The HIGHlite Displays range of

SUPER-HIGH-BRIGHTNESS DIGITAL VIDEO PROJECTORS

HIGHlite Displays

USER MANUAL

Revision A - 12/06/2001

DIGITAL PROJECTION

DLP™
A TEXAS INSTRUMENTS TECHNOLOGY

Declaration of Conformity

Directives covered by this Declaration
89/336/EEC Electromagnetic Compatibility Directive, amended by 92/31/EEC & 93/68/EEC.
73/23/EEC Low Voltage Equipment Directive, amended by 93/68/EEC.

Products covered by this Directive
Large Screen Projector type **HIGHlite 4100gv** **HIGHlite 5100gv**
HIGHlite 4000sx **HIGHlite 6000sx.**

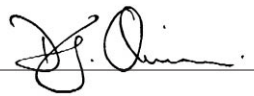
Basis on which Conformity is being declared
The products identified above comply with the protection requirements of the above EU directives, and the manufacturer has applied the following standards:-

EN 55022:1998 - Limits and Methods of Measurements of Radio Disturbance Characteristics Information Technology Equipment.

EN 55024:1998 - Limits and Methods of Immunity Characteristics of Information Technology Equipment.

EN 61000-3.2:1998 - Harmonic Current Emissions.

EN 61000-3.3:1998 - Immunity to Voltage Fluctuations and Flicker.



Signed:
Authority: D.J. Quinn, Product Development Director

Date: 15th May 2001

Attention!
The attention of the specifier, purchaser, installer, or user is drawn to special measures and limitations to use which must be observed when these products are taken into service to maintain compliance with the above directives. Details of these special measures are available on request, and are also contained in the product manuals.

The technical documentation required to demonstrate that the products meet the requirements of the Low Voltage directive has been compiled by the signatory below and is available for inspection by the relevant enforcement authoroties. The CE mark was first applied in 2001.

Revision Record

From time to time revisions will be issued to this manual. To maintain a correct and up to date copy of the manual it is important that the instructions given in revision notices are carried out.

The person carrying out the revision should complete the table below.

Revision No	Revision Details	Date Revised
A	First Published	25 Sept 2001

Introduction

HIGHLite Displays are amongst the finest, most technically advanced projectors available today.
Using state-of-the-art DLP™ technology by Texas Instruments, our projectors deliver images with crystal clear clarity and sharper quality.
Your **HIGHLite Displays** projector enables you to project exceptionally bright, precise images up to 500 inches across (measured diagonally) from your PC or Macintosh computer, VCR, document camera, laser disc player, DVD player and even an HD VCR, HD laser disc player or video server.

Please read the following before proceeding

An Outline of Contents is given overleaf which provides an overview of the five sections, A to E, in this manual and lists all the major topics covered along with their location. This outline allows the user to direct themselves to the appropriate section of this manual where a detailed contents page will provide the exact location of the topic required. Section identifiers are also provided on the outside edge of the pages to allow the quick location of individual sections.

The user is strongly recommended to read Section A: Overview before unpacking or switching on the projector, paying particular attention to the safety warnings provided.

Digital Projection Limited,
Greenside Way, Middleton, Manchester M24 1XX, UK.
Registered in England No. 2207264, Registered Office: As Above

Tel: +44 (0) 161 947 3300
Fax:+44 (0) 161 684 7674
E-Mail:enquiries@digitalprojection.co.uk, service@digitalprojection.co.uk
Web Site:www.digitalprojection.co.uk

Digital Projection Inc.
55 Chastain Road, Suite 115, Kennesaw, GA 30144. USA

Tel: (USA) 770 420 1350
Fax: (USA) 770 420 1360
E-Mail: powerinfo@digitalprojection.com
Web Site: www.digitalprojection.com

Outline of Contents

Section D: Advanced User Information

Section E: Maintenance

Appendix

Section A: Overview

Packaging

Projector Packaging

The following components should be contained within the projector packaging. Should any of the components be absent, please contact the dealer who supplied the projector, or Digital Projection Limited (Digital Projection Inc. if in North America) immediately.

1 x **HIGHlite Displays** Projector
1 x Remote Control Unit with Remote Cable (wireless/wired)
1 x AC Power Cable
1 x AC Power Cable Stopper
1 x DVI-D Cable
2 x AAA Batteries
1 x User Manual
1 x Foam Dust Cap
CompactFlash Memory Card (8MB) with adapter

All packaging should be retained to provide maximum protection during future shipping of the projector.

Lens Packaging

Lenses are supplied as individual items and the packaging may differ depending on the version ordered. Please refer to the instructions supplied with your lens.

Safety Advice

The safety instructions provided in this manual are to ensure the long life of your projector and to prevent fire and shock. Please read them carefully and heed all warnings.

Fire and Shock Precautions

Ensure that there is sufficient ventilation and that vents are unobstructed to prevent potentially dangerous concentrations of ozone and the build-up of heat inside your projector. Allow at least 20cm (8”) of space between your projector and a wall. Allow at least 50cm (20”) of space between the ventilation duct outlet and object.

Ensure that nothing can be spilled on, or dropped inside the projector. If this does happen, switch off and unplug the mains supply immediately. Do not operate the projector again until it has been checked by qualified service personnel.

Do not insert any metal objects such as a wire or screwdriver into your projector.

Lamp Precautions

Due to the lamp being sealed in a pressurised environment, there is a small risk of explosion, if not operated correctly. There is minimal risk involved, if the unit is in proper working order, but if damaged or operated beyond the recommended 1500 hours, the risk of explosion increases.

The projector has a warning system that displays the following message when you reach 1500 hours of operation - Lamp Running Time is Over 1500 Hours!!. When you see this message please contact your Digital Projection dealer for a replacement lamp.

If the lamp does explode, smoke will be discharged from the vents located on the side of the unit. This smoke is comprised of glass in particulate form and Xenon

gas, and will not cause harm if kept out of your eyes. If your eyes have been exposed to this gas, please flush your eyes out with water immediately and seek immediate medical attention. Do not rub your eyes as this could cause serious injury.

WARNING: Do not look into the lens while the projector is on. Serious damage to your eyes could result.

CAUTION: The high pressure lamp may explode if improperly handled. Refer all servicing to qualified service personnel.

Power Supply

The projector is designed to operate on a power supply of 1.0kW 100-120VAC / 1.5kW 200-240VAC 50/60Hz. Ensure that your power supply fits this requirement before attempting to use your projector.

Handle the power cable carefully and avoid excessive bending. A damaged cord can cause electric shock or fire.

Running the power cord and the RGB cable close to each other can cause beat noise. If this happens, keep the two separated so that beat noise is not generated.

If the projector is not be used for an extended period of time, disconnect the plug from the power outlet. Do not unplug the power cable from the wall outlet under the following circumstances, doing so may cause damage to the projector:

a) Immediately after the power cable is plugged into the wall outlet (the POWER indicator has not changed to a steady amber glow).

b) Immediately after the lamp has been switched off. After the projector is turned off with the POWER OFF button the cooling fan continues to operate for 3 minutes while the Two Digit INDICATOR "--" flashes.

c) While the hour glass icon or the message ‘Please wait a litttle’ is being displayed.

Installation Advice

The projector should be placed on a flat, level surface and in a dry area free from dust and moisture. Do not place the projector in direct sunlight, near heaters or heat radiating appliances as exposure to direct sunlight, smoke or steam could harm internal components.

The projector should always be handled with care. Dropping or jarring the projector could damage internal components.

Do not place heavy objects on the projector.

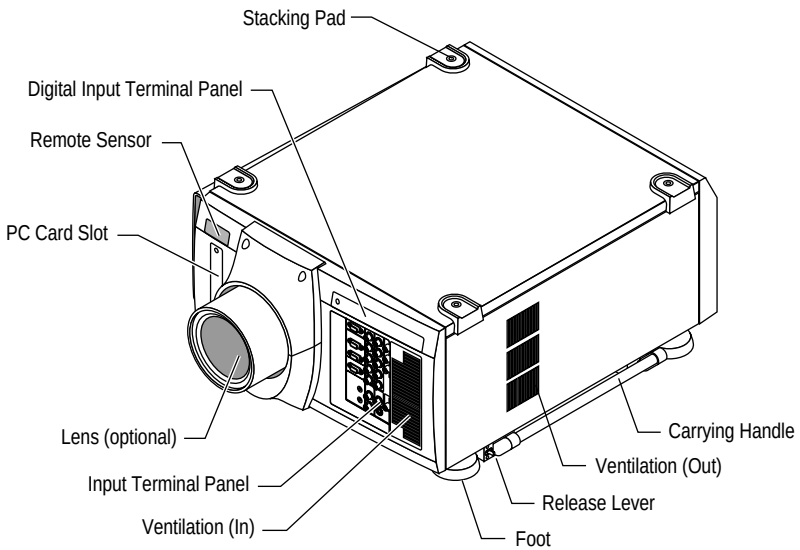
If you wish to have the projector installed on the ceiling do not attempt to install the projector yourself. The projector must be installed in accordance with any local building codes by qualified technicians in order to ensure proper operation and reduce the risk of bodily injury.

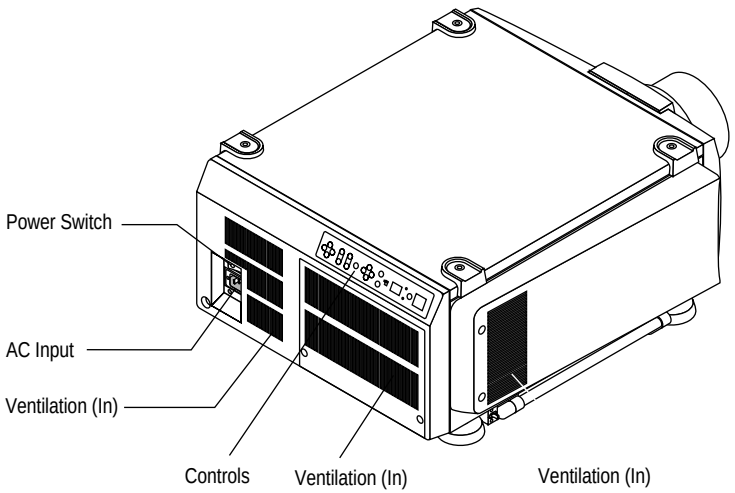
The ceiling must be strong enough to support the weight of the projector.

Do not attempt to stack projectors on the ceiling.

Components

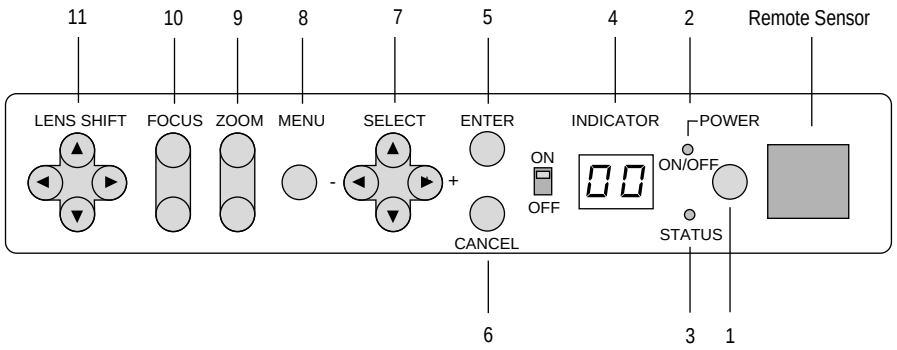
Part Names





Control Panel

The control panel at the rear of the projector provides all the main controls necessary to operate the projector.



1 - Power Button
Press to turn the projector on when the projector is in the standby condition (Main Power switch must be on and the POWER indicator lit amber). Press and hold for 2 seconds to turn off the projector.

2 - Power LED
The power indicator is a dual colour LED. When the projector is on the indicator is green. When the projector is in standby mode the indicator is amber.

After the projector is turned off, the indicator "--" flashes for three minutes to show that the cooling fan is working. Do not turn off the main power during that time. After "--" stops flashing, the POWER indicator will change to a steady amber glow and the projector will be in the stand-by mode. The main power can then be turned off.

3 - Status LED
When the projector is used with a configured switcher on SW1 level or SW2 level mode, this indicator flashes when the projector is not connected with the switcher correctly or when the switcher is turned off.

4 - Indicator Display
During normal operation the current projector ID (address) is shown in this two digit display. In the event of an error, a projector error code will be displayed. The display can be turned off using the ON/OFF Switch to the left hand side.

5 - Enter Button
Executes your menu selection and activates items selected from the menu. When the slidebar or dialog box is displayed: Pressing this button confirms adjustments/ setting and returns to the previous menu display.

6 - Cancel Button
Press this button to exit the menu. Press this button to return the adjustments to the last condition while you are in the adjustment or setting menu.

7 - Select Cursor Buttons
The up & down cursor buttons are used to select the menu of the item you wish to adjust and the left & right cursors change the level of a selected menu item.

8 - Menu Button
Activates the main menu.

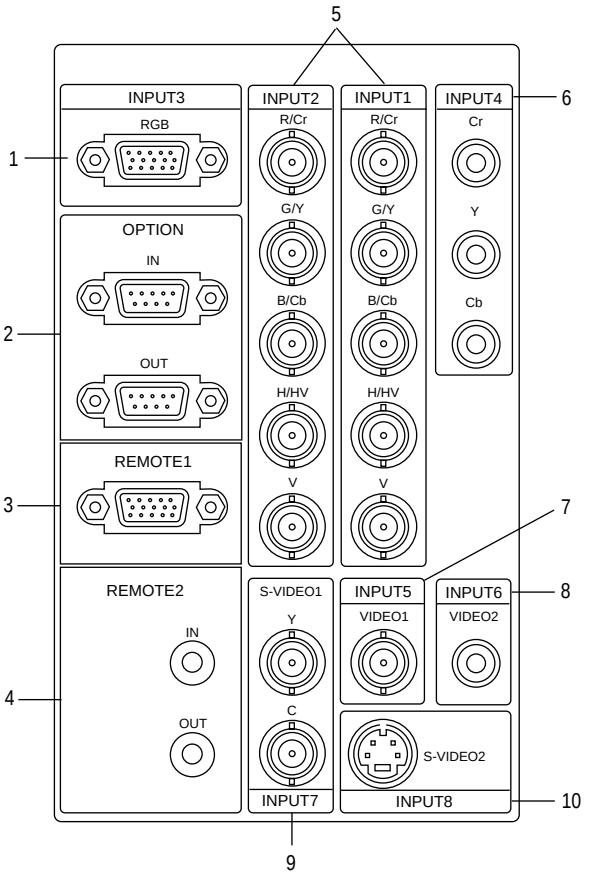
9 - Zoom Button
Zoom the lens in and out.

10 - Focus Button
Adjust the lens focus.

11 - Lens Shift Cursor Buttons
Adjust the lens offset by shifting the projected image position horizontally and/or vertically.

Terminal Panel

The Terminal Panel located at the front of the projector provides all the required connections for video, computer and remote control.



1 - INPUT 3 (RGB3)

A Mini D-Sub 15 pin connector to allow connection of a PC or other analogue RGB equipment such as a high-definition document camera.

2 - OPTION IN/OUT

Two Mini D-Sub 9 pin connectors for system expansion such as PC-control. The IN

connection should be attached to the external control equipment such as PC. The OUT connection provides for daisy-chaining multiple projectors and operating them with the same external equipment. To daisy-chain projectors, connect the IN terminal of the second projector to the OUT connection of the first projector. A third projector would be connected to the second projector in the same manner and the procedure would be repeated until all the projectors are connected.

3 - REMOTE 1

This Mini D-Sub 15 pin terminal allows external control of the projector from either a configured switcher or from an external control source. When the switcher is used, connect to the REMOTE 1 terminal on the back of the switcher.

4 - REMOTE 2

Two 3.5mm stereo mini jack sockets allow direct wired connection to an individual projector or a number of projectors. The IN connector allows direct connection of the remote control unit. The OUT connector is used for daisy-chaining multiple projectors and operating them with the same remote control.
Plugging the cable into the projector will automatically disable the infra-red remote receivers.

5 - INPUT 1 (RGB1) and INPUT 2 (RGB2)

Inputs with BNC terminals for connection of R, G, B, H and V outputs of external equipment such as a switcher. If using a source with combined sync output, connect it to the H/V terminal. The R, G, B terminals can also be used to connect component video outputs (Y/Cb/Cr) of external equipment.

6 - INPUT 4 (Component (Y/Cb/Cr))

Inputs with RCA terminals for component video outputs (Y/Cb/Cr) of external equipment such as DVD player.

This input accepts component signals only.

7 - INPUT 5 (VIDEO 1)

BNC composite video connection for external equipment such as a VCR or laser disk player.

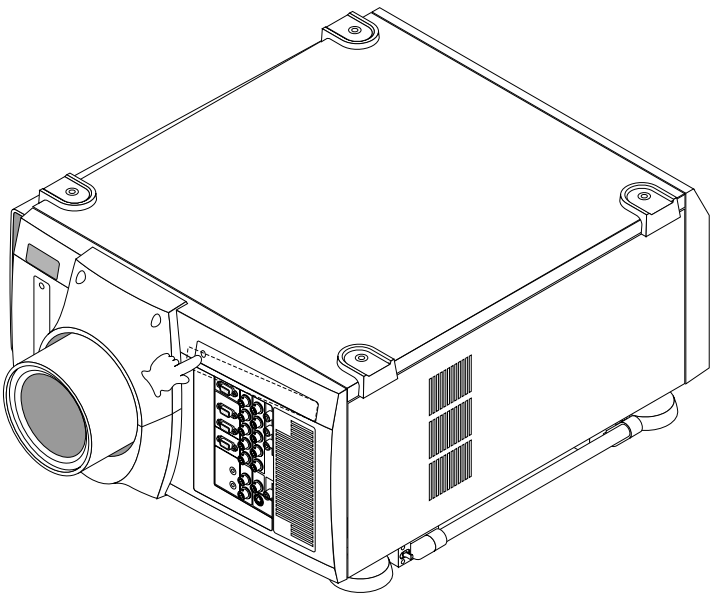
8 - INPUT 6 (VIDEO 2)
RCA composite video connection for external equipment such as a VCR or laser disk player.

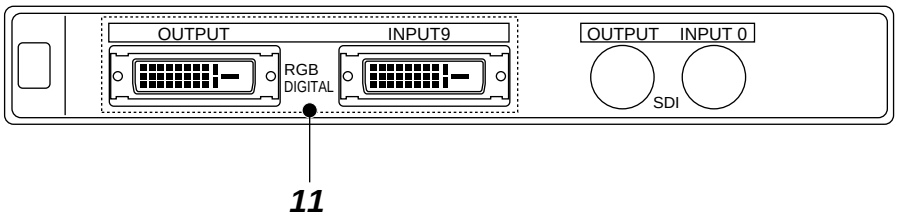
9 - INPUT 7 (S-VIDEO 1)
Two BNC connectors allow for S-Video connection for use with external equipment such as a VCR or laser disk player that have separate Y and C video outputs.

10 - INPUT 8 (S-VIDEO 2)
Mini-DIN-4pin S-video connection for external equipment such as a VCR. This input allows switching between S2 and S1 VIDEO input modes. See the "S-Video Mode Select" section for more information.

RGB Digital Connectors & Optional SDI Board

There is a compartment above the terminal board on the front of the projector for RGB Digital connectors and the optional SDI board. The compartment is opened by pushing the left side of the panel.





11 - INPUT 9 (RGB (Digital))

DVI-D 24 pin connectors for double or triple stacking. Use the supplied DVI-D cable to connect the OUTPUT terminal of the first projector to the second projector's INPUT until all the projectors are connected.

The DVI-D cable must not exceed 5 m (16.4 feet) in length.

These connectors can also be used to accept TMDS standard digital signal output from a digital ready computer. When used in this manner some graphics cards may cause flickering noise on the screen.

The projectors support a maximum resolution of 1024x768 (4100gv and 5100gv) or 1280x1024 (4000sx and 6000sx).

12 - INPUT 0 (SDI)

BNC SDI connection for use with equipment such as commercial type digital VTR. Compatible with digital component signals complying with SMPTE 259M-C standard.
4000sx and 6000sx models are also compatible with digital component signals complying with SMPTE 292M standard.

For further information on installing the optional SDI board contact your Digital Projection Dealer.

OPTIONALLY AVAILABLE SDI BOARDS

SDI Board (all models)

This board accepts the input of non-compressed signal sources from equipment such as commercial type digital VCR compatible with digital serial component signals of the SMPTE 259-C standard and provides a high quality image without quantisation noise.

BNC cable used with the SDI connector should be Belden 8281 cable, or 3C-2V equivalent cable or better.

Included in option:-

SDI Board	Shield Case
Connector Cable (Internal)	Installation Manual

HDSDI Board (sx models only)

This board accepts the input of non-compressed signal sources from equipment such as commercial type digital VCR compatible with digital serial component signals of the SMPTE 292M standard and provides a high quality image without quantisation noise. This board accepts the following image formats.

1920 x 1035/60/2:1	30	2:1 Interlace
1920 x 1080/60/2:1	30	2:1 Interlace
1280 x 720/60/1:1	60	Progressive
1920 x 1080/24sF	24	Progressice (Segmented Frame)

BNC cable used with the HDSDI connector should be 5C-FB equivalnt cable or better.

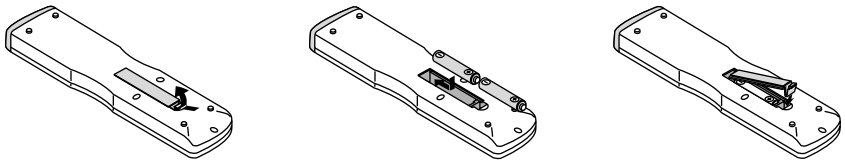
Included in option:-

SDI Board	Shield Case
Connector Cable (Internal) (2)	Flat Cable
Set screw for Shield Case (2)	Installation Manual

Remote Control

All the functions of your **HIGHlite Displays** projector can be controlled using the remote control. The remote control unit can operate either by infra red or by direct connection to the projector via a hard wire connection.

For infra red operation the remote control requires to be powered by 2 AAA (HP16/RO3/LR03) alkaline batteries. The battery compartment is located on the back of the remote control. To remove the compartment cover press and open as shown below.



Insert the first battery into the compartment according to the (+) and (-) indications inside the case and it to the back of the compartment. Insert the second battery by pivoting it against the first and pushing down into place. When the batteries are securely in place, replace the battery compartment cover.

When using infra red operation the remote control has an effective range of about 7m (23 feet) and at an angle of 30° above, below, to the left and to the right of the remote control sensors located at the front and the rear of the projector.

The remote control should not be exposed to heat, steam, water or any other liquid. If the remote control gets wet, wipe it dry immediately.

When remote control buttons are pressed and held down the main unit function keys may not operate.

You cannot operate the projector using the remote control if the remote ID is not set to [00] or the remote ID is not the same as the projector ID.

Very bright flourescent lighting or Infra Red translation systems may saturate the projectors' Infra Red receiver rendering the remote control inoperative.

Section B: System Installation

Installation Guidelines

This installation section explains how to install the projector for optimum results. To do this, it is necessary to determine the following:

1. The type of screen and whether front or rear projection is to be used.

2. The projector location and therefore the type of lens to be used.

3. The method of mounting for the projector.

4. The type of input source to be used with the projector.

Screen Requirements

As virtually all commercially available screens will give a pleasing image you should choose according to your individual requirements. However, to achieve optimum results we recommend a low gain (1.2 - 1.3), non-perforated screen for front projection, this will keep hot spotting and light loss to a minimum whilst providing wide viewing angles.

Regardless of the type of screen used, it is important that your screen is of sufficient height to display the images at the aspect ratios intended to be used. Use the following tables to check that you are able to display the full image on your screen. If you have insufficient height, you will have to reduce the overall image size in order to display the full image on your screen.

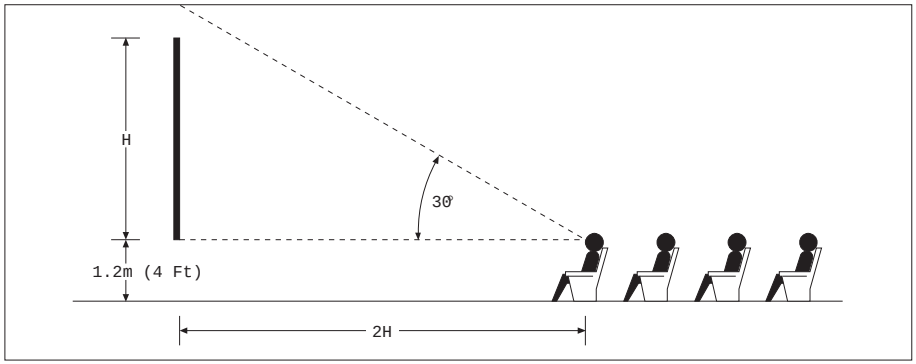
Screen Width	Screen Height (metres) Needed to Display Full Image with Aspect Ratio:				
(metres)	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
2.40	1.80	1.92	1.5	1.54	1.35
3.00	2.25	2.40	1.87	1.93	1.69
3.60	2.70	2.88	2.25	2.31	2.02
4.20	3.15	3.36	2.62	2.70	2.36
4.80	3.60	3.84	3.00	3.09	2.70
6.00	4.50	4.80	3.75	3.86	3.38
10.00	7.50	8.00	6.25	6.43	5.63

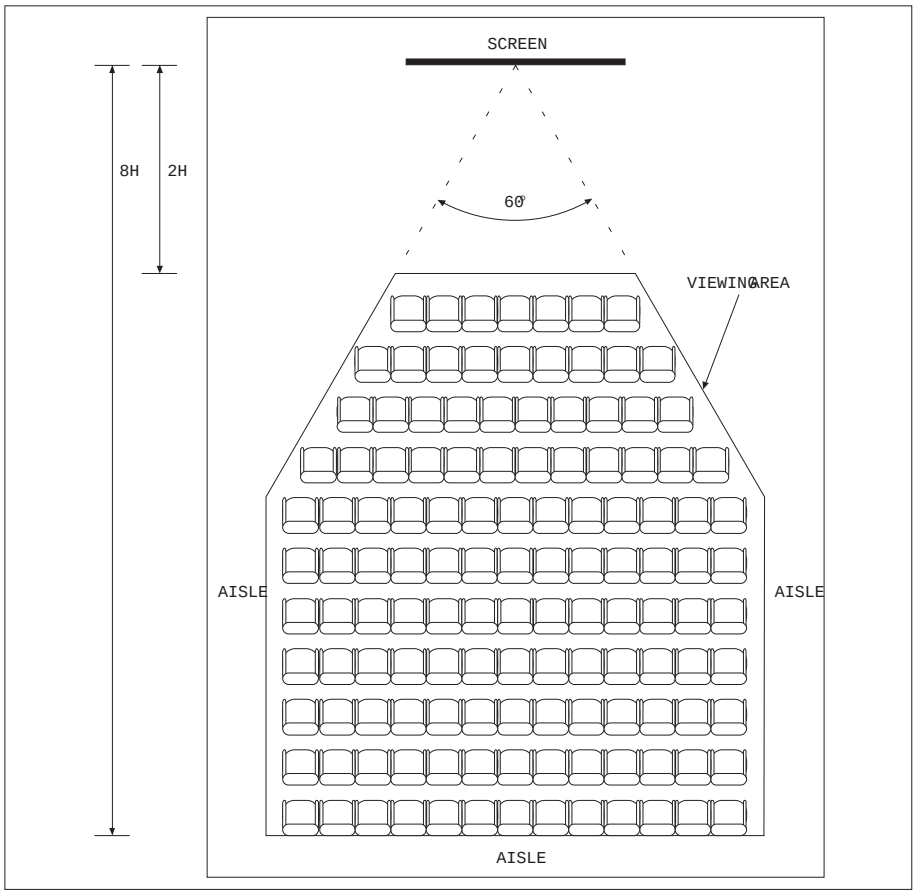
Screen Width	Screen Height (feet/inches) Needed to Display Full Image with Aspect Ratio:				
(feet)	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
8' 0"	6' 0"	6' 5"	5' 0"	5' 2"	4' 6"
10' 0"	7' 6"	8' 0"	6' 3"	6' 5"	5' 8"
12' 0"	9' 0"	9' 7"	7' 6"	7' 9"	6' 9"
14' 0"	10' 6"	11' 2"	8' 9"	9' 0"	7' 11"
16' 0"	12' 0"	12' 10"	10' 0"	10' 8"	9' 0"
20' 0"	15' 0"	16' 0"	12' 6"	12' 10"	11' 4"
30' 0"	22' 6"	24' 0"	18' 9"	19' 4"	16' 11

For optimum viewing, the screen should be a flat surface perpendicular to the floor. The bottom of the screen should be 1.2m (4 feet) above the floor and the front row of the audience should not have to look up more than 30° to see the top of the screen (see opposite).

The distance between the front row of the audience and the screen should be at least twice the screen height and the distance between the back row and the screen should be a maximum of 8 times the screen height. The screen viewing area should be within a 60° range from the face of the screen.

If you intend to use a rear projection screen you must ensure you have sufficient distance behind the screen for the projector to be correctly located Rear projection has the advantage that the projector cannot be seen and higher ambient light levels can be tolerated. Although the image can be flipped to rear projection and displayed without the need for extra mirrors or equipment, it makes the installation more complicated and advice should be sought from your local dealer before attempting an installation in this way.


H
30°
1.2m (4 Ft)
2H

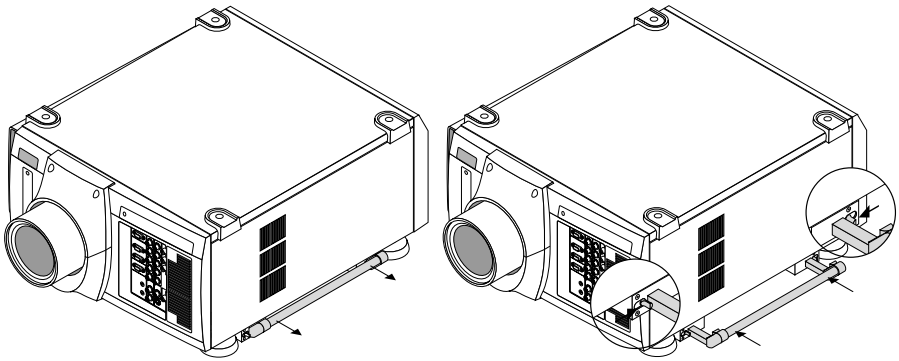

SCREEN
8H
2H
60°
VIEWING AREA
AISLE
AISLE
AISLE

Positioning the Projector

Correct positioning of the projector is essential to achieve the best results. Before deciding on the final location of the projector please ensure you read the following information very carefully.

The projector must be situated in a clean, dry environment and away from direct sunlight or heat. Make sure you locate the projector so that the air inlets and outlets for the cooling system are not obstructed.

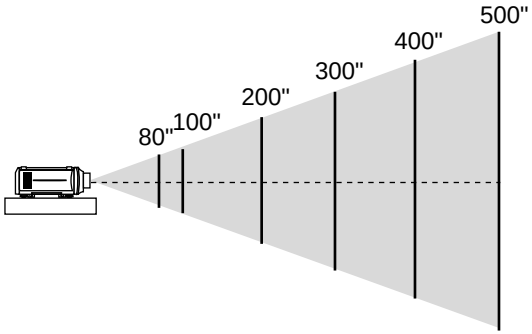
When positioning the projector always carry it by the retractable handles provided. The handles pull out from the bottom of the projector and click into place. To retract the handles, push the securing lever to unlock and push back (see below).



Ensure that the power cord and any other cables connecting to video sources are disconnected before moving the projector. When moving the projector or when it is not in use, cover the lens with the lens cap.

PROJECTOR THROW DISTANCE

The further the projector is positioned from the screen or wall, the larger the displayed image. The minimum projected image size is 2m (80") measured diagonally. The largest the image can be is 12.7m (500").



When using a zoom lens, exact positioning of the projector is not required as the image size can be adjusted. However, the projector must be located within the Throw Distance range imposed by the minimum and maximum lens throw ratios. To calculate the distance required between the screen and the projector select your lens type and screen size from the table below.

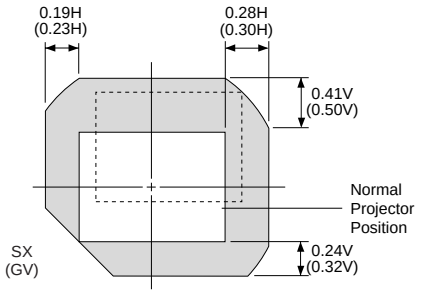
Screen Size (Diagonal)	Throw Distance required for Lens Model			
	LA00111, 0.84	**LA00107, 1.5-2.5**	**LA00108, 2.5-4.0**	**LA00109, 4.0-7.0**
80”	1.4 (4.48)	2.5 - 4.0 (8.20 - 13.10)	4.1-6.5 (13.45-21.33)	6.6-11.3 (21.65-37.07)
100”	1.7 (5.60)	3.1 - 5.0 (10.17 - 16.40)	5.1 - 8.1 (16.73 - 26.57)	8.2 - 14.2 (26.90 - 46.59)
200”	3.4 (11.20)	6.1 - 10.1 (20.00 - 33.14)	10.2 - 16.2 (33.46 - 53.15)	16.3 - 28.4 (53.48 - 93.18)
300”	5.1 (16.80)	9.2 - 15.2 (30.18 - 49.87)	15.3 - 24.3 (59.20 - 79.72)	24.4 - 42.6 (80.05 - 139.76)
400”	6.8 (22.40)	12.2 - 20.3 (40.03 - 66.60)	20.04 - 35.5 (66.93 - 116.47)	32.6 - 56.8 (106.96 - 186.35)
500”	8.5 (28.00)	15.2 - 25.4 (49.87 - 83.34)	25.4 - 40.6 (83.33 - 133.20)	40.7 - 71.1 (133.53 - 233.27)

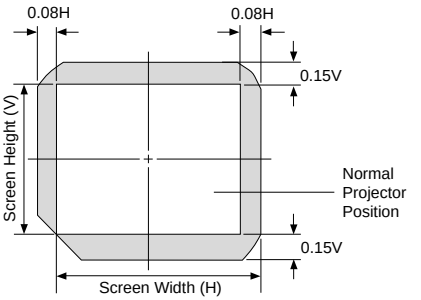
Throw distances measured in metres and (feet)

LENS SHIFT

The default height for positioning the projector is at the centre of your screen. However, you can set the projector above or below the centre and adjust the image using the ‘Lens Shift’ facility to centre the image on the screen.

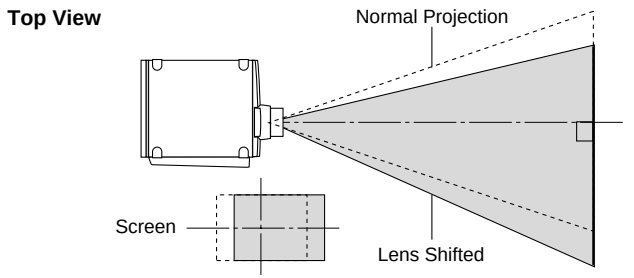
As with vertical positioning, the default horizontal position of the projector is at the centre of the screen. However, the projector can be mounted to the left or right of image centre and the 'Lens Shift' function used to centre the image on screen. The lens can be shifted within the shaded shown below using the normal projection position as a starting point.

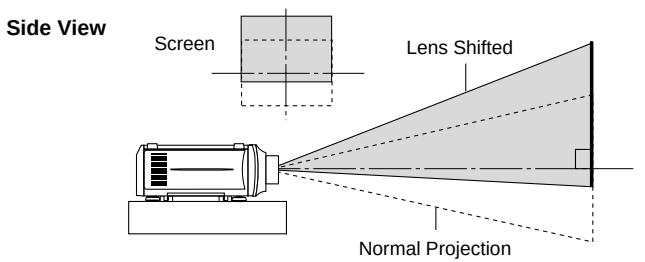




Screen Size	80"	100"	150"	200"	300"	400"	500"
H	1.6 (5.33)	2.0 (6.67)	3.0 (10.00)	4.0 (13.33)	6.1 (20.00)	8.1 (26.67)	10.2 (33.33)
V	1.2 (4.00)	1.5 (5.00)	2.3 (7.50)	3.0 (10.00)	4.6 (15.00)	6.1 (20.00)	7.6 (25.00)

H: Width of projected image, V: Height of projected image, Units: Metres (Feet)





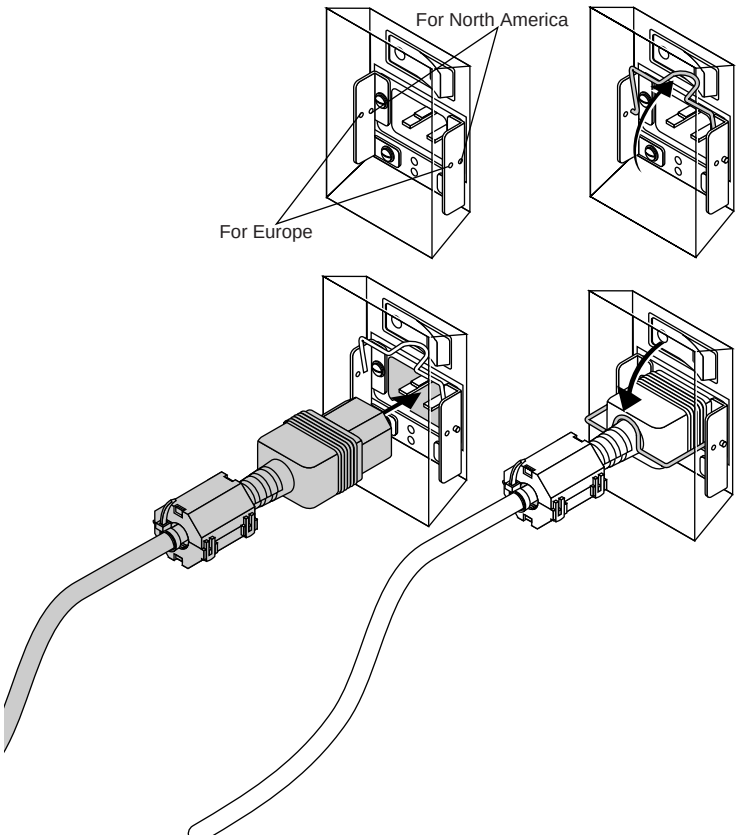
Installation

Attaching the Power Cable Stopper

The Power Cable Stopper is provided with the projector so that the cable cannot be accidentally unplugged from the AC IN.

1. Lift up the wire stopper. Check it is fitted in correct holes for your cable.

2. Connect the Power Cable to the AC IN then lower the stopper to hold the power cable.



Lens Installation

There are three zoom lenses available for the HIGHLite Displays projectors Model numbers LA00107, LA00108 and the LA00109. These lenses have throw ratios of 1.5-2.5:1, 2.5-4.0:1 and 4.0-7.0:1 respectively. In addition to the zoom lenses a fixed lens LA00111 is available with a throw ratio of 0.84:1.

Do not attempt to install a lens if the projector is turned on. If the projector is operating, turn off the power and wait for the cooling fan to stop. Next turn off the main power switch on the rear panel and wait for the projector to cool off.

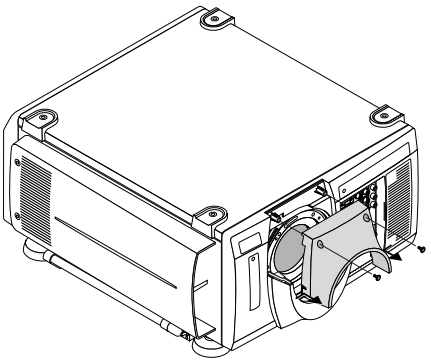
INSTALLATION PROCEDURE

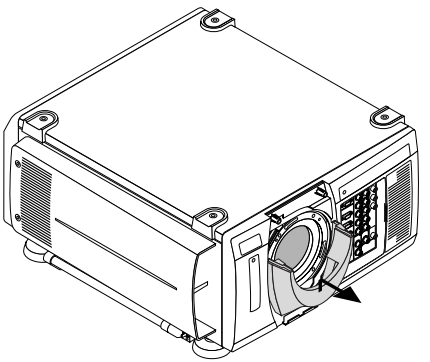
1. Remove the protective sponge from the lens hood.

2. Remove the two screws from the top of the upper lens hood.

3. Push the lower end to lift up and remove the upper lens hood.

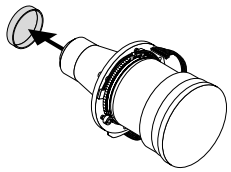
4. Lift up the lower lens hood by 1 cm to release from the hook then remove the hood.

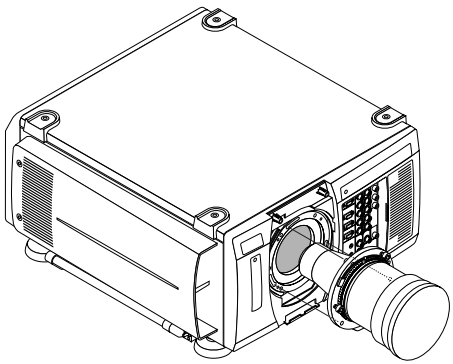




5. Remove the cap from the rear of the lens and insert the lens so that the three pins on the lens unit are properly lined up with the holes on the projector.

Do not remove the front lens cap during lens installation. The lens cap helps minimise any damage to the front lens element and prevents touching of the lens surface which can degrade the optical performance.

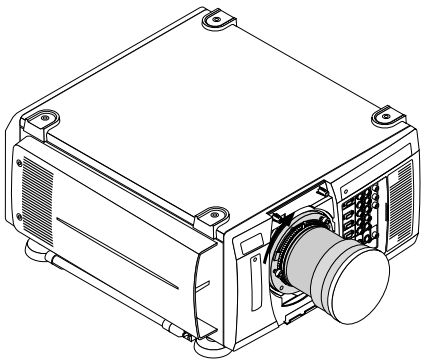


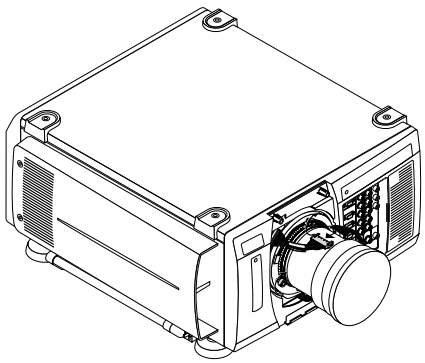


6. Rotate the lens barrel clockwise to fix the lens unit.

7. Secure the three screws on the lens holder.

8. Insert the connector of the lens unit into the socket of the extension cable attached to the projector.

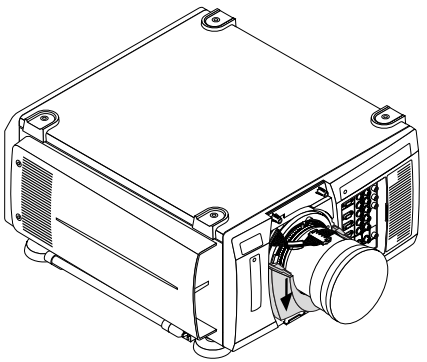


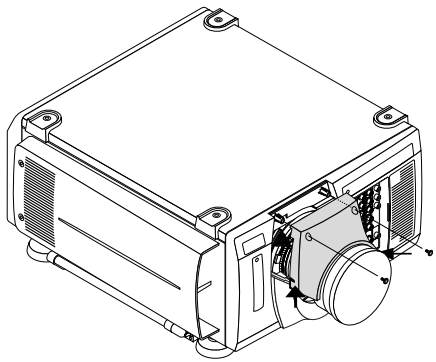


9. Insert the lower lens hood into the retaining hook and secure.

10. Re-attach the upper lens hood while pushing the left and right bottom.

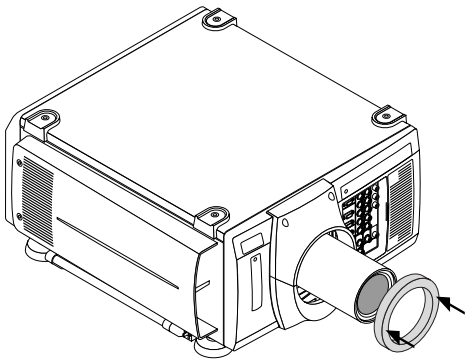
11. Secure the upper lens hood with two screws through the top of the hood.





12. Attach the foam sealing ring.

13. Remove the front lens cap.



Setting Up the Projector

This section describes how to select a computer or video source, adjust the picture edit a signal and adjust all other settings and adjustments for correct projector set-up.

Before you turn on the projector ensure that the computer or video source is turned on and that the projector lens cap is removed.

Plug the supplied power cable into the AC outlet and turn on the projector with the main power switch on the rear panel of the projector. The projector will go into its standby mode and the POWER indicator will glow amber.

Press the 'POWER ON' button on the remote control or projector cabinet. The POWER light will turn to green and the projector will fully turn on.

The projector will display a black, blue image or logo if no input signal is present. To select the desired source press the 'INPUT' button on the remote control or press the MENU button and use the Source Select function.

Adjust the projector position so that it is square to the screen and the displayed image is horizontally centred. Next, adjust the vertical position of the projected image using the Lens Shift Control.

Adjustments to the displayed image can be made using the ADJUST PICTURE or ADJUST WHITE BAL buttons on the remote control or via the Adjust (Source) option from the Main Menu.

If projecting an image with lower resolution than the projector's native resolution (1024x768 (gv) or 1280x1024 (sx)), the image can be enlarged to fill the screen by selecting Native the Resolution window.

While pressing and holding CTL, press MAGNIFY or FOCUS on the remote control to zoom the lens or adjust the lens focus.

Reflecting the Displayed Image

Using a mirror to reflect your projector's image enables you to obtain a much larger image in a much smaller space. If the image is inverted when using a mirror, it can be corrected using the Orientation feature under Setup in the Projector Options Sub-menu. For further details contact your dealer or Digital Projection.

You can use your **HIGHlite Displays** projector to project an image from the rear onto a translucent screen. The throw distance required for rear projections is the same as for front projection. If the image is inverted when projecting an image from the rear, it can be corrected using the Orientation feature under Setup in the Projector Options Sub-menu. For further details contact your dealer or Digital Projection.

Shutter Mechanism

Your **HIGHlite Displays** projector is equipped with a mechanical shutter which allows the user to shut off the light completely on the screen. To use the shutter function, hold down the CTL button, and press the MUTE PICTURE button on the remote control

Turning Off the Projector

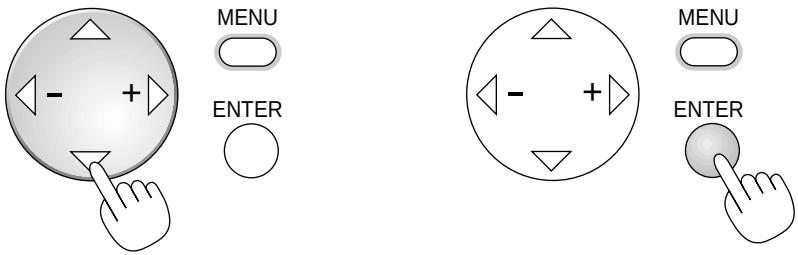
In order to extend the life of the lamp the projector should be turned off as described below. Press the POWER OFF button on the remote control or the projector cabinet and allow the fan to cool the projector for three minutes. After the cooling fan stops working the POWER indicator will change to a steady amber glow and the projector will be in the stand-by mode. The projector can now be turned off using the main power switch on the rear panel. If the projector is not going to be used for an extended period it should be disconnected from the mains supply. Do not turn the projector off and then immediately back on. The Projector needs to cool down for three minutes before it is powered on again. If you want to turn off the image briefly (five minutes or less) use the MUTE PICTURE feature.

Do not turn off the main power while the cooling fan is working.

Startup Screen (Language Select)

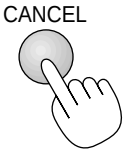
When you first turn on your Highlite Displays projector you will get the startup screen.
This screen gives you the opportunity to select one of the seven menu languages: English, German, French, Italian, Spanish, Swedish and Japanese.

Use the cursor movement button to highlight the desired language and press ENTER to select.



INSTALLATION

To close the menu without making a selection or to save your language selection, press the CANCEL button.



To select or change the language later press MENU and navigate to ‘Projector Options’ - ‘Menu’ - ‘Page1’ - ‘Language’ and follow the above instructions.

Connecting Signal Sources

CONNECTING A VIDEO RECORDER OR LASER DISC PLAYER

Video recorders and laser disc player connect to the **HIGHlite Displays** Projector using common RCA cables (not provided). To make these connections, simply:

Connect one end of your RCA cable to the video output connector on the back of your video recorder or laser disc player and the other end to the Video input on your projector.

Refer to your VCR or laser disc player owner's manual for more information about your equipment's video output requirements.

CONNECTING A COMPUTER

Connecting your PC or Macintosh computer to the **HIGHlite Displays** Projector will enable you to project your computer's screen image for an impressive presentation. To connect to a computer:

Use the signal cable supplied with the PC or Macintosh computer to connect to the projector.

If the projector goes blank after a period of inactivity, it may be caused by a screen saver installed on the computer.

CONNECTING A DOCUMENT CAMERA

To connect your **HIGHlite Displays** Projector to a document camera simply:

Using a standard video cable, connect your document camera to the Video input (or INPUT3, RGB) on your projector.

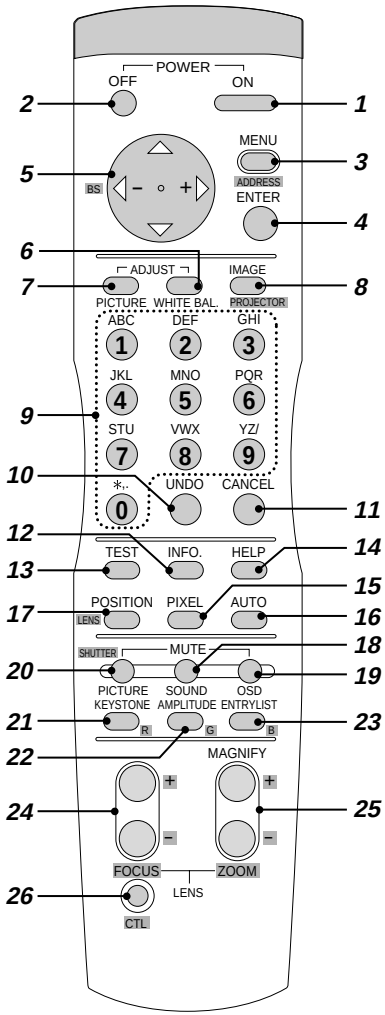
Refer to your document camera's owner's manual for more information about your camera's video output requirements.

Section C: System Operation

Remote Control Overview

All the functions of a **HIGHLite Displays** projector can be controlled by the remote control unit. The remote control can be directly connected to the projector via a control cable or to provide more flexibility send infra red signals which are detected by sensors located at the front and rear of the projector.

A description of all the remote control functions is provided overleaf.



1 - POWER ON

Press to turn on the projector. The POWER indicator on the projector lights up green.

2 - POWER OFF

Press and hold this button for a minimum of 2 seconds to turn off the projector.

3 - MENU

Press to display the main menu.

While pressing and holding CTL, press this button to display the Remote Control ID dialog box to specify the remote control ID.

4 - ENTER

Executes the menu selection and activates items selected from the menu.

When the slidebar or dialog box is displayed:

Pressing this button confirms adjustments / settings and returns to previously displayed menu.

5 - CURSOR (Up / Down / Left / Right)

Moves the highlighted menu selection as indicated.

When pressed together the CTL and < buttons work as a backspace key in the entry screen.

Pressing and holding CTL, then this button moves the menu, slidebar or dialog box in the indicated direction on the displayed image.

6 - ADJUST WHITE BAL

Press to display the Colour adjustment screen. Sequential presses of this button selects “Colour Temperature” - “White Balance - Brightness” - “White Balance - Contrast” - “Signal Level” - “Ref. White Bal” - “Switcher Gain”

7 - ADJUST PICTURE

Press to display the Picture adjustment screen. Sequential presses of this button selects “Brightness” - “Contrast” - “Saturation” - “Colour” - “Hue” - “Sharpness” - “V-Aperture” - “Gamma Correction”

8 - IMAGE / PROJECTOR

Press to display the Image Option screen. Sequential presses of this button selects "Pixel Adjust" - "Position" - "Aspect Ratio" - "Resolution" - "Overscan" - "Video Filter" - "Blanking".

While pressing and holding CTL, sequentially pressing this button selects "On/Off Timer" - "Sleep Timer" - "Menu" - "Setup" - "Link Mode" - "Switcher Control".

9 - INPUT

Use to select an input, to name a signal or to enter a passcode during input registration.

1 - INPUT 1 for RGBHV / Y, Cr/Pr, Cb/Pb
2 - INPUT 2 for RGBHV / Y, Cr/Pr, Cb/Pb
3 - INPUT 3 for RGB
4 - INPUT 4 for Y, Cr/Pr, Cb/Pb
5 - INPUT 5 for VIDEO 1
6 - INPUT 6 for VIDEO 2
7 - INPUT 7 for S-VIDEO 1
8 - INPUT 8 for S-VIDEO 2
9 - INPUT 9 for RGB DIGITAL input
0 - INPUT 0 for SDI input on the optional SDI board

10 - UNDO

Press to return the adjustments and settings to the previous condition.

While pressing and holding CTL use this button to clear all menus or adjustment/setting screen. At this time the adjustments/settings are stored in memory.

11 - CANCEL

Press this to exit to the previous menu.

While pressing and holding CTL use this button to make the previous menu active without exiting the current menu. This feature allows you to adjust several items concurrently.

12 - INFO

Displays the "Source Information" or "Projector Information" window.

This button toggles between these two windows.

13 - TEST
Press to display internal test pattern.
Sequential presses scroll through series of five test patterns.

14 - HELP
Provides on line help.

15 - PIXEL
Displays the Pixel Adjust screen to adjust pixel clock and phase.

16 - AUTO (RGB only)
Press to automatically adjust Position-H/V and Pixel Clock for optimal picture.

The Pixel Phase is not adjusted.

17 - POSITION
Press to display the Blanking screen; press again to display the position screen.
While pressing and holding CTL, press this button to display the Lens Shift adjustment screen.

18 - MUTE SOUND
(available only when using a configured switcher)
Turns off the sound for a short period of time. Press again to restore the sound.

19 - MUTE OSD
Press to turn off the on-screen menu display. Press again to restore the on-screen display.

You can also turn off the on-screen display by pressing and holding the CTL and then pressing MUTE OSD; doing this again restores it. It this case any adjustment will still change the projector's memory settings. This mode is available even when an input is switched to another or if the power is turned off using the POWER OFF button on the remote control.

20 - MUTE PICTURE
Press to turn off the picture for a short period of time. Press again to restore the picture. Pressing and holding CTL, then pressing this button closes the light shutter such that no light is emitted through the projection lens.

21 - KEYSTONE (R)
Press to display the Keystone Correction screen.

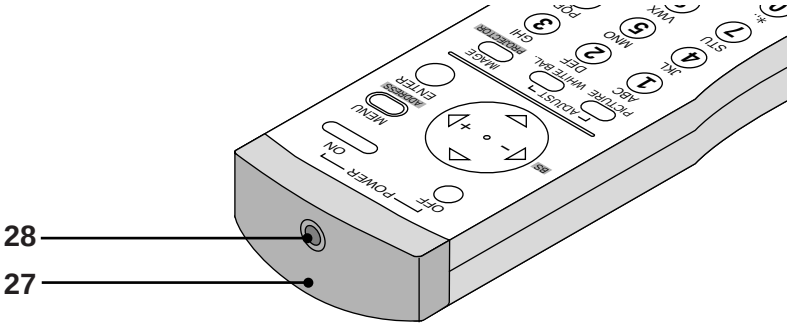
22 - AMPLITUDE (G)
Service personnel only.

23 - ENTRY LIST (B)
Press to display the Entry List screen.

24 - FOCUS (+/-)
While pressing and holding CTL, pressing this button allows you to adjust the lens focus.

25 - MAGNIFY/ZOOM (+/-)
Magnify the size of a target portion.
While pressing and holding CTL, pressing this button allows you to zoom the lens in and out.

26 - CTL
Used in conjunction with other buttons, similar to a shift key on a computer keyboard.



27 - INFRARED TRANSMITTER

Direct the remote control toward the remote sensor on the projector cabinet.

28 - REMOTE JACK

Connect your remote control cable here for wired operation.

Direct Key Combinations

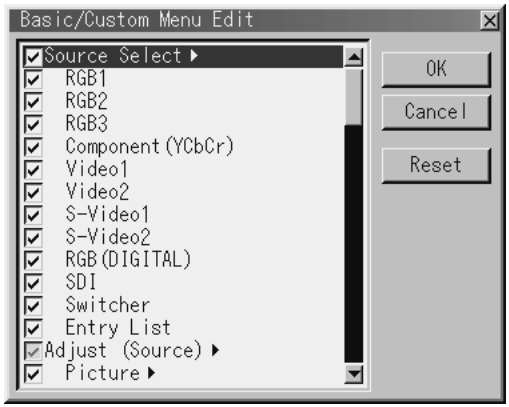
The CTL button can be used in conjunction with other remote control buttons to provide alternative functions. A list of these combinations is provided below.

KEY COMBINATION	ACTION
CTL + INPUT (1-10)	Switches to selected signal found in the Entry List. To enable this combination, you must first assign specific remote keys for direct input selection in the Entry Edit window.
CTL + ENTER	Displays the Entry Edit Command Window. Only available while displaying the Entry List window.
CTL + MUTE PICTURE (SHUTTER)	Blocks all projector light output.
CTL + CANCEL	Returns to previous menu without closing the slidebar or dialogue box.
CTL + UNDO	Clears all menus or adjustment/setting screens. Adjustments & settings are saved automatically.
CTL + Cursor Button	Moves the slidebar or dialogue box horizontally or vertically.
CTL + Cursor Button (while using zoom)	Displays the magnifying glass icon.
CTL + Left Cursor (BS)	Deletes one letter or numeral in the entry screen.
CTL + TEST	Displays the Passcode Entry screen.
CTL + MENU (ADDRESS)	Displays the Remote ID Entry window.
CTL + IMAGE (PROJECTOR)	Sequentially selects the Projector Options sub menus.
CTL + POSITION (LENS)	Displays the Lens Shift control window.
CTL + KEYSTONE (R)	Turns on Red. Only available when viewing Test Patterns.
CTL + AMPLITUDE (G)	Turns on Green. Only available when viewing Test Patterns.
CTL + ENTRY LIST (B)	Turns on Blue. Only available when viewing Test Patterns.
CTL + MAGNIFY (ZOOM)	Zooms the lens in and out.
CTL + (FOCUS)	Adjusts the lens focus.
CTL + INFO	Saves Lens Zoom and Focus position.

Basic/Custom Menu

The Basic/Custom menu can be customised to meet your requirements.

Select ‘Projector Options’ - ‘Menu’ - ‘Page1’ - ‘Basic/Custom Menu Edit’ to display the menu editing screen.



Highlight your desired selection and press the ENTER button to place a check mark next to the option.
If you select an item with a solid triangle and press the ENTER button all submenu items will also be selected.
You can press the ENTER button again to clear a check mark.

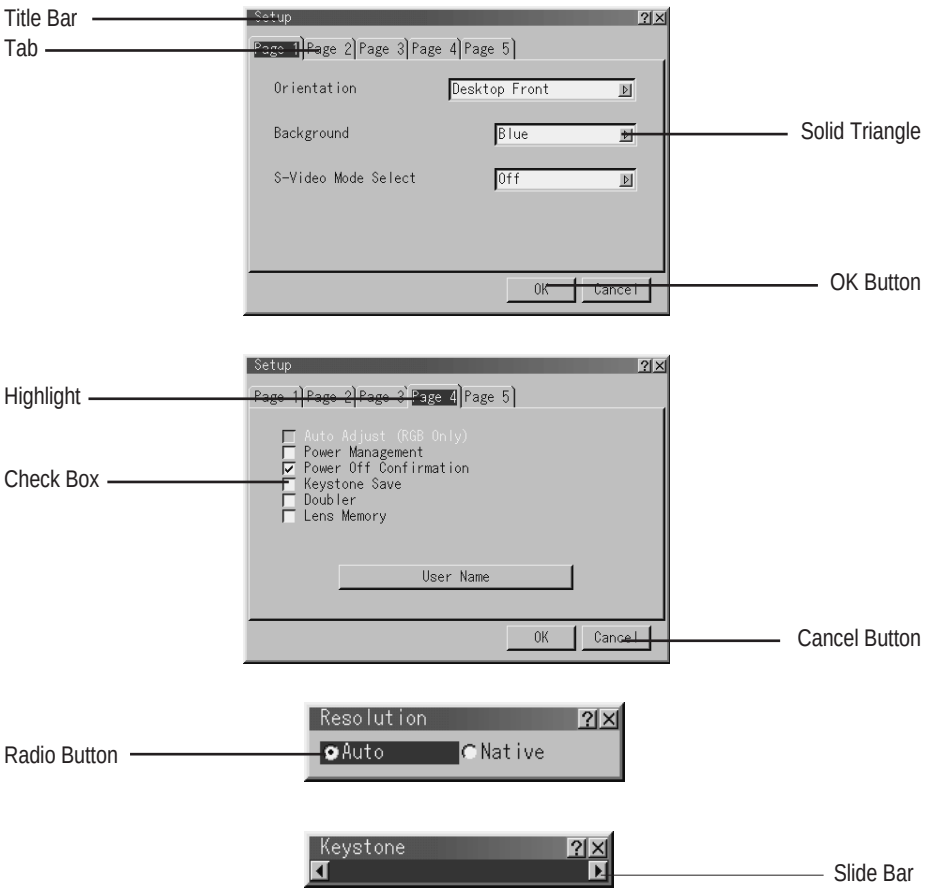
Up to 12 main items (not including submenu items) can be selected for display.

To finalise your selection navigate to the OK button and press the ENTER button. You will then be asked to confirm the changes.

All items not selected can still be accessed by selecting ‘To Advanced Menu’ item in the Main Menu.

Menu System Overview

Menu windows or dialog box typically have the following elements:



Title bar - Indicates the menu title.

Highlight - Indicates the selected menu or item.

Solid triangle - Indicates further choices are available. A highlighted triangle indicates the item is active.

Tab - Indicates a group of features in a dialog box. Selecting any tab brings its page to the front.

Radio button - Use this round button to select an option in a dialog box.

Check box - Place a checkmark in the square box to turn the option On.

Slide bar - Indicates settings or the direction of adjustment.

OK button - Press to confirm your setting. You will return to the previous menu.

Cancel button - Press to cancel your setting. You will return to the previous menu.

Navigating the Menu System

Press the MENU button on the remote control to display the Main Menu. Next, use the up and down cursor buttons on the remote control to select the required sub menu and press ENTER.

Using the up and down cursor buttons to select the item to be modified from the sub menu and press ENTER to display the adjustment screen or dialog box.

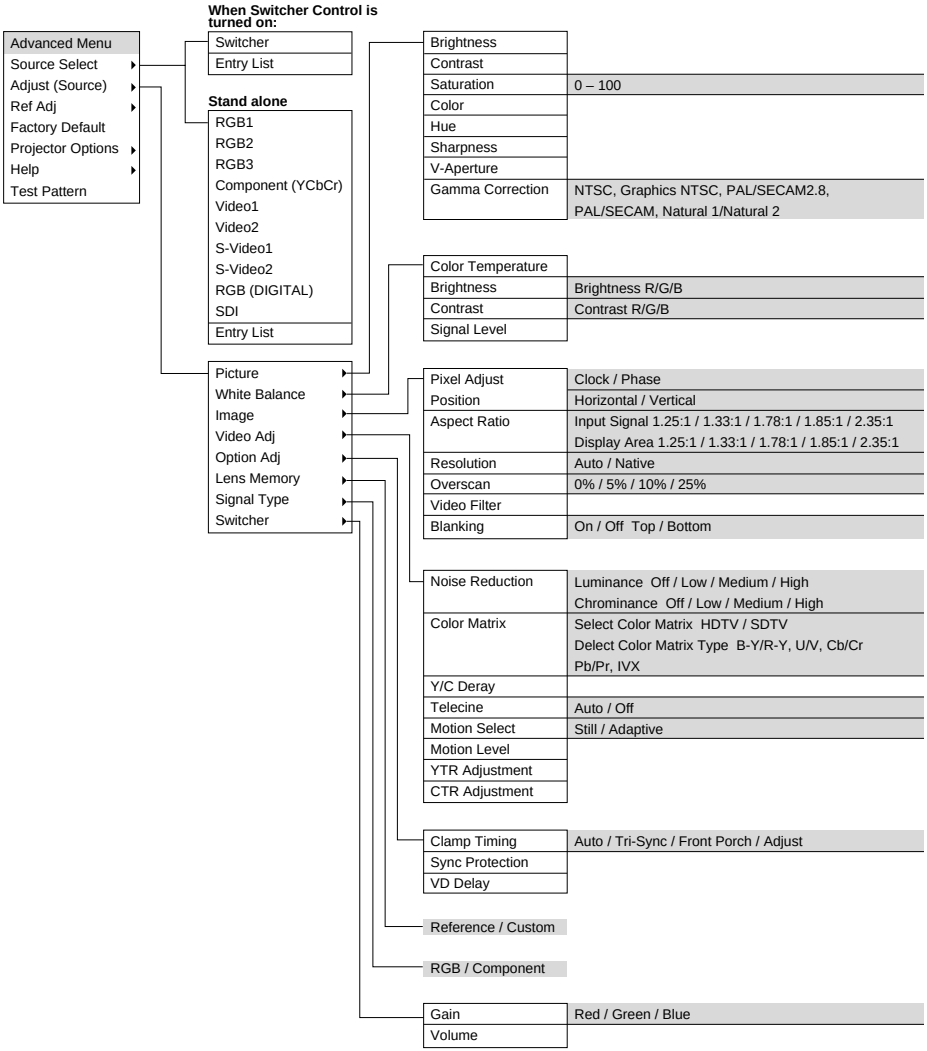
A right-oriented delta symbol ▶ in the menu structure indicates that further choices are available by pressing the right cursor button.

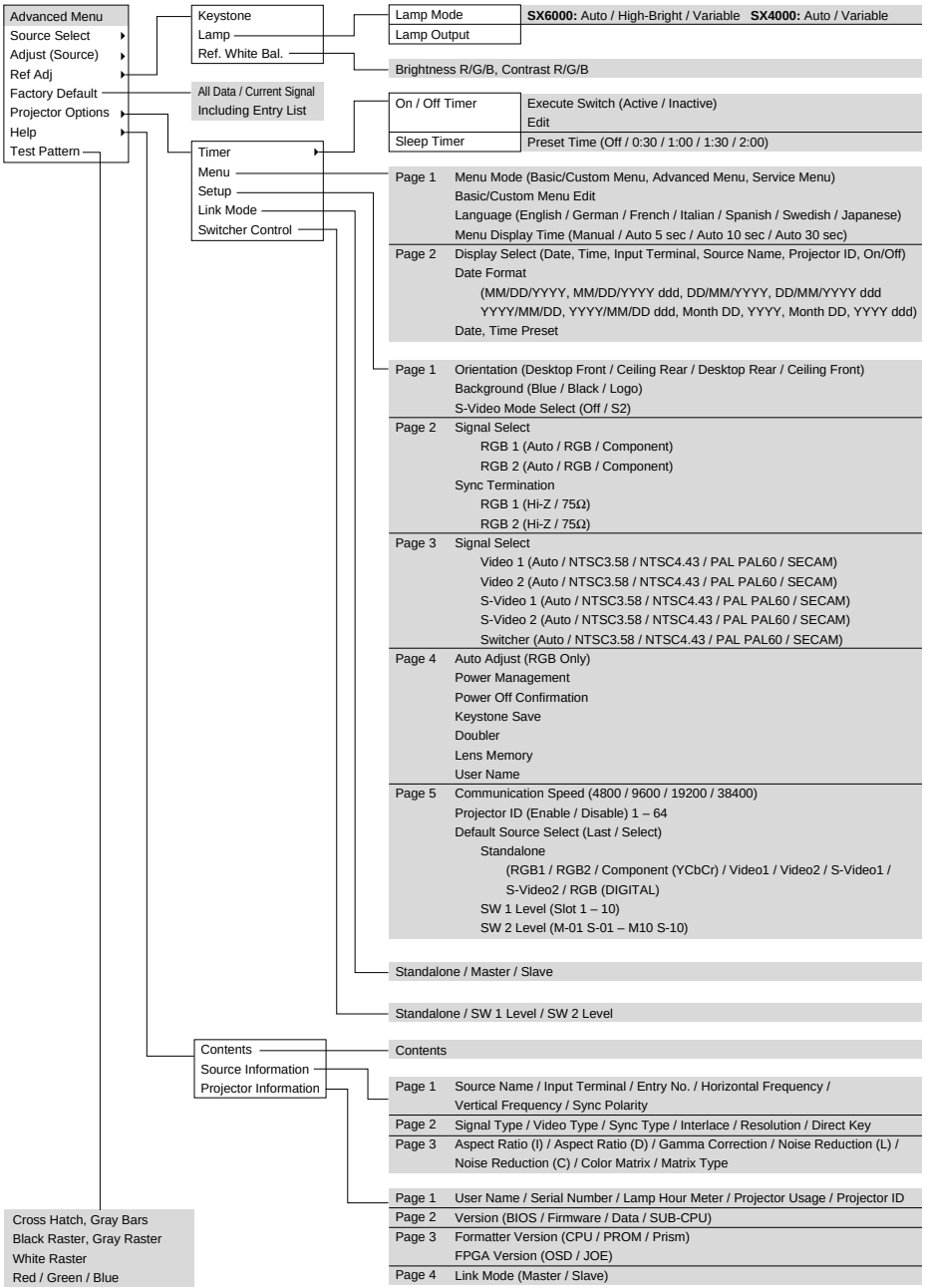
Adjust the level or turn the selected item on or off using left or right cursor keys on the remote control. The on-screen slide bar will show you the amount of increase or decrease.

To exit, press CANCEL on the remote control.

The change is stored automatically when the on-screen display disappears, the projector goes into standby mode or one input is switched to another.

Menu Structure




Advanced Menu
Source Select
Adjust (Source)
Ref Adj
Factory Default
Projector Options
Help
Test Pattern
Keystone
Lamp
Ref. White Bal.
All Data / Current Signal
Including Entry List
Timer
Menu
Setup
Link Mode
Switcher Control
Contents
Source Information
Projector Information
Cross Hatch, Gray Bars
Black Raster, Gray Raster
White Raster
Red / Green / Blue
Lamp Mode
SX6000: Auto / High-Bright / Variable SX4000: Auto / Variable
Lamp Output
Brightness R/G/B, Contrast R/G/B
On / Off Timer
Execute Switch (Active / Inactive)
Edit
Sleep Timer
Preset Time (Off / 0:30 / 1:00 / 1:30 / 2:00)
Page 1
Menu Mode (Basic/Custom Menu, Advanced Menu, Service Menu)
Basic/Custom Menu Edit
Language (English / German / French / Italian / Spanish / Swedish / Japanese)
Menu Display Time (Manual / Auto 5 sec / Auto 10 sec / Auto 30 sec)
Page 2
Display Select (Date, Time, Input Terminal, Source Name, Projector ID, On/Off)
Date Format
(MM/DD/YYYY, MM/DD/YYYY ddd, DD/MM/YYYY, DD/MM/YYYY ddd
YYYY/MM/DD, YYYY/MM/DD ddd, Month DD, YYYY, Month DD, YYYY ddd)
Date, Time Preset
Page 1
Orientation (Desktop Front / Ceiling Rear / Desktop Rear / Ceiling Front)
Background (Blue / Black / Logo)
S-Video Mode Select (Off / S2)
Page 2
Signal Select
RGB 1 (Auto / RGB / Component)
RGB 2 (Auto / RGB / Component)
Sync Termination
RGB 1 (Hi-Z / 75Ω)
RGB 2 (Hi-Z / 75Ω)
Page 3
Signal Select
Video 1 (Auto / NTSC3.58 / NTSC4.43 / PAL PAL60 / SECAM)
Video 2 (Auto / NTSC3.58 / NTSC4.43 / PAL PAL60 / SECAM)
S-Video 1 (Auto / NTSC3.58 / NTSC4.43 / PAL PAL60 / SECAM)
S-Video 2 (Auto / NTSC3.58 / NTSC4.43 / PAL PAL60 / SECAM)
Switcher (Auto / NTSC3.58 / NTSC4.43 / PAL PAL60 / SECAM)
Page 4
Auto Adjust (RGB Only)
Power Management
Power Off Confirmation
Keystone Save
Doubler
Lens Memory
User Name
Page 5
Communication Speed (4800 / 9600 / 19200 / 38400)
Projector ID (Enable / Disable) 1 – 64
Default Source Select (Last / Select)
Standalone
(RGB1 / RGB2 / Component (YCbCr) / Video1 / Video2 / S-Video1 /
S-Video2 / RGB (DIGITAL)
SW 1 Level (Slot 1 – 10)
SW 2 Level (M-01 S-01 – M10 S-10)
Standalone / Master / Slave
Standalone / SW 1 Level / SW 2 Level
Contents
Contents
Page 1
Source Name / Input Terminal / Entry No. / Horizontal Frequency /
Vertical Frequency / Sync Polarity
Page 2
Signal Type / Video Type / Sync Type / Interlace / Resolution / Direct Key
Page 3
Aspect Ratio (I) / Aspect Ratio (D) / Gamma Correction / Noise Reduction (L) /
Noise Reduction (C) / Color Matrix / Matrix Type
Page 1
User Name / Serial Number / Lamp Hour Meter / Projector Usage / Projector ID
Page 2
Version (BIOS / Firmware / Data / SUB-CPU)
Page 3
Formatter Version (CPU / PROM / Prism)
FPGA Version (OSD / JOE)
Page 4
Link Mode (Master / Slave)

Menu Operation

Main Menu

The Main Menu provides access to sub-menus which allow you to control the projector and to view any system settings.

Source Select - enables selection of an input source.

Adjust (Source) - provides access to the image controls.

Ref Adj - provides access to Keystone, Lamp and Reference White settings.

Factory Default - takes you to the Factory Default options menu.

Projector Options - enables you to set projector options and other operating options

PC Card Files - provides access to files stored on CompactFlash Card.

Help - provides on-line help.

To Advanced Menu - gives access to the advanced level menus.

Source Select

Source Select enables you to select an input source connected to the projector.

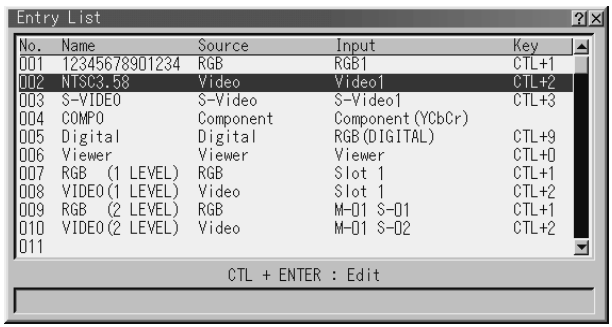
To select an input source use the up/down buttons on your remote control or the projector cabinet to highlight the desired input type and press Enter. Available options include: RGB1, RGB2, RGB3, Component (YCbCr), Video1, Video2, S-Video1, S-Video2, RGB Digital or SDI.

Alternatively Entry List may be selected which contains a list of the entry signals. When in the Entry List window, use the up/down buttons on your remote control or the projector cabinet to select the desired signal and press the Enter button.

When switcher control is turned on selecting Source Select will provide you with options of selecting a Switcher input or selecting a signal from the Entry List.

Entry List

The Entry List window contains a list of all current and previously connected input signals.



ENTRY EDIT COMMAND

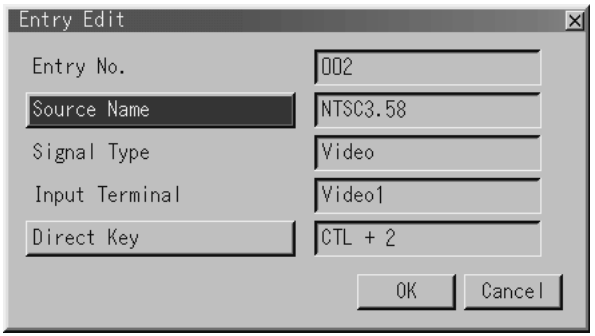
The names and positions of the signals stored in the entry list can be modified using the Entry Edit Command. To display the Entry Edit Command window hold down CTL and press ENTER on the remote control. You can then Cut, Copy, Paste and Edit the entries.

Cut - allows you to remove a selected signal from the list. The selected signal is stored on the 'clipboard' in the projector.

Copy - copies the selected signal from the list and stores it on the 'clipboard'.

Paste - Enables you to paste the signal stored on the 'clip-board' to any other line of the list. To do this, select Paste and then select the line number you want to paste to and press ENTER.

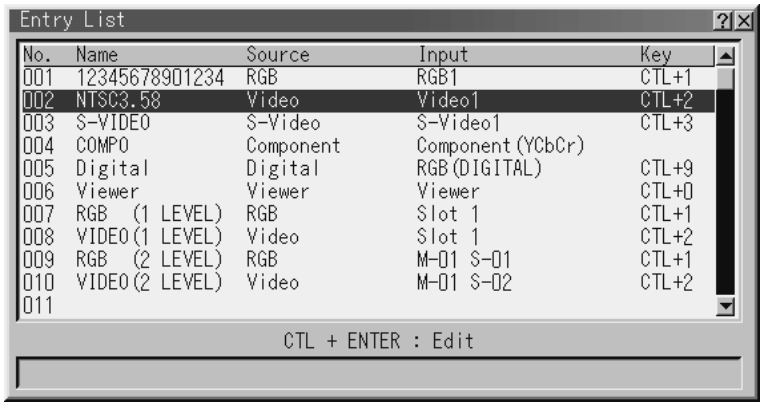
Edit - allows you to change source name or assign the direct key.



The source name and input terminals can be modified by selecting “Source Name” and “Input Terminal”. The appropriate Edit window will be displayed allowing you to make adjustments, This option is only available for sources which are not being currently being displayed.

You can assign specific remote keys for direct signal input selection using the ‘Direct Key’ function. Select ‘List’ and press ENTER to display the Direct Key assignment list.

After assigning the desired remote keys, select ‘OK’ and press ENTER to save changes and close the window.



After modifying an entry in the list using the Edit function select OK and press ENTER to save the new settings. To exit without storing setting, select Cancel.

To close the List window without making any changes press CANCEL on the remote control.

One feature of HIGHLite Displays is the automatic creation of a new entry in the Entry List when a new source is modified using picture controls such as brightness etc. If many different sources are used with the projector it is theoretically possible to fill the 100 entries available in the Entry List. If this occurs, in the worst case the projector may not be able to display an image. Therefore it is recommended that the Entry List is periodically cleared out, deleting any unwanted RGB signals using the Cut command in the Entry Edit Command menu.

Adjust (Source)

The Adjust (Source) Menu provides access to the image controls. Use the up and down cursor buttons on your remote control or the projector cabinet to highlight the menu item you want to adjust.

Picture

The Picture Menu provides access to the Brightness, Contrast, Colour, Hue. Sharpness and V-Aperture parameters of the displayed image. Each image parameter is controlled by a slide bar.

Brightness - Adjusts the brightness level or the back raster intensity.

Contrast - Adjusts the intensity of the image according to the incoming signal.

Color - Increases or decreases the color saturation level (not available for RGB).

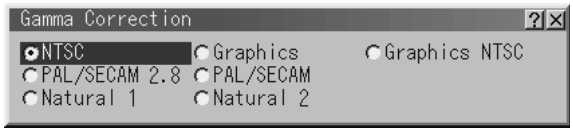
Hue - Varies the color level from +/- green to +/-blue. The red level is used as reference. This adjustment is only valid for Video and Component inputs (Not available for RGB).

Sharpness - Controls the detail of the image for Video (Not available for RGB and Component).

V-Aperture - Adjusts edge enhancement in the vertical direction. (Not available for RGB).

Gamma Correction - Allows the selection from a list of appropriate gamma corrections to match the video type being input.

Natural 1 setting is for Video and S-Video
Natural 2 setting is for component video (Gamma = 2.2)



White Balance

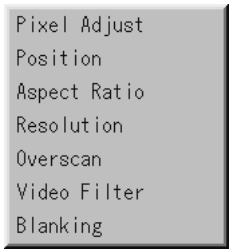
This feature adjusts the white balance for each input signal.

For Video/RGB signals the brightness for each color (RGB) is used to adjust the black level of the screen and the contrast for each color adjusts the white level of the screen.

For Y/Cb/Cr the brightness for each color (Y/Cb/Cr) is used to adjust the white level of the screen and the contrast for each color is used to adjust the black level of the screen.

Image

The Image Menu provides access to the Auto Adjust, Position, Pixel Adjust, Resolution and Video Filter features of the projector.



PIXEL ADJUST

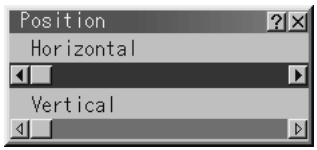
When Auto Adjust is off, Pixel Adjust allows you to manually modify the Pixel Clock and Phase settings.

Clock - Used to fine tune the computer image or to remove any vertical banding that might appear.

Phase - Adjusts the clock phase or used to reduce video noise, dot interference or cross talk. (this is evident when part of your image appears to be shimmering). The Phase should only be adjusted after the Clock parameter has been defined.

POSITION

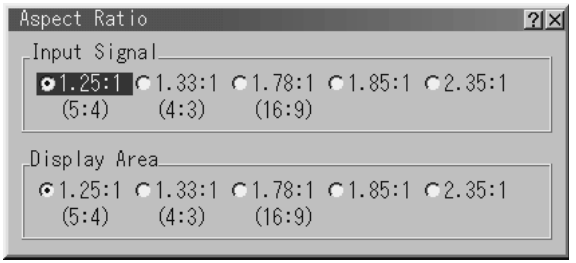
When Auto Adjust is off, Position adjusts the image location horizontally and vertically. This adjustment is made automatically when the Auto Adjust is turned on.



OPERATION

ASPECT RATIO (Not available for RGB)

This feature allows you to define the correct proportions for displayed image.



You can select the aspect ratio for the input signal and the display aea respectively.

When 'Resolution' is set to 'Native' this feature is not available, any stored settings and adjustmanets are invalid.

RESOLUTION

When Auto Adjust is turned off, Resolution allows you to activate or deactivate the Imaging Resizing feature. There are three possible settings - Auto, Native and Native with Zoom.

Auto - Turns on the Imaging Resizing feature. The projector automatically reduces or enlarges the current image to fit the full screen.

Native - Turns off the Imaging Resizing feature. The projector displays the current image in its true resolution.

If you are displaying an image with higher resolution than the projector's native resolution, even in Native mode, the image is displayed full screen using the Image Resizing Feature.

OVERSCAN

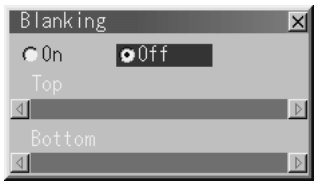
Selects the % of overscan to be applied to a RGB image.

VIDEO FILTER

This feature reduces video noise. Video filtering is controlled by a slide bar with adjustments made using the cursor buttons on the remote control. When the bar is set at 0, video filtering is Off. High filtering is applied when the bar is set to 1/3rd. When the bar is at 2/3rds, medium filtering is applied and when set to full, low filtering is applied. The appropriate filter value should be selected to give the best image for your input signal.

BLANKING

The Blanking feature allows you to mask any unwanted area of the screen image.

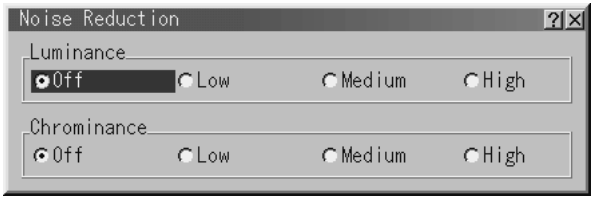


Blanking functions on the vertical display range only.

Video Adj

NOISE REDUCTION

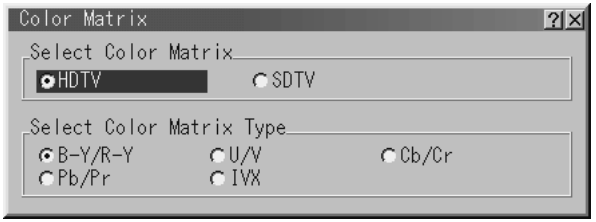
This feature is used to reduce video noise. Select Low, Medium or High to give the optimum image.



The lower the Noise Reduction level, the better the image quality. Increasing Noise Reduction lowers video bandwidth.

COLOR MATRIX

The Color Matrix feature is only available for component video signals. To use this feature first select an appropriate color matrix for your input signal, either HDTV or SDTV. Next, select an appropriate matrix type.



Y/C DELAY

Adjusts Y/C delay level.

MOTION SELECT

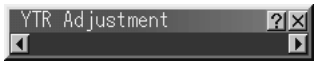
Sets the interpolation method. Select Still for non moving images such as a document camera and Adaptor for all motion video.

MOTION LEVEL

Adjusts level of motion detection when Motion Select is defined as Adaptive.

YTR ADJUSTMENT (Not available for RGB)

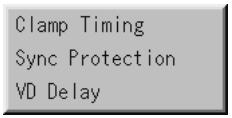
Adjusts the Luminance Transient Time.



CTR ADJUSTMENT (Not available for RGB)

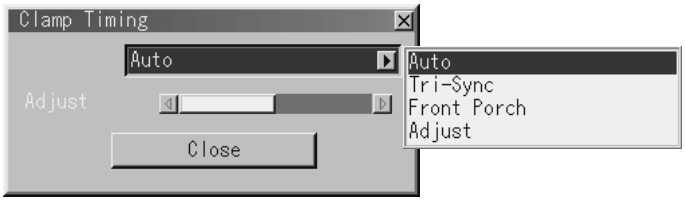
Adjusts the Chroma Transient Time.

Option Adj



CLAMP TIMING

This function sets the standard black level position of the displayed image. Select one of the four options:



Auto - Normal setting.

Tri-Sync - Setting for HDTV signal.

Front Porch - For other settings than above.

Adjust - Permits manual adjustment of level for special analogue input signals such as 1080P.

SYNC PROTECTION

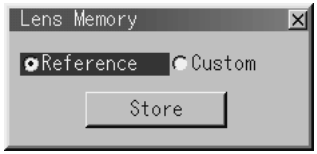
Use during playback from a VCR or DVD that supports Copyguard (a copy prevention system) to remove the image hooking that can occur.

VD DELAY

This feature is used to correct vertical jitter of non-standard inter-laced signal. Select one of the three VD delay levels.

OPERATION

Lens Memory

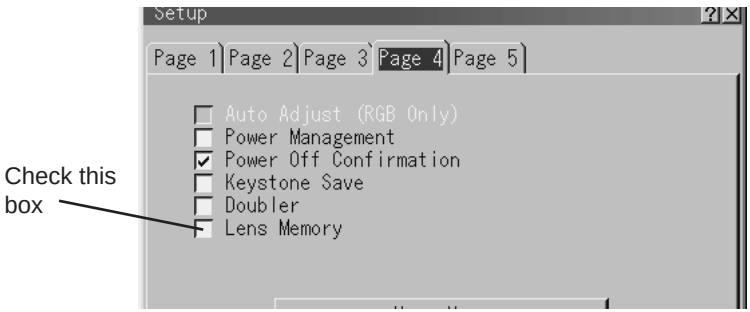


This feature stores in memory the values for the lens Shift, Focus and Zoom after adjustment by the remote control or the main unit controls.

For Example.
In order to display a 4x3 video image and a 5x4 computer image on the same 4x3 aspect ratio screen.
On a 4100gv or 5100gv both the images will occupy the same height and nothing needs to be done.
On a 4000sx or 6000sx the computer image will fill the height of the DMD™ but the video image will only fill 90% of the DMD™ height.
In this case it will be necessary to alter the lens zoom to fill the screen for the video image. This will cause the image focus to change and, if there is any lens shift employed, will cause the image to move laterally on the screen.
Storing the two lens states in memory will allow the lens to change its position, focus and zoom for both of these images automatically.

Memorising the setting with no video input will set the reference (default) position for the lens settings.

To memorise a setting.
Check the box in *Projector Options - Setup - Page 4*



While displaying the image you wish to store lens settings for, or with no input to set the reference position, adjust each of the lens parameteres foe zoom, focus and shift.
Select *Adjust (Source) - Reference - Lens Memory*
Select the appropriate radio button to store the reference posiion (Reference) or the specific position for your input signal (Custom) and Store your adjustmants.

Another method to store the lens position is to use the remote control.
Press the INFO button whilst pressing and holding the CTL button.

This function is only available with two optional lenses - TL-1Z (1.5-2.5) and TL-2Z (2.5-4.0)

When storing the lens position using the remote control the settings will be stored according to the Reference/Custom radio setting button.
New input signals cause this selection to default to Reference.

When storing lens positions it is recommended that the following procedures are adhered to
Make adjustments after the projector has reached normal operating temperature. (60 minutes is recommended)
Always make your final focus adjustment in the positive direction on the remote. (Lens mechanics interact differently when adjusting focus from one direction to the other)

Signal Type

Select either the RGB or Component signal type to get the correct colour space for your input.

RGB.....RGB Signal
Component.....Composite signals such as YCrCb/YPrPb

This feature is available on RGB1 and RGB2 only.

Switcher

SWITCHER GAIN

This feature adjusts the input level of the signal to correct any image colour balance errors caused by signal path differences.
This must be done to each colour: R, G and B.

VOLUME

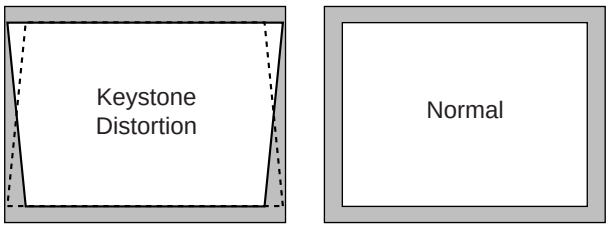
This feature adjusts the volume of the audio output, when connected through a suitable switcher. Adjust the sound corresponding to the selected slot.

Audio output from the switcher must go to a suitable audio system. Audio cannot be played through the projector.

Ref Adj

The Ref Adj (Reference Adjust) Menu provides access to the reference controls. Use the up and down cursor buttons on your remote control or the projector cabinet to highlight the menu item you want to adjust.

Keystone



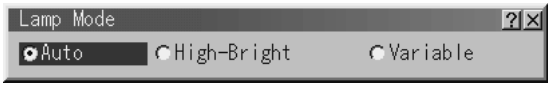
Keystone is the distortion of a projected image that usually creates a wider top than bottom. Aiming a projector upward on a wall rather than straight at a wall creates this distortion. Use slide bar to correct this keystone (trapezoidal) distortion.

With the projector aimed directly at the screen the maximum keystone angle that can be corrected is ±15 degrees.

Lamp

LAMP MODE

Lamp Mode allows the lamp power supply to operate under the following settings:



Auto - This setting keeps the projector's original light output level for a certain period of time.

High-Bright - This setting consumes maximum current from the AC input and results in the most light output.

The High Bright mode shortens the lamp life. Be sure to use this mode at temperatures of 95°F (35°C) or less.

Variable - This setting allows the lamp power supply to draw a variable amount of current from the AC input source and allows for maximum power consumption and variable light output. When selecting Variable, use the Lamp Output slidebar to set the desired projector light output.

LAMP OUTPUT

Defines the projector light output when Lamp Mode is set to Variable.

Reference White Balance

Reference White Balance is only available when viewing test patterns and adjusts the white balance that is used as a reference.

Any adjustment will affect the displayed image for all input sources.

Factory Default

Factory Default returns all adjustments and image settings (with the exception of Keystone and Lamp Output) to the factory preset level.

There are three options available:

All Data - Resets the settings for all signals to the factory preset levels.

Current Signal - Resets the adjustments and image options for the current signal to the factory preset levels.

Including Entry List - Resets the adjustments and image settings for all signals and deletes all signals in the Entry List.

Projector Options

The Projector Options menu enables you to set preferences and other operating options.

Timer

This feature enables you to turn on or off your projector automatically at a specified time. There are two timer functions are available: On/Off Timer and Sleep Timer.

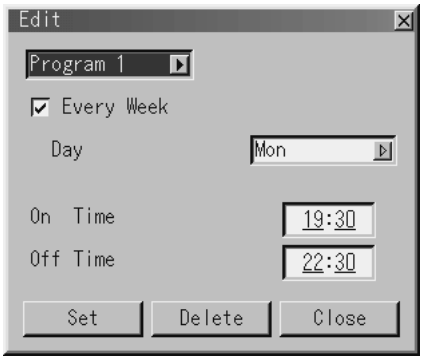
ON/OFF TIMER

The On/Off Timer enables you to schedule up to eight on and off times in 12 or 24 hour format. Before setting the On/Off Timer the current date and time must be defined using the Date, Time Pre-set feature. When the On/Off Timer has been set it is still possible to turn the projector on or off with the remote control.

To schedule an On and Off Time:

1. Open the On/OFF Timer window.

2. Select EDIT and press ENTER on the remote control to open the EDIT window.



3. Set the Week, Day, On-Time and Off-Time using the CURSOR buttons and INPUT buttons (1 through 10). To cancel the on-time or off time, use Delete.

4. Select Set and press ENTER on the remote control to complete the setting. To close, select Close.

5. To enable your setting, select Active on the Execute Switch.

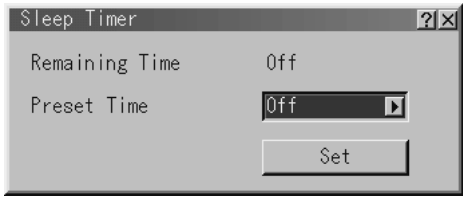
6. Select OK and press ENTER on the remote control to complete the setting.

When On Timer is set and the projector is in the standby mode, the "00" display on the INDICATOR flashes to show that On Timer program is active.

The projector must be in stand-by mode at the time of turning on. The preset power-on time will be void if the cooling fan is working or an error occurs.

SLEEP TIMER

The Sleep Timer allows you to set the projector to automatically turn itself off after a predefined time period.



To activate the Sleep Timer:

1. Select your desired time between 30 minutes and 2 hours in 30 minutes.

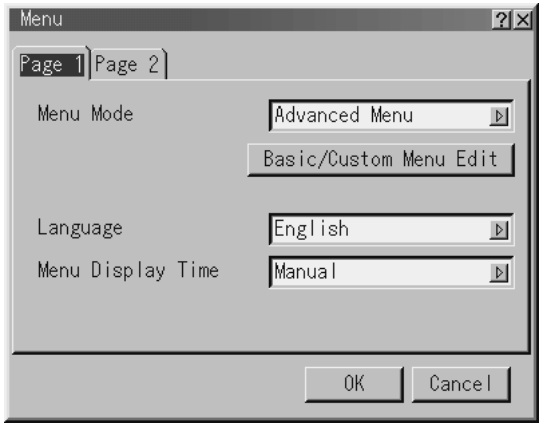
2. Select Set and press the ENTER button on the remote control.

3. The remaining time starts counting down.

4. The projector will turn off after the countdown is complete.

Menu

The Menu window allows you to set preferences for the on-screen menu system.



Language - Up to seven languages are available for the on screen instructions. The options are: English, German, French, Italian, Spanish, Swedish and Japanese.

Menu Display Time - The on screen menu display appears when the buttons on the remote control, or the controls on the rear panel are pressed. The display can be set to automatically turn off at a pre-selected time between 3 and 30 seconds after the last menu action or set to manual operation. When set to manual, the display will be turned on and off whenever the MUTE OSD button is pressed. If no button operation is made for 20 minutes or more, the on-screen message will automatically turn off.

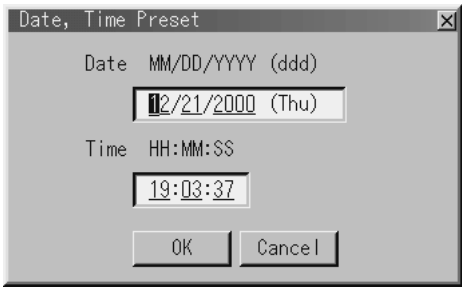
Display Select - defines the status information displayed on the screen each time you switch between input sources.

Date Format - defines the format of the date displayed in the upper left corner of the screen.

Date, Time Preset - The projector has a built-in clock allowing the current year, month, date and time to be displayed in the top of the screen. The clock will keep working for about 3 days after the main power is turned off. If the main power is off for 3 days or more, the built-in clock will be reset and the date and time will have to be re-defined. The built-in clock will not reset while in the standby condition.

To set the Date and Time:

1. Select Date, Time Preset from the Menu window. The Date, Time Preset window will open.



2. Type in the current month, date and year using the input buttons on the remote control. The month and date must be entered in two digit format.

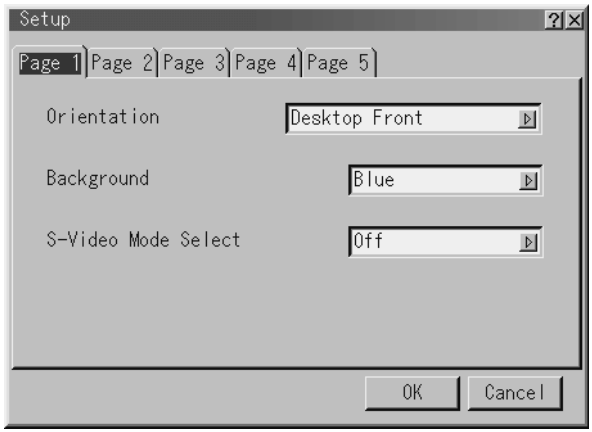
3. Enter the current time in 24-hour format.

4. Select OK and press ENTER. The clock will start when the window closes.

Setup

There are five Setup windows used to define the operating options for the projector.

SETUP PAGE 1

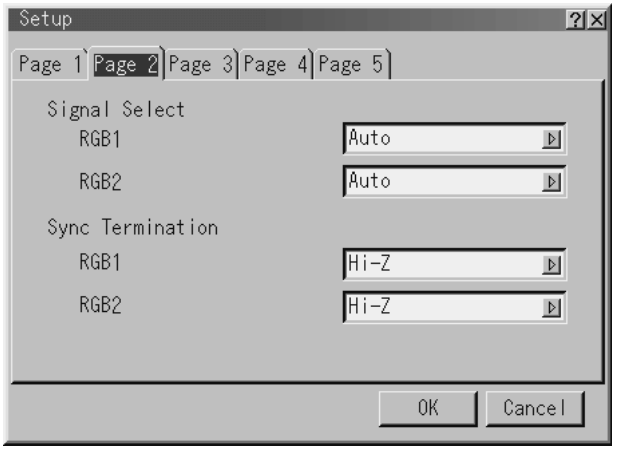


Orientation - The projector can be set for floor projection, rear ceiling projection, rear floor projection and front ceiling projection.

Background - The projector can be set to display a black, blue screen or logo when no input signal is present.

S-Video Mode Select - Defines the S-Video signal detection mode to allow the identification of S-Video signals with different aspect ratios. When set to S1, zoom signals (16:9) will be identified. When set to S2, zoom signals and wide zoom signals (4:3) will be identified.

SETUP PAGE 2

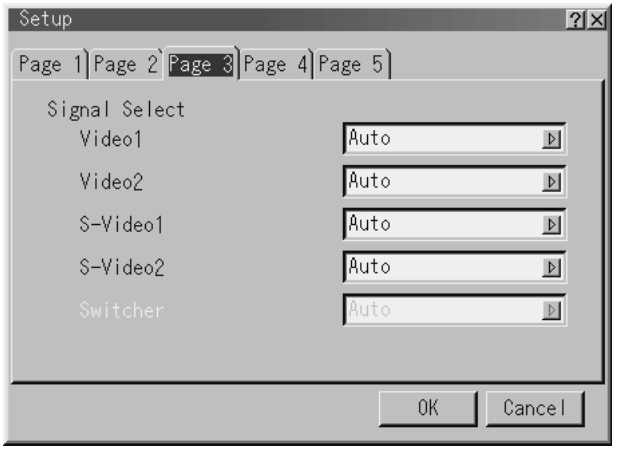


Signal Select

RGB 1/2 - Allows the RGB1 and RGB2 inputs to be defined as either RGB, Component or Auto. When set to Auto the projector attempts to automatically detect the signal type. However, certain component signals may not be detectable.

Sync Termination - Defines the impedance of the sync signal for the RGB1 and RGB2 inputs. The default setting for normal use is 75Ω. Hi-Z should be selected when using a TTL signal.

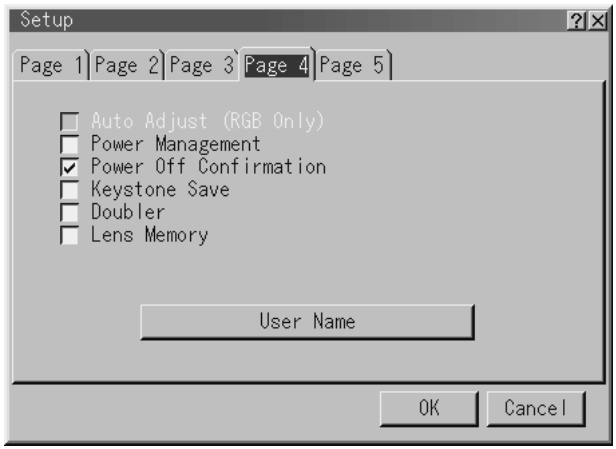
SETUP PAGE 3



Video 1/2 - Allows the manual selection of composite video standards for the Video 1 and Video 2 inputs.

S-Video 1/2 - Allows the manual selection of composite video standards for the S-Video 1 and S-Video 2 inputs.

SETUP PAGE 4



Power Management - This feature automatically turns the projector off if there is no RGB input for over five minutes. Power Management is not active for video signals.

Power Off Confirmation - Determines whether a confirmation dialogue is displayed when turning the projector off.

Keystone Save - Enables the current keystone settings to be saved. The keystone setting is global and affects all sources. It is saved when the projector is switched off.

Doubler (Video/S-Video only) - Sets the double speed interpolation of the video signal
On = Non-Interlaced display
Off = Interlaced display

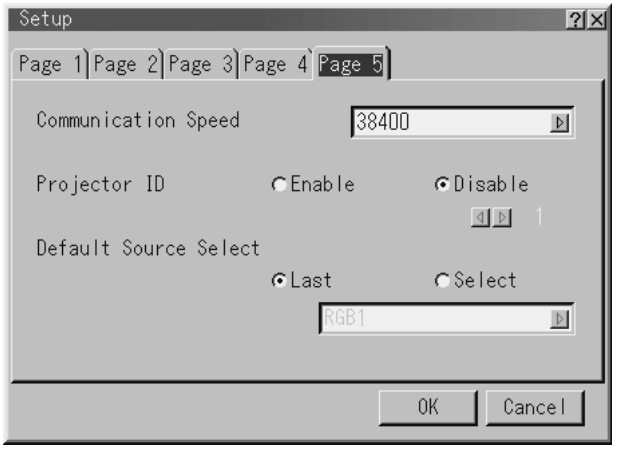
Lens Memory - Applies the stored lens shift, focus and zoom adjustment values to the selected signal.
On - Enables the lens memory function and applies saved settings to the selected signal
Off - Disables the lens memory function so there will be no application of stored lens settings.

Values for lens shift, focus and zoom can be stored regardless of whether or not the lens memory function is enabled.

Lens Memory feature is not available in Link Mode.

User Name - An 18 character user name may be assigned to the projector using the alpha-numeric INPUT keys on the remote control. The cursor keys allow movement through the character entry field. To save the name, press the ENTER button.

SETUP PAGE 5



Communication Speed - Defines the baud rate of the PC CONTROL connector. Select the appropriate rate between 4800 and 38400 according to the equipment connected. The default rate is 38400bps.

Projector ID - Each projector requires a unique address when used in serial communication mode. Up to 64 addresses are available by selecting Enable and then using the spin buttons to change the ID number. To save the setting, select OK.

Default Source Select - The projector can be configured to display either the last input used or a preset input whenever it is turned on.

Link Mode

This feature is used for multiple projector connection using RGB Digital Input/Output connectors.

The master projector is set to Master.
The other slave projectors are set to Slave.
When not using Link mode, set to Standalone.
See page D-4 for setting up for double or stacking in link mode.

Switcher Control

This feature sets the projector for communication with the ISS-6020 Switcher manufactured by NEC.

Standalone - Use the projector in stand alone operation

SW1 Level - Use the projector with one switcher

SW2 Level - Use the projector with two or more switchers

Selections SW1 and SW2 are not available in Link Mode.

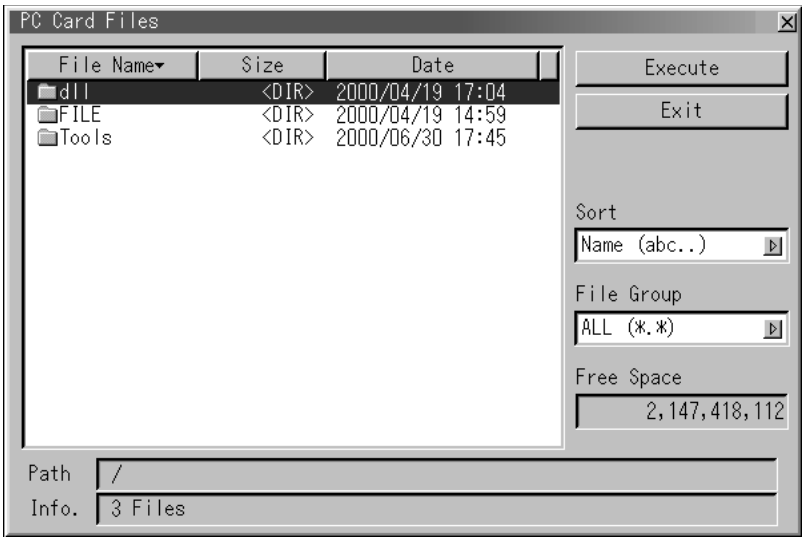
When changing this setting, a confirmation box will appear.

If you want to restart your projector, select Yes, if not select No.

This setting only becomes effective following a restart of the projector.

PC Card Files

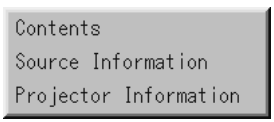
Displays a list of all the files stored in the PC Card so that you can select a file you want to display.
You can also sort files by file name or date, or display the file.



Although the list displays all the files in the PC Card, files can only be displayed in text, HTML, JPEG or BMP format. To display the selected file, select Execute.

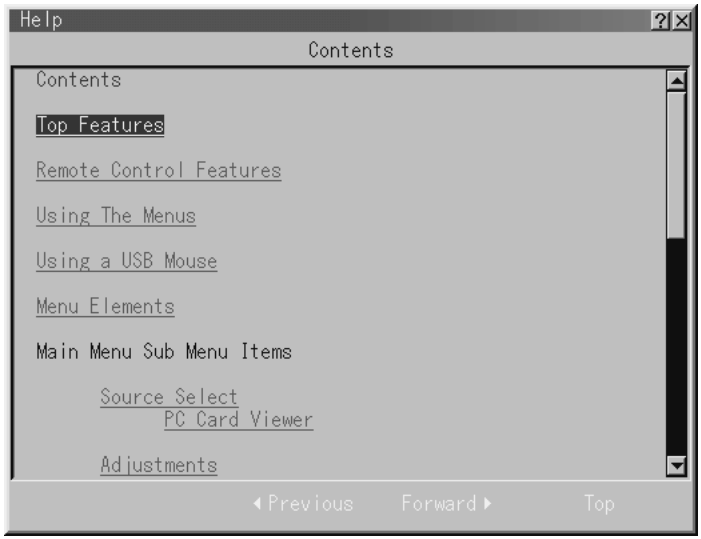
Help

The Help menu provids three option - Contents, Source Information and Projector information.



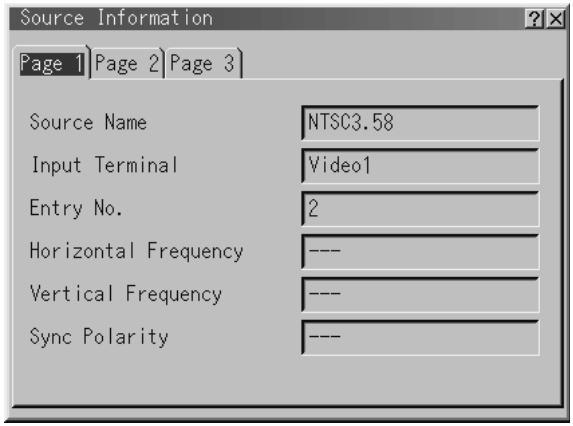
CONTENTS

The Contents option provides a list of functions for which online help is available. Underlined functions provide a direct link to the corresponding item by selecting the option and pressing Enter.



SOURCE INFORMATION

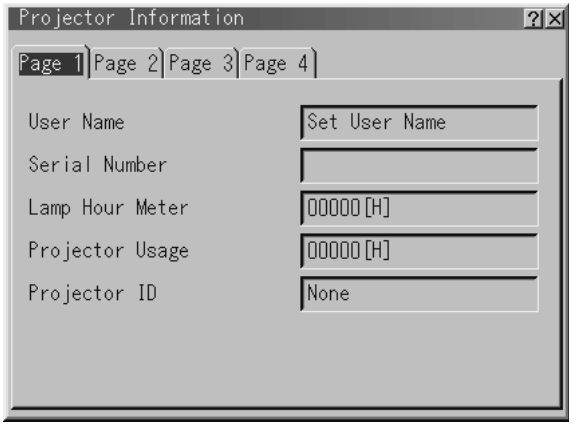
Source information consists of three pages displaying the configuration of the current input signal.



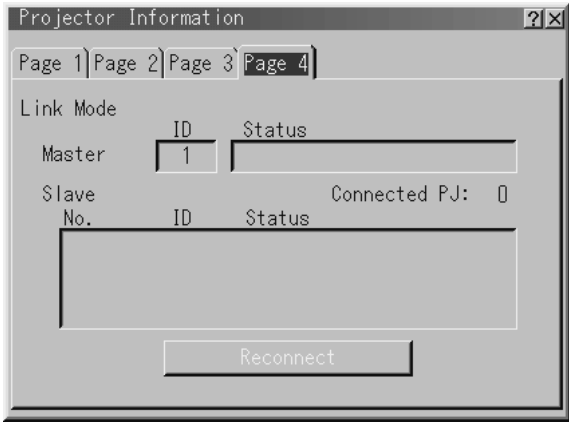
OPERATION

PROJECTOR INFORMATION

Displays information about the projector such as lamp usage, serial number, version number etc. Projector Information provides four pages of information with page four giving Link Mode details.



Page four of Projector Status displays the status of the master projector and linked slave projectors. If more than three slave projectors are connected, the page buttons can be used to display information on up to 16 slave projectors.



Master ID - Displays the ID of the master projector.

Master Status - Shows the status of the master projector.

Connected PJ - Shows the number of slave projectors connected.

Slave Number - Displays the serial number of a slave projector.

Slave ID - Displays the ID of a slave projector.

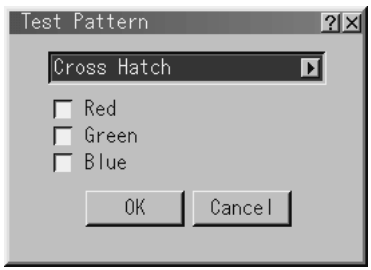
Slave Status - Displays the status of a slave projector.
Running - The projector is operating.
Cooling Lamp - The fan is cooling the lamp.
Standby - The projector is in Standby mode.
Communication Error - A communication error has occured.
Connecting... - The projector is verifying the connection.
Error Standby - An error has caused the projector to enter Standby mode.

Page Buttons - Turns 'pages' to display information on additional slave projectors.

Reconnect - Confirms connection of all linked projectors.

Test Pattern

Five internal Test Patterns are provided to assist with projector setup and alignment. Use the Red, Green and Blue check boxes to turn individual colours on and off.



Cross Hatch - Used during manufacture to align the DMDs this pattern can be useful in the field for overlaying the images in multiple projector stacks.

Grey Bars - Provides a grey scale for adjusting the projector colour balance away from that set during manufacture for applications where a custom balance is required.

Black Raster - Used as the off measurement for calculating the on/off contrast ratio.

Grey Raster - Gives an indication of the on screen luminance level that can be expected when displaying video.

White Raster - Used for measuring projector luminance and for on reading for on/off contrast ratio measurement.

Section D: Advanced User Information

Screen Illuminance

The projector's arc lamp emits a *luminous flux* measured in **lumens**. This flux is directed at the screen and illuminates it, the *illuminance* (E) can be measured in **Lux** (lumens/m2) or **Foot Candles** (lumens/ft^2). The *illuminance* of the screen is calculated by dividing the incident flux by the illuminated screen area.

The brightness of the screen, known as the screen *luminance* (B) is determined by the amount of light reflected from it (or transmitted through it if using a rear projection screen). If the screen is diffuse, the incident light is reflected into a hemisphere. If the screen has a *reflectivity* (R), the screen *luminance* in candela/m^2 is given by (R x E) / π, where E is measured in Lux. If E is measured in Foot-Candles, the screen *luminance* is in Foot-Lamberts, and is given by R x E.

Examples:

1) A 6' x 4' 6" diffuse screen, with a reflectivity of 0.8 is illuminated by a projector emitting 3000 lumens.

The screen illuminance (E) = F / A = 3000 / 27 = 111 Foot-Candles

The screen luminance (B) = R x E = 0.8 x 111 = 89 Foot Lamberts

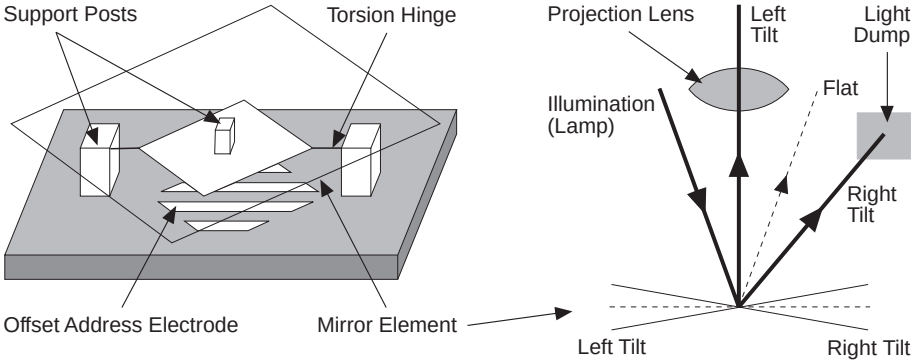
2) A 4m x 3m screen with a reflectivity of 0.85 is illuminated by a projector emitting 3500 lumens.

The screen illuminance (E) = F / A = 3500 / 12 = 292 Lux

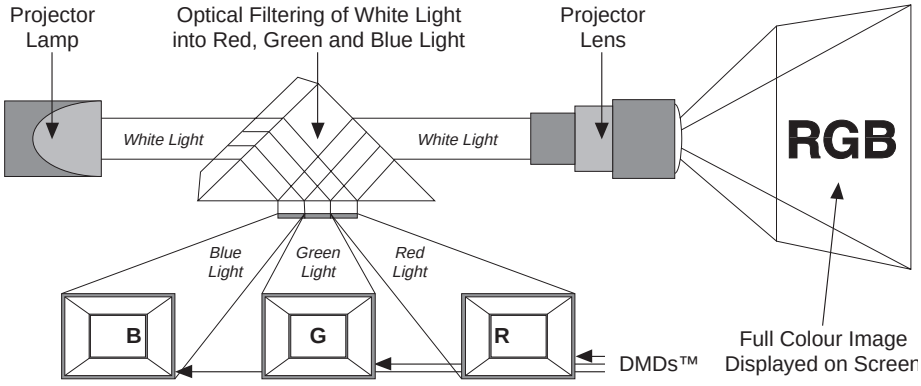
The screen luminance (B) = (R x E) / π = (0.85 x 292) / π = 79 Candela/m^2

DMD™ Operation and Usage

A DMD™ (Digital Micromirror Device™) is a true digital light modulator and utilises 786,432 (gv) or 1,310,720 (sx) moving aluminium mirrors, with each one representing a pixel in the final projected image. Each mirror is suspended over address electrodes by a torsion hinge between two posts. Depending on the voltage polarity applied, each mirror will either tilt to left or to the right. When light is applied to the complete DMD™, only the light redirected from a mirror tilting to the left is projected.



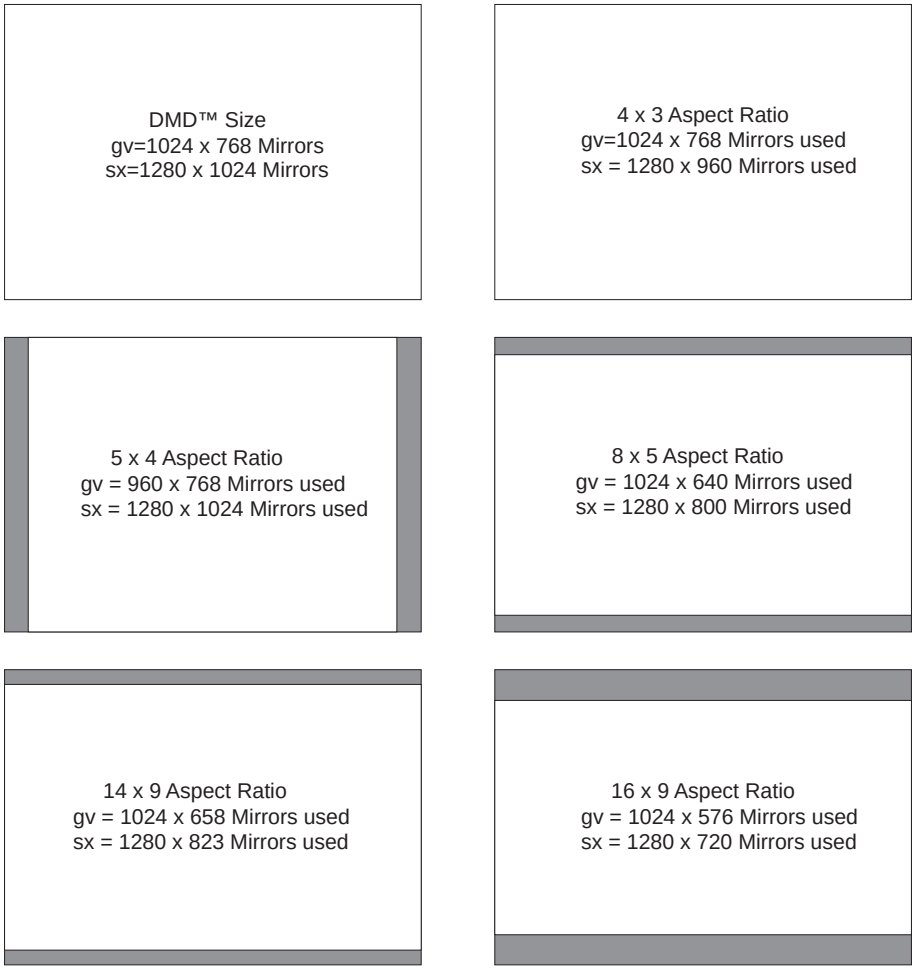
The projector optically filters white light from the lamp into its constituent red, green and blue. Each colour illuminates a separate DMD™ whose modulated output is then recombined with the other two to form the projected full colour image.



DMD & Digital Micromirror Device are trademarks of Texas Instruments Incorporated.

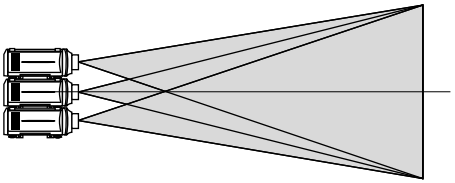
ADVANCED

The mirrors in the DMD™ are arranged in a 1024 x 768 (gv) or 1280 x 1024 (sx) array allowing images of all aspect ratios to be displayed. However, the proportion of DMD™ effectively used will differ depending on the aspect ratio of the image e.g. a 5 x 4 aspect ratio on a 5100gv would only require the use of 960 x 768 mirrors. The diagrams below show the DMD™ usage for each aspect ratio (4 x 3, 5 x 4, 8 x 5, 14 x 9 and 16 x 9) with the shaded areas representing redundant mirrors.

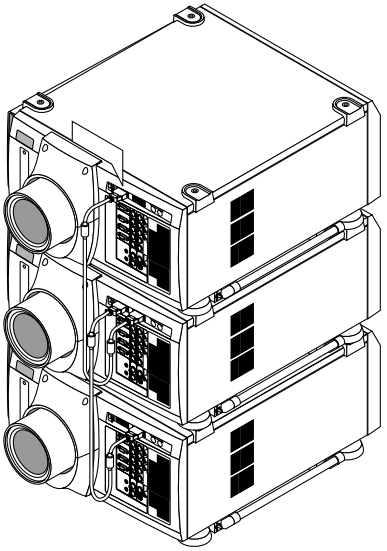


Multiple Projection

Up to three **HIGHlite Displays** projectors can be stacked without any additional framing (gravity stacking). One unit can be stacked on top of the other up to three units. Make sure that each foot is securely seated on the stacking pad.

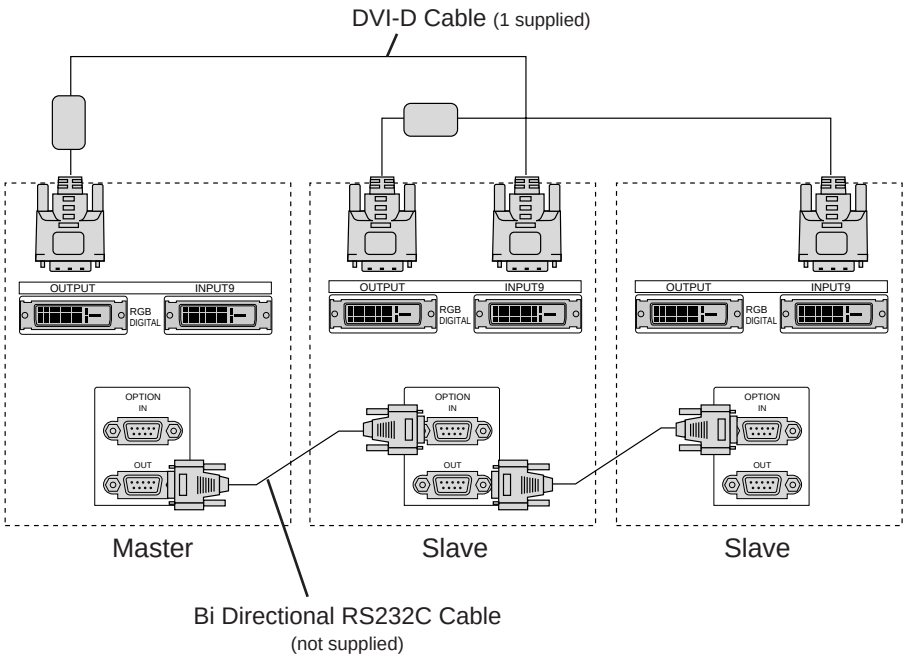


Connection Instructions



To connect multiple projectors use the supplied DVI-D cable to connect the RGB DIGITAL output (INPUT 9) of the master projector to the RGB DIGITAL input of the slave projector (the second and third stack) until all the projectors are connected.

Next, using a commercially available, bi-directional RS-232C cable connect the OPTION OUT terminal of the master projector to the OPTION IN terminal of the slave projector(s) until all the projectors are connected.



OPTICAL AND MECHANICAL ADJUSTMENT

Place the projectors at the proper height for best screen to projector relationship and ensure that all projectors have the same display orientation. Next, turn on all the projectors and display the internal crosshatch test pattern using a different single colour for each projector e.g. turn on green for the master projector, red for the first slave projector and blue of the other second slave projector.

Setting up for Double or Triple Stacking

Adjust the lens shift, zoom and focus to clearly display all projected patterns.

If the vertical alignment of the projector(s) is incorrect, adjust the height of the feet. If there is any keystone distortion, use Keystone adjustment to correct and save the settings on each projector.

SIGNAL DATA PREPARATION

When stacking multiple projectors each projector should be configured to display the input image in exactly the same manner. This requires configuring the master projector for each input signal type, adjusting the image and copying it to the slave projectors using a PC card as follows:

1. Choose one projector to be the master projector and turn it on.

2. Display all the desired input signals adjusting each signal to provide an optimum image and place the master projector in standby mode.

3. Remove the PC Card slot decorative panel and insert a PC card into the slot.

4. Press and hold CANCEL, then press POWER on the rear panel of the master projector. The POWER indicator will change to steady green and the PC Card Access indicator will start flashing. The data will be automatically stored on the PC card and the POWER indicator will change to amber.

5. Remove the PC card from the slot of the master projector. With the slave projector in standby, insert the PC card into the slot of a slave projector.

Since data in the slave projectors will be lost at this time, make backup copies of them before proceeding.

6. Press and hold ENTER, then press MENU on the rear panel of the slave projector. The POWER indicator will change to steady green and the PC Card

Access indicator will start flashing to indicate that the data is being copied from the PC card to the slave projector. After copying data to the slave projector, the POWER indicator will change to amber.

7. If you are triple stacking the projectors copy the data stored on the PC card to the third projector.

8. All the entries in the slave projector Entry List now need to be edited to change the Input Terminal of the signals copied from the master projector to RGB (Digital). This is done by pressing CTL and Enter while displaying the Entry List - the Entry Edit Command window will open allowing the Input Terminal to be changed.

LINK MODE SETTINGS

1. Select Projector ID from the Projector Options sub-menu on each projector and assign a unique ID for each projector.

2. Define the same communication speed (4800 - 38400) for each projector.

3. Select Link Mode from the Projector Options sub-menu on each projector and define the chosen master projector and the rest as slaves.

4. Display an image onto the screen using all projectors and check that the image is displayed correctly while the projectors are in link mode.

5. When a new input source is applied, adjustments to the image from the slave projector(s) may be required (e.g. position, brightness etc.) in order to match those of the Master projector. In order to make any adjustments first change the Master projector from Master to Standalone mode. Next, on the slave projector, select the same signal from the Entry List as that of the master projector. Adjust the displayed image on the slave projectors as required and set the master projector back to Master mode to activate the Link Mode.

6. The Link Mode adjustment procedure is now complete and the desired source can be displayed.

LINK MODE: COMPATIBLE INPUT SIGNALS

All input signals for HIGHlite 4000sx and HIGHlite 6000sx pojectors are compatible with Link Mode up to SXGA 1280 x 1024 @ 75Hz.
The the signals in the table below are supported by HIGHlite 4100gv and HIGHlite 5100gv projectors while in Digital Link mode.

Signal Type	Standard	Resolution	Sync Frequency		Pixel	See
			H (kHz)	V(Hz)	(MHz)	Note
Analogue RGB	VESA XGA@70Hz	1024 x 768	56.6	70	75.0	*1
	VESA XGA@75Hz	1024 x 768	60.0	75	78.8	*1
	VESA VGA@72Hz	640 x 480	37.9	72	31.5	*1 *2
	VESA VGA@75Hz	640 x 480	37.5	75	31.5	*1 *2
	VESA VGA@85Hz	640 x 480	43.3	85	36.0	*1 *2
	VESA SVGA@56Hz	800 x 600	35.1	56	36.0	*1 *2
	VESA SVGA@60Hz	800 x 600	37.9	60	40.0	*1 *2
	VESA SVGA@85Hz	800 x 600	53.7	85	56.3	*1
	VESA XGA@60Hz	1024 x 768	48.4	60	65.0	*1
	VESA XGA@70Hz	1024 x 768	56.6	70	75.0	*1
	VESA XGA@75Hz	1024 x 768	60.0	75	78.8	*1
	APPLE MAC 13”@67Hz	640 x 480	35.0	67	30.2	*1 *2
	APPLE MAC 16”@75Hz	832 x 624	49.7	75	57.3	*1
	IBM VGA-400@70Hz	720 x 400	31.5	70	28.3	*1 *2
	IBM XGA2-768@72Hz	1024 x 768	58.1	72	79.0	*1
Analogue Video Signal	3.58NTSC	-	-		-	-
	BW@60	-	-		-	-
	PAL	-	-		-	-
	SECAM	-	-		-	-
	BW@50	-	-		-	-
Digital RGB	VESA VGA@60Hz	640 x 480	31.5	60	31.5	-
	VESA SVGA@60Hz	800 x 600	37.9	60	40.0	-
	VESA XGA@60Hz	1024 x 768	48.4	60	65.0	-
Digital Serial	SDI 525	-	-		-	-
	SDI 625	-	-		-	-

*1 In link mode the Pixel Clock adjustment range of the slave projectors is narrow. You can only adjust the pixel clock within this range.

*2 Adjust Pixel Phase so that slave projectors are in phase with the master projector.

LIST OF MENU ITEMS AVAILABLE ON LINK MODE (EXPERT MODE)

Menu Item (Expert Mode)			Digital Link	Analog Link
Source Select			L	L
Adjust (Source)	Picture (all items)		L	L
	White Balance		L	L
	Image	Pixel Adjust	L	L
		Position	N	N
		Aspect Ratio	L	L
		Resolution	L	L
		Overscan	L	L
		Video Filter	L	L
		Blanking	N	N
	Video Adj		N	N
	Option Adj		N	N
	Lens Memory		N	N
	Signal Type		N	N
	Switcher		N	N
Ref Adj	Keystone		N	N
	Lamp		N	N
	Ref. White Bal.		N	N
Factory Default			N	N
Projector Options	Timer		L	L
	Menu		M	M
	Setup		N	N
	Link Mode		M	M
	Switcher Control		N	N
Help			M	M
Test Pattern			N	N
Direct Button	LENS SHIFT	Projector	I	I
		Remote Control	N	N
	FOCUS	Projector	I	I
		Remote Control	I	I
	ZOOM	Projector	I	I
		Remote Control	I	I

Menu Item (Expert Mode)			Digital Link	Analog Link
Direct Button	MENU	Projector	L (*1)	L (*1)
		Remote Control	L (*1)	L (*1)
	POWER		L (*2)	L (*2)
	POWER ON		L (*2)	L (*2)
	POWER OFF		L (*2)	L (*2)
	INPUT		L (*1)	L (*1)
	MUTE (PICTURE)		L (*1)	L (*1)
	MUTE (SHUTTER)		L (*1)	L (*1)
	MUTE (OSD)		L (*1)	L (*1)
	AUTO		N (*3)	N (*3)
	TEST		N	N
PC Control	All	No restriction. Comply with the above specification		

Each letter used in the ablove means the following

Letter	Master Projector	Slave Projector(s)
L	Valid	Linked
N	Invalid	Invalid
M	Valid	Invalid
I	Independantly adjustable	Independantly adjustable

*1 - Each adjustment is not possible on the slave projector.

*2 - Each adjustment is possible on the slave projector.

*3 - Auto Adjust in Setup is not possible.

External Hardwired Control via Remote 1 Connector

When used in stand alone operation.

Pin No.	Short/Open				Function
14	Short				External Control Mode ON
	Open				External Control Mode OFF
5	Short				Power ON
	Open				Power OFF
10	Short				Picture Mute ON
	Open				Picture Mute OFF
4,8,11,12	**4**	**8**	**11**	**12**	
	Open	Open	Open	Open	RGB 1 (INPUT 1)
	Short	Open	Open	Open	VIDEO 1 (INPUT 5)
	Open	Short	Open	Open	S-VIDEO 1 (INPUT 7)
	Short	Short	Open	Open	COMPONENT (INPUT 4)
	Open	Open	Open	Short	SDI
	Short	Open	Open	Short	RGB 2 (INPUT 2)
	Open	Short	Open	Short	VIDEO 2 (INPUT 6)
	Short	Short	Open	Short	S-VIDEO 2 (INPUT 8)
	Open	Open	Short	Open	RGB (DIGITAL) (INPUT 9)
	Open	Short	Short	Open	RGB 3 (INPUT 3)

When combinations other than those specified in the above table are selected the input will be forcefully switched to RGB 1.

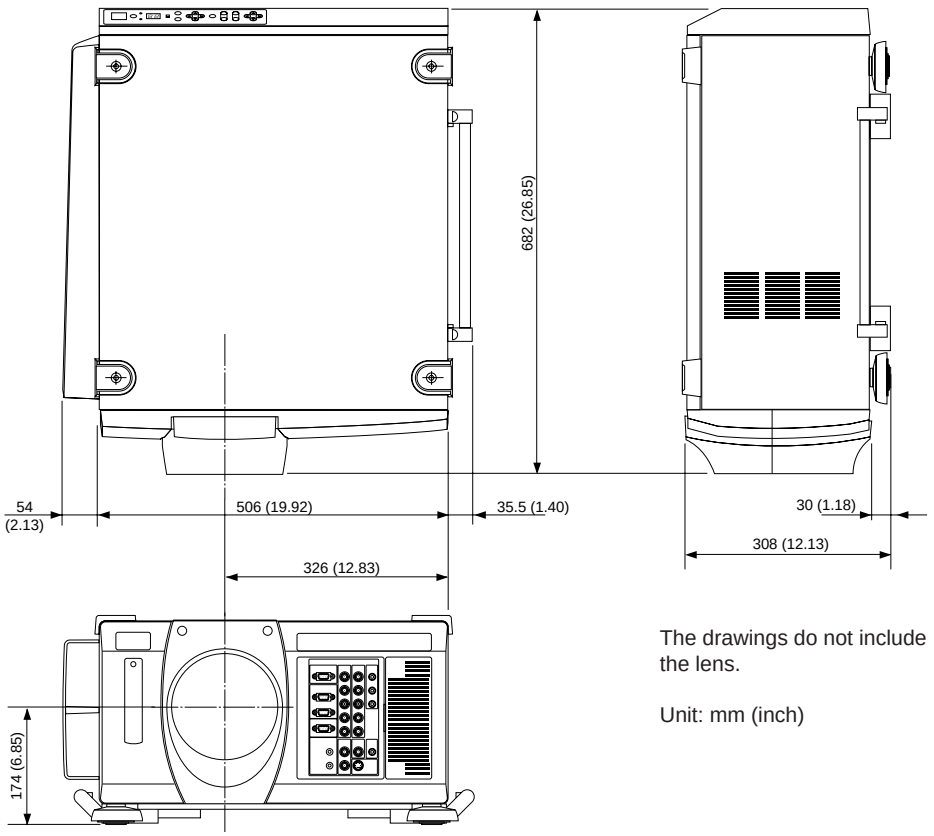
The term 'Short' means to connect to Pin 15.

When in the external control mode, the Power, Input and Picture Mute buttons on the remote control will not function.

Pin 13 is the external remote signal terminal. The projector can be controlled by the same format signal as the supplied remote control from the external controller regardless of the setting on Pin 14.

When turning off the power to the projector using the external control, do not disconnect the plug from the power outlet. These procedures are to protect your projector and the connected equipment.

Projector Dimensions



The drawings do not include the lens.

Unit: mm (inch)

Technical Specification

	4100gv	5100gv	4000sx	6000sx
Lamp Type	Short Arc Xenon Bubble Lamp			
Brightness - High	3,500 (±20%)	5,000 (±10%)	3,500 (±20%)	5,000 (±10%)
(Lumens) - Variable	3,000 (±20%)	4,300 (±10%)	3,000 (±20%)	4,300 (±10%)
Brightness Linearity	>80% Edge to Centre			
Contrast Ratio	400:1 Full Field			

Display Type	3 x DMD™ (one per R, G & B)	
DMD™ Specification	1024 x 768 Pixels	1280 x 1024 Pixels
	16.3µm x 16.3µm Pixel size	13.0µm x 13.0µm Pixel size
	17µm x 17µm Pixel pitch	13.8µm x 13.8µm Pixel pitch
	17.4mm x 13.1 DMD™ size	17.7mm x 14.1 DMD™ size
Fill Factor	90% Pixel fill factor	

Source Compatibility	NTSC, PAL, SECAM, HDTV 1080i, 720p, 480p, VGA, SVGA, XGA, SXGA, MAC & DFP (24P & 24Psf (sx only))
Inputs	RGB/YCr/Pr, Cb/PB (2 x BNC) RGB H/V, HV (1 x D-sub 15 pin) YPbPr/YCrCb (1 x RCA) Video (1 x BNC, 1 x RCA) S-Video (1 x S-Video terminal) Y/C (1 x BNC)
Digital I/O	RGB Digital (1) MDR 20 pin DFP Specification (Max resolution: XGA) (1) Process out 20 pin Serial Digital Input (1) BNC (optional) SMPTE 259M Lvl C, 4:2:2 (or SMPTE 292M 4:2:2 Component (sx)) 525/625 Component (1) BNC loop through
PC Card	PCMCIA Data back-up
Video Processing	ASIC automatic resizing
Sync Formats	Separate Sync/Composite Sync/Sync on Green
Remote Control	Addressable remote control (wired/wireless)
Automation	RS232 9 pin D type contact closure
Switcher	Video Switcher in/out via 15 pin D type

Mounting	Floor Mount (standard) Ceiling Mount LA00198

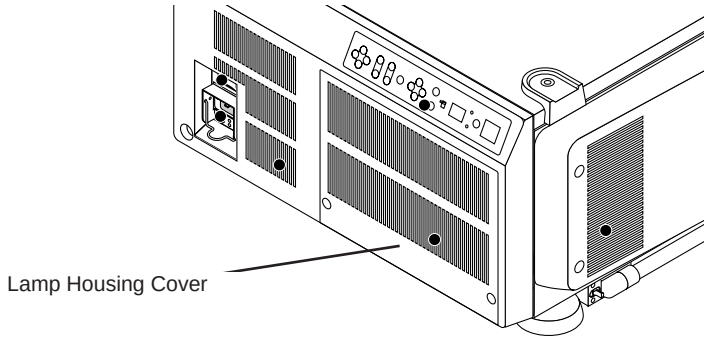
Lens Options	0.84:1 Fixed 1.5 - 2.5:1 Power Zoom/Focus 2.5 - 4.0:1 Power Zoom/Focus 4.0 - 7.0:1 Power Zoom/Focus

Power Requirements	100 - 120 / 200 - 240VAC 50 - 60Hz
Input Current	11A (100 - 120V) 7.3A (200 - 240V)
Power Consumption	1kW (100 - 120V) 1.5kW (200 - 240V)

Operating Temperature	41° to 95°F / 5° to 35°C
Operating Humidity	20% to 80% Non Condensing
Storage Temperature	14° to 122°F / -10° to 50°C
Accoustic Noise	54dB (by JIS 1996)
Physical Dimensions	308mm (12.2”) height 560mm (22.0”) width 682mm (26.9” length
Weight (chassis only)	45 Kg (95lbs)

Section E: Maintenance

Lamp Replacement



Before removing the lamphousing, switch off the lamp and allow the cooling fans to run for three minutes. When the projector is in standby mode (power indicator glows amber) disconnect from the mains supply and wait at least 10 minutes for the projector to cool down. If the lamp has exceeded 1600 hours and the message “LP” is displayed on the 7 segment display, it will be necessary to reset the projectors internal running time by pressing the Help key or Power Off key on the remote control for 10 seconds, then turn on the mains switch.

1. Remove the two screws from the lamp housing cover at the rear of the projector. Remove the cover, locate the Timer PCB at top right of lamp housing and disconnect connector POXP.

2. Unscrew the two captive screws at the bottom left and right hand corners of the lamp housing and gently pull the lamp out of the projector using the handle on the lamp housing.

The lamp housing must be handled with care. If it is dropped from just 10cm the lamp will be defective.

To install a new lamp simply reverse the above procedure.

New lamps are supplied with a fine mesh filter. This filter needs to be fitted under the filter lid at the front of the projector to the right of the input terminals.

Cleaning Procedure

1. Unplug the projector before cleaning.

2. Clean the cabinet periodically with a damp cloth. If heavily soiled, use a mild detergent. Never use strong detergents or solvents such as alcohol or thinner.

3. Use a blower or lens paper to clean the lens, and be careful not to scratch or mark the lens.

Troubleshooting

ERROR MESSAGE	DETAILS	SOLUTION
LAMP USAGE (1) (Display Code = LP)	Operates when the lamp's running time exceeds 1600 hours.	Replace the lamp and the timer printed circuit board. Hold down the POWER OFF key on the remote control for ten seconds to reset the running time, then power on the projector.
LAMP USAGE (2) (L0)	When the lamp's running time exceeds 1500 hours, an on-screen display is presented to suggest that the lamp be replaced.	Replace the lamp and the timer printed circuit board. Power on the projector.
PSPROTECT (A1)	Operates when the power supply is faulty or when there is a power overload or the thermal protection device is activated in the power circuit.	Check all connections, air ducts and power supply output terminals. If all appears in order, replace the power supply unit.
EXTPROTECT (F1)	A temperature of over 65 degrees has been detected at the light engine and the thermal protection device has been activated.	Check all the air ducts. If all appears in order, replace the thermal sensor on the light engine.

ERROR MESSAGE	DETAILS	SOLUTION
LAMP TEMP (F6)	A temperature of over 130 degrees has been detected at the lamp housing and the thermal protection device has been activated.	Check all the air ducts. If all appears in order, replace the lamp housing.
FANSTOP (E0)	Operates when the fan has failed.	Check for 5 volts on pin 3 of P0KA to P0KK on the fan board.If 5 volts is present, the fan is faulty, Replace the fan.
LAMP STATE0 (F5)	Operates when the lamp fails.	Check the connections between the power supply, the igniter and the lamp housing. If OK, replace the lamp or power supply.
TIMER read/write fail (F4)	Occurs when there is a comms error on the lamp timer printed circuit board.	Check the connections from the fan printed circuit board to the timer PCB. If OK, replace the timer PCB.
Reset controller communication fail (b0)	There is a comms error on the TI CPU.	Replace the main PCB.
Sequencer controller communication fail. (b1)	There is a comms error on the TI CPU.	Replace the main PCB.

ERROR MESSAGE	DETAILS	SOLUTION
Red, Green or Blue asic comms fail. (b2) (b3) (b4)	Red, Green or Blue display board drive error.	Check connection between main PCB and engine. If OK replace main PCB.
Red,Green or Blue display board comms fail. (b5) (b6) (b7)	Red, Green or Blue display board drive error.	Check connection between main PCB and engine. If OK replace main PCB.
Reset FPGA download fail. (b8)	Comms error with TI CPU.	Replace main PCB.
Sequencer FPGA download fail. (b9)	Comms error with TI CPU.	Replace main PCB.
Software/prom incompatibility. (bA)	Software incompatibility between TI and PJ.	Check software and hardware versions. Update as necessary.
Software/display board incompatibility. (bb)	Software incompatibility between TI and PJ.	Check software and hardware versions. Update as necessary.
Software/product type incompatibility. (bc)	Software incompatibility between TI and PJ.	Check software and hardware versions. Update as necessary.

Appendix

Glossary

Aspect Ratio
This is the ratio of picture width to picture height (the standard television aspect ratio is 4x3).

Black body
An ideal body or surface that completely absorbs all light falling upon it with no reflection.

Brightness
The light intensity of the displayed image.

Colour Temperature
The Colour Temperature is the position along the black body curve of the chromaticity diagram - but takes into account the preset values for colour balance in the service set-up to take up the variations in the prism.

Composite Signal
A signal line that carries information relating to the entire signal, also incorporating sync pulses.

Contrast
The difference between the dark and light areas of the screen.

DMD™
A Digital Micromirror Device™ is a true digital light modulator. See D—2, DMD™ Usage and Operation for further explanation.

Field
A space on a menu screen for data to be entered.

Horizontal Scan Rate
This is the rate at which the DMD™ is scanning the horizontal lines on the screen. The rate is set by the horizontal sync from the source and measured in Hertz.

Hs + Vs
This stands for Horizontal and Vertical sync.

Hue
The graduation (red/green balance) of colour (applicable to NTSC).

Hz - Hertz
Hertz is a measurement of frequency, where one hertz is one cycle per second.

Interlacing
An interlaced image is displayed by alternatively updating two fields of horizontal display lines to produce a constant image. Field 1 (the odd lines) is updated, then field 2 (the even lines) is updated.

LED
A Light Emitting Diode is an electronic component that emits light.

Lumen
The measurement of luminous flux.

Luminance
Also known as 'Y' this is the part of an S-Video signal which affects the brightness, i.e. the black and white part.

Noise
Electrical interference displayed on the screen.

NTSC- National Television Standards Committee
The United States standard for television - 525 lines of resolution transmitted at 60 interlaced frames per second.

PAL - Phase Alternate Line
The television system used in the UK, Australia and other countries - 625 lines of resolution transmitted at 50 interlaced frames per second.

Resolution
This is expressed as the number of horizontal pixels by the number of vertical lines, e.g. 680 x 400 means 400 lines with 680 pixels per line.

RGB
The Red, Green and Blue inputs from an RGB source.

S-Video
A video signal which has separate Y and C signals.

Throw Distance
The required distance between the screen and the projector.

Y
This is the luminance input (brightness) from an S-Video or component video signal.