POWER
3dv

POWER
3gv

The POWER display range of

SUPER-HIGH-BRIGHTNESS DIGITAL VIDEO PROJECTORS

POWER 3dv and POWER 3gv

USER MANUAL

Revision A - 01/11/98

DIGITAL PROJECTION

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 3dv** and **POWER 3gv**.

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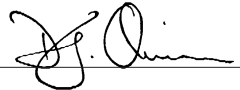
BS EN 50082-1: 1992 EMC Generic Immunity Standard for Residential, Commercial and Light Industrial Equipment.

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 1998.

Signed: _____

Authority: D.J. Quinn, Product Development Director

Date: 29th May 1998

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.

Revision Record

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

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

Revision No	Revision Details	Date Revised

Introduction

Please read the following before proceeding

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 page A—3.

INTRODUCTION

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

Outline of Contents

INTRODUCTION

Section D: Advanced User Information

Section E: Fault Finding & Maintenance

Appendix

Section A: Overview

OVERVIEW

Packaging

Projector Packaging

To provide protection during transportation, the projector is surrounded with foam, enclosed within a sturdy fibreboard carton and placed on a wooden palette. 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, at least two people are required to lift the projector. 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 **POWER display** Projector	1 x Remote Control Unit
1 x AC Power Cable	1 x User Manual

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

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

The **POWER 3dv** and **POWER 3gv** 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 3dv** and **POWER 3gv** 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.

OVERVIEW

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

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.

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 with the left hand side raised.

Care should be taken when removing or re-attaching the projector feet to ensure that the projector does not rest on its feet at an angle.

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

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

OVERVIEW

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Initial Preparation

Pre-Installation Check

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 45 seconds.

5. Check air is flowing out of the exit ducts on the top and left hand side of the projector.

6. Insert batteries into the remote control unit (see overleaf).

7. 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).

8. Turn the lamp off by depressing the LAMP OFF button on the remote control for two seconds.

9. Power down the projector and disconnect from the mains supply.

10. 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 or hard wire..

OVERVIEW
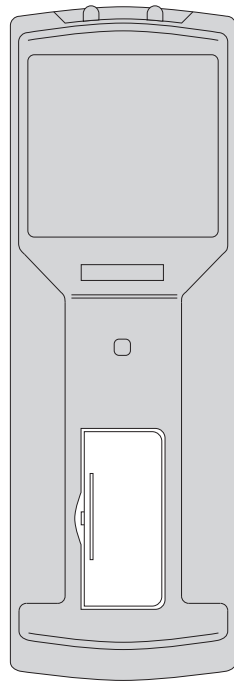
The battery compartment is located on the back of the Remote Control. To remove the compartment cover, insert a finger-nail into the recess provided to the right of the cover and push to the right. While pushing to the right, lift out the left hand side of the cover.
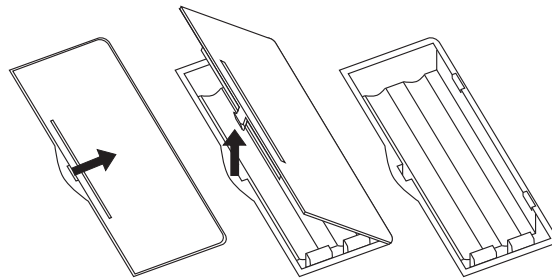
Insert the first two new batteries as shown below and slide them to the back of the compartment. Insert the remaining two batteries by pivoting them against the electrical contacts and pushing down into place.
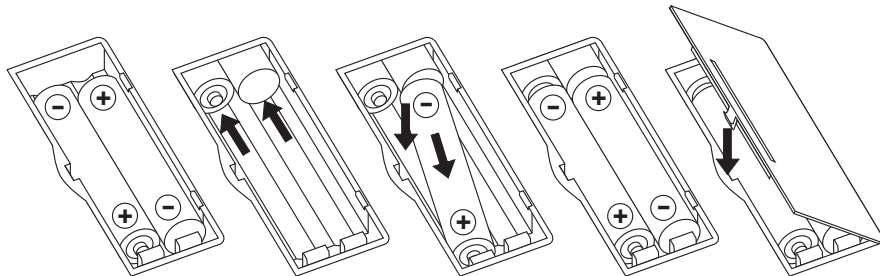
When the batteries are securely in place, replace the cover by aligning the stays on the right hand side and pushing down the left hand side until it 'clicks' into place.

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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—16.

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Mounting Hole

Infra Red Receiver

DIGITAL PROJECTION

4 Way 'LEMO' Connector

15 Way HD 'D' Connector
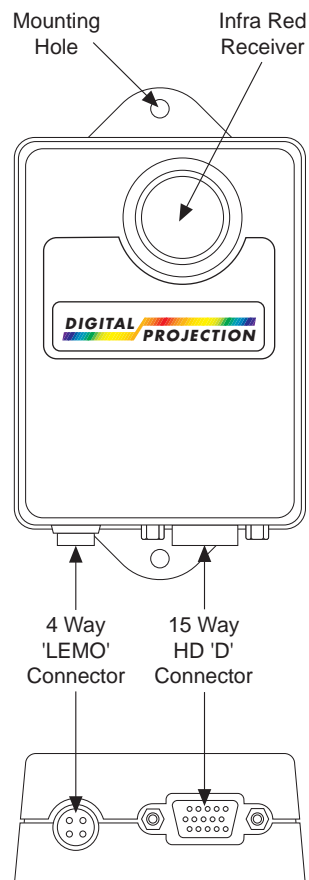
Hard Wired Remote Adapter

The hard wired remote adapter consist of two cables which connect together to form a direct (hard wired) link between the remote control unit and the projector.

The longer of the two cables has a 3.5mm stereo jack plug at one end which connects into the top of the remote control unit.

The 3.5mm stereo jack plug has a long outer shell - some of which may be visible when the plug is seated correctly in the Remote Control Unit. To avoid damage, do not attempt to push the plug further into the Remote Control Unit.

The two cables then connect together using a 3-pole audio/video connection and are secured by a latch to prevent accidental disengagement. The shorter cable also has a 3-pole audio/video plug which connects to the 'Ext Remote' input on the back of the projector.

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

As with hard wiring via the remote receiver, the remote control does not require batteries when used in this manner. The remote adapter also allows control of the projector from a greater distance than via the remote receiver - using standard 'XLR' cable assemblies the user can extend the length of cable up to a maximum of 100m (330ft).

For further information on the hard wire remote adapter wiring, see Cables and Connections, D—18.

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Components

Projector Case

The projector case is constructed of sturdy thermoplastic panels attached to a structural (space) frame. The projector base is held in position by the four feet which provide the basis for all types of mounting.
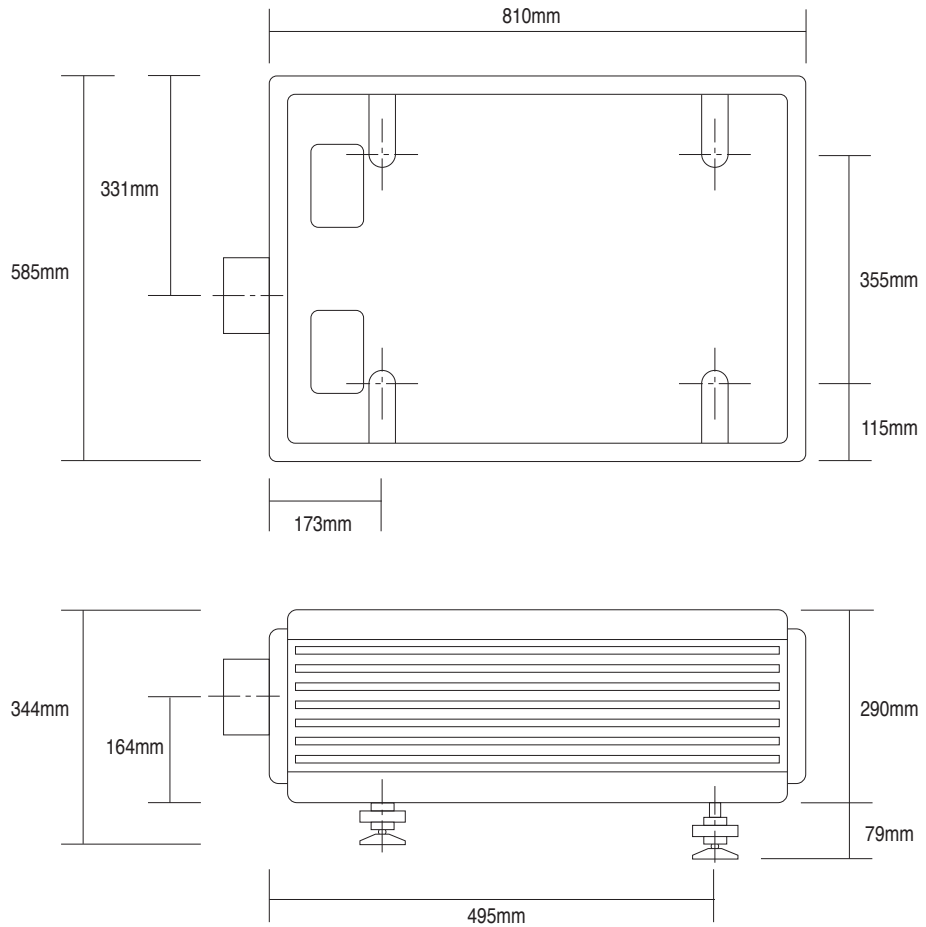
Analogue Input Board

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 functions of the input board can be split into four main sections - Power, Input Source, External Control and Integrated Keypad.
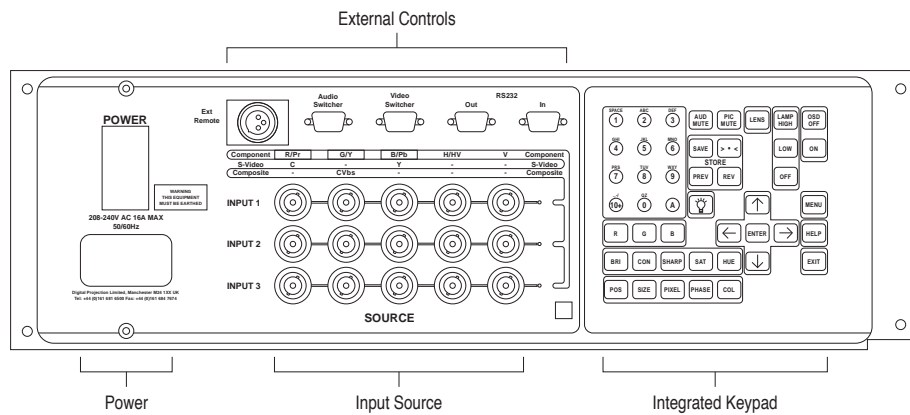
POWER

Mains Input - For connection of 208 - 240 V ac 50 - 60 Hz.

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

INPUT 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.

EXTERNAL CONTROLS

Ext Remote - Input providing direct connection with the remote control unit.

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

Audio Switcher - *This feature is not used at present*.

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

INTEGRATED KEYPAD

The **Integrated Keypad** provided on the rear of the projector allows the projector to be controlled without the remote control. The operation of this keypad is identical to that of the remote control (see System Operation, C—1 for further details).

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 around 1000 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—4).

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

The lamp faces sideways 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

The range of lenses available for the **POWER 3dv/3gv** projectors 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 five fixed ratio lenses available for the **POWER 3dv** projector (3:1, 5:1, 7:1, 1.27:1 Short Throw and an SVGA Ultra Wide Angle lens) and two zoom lenses (1.5:1 to 3:1 and 3:1 to 7:1) .

Three zoom lenses have been developed specifically for the **POWER 3gv** projector (zoom ratios 1.5:1 to 2.5:1, 2.5:1 to 4:1 and 4:1 to 7:1) and an XGA Ultra Wide Angle lens. In addition to these, the lenses developed for the **POWER 3dv** series may be used, albeit with modified throw ratios and limited lens shift capabilities.

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 you are unsure as to which lens would best suit your requirements, consult your dealer.

The throw ratios defined for each lens are nominal values.

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Electronics

The main electronic components of the projector are the Analogue Input Board, the digital processing cards, an Embedded PC and three display boards (each of which contains a Digital Micromirror Device™).

The Analogue Input Board, situated at the rear of the projector, processes analogue inputs and routes them to the digital processing cards located in the light engine.

The digital processing cards consist of a Signal Converter, Image Processor and a Formatter Card. The Signal Converter converts the input from analogue to digital. The Image Processor then re-processes the image and the Formatter Card translates the signal into a format that the Digital Micromirror Devices™ can read.

The Embedded PC provides user control and the On Screen Display features.

Digital Micromirror Devices™

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. The DMDs™ in the 3dv projector each contain 508,800 mirrors arranged in a 848 x 600 array and the DMDs™ in the 3gv projectors contain 786,432 mirrors arranged in a 1024 x 768 array.

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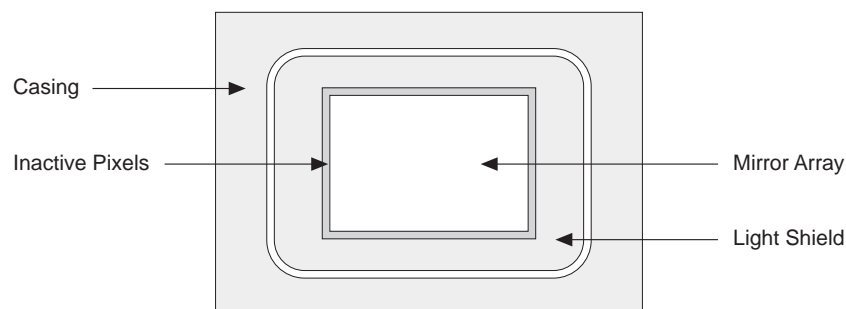
Power supplies

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

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.

Remote Control

All the functions of the **POWER display** are controlled using the remote control or the integrated keypad on the rear of the projector. The remote control can be connected to the projector via the remote receiver or hard wired remote adapter. This connection simultaneously powers the control unit, illuminates 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).

Very bright fluorescent lighting or Infra Red translation systems may saturate the projectors Infra Red receivers rendering remote control inoperative.

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OVERVIEW

Remote Receiver

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—6 and D—16 for more information).

Section B: System Installation

INSTALLATION

INSTALLATION

Installation Guidelines

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

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

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

3. The method of mounting for the projector.

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

Screen Requirements

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

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

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

INSTALLATION

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

INSTALLATION

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 menu (see system operation, C—8) and displayed without the need for extra mirrors or equipment, it makes the installation more complicated and advice should be sought from your local dealer before attempting an installation in this way.

H

30°

1.2m (4 Ft)

2H

INSTALLATION

SCREEN

8H   2H

60°

VIEWING AREA

AISLE   AISLE

AISLE
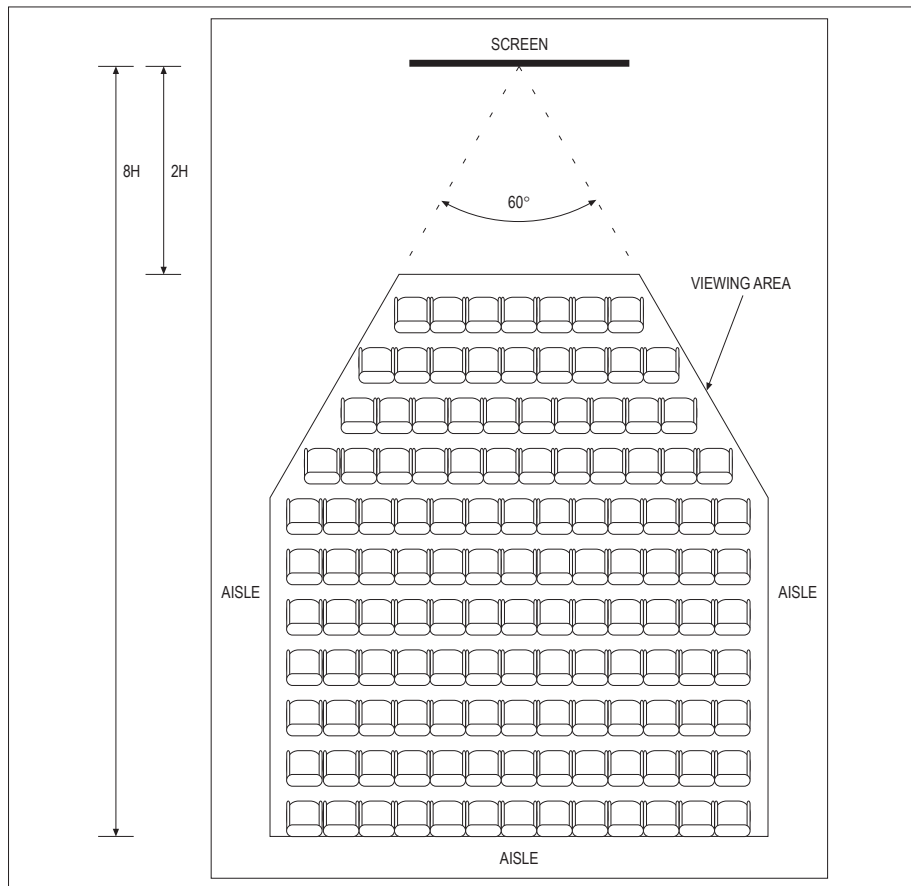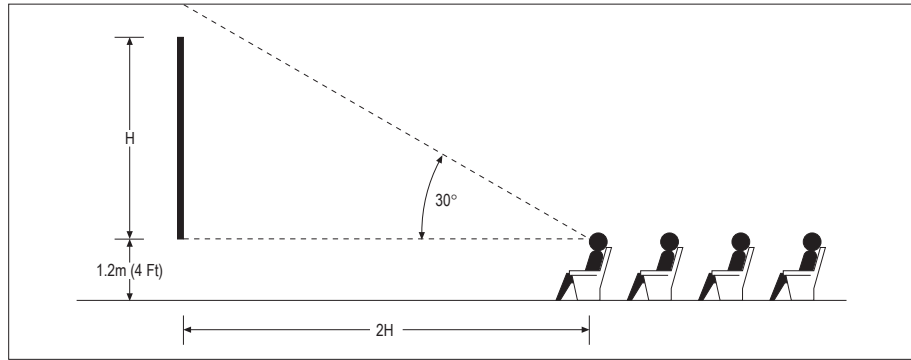
Positioning the Projector

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

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

INSTALLATION

PROJECTOR HEIGHT

The default height for positioning the projector is at the centre of your screen. However, you can set the projector above or below the centre and adjust the image using the 'Lens Shift' facility to maintain a geometrically correct image. Up to 384 pixels of Lens Shift correction can be implemented for all lenses, however, in order to achieve this slight tilting of the projector may be required.

'Lens Shift' may also be described in this document as rising or falling front.

HORIZONTAL POSITION

As with vertical positioning, the default horizontal position of the projector is at the centre of the screen. However, the projector can be mounted up to one quarter screen width left or right of image centre and the 'Horizontal Lens Shift' function used to centre the image on screen without geometric distortion.

Vertical Lens Shift and Horizontal Lens Shift can be used in combination, however the extent of their individual ranges will be reduced according to the amount of shift used i.e. Vertical Lens Shift is maximised when Horizontal Lens Shift is centred and vice versa.

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.

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.

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 tables overleaf and perform the following calculation for both the minimum and maximum lens throw ratios in relation to the aspect ratios you intend to display. The results will define the distance range required according to the lens tolerance.

Distance Required = (Screen Width x Actual Lens Throw Ratio) + Offset

B—5

For POWER 3dv projectors

| Nominal Lens POWER dv Lens Throw Ratio | Actual Lens Throw Ratio on a POWER dv projector for Aspect Ratios:- | | | | Offset Required (metres) |
| | 4 x 3, 16 x 9, 14 x 9 and 8 x 5 | | 5 x 4 | | |
	Min	Max	Min	Max	
Ultra Wide Angle	0.96	1.00	0.91	0.94	0.175
Fixed Short Throw	1.24	1.29	1.17	1.22	0.148
3.0:1	3.01	3.08	2.84	2.91	0.076
5.0:1	4.90	5.05	4.62	4.76	0.056
7.0:1	6.80	7.07	6.46	6.67	0.039
1.5-3.0:1 @ 1.5:1	1.50	1.52	1.42	1.43	0.180
1.5-3.0:1 @ 3.0:1	2.80	2.87	2.64	2.71	0.180
3.0-7.0:1 @ 3.0:1	2.96	2.98	2.79	2.81	0.085
3.0-7.0:1 @ 7.0:1	6.96	7.00	6.57	6.60	0.085

For POWER 3gv projectors

| Nominal Lens POWER gv Lens Throw Ratio | Actual Lens Throw Ratio on a POWER gv projector for Aspect Ratios:- | | | | Offset Required (metres) |
| | 4 x 3, 16 x 9, 14 x 9 and 8 x 5 | | 5 x 4 | | |
	Min	Max	Min	Max	
Ultra Wide Angle	0.81	0.84	0.86	0.90	0.175
1.5-2.5:1 @ 1.5:1	1.49	1.50	0.59	1.60	0.205
1.5-2.5:1 @ 2.5:1	2.50	2.51	2.67	2.68	0.205
2.5-4.0:1 @ 2.5:1	2.49	2.50	2.66	2.67	0.170
2.5-4.0:1 @ 4.0:1	4.00	4.02	4.27	4.29	0.170
4.0-7.0:1 @ 4.0:1	3.97	4.00	4.24	4.27	0.110
4.0-7.0:1 @ 7.0:1	7.00	7.03	7.47	7.50	0.110

The lenses developed for the **POWER 3dv** projector may be used with a **POWER 3gv**, albeit with limited lens shift capabilities. It should be noted that the throw ratios of the **POWER dv** lenses, when used with a **POWER gv** projector are modified and the throw distance required should be calculated in accordance with the table opposite.

| Nominal Lens | Actual Lens Throw Ratio on a POWER gv projector for Aspect Ratios:- | | | | Offset |
| POWER dv Lens | 4 x 3, 16 x 9, 14 x 9 and 8 x 5 | | 5 x 4 | | Required |
Throw Ratio	Min	Max	Min	Max	(metres)
Ultra Wide Angle	0.81	0.84	0.86	0.90	0.175
Fixed Short Throw	0.97	1.02	1.04	1.09	0.148
3.0:1	2.36	2.40	2.52	2.56	0.076
5.0:1	3.84	3.94	4.09	4.20	0.056
7.0:1	5.31	5.53	5.66	5.90	0.039
1.5-3.0:1 @ 1.5:1	1.17	1.19	1.25	1.27	0.180
1.5-3.0:1 @ 3.0:1	2.16	2.24	2.30	2.39	0.180
3.0-7.0:1 @ 3.0:1	2.31	2.33	2.46	2.49	0.085
3.0-7.0:1 @ 7.0:1	5.44	5.47	5.80	5.84	0.085

These dv lenses may be used on the gv range of projectors with up to 100 pixels offset. However, it should be noted that under certain circumstances the specified luminance uniformity and resolution may not be maintained.

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 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 with the left hand side raised.

INSTALLATION

MOUNTING FEET

The projector has four feet which are attached through the base cover into the space frame. These feet hold the base cover in position and provide for all mounting requirements.

Care should be taken when removing or re-attaching the projector feet to ensure that the projector does not rest on its feet at an angle.

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 Stacking Cups

The optional Stacking Cups enable two projectors to be mounted, one above the other, in order to increase the brightness of the displayed image. The Stacking Cups replace the four retaining screws on the top cover of the lower projector to provide individual platforms for the feet of the upper projector.

Using projectors in this manner requires precise sizing and positioning of both images.

Optional Mounting Frames

Specialised flying and rigging frames are available, contact your dealer or Digital Projection for details.

INSTALLATION

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—21) 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 black, 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.

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.

INSTALLATION

COMPOSITE SIGNALS

PAL 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.
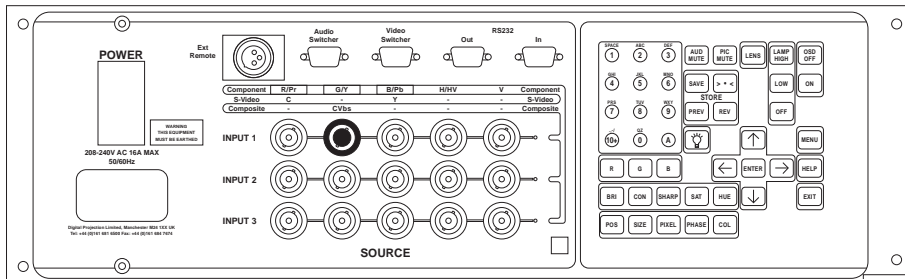
S-VIDEO SIGNALS

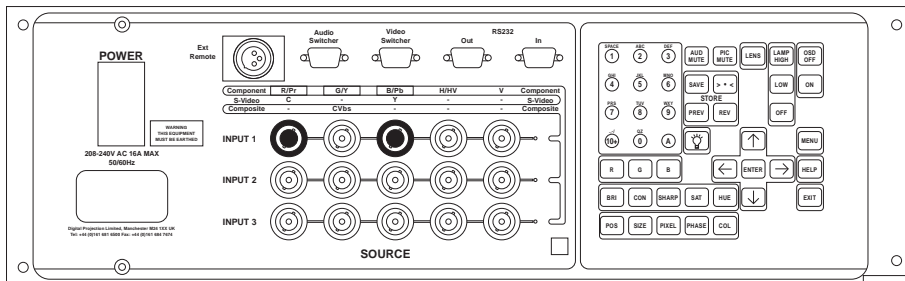VCRs and most video cameras produce an S-Video format. They are connected to the projector ports Y and C.

Y Pr Pb SIGNALS

A Betacam signal requires connection to the Y, Pr and Pb ports.
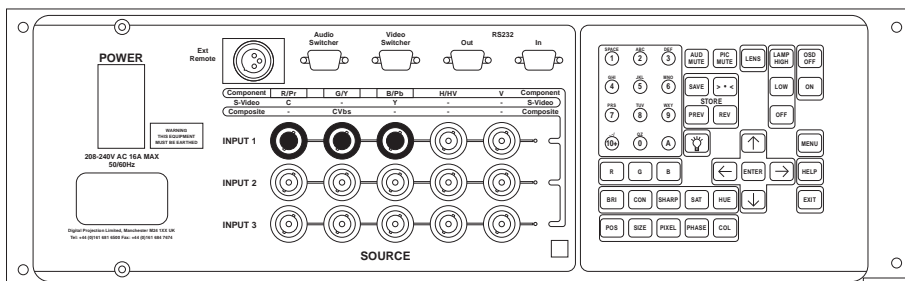
COMPONENT VIDEO SIGNALS WITH SEPARATE SYNC

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.
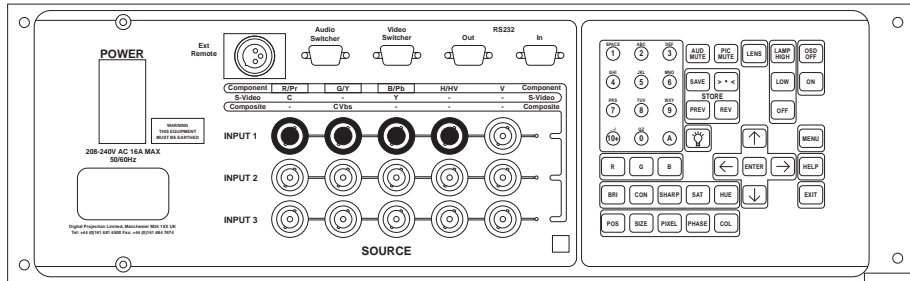
RGB Hs+Vs AND RGB Hs Vs SIGNALS

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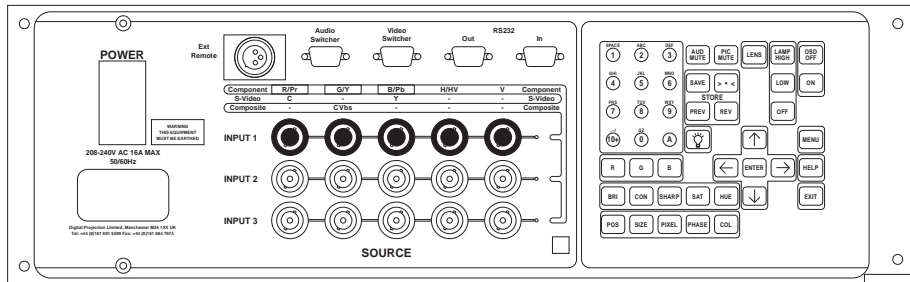
Apple Macintosh (series II) computers output a combined sync and therefore have one connection less than an SVGA computer. The R, G, B and combined horizontal and vertical syncs are connected as shown below.

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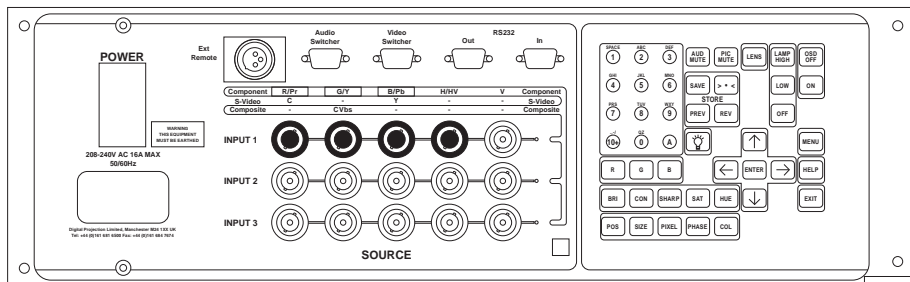
Turning On the Lamp

The lamp should light up within 45 seconds of the projector being turned on. If it has not lit, 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

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.

IMAGE CONTROL

The image parameters determine how a picture looks on screen and are adjusted by using the remote control or the Image 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 ⇧ , ⇨ buttons to increase and the ⇩ , ⇦ buttons to decrease the value (see System Operation). 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 are saved to the mode used by the channel being displayed. The modifications are specific only to the mode when used with that channel and do not affect any other channels configured to display images with the same mode.

The channel also stores the input source address allowing the use of the input device at a later date without having to reconfigure the parameters to achieve the desired image. The channel is selected using the remote control or integrated keypad and the source image is then displayed on screen.

LENS CONTROL

The motorised lens mount provides picture control features via the remote control in the form of Focus and Lens Shift. Both features are operated via the LENS button (see System Operation, C—2) 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 and is 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 'OFF' the menu system and messages will not be displayed on screen.

INSTALLATION

Storing System Configurations

A Channel is a 'store' containing all the parameters associated with an input and the image it displays. Channels display images using pre-defined modes. Multiple channels can be configured to display images using the same mode and multiple modes can be assigned to an individual channel. When adjustments are made to the image parameters (brightness, contrast etc.) of a channel, the changes are saved to the current mode used by that channel. This modified mode is specific only to that channel and does not have any effect on any other channels using the same mode.

In addition there are three further 'stores', 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 is selected, the image parameters associated with the displayed mode are held in both the previous and revised stores. When changes are made to the image, 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. When SAVE is pressed on the remote control, whichever image is being displayed on screen will be saved to both stores.

To clear changes held in the Revised store press PREV to re-select the original image and then SAVE.

The factory pre-set channel configurations cannot be changed. However new channels can be created using the same modes and these channels can then be modified to suit your requirements. There are pre-set modes for NTSC Composite, PAL Composite, 525/60 Component, 625/50 Component, SVGA 800 x 600, XGA 1024 x 768 and SXGA 1280 x 1024.

Section C: System Operation

OPERATION

OPERATION

Remote Control - Overview

Both the remote control unit and the integrated keypad on the rear of the projector can be used to select channels, adjust parameters and navigate through the menu systems.

Most of the 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.

As projector operation will frequently take place in a darkened room, the remote control has a built in back-light which illuminates the control panel. When the remote control is directly connected to the projector (either via the Remote Receiver or using the Hard Wire Remote Adapter) 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.

OPERATION

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BUTTON	FUNCTION / OPERATION
LENS	The LENS button is used to activate the Focus and Lens Shift features on projectors fitted with a motorised lens mount.
	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.
LAMP HIGH LAMP LOW LAMP OFF	LAMP HIGH represents 100% lamp power and LAMP LOW is variable between 0 and 31, which corresponds to between 50% and 100%. When LAMP LOW is pressed, a slider bar appears on screen allowing the user to define the setting of light output using the left and right cursor keys. LAMP HIGH and LAMP LOW can then be used to toggle between 100% and the previously defined LAMP LOW setting.
OSD ON OSD OFF	OSD ON activates the On Screen Display allowing you to view the menu system on the screen. OSD OFF deactivates the display.
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.

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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.-
PREV *(Previous)* REV *(Revised)* SAVE >·<	These buttons are used to store display settings. When modifications have been made to image parameters, pressing the PREV button will revert the display to the previously stored configuration. To view the image with changes, press the REV button. The SAVE button will store the version of the image being displayed whether it is the original (previous) or revised version. The >·< button will restore the factory pre-set values.
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.
⇦ ,⇧ ,⇩ ,⇨ 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.
EXIT	When at the Main menu, pressing EXIT will exit the menu system completely, otherwise it will return you to the previous menu.
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.

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BUTTON	FUNCTION / OPERATION
BRI *(Brightness)* CON *(Contrast)* SHARP *(Sharpness)* SAT *(Saturation)* HUE	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.
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.
POS *(Position)*	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.
SIZE	The image size can be altered using the cursor keys after selecting the SIZE button.
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.
COL *(Colour Temperature)*	The colour temperature can be adjusted in steps of 100° from 2200° to 9900° Kelvin. Press COL, then increase or decrease the temperature using the cursor buttons.

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Menu Operation

The menu system consists of four main menu screens (Image, Service, Modes and Channels) which provide all the parameters necessary to configure & control the projector.

In order to access the menu system the On Screen Display must be 'ON'. When the On Screen Display is on, the menu system can be viewed by pressing the 'MENU' button on the remote control. When accessing the menu system, either the 'Image' screen or the last screen of the menu system used will be displayed depending on whether the menus have been used since the Power or the On Screen Display was last turned on.

The Menu System can be temporarily removed to view test patterns or any changes to the image parameters by pressing 'EXIT' on the remote control (when not entering data). To leave the menu system entirely, press 'OSD OFF'. This will lose access to the menus along with any test pattern being displayed. When the menu system is re-entered, the entry point will be the 'Image' screen.

OPERATION

Navigation through the Menu System

Movement through the four menu screens is controlled using the 'MENU' button. Each press of the 'MENU' button will tab through the menu screens from left to right in a circular fashion.

Movement within individual screens is performed with the cursor keys on the remote control or integrated keypad and a thin red keyline is used to indicate your current position. When a parameter is selected with the ENTER button, the keyline will change to a thick red line to indicate that the parameter can be adjusted. If the cursor is moved off the edge of the screen in any direction it will reappear over the nearest function on the opposite side of the screen.

Name Fields

Each channel & mode configured in the projector must be allocated a unique name. To enter a name, select the name field with the cursors on the remote control and press ENTER. The name field will be surrounded with a thick red line and pressing an alpha-numeric button on the remote control will overlay the alpha-numeric characters associated with that button (e.g. pressing 2 will overlay 2 A B C a b c). To enter a character into the name field, it must be selected with the cursor keys and ENTER pressed on the remote control.

Pressing EXIT on the remote control whilst displaying an overlay, will remove the overlay and return to the name field without a character entry.

When characters have been entered into the name field they can be modified with the aid of the left cursor (move left), right cursor (move right), up cursor (forward delete) and the down cursor (delete).

Numerical Entry Fields

Numerical entries are required throughout the menu system for defining Input Numbers, Channel Numbers etc. To enter a number into one of these fields, position the cursor over the field and press 'ENTER'. Next, use the alpha-numeric buttons on either the remote control or integrated keypad to enter the required value and press 'ENTER'.

Flyout Lists

Flyout lists are provided for fields that require you to choose from a long list of possible choices. Options within a flyout list are provided in the following order: names starting with any punctuation; numeric entries in numerical order; names in alphabetical order.

Parameters that provide a flyout list can be identified by the ▾ icon at the right hand side of the data field.

OPERATION

To select from a flyout list, first place the dashed selection cursor over the data field and press 'ENTER' so that a thick red line surrounds the paramater to be adjusted. Next, press the ⇦ or ⇨ cursor to 'drop down' the flyout list. Highlight your choice using the ⇧ and ⇩ cursors and press 'ENTER'. The flyout list will close and the chosen data is selected. To exit a flyout list without making any changes, press 'EXIT'.

You can scroll through the options using the up and down cursors without displaying the full list.

Soft Buttons

There are four Soft Buttons used within the Menu System: 'ADD', 'REMOVE', 'APPLY' and 'CANCEL'. They are immediately activated by positioning the cursor over one of them and pressing ENTER.

In Menu Screens the 'APPLY' and 'CANCEL' soft buttons will save or ignore any changes made. In overlaid windows the 'APPLY' Soft Button will accept any selection made and exit the window and the 'CANCEL' Soft Button will ignore any selection and exit the window.

The 'ADD' and 'REMOVE' Soft Buttons are used to add and remove modes and channels.

Information Windows

Information windows provide information and advise a course of action. These overlaid windows will be automatically removed after approximately two seconds, or can be immediately removed by pressing ENTER on the remote control.

OPERATION

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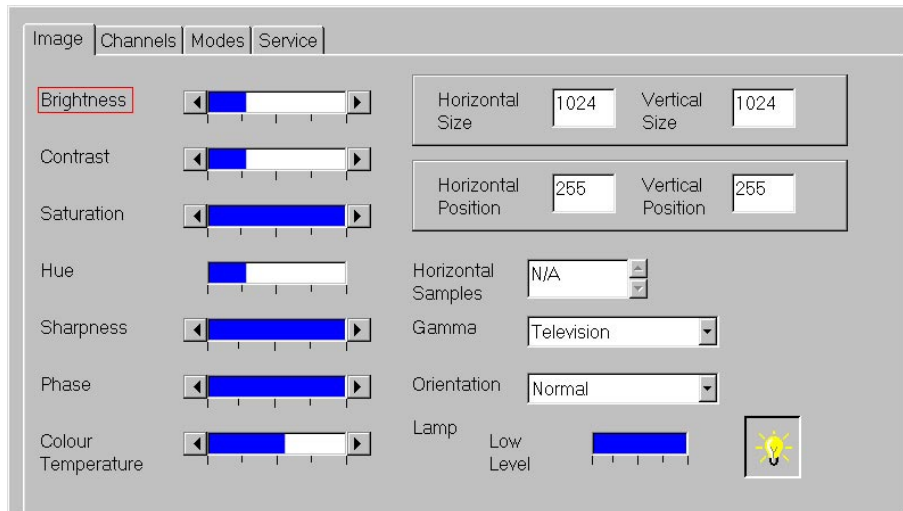
Image Menu

The Image Menu provides access to the following image parameters:

Brightness, Contrast, Saturation, Hue, Sharpness & Phase - These functions adjust the image parameters. Each parameter uses a scalar bar to indicate the current setting. To adjust a parameter move the selection keyline over the desired parameter and press ENTER on the remote contol. The keyline will change to a thick red line and the parameter can be adjusted using the cursor keys. The ⇧ and ⇨ cursors increase the value and the ⇦ and ⇩ cursors decrease it. Pressing 'Enter' will set the parameter and exit the function.

Colour Temperature - The Colour Temperature can be defined between 2200° and 9900° Kelvin. Adjustment in steps of 100° is made using the cursor keys.

Horizontal & Vertical Size - Size is measured as a percentage with 0% being the smallest image and 100% the largest. When selected, the ⇦ and ⇨ cursors on the remote control will adjust the horizontal Size and the ⇧ and ⇩ cursors control the vertical size.

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Horizontal & Vertical Position - Position is also measured as a percentage with a horizontal position of 0% at far left of the screen and 100% at the far right. A vertical position of 0% is at the bottom of the screen and 100% is at the top. When selected, the ⇦ and ⇨ cursors on the remote control will adjust the horizontal position and the ⇧ and ⇩ cursors will control the vertical position.

Horizontal Samples - Defines the number of horizontal pixels to be sampled in an incoming computer image.

Gamma - Corrects the degree of contrast in the input signal to provide an optimum image and should be set to either Television or Film according the signal type.

Orientation - Allows configuration for front or rear projection by horizontally or vertically flipping the projected image. The orientation should be selected from the flyout list according to your installation.

Lamp (Low Level) - Defines the brightness of the lamp when the projector is set to Lamp Low. The lamp power is controlled by a scalar bar and can be set between 0 (50%) and 31 (100%).

OPERATION

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Channels Menu

The 'Channels' Screen allows you to create new channel configurations and modify or delete previously configured channels. There are several factory default channels available to view input sources, these cannot be modified or deleted.

Creating or modifying 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.

The parameters which can be accessed and edited in the 'Channels' Screen are: Channel Number; Channel Name; Input Number and available Modes.
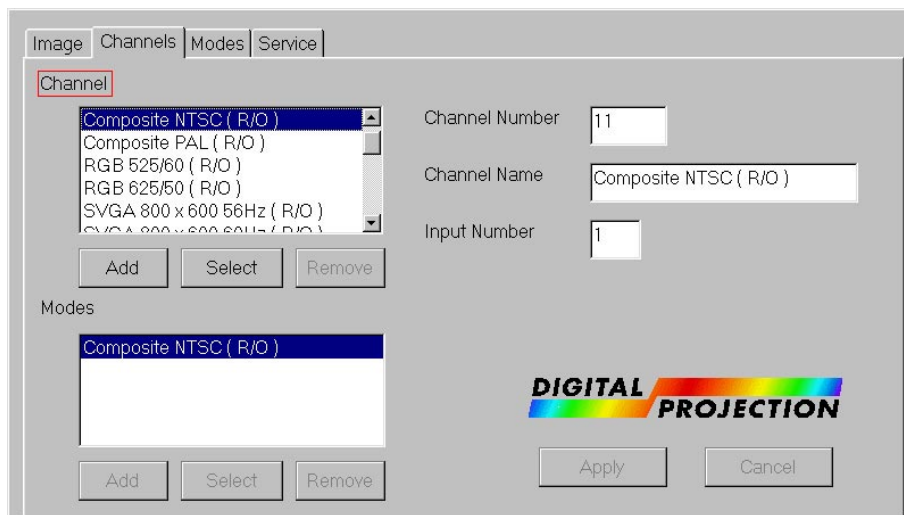
Channel - An alphabetical list of all existing channel names. To identify the channel currently being displayed, <*> is appended to that channel name.

Modes - Lists the modes associated with the channel highlighted in the Channel list.

Channel Number - The number entered on the remote control to select a channel.

Channel Name - A unique name used to quickly identify an individual channel.

Input Number - Specifies which input connection (1, 2 or 3) will be used for a particular channel.

In addition each channel will store the image settings (brightness, contrast, etc.) for each available mode. These parameters are accessed via the remote control and stored using the SAVE button. Adjustments only affect the selected mode for the current channel. Other channels using the same mode will not be altered.

Selecting a Channel

To select a channel enter the channel number required using the alpha-numeric keys on the Remote control or the integrated keypad. This can be done while in the menu system as long as you are not in an active field requiring an alpha-numeric entry.

To select a channel using the Channels Menu place the cursor over the channel list and press ENTER on the remote control. With the channel list active, select the desired channel using the cursor keys and ENTER. Next, move the selection cursor to the Select option and press ENTER. The selected channel will be displayed and <*> will be appended to the channel name in the channel list.

Adding a New Channel

In the Channels menu, move the selection cursor to the 'Add' button (under the channels list) and press ENTER. The next available channel number will be inserted into the channel number field and the selection cursor will move to the channel name field. If required, the channel number can be changed to any unused number.

Press ENTER to select the Channel Name field then enter a unique name for the new channel using the alpha-numeric keys on the remote control or integrated keypad (see Name Fields, page C—8 for more information). After name has been entered press ENTER.

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Use either the down or right cursor on the remote control to move the selection cursor to the input field. If you wish to change the input number, press ENTER, enter the new input number (1,2 or 3) then press ENTER again.

Press the down or right cursor on the remote control to move to the Apply button and press ENTER to create the new channel. If you have defined a valid name and input number the new channel will be created and will appear in the channel list.

If an invalid name was entered or the name field was left blank an information box will be overlaid stating - "The channel name field must contain a legitimate name". You will then be returned to the name field to enter a valid name.

> **3 Series Projector - Information**
>
> The Channel Name field must contain a
> legitimate name
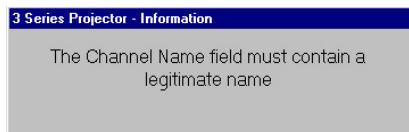
If an invalid input number was entered an information box will be overlaid stating - "The input number must be in the range 1..3". You will then be returned to the input field to enter a valid input number.

> **3 Series Projector - Information**
>
> The Input Number must be in the range
> 1..3
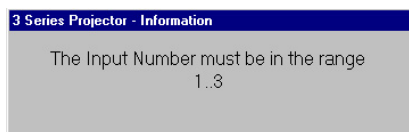
When a new channel is first created it does not have a mode associated with it. Therefore, the user is prompted to select a mode from the mode library. Until a mode has been allocated to the channel, the channel cannot be selected.

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Deleting a Channel

In the Channels menu, highlight the channel to be deleted in the channel list.

Press the down cursor on remote contol or integrated keypad to move to the Add button then the right cursor to move to the Remove button and press ENTER.

The selected channel will be removed from the channel list.

Factory default channels are Read Only (R/O) and cannot be deleted.

Modifying an Existing Channel

In the Channels screen move the selection cursor to the channels list and press enter. Next, use the up and down cursor keys on the remote contol to highlight the channel to be modified and press Enter.

The channel parameters (Channel Number, Channel Name, Input and Available Modes) will be displayed and can be altered to suit your requirements.

When the changes have been completed, move the selection cursor to the Apply button an press enter. The modifications will be saved to the selected channel.

Factory default channels are Read Only (R/O) and cannot be modified.

OPERATION

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Adding a Mode to a Channel

Select the channel you wish to add a mode to from the channel list then move the selection cursor to the Add button under modes and press ENTER - a window will be overlaid displaying all the available modes.
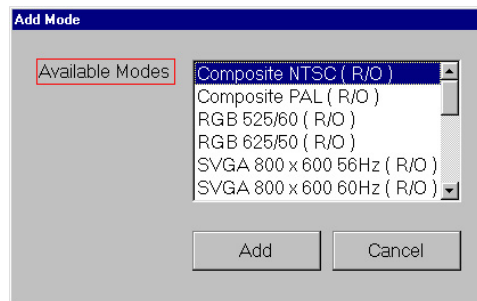
Press ENTER to select the mode list and using the up/down cursors highlight the mode you wish to add and press ENTER.

Use the down or right cursor keys to move to the Add button and press ENTER. The Add Mode window will be removed and the selected mode will be entered into the list of modes available to the channel.

Removing a Mode from a Channel

Select the channel you wish to remove a mode from in the channel list then move the selection cursor to the list of Available Modes.

Press ENTER to select the Available Modes list and using the up/down cursors highlight the mode you wish to remove and press ENTER.

Move the selection cursor to the Remove button under the list of available modes and press ENTER. The highlighted mode will be removed from the list of modes available to that channel.

At least one mode must be assigned to a channel in order for that channel to be selected.

Modes Menu

The projector stores a library of Modes, which are used by Channels to define the type of input signal expected. This library contains a number of factory default read only modes, indicated by (R/O), which cannot be modified or deleted. The default modes available within the library cater for all major formats of Composite video, Component video and Computer standards. However, the user can define their own modes for storage in the library.
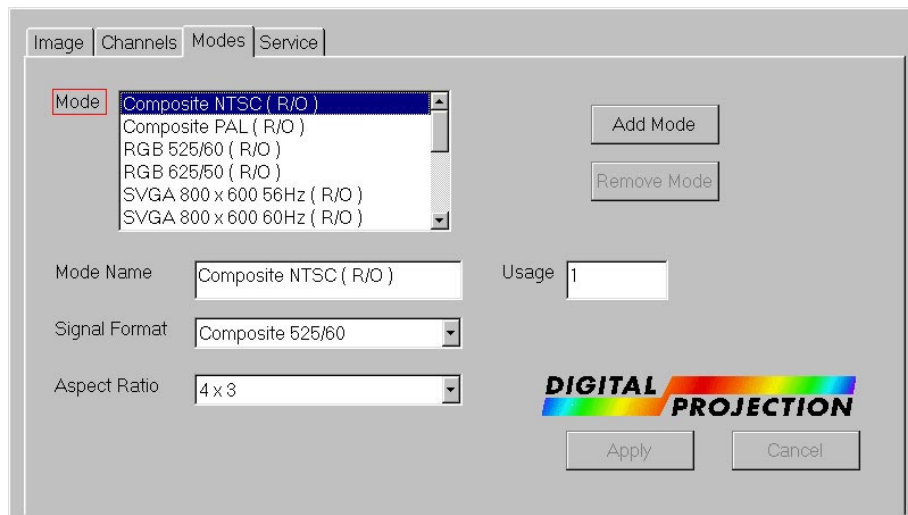
The Modes Menu, shown above, allows the creation, modification and removal of user defined modes using the following parameters:-

Mode - Displays a list of currently defined modes.

Mode Name - A unique name used to quickly identify an individual mode.

Signal Format - Defines the type of input source. Selection is made from a flyout list containing Composite 625/50, Composite 525/60, RGB 625/50, RGB 525/60, YPrPB 625/50, YPrPb 525/60, Y/C 625/50, Y/C 525/60 and Graphics.

Aspect Ratio - Defines the aspect ratio at which to display the image. Selection is made from a flyout list containing 4 x 3, 5 x 4, 16 x 9, 14 x 9, 8 x 5 and RAW.

C—15

Add Mode - Allows the creation of a new mode.

Remove Mode - Allows the deletion of an unused user defined mode.

Usage - Shows the number of channels currently configured to use the selected mode. If usage has a non zero value the mode cannot be deleted until it has been removed from the channels.

Apply - Saves any changes made to mode parameters.

Cancel - Cancels any changes made to mode parameters.

Creating a New Mode

With the Menu System on screen, use the 'Menu' button on the remote control or integrated keypad to tab to the Modes screen in the Menu System.

Using the cursor keys move the cursor to 'Add Mode' and press 'Enter'. The cursor will move to the 'Mode Name' field to name the new mode. Press 'Enter' to select the name field and enter a unique name using alpha-numeric keys and press 'Enter'.

Define the Signal Format and Aspect Ratio then move the cursor to 'Apply' and press 'Enter' to add the new mode.

If valid Mode has been defined, the Mode will be created and the name will appear in the Mode list.

If an existing Mode name has been entered, or the name field has been left blank an information box will be overlaid stating:- "The mode name field must contain a legitimate name". The user will then be returned to the Mode name field to enter a valid name.

OPERATION

Modifying an existing Mode

With the Menu System on screen, use the 'Menu' button on the remote control or integrated keypad to tab to the Modes screen in the Menu System.

Using the cursor keys on the remote control move the select cursor to the Mode List and press 'Enter'. Then, highlight the mode to be modified using the cursor keys and press 'Enter'.

The mode parameters for the selected mode will be shown. Redefine the parameters as appropriate and select 'Apply' to save the new settings.

Deleting a Mode

With the Menu System on screen, use the 'Menu' button on the remote control or integrated keypad to tab to the Modes screen in the Menu System.

Using the cursor keys on the remote control move the cursor to the Mode List and press 'Enter'. Then, highlight the mode to be deleted and press 'Enter'.

The mode parameters for the mode will be shown. Check that Usage has a value of zero - if it has a non zero value the mode is being used by one or more channels and cannot be deleted.

Move the cursor to 'Remove Mode' and press 'Enter'. Assuming no channels are configured to use the mode, the mode will be removed from the Mode list.

OPERATION

Service Menu

The Service Menu used by qualified engineers to configure and test the projector. Users are advised not to make any modifications to the parameters within this menu unless advised to do so by their dealer or by Digital Projection.

OPERATION
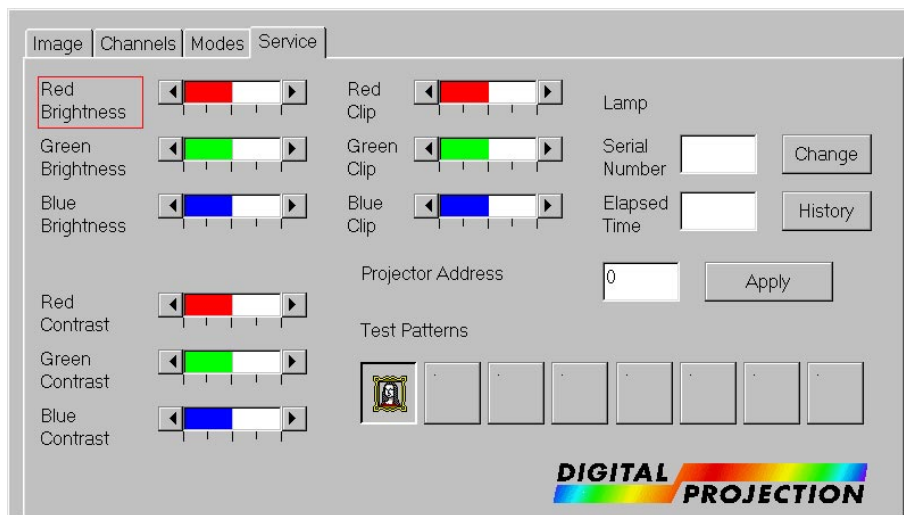
Red, Green & Blue Brightness, **Contrast and Clip** - defines the brightness, contrast and Clipping applied to each colour in order to achieve image.

Lamp Serial Number - displays the serial number of the current lamp (assuming it was entered when the lamp was inserted).

Lamp Elapsed Time - shows the number of hours the current lamp has run.

Lamp History - lists the serial numbers and elapsed time of previous lamps.

Projector Address - defines the control address (0 - 255) allocated to individual projectors in multiple projector installations.

Test Patterns - a range of patterns are available to enable qualified personnel to check the operation of the projector.

Applying a new signal source

Configuring a Video Channel

1. In the Image menu set Gamma and Colour Temperature to preferred Values.

2. In the Channels Menu select the correct input, aspect ratio and mode.

3. Using the Size & Position functions adjust the image until it fills the screen.

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.

OPERATION

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Configuring a Computer Channel

1. In the Image menu set Gamma and Colour Temperature to preferred Values.

2. In the Channels menu select a channel with an apropriate mode for the computer source. If there is no mode available for the input type, define one in the Mode menu.

3. Apply intended computer input.

4. Set Horizontal Pixels to equal the number of pixels per line in the signal source (up to a maximum of 1024 samples).

5. Define the aspect ratio as 4 x 3 for an 800 x 600 or 1024 x 768 standard.

6. Adjust the Horizontal Size until beating pattern minimises or disappears (use an alternate pixel pattern from Paintbrush to emphasise errors).

7. Some Horizontal bars may remain, remove them by adjusting the Pixel Phase.

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

8. Adjust the Position to centre the image on the DMD™ display.

9. Use a Pluge Test Pattern 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.

OPERATION

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 in 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).

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. When toggling between the two views information windows will appear to advise you of the current view (see below).

3 Series Projector - Information	3 Series Projector - Information
Previous Settings have been restored	Revised Settings have been restored
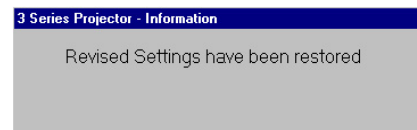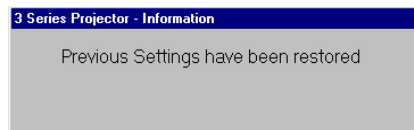
To save your new settings press the 'SAVE' button, an information window will briefly appear stating "Current settings have been saved".

3 Series Projector - Information
Current Settings have been saved

OPERATION

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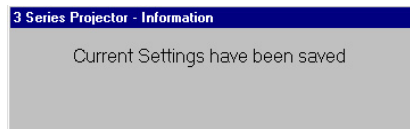
BRI, SAT, SHARP, CON, HUE

These function buttons are used to select and adjust the image parameters. When selected their associated icon and scalar bar will appear. The settings are adjusted using the cursor keys with the ⇧ and ⇨ cursors increasing the value and the ⇦ and ⇩ 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 ⇨ cursor and decreased with the ⇦ cursor. The height can be increased using the ⇧ cursor and decreased using the ⇩ 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 ⇧ and ⇨ cursors can be used to increase the value or the ⇦ and ⇩ 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 ⇧ and ⇨ cursors increasing the value and the ⇦ and ⇩ cursors decreasing it.

COL

This function adjusts the colour temperature setting in steps of 100° (or 500°) from 2200° to 9900°. When this function is selected the colour temperature icon will appear along with a numerical field showing the current temperature. The ⇧ and ⇨ cursors can be used to increase the value or the ⇦ and ⇩ cursors can be used to decrease it. Holding down a cursor key for up to 5 seconds will automatically step 100° per second, after 5 seconds the value will change in 500° steps.

OPERATION

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.

OPERATION

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 by allocating each projector a unique address in the Image menu screen. Individual projectors can then be controlled either by the remote control or by a computer (see Computer Control, opposite). The remote control can operate up to 32 projectors and a computer is capable of operating up to 256.

ADDRESSING PROJECTORS WITH THE REMOTE CONTROL

The 'A' button on the remote control 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. 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.

OPERATION

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—17, 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: 19,200 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

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

OPERATION

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

Header	Action	Implication
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.

OPERATION

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 seperate 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.

OPERATION

C—27

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.

OPERATION

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 excercised 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 over write 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.

OPERATION

C—29

Switcher Operation

Using an appropriate RS232 interface (see D—17, 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.

The projector and external switching device communicate at RS232 levels using the following protocols:-

Data Rate: 19,200 baud
Data bits: 8
Stop bits: 1
Parity: None
Handshake: None

At present, an external switcher will allow you to control the lamp power, picture mute and channel change functions. Messages transfered 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

Header	Represents data type according to the table below.
Data Length	Will indicate the amount of variable length data to follow, in bytes, not including the checksum.
Data	Variable length string of characters.
Checksum	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.

Header	Message	Data	Meaning
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.

OPERATION

OPERATION

Section D: Advanced User Information

ADVANCED

ADVANCED

DMD™ Operation and Usage

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

Support Posts　　　　　Torsion Hinge

Offset Address Electrode　　　　Mirror Element

Projection Lens　　Left Tilt　　Light Dump

Illumination (Lamp)　　　Flat

Right Tilt

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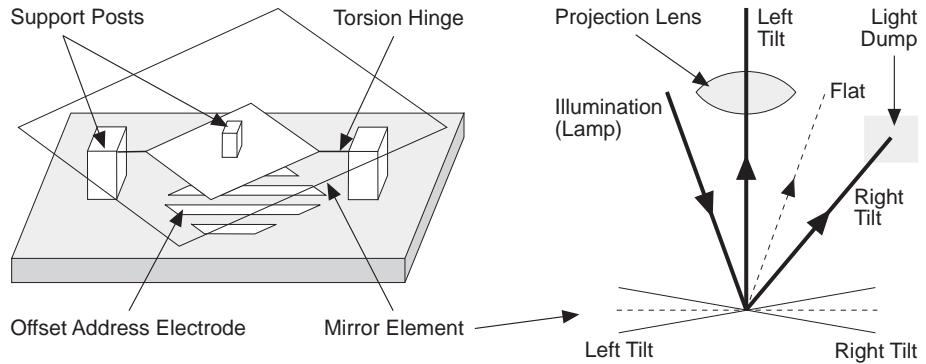
The projector optically filters white light from the lamp into its constituent red, green and blue. Each colour illuminates a separate DMD™ whose modulated output is then recombined with the other two to form the projected full colour image.

Projector Lamp

Optical Filtering of White Light into Red, Green and Blue Light

Projector Lens

White Light　　　　White Light

RGB

Blue Light　　Green Light　　Red Light

B　　　G　　　R

DMDs™

Full Colour Image Displayed on Screen

ADVANCED

D—1
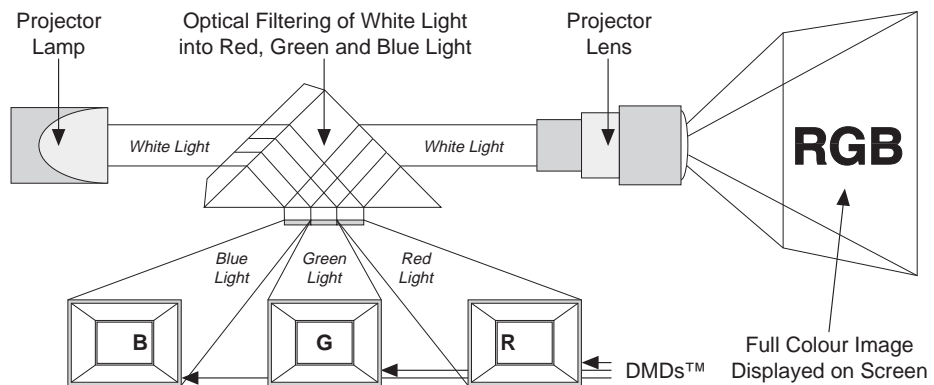
POWER 3dv DMDs™

The DMDs™ in a 3dv projector contain 508,800 mirrors 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 5 x 4 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.

DMD™ Size
(848 x 600 Mirrors)

4 x 3 Aspect Ratio
(800 x 600 Mirrors used)

5 x 4 Aspect Ratio
(750 x 600 Mirrors used)

8 x 5 Aspect Ratio
(848 x 530 Mirrors used)

14 x 9 Aspect Ratio
(848 x 545 Mirrors used)

16 x 9 Aspect Ratio
(848 x 477 Mirrors used)

ADVANCED

D—2
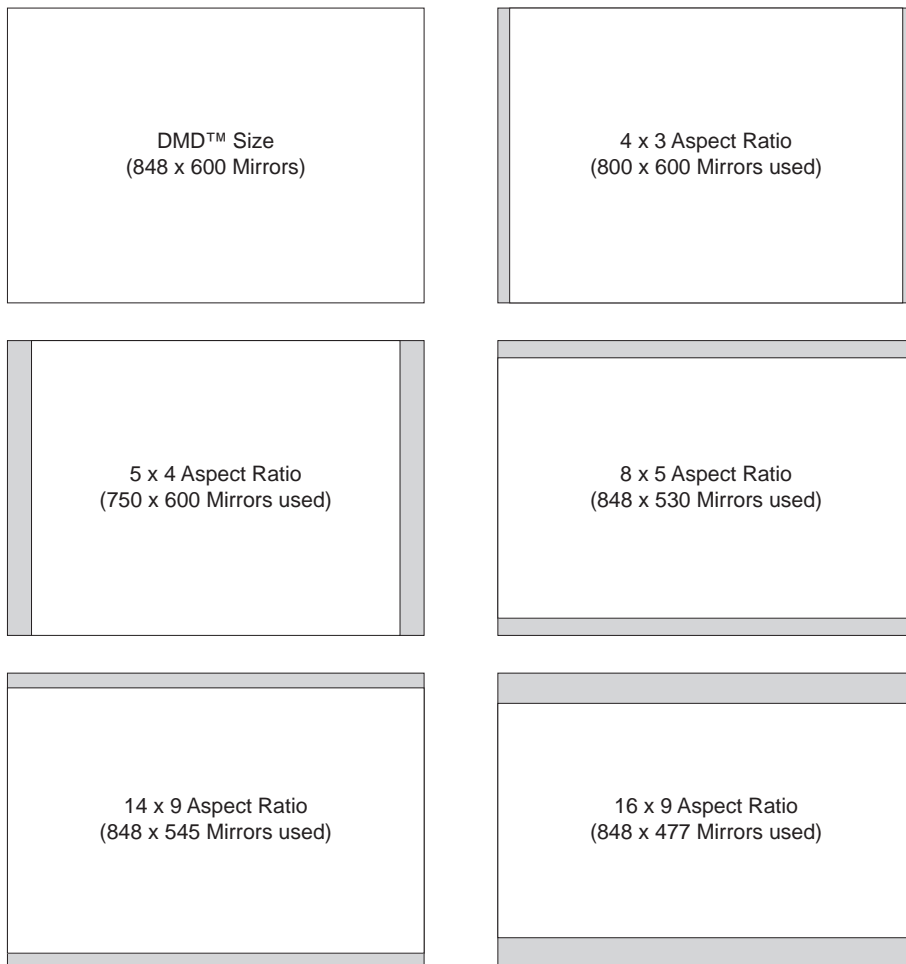
POWER 3gv DMDs™

The DMDs™ in a 3gv projector contain 786,432 mirrors arranged in a 1024 x 768 array allowing images of all aspect ratios to be displayed. However, the proportion of DMD™ effectively used will differ depending on the aspect ratio of the image e.g. a 5 x 4 aspect ratio would only require the use of 1024 x 768 mirrors. The diagrams below show the DMD™ usage for each aspect ratio (4 x 3, 5 x 4, 8 x 5, 14 x 9 and 16 x 9) with the shaded areas representing redundant mirrors.

DMD™ Size
(1024 x 768 Mirrors)

4 x 3 Aspect Ratio
(1024 x 768 Mirrors used)

5 x 4 Aspect Ratio
(960 x 768 Mirrors used)

8 x 5 Aspect Ratio
(1024 x 640 Mirrors used)

14 x 9 Aspect Ratio
(1024 x 658 Mirrors used)

16 x 9 Aspect Ratio
(1024 x 576 Mirrors used)

ADVANCED

D—3
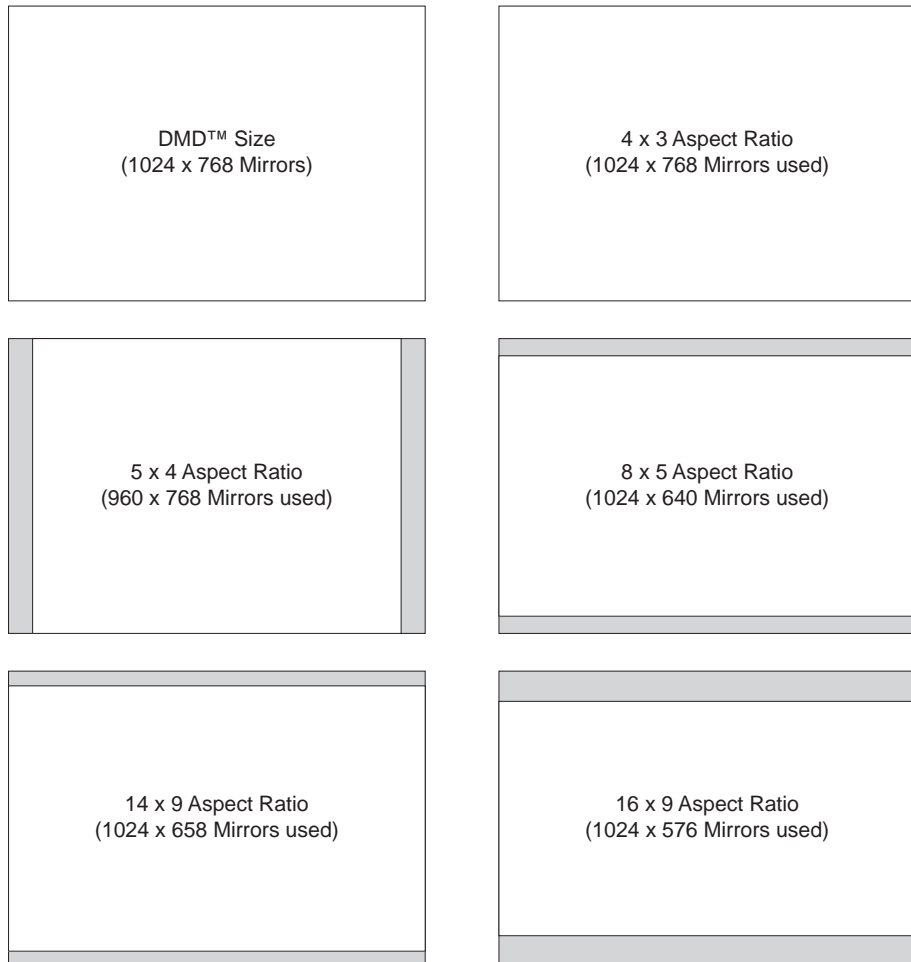
POWER 3dv Lenses

3 : 1 Fixed Lens

BASIC PARAMETERS

Throw Ratio	3.0 : 1
Minimum Screen Distance	4.3 m (14.1 ft)
Maximum Screen Distance	27.6 m (90.6 ft)
Full Beam Angle	18.93°
Rising/Falling Front[1]	±300 pixels
Aperature	F/3
Effective Focal Length	41.9 mm (1.65")
Distortion	<0.5%
Transmission[2]	94%
Centre MTF @ 33 lp/mm	>50
Corner MTF @ 33 lp/mm	>30
Maximum Object Radius[3]	12.51 mm (0.5")

MECHANICAL

Mass	3.9 kg (8.6 lb)
Lens Extension[4]	46 mm (1.8")
Maximum Size	261.5 x 108 mm (10.3" x 4.3")

Notes

[1] *Measured at a distance of 2m from the screen with full active area width.*

[2] *Relative to a 5.0 : 1 lens.*

[3] *Limits for specified performance. Does not include lens extension.*

[4] *Some limitations may apply depending on projector lens mount.*

ADVANCED

5 : 1 Fixed Lens

BASIC PARAMETERS

Throw Ratio	5.0 : 1
Minimum Screen Distance	7.4 m (24.3ft)
Maximum Screen Distance	46 m (151ft)
Full Beam Angle	11.42°
Rising/Falling Front[1]	±300 pixels
Aperature	F/3
Effective Focal Length	68.92 mm (2.71")
Distortion	<0.5%
Transmission[2]	100%
Centre MTF @ 33 lp/mm	>50
Corner MTF @ 33 lp/mm	>30
Maximum Object Radius[3]	12.51 mm (0.35")

MECHANICAL

Mass	2.7 kg (6 lb)
Lens Extension[4]	26 mm (1")
Maximum Size	240.6 x 108 mm (9.5" x 4.3")

Notes

[1] Measured at a distance of 2m from the screen with full active area width.

[2] Relative to a 5.0 : 1 lens.

[3] Limits for specified performance. Does not include lens extension.

[4] Some limitations may apply depending on projector lens mount.

ADVANCED

7 : 1 Fixed Lens

BASIC PARAMETERS

Throw Ratio	7.0 : 1
Minimum Screen Distance	10.3 m (33.8ft)
Maximum Screen Distance	64 m (210ft)
Full Beam Angle	8.2°
Rising/Falling Front[1]	±300 pixels
Aperature	F/3
Effective Focal Length	96.36 mm (3.8")
Distortion	<0.5%
Transmission[2]	97%
Centre MTF @ 33 lp/mm	>50
Corner MTF @ 33 lp/mm	>30
Maximum Object Radius[3]	12.51 mm (0.5")

MECHANICAL

Mass	2.5 kg (5.5 lb)
Lens Extension[4]	9 mm (0.35")
Maximum Size	240.6 x 108 mm (9.5" x 4.3")

Notes

[1] Measured at a distance of 2m from the screen with full active area width.

[2] Relative to a 5.0 : 1 lens.

[3] Limits for specified performance. Does not include lens extension.

[4] Some limitations may apply depending on projector lens mount.

ADVANCED

1.27 : 1 Fixed Short Throw Lens

BASIC PARAMETERS

Throw Ratio	1.27 : 1
Minimum Screen Distance	1.8 m (6 ft)
Maximum Screen Distance	11.7 m (38.4 ft)
Full Beam Angle	43°
Rising/Falling Front[1]	±300 pixels
Aperature	F/3
Effective Focal Length	17.67 mm (0.7")
Distortion	<0.25%
Transmission[2]	96.4%
Centre MTF @ 33 lp/mm	>50
Corner MTF @ 33 lp/mm	>30
Maximum Object Radius[3]	12.51 mm (0.5")

MECHANICAL

Mass	4.9 kg (10.8 lb)
Lens Extension[4]	118 mm (4.7")
Maximum Size	323.8 x 162 mm dia. (12.75" x 6.4")

Notes

[1] *Measured at a distance of 2m from the screen with full active area width.*

[2] *Relative to a 5.0 : 1 lens.*

[3] *Limits for specified performance. Does not include lens extension.*

[4] *Some limitations may apply depending on projector lens mount.*

ADVANCED

SVGA Ultra Wide Angle Lens

BASIC PARAMETERS

Throw Ratio	0.96 : 1
Minimum Screen Distance	2 m (6.6ft)
Maximum Screen Distance	10 m (32.8 ft)
Full Beam Angle	53.1°
Rising/Falling Front[1]	±200 pixels
Aperature	F/3
Effective Focal Length	14.67 mm (0.57")
Distortion	<1.8%
Transmission[2]	>88%
Centre MTF @ 33 lp/mm	>55
Corner MTF @ 33 lp/mm	>40
Maximum Object Radius[3]	8.83 mm (0.35")

MECHANICAL

Mass	5.1 kg (5.5 lb)
Lens Extension[4]	145 mm (0.35")
Maximum Size	350 x 190 mm (13.8" x 7.5")

Notes

[1] Measured at a distance of 2m from the screen with full active area width.

[2] Relative to a 5.0 : 1 lens.

[3] Limits for specified performance. Does not include lens extension.

[4] Some limitations may apply depending on projector lens mount.

ADVANCED

1.5 - 3.0 :1 Zoom Lens

BASIC PARAMETERS

Throw Ratio	1.5 - 3.0 : 1 zoom
Minimum Screen Distance	2.3 m (7.6 ft)
Maximum Screen Distance	27.5 m (90.2 ft)
Full Beam Angle	36.9° - 18.93°
Rising/Falling Front[1]	±150 pixels
Aperature	F/3
Effective Focal Length	21 - 41mm (0.83 - 1.6")
Distortion	<2%
Transmission[2]	91.6%
Centre MTF @ 33 lp/mm	>40
Corner MTF @ 33 lp/mm	>30
Maximum Object Radius[3]	10.51 mm (0.4")

MECHANICAL

Mass	3.4 kg (7.5 lb)
Lens Extension[4]	150 mm (6")
Maximum Size	356 x 108 mm (14" x 4.3")

Notes

[1] Some limitations may apply depending on projector lens mount.

[2] Relative to a 5.0 : 1 lens.

[3] Includes quoted rising/falling front.

[4] Distance from projector case front to front of lens.

ADVANCED

3.0 - 7.0 : 1 Zoom Lens

BASIC PARAMETERS

Throw Ratio	3.0 - 7.0 : 1 zoom
Minimum Screen Distance	4.5 m (14.8 ft)
Maximum Screen Distance	55 m (180.5 ft)
Full Beam Angle	18.93° - 8.2°
Rising/Falling Front[1]	±150 pixels
Aperature	F/3
Effective Focal Length	41- 97mm (1.6 - 3.8")
Distortion	<2%
Transmission[2]	90.6%
Centre MTF @ 33 lp/mm	>40
Corner MTF @ 33 lp/mm	>30
Maximum Object Radius[3]	10.51 mm (0.4")

MECHANICAL

Mass	2.4 kg (7.5 lb)
Lens Extension[4]	55 mm (2.2")
Maximum Size	269 x 108 mm (10.6" x 4.3")

Notes

[1] *Some limitations may apply depending on projector lens mount.*

[2] *Relative to a 5.0 : 1 lens.*

[3] *Includes quoted rising/falling front.*

[4] *Distance from projector case front to front of lens.*

ADVANCED

POWER 3gv Lenses

0.82 : 1 Fixed Short Throw Lens

BASIC PARAMETERS

Throw Ratio[1]   0.82 : 1
Minimum Screen Distance[2]   2 m (6.56 ft)
Maximum Screen Distance[2]   10 m (32.80 ft)
Full Beam Angle   62.3°
Rising/Falling Front[3]   ±30 pixels
Aperature   F/3
Effective Focal Length   14.67 mm
Distortion[4]   <1.8%
Transmission   >88%
Centre MTF @ 33 lp/mm   >55%
Corner MTF @ 33 lp/mm   >25%
Maximum Object Radius   10.88 mm (0.42")

MECHANICAL

Mass   5.1 kg (11.24 lb)
Lens Extension[5]   145 mm (5.70")
Maximum Size   350 x 190 mm dia. (13.7" x 7.48")

Notes

[1] *Measured at a distance of 2m from the screen with full active area width.*

[2] *Limits for specified performance. Does not include lens extension.*

[3] *Some limitations may apply depending on projector lens mount.*

[4] *Measured at 540mm.*

[5] *Distance from projector front panel to front of lens.*

ADVANCED

XGA Ultra Wide Angle Lens

BASIC PARAMETERS

Throw Ratio	0.8 : 1
Minimum Screen Distance	2 m (6.6ft)
Maximum Screen Distance	10 m (32.8 ft)
Full Beam Angle	62.3°
Rising/Falling Front[1]	±30 pixels
Aperature	F/3
Effective Focal Length	14.67 mm (0.57")
Distortion	<1.8%
Transmission[2]	>88%
Centre MTF @ 33 lp/mm	>55
Corner MTF @ 33 lp/mm	>25
Maximum Object Radius[3]	10.88 mm (0.43")

MECHANICAL

Mass	5.1 kg (5.5 lb)
Lens Extension[4]	145 mm (0.35")
Maximum Size	350 x 190 mm (13.8" x 7.5")

Notes

[1] *Measured at a distance of 2m from the screen with full active area width.*

[2] *Relative to a 5.0 : 1 lens.*

[3] *Limits for specified performance. Does not include lens extension.*

[4] *Some limitations may apply depending on projector lens mount.*

ADVANCED

XGA 1.5 - 2.5 Zoom Lens

BASIC PARAMETERS

Throw Ratio[1]	1.5 - 2.5 : 1
Minimum Screen Distance[2]	3 m (9.84 ft)
Maximum Screen Distance[2]	25 m (82.02 ft)
Full Beam Angle	37.02° - 22.84°
Rising/Falling Front[3]	±360 pixels
Aperature	F/3
Effective Focal Length	26.0 - 43.1 mm
Distortion[4]	< 2%
Transmission	> 80%
Centre MTF @ 33 lp/mm	> 40%
Corner MTF @ 33 lp/mm	> 30%
Maximum Object Radius	15.35 mm (0.6")

MECHANICAL

Mass	7.8 kg (17.2 lb)
Lens Extension[5]	175 mm (6.9")
Maximum Size	390 x 180 mm dia. (15.4" x 7.1")

Notes

[1] Full active area width.

[2] Limits for specified performance. Does not include lens extension.

[3] Some limitations may apply depending on projector lens mount.

[4] Measured at 540mm.

[5] Distance from projector front panel to front of lens.

ADVANCED

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XGA 2.5 - 4.0 Zoom Lens

BASIC PARAMETERS

Throw Ratio[1]	2.5 - 4.0 : 1
Minimum Screen Distance[2]	5 m (16.4 ft)
Maximum Screen Distance[2]	40 m (131.2 ft)
Full Beam Angle	22.43° - 14.36°
Rising/Falling Front[3]	±360 pixels
Aperature	F/3
Effective Focal Length	43.9 - 69.1 mm
Distortion[4]	< 2%
Transmission	> 80%
Centre MTF @ 33 lp/mm	> 40%
Corner MTF @ 33 lp/mm	> 30%
Maximum Object Radius	15.35 mm (0.6")

MECHANICAL

Mass	4.6 kg (10.1 lb)
Lens Extension[5]	175 mm (6.9")
Maximum Size	345 x 105 mm dia. (13.6" x 4.1")

Notes

[1] *Full active area width.*

[2] *Limits for specified performance. Does not include lens extension.*

[3] *Some limited may apply depending on projector lens mount.*

[4] *Measured at 540mm.*

[5] *Distance from projector front panel to front of lens.*

ADVANCED

XGA 4.0 - 7.0 Zoom Lens

BASIC PARAMETERS

Throw Ratio[1]	4.0 - 7.0 : 1
Minimum Screen Distance[2]	8 m (26.3 ft)
Maximum Screen Distance[2]	70 m (229.7 ft)
Full Beam Angle	14.3° - 8.22°
Rising/Falling Front[3]	±200 pixels
Aperature	F/3
Effective Focal Length	69.4 - 121.1 mm
Distortion[4]	< 2%
Transmission	> 80%
Centre MTF @ 33 lp/mm	> 40%
Corner MTF @ 33 lp/mm	> 30%
Maximum Object Radius	13.2 mm (0.52")

MECHANICAL

Mass	4.4 kg (9.7 lb)
Lens Extension[5]	80 mm (3.2")
Maximum Size	280 x 105 mm dia. (11" x 4.1")

Notes

[1] *Full active area width.*

[2] *Limits for specified performance. Does not include lens extension.*

[3] *Some limited may apply depending on projector lens mount.*

[4] *Measured at 540mm.*

[5] *Distance from projector front panel to front of lens.*

**ADVANCED**

Cables & Connections

Remote Receiver

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

The cable between the Remote Control and the Remote 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 Remote Receiver end.
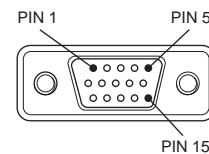
Remote Control End	Signal	Remote Receiver End	Conductor
Screen	+15V	Pin 1	White
Centre	Signal	Pin 3	Blue
Tip	Ground	Pin 4	Screen
	Sense	Pin 2 to Pin 4	Wire Link
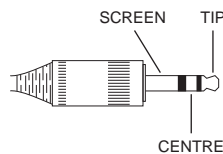
3.5mm SCREENED
STEREO JACK PLUG
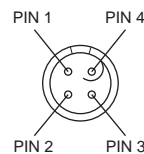
4 WAY 'LEMO'
CONNECTOR

MALE 15-PIN HIGH DENSITY
'D' STYLE CONNECTOR

The cable between the Remote 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.

| Remote 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). According to the type of projector used the following pins should be connected:-
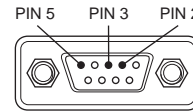
For 3dv Projectors

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

For 3gv Projectors

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

PIN 2   PIN 3   PIN 5   PIN 5   PIN 3   PIN 2
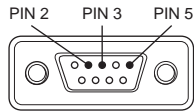
MALE 9-PIN 'D' STYLE CONNECTOR   FEMALE 9-PIN 'D' STYLE CONNECTOR

ADVANCED

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.

Hard Wire Remote Adapter

The hard wire remote adapter consists of two cables which latch together to connect the remote control unit to the projector.

The first cable has a 3-pole 'XLR' audio/video at each end. This cable should be connected to the 'Ext Remote' socket at the rear of the projector.

Projector End	Signal	Audio/Video Connector
Pin 1	+15V	Pin 1
Pin 2	Signal	Pin 2
Pin 3	Ground	Pin 3
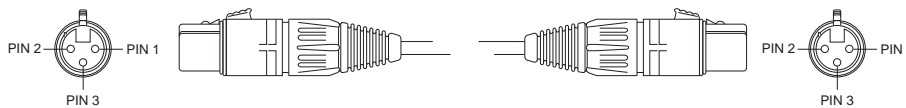
The second cable has a 3-pole 'XLR' audio/video plug at one end and a 3.5mm stereo Jack Plug at the remote control end.

Audio/Video Connector	Signal	Remote Control End
Pin 1	+15V	Screen
Pin 2	Signal	Centre
Pin 3	Ground	Tip
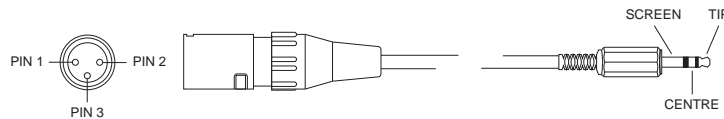
As the two cables connect together using a standard 3-pole audio/visual connection, the user can extend the length of the hard wire remote adapter up to a maximum of 100m (330ft) by inserting an 'XLR' compatible cable assembly between the two cables.

D—18

Technical Specification

	POWER 3dv	POWER 3gv

Lamp Type	Proprietary Xenon Arc	
ANSI Output	2500 Lumens	> 3000 Lumens
Lamp Life	1000 Hours	1000 Hours
Brightness Linearity	>90% Edge to Centre	
Colour Temperature	3000°K - 9300°K adjustable	
Contrast Ratio	>150:1 ANSI Checker board > 200:1 Full Field	>200:1 ANSI Checkerboard >350:1 Full Field

Display Type	3 x DMD (one per R, G & B)	
DMD Specification	848 x 600 pixels	1024 x 768 pixels
Pixel Size	16μm x 16μm	16.3μm x 16.3μm
Pixel Pitch	17μm x 17μm	17μm x 17μm
DMD Size	14.4mm x 10.2mm	17.4mm x 13.1mm
Fill Factor	88%	92%

Input Specification	3 independently configurable inputs - selectable via remote control. BNC connectors. 525/60, 625/50, PAL, NTSC, HDTV, VGA, SVGA, XGA, SXGA & MAC
RGBS	RGB = 700 mV/75R S = 0.7 V - 5 V Sync on G, Separate H & V, Composite Sync Auto Select.
Component Video	Y = 700 mV + 300 mV/75R Pr, Pb = 700 mV p-p/75R
Y/C (S video)	Y = 700 mV + 300 mV/75R C = 300 mV p-p/75R
Composite	1 V p-p/75R Advanced Video Decoding by Faroudja
Computer	H = 15 kHz to 64 kHZ V = 24 Hz to 100 Hz
Source Compatibility	up to 1280 x 1024 @ 60Hz
Display Rate	as input rate up to maximum of 72Hz

ADVANCED

	POWER 3dv	POWER 3gv
Remote Control	IR Receivers front and rear. Hard wire link to handset 9 Pin D type connector	
Automation	RS232 input/output loop through, 9 Pin D type	
Switcher	Seperate Audio & Video Video switcher outputs - RS232, 9 Pin D type	

Mounting	Floor Mount (standard), Flying Frame (optional) Rigging Frame (optional), Stacking Adapter (optional)	

Lens Options	1.05:1, 1.27:1, 3:1 5:1 & 7:1 fixed. 1.5 - 3.0:1 zoom & 3.0 - 7.0 zoom	0.82:1 & 1.0:1 fixed. 1.5 - 2.5:1 zoom, 2.5 - 4.0:1 zoom & 4.0 - 7.0:1 zoom.
Rising/Falling Front	Up to 384pixels for all lenses	
Lens Distortion	0.25% at maximum rising front for fixed lenses 0.5% at maximum rising front for zoom lenses	

Power Requirements	208 - 240V AC, 50 - 60Hz	
Factor Correction	0.95	
Power Consumption	1800 watts, 6142 BTU/hr	

Physical Dimensions	190mm (11.4") height 585mm (23") width 9810mm (31.9" length	
Weight (chassis only)	51 Kg (112lbs)	

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Section E: Fault Finding and Maintenance

MAINTENANCE

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.
No Image is displayed.	Lamp has not lit.	Switch off the projector and power-up again.
	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.
No image is displayed and a LED is flashing on the input board.	No Input Source.	Connect input Source.
	Input device is connected to wrong input.	Connect input to the row with flashing LED.
		Change the input number of selected device in the Channels screen.
The lamp is lit but no image is being displayed.	No input source.DMDs™ have been shut down due to overheating.	Check if air ducts are clear.

MAINTENANCE

E—1

PROBLEM	POSSIBLE CAUSE	SOLUTION
Image does not fit onto screen.	The wrong aspect ratio has been set.	Change the aspect ratio in Channels screen
	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.	Input frame rate too high.	Adjust source equipment to give lower frame rate.
	The lamp may be reaching the end of it's life.	Replace Lamp.
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.

MAINTENANCE

E—2

PROBLEM	POSSIBLE CAUSE	SOLUTION
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

Maintenance

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 can be turned off and the lamp immediately removed after use without damage or reduction in performance. However, care must be taken as the lamp unit and surrounding components will be hot.

TO REMOVING THE EXISTING LAMP

1. Disconnect the projector from the mains supply.
2. Undo the four retaining screws on the top cover.
3. Remove the top cover and set aside in a safe place.
4. Remove the two push fit power connectors from the lamp.
5. Disconnect the lamp multiway connection (the cable originates from beside the positive push fit connector).
6. Loosen the cross-head screw on the retaining clip and lift it forward.
7. Lift back the retaining canvas belt.
8. Grasp lamp firmly by handle and pull smoothly upwards closing the lamp shutter while doing so.
9. Remove lamp to safe place.

MAINTENANCE

INSTALLING A NEW LAMP

1. Remove the new lamp from its protective packaging and holding it firmly by the handle smoothly slide into position - the lamp shutter will automatically open whilst doing so.
2. Ensure the lamp is firmly pressed down onto the locating points and that the three mounting points are properly centered.
3. Pull the retaining canvas band over the lamp and secure the hook into the retaining eye on the lamp mounting.
4. Connect the lamp multiway connection.
5. Attach the two push fit power connectors.
6. Replace the top cover.
7. Connect to mains supply and test for operation.

In order to keep an accurate record of the lamp use, the serial number of the new lamp should be entered in the Service menu.

Lamp Life Timer

The lamp incorporates a passive mercury lamp life timer. This timer is located on the lamp base and operates when the lamp is running.

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 usuage is indicated by a black mark on the the mercury bar (shown in diagram at 750 hours).
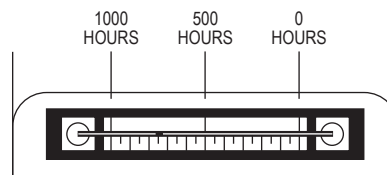
As the timer does not operate when the lamp shutter is closed, it is recommend that spare lamps are kept for good measure. Replacement lamps should be stored in their original packaging in a cool dry area until they are required for installation.

E—5

MAINTENANCE

Appendix

APPENDIX

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

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, switch off the projector and turn it back on again.

When the projector starts up, it will display images using the default settings - you may need to select new settings.

On Screen Display

The On Screen Display (OSD) displays the menu system and funtion icons with their associated scalar bars. 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. If OSD is on but the menu system is not displayed it can be accessed by pressing the MENU button. When OSD is ON, the menu system can be temporarily removed by pressing EXIT 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 the menu system is removed using OSD OFF, when it is turned back on ? at the Image screen.

APPENDIX

i

If there is no Image

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, check the settings in the Channels screen.

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

The image is out of focus.
Ensure the projector is placed in the correct position, then focus the image using the lens control functions.

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 in the Channels screen.

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.

APPENDIX

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.

APPENDIX

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.

APPENDIX

Test Patterns

A number of test patterns are provided in the Service menu to check the operation of the projector. 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.

White Field - a digital white field used to check full field contrast ratio.

ANSI Checkerboard - a black and white checked pattern used to measure contrast ratio.

Grid - a grid consisting of white lines on a black background used to check convergence.

Vertical Stripe -

Modified 16 x 16 Grid -

Black Field - a digital black field used to check full field contrast ratio.

To select a test pattern, position the cursor over the required pattern button and press enter. The button will appear to be depressed and the pattern will be displayed. Only one pattern can be selected at a time and it will be displayed over any input images.

The test patterns leave the menu system on screen. To remove the menu system, press EXIT on the remote. To reactivate the menu system, press MENU again.

To remove a pattern, position the cursor over the displayed test pattern button and press enter. The button will appear to be <opposite of depressed> and the input signal will be displayed.

OPERATION