STUDIO COLOR®

Automated Wash Luminaire

User's Manual

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Studio Color uses one or more of the following patents: US 4,962,687; US 5,078,039; UK 2,043,769; US 5,331,822; US 5,402,326; US D 372550; UK 2292896; US D365165; US 5,430,629; US D360,404; US 5,455,748; 0475082; US 5,506,762; M9604224.9; US 5,515,254; US D370080; UK 2.291,814; US 5,545.951; UK 2055842; UK 2,292,530; UK 2294909; UK 2292896; MR 8621996; and US 5,580,164.

Additional patents pending.

March 11, 2005

Studio Color User's Manual
P/N 60600061 Rev. C

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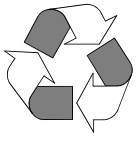
Additional patents pending.

June 22, 2004

Studio Color User's Manual
P/N 60600061 Version 3.0



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Declaration of Conformity

according to ISO/IEC Guide 22 and EN45104

Manufacturer's name:	High End Systems
Manufacturer's address:	2105 Gracy Farms Lane Austin, Texas 78758 U.S.A.
Distributor's name:	High End Systems Inc.
Distributor's address:	2105 Gracy Farms Lane Austin, Texas 78758 U.S.A.

Declares that the product

Product Name:	Studio Color
Product Number:	Studio Color 575-M Studio Color 575-S
Product Options:	All

conforms to the following EEC directives:
73/23/EEC, as amended by 93/68/EEC
89/336/EEC, as amended by 92/31/EEC and 93/68/EEC

Equipment referred to in this declaration of conformity first manufactured in 1996 in compliance with the following standards:

Safety:	EN 60598-1 : 1993 EN 60598-2-17 : 1989 A1-A3 : 1993
EMC:	EN 55022, Class A ITE 1987 IEC 801-2, 1991 Level 2 (4/8 kV) IEC 801-3, Draft 5 Level 2 (3 V/m) 1991 IEC 801-4, 1988 Level 2 (1 kV/0.5 kV)

U.S.A., June 22, 2004
Lanny Derryberry, Compliance Engineer

IMPORTANT SAFETY INFORMATION

INSTRUCTIONS PERTAINING TO CONTINUED PROTECTION AGAINST FIRE, ELECTRIC SHOCK, EXPOSURE TO EXCESSIVE UV RADIATION, AND INJURY TO PERSONS ARE FOUND IN APPENDIX D.

READ ALL CAUTIONS AND WARNINGS PRIOR TO ASSEMBLY, MOUNTING, AND OPERATING THIS EQUIPMENT.

IMPORTANT: INFORMATIONS DE SÉCURITÉ

INSTRUCTIONS RELATIVES À UNE PROTECTION CONTINUE CONTRE L' INCENDIE, LE CHOC ÉLECTRIQUE, L' EXPOSITION AUX RADIATIONS ULTRAVIOLETTES EXCESSIVES, ET CONTRE DES BLESSURES POSSIBLES SUR DES INDIVIDUS SE TROUVENT DANS L'APPENDICE D.

PRIÈRE DE LIRE TOUTES LES PRÉCAUTIONS ET LES AVERTISSEMENTS AVANT D'ASSEMBLER, DE MONTER, ET DE FAIRE FONCTIONNER CET ÉQUIPEMENT.

WICHTIGE SICHERHEITSHINWEISE

DIE NACHSTEHENDEN HINWEISE BETREFFEN DEN SCHUTZ GEGEN BRAND, ELEKTRISCHEN SCHLAG, ÜBERHÖHTE UV-STRAHLUNG SOWIE VERLETZUNGEN. SIE BEFINDEN SICH IN APPENDIX D.

LESEN SIE ALLE WARNUNGEN SORGFÄLTIG, BEVOR SIE DAS GERÄT ZUSAMMENBAUEN, INSTALLIEREN UND BENUTZEN!

INFORMACIÓN IMPORTANTE DE SEGURIDAD

SE ENCUENTRAN EN EL APÉNDICE D LAS INSTRUCCIONES CONCERNIENTES A LA PROTECCIÓN CONTINUA CONTRA INCENDIO, CHOQUE ELÉCTRICO, EXPOSICIÓN EXCESIVA A RAYOS ULTRAVIOLETAS Y LESIONES A PERSONAS.

POR FAVOR LEA TODAS LAS PRECAUCIÓNS Y LAS ADVERTENCIAS ANTES DE ENSAMBLAR, MONTAR Y OPERAR ESTE EQUIPO.

INFORMAZIONI IMPORTANTI DI SICUREZZA

ISTRUZIONI PERTINENTI LA PROTEZIONE CONTRO IL FUOCO, LE SCOSSE ELETTRICHE, L' ECCESSIVA ESPOSIZIONE AI RAGGI ULTRAVIOLETTI I DANNI ALLE PERSONE SI TROVANO NEL APPENDICE D.

LEGGERE TUTTI GLI AVVERMENTI PRIMA DI MONTARE E USARE QUESTO APPARECCHIO.

FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC 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 is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warranty Information

Limited Warranty
Unless otherwise stated, your product is covered by a two year parts and labor limited warranty. Dichroic filters and Lithopatterns™ are not guaranteed against breakage or scratches to coating. It is the owner's responsibility to furnish receipts or invoices for verification of purchase, date, and dealer or distributor. If purchase date cannot be provided, date of manufacture will be used to determine warranty period.

Returning an Item Under Warranty for Repair
It is necessary to obtain a Return Authorization Number (RA#) from your dealer/point of purchase BEFORE any units are returned for repair. The manufacturer will make the final determination as to whether or not the unit is covered by warranty. Lamps are covered by the lamp manufacturer's warranty.

Any Product unit or parts returned to High End Systems must be packaged in a suitable manner to ensure the protection of such Product unit or parts, and such package shall be clearly and prominently marked to indicate that the package contains returned Product units or parts and with a Return Authorization (RA#) number. Accompany all returned Product units or parts with a written explanation of the alleged problem or malfunction.

Please note: Freight Damage Claims are invalid for fixtures shipped in non-factory boxes and packing materials.

Freight
All shipping will be paid by the purchaser. Items under warranty shall have return shipping paid by the manufacturer only in the Continental United States. Under no circumstances will freight collect shipments be accepted. Prepaid shipping does not include rush expediting such as air freight. Air freight can be sent customer collect in the Continental United States.

REPAIR OR REPLACEMENT AS PROVIDED FOR UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE CONSUMER. HIGH END SYSTEMS, INC. MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, WITH RESPECT TO ANY PRODUCT, AND HIGH END SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. HIGH END SHALL NOT BE LIABLE FOR ANY INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGE, INCLUDING LOST PROFITS, SUSTAINED OR INCURRED IN CONNECTION WITH ANY PRODUCT OR CAUSED BY PRODUCT DEFECTS OR THE PARTIAL OR TOTAL FAILURE OF ANY PRODUCT REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT, (INCLUDING NEGLIGENCE), STRICT LIABILITY, OR OTHERWISE, AND WHETHER OR NOT SUCH DAMAGE WAS FORESEEN OR UNFORESEEN.

Warranty is void if the product is misused, damaged, modified in any way, or for unauthorized repairs or parts. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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Introduction

Congratulations on your purchase of the Studio Color® Automated Wash Luminaire from High End Systems®.

About This Manual

This manual provides the means to setup and operate Studio Color. This manual is organized in the following sections:

Introduction—introduces you to this manual, provides hardware specifications, and technical support information.

Chapter 1 Installation and Setup—explains how to install and setup Studio Color.

Chapter 2 Operation—explains the functionality and operation of the fixture in detail.

Chapter 3 Menu System—provides information on using the menu system and its functions.

Appendix A Troubleshooting and Maintenance—provides directions for troubleshooting problems, maintenance, and uploading software.

Appendix B Accessory Installation—provides information on installing approved accessories.

Appendix C Supplemental Information—provides information on how to color mix common gel colors and contains a reference chart for DMX values to MSpeed times.

Appendix D Important Safety Information—provides safety information in English, French, German, Spanish, Italian, and Danish.

Index—provides easy access to relevant topics and words.

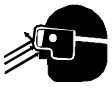
Caution and Warning Symbols

The following international symbols appear in margins throughout this manual to highlight caution and warning messages.

Caution: This symbol appears adjacent to Caution messages. Ignoring these messages could result damage to equipment.

Warning: This symbol appears adjacent to High Voltage Warning messages. Ignoring these messages could result in serious personal injury.

This symbol indicates the minimum distance to a lighted object is 1 meter.



This symbol indicates eye protection is required.

This symbol indicates a hot surface.

This symbol indicates an explosion hazard.

Safety Instructions

- Heed all caution and warning messages throughout this manual and the documentation that accompanies your fixtures.
- Servicing must be conducted by the manufacturer or other qualified service personnel.
- Avoid allowing liquids in any form to come in contact with the fixture.

Studio Color 575-S Features

- Automatic voltage selection for electronics, lamp, and motors at 50-60 Hz for all international voltages
- Full power factor correction
- Convection cooled for quiet operation
- Utilizes stepper motors throughout
- All functions are controllable via DMX-512 protocol
- Subtractive color mixing system plus six position fixed color wheel (100 million color permutations)
- 6200° K color temperature using the MSR 575/2 lamp and 5600° K using the MSD 575. The color correction filter fitted in the color wheel changes the MSR 575/2's color temperature to 3100° K and the MSD 575's color temperature to 2800° K. Virtually infinite up/down color correction is also available through the use of the three variable subtractive color wheels.
- Partial colors, color spins, synchronized color sequences, and random color sequences are available for effects
- The 8° to 22° selectable beam angle may be further user shaped to variable horizontal or vertical positioning through the use of proprietary secondary effects lens systems.
- Variable frost
- Moving yoke achieves up to 370° pan and 240° tilt. Control accuracy is 11.6" (sec.) (0.0032°).
- Optical encoders self-correct pan and tilt positions
- Accessory PAR type lenses are available in VNSP, NSP, WFL, MFL, and XWFL PAR beams
- 15-segment four character alpha-numeric LED display shows data, status, and internal diagnostic features
- LED indicators are provided to analyze power and data conditions
- Easy, quick, lamp replacement
- Integral AC power switch/breaker
- Integral floor mountable design with carrying handles. Mountable with standard installation hardware.
- Smooth iris dimming
- Shutter providing instant blackout, strobe effects, and random strobe effects
- Flicker-free light output
- Lamp power reduction for special applications
- Automatic power-saving mode when the shutter is closed
- Remote fixture shutdown
- Enhanced lamp life

Studio Color 575-M Features

- Robust magnetic ballast power supply for operation at 50 or 60 Hz at 208 or 230 volts
- Power factor correction
- Utilizes stepper motors throughout
- Convection cooled for quiet operation
- All functions are controllable via DMX-512 protocol
- Subtractive color mixing system plus six position fixed color wheel (100 million color permutations)
- 6200° K color temperature using the MSR 575/2 lamp and 5600° K using the MSD 575. The color correction filter fitted in the color wheel changes the MSR 575/2's color temperature to 3100° K and the MSD 575's color temperature to 2800° K. Virtually infinite up/down color correction is also available through the use of the three variable subtractive color wheels.
- Partial colors, color spins, synchronized color sequences, and random color sequences are available for effects
- The 8° to 22° selectable beam angle may be further user shaped to variable horizontal or vertical positioning through the use of proprietary secondary effects lens systems
- Variable frost
- Moving yoke achieves up to 370° pan and 240° tilt. Positioning accuracy is 19.8" (sec.) (0.0055°).
- Accessory PAR type lenses are available in VNSP, NSP, MFL, WFL, and XWFL PAR beams
- 15-segment four character alpha-numeric LED display shows data, status, and internal diagnostic features
- LED indicators are provided to analyze power and data conditions
- Easy, quick, lamp replacement
- Integral AC power switch/breaker
- Integral floor mountable design with carrying handles. Mountable with standard installation hardware.
- Smooth iris dimming
- Shutter provides instant blackout, strobe effects, and random strobe effects

System Overview

The following subsections provide a basic overview of the Studio Color features.

MSR 575/2 and MSD 575 Lamps

Studio Color utilizes custom lamps which are critical to the achievement of a full range of color permutations for the fixture. The MSR 575/2 provides a high color rendering index and high color temperature of 6200° K.

An optional MSD 575 lamp is available for architectural applications. It has a color temperature of 5600° K and offers extended lamp life.

Color Mixing and Capabilities

Color range is achieved through the use of two systems, a fixed color wheel and three subtractive color wheels. The fixed color wheel contains six user selectable filters. Custom color filters may be selected and ordered from High End Systems' dichroic color filter selection and easily installed by the user in the fixed color wheel.

When the fixed color wheel is used in combination with the subtractive color mixing gradient dichroic color wheels, over 100 million colors can be achieved. Proprietary dichroic subtractive color mixing wheels employ computer generated color distribution for uniform color of the beam and the most seamless three-color mixing available. The coloration of the three filters (CYM) is optimized in High End Systems' dichroic labs to provide the widest range of color available from subtractive color mixing. A color correcting dichroic is fitted in the fixture's color wheel to correct color temperature to 3100° K with the MSR 575/2 and 2800° K with the MSD.

Special color functions allow MSpeed to control all color systems, color spins of the fixed color wheel, random color combinations, double rotation of the subtractive color wheels, and quickest path to the desired color.

Beam Shaping

An exclusive variable beam profiling effect is achieved through selectable lens and frost systems. The standard beam angle selection is from 8° to 22°, which may be further shaped through a secondary effects lens system. The beam retains full light output while being profiled. This delivers virtually unlimited beam shaping in both the horizontal and vertical planes. Additionally, a variable frost effect provides progressive beam diffusion enhancement. These features deliver dynamic control of beam shape, offering new features never before available in a traditional wash fixture.

Full Mechanical Dimming

The dimming system is optimized to provide extremely uniform dimming of the beam. A dimming iris provides complete dimming without changing the color temperature.

Automatic Voltage Selection

Studio Color 575-S features integral proprietary switching power supplies for the on-board electronics packages and the lamp power supply. The fixture automatically operates on all voltages between 100 V.A.C. and 250 V.A.C. at 50 to 60 hertz without changing a power tap, the lamp, or making any adjustments.

Power Factor Correction

Both Studio Color models are power factor corrected. The lamp's power supply is also power factor corrected to optimize the light source's efficiency and deliver maximized power economy.

Cooling

Studio Color is convection cooled and uses no fans. Careful optical design provides a reduction of 65% heat between the lamp chamber and the optical section.

DMX Control

Full control over all operating parameters of Studio Color is achieved via 16 channels of DMX-512 protocol. This includes 16-bit pan and tilt positioning accuracy over the 370° x 240° range of movement, 8-bit accuracy for color wheels, effects wheels, and 8-bit dimming. A full function alpha-numeric display provides the ability to comfortably program the address channel, mode, offset, and other functions of the fixture in easy to view characters. A full set of diagnostic functions are available through the menu system. All parameters are controlled by a built-in Motorola® 68340 microprocessor. Operating software can be uploaded from the Lightwave Research Upload Dongle, the Wholehog III, Lighting Console, or from another fixture, thus keeping the fixtures constantly updated with the latest software version.

Stepper Motors

All motors are digitally controlled steppers, providing precision control and very long life. The pan and tilt motors are special high torque stepper motors offering 40% greater torque than comparable steppers. All mechanical movements are achieved via belt drives, insuring high reliability and very smooth, quiet performance.

Optical Encoders

The Studio Color 575-S utilizes optical encoders for the pan and tilt systems. The encoders automatically correct position if a fixture is jolted from a programmed position.

Lamp Power Options

For special applications, lamp power in the Studio Color 575-S can be reduced to 250 watts. This feature decreases light output, decreases heat, and saves power.

Automatic Power-Saving Mode

The Studio Color 575-S provides an automatic power-saving mode. When the shutter is closed, lamp power decreases to 250 watts. When the shutter is reopened, the lamp instantly returns to full power.

Ease of Maintenance

Studio Color has been designed for the professional user. All electronics, motors, and drive systems are easily accessible. Access to all color wheels, color motors, and effects motors is provided via a removable impact resistance, high temperature polymer front bezel. This front bezel is removable in seconds through two quick release latches. All processor and power supplies are accessible by opening the electronics housing and removing complete modules. Changing the lamp is quick (typically less than 30 seconds) and convenient, being accessed through the rear of the fixture via two access screws. The lamp assembly retains optimum lamp alignment during movement and replacement.

Safety

The lamp cover is secured through a wiring harness for additional safety. Multi-point grounding is provided throughout for complete assurance of safe operation. The bezel is secured to the unit by an additional safety cable. The fixture and all electronics comply with current UL, CE, and CSA safety standards for professional lighting fixtures.

Specifications

Models

Studio Color 575-S
Studio Color 575-M

Mechanical

Dimensions:

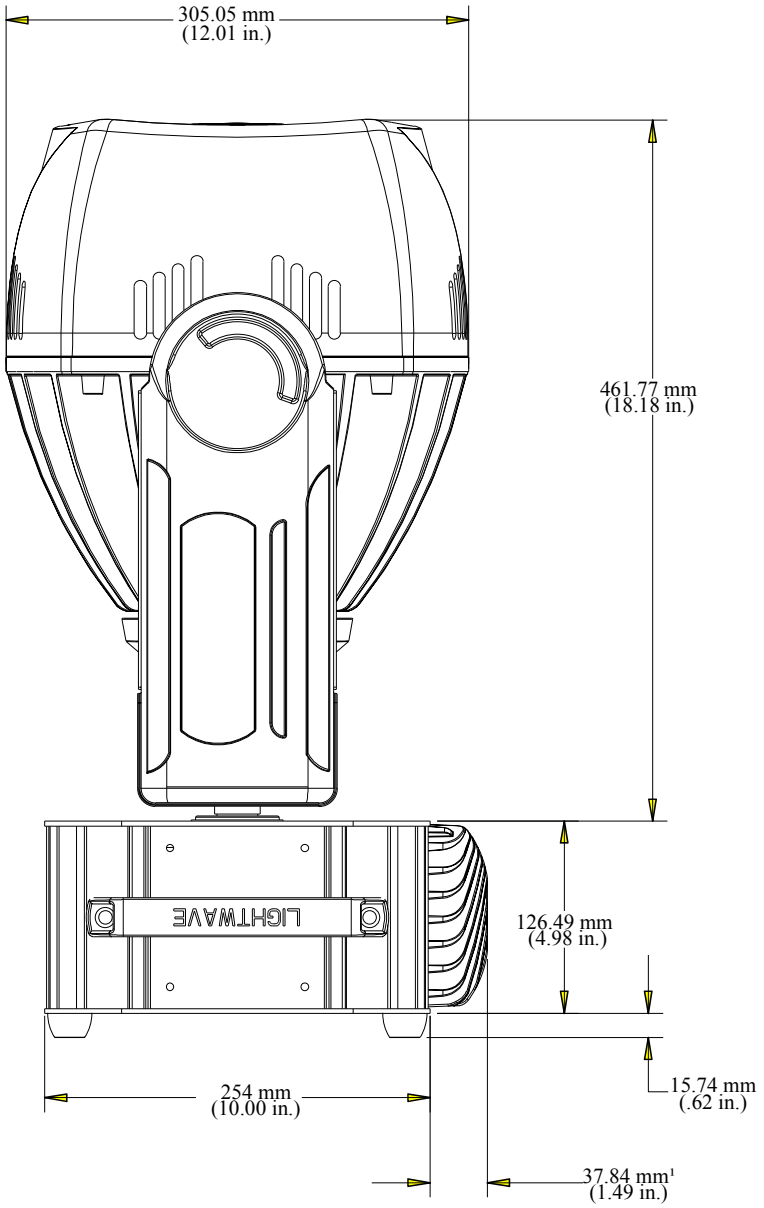
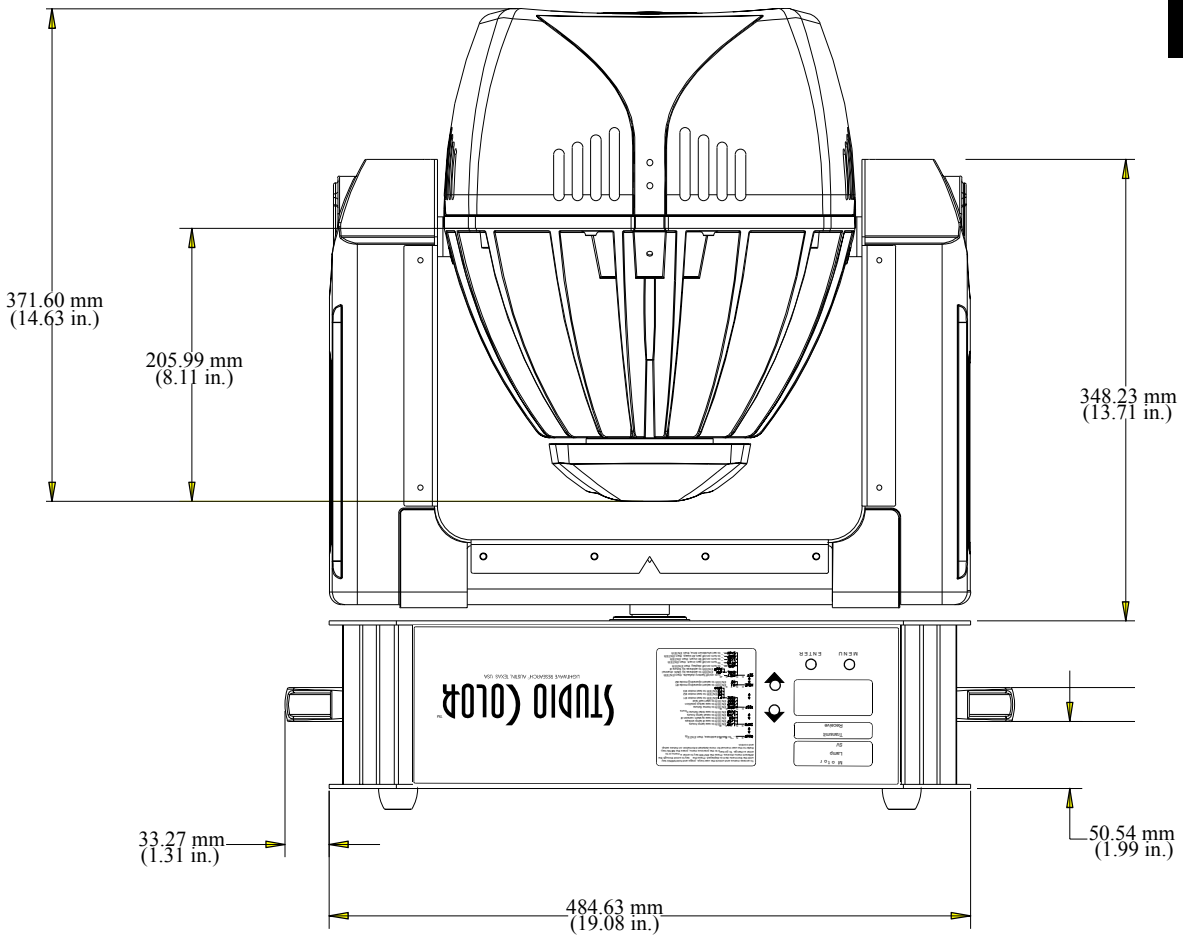


Figure 1. Side View Dimensions

[1]Note: *the 575-S has a proprietary heat sink which extends the fixture depth by 37.84 mm (1.49 in.).*



Weight

575-S:	25.85 kg (57 pounds)
575-M:	30.68 kg (67.5 pounds)

Electrical

Studio Color 575-S

Rated voltage:	100–230 V.A.C.[1]
Rated current:	7.0 A @ 100 V/60 Hz., 3.0 A @ 230 V/50 Hz.
Rated power:	700 W max.
Rated frequency:	50/60 Hz.
Max. ambient temperature, Ta:	40° C (104° F)
Max. exterior surface temperature:	140° C (284° F)
Power factor:	0.96 @ 230 V/50 Hz., 1.0 @ 100 V/60 Hz.
Max. winding temperature, Tw:	130° C (266° F)
Max. capacitor temperature, Tc:	85° C (185° F)

Studio Color 575-M

Rated voltage:	208/230[1] V.A.C.
Rated frequency:	50/60 Hz.
Rated current:	3.2 A @ 208 V/60 Hz., 3.0 A @ 230 V/50 Hz.
Rated power:	700 W max.
Max. ambient temperature, Ta:	40° C (104° F)
Max. exterior surface temperature:	140° C (284° F)
Power factor:	0.90 @ 60 Hz., 0.864 @ 50 Hz.
Max. winding temperature, Tw:	130° C (266° F)
Max. capacitor temperature, Tc:	100° C (212° F)

[1]Note: *fixtures can operate with international 200, 240 and 250 V.A.C. supplies. 575-M fixtures must be re-tapped for some voltages. To retap 575-M fixtures, contact your authorized dealer or High End Systems Service Department.*

Lamp

Lamp type:	Use only M Series, GX 9.5 base, 575 watt, metal halide type lamp
MSR 575/2 color temperature:	6200° Kelvin
MSD 575 color temperature:	5600° Kelvin

WARNING: Use only the lamps purchased from High End Systems. These lamps were specifically designed for use in Studio Color.

Communication

Protocol:	USITT DMX-512
Start code:	00h
Maximum load:	32 fixtures per DMX link
Required channels:	16
Termination:	120 Ω

Compliance

Studio Color 575-M and 575-S are compliant to the following standards:

- UL 1572
- CSA 22.2 Number 9
- EN 60598-1 : 1993
- EN 60598-2-17 : 1989 A1-A3 : 1993
- EN 55022, Class A ITE
- IEC 801-2, 1991 Level 2 (4/8 kV)
- IEC 801-3, Draft 5 Level 2 (3 V/m)
- IEC 801-4, 1988 Level 2 (1 kV/0.5 kV)
- FCC-Class A digital device

CE

Available Controllers

The following controllers from Lightwave Research® may be used to operate Studio Color:

Wholehog III Lighting Console

Hog2 PC controller

Additionally, most DMX-512 controllers may be used to operate Studio Color.

Accessories

The following items are currently available for Studio Color:

Accessory effect lenses (set of five)	99090029
Cheeseborough clamp	55040014
Color mixing assembly	80430044
Dark blue color filter	80510061
Orange color filter	80510060
Color corrector filter (full)	80510159
Purple color filter	80510063
Blue color filter	80510116
Green color filter	80510117
Indigo color filter	80510114
Magenta color filter	80510118
Yellow color filter	80510119
10-foot heavy duty data cable w/ Neutrik XLRs	55050005
25-foot heavy duty data cable w/Neutrik XLRs	55050006
50-foot heavy duty data cable w/ Neutrik XLRs	55050007
100-foot heavy duty data cable w/ Neutrik XLRs	55050008
Lightwave Research Upload Dongle	26040002
Ecodome™ 115 V (575-S only)	28010001
Ecodome 208/230 V	28010002
Keal Road Case for one fixture	26070000
Keal Road Case for two fixtures	26070001
Light snoot (fresnel light shield)	99190012
Philips MSR 575/2 lamp	55030045
Philips MSD 575 lamp	55030050
Safety cable	12040001
Studio Color User's Manual	60600061
Studio Color Quick Reference Card	60600082

Notes: *additional custom color filters are available from High End Systems. For special applications, all Studio Color models are available in white. Contact your authorized dealer or distributor for ordering information.*

Front and Side Panels

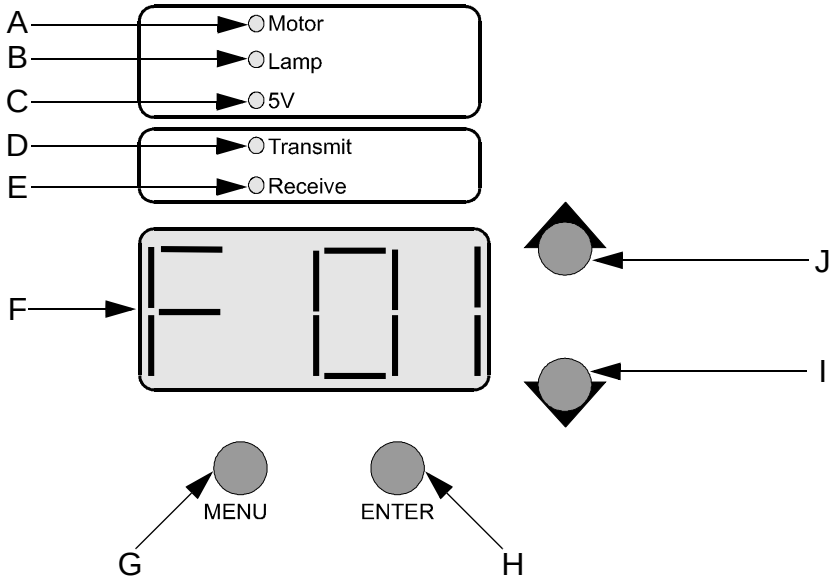


Figure 2. Front Panel

A- Motor power supply indicator. This LED is on when the motor power supply has the proper voltage.

B- Lamp power supply indicator[1]. This LED is on when the lamp is on, off if the lamp is turned off, or flashing if there is a malfunction.

C- 5V supply indicator. This LED is on when the logic board is being supplied with +5 volts.

D- Transmit data indicator. This LED is on when the fixture is the bus master (not the controller).

E- Receive data indicator. This LED reflects the state of the received data.

F- 15-segment four character alpha-numeric LED display. The display provides data, status, and internal diagnostic features.

G- <MENU> button. This button recalls the menu system and backs out of the current field.

H- <ENTER> button. This button enters the current field.

I- Down arrow button. This button scrolls downward through data fields.

J- Up arrow button. This button scrolls upward through data fields.

[1]Note: *the 575-M LED will always remain on.*

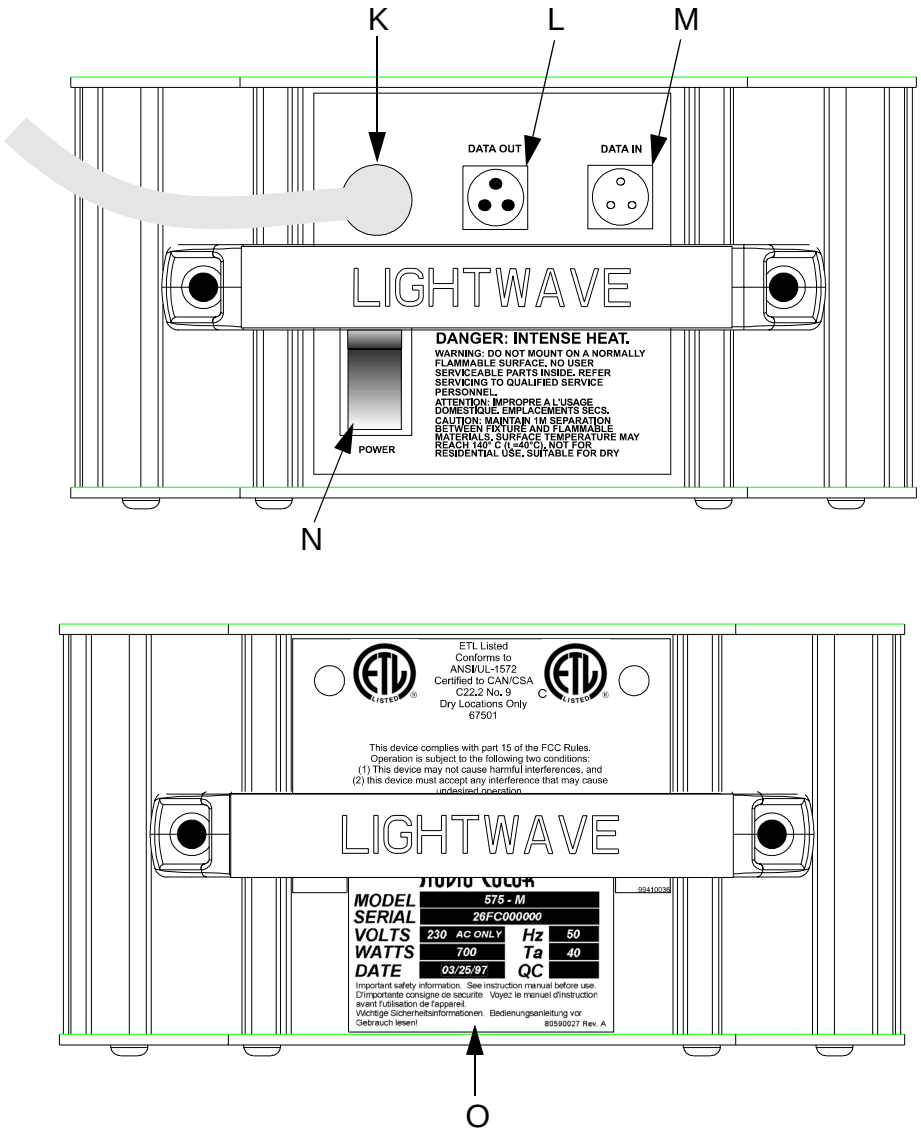


Figure 3. Side Panels

K- Line cord.

L- Data Out connector.

M- Data In connector.

N- Breaker/power switch.

O- QC/rating label.

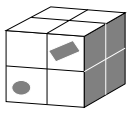
Chapter 1
Installation and Setup

In this chapter you will:

- *unpack Studio Color (1-1)*
- *construct a road case (1-2)*
- *construct line cord caps (1-5)*
- *learn the power requirements (1-5)*
- *construct data cables (1-5)*
- *construct terminators (1-6)*
- *install the lamp (1-7)*
- *mount the fixture (1-9)*
- *connect data cables (1-11)*
- *set the starting address (1-12)*
- *patch fixtures into the controller (1-14)*
- *configure your DMX controller to control Studio Color (1-15)*

Unpack *Studio Color*

In this section you unpack your Studio Color and verify that it arrived complete and without any damage.



Save the Shipping Materials

Do not discard the shipping carton and packing materials. The carton and packing materials are specifically designed to protect the fixture during transport.

If you ever need to return a product for repair or maintenance, you must return it in its original shipping carton and packing materials. You will be billed for a new shipping carton and new packing materials if you return your Studio Color in a non-factory shipping carton with non-factory packing materials.

Note: *Before returning anything to the factory, be sure to call your High End Systems Dealer/Distributor for a Return Authorization Number. The factory can not accept any goods shipped without an RA number.*

Inspect the Contents

The carton contains the following:

- Studio Color fixture
- Philips MSR 575/2 or MSD 575 series lamp
- *Studio Color User's Manual*
- *Studio Color Quick Reference Card*

Road Cases

If Studio Color fixtures will be transported after they are unpacked from their original shipping box, a professional road case is strongly recommended. Road cases must be purchased from High End Systems or constructed according to the information in this section.

Minimum Material Requirements

Use the following materials to construct the road case:

- 3/4-inch pressed plywood
- 4 pound poly-ethylene foam
- steel or aluminum rivets

Construction Requirements

The road case must be constructed in a manner that supports the base and the handles with the head pointed down and the yoke rotated 90°. Refer to Figure 1.1 and Figure 1.2.

Caution: For 575-S fixtures, allow a small gap in the foam around the heat sink to ensure that the foam is not damaged by the heat from the fixture.

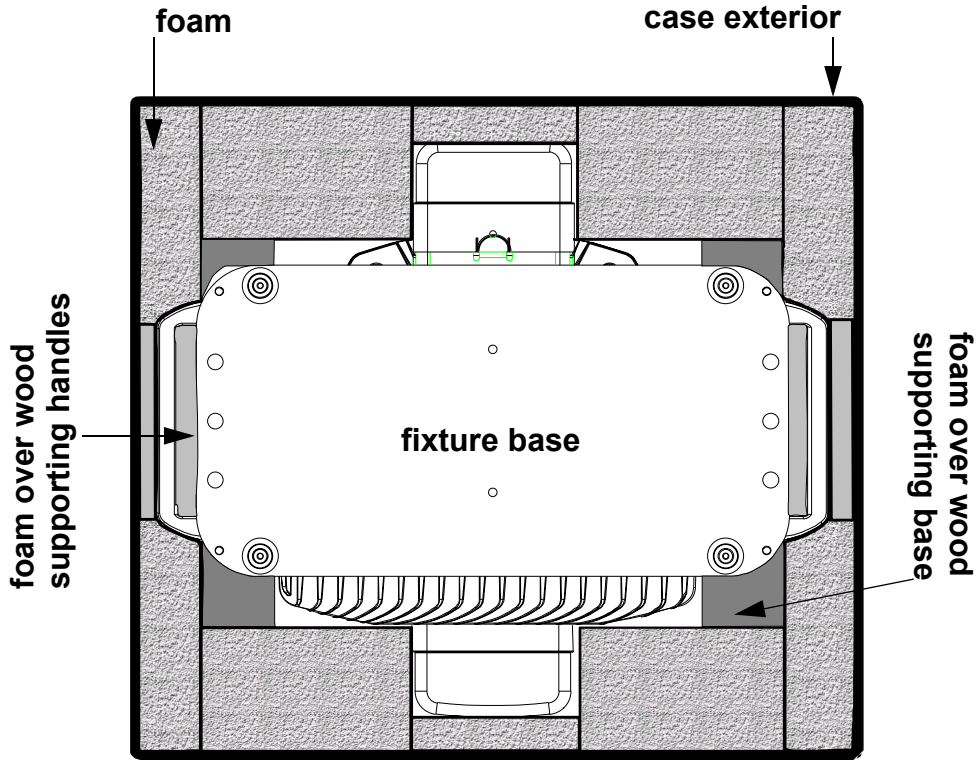


Figure 1.1. Road Case Construction Overhead View

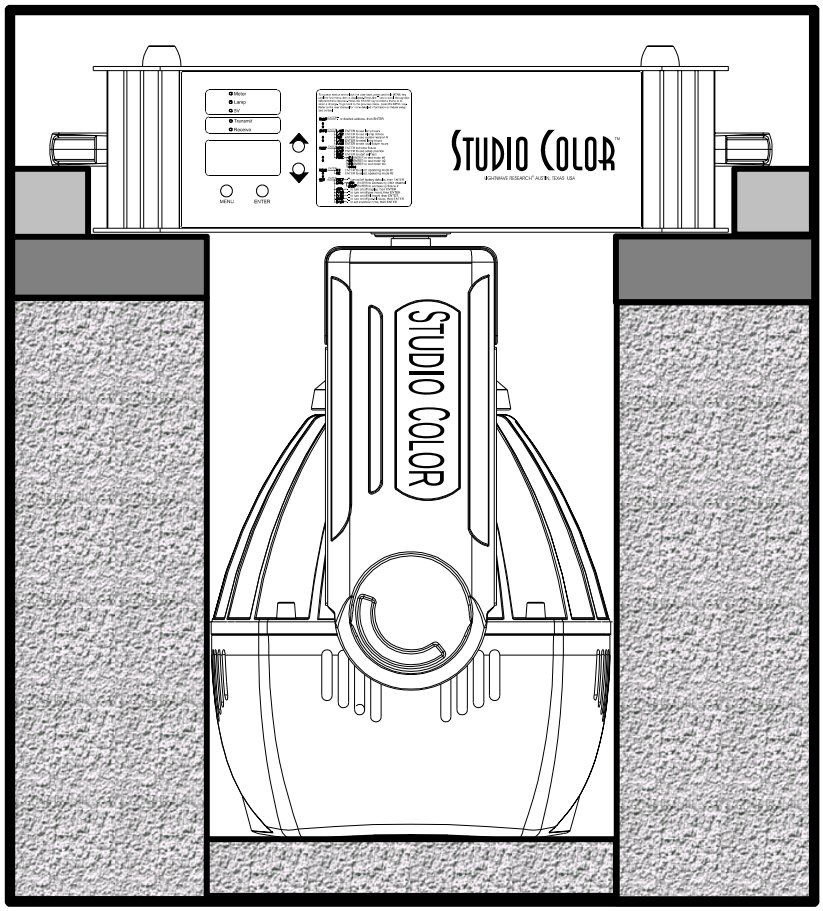


Figure 1.2. Road Case Construction Side View

Before You Begin Installation

Warning: Before you begin the installation read the following safety precautions.

1. Disconnect the fixture from power before removing the cover or changing the lamp.
2. Allow the unit to cool for at least five minutes before removing cover or accessing the lamp.
3. Wear protective gloves and goggles when working inside the unit.

Power Requirements

The following items must be used to provide power to Studio Color:

- 12 AWG stranded THHN or equivalent
- Branch Circuit Protection
- 20 A, high-surge thermal breakers (GE THQB, THQL, or equivalent). Refer to Table 1.1.

Table 1.1: Breaker Requirements

	575-S	**575-M**
Voltage	***Number of Fixtures per 20 A Breaker***	
110	3	n/a
208	5	3
230	6	4

Note: *do not use magnetic type circuit breakers*.

Line Cord Cap Construction

Studio Color is shipped without a line cord cap attached. Secure the line cord to a line cord cap in accordance with the following code:

- green and yellow– earth
- blue– neutral
- brown– live

In the United States, use an integral cord grip that is rated either at 125 V 20 A (NEMA 5-20) or 250 V 20 A (NEMA 6-20), depending on the available supply.

In the United Kingdom, as the colours of the cores in the mains lead of this equipment may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

- The core which is coloured green and yellow must be connected to the terminal in the plug which is marked with the letter **E** or by the earth symbol, or coloured green or green and yellow.
- The core which is coloured blue must be connected to the terminal which is marked with the letter **N** or coloured black.
- The core which is coloured brown must be connected to the terminal which is marked with the letter **L** or coloured red.

WARNING: Class I equipment. This equipment must be earthed.

Data Cable Construction

Studio Color uses standard three-pin XLR connectors. You should construct data cables using shielded, two conductor cable with male three-pin XLR connectors at one end and a female three-pin XLR connectors on the other end. You can use microphone cables if the pin connections are correct. Test each cable with a volt-ohm meter for correct polarity and ensure that the negative and positive pins are not grounded or shorted to the shield. Ensure that pin 1 is shielded. Refer to Figure 1.3.

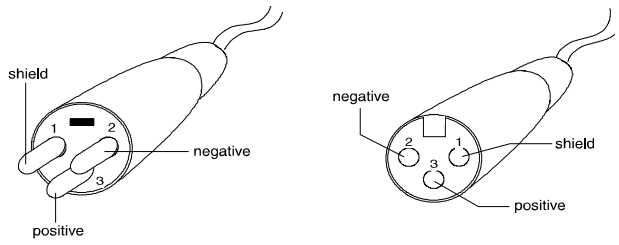


Figure 1.3. Data Cable Construction

If your DMX controller uses five-pin data cables, you will need to construct or purchase a five-pin to three-pin adapter.

Terminator Construction

DMX-512 protocol recommends terminating resistors be used on the last fixture on the link. You will need the following items to construct a terminator:

- Male three-pin XLR connector
- 120 Ω resistor (¼ watt minimum)

To construct a terminator, complete the following procedure:

1. Disassemble the male XLR connector.
2. Solder a 120 Ω resistor, minimum of ¼ watt, between pins 2 and 3.

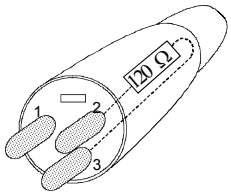


Figure 1.4. Terminator Construction

3. Reassemble the XLR connector.

Lamp Installation

You will need the following items to install or replace the lamp:

- ¼ inch hex wrench
- Philips MSR 575/2, MSD 575, or factory approved lamp
- Protective gloves
- Protective goggles

Note: *do not mix lamp types! The MSR 575/2 and the MSD 575 have different color temperatures and characteristics.*

To install or replace the lamp, complete the following procedure:

1. Remove power from fixture. If the fixture has been in operation, allow it to cool for at least five minutes before continuing.
2. Using the ¼-inch hex wrench, loosen the hex screws located at the rear of the fixture and remove the lamp access cover. Refer to Figure 1.5.

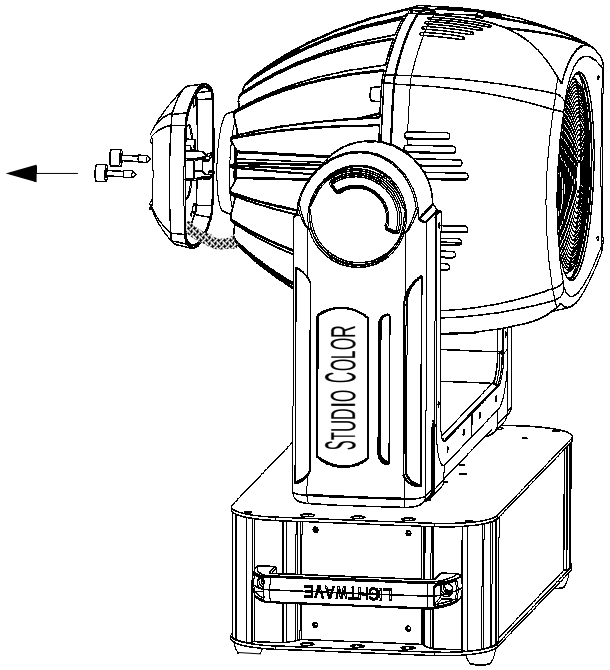


Figure 1.5. Removing the Lamp Access Cap

3. Holding the lamp by its base, align the lamp leads to their female slots and carefully push the lamp into the socket. Refer to Figure 1.6.

Warning: Do not touch the lamp with bare fingers. If the lamp is accidentally touched, clean it immediately with a soft cloth and isopropyl alcohol (C_3H_8O). An alcohol cloth is provided with each lamp.

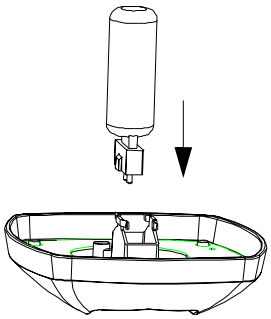


Figure 1.6. Installing the Lamp

4. Place lamp assembly back into the housing and tighten the hex screws.

Caution: Do not overtighten the hex screws.

Note: *when a lamp is replaced, remember to reset the lamp hours as outlined in "Resetting Lamp Hours" on page 3-7. If you are using a 575-M, reset the fixture hours as outlined in "Resetting Fixture Hours" on page 3-7.*

Fixture Mounting

Studio Color may be mounted on the ground or at any angle on a truss. Complete the instructions in the following subsections to mount the fixture properly.

Caution: Keep flammable items at least 1 M away from fixture.

Floor Mounting

Complete the following procedure to mount a fixture on the floor:

1. Check to ensure that the rubber feet are installed on the base of the fixture and place it on a flat surface. Refer to Figure 1.7.

Caution: Do not place the unit on a flat surface without the rubber feet installed.

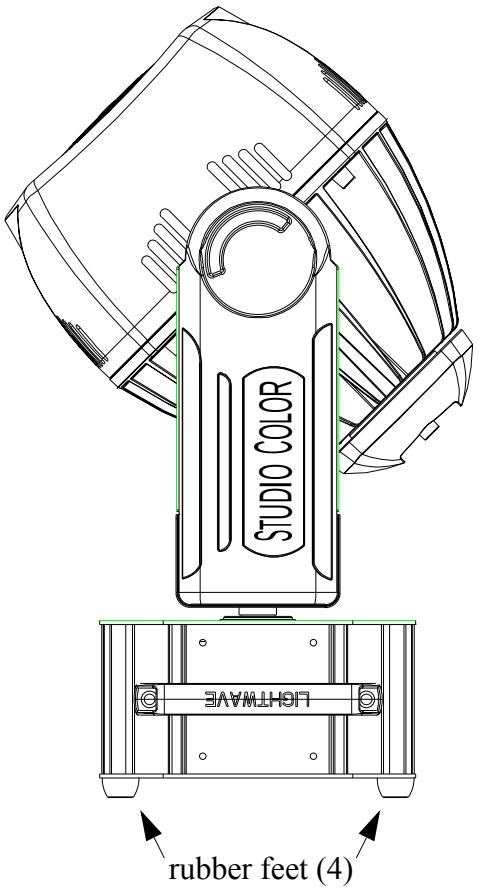


Figure 1.7. Floor Installation

Truss Mounting

To mount the fixture on a truss, you will need the following equipment:

- (2) Safety cables
- (2) Cheeseborough clamps (recommended) or other mounting hardware

Complete the following procedure to mount the fixture to a truss:

1. Lay the fixture on its side and attach the mounting hardware to the center holes on the base. Refer to Figure 1.8

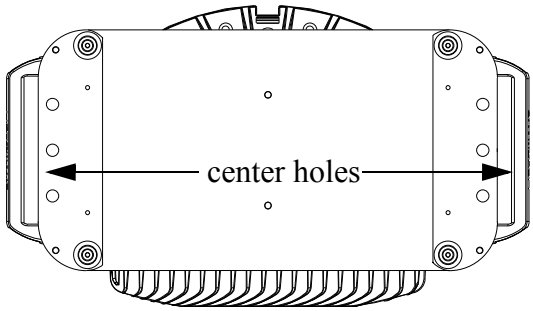


Figure 1.8. Attaching Mounting Hardware

2. Install the fixture on the truss and secure the mounting hardware.
3. Loop the safety cables through an outer hole on the base of the unit, around the handle, and out the other outer hole. Refer to Figure 1.9.

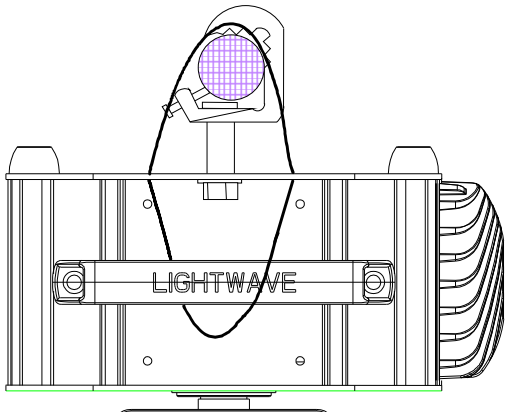


Figure 1.9. Safety Cable Installation

Caution: Only experienced lighting personnel should attempt to hang a lighting fixture to an appropriate theatrical truss.

Do not place safety cables through the lower plate that connects to the fixture yoke. Doing so may cause interference with the fixture's pan movement.

Warning: Failure to use a safety cable could result in injury or death. High End Systems supplies the proper safety cables and may be contacted for replacements if necessary. For more information go to: www.highend.com/trusshang.

Data Cabling

To connect the data cables, complete the following procedure:

1. Connect the data cable from the controller to the Data In connector on the side of the fixture. Refer to Figure 1.10.

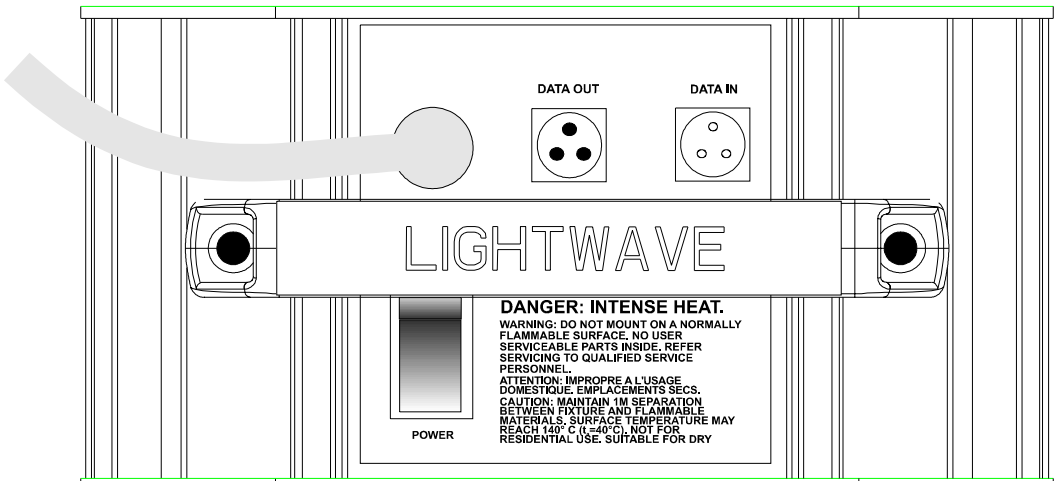


Figure 1.10. Data In and Data Out Connectors

2. Daisy chain additional fixtures by connecting the Data Out connector to the Data In connectors on subsequent fixtures. Refer to Figure 1.11.

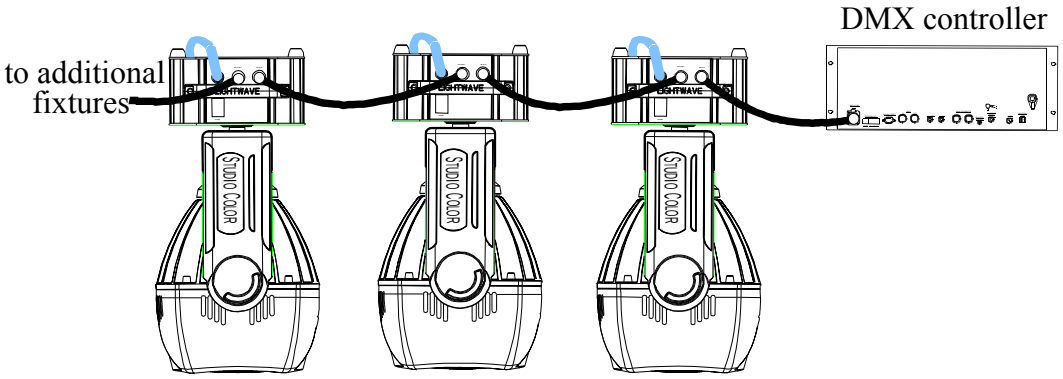


Figure 1.11. Daisy Chaining Fixtures

3. Install a terminator in the Data Out connector of the last fixture on each DMX link.
4. Connect AC mains (power) and turn on the breaker located next to the power cord on the side of each fixture. Refer to Figure 1.10.
5. The fixture(s) will home and run through a built in self-test.

Note: *if any error messages are present on the display, refer to Troubleshooting in Appendix A.*

DMX Starting Channel

Use the following subsections to set the fixture DMX starting channel. Starting channels may be set by fixture number (1-32) or DMX channel number (1-512). Either way, each fixture uses 16 DMX channels.

Setting the Starting Channel by Fixture Number

To set the starting channel by fixture number, complete the following procedure:

1. Apply power to the fixture.

Note: *to skip the homing process, simultaneously hold down the <**MENU**> and <**ENTER**> buttons immediately after applying power to the fixture.*

2. Observe the display on the front of the fixture. Initially, it will display the software version (V xxx) and then the fixture number (F 01).
3. Press and hold the <MENU> button until the display changes to the ADDR field. Press the <ENTER> button to manipulate the address field. Refer to Figure 1.12.

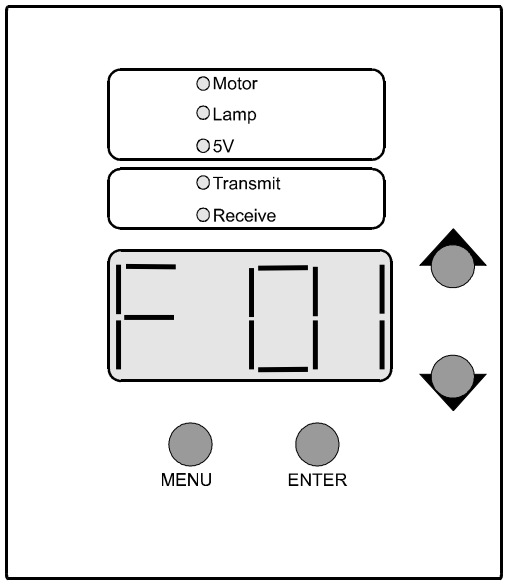


Figure 1.12. Using the Front Panel

4. Using the up and down arrow keys on the front of the unit, set the desired fixture number (F 01 to F 32). The display will flash when it is moved from the stored value.
5. Press the <ENTER> key to store the appropriate fixture number. The display will stop flashing.

Note: *if the <**ENTER**> key is not pressed, the unit will not store the starting channel.*

6. Press the <MENU> button to exit the menu.

Setting the Starting Channel by DMX Channel Number

To set the starting channel by DMX channel number, complete the following procedure:

Caution: if an incorrect starting channel is given, channels could overlap and produce unexpected results.

1. Apply power to the fixture.
2. Observe the display on the front of the fixture. Initially, it will display the software version (V x x x) and then the fixture number (F 01).
3. Press and hold the <MENU> button until the display changes to AddR. Refer to Figure 1.12.
4. Use the up and down keys to move to the SET field. Press <ENTER> to enter the SET field.
5. Use the up and down keys to move to the CHNL field. Press <ENTER> to enter the CHNL field.
6. Use the up and down keys to move to the DMX field. Press <ENTER> to enable the fixture to accept addressing by DMX channel.
7. Press the <MENU> key to back out to the AddR (address) field.
8. Using the up and down keys on the front of the unit, set an the starting channel from (C 001 to C512). Studio Color fixtures require 16 DMX channels per fixture. Refer to Table 1.2 “DMX Starting Channel” on page 1-14 for assistance. The display will flash when it is moved from the stored value.
9. Press the <ENTER> key to store the appropriate starting channel. The display will stop flashing. The fixture address is stored in ROM and retains its value until the value is changed.

Note: *if <**ENTER**> is not pressed, the unit will not store the starting channel.*

10. Press and hold the <MENU> button to exit the menu.

Patching DMX Controllers

Use the following table to patch (set the correct starting address) DMX controllers. If your starting channels are assigned by DMX channel number, set each starting address by adding multiples of 16.

Table 1.2: DMX Starting Channel

Fixture Number	DMX Starting Channel	Fixture Number	DMX Starting Channel	Fixture Number	DMX Starting Channel	Fixture Number	DMX Starting Channel
1	1	9	129	17	257	25	385
2	17	10	145	18	273	26	401
3	33	11	161	19	289	27	417
4	49	12	177	20	305	28	433
5	65	13	193	21	321	29	449
6	81	14	209	22	337	30	465
7	97	15	225	23	353	31	481
8	113	16	241	24	369	32	497

DMX Control of Functions

Studio Color may be controlled by either by 8- or 16-bit DMX controllers. Chapter 2 discusses all Studio Color functions in detail. Use the following table to control Studio Color functions via DMX.

Table 1.3: DMX Control

DMX Chan.	Function	Description	Decimal	Fader percent	Hex
1	Pan MSB	*coarse positioning, 8 bit; 8-bit controllers use only high byte*	0-255	0-100	00-ffh
2	Pan LSB	*fine positioning*	0-255	0-100	00-ffh
3	Tilt MSB	*coarse positioning, 8 bit; 8-bit controllers use only high byte*	0-255	0-100	00-ffh
4	Tilt LSB	*fine positioning*	0-255	0-100	00-ffh

Table 1.3: DMX Control

DMX Chan.	Function	Description	Decimal	Fader percent	Hex
5	Color functions	*default*- color wheel continuous *F1- allows the color mixing wheels to make two complete rotations* *F2- locks dim, color, and effect systems to MSpeed* *F3- enables forward color spins on the fixed color wheel or synchronized color mix sequences* *F4- enables reverse color spins on the fixed color wheel or random color mix cycling from the subtractive color wheels* *F5- color wheel color lock and quickest path*			
		default	0	0	00
		F3	16	8	10h
		F4	32	14	20h
		F5	48	20	30h
		F1	64	26	40h
		F1 and F3	80	33	50h
		F1 and F4	96	39	60h
		F1 and F5	112	45	70h
		F2	128	51	80h
		F2 and F3	144	58	90h
		F2 and F4	160	64	a0h
		F2 and F5	176	70	b0h
		F1 and F2	192	76	c0h
		F1, F2, and F3	208	83	d0h
		F1, F2, and F4	224	89	e0h
		F1, F2, and F5	240	95	f0h

Table 1.3: DMX Control

DMX Chan.	Function	Description	Decimal	Fader percent	Hex
6	Color wheel	*default- continuously variable*			
		pos 0 - open	0 & 255	0 & 100	00 & ffh
		pos 1 - CTO	44	17	2ch
		pos 2 - pink	86	34	56h
		pos 3 - magenta	128	50	80h
		pos 4 - red	170	66	aah
		pos 5 - aqua	213	83	d5h
		F3- variable forward spins/synchronized color mix sequences			
		spin stop	0-3	0-1	00-03h
		spin forward slowest	4	2	04h
		spin forward fastest	127	48	7fh
		color mix sequence slowest	128	50	80h
		color mix sequence fastest	255	100	ffh
		F4- variable reverse spins /random color mix cycling			
		spin stop	0-3	0-1	00-03h
		spin reverse slowest	4	2	04h
		spin reverse fastest	127	48	7fh
		color mix cycle slowest	128	50	80h
		color mix cycle fastest	255	100	ffh
		F5- *color lock and quickest path*			
		pos 0 - open	0-43	0-17	0-2bh
		pos 1 - CTO	44-85	18-33	2ch-55h
		pos 2 - pink	86-127	34-50	56h-79h
		pos 3 - magenta	128-169	51-66	80h-a9h
		pos 4 - red	170-212	67-83	aah-d4h
		pos 5 - aqua	213-255	84-100	d5h-ffh
7	Cyan mix	*red subtractive*			
		cyan in	0	0	00h
		cyan out	255	100	ffh
8	Magenta mix	*green subtractive*			
		magenta in	0	0	00h
		magenta out	255	100	ffh
9	Yellow mix	*blue subtractive*			
		yellow in	0	0	00h
		yellow out	255	100	ffh

Table 1.3: DMX Control

DMX Chan.	Function	Description	Decimal	Fader percent	Hex
10	Lens wheel (effects wheel 1)	*full rotation, continuously variable* open wide angle filter narrow horizontal shaping center axis wide vertical shaping center axis	 0 & 255 64 128 192	 0 & 100 25 50 75	 00 & ffh 40h 80h c0h
11	Frost wheel (effects wheel 2)	*full rotation, continuously variable* open frost narrow vertical shaping center axis wide horizontal shaping center axis	 0 & 255 64 128 192	 0 & 100 25 50 75	 00 & ffh 40h 80h c0h
12	Shutter	closed strobe slowest strobe fastest random strobe-low saturation random strobe-high saturation open	0-7 8 127 128 247 248-255	0-2 3 49 50 96 97-100	00h-07h 08h 7fh 80h f7h f8h-ffh
13	Dimmer	*iris* closed open	 0 255	 0 100	 0h ffh
14	MSpeed	*movement speed* controller cross fade slowest fastest	 0-3 4 255	 0-1 2 100	 00-03h 04h ffh
15	Control[1]	safe home shutdown[2]	0 64 128	0 25 50	0h 40h 80h
16	Check-sum	set to default value (00)	00	0	00h

[1] Note: *the shutter must be closed to access control channel. The fixture must receive the value for 0.5 second before it instigates a Control function.*

[2] Note: *only available on the 575-S.*

Chapter 2
Operation

In this chapter you will learn how to use:

- *MSpeed (2-1)*
- *pan and tilt (2-2)*
- *dim (2-3)*
- *strobe (2-3)*
- *color mixing (2-3)*
- *color functions (2-4)*
- *beam shaping (2-5)*
- *remote fixture shut down (2-5)*
- *remote homing (2-5)*

Overview

This chapter explains the capabilities of Studio Color in detail and provides helpful programming tips.

MSpeed

MSpeed (motor speed) is the time required to complete motor movement from one position to another. MSpeed provides a means for all motors to reach their target position at the same time. The following functions can use MSpeed:

- pan
- tilt
- dim
- fixed color wheel
- cyan color wheel
- magenta color wheel
- yellow color wheel
- effects wheel 1
- effects wheel 2

Note: *to attach MSpeed to dim, color systems, and the effects wheels, refer to "Color Functions" on page 2-4.*

MSpeed is not linearly scaled, it is exponentially scaled. Refer to Figure 2.1.

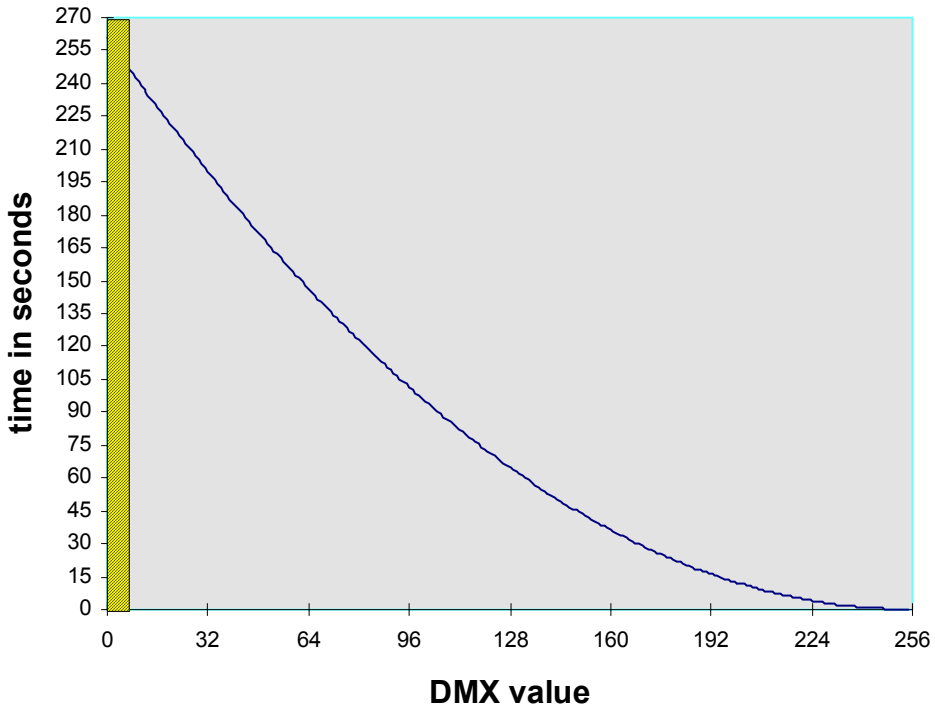


Figure 2.1. MSpeed Values

Note: *the darker region in the above figure indicates DMX values 0-3 which disable MSpeed and allow the controller to crossfade the fixture.*

For a MSpeed conversion chart, refer to "Converting DMX Values to MSpeed Times" on page C-5.

Pan and Tilt

Studio Color has the capability of 370° pan and 240° tilt movement. When programming pan and tilt sequences, consider MSpeed as a new position may be given before the last position was reached (MSpeed greater than delay). Studio Color supports both 8-bit and 16-bit DMX controllers. Channels 1 and 3 provide coarse positioning of approximately 1° while Channels 2 and 4 provide fine positioning between the 1° steps. Studio Color provides 16-bit internal processing of pan and tilt movement. If you are using an 8-bit DMX controller, we recommend using MSpeed to provide smooth and natural motion between programmed positions.

Studio Color 575-S includes optical encoders which instantly correct the pan and tilt positions if the fixture is heavily jarred. The fixture will attempt to correct the positions numerous times before it times out.

Dimming

Studio Color has full dimming capability without changing the color temperature. This is accomplished through a dimming iris. Dimming is linearly scaled with 256 values to provide smooth and accurate motion. When dim is set to 0, the shutter will close. To control dimming, use DMX channel 13 and a value from 0 (closed) to 255 (full).

Strobe Effects

Studio Color produces strobe effects through the use of a mechanical shutter. 120 random strobe functions and 120 continuously variable strobe effects are provided. Additionally, the shutter can be used as a gate for instantaneous blackout. Strobe effects are accessed though DMX channel 12.

Color Mixing

Studio Color can achieve over 100 million colors through the use of its fixed color wheel and subtractive color mixing system. Appendix C contains a chart of common gel colors and the values to acquire them from the color mixing systems.

Fixed Color Wheel

The fixed color wheel is controlled through DMX channel 6. The factory fixed color wheel contains the following primary colors:

- Position 1-white (open)
- Position 2- ¾ CTO[1] (color temperature orange)
- Position 3-pink
- Position 4-magenta
- Position 5-red
- Position 6-aqua

[1]Note: *the stock ¾ CTO is easily replaced with optional ½ or full CTOs.*

Subtractive Color Wheels

The subtractive color mixing system uses the following color wheels and DMX channels:

- cyan- DMX channel 7
- magenta- DMX channel 8
- yellow- DMX channel 9

The subtractive color wheels uses a proprietary gradiated pattern for even color mixing.

Color Functions

Studio Color offers five color functions. Color functions are accessed through DMX channel 5. Multiple color functions can be combined for additional flexibility. The following subsections discuss the individual color functions.

Double Rotation of Color Mixing Wheels

Function 1 enables the color mixing wheels to make two complete rotations. This provides quicker color selection if the color is located on the saturated side of the color mixing wheel. This also allows movement over the edges of the wheel for special effects (saturated color and open for partial colors).

Enable MSpeed On Color Functions

Function 2 allows the dim, color mixing system, fixed color wheel, and effects wheels to attach to MSpeed. When this function is enabled, the motors will reach their programmed setting at the MSpeed time. When this function is not used, the motors are crossfaded by the controller.

Forward Color Spins and Synchronized Color Mix Sequences

Function 3 allows the fixed color wheel to spin forward or allows synchronized color mix sequences with the color mixing wheels. The forward color spin provides 123 variable speeds.

The synchronized color mix sequences provide color chases with 127 variable speeds.

Reverse Color Spins and Random Color Mix Cycling

Function 4 allows the fixed color wheel to spin in reverse or allows random color mix cycling of the color mixing wheels. The spin control provides 123 variable speeds.

The random color mix cycling provides color chases with 127 variable speeds.

Color Lock and Quickest Path

Function 5 allows the fixed color wheel to snap on whole colors. It also rotates the wheel in the quickest path for the desired color. For example, if you are on open (1) and need to reach color 6, the wheel rotates directly to 6 instead of through four additional colors. If Function 5 is not enabled, the fixture defaults to continuous motion of the fixed color wheel. This allows varying degrees of the color and partial colors. In the default mode, the fixed color wheel can spin one complete rotation.

Beam Shaping

Studio Color utilizes lenticular, frost, and convex lenses to refract light without decreasing light output. This allows for a wide variety of beam shaping effects beyond the possible combinations from mechanical systems. The system uses two independent effect wheels to accomplish this task. The following options are available on their respective wheels:

Effects Wheel 1:Beam Shaping (DMX channel 10)

- Variable wide angle lens
- Variable narrow horizontal to wide vertical beam shaping

Effects Wheel 2: Beam Shaping (DMX channel 11)

- Variable frost lens
- Variable narrow vertical to wide horizontal beam shaping

Remote Shutdown

Studio Color 575-S can be remotely shutdown through DMX. To shutdown a fixture, complete the following procedure:

1. Set DMX Channel 12 (Shutter) to a value of 0 on the appropriate fixture(s). This will unlock Channel 15 (Control channel).
2. Set DMX Channel 15 (Control) to a value of 128 (50%) on the appropriate fixture(s). The value must be sent for 0.5 seconds before the fixture(s) will shutdown. The fixture(s) will close the gate and iris, turn off all motors, and extinguish the lamp.

Remote Homing and Lamp Restrike

To home Studio Color and restrike the lamp from a DMX console, complete the following procedure:

1. Set DMX Channel 12 (Shutter) to a value of 0 on the appropriate fixture(s). This will unlock Channel 15 (Control channel).
2. Set DMX Channel 15 (Control) to a value of 64 (25%) on the appropriate fixture(s). The value must be sent for 0.5 seconds before the fixture homes. The display will indicate RST (reset), strike the lamp, and HOME during the process.

Chapter 3
Menu System

In this chapter you will:

- *be provided with a menu map (3-2)*
- *use the address menu (3-5)*
- *use the information menu (3-6)*
- *use the test menu (3-11)*
- *use the mode menu (3-13)*
- *use the set menu (3-14)*

Overview

The built-in menu system offers a number of features from setting the starting channel to viewing DMX data.

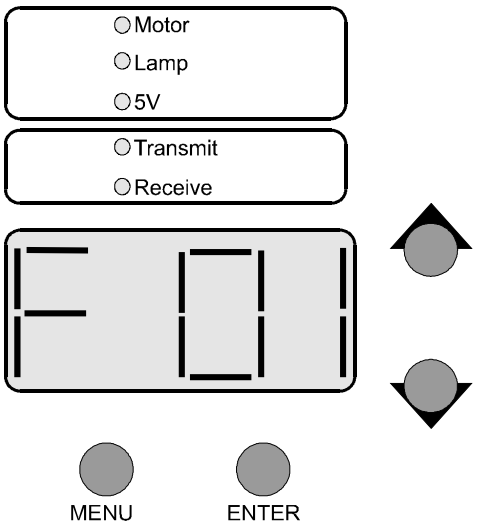


Figure 3.1. Fixture Menu

Use the keys on the front panel to perform the following functions:

- up and down arrow keys- scroll through data fields
- <MENU>-brings up the menu system and backs out of current field
- <ENTER>- enters the current field

Menu Map

The following information is a complete map of the menu system.

ADDR -fixture address

INFO

- L/HR - lamp hours†
- L/ST - lamp strikes†
- VER - software version
- L/RS - resets lamp hours and lamp strikes†
- F/HR - fixture hours
- F/RS - resets fixture hours
- TEMP
  - CURR - current internal temperature
  - MINT - minimum internal temperature
  - MAXT - maximum internal temperature
  - RST - reset temperature
- DMX
  - FIXT
    - ERRS - DMX errors
    - CSUM - checksum
    - CNTL - control value
    - MSPd - MSpeed value
    - dIM - dim value
    - SHUT - shutter value
    - FRST - frost wheel value
    - LENS - lens wheel value
    - CYAN - cyan wheel value
    - YELW - yellow wheel value
    - MAGN - magenta wheel value
    - CLR - color value
    - CLRF - color function value
    - TILT - tilt value
    - PAN - pan value

STRT - start code

CE - checksum errors

OV - overrun errors

FE - framing errors

DATA

C001 - C512 - shows DMX data on the selected channel

CODE

SENP - pan sensor

TPOS - tilt position

PPOS - pan position

DUTY - encoder duty cycle

PCOR - pan or tilt corrections†

TIME - main loop time

SVCC - sensor power

SEN2 - sensor 2

SEN1 - sensor 1

SENT - tilt sensor

TEST

HOME - homes the fixture

S/UP - places the fixture in setup mode

SELF

ALL - runs through all self tests

DIM - test

SHUT - test

FRST - test

LENS - test

CYAN - test

YELW - test

MAGN - test

COLR - test

TILT - test

PAN - test

FUNC

F1 - reserved

F2 - reserved

F3 - reserved

bOOT - stores the new boot code into the Flash ROM

LAMP

STAT - lamp status†

LOFF - turns lamp off†

L ON - turns lamp on†

MOdE

M1 - reserved

M2 - reserved

XLd - cross-loads fixture code

SET

FACT - sets factory defaults

CHNL

dMX - set the starting channel by DMX channel number

AddR - set the starting channel by fixture number

dSPL

ON - turns the display on

OFF - turns the display off

dIM - dims the display

P/IN - pan invert

T/IN - tilt invert

SWAP - swap pan and tilt

S/dN

5 MN - sets shutdown time for 5 minutes

10MN - sets shutdown time for 10 minutes

LAMP

575W - 575 watt setting

250W - 250 watt setting†

PCAL - pan calibration ±20 in .4° increments

TCAL - tilt calibration ±20 in .4° increments

†Note: *575-S model only.*

Address Menu

Use the following subsection to manipulate the ADDR functions for setting the starting channel.

Setting the Starting Channel

The starting channel can be set by fixture number or DMX channel address. To change the way the starting channel is set, refer to "Setting the Starting Channel by DMX Channel or by Fixture Number" on page 3-14. To set the starting address by fixture number, complete the following procedure:

1. Observe the display. Initially, it will display the software version (V xxx) and then the fixture number (F 01).
2. Press and hold the <MENU> button until the display changes to ADDR.
3. Press the <ENTER> button to edit the ADDR field.
4. Using the up and down buttons on the front of the unit, set the address. The display will flash when it is moved from the previous value.
5. Press the <ENTER> key to accept the appropriate channel. The display will stop flashing.

Note: *if the* <ENTER> *key is not pressed, the fixture will not store the starting channel.*

Information Menu

Use the following subsections to perform the functions contained within the INFO menu.

Viewing Lamp Hours

To view the number of lamp hours, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button. The display will indicate L/HR.
3. Press the <ENTER> button to enter the field and display the lamp hours.

Note: *this feature is only available on the 575-S.*

Viewing Lamp Strikes

To view the number of times the lamp has attempted to strike, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the L/ST field and press <ENTER>. The fixture will display the number of times the lamp has attempted to strike.

Notes: *lamp strikes are automatically reset when the lamp hours are reset. Refer to "Resetting Lamp Hours" on page 3-7. This feature is only available on the 575-S.*

Viewing System Version Number

To view the system version number (software revision level), complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the VER field and press <ENTER>. The fixture will display the current system version.

Resetting Lamp Hours

To reset lamp hours and lamp strikes, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the L/RS field and hold down <ENTER> until the fixture resets the lamp hours to 0000.

Note: *this feature is only available on the 575-S.*

Viewing Total Fixture Hours

Fixture hours are provided as an extra timing function. To view total fixture hours (total hours the fixture has spent on), complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the F/HR field and press <ENTER>. The fixture will display the lamp hours.

Note: *fixture hours can be used to determine lamp hours for the 575-M.*

Resetting Fixture Hours

To reset the fixture hours, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the F/RS field and hold down <ENTER> until the fixture resets the fixture hours to 0000.

Viewing the Current Internal Temperature

To view the fixture's internal temperature, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the TEMP field and press the <ENTER> button.
4. Using the up and down buttons, scroll down to the CURR field and press the <ENTER> button.
5. The fixture will display the internal temperature followed by C (degrees centigrade).

Viewing the Minimum Internal Temperature

To view the fixture's minimum internal temperature (lowest ambient at power on), complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the TEMP field and press the <ENTER> button.
4. Using the up and down buttons, scroll down to the MINT field and press the <ENTER> button.
5. The fixture will display the minimum internal temperature followed by C (degrees centigrade).

Viewing the Maximum Internal Temperature

To view the fixture's maximum internal temperature (since the last reset), complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the TEMP field and press the <ENTER> button.
4. Using the up and down buttons, scroll down to the MAXT field and press the <ENTER> button.
5. The fixture will display the maximum internal temperature followed by C (degrees centigrade).

Resetting Temperature Readings

To reset the minimum and maximum temperature readings, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the TEMP field and press the <ENTER> button.
4. Using the up and down buttons, scroll down to the RST field and press the <ENTER> button.

Viewing DMX Errors and Function Values

DMX errors and individual function values can be viewed. This feature is provided for advanced users and troubleshooting fixtures. The following values and errors can be viewed:

- ERRS - DMX errors
- CSUM - checksum
- CNTL - control channel
- MSPd - MSpeed
- dIM - dim
- SHUT - shutter
- FRST - effects wheel 1 position
- LENS - effects wheel 2 position
- CYAN - cyan wheel position
- YELW - yellow wheel position
- MAGN - magenta wheel position
- CLR - fixed color wheel position
- CLRF - color function
- TILT - tilt position
- PAN - pan position
- STRT - start code
- CE - checksum errors
- OV - overrun errors
- FE - framing errors

To view any item listed above, complete the following procedure:

1. Hold the <MENU> button until the display changes to AddR .
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the VIEW field and press the <ENTER> button.
4. Using the up and down buttons, scroll down to the dMX field and press the <ENTER> button.
5. Using the up and down buttons, scroll down to the FIXT field and press the <ENTER> button.
6. Using the up and down buttons, scroll to desired field listed above and press the <ENTER> button to view the DMX value.

Viewing DMX Data by Channel Number

Studio Color provides a built-in DMX viewer. To view DMX data by channel, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the VIEW field and press the <ENTER> button.
4. Using the up and down buttons, scroll down to the DMX field and press the <ENTER> button.
5. Using the up and down buttons, scroll down to the DATA field and press the <ENTER> button.
6. Using the up and down buttons, scroll to desired channel (C001-C512) and press the <ENTER> button to view the DMX value.

Viewing Supplemental Fixture Data

Supplemental fixture data is provided for advanced users and troubleshooting. The following items can be viewed:

- SENP - checks for pan homing tab on the sensor (homed)
- TPOS - checks the tilt position from the encoder
- PPOS - checks the pan position from the encoder
- DUTY - encoder duty cycle and phase angle
- SENT - checks for tilt homing tab on the sensor (homed)
- PCOR - number of pan and tilt corrections
- TIME - additional internal timer for the main loop
- SVCC - checks sensor power on all sensors
- SEN2 - checks for effects wheel 2 homing tab on the sensor (homed)
- SEN1 - checks for effects wheel 1 homing tab on the sensor (homed)
- SENT - checks for tilt homing tab on the sensor (homed)

To view supplemental fixture data, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the INFO field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the VIEW field and press the <ENTER> button.
4. Using the up and down buttons, scroll down to the CODE field and press the <ENTER> button.
5. Using the up and down buttons, scroll to desired field listed above and press the <ENTER> button to view the DMX function.

Test Menu

Use the following subsections to perform the functions contained within the TEST menu.

Manually Homing the Fixture

To manually home the fixture, complete the following procedure:

1. Hold the <MENU> button until the display changes to AddR.
2. Using the up and down buttons, scroll down to the TEST field and press the <ENTER> button. The screen will display HOME.
3. Press the <ENTER> button to home the fixture. The display will indicate RST (reset) and HOME during the process. The fixture will automatically reset the display when the process is complete.

Moving the Fixture to Setup Position

Caution: The setup position is used only by service personnel before maintenance routines.

To place the fixture in setup position before service, complete the following procedure:

1. Hold the <MENU> button until the display changes to AddR.
2. Using the up and down buttons, scroll down to the TEST field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the S/UP field and press the <ENTER> button. The display will indicate SET NOW while the motors are electronically locked into place.
4. Perform the appropriate maintenance procedures.
5. Press the <MENU> button to reset and home the fixture.

Self Tests

Studio Color has the following self tests to check the following functions:

- ALL - runs through each self test twice
- dIM - dimming iris moves from closed to full open
- SHUT - moves through all strobe functions
- FRST - rotates the effects wheel 2 from 0 to 255 and back to 0 (dim at full)
- LENS - rotates effects wheel 1 through 4 positions (dim at full)
- CYAN - rotates the cyan color wheel from 0 to 255 and back to 0 (dim at full)
- YELW - rotates the yellow color wheel from 0 to 255 and back to 0 (dim at full)
- MAGN - rotates the magenta color wheel from 0 to 255 and back to 0 (dim at full)
- COLR - rotates from position 1 to 6 (dim at full)
- TILT - moves the tilt motor from 0º to 370º
- PAN - moves the pan from 0º to 240º

To begin the self-test function, complete the following procedure:

1. Hold the <MENU> button until the display changes to AddR.
2. Using the up and down buttons, scroll down to the TEST field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the desired test from the choices above and press <ENTER>. The fixture will perform the desired test.
4. To exit the test in progress, press the <MENU> button.

Changing Functions

The function modes are reserved for future use.

Changing Boot Codes

When Studio Color is uploaded, occasionally it is necessary to include a new boot code with the new software. This is apparent when bOOT diFF appears in the display. To accept and store the new boot code, complete the following procedure:

1. Hold the <MENU> button until the display changes to AddR.
2. Using the up and down buttons, scroll down to the TEST field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the bOOT field and press the <ENTER> button. The fixture will display DONE, RST, and home.

Caution: Do not remove power from the fixture during the above procedure.

Mode Menu

Use the following subsections to perform the functions contained within the MODE menu.

Selecting Operational Mode 1

Reserved for future use.

Selecting Operational Mode 2

Reserved for future use.

Cross-Loading Fixtures

Studio Color can cross-load software from one fixture to all other fixtures on the same link (32 fixtures per link). To cross-load software, complete the following procedure:

1. Disconnect the data cable between controller and the first fixture.
2. Hold the <MENU> button on the master fixture until the display changes to ADDR.
3. Using the up and down buttons, scroll down to the MODE field and press the <ENTER> button.
4. Using the up and down buttons, scroll down to the XLd field and press the <ENTER> button. The master fixture will upload its software to all connected fixtures on the link. The slave fixtures will display UPLd during the process.

Notes: *if the fixture(s) take longer than one minute to reset after an upload, turn off the fixture(s) and repeat the procedure. Cross-loading can also be instigated by holding down both arrow keys on the master fixture when it is turned on.*

Set Menu

Use the following subsections to perform the functions contained within the SET menu.

Turning On and Off Factory Presets

To revert fixture settings back to factory presets, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the SET field and press the <ENTER> button. The display will indicate FACT.
3. Press the <ENTER> button again to enter the field.
4. Using the up and down buttons, turn the factory presets to ON or OFF and press the <ENTER> button.

Setting the Starting Channel by DMX Channel or by Fixture Number

To change the addressing to DMX channel or to fixture number, complete the following procedure:

Note: *the factory preset is by fixture number.*

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the SET field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the CHNL field and press the <ENTER> button.
4. Using the up and down buttons, select either ADDR (fixture number) or DMX (DMX channel) and press the <ENTER> button.
5. Press the <MENU> button twice to return the display to normal operation.

Setting Display Output

To set the display's output, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the SET field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the DSPL field and press the <ENTER> button.
4. Using the up and down buttons, select either ON, OFF, or DIM and press the <ENTER> button.

Inverting Pan

When fixtures are mounted backwards (display away in back), Studio Color can invert the pan motion. To internally invert pan, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the SET field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the P/IN field and press the <ENTER> button.
4. Using the up and down buttons, select either ON or OFF and press the <ENTER> button.

Inverting Tilt

When fixtures are mounted on the floor (upside down) Studio Color can invert tilt movement. To invert tilt, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the SET field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the T/IN field and press the <ENTER> button.
4. Using the up and down buttons, select either ON or OFF and press the <ENTER> button.

Swapping Pan and Tilt

When fixtures are mounted sideways, Studio Color can swap the pan and tilt functions. To swap the pan and tilt functions, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the SET field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the SWAP field and press the <ENTER> button.
4. Using the up and down buttons, select either ON or OFF and press the <ENTER> button.

Setting Fixture Shutdown Time

Studio Color can automatically shut itself down when controller is turned off or the link is unplugged (no DMX data is present). To set the shutdown time, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the SET field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the S/DN field and press the <ENTER> button.
4. Using the up and down buttons, set the shutdown time in minutes at 5 (5MN) or 10 minutes (10MN) and press the <ENTER> button.

Setting the Lamp Power

For special applications, the lamp in the Studio Color 575-S can be set to 250 watts. This feature decreases light output, decreases heat, and saves power.

Notes: *do not mix fixtures that have different lamp power settings. The light output is different.*

Warning: Never install a 250 watt lamp into a Studio Color fixture. The lamp may explode and will malfunction.

To set the lamp power, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the SET field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the LAMP field and press the <ENTER> button.
4. Using the up and down buttons, set the lamp power to either 575W or 250W and press the <ENTER> button. After a time delay, the fixture will adjust the lamp to appropriate new power level.

Notes: *if you are using the 250 watt setting, the lamp will initially power up to 575 watts (warm up) for the first ten minutes of operation and then change to 250 watts. If you revert to the factory default settings, the lamp power setting will remain unaffected.*

Calibrating Pan

Pan position is easily calibrated for precise preset positions. Pan can be adjusted in .4° increments up to 8°. To calibrate pan, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the SET field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the PCAL field and press the <ENTER> button.
4. Using the up and down buttons, set the pan calibration from (-020 to +020) and press the <ENTER> button.
5. Check the calibration by homing the fixture. Repeat the procedure as necessary.

Calibrating Tilt

Tilt position is easily calibrated for precise preset positions. Tilt can be adjusted in .4° increments up to 8°. To calibrate tilt, complete the following procedure:

1. Hold the <MENU> button until the display changes to ADDR.
2. Using the up and down buttons, scroll down to the SET field and press the <ENTER> button.
3. Using the up and down buttons, scroll down to the TCAL field and press the <ENTER> button.
4. Using the up and down buttons, set the tilt calibration from (-020 to +020) and press the <ENTER> button.
5. Check the calibration by homing the fixture. Repeat the procedure as necessary.

Appendix A
Troubleshooting and Maintenance

In this appendix you will:

- *fill out a technical support checklist (A-1)*
- *contact High End Systems (A-2)*
- *troubleshoot problems (A-2)*
- *perform maintenance (A-11)*
- *upload software (A-13)*

Overview

This appendix provides directions for troubleshooting problems that may be preventing you from installing or operating your Studio Color properly. Before calling for technical assistance, follow the recommended procedures in this appendix to diagnose and solve many potential hardware and software problems.

If the procedures in this appendix do not solve your problem and you need to call for assistance, please provide the support technician with the information outlined in the "Support Checklist" provided in this appendix.

Before You Begin

Caution: Before you perform any troubleshooting procedures read the following personal and equipment safety precautions.

1. Wear hand and eye protection.
2. Wait at least five minutes before handling fixture after operation.

Support Checklist

Technical support can provide you with faster service if you can provide the following information when you call:

- Customer name
- Country, if other than U.S.A.
- Phone number and facsimile number
- Fixture serial number
- Error messages on your Studio Color display
- Description of your problem and the troubleshooting procedures that you have performed so far to diagnose and resolve your problem
- Software version

Acquiring Help

If can not resolve a problem with this appendix, contact your authorized High End Systems dealer or contact High End Systems Technical Service through the following numbers:

U.S. and Canada	From 8 a.m. to 6 p.m. (U.S. Central time) Monday through Friday: (800) 890-8989 FAX: (512) 834-9195 Voice mail: (512) 837-3063 or (800) 890-8989
California Office	From 8 a.m. to 6 p.m. (U.S. Pacific time) Monday through Friday: (818) 947-0550 FAX: (818) 908-8975
24-hour World Wide Web Site	http://www.highend.com
Service Web Site	http://info.highend.com/service/service.html
FTP Site	ftp.highend.com
Europe	Voice: +49 8122 9903-0 FAX: +49 8122 9903-33
Singapore	Voice: +65 742 8266 FAX: +65 743 9322

Troubleshooting

This section provides information on diagnosing and solving operational problems. If a solution to your problem cannot be found in the following subsections, contact your authorized dealer or High End Systems Technical Support. Please note that nearly every possible problem is documented to speed troubleshooting, but most are extremely unlikely to ever occur.

The following troubleshooting topics are covered in their subsections:

- "Display Error Messages" on page A-3
- "General Troubleshooting" on page A-7
- "Upload Troubleshooting" on page A-9
- "Onboard Self-Tests" on page A-10
- "Testing DMX Data" on page A-10

Display Error Messages

Studio Color contains an elaborate and comprehensive set of tests and messaging. Use the following table to identify and report errors to a qualified service technician.

Table A.1:Display Error Messages

Display Message	Problem	Explanation	Solution
AddR LOST	EEPROM address was unreadable	• fixture was unable to recover fixture address	• refer to qualified service personnel
AddR OVER	stored address value stored is out of range	• new logic board without a stored address • EEPROM was erased	• set the starting channel
bOOT dIFF ERR	boot code differences	• current boot code does not match new boot code	• refer to "Changing Boot Codes" on page 3-12
COOL	the lamp is too hot to strike	• lamp must cool before it can restrike	• the fixture will restrike the lamp as soon as it cools
EMEM ERR	EEPROM error	• data is not readable from PINV, TINV, dSPL, CHNL, SWAP, LSTA, LPLV, MODE, S/dN, LHRS, FHRS, L/ST, or LSTA	• refer to qualified service personnel
ERSE FLSH	cannot erase the flash ROM	• bad comm board • bad data bus	• refer to qualified service personnel
FMEM ERR	flash ROM error	• read/write error from flash ROM	• refer to qualified service personnel
FPGA ERR	FPGA error	• read/write error from the Field Programmable Gate Array	• refer to qualified service personnel
ID ERR	ID or unique number error	• error reading ID • error reading unique fixture ID	• refer to qualified service personnel

Table A.1:Display Error Messages

Display Message	Problem	Explanation	Solution
LAMP OUT ERR	lamp has extinguished during operation	• dead lamp • power supply failure	• replace lamp, refer to "Replacing the Lamp" on page A-11 • refer to qualified service personnel
LAMP TOUT ERR	lamp time-out error	• lamp too hot to restrike • dead lamp • ignitor error	• allow time for the lamp to cool, and home the fixture to restrike the lamp • replace lamp, refer to "Replacing the Lamp" on page A-11 • refer to qualified service personnel
LINK BUSY	other data present on the link during a cross load	• controller is still connected to the link	• disconnect controller
LINK ERR	link error	• bad cable(s) • no data • bad data • output from previous fixture is bad • bad comm board	• test and replace cable(s) as necessary • test data line • test data line • test by bypassing previous fixture • refer to qualified service personnel
OVER	value counter is out of range	• lamp strikes, lamp hours, or fixture hours have rolled over 9999	• reset the out of range item
OVER TEMP	fixture is over temperature	• temperature is too high	• fixture is too close to a major heat source • check and reduce ambient temperature

Table A.1:Display Error Messages

Display Message	Problem	Explanation	Solution
PAN DRV ERR	pan driver error	• motor wire shorted to ground • driver chip bad • bad motor	• refer to qualified service personnel
PAN CONN	pan connector is disconnected	• pan connector is disconnected at the logic board or at the sensor	• refer to qualified service personnel
PAN ENCD	pan encoder failure	• external obstruction • bad connector	• remove obstruction • refer to qualified service personnel
PAN ERR	pan homing error	• loose pinion gear • loose motor cable • incorrect cabling to pan input • bad sensor • bad motor	• run self-test and refer to qualified service personnel
PRGM TIME	program time has expired during an upload	• bad board	• refer to qualified service personnel
SVCC ERR	sensor power error	• bad board • loose cable	• refer to qualified service personnel
SENS TOUT	sensor time-out	• fixture attempted to correct pan/tilt position without success due to a physical obstruction • bad sensor 1 or 2	• remove the obstruction and reset the fixture • refer to qualified service personnel

Table A.1:Display Error Messages

Display Message	Problem	Explanation	Solution
SEN1 ERR	cyan color mixing, fixed color wheel, or effects wheel 1	• problem with cyan wheel tab, sensor, or motor • problem with fixed color wheel tab, sensor, or motor • problem with effects wheel 1 tab, sensor, or motor • bad sensor 1	• run self-test on sensor 1 • refer to qualified service personnel
SEN2 ERR	magenta, yellow, or effects wheel 2	• problem with magenta wheel tab, sensor, or motor • problem with yellow wheel tab, sensor, or motor • problem with effects wheel 2 tab, sensor, or motor • bad sensor 2	• run self-test on sensor 2 • refer to qualified service personnel
TILT CONN	tilt connector is disconnected	• tilt connector is disconnected at the logic board or at the sensor	• refer to qualified service personnel
TILT DRV ERR	tilt driver error	• motor wire shorted to ground • bad driver chip • bad motor	• refer to qualified service personnel
TILT ENCD	tilt encoder failure	• external obstruction • bad connector	• remove obstruction • refer to qualified service personnel
TILT ERR	tilt homing error	• loose pinion gear • loose motor cable • incorrect cabling to tilt input • bad sensor • bad motor	• run self-test and refer to qualified service personnel

General Troubleshooting

Use the following table to troubleshoot problems that may not be indicated by the menu system.

Table A.2. General Troubleshooting

Problem	Probable Cause	Solution
Unit will not turn on	• no power • breaker is turned off • power connectors • power line filter	• connect power • turn breaker on • refer to qualified technician • refer to qualified technician
Unit functions but lamp does not strike	• bad lamp • incorrect voltage on the 575-M version • lamp is too hot from operation (unit turned off and on) • bad ballast • ignitor connection is loose	• replace lamp • provide correct power source or refer to qualified service technician to move power tap • leave the unit turned on, when the lamp's temperature drops, it will restrike • refer to qualified technician • refer to qualified technician
Lamp is dimmer than other units	• lamp is set for 250 watts • wrong voltage on 575-M version • bad lamp • different type of lamp	• set the lamp to 575 watts as outlined in "Setting the Lamp Power" on page 3-16 • provide correct power source or refer to qualified service technician to move power tap • replace lamp • replace lamp with identical type
Unit will not home properly	• belt(s) is loose • bad sensor(s)	• tighten belt(s) • refer to qualified technician
Color system is not producing the correct color	• unit is not homed properly	• home the unit
Pan or tilt position is off	• unit is not homed properly • belt tension too loose	• home the unit • tighten belt(s)

Table A.2. General Troubleshooting

Problem	Probable Cause	Solution
Unit is not responding to controller	• wrong fixture DMX address • bad data cable(s) • link not terminated	• set the address as outlined in “Address Menu” on page 3-5 • check and replace data cables as needed • terminate link as outlined in "Data Cabling" on page 1-11
Unit is producing unexpected results	• incorrect DMX starting address on the controller • last fixture is not terminated	• Refer to "DMX Starting Channel" on page 1-12 • terminate fixture
Display is not functioning	• display is turned off • power connectors are loose • bad logic board	• Refer to “Setting Display Output” on page 3-14 • refer to qualified technician • refer to qualified technician
Cracks have developed in the color mixing wheels- “stress relieving fissures”	• heat and natural expansion of the glass	• stress relieving fissures are normal and do not in any way degrade the functionality or the performance of the fixture

Upload Troubleshooting

This subsection provides information for troubleshooting upload problems.

Table A.3: Upload Troubleshooting

Problem	Probable Cause	Solution
Not all fixtures on link are receiving download	• unit(s) turned off • bad cable(s) • cable(s) disconnected	• turn on unit(s) • test and replace cable(s) as necessary • reconnect cable(s)
Status Cue displays: **Fixture could not erase flashrom**	• the XLR cable(s) was disconnected • bad cable(s) • the fixture's electrical circuitry is damaged	• reconnect XLR cable(s) • replace cable(s) • refer to qualified service personnel
Status Cue displays: **WARNING: No response from Fixture xx (Link xx Address xx)**	• Status Cue was configured with a Studio Color at that address but no fixtures were found there • fixture(s) using RS-422 is physically connected before Studio Color fixtures	• if there is not a fixture at that address, nothing is wrong • check connections • check to ensure fixture is turned on • remove the fixture(s) from the data link or move them after Studio Color fixtures
Fixture displays bOOT dIFF	• new software also included boot code (normal)	• refer to “Changing Boot Codes” on page 3-12
Fixtures are not cross-loading	• a controller is connected to the link • fixture(s) using RS-422 is physically connected before Studio Color fixtures	• disconnect the controller and attempt the upload again • remove the fixture(s) from the data link or move them after Studio Color fixtures

Onboard Self-Tests

Studio Color has on-board self-tests to diagnose problems. If you are experiencing problems that you suspect are mechanical, perform the tests outlined in “Self Tests” on page 3-12.

Testing DMX Data

Studio Color has the ability to view any of the 512 DMX channels on its link. This is a very useful feature to ensure Studio Color and other fixtures are receiving the correct data from your DMX controller. To test individual DMX data by channel, perform the procedures outlined in “Viewing DMX Data by Channel Number” on page 3-10. To view DMX errors, overrun errors, framing errors, and start code errors refer to the procedures outlined in “Viewing DMX Errors and Function Values” on page 3-9.

Maintenance

This section provides information for basic maintenance. Studio Color does not require regular maintenance besides lamp changes and cleaning. If other maintenance is required, refer servicing to a qualified technician.

Replacing the Lamp

To replace the lamp, follow the procedures outlined in "Lamp Installation" on page 1-7.

Cleaning

You should clean your Studio Color on a regular basis. Dust, dirt, and smoke (cigarette and oil-based fog fluid) can accumulate and cause malfunctions.

Warnings: Do not submerse in liquid. There are no user serviceable parts inside. Servicing should only be conducted by a qualified technician. If any liquid (soda, beer, etc.) has been spilled on or into the Studio Color, contact High End Systems technical support before attempting to service the fixture. Disconnect the fixture from power before cleaning. Exterior surfaces can reach 140° C. Wait five minutes before touching any surface.

Exterior

To clean the exterior surfaces:

- Wipe with a soft damp cloth or tissue, or use a small vacuum to remove any built-up dust and dirt. Do not use a blower, as this will force dirt into the fixture.
- For stubborn substances (grime and serious build up), use Industrial Strength Green 409™ cleaner (sparingly) and a soft cloth.

Lens Interior

To clean the interior of the lens, perform the following procedure:

1. Disconnect power from the unit. If the unit has been in operation, allow it to cool for at least five minutes.
2. Unlatch the latches on the top and bottom of the bezel. Refer to Figure A.1.

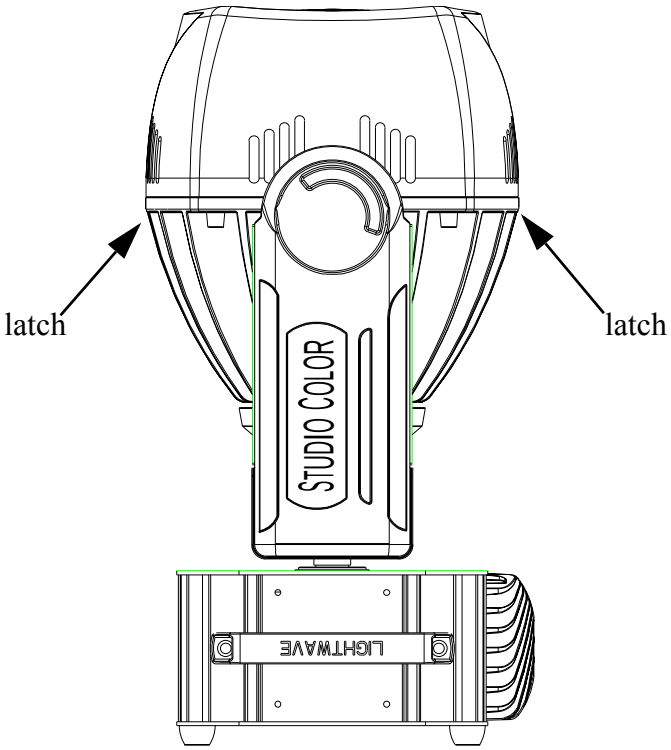


Figure A.1. Removing the Bezel

3. Detach the safety cable from the bezel and pull the bezel off unit.
4. Wipe with a soft damp cloth or tissue, or use a small vacuum to remove the built-up dust and dirt.
5. Replace the bezel and safety cable.
6. Relatch the bezel.

Software Updates

Studio Color software is easily upgradeable through the following means:

- Status Cue
- Upload Dongle
- another Studio Color

To acquire the latest software version, refer to "Acquiring Help" on page A-2.

Status Cue

To update Studio Color software through Status Cue, complete the following procedure:

1. Copy the latest `Studio.s19` file to the Status Cue directory (if necessary).
2. Select **Device upload...** from the **File** drop-down menu. This brings up the **Device Code Upload** dialogue box. Refer to Figure A.2.

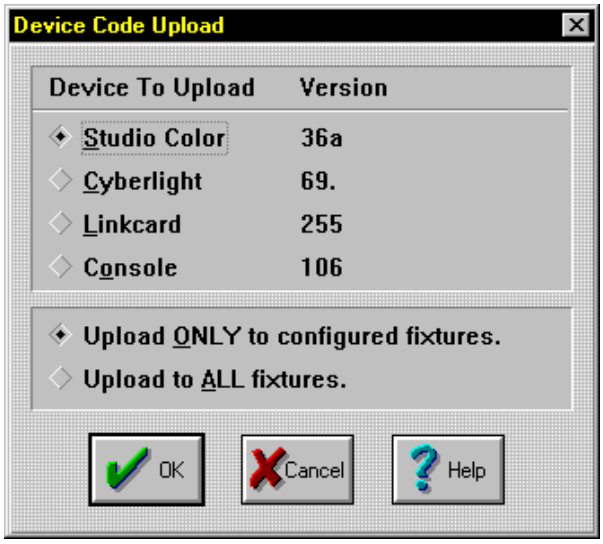


Figure A.2. Device Code Upload Dialogue Box

3. Select **Studio Color** check box from the list of available devices.
4. Select the appropriate check box for the fixture(s) to upload.
5. Click the **OK** button to start uploading. This brings up the **Device Upload Status** information box. Refer to Figure A.3. During the upload, the fixture's display will quickly flicker and display UPLd to indicate it is uploading. The **Device Upload Status** dialogue box indicates the number of fixtures that are being uploaded and the progress of the upload.

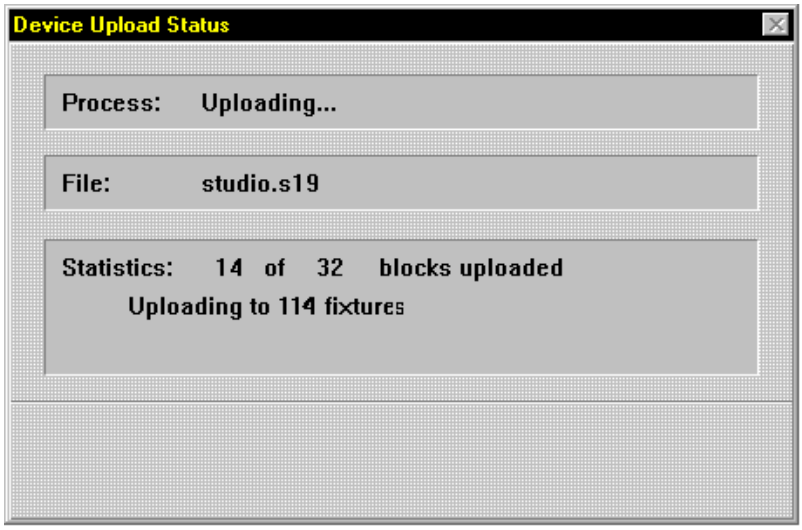


Figure A.3. Device Upload Status Information Window

6. When the update has successfully completed, the **Process** field will indicate **Finished!** Click the **OK** button to complete the procedure.

Note: *Status Cue provides upload communication with Studio Color fixtures. If any error messages are received, refer to "Upload Troubleshooting" on page A-9.*

Upload Dongle

To use the upload dongle, you will need the following items:

- High End Systems parallel-to-DMX dongle (p/n 99190009)
- 386-based or faster PC
- MS DOS® v3.3 or later
- 1 MB free disk space
- dongle software
- latest Studio Color binary file (`studioxx.bin`)

Connect the dongle to the computer and install its software as outlined in the instructions provided with the dongle. To upload software from the dongle, complete the following procedure:

1. In DOS, enter the Studio Color upload directory by typing `cd scupload` at the `c:\` prompt.
2. Copy the latest studio*xx*.bin file into the upload directory.
3. Type `upload` to start the program.
4. The program will cause the fixtures to strobe for 30 seconds and then it starts the upload. Optionally, you may press <R> to instantly run the upload or <Q> to quit the program.
5. The display will indicate the fixtures and the status of the upload.

Notes: *the dongle software provides bi-directional upload communication with Studio Color fixtures. If any error messages are received, refer to "Upload Troubleshooting" on page A-9.*

Another Studio Color

This procedure is covered in “Cross-Loading Fixtures” on page 3-13.

Appendix B
Accessory Installation

In this chapter you will:

- *install accessory dichroic glass (B-2)*
- *install an accessory lens (B-7)*
- *install a light snoot (B-8)*

Overview

This appendix provides information on accessory installation. A list of approved accessories is provided in the "Introduction" on page I-12.

Caution: Do not install accessories that are not specified by High End Systems. Doing so may damage the fixture and void the warranty.

Warning: Before performing any procedure in this Appendix, adhere to the following safety precautions:

- disconnect the unit from power
- allow the unit to cool for a minimum of 10 minutes

Dichroic Glass Installation

You will need the following items to install dichroic glass into your Studio Color:

- phillips-head screw driver
- accessory dichroic glass

Note: *Studio Color uses the same dichroic glass catalogue as Cyberlight® and Cyberlight CX.*

To install dichroic glass, complete the following procedure:

1. Remove power from the fixture and place it on a flat surface.
2. Remove the bezel by releasing the two latches located in the middle of the fixture head. Refer to Figure B.1.

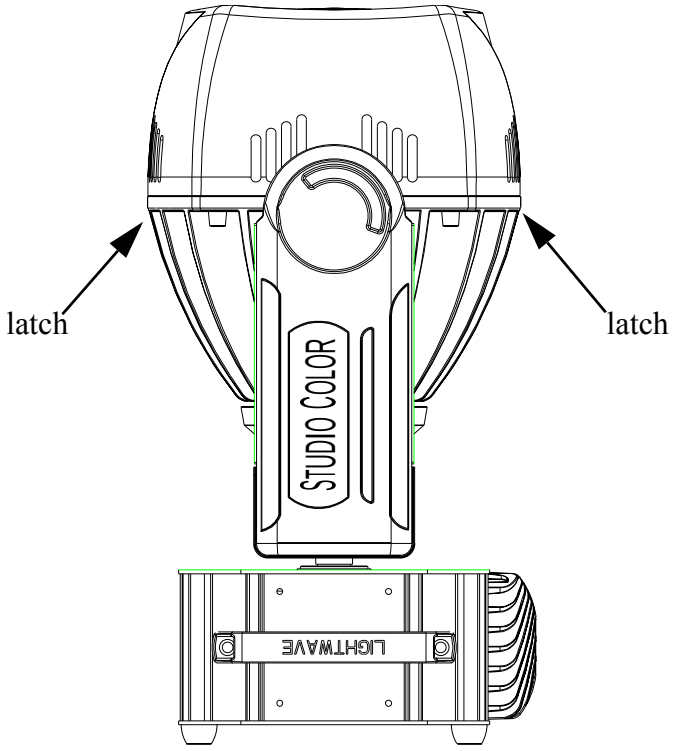


Figure B.1. Removing the Bezel

3. Remove the safety cable from its latch and set the bezel aside.
4. Disconnect the stepper motor drive cable from its connector. Refer to Figure B.2.

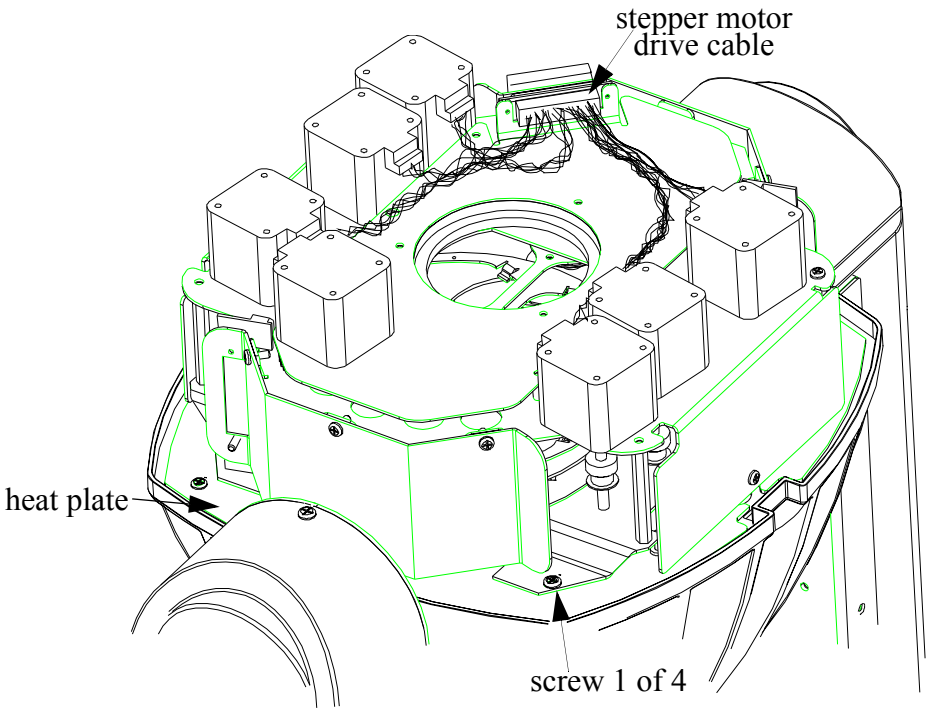


Figure B.2. Stepper Drive Cable Removal

5. Using a phillips-head screw driver, remove the four screws holding the optical assembly to the heat plate and remove the assembly.
6. Turn the optical assembly over so that the stepper motors are resting on the table.
7. Remove the six screws holding the strobe plate to its standoffs. Refer to Figure B.3.

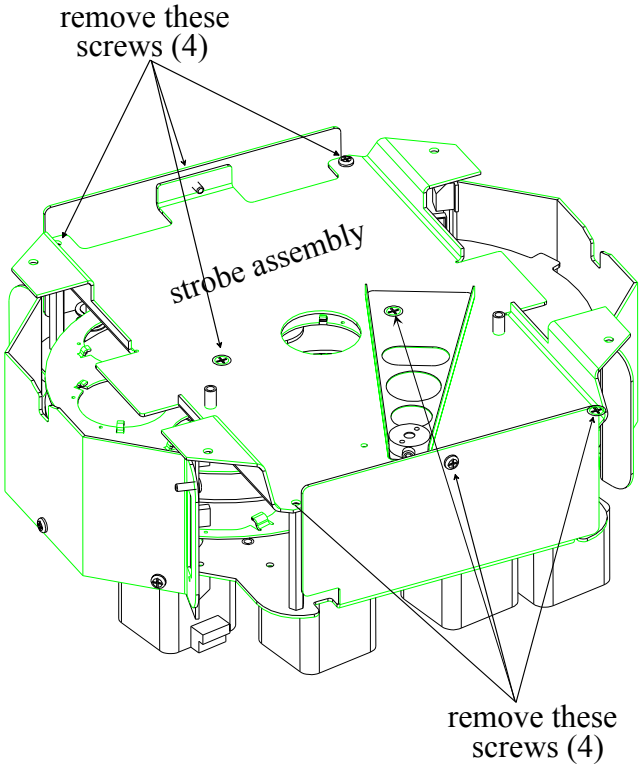


Figure B.3. Removing the Strobe Plate

8. Remove the two screws securing the L-brackets to the sides of the optical assembly. Refer to Figure B.3.
9. Lift the strobe assembly straight up and away from the remaining optical assembly. Refer to Figure B.4.

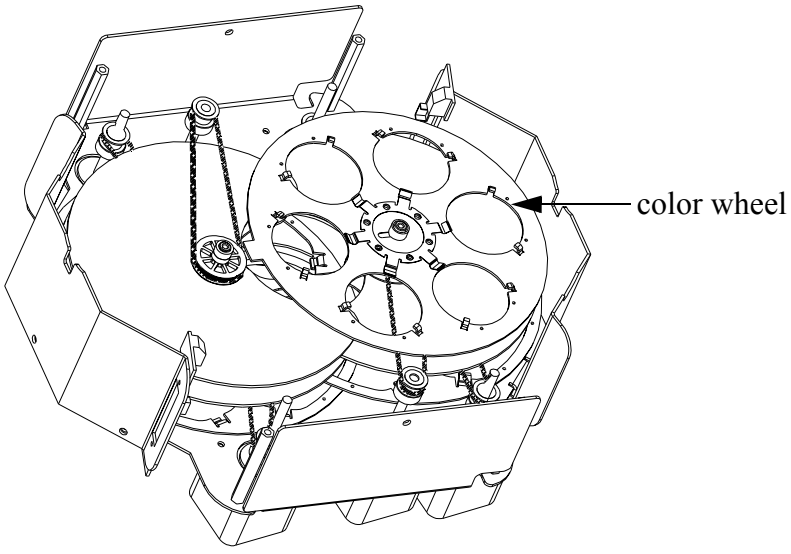


Figure B.4. Locating the Color Wheel

10. Take special note of the index positions on the color wheel. Refer to Figure B.5.

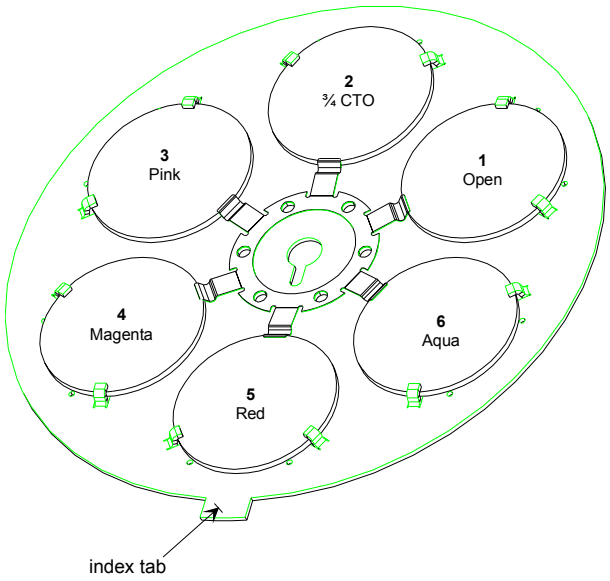


Figure B.5. Color Wheel and Factory Index Positions

11. Gently push the glass towards the spindle in the center of the color wheel (A), lift the edge away from the spindle (B), and remove the glass. Refer to Figure B.6.

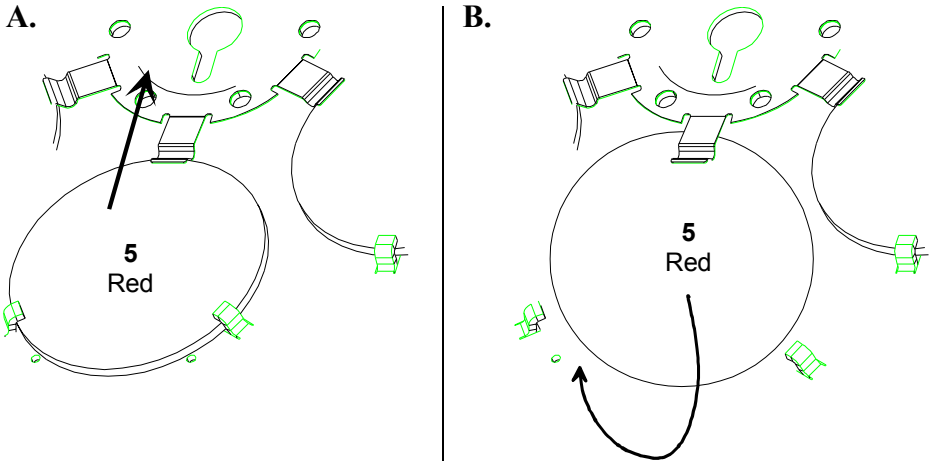


Figure B.6. Removing the Dichroic Glass

Caution: Do not bend or lift the inner tabs up, as you could damage them.

12. Using the above steps in reverse, install the new dichroic into the color wheel with the coated side down (towards the lamp).

13. Take note of the new positions on the color wheel.
14. Reinstall the strobe assembly by replacing the eight screws removed in Step 7 and Step 8.
15. Place the optical assembly back into the head and replace the four screws removed in Step 5.
16. Reconnect the stepper motor power cable.
17. Replace the bezel, secure the safety cable to its clamp, and relatch the bezel.

Note: *the bezel can only be replaced one way to ensure the safety cable can connect to its bracket*.

Accessory Lens Installation

To complete this procedure, you will need the following items:

- accessory lens
- phillips screw driver

Complete the following procedure to install an accessory lens:

1. Remove power from the fixture and place it on a flat surface.
2. Remove the bezel by releasing the two latches located in the middle of the head. Refer to Figure B.1.
3. Remove the safety cable from its latch and set the bezel on a flat surface.
4. Using a phillips-head screw driver, loosen the four screws securing the clips to the lens and rotate the clips 90°. Refer to Figure B.7.

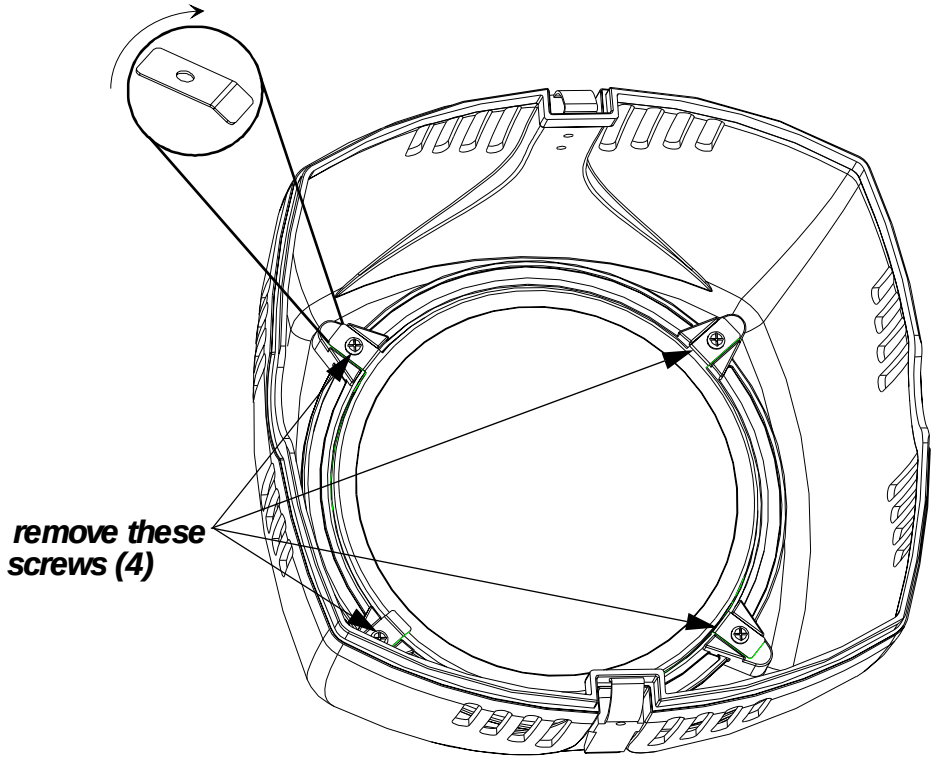


Figure B.7. Lens Removal

5. Remove the old lens and install the new lens in its place.
6. Rotate the clips back in place and tighten the four screws. Check to ensure the lens is secure by attempting to rotate it.
7. Reinstall the bezel, attach the safety clip, and relatch the bezel.

Note: *the bezel can only be correctly replaced one way to allow the use of the safety cable.*

Light Snoot

Studio Color has an optional light snoot which can be installed to eliminate the light leak common with Fresnel lenses.

To complete this procedure, you will need the following items:

- light snoot
- phillips screw driver

Complete the following procedure to install the light snoot:

1. Remove power from the fixture and place it on a flat surface.
2. Remove the bezel by releasing the two latches located in the middle of the head. Refer to Figure B.1.
3. Remove the safety cable from its latch and set the bezel on a flat surface.
4. Using a phillips-head screw driver, loosen the four screws securing the clips to the lens and rotate the clips 90°. Refer to Figure B.7.
5. Remove the lens and set it aside.
6. Place the light snoot under the four securing clips with the lip pointing outwards and replace the lens. Refer to Figure B.8.

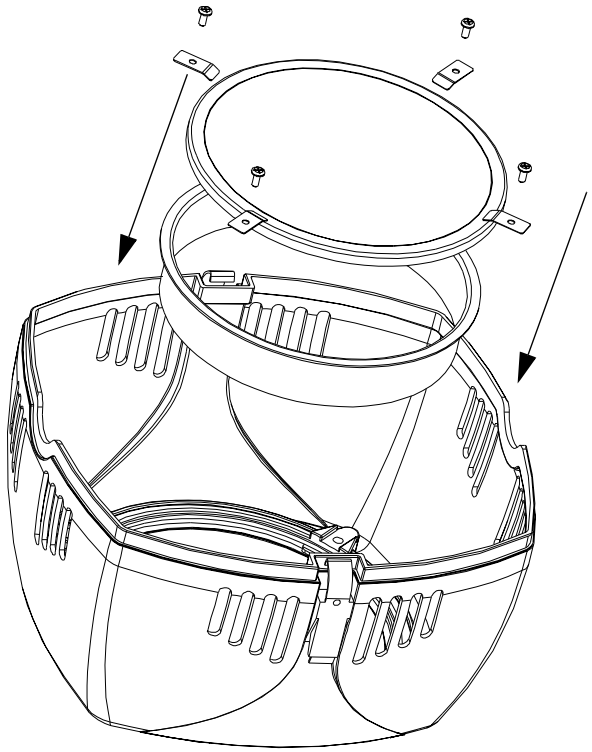


Figure B.8. Installing the Light Snoot (Exploded View)

7. Rotate the clips back in place and tighten the four screws. Refer to Figure B.9. Check to ensure the lens is secure by attempting to rotate it.

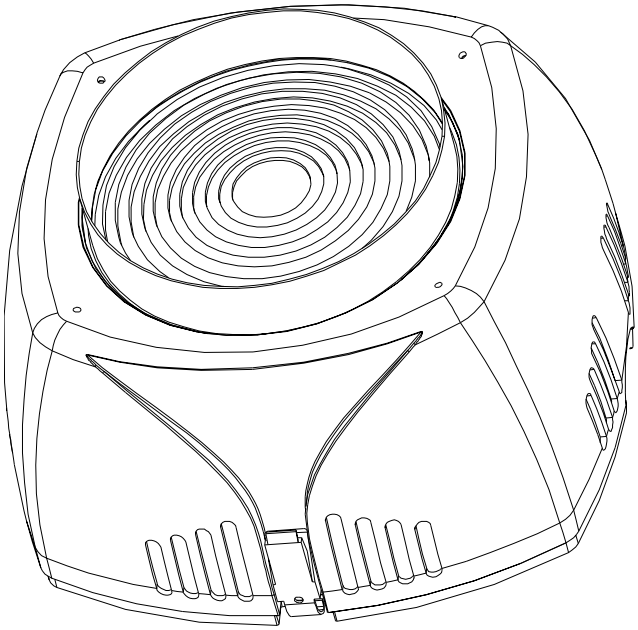


Figure B.9. Installed Light Snoot

8. Reinstall the bezel, attach the safety clip, and relatch the bezel.

Note: *the bezel can only be correctly replaced one way to allow the use of the safety cable.*

Warning: when the fixture is in operation, the light snoot will become very hot. Take heed to not burn yourself.

Appendix C
Supplemental Information

In this appendix you will:

- *match common gel colors (C-1)*
- *convert DMX values to MSpeed times (C-5)*

Color Matching

This appendix provides the DMX values and fader percentages to approximately match common gel colors with Studio Color. Additional color matches are available on the High End Systems web site. The color matches were created at full intensity with Studio Color and PAR 64 fixtures. The reference PAR 64 fixtures used 1000-watt tungsten lamps. Due to fixture variations and lamps, minor adjustments may be required.

Use the following table match common gel colors. *R* depicts a Rosco® gel color, *L* depicts a Lee® gel, and LHT depicts a high temperature Lee gel.

Table C.1: Color Matching

Color Name	Color #	Fixed Color Wheel DMX Value	Fixed Color Wheel %	Red DMX Value	Red %	Green DMX Value	Green %	Blue DMX Value	Blue %
No Color Blue	R60	0	0%	255	100%	189	74%	166	65%
Mist Blue	R61	0	0%	255	100%	196	77%	168	66%
Booster Blue	R62	0	0%	255	100%	255	100%	201	79%
Pale Blue	R63	0	0%	255	100%	223	87%	189	74%
Light Steel Blue	R64	0	0%	171	67%	223	87%	255	100%
Daylight Blue	R65	0	0%	158	62%	255	100%	209	82%
Cool Blue	R66	0	0%	255	100%	221	87%	166	65%
Light Sky Blue	R67	0	0%	135	53%	222	87%	255	100%

Table C.1: Color Matching

Color Name	Color #	Fixed Color Wheel DMX Value	Fixed Color Wheel %	Red DMX Value	Red %	Green DMX Value	Green %	Blue DMX Value	Blue %
Sky Blue	R68	0	0%	30	9%	161	63%	255	100%
Brilliant Blue	R69	0	0%	36	14%	255	100%	199	78%
Nile Blue	R70	0	0%	166	65%	255	100%	163	64%
Sea Blue	R71	0	0%	110	43%	255	100%	171	67%
Azure Blue	R72	0	0%	115	45%	255	100%	176	69%
Peacock Blue	R73	0	0%	84	33%	255	100%	148	58%
Light Green Blue	R76	0	0%	0	0%	255	100%	194	76%
Green Blue	R77	0	0%	17	7%	181	71%	255	100%
Trudy Blue	R78	0	0%	158	62%	168	66%	255	100%
Green Blue	R80	0	0%	5	2%	122	48%	255	100%
Urban Blue	R81	0	0%	56	22%	150	58%	255	100%
Clearwater	R360	0	0%	255	100%	189	74%	166	65%
Tipton Blue	R362	0	0%	255	100%	222	87%	207	81%
Aquama-rine	R363	0	0%	255	100%	240	94%	176	69%
Blue Bell	R364	0	0%	181	71%	191	75%	255	100%
Tharon Delft Blue	R365	0	0%	217	85%	201	79%	255	100%

Table C.1: Color Matching

Color Name	Color #	Fixed Color Wheel DMX Value	Fixed Color Wheel %	Red DMX Value	Red %	Green DMX Value	Green %	Blue DMX Value	Blue %
Bermuda Blue	R376	0	0%	105	41%	255	100%	181	71%
Alice Blue	R378	0	0%	150	59%	132	52%	255	100%
Medium Yellow	L010	0	0%	255	100%	158	62%	15	6%
Medium Amber	L020	0	0%	255	100%	84	33%	18	7%
Gold Amber	L021	0	0%	255	100%	18	7%	41	16%
Scarlet	L024	0	0%	255	100%	34	13%	49	19%
Bright Red	L026	0	0%	255	100%	255	100%	0	0%
Medium Red	LHT 027	0	0%	255	100%	255	100%	33	13%
Light Pink	L035	0	0%	255	100%	115	45%	112	44%
Medium Pink	L036	0	0%	255	100%	84	33%	112	44%
Dark Magenta	L046	0	0%	255	100%	0	0%	71	28%
Light Lavender	L052	0	0%	255	100%	128	50%	148	58%
Lavender	L058	0	0%	153	60%	94	37%	255	100%
Deep Amber	L104	0	0%	255	100%	115	45%	15	6%
Orange	LHT 105	0	0%	255	100%	99	39%	0	0%
Magenta	L113	0	0%	255	100%	0	0%	38	15%
Peacock Blue	L115	0	0%	43	17%	255	100%	110	43%

Table C.1: Color Matching

Color Name	Color #	Fixed Color Wheel DMX Value	Fixed Color Wheel %	Red DMX Value	Red %	Green DMX Value	Green %	Blue DMX Value	Blue %
Light Blue	L118	0	0%	46	18%	255	100%	186	73%
Dark Green	L124	0	0%	26	10%	255	100%	38	15%
Mauve	L126	0	0%	255	100%	0	0%	158	62%
Medium Blue	L132	0	0%	0	0%	166	65%	255	100%
Primary Green	L139	0	0%	0	0%	255	100%	0	0%
Deep Orange	L158	0	0%	227	89%	36	14%	0	0%
Chrome Orange	L179	0	0%	255	100%	87	34%	0	0%
Dark Lav-ender	L180	0	0%	102	40%	79	31%	255	100%

Converting DMX Values to MSpeed Times

Use the following table to convert DMX values and fader percentages to the desired MSpeed time.

Table C.2: DMX Values to MSpeed Times

DMX Value	Fader %	MSpeed Time in Seconds	DMX Value	Fader %	MSpeed Time in Seconds
1	0.4	0.15	23	9	215.9
2	0.8	0.15	24	9.4	214
3	1.2	0.15	25	9.8	212.2
4	1.6	252.7	26	10.2	210.4
5	2	250.7	27	10.6	208.5
6	2.4	248.7	28	11	206.7
7	2.7	246.7	29	11.4	204.9
8	3.1	244.7	30	11.8	203.1
9	3.5	242.7	31	12.2	201.3
10	3.9	240.8	32	12.5	199.5
11	4.3	238.8	33	12.9	197.7
12	4.7	236.8	34	13.3	195.9
13	5.1	234.9	35	13.7	194.2
14	5.5	233	36	14.1	192.4
15	5.9	231	37	14.5	190.6
16	6.3	229.1	38	14.9	188.9
17	6.7	227.2	39	15.3	187.2
18	7.1	225.3	40	15.7	185.4
19	7.5	223.4	41	16.1	183.7
20	7.8	221.5	42	16.5	182
21	8.2	219.6	43	16.9	180.3
22	8.6	217.8	44	17.3	178.6

Table C.2: DMX Values to MSpeed Times

DMX Value	Fader %	MSpeed Time in Seconds	DMX Value	Fader %	MSpeed Time in Seconds
45	17.6	176.9	71	27.8	135.9
46	18	175.2	72	28.2	134.4
47	18.4	173.6	73	28.6	132.9
48	18.8	171.9	74	29	131.5
49	19.2	170.4	75	29.4	130
50	19.6	168.6	76	29.8	128.6
51	20	167	77	30.2	127.2
52	20.4	165.3	78	30.6	125.7
53	20.8	163.7	79	31	124.3
54	21.2	162.1	80	31.4	122.9
55	21.6	160.5	81	31.8	121.5
56	22	159.9	82	32.2	120.1
57	22.4	157.5	83	32.5	118.7
58	22.7	155.7	84	32.9	117.4
59	23.1	154.1	85	33.3	116
60	23.5	152.6	86	33.7	114.6
61	23.9	151	87	34.1	113.3
62	24.3	149.5	88	34.5	111.9
63	24.7	147.9	89	34.9	110.6
64	25.1	146.4	90	35.3	109.3
65	25.5	144.9	91	35.7	108
66	25.9	143.3	92	36.1	106.6
67	26.3	141.8	93	36.5	105.3
68	26.7	140.3	94	36.9	104.1
69	27.1	138.8	95	37.3	102.8
70	27.5	137.3	96	37.6	101.5

Table C.2: DMX Values to MSpeed Times

DMX Value	Fader %	MSpeed Time in Seconds	DMX Value	Fader %	MSpeed Time in Seconds
97	38	100.2	123	48.2	70
98	38.4	99	124	48.6	68.9
99	38.8	97.5	125	49	67.9
100	39.2	96.5	126	49.4	66.9
101	39.6	95.2	127	49.8	65.8
102	40	94	128	50.2	64.8
103	40.4	92.8	129	50.6	63.8
104	40.8	91.5	130	51	62.8
105	41.2	90.3	131	51.4	61.8
106	41.6	89.1	132	51.8	60.8
107	42	88	133	52.2	59.8
108	42.4	86.8	134	52.5	58.8
109	42.7	85.6	135	52.9	57.9
110	43.1	84.4	136	53.3	56.9
111	43.5	83.3	137	53.7	56
112	43.9	82.1	138	54.1	55
113	44.3	81	139	54.5	54.1
114	44.7	79.8	140	54.9	53.2
115	45.1	78.7	141	55.3	52.2
116	45.5	77.6	142	55.7	51.3
117	45.9	76.5	143	56.1	50.4
118	46.3	75.4	144	56.5	49.5
119	46.7	74.3	145	56.9	48.7
120	47.1	73.2	146	57.3	47.8
121	47.5	72.1	147	57.6	46.9
122	47.8	71.1	148	58	46

Table C.2: DMX Values to MSpeed Times

DMX Value	Fader %	MSpeed Time in Seconds	DMX Value	Fader %	MSpeed Time in Seconds
149	58.4	45.2	175	68.6	25.8
150	58.8	44.3	176	69	25.2
151	59.2	43.5	177	69.4	24.5
152	59.6	42.7	178	69.8	23.9
153	60	41.9	179	70.2	23.3
154	60.4	41	180	70.6	22.7
155	60.8	40.2	181	71	22.1
156	61.2	39.4	182	71.4	21.5
157	61.6	38.6	183	71.8	20.9
158	62	37.9	184	72.2	20.4
159	62.4	37.1	185	72.5	19.8
160	62.7	36.3	186	72.9	19.2
161	63.1	35.6	187	73.3	18.7
162	63.5	34.8	188	73.7	18.1
163	63.9	34.1	189	74.1	17.6
164	64.3	33.3	190	74.5	17.1
165	64.7	32.6	191	74.9	16.6
166	65.1	31.9	192	75.3	16.1
167	65.5	31.2	193	75.7	15.6
168	65.9	30.5	194	76.1	15.1
169	66.3	29.8	195	76.5	14.6
170	66.7	29.1	196	76.9	14.1
171	67.1	28.2	197	77.3	13.6
172	67.5	27.8	198	77.6	13.2
173	67.8	27.1	199	78	12.7
174	68.2	26.4	200	78.4	12.3

Table C.2: DMX Values to MSpeed Times

DMX Value	Fader %	MSpeed Time in Seconds	DMX Value	Fader %	MSpeed Time in Seconds
201	78.8	11.8	226	88.6	3.5
202	79.2	11.4	227	89	3.3
203	79.6	11	228	89.4	3.1
204	80	10.6	229	89.8	2.9
201	78.8	11.8	230	90.2	2.7
205	80.4	10.2	231	90.6	2.5
206	80.8	9.8	232	91	2.3
207	81.2	9.4	233	91.4	2.1
208	81.6	9	234	91.8	1.9
209	82	8.6	235	92.2	1.8
210	82.4	8.3	236	92.5	1.6
211	82.7	7.9	237	92.9	1.4
212	83.1	7.6	238	93.3	1.3
213	83.5	7.2	239	93.7	1.2
214	83.9	6.9	240	94.1	1.1
215	84.3	6.6	241	94.5	0.94
216	84.7	6.2	242	94.9	0.83
217	85.1	5.9	243	95.3	0.73
218	85.5	5.6	244	95.7	0.63
219	85.9	5.3	245	96.1	0.55
220	86.3	5.1	246	96.5	0.47
221	86.7	4.8	247	96.9	0.41
222	87.1	4.5	248	97.3	0.35
223	87.5	4.3	249	97.6	0.29
224	87.8	4	250	98	0.25
225	88.2	3.8	251	98.4	0.21

Table C.2: DMX Values to MSpeed Times

DMX Value	Fader %	MSpeed Time in Seconds	DMX Value	Fader %	MSpeed Time in Seconds
252	98.8	0.19			
253	99.2	0.17			
254	99.6	0.15			
255	100	0.15			

Appendix D
Important Safety Information

Warning: For Continued Protection Against Fire

1. This equipment is designed for use with Phillips Type MSR 575/2 or MSD 575 lamp only. Use of any other type lamp may be hazardous and will void the warranty.
2. Do not mount on a flammable surface.
3. Maintain minimum distance of 1.0 meter (3.28 feet) from combustible materials.
4. Replace fuses only with the specified type and rating.
5. Observe minimum distance to lighted objects of 1.0 meter (3.28 feet).
6. This equipment for connection to branch circuit having a maximum overload protection of 20 A.

Warning: For Continued Protection Against Electric Shock

1. If this equipment was received without a line cord plug, attach the appropriate line cord plug according to the following code:
    - brown–live
    - blue–neutral
    - green / yellow–earth
2. As the colours of the cores in the mains lead of this equipment may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:
    - the core which is coloured green and yellow must be connected to the terminal in the plug which is marked with the letter E or by the earth symbol ⏚, or coloured green or green and yellow.
    - the core which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.
    - the core which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.
3. **Class I equipment. This Equipment Must Be Earthed.**
4. Disconnect power before re-lamping or servicing.
5. Equipment suitable for dry locations only. Do not expose this equipment to rain or moisture.
6. Refer servicing to qualified personnel; no user serviceable parts inside.

Warning: For Continued Protection Against Exposure To Excessive Ultraviolet (UV) Radiation

1. Do not operate this equipment without complete lamp enclosure in place or if shields, lenses, or ultraviolet screens are damaged.
2. Change shields, lenses, or ultraviolet screens if they have become visibly damaged to such an extent that their effectiveness is impaired, for example by cracks or deep scratches.
3. Never look directly at the lamp while lamp is on.

Warning: For Continued Protection Against Injury To Persons

1. Use secondary safety cable when mounting this fixture.
2. Caution: hot lamp may be an explosion hazard. Do not open for 5 minutes after switching off. Wear eye and hand protection when re-lamping.
3. Equipment surfaces may reach temperatures up to 140 degrees C (284 degrees F). Allow 5 minutes for cooling before handling.
4. Change the lamp if it becomes damaged or thermally deformed.

Appendice D
Importantes Informations Sur La Sécurité

Mise en garde: pour une protection permanente contre les incendies

1. Cet appareil est conçu pour être exclusivement utilisé avec des lampes de 575 watts MSR 575/2-MSD 575. L'usage d'autres lampes peut être risqué et annulera la garantie.
2. Ne pas monter les lampes sur une surface inflammable.
3. Maintenir à une distance minimum de 1.0 mètre de matières inflammables.
4. Ne remplacer les fusibles qu'avec des modèles et valeurs assignées recommandés.
5. Respecter une distance minimum de 1.0 mètre par rapport aux objets éclairés.
6. Cet appareil de connection au circuit de dérivation comporte une protection contre les surcharges de 20 A.

Mise en garde: pour une protection permanente contre les chocs électriques

1. Assembler le câble électrique conformément aux instructions du manuel.
2. Débrancher le courant avant de changer les lampes ou d'effectuer des réparations.
3. Cet équipement doit être uniquement utilisé dans des endroits secs. Ne pas l'exposer à la pluie ou l'humidité.
4. À l'intérieur de l'équipement il n'y a pas de pièces remplaçables par l' utilisateur. Confiez l'entretien à un personnel qualifié.
5. Equipement de Classe I.

Mise en garde: pour une protection permanente contre des expositions excessives aux rayons ultra violets (UV)

1. Ne pas utiliser cet appareil si le boîtier de la lampe n'est pas complètement fixé ou si les blindages, lentilles, ou écrans ultraviolets sont endommagés.
2. Changer les blindages ou les écrans ultraviolets s'ils sont visiblement endommagés au point que leur efficacité aient été altérée, par exemple par des fissures ou de profondes égratignures.
3. Ne jamais regarder directement la lampe quand celle ci est allumée.

Mise en garde: pour une protection permanente contre les blessures corporelles

1. Lors de l'assemblage, utiliser un câble de sécurité secondaire.
2. AVERTISSEMENT: les lampes chaudes comportent un risque d'explosion. Après l'avoir éteinte, attendre 5 minutes avant de la dégager. Lors du remplacement de la lampe, une protection des yeux et des mains est requise.
3. Les surfaces de l'appareil peuvent atteindre des températures de 140 C. Laisser refroidir pendant 5 minutes avant la manipulation.
4. Changer la lampe si elle est endommagée ou thermiquement déformée.

Anhang D
Wichtige Hinweise Für Ihre Sicherheit

WARNUNG: ZUM SCHUTZ VOR BRANDGEFAHR

1. Dieses Gerät darf nur mit 575 Watt Lampen vom Typ MSR 575/2-MSD 575 von Philips verwendet werden. Die Verwendung von Lampen eines anderen Typs kann gefährlich sein und ein Erlöschen der Garantieansprüche zur Folge haben.
2. Das Gerät nie auf einer feuergefährlichen Fläche montieren.
3. Stets einen Mindestabstand von 1 Meter zu brennbaren Materialien einhalten.
4. Zum Ersatz nur Sicherungen verwenden, die dem vorgeschriebenen Typ und Nennwert entsprechen.
5. Einen Mindestabstand von 1 Meter zu den angestrahlten Objekten einhalten.
6. Dieses Gerät darf nur an eine Zweigleitung mit einem Überlastungsschutz von höchstens 20 A angeschlossen werden.

WARNUNG: ZUM SCHUTZ GEGEN GEFÄHRLICHE KÖRPERSTRÖME

1. Bei der Installation des Netzkabels am Lampensockel folgen Sie bitte Anweisungen in diesem Handbuch.
2. Vor dem Austauschen von Lampen oder vor Wartungsarbeiten stets den Netzstecker ziehen.
3. Diese Geräte sind nur zum Einbau in trockenen Lagen bestimmt und müssen vor Regen und Feuchtigkeit geschützt werden.
4. Servicearbeiten sollten nur von Fachpersonal ausgeführt werden. Das Gerät enthält keine wartungsbedürftigen Teile.
5. Dieses Gerät gehört zur Klasse I.

WARNUNG: ZUM SCHUTZ GEGEN ÜBERMÄSSIGE ULTRAVIOLETT (UV)-BESTRAHLUNG

1. Benutzen Sie dieses Gerät nur, wenn das komplette Lampengehäuse fest eingebaut ist; ebenfalls dürfen keine der Schutzabdeckungen, Linsen oder der UV-Schutz Beschädigungen aufweisen.
2. Die Schutzabdeckungen, Linsen und der UV-Schutz müssen ausgewechselt werden, wenn sie sichtlich dermaßen beschädigt sind, daß sie ihre Wirksamkeit einbüßen, z.B. infolge von Rissen oder tiefen Kratzern.
3. Nie direkt in die eingeschaltete Lampe schauen.

WARNUNG: ZUM SCHUTZ VOR VERLETZUNGEN

1. Verwenden Sie bei der Installation des Beleuchtungskörpers ein zusätzliches Sicherheitskabel.
2. VORSICHT: Bei einer heiße Lampe besteht Explosionsgefahr. Nach dem Abschalten der Netzspannung sollten Sie etwa 5 Minuten warten, bevor Sie das Lampengehäuse öffnen. Schützen Sie beim Auswechseln der Lampen Ihre Hände und tragen Sie eine Schutzbrille.
3. Die Oberflächen des Gerätes können Temperaturen bis zu 140 C erreichen. Vor dem Anfassen stets 5 Minuten lang abkühlen lassen.
4. Falls die Lampe beschädigt oder durch Wärmeeinwirkung verformt ist, muß sie ausgewechselt werden.

Apéndice D
Información Importante De Seguridad

ADVERTENCIA: PARA PROTECCIÓN CONTINUA CONTRA INCENDIOS:

1. Se ha diseñado este equipo para usarse con lámpara tipo Philips MSR 575/2-MSD 575, 575 vatios. El uso de otro tipo de lámpara puede resultar peligroso e invalidará la garantía.
2. No monte el equipo sobre una superficie inflamable.
3. Mantenga una distancia mínima de materiales combustibles de 1.0 metro.
4. Cambie los fusibles únicamente por otros que sean del tipo y la clasificación especificadas.
5. Observe una distancia mínima a objetos iluminados de 1.0 metro.
6. Este equipo debe conectarse a un circuito derivado que tenga una protección máxima contra las sobrecargas de 20 A.

ADVERTENCIA: PARA LA PROTECCIÓN CONTINUA CONTRA ELECTROCUCIONES

1. Ensamble la tapa del cordón de alimentación según las instrucciones del manual.
2. Desconecte el suministro de energía antes de recambiar lámparas o prestar servicio de reparación.
3. Este equipo se adecua a lugares secos solamente. no lo exponga a la lluvia o humedad.
4. Derive el servicio de reparación de este equipo al personal calificado. el interior no contiene repuestos que puedan ser reparados por el usuario.
5. Equipo de Clase I.

ADVERTENCIA: PARA PROTECCIÓN CONTINUA CONTRA LA EXPOSICIÓN A RADIACIÓN ULTRAVIOLETA (UV) EXCESIVA

1. No opere este equipo sin tener colocada en su lugar la caja protectora completa de la lámpara o bien, si el blindaje , los lentes o las pantallas ultravioletas están dañadas.
2. Cambie el blindaje, los lentes o las pantallas ultravioleta si nota una avería visible, a tal grado que su eficacia se vea comprometida. Por ejemplo, en el caso de grietas o rayaduras profundas.
3. Jamás mire directamente a la lámpara en tanto ésta esté encendida.

ADVERTENCIA: PARA PROTECCIÓN CONTINUA CONTRA LESIONES CORPORALES

1. Use cable secundario de seguridad al montar este aparato.
2. Precaución: una lámpara caliente puede constituir un peligro de explosión. No la abra por 5 minutos luego de haberla apagado. lleve puestos un protector ocular y guantes al recambiar lámparas.
3. Las superficies del equipo pueden alcanzar temperaturas máximas de 140 grados centígrados. Deje que se enfríen por 5 minutos antes de tocarlas.
4. Cambie la lámpara si ésta se avería o deforma por acción térmica.

Appendice D
Importanti Informazioni Di Sicurezza

AVVERTENZA: PER PREVENIRE INCENDI:

1. Questa apparecchiatura e' stata disegnata per usarsi soltanto con le lampadine tipo MSR 575/2-MSD 575 di 575 watt. Se si usa qualsiasi altro tipo di lampadina potrebbe essere pericoloso e causa l' annullamento della garanzia.
2. Da non montare sopra una superficie infiammabile.
3. Mantenere l' apparecchio a un minimo di 1.0 metri (3.28 piedi) di distanza dai materiali combustibili.
4. Rimpiazare i fusibili usando soltanto quelli del tipo e della taratura adatta.
5. Mantenere una distanza minima di 1.0 metri (3.28 piedi) dagli oggetti accesi.
6. Questa apparecchiatura e' da collegarsi ad un circuito derivato con una protezzione da sovraccarico massima di 20 amperes.

AVVERTENZA: PER PREVENIRE LE SCOSSE ELETTRICHE:

1. Montare la cappa del cavo seguendo le istruzioni del manuale.
2. Disinnestare la corrente prima di cambiare la lampadina o prima di eseguire qualsiasi riparazione.
3. Questa apparecchiatura e' da usarsi in ambienti secchi. Non e' da essere esposta ne alla pioggia ne all' umidita'.
4. Per qualsiasi riparazione rivolgersi al personale specializzato. L' utente non deve riparare nessuna parte dentro l' unita'.
5. Aparecchio di Classe I.

AVVERTENZA: PER PROTEGGERSI CONTRO LE RADIAZIONI DEI RAGGI ULTRAVIOLETTI:

1. Non usare questa apparecchiatura se il sistema di chiusura della lampadina non e' completo o se gli scudetti, le lenti, o gli schermi ultravioletti si sono visibilmente danneggiati di maniera tale che la loro efficacia sia stata ridotta --- ad esempio, se vi sono visibili spaccature o graffi profondi. Mai guardare direttamente verso la lampadina quando sia accesa.

AVVERTENZA: PER NON FERIRE AD ALTRE PERSONE:

1. Al montare questa apparechiatura, usare un secondo cavo di sicurezza.
2. Avvertenza: la lampadina calda potrebbe esplodere. spegnerla per 5 minuti prima di aprirla. usare protezzioni per le mani e per gli occhi prima di cambiare la lampadina.
3. Le superfici della apparecchiatura possono arrivare a temperature di 140 gradi centrigradi (302 gradi f). aspettare 5 minuti prima di maneggiare.
4. Cambiare la lampadina se si danneggia o se si e' deformata dovuto alle alte temperature.

Appendiks D
Vigtig Sikkerhedsinformation

Advarsel: Beskyttelse mod elektrisk chock.
VIGTIGT! LEDEREN MED GUL/GROEN ISOLATION MAA KUN TILSLUTTES KLEMME MAERKET ⏚ ELLER ⏚.

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