SDTV as input.
	SDTV Component			Selects Component SDTV as input.
Table sheet 1 of 5				

Table 5: OSD Menu Levels (16:9 Output)

OSD Menu Levels (16:9 Output)				Functionality
Level 1	**Level 2**	**Level 3**	**Level 4**	
Picture	Brightness	0 - 100 (default 50) The default is 16 for HDTV		Adjusts brightness in: SDTV, HDTV, and Analog Graphics. Not supported for DVI Graphics.
	Contrast	0 - 100 (default 50)		Adjusts contrast in SDTV, HDTV, and Analog Graphics. Not supported for DVI Graphics.
	Sharpness	0 - 10 (default 5)		Adjusts sharpness (10 is maximum sharpness).
	Color	0 - 100 (default 50)		Adjusts color saturation in HDTV YPbPr and SDTV NTSC. Not supported for HDTV RGB (dimmed), SDTV PAL/SECAM (dimmed), and Graphics (dimmed).
	Tint	0 - 360 (default 0)		Adjusts tint in HDTV YPbPr and SDTV NTSC. Not supported for HDTV RGB (dimmed), SDTV PAL/SECAM (dimmed), and Graphics (dimmed).
	SDTV De-interlacing	Auto (default)		Automatically chooses a de-interlacing method in SDTV mode through FLI2200.
		3:2 (2:2) Pull Down		Chooses 3:2 (2:2) pull down in FLI2200.
		Static Mesh		Chooses static mesh in FLI2200.
		V/T De-Interlacing		Chooses vertical/temporal de-interlacing in FLI2200.
	Color Temp	Linear (default)		Chooses linear color temperature.
		5500K		Chooses 5500K color temperature.
		6500K		Chooses 6500K color temperature.
		9300K		Chooses 9300K color temperature.
		User	Red, Green, and Blue scroll bars	Manually adjusts color temperature ALL: 0 - 255 (default 255).
Table sheet 2 of 5				

Table 5: OSD Menu Levels (16:9 Output)

OSD Menu Levels (16:9 Output)				Functionality
Level 1	**Level 2**	**Level 3**	**Level 4**	
Picture	Gamma Correction	Linear (1.0) (default)		Chooses linear gamma correction.
		Gamma 1 (1.5)		Chooses 1.5 gamma correction factor.
		Gamma 2 (2.2)		Chooses 2.2 gamma correction factor.
		Gamma 3 (2.8)		Chooses 2.8 gamma correction factor.
	Auto Sync			Automatically adjusts sync for Analog graphics and HDTV. Not supported for SDTV (dimmed) or DVI (dimmed).
	Clock	Clock = ?		Manually adjusts the clock for Analog graphics and HDTV. Not supported for SDTV (dimmed) or DVI (dimmed).
	Phase	Phase = ?		Manually adjusts the phase for Analog graphics and HDTV. Not supported for SDTV (dimmed) or DVI (dimmed).
	Position	H = ? Y = ?		Adjusts the horizontal and vertical image position.
	Reset			Reverts to factory defaults for all items in Picture sub-menus.
Advanced	Video System	Auto (default)		SDTV only - automatically selects the video system input.
		NTSC		SDTV only - forces NTSC video decoding.
		PAL		SDTV only - forces PAL video decoding.
		SECAM		SDTV only - forces SECAM video decoding.
		4.43 NTSC		SDTV only - forces 4.43 NTSC video decoding.
		PAL - M		SDTV only - forces PAL-M video decoding.
		PAL - N		SDTV only - forces PAL-N video decoding.
		PAL - 60		SDTV only - forces PAL-60 video decoding.
	OSD Position	X=? Y=?		Adjusts the OSD vertical and horizontal position.
	Lamp Timer Reset	Are you sure?	No (default)	Does not reset the lamp timer.
			Yes	Resets the lamp timer to zero.
	DPMS	On (default)		Enables DPMS power mode. Selecting this option cause the OptiScale to *hibernate* if no input signal is detected for three minutes. Output signals are shut down.
		Off		Disables DPMS low power mode. Output signals are always on.

Table sheet 3 of 5

Table 5: OSD Menu Levels (16:9 Output)

OSD Menu Levels (16:9 Output)				Functionality
Level 1	**Level 2**	**Level 3**	**Level 4**	
Advanced	Test Pattern			Displays a Test Pattern for alignment.
	Status Screen	Input Source		Shows the current input source.
		Resolution = ?		Shows the current input resolution.
		H Frequency = ? kHz		Shows the current input horizontal frequency.
		V Frequency = ? Hz		Shows the current input vertical frequency.
		Pixel Clock = ? MHz		Shows the current input pixel clock.
		HSYNC Polarity = ?		Shows the current input horizontal sync polarity.
		VSYNC Polarity = ?		Shows the current input vertical sync polarity.
		Lamp Hours = ?		Shows the current lamp timer since the last lamp timer reset.
		FPGA Revision: ?		Shows the FPGA version.
		HDTV FPGA Revision: ?		Shows the HDTV FPGA Revision number.
		CPLD Revision: ?		Shows the CPLD Revision number.
		Firmware Revision:?		Shows the firmware version.
		Serial Number: ? eWARP: (On or Off)		Shows the serial number and On/Off status of eWARP Designer.
	Reset			Reverts to factory resets for all items in Advanced sub-menus, except lamp timer.
Geometry	Magnify	Zoom Horizontal Pan Vertical Pan		Enables magnification of a smaller area.
	Projection	Front Tabletop (default)		Sets the picture to project normally.
		Front Ceiling		Sets the picture to display upside down 1 (flip along the horizontal axis, for front projection upside down from the ceiling.)
		Rear Tabletop		Sets the picture to display backwards (flip along the vertical axis, for rear projection).
		Rear Ceiling		Sets the picture to display upside down and backwards (flip along horizontal and vertical axes for rear projection, upside down from the ceiling).
	Reset			Reverts to Front Tabletop and Horizontal keystone = 0, Vertical keystone = 0.
Table sheet 4 of 5				

Table 5: OSD Menu Levels (16:9 Output)

OSD Menu Levels (16:9 Output)				Functionality
Level 1	**Level 2**	**Level 3**	**Level 4**	
Aspect Ratio	16:9 Standard			SDTV - treated as 4:3 input and shown as a pillar box. Graphics - treated as 4:3 input and shown as a pillar box. HDTV - treated as 16:9 input and shown full screen.
	Letterbox input			SDTV - extracts a 16:9 letterbox region and expands to full screen. Graphics - not supported (dimmed). HDTV - not supported (dimmed).
	Anamorphic Input			SDTV - treated as 4:3 input, stretched linearly, and shown full screen. Graphics - treated as 4:3 input, stretched linearly, and shown full screen. HDTV - not supported (dimmed).
	Reset			Resets to 16:9 Standard.
Language	English			Chooses English as the OSD language.
	Japanese			Chooses Japanese as the OSD language.
	Français			Chooses French as the OSD language.
	Italiano			Chooses Italian as the OSD language.
	Español			Chooses Spanish as the OSD language.
	Deutsch			Chooses German as the OSD language.
	Korean			Chooses Korean as the OSD language.
	Chinese			Chooses Chinese as the OSD language.
Factory Reset				Resets all settings to the factory default.
Table sheet 5 of 5				

Aspect Ratio

This section explains the different aspect ratio selections available in 4:3 and 16:9 output. You can select aspect ratios within OptiScale via the OSD menu.

4:3 Output Aspect Ratio

The available Aspect Ratio treatment selections for 4:3 aspect ratio output modes are as follows:

- 4:3 Standard
- Crop to 4:3
- Anamorphic

Table 6 shows the 4:3 aspect ratio treatments for HDTV inputs, **Table 7** shows 4:3 aspect ratio treatments for SDTV inputs, and **Table 8** shows 4:3 aspect ratio treatments for graphics inputs (DVI and analog).

Table 6: Aspect Ratio Treatments for HDTV 16:9 Inputs

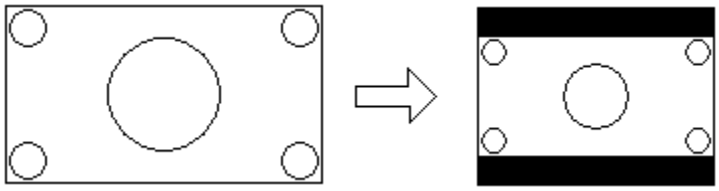
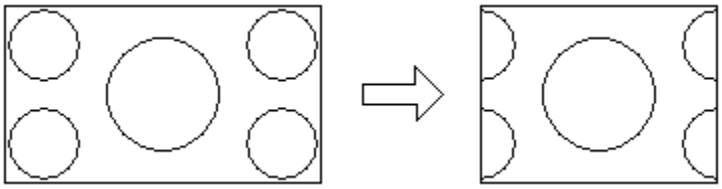
OSD Menu Name	Description
4:3 Standard	All HDTV inputs are assumed to be 16:9. HDTV input signals (1080i and 720P) are shown in a letterbox on the 4:3 output display 
Crop to 4:3	16:9 HDTV input signals shown in 4:3 output display, cropped on left and right sides 
Anamorphic Input	Not supported (dimmed) for HDTV input

Table 7: Aspect Ratio Treatments for SDTV 4:3 Inputs

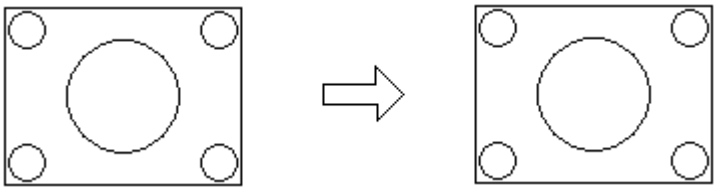
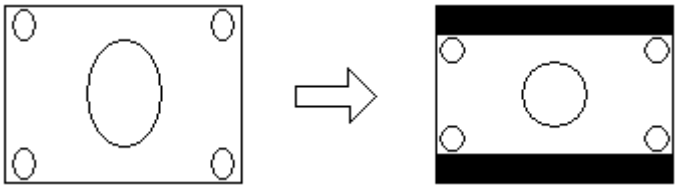
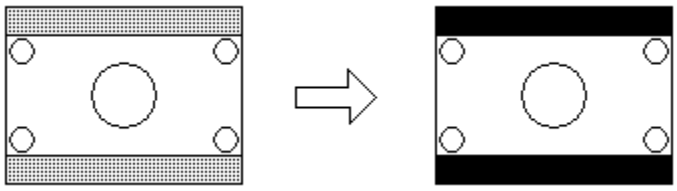
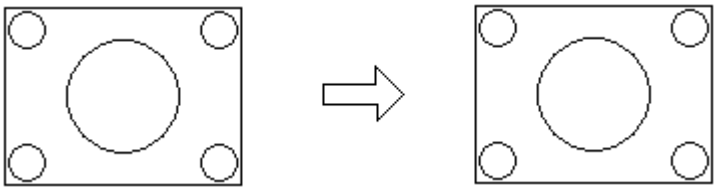
OSD Menu Name	Description
4:3 Standard	4:3 input signals shown full screen on 4:3 output display 
Crop to 4:3	Not supported (dimmed) for SDTV input
Anamorphic	Anamorphic or *widescreen* encoded DVDs shown letterbox on 4:3 output display. These DVDs have 16:9 content that has been compressed vertically to fit the NTSC or PAL signal. 
Letterbox Input	4:3 input signals with letterbox content are shown letterboxed on 4:3 output displays  Note that this mode appears identical to the 4:3 Standard mode when the keystone angles are 0 degrees. At non-zero keystone angles, the displayed letterbox appears larger because the usable portion of the input signal is reduced, enabling the scaling algorithms to make more use of the output display.

Table 8: Aspect Ratio Treatments for Graphics Inputs

OSD Menu Name	Description
4:3 Standard	4:3 input signals shown full screen on 4:3 output display 
Crop to 4:3	Not supported (dimmed) for graphics input
Anamorphic	Not supported (dimmed) for graphics input
Letterbox Input	Not supported (dimmed) for graphics input

16:9 Output Aspect Ratio

The available Aspect Ratio treatment selections for 16:9 aspect ratio output modes are as follows:

- 16:9 Standard
- Anamorphic
- Virtual Wide

Each of these aspect ratio treatments behaves differently depending upon the source. **Table 9** shows 16:9 aspect ratio treatments for HDTV inputs, **Table 10** shows 16:9 aspect ratio treatments for SDTV inputs, and **Table 11** shows 16:9 aspect ratio treatments for graphics inputs (DVI and analog).

Table 9: 16:9 Aspect Ratio Treatments for HDTV 16:9 Inputs

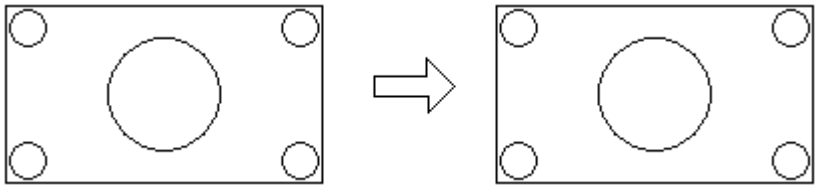
OSD Menu Name	Description
16:9 Standard	16:9 input signals shown full screen on 16:9 output display 
Letterbox Input	Not supported (dimmed) for HDTV input
Anamorphic	Not supported (dimmed) for HDTV input

Table 10: 16:9 Aspect Ratio Treatments for SDTV 4:3 Inputs

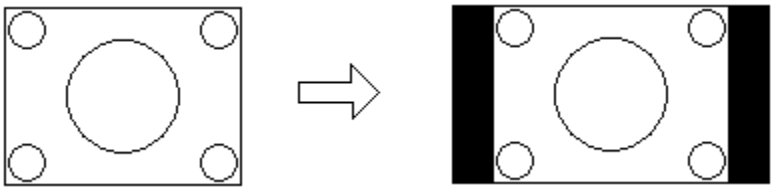
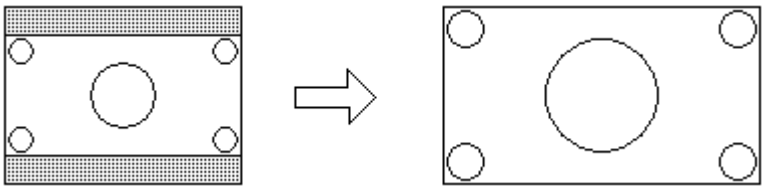
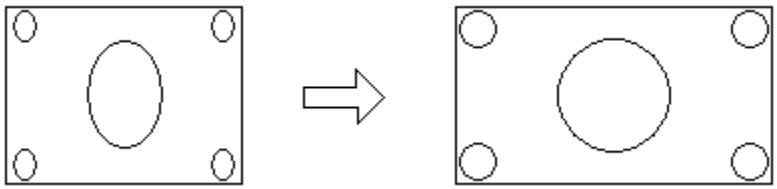
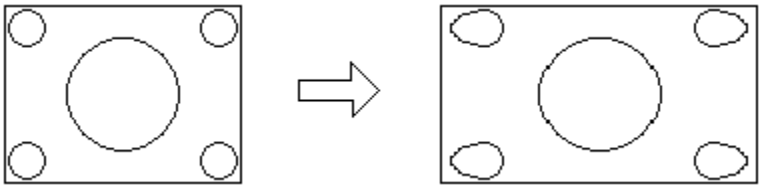
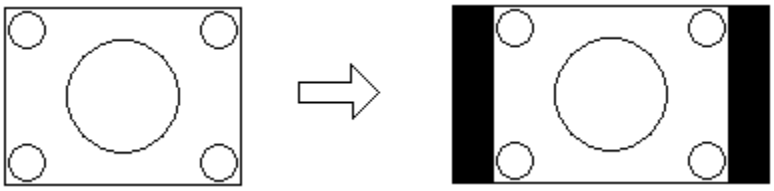
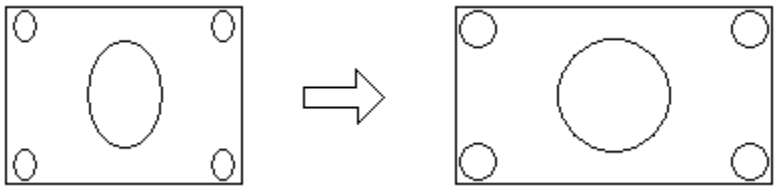
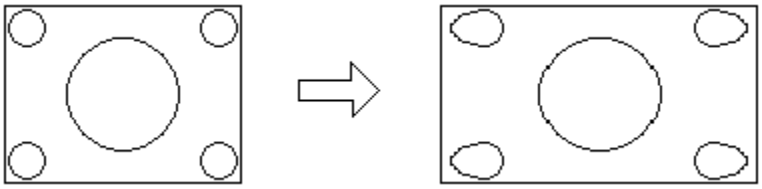
OSD Menu Name	Description
16:9 Standard	4:3 input signals are shown in a pillar box on the 16:9 output display 
Letterbox Input	A 4:3 letterbox is extracted and expanded to a full screen 16:9 output display 
Anamorphic	SDTV input is displayed on a full screen 16:9 output display 
Virtual Wide	4:3 input signals are non-linearly stretched in the horizontal direction to fill 16:9 output displays. Horizontal and vertical scaling is equal in the middle, more horizontal stretching towards left and right sides to fill 16:9 outputs Virtual Wide is intended for plasma displays, and is optimally configured for 0-degree horizontal and vertical keystone. It should be used for on-axis projection. 

Table 11: 16:9 Aspect Ratio Treatments for Graphics 4:3 Inputs

OSD Menu Name	Description
16:9 Standard	4:3 input signals are shown in a pillar box on the 16:9 output display 
Letterbox Input	Not supported for graphics inputs
Anamorphic	4:3 input is displayed on a full screen 16:9 output display 
Virtual Wide	4:3 input signals are non-linearly stretched in the horizontal direction to fill 16:9 output displays. Horizontal and vertical scaling is equal in the middle, more horizontal stretching towards left and right sides to fill 16:9 outputs. Virtual Wide is intended for plasma displays, and is optimally configured for 0-degree horizontal and vertical keystone. It should be used for on-axis projection. 

Chapter 5
Loading Firmware

Introduction

This chapter describes the firmware update procedure for the OptiScale system using the PC Loader.

PC Loader is the software program that controls the firmware update process—you can obtain by e-mail new features that become available and you can download them onto OptiScale. The download procedure takes about 5 minutes and prevents you from having to return your unit to the factory for simple upgrades.

The PC Loader program provides an easy and fast way to update (download) firmware into CPU FLASH/RAM memory, via a RS232 communication line, in the OptiScale systems equipped with BootLoader firmware. During the download process, you are informed about all verifications performed by firmware and error messages are returned.

Loading HEX Files

To load HEX files follow the procedure below:

1. Link your PC to the OptiScale system using a serial communication cable; be sure to use the proper COM port number on the PC (see **Figure 5**). Turn off the OS-100 power using the power switch mounted on the back of the unit.

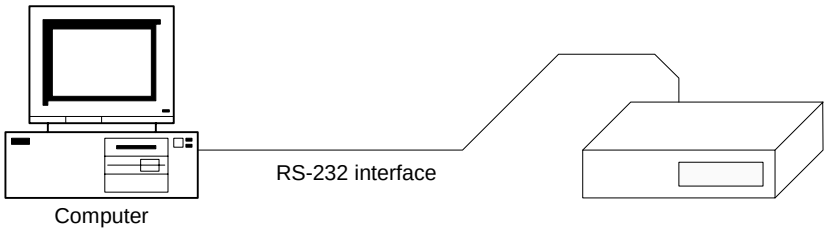


Figure 5: RS232 Connection

2. Run PCLoader.exe from the current directory—it will search for *.cfg* and *.dev* files only in the current directory. Be sure that if you create an icon for this application, you have the start directory with the same string as the *.exe* file path. Usually, this is a default setting provided by Windows.
3. In most cases, the default options should be correct for proper operation. However, if there are any difficulties with the download procedure, then verify that all the configuration options are correct.
4. Choose **Connect** from the **Communication** menu to open the COM port.

5. Power on the OS-100.
6. To load a HEX file for the firmware update, choose **Open** from the **File** menu . Open the file that was provided for the new firmware update.
7. Begin the download process of the firmware update using the **Load Hex** button. Note the messages provided by the firmware during the loading process in the Info field.
8. When the download process has completed (and there were no errors), power-off the OptiScale box, and power it back on to begin normal operation.

NOTE: The errors that might be reported by the application during the startup have have two possible reasons, as follows: the current working directory is not the directory where PCLoader.exe and PCLoader.cfg are located; or, the PCLoader.cfg file is corrupt, so the best solution is to delete this file, run PCLoader.exe again (the application builds a new .cfg file) and set up communication and device settings, which will be saved in the new .cfg file.

The above process should be all you need to load files. The remainder of this chapter is provided for advanced users only.

PC Loader Interface

The PC Loader main window is as illustrated in **Figure 6**.

Menu Bar Options and Commands

The menu bar across the top of the PC Loader main window provides the options described in **Table 12**.

Tool Bar Buttons and Functions

The toolbar in the PC Loader main window provides the buttons and functions described in **Table 13**.

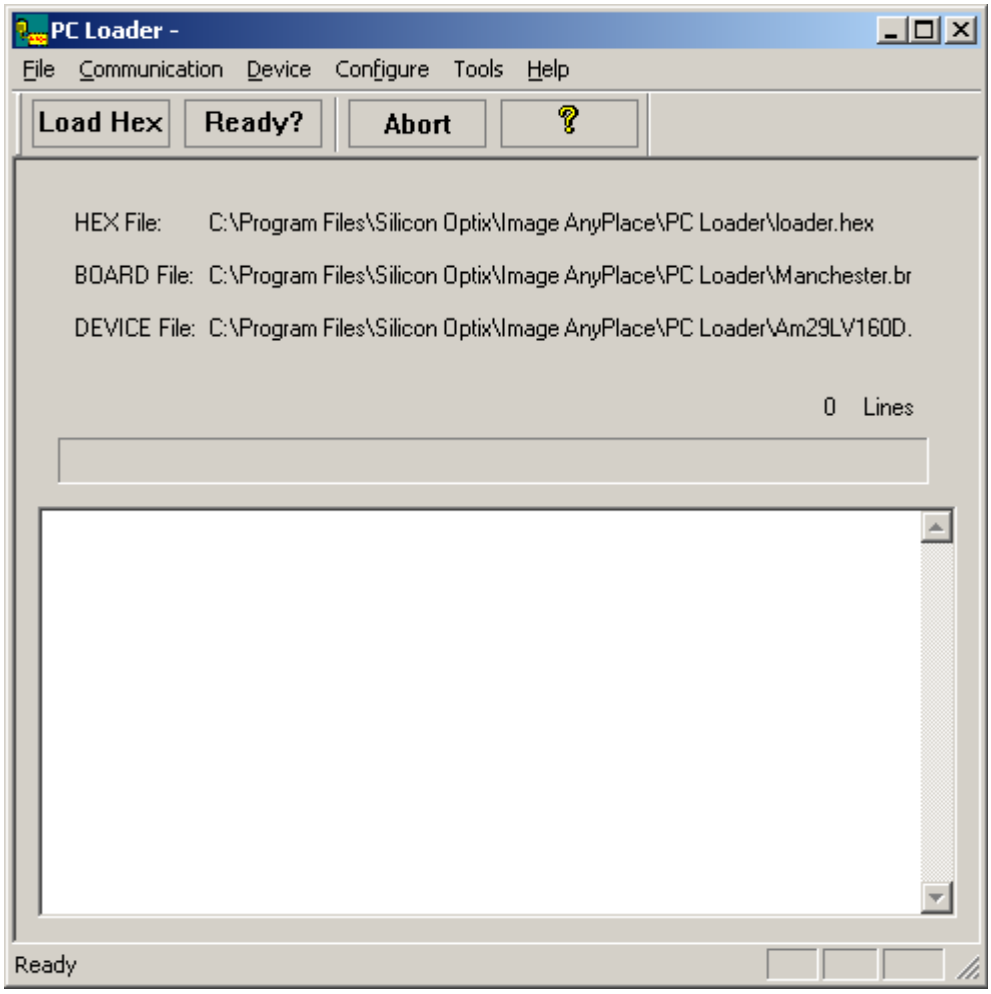


Figure 6: PC Loader Main Window

Table 12: PC Loader Menu Bar Options

Menu	Menu Options	Description
File	Open	Opens a HEX file, this file becomes the current HEX file and its name is written into the HEX file field.
	Exit	Quits the program.
Communication	Connect	Opens the communication port* (COM).
	Disconnect	Closes the communication port (COM).
	Configure	Sets up the communication port (COM).
Device	Properties	Loads and displays a *.brd* file that contains hardware information about the currently used board.
Configure	Loading	Configures the loading command (Loading Options).
Tools	Convert BIN to HEX	Converts a BIN file in Intel HEX file format.
Help	About	PC Loader copyright information and version number.
*Note: a Com Port Open message indicates that the Com Port opened successfully. Communication is only established after OptiScale is turned on.		

Table 13: Toolbar Buttons and Functions

Button	Function
Load HEX	Starts Loading the HEX file into the board
Ready	Tests if the board and BootLoader firmware are running and ready to receive commands from the PC Loader tool
Abort	Abort current command
Help	PC Loader copyright information and version number

File Names

File names are as follows:

- **HEX File**: Current HEX file name (File to be loaded into memory)
- **BOARD File**: Current BRD file name (Board hardware info)
- **DEVICE File**: Current DEV file name (Flash Device info)

Progress Bar

The Progress Bar and the Number of Line fields provide the status of the current downloading process.

Info Field

The Info multi-edit field displays messages and errors returned by the BootLoader firmware.

Communication Line Settings

The Serial Communication Parameters are as follows:

- Speed: 115200 bits/second
- 8 bits/char
- No parity
- 1 bit stop

Choose the **Configure** option in the **Communication** menu to set these parameters to load the HEX file into the board, which opens the dialog box illustrated in **Figure 7**.

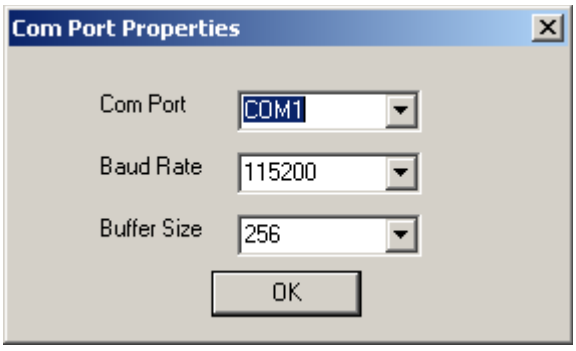


Figure 7: Com Port Properties Dialog Box

NOTE: The **8 bits/char**, **no parity**, and **1 bit stop** parameters are the default parameters and are mandatory because the BootLoader firmware version 1.2 supports only these communication parameters. The **Buffer Size** parameter is not used.

Program Settings and PCLoader.cfg File

The PC Loader program saves the current settings in a PCLOADER.CFG configuration file. These settings are as follows:

- Full path and name of current HEX file
- Full path and name of current BRD file
- Communication Line Settings
- Loading Options

NOTE: Do not edit this file with any other tools! Using the PC Loader menu and dialog boxes, all settings are automatically saved in the configuration file.

Board and Device Settings

Load a *.brd* file which contains hardware information about the currently-linked board. To accomplish this, choose **Properties** from the **Device** menu which opens the Device Properties dialog box shown in **Figure 8**.

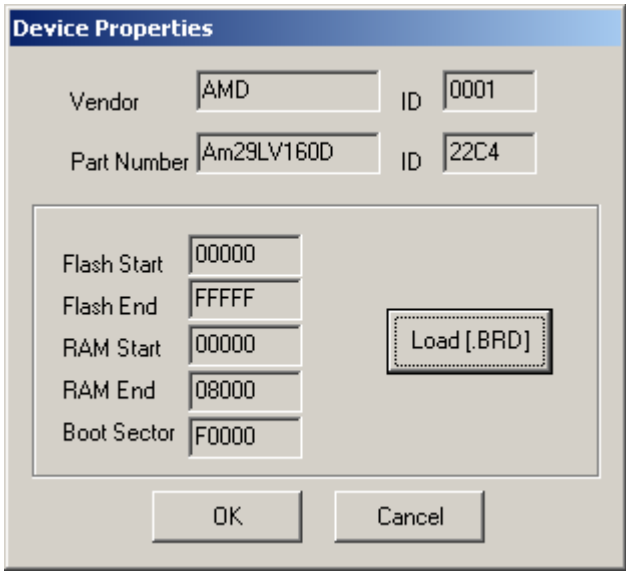


Figure 8: Device Properties Dialog Box

The only *.brd* file you should use with OptiScale is the OptiScale.brd file. The only *.dev* file you should use with OptiScale is the AM29LV160D.dev file. The *.brd* file is an ASCII file with the following format (example: OptiScale.brd file):

```
Manufacturer Name = AMD

Part Name = Am29LV160D

Manufacturer ID = 0001

Part ID = 22C4

Flash Start = 00000

Flash End = FFFFF

RAM Start = 00000

RAM End = 08000

BOOT SECTOR START = F0000
```

Loading Options

The loading options let you choose the appropriate way to load the HEX file, by choosing **Loading** from the **Configure** menu. The Loading Configuration dialog box shown in **Figure 9** opens. These are the only loading options that you should use with OptiScale.

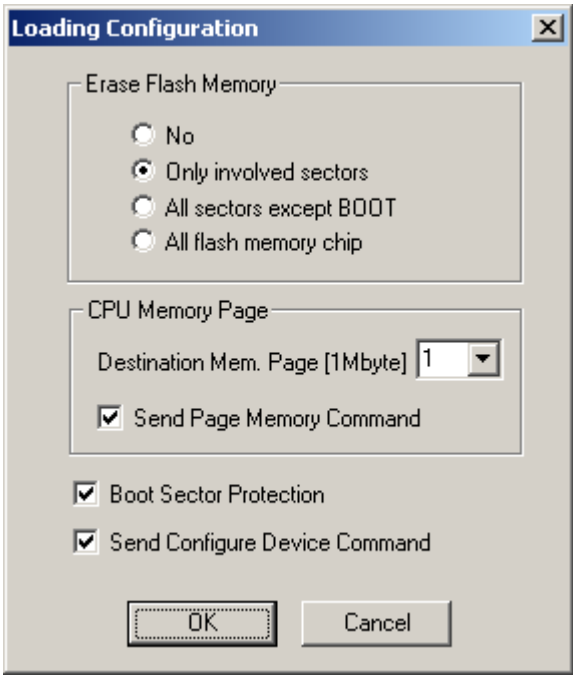


Figure 9: Loading Configuration Dialog Box

Loading Configuration Options

Erase Flash Memory

- **No**: No Flash memory erasing commands are sent to the firmware.
- **Only involved sectors**: Sends erasing commands according to the content of the HEX file.
- **All sectors except BOOT**: Sends erasing commands for all Flash memory sectors, except BOOT sector, according to the current *.dev* file.
- **All flash memory chip**: Sends an Erase All chip command to the firmware including boot sector.

WARNING: **This option destroys the BootLoader firmware itself!** This option is usually used when replacing the BootLoader with a new version, or when installing a firmware directly at the CPU reset address without using BootLoader firmware.

CPU Memory Page

- **Destination Memory Page**: Set the destination 1 Mbyte CPU memory page for HEX file. This term should not be confused with the CPU scrollable window for memory paging. Page 1 represents the memory range 00000H-FFFFFH and page 2 represents the memory range 100000H-1FFFFFH.

Due to Am186 ER, the CPU cannot access over 1 MB, this paging mechanism provides support for usage on the OptiScale board of bigger CPU Flash memory than 1 MB.

- **Boot Sector Protection**: If checked, avoids erasing and data downloading into boot sector. To protect the Bootloader program against accidental overwriting, this option is always set automatically when the program is started and after every loading process.
- **Send Configure Device Command**: If checked, this sends a configuration command to the firmware before loading a HEX file. This option is useful if the default settings of the firmware are different from those of the current hardware board.

NOTE: Usually, the Loading Settings are: Only involved sectors, Boot Sector Protection, and Send Configure Device Command.

Convert BIN File in Intel HEX File Format

This option is very useful for converting FPGA code binary files, but can be used for any kind of binary data. The PC Loader generates a new file in Intel HEX format with the same name as the BIN file, but with the extension HEX. To use this option, choose Convert BIN to HEX from the Tools menu and fill in the fields in the dialog box illustrated in **Figure 10**. This option is not required for the OptiScale normal operation.

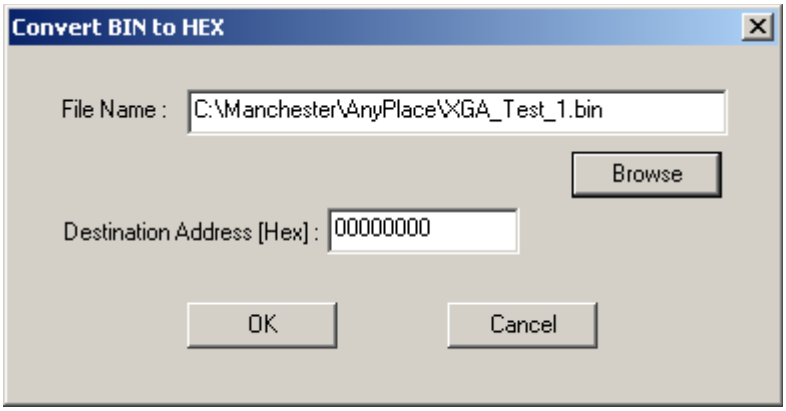


Figure 10: Convert BIN to HEX Dialog Box

List of Files

- **PCLoader.exe** Application program
- **PCLoader.cfg** Configuration file
- **OptiScale.brd** Board Configuration files (or any other .brd file)
- **Am29LV160D.dev** Device Flash Memory Configuration files (or any .dev file)

Chapter 6
RS232/422/485 Protocols

RS232/422/485 Interface

You can control OptiScale via the OpticalScale RS232/422/485 interfaces or the Serial Control Panel. The interfaces and baud rate are configured in the **Standby** mode menu. The RS232/422/485 interfaces connector pins are listed in Table 14.

Table 14: RS232/422/485 Connector Pinout

DB9 Pin No.	Signal Name	Notes
1	RS422_TX-	RS422 Transmit (-), the OptiScale box drives this signal
2	RS232_TX	RS232 Transmit, the OptiScale box drives this signal
3	RS232_RX	RS232 Receive, the OptiScale box receives this signal
4	RS422_TX+	RS422 Transmit (+), the OptiScale box drives this signal
5	GROUND	
6	RS422_RX-	RS232 Receive, the OptiScale box receives this signal
7	Reserved for SCL	
8	RS422_RX+	RS232 Receive, the OptiScale box receives this signal
9	Reserved for SDA	

The OptiScale Serial Control Panel allows the user to send individual commands to an OptiScale box. It also provides the capability to run script files that the user creates.

To create a script file, the user has to enter RS232 commands and scripting commands in a Notepad file. There are five scripting commands that can be used: DM, DS, LOOP/LEND, and HALT. The DM command delays the command execution in tens of milliseconds; DS delays the command execution in seconds; LOOP executes a group of commands (bounded by the LEND) command n times. When n is set to 0, the loop becomes endless; the HALT command pauses execution and waits for the user response.

The following is a list of script commands that can be used:

‘;’ — the semicolon indicates a comment

DM n — delay in tens of milliseconds

DS n — delay in seconds

LOOP n — executes the instructions bounded by the LOOP in LEND n time

LEND — see LOOP n

HALT message — pauses execution and displays a message

The following is a sample script file:

```
File: OptiScale Example Script File

;**  Author: B. McGinn

;**  Date: 01/11/04

;**

;*****************************************************************

;*****************************************************************

;**  The OptiScale Serial Batch/Script utility program uses the

;**  AnyPlace serial control protocol along with a few program

;**  command statements to allow the user to control an

;**  OptiScale box via script file.

;**

;**  The commands are (case is important!):

;**

;**;             - indicates a comment

;**DM n          - Delay in tens of milliseconds

;**DS n          - Delay in seconds

;**LOOP n        - Execute the instructions bounded by the

;**                      LOOP and LEND n times.  Note:If n=0 then

;**                      this becomes an endless loop.

;**

;**LEND          - See LOOP n

;**HALT message  - Pause execution and display message

;**

;*****************************************************************
```

```
;*************************************************************
;**
;**
;
; Example commands
; Turn on box
A00Bb0000
HALT  Turning on OptiScale
;
; Set input to RGB Graphics and Delay 100 milliseconds
A00Ca0000
DM 10
;
; Begin an Endless loop
LOOP 0
; Reset Geometry
;A00Fa0000
;DM 10
;
;
; increment the horz zoom
LOOP 80
A00Fn0000
DM 10
LEND
;
; increment the Vert zoom
LOOP 40
```



```
A00Fo0000

DM 10

LEND

;

; decrement the horz zoom

LOOP 80

A00Fn1000

DM 10

LEND

;

; decrement the Vert zoom

LOOP 40

A00Fo1000

DM 10

LEND

;

;

LEND
```

RS232/422/485 Protocol

This protocol is used to configure the Silicon Optix OptiScale box. The interface channel is RS232/422/485 with selectable baud rate, 8 bits data, 1 stop bit, and no parity bit. You can select the baud rate from the Standby menu.

Command Format

The Command format is described in **Table 15** and **Table 16** (note all bytes are ASCII).

Table 15: RS232/422/485 Command Format

Byte	0	1-2	3	4	5	6-7	8
Register	**Start**	**Device Address**	**Function Menu**	**Function Code**	**Sub-Function Code**	**Value**	**0**
Description	**A** for Optical Scale protocol (Upper-case ASCII only - A = 41 Hex 65 decimal)	Address of OpticalScale: Valid Addresses are 00-32, with 00 being a broadcast address, where all boxes respond (ASCII - 0 = 30 Hex 48 decimal)	Field selects one of six general areas to control: B, C, D, E, F, and G (upper-case ASCII only).	Field to select function with a given function menu (lower-case ASCII only - a = 61 Hex 97 decimal)	Field to select sub-function with a given function menu/func-tion code	This field contains an integer ranging from 0 to 255 used for functions that require an integer input (numeric integer 0 - 255) Unused	ASCII 30 Hex 48 decimal

Table 16: Function Menu

Function Menu	Function	Comments
B	On/Off	Allows user to turn box on or off and set output resolution
C	Input Signals	Allows user to select input
D	Picture	Allows user to adjust input features such as color, position, etc.
E	Advanced	Allows user to select video input type, OSD position, etc.
F	Geometry	Allows user to magnify the input
G	Aspect Ratio	Allows user to set input and output aspect ratios
H	Factory Reset	Sets box to default settings

Command Responses

After receiving a command, the CPU processes, executes, and then sends back an **ERROR** or an **OK** response.

Error Response

If there is any error in any field of the message, or any error in accessing the device, the CPU responds with an error message formatted as listed in **Table 17**.

Table 17: Error Response Message Format

Byte	0	1	2
Register	Z	LF	CR

OK Response

If there is no error writing the register, MCU responds with the OK message formatted as listed in Table 18.

Table 18: OK Response Message Format

Byte	0	1	2
Register	X	LF	CR

RS232/422/485 Commands

Power On/Off Commands

Table 19: Power-off Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OpticalScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	B = On/Off
4	Function Code	1	a = Off, b= On (with output selection), c= On (no change to output setting)
5	Sub-function Code	1	0 = XGA @ 60 1 = XGA @ 50 2 = VGA v@ 60 3 = SVGA @ 60 4 = 720p @ 60 5 = 720p @ 59.54 6 = 720p @ 50 7 = SXGA @ 60 8 = SXGA+ @ 60 9 = SXGA+ @ 50 A = WXGA (1366 x 768) B = WVGA (952 x 488) C = VGA @ 50 D = SVGA @ 50 E = SXGA @ 50
6	Value	1	0
7	Spare	2	00

Input Signal Commands

Table 20: Input Signal Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OpticalScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	C = Input Signal
4	Function Code	1	a = Graphics RGB b = Graphics DV1 c = HDTV YPrPb d = HDTV RGB e = SDTV Composite 1 f = SDTV Composite 2 g = SDTV S-Video h = SDTV Component
5	Sub-function Code	1	0 = Unused
6	Value	1	0
7	Spare	2	00

Picture Commands

Picture Reset Command

Table 21: Picture Reset Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	D = Picture
4	Function Code	1	a = Reset to Defaults
5	Sub-function Code	1	0 = Unused
6	Value	1	0
7	Spare	2	00

Picture Color Adjust Commands

Table 22: Picture Color Adjust Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	D = Picture
4	Function Code	1	b = Brightness c = Contrast d = Sharpness e = Color f = Tint
5	Sub-function Code	1	0 = Increment 1 = Decrement
6	Value	1	0
7	Spare	2	00

Picture SDTV De-interlacing Command

Table 23: Picture SDTV De-interlacing Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	D = Picture
4	Function Code	1	g = SDTV De-interlacing
5	Sub-function Code	1	0 = AUTO 1 = 3.2 Pull Down 2 = Static Mesh 3 = Vertical/Temporal
6	Value	1	0
7	Spare	2	00

Picture Color Temperature Command

Table 24: Picture Color Temperature Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	D = Picture
4	Function Code	1	h = Color Temp
5	Sub-function Code	1	0 = Linear 1 = 5500K 2 = 9300K 3 = 9300K 4 = User
6	Value	1	0
7	Spare	2	00

Picture User Color Temperature Adjust Command

Table 25: Picture User Color Temperature Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	D = Picture
4	Function Code	1	i = User Color Red j = User Color Green k = User Color Blue
5	Sub-function Code	1	0 = Increment 1 = Decrement
6	Value	1	0
7	Spare	2	00

Picture Gamma Correction Command

Table 26: Picture Gamma Correction Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	D = Picture

Table 26: Picture Gamma Correction Command Format

Offset	Field Name	Size (bytes)	Description
4	Function Code	1	I = Gamma Correction
5	Sub-function Code	1	0 = Linear 1 = Gamma1 2 = Gamma2 3 = Gamma3 4 = User
6	Value	1	0
7	Spare	2	00

Picture Analog Graphics Auto Sync Command

Table 27: Picture Analog Graphics Auto Sync Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	D = Picture
4	Function Code	1	M = Auto Sync
5	Sub-function Code	1	0 = Unused
6	Value	1	0
7	Spare	2	00

Picture Analog Graphics Clock and Phase Command

Table 28: Picture Analog Graphics Clock and Phase Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	d = Picture
4	Function Code	1	n = Clock o = Phase
5	Sub-function Code	1	0 = Increment 1 = Decrement
6	Value	1	0
7	Spare	2	00

Picture Position Command

Table 29: Picture Position Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	D = Picture
4	Function Code	1	p = Horizontal Position q = Vertical Position
5	Sub-function Code	1	0 = Increment 1 = Decrement
6	Value	1	0
7	Spare	2	00

Advanced Commands

Advanced Reset Command

Table 30: Advanced Reset Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	E = Advanced
4	Function Code	1	a = Reset to Defaults
5	Sub-function Code	1	0 = Unused
6	Value	1	0
7	Spare	2	00

Advanced Video System Command

Table 31: Advanced Video System Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	E = Advanced
4	Function Code	1	b = Video System
Table sheet 1 of 2			

Table 31: Advanced Video System Command Format

Offset	Field Name	Size (bytes)	Description
5	Sub-function Code	1	0 = Auto 1 = NTSC 2 = PAL 3 = SECAM 4 = 4.43 NTSC 5 = PAL-M 6 = PAL-N 7 = PAL-60
6	Value	1	0
7	Spare	2	00
Table sheet 2 of 2			

Advanced Lamp Timer Reset Command

Table 32: Advanced Lamp Timer Reset Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	E = Advanced
4	Function Code	1	c = Lamp Timer Reset
5	Sub-function Code	1	0 = Unused
6	Value	1	0
7	Spare	2	00

Advanced DPMS Enable/Disable Command

Table 33: Advanced DPMS Enable/Disable Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	E = Advanced
4	Function Code	1	d = DPMS
Table sheet 1 of 2			

Table 33: Advanced DPMS Enable/Disable Command Format

Offset	Field Name	Size (bytes)	Description
5	Sub-function Code	1	0 = Disable 1 = Enable
6	Value	1	0
7	Spare	2	00
Table sheet 2 of 2			

Geometry Magnify Command

Table 34: Geometry Magnify Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	F = Geometry
4	Function Code	1	e = Horizontal pan f = Vertical pan g = Zoom
5	Sub-function Code	1	0 = Increment (Zoom in) 1 = Decrement (Zoom out)
6	Value	1	0
7	Spare	2	00

Geometry Projection Command

Table 35: Geometry Projection Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	F = Geometry
4	Function Code	1	h = Projection
5	Sub-function Code	1	0 = Front Table Top 1 = Front Ceiling 2 = Rear Table Top 3 = Rear Ceiling
6	Value	1	0
7	Spare	2	00

Aspect Ratio Commands

Aspect Ratio Command Format

Table 36: Aspect Ratio Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	G = Aspect Ratio
4	Function Code	1	a = Reset b = Standard 16:9 c = Letterbox 16:9 d = Anamorphic e = Virtual Wide f = Standard 4:3 g = Crop 4:3 h = Anamorphic 4:3 i = Letterbox 4:3
5	Sub-function Code	1	0
6	Value	1	0
7	Spare	2	00

Factory Reset Command

Table 37: Factory Reset Command Format

Offset	Field Name	Size (bytes)	Description
0	Start of Message	1	A is the first byte for all OptiScale RS232 control
1	Box address	2	00-31 where 00 is a broadcast address (all boxes respond to 00)
3	Function Menu	1	H = Factory Reset
4	Function Code	1	a
5	Sub-function Code	1	0
6	Value	1	0
7	Spare	2	00

Chapter 7
Troubleshooting

Troubleshooting Guide

Before consulting Silicon Optix Technical Support for OptiScale, perform the following simple checks listed in **Table 38**.

Table 38: Troubleshooting Guide

Problem	Probable Cause	Solution
No power (no illumination of LCD screen or front panel buttons)	Unit not plugged into main power	Ensure that the OptiScale power plug is connected to a live power outlet.
	Power switch set to OFF	Ensure that the main power switch on the back of the unit is set to the ON position.
No picture output	Unit is in Standby mode	Press the ONStandby button on the front of the unit. The front panel buttons should become illuminated.
	No input source	Ensure that the input source is operational and connected to the OptiScale unit Ensure that the input source is selected in the Input signals menu of the OptiScale OSD. The selected input source should be highlighted gray. If you're using a PC laptop, press the function key that lets you display on an external monitor. This key is often labeled with an icon, however, it may also be labeled CRT/LCD. You may have to hold down a Function key while pressing it. Check your laptop's manual or online help for details. Depending upon your computer's video card, you might need to use the Display utility in the Control Panel to make sure that both the LCD screen and external monitor port are enabled. See your computer's documentation or online help for details.
Table sheet 1 of 3		

Table 38: Troubleshooting Guide

Problem	Probable Cause	Solution
Color of the output image is incorrect	Incorrect Y Cb and Cr inputs	If the input video signal is in a component format, ensure that the Y Cb and Cr inputs are properly connected.
	Incorrect color temperature and gamma settings	Check that the color temperature and gamma settings in the **Picture** menu are correct for the input image.
	Incorrect color and tint settings	Check that the color and tint in the **Picture** menu are correct for the input image.
	OptiScale needs to be reset	If none of the above solutions correct the image, perform a factory reset on the OptiScale unit from the main OSD menu.
The projected image is upside down or a reversed image is displayed	Projector image flip enabled	Check the projector to ensure that image flip is not enabled.
	Front Tabletop option is not selected.	From the OptiScale OSD, select the **Geometry** menu, and then select the **Projection** submenu. Ensure that the **Front Tabletop** option is selected.
The bottom/top or left/right portions of the projected image are cut off. The entire image is not displayed.	Projector image position has been adjusted	Check the projector to ensure that image position has not been adjusted.
	Horizontal and vertical picture position are not set to zero	From the OptiScale OSD, select the **Picture** menu, and then select the **Position** submenu. Ensure that the H and V sliders are set to zero.
The image is too small, too large, or compressed.	Wrong aspect ratio selected	Select a different aspect ratio by pressing the **Aspect Ratio** button on the remote control.
	Wrong image position settings in the Picture menu	Make sure the image position settings are correct on the **Picture** menu.
	Computer resolution setting incorrect	If you're using a computer, make sure its resolution setting is correct.
The image appears blurry or soft	There may be dirt or smears on the projector lens	Clean the projector lens.
	Projector focused incorrectly	Adjust the focus of the projector.
	Picture sharpness setting incorrect	Adjust the **Sharpness** setting in the OptiScale OSD **Picture** submenu.
	Wrong SDTV de-interlacing setting	If the input is connected to an SDTV interlaced source, try selecting a different de-interlacing option in the OptiScale OSD **SDTV De-interlacing** submenu. The recommended setting is **Auto**.
Table sheet 2 of 3		

Table 38: Troubleshooting Guide

Problem	Probable Cause	Solution
OptiScale does not respond to remote control commands	Remote Control out of range	Make sure you are within 30 feet (9 meters) of the OptiScale, and within range of the front IR sensor (approximately 30° to left or right and 15° above or below).
	Remote Control batteries discharged or installed incorrectly	Replace the Remote Control batteries.
	External infra-red energy interference	Turn off any fluorescent lighting and ensure that the OptiScale unit is not in direct sunlight. Strong lighting, especially fluorescent lights, may affect the infrared receiver. Turn off any nearby equipment that emits infrared energy, such as a radiant room heater.
Table sheet 3 of 3		

Glossary

Anamorphic Scaling

Refers to the use of 16x9 aspect ratio pictures in a 4x3 system. For example, anamorphic supplementary lenses are used to change the proportions of an image to 16x9 on the surface of a 4x3 sensor by either extending the horizontal axis or compressing the vertical axis. Signals from 16x9 cameras and telecines produce an *anamorphic* signal which is electrically the same as with 4x3 images but will appear horizontally squashed if displayed at 4x3.

The alternative way of carrying 16x9 pictures within 4x3 systems is letterbox. Letterbox has the advantage of showing the correct 16:9 aspect ratio on 4:3 displays, the vertical resolution is less than 16:9 anamorphic.

See also: *Aspect Ratio* and *Letterbox*

Aspect Ratio

The ratio of a screen's width to its height. For example, 16:9 implies a screen 16 units wide by 9 units high.

A/V

Audio/**V**isual

.

De-Interlacing

The blending of two video fields to form one progressive frame. This process avoids interlacing artifacts. See also *Interlaced Display.*

DVI

Video standard - acronym for **D**igital **V**isual **I**nterface. A digital interface standard created by the Digital Display Working Group (DDWG) to convert analog signals into digital signals to accommodate both analog and digital monitors.

HDTV

Video standard - acronym for **H**igh **D**efinition **T**ele**V**ision. HDTV is high-resolution digital television (DTV) combined with Dolby Digital surround sound (AC-3). HDTV is the highest DTV resolution in the new set of video standards. The main selling point for HDTV is the higher resolution picture. 720 or 1080 lines of resolution versus the 525 lines people are used to in North America (or the 625 lines in Europe).

Interlaced Display

In basic terms, a video can be thought of as being made up of numerous snapshots, called **frames**. The **frame rate**, or the number of frames displayed each second, is 29.97 in the United States and other NTSC-based countries. For the sake of simplicity, we can round this number to 30 frames per second (fps). In many European countries, PAL and SECAM video systems display exactly 25 fps. The following explanation is based upon 30 fps, but you can replace the number 30 with 25 for PAL/SECAM video and the same principles hold true.

Television, however, does not deal with video in terms of frames. Instead, it displays a video using half-frames, called **fields**. Each frame contains exactly two fields. One field is made up of the odd horizontal lines in a frame. This is called the **odd field** or the **top field** since it contains the top line of the image. The other field is made up of the even horizontal lines in a frame. This is called the **even field** or **bottom field**. Since there are two fields in every frame, television actually updates the display at 60 fields per second (or 50 fields per second for PAL/SECAM video). Each field is displayed $1/60^{th}$ of a second after the preceding field (or $1/50^{th}$ of a second for PAL/SECAM video).

Computer monitors and television screens do not display video in the same fashion. A computer monitor updates the image only once for each frame of video. Because of this, both fields that make up a video frame are shown simultaneously. Thus, a computer monitor displays video at 30 fps. This is called a progressive scan display.

A television, on the other hand, updates each field of a video frame separately. Because of this, the television must update its display twice to show a complete frame. It first updates the odd field, and $1/60^{th}$ of a second later it updates the even field. It continues to alternate between the odd and lines 60 times each second. Thus, a television displays video at 60 fields per second. This is called an interlaced display.

I/O

Acronym for **I**nput/**O**utput

IR

Acronym for **I**nfra-**R**ed

LCD

Acronym for **L**iquid **C**rystal **D**isplay

Letterbox

Video display format that has an *aspect ratio* of 16:9. This mode is used when the input aspect ratio is wider than the output. It can be used for showing wide screen content such as 16:9 HDTV signals or a letterboxed DVD movie in letterbox mode on a 4:3 display.

NTSC

Video broadcast standard - Acronym for **N**ational **T**elevision **S**ystem **C**ommittee.

The NTSC standard has a fixed vertical resolution of 525 horizontal lines stacked on top of each other, with varying amounts of lines making up the horizontal resolution, depending on the electronics and formats involved. There are 59.94 fields displayed per second. A field is a set of even lines, or odd lines. The odd and even fields are displayed sequentially, thus interlacing the full frame. One full frame, therefore, is made of two interlaced fields, and is displayed about every 1/30 of a second.

Operational Mode

OptiScale *Operational mode* displays the selected input, input frame rate, output resolution, and output frame rate.

On-Screen Display

The On-Screen Display (OSD) menu is the primary way of controlling and selecting functions in the OptiScale system. The OptiScale system is initially in a factory default state. Many OptiScale control parameters can be saved to OptiScale memory and retained for use in later sessions. Performing a factory reset erases these saved parameters and returns the system to the default state.

OptiScale supports two different OSDs: one for 4:3 (1024x768) output aspect ratio, and one for 16:9 (1280x720) output aspect ratio.

PAL

Video broadcast standard - Acronym for **P**hase **A**lternating **L**ine. This standard was introduced in the early 1960's and implemented in most European countries except for France. The PAL standard utilizes a wider channel bandwidth than NTSC which allows for better picture quality. PAL runs on 625 lines/frame.

Pan

The movement of a camera. Horizontal pan is movement in a horizontal plane (azimuth); vertical pan is movement in a vertical plane (pitch).

PC Loader

Silicon Optix' proprietary software used to load OptiScale firmware.

Plasma Display

A flat-panel, non-CRT video display device. The basic idea of a plasma display is the illumination of tiny colored fluorescent lights to form an image. Each pixel is made up of three fluorescent lights - a red light, a green light and a blue light. Just like a CRT television, the plasma display varies the intensities of the different lights to produce a full range of colors.

Resampling

This function establishes the raw intensity for each output pixel based upon its relative position on the input space. Restated, this is the amount of input intensity proportional to each output pixel based upon the relative position of the output pixels on the input space.

RGB

Video standard - Acronym for **R**ed, **G**reen and **B**lue signals, the primary colors of television. By varying the intensity of each of these colors in a single pixel, the human eye can be fooled into seeing a wide range of colors. For example, a combination of red and green appears as yellow, even though no light with a yellow wavelength is emanating from the screen. This works because the optical system integrates the photons striking a region on the retina, and the combined impulses from green and red sensitive cones are seen as yellow.

RS232 Interface

A standard for serial data communications defined by EIA Standard RS232 and is designed for short distances only - up to 10 metres. It uses single-ended signalling with a conductor per channel plus a common ground, which is relatively cheap, easy to arrange but susceptible to interference - hence the distance limitation.

The OptiScale RS232/422/485 interface lets you control the OptiScale box. The interface channel is RS232C with 57600 baud, 8 bits data, 1 stop bit and no parity bit.

RS422/485 Interface

Not to be confused with 4:2:2 sampling or 422P MPEG, this is a standard for serial data communications defined by EIA Standard RS422. It uses current-loop, balanced signalling with a twisted pair of conductors per channel, two pairs for bi-directional operation. It is more costly than RS232 but has a high level of immunity to interference and can operate over reasonably long distances - up to 300m/1000 ft.

S-Video

S-Video is one of the high quality methods of transmitting a television signal from a device such as a Camcorder, VCR, or a game machine (PSX/Saturn/SNES and so on). It separates the color information (Chrominance) from the brightness (Luminance), which prevents nasty things like color bleeding and dot crawl, and helps increase clarity and sharpness.

Scaling Parameter

A single numeric value, such as *zoom*, *window offset*. See *Control Parameter.* The Input and Output resolution (width and height) are used to adapt to different physical video resolutions at input and output. The *zoom* and *window offset* (horizontal and vertical) effectively allow the linear scaling and displacement of the input image; these can be used to implement a zoom and pan function in a projection system, for instance.

Setup Mode

OptiScale standby mode lets you select the output resolution and output frame rate and enter the *operational mode*.

SXGA

Video standard, acronym for **S**uper E**x**tended **G**raphics **A**rray. Adisplay specification that is capable of displaying 1280 x 1024 resolution, or approximately 1.3 million pixels. See also *XGA*.

SDTV

Video standard, acronym for **S**tandard **D**efinition **T**ele**V**ision. Refers to the use of a digital broadcast to carry TV pictures of the same physical parameters as today's existing systems. These are interlaced signals (where each frame is divided into two fields) and the only new feature they add over existing analog TV distribution from a picture viewpoint is automatic support for both 4:3 and 16:9 aspect ratio operation.

SECAM

Video standard, acronym for **SE**quential **C**ouleur **A**vec **M**emoire or **S**equential **C**olour with **M**emory. This standard was introduced in the early 1960's and implemented in France. SECAM uses the same bandwidth as PAL but transmits the color information sequentially. SECAM runs on 625 lines/frame.

Throw Ratio

Throw ratio is defined as the ratio of projection distance (throw distance) over projected image width. That is, the ratio of the distance from the screen divided by the horizontal width of the screen. It can also be described as the *zoom* of the projector optics.

Referring to Figure A-2, the screen and lens are shown from above in horizontal section, the throw ratio r is given by the relation:

$$\rho = \frac{D}{W} = \frac{f}{w}$$

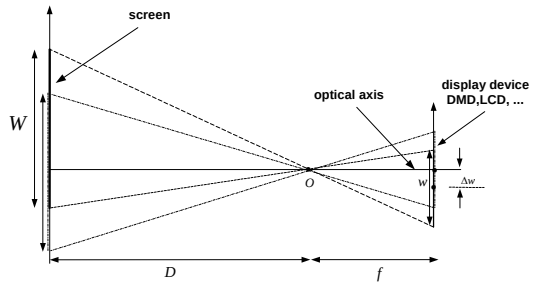
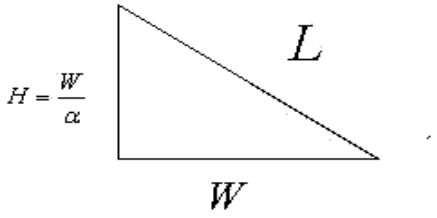


Figure A-2:Throw Ratio in a Projection System

Throw ratio is sometimes defined using diagonal screen size. In that case, using the display device aspect ratio and the triangular equation, we can find the real aspect ratio *s*:



where:

$$\sigma = \frac{W}{H}, \quad W = \sqrt{\frac{\sigma^2}{1+\sigma^2}}\,L$$

VESA

Acronym for **V**ideo **E**lectronics **S**tandards **A**ssociation. This group has produced standards for the VLB (**V**esa **L**ocal **B**us), VESA SVGA video modes and standards for minimum screen refresh rates at various pixel addressabilities.

VGA

Video standard - Acronym for **V**ideo **G**raphics **A**dapter or **V**ideo **G**raphics **A**rray. IBM developed VGA in 1987, as one of the first computer video types to use analog signals. Supports pixel addressabilities of up to 640x480x16. This is the de facto video standard and consists of a number of video modes.

A forward transformation is defined as the mapping of the input points onto the output image, and an inverse transformation is defined as the mapping of output points onto the input image.

XGA

Acronym for E**x**tended **G**raphics **A**rray, a high-resolution graphics standard introduced by IBM in 1990. XGA was designed to replace the older 8514/A video standard. It provides the same resolutions (640 by 480 or 1024 by 768 pixels), but supports more simultaneous colors (65 thousand compared to 8514/A's 256 colors). In addition, XGA allows monitors to be non-interlaced.

See also *SXGA*.

Zoom

The ability to magnify (zoom in) or shrink (zoom out) the projected image.

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