



The POWER display range of  
**SUPER-HIGH-BRIGHTNESS DIGITAL VIDEO PROJECTORS**

POWER 2v, POWER 4dv and POWER 5dv

# **USER MANUAL**

Revision E - 28/01/98





## 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 types **POWER 2v**, **POWER 4dv** and **POWER 5dv**

### 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:-

BS EN 50081-1: 1992 EMC Generic Emission Standard for Residential, Commercial and Light Industrial Equipment.

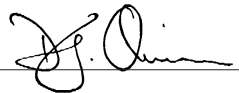
BS EN 50082-1: 1992 EMC Generic Immunity Standard for Residential, Commercial and Light Industrial Equipment.

BS EN 55022: 1995 - Limits and Methods of Measurements of Radio Disturbance Characteristics Information Technology Equipment.

BS EN 60950: 1992 - Specification for Safety of Information Technology Equipment, including Electrical Business Equipment.

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 authorities. The CE mark was first applied in 1997.

Signed: \_\_\_\_\_



Authority: D.J. Quinn, Product Development Director

Date: 29th April 1997

### 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.



# Introduction

## Please read the following before proceeding

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The Digital Projection **POWER displays** are Super-High-Brightness Video Projectors capable of producing images of superb brightness and clarity with the minimum of set-up time and operating support. The User Interface via the On Screen Display, is designed to allow the novice user rapid access to basic projector operation while providing the expert with the ability to tailor the performance to his exact requirements.

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 on pages A—3 and A—4.

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# Outline of Contents

## Section A: Overview

Packaging .....	A—1
Safety Advice .....	A—2
Initial Preparation .....	A—5
Components .....	A—8

## Section B: System Installation

Installation Guidelines .....	B—1
Switching On .....	B—17

## Section C: System Operation

Remote Control - Overview .....	C—1
LED Indicators .....	C—6
Menu Operation .....	C—7
Main Menu - Overview .....	C—11
Channel Set-up Function .....	C—13
Image Mode .....	C—28
User Preferences .....	C—29
Test Patterns .....	C—31
Projector Status .....	C—33
Set Projector Address .....	C—35
Add Computer .....	C—36
Applying a New Signal Source .....	C—42
Adjusting the Displayed Image .....	C—45
Addressing Multiple Projectors .....	C—48

**Section C: System Operation**

Computer Control.....	C—49
Switcher Operation.....	C—54

**Section D: Advanced User Information**

Screen Illuminance .....	D—1
DMD™ Operation and Usage .....	D—2
Operation Flowcharts.....	D—4
Lenses .....	D—14
Technical Specification .....	D—44

**Section E: Fault Finding & Maintenance**

Trouble Shooting .....	E—1
Maintenance .....	E—4

**Appendix**

Quick Set-up Reference.....	i
Menu System Review .....	iii
Glossary.....	vi



## Section A: Overview

Packaging .....	A—1
Projector Packaging .....	A—1
Lens Packaging .....	A—1
Safety Advice .....	A—2
Compliance with Regulatory Bodies .....	A—2
Safety Warnings.....	A—3
Initial Preparation .....	A—5
Pre-Installation Check .....	A—5
Remote Control Unit - Battery Installation .....	A—6
Remote Receiver.....	A—7
Components .....	A—8
Projector Case .....	A—8
LED Indicators .....	A—9
Arc Lamp .....	A—9
Optics .....	A—10
Lenses.....	A—10
Electronics .....	A—11
Digital Micromirror Devices™ .....	A—11
Analogue Input Board .....	A—12
Power Supplies .....	A—13
Cooling System .....	A—13
Air Filters.....	A—14

**Components**

**Remote Control .....A—14**  
**Remote Receiver .....A—15**

## Packaging

### Projector Packaging

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To provide protection during transportation, the projector is surrounded with foam, placed on a wooden palette and enclosed within a sturdy fibreboard carton. The package is then secured with banding and fastening clips.

To unpack the projector, first release the two fastening clips and remove the banding. Next, using the finger holes provided, gently lift off the outer cover of the carton. **Do not open the tape seal on the top of the cover.**

Lift out the carton containing the peripheral equipment and place to one side, then remove the two sections of protective foam.

Due to the projector's weight, four people are required to lift the projector, one at each corner using the finger grips on the underside. The purchaser is reminded to use good practice in lifting the projector to avoid risk of back injury.

All packaging should be retained to provide maximum protection during future shipping of the projector. To repack the projector, reverse the above procedure.

Contained within the packaging will be:

1 x <b>POWER display</b> Projector	1 x Remote Control Unit
1 x AC Power Cable	1 x User Manual
4 x Projector Mounting Feet	

Should any of the above components be absent, please contact the dealer who supplied the projector, or Digital Projection Limited (Digital Projection Inc. if in North America) immediately.

### Lens Packaging

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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

### Compliance with Regulatory Bodies

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The **POWER 2v**, **POWER 4dv** and **POWER 5dv** have been built to comply with IEC950 and UL 1950, the International safety standards for information technology and electrical business equipment. These standards impose stringent safety requirements on the construction and operation to prevent energy hazards, access to live parts and the risk of electric shock. The safety standards also provide regulations on internal and external temperature increases, radiation levels, mechanical stability and strength, enclosure construction and fire protection.

The **POWER 2v**, **POWER 4dv** and **POWER 5dv** have been tested and found to comply with the limits for a class A digital device, pursuant with Part 15 of the Federal Communication Commission rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be responsible for correcting any interference.

## Safety Warnings



All the safety warning in this manual are in bold italic type and can be identified by the symbol shown on the left.

A list containing all the warnings is given below. It is recommended that time is taken to study these before installing or operating the projector.

*The customer should never attempt to disassemble the lamp from its housing or to dispose of it other than by returning it to Digital Projection.*

*The condenser system is precisely aligned in the factory and no attempt should be made by the customer to adjust it.*

*Only use lenses specified in this manual or recommended by Digital Projection.*

*High Voltage, Danger of Death - the arc lamp power supply has a 30kV strike pulse mechanism, which is active during lamp switch-on.*

*Do not move or tamper with any seals or ducting panels on the projector or the air flow could be disrupted and cause the projector to overheat. Always keep the air inlets and outlets clear of any obstruction.*

*If the Air Filters are not regularly replaced the air flow inside the projector could be disrupted and cause overheating. Overheating may lead to the projector shutting down during operation*

*The projector should never, under any circumstances, be mounted or operated upside down or at an angle greater than 90° from horizontal.*

*Never mount the projector near air conditioning or heating ducts, electrical wiring or any materials which could be affected by the projector's operational heat i.e. polystyrene ceiling tiles etc.*

*The projector is designed to be lifted using the finger grips on the base. Do not attempt to lift the projector by holding the front or side covers.*

*Care should be taken when attaching the projector feet so that the projector does not rest on its feet at an angle.*

*Never operate the projector with the cover removed, the arc lamp power supply has a 30kV strike pulse mechanism, which is active during lamp switch-on.*

*NEVER look into the lamp housing, or attempt to remove the lamp from its housing when the lamp is on.*

*Before attempting to remove any of the projector's covers, you must turn off the projector and disconnect from the mains supply.*

## **OTHER IMPORTANT SAFETY CONSIDERATIONS**

*In order to ensure that correct internal airflows are maintained, and that the projector complies with Electro-Magnetic Compatibility requirements, it should always be operated with all of its covers in place.*

*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.*

*The projector must always be mounted in a manner which ensures free flow of air into its air inlets and unimpeded evacuation of the hot air exhausted from its cooling system. The air exit duct at the top of the projector can become hot during operation and should not be touched by the operator. Heat sensitive materials should not be placed in the path of the exhausted air.*

*Do not move or tamper with any seals or ducting panels on the projector or the air flow could be disrupted and cause the projector to overheat. Always keep the air inlets and outlets clear of any obstruction.*

## Initial Preparation

### Pre-Installation Check

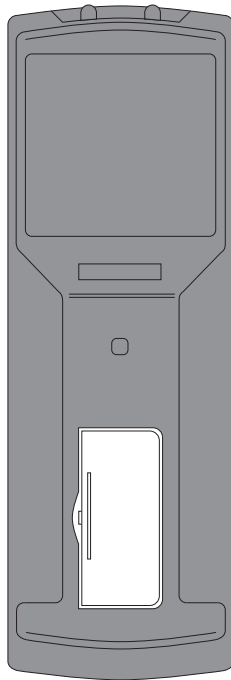
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Before mounting the projector in its intended location, the following pre-installation routine must be performed:

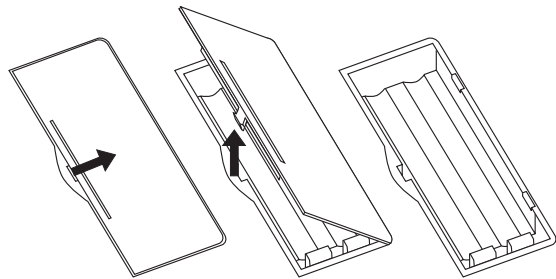
1. Install the projector lens.
2. Ensure all the air flow inlet and outlet ducts are clear from obstruction.
3. Insert the power cord securely into the socket on the rear panel of the projector and connect to an appropriate mains supply (refer to the specification label at the rear of projector).
4. Switch on the projector and wait for approximately 30 seconds.
5. Check air is flowing out of the exit ducts on the top and left hand side of the projector.
6. With the screen or a wall illuminated, confirm the Menu System is operational by pressing OSD ON then MENU on remote control (a main menu should be clearly visible).
7. Turn the lamp off by depressing the LAMP OFF button on the remote control for two seconds.
8. Power down the projector and disconnect from the mains supply.
9. Continue with the system installation.

## Remote Control Unit - Battery Installation

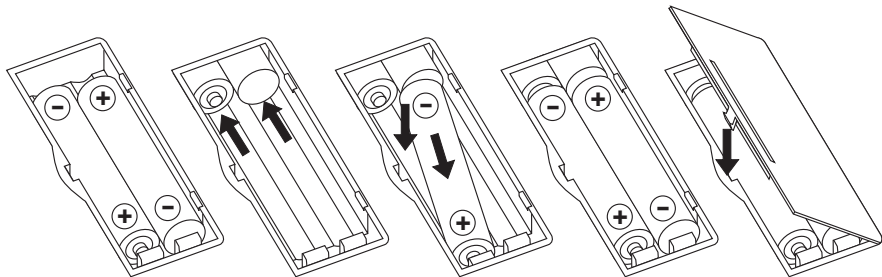
The Remote Control Unit can be powered by 4 AAA (HP16/RO3/LR03) alkaline batteries or by direct connection to the projector via a remote receiver.



The battery compartment is located on the back of the Remote Control. To remove the compartment cover, insert a finger-nail into the recess provided to the right of the cover and push to the right. While pushing to the right, lift out the left hand side of the cover.



Insert the first two new batteries as shown below and slide them to the back of the compartment. Insert the remaining two batteries by pivoting them against the electrical contacts and pushing down into place.



When the batteries are securely in place, replace the cover by aligning the stays on the right hand side and pushing down the left hand side until it 'clicks' into place.



## Remote Receiver

The optional remote receiver acts as a relay between the remote control and the projector and is useful for installations where the Infra Red signal from the remote cannot reach the sensors on the projector.

The Infra Red signals from the remote control are picked up by the IR receiver on the front of the remote receiver and are relayed to the projector via the 15 way high density 'D' style connector on the underside of the unit.

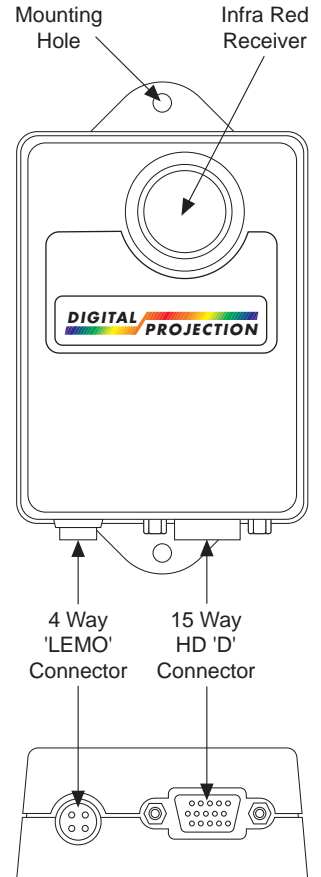
The remote receiver also allows direct cabling (hard wiring) of the remote control unit via a 4 way 'LEMO' connector. When used in this way, the remote control does not require batteries and the IR receiver on the remote receiver is disabled.

Hard wiring has the advantage of allowing control of the projector from a greater distance: The cable from the remote control to the remote receiver can be up to 10m (33ft) in length and the cable connecting the remote receiver to the projector can be up to 60m (200ft) long.



***When hard wiring, the remote control unit must be connected to the remote receiver before the remote receiver is connected to the projector. If the connections are not made in this order the remote receiver fuse will trip and the remote receiver will have to be disconnected for approximately one minute before reconnecting in the correct manner.***

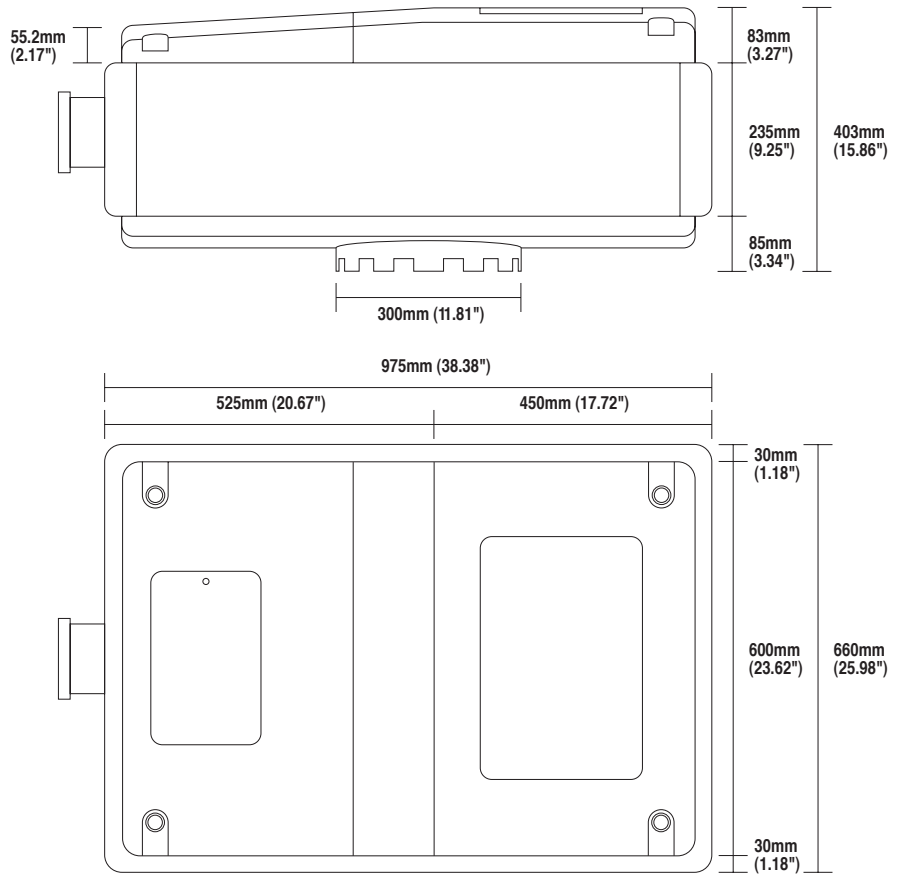
For further information on remote receiver wiring, see Cables and Connections, D—39.



## Components

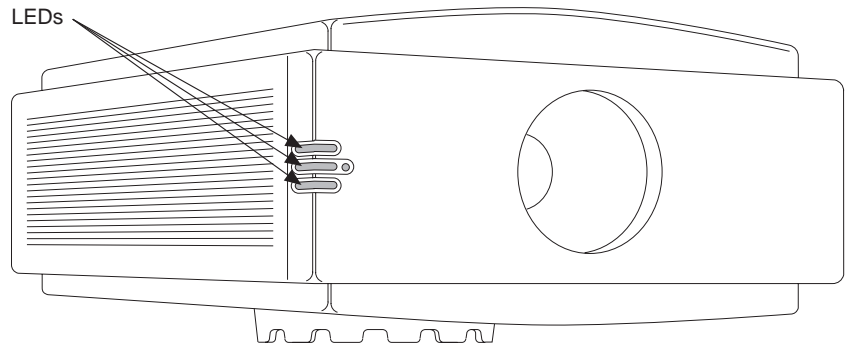
### Projector Case

The projector case has an aluminium die cast chassis with rigid corner posts and cross members to support the side and top covers. The integral mounting plate provides for easy mounting onto a table, stand or cradle.



## LED Indicators

There are 3 Light Emitting Diodes (top - red, middle - green, bottom - red) at the front of the case which indicate the status of the projector. The top red LED is used to indicate that power is applied to the projector and that it is turned on. The middle green LED indicates normal operation and flashes when the projector is receiving a signal from the remote control unit. The bottom red LED indicates that the lamp has failed. For further information see System Operation, C—6.



## Arc Lamp

The projector uses a specialised, high pressure xenon arc lamp designed to operate in conjunction with Digital Projection's optical condenser system and specialised power supply unit. The lamp achieves maximum brightness immediately following strike and is designed for an operating life of greater than 750 hours.

The operator is advised where possible to switch off the lamp using the 'LAMP OFF' button on the remote control, and allow the cooling system to run on for two minutes before switching off the mains supply.

The lamp is contained in a special safety housing to dissipate heat and to make changing the lamp as easy as possible (see Fault Finding and Maintenance, E—6).



***The customer should never attempt to disassemble the lamp from its housing or to dispose of it other than by returning it to Digital Projection.***

## Optics

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The lamp faces downwards onto a 'cold mirror' which directs the light beam into a condenser. A prism then splits the concentrated beam from the condenser into red, green and blue light using dichroic filters and directs the light onto separate DMDs™. The images produced by the three DMDs™ are then combined by the prism to form a full colour image and directed into the lens for projection.



*The condenser is precisely aligned in the factory. If it is moved there could be a reduction in light output and image display quality.*

## Lenses

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There are seven lenses available for the **POWER display** projectors which cater for all foreseen user requirements. The lenses are identified by their ratio of 'Throw Distance' to screen width, where 'Throw Distance' is the distance the projector must be positioned from the screen to display an optimum image (see B—4, Positioning the Projector).

At present, there are four fixed ratio lenses available for the projector (1.27:1, 3:1, 5:1 and 7:1), two zoom lenses; 1.5:1 to 3:1 and 3:1 to 7:1 respectively and an SVGA Ultra Wide Angle lens.



*1.27:1 is the accurate ratio for the lens marked as 1.2 and this ratio should be used for any calculations.*

The lens required will be dependant on the size of the screen, the 'Throw Distance' available and the aspect ratios of the images to be displayed. If unsure which lens would best suit your requirements, consult your dealer.



*Only use lenses specified in this manual or recommended by Digital Projection.*

## Electronics

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The main electronic components of the projector are the Analogue Input Board, Digital Processing Card, Formatter Card and the three Display Boards (each of which contains a Digital Micromirror Device™).

The Analogue Input Board, situated at the rear of the projector, converts analogue inputs to digital signals and routes them to the digital processing card.

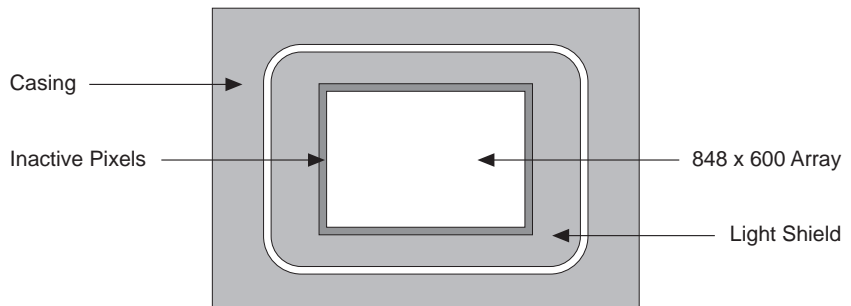
The Digital Processing Card stores the channel configurations and any on screen adjustments such as brightness, contrast etc. These settings are applied to the incoming signal for transfer to the Formatter Card.

The Formatter Card translates the digital signal into a format that the Digital Micromirror Devices™ can read.

## Digital Micromirror Devices™

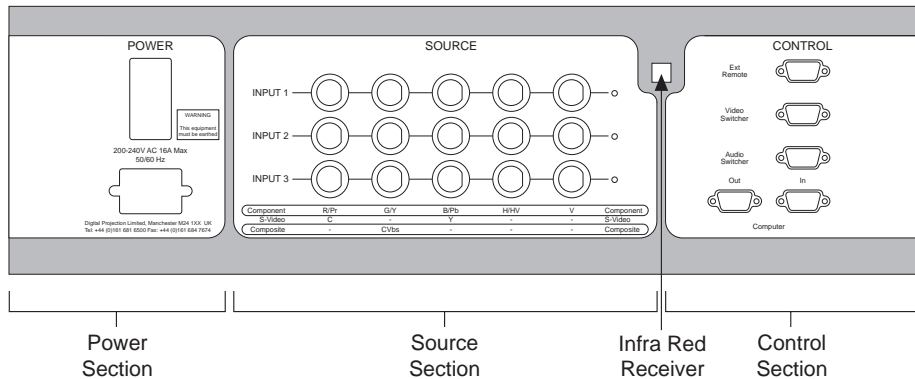
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A Digital Micromirror Device™ (DMD™) is a digital light modulator fabricated from moving aluminum mirrors. Each mirror, which acts as a pixel, is suspended between two posts by a thin torsion hinge and can be tilted to the left to produce a bright pixel or to the right for a dark pixel. There are three DMDs™ in the projector, one for each of the primary colours, each containing 508,800 mirrors arranged in a 848 x 600 array.



## Analogue Input Board

The Analogue Input Board located at the rear of the projector provides all the required connections for video, computer, audio and remote control inputs. The input board is split in three main sections - Power, Source and Control (see below).



### POWER

**Mains Input** - For connection of 200 - 240 V ac 50 - 60 Hz.

**Circuit Breaker (On/Off Control)** - Combined on/off switch and circuit isolator (in case of system overload).

### SOURCE

**Inputs 1, 2, 3** - Each of these inputs can be configured for different signal sources. RGB, Hs Vs and Hs+Vs are used with a computer input, Composite/G is used with a composite signal (such as NTSC), C and Y (S-VIDEO) are used with a VHS video player and Y Pr Pb are used with Betacam or component sources.

**Select LED's** - The input card LED's indicate which input should be used with the current channel. If the projector cannot find a valid signal, the LED flashes.

## CONTROL

**Ext Remote** - Input providing direct connection with the remote receiver.

**Video Switcher** - Control input and output for video switcher configurations.

**Audio Switcher** - *Future Feature, when available this connection will permit the control of a third party 3 channel audio switcher.*

**Computer (In/Out)** - Provides data input and output ports for computer control and for daisy chain connector to multiple projectors.

## Power supplies

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The General Power Supply provides a range of low voltage rails to the electronics. The Xenon Arc Lamp has a separate high current power supply.



***High Voltage, Danger of Death - the arc lamp power supply has a 30kV strike pulse mechanism, which is active during lamp switch-on.***

## Cooling System

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During normal operation considerable heat is generated inside the projector, therefore, an air cooling system is provided. This consists of a powerful fan which draws cool air through specially designed air ducts within the case to distribute it over the lamp and other components. The cooling system provides maximum cooling whilst minimising noise output.



***Do not move or tamper with any seals or ducting panels on the projector or the air flow could be disrupted and cause the projector to overheat. Always keep the air inlets and outlets clear of any obstruction.***

## Air Filters

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There are 5 air filters in the **POWER 4dv** and **POWER 2v** projectors, one in each side cover and three underneath. The **POWER 5dv** has only the 3 air filters underneath. All filters must be regularly checked and replaced in order to prevent the projector from overheating.

Air filters are supplied in complete sets and it is recommended that they are replaced at least every 3 months. All filters can be replaced without the need for special tools and complete instructions are given on pages E—4 and E—5 of this manual.



*If the Air Filters are not regularly replaced the air flow inside the projector could be disrupted and cause overheating. Overheating may lead to the projector shutting down during operation*

## Remote Control

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All the functions of the **POWER display** are controlled from the remote control, which can be connected via a remote receiver to the projector. When connected via the remote receiver, it simultaneously powers the control unit, lights the remote controls back panel and relays commands back to the projector.

To allow the operator more flexibility the remote control can be operated by four AAA batteries, producing infra-red signals which are detected by sensors located at the front and rear of the projector. The remote control unit is designed to transmit command signals to the projector from a maximum distance of 80m (266ft).



*The presence of very bright fluorescent lighting or Infra Red translation systems may saturate the projectors Infra Red receivers.*



## Remote Receiver

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The optional remote receiver is used to pick-up infra-red signals from the remote control unit and relay them to the projector. and also provides a 'hard wire' interface between the remote control and the projector.

The remote receiver is a small 75mm x 100mm x 25mm (3" x 4" x 1") matt black box with mounting lugs on each end and an infra red sensor on the front. On the underside there are 2 connection points:- a 15 way high density 'D' style connector for the projector and a 4 way 'LEMO' connector for the remote control (refer to A—7 and D—39 for more information).



## Section B: System Installation

Installation Guidelines .....	B—1
Screen Requirements .....	B—1
Positioning the Projector .....	B—4
Mounting the Projector .....	B—12
Optional Mounting Frames .....	B—15
Switching On.....	B—17
Signal Sources.....	B—17
Turning On the Lamp .....	B—20
Picture Display .....	B—20
Storing System Configurations .....	B—22



## 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.

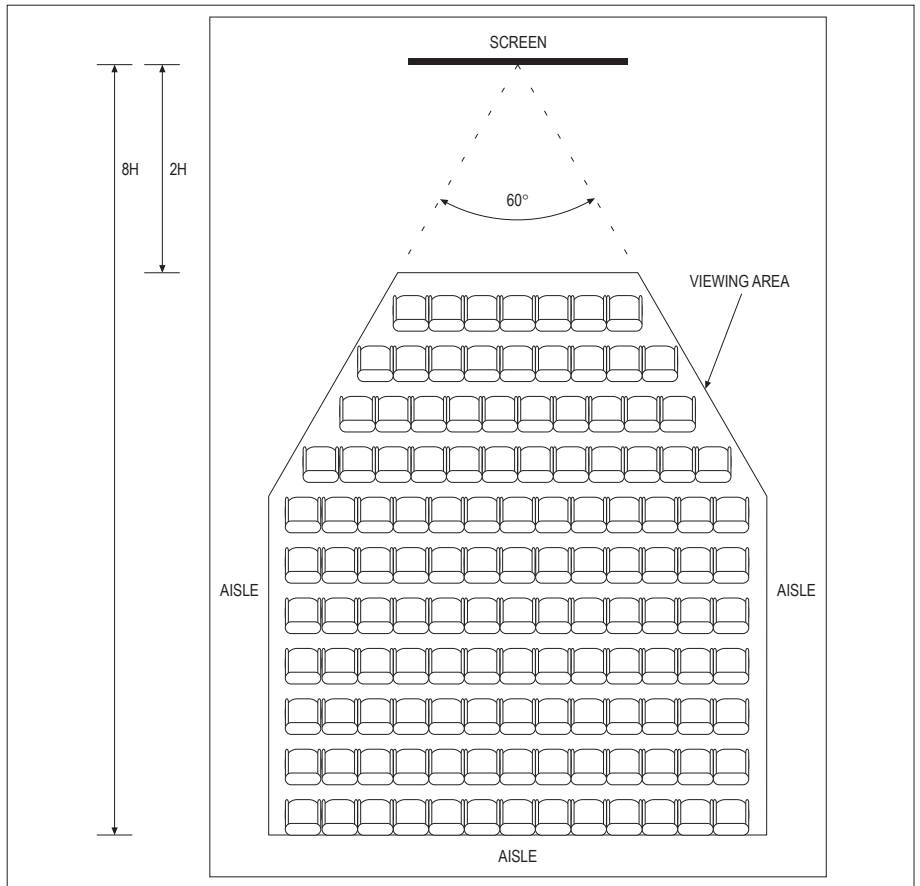
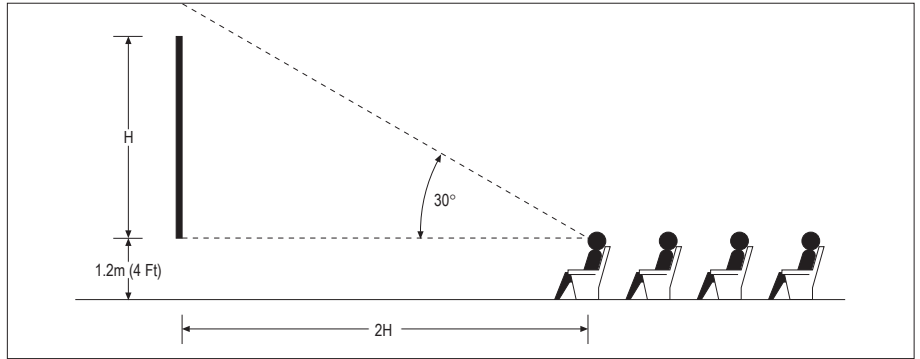
Screen Width (metres)	Screen Height (metres) Needed to Display Full Image with Aspect Ratio:				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
2.40	1.80	1.92	1.5	1.54	1.35
3.00	2.25	2.40	1.87	1.93	1.69
3.60	2.70	2.88	2.25	2.31	2.02
4.20	3.15	3.36	2.62	2.70	2.36
4.80	3.60	3.84	3.00	3.09	2.70
6.00	4.50	4.80	3.75	3.86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

Screen Width (feet)	Screen Height (feet/inches) Needed to Display Full Image with Aspect Ratio:				
	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 (see B—4). 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 using the Image Mode Menu (see system operation, C—28) 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.



## 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.



*The projector should never, under any circumstances, be operated upside down or at an angle greater than 90° from horizontal.*

### PROJECTOR HEIGHT

The default height for positioning the projector is at the centre of your screen. However, depending on your lens specification, you can set the projector above or below the centre and adjust the image using the rising front facility to maintain a geometrically correct image.

### THROW DISTANCE - FIXED RATIO LENSES

It is important to position the projector at the right distance from the screen. This 'Throw Distance' is measured from the front of the projector case to the front of the screen and is calculated by taking into account your screen width, the type of lens used, and the aspect ratio you intend to display.

If you intend to display images with different aspect ratios, it is recommended that you position the projector at a distance from the screen which will allow you to project images at the maximum aspect ratio. Failure to do so could result in larger aspect ratio images exceeding the height and/or width of your screen. Refer to D—3 for more information on aspect ratios.



## THROW DISTANCE - ZOOM LENSES

When using a zoom lens, exact positioning of the projector less important because the image size can be adjusted. However, the projector must be located within the Throw Distance range imposed by the minimum and maximum lens ratios and the focus range of the lens.

If you intend to display images with different aspect ratios, it is recommended that you define your own Throw Distance range from the ranges given for each Aspect Ratio. To define the minimum value for your range, you must select the **highest** minimum value from the ranges given for each aspect ratio you wish to display. To define the maximum value for your range, you must select the **lowest** maximum value from the appropriate ranges.

## CALCULATING THE THROW DISTANCE

To calculate the distance between the screen and the front of the projector case select your lens type from the following pages and use the tables provided. If your screen size is not listed in these tables or included in the lens tables in Section D, you will need to calculate the distance required using the following formula:-

$$\text{Distance Required} = (W + A) \times (C \div B)$$

Where W = Screen Width and A,B and C are constants from the tables below.

Lens	A	B
1.27 Fixed	-0.0037	0.8140
3.0 Fixed	0.0034	0.3520
5.0 Fixed	-0.0269	0.2097
7.0 Fixed	-0.0286	0.1497
1.5 - 3.0 Zoom at 1.5 position	0.0280	0.6807
1.5 - 3.0 Zoom at 3.0 position	0.0082	0.3532
3.0 - 7.0 Zoom at 3.0 position	-0.0175	0.3545
3.0 - 7.0 Zoom at 7.0 position	-0.0253	0.1418
SVGA Ultra Wide Angle	0.0467	0.9909

Aspect Ratio	C
4 x 3	1.06
5 x 4	1.1307
8 x 5	1.0
14 x 9	1.0
16 x 9	1.0

**1.27 : 1 LENS**

Please ensure you have completely read and understood the Positioning the Projector overview given on pages B—4 and B—5 before proceeding.

To calculate the distance in metres required between the screen and the front of the projector case select your screen width from the following table and the aspect ratios of the images you intend to display.

THROW DISTANCE (IN METRES) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (metres)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
2.40	3.22	3.42	3.04	3.04	3.04
3.00	4.02	4.27	3.80	3.80	3.80
3.60	4.82	5.13	4.56	4.56	4.56
4.20	5.63	5.98	5.32	5.32	5.32
4.80	6.43	6.83	6.08	6.08	6.08
6.00	8.04	8.54	7.61	7.61	7.61

To calculate the distance in feet required between the screen and the front of the projector case use the following table.

THROW DISTANCE (IN FEET) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (feet)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
8.0	10.41	11.11	9.82	9.82	9.82
10.0	13.02	13.89	12.28	12.28	12.28
12.0	15.62	16.66	14.74	14.74	14.74
14.0	18.23	19.44	17.19	17.19	17.19
16.0	20.83	22.22	19.65	19.65	19.65
20.0	26.04	27.78	24.57	24.57	24.57

If your screen width is not included in the above tables refer to lenses, D—15.



*Installers should allow for up to 75mm (3 inches) of projected image width adjustment to account for lens tolerances.*

### 3 : 1 LENS

Please ensure you have completely read and understood the Positioning the Projector overview given on pages B—4 and B—5 before proceeding.

To calculate the distance in metres required between the screen and the front of the projector case select your screen width from the following table and the aspect ratios of the images you intend to display.

THROW DISTANCE (IN METRES) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (metres)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
2.40	7.24	7.72	6.83	6.83	6.83
3.00	9.04	9.65	8.53	8.53	8.53
3.60	10.85	11.57	10.24	10.24	10.24
4.20	12.66	13.50	11.94	11.94	11.94
4.80	14.46	15.43	13.65	13.65	13.65
6.00	18.08	19.28	17.06	17.06	17.06

To calculate the distance in feet required between the screen and the front of the projector case use the following table.

THROW DISTANCE (IN FEET) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (feet)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
8.0	24.10	25.71	22.74	22.74	22.74
10.0	30.12	32.13	28.42	28.42	28.42
12.0	36.15	38.56	34.10	34.10	34.10
14.0	42.17	44.98	39.78	39.78	39.78
16.0	48.19	51.40	45.46	45.46	45.46
20.0	60.24	64.25	56.83	56.83	56.83

If your screen width is not included in the above tables refer to lenses, D—18.



*Installers should allow for up to 75mm (3 inches) of projected image width adjustment to account for lens tolerances.*

## 5 : 1 LENS

Please ensure you have completely read and understood the Positioning the Projector overview given on pages B—4 and B—5 before proceeding.

To calculate the distance in metres required between the screen and the front of the projector case select your screen width from the following table and the aspect ratios of the images you intend to display.

THROW DISTANCE (IN METRES) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (metres)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
2.40	12.00	12.80	11.32	11.32	11.32
3.00	15.03	16.03	14.18	14.18	14.18
3.60	18.06	19.27	17.04	17.04	17.04
4.20	21.09	22.50	19.90	19.90	19.90
4.80	24.13	25.74	22.76	22.76	22.76
6.00	30.19	32.21	28.48	28.48	28.48

To calculate the distance in feet required between the screen and the front of the projector case use the following table.

THROW DISTANCE (IN FEET) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (feet)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
8.0	40.30	42.99	38.02	38.02	38.02
10.0	50.41	53.77	47.56	47.56	47.56
12.0	60.52	64.56	57.10	57.10	57.10
14.0	70.63	75.34	66.63	66.63	66.63
16.0	80.74	86.12	76.17	76.17	76.17
20.0	100.96	107.69	95.25	95.25	95.25

If your screen width is not included in the above tables refer to lenses, D—21.



*Installers should allow for up to 75mm (3 inches) of projected image width adjustment to account for lens tolerances.*

## 7 : 1 LENS

Please ensure you have completely read and understood the Positioning the Projector overview given on pages B—4 and B—5 before proceeding.

To calculate the distance in metres required between the screen and the front of the projector case select your screen width from the following table and the aspect ratios of the images you intend to display.

THROW DISTANCE (IN METRES) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (metres)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
2.40	16.79	17.91	15.84	15.84	15.84
3.00	21.04	22.44	19.85	19.85	19.85
3.60	25.29	26.97	23.86	23.86	23.86
4.20	29.54	31.51	27.87	27.87	27.87
4.80	33.79	36.04	31.87	31.87	31.87
6.00	42.28	45.10	39.89	39.89	39.89

To calculate the distance in feet required between the screen and the front of the projector case use the following table.

THROW DISTANCE (IN FEET) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (feet)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
8.0	56.44	60.21	53.25	53.25	53.25
10.0	70.61	75.31	66.61	66.61	66.61
12.0	84.77	90.42	79.97	79.97	79.97
14.0	98.93	105.52	93.33	93.33	93.33
16.0	113.09	120.63	106.69	106.69	106.69
20.0	141.41	150.84	133.41	133.41	133.41

If your screen width is not included in the above tables refer to lenses, D—24.



*Installers should allow for up to 75mm (3 inches) of projected image width adjustment to account for lens tolerances.*

### 1.5-3 : 1 ZOOM LENS

Please ensure you have completely read and understood the Positioning the Projector overview given on pages B—4 and B—5 before proceeding.

To calculate which Throw Distance ranges (in metres) are applicable to your installation, select your screen width from the following table and the aspect ratios of the images you intend to display.

THROW DISTANCE (IN METRES) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (metres)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
2.40	3.78 - 7.23	4.03 - 7.71	3.57 - 6.82	3.57 - 6.82	3.57 - 6.82
3.00	4.72 - 9.03	5.03 - 9.63	4.45 - 8.52	4.45 - 8.52	4.45 - 8.52
3.60	5.65 - 10.83	6.03 - 11.55	5.33 - 10.22	5.33 - 10.22	5.33 - 10.22
4.20	6.58 - 12.63	7.02 - 13.47	6.21 - 11.91	6.21 - 11.91	6.21 - 11.91
4.80	7.52 - 14.43	8.02 - 15.39	7.09 - 13.61	7.09 - 13.61	7.09 - 13.61
6.00	9.39 - 18.03	10.01 - 19.23	8.86 - 17.01	8.86 - 17.01	8.86 - 17.01

To calculate the Throw Distance ranges (in feet) required between the screen and the front of the projector case use the following table.

THROW DISTANCE (IN FEET) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (feet)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
8.0	12.50 - 24.03	13.33 - 25.64	11.79 - 22.67	11.79 - 22.67	11.79 - 22.67
10.0	15.62 - 35.04	16.66 - 32.04	14.73 - 28.34	14.73 - 28.34	14.73 - 28.34
12.0	18.73 - 36.04	19.98 - 38.44	17.67 - 34.00	17.67 - 34.00	17.67 - 34.00
14.0	21.84 - 42.04	23.30 - 44.84	20.61 - 39.66	20.61 - 39.66	20.61 - 39.66
16.0	24.94 - 48.04	26.62 - 51.25	23.55 - 45.32	23.55 - 45.32	23.55 - 45.32
20.0	31.19 - 60.05	33.27 - 64.05	29.42 - 56.65	29.42 - 56.65	29.42 - 56.65

If your screen width is not included in the above tables refer to lenses, D—27.



*Installers should allow for up to 75mm (3 inches) of projected image width adjustment to account for lens tolerances.*

### 3-7 : 1 ZOOM LENS

Please ensure you have completely read and understood the Positioning the Projector overview given on pages B—4 and B—5 before proceeding.

To calculate which Throw Distance ranges (in metres) are applicable to your installation, select your screen width from the following table and the aspect ratios of the images you intend to display.

THROW DISTANCE (IN METRES) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (metres)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
2.40	7.12 - 17.00	7.60 - 18.13	6.72 - 16.03	6.72 - 16.03	6.72 - 16.03
3.00	8.92 - 21.29	9.51 - 22.71	8.41 - 20.09	8.41 - 20.09	8.41 - 20.09
3.60	10.71 - 25.59	11.43 - 27.29	10.11 - 24.14	10.11 - 24.14	10.11 - 24.14
4.20	12.51 - 29.88	13.34 - 31.87	11.80 - 28.19	11.80 - 28.19	11.80 - 28.19
4.80	14.30 - 34.17	15.25 - 36.45	13.49 - 32.24	13.49 - 32.24	13.49 - 32.24
6.00	17.89 - 42.76	19.08 - 45.61	16.88 - 40.34	16.88 - 40.34	16.88 - 40.34

To calculate the Throw Distance ranges (in feet) required between the screen and the front of the projector case use the following table.

THROW DISTANCE (IN FEET) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (feet)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
8.0	23.87 - 57.08	25.46 - 60.88	22.52 - 53.85	22.52 - 53.85	22.52 - 53.85
10.0	29.85 - 71.39	31.84 - 76.15	28.18 - 67.35	28.18 - 67.35	28.18 - 67.35
12.0	35.83 - 85.71	38.12 - 91.42	33.80 - 80.86	33.80 - 80.86	33.80 - 80.86
14.0	41.81 - 100.02	44.60 - 106.69	39.44 - 94.36	39.44 - 94.36	39.44 - 94.36
16.0	47.79 - 114.34	20.98 - 121.96	45.08 - 107.86	45.08 - 107.86	45.08 - 107.86
20.0	59.75 - 142.97	63.73 - 152.20	56.37 - 134.87	56.37 - 134.87	56.37 - 134.87

If your screen width is not included in the above tables refer to lenses, D—33.



*Installers should allow for up to 75mm (3 inches) of projected image width adjustment to account for lens tolerances.*

## SVGA ULTRA WIDE ANGLE LENS

Please ensure you have completely read and understood the Positioning the Projector overview given on pages B—4 and B—5 before proceeding.

To calculate which Throw Distance ranges (in metres) are applicable to your installation, select your screen width from the following table and the aspect ratios of the images you intend to display.

THROW DISTANCE (IN METRES) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (metres)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
2.40	2.62	2.79	2.47	2.47	2.47
3.00	3.26	3.48	3.07	3.07	3.07
3.60	3.90	4.16	3.68	3.68	3.68
4.20	4.54	4.85	4.29	4.29	4.29
4.80	5.18	5.53	4.89	4.89	4.89
6.00	6.47	6.90	6.10	6.10	6.10

To calculate the Throw Distance ranges (in feet) required between the screen and the front of the projector case use the following table.

THROW DISTANCE (IN FEET) REQUIRED TO DISPLAY FULL IMAGE					
Screen Width (feet)	4 x 3 Aspect Ratio	5 x 4 Aspect Ratio	8 x 5 Aspect Ratio	14 x 9 Aspect Ratio	16 x 9 Aspect Ratio
8.0	8.61	9.18	8.12	8.12	8.12
10.0	10.75	11.46	10.14	10.14	10.14
12.0	12.89	13.75	12.16	12.16	12.16
14.0	15.03	16.03	14.18	14.18	14.18
16.0	17.17	18.31	16.19	16.19	16.19
20.0	21.44	22.87	20.23	20.23	20.23

If your screen width is not included in the above tables refer to lenses, D—39.



*Installers should allow for up to 75mm (3 inches) of projected image width adjustment to account for lens tolerances.*



## Mounting the Projector

Now that you know the distance from the screen that the projector must be located you can decide on which type of mounting will best suit your requirements. The easiest method of mounting is to rest the projector on a desk or table directly in front of the display screen. If you intend to use this method, make sure that the desk or table is strong enough to support the projector's weight of 90kg safely.



*Never mount the projector near air conditioning or heating ducts, electrical wiring or any materials which could be affected by the projector's operational heat i.e. polystyrene ceiling tiles etc. The projector should never, under any circumstances, be operated upside down or at an angle greater than 90° from horizontal.*

For safe movement of the projector, at least 4 people are required, one at each corner using the finger recesses provided on the underside of the projector case. Avoid handling the projector by the front lens cover as it is removable.



*The projector is designed to be lifted using the finger grips on the base. Do not attempt to lift the projector by holding the front or side covers.*

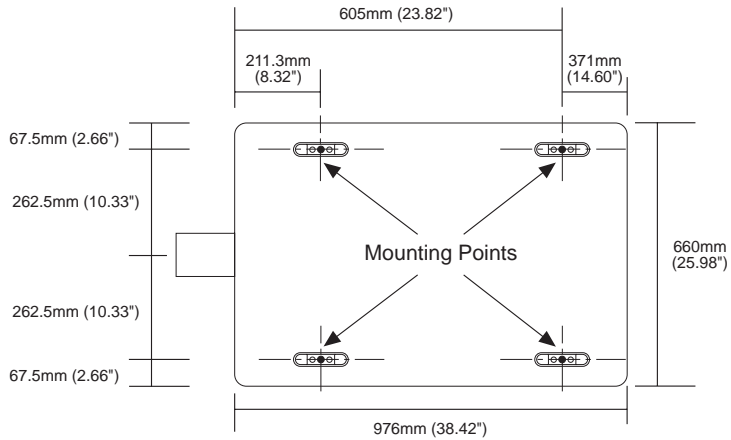
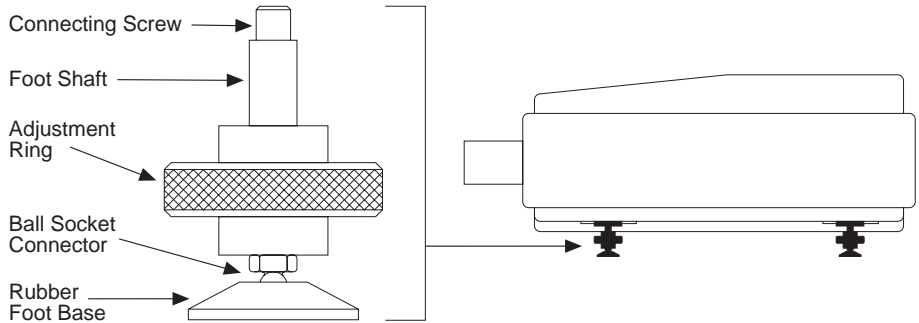
### MOUNTING FEET

There are four mounting points located in recesses on the underside of the projector for the attachment of the mounting feet (supplied) and all four must be attached to the projector. A rubber base is provided for insertion into each foot which in turn is screwed into the mounting points and tightened using a spanner on the flats of the foot shaft.



*Care should be taken when attaching the projector feet so that the projector does not rest on its feet at an angle.*

The mounting points are also used to attach the projector to all types of optional mounting frames available from Digital Projection (see B—15).



When all four feet have been attached, the projector can be levelled using the black adjustment rings on each foot which allow 25mm (1 inch) of movement. The rubber foot base incorporates a ball socket connector which will form to an uneven surface to assist in mounting.



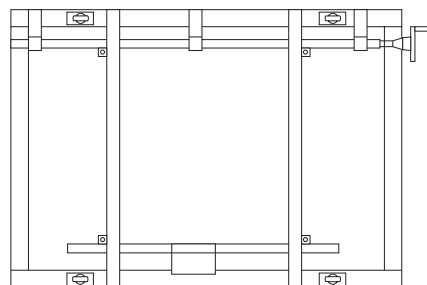
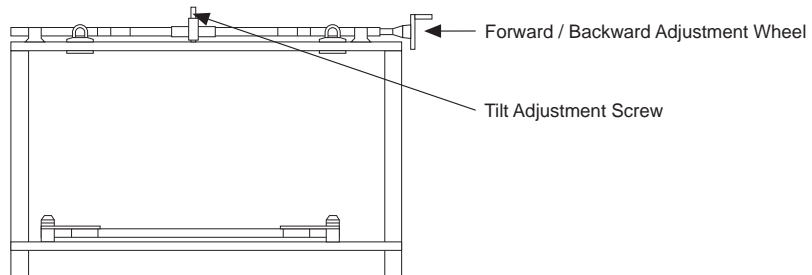
*Although the adjustment rings on the projector feet will allow the slight raising or lowering of the front of the projector, it is recommended that projector is made level and the lens tilt feature is used to perform this function.*

## Optional Mounting Frames

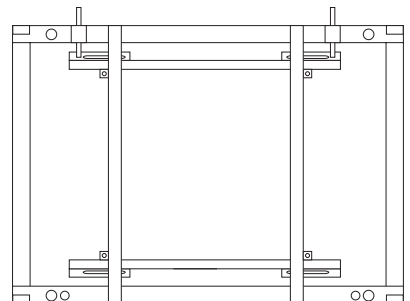
### STACKING FRAME

The stacking frame allows two projectors to be mounted, one above the other, in order to increase the brightness of the displayed image. Use of the projectors in this way requires precise sizing and positioning of both images. Therefore, the stacking frame provides positioning facilities which, when used in conjunction with the image adjustment features of the projectors, allows the images produced to coincide exactly on the screen.

On the lower mounting there are two rails, one at the front and one at the back, which slide the projector to the left or right. As these rails operate independantly, they can also be used to rotate the projector. A forward and backward positioning wheel is provided on the upper mounting which allows the magnification of the image from the top projector to be adjusted relative to the lens throw distance. A vertical adjustment screw is also provided on the left hand side of the upper mounting to adjust the projector tilt.



Top Mounting Frame



Lower Mounting Frame

### **FLYING FRAME**

The flying frame is intended for fixed ceiling installations and incorporates four tabs - one beside each projector mounting block. These tabs extend outwith the width of the projector to allow the connection of threaded rods or rigging wires.

### **RIGGING FRAME**

The rigging frame incorporates a lift beam to allow the attachment of a scaffolding clamp. In order to attach the projector to the rigging frame there are four clamp blocks with U bolts on the underside of the frame. The U bolts must be removed in order to connect the clamp blocks to the projector foot blocks and then re-attached.



*For further information on any of the above mounting frames, please refer to the documentation supplied with your frame.*

## Switching On

First of all, connect the video signal input source to the Analogue Input Board at the back of the projector (refer to Signal Sources for details on different sources and how to connect them). Then plug the projector into the mains supply and switch it on (using the on/off switch at the back of the projector). Switch on the video source. The projector will select the first valid signal it finds, working from inputs 1 to 3, and display the image using the Factory Default parameters. The quality of the image can be adjusted using the remote buttons. Refer to Adjusting the displayed Image (System Operation, C—45) for further information.



***Never operate the projector with the cover removed and always switch off the mains supply and disconnect the plug before removing the cover.***

If the screen is light blue, check that the video source is connected to the correct input, e.g. if it is a one lead composite source, then it should be plugged into the Composite/G input.

After initial power-up, you can define how the projector will subsequently start-up by using the User Preferences Menu (see System Operation, C—29).

## Signal Sources

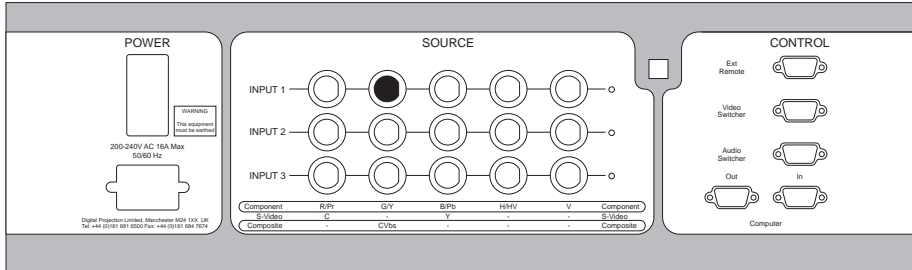
The projector accepts composite, S-Video, Y Pr Pb and RGB input signals. These signals constitute most of the video and computer formats available. The analogue input board at the back of the projector provides three rows of 5 input ports. Each row can be configured to accept any of the given signal types by using a different port combination. The provision of three rows (inputs 1, 2 and 3) allows three signal types to be connected at any one time.



***The correct port combination must be used in order to display the image.***

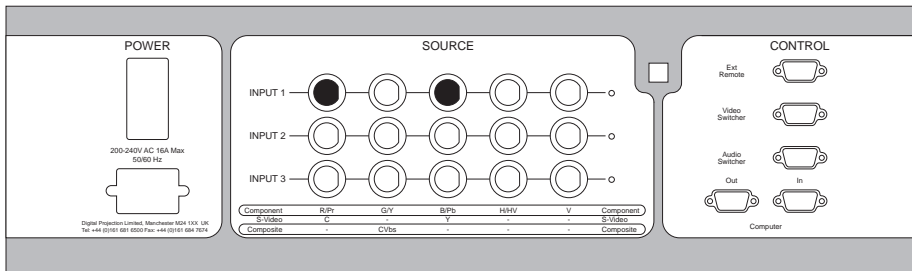
### COMPOSITE SIGNALS

PAL, SECAM (Europe and Australia) and NTSC (US and Japan) signals, are composite video formats used by televisions and VCRs. They are connected by one lead to the COMPOSITE/G port in the source section on the rear panel.



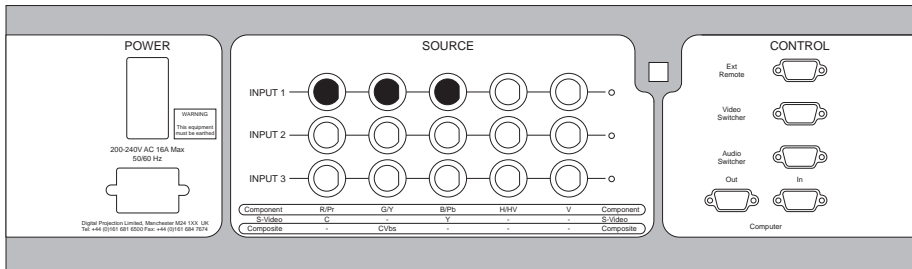
### S-VIDEO SIGNALS

VCRs and most video cameras produce an S-Video format. They are connected to the projector ports Y and C.



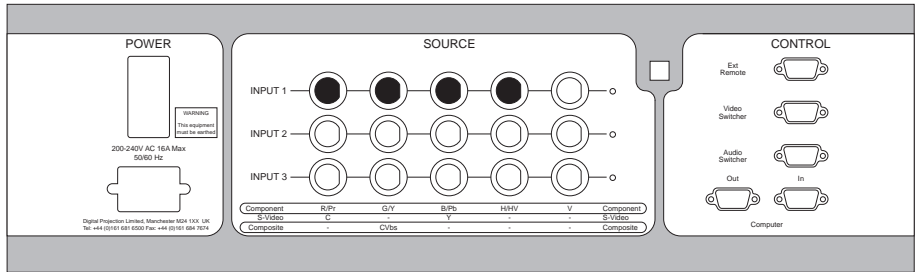
### Y Pr Pb SIGNALS

A Betacam signal requires connection to the Y, Pr and Pb ports.



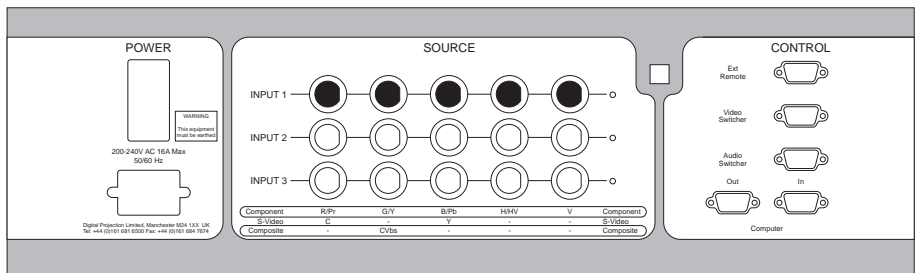
### COMPONENT VIDEO SIGNALS WITH SEPARATE SYNC

When using a component video input which has a separate sync, and the sync is composite (combined horizontal and vertical), the connections are as shown below.

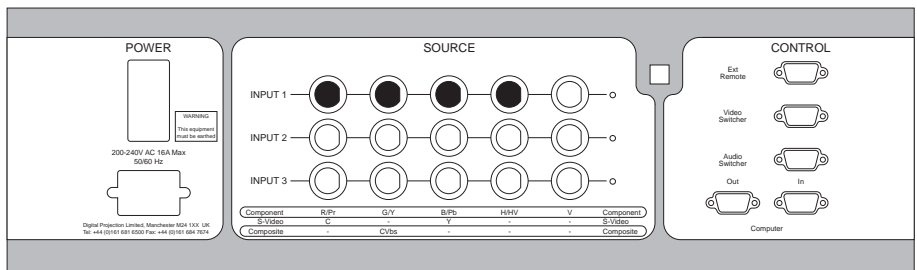


### RGB Hs+Vs AND RGB Hs Vs SIGNALS

Computer signals are separated into R, G and B with either separate or combined horizontal and vertical syncs (Hs Vs or Hs+Vs). SVGA compatible computers, such as IBM compatible PCs, have separate syncs and should be connected as follows.



Apple Macintosh (series II) computers output a combined sync and therefore have one connection less than an SVGA computer. The R, G, B and combined horizontal and vertical syncs are connected as shown below.



INSTALLATION

## Turning On the Lamp

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The lamp should light up within 25 seconds of the projector being turned on. If it has not lit, the bottom red LED at the front of the case will glow constantly and the projector should be turned off and back on again.



*Never look into the lamp housing or the lens, or attempt to remove the lamp from its housing when the projector is on.*

## Picture Display

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The picture display can be controlled using the PIC MUTE button on the remote control. When muted the screen goes blank (with the shutter option included, PIC MUTE will provide additional blackout by removing any stray light that may fall onto the screen).

When unmuted the video image is displayed on screen and the lamp is set to either HIGH or LOW depending on the last selection made with the lamp power buttons.

The Picture Display can be set in the User Preferences menu for the next time the projector is switched on (see System Operation, C—29).

## IMAGE CONTROL

The image parameters determine how a picture looks on screen and are adjusted by using the remote control or the on-screen Modify menu. Adjustable parameters include Brightness, Contrast, Sharpness, Saturation, Hue, Size, Position, Pixel number, Pixel phase and Colour Temperature.

To adjust a parameter using the remote control, first press the appropriate command button then use the  $\uparrow$ ,  $\Rightarrow$  buttons to increase and the  $\downarrow$ ,  $\Leftarrow$  buttons to decrease the value (see System Operation, C—1). If the cursor buttons are not pressed within ten seconds, the function will be deactivated. If a second function is selected before the ten seconds have elapsed, the new function will be applied instead.





*The Image Parameter controls on the remote can be used in the Menu system providing that no data fields are being edited.*

The adjusted parameter settings for an input device can be saved to a 'channel'. A channel setting also stores the input source address (see storing system configurations, B—22, for more information). This allows you to use the input device at a later date without having to reconfigure the parameters to achieve the desired image. The channel is selected in the Channel Set-up menu or by using the remote. The source image is then displayed on screen.

## LENS CONTROL

Projectors fitted with a motorised lens mount have additional picture control features available via the remote control in the form of Focus and Lens Shift. Both features are operated via the LENS button (see System Operation, C—4) and allow the user to either adjust the image Focus and/or adjust the horizontal and vertical positioning of the displayed image relative to the projector.

## ON SCREEN DISPLAY (OSD)

The On Screen Display (OSD) displays the system menus and messages. The OSD will come on automatically at power-up if it is preset in User Preferences Menu. Alternatively it can be activated by the OSD ON remote control button.

## MENU SYSTEM

The main menu provides access to dialogue boxes which allow you to control the projector and to view system settings. If the OSD is set or switched to 'OFF' the menu system and messages will not be displayed on screen.

## Storing System Configurations

---

A Channel is a 'store' containing all of the parameters associated with an input and the image it displays. The projector has 63 available channels.

In addition to the channels there are three further 'stores'. They are the **Previous Store**, **Revised Store** and **Factory Pre-set**. These three stores are accessed directly from the remote using the PREV (previous store), REV (revised store) and >< (factory pre-set) buttons.

When a channel has just been selected or the factory pre-set is being used, the parameters are held in the previous store. If any changes are then made to the channel or the pre-set, they are held in the revised store.

At any point PREV and REV can be pressed to compare the original image with the revised image. Any final changes can be saved by pressing SAVE on the remote which will transfer the contents of the Revised store to the last channel selected.



*To clear changes held in the Revised store re-select the original channel using the numeric keypad on the remote control.*

The factory pre-set contains configuration parameters which cannot be altered, however changes can be made and stored in a new channel using the Channel Set-up menu. There is a pre-set for a computer input and one for a video input. The pre-set will produce an image but not necessarily of the ultimate quality. The quality can be improved using the Modify Command. The factory pre-set channel number is 0 (zero).



*To find out which channel is currently being used, press MENU and select Channel Set-up. The current channel will be highlighted in the channel list.*

## Section C: System Operation

Remote Control - Overview .....	C—1
LED Indicators .....	C—6
Menu Operation .....	C—7
Dialogue Boxes .....	C—8
Check boxes .....	C—8
Flyout Lists .....	C—9
Soft Buttons .....	C—9
Data Entry Fields .....	C—10
Information Windows .....	C—10
Password .....	C—10
Main Menu - Overview .....	C—11
Channel Set-up .....	C—13
Select Command .....	C—15
View Command .....	C—16
Copy Command .....	C—17
New Command .....	C—19
Modify Command .....	C—21
Delete Command .....	C—27
Image Mode .....	C—28
User Preferences .....	C—29

Test Patterns .....	C—31
Projector Status.....	C—33
Set Projector Address .....	C—35
Add Computer.....	C—36
Create/Modify Command .....	C—37
Delete Command .....	C—39
Copy Command .....	C—41
Applying a New Signal Source.....	C—42
Pixel Noise on Computer Images .....	C—42
Configuring a Computer Channel.....	C—43
Configuring a Video Channel .....	C—44
Adjusting the Displayed Image.....	C—45
Addressing Multiple Projectors.....	C—48
Computer Control.....	C—49
Switcher Operation .....	C—54

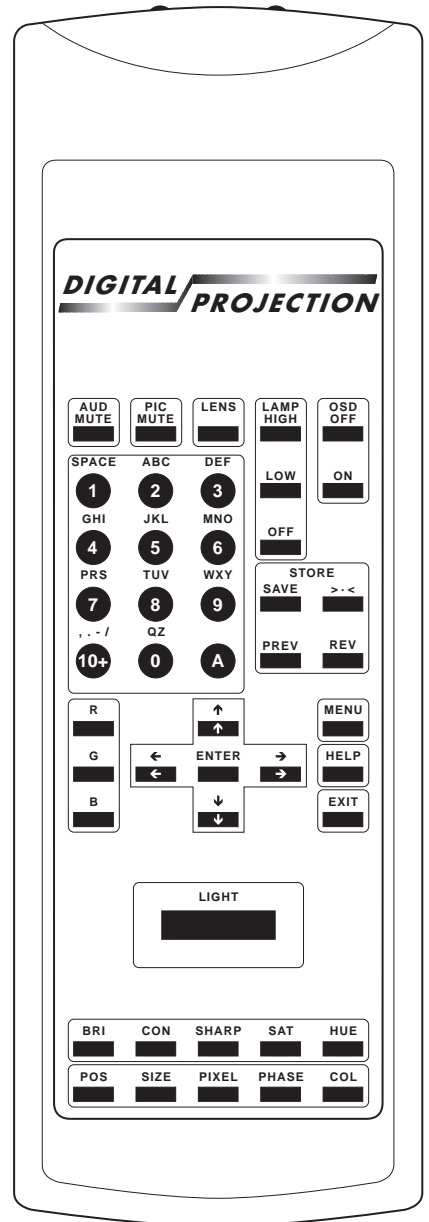
## Remote Control - Overview








The remote control is an integral part of the projector, take care not to lose or damage it, as it is the only means of selecting channels, adjusting parameters and navigating through the menu systems.






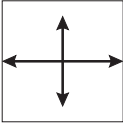
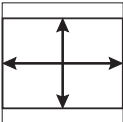
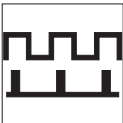
As projector operation will frequently take place in a darkened room, the remote has a built in back-light which illuminates the control panel. If the remote control is cable connected via the remote receiver to the projector this light will be constantly illuminated allowing you to locate the buttons required. When battery operated, pressing 'LIGHT' on the remote control will illuminate the panel and activate a timer. This timer will automatically turn the back-light off after 10 seconds and is reset every time you press a button. Therefore the back-light will stay on for 10 seconds after the last operation on the remote.





Most of the remote control functions have an icon and a scalar bar which are displayed on screen when the function is activated.

When making adjustments to the image settings, always make sure the On Screen Display is on. You can use the On Screen Display whilst showing an image to see the affects of any changes made.



BUTTON	ICON	FUNCTION / OPERATION
AUD MUTE ( <i>Audio Mute</i> )	 	If an external audio switcher is connected to the projector AUD MUTE will toggle the audio on or off.
PIC MUTE ( <i>Picture Mute</i> )		Pressing PIC MUTE will toggle the displayed image between the incoming signal and a blank screen. With the Shutter option included, PIC MUTE will provide additional blackout
LAMP HIGH		These buttons allow you to adjust the lamp brightness. In order to view the brightest image on the screen the lamp must be set to HIGH (maximum power). Setting the lamp to LOW, will extend the life of the lamp. To switch off the lamp completely, hold down the lamp OFF button for 2 seconds. When the lamp is off, pressing HIGH or LOW will turn it back on.
LAMP LOW		
LAMP OFF		
OSD ON OSD OFF		OSD ON activates the On Screen Display allowing you to view system information on the screen. OSD OFF deactivates the display. There is no icon for OSD OFF.
PIXEL		Press PIXEL to designate the number of horizontal pixels to be sampled in the incoming signal. Movement through the range is controlled by the cursor buttons.

BUTTON	ICON	FUNCTION / OPERATION
BRI ( <i>Brightness</i> )		These image control buttons allow you to adjust the brightness, contrast, sharpness, saturation and hue parameters of the displayed image. Pressing one of these buttons will display its associated icon and scalar bar, adjustments can then be made using the cursor buttons. SHARP, SAT and HUE will have no effect on displayed image if a component or computer signal is being used. Similarly, HUE will have no effect on a PAL signal (see help text).
CON ( <i>Contrast</i> )		
SHARP ( <i>Sharpness</i> )		
SAT ( <i>Saturation</i> )		
HUE		
POS ( <i>Position</i> )		These buttons are used to alter the horizontal & vertical size and position of the displayed image. Press POS and use the cursor keys to alter the position of the image. The image size can be altered using the cursor keys after selecting the SIZE button.
SIZE		
PHASE		By pressing PHASE, then using the cursor buttons, the pixel clock phase (0 to 100) can be adjusted. This function is only used for computer input signals.

BUTTON	ICON	FUNCTION / OPERATION
COL (Colour Temperature)		The colour temperature can be adjusted in steps of 100° from 2000° to 10,000° Kelvin. Press COL, then increase or decrease the temperature using the cursor buttons.
PREV (Previous)		These buttons are used to store channels. Pressing the PREV button will access the previously stored channel configuration and display the image on screen without any parameter changes you have made. To view the image with any changes made, press the REV button. Pressing the SAVE button will store any changes made to the channel selected. The >< button restores the factory pre-set values.
REV (Revised)		
SAVE		
><		

BUTTON	FUNCTION / OPERATION
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LENS	The LENS button is used to activate the Focus and Lens Shift features on projectors fitted with a motorised lens mount.
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To Focus an image, press the LENS button until the Focus dialogue box appears on the screen and adjust using the ⇐ and ⇒ cursor buttons.

Lens Shift allows the user to adjust the horizontal and vertical positioning of the displayed image relative to the projector. To use the Lens Shift feature, press the LENS button until the Lens Shift dialogue box appears on the screen then position the image using the cursor buttons.

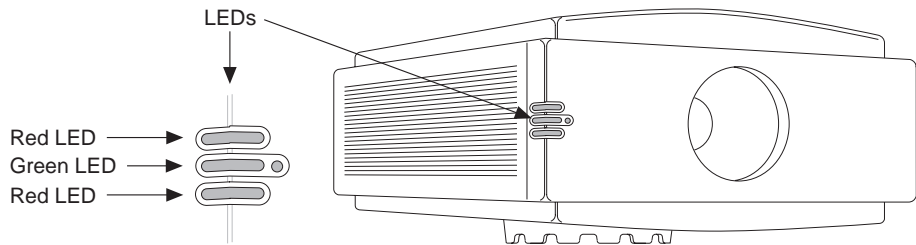


BUTTON	FUNCTION / OPERATION
⇐, ↑, ↓, ⇒ ENTER	The cursors are used to adjust image parameters directly from the remote control. When used in conjunction with the ENTER button they allow navigation through the menu system in order to select and change data.
MENU	Press MENU to display or hide the menu system. The On Screen Display must be switched on to use this function.
HELP	When you are in the menu system a basic explanation of the function under the cursor will be given if this button is pressed. Information relating to remote control buttons can be accessed, when the menu system is hidden, by pressing HELP followed by the relevant button. The help screen is cleared after 15 seconds or by pressing the HELP button again.
EXIT	When at the Main menu, pressing EXIT will exit the menu system completely, otherwise it will return you to the previous menu.
R, G, B	The Red, Green and Blue buttons toggle the individual colours on and off. These buttons are only active when the On Screen Display is on and are mainly used for fault finding.
ALPHA- NUMERIC BUTTONS	These buttons are used to select channels and enter values in data fields. A channel can be selected by simply pressing the number of the channel. For channels 1 to 9, just press the number. you desire. For channels 10 and onwards, press the 10+ button first, e.g. to select channel 35 you must press 10+ followed by 3 followed by 5. When in a data field, repeatedly pressing an alphanumeric button will cycle through all the characters relevant to that button.
LIGHT	When battery operated, pressing LIGHT will illuminate the back panel on the remote control. The panel light will automatically switch off 10 seconds after the last used button is pressed.

BUTTON	FUNCTION / OPERATION
A	When using multiple projectors, it may be necessary to control all projectors collectively and individually. This is achieved by allocating an address to each projector (using the menu system C—35). All projectors will respond to the remote control when the address is set to 0. To address an individual projector, press A twice followed by the projector's address.

## LED Indicators

There are 3 Light Emitting Diodes (top - red, middle - green, bottom - red) at the front of the case which indicate the status of the projector.



The top red LED, when on constantly, indicates that power is applied to the projector and that it is turned on.

The green LED, when on constantly, indicates the projector is operating normally and the lamp is lit. When flashing, the green LED shows that a valid remote control signal is being received. If the green LED is not illuminated, it indicates a fault.

When the bottom red LED is illuminated, it indicates that the lamp has failed to strike. This could be due to lamp failure or the safety interlock switch circuit detecting a fault condition.

## Menu Operation

The On Screen Display must be 'ON' to access the menu system, if the OSD is on but no menus are being displayed, press the 'MENU' button. This will display either the Main menu or the last screen of the menu system used (depending on whether the menus have been used since the power or the On Screen Display was last turned on). Menu operations are only active when the menu is being displayed on the screen. The active menu or window is always the window in the foreground.

Menu displays can be temporarily removed, to view test patterns etc., by pressing 'MENU'. If a data field is being edited, pressing 'MENU' will not turn off the menu display, but will display a message box stating- "Cannot turn Menu display off while Data is being edited. Press enter or EXIT to finish edit". The menu will be removed 10 seconds after the last editing button is pressed. When the 'MENU' button is pressed again, you will be returned to the menu screen you last accessed so you can continue editing or configuring the system.

To leave the menu system entirely, either press 'EXIT' at the main menu level or 'OSD OFF' at any time. This will lose access to the Service menu along with any test pattern being displayed. When the menu system is re-entered, the entry point will be the Main menu (top level).

Movement through the menu system is cursor controlled, the  $\uparrow$  and  $\downarrow$  buttons can be used to move up and down the page and the  $\leftarrow$  and  $\rightarrow$  buttons to move across the page. If the cursor is moved off the edge of the page in any direction it will reappear over the nearest function on the opposite side of the page.

To select a menu, press 'ENTER' when the cursor is over the required item. To move up one menu level from a lower level press the 'EXIT' button when not entering data. Alternatively, when a menu page offers a soft 'OK' or 'CANCEL' button, move the cursor over one of these and press 'ENTER'. This will either accept changes made (OK) while in the page or ignore changes (CANCEL) and return to the higher level.

## Dialogue Boxes

---

A number of dialogue boxes allow you to enter or change data. This is done by using data entry fields, flyout lists, check boxes and soft buttons. Both the  $\uparrow$  and  $\leftarrow$  buttons can be used to move up the page and the  $\downarrow$  and  $\rightarrow$  buttons can be used to move down the page.

To edit a data field in a dialogue box, position the cursor over the field you want to access and press 'ENTER'. The cursor appears over the first unused character and the new characters are entered using the keys on the remote. Press the  $\rightarrow$  button to move the cursor to the right for the next character. Press the  $\leftarrow$  button to delete characters by moving the cursor one character to the left. If the data needs to be increased or decreased in value, use the  $\uparrow$  and  $\downarrow$  cursor buttons provided. Press 'ENTER' to accept any changes and to close the edit mode. To ignore any changes made press 'EXIT'.



*While data fields are being edited the menu cannot be switched off (see Menu Operation).*

## Check Boxes

---

A check box is used to either toggle a function on or off or select one of a number of mutually exclusive items.

**Toggling a check box on/off** - Position the cursor over the check box you want and press 'ENTER'. If the function was off, a cross will appear and the function will be turned on. If the function is already switched on, the cross will disappear and the function will be turned off.

**Selecting an exclusive check box** - Place the cursor over the check box and press 'ENTER', a cross appears in the selected box and the function will be turned on. The previous selection is cancelled.

## Flyout Lists

---

A flyout list is provided for fields that require you to choose from a long list of possible choices.

Place the cursor over the data field and press enter. The flyout list appears as a list of three items expanded from the data already displayed. The list will be in the following order: names starting with any punctuation; numeric entries in numerical order; names in alphabetical order. When the flyout list is open some fields or titles may be covered up temporarily.

Use the  $\uparrow$  or  $\Rightarrow$  button to scroll up the list and the  $\downarrow$  or  $\Leftarrow$  button to scroll down. Pressing an arrow button once will move the cursor by one item in that direction. Holding the button down will scroll 2 items per second for the first 5 seconds, followed by 10 per second.

Place the cursor over your choice and press 'ENTER'. The flyout list closes and the chosen data is entered. If you do not want to make any changes, press 'EXIT' and the list will close.

## Soft Buttons

---

The two most common Soft Buttons are the 'OK' and 'CANCEL' buttons. They are activated by positioning the cursor over one of them and pressing ENTER.

In active windows the 'OK' Soft Button will accept any changes made and exit that window. If there is a confirmation window this will clear and the changes will be accepted. If the button appears in a message box it will clear the box.

The 'CANCEL' Soft Button will ignore any changes and clear the window. If it is pressed in a confirmation window, it will clear leaving the underlying window displayed without any changes. The 'CANCEL' soft button is the same as the 'EXIT' button on the remote control.

## Data Entry Fields

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Position the cursor over the data entry field and press 'ENTER'. Next, use the alphanumeric buttons to enter the required characters then press 'ENTER'. Use the (left arrow) to delete the last character.

## Information Windows

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There are three types of information window:

**Message Boxes** - provide information or advise a course of action.

**Confirmation Boxes** - ask you to accept or reject changes made in dialogue boxes.

**Warning Boxes** - indicate possible system problems. They will repeat every 15 minutes until the fault is cleared.

## Password

---

The system password is used to gain access to the Service Set-up menu. When the Service Set-up menu is selected from the Main menu, a Password Entry field will appear with four underscore characters.

As each number of the password is entered, it will be displayed as an asterisk. If the four numbers are correct on the press of the last number you will automatically enter the Service Set-up menu. If the wrong password is entered the password underscore characters will return.

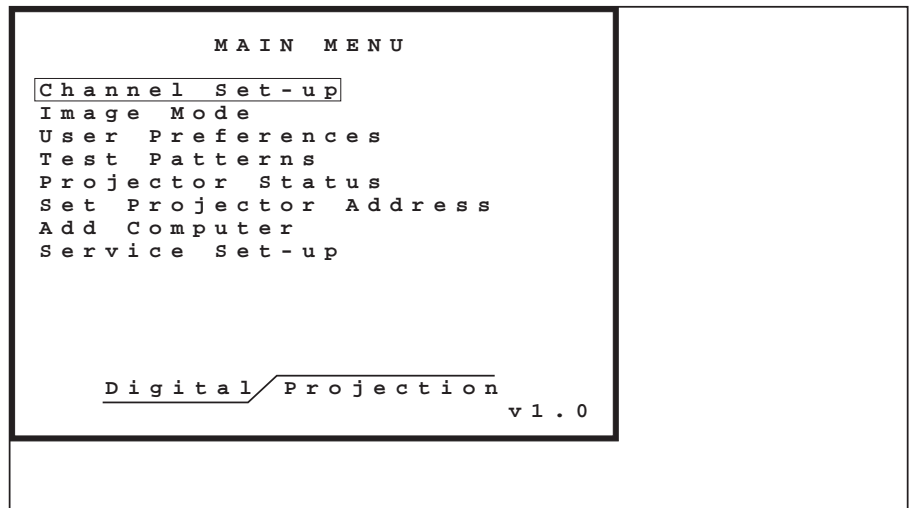
To quit password entry for any reason press 'EXIT' on the remote, this returns you to the Main menu. Pressing  $\uparrow$  or  $\downarrow$  will also clear the Password field but will move the cursor to another item in the menu.

If a non-numeric key, except 'EXIT',  $\uparrow$  or  $\downarrow$ , is pressed during password entry, its action will be ignored.

## Main Menu - Overview

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

The sub menus are Channel Set-up, Image Mode, User Preferences, Test Patterns, Projector Status, Set Projector Address, Add Computer and Service Set-up (this last function is for qualified technicians and is password protected).



**Channel Set-up** - You can create NEW channel configurations and SELECT, VIEW, COPY, MODIFY or DELETE current channels.

**Image Mode** - Allows you to define front or rear projection and configure the projector for either TV or Film originated signal inputs.

**User Preferences** - You can decide how the projector powers up and it's general control defaults can be set.

**Test Patterns** - A range of patterns is available to enable alignment of the projector and check it's performance.

**Projector Status** - Displays lamp information, the projector's temperature, memory status and the last 4 warnings displayed.

**Set Projector Address** - When using multiple projectors, the individual projector address must be set using this function.

**Add Computer** - This function allows you to configure the projector to display new computer cards and add them to the projector's library.

**Service Set-up** - This is for the use of qualified technicians and is password protected.



## Channel Set-up

The Channel Set-up function allows you to create NEW channel configurations and SELECT, VIEW, COPY, MODIFY or DELETE current channels. Creating or editing channel parameters does not require the input source to be present, however for the best results it is advisable to make adjustments while viewing the image on screen.

Before you can adjust a channel you first have to select it. The only exception is when using the Copy command, when you can copy a highlighted channel configuration to another channel.

The parameters which can be accessed and edited in the Channel Set-up menu are: channel number; channel name; input number; external switcher input number; source format Y Pr Pb / RGB; video standard PAL / NTSC / SECAM; computer selection; pixel resolution; pixel phase; image size and position; aspect ratio; colour temperature; signal sync source.

In addition each channel will store the selected settings for brightness, contrast, saturation, hue and sharpness where applicable. These parameters are accessed via the remote control. If they are saved using the SAVE button the settings for that particular channel will be stored in memory.

There are two factory preset channels - one for video input and one for computer input and both presets use the settings defined in the User Preferences screen.



*For a computer input, the size, position, pixel and phase will be determined by the choice of computer card and the mode selected by the input signal.*

The Channel Set-up screen which is accessed from the Main Menu is shown opposite. The screen has a row of options across the bottom and is split into 5 columns- Chan, Name , IP, ADR and Type.

CHANNEL SET - UP				
Chan	Name	IP	ADR	Type
1	VIDEO (RGB)	1		VIDEO
2	VIDEO (YPrPb)	2		VIDEO
3	COMPUTER	3		COMPUTER
4	14 CHARACTERS			
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

**Chan:** This is the channel number entered on the remote control keypad to select an input. The channels are listed in numerical order and are scrollable.

**Name:** A name of up to 14 characters in length can be entered to describe each channel.

**IP:** Specifies which input connection on the rear of the projector (1, 2 or 3) will be used for a particular channel.

**ADR:** The switcher input address. If a number is preset here, the projector will command a video switcher to select that input via the RS232 serial control cable.

**Type:** Denotes the type of input source for each channel. Examples of a video input include PAL, NTSC and SECAM, While computer inputs could be VIDEO7, TSENG, MATRX, etc. (for further information see B—17, Signal Sources).

## SELECT Command

---

Channel selection can be made in two ways, by simply keying in the channel number on the remote control or by selection in the Channel Set-up screen. Using the remote control is quicker if you know the channel number required, but if you don't, the Channel Set-up screen will remind you.

To select a channel using the On Screen Display, first choose Channel Set-up from the the Main Menu and locate the cursor over the desired channel using the  $\uparrow$  and  $\downarrow$  buttons. Highlight 'SELECT' from the options at the bottom of the screen using the  $\leftarrow$  and  $\rightarrow$  buttons and press 'Enter' to display the selected channel.

If a blank channel is selected, the image display will turn black and a message box will be overlaid stating- "Channel XX not configured"

If a valid channel is selected but a source is not detected at the input, the screen will go black until the signal is connected. A message box will be overlaid stating- "Source is not Present".

If a valid channel is selected but the detected source is different from that expected, a message box will be overlaid stating- "Source is not the expected configuration".



*The system will do its best to display the image using the parameters of the selected channel.*

If a channel configured for a computer is selected and the projector does not identify a computer card mode which matches the incoming signal, the screen will display an image using the system default parameters. These parameters, such as size and position, are stored in the system memory. An on-screen message also appears stating- "New mode will be lost if not saved or if channel is changed". The display will then have to be adjusted manually to give an optimum image (Refer to Storing System Configurations, B—22 for further details).

## VIEW Command

The 'VIEW' command will display information about a channel. When viewing a channel the information displayed cannot be modified.

Highlighting a channel in the Channel Set-up menu and selecting 'VIEW' will display the View Channel window (see example below). Further information can be accessed by selecting INFO, SIZE POS and COMPMODE. To exit the window and return to the Channel Set-up menu press the 'Close' soft button or 'EXIT' on the remote.

VIEW CHANNEL

Channel 03                      Name -----

Input 3

Configuration	Switcher
<input type="checkbox"/> Video	<input checked="" type="checkbox"/> Computer                      Input ---
<input type="checkbox"/> PAL	Computer VIDEO7
<input type="checkbox"/> NTSC	<input type="checkbox"/> Ext. Mixed
<input type="checkbox"/> SECAM	Syncs. <input checked="" type="checkbox"/> Film Look ON
<input type="checkbox"/> CPENT	<input type="checkbox"/> Direct <input checked="" type="checkbox"/> Look 1
<input checked="" type="checkbox"/> RGB	Sync. <input type="checkbox"/> Look 2
<input type="checkbox"/> YPrPb	Colour Temp 6500
<input type="checkbox"/> SVIDEO	Aspect Ratio MODE

INFO  
 SIZE POS  
 COMPMODE  
CLOSE

SELECT  
VIEW  
COPY  
NEW  
MODIFY  
DELETE

## COPY Command

The COPY command allows all or just selected parameters from a channel to be copied to another channel. To copy a channel, highlight it with the cursor in the Channel Set-up menu and select the COPY command. This displays the Copy Channel screen containing three main fields: Copy From, Copy To and Copy Parameters.

```

          COPY CHANNEL

Copy From 01      Name VIDEO (RGB)
Copy To  --      Name -----
Copy Parameters
 All       Selected
 Input Config       Saturation
 Size & Position       Sharpness
 Colour Temp       Hue
 Switcher Source
 Brightness
 Contrast
          CANCEL      OK

SELECT VIEW COPY NEW MODIFY DELETE
  
```

**Copy From** - displays the name and number of the channel to be copied.

**Copy To** - displays the name and number of the destination channel.

**Copy Parameters** - allows copying of all or selected channel parameters.

To select a destination channel, place the cursor over the Copy To field and press 'ENTER'. Scroll through the flyout list using the  $\uparrow$  and  $\downarrow$  buttons until the desired channel is highlighted and press 'ENTER'. The name and number of the channel will appear in the Copy To field. If a blank channel is selected it can be named at this point by placing the cursor over the name field and pressing 'ENTER'. The field will then be in Data Edit mode allowing a name to be entered.

The next stage is to select which parameters you wish to copy by crossing either the 'All' or 'Selected' check boxes. If 'Selected' is chosen, the check boxes of the parameters you wish to copy must be crossed. The choices available are Input Configuration, Size & Position, Colour Temperature, Switcher Source, Brightness, Contrast, Saturation, Sharpness and Hue. With the desired parameters selected pressing 'OK' soft button will copy them to the destination channel and return you to the Channel Set-up screen.

If a destination channel has not been chosen on pressing 'OK', a message box appears stating- "No Copy To channel number has been entered". Pressing 'OK' in the message box will return you to the Copy Channel window to enter a channel.

Pressing 'OK' to copy the parameters to a destination channel that is already in use will overlay a confirmation box stating- "Destination Channel already in use press OK to Overwrite or CANCEL to return to the Copy dialogue". Selecting 'CANCEL' or pressing 'EXIT' on the remote will terminate the copying process. This is confirmed by a box stating- "Changes will be lost".

## NEW Command

The NEW command allows you to set up a channel for a new input device. When you are in the Channel Set-up menu, highlight an empty channel and select NEW. Assuming you have enough memory left in the projector, you will enter the NEW function. The default parameters as specified in the User Preferences menu will be automatically entered in the data fields. These parameters can be modified as required. If you need to define specific size, position or computer mode parameters, this can be done using the MODIFY command after creating the new channel.



*It is not essential to have the signal source present to create a new channel.*

The main areas on the screen include the channel name, input, configuration, switcher details, sync, colour temperature and aspect ratio.

NEW CHANNEL

Channel 03                      Name

Input 3

<p>Configuration</p> <p><input type="checkbox"/> Video    <input checked="" type="checkbox"/> Computer</p> <p><input type="checkbox"/> PAL        <input checked="" type="checkbox"/> Computer    VIDEO 7</p> <p><input type="checkbox"/> NTSC      <input type="checkbox"/> Ext. Mixed</p> <p><input type="checkbox"/> SECAM     Syncs.</p> <p><input type="checkbox"/> CPENT     <input type="checkbox"/> Direct</p> <p><input checked="" type="checkbox"/> RGB        Sync.</p> <p><input type="checkbox"/> YPrPb</p> <p><input type="checkbox"/> SVIDEO</p>	<p>Switcher</p> <p>Input <input style="width: 50px;" type="text"/></p> <p><input checked="" type="checkbox"/> Film Look ON</p> <p><input checked="" type="checkbox"/> Look 1</p> <p><input type="checkbox"/> Look 2</p> <p>Colour Temp <input style="width: 50px;" type="text" value="6500"/></p> <p>Aspect Ratio <input style="width: 50px;" type="text" value="MODE"/></p> <p style="text-align: right;"><input type="button" value="CANCEL"/>    <input type="button" value="OK"/></p>
---	---

**Name** - The channel name can be up to 14 characters

**Input** - The source input can be set to 1, 2 or 3 depending on which input you have selected on the rear analogue panel. Channels 1, 2 and 3 have inputs set at 1, 2 and 3 respectively and cannot be changed.

**Configuration** - Select either Video or Computer according to the input device. The selections for a video configuration are PAL, NTSC, SECAM, CPENT and S-VIDEO. An AUTO configuration will be applied if no selection is made, however it is advisable to select the corresponding check box to make the signal less noisy. If a CPENT video input is selected you must state the component format (RGB or Y Pr Pb). Ext. Mixed Syncs should be selected when using base band video signals with a combined sync e.g. RGBS signals.

A computer configuration requires the selection of a computer card from the library. Highlighting the computer card name field and pressing 'ENTER' will access a flyout list containing all the cards in the library. A Direct Sync option is available on some hardware versions and should be selected when using computer signals with stable syncs to produce a stable image even where there is fine pixel detail.

**Switcher** - If you are using an external switcher, enter the input number here.

**Film Look** - When Film Look is 'ON' it enhances the appearance of 625/50 versions of film originated material. Film Look should not be used for 525/60 or similar formats. Film Look 1 or Film Look 2 should be selected according to which provides the optimum image. When Film Look is 'OFF', or when "Computer" is selected, the check boxes are greyed out and the function is disabled.

**Colour Temperature** - The Colour Temperature can be selected from a flyout list, the choices are 3200°, 5400°, 6500° and 9300° Kelvin.

**Aspect Ratio** - A flyout list allows you to select the aspect ratio. The choices for video are RAW, 4 x 3, 5 x 4, 8 x 5, 14 x 9, 16 x 9. This field is 'greyed-out' for a computer configuration and will state "Mode". The aspect ratio for individual computer card modes is selected in the Size & Position Adjust window.



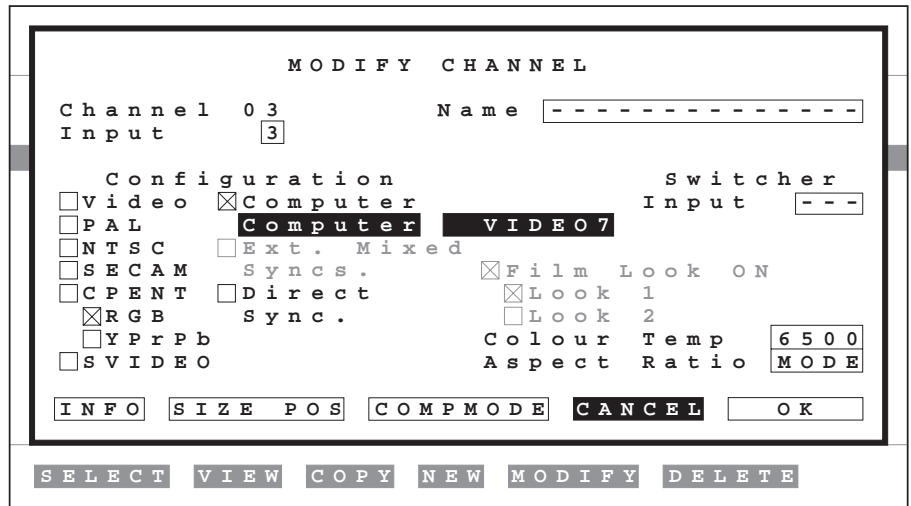
*When first selecting RAW the number of pixels per line will be sampled 640 active pixels. This can be modified using COMPMODE (see System Operation, C—24).*

After modifying any parameters, select 'OK' to store them to the new channel and return to the Channel Set-up menu. If you have not entered an Input number a message box will remind you. If you decide not to create a new channel, you can select 'CANCEL' or press 'EXIT' on the remote at any time.



## MODIFY Command

The 'MODIFY' option in the Channel Set-up screen allows you to change certain parameters for individual channels. The definable parameters in the Modify Channel window are the same as for a new channel. At the base of the Modify Channel window there are three options (Info, Size Pos and Compmode) that are not available in the New Channel function.



### 'INFO' (Channel Information)

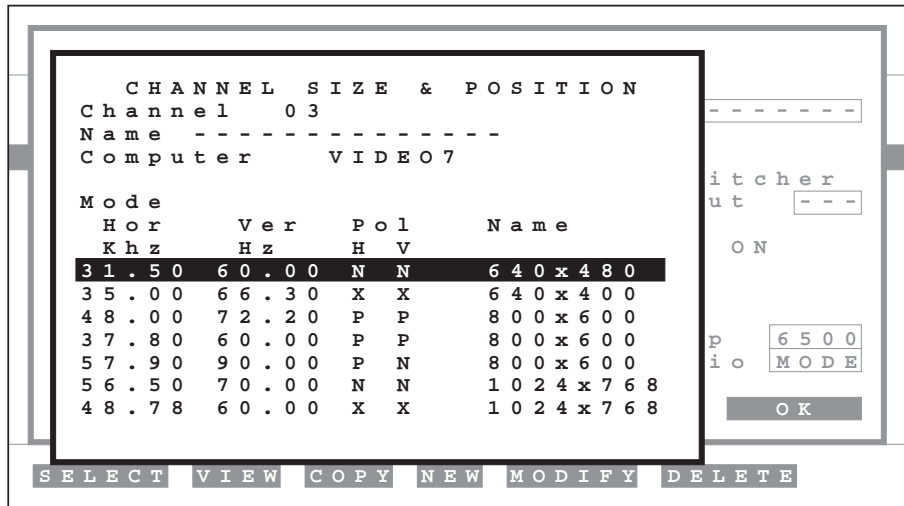
Selecting the INFO command will open the Channel Info window which displays further details about the channel under modification. This is an information window only - the parameters displayed cannot be modified.

The image Brightness, Contrast, Sharpness, Saturation and Hue are shown as percentages. The Frame and Line Rates for the input signal currently being used are automatically determined by the projector. They will state "NO SIG" if there is no input signal present.

**'SIZE POS' (Channel Size and Position)**

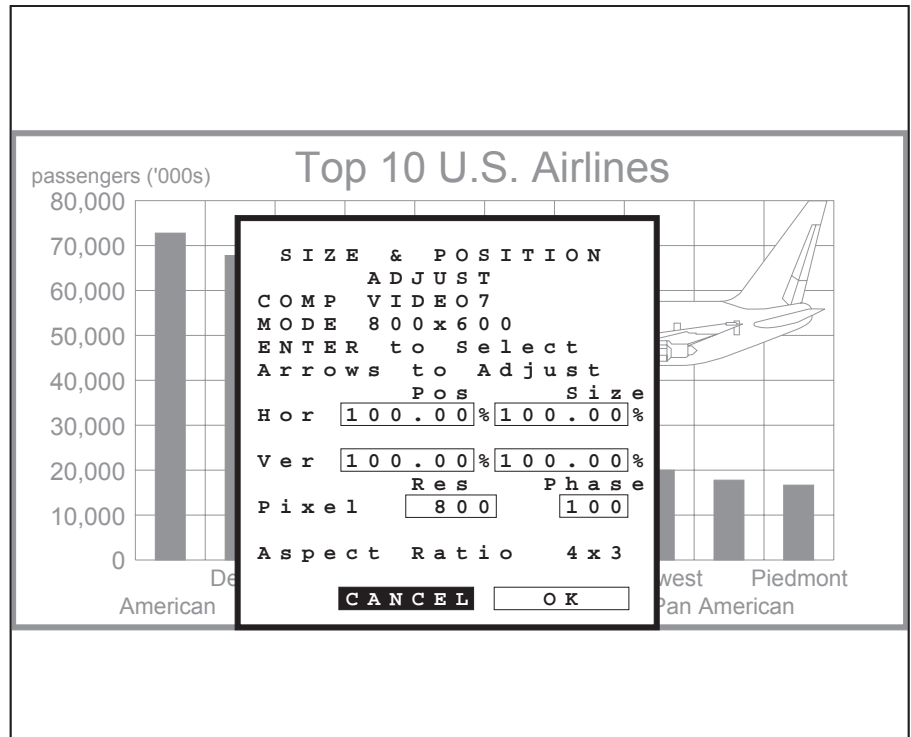
The SIZE POS function is entered by pressing a soft button located at the base of the Modify dialogue box and consists of two screens.

The first screen allows you to select a computer mode from a list or to select video. The horizontal and vertical scan rates of the computer configuration will be displayed, but for a video configuration it will simply state- "Video Configuration". To exit this screen you must use the 'Exit' button on the remote.



If you select a mode using the cursor keys and press 'ENTER', you will be taken to the second screen where the mode can be adjusted. This is the SIZE & POSITION ADJUSTMENT window and it appears by itself, i.e. it does not overlay the other screens. The image is displayed in the background so that you can see the changes in the image as it is adjusted (See opposite page).

Each parameter is controlled by a range of increments. A display range is changed by using the  $\hat{\uparrow}$  and  $\Rightarrow$  buttons to increase the value and the  $\hat{\downarrow}$  and  $\Leftarrow$  to decrease it. Single presses will adjust in single increments. Holding down the button will step 1 increment per second for 5 seconds followed by 10 increments per second. After adjustment, select 'OK' to accept the changes and return to the previous screen.



**Horizontal Position:** Measured as a percentage, 0 is far left and 100 is far right.

**Vertical Position:** 0% is the bottom and 100% is the top.

**Horizontal & Vertical Size:** Size is also measured as a percentage with 0 being the smallest image and 100 the largest.

**Pixel Phase & Resolution:** The pixel phase is the point in the line timing where the pixel sample is taken and is represented as a number between 0 and 100. The Resolution can be set from 630 to 848 and defines the number of pixels in a scan line.

**Aspect Ratio:** This is the ratio of picture width to height and is chosen from a flyout list.

### 'COMPMode' (Channel Computer Mode)

COMPMode enables you to modify individual computer modes. If the current channel is a video configuration, you will not be able to access this function.

The Channel Computer Mode screen is split into two main areas. The top of the screen displays the channel number, channel name and the computer card. The remainder of the screen provides a list of available modes. The list provides horizontal and vertical scan rates, sync pulse polarity and a name to help you select the required mode. To exit this screen you must use the 'Exit' button on the remote.

Mode	Hor KHz	Ver Hz	Pol H	Pol V	Name
31.50	60.00	N	N		640x480
35.00	66.30	X	X		640x400
48.00	72.20	P	P		800x600
37.80	60.00	P	P		800x600
57.90	90.00	P	N		800x600
56.50	70.00	N	N		1024x768
48.78	60.00	X	X		1024x768

Select a mode using the cursor keys and press 'ENTER'. This will change the display to the Mode Parameters window and allow you to make modifications. If you select a mode other than the one currently being used to display the image, the display will turn light blue. The Mode Parameters window will then be displayed.

Modifications in the Mode Parameters window can have a serious effect upon whether or not the mode can be used. Therefore a message box will appear upon entry stating - "CAUTION Changes in this dialogue may prevent the Mode from being selected by a Computer signal".

Mode Parameters

Computer Video 7

Mode Name 800x600

Hor	31.50	kHz	Sync	Pos	Neg	Polarity	N/A
Ver	60.00	Hz	Pos	Neg	N/A		

Active Pixels Res Phase  
800 100

Aspect Ratio 4x3

SAVE AS CANCEL OK

SELECT VIEW COPY NEW MODIFY DELETE

**Mode Name** - You can re-name the mode (maximum of nine characters).

**Scan** - The projector will automatically determine the horizontal and vertical frequencies of the mode from the incoming signal.

**Sync polarity** - Check boxes are used to select the polarity of the horizontal and vertical syncs. The N/A (not applicable) choice will cause the polarity to be ignored in the selection of the mode. This is necessary in the case of Apple Macintosh computers which do not utilise sync polarity.

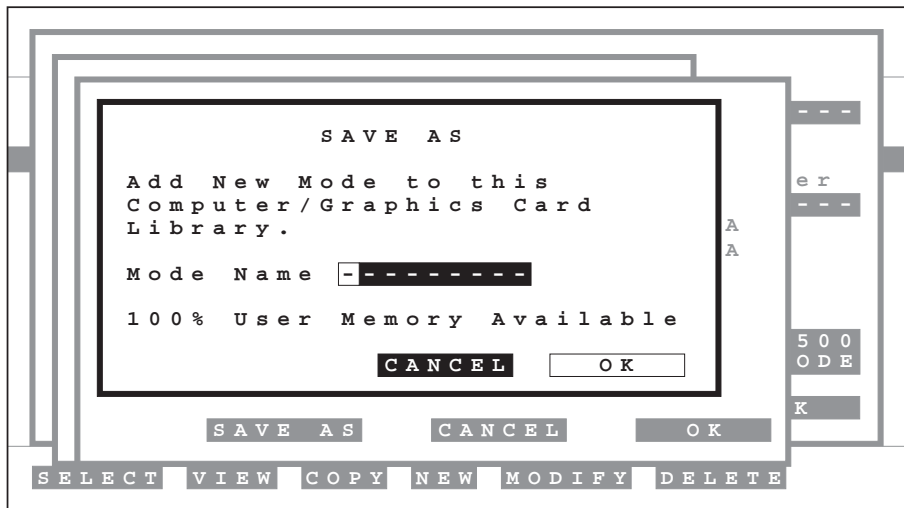
**Active Pixels** - The pixel resolution can be set between 630 and 848. The pixel phase is defined by a number between 0 and 100.

**Aspect Ratio** - The aspect ratio is chosen from a flyout list.

When the mode parameters have been modified press the 'SAVE AS' button located at the foot of the screen, to enter the SAVE AS window.

## SAVE AS

This command can save any changes made to the parameters. The SAVE AS screen allows you to edit the mode name in order to save your changes as an additional mode for the computer card. The window also displays the amount of user memory available to store new modes.



If there is insufficient memory, a message box will appear upon entry to the SAVE AS window stating - "Cannot create Computer Mode due to insufficient memory. Need to delete a COMPUTER entry from the library of Computer Cards. Go to ADD COMPUTER Dialogue in Menu. (New Mode will be lost if Channel is Changed.). On pressing 'OK', the message box and Save As window will close and you will return to the previous level in the menu system.

If the Card Data Set is in ROM (i.e. it is a factory preset) then the whole set will be copied to non-volatile memory along with the New Mode. It will be saved with the same name as the computer card but with an asterisk ( \* ) appended to distinguish it from the factory preset version.

## DELETE Command

The DELETE command allows you to delete any unwanted channels. To delete a channel highlight it in the Channel Set-up menu and select 'DELETE' from the bottom of the screen. You will enter the 'Delete Channel' screen which will confirm the name and number of the channel to be deleted.

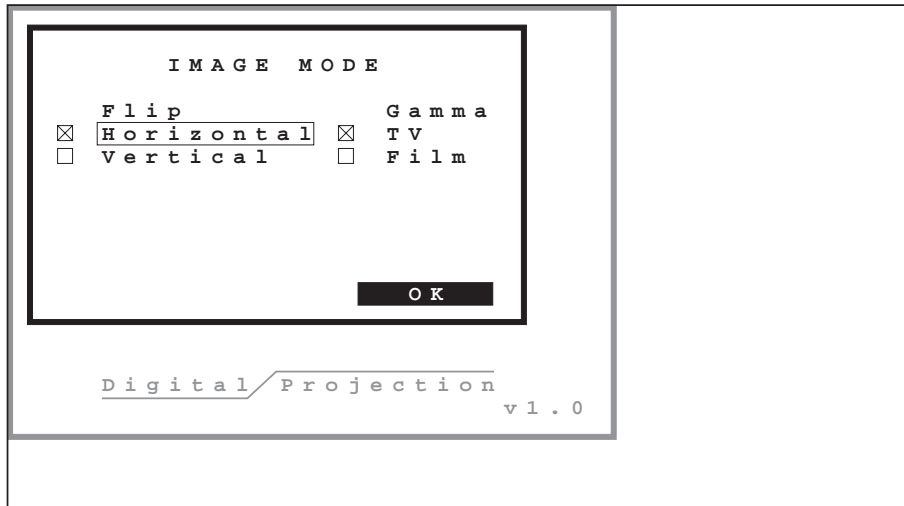
D E L E T E   C H A N N E L			
C h a n n e l   0 4		N a m e   - - - - -	
W I L L   B E   D E L E T E D			
<b>C A N C E L</b>			<input type="button" value="O K"/>
1 1			
1 2			
1 3			
1 4			
1 5			
<input type="button" value="S E L E C T"/> <input type="button" value="V I E W"/> <input type="button" value="C O P Y"/> <input type="button" value="N E W"/> <input type="button" value="M O D I F Y"/> <input type="button" value="D E L E T E"/>			

If this channel is the one you wish to delete select 'OK'. A confirmation box will appear stating: "Are you sure you want to DELETE Channel XX? Press "OK" to Delete or "CANCEL" to ignore". This is your last chance to prevent the channel being deleted.

If the channel to be deleted is being displayed, on pressing 'OK' the screen will turn light blue.

## Image Mode

Image Mode is chosen from the Main menu. This screen has two sections: Flip and Gamma. All the parameters are defined using check boxes.



**FLIP** - Allows configuration for front or rear projection by horizontally or vertically reversing the projected image.

**GAMMA** - Corrects the degree of contrast in your input signal to provide an optimum image and should be set according your signal type.

Select the "OK" button to return to the the Main menu, saving any changes that have been made.



## User Preferences

The User Preferences window allows you to set a number of system defaults and is split into three main areas: At Power Up, Default Configuration and Other. When all changes have been made in the User Preferences, press the EXIT button on the remote to execute. This will save the changes and return to the Main menu.

USER PREFERENCES		
<b>At Power Up</b>		
Input	Display	
<input checked="" type="checkbox"/> Last Used	<input checked="" type="checkbox"/> Pic Mute	
<input type="checkbox"/> Preset 02	<input type="checkbox"/> OSD Off	
<input type="checkbox"/> First Sync	Audio	
	<input type="checkbox"/> Aud Mute	
<b>Other</b>		
	Background	
	<input checked="" type="checkbox"/> Normal	
	<input type="checkbox"/> Clear	
	Language	
	English	
<b>Default Configuration</b>		
<input type="checkbox"/> Video	<input checked="" type="checkbox"/> Computer	
<input type="checkbox"/> PAL	Computer	Video 7
<input type="checkbox"/> NTSC	<input type="checkbox"/> Ext. Mixed	<input checked="" type="checkbox"/> Film Look ON
<input type="checkbox"/> SECAM	Syncs.	<input checked="" type="checkbox"/> Look 1
<input type="checkbox"/> CPENT	<input type="checkbox"/> Direct	<input type="checkbox"/> Look 2
<input checked="" type="checkbox"/> RGB	Sync.	Input
<input type="checkbox"/> YPrPb		Colour Temp
<input type="checkbox"/> SVIDEO		Aspect Ratio
		6500
		MODE

### AT POWER UP

This section defines what will be displayed when the projector is switched on.

**Input** - You can set the projector to display the last input channel that was used, preset a channel by entering a channel number or let the projector display the first input signal it finds.

**Display** - With 'Pic mute' off the incoming signal will be displayed, if 'Pic mute' is on the screen will be black and the lamp will be at low. With the 'OSD off' check box uncrossed the menu system will be displayed when the projector is switched on.

**Audio** - Future Function, when a 3rd party external audio switcher is used with the projector, and providing that audio mute control is available within the switcher, the projector will control the audio from power-up using this setting.

## DEFAULT CONFIGURATION

This sets the default values for any new channels created.

**Video** - PAL, NTSC, SECAM and CPENT video configurations are available as defaults. A configuration will be automatically chosen, if you do not make a selection, however it is advisable to select the appropriate check box for your signal to improve the screen image. If a CPENT video input is selected you must also state the component format (RGB or Y Pr Pb).

**Computer** - Selecting computer also requires the selection of a computer card from the library. Highlighting the computer card name field and pressing 'ENTER' will access a flyout list containing all the cards in the library.

**Sync** - Ext. Mixed Syncs should be selected when using base band video signals with a combined sync e.g. RGBS. A Direct Sync option is available on some hardware versions and should be selected when using computer signals with stable syncs.

**Input** - 1, 2 or 3 may be entered.

**Colour Temp** - 3200°, 5400°, 6500° or 9300° can be selected from the flyout list.

**Aspect Ratio** - A flyout list provides RAW, 4 x 3, 5 x 4, 14 x 9 and 16 x 9 options.

**Film Look** - When checked Film Look is 'ON' and a choice of Look 1 or Look 2 is provided. Whichever look produces the best image should be selected. When Film Look is 'OFF', or when "Computer" is selected, the function is disabled.

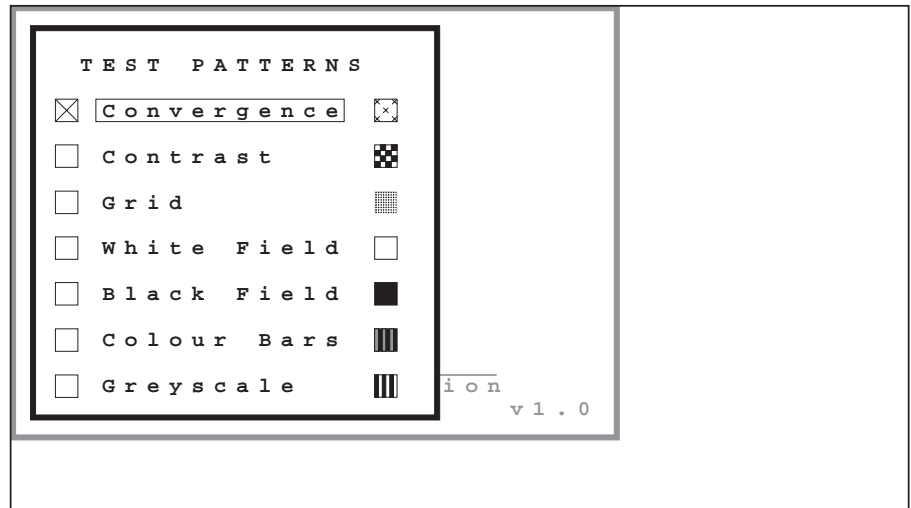
## OTHER

**Background** - The On Screen Display colour can be set to normal (the given colours) or clear (transparent). When set to clear only the lowest level of dialogue box will be visible but warning boxes will maintain the same colours.

*Languages* - Future Feature, provision has been made to allow multiple languages for the display. When available the languages will be selected from a flyout list.

## Test Patterns

A number of test patterns are provided to check the operation of the projector. Selected from the Main menu the Test Pattern window is as shown below.



**Convergence** - a cross pattern generated by the digital board and used by factory set-up staff for converging the DMD light valve. This pattern is also useful to confirm projector alignment.

**Contrast** - a 4 by 4, black and white checked pattern generated by the light engine electronics and used to measure contrast ratio.

**Grid** - a grid generated by the light engine electronics consisting of white lines on a black background that performs a similar function to convergence.

**White Field** - a digital white field generated by the light engine electronics to check full field contrast ratio.

**Black Field** - a digital black field generated by the light engine electronics to check full field contrast ratio.

**Colour Bars** - an analogue colour pattern generated by the analogue board to verify the colour balance.

**Greyscale** - generated by the analogue board to assist in the correct setting of colour balance, this is an 8 step greyscale ranging from black on the left to white on the right.

To select a test pattern, position the cursor over the required pattern and press enter to put a cross in the check box. Only one pattern can be selected at a time and it will be displayed over any input images.

The convergence, colour bars and grey scale test patterns leave the menu system on screen. To view one of these patterns without the menu, press MENU on the remote. To reactivate the menu system, press MENU again; you will be returned to the test pattern screen.

To remove a pattern, toggle the check box again to remove the cross and to return any input signal to the screen.



*In the event of a processing fault, selecting various patterns may help identify on which component the fault is located. The user should select each test pattern in turn and report the results to their service manager.*

To exit the Test Pattern menu press the EXIT button on the remote.

## Projector Status

The Projector Status function is accessed through the Main menu. Information about the lamp, the projector temperature and the user memory can be viewed. The last four warning messages are also stored in here.

```

                                P R O J E C T O R   S T A T U S

S o f t w a r e   V e r s i o n                2 . 2 8

U n i t   R u n   -   T h i s   U n i t        5 0 0 H o u r s
U n i t   S t r i k e s   -   T h i s   U n i t  1 5 0 T o t a l

L a m p   S t a t u s                          O K
T e m p e r a t u r e                          O K
U s e r   M e m o r y   A v a i l a b l e    1 0 0 %

                                W A R N I N G   M E S S A G E S

L A S T
M e s s a g e 1
M e s s a g e 2
M e s s a g e 3
M e s s a g e 4

```

**Lamp Run** - The number of hours the current lamp has run is displayed.

**Lamp Strikes** - The number of times the current lamp has struck is displayed.

**Lamp Status** - If “OK” is displayed, the lamp is operating as normal. If “REPLACE” is displayed, the lamp is coming to the end of its useful life.

**Temperature** - Displays the temperature condition of the projector according to a temperature sensor within the case. “OK” is the normal operating temperature. “HOT” is when the lower temperature sensor has triggered. “HOT” warns you to investigate the reasons for the high temperature. If the higher temperature sensor is triggered, the projector will shut down.

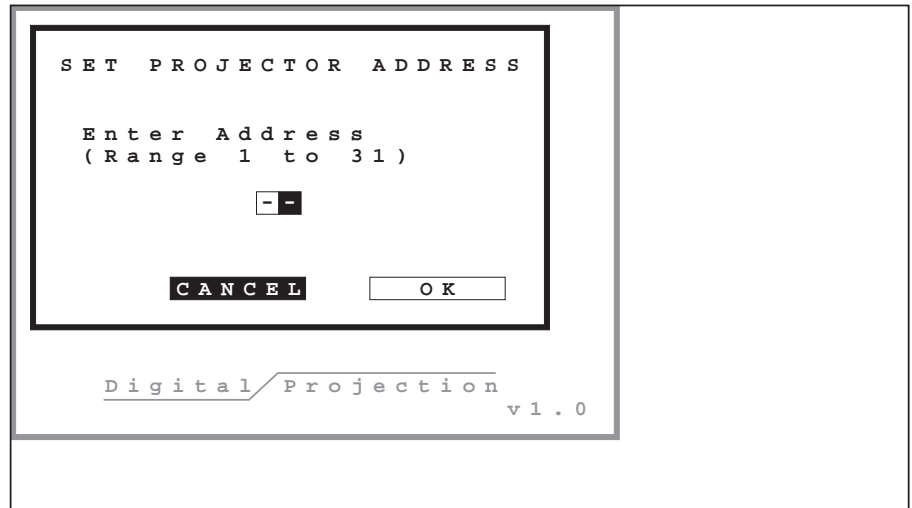
**User Memory Available** - This displays the percentage of user memory available for storing additional or updated Factory Supplied Computer Cards and Modes.

**Warning Messages** - The last four warning messages are displayed with the most recent at the top of the list.

Press the EXIT button on the remote to leave the Projector Status screen and to return to the Main menu.

## Set Projector Address

The Set Projector Address is accessed through the Main menu and it allows you to set a unique address for the projector. This will enable it to respond to commands received from an external computer or from the remote control when using multiple projectors.



**Enter Address** -Enter the address of the projector as a numeric value between 1 and 31 using the remote control. In addition to this value the projector will always respond to an address of zero. The number will be preceded by 0 (zero), but you are not required to key this in.

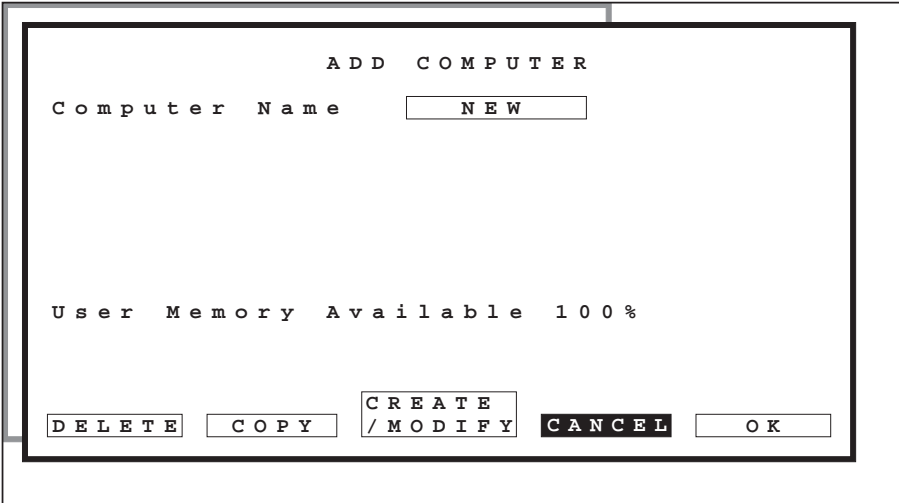
Press the “OK” soft button to save the address and to return to the Main menu.

Press the EXIT button on the remote or “CANCEL” to keep the same address and to return to the Main menu.

## Add Computer

The **Add Computer** function allows groups of computer modes to be created and saved to the projector under a collective name. Other options available through this function include the modification of existing mode parameters, the deletion of a computer card or mode and the copying and renaming of a complete computer card.

After selection from the Main Menu the **Add Computer** screen will be displayed. This screen can be divided into three main areas: Computer Name, Available Memory and Function Options.



```

      ADD  C O M P U T E R

C o m p u t e r  N a m e   [ N E W ]

U s e r  M e m o r y  A v a i l a b l e  1 0 0 %

[ D E L E T E ]  [ C O P Y ]  [ C R E A T E / M O D I F Y ]  [ C A N C E L ]  [ O K ]

```

**Computer Name:** By default the computer name field will display "NEW". This field contains a fly-out list of all the computers stored in the projectors library and is accessed by pressing 'Enter' on the remote control when the field is highlighted.

**Available Memory:** The user memory available to create additional cards/modes is displayed as a percentage.

**Function Options:** The options at the bottom of the screen can be selected using the cursor and 'Enter' keys on the remote control.



## CREATE/MODIFY Command

The 'CREATE/MODIFY' command is used to create (add) a new computer mode to the projectors library or modify an existing computer mode.

### CREATING A NEW COMPUTER

In order to add a new computer to the projectors library select 'CREATE/MODIFY' from the **Add Computer** screen. The "Computer Name" window will open asking you to enter the name of the new computer.

The screenshot displays the 'ADD COMPUTER' screen. At the top, it says 'ADD COMPUTER'. Below that, 'Computer Name' is followed by a field containing 'NEW'. To the left of the screen, the letters 'S', 'S', 'A', 'S' are stacked vertically. Below the 'Computer Name' field, the text 'Resolution' is partially visible, followed by 'New Computer Name'. A dialog box is open in the center, containing a field with a hyphen and dashes, and two buttons: 'CANCEL' and 'OK'. At the bottom of the screen, there are four buttons: 'DELETE', 'CREATE / MODIFY', 'CANCEL', and 'OK'.

Assuming you have sufficient memory, entering a new computer name will return you to the **Add Computer** screen where the New Computer Name is displayed and a Resolution Mode field has appeared stating "NEW". If there is insufficient memory available you will be prompted to delete any unwanted entries from the library of computer cards to make room for the new card. If you enter a name that already exists a confirmation message will appear stating - "Duplicate computer card name - Press 'OK' to Edit". Select 'OK' to duplicate the name and enter the 'MODE PARAMETERS' window or 'CANCEL' to return to the 'Computer Name' window in order to enter a different name.

The duplication of a computer name allows you to save a different set of mode parameters for the same computer. If a card using the factory defaults is selected, a duplicate will be made using the same name but with an asterisk ( \* ) at the end.

The next step is to set the new computer's Resolution Mode, this is done by selecting 'CREATE/MODIFY'. The 'MODE PARAMETERS' window will open (see below) and you should enter the following information.

**Mode Name** - Name the set of mode parameters.

**Scan Rates** - Enter the scan rates stated in your computer card specifications.

**Sync Polarity** - Defines the polar values for the horizontal and vertical syncs as stated in your computer card specifications.

**Size and Position** - Set values (shown as percentages) for the horizontal and vertical size and position.

**Active pixels** - In these fields define the number of active pixels across the display and the phase of each pixel from the start of one pixel period to the end.

**Aspect Ratio** - From this fly-out list select an aspect ratio.

The screenshot shows a window titled "MODE PARAMETERS" with the following fields and values:

MODE PARAMETERS							
Computer	DIAMOND						
Mode Name	1 0 2 4 x 7 6 8						
	Scan	Sync	Polarity	Pos	Size		
Hor	-. . - kHz	<input checked="" type="checkbox"/> Pos	<input type="checkbox"/> Neg	<input type="checkbox"/> N/A	100%	100%	
Ver	-. . - Hz	<input type="checkbox"/> Pos	<input checked="" type="checkbox"/> Neg	<input type="checkbox"/> N/A	100%	100%	
Active Pixels	Res	Phase					
	1200	100					
Aspect Ratio	4 x 3						
						CANCEL	OK

After entering the required information select 'OK', a confirmation box will appear stating "Computer graphics card will be created/updated. Press 'OK' to proceed or 'CANCEL' to ignore". Select 'OK' to save the new mode.

## MODIFYING AN EXISTING COMPUTER CARD MODE

Having selected an existing computer card it is possible to modify a specific mode for that card. After selecting the mode to be modified from the resolution mode fly-out list you will enter the 'MODE PARAMETERS' window. The computer and mode names will be displayed along with the previously defined parameters.

When all the changes have been made press the 'OK' button to execute the changes. A confirmation box will appear stating- "Computer/Graphics Card will be Updated. Press 'OK' to proceed or 'CANCEL' to ignore". This is your last chance to cancel the changes to the mode.

## DELETE Command

It is possible to delete a single mode contained within a Computer Card or all the modes contained within a card effectively deleting the complete card. Deletion of a Computer Card takes place in the **Add Computer** screen as the most likely reason for deleting a card is that there is insufficient memory available to add a new card.

Only Computer Cards you have created are valid for deletion, factory supplied cards cannot be deleted. "NEW" is also an invalid option as it represents a card which has still to be created, therefore cannot be deleted. If you try to delete an invalid card a message box will appear advising you that the card you have selected cannot be deleted.

Whether deleting all modes or a single mode from a Computer Card the first step is to select the card from the fly-out menu in the Add Computer screen using the remote control. Assuming you have selected a valid Computer Card selecting "DELETE" from the screen options will open the 'DELETE COMPUTER' window.

The 'DELETE COMPUTER' screen (below) displays the card name for verification and gives you the choice of deleting all modes or a single mode by 'checking' the appropriate box.

```

      DELETED COMPUTER

Computer Card DIAMOND

 Delete All Modes
 Delete Single Mode

Select Mode 1024x768

      Scan      Sync  Polarity
Hor 62.56 kHz  Pos   Neg   N/A
Ver 65.00 Hz   Pos   Neg   N/A

      CANCEL      OK

DELETE  COPY  /MODIFY  CANCEL  OK

```

**Delete All Modes:** When you 'Check' this box the Select Mode option along with the mode information will be greyed out. Select 'OK' to display a confirmation box stating "Computer Card xx is about to be deleted. Press 'OK' to proceed or 'CANCEL' to abort.". This is your last chance to cancel the deletion.

**Delete Single Mode:** With this box 'Checked" you can choose a mode to delete from the Select Mode fly-out menu, the Scan, Sync and Polarity for the chosen mode will be displayed underneath to assist in your selection. When you select 'OK' a confirmation box stating "Mode yyy on Computer Card xx is about to be deleted. Press 'OK' to proceed or 'CANCEL' to abort".

## COPY Command

The Copy function in the Add Computer screen permits the user to make a copy of an existing computer card with all its associated modes and give it a different name. It is not possible to copy an individual mode, either within a computer card or between cards.

To copy a computer card it is necessary to select it from the computer name fly-out list and press 'COPY'. Assuming you have sufficient memory available you will enter the 'COPY COMPUTER' window (See below). If you don't have enough memory to make a copy you will be prompted to remove any unwanted computer cards from the library to make room.

The screenshot shows a terminal-style interface. At the top, it says "ADD COMPUTER". Below that, "Computer Name" is followed by a box containing "NEW". In the center, a smaller window titled "COPY COMPUTER" is open, containing the text "Enter New Computer Name" followed by a box containing "DIAMOND". Below this are two buttons: "CANCEL" and "OK". At the bottom of the main screen, there is a row of five buttons: "DELETE", "COPY", "CREATE / MODIFY", "CANCEL", and "OK". On the far right edge of the page, there is a vertical label "OPERATION".

The 'COPY COMPUTER' window requires you to enter a name for the new version of the computer card. After naming the new version select 'OK' to execute the copy. If the computer card name is duplicated then a message box will appear stating-"Duplicate Computer card Name - Must Enter a Unique Name. Press 'OK' to Continue", pressing 'OK' will return you to the "COPY COMPUTER' window so you can enter a different name.

## Applying a new signal source

If a New computer signal is applied when the selected channel is configured for computer and the computer signal does not identify a mode which matches, the screen will display an image using default Size, Position, Number of Pixels, Pixel Phase and Aspect Ratio. These default parameters will be supplied from ROM. A message will also appear stating- "New Mode will be lost if not saved or if Channel is changed".

The display will then have to be adjusted manually to give an optimum image.



*These default parameters will be applied to the Revised Store. See Storing System Configurations.*

If SAVE is then pressed on the remote or "Save" is selected in the menu system and there is insufficient memory to store a new mode, a message box will be overlaid stating- "Cannot create Computer Mode due to insufficient Memory. Need to delete an unwanted COMPUTER Entry from the library of Computer Cards. Go to ADD COMPUTER Dialogue in Menu. (New Mode will be lost if Channel is Changed.)"

## Pixel Noise on Computer Images

Many computer video cards and distribution systems exhibit unstable pixel clocks. These can show excessive pixel noise when displayed on the **POWER display**.

Some versions of hardware offer a Direct Sync option in the Channel Set-up Menus to enable you to reduce the amount of pixel noise (see C—13). To ensure stability of picture position it is recommended that the Direct Sync option is only used in cases of extreme difficulty in achieving noise free images.

Computers do not start up in exactly the same way each time, so you should be aware that with Direct Sync selected, the picture position may alter between computers and each time your computer is restarted.



*Direct Sync may not work for computers with very short video sync pulses.*

## Configuring a Computer Channel

---

1. Set Gamma in Image Mode to Preferred Value
2. In the Channel Set-up Menu select Computer Source and Colour Temperature.
3. Apply intended computer input.
4. Select Size & Position.
5. The cursor should be over the correct rate mode, press ENTER.
6. Set Pixels to equal the number of pixels per line in the signal source.
7. If the source is to be pixel mapped (e.g. 800 x 600), select a Raw Aspect Ratio. If the source is to be scaled up or down (e.g. 640 x 480 or 1024 x 768), select a 4:3 Aspect Ratio.
8. Adjust the Horizontal Size until beating pattern minimises or disappears (use an alternate pixel pattern from Paintbrush to emphasise errors).
9. Some Horizontal bars may remain, remove them by adjusting the Pixel Phase.



*No Vertical Size adjustment should be required for a Raw source.*

10. Adjust the Position to centre the image on the DMD™ display.
11. Use Pluge as per the Video channel set-up (previous page) to set up the Brightness and Contrast.



*Computer outputs cannot have negative values and therefore computer pluge bars are +2% and +4% and should both be visible. An acceptable set-up pattern can be created using Paintbrush.*



*Sharp, Hue and Saturation will have no effect on computer sources.*

## Configuring a Video Channel

---

1. Set Gamma in Image Mode to Preferred Value
2. In the Channel Set-up Menu select the correct input, aspect ratio, colour temperature and format (i.e. PAL, NTSC, SECAM, S-Video, Component RGB or Component Y Pr Pb).
3. Using either the Size & Position sub menu or the single press remote control buttons, adjust the size and position until the image fills the screen exactly.
4. Apply a Pluge Test Pattern (or a test signal or tape which has near blacks and near saturated whites).
5. Using the single press buttons on the remote control adjust the Brightness so that the -2% bar disappears but the +2% is still visible. If using a tape, adjust the Brightness up and then down until the darkest part of the tape stops getting any darker.
6. Adjust the Contrast upwards so that the white bar of the Pluge pattern or a saturated piece of tape is just saturating and then reduce again until this stops.
7. If using an NTSC source adjust the Hue to give correct colours.
8. Adjust Saturation to taste (50% is usually acceptable).



*Saturation will have no effect on RGB sources.*

9. Adjust Sharpness to taste.



*Pixel and Phase have no effect on video sources.*



## Adjusting the Displayed Image

The function buttons, located at the bottom of the remote control, allow you to adjust (where applicable) the brightness, contrast, sharpness, saturation, hue, position, size, pixel resolution, pixel phase and colour temperature of the channel currently being displayed. If a motorised lens mount is fitted to the projector the focus and horizontal/vertical position of the displayed image may also be adjusted using the 'LENS' button.

Although it is not a necessity, it is recommended that the On Screen Display should be ON before adjusting any of the channel parameters as you can then be sure which function (if any) has been activated.

When the OSD is ON, pressing a function button will bring up it's icon and a scalar bar indicating the current setting. This value can then be adjusted using the cursor keys. The current channel is displayed in the background so that you can see the changes in the image as it is adjusted. All of the functions operate a 'Hold Live' system which deactivates the function after 5 seconds if no further buttons are pressed (or 5 seconds after the last adjustment was made).



***The cursor keys are repeat action buttons and will keep changing a setting until released or the parameter limits have been reached.***

After making your adjustments to the channel image you can toggle between the original and revised parameter settings using the 'PREV' (previous) and 'REV' (revised) buttons on the remote control. To save your new settings press the 'SAVE' button, the save icon will appear for 5 seconds along with a message stating, "Channel XX updated successfully" (where XX is the channel number currently being displayed).

As Factory Preset channels cannot be updated, any alterations you wish to make to them must be saved to a new channel using the 'Channel Set-Up' function. If you try to save to a Factory Preset channel a message box will appear stating, "Unable to update the Factory Preset".



***If the OSD is OFF no message will appear.***

**BRI, SAT, SHARP, CON, HUE**

These function buttons are used to select and adjust the image parameters. When selected their associated icon and a numerical field will appear. The settings are adjusted using the cursor keys with the  $\uparrow$  and  $\Rightarrow$  cursors increasing the value and the  $\Leftarrow$  and  $\downarrow$  cursors decreasing it.

**POS**

Sets the horizontal and vertical position of the image. Pressing a cursor key will move the image in that direction.

**SIZE**

Sets the horizontal and vertical image size. The width is increased with the  $\Rightarrow$  cursor and decreased with the  $\Leftarrow$  cursor. The height can be increased using the  $\uparrow$  cursor and decreased using the  $\downarrow$  cursor.

**PIXEL**

This function is used to adjust the number of horizontal pixels being sampled in the incoming image and is only relevant for channels configured for computers. The  $\uparrow$  and  $\Rightarrow$  cursors can be used to increase the value or the  $\Leftarrow$  and  $\downarrow$  cursors can be used to decrease it.

**PHASE**

This function is only relevant to computer channels and is used to adjust the phase of the pixel clock with the  $\uparrow$  and  $\Rightarrow$  cursors increasing the value and the  $\Leftarrow$  and  $\downarrow$  cursors decreasing it.

**COL**

This function adjusts the colour temperature setting in steps of  $100^\circ$  (or  $500^\circ$ ) from  $3000^\circ$  to  $9000^\circ$ . When this function is selected the colour temperature icon will appear along with a numerical field showing the current temperature. The  $\uparrow$  and  $\Rightarrow$  cursors can be used to increase the value or the  $\Leftarrow$  and  $\downarrow$  cursors can be used to decrease it. Holding down a cursor key for up to 5 seconds will automatically step  $100^\circ$  per second, after 5 seconds the value will change in  $500^\circ$  steps.

## FOCUS

To select Focus press LENS until the Focus dialogue box appears on the screen and then make any adjustments using the ⇐ and ⇒ cursor buttons.

Focus adjustment starts very slowly and may not be immediately obvious, therefore the cursor buttons should be held down until the focus visibly changes. To achieve optimum focus it may be necessary to repeat the adjustment a couple of times until the operation of the feature feels comfortable to use.

## LENS SHIFT

Adjusts the horizontal and vertical position of the displayed image relative to the projector. To select Lens Shift press LENS until the Lens Shift dialogue box appears on the screen. The horizontal shift can then be adjusted using the ⇐ and ⇒ cursors. The vertical shift (rising/falling front) is adjusted by using the ↑ and ↓ cursors.

Vertical and horizontal shift can be used in combination, however the extent of their individual ranges will be reduced depending on the amount of shift used i.e. vertical shift is maximised when horizontal shift is centred and vice versa. When the extent of the range reaches its limit, it is possible that there will be a slight distortion of the lens position which may result in additional flare. If this position is reached, reduce the lens shift until the distortion is removed.

## Addressing Multiple Projectors

Multiple projectors are used to produce a brighter image, to join up two or more images or to display two or more images side by side.

When using multiple projectors it may be necessary to control all projectors at once, or to operate an individual projector. This is achieved through the use of the Infra-red remote control or a computer.

Each projector has its own unique address which is set using the remote control or a computer (see Set Projector Address, C—35 & Computer Control, opposite). The remote control can operate up to 32 projectors and a computer is capable of operating up to 256.

The 'A' button on the remote is used to send a command to all operating projectors, or to an individual projector, see examples below.

### To activate only projector #1:

1. Press 'A' twice.
2. Press '1'.
3. A message box will appear stating- 'Projector Address is 1'.
4. Use control buttons to operate projector #1.

### To address all of the projectors:

1. Press 'A' twice.
2. Press '0' (zero is the global address).
3. Use control buttons to operate all projectors.



*You must press the 'A' button twice within three second in order for the function to be recognised and the function will be automatically de-selected if you do not issue any commands within 10 seconds.*

All of the remote commands, apart from 'A', can be global or individual. If you use the remote for an individual projector, you will need to make sure that only that projector receives the command.

## Computer Control

To control the projector by computer, it is necessary to set up certain parameters within the control device and then connect the projector via a suitable cable to the computer (see D—40, Cables & Connections). The cable should be plugged into the 'Computer In' port on the projector and extra projectors may be connected, in 'Daisy Chain' fashion, using the 'Computer Out' port. A maximum number of 31 individually addressed projectors may be connected in this way.

The projector and computer send data to each other at RS232 levels. The following protocol must be specified for the computer's serial port:-

**Data Rate:** 9600 baud

**Data bits:** 8

**Stop bits:** 1

**Parity:** None

**Handshake:** None

Data transfer to and from the projector is made up as a series of ASCII coded hexadecimal characters formed into message packets using the structure below:-

### Address Header Data Length Data Checksum Delimiter

<b>Address</b>	Projector address (01 - 31) consisting of two characters.
<b>Header</b>	Command instruction consisting of two characters.
<b>Data Length</b>	Number representing the length of data string consisting of two characters.
<b>Data</b>	Variable length string of characters.
<b>Checksum</b>	Two least significant digits of sum generated by adding all previous pairs of characters.
<b>Delimiter</b>	Carriage return.

The checksum calculation can be avoided by substituting two lower case 'x's instead of two calculated digits. This tells the projector to ignore the checksum and treat the message as being correctly received.

The headers, or command instructions, perform the actions described below. Any subsequent implications are also described where appropriate.

<b>Header</b>	<b>Action</b>	<b>Implication</b>
00	Set lamp to power level	Level of ff will switch lamp on and a level of 00 will switch lamp off. Projector will restart in mode defined in start up preferences.
01	Sets projector mutes	None
03	Lock/unlock the user interface	The projector will ONLY respond to computer control if the lock command is issued.
04	Queries projector capability	Useful to determine the maximum input frequencies.
05	Queries projectors settings	Without using this command it is difficult to determine exactly what the projector is set to.
06	Queries model information	Useful to differentiate between 848 x 600 1024 x 768 models.
07	Wipes memory in projector	This wipes all information out of the projector including colour balance and all set up channels except 1, 2 and 3. It may lock the projector up which will require a power reset to correct.
08	Changes channel	Black screen if non-set up channel or no source on channel selected. It takes 2 or 3 seconds to lock to new channel.

Header	Action	Implication
0a	Displays box on screen	Possible to overwrite menu area. Results will vary according to the aspect ratio selected.
0b	Displays text on screen	As above.
0c	Displays icons on screen	As above.
0d	Simulates zapper command	If OSD is switched on, it is possible to switch the DMD's off.
0f	Simulates en port command	Messages can be confusing as they vary between software releases.
10	Grabs engineering messages	As above.
11	Display Test Patterns	Ramp pattern not available via menu system so cannot be switched off except by computer.
12	Changes image orientation	Could cause text to be back to front.
13	Selects gamma	None
14	Downloads new gamma	Overwrites current gamma table. Needs 256 separate values to be correctly calculated and entered along with the relevant checksum. Once in, the projector must be restarted to utilise them.
15	Sets projector's colour balance	Note, no password required to enter new colour balance. This then stops accurate black body curve tracking, leading to incorrect colour temperatures.

Header	Action	Implication
16	Sets projector's colour clip	As above, however it only affects saturated colours and the projector must be re-started to take effect.
17	Sets engineering password	Could effectively disable colour balance, colour clip and projector password changes via zapper if new password not written down or remembered. Note there is no confirmation of new password, and changes happen immediately.
18	Sets Projector address	Could lead to subsequent messages being sent to the wrong projector. May also effectively disable remote control.
19	Sequences addresses	As above, but work on all projectors connected in a chain. Potentially catastrophic if projectors already arranged in groups.
20	Set to value	Care should be taken in selecting start up mutes and preset channel number in case either result in black display on start up.
21	Save settings	This saves settings to memory which are currently in the revised buffer and not necessarily the current displayed image.
22	Previous settings	This will use the settings in the previous buffer to display an image.
23	Revised settings	This will use the settings in the revised buffer to display an image.



Header	Action	Implication
24	Preset settings	This will use the factory default settings to display an image. It will overwrite all previous changes for the currently selected channel.
30	Download channel data	This will overwrite all existing channel data for the specified channel. Care should be exercised in ensuring that wanted data is not deleted from memory.
31	Download computer card data	This command could potentially use large amounts of users memory.
32	Download submode data	Care should be taken to ensure that the settings do not exceed given ranges, otherwise use of new submode could produce unusable images.
33	Begin download card list	This command tells the projector to overwrite the existing computer card list and the associated submodes. Care should be taken if existing data needs to be kept.
34	Add computer card	Adds a new computer card to the current list. It does not overwrite any existing data.
35	Structure transfer complete	Tells the projector that no more channel/card and submode data is forthcoming.
36	Upload channel data request	Data uploaded from the projector in this way cannot be modified and sent back to the projector as a new channel without changing the status of the read/write byte.

## Switcher Operation

Using an appropriate RS232 interface (see D—40, Cables & Connections) the projector can be used in conjunction with a third party switching device. Currently 'Extron System 8' and 'Extron System 10' are compatible with the projector.

At present, an external switcher will allow you to control the lamp power, picture mute and channel change functions. Messages transferred to and from the projector are made up as a series of ASCII coded hexadecimal characters formed into message packets using the structure below:-

### Header Data Length Data Checksum

<b>Header</b>	Represents data type according to the table below.
<b>Data Length</b>	Will indicate the amount of variable length data to follow, in bytes, not including the checksum.
<b>Data</b>	Variable length string of characters.
<b>Checksum</b>	A checksum of XX will indicate that the checksum should be ignored and the message treated as correctly received.

Header	Message	Data	Meaning
04	Lamp Power	XX	Change lamp power to specified value. 00 = minimum power and FF = maximum.
07	Picture Unmute	-	Unmutes the Picture.
08	Picture Mute	-	Mutes the Picture.
0a	Channel Change	XX	Change to logical channel number.

All messages sent to the projector will receive a standard ASCII ACK (06 hex) or NACK (15 hex) character in response.

For further information on switcher connection and operation please refer to the documentation supplied with your switching device.

## Section D: Advanced User Information

Screen Illuminance .....	D-1
DMD™ Operation and Usage .....	D-2
Operation Flowcharts .....	D-4
Creating a New Channel .....	D-4
Copying a Channel .....	D-6
Modifying a Channel .....	D-8
Adding a Computer .....	D-10
Modifying a Computer Card .....	D-12
Lenses .....	D-14
Lens Transmission & Beam Angles .....	D-14
Rising & Falling Front .....	D-14
Metric Throw Distances for a 1.27:1 Lens .....	D-15
Imperial Throw Distances for a 1.27:1 Lens .....	D-17
Metric Throw Distances for a 3:1 Lens .....	D-18
Imperial Throw Distances for a 3:1 Lens .....	D-20
Metric Throw Distances for a 5:1 Lens .....	D-21
Imperial Throw Distances for a 5:1 Lens .....	D-23
Metric Throw Distances for a 7:1 Lens .....	D-24
Imperial Throw Distances for a 7:1 Lens .....	D-26
Metric Throw Distances	
for a 1.5 - 3:1 Zoom Lens at 1.5:1 .....	D-27
Imperial Throw Distances	
for a 1.5 - 3:1 Zoom Lens at 1.5:1 .....	D-29

**Metric Throw Distances**  
for a 1.5 - 3:1 Zoom Lens at 3:1 .....D—30

**Imperial Throw Distances**  
for a 1.5 - 3:1 Zoom Lens at 3:1 .....D—32

**Metric Throw Distances**  
for a 3 - 7:1 Zoom Lens at 3:1 .....D—33

**Imperial Throw Distances**  
for a 3 - 7:1 Zoom Lens at 3:1 .....D—35

**Metric Throw Distances**  
for a 3 - 7:1 Zoom Lens at 7:1 .....D—36

**Imperial Throw Distances**  
for a 3 - 7:1 Zoom Lens at 7:1 .....D—38

**Metric Throw Distances**  
for an Ultra Wide Angle Lens .....D—36

**Imperial Throw Distances**  
for an Ultra Wide Angle Lens .....D—38

**Cables & Connections .....D—42**

**Satellite Receiver .....D—42**

**Remote Computer Control .....D—43**

**Switcher Control .....D—43**

**Technical Specification .....D—44**

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**Disclaimer** Digital Projection has made every effort to ensure the accuracy of the lens throw distance tables contained within this section. However, Digital Projection disclaims any responsibility for any inappropriate displayed image size resulting from the use of the information in these tables.

## 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/m<sup>2</sup>) or **Foot Candles** (lumens/ft<sup>2</sup>). 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<sup>2</sup> is given by  $(R \times E) / \pi$ , where E is measured in Lux. If E is measured in Foot-Candles, the screen *luminance* is in Foot-Lamberts, and is given by  $R \times E$ .

### *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) =  $F / A = 3000 / 27 = \underline{111 \text{ Foot-Candles}}$

The screen luminance (B) =  $R \times E = 0.8 \times 111 = \underline{89 \text{ Foot Lamberts}}$

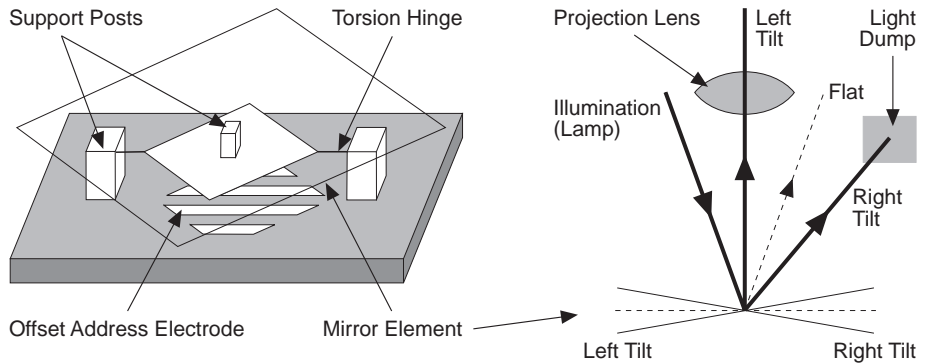
- 2) A 4m x 3m screen with a reflectivity of 0.85 is illuminated by a projector emitting 3500 lumens.

The screen illuminance (E) =  $F / A = 3500 / 12 = \underline{292 \text{ Lux}}$

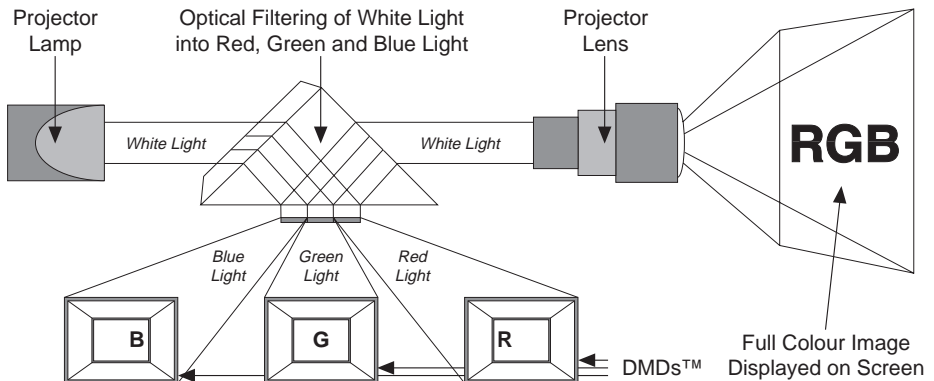
The screen luminance (B) =  $(R \times E) / \pi = (0.85 \times 292) / \pi = \underline{79 \text{ Candela/m}^2}$

## DMD™ Operation and Usage

A DMD™ (Digital Micromirror Device™) is a true digital light modulator and utilises 508,800 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.

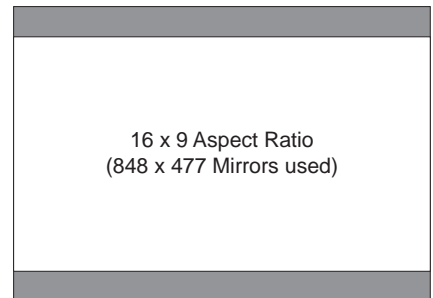
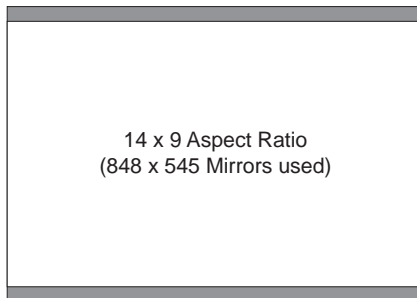
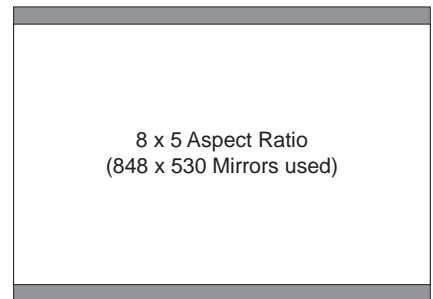
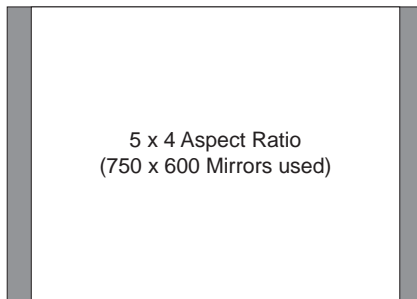
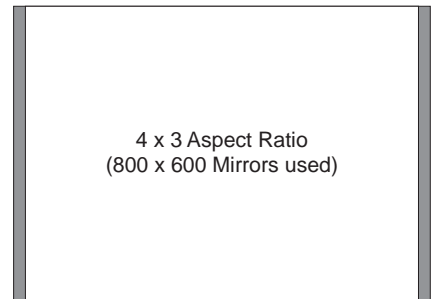


The projector optically filters white light from the lamp into its constituent red, green and blue. Each colour illuminates a separate DMD™ whose modulated output is then recombined with the other two to form the projected full colour image.



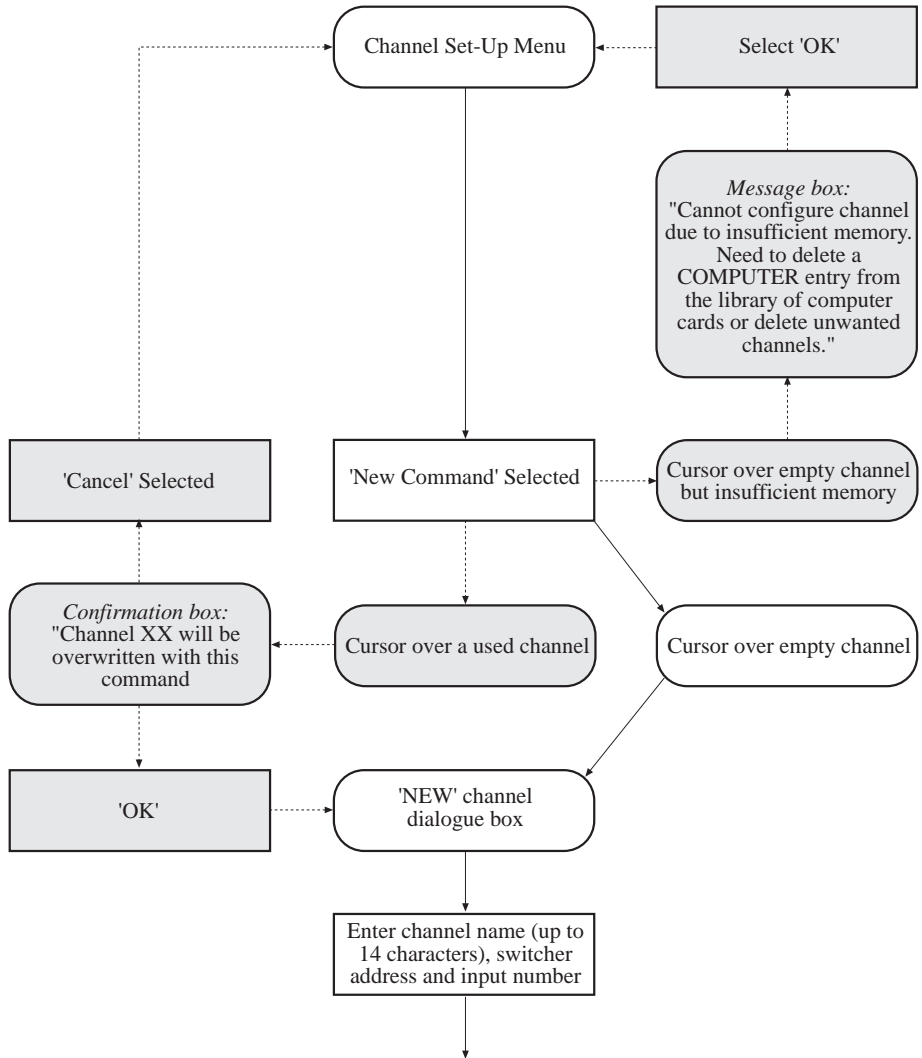
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The mirrors in the DMD™ are arranged in a 848 x 600 array allowing images of all aspect ratios to be displayed. However, the proportion of DMD™ effectively used will differ depending on the aspect ratio of the image e.g. a 4 x 3 aspect ratio would only require the use of 800 x 600 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.



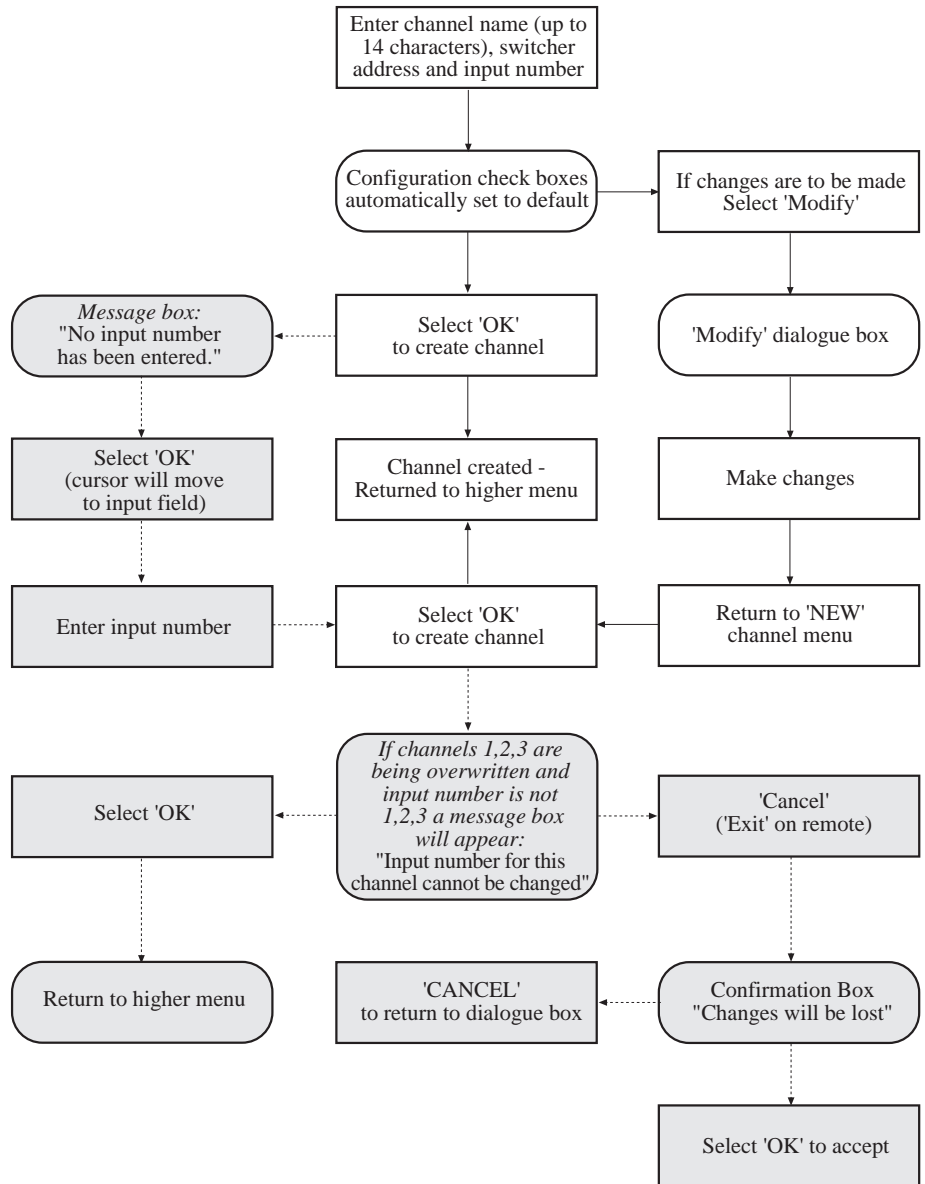
## Operation Flowcharts

### Creating a New Channel

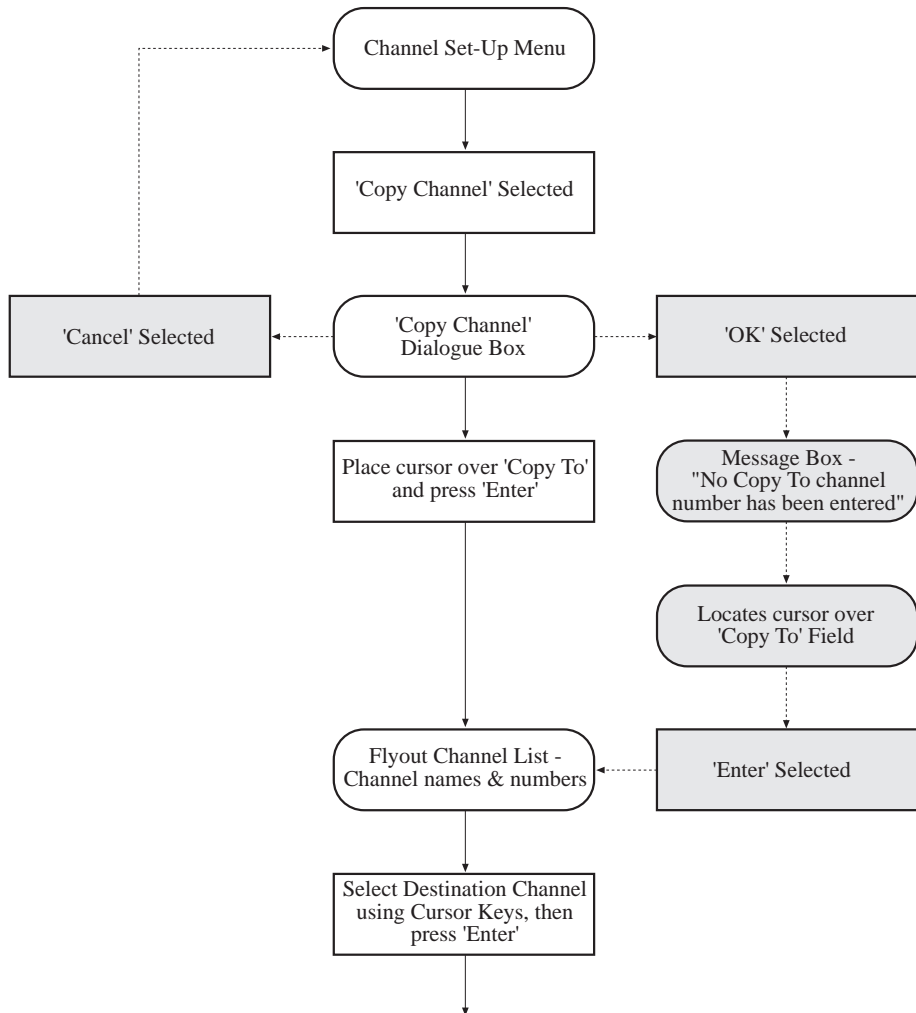


ADVANCED

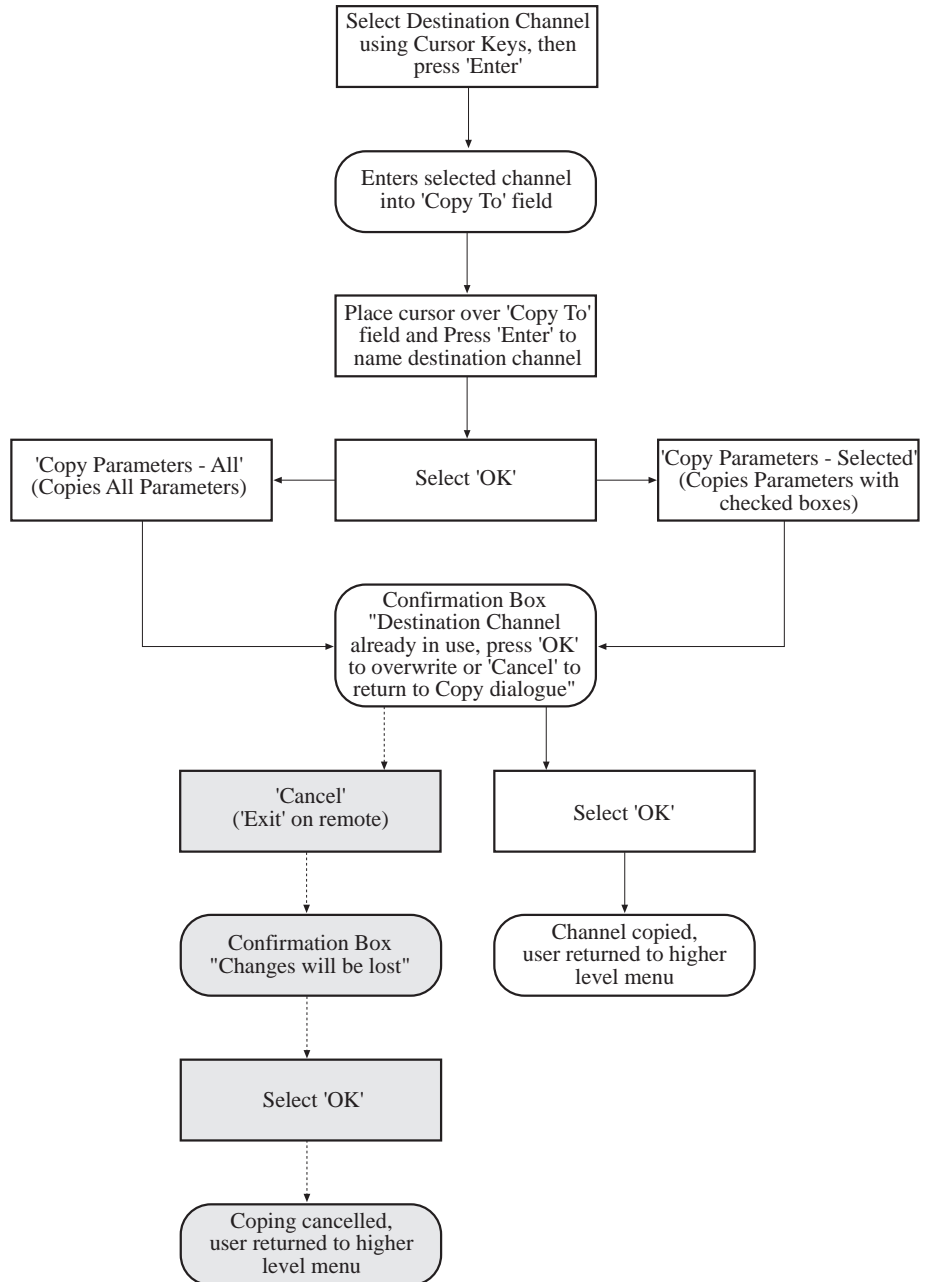




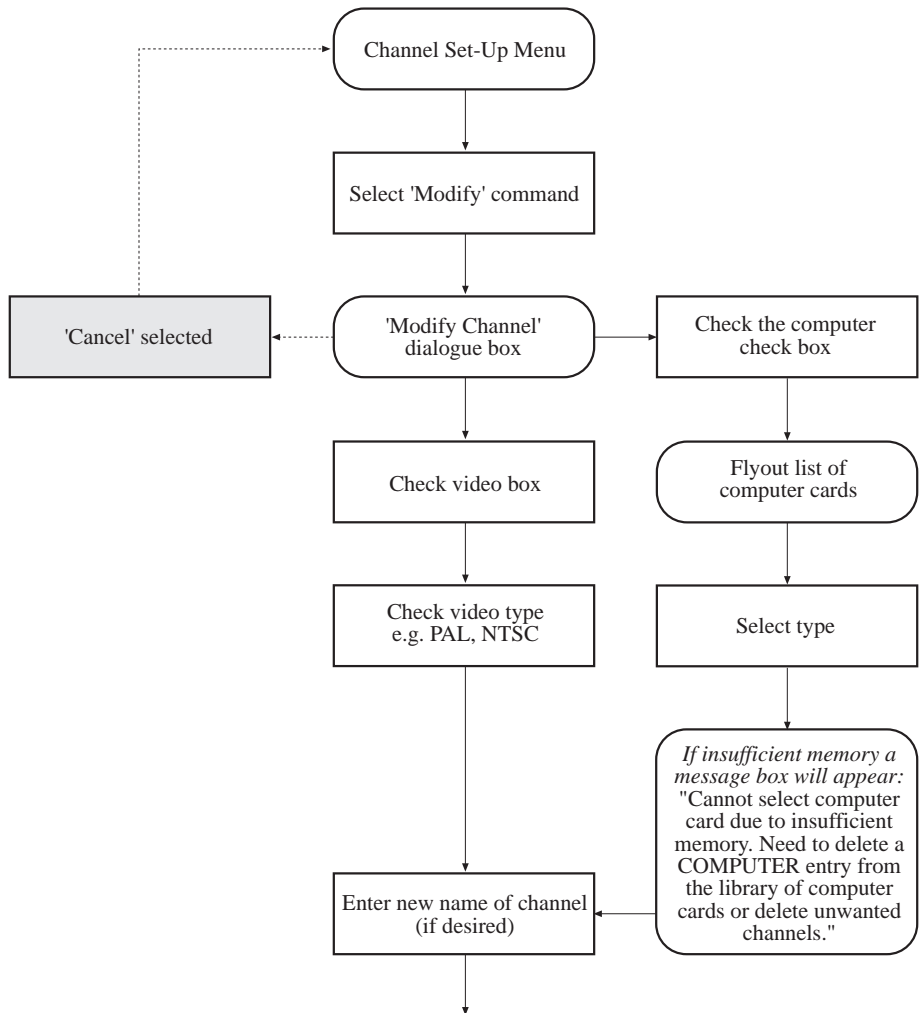
## Copying a Channel



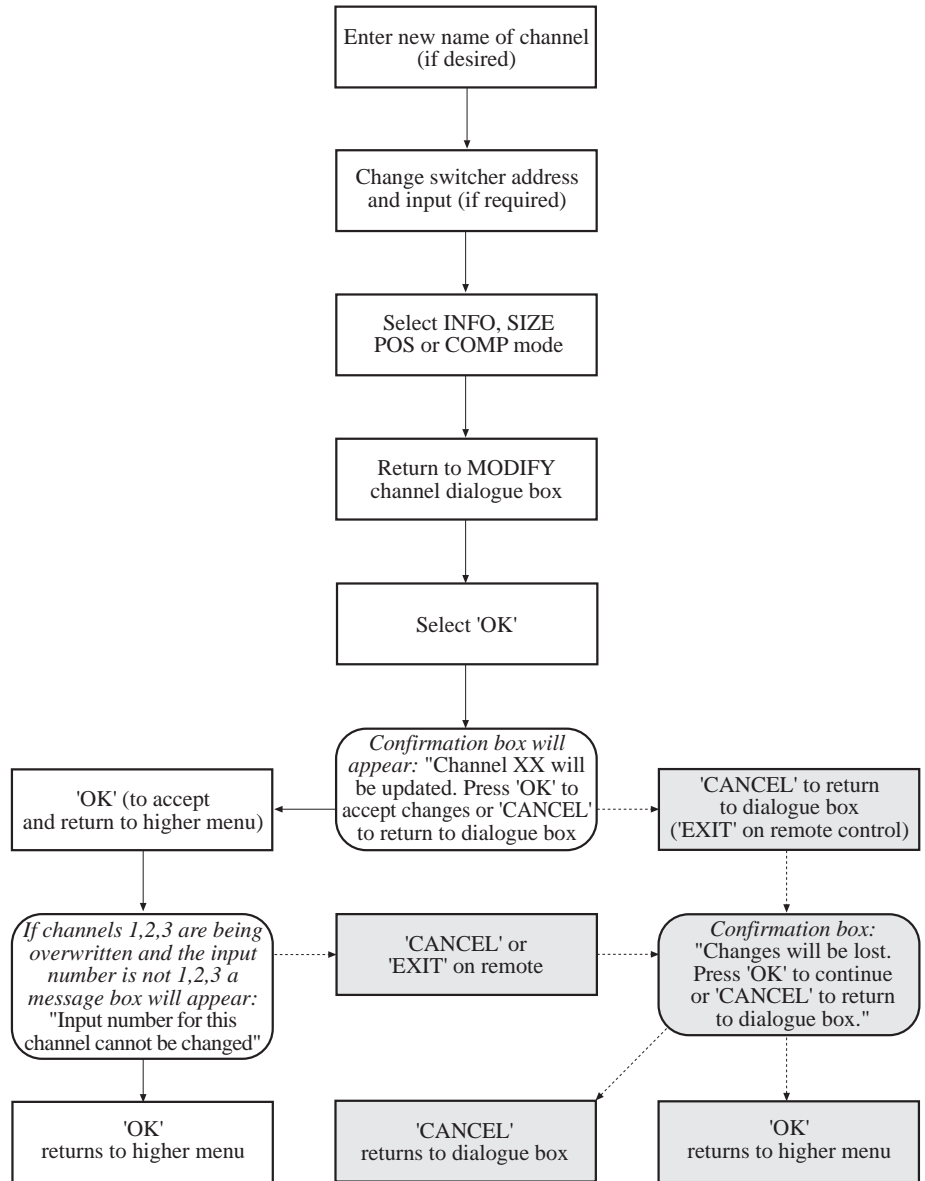
ADVANCED



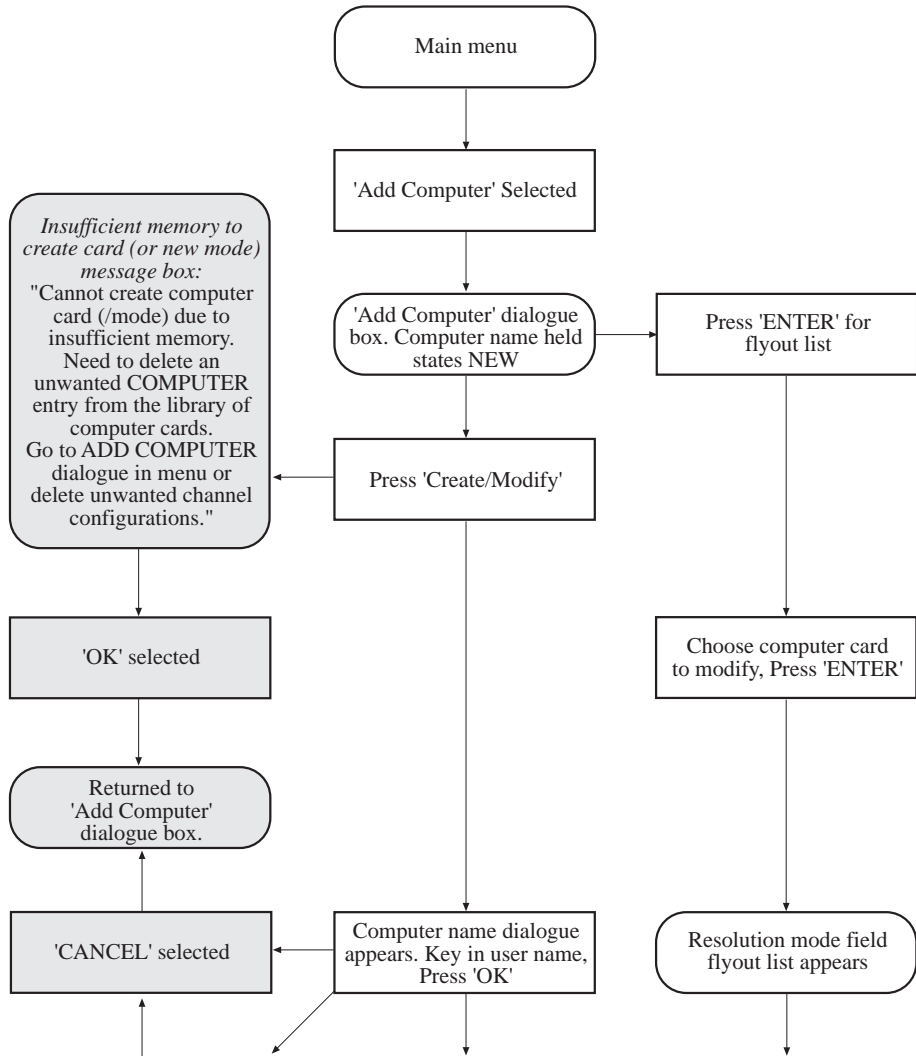
## Modifying a Channel



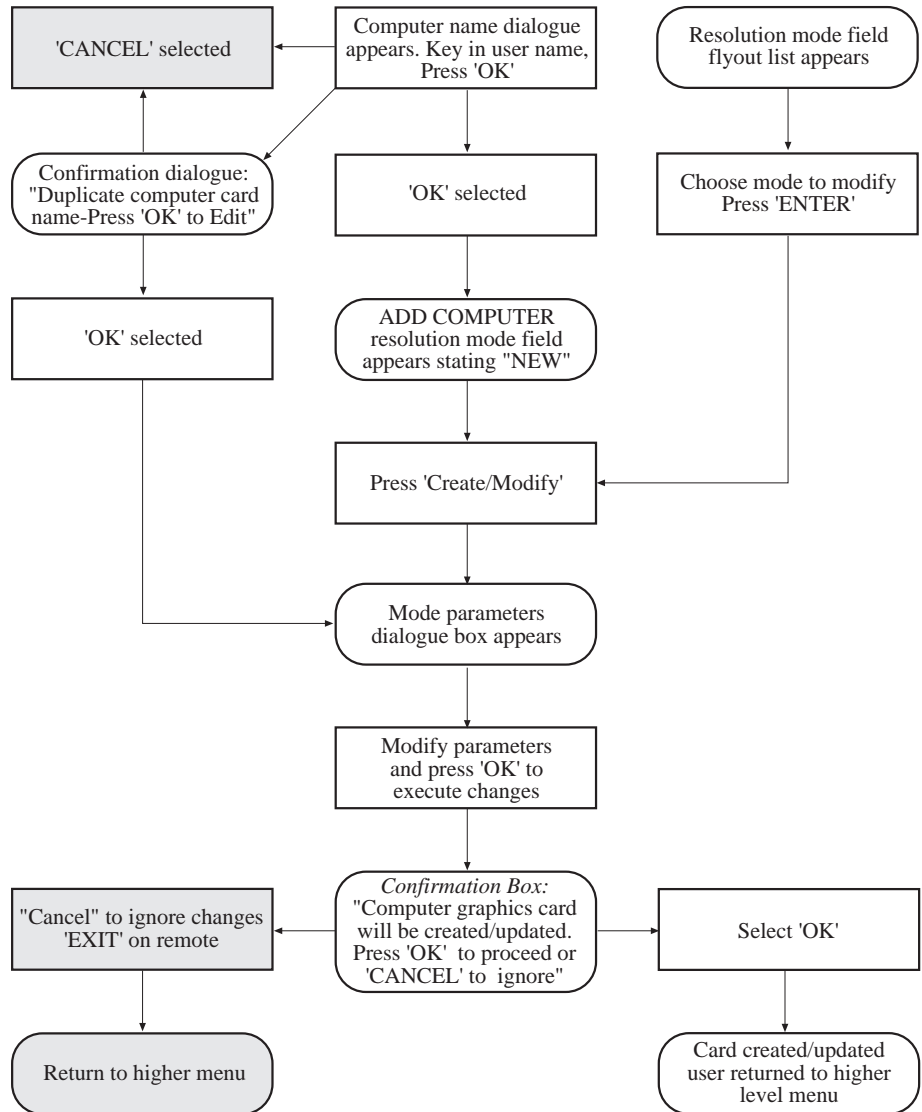
ADVANCED



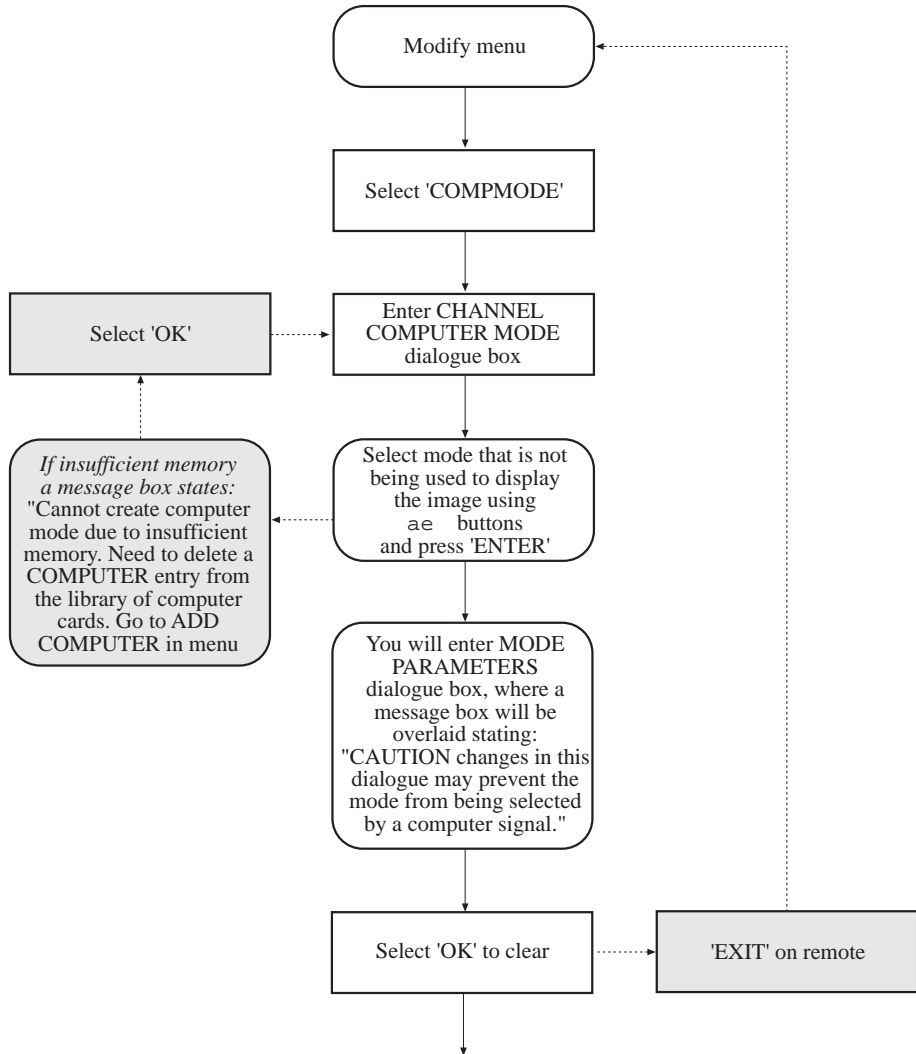
## Adding a Computer



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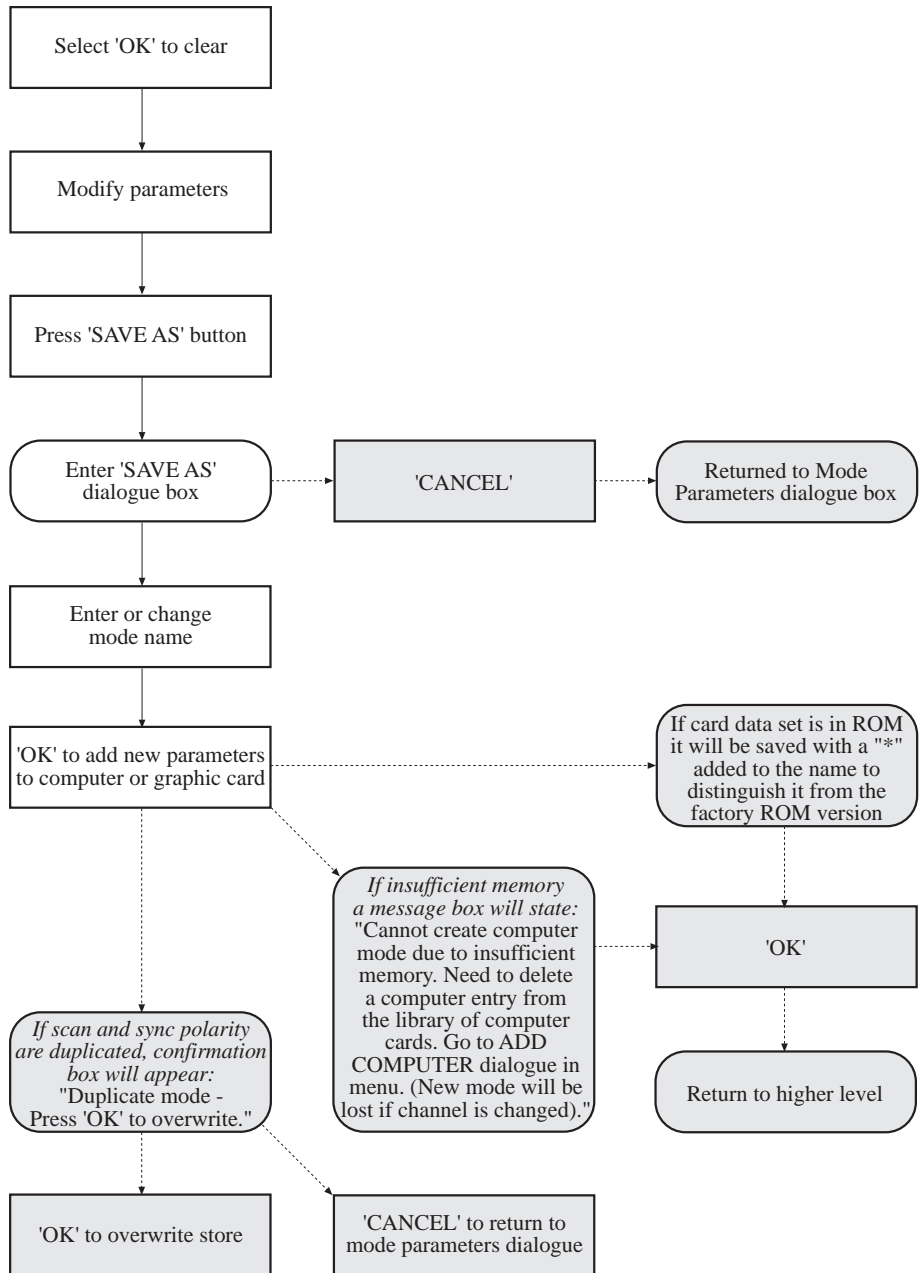


## Modifying a Computer Card



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## Lenses

### Lens Transmission & Beam Angles

Lens	Used At	Transmission	Half Beam Angle	Full Beam Angle
1.27 : 1	1.27 : 1	96.4	21.50°	43.00°
3.0 : 1	3.0 : 1	94.0	9.46°	18.93°
5.0 : 1	5.0 : 1	100.0	5.71°	11.42°
7.0 : 1	7.0 : 1	97.0	4.10°	8.20°
1.5 : 1 - 3.0 : 1	1.5 : 1	91.6	18.45°	36.90°
1.5 : 1 - 3.0 : 1	3.0 : 1	91.6	9.46°	18.93°
3.0 : 1 - 7.0 : 1	3.0 : 1	90.6	9.46°	18.93°
3.0 : 1 - 7.0 : 1	7.0 : 1	90.6	4.10°	8.20°
Ultra Wide Angle	0.96 : 1	88.0	26.55°	53.10°



*All lens transmission values are percentages relative to a 5.0 : 1 lens*

### Rising & Falling Front

The rising and falling front facility allows images to be displayed with negligible keystone distortion when the projector is positioned above or below the centre of the screen. Up to 300 pixels of rising front correction can be implemented for all lenses using either the manual or motorised lens mount.

When using the manual lens mount, up to 120 pixels of falling front is achievable for all lenses. The motorised lens mount will allow a maximum of 200 pixels of falling front with a 1.27 : 1 or Ultra Wide Angle lens and up to 300 pixels with all other lenses. However, in order to achieve 300 pixels of falling front, slight tilting of the projector may be required.



*The maximum rising and falling front values only apply when the horizontal lens shift is centred.*

## Metric Throw Distances for a 1.27:1 Lens



*1.27:1 is the accurate ratio for the lens marked as 1.2 and this ratio should be used for any calculations.*

Metres	Screen Width Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
1.00	1.30	1.38	1.22	1.22	1.22
1.10	1.43	1.52	1.35	1.35	1.35
1.20	1.56	1.66	1.47	1.47	1.47
1.30	1.69	1.80	1.59	1.59	1.59
1.40	1.82	1.94	1.72	1.72	1.72
1.50	1.95	2.08	1.84	1.84	1.84
1.60	2.08	2.22	1.96	1.96	1.96
1.70	2.21	2.36	2.08	2.08	2.08
1.80	2.34	2.50	2.21	2.21	2.21
1.90	2.47	2.63	2.33	2.33	2.33
2.00	2.60	2.77	2.45	2.45	2.45
2.10	2.73	2.91	2.58	2.58	2.58
2.20	2.86	3.05	2.70	2.70	2.70
2.30	2.99	3.19	2.82	2.82	2.82
2.40	3.12	3.33	2.94	2.94	2.94
2.50	3.25	3.47	3.07	3.07	3.07
2.60	3.38	3.61	3.19	3.19	3.19
2.70	3.51	3.75	3.31	3.31	3.31
2.80	3.64	3.88	3.44	3.44	3.44
2.90	3.77	4.02	3.56	3.56	3.56
3.00	3.90	4.16	3.68	3.68	3.68
3.10	4.03	4.30	3.80	3.80	3.80
3.20	4.16	4.44	3.93	3.93	3.93
3.30	4.29	4.58	4.05	4.05	4.05
3.40	4.42	4.72	4.17	4.17	4.17
3.50	4.55	4.86	4.30	4.30	4.30
3.60	4.68	5.00	4.42	4.42	4.42
3.70	4.81	5.13	4.54	4.54	4.54
3.80	4.94	5.27	4.66	4.66	4.66
3.90	5.07	5.41	4.79	4.79	4.79
4.00	5.20	5.55	4.91	4.91	4.91
4.10	5.33	5.69	5.03	5.03	5.03
4.20	5.46	5.83	5.16	5.16	5.16
4.30	5.59	5.97	5.28	5.28	5.28
4.40	5.72	6.11	5.40	5.40	5.40
4.50	5.86	6.25	5.52	5.52	5.52
4.60	5.99	6.38	5.65	5.65	5.65
4.70	6.12	6.52	5.77	5.77	5.77
4.80	6.25	6.66	5.89	5.89	5.89
4.90	6.38	6.80	6.02	6.02	6.02
5.00	6.51	6.94	6.14	6.14	6.14

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
5.10	6.64	7.08	6.26	6.26	6.26
5.20	6.77	7.22	6.38	6.38	6.38
5.30	6.90	7.36	6.51	6.51	6.51
5.40	7.03	7.50	6.63	6.63	6.63
5.50	7.16	7.63	6.75	6.75	6.75
5.60	7.29	7.77	6.88	6.88	6.88
5.70	7.42	7.91	7.00	7.00	7.00
5.80	7.55	8.05	7.12	7.12	7.12
5.90	7.68	8.19	7.24	7.24	7.24
6.00	7.81	8.33	7.37	7.37	7.37
6.10	7.94	8.47	7.49	7.49	7.49
6.20	8.07	8.61	7.61	7.61	7.61
6.30	8.20	8.75	7.74	7.74	7.74
6.40	8.33	8.88	7.86	7.86	7.86
6.50	8.46	9.02	7.98	7.98	7.98
6.60	8.59	9.16	8.10	8.10	8.10
6.70	8.72	9.30	8.23	8.23	8.23
6.80	8.85	9.44	8.35	8.35	8.35
6.90	8.98	9.58	8.47	8.47	8.47
7.00	9.11	9.72	8.59	8.59	8.59
7.10	9.24	9.86	8.72	8.72	8.72
7.20	9.37	10.00	8.84	8.84	8.84
7.30	9.50	10.13	8.96	8.96	8.96
7.40	9.63	10.27	9.09	9.09	9.09
7.50	9.76	10.41	9.21	9.21	9.21
7.60	9.89	10.55	9.33	9.33	9.33
7.70	10.02	10.69	9.45	9.45	9.45
7.80	10.15	10.83	9.58	9.58	9.58
7.90	10.28	10.97	9.70	9.70	9.70
8.00	10.41	11.11	9.82	9.82	9.82
8.10	10.54	11.25	9.95	9.95	9.95
8.20	10.67	11.38	10.07	10.07	10.07
8.30	10.80	11.52	10.19	10.19	10.19
8.40	10.93	11.66	10.31	10.31	10.31
8.50	11.06	11.80	10.44	10.44	10.44
8.60	11.19	11.94	10.56	10.56	10.56
8.70	11.32	12.08	10.68	10.68	10.68
8.80	11.45	12.22	10.81	10.81	10.81
8.90	11.58	12.36	10.93	10.93	10.93
9.00	11.72	12.50	11.05	11.05	11.05
9.10	11.85	12.63	11.17	11.17	11.17
9.20	11.98	12.77	11.30	11.30	11.30
9.30	12.11	12.91	11.42	11.42	11.42
9.40	12.24	13.05	11.54	11.54	11.54
9.50	12.37	13.19	11.67	11.67	11.67
9.60	12.50	13.33	11.79	11.79	11.79
9.70	12.63	13.47	11.91	11.91	11.91
9.80	12.76	13.61	12.03	12.03	12.03
9.90	12.89	13.75	12.16	12.16	12.16
10.00	13.02	13.89	12.28	12.28	12.28

ADVANCED

## Imperial Throw Distances for a 1.27:1 Lens

Screen Width Imperial (ft)	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
3.00	3.90	<b>4.16</b>	3.68	3.68	3.68
3.50	4.55	<b>4.86</b>	4.30	4.30	4.30
4.00	5.20	<b>5.55</b>	4.91	4.91	4.91
4.50	5.86	<b>6.25</b>	5.52	5.52	5.52
5.00	6.51		6.14	6.14	6.14
5.50	7.16	<b>6.94</b>	6.75	6.75	6.75
6.00	7.81	7.63	7.37	7.37	7.37
6.50	8.46	8.33	7.98	7.98	7.98
7.00	9.11	9.72	8.59	8.59	8.59
7.50	9.76	10.41	9.21	9.21	9.21
8.00	10.41	11.11	9.82	9.82	9.82
8.50	11.06	11.80	10.44	10.44	10.44
9.00	11.72	12.50	11.05	11.05	11.05
9.50	12.37	13.19	11.67	11.67	11.67
10.00	13.02	13.89	12.28	12.28	12.28
10.50	13.67	14.58	12.89	12.89	12.89
11.00	14.32	15.27	13.51	13.51	13.51
11.50	14.97	15.97	14.12	14.12	14.12
12.00	15.62	16.66	14.74	14.74	14.74
12.50	16.27	17.36	15.35	15.35	15.35
13.00	16.92	18.05	15.97	15.97	15.97
13.50	17.58	18.75	16.58	16.58	16.58
14.00	18.23	19.44	17.19	17.19	17.19
14.50	18.88	20.14	17.81	17.81	17.81
15.00	19.53	20.83	18.42	18.42	18.42
15.50	20.18	21.52	19.04	19.04	19.04
16.00	20.83	22.22	19.65	19.65	19.65
16.50	21.48	22.91	20.27	20.27	20.27
17.00	22.13	23.61	20.88	20.88	20.88
17.50	22.78	24.30	21.49	21.49	21.49
18.00	23.43	25.00	22.11	22.11	22.11
18.50	24.09	25.69	22.72	22.72	22.72
19.00	24.74	26.39	23.34	23.34	23.34
19.50	25.39	27.08	23.95	23.95	23.95
20.00	26.04	27.78	24.57	24.57	24.57
21.00	27.34	29.16	25.79	25.79	25.79
22.00	28.64	30.55	27.02	27.02	27.02
23.00	29.95	31.94	28.25	28.25	28.25
24.00	31.25	33.33	29.48	29.48	29.48
25.00	32.55	34.72	30.71	30.71	30.71
26.00	33.85	36.11	31.94	31.94	31.94
27.00	35.15	37.50	33.16	33.16	33.16
28.00	36.46	38.89	34.39	34.39	34.39
29.00	37.76	40.28	35.62	35.62	35.62
30.00	39.06	41.67	36.85	36.85	36.85

## Metric Throw Distances for a 3:1 Lens

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
1.00	3.02	3.22	2.85	2.85	2.85
1.10	3.32	3.54	3.13	3.13	3.13
1.20	3.62	3.87	3.42	3.42	3.42
1.30	3.93	4.19	3.70	3.70	3.70
1.40	4.23	4.51	3.99	3.99	3.99
1.50	4.53	4.83	4.27	4.27	4.27
1.60	4.83	5.15	4.56	4.56	4.56
1.70	5.13	5.47	4.84	4.84	4.84
1.80	5.43	5.79	5.12	5.12	5.12
1.90	5.73	6.11	5.41	5.41	5.41
2.00	6.03	6.44	5.69	5.69	5.69
2.10	6.33	6.76	5.98	5.98	5.98
2.20	6.64	7.08	6.26	6.26	6.26
2.30	6.94	7.40	6.54	6.54	6.54
2.40	7.24	7.72	6.83	6.83	6.83
2.50	7.54	8.04	7.11	7.11	7.11
2.60	7.84	8.36	7.40	7.40	7.40
2.70	8.14	8.68	7.68	7.68	7.68
2.80	8.44	9.00	7.96	7.96	7.96
2.90	8.74	9.33	8.25	8.25	8.25
3.00	9.04	9.65	8.53	8.53	8.53
3.10	9.35	9.97	8.82	8.82	8.82
3.20	9.65	10.29	9.10	9.10	9.10
3.30	9.95	10.61	9.38	9.38	9.38
3.40	10.25	10.93	9.67	9.67	9.67
3.50	10.55	11.25	9.95	9.95	9.95
3.60	10.85	11.57	10.24	10.24	10.24
3.70	11.15	11.90	10.52	10.52	10.52
3.80	11.45	12.22	10.81	10.81	10.81
3.90	11.75	12.54	11.09	11.09	11.09
4.00	12.06	12.86	11.37	11.37	11.37
4.10	12.36	13.18	11.66	11.66	11.66
4.20	12.66	13.50	11.94	11.94	11.94
4.30	12.96	13.82	12.23	12.23	12.23
4.40	13.26	14.14	12.51	12.51	12.51
4.50	13.56	14.47	12.79	12.79	12.79
4.60	13.86	14.79	13.08	13.08	13.08
4.70	14.16	15.11	13.36	13.36	13.36
4.80	14.46	15.43	13.65	13.65	13.65
4.90	14.77	15.75	13.93	13.93	13.93
5.00	15.07	16.07	14.21	14.21	14.21
5.10	15.37	16.39	14.50	14.50	14.50
5.20	15.67	16.71	14.78	14.78	14.78
5.30	15.97	17.04	15.07	15.07	15.07
5.40	16.27	17.36	15.35	15.35	15.35
5.50	16.57	17.68	15.63	15.63	15.63

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
5.60	16.87	18.00	15.92	15.92	15.92
5.70	17.18	18.32	16.20	16.20	16.20
5.80	17.48	18.64	16.49	16.49	16.49
5.90	17.78	18.96	16.77	16.77	16.77
6.00	18.08	19.28	17.06	17.06	17.06
6.10	18.38	19.60	17.34	17.34	17.34
6.20	18.68	19.93	17.62	17.62	17.62
6.30	18.98	20.25	17.91	17.91	17.91
6.40	19.28	20.57	18.19	18.19	18.19
6.50	19.58	20.89	18.48	18.48	18.48
6.60	19.89	21.21	18.76	18.76	18.76
6.70	20.19	21.53	19.04	19.04	19.04
6.80	20.49	21.85	19.33	19.33	19.33
6.90	20.79	22.17	19.61	19.61	19.61
7.00	21.09	22.50	19.90	19.90	19.90
7.10	21.39	22.82	20.18	20.18	20.18
7.20	21.69	23.14	20.46	20.46	20.46
7.30	21.99	23.46	20.75	20.75	20.75
7.40	22.29	23.78	21.03	21.03	21.03
7.50	22.60	24.10	21.32	21.32	21.32
7.60	22.90	24.42	21.60	21.60	21.60
7.70	23.20	24.74	21.88	21.88	21.88
7.80	23.50	25.07	22.17	22.17	22.17
7.90	23.80	25.39	22.45	22.45	22.45
8.00	24.10	25.71	22.74	22.74	22.74
8.10	24.40	26.03	23.02	23.02	23.02
8.20	24.70	26.35	23.31	23.31	23.31
8.30	25.00	26.67	23.59	23.59	23.59
8.40	25.31	26.99	23.87	23.87	23.87
8.50	25.61	27.31	24.16	24.16	24.16
8.60	25.91	27.64	24.44	24.44	24.44
8.70	26.21	27.96	24.73	24.73	24.73
8.80	26.51	28.28	25.01	25.01	25.01
8.90	26.81	28.60	25.29	25.29	25.29
9.00	27.11	28.92	25.58	25.58	25.58
9.10	27.41	29.24	25.86	25.86	25.86
9.20	27.71	29.56	26.15	26.15	26.15
9.30	28.02	29.88	26.43	26.43	26.43
9.40	28.32	30.20	26.71	26.71	26.71
9.50	28.62	30.53	27.00	27.00	27.00
9.60	28.92	30.85	27.28	27.28	27.28
9.70	29.22	31.17	27.57	27.57	27.57
9.80	29.52	31.49	27.85	27.85	27.85
9.90	29.82	31.81	28.13	28.13	28.13
10.00	30.12	32.13	28.42	28.42	28.42

## Imperial Throw Distances for a 3:1 Lens

Screen Width Imperial (ft)	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
3.00	9.04	9.65	8.53	8.53	8.53
3.50	10.55	11.25	9.95	9.95	9.95
4.00	12.06	12.86	11.37	11.37	11.37
4.50	13.56	14.47	12.79	12.79	12.79
5.00	15.07	16.07	14.21	14.21	14.21
5.50	16.57	17.68	15.63	15.63	15.63
6.00	18.08	19.28	17.06	17.06	17.06
6.50	19.58	20.89	18.48	18.48	18.48
7.00	21.09	22.50	19.90	19.90	19.90
7.50	22.60	24.10	21.32	21.32	21.32
8.00	24.10	25.71	22.74	22.74	22.74
8.50	25.61	27.31	24.16	24.16	24.16
9.00	27.11	28.92	25.58	25.58	25.58
9.50	28.62	30.53	27.00	27.00	27.00
10.00	30.12	32.13	28.42	28.42	28.42
10.50	31.63	33.74	29.84	29.84	29.84
11.00	33.14	35.34	31.26	31.26	31.26
11.50	34.64	36.95	32.68	32.68	32.68
12.00	36.15	38.56	34.10	34.10	34.10
12.50	37.65	40.16	35.52	35.52	35.52
13.00	39.16	41.77	36.94	36.94	36.94
13.50	40.66	43.37	38.36	38.36	38.36
14.00	42.17	44.98	39.78	39.78	39.78
14.50	43.68	46.59	41.20	41.20	41.20
15.00	45.18	48.19	42.62	42.62	42.62
15.50	46.69	49.80	44.04	44.04	44.04
16.00	48.19	51.40	45.46	45.46	45.46
16.50	49.70	53.01	46.88	46.88	46.88
17.00	51.20	54.62	48.31	48.31	48.31
17.50	52.71	56.22	49.73	49.73	49.73
18.00	54.21	57.83	51.15	51.15	51.15
18.50	55.72	59.44	52.57	52.57	52.57
19.00	57.23	61.04	53.99	53.99	53.99
19.50	58.73	62.65	55.41	55.41	55.41
20.00	60.24	64.25	56.83	56.83	56.83
21.00	63.25	67.47	59.67	59.67	59.67
22.00	66.26	70.68	62.51	62.51	62.51
23.00	69.27	73.89	65.35	65.35	65.35
24.00	72.28	77.10	68.19	68.19	68.19
25.00	75.29	80.31	71.03	71.03	71.03
26.00	78.31	83.53	73.87	73.87	73.87
27.00	81.32	86.74	76.71	76.71	76.71
28.00	84.33	89.95	79.56	79.56	79.56
29.00	87.34	93.16	82.40	82.40	82.40
30.00	90.35	96.37	85.24	85.24	85.24



## Metric Throw Distances for a 5:1 Lens

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
1.00	4.92	5.25	4.64	4.64	4.64
1.10	5.42	5.79	5.12	5.12	5.12
1.20	5.93	6.33	5.59	5.59	5.59
1.30	6.44	6.86	6.07	6.07	6.07
1.40	6.94	7.40	6.55	6.55	6.55
1.50	7.45	7.94	7.02	7.02	7.02
1.60	7.95	8.48	7.50	7.50	7.50
1.70	8.46	9.02	7.98	7.98	7.98
1.80	8.96	9.56	8.46	8.46	8.46
1.90	9.47	10.10	8.93	8.93	8.93
2.00	9.97	10.64	9.41	9.41	9.41
2.10	10.48	11.18	9.89	9.89	9.89
2.20	10.98	11.72	10.36	10.36	10.36
2.30	11.49	12.26	10.84	10.84	10.84
2.40	12.00	12.80	11.32	11.32	11.32
2.50	12.50	13.33	11.79	11.79	11.79
2.60	13.01	13.87	12.27	12.27	12.27
2.70	13.51	14.41	12.75	12.75	12.75
2.80	14.02	14.95	13.22	13.22	13.22
2.90	14.52	15.49	13.70	13.70	13.70
3.00	15.03	16.03	14.18	14.18	14.18
3.10	15.53	16.57	14.65	14.65	14.65
3.20	16.04	17.11	15.13	15.13	15.13
3.30	16.54	17.65	15.61	15.61	15.61
3.40	17.05	18.19	16.09	16.09	16.09
3.50	17.56	18.73	16.56	16.56	16.56
3.60	18.06	19.27	17.04	17.04	17.04
3.70	18.57	19.80	17.52	17.52	17.52
3.80	19.07	20.34	17.99	17.99	17.99
3.90	19.58	20.88	18.47	18.47	18.47
4.00	20.08	21.42	18.95	18.95	18.95
4.10	20.59	21.96	19.42	19.42	19.42
4.20	21.09	22.50	19.90	19.90	19.90
4.30	21.60	23.04	20.38	20.38	20.38
4.40	22.11	23.58	20.85	20.85	20.85
4.50	22.61	24.12	21.33	21.33	21.33
4.60	23.12	24.66	21.81	21.81	21.81
4.70	23.62	25.20	22.28	22.28	22.28
4.80	24.13	25.74	22.76	22.76	22.76
4.90	24.63	26.27	23.24	23.24	23.24
5.00	25.14	26.81	23.72	23.72	23.72
5.10	25.64	27.35	24.19	24.19	24.19
5.20	26.15	27.89	24.67	24.67	24.67
5.30	26.65	28.43	25.15	25.15	25.15
5.40	27.16	28.97	25.62	25.62	25.62
5.50	27.67	29.51	26.10	26.10	26.10

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
5.60	28.17	30.05	26.58	26.58	26.58
5.70	28.68	30.59	27.05	27.05	27.05
5.80	29.18	31.13	27.53	27.53	27.53
5.90	29.69	31.67	28.01	28.01	28.01
6.00	30.19	32.21	28.48	28.48	28.48
6.10	30.70	32.75	28.96	28.96	28.96
6.20	31.20	33.78	29.44	29.44	29.44
6.30	31.71	33.82	29.91	29.91	29.91
6.40	32.22	34.36	30.39	30.39	30.39
6.50	32.72	34.90	30.87	30.87	30.87
6.60	33.23	35.44	31.35	31.35	31.35
6.70	33.73	35.98	31.82	31.82	31.82
6.80	34.24	36.52	32.30	32.30	32.30
6.90	34.74	37.06	32.78	32.78	32.78
7.00	35.25	37.60	33.25	33.25	33.25
7.10	35.75	38.14	33.73	33.73	33.73
7.20	36.26	38.68	34.21	34.21	34.21
7.30	36.76	39.22	34.68	34.68	34.68
7.40	37.27	39.75	35.16	35.16	35.16
7.50	37.78	40.29	35.64	35.64	35.64
7.60	38.28	40.38	36.11	36.11	36.11
7.70	38.79	41.37	36.59	36.59	36.59
7.80	39.29	41.91	37.07	37.07	37.07
7.90	39.80	42.45	37.54	37.54	37.54
8.00	40.30	42.99	38.02	38.02	38.02
8.10	40.81	43.53	38.50	38.50	38.50
8.20	41.31	44.07	38.98	38.98	38.98
8.30	41.82	44.61	39.45	39.45	39.45
8.40	42.32	45.15	39.93	39.93	39.93
8.50	42.83	45.69	40.41	40.41	40.41
8.60	43.34	46.22	40.88	40.88	40.88
8.70	43.84	46.76	41.36	41.36	41.36
8.80	44.35	47.30	41.84	41.84	41.84
8.90	44.85	47.84	42.31	42.31	42.31
9.00	45.36	48.38	42.79	42.79	42.79
9.10	45.86	48.92	43.27	43.27	43.27
9.20	46.37	49.46	43.74	43.74	43.74
9.30	46.87	50.00	44.22	44.22	44.22
9.40	47.38	50.54	44.70	44.70	44.70
9.50	47.89	51.08	45.17	45.17	45.17
9.60	48.39	51.62	45.65	45.65	45.65
9.70	48.90	52.16	46.13	46.13	46.13
9.80	49.40	52.69	46.61	46.61	46.61
9.90	49.91	53.23	47.08	47.08	47.08
10.00	50.41	53.77	47.56	47.56	47.56

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## Imperial Throw Distances for a 5:1 Lens

Screen Width Imperial (ft)	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
3.00	15.03	16.03	14.18	14.18	14.18
3.50	17.56	18.73	16.56	16.56	16.56
4.00	20.08	21.42	18.95	18.95	18.95
4.50	22.61	24.12	21.33	21.33	21.33
5.00	25.14	26.81	23.72	23.72	23.72
5.50	27.67	29.51	26.10	26.10	26.10
6.00	30.19	32.21	28.48	28.48	28.48
6.50	32.72	34.90	30.87	30.87	30.87
7.00	35.25	37.60	33.25	33.25	33.25
7.50	37.78	40.29	35.64	35.64	35.64
8.00	40.30	42.99	38.02	38.02	38.02
8.50	42.83	45.69	40.41	40.41	40.41
9.00	45.36	48.38	42.79	42.79	42.79
9.50	47.89	51.08	45.17	45.17	45.17
10.00	50.41	53.77	47.56	47.56	47.56
10.50	52.94	56.47	49.94	49.94	49.94
11.00	55.47	59.17	52.33	52.33	52.33
11.50	57.99	61.86	54.71	54.71	54.71
12.00	60.52	64.56	57.10	57.10	57.10
12.50	63.05	67.25	59.48	59.48	59.48
13.00	65.58	69.95	61.87	61.87	61.87
13.50	68.10	72.64	64.25	64.25	64.25
14.00	70.63	75.34	66.63	66.63	66.63
14.50	73.16	78.04	69.02	69.02	69.02
15.00	75.69	80.73	71.40	71.40	71.40
15.50	78.21	83.43	73.79	73.79	73.79
16.00	80.74	86.12	76.17	76.17	76.17
16.50	83.27	88.82	78.56	78.56	78.56
17.00	85.80	91.52	80.94	80.94	80.94
17.50	88.32	94.21	83.32	83.32	83.32
18.00	90.85	96.91	85.71	85.71	85.71
18.50	93.38	99.60	88.09	88.09	88.09
19.00	95.91	102.30	90.48	90.48	90.48
19.50	98.43	105.00	92.86	92.86	92.86
20.00	100.96	107.69	95.25	95.25	95.25
21.00	106.02	113.08	100.01	100.01	100.01
22.00	111.07	118.48	104.78	104.78	104.78
23.00	116.13	123.87	109.55	109.55	109.55
24.00	121.18	129.26	114.32	114.32	114.32
25.00	126.24	134.65	119.09	119.09	119.09
26.00	131.29	140.04	123.86	123.86	123.86
27.00	136.34	145.43	128.63	128.63	128.63
28.00	141.40	150.83	133.40	133.40	133.40
29.00	146.45	156.22	138.16	138.16	138.16
30.00	151.50	161.62	142.92	142.92	142.92

## Metric Throw Distances for a 7:1 Lens

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
1.00	6.88	7.34	6.49	6.49	6.49
1.10	7.59	8.09	7.16	7.16	7.16
1.20	8.29	8.85	7.82	7.82	7.82
1.30	9.00	9.60	8.49	8.49	8.49
1.40	9.71	10.36	9.16	9.16	9.16
1.50	10.42	11.11	9.83	9.83	9.83
1.60	11.13	11.87	10.50	10.50	10.50
1.70	11.83	12.62	11.16	11.16	11.16
1.80	12.54	13.38	11.83	11.83	11.83
1.90	13.25	14.13	12.50	12.50	12.50
2.00	13.96	14.89	13.17	13.17	13.17
2.10	14.67	15.65	13.84	13.84	13.84
2.20	15.38	16.40	14.51	14.51	14.51
2.30	16.08	17.16	15.17	15.17	15.17
2.40	16.79	17.91	15.84	15.84	15.84
2.50	17.50	18.67	16.51	16.51	16.51
2.60	18.21	19.42	17.18	17.18	17.18
2.70	18.92	20.18	17.85	17.85	17.85
2.80	19.62	20.93	18.51	18.51	18.51
2.90	20.33	21.69	19.18	19.18	19.18
3.00	21.04	22.44	19.85	19.85	19.85
3.10	21.75	23.20	20.52	20.52	20.52
3.20	22.46	23.95	21.19	21.19	21.19
3.30	23.16	24.71	21.85	21.85	21.85
3.40	23.87	25.46	22.52	22.52	22.52
3.50	24.58	26.22	23.19	23.19	23.19
3.60	25.29	26.97	23.86	23.86	23.86
3.70	26.00	27.73	24.53	24.53	24.53
3.80	26.70	28.48	25.19	25.19	25.19
3.90	27.41	29.24	25.86	25.86	25.86
4.00	28.12	30.00	26.53	26.53	26.53
4.10	28.83	30.75	27.20	27.20	27.20
4.20	29.54	31.51	27.87	27.87	27.87
4.30	30.25	32.26	28.53	28.53	28.53
4.40	30.95	33.02	29.20	29.20	29.20
4.50	31.66	33.77	29.87	29.87	29.87
4.60	32.37	34.53	30.54	30.54	30.54
4.70	33.08	35.28	31.21	31.21	31.21
4.80	33.79	36.04	31.87	31.87	31.87
4.90	34.49	36.79	32.54	32.54	32.54
5.00	35.20	37.55	33.21	33.21	33.21
5.10	35.91	38.30	33.88	33.88	33.88
5.20	36.62	39.06	34.55	34.55	34.55
5.30	37.33	39.81	35.21	35.21	35.21
5.40	38.03	40.57	35.88	35.88	35.88
5.50	38.74	41.32	36.55	36.55	36.55

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Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
5.60	39.45	42.08	37.22	37.22	37.22
5.70	40.16	42.84	37.89	37.89	37.89
5.80	40.87	43.59	38.55	38.55	38.55
5.90	41.57	44.35	39.22	39.22	39.22
6.00	42.28	45.10	39.89	39.89	39.89
6.10	42.99	45.86	40.56	40.56	40.56
6.20	43.70	46.61	41.23	41.23	41.23
6.30	44.41	47.37	41.89	41.89	41.89
6.40	45.11	48.12	42.56	42.56	42.56
6.50	45.82	48.88	43.23	43.23	43.23
6.60	46.53	49.63	43.90	43.90	43.90
6.70	47.24	50.39	44.57	44.57	44.57
6.80	47.95	51.14	45.23	45.23	45.23
6.90	48.66	51.90	45.90	45.90	45.90
7.00	49.36	52.65	46.57	46.57	46.57
7.10	50.07	53.41	47.24	47.24	47.24
7.20	50.78	54.16	47.91	47.91	47.91
7.30	51.49	54.92	48.57	48.57	48.57
7.40	52.20	55.68	49.24	49.24	49.24
7.50	52.90	56.43	49.91	49.91	49.91
7.60	53.61	57.19	50.58	50.58	50.58
7.70	54.32	57.94	51.25	51.25	51.25
7.80	55.03	58.70	51.91	51.91	51.91
7.90	55.74	59.45	52.58	52.58	52.58
8.00	56.44	60.21	53.25	53.25	53.25
8.10	57.15	60.96	53.92	53.92	53.92
8.20	57.86	61.72	54.59	54.59	54.59
8.30	58.57	62.47	55.25	55.25	55.25
8.40	59.28	63.23	55.92	55.92	55.92
8.50	59.98	63.98	56.59	56.59	56.59
8.60	60.69	64.74	57.26	57.26	57.26
8.70	61.40	65.49	57.93	57.93	57.93
8.80	62.11	66.25	58.59	58.59	58.59
8.90	62.82	67.00	59.26	59.26	59.26
9.00	63.52	67.76	59.93	59.93	59.93
9.10	64.23	68.52	60.60	60.60	60.60
9.20	64.94	69.27	61.27	61.27	61.27
9.30	65.65	70.03	61.93	61.93	61.93
9.40	66.36	70.78	62.60	62.60	62.60
9.50	67.07	71.54	63.27	63.27	63.27
9.60	67.77	72.29	63.94	63.94	63.94
9.70	68.48	73.05	64.61	64.61	64.61
9.80	69.19	73.80	65.27	65.27	65.27
9.90	69.90	74.56	65.94	65.94	65.94
10.00	70.61	75.31	66.61	66.61	66.61

## Imperial Throw Distances for a 7:1 Lens

Screen Width Imperial (ft)	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
3.00	21.04	22.44	19.85	19.85	19.85
3.50	24.58	26.22	23.19	23.19	23.19
4.00	28.12	30.00	26.53	26.53	26.53
4.50	31.66	33.77	29.87	29.87	29.87
5.00	35.20	37.55	33.21	33.21	33.21
5.50	38.74	41.32	36.55	36.55	36.55
6.00	42.28	45.10	39.89	39.89	39.89
6.50	45.82	48.88	43.23	43.23	43.23
7.00	49.36	52.65	46.57	46.57	46.57
7.50	52.90	56.43	49.91	49.91	49.91
8.00	56.44	60.21	53.25	53.25	53.25
8.50	59.98	63.98	56.59	56.59	56.59
9.00	63.52	67.76	59.93	59.93	59.93
9.50	67.07	71.54	63.27	63.27	63.27
10.00	70.61	75.31	66.61	66.61	66.61
10.50	74.15	79.09	69.95	69.95	69.95
11.00	77.69	82.87	73.29	73.29	73.29
11.50	81.23	86.64	76.63	76.63	76.63
12.00	84.77	90.42	79.97	79.97	79.97
12.50	88.31	94.20	83.31	83.31	83.31
13.00	91.85	97.97	86.65	86.65	86.65
13.50	95.39	101.75	89.99	89.99	89.99
14.00	98.93	105.52	93.33	93.33	93.33
14.50	102.47	109.30	96.67	96.67	96.67
15.00	106.01	113.08	100.01	100.01	100.01
15.50	109.55	116.85	103.35	103.35	103.35
16.00	113.09	120.63	106.69	106.69	106.69
16.50	116.63	124.41	110.03	110.03	110.03
17.00	120.17	128.18	113.37	113.37	113.37
17.50	123.71	131.96	116.71	116.71	116.71
18.00	127.25	135.74	120.05	120.05	120.05
18.50	130.79	139.51	123.39	123.39	123.39
19.00	134.33	143.29	126.73	126.73	126.73
19.50	137.87	147.07	130.07	130.07	130.07
20.00	141.41	150.84	133.41	133.41	133.41
21.00	148.49	158.39	140.09	140.09	140.09
22.00	155.58	165.95	146.77	146.77	146.77
23.00	162.66	173.50	153.45	153.45	153.45
24.00	169.74	181.05	160.13	160.13	160.13
25.00	176.82	188.61	166.81	166.81	166.81
26.00	183.90	196.16	173.49	173.49	173.49
27.00	190.98	203.71	180.17	180.17	180.17
28.00	198.06	211.26	186.85	186.85	186.85
29.00	205.14	218.82	193.53	193.53	193.53
30.00	212.22	226.37	200.21	200.21	200.21

## Metric Throw Distances for a 1.5 - 3:1 Zoom Lens at 1.5:1

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
1.00	1.60	1.71	1.51	1.51	1.51
1.10	1.76	1.87	1.66	1.66	1.66
1.20	1.91	2.04	1.80	1.80	1.80
1.30	2.07	2.21	1.95	1.95	1.95
1.40	2.22	2.37	2.10	2.10	2.10
1.50	2.38	2.54	2.24	2.24	2.24
1.60	2.54	2.70	2.39	2.39	2.39
1.70	2.69	2.87	2.54	2.54	2.54
1.80	2.85	3.04	2.69	2.69	2.69
1.90	3.00	3.20	2.83	2.83	2.83
2.00	3.16	3.37	2.98	2.98	2.98
2.10	3.31	3.53	3.13	3.13	3.13
2.20	3.47	3.70	3.27	3.27	3.27
2.30	3.63	3.87	3.42	3.42	3.42
2.40	3.78	4.03	3.57	3.57	3.57
2.50	3.94	4.20	3.71	3.71	3.71
2.60	4.09	4.37	3.86	3.86	3.86
2.70	4.25	4.53	4.01	4.01	4.01
2.80	4.40	4.70	4.15	4.15	4.15
2.90	4.56	4.86	4.30	4.30	4.30
3.00	4.72	5.03	4.45	4.45	4.45
3.10	4.87	5.20	4.60	4.60	4.60
3.20	5.03	5.36	4.74	4.74	4.74
3.30	5.18	5.53	4.89	4.89	4.89
3.40	5.34	5.69	5.04	5.04	5.04
3.50	5.49	5.86	5.18	5.18	5.18
3.60	5.65	6.03	5.33	5.33	5.33
3.70	5.81	6.19	5.48	5.48	5.48
3.80	5.96	6.36	5.62	5.62	5.62
3.90	6.12	6.52	5.77	5.77	5.77
4.00	6.27	6.69	5.92	5.92	5.92
4.10	6.43	6.86	6.06	6.06	6.06
4.20	6.58	7.02	6.21	6.21	6.21
4.30	6.74	7.19	6.36	6.36	6.36
4.40	6.90	7.36	6.51	6.51	6.51
4.50	7.05	7.52	6.65	6.65	6.65
4.60	7.21	7.69	6.80	6.80	6.80
4.70	7.36	7.85	6.95	6.95	6.95
4.80	7.52	8.02	7.09	7.09	7.09
4.90	7.67	8.19	7.24	7.24	7.24
5.00	7.83	8.35	7.39	7.39	7.39
5.10	7.99	8.52	7.53	7.53	7.53
5.20	8.14	8.68	7.68	7.68	7.68
5.30	8.30	8.85	7.83	7.83	7.83
5.40	8.45	9.02	7.97	7.97	7.97
5.50	8.61	9.18	8.12	8.12	8.12

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
5.60	8.76	9.35	8.27	8.27	8.27
5.70	8.92	9.51	8.41	8.41	8.41
5.80	9.08	9.68	8.56	8.56	8.56
5.90	9.23	9.85	8.71	8.71	8.71
6.00	9.39	10.01	8.86	8.86	8.86
6.10	9.54	10.18	9.00	9.00	9.00
6.20	9.70	10.34	9.15	9.15	9.15
6.30	9.85	10.51	9.30	9.30	9.30
6.40	10.01	10.68	9.44	9.44	9.44
6.50	10.17	10.84	9.59	9.59	9.59
6.60	10.32	11.01	9.74	9.74	9.74
6.70	10.48	11.18	9.88	9.88	9.88
6.80	10.63	11.34	10.03	10.03	10.03
6.90	10.79	11.51	10.18	10.18	10.18
7.00	10.94	11.67	10.32	10.32	10.32
7.10	11.10	11.84	10.47	10.47	10.47
7.20	11.26	12.01	10.62	10.62	10.62
7.30	11.41	12.17	10.77	10.77	10.77
7.40	11.57	12.34	10.91	10.91	10.91
7.50	11.72	12.50	11.06	11.06	11.06
7.60	11.88	12.67	11.21	11.21	11.21
7.70	12.03	12.84	11.35	11.35	11.35
7.80	12.19	13.00	11.50	11.50	11.50
7.90	12.35	13.17	11.65	11.65	11.65
8.00	12.50	13.33	11.79	11.79	11.79
8.10	12.66	13.50	11.94	11.94	11.94
8.20	12.81	13.67	12.09	12.09	12.09
8.30	12.97	13.83	12.23	12.23	12.23
8.40	13.12	14.00	12.38	12.38	12.38
8.50	13.28	14.17	12.53	12.53	12.53
8.60	13.44	14.33	12.68	12.68	12.68
8.70	13.59	14.50	12.82	12.82	12.82
8.80	13.75	14.66	12.97	12.97	12.97
8.90	13.90	14.83	13.12	13.12	13.12
9.00	14.06	15.00	13.26	13.26	13.26
9.10	14.21	15.16	13.41	13.41	13.41
9.20	14.37	15.33	13.56	13.56	13.56
9.30	14.53	15.49	13.70	13.70	13.70
9.40	14.68	15.66	13.85	13.85	13.85
9.50	14.84	15.83	14.00	14.00	14.00
9.60	14.99	15.99	14.14	14.14	14.14
9.70	15.15	16.16	14.29	14.29	14.29
9.80	15.30	16.32	14.44	14.44	14.44
9.90	15.46	16.49	14.58	14.58	14.58
10.00	15.62	16.66	14.73	14.73	14.73



## Imperial Throw Distances for a 1.5 - 3:1 Zoom Lens at 1.5:1

Screen Width Imperial (ft)	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
3.00	4.72	5.03	4.45	4.45	4.45
3.50	5.49	5.86	5.18	5.18	5.18
4.00	6.27	6.69	5.92	5.92	5.92
4.50	7.05	7.52	6.65	6.65	6.65
5.00	7.83	8.35	7.39	7.39	7.39
5.50	8.61	9.18	8.12	8.12	8.12
6.00	9.39	10.01	8.86	8.86	8.86
6.50	10.17	10.84	9.59	9.59	9.59
7.00	10.94	11.67	10.32	10.32	10.32
7.50	11.72	12.50	11.06	11.06	11.06
8.00	12.50	13.33	11.79	11.79	11.79
8.50	13.28	14.17	12.53	12.53	12.53
9.00	14.06	15.00	13.26	13.26	13.26
9.50	14.84	15.83	14.00	14.00	14.00
10.00	15.62	16.66	14.73	14.73	14.73
10.50	16.39	17.49	15.47	15.47	15.47
11.00	17.17	18.32	16.20	16.20	16.20
11.50	17.95	19.15	16.94	16.94	16.94
12.00	18.73	19.98	17.67	17.67	17.67
12.50	19.51	20.81	18.40	18.40	18.40
13.00	20.29	21.64	19.14	19.14	19.14
13.50	21.07	22.47	19.87	19.87	19.87
14.00	21.84	23.30	20.61	20.61	20.61
14.50	22.62	24.13	21.34	21.34	21.34
15.00	23.40	24.96	22.08	22.08	22.08
15.50	24.18	25.79	22.81	22.81	22.81
16.00	24.96	26.62	23.55	23.55	23.55
16.50	25.74	27.45	24.28	24.28	24.28
17.00	26.52	28.28	25.02	25.02	25.02
17.50	27.29	29.11	25.75	25.75	25.75
18.00	28.07	29.95	26.48	26.48	26.48
18.50	28.85	30.78	27.22	27.22	27.22
19.00	29.63	31.61	27.95	27.95	27.95
19.50	30.41	32.44	28.69	28.69	28.69
20.00	31.19	33.27	29.42	29.42	29.42
21.00	32.75	34.93	30.89	30.89	30.89
22.00	34.30	36.59	32.36	32.36	32.36
23.00	35.86	38.25	33.83	33.83	33.83
24.00	37.42	39.91	35.30	35.30	35.30
25.00	38.97	41.57	36.77	36.77	36.77
26.00	40.53	43.23	38.24	38.24	38.24
27.00	42.09	44.89	39.71	39.71	39.71
28.00	43.64	46.55	41.17	41.17	41.17
29.00	45.64	48.22	42.64	42.64	42.64
30.00	46.76	49.88	44.11	44.11	44.11

## Metric Throw Distances for a 1.5 - 3:1 Zoom Lens at 3:1

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
1.00	3.03	3.23	2.85	2.85	2.85
1.10	3.33	3.55	3.14	3.14	3.14
1.20	3.63	3.87	3.42	3.42	3.42
1.30	3.93	4.19	3.70	3.70	3.70
1.40	4.23	4.51	3.99	3.99	3.99
1.50	4.53	4.83	4.27	4.27	4.27
1.60	4.83	5.15	4.55	4.55	4.55
1.70	5.13	5.47	4.84	4.84	4.84
1.80	5.43	5.79	5.12	5.12	5.12
1.90	5.73	6.11	5.40	5.40	5.40
2.00	6.03	6.43	5.69	5.69	5.69
2.10	6.33	6.75	5.97	5.97	5.97
2.20	6.63	7.07	6.25	6.25	6.25
2.30	6.93	7.39	6.54	6.54	6.54
2.40	7.23	7.71	6.82	6.82	6.82
2.50	7.53	8.03	7.10	7.10	7.10
2.60	7.83	8.35	7.35	7.35	7.35
2.70	8.13	8.67	7.67	7.67	7.67
2.80	8.43	8.99	7.95	7.95	7.95
2.90	8.73	9.31	8.23	8.23	8.23
3.00	9.03	9.63	8.52	8.52	8.52
3.10	9.33	9.95	8.80	8.80	8.80
3.20	9.63	10.27	9.08	9.08	9.08
3.30	9.93	10.59	9.37	9.37	9.37
3.40	10.23	10.91	9.65	9.65	9.65
3.50	10.53	11.23	9.93	9.93	9.93
3.60	10.83	11.55	10.22	10.22	10.22
3.70	11.13	11.87	10.50	10.50	10.50
3.80	11.43	12.19	10.78	10.78	10.78
3.90	11.73	12.51	11.07	11.07	11.07
4.00	12.03	12.83	11.35	11.35	11.35
4.10	12.33	13.15	11.63	11.63	11.63
4.20	12.63	13.47	11.91	11.91	11.91
4.30	12.93	13.79	12.20	12.20	12.20
4.40	13.23	14.11	12.48	12.48	12.48
4.50	13.53	14.43	12.76	12.76	12.76
4.60	13.83	14.75	13.05	13.05	13.05
4.70	14.13	15.07	13.33	13.33	13.33
4.80	14.43	15.39	13.61	13.61	13.61
4.90	14.73	15.71	13.90	13.90	13.90
5.00	15.03	16.03	14.18	14.18	14.18
5.10	15.33	16.35	14.46	14.46	14.46
5.20	15.63	16.67	14.75	14.75	14.75
5.30	15.93	16.99	15.03	15.03	15.03
5.40	16.23	17.31	15.31	15.31	15.31
5.50	16.53	17.63	15.60	15.60	15.60

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
5.60	16.83	17.95	15.88	15.88	15.88
5.70	17.13	18.27	16.16	16.16	16.16
5.80	17.43	18.59	16.44	16.44	16.44
5.90	17.73	18.91	16.73	16.73	16.73
6.00	18.03	19.23	17.01	17.01	17.01
6.10	18.33	19.55	17.29	17.29	17.29
6.20	18.63	19.87	17.58	17.58	17.58
6.30	18.93	20.16	17.86	17.86	17.86
6.40	19.23	20.51	18.14	18.14	18.14
6.50	19.53	20.83	18.43	18.43	18.43
6.60	19.83	21.15	18.71	18.71	18.71
6.70	20.13	21.47	18.99	18.99	18.99
6.80	20.43	21.79	19.28	19.28	19.28
6.90	20.73	22.11	19.56	19.56	19.56
7.00	21.03	22.43	19.84	19.84	19.84
7.10	21.33	22.75	20.13	20.13	20.13
7.20	21.63	23.07	20.41	20.41	20.41
7.30	21.93	23.40	20.69	20.69	20.69
7.40	22.23	23.72	20.97	20.97	20.97
7.50	22.53	24.04	21.26	21.26	21.26
7.60	22.83	24.36	21.54	21.54	21.54
7.70	23.13	24.68	21.82	21.82	21.82
7.80	23.43	25.00	22.11	22.11	22.11
7.90	23.73	25.32	22.39	22.39	22.39
8.00	24.03	25.64	22.67	22.67	22.67
8.10	24.33	25.96	22.96	22.96	22.96
8.20	24.63	26.28	23.24	23.24	23.24
8.30	24.93	26.60	23.52	23.52	23.52
8.40	25.23	26.92	23.81	23.81	23.81
8.50	25.53	27.24	24.09	24.09	24.09
8.60	25.83	27.56	24.37	24.37	24.37
8.70	26.13	27.88	24.66	24.66	24.66
8.80	26.43	28.20	24.94	24.94	24.94
8.90	26.73	28.52	25.22	25.22	25.22
9.00	27.03	28.84	25.50	25.50	25.50
9.10	27.33	29.16	25.79	25.79	25.79
9.20	27.64	29.48	26.07	26.07	26.07
9.30	27.94	29.80	26.35	26.35	26.35
9.40	28.24	30.12	26.64	26.64	26.64
9.50	28.54	30.44	26.92	26.92	26.92
9.60	28.84	30.76	27.20	27.20	27.20
9.70	29.14	31.08	27.49	27.49	27.49
9.80	29.44	31.40	27.77	27.77	27.77
9.90	29.74	31.72	28.05	28.05	28.05
10.00	30.04	32.04	28.34	28.34	28.34

## Imperial Throw Distances for a 1.5 - 3:1 Zoom Lens at 3:1

Screen Width Imperial (ft)	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
3.00	9.03	9.63	8.52	8.52	8.52
3.50	10.53	11.23	9.93	9.93	9.93
4.00	12.03	12.83	11.35	11.35	11.35
4.50	13.53	14.43	12.76	12.76	12.76
5.00	15.03	16.03	14.18	14.18	14.18
5.50	16.53	17.63	15.60	15.60	15.60
6.00	18.03	19.23	17.01	17.01	17.01
6.50	19.53	20.83	18.43	18.43	18.43
7.00	21.03	22.43	19.84	19.84	19.84
7.50	22.53	24.04	21.26	21.26	21.26
8.00	24.03	25.64	22.67	22.67	22.67
8.50	25.53	27.24	24.09	24.09	24.09
9.00	27.03	28.84	25.50	25.50	25.50
9.50	28.54	30.44	26.92	26.92	26.92
10.00	30.04	32.04	28.34	28.34	28.34
10.50	31.54	33.64	29.75	29.75	29.75
11.00	33.04	35.24	31.17	31.17	31.17
11.50	34.54	36.84	32.58	32.58	32.58
12.00	36.04	38.44	34.00	34.00	34.00
12.50	37.54	40.04	35.41	35.41	35.41
13.00	39.04	41.64	36.83	36.83	36.83
13.50	40.54	43.24	38.25	38.25	38.25
14.00	42.04	44.84	39.66	39.66	39.66
14.50	43.54	46.44	41.08	41.08	41.08
15.00	45.04	48.04	42.49	42.49	42.49
15.50	46.54	49.64	43.91	43.91	43.91
16.00	48.04	51.25	45.32	45.32	45.32
16.50	49.54	52.85	46.74	46.74	46.74
17.00	51.04	54.45	48.15	48.15	48.15
17.50	52.54	56.05	49.57	49.57	49.57
18.00	54.04	57.65	50.99	50.99	50.99
18.50	55.55	59.25	52.40	52.40	52.40
19.00	57.05	60.85	53.82	53.82	53.82
19.50	58.55	62.45	55.23	55.23	55.23
20.00	60.05	64.05	56.65	56.65	56.65
21.00	63.05	67.25	59.48	59.48	59.48
22.00	66.05	70.45	62.31	62.31	62.31
23.00	69.05	73.65	65.14	65.14	65.14
24.00	72.05	76.86	67.97	67.97	67.97
25.00	75.05	80.06	70.80	70.80	70.80
26.00	78.05	83.26	73.64	73.64	73.64
27.00	81.06	86.46	76.47	76.47	76.47
28.00	84.06	89.66	79.30	79.30	79.30
29.00	87.06	92.86	82.13	82.13	82.13
30.00	90.06	96.06	84.96	84.96	84.96

## Metric Throw Distances for $\alpha$ 3 - 7:1 Zoom Lens at 3:1

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
1.00	2.94	3.13	2.77	2.77	2.77
1.10	3.24	3.45	3.05	3.05	3.05
1.20	3.54	3.77	3.34	3.34	3.34
1.30	3.83	4.09	3.62	3.62	3.62
1.40	4.13	4.41	3.90	3.90	3.90
1.50	4.43	4.73	4.18	4.18	4.18
1.60	4.73	5.05	4.46	4.46	4.46
1.70	5.03	5.37	4.75	4.75	4.75
1.80	5.33	5.69	5.03	5.03	5.03
1.90	5.63	6.00	5.31	5.31	5.31
2.00	5.93	6.32	5.59	5.59	5.59
2.10	6.23	6.64	5.87	5.87	5.87
2.20	6.53	6.96	6.16	6.16	6.16
2.30	6.82	7.28	6.44	6.44	6.44
2.40	7.12	7.60	6.72	6.72	6.72
2.50	7.42	7.92	7.00	7.00	7.00
2.60	7.72	8.24	7.28	7.28	7.28
2.70	8.02	8.56	7.57	7.57	7.57
2.80	8.32	8.87	7.85	7.85	7.85
2.90	8.62	9.19	8.13	8.13	8.13
3.00	8.92	9.51	8.41	8.41	8.41
3.10	9.22	9.83	8.70	8.70	8.70
3.20	9.52	10.15	8.98	8.98	8.98
3.30	9.82	10.47	9.26	9.26	9.26
3.40	10.11	10.79	9.54	9.54	9.54
3.50	10.41	11.11	9.82	9.82	9.82
3.60	10.71	11.43	10.11	10.11	10.11
3.70	11.01	11.75	10.39	10.39	10.39
3.80	11.31	12.06	10.67	10.67	10.67
3.90	11.61	12.38	10.95	10.95	10.95
4.00	11.91	12.70	11.23	11.23	11.23
4.10	12.21	13.02	11.52	11.52	11.52
4.20	12.51	13.34	11.80	11.80	11.80
4.30	12.81	13.66	12.08	12.08	12.08
4.40	13.10	13.98	12.36	12.36	12.36
4.50	13.40	14.30	12.64	12.64	12.64
4.60	13.70	14.62	12.93	12.93	12.93
4.70	14.00	14.93	13.21	13.21	13.21
4.80	14.30	15.25	13.49	13.49	13.49
4.90	14.60	15.57	13.77	13.77	13.77
5.00	14.90	15.89	14.06	14.06	14.06
5.10	15.20	16.21	14.34	14.34	14.34
5.20	15.50	16.53	14.62	14.62	14.62
5.30	15.80	16.85	14.90	14.90	14.90
5.40	16.09	17.17	15.18	15.18	15.18
5.50	16.39	17.49	15.47	15.47	15.47

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
5.60	16.69	17.81	15.75	15.75	15.75
5.70	16.99	18.12	16.03	16.03	16.03
5.80	17.29	18.44	16.31	16.31	16.31
5.90	17.59	18.76	16.59	16.59	16.59
6.00	17.89	19.08	16.88	16.88	16.88
6.10	18.19	19.40	17.16	17.16	17.16
6.20	18.49	19.72	17.44	17.44	17.44
6.30	18.79	20.04	17.72	17.72	17.72
6.40	19.08	20.36	18.00	18.00	18.00
6.50	19.38	20.68	18.29	18.29	18.29
6.60	19.68	20.99	18.57	18.57	18.57
6.70	19.98	21.31	18.85	18.85	18.85
6.80	20.28	21.63	19.13	19.13	19.13
6.90	20.58	21.95	19.41	19.41	19.41
7.00	20.88	22.27	19.70	19.70	19.70
7.10	21.18	22.59	19.98	19.98	19.98
7.20	21.48	22.91	20.26	20.26	20.26
7.30	21.78	23.23	20.54	20.54	20.54
7.40	22.07	23.55	20.83	20.83	20.83
7.50	22.37	23.87	21.11	21.11	21.11
7.60	22.67	24.18	21.39	21.39	21.39
7.70	22.97	24.50	21.67	21.67	21.67
7.80	23.27	24.82	21.95	21.95	21.95
7.90	23.57	25.14	22.24	22.24	22.24
8.00	23.87	25.46	22.52	22.52	22.52
8.10	24.17	25.78	22.80	22.80	22.80
8.20	24.47	26.10	23.08	23.08	23.08
8.30	24.77	26.42	23.36	23.36	23.36
8.40	25.06	26.74	23.65	23.65	23.65
8.50	25.36	27.05	23.93	23.93	23.93
8.60	25.66	27.37	24.21	24.21	24.21
8.70	25.96	27.69	24.49	24.49	24.49
8.80	26.26	28.01	24.77	24.77	24.77
8.90	26.56	28.33	25.06	25.06	25.06
9.00	26.86	28.65	25.34	25.34	25.34
9.10	27.16	28.97	25.62	25.62	25.62
9.20	27.46	29.29	25.90	25.90	25.90
9.30	27.76	29.61	26.18	26.18	26.18
9.40	28.05	29.93	26.47	26.47	26.47
9.50	28.35	30.24	26.75	26.75	26.75
9.60	28.65	30.56	27.03	27.03	27.03
9.70	28.95	30.88	27.31	27.31	27.31
9.80	29.25	31.20	27.60	27.60	27.60
9.90	29.55	31.52	27.88	27.88	27.88
10.00	29.85	31.84	28.16	28.16	28.16

ADVANCED

## Imperial Throw Distances for $\alpha$ 3 - 7:1 Zoom Lens at 3:1

Screen Width Imperial (ft)	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
3.00	8.92	9.51	8.41	8.41	8.41
3.50	10.41	11.11	9.82	9.82	9.82
4.00	11.91	12.70	11.23	11.23	11.23
4.50	13.40	14.30	12.64	12.64	12.64
5.00	14.90	15.89	14.06	14.06	14.06
5.50	16.39	17.49	15.47	15.47	15.47
6.00	17.89	19.08	16.88	16.88	16.88
6.50	19.38	20.68	18.29	18.29	18.29
7.00	20.88	22.27	19.70	19.70	19.70
7.50	22.37	23.87	21.11	21.11	21.11
8.00	23.87	25.46	22.52	22.52	22.52
8.50	25.36	27.05	23.93	23.93	23.93
9.00	26.86	28.65	25.34	25.34	25.34
9.50	28.35	30.24	26.75	26.75	26.75
10.00	29.85	31.84	28.16	28.16	28.16
10.50	31.34	33.43	29.57	29.57	29.57
11.00	32.84	35.03	30.98	30.98	30.98
11.50	34.33	36.62	32.39	32.39	32.39
12.00	35.83	38.22	33.80	33.80	33.80
12.50	37.32	39.81	35.21	35.21	35.21
13.00	38.82	41.41	36.62	36.62	36.62
13.50	40.31	43.00	38.03	38.03	38.03
14.00	41.81	44.60	39.44	39.44	39.44
14.50	43.30	46.19	40.85	40.85	40.85
15.00	44.80	47.79	42.26	42.26	42.26
15.50	46.29	49.38	43.67	43.67	43.67
16.00	47.79	50.98	45.08	45.08	45.08
16.50	49.28	52.57	46.50	46.50	46.50
17.00	50.78	54.17	47.91	47.91	47.91
17.50	52.27	55.76	49.32	49.32	49.32
18.00	53.77	57.35	50.73	50.73	50.73
18.50	55.27	58.95	52.14	52.14	52.14
19.00	56.76	60.54	53.55	53.55	53.55
19.50	58.26	62.14	54.96	54.96	54.96
20.00	59.75	63.73	56.37	56.37	56.37
21.00	62.74	66.92	59.19	59.19	59.19
22.00	65.73	70.11	62.01	62.01	62.01
23.00	68.72	73.30	64.83	64.83	64.83
24.00	71.71	76.49	67.65	67.65	67.65
25.00	74.70	79.68	70.47	70.47	70.47
26.00	77.69	82.87	73.29	73.29	73.29
27.00	80.68	86.06	76.11	76.11	76.11
28.00	83.67	89.25	78.94	78.94	78.94
29.00	86.66	92.44	81.76	81.76	81.76
30.00	89.65	95.63	84.58	84.58	84.58

## Metric Throw Distances for a 3 - 7:1 Zoom Lens at 7:1

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
1.00	6.98	7.44	6.58	6.58	6.58
1.10	7.69	8.20	7.26	7.26	7.26
1.20	8.41	8.97	7.93	7.93	7.93
1.30	9.12	9.73	8.61	8.61	8.61
1.40	9.84	10.50	9.28	9.28	9.28
1.50	10.55	11.26	9.96	9.96	9.96
1.60	11.27	12.02	10.63	10.63	10.63
1.70	11.99	12.79	11.31	11.31	11.31
1.80	12.70	13.55	11.98	11.98	11.98
1.90	13.42	14.31	12.66	12.66	12.66
2.00	14.13	15.08	13.33	13.33	13.33
2.10	14.85	15.84	14.01	14.01	14.01
2.20	15.57	16.60	14.68	14.68	14.68
2.30	16.28	17.37	15.36	15.36	15.36
2.40	17.00	18.13	16.03	16.03	16.03
2.50	17.71	18.89	16.71	16.71	16.71
2.60	18.43	19.66	17.38	17.38	17.38
2.70	19.14	20.42	18.06	18.06	18.06
2.80	19.86	21.18	18.74	18.74	18.74
2.90	20.58	21.95	19.41	19.41	19.41
3.00	21.29	22.71	20.09	20.09	20.09
3.10	22.01	23.47	20.76	20.76	20.76
3.20	22.72	24.24	21.44	21.44	21.44
3.30	23.44	25.00	22.11	22.11	22.11
3.40	24.15	25.76	22.79	22.79	22.79
3.50	24.87	26.53	23.46	23.46	23.46
3.60	25.59	27.29	24.14	24.14	24.14
3.70	26.30	28.05	24.81	24.81	24.81
3.80	27.02	28.82	25.49	25.49	25.49
3.90	27.73	29.58	26.16	26.16	26.16
4.00	28.45	30.34	26.84	26.84	26.84
4.10	29.16	31.11	27.51	27.51	27.51
4.20	29.88	31.87	28.19	28.19	28.19
4.30	30.60	32.64	28.86	28.86	28.86
4.40	31.31	33.40	29.54	29.54	29.54
4.50	32.03	34.16	30.21	30.21	30.21
4.60	32.74	34.93	30.89	30.89	30.89
4.70	33.46	35.69	31.56	31.56	31.56
4.80	34.17	36.45	32.24	32.24	32.24
4.90	34.89	37.22	32.91	32.91	32.91
5.00	35.61	37.98	33.59	33.59	33.59
5.10	36.32	38.74	34.27	34.27	34.27
5.20	37.04	39.51	34.94	34.94	34.94
5.30	37.75	40.27	35.62	35.62	35.62
5.40	38.47	41.03	36.29	36.29	36.29
5.50	39.18	41.80	36.97	36.97	36.97

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Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
5.60	39.90	42.56	37.64	37.64	37.64
5.70	40.62	43.32	38.32	38.32	38.32
5.80	41.33	44.09	38.99	38.99	38.99
5.90	42.05	44.85	39.67	39.67	39.67
6.00	42.76	45.61	40.34	40.34	40.34
6.10	43.48	46.38	41.02	41.02	41.02
6.20	44.19	47.14	41.69	41.69	41.69
6.30	44.91	47.90	42.37	42.37	42.37
6.40	45.63	48.67	43.04	43.04	43.04
6.50	46.34	49.43	43.72	43.72	43.72
6.60	47.06	50.19	44.39	44.39	44.39
6.70	47.77	50.96	45.07	45.07	45.07
6.80	48.49	51.72	45.74	45.74	45.74
6.90	49.20	52.48	46.42	46.42	46.42
7.00	49.92	53.25	47.09	47.09	47.09
7.10	50.64	54.01	47.77	47.77	47.77
7.20	51.35	54.78	48.44	48.44	48.44
7.30	52.07	55.54	49.12	49.12	49.12
7.40	52.78	56.30	49.80	49.80	49.80
7.50	53.50	57.07	50.47	50.47	50.47
7.60	54.21	57.83	51.15	51.15	51.15
7.70	54.93	58.59	51.82	51.82	51.82
7.80	55.65	59.36	52.50	52.50	52.50
7.90	56.36	60.12	53.17	53.17	53.17
8.00	57.08	60.88	53.85	53.85	53.85
8.10	57.79	61.65	54.52	54.52	54.52
8.20	58.51	62.41	55.20	55.20	55.20
8.30	59.22	63.17	55.87	55.87	55.87
8.40	59.94	63.94	56.55	56.55	56.55
8.50	60.66	64.70	57.22	57.22	57.22
8.60	61.37	65.46	57.90	57.90	57.90
8.70	62.09	66.23	58.57	58.57	58.57
8.80	62.80	66.99	59.25	59.25	59.25
8.90	63.52	67.75	59.92	59.92	59.92
9.00	64.23	68.52	60.60	60.60	60.60
9.10	64.95	69.28	61.27	61.27	61.27
9.20	65.67	70.04	61.95	61.95	61.95
9.30	66.38	70.81	62.62	62.62	62.62
9.40	67.10	71.57	63.30	63.30	63.30
9.50	67.81	72.33	63.98	63.98	63.98
9.60	68.53	73.10	64.65	64.65	64.65
9.70	69.24	73.86	65.33	65.33	65.33
9.80	69.96	74.62	66.00	66.00	66.00
9.90	70.68	75.39	66.68	66.68	66.68
10.00	71.39	76.15	67.35	67.35	67.35

## Imperial Throw Distances for a 3 - 7:1 Zoom Lens at 7:1

Screen Width Imperial (ft)	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
3.00	21.29	22.71	20.09	20.09	20.09
3.50	24.87	26.53	23.46	23.46	23.46
4.00	28.45	30.34	26.84	26.84	26.84
4.50	32.03	34.16	30.21	30.21	30.21
5.00	35.61	37.98	33.59	33.59	33.59
5.50	39.18	41.80	36.97	36.97	36.97
6.00	42.76	45.61	40.34	40.34	40.34
6.50	46.34	49.43	43.72	43.72	43.72
7.00	49.92	53.25	47.09	47.09	47.09
7.50	53.50	57.07	50.47	50.47	50.47
8.00	57.08	60.88	53.85	53.85	53.85
8.50	60.66	64.70	57.22	57.22	57.22
9.00	64.23	68.52	60.60	60.60	60.60
9.50	67.81	72.33	63.98	63.98	63.98
10.00	71.39	76.15	67.35	67.35	67.35
10.50	74.97	79.97	70.73	70.73	70.73
11.00	78.55	83.79	74.10	74.10	74.10
11.50	82.13	87.60	77.48	77.48	77.48
12.00	85.71	91.42	80.86	80.86	80.86
12.50	89.29	95.24	84.23	84.23	84.23
13.00	92.86	99.06	87.61	87.61	87.61
13.50	96.44	102.87	90.98	90.98	90.98
14.00	100.02	106.69	94.36	94.36	94.36
14.50	103.60	110.51	97.74	97.74	97.74
15.00	107.18	114.32	101.11	101.11	101.11
15.50	110.76	118.14	104.49	104.49	104.49
16.00	114.34	121.96	107.86	107.86	107.86
16.50	117.91	125.78	111.24	111.24	111.24
17.00	121.49	129.59	114.62	114.62	114.62
17.50	125.07	133.41	117.99	117.99	117.99
18.00	128.65	137.23	121.37	121.37	121.37
18.50	132.23	141.04	124.74	124.74	124.74
19.00	135.81	144.86	128.12	128.12	128.12
19.50	139.39	148.68	131.50	131.50	131.50
20.00	142.97	152.50	134.87	134.87	134.87
21.00	150.12	160.13	141.63	141.63	141.63
22.00	157.28	167.77	148.38	148.38	148.38
23.00	164.44	175.40	155.13	155.13	155.13
24.00	171.59	183.03	161.88	161.88	161.88
25.00	178.75	190.67	168.63	168.63	168.63
26.00	185.91	198.30	175.39	175.39	175.39
27.00	193.07	205.94	182.14	182.14	182.14
28.00	200.22	213.57	188.89	188.89	188.89
29.00	207.38	221.21	195.64	195.64	195.64
30.00	214.54	228.89	202.39	202.39	202.39

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## Metric Throw Distances for an Ultra Wide Angle Lens

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
1.00	1.12	1.19	1.06	1.06	1.06
1.10	1.23	1.31	1.16	1.16	1.16
1.20	1.33	1.42	1.26	1.26	1.26
1.30	1.44	1.54	1.36	1.36	1.36
1.40	1.55	1.65	1.46	1.46	1.46
1.50	1.65	1.76	1.56	1.56	1.56
1.60	1.76	1.88	1.66	1.66	1.66
1.70	1.87	1.99	1.76	1.76	1.76
1.80	1.98	2.11	1.86	1.86	1.86
1.90	2.08	2.22	1.96	1.96	1.96
2.00	2.19	2.34	2.07	2.07	2.07
2.10	2.30	2.45	2.17	2.17	2.17
2.20	2.40	2.56	2.27	2.27	2.27
2.30	2.51	2.68	2.37	2.37	2.37
2.40	2.62	2.79	2.47	2.47	2.47
2.50	2.72	2.91	2.57	2.57	2.57
2.60	2.83	3.02	2.67	2.67	2.67
2.70	2.94	3.13	2.77	2.77	2.77
2.80	3.05	3.25	2.87	2.87	2.87
2.90	3.15	3.36	2.97	2.97	2.97
3.00	3.26	3.48	3.07	3.07	3.07
3.10	3.37	3.59	3.18	3.18	3.18
3.20	3.47	3.70	3.28	3.28	3.28
3.30	3.58	3.82	3.38	3.38	3.38
3.40	3.69	3.93	3.48	3.48	3.48
3.50	3.79	4.05	3.58	3.58	3.58
3.60	3.90	4.16	3.68	3.68	3.68
3.70	4.01	4.28	3.78	3.78	3.78
3.80	4.11	4.39	3.88	3.88	3.88
3.90	4.22	4.50	3.98	3.98	3.98
4.00	4.33	4.62	4.08	4.08	4.08
4.10	4.44	4.73	4.18	4.18	4.18
4.20	4.54	4.85	4.29	4.29	4.29
4.30	4.65	4.96	4.39	4.39	4.39
4.40	4.76	5.07	4.49	4.49	4.49
4.50	4.86	5.19	4.59	4.59	4.59
4.60	4.97	5.30	4.69	4.69	4.69
4.70	5.08	5.42	4.79	4.79	4.79
4.80	5.18	5.53	4.89	4.89	4.89
4.90	5.29	5.64	4.99	4.99	4.99
5.00	5.40	5.76	5.09	5.09	5.09
5.10	5.51	5.87	5.19	5.19	5.19
5.20	5.61	5.99	5.29	5.29	5.29
5.30	5.72	6.10	5.40	5.40	5.40
5.40	5.83	6.21	5.50	5.50	5.50
5.50	5.93	6.33	5.60	5.60	5.60

Screen Width Metres	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
5.60	6.04	6.44	5.70	5.70	5.70
5.70	6.15	6.56	5.80	5.80	5.80
5.80	6.25	6.67	5.90	5.90	5.90
5.90	6.36	6.79	6.00	6.00	6.00
6.00	6.47	6.90	6.10	6.10	6.10
6.10	6.58	7.01	6.20	6.20	6.20
6.20	6.68	7.13	6.30	6.30	6.30
6.30	6.79	7.24	6.40	6.40	6.40
6.40	6.90	7.36	6.51	6.51	6.51
6.50	7.00	7.47	6.61	6.61	6.61
6.60	7.11	7.58	6.71	6.71	6.71
6.70	7.22	7.70	6.81	6.81	6.81
6.80	7.32	7.81	6.91	6.91	6.91
6.90	7.43	7.93	7.01	7.01	7.01
7.00	7.54	8.04	7.11	7.11	7.11
7.10	7.65	8.15	7.21	7.21	7.21
7.20	7.75	8.27	7.31	7.31	7.31
7.30	7.86	8.38	7.41	7.41	7.41
7.40	7.97	8.50	7.52	7.52	7.52
7.50	8.07	8.61	7.62	7.62	7.62
7.60	8.18	8.73	7.72	7.72	7.72
7.70	8.29	8.84	7.82	7.82	7.82
7.80	8.39	8.95	7.92	7.92	7.92
7.90	8.50	9.07	8.02	8.02	8.02
8.00	8.61	9.18	8.12	8.12	8.12
8.10	8.71	9.30	8.22	8.22	8.22
8.20	8.82	9.41	8.32	8.32	8.32
8.30	8.93	9.52	8.42	8.42	8.42
8.40	9.04	9.64	8.52	8.52	8.52
8.50	9.14	9.75	8.63	8.63	8.63
8.60	9.25	9.87	8.73	8.73	8.73
8.70	9.36	9.98	8.83	8.83	8.83
8.80	9.46	-	8.93	8.93	8.93
8.90	9.57	-	9.03	9.03	9.03
9.00	9.68	-	9.13	9.13	9.13
9.10	9.78	-	9.23	9.23	9.23
9.20	9.89	-	9.33	9.33	9.33
9.30	10.00	-	9.43	9.43	9.43
9.40	-	-	9.53	9.53	9.53
9.50	-	-	9.63	9.63	9.63
9.60	-	-	9.74	9.74	9.74
9.70	-	-	9.84	9.84	9.84
9.80	-	-	9.94	9.94	9.94
9.90	-	-	-	-	-
10.00	-	-	-	-	-



*The Maximum Screen Distance for an Ultra Wide Lens is 10 metres (32.8 foot).*

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## Imperial Throw Distances for an Ultra Wide Angle Lens

Screen Width Imperial (ft)	Throw Distance Required to display image with an Aspect Ratio of				
	4 x 3	5 x 4	8 x 5	14 x 9	16 x 9
3.00	3.26	3.48	3.07	3.07	3.07
3.50	3.79	4.05	3.58	3.58	3.58
4.00	4.33	4.62	4.08	4.08	4.08
4.50	4.86	5.19	4.59	4.59	4.59
5.00	5.40	5.76	5.09	5.09	5.09
5.50	5.93	6.33	5.60	5.60	5.60
6.00	6.47	6.90	6.10	6.10	6.10
6.50	7.00	7.47	6.61	6.61	6.61
7.00	7.54	8.04	7.11	7.11	7.11
7.50	8.07	8.61	7.62	7.62	7.62
8.00	8.61	9.18	8.12	8.12	8.12
8.50	9.14	9.75	8.63	8.63	8.63
9.00	9.68	10.32	9.13	9.13	9.13
9.50	10.21	10.89	9.63	9.63	9.63
10.00	10.75	11.46	10.14	10.14	10.14
10.50	11.28	12.03	10.64	10.64	10.64
11.00	11.82	12.80	11.15	11.15	11.15
11.50	12.35	13.18	11.65	11.65	11.65
12.00	12.89	13.75	12.16	12.16	12.16
12.50	13.42	14.32	12.66	12.66	12.66
13.00	13.96	14.89	13.17	13.17	13.17
13.50	14.49	15.46	13.67	13.67	13.67
14.00	15.03	16.03	14.18	14.18	14.18
14.50	15.56	16.60	14.68	14.68	14.68
15.00	16.10	17.17	15.18	15.18	15.18
15.50	16.63	17.74	15.69	15.69	15.69
16.00	17.17	18.31	16.19	16.19	16.19
16.50	17.70	18.88	16.70	16.70	16.70
17.00	18.24	19.45	17.20	17.20	17.20
17.50	18.77	20.02	17.71	17.71	17.71
18.00	19.31	20.59	18.21	18.21	18.21
18.50	19.84	21.16	18.72	18.72	18.72
19.00	20.37	21.73	19.22	19.22	19.22
19.50	20.91	22.30	19.73	19.73	19.73
20.00	21.44	22.87	20.23	20.23	20.23
21.00	22.51	24.02	21.24	21.24	21.24
22.00	23.58	25.16	22.25	22.25	22.25
23.00	24.65	26.30	23.26	23.26	23.26
24.00	25.72	27.44	24.27	24.27	24.27
25.00	26.79	28.58	25.28	25.28	25.28
26.00	27.86	29.72	26.29	26.29	26.29
27.00	28.93	30.86	27.30	27.30	27.30
28.00	30.00	32.00	28.31	28.31	28.31
29.00	31.07	-	29.32	29.32	29.32
30.00	-	-	30.33	30.33	30.33

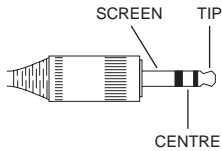
## Cables & Connections

### Satellite Receiver

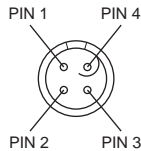
The Satellite Receiver requires two cables, one to connect the Remote Control to the Satellite Receiver and one to connect the Satellite Receiver to the Projector. The signal between the Remote Control and the Satellite Receiver is Phillips RC5 and the signal between the Satellite Receiver and the Projector is RS232.

The cable between the Remote Control and the Satellite Receiver can be up to 10 metres in length and requires a 3.5mm stereo Jack Plug at the remote control end and a 4 pin LEMO connector at the Satellite Receiver end.

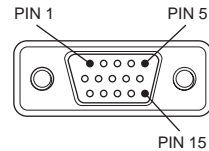
Remote Control End	Signal	Satellite Receiver End	Conductor
Screen	+15V	Pin 1	White
Centre	Signal	Pin 3	Blue
Tip	Ground	Pin 4	Screen
	Sense	Pin 2 to Pin 4	Wire Link



3.5mm SCREENED STEREO JACK PLUG



4 WAY 'LEMO' CONNECTOR



MALE 15-PIN HIGH DENSITY 'D' STYLE CONNECTOR

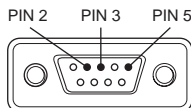
The cable between the Satellite Receiver and the Projector can be up to 60 metres in length and requires a male 15-pin High Density 'D' type connector at both ends.

Satellite Receiver End	Signal	Projector End	Conductor
Pin 1	+15V	Pin 1	White
Pin 5	Signal	Pin 5	Blue
Pin 15	Ground	Pin 15	Screen

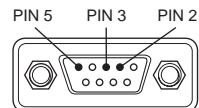
## Remote Computer Control

The projector end of this cable must be fitted with a 'male' 9-pin D-type connector. If using a 'laptop' computer, the other end of the cable should be fitted with a 'female' 9-pin D-type connector (or a 'female' 25-pin connector). The cable should be a screened cable with a minimum of three cores including the screen. The following pins should be connected:-

Projector End	Signal	Computer End (9-pin)	Computer End (25-pin)
Pin 2	TX	Pin 3	Pin 3
Pin 3	RX	Pin 2	Pin 2
Pin 5	Ground	Pin 5	Pin 7



MALE 9-PIN 'D' STYLE CONNECTOR



FEMALE 9-PIN 'D' STYLE CONNECTOR



*On the Computer Out connection the RX and TX signals are reversed.*

## Switcher Control

The connection requirements for the projector end of the switcher control cable are identical to that for remote computer control. For information on the switcher end of the cable, please refer to the documentation supplied with your switching device.

## Technical Specification

	POWER 2v	POWER 4dv	POWER 5dv
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<b>Lamp Type</b>	Proprietary Xenon Arc		
<b>ANSI Output</b>	2500 Lumens	3500 Lumens	5000 Lumens
<b>Lamp Life</b>	1000 hours	750 hours	500 hours
<b>Brightness Linearity</b>	>90% Edge to Centre		
<b>Colour Temperature</b>	3000K - 9300K adjustable		
<b>Contrast Ratio</b>	>150:1 ANSI Checkerboard >200:1 Full Field		

<b>Display Type</b>	3 x DMD (one per R, G & B)
<b>DMD Specification</b>	848 x 600 Pixels 16um x 16um Pixel size 17um x 17um Pixel pitch 14.4mm x 10.2mm DMD size
<b>Fill Factor</b>	88% Pixel fill factor

<b>Input Specification</b>	3 independently configurable inputs - selectable via remote control. BNC connectors 525/60, 625/50, PAL, NTSC, SECAM, SVGA, VGA, XGA & MAC Auto Select.		
<b>RGBS</b>	RGB = 700 mV/75R S = 0.7 V - 5 V Sync on G, Separate H & V, Composite Sync Auto Select.		
<b>Y Pr Pb</b>	Y = 700 mV + 300 mV/75R Pr, Pb = 700 mV p-p/75R		
<b>Y/C (S video)</b>	Y = 700 mV + 300 mV/75R C = 300 mV p-p/75R		
<b>Composite</b>	1 V p-p/75R		
<b>Computer</b>	H = 15 kHz to 79 kHz V = 24 Hz to 100 Hz		
<b>Source Compatibility</b>	up to 800 x 600 @ 100Hz	up to 1024 x 768 @ 100Hz	up to 1024 x 768 @ 100Hz



	POWER 2v	POWER 4dv	POWER 5dv
<b>Remote Control</b>	IR Receivers front and rear. Hard wire link to handset 15 Pin HD type connector		
<b>Automation</b>	RS232 input/output loop through, 9 Pin D type		
<b>Switcher</b>	Seperate Audio & Video Switcher outputs - RS232, 9 Pin D type		
<b>Mounting</b>	Floor mount (standard) Ceiling mount (option) Custom stand and cradle (option)		
<b>Lens Options</b>	1.27:1, 3.0:1, 5.0:1, 7.0:1 1.5-3.0:1 zoom, 3.0-7.0:1 zoom		
<b>Rising/Falling Front (manual lens mount)</b>	300 pixels rising for all lenses 120 pixels falling for all lenses		
<b>Rising/Falling Front (motorised lens mount)</b>	300 pixels rising for all lenses 200 pixels falling for 1.27:1 lens and 300 pixels falling for all other lenses		
<b>Lens Distortion</b>	0.25% at maximum rising front for fixed lenses 0.5% at maximum rising front for zoom lenses		
<b>Power Requirements</b>	200 - 240V ac 50 - 60Hz		
<b>Factor Correction</b>	0.95		
<b>Power Consumption</b>	2300 watts 7848 BTU/hr	2700 watts 8872 BTU/hr	3000 watts 10237 BTU/hr
<b>Physical Dimensions</b>	403mm (16") height 660mm (26") width 975mm (38.5") length		
<b>Weight</b>	90 Kg (198 lbs) including standard lens		



# Section E: Fault Finding and Maintenance

Troubleshooting.....	E—1
Maintenance.....	E—4
Air Filter Replacement .....	E—4
Lamp Replacement.....	E—6



## Troubleshooting

PROBLEM	POSSIBLE CAUSE	SOLUTION
The projector will not power-up.	The projector is not plugged in correctly.	Check mains plug and projector switch.
The projector shuts down.	Thermal shut down devices have cut power due to overheating.	Check if air ducts are clear, clean/replace filters.
Lamp power declines.	The projector is overheating.	Check if air ducts are clear, clean/replace filters.
Front Red LED illuminated.	The lamp has reached the end of its life.	Replace the lamp.
No Image is displayed.	Lamp has not lit (the red LED will be illuminated).	Switch off the projector and power-up again.
	No input source.	Connect an input source.
	Input source incorrectly connected.	Refer to 'Signal Sources' for correct connections.
	PIC MUTE is on.	Press the PIC MUTE button on the remote control to turn it off.
	Channel has not been selected.	Select a channel.
The lamp is lit but no image is being displayed.	DMDs™ have been shut down due to overheating.	Check if air ducts are clear, clean/replace filters.

PROBLEM	POSSIBLE CAUSE	SOLUTION
No image is displayed and a LED is flashing on the input board.	Input device is connected to wrong input.	Connect input to the row with flashing LED.  Change the input number of selected device in the Channel Set-up.
	No input source.	Connect input source.
Image does not fit onto screen.	The wrong aspect ratio has been set.	Change the aspect ratio in CHANNEL SET-UP.
	Projector is in the wrong position.	Check the throw distance is correct.
Uneven focusing.	Projector not positioned correctly.	Re-position the projector to be perpendicular to the screen and re-focus.
Poor vertical resolution.	Faulty interlacing.	Contact your dealer.
Picture flicker.	Incorrect sync selected.	Set sync to match the input devices sync.
	The lamp may be reaching the end of it's life.	Replace Lamp.
An interrupted image is being displayed.	The image has been pre-recorded with a different sync.	Change the input sync using MODIFY in the CHANNEL SET-UP to match the signal to the projector.

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>SOLUTION</b>
Distorted image from a computer input.	The computers pixel phase and resolution differ from that of the projector.	Use the PIXEL and PHASE buttons on the remote control to match them with the projector.
No menus are displayed when pressing MENU on the remote control.	The On Screen Display is turned off.	Press the OSD ON button on the remote control.
Uneven light distribution.	Screen may be wrinkled or incorrectly installed.	Ensure screen is flat and securely mounted.
A warning box tells you the projector is too hot.	The projector is overheating.	Check if air ducts are clear, clean/replace filters.
The projector is not responding to commands from the remote control.	The batteries are flat.	Replace batteries.
	The remote cable is not connected properly.	Ensure the cable is connected properly.
The back light on the remote control will not illuminate.	The batteries are flat.	Replace batteries.
	The remote cable is not connected properly.	Ensure the cable is connected properly.

## Maintenance

### Air Filter Replacement

There are five air filters in the **POWER 4dv** and **POWER 2v** projectors, one in each side cover and three underneath. The **POWER 5dv** projector has only three as it does not have any filters in the side covers. All filters must be regularly checked and replaced in order to prevent the projector from overheating.

Air filters are only supplied in complete sets and it is recommended that all filters are replaced at least every 3 months. As a matter of good practice, the user is recommended to renew all the filters each time the lamp is replaced.



*Before attempting to remove any of the projector's covers, you must turn off the projector and disconnect from the mains supply.*

#### TOP REAR COVER

The rear cover on the top of the projector contains an air outlet grill to allow heat dissipation from the lamp. An air filter is located on the underside of the grill and to check or replace it, you must first remove the cover. This is accomplished by releasing the two shoulder screws at the rear, then while gently lifting, slide the cover back towards the rear of the projector. The air filter will now be exposed and can be easily removed from the centre of the cover and replaced.



*For safety reasons, the projector has an interlock system preventing its operation with the lid removed.*

#### UNDERSIDE

There is one circular and two rectangular air filters accessed from the underside of the projector. The circular filter is located in the filter cassette which slides into, and out from, the castellated mounting bracket for replacement.

The rectangular filters are located inside hinged panels to the front of the projector. These panels are released by removing the retaining screw, and drop down to reveal the velcro-held filters.



### SIDE COVERS

To access the filters in the side covers, remove the four screws securing each cover and lift away. The filters in the side covers are fastened in place using velcro strips and can be removed by pulling away from either end.



*The filter on the left hand side requires the removal of the perforated section from the filter before attaching to the side cover.*

Secure the new filters in position over the 'hook' velcro on the side covers, then re-attach the covers. Take care to ensure that the hole in the left hand side cover filter is in position over the exit duct of the lamp power supply when re-attaching the cover.

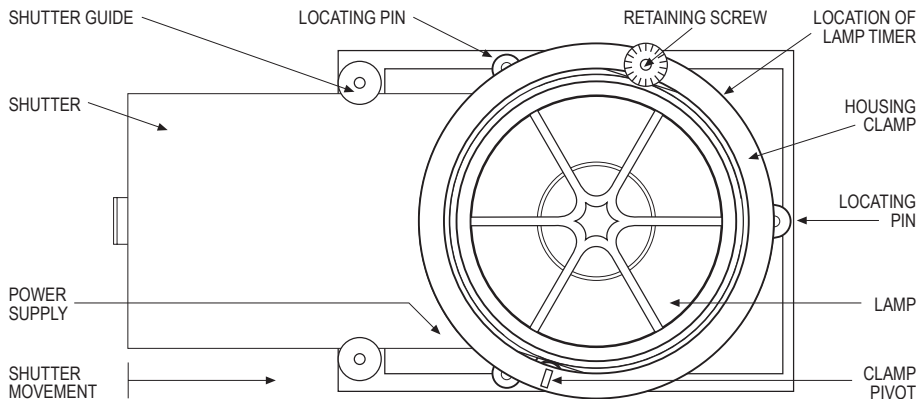
## Lamp Replacement

To remove the lamp, switch off the projector, disconnect from the mains supply and wait 20 minutes for the projector to cool down. As a matter of good practice, and in order to reduce the 20 minutes cooling time, the user is recommended to switch off the existing lamp using the LAMP OFF button on the remote control unit, and to allow the cooling fan to run for 5 minutes before turning off the projector and disconnecting from the mains supply. The projector will however be undamaged by immediate removal of the mains supply.

Remove the top rear cover by releasing the two shoulder screws at the back, then while gently lifting, slide the cover back towards the rear of the projector. Next, remove the screws securing the rear sub cover to the mounting bracket and lift out the cover.



***For safety reasons the lamp has an integral housing and shutter, this shutter must be closed before the lamp can be removed.***



Before attempting to disconnect the lamp from the power supply, locate the lamp shutter and push it to the closed position. Disconnect the lamp from the power supply by removing the two push-fit connectors. Next, undo the retaining screw on the housing clamp and pivot it back. Then, carefully lift out the lamp housing and remove it to a safe place. If you do not want to replace the lamp immediately, close the housing clamp and replace both covers.

To fit a new lamp, make sure the projector is disconnected from the mains supply and align the lamp housing over the locating pins and gently lower into position. Pivot the back into position and secure the retaining screw. Attach the electrical connectors carefully checking the correct polarity and then slide open the lamp shutter. Replace the sub cover and rear top cover.

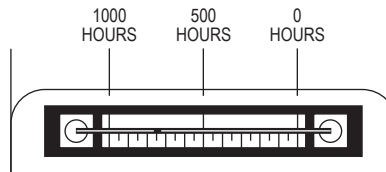


***Following lamp replacement, ALWAYS ensure that the shutter mechanism is fully open and resting against its end stop. Failure to do this will prevent the lamp from striking.***

### Lamp Life Timer

The lamp has been enhanced to include a passive mercury lamp life timer. This timer is located on the lamp base and operates when the lamp is running with the lamp shutter open.

The timer has an unmarked scalar bar which indicates 0 to 1000 hours of lamp use with graduation marks every 50 hours. The current lamp usage is indicated by a black mark on the the mercury bar (shown in diagram at 750 hours).



As the timer does not operate when the lamp shutter is closed, it is recommend that spare lamps are kept for good measure. Replacement lamps should be stored in their original packaging in a cool dry area until they are required for installation.



# Appendix

- Quick Set-up Guide ..... i
  - Setting Up the Projector ..... i
  - On Screen Display ..... i
  - If there is no Image..... ii
  - Correcting Distorted Images..... ii
  
- Menu System Review ..... iii
  - The On Screen Display (OSD)..... iii
  - The Menu System ..... iii
  
- Glossary ..... vi



## Quick Set-up Reference

*This guide assumes the projector has been previously installed and configured in accordance with the System Installation guidelines in this Manual.*

### Setting Up the Projector

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Check that the input source you wish to display is connected to the back of the projector. If it is not, and you are unsure how to connect the source, refer to System Installation, B—13.

Connect the projector and the input device to the mains supply and switch on (the projector's power button is located at the back, on the left hand side). After turning the projector on, check that air is flowing out of the vent on the top of the projector case, if it isn't, turn the projector off immediately and contact your dealer.

If after 25 seconds the projector lamp has not lit (and the red LED is illuminated on the front of the projector), switch off the projector and turn it back on again.

When the projector starts up, it will display images using the settings defined by the 'At Power Up' section of the User Preferences - you may need to select new settings.

### On Screen Display

---

The On Screen Display (OSD) displays the menu system and messages and unless pre-set to OFF in the User Preferences, will appear when the projector starts up.

The OSD must be turned ON if you wish to make changes to the projector set-up. If it is OFF, it can be activated using the OSD ON button on the remote control.

When OSD is ON, the menu system can be temporarily removed by pressing MENU on the remote control. To re-activate the menu system, press MENU again and you will be returned to the last menu screen used.

## If there is no Image

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### **Ensure the input source is sending a signal.**

Check the input source is correctly connected, an LED will flash on the input board at the rear of the projector if you have incorrectly connected the input device. Check that a signal is being sent (e.g. if it is a video recorder, it is set to play).

### **Ensure the correct input and channel numbers have been selected.**

Check the type of input source and the input number you have connected the device to, then, select the appropriate settings in the Channel Set-up Function.

### **Ensure Pic Mute has not been inadvertently selected.**

If Pic Mute is ON, press the Pic Mute button on the remote control to toggle it OFF.

## Correcting Distorted Images

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### **The image is out of focus.**

Ensure the projector is placed in the correct position, then focus the image by using the manual controls located underneath the front hatch.

### **The image does not fit the screen.**

Ensure the projector is placed in the correct position, then select the channel with the required aspect ratio for the image you want to display. The aspect ratio can be changed using the Modify option in the Channel Set-up function.

### **The image is stretched horizontally or vertically.**

The image is being displayed with the wrong aspect ratio. Before changing the aspect ratio, ensure you have selected the correct channel for your input device and the horizontal and vertical sizes are correct.



## Menu System Review

### The On Screen Display (OSD)

---

A menu system is provided to access the projector's system and image input settings. In order to access the menu system OSD must be turned 'ON'. If OSD is ON but no menus are displayed press the MENU button on the remote control. The MENU button temporarily removes or replaces the menu display allowing you to exit the menu system and re-enter at the same point. To leave the menu system completely, either press EXIT at the main menu or OSD OFF at any time. When the menu system is re-entered, you will be at the Main Menu. Movement through the menu system is controlled by the cursor and enter buttons on the remote control.

### The Menu System

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The **MAIN MENU** provides access to the sub-menus which allow you to control the projector and to view any system settings. A brief description of each sub-menu is given below.

**CHANNEL SET UP** - allows you to create **NEW** channel configurations, **SELECT** a channel and **VIEW, COPY, MODIFY** or **DELETE** that channel.

#### NEW

The **NEW** command allows you to set up a channel for a new input device. Highlight a channel and select **NEW**, a new channel with the default parameters as specified in the **USER PREFERENCES** menu will be automatically created. These parameters can then be modified to meet your requirements.

#### SELECT

Channel selection can be made in two ways, by simply keying in the channel number on the remote control or by selection in the Channel Set Up screen. To select a channel using the On Screen Display, highlight both the desired channel and **SELECT** using the cursors then press **ENTER**.

### VIEW

The VIEW command will display information about the selected channel, the information cannot be modified in this function. To select a channel, highlight it using the cursors and select VIEW.

### COPY

The COPY command allows all or just selected parameters from a channel to be copied to another channel. To copy a channel highlight both the desired channel and COPY using the cursors then press ENTER. Next, enter the destination channel and the parameters to be copied.

### MODIFY

The MODIFY option allows you to change individual channel configurations. As the Size & Position and Computer Mode parameters are defaults when you create a new channel you can re-define them using this option.

### DELETE

The DELETE command allows to delete any unwanted channels (except the factory defaults). To delete a channel highlight it in the Channel Set Up screen and select DELETE. For safety, you will be asked to confirm the deletion.

**ADD COMPUTER** - allows you to configure the projector to display different computer card outputs. It also allows groups of computer modes to be created and saved under a collective name. Other options include the modification, deletion and copying of computer cards.

### DELETE

It is possible to delete a single mode contained within a computer card or all modes contained within a card (effectively deleting the complete card). Select the card from the fly-out list in the Add Computer Screen, only computer cards you have created are valid for deletion - factory supplied cards cannot be deleted. Assuming you have selected a valid computer card, selecting DELETE will open the 'Delete Computer' window allowing you to select the appropriate modes.

### MODIFY/CREATE

If you selected an existing computer card it is possible to modify a specific mode for that card. After selecting the mode to be modified from the resolution mode fly-out list you will enter the 'Mode Parameters' window. The computer and mode names will be displayed along with the previously defined parameters.

If you selected NEW, the 'Computer Name' window will open asking you to enter the name of the new computer. After entering the name and selecting OK, the mode parameters window will appear to allow you to define its configuration.

### COPY

The COPY function permits the user to make a copy of an existing computer card with all its associated modes and give it a different name. It is not possible to copy an individual mode, either within a computer card or between cards. To copy a computer card, select it from the fly-out list and press COPY. After naming the new version select OK to execute the copy.

**IMAGE MODE** - allows you to configure the projector for front or rear projection and to define gamma correction for TV or Film inputs.

**USER PREFERENCES** - enable you to define the general defaults to be applied when the projector is turned on.

**TEST PATTERNS** - are used to check the projectors alignment and performance.

**SET ADDRESS** - defines an individuals projector's address when using multiple projectors.

**PROJECTOR STATUS** - displays lamp information along with the projectors temperature and memory status. The last four warning issued are also displayed.

**SERVICE SET UP** - is for qualified technicians only and is password protected.

## Glossary

### **Arc Lamp**

The xenon arc lamp has a sapphire lens and a ceramic cover over the anode and cathode. It operates at high temperatures and the beam contains high levels of ultra-violet and infrared radiation. It is contained in a housing which acts as a heat sink.

### **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.

### **Cold Mirror**

This type of mirror absorbs infrared light, so that only 'cold' light is reflected. In the projector it is used to reflect the beam from the lamp into the condenser.

### **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 imbalance in the prism.. The projector allows you to adjust this temperature (i.e. adjust the picture colour) in steps of 100°K from 3000° to 9900°.

### **Composite Signal**

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

### **Contrast**

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

**Dichroic Filter**

The red, green and blue light from the lamp beam is separated by the prism. Each section of the prism transmits only one of the colours.

**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 light.

**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.

**Pr, Pb**

These are Chrominance (Chroma) signals and are used with Y for S-Video inputs. They provide information about the signal colour.

**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**

R - Red, G - Green and B - Blue are the three primary light colours from which all other colours may be derived.

**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 from an S-Video signal.