

STUDIO SPOT® 575

User Manual

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US 4,392,187; US 4,602,321; US 4,688,161; US 4,701,833; US 4,709,311; US 4,779,176; US 4,800,474; US 4,962,687; US 4,972,306; US 4,980,806; US 5,010,459; US 5,031,078; US 5,073,847; US 5,078,039; US 5,186,536; US 5,209,560; US 5,278,742; US 5,282,121; US 5,307,295; US 5,329,431; US 5,331,822; US 5,367,444; US 5,402,326; US 5,430,629; US 5,432,691; US 5,454,477; US 5,455,748; US 5,506,762; US 5,515,254; US 5,537,303; US 5,545,951; US 5,580,164; US 5,590,954; US 5,590,955; US 5,640,061; US 5,647,662; US 5,665,305; US 5,691,886; US 5,728,994; US 5,758,955; US 5,758,956; US 5,769,527; US 5,774,273; US 5,798,619; US 5,806,951; US 5,823,661; US 5,825,548; US 5,828,485; US 5,829,868; US 5,857,768; US 5,882,107; US 5,934,794; US 5,940,204; US 5,945,786; US 5,953,152; US 5,980,066; US 6,048,080; US 6,327,103; US 6,048,081; US 6,057,958; US 6,054,816; US 6,126,288; US 6,142,652; US 6,172,822; US 6,188,933; US 6,208,087; US 6,219,093; US 6,220,730; US 6,241,366; US 6,255,787; US 6,256,136; US 6,278,542; US 6,288,828; US 6,327,103; US 6,421,165; US 6,430,934; US 6,466,357; US 6,502,961; US D347,113; US D350,408; US D359,574; US D360,404; US D365,165; US D366,712; US D370,080; US D372,550; US D377,338; US D381,740; US D409,771; US 6693392; US 6719433; EP 0662275; EP 0767398; DE 621495; DE 655144; DE 797503; EP 0475082; GB 2 043 769 B; GB 2 055 842 B; GB 2 283 808 B; GB 2 290 134 B; GB 2 291 814 B; GB 2 292 530 B; GB 2 292 896 B; GB 2 294 909 B; GB 2 295 058 B; GB 2 303 203 B; GB 2 306 887 B; GB 2 307 036 B; GB 2 316 477 B; MR0862-1996; M9,604,224.9

Additional patents pending.

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Declaration of Conformity

according to ISO/IEC Guide 22 and EN45104

Manufacturer's name: High End Systems

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

Declares that the product

Product Name: Studio Spot 575
Product Number: Studio Spot 575
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 1998 in compliance with the following standards:

Safety: EN 60598-1: 1993
EN 60598-2-17: 1989
A1-A3: 1993

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



U.S.A., Friday, September 17, 2004
Kenneth Hansen, Compliance Engineer

Product Modification Warning

High End Systems products are designed and manufactured to meet the requirements of United States and International safety regulations. Modifications to the product could affect safety and render the product non-compliant to relevant safety standards.

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Les produits High End Systems sont conçus et fabriqués conformément aux exigences des règlements internationaux de sécurité. Toute modification du produit peut entraîner sa non conformité aux normes de sécurité en vigueur.

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FCC Information

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.

Important Safety Information

Instructions pertaining to continued protection against fire, electric shock, exposure to excessive ultraviolet (UV) radiation, and injury to persons are found in Appendix C. Please read all instructions prior to assembling, mounting, and operating this equipment.

Important: Informations De Sécurité

Les instructions se rapportant à la protection permanente contre les incendies, l'électrocution, l'exposition à un rayonnement ultraviolet (UV) excessif et aux blessures corporelles se trouvent dans l'Annexe C.

Veillez lire toutes les instructions avant d'assembler, de monter ou d'utiliser cet équipement.

Wichtige Sicherheitshinweise

Sicherheitsanleitungen zum Schutz gegen Feuer, elektrischen Schlag, übermäßige UV-Strahlung und Verletzung von Personen finden Sie in Anhang C.

Vor der Montage, dem Zusammenbau und der Inbetriebnahme dieses Geräts alle Anleitungen sorgfältig durchlesen.

Informazioni Importanti Di Sicurezza

Le istruzioni sulla protezione da incendi, folgorazione, esposizione eccessiva a raggi ultravioletti (UV) e infortuni sono contenute nell'appendice C.

Si prega di leggere tutte le istruzioni prima di assemblare, montare e azionare l'apparecchiatura.

Informacion Importante De Seguridad

En el Apéndice C se encuentran instrucciones sobre protección continua contra incendios, descarga eléctrica, exposición excesiva a radiación ultravioleta (UV) y lesiones personales.

Lea, por favor, todas las instrucciones antes del ensamblaje, montaje y operación de este equipo.

Symbols

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



Caution: This symbol appears adjacent to Caution messages. Not heeding these messages could result in personal injury and/or damage to equipment.



Warning: This symbol appears adjacent to high voltage warning messages. Not heeding these messages could result in serious personal injury.



This symbol indicates that a fire hazard is present. Not heeding these messages could result in serious personal injury.



This symbol indicates that eye protection is required.



This symbol indicates an explosion hazard.



This symbol indicates the minimum distance to a lighted object, which in this case, is 1 meter.



This symbol indicates a hot surface.



This symbol indicates that an object not be mounted on a flammable surface

Manual Conventions

This manual uses the following conventions:

- a menu button will look like: press the <ENTER> button
- an L.E.D. display item on the front panel will look like: `SET` menu
- DOS prompts, computer file names, and input keyboard strokes will look like:
Type `a:\ setup`.

Warranty Information

Limited Warranty

Unless otherwise stated, your *product* is covered by a two year parts and labor limited warranty. Dichroic filters 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 Material Authorization (RMA) number from your dealer or 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 an RMA number. Accompany all returned Product units or parts with a written explanation of the alleged problem or malfunction. Ship returned Product units or parts to: 2105 Gracy Farms Lane, Austin, TX 78758 USA.

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, EXPRESS 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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Chapter 1:

Product Overview

Features

Studio Spot 575 is available in four models that vary in features as shown in the following table:

Table 1-1 Studio Spot 575 Model Feature Comparison

Feature	Studio Spot Model			
	575	575 Zoom	CMY	CMY Zoom
Color Wheels with 10 Dichroic Glass Filters Total	X	X		
CMY Continuous Color Mixing Wheels			X	X
Mechanical Frost Flags	X		X	
Mechanical Zoom Lens		X		X

Standard Features

- Automatic switching power supply operates on all international voltages at 50 or 60 Hertz .
- Provides full DMX control using 24 channels with 16-bit accuracy for pan, tilt, and gobo indexing; and 8-bit accuracy for all other parameters.
- Convection cooling ensures quiet performance.
- 370° pan and 255° tilt
- Up to 35 combination patterns using 10 rotating litho/effects (plus two open) located on two independent wheels. Each wheel can be independently indexed and rotated in either direction at variable speeds. Slow and lenticular glass effects are standard. Optional and custom LithoPatterns, effect glass, and prisms are available and are easily installed.
- Each of the two color wheels support five dichroic glass filters plus open.
- Optional CMY Feature replaces standard color wheels with two double wheels that can be rotated to achieve continuous color mixing.
- The MSR 575/2 provides a high color rendering index and a high color temperature of 6200 K. An optional MSD 575 lamp is available for architectural applications. The MSD 575 provides a color temperature of 5600 K and enhanced lamp life. Studio Spot fixtures also include a lamp power reduction for special applications.

- A patented elliptical/spherical reflector system delivers an extraordinary gain in light output compared to systems in other similar fixtures.
- Special effect functions provide color spins, random color combinations, random gobos, or MSpeed to control the color and litho wheels. The ‘blink’ function quickly strobes the dimming system during color and/or litho changes.
- Eight factory-programmed macros modify a specific set of constructs to produce a unique effect, while allowing the user to retain control of all other constructs.
- A variable frost mechanism provides infinite beam diffusion to create a wash effect.

Note: Frost is not available in models with the optional Zoom lens feature.

- A smooth mechanical dimming system provides seamless dimming without affecting the beam shape or the color temperature output.
- An independent iris can remotely manipulate the beam diameter.
- The variable remote focus lens can precisely focus on either litho/effect wheel at any distance.
- The standard lens provides an 18° beam angles. Optional 13° and 30° lenses are available for narrow and wide field projection.
- Optional 18° - 30° Zoom lens is available
- The dimming system provides instant blackout, variable and random speed strobes, variable and random ramp/snap effects, and a blink function. Additionally, Studio Spot can dim while strobing.
- Up to 16 scenes can be programmed for playback without a DMX console. Scenes can be programmed from the front panel or ‘captured’ from DMX data. You can playback data in stand-alone mode or synchronize playback with up to 32 fixtures.
- Optical encoders for the pan and tilt systems automatically correct the fixture’s position.
- Onboard menu system allows the user to easily program all functions of the fixture and provides a full set of diagnostic functions. Studio Spot can also serve as a DMX tester to view channel values and DMX errors. The display can be remotely turned on, off, or dimmed via DMX.
- Five LED indicators visually provide the status of the lamp power supply, motor power supply, and data.
- Studio Spot can be truss mounted on 22-inch centers in any orientation or it can be floor mounted on its rubber feet.
- Digitally controlled stepper motors provide precision control, high torque, smooth movement, near quiet performance, and very long life.

- Fixture shutdown, lamp on/off, and homing can be accessed remotely via DMX. You can also turn the lamp on or off and home the fixture with the front panel menu system.
- The integral AC power switch/breaker is conveniently located on the side of the fixture.
- Power factor correction capability optimizes the light source's efficiency and deliver maximized power economy.
- Power saving mode decreases the wattage and reduces heat when the dimming system is closed. When the shutter is opened, the lamp instantly returns to full power.
- Operating software can be uploaded from the Lightwave Research Upload Dongle, a lighting console, or from another fixture. The latest software version is available at www.highend.com.
- The lamp cover is secured through its 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, ETL, C-ETL, CE, FCC, CSA, and EMC standards for professional lighting fixtures.

Optional Accessories

The Studio Spot optional accessories available from your High End Systems dealer/distributor are listed in the table below. For more information about optional accessories, contact either your High End Systems dealer/distributor, High End System Sales, or visit the High End Systems Web site at www.highend.com. For additional contact information, see “Contacting High End Systems®” on page -ii.

Part Description	Part Number
Replacement MSR700-SA lamp	55030054
Color wheel dichroic filters	See Note
Lithopatterns	See Note
Effect Glass	See Note
Whole Hog III lighting console	25020001
Lightwave Research Upload Dongle	26040002
10-foot heavy duty data cable with Neutrik XLRs	55050005
25-foot heavy duty data cable with Neutrik XLRs	55050006
50-foot heavy duty data cable with Neutrik XLRs	55050007
100-foot heavy duty data cable with Neutrik XLRs	55050008
Male XLR terminator	90404039
Neutrik 5/3 pin and 3/5 pin XLR convertor set	55050015
13° narrow field lens	80160029
18° standard field lens (factory installed)	80160030
<i>Studio Spot User's Manual</i>	60600093
Cheeseborough clamp	55040014
Safety cable	12040001
Rubber feet	90410089
Keal road case for one fixture	39070001
Keal road case for two fixtures	39070002
Philips MSR 575/2 lamp	55030052
Philips MSD 575 lamp	55030050

Note: Call High End Systems for information on standard or custom dichroic color filters, lithopatterns and effect glass.

Specifications

Physical

- Height: 713 mm (28.1 in.) for Standard Models; 733 mm (29.6) for Zoom Models
- Width: 551 mm (21.7 in.)
- Depth 318 mm (12.5 in.)
- Weight: 26.76 kg (59 lbs.)

For additional dimensions, refer to Figure 1-1 and Figure 1-2.

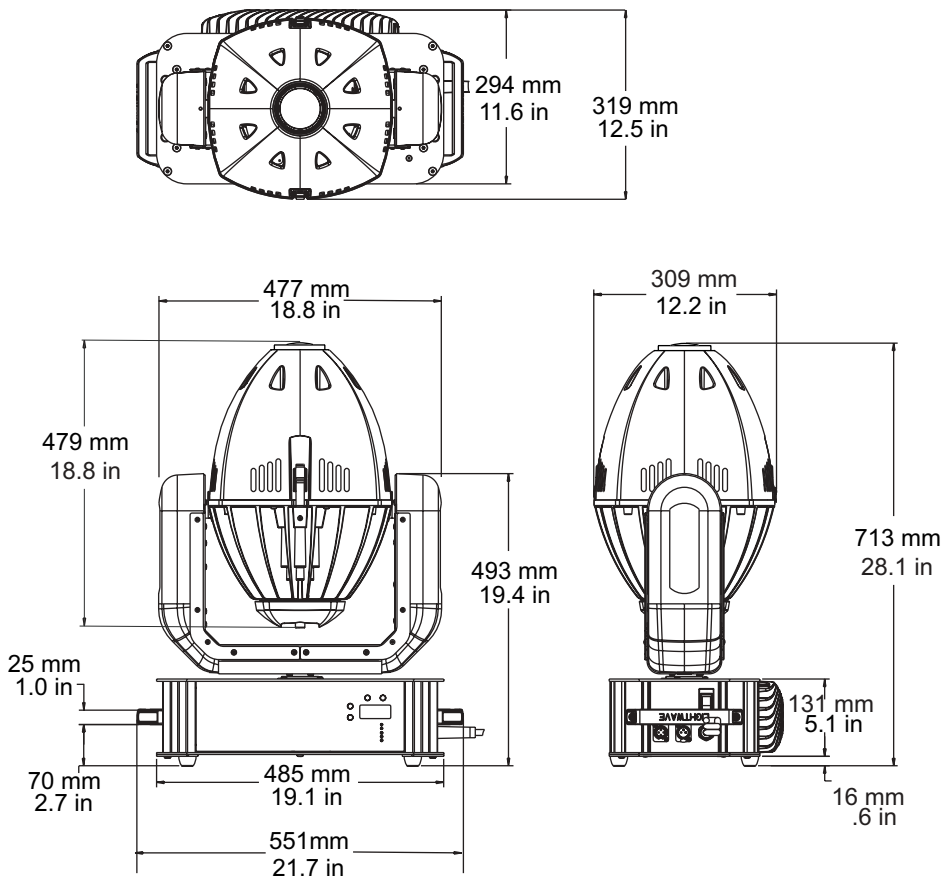


Figure 1-1 Studio Spot 575/575CMY physical dimensions

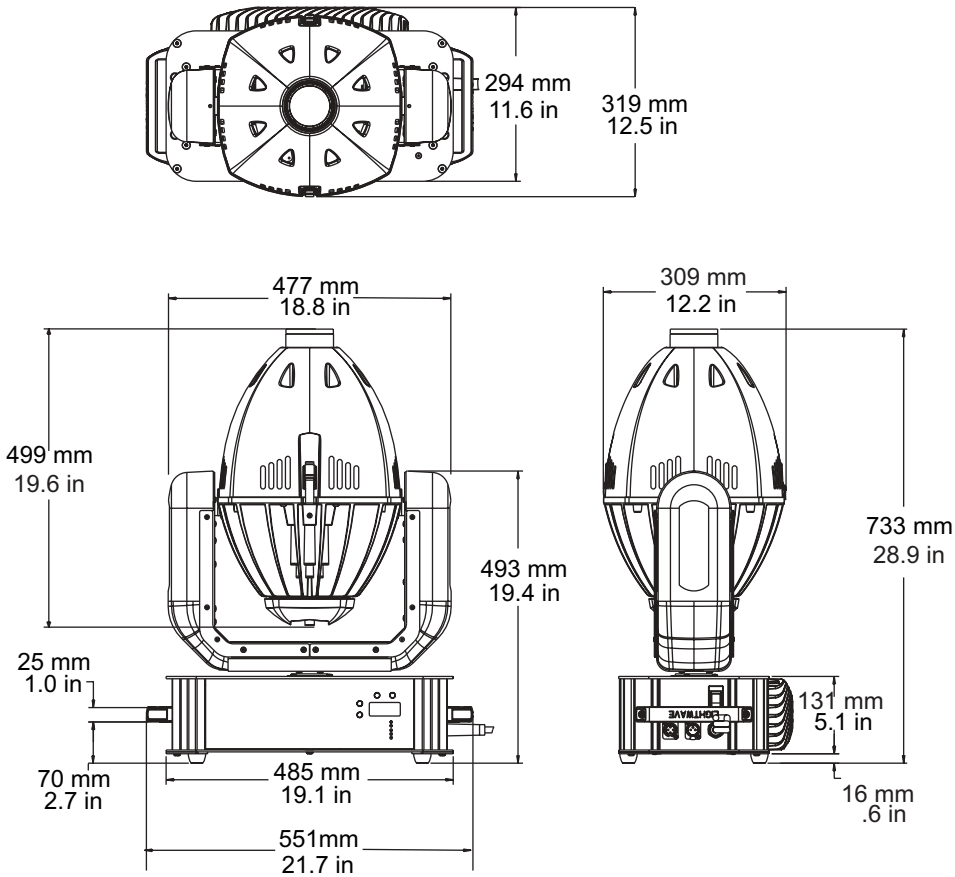


Figure 1-2 Studio Spot 575Z/575CMY Zoom physical dimensions

Electrical

- Rated voltage: 100–230 V.A.C. (Supports international voltages up to 250 V.A.C.)
- Rated current: 7.0–3.0 A
- Rated power: 700 W max
- Rated frequency: 50/60 Hz
- Max. ambient temperature, Ta: 40° C (104° F)
- Max. exterior surface temperature: 200° C (392° F)
- Power factor: 0.96 @ 230 V/50 Hz,
0.99 @ 100 V/60 Hz
- Max. winding temperature, Tw: 130° C (266° F)
- Max. capacitor temperature, Tc: 85° C (185° F)

Optical System

Dichroic Glass Gobos (Standard and Standard Zoom Models)

- Diameter: 44.323 mm \pm 0.25 (1.745 in. \pm 0.010)
- Thickness: 1.778 mm \pm 0.25 (0.070 in. \pm 0.010)

Note: The dichroic glass specifications for Studio Spot are identical to Studio Color, Cyberlight, Cyberlight CX, and Cyberlight SV.

Effect Glass (All Models)

- Diameter: 36.322 mm \pm 0.25 (1.430 in. \pm 0.010)
- Image area: 31.750 mm \pm 0.25 (1.250 in. \pm 0.010)
- Thickness: 3.175 mm \pm 0.25 (0.125 in. \pm 0.010)

Note: The effect glass specifications for Studio Spot are identical to Technobeam, Technopro, and Technoray.

LithoPatterns (All Models)

- Resolution: 3300 d.p.i.
- Diameter: 36.449 mm \pm 0.15 (1.435 in. \pm 0.006)
- Image area: 31.750 mm \pm 0.25 (1.250 in. \pm 0.010)
- Thickness: 1.778 mm \pm 0.25 (0.070 in. \pm 0.010)

Note: use the above specifications for metal gobos.

Lenses (Standard and CMY Models)

Table 1-2 Lens Specifications

Lens	Minimum Focal Distance	Effective Focal Length	F-Stop	Elements
13°	1 M - ∞	140 mm	1:2	4
18°	1 M - ∞	100 mm	1:1.6	4
30°	1 M - ∞	60 mm	1:1.8	5

Note: To determine which lens best suits your application, refer to “Replacing Dichroic Glass” on page 5-5.

Zoom Lens (Standard Zoom and CMY Zoom Models)

Mechanical 18°-30° 18°-30°

Lamps

- Lamp type: Philips® MSR 575/2 or Philips MSD 575
- MSR 575/2 color temperature: 6500 Kelvin
- MSD 575 color temperature: 5600 Kelvin



Warning: use only M Series, GX 9.5 Base, 575 watt, metal halide type lamp.

Notes: The above lamps were specifically designed for use in Studio Spot and Studio Color. Additionally, mixing MSR 575/2 and MSD 575 lamp types will result in undesirable color points between fixtures.

Front and Side Panel Functionality

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

B- Lamp power supply 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 LED is on when the logic board is supplied with +5 volts.

D- Transmit data LED is on when the fixture is the bus master (not the DMX console), when the fixture is the master during a crossload, and during preset playback.

E- Receive data LED flickers to reflect received data.

F- 15-segment four character alphanumeric L.E.D. display provides data, status, and internal diagnostic features.

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

H- <ENTER> button enters the current field and stores data.

I- Down button scrolls downward through data fields and values.

J- Up button scrolls upward through data fields and values.

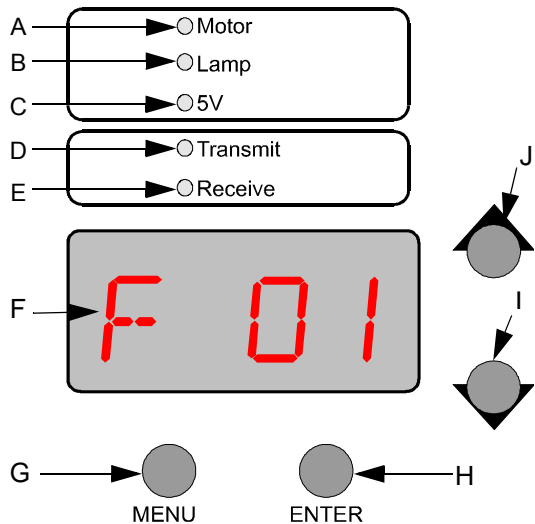


Figure 1-3 Front Panel

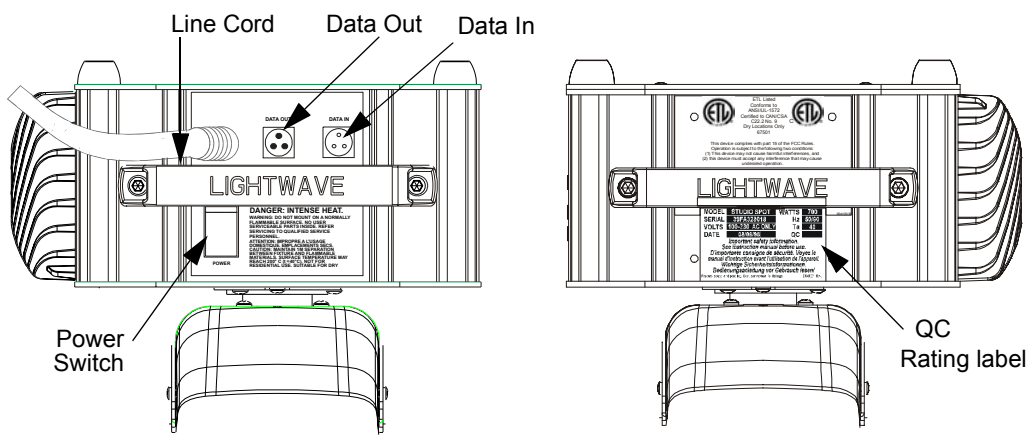


Figure 1-4 Fixture side panels

Chapter 2:

Setup and Configuration

2

Unpacking the Fixture

Unpack the fixture and verify that it arrived complete and without any damage. The shipping carton contains the following items:

- Studio Spot fixture
- Philips MSR 575/2 lamp installed in the fixture
- Studio Spot User's Manual

Save All Shipping Materials

Do not discard the shipping carton and packing materials. The carton and packing materials are specifically designed to protect the product during transport. High End Systems® assumes no responsibility for products that are damaged during transport. Return a product for repair in its original shipping carton and packing materials.

Before sending anything to the factory, call your High End Systems dealer/distributor for a Return Material Authorization (RMA) number. The factory cannot accept any goods shipped without an RMA number.

Inspecting the Fixture

After unpacking the box, complete the following procedure to inspect the fixture:

1. Place the fixture upright on a flat surface.
2. Inspect the fixture for physical damage.
3. Remove the bezel by releasing the two latches located in the middle of the fixture head as shown in Figure 2-1.
4. Remove the safety cable from its latch and set the bezel aside.
5. Inspect the inside of the optical assembly for any visible damage to glass components.
6. Replace the bezel, secure the safety cable to its clamp, and re-latch the bezel.

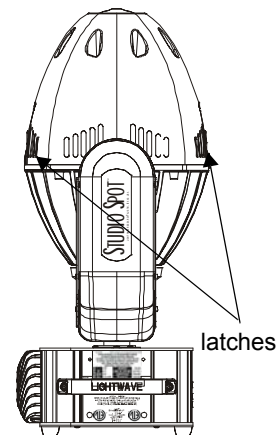


Figure 2-1 Removing the Bezel

Road Cases

If Studio Spot fixtures will be transported after they are unpacked from their original shipping box, a professional road case is strongly recommended. Road cases can be purchased from High End Systems or constructed in accordance 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 polyethylene 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°.

Note: Do not scale the figures to design your road cases. They are provided for informational purposes only.



Caution: 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.

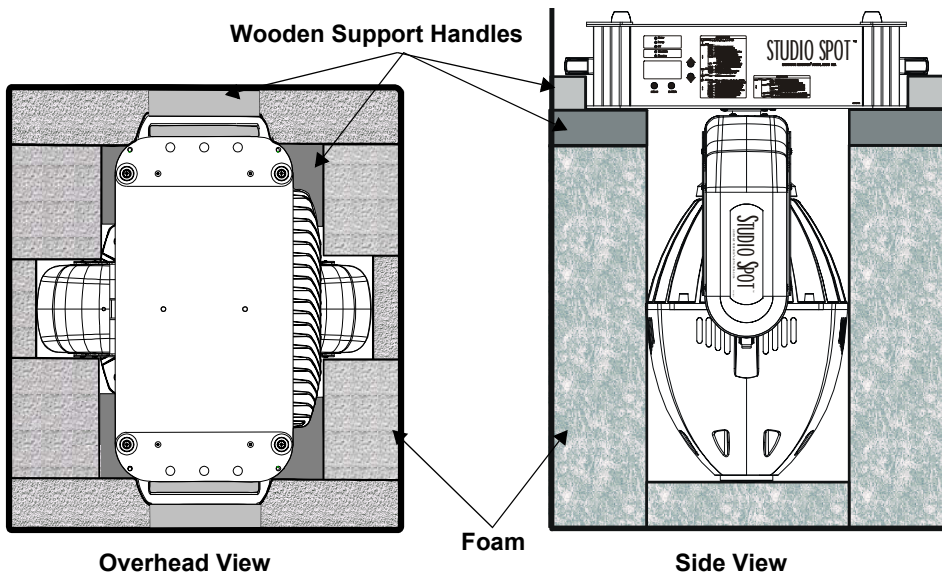


Figure 2-2 Roadcase Construction

Fixture Setup

Note the following safety precautions before beginning installation:



Warnings: Disconnect the fixture from power before removing the bezel or changing the lamp.



Allow the unit to cool for at least five minutes before removing cover or accessing the lamp.



Wear protective gloves and goggles when working inside the unit.

2

Power and Breaker Requirements

Studio Spot automatically senses and adjusts to input voltages from 90–250 volts (which is $\pm 10\%$ of its rated voltages) and frequencies of 50 or 60 Hz.

Due to variances between breaker types and manufacturers, wiring should be sized in accordance to the electrical code where fixture(s) will be operated. Breakers should include 20 amp maximum branch circuit protection. A guideline for determining the number of fixtures that can be powered per breaker is shown in Table 1-1.

Table 2-1 Breaker Requirements

Voltage	Fixtures Per 20 A Breaker
100	2
110	3
200-208	5
220-240	6

Installing a Power Cord Cap

Studio Spot 575 fixtures are shipped without an attached power cord cap. Different locations (even within the same country) may require a different power cord cap to connect the fixture to a power outlet.

Because of the variety of power cord caps used worldwide, High End Systems, Inc. cannot make specific recommendations for the power cord cap. Contact a local authority for the type of power cord cap needed. When installing the power cord cap, note that the cores in the mains lead are colored in accordance with the following code:

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



Warning: Class 1 equipment - This equipment must be earthed.

Installing a Line Cord Cap - U.K. Only

In the United Kingdom, the colours of the cores in the mains lead of this equipment may not correspond with the colored markings identifying the terminals in the fixture's plug. Therefore, install a line cord cap in accordance with the following code:

- The core which is coloured green and yellow must be connected to the plug terminal which is marked with the letter “E,” or by the earth symbol \oplus , 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 1 equipment - This equipment must be earthed.

Vatic Fitter Heads Information - Danmark

Advarsel: Beskyttelse mod elektrisk chock.

Vigtigt!

Lederne med gul/groen isolation maa kun tilsluttes en klemme maerket



Fixture Mounting

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

Warning: Keep flammable objects at least 1 meter away from fixture. Do not light objects closer than 1 meter.



Floor Mounting

To mount a fixture on the floor, ensure that the rubber feet are installed on the base of the fixture and place it upright on a flat surface. Refer to Figure 2-3.



Caution: Do not mount a fixture on the floor without the rubber feet installed.

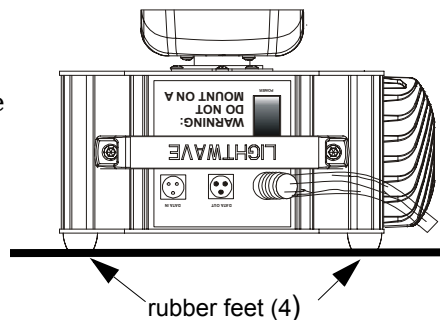


Figure 2-3 Floor Installation

Linking the Fixtures

Studio Spot fixtures can be linked to other fixtures on a standard DMX 512 link and then be controlled by the first fixture on the link or a DMX console. When linking fixtures remember:

- The number of fixtures on a link will be determined by the combined number of channels required by all the fixtures. A Studio Spot fixture requires 24 channels on a DMX 512 link.
- When connecting more than 32 fixtures to a link, use a DMX splitter. The 32 device limit complies with the EIA-485 standard. Connecting more than 32 devices per link without a DMX splitter will eventually deteriorate the digital signal.
- DMX consoles, serial data distributors, data line optoisolators, and any fixtures using the RS-422 DMX standard of serial communications (including Dataflash[®] AF1000 xenon strobes, and Intellabeam[®] fixtures) block software uploads, crossloads, or TalkBack[™] protocol on a link. Make sure to either put all of these devices after the Studio Spot[™] fixture on the link, or bypass these devices when performing software uploads or crossloads.

Data Cabling and Connectors

To link one or more fixtures to a DMX console and/or to each other, obtain data cabling. Cabling can be purchased from High End Systems (see “Optional Accessories” on page 1-4) or constructed.

High End Systems recommends data-grade cable. Data-grade cable is designed to carry a high-quality signal with less susceptibility to electromagnetic interference.

DMX Data Cables

Use Belden[®] 9842 or equivalent (meets specifications for EIA RS-485 applications) data cables with the following characteristics:

- 2-conductor, twisted pair plus a shield
- maximum capacitance between conductors - 30 pF/ft.
- maximum capacitance between conductor & shield - 55 pF/ft.
- maximum resistance of 20 Ohms/1000 ft.
- nominal impedance 100–140 Ohms
- 22–24 AWG with insulation having a dielectric rating of 300 volts or higher

Cable Connectors

The Studio Spot fixture accepts 3-pin XLR cable connectors. Cabling must have a male XLR connector on one end of the cable and a female XLR connector on the other end.

Note: If your DMX console uses 5-pin data cables, you will need to construct or purchase a 5-pin to 3-pin adapter.

Pin one is the common (cable shield), pin two is the data complement (negative), pin three is the data true (positive), see Figure 2-6.

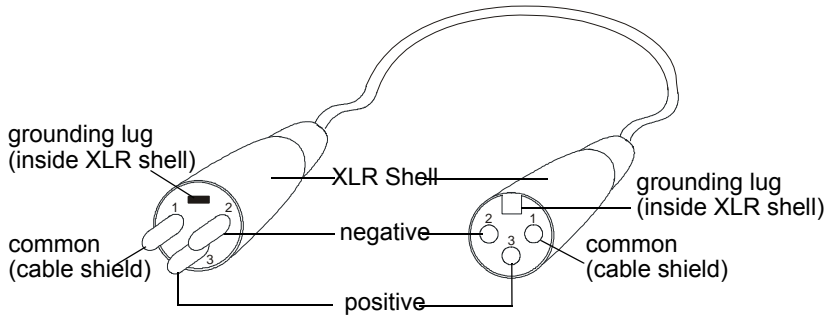


Figure 2-6 Data Cable Construction

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 the shield.



Caution: Do not connect anything to the ground lug on the XLR connectors. Do not connect or allow contact between the common (cable shield) and the fixture’s chassis ground. Grounding the common could cause a ground loop and/or erratic behavior.

Setting up the Link

To link one or more fixtures to a DMX console as shown in Figure 2-7:

1. Connect the male XLR connector of a DMX Data cable to the console’s DMX Data Out connector.
2. Connect the Data cable’s female XLR connector to the Data In connector of the first (or next) fixture on the DMX link.
3. Continue linking the remaining fixtures connecting a cable from the Data Out connector of each fixture to the Data In connector of the next fixture on the link.

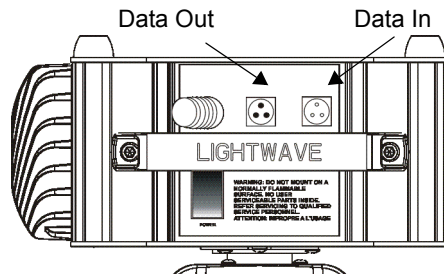


Figure 2-7 Data In and Data Out Connectors

4. Connect a male terminator to the Data Out connector of the last fixture in the link (see “Constructing a Terminator” on page 2-8). For information on obtaining a terminator, see “Optional Accessories” on page 1-4.

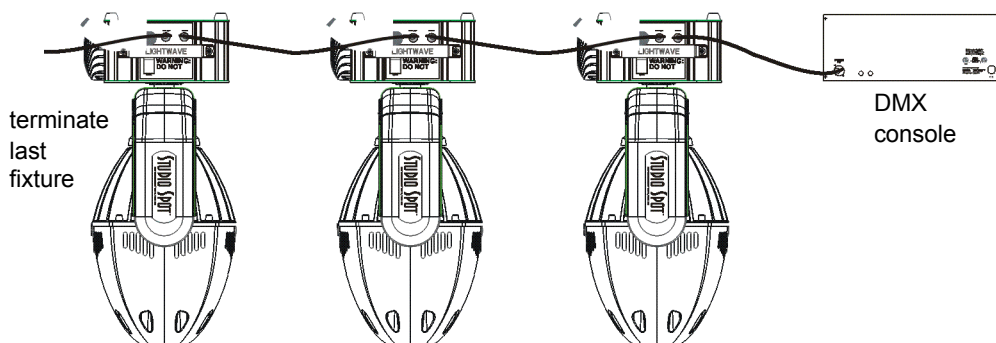


Figure 2-8 Linking fixtures to a DMX console

To control fixtures in stand-alone mode (without a DMX console):

1. Connect the male XLR connector of a DMX Data cable to the Data Out connector on the fixture addressed at DMX Start channel 1.
2. Connect the cable’s female XLR connector to the Data In connector of the next fixture on the DMX link.
3. Continue linking the remaining fixtures connecting a cable from the Data Out connector of each fixture to the Data In connector of the next fixture on the link.
4. Connect a male terminator to the Data Out connector of the last fixture in the link (see “Constructing a Terminator”). For information on obtaining a terminator, see the following section.



Caution: Failure to terminate the last fixture on each link can result in erratic operation.

Note: If you are not using a DMX console to capture data for synchronized playback, it is recommended that you install terminators on the first fixture’s DATA IN connector and the last fixture’s DATA OUT connector.

Constructing a Terminator

Install a 120 ohm, 1/4 watt (minimum) terminator in the fixture’s Data Out (female) cable connector in the *last* fixture on each DMX link. A terminator on the last fixture of the link prevents data reflection, which can corrupt the data communication on the link.

Purchase a terminator from a High End Systems dealer/distributor (see “Optional Accessories” on page 1-4), or follow the instructions below.

Note: Before uploading new software, disconnect any DMX controllers, bypass any serial data distributors and/or data line optoisolators, and bypass or make sure that any fixtures using RS-422 communications (such as Dataflash® AF1000 xenon strobes, and Intellabeam® fixtures) are located after all the Studio Spot fixtures on the link. These devices will block communication with any other Studio Spot fixtures on the link

Setting the Fixture Address

Use the following subsections to set the fixture address. Fixtures may be addressed by fixture number (1-21) or by DMX starting channel number (1-489). Either way, each fixture uses 24 DMX channels.

Fixture Number Mode

To address Studio Spot by fixture number, complete the following procedure:

1. Apply power to the fixture.
2. After the fixture homes, observe the display on the front of the fixture. Initially, it will display $\square P \square T$, the software version $V \times \times \times$, and then the fixture number $F \square \square$. Refer to Figure 2-10.
3. Press and hold <MENU> until the display changes to $F \square \square R$. Press <ENTER> to manipulate the address field.
4. Using the up and down keys, set the fixture number from $F \square \square$ to $F \square \square$. The display will flash when it is moved from the stored value.
5. Press <ENTER> to store the fixture number. The display will stop flashing.
Note: If <ENTER> is not pressed, the unit will not store the fixture number.
6. Press <MENU> to exit the menu.

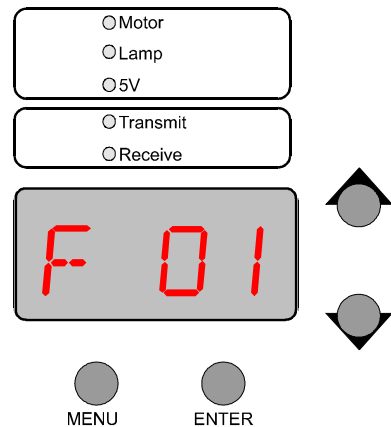


Figure 2-10 Using the Front Panel

DMX Starting Channel Mode

To address Studio Spot by DMX starting channel, complete the following procedure:

1. Press and hold <MENU> until the display changes to $F \square \square R$.
2. Using the up and down keys, scroll to $\square E T$ and press <ENTER>.
3. Using the up and down keys, scroll to $\square H N L$ and press <ENTER>.

4. Using the up and down keys, scroll to *d M X* and press <ENTER>. Press <MENU> twice to move back up menu levels to *F d d R*. Press <ENTER> to address the fixture.
5. Using the up and down keys, set a starting channel from *□ □ □ □* to *□ 4 8 9*. Refer to Table 2-2 for assistance. The display will flash when it is moved from the stored value.

Table 2-2: DMX Starting Channels

Fixture #	DMX Starting Channel	Fixture#	DMX Starting Channel	Fixture#	DMX Starting Channel
1	1	8	169	15	337
2	25	9	193	16	361
3	49	10	217	17	385
4	73	11	241	18	409
5	97	12	265	19	433
6	121	13	289	20	457
7	145	14	313	21	481



Caution: If an incorrect address is given, channels could overlap and produce erratic results.

6. Press <ENTER> to store the desired starting channel. The display will stop flashing.
Note: If <ENTER> is not pressed, the unit will not store the starting channel.
7. Press and hold <MENU> to exit the menu.

Controlling Studio Spot With DMX

Studio Spot may be controlled by 8- or 16-bit DMX consoles. Chapter 3 discusses Studio Spot operation in detail. See Appendix A for the protocol used to control Studio Spot via DMX.

Note: Studio Spot's protocol, software, and documentation are subject to change. Visit the High End Systems web site at <http://www.highend.com> for the latest updates.

Chapter 3:

Fixture Operation

3

The Onboard Menu System controls all fixture operations. This chapter discusses Accessing the Menu System, navigation, the options available at each Menu level, and includes examples. See for a complete Menu table for your fixture model.

DMX programming, used to control one or more fixtures on a link for show creation, can be executed through the Onboard Presets Menu or a DMX Console. For more information regarding DMX programming options and parameters, see “Chapter 4: DMX Programming” .

Direct Menu System Access

The display panel allows direct access to the fixtures menu system for feature control. Major operational features for Studio Spot 575™ fixtures include:

- Assigning a DMX start channel
- Accessing and setting fixture options
- Viewing fixture status
- Crossloading software
- Performing self tests
- DMX programming, storing, and playing scenes

TalkBack™ Support for Remote Access

All Studio Spot 575 fixtures support TalkBack™ technology. TalkBack™ technology is a feature that allows remote access to the menu system built into High End Systems fixtures. A DMX console supporting TalkBack protocol, can remotely access any option in the Studio Spot 575 onboard menu system.

TalkBack protocol uses the normal DMX-512 connection for bi-directional communication with the fixture so physical access to the fixture is no longer required to perform operations like changing a DMX address or configuring preset programs. TalkBack protocol utilizes the primary DMX link (pins 2-3) in a half-duplex communication mode. This means that it does not require pins 4-5 to be connected or used to receive TalkBack messages coming from the fixture.

TalkBack protocol uses a discovery process to find the unique number that is embedded inside each fixture, similar to a serial number. Once the fixtures have all been identified, the current fixture parameter settings and information can be accessed.

Fixture access can happen at anytime, but the Talkback messages are only valid after the fixture starts homing.

Navigating the Menu System

The Studio Spot 575 Display

Figure 3-1 shows the elements of the Studio Spot 575 display panel. The display is composed of four 15-segment LED. Four keys allow you to manipulate the display as shown in Figure 3-1.

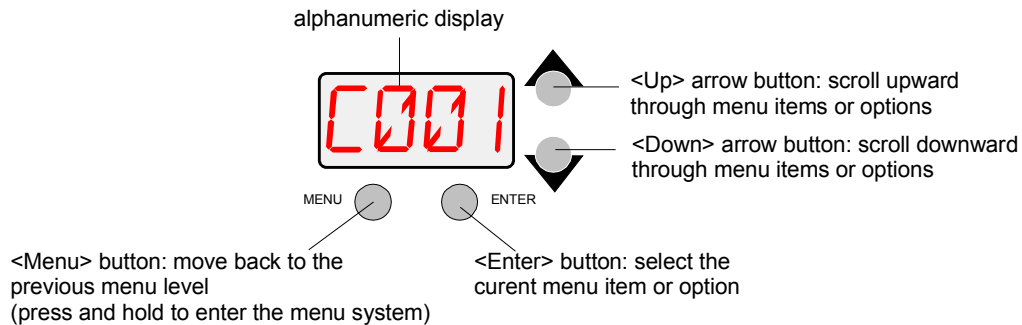


Figure 3-1 Menu navigation buttons

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

- <MENU> button. This button unlocks the menu system and backs out of the current field.
- <ENTER> button. This button enters the current field and stores data.
- Down button. This button scrolls downward through data fields and values.
- Up button. This button scrolls upward through data fields and values.

Unlocking the Menu System

After homing, The alphanumeric display will read $S P O T$, the software version ($V X X X$), and the fixture number ($F 01 - F 21$) sequentially. To unlock the menu system, press and hold the Menu button until the display changes $H d d R$. The menu system is protected against inadvertent menu changes by requiring the Menu button to be held for a few seconds before allowing entry to the menus. DMX Address Menu is the first option on the top menu level.

Exiting the Menu System

To exit the menu system, keep pressing the Menu button to back out of each menu level until the fixture's designation name (SPIT) appears. After a few seconds, standard display for the locked mode as described above begins.

The Menu System Structure

The following sections in Chapter 3 describe options available in each of the top level menus and show examples of specific options located in that menu.

Appendix D contains a complete Menu map of all the options and settings available in the Studio Spot 575 Menu System.

3

Address Menu

Determining DMX Start Channel Assignment

There are 512 available channels on each DMX link divided among *all* the devices in a particular link. A fixture must have a *unique* start channel number in order to respond *independently* to console commands.

To determine each fixture's DMX start channel in a link, identify the channel range of every fixture on the link. Channel range is the number of consecutive channels a fixture requires. Each Studio Spot 575 fixture requires a block of 24 consecutive channels on a 512-Channel DMX link. The start channel is the first number a fixture's channel range.

A Studio Spot fixture can be addressed by fixture number or DMX starting channel. To change the way the Studio Spot fixture is addressed, refer to "Setting Addressing Method" on page 3-14.

When setting the start channel on a fixture, remember:

- A fixture's physical location on the link does not have to coincide with the order of channel range assignments in the link.
- The fixture's channel range must not overlap any other device's channel range on the link. When two devices on the same DMX link have overlapping channel ranges, one or both devices will be disabled or behave erratically. The single exception would be if two or more fixtures need to respond to DMX console commands in exactly the same way. In that case, those fixtures must be the same type and model (for example two Studio Spot 575 CMY fixtures) and must share the *entire* channel range.

Setting DMX Start Channel or Fixture Number

To address the Studio Spot 575 fixture:

1. Observe the display. Initially, it will display `SPOT`, the software version (`Vxxx`), and then the fixture number (`F 01 - F 21`) or the DMX starting channel (`C 001 - C 499`).
2. Press and hold `<MENU>` until the display changes to `Addr`.
3. Press `<ENTER>` to edit the `Addr` field.
4. Using the up and down arrow buttons, set the desired fixture number or address. The display will flash when it is moved from the existing value.
5. Press `<ENTER>` to store the desired fixture number or DMX channel. The display will stop flashing.
6. Note: *if the `<ENTER>` key is not pressed, the fixture will not store the address.*

Information Menu

Use the following subsections to use the functions contained within the `INF□` menu. The Information menu displays current fixture information such as internal temperature, lamp hours, total fixture hours, lamp strikes, hardware and software versions, DMX errors, and view DMX data for any device on the link. Lamp and Fixture hours resets are also executed in the Information Menu.

Viewing Lamp Status

To view the lamp status:

1. Hold `<MENU>` until the display changes to `Addr`.
2. Using the up and down buttons, scroll to the `INF□` field and press `<ENTER>`. The display will indicate `LAMP`.
3. Press `<ENTER>` to view the lamp status. The fixture will display one of the following:
 - `□N` - the lamp is on
 - `□FF` - the lamp is off
 - `STRK` - the lamp is attempting to strike

3

Viewing Lamp Hours

To view the number of hours the lamp has spent on (ignited):

1. Hold `<MENU>` until the display changes to `Addr`.
2. Using the up and down buttons, scroll to the `INF□` field and press `<ENTER>`.
3. Using the up and down buttons, scroll to the `L/HR` field and press `<ENTER>` to view the lamp hours.

Note: If the display indicates `□VER`, the counter has rolled over 9999 hours.

Viewing Lamp Strikes

To view the number of times the ignitor has attempted to strike the lamp:

1. Hold `<MENU>` until the display changes to `Addr`.
2. Using the up and down buttons, scroll to the `INF□` field and press `<ENTER>`.
3. Using the up and down buttons, scroll 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. See “Resetting Lamp Hours” on page 3-6. If the display indicates `□VER`, the counter has rolled over 9999 lamp strikes and must be manually reset.

Viewing System Version Number

To view the system version number (software revision level):

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

Note: The version number is also displayed after power on.

Resetting Lamp Hours

To reset lamp hours and lamp strikes:

1. Hold <MENU> until the display changes to `###R`.
2. Using the up and down buttons, scroll to the `INF` field and press <ENTER>.
3. Using the up and down buttons, scroll to the `L/R5` field and hold <ENTER> until the fixture resets the lamp hours to `####`.

Viewing Fixture Hours

To view the time a fixture has spent turned on:

1. Hold <MENU> until the display changes to `###R`.
2. Using the up and down buttons, scroll to the `INF` field and press <ENTER>.
3. Using the up and down buttons, scroll to the `F/HR` field and press <ENTER>. The fixture will display the total fixture hours.

Note: The display will indicate Hxxx for hours and M xx for minutes until H999. When fixture hours exceed 999, the display will no longer indicate minutes, instead it will use all four digits to display hours. If the display indicates `OVER`, the counter has rolled over 9999 hours and must be manually reset.

Resetting Fixture Hours

To reset fixture hours:

1. Hold <MENU> until the display changes to `###R`.
2. Using the up and down buttons, scroll to the `INF` field and press the <ENTER> button.
3. Using the up and down buttons, scroll to the `F/R5` field and hold down <ENTER> until the fixture resets the fixture hours to `####`.

Monitoring Internal Fixture Temperature

Viewing the Current Internal Temperature

To view the fixture's current internal temperature:

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

Note: The maximum recommended operating temperature is 96° C.

Viewing the Minimum Internal Temperature

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

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

Viewing the Maximum Internal Temperature

To view the fixture's maximum internal temperature (since the last reset):

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

Note: The maximum recommended operating temperature is 96° C.

Resetting Temperature Readings

To reset the minimum and maximum temperature readings:

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

Viewing DMX Values

DMX errors and individual parameter values can be viewed by parameter name or by channel number. This feature is provided for advanced users to troubleshoot fixtures. For a complete listing of the Parameters, see the Studio Spot Menu Map on page D-1 for Standard and Standard Zoom models, or page D-9 for CMY and CMY Zoom models.

View Errors and Fixture Parameter DMX Values

To view any item listed above:

1. Hold <MENU> until the display changes to *ADDR*.
2. Using the up and down buttons, scroll to the *INFO* field and press <ENTER>.
3. Using the up and down buttons, scroll to the *DMX* field and press <ENTER>.
4. Using the up and down buttons, scroll to the *FIXT* field and press <ENTER>.
5. Using the up and down buttons, scroll to desired field and press <ENTER> to view its value (in decimal form).

Viewing DMX Data by Channel Number

The Studio Spot fixture provides a built-in DMX viewer. To view DMX data by channel:

6. Hold <MENU> until the display changes to *ADDR*.
7. Using the up and down buttons, scroll to the *INFO* field and press <ENTER>.
8. Using the up and down buttons, scroll to the *DMX* field and press <ENTER>.
9. Using the up and down buttons, scroll to the *CHTN* field and press <ENTER>.
10. Using the up and down buttons, scroll to desired channel (*CH1 - CH2*) and press <ENTER> to view the DMX value (in decimal form).

Viewing Sensor Data

Sensor data is provided for advanced users to troubleshoot fixtures. Studio Spot Fixtures have sensors that detect Pan and Tilt positioning and homing function, color and litho wheel movement, and power.

To view supplemental fixture data:

1. Hold <MENU> until the display changes to *ADDR*.
2. Using the up and down buttons, scroll to the *INFO* field and press <ENTER>.
3. Using the up and down buttons, scroll to the *SENS* field and press <ENTER>.
4. Using the up and down buttons, scroll to desired field and press <ENTER> to view the sensor information.

Test Menu

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

Changing Boot Codes

When the Studio Spot fixture is uploaded, occasionally it is necessary to include a new boot code with the latest software. This is apparent when *bOOT dIFF* appears in the display. To accept and store the new boot code:

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



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

Lamp Test

The Lamp Test menu gives the user options for viewing lamp status, striking the lamp or turning it off.

To access the lamp function:

1. Hold <MENU> until the display changes to *FddR*.
2. Using the up and down buttons, scroll to the *TEST* field and press <ENTER>. The display will indicate.
3. Using the up and down buttons, scroll to the *LAMP* field and press <ENTER>.
4. Using the up and down buttons, scroll to one of the following options and press <ENTER>.
 - Select *STAT* to view the lamp status. The fixture will display one of the following items:
 - L ON* - the lamp is on
 - L OFF* - the lamp is off
 - STRK* - the lamp is attempting to strike
 - Select *L ON* or *L OFF* to strike or extinguish the lamp.

Homing the Fixture

To home the fixture from the front panel:

1. Hold <MENU> until the display changes to *Addr*.
2. Using the up and down buttons, scroll to the *TEST* field and press <ENTER>.
3. Using the up and down buttons, scroll to the *HOME* field and press <ENTER> to home the fixture. The display will indicate *RST* (reset) and *HOME* during the process.

Disabling Encoders

Studio Spot fixtures proved the option of disabling encoders when they might interfering with servicing.

1. Hold <MENU> until the display changes to *Addr*.
2. Using the up and down buttons, scroll to the *TEST* field and press <ENTER>.
3. Using the up and down buttons, scroll to the *ENCd* field and press <ENTER>.
4. Using the up and down buttons, scroll to *OFF* and press <ENTER> to disable encoders.

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 servicing:

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

Self Tests

All Studio Spot fixture models have a comprehensive set of self-tests to check mechanical functionality. Systems can be checked individually or ALL can be selected to run all self test consecutively. See the TEST menu in “Appendix D: Menu Maps” for the appropriate model.

To begin the self-test function:

1. Hold <MENU> until the display changes to *FRDR*.
2. Using the up and down buttons, scroll to the *TEST* field and press <ENTER>.
3. Using the up and down buttons, scroll to the *SELF* field and press <ENTER>.
4. Using the up and down buttons, scroll to the desired test and press <ENTER>. The fixture will perform the desired test(s).

To exit the test in progress, press <MENU>

Mode Menu

Use the following subsection to perform the functions contained within the `MODE` menu.

Crossloading Fixtures

the Studio Spot fixture can crossload software from one fixture to additional Studio Spot fixtures on the same link (32 fixtures per link). To crossload software:

1. Disconnect the data cable between the console and the first fixture.
2. Hold `<MENU>` on the master fixture (the fixture with the latest software version) until the display changes to `FLDR`.
3. Using the up and down buttons, scroll to the `MDE` field and press `<ENTER>`.
4. Using the up and down buttons, scroll to the `XLd` field and press `<ENTER>`. The master fixture will upload its software to all connected fixtures on the link. The slave fixtures will display `LFld` during the process. After the fixtures have completed the upload, they will reset and home.

Notes: If the fixture(s) take longer than one minute to reset after an upload, turn off the fixture(s) and repeat the procedure. If a new boot code was included with the latest software, you will need to store the boot code on each fixture. Refer to “Changing Boot Codes” on page 3-9.

Setting the Studio Series Fixture

All Studio Series fixtures run the same fixture software. This menu matches the protocol and menu options to the fixture type. It is set automatically in the factory for Studio Spot or Studio Color. When Studio Spot type is selected, the specific model of Studio Spot fixture (Standard, Standard Zoom, CMY or CMY Zoom) is automatically detected by the software.

Set Menu

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

Reverting to the Factory Defaults

Studio Spot fixtures are shipped from High End Systems with the following factory defaults:

- addressing by fixture number mode
- five minute fixture shutdown time
- display on (bright)
- pan invert off
- tilt invert off
- swap pan and tilt off

To revert to the factory defaults:

1. Hold **<MENU>** until the display changes to **ADDR**.
2. Using the up and down buttons, scroll to the **SET** field and press **<ENTER>**. The display will indicate **FACT**.
3. Press **<ENTER>** again to enter the field.
4. Using the up and down buttons, scroll to the **IN** field and press **<ENTER>**. The fixture will return to the factory default listed above and home the fixture.

Setting Lens Option

This option should be set for the fixture's lens type, either the optional Zoom lens or the Normal lens in the Standard and CMY models.

1. Hold **<MENU>** until the display changes to **ADDR**.
2. Using the up and down buttons, scroll to the **SET** field and press **<ENTER>**.
3. Using the up and down buttons, scroll to the **LENS** field and press **<ENTER>**.
4. Using the up and down buttons, select **NORM** to enable pan invert or **Zoom** and press **<ENTER>** to select the correct lens configuration.

Setting Addressing Method

To set the addressing method to DMX starting channel or to fixture number mode:

1. Hold <MENU> until the display changes to *Addr*.
2. Using the up and down buttons, scroll to the *SET* field and press <ENTER>.
3. Using the up and down buttons, scroll to the *CHNL* field and press <ENTER>.
4. Using the up and down buttons, select either *Addr* (fixture number mode) or *DMX* (DMX starting channel mode) and press <ENTER>. The options in the *Addr* will now reflect the numbering for the selected method.

Setting Display Intensity

To set the display's intensity:

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

Inverting Display

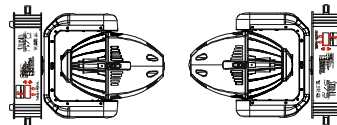
The Studio Spot fixture can invert the orientation of the display's LED characters and navigation control functions for viewing in certain mounting configurations.

To invert the LED Display:

1. Hold <MENU> until the display changes to *Addr*.
2. Using the up and down buttons, scroll to the *SET* field and press <ENTER>.
3. Using the up and down buttons, scroll to the *d/IN* field and press <ENTER>.
4. Using the up and down buttons, scroll to *ON* and press <ENTER> to invert the display orientation.

Inverting Pan

This menu option inverts the direction of the pan motor to coordinate movements between fixtures facing each other horizontally.



To invert pan:

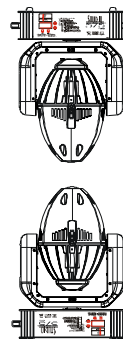
1. Hold <MENU> until the display changes to *Addr*.
2. Using the up and down buttons, scroll to the *SET* field and press <ENTER>.
3. Using the up and down buttons, scroll to the *P/IN* field and press <ENTER>.
4. Using the up and down buttons, select *ON* to enable pan invert or *OFF* to disable pan invert and press <ENTER>.

Inverting Tilt

This menu option inverts the direction of the tilt motor to coordinate movements between fixtures on a link facing each other vertically.

To invert tilt:

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



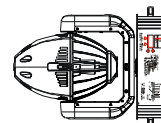
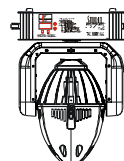
3

Swapping Pan and Tilt

This option swaps the pan motor and tilt motor operation to coordinate movements between fixtures on a link mounted perpendicular to each other.

To swap the pan and tilt functions:

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



Setting the Fixture Shutdown Time

The Studio Spot fixture automatically shuts itself down when DMX data is removed. When a shutdown occurs, power is removed from all motors and the lamp is turned off.

To set the length of time the Studio Spot fixture takes before it powers down:

1. Hold <MENU> until the display changes to *FddR*.
2. Using the up and down buttons, scroll to the *SET* field and press <ENTER>.
3. Using the up and down buttons, scroll to the *SHDN* field and press <ENTER>.
4. Using the up and down buttons, select *5 MN* (5 minutes) or *10 MN* (10 minutes) and press <ENTER>.

Preset Menu

The preset menu (*PRST*) allows you to program and playback scenes from the Studio Spot fixture on-board memory. The Presets menu provides many of the features of a DMX console onboard the fixture. Presets give the user the capability of programming fixtures for stand-alone operation by creating, storing, sequencing, synchronizing and playing back scenes. Onboard Presets also allows to viewing, programming and copying parameters between scenes on a single fixture or sending them to other fixtures.

For more information on DMX programming at the fixture level including looping scenes and synchronizing playback, see “Standalone Programming” on page 4-2.

Chapter 4:

DMX Programming

Parameters are fixture attribute that can be controlled to modify the light beam in terms of color, beam quality and pattern, intensity, or focus (position). To program fixtures, DMX values are assigned to each of the fixture's parameters according to that fixtures DMX protocol. A cue (sometimes referred to as a *scene* or *look* depending on the console used) is one set of attribute options. Combining cues into cuelists, assigning times and synchronizing fixtures on a link are the basics of show creation.

This chapter discusses DMX programming options and describes the parameters in the Studio Spot 575 DMX protocol. Appendix A contains a complete table of Studio Spot 575 protocol DMX values.

4

DMX Programming Options

Studio Spot 575[®] fixtures can be programmed to create and play back cues with either a DMX-compatible console or, at the fixture level, with the Onboard Menu System's Preset menu, see "Menu System Scene Editing" on page 4-2. However, a DMX compatible console and the fixture's on-board menu system cannot be used at the same time. In other words, a scene cannot be created using the on-board memory and played back using a console. Also, a console cannot be used at the same time on-board scenes are playing.

Note: Because consoles cannot transmit crossfade or delay construct values, use preset programming in the onboard menu system to manually set those construct values at the fixture.

Programming with a DMX Controller

Using a DMX controller, an operator can program an unlimited number of cuelists (combinations of cues) and retain direct control over the Studio Spot 575 fixture at all times. The technique of programming a fixtures using a console and then capturing the cue(s) to the on-board memory of multiple Studio Spot 575 fixtures can save time. For more information, see "Capturing DMX Data Into a Scene" on page 4-6.

The Whole Hog III[®] Lighting Console, and the Hog PC controller are the DMX controllers available from High End Systems to control Studio Spot 575 fixtures, see "Optional Accessories" on page 1-4. For more information on whether a DMX console supports Studio Spot 575 fixtures, contact the console's vendor. For more

information on operating the fixture with a console (or control device such as DMX control software), consult the documentation provided with the console.

Standalone Programming

Each Studio Spot fixture can store and play back up to 16 preset scenes. Scenes can be played back independently on any fixture without a DMX console or up to 32 supported fixtures can be synchronized together with a data link. Studio575 Series, x.SpotXtreme, ColorPro, Studio250 Series, Technobeam and EC2 fixtures all feature standalone programming capability.

Preset Programming

Scene – a combination of attributes (constructs) and timing controls.

Attribute – a unique fixture feature—for example, focus, color or rotating effects.

Sequence – two or more scenes that continuously repeat (also known as a loop or a chase). Sequences will continue to play back until you turn the fixture off or manually stop playback.

Sequences can be created without skipping a scene. The fixture will automatically restart the sequence when it encounters the first unprogrammed scene.

Each value is permanently stored in memory until you change it so you do not have to ‘save’ each scene after it is edited.

Editing allows you to create preset scenes by manipulating Studio Spot’s constructs and timing controls. There are three ways to edit scenes:

1. Menu system
2. Copying and pasting an existing scene
3. Capturing construct data from a DMX link

Note: If you capture DMX data, you must use the menu system to edit the timing controls.

Menu System Scene Editing

Setting Attributes

To edit (program) a scene using the menu system:

1. Press and hold <MENU> until the fixture unlocks the menu system (if necessary).
2. Using the up and down arrow buttons, scroll to *PRST* (Preset) and press <ENTER>.

- Using the up and down arrow buttons, scroll to the `EDIT` and press `<ENTER>`. `SN01` (scene 1) will appear on the display.
- Press `<ENTER>` to begin with editing scene 1. Optionally, use the up and down arrow keys to select another scene (`SN02` - `SN16`) and press `<ENTER>`. The first construct will appear on the display.

Note: During playback, the sequence will restart with scene 1 when the fixture reaches the first unprogrammed scene.

- Using the up and down arrow buttons, select the construct to edit and press `<ENTER>` to view and edit its value. Refer to Appendix D for a complete Menu System table.
- Using the up and down arrow buttons, change the construct to the desired value. The fixture will instantly respond to any changes that are made. Press `<ENTER>` to store the construct's value.

Note: You can press `<MENU>` to back out of the menu level and return to the previously programmed value.

Tip: To view the fixture's output, open the shutter and increase dim to a visible level.

- Repeat step 6 to program additional fixture constructs.
- Using the up and down arrow keys, scroll to `TIME` and press `<ENTER>`.
- Using the up and down arrow keys, set the unit of time and press `<ENTER>`. For additional information, refer to "Using the Time Parameter" below.
- Using the procedures outlined in steps 5 and 6, set the values for `xFADE` (crossfade), `DELAY` (delay), and `MSPD` (MSpeed). Refer to "Using Crossfade, Delay, and MSpeed" below for additional information.
- Press `<MENU>` to back out of the current scene. Repeat steps 4 through 10 until all desired scenes have been programmed.

Note: For additional editing information, refer to "Step-By-Step Editing Example" on page 4-4.

Using the Time Parameter

The `TIME` parameter determines the unit of time used in each scene for crossfade and delay. Choose from the following options:

- `SEC` - seconds
- `MIN` - minutes
- `HOUR` - hours

Crossfade and delay values can be set from 0.1 to 166. MSpeed values can be set from 0.15 to 252.7.

Using Crossfade, Delay, and MSpeed

Crossfade, delay, and MSpeed are independent timing elements in each preset scene. Crossfade and MSpeed determine the amount of time a construct takes to move from one position (value) to another, while delay is the length of each scene.

MSpeed controls the timing for pan and tilt and can be selectively applied to color selection, litho selection, and litho rotation. Crossfade controls the timing for all other constructs. This allows you to program constructs that will reach their destinations at different times within one scene. Refer to Figure 4-1.

Tip: To make circular and ballyhoo motions with fixtures, experiment with setting Delay less than MSpeed.

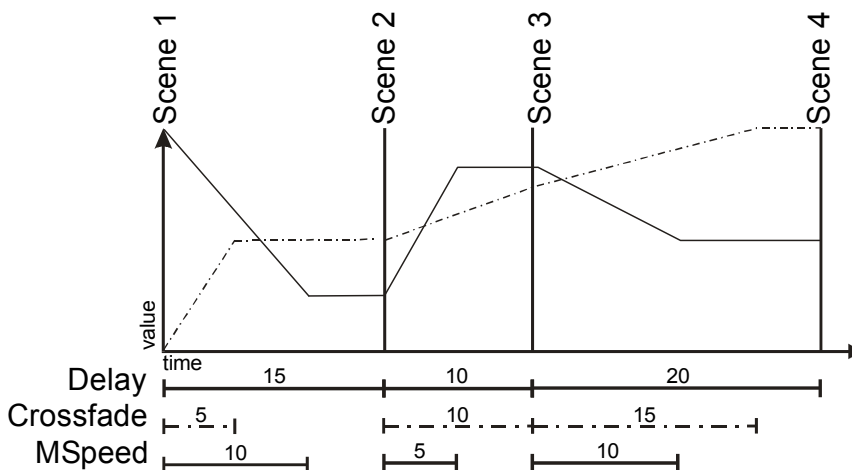


Figure 4-1 Crossfade, Delay, and MSpeed Example

Note: The above figure shows how constructs using crossfade and MSpeed can reach their destination values at different times.

Step-By-Step Editing Example

In this subsection, you will create a scene that requires editing most of the available constructs:

1. Press and hold `<MENU>` until the fixture unlocks the menu system.
2. Using the up and down arrow buttons, scroll to `PRST` and press `<ENTER>`.
3. Using the up and down arrow buttons, scroll to `EDIT` and press `<ENTER>`. `SC01` (scene 1) will appear on the display.
4. Press `<ENTER>` to edit scene 1.
5. Using the up and down arrow buttons, select `SHUT` (shutter) and press `<ENTER>`.
6. Using the up and down arrow buttons, change the construct to `OPEN` and press `<ENTER>`.

7. Using the up and down arrow buttons, select `dIM` and press `<ENTER>`.
8. Using the up and down arrow keys, change the dim value to `d255` and press `<ENTER>`.
9. Using the up and down arrow buttons, select `TILT` and press `<ENTER>`.
10. Using the up and down arrow keys, change the tilt value to `+27.5` and press `<ENTER>`.
11. Using the up and down arrow buttons, select `C01C` (color wheel 1 function) and press `<ENTER>`.
12. Using the up and down arrow keys, select `MbLK` (MSpeed blink mode) and press `<ENTER>`.
13. Using the up and down arrow keys, select `C01` (color wheel one) and press `<ENTER>`.
14. Using the up and down arrow keys, select `b 4` (blink position 4 (aqua)) and press `<ENTER>`.
15. Using the up and down arrow keys, select `LTC1` (litho wheel 1 function) and press `<ENTER>`.
16. Using the up and down arrow keys, select `FSP` (forward spin) and press `<ENTER>`.
17. Using the up and down arrow keys, select `LF 6` (litho forward position 6 (Shatters)) and press `<ENTER>`.
18. Using the up and down arrow keys, select `FUS` (focus) and press `<ENTER>`.
19. Using the up and down arrow keys, focus the litho from `000` to `255` and press `<ENTER>`.
20. Using the up and down arrow keys, select `TIME` and press `<ENTER>`.
21. Using the up and down arrow keys, select `SEC` and press `<ENTER>`.
22. Using the up and down arrow keys, select `dLAY` and press `<ENTER>`.
23. Using the up and down arrow keys, select `d 20` and press `<ENTER>`.
24. Using the up and down arrow keys, select `XFA d` and press `<ENTER>`.
25. Using the up and down arrow keys, select `X 10` and press `<ENTER>`.
26. Using the up and down arrow keys, select `MSP d` and press `<ENTER>`.
27. Using the up and down arrow keys, select `15.1` and press `<ENTER>`.
28. Playback the scene 1. Refer to "Playing Back Scenes in Stand-Alone Mode" on page 4-7.

Copying and Pasting Scenes

Scenes are easily copied and pasted between locations. This is beneficial when you only want to modify a few constructs, such as pan and tilt.

To copy and paste a scene:

1. Press and hold <MENU> until the fixture unlocks the menu system
2. Using the up and down arrow buttons, scroll to *PRST* and press <ENTER>.
3. Using the up and down arrow buttons, scroll to *COPY* and press <ENTER>. *FROM* will appear on the display.
4. Press <ENTER> again to select the scene to copy (source scene).
5. Using the up and down arrow buttons, select the scene to copy (*F001-F016*) and press <ENTER>. *T0* will appear in the display.
6. Press <ENTER> again to select the scene to paste to (destination scene).
7. Using the up and down arrow buttons, select the destination (*T001-T016*) and press <ENTER>. The display will indicate *DONE* and return to the *COPY* field.

Capturing DMX Data Into a Scene

Studio Spot can create preset scenes by capturing data from a DMX console. All constructs can be captured except for *TIME*, *XFAJ*, and *DELAY*. To capture DMX data:

1. Check that all linked fixtures are properly addressed and respond to the console.
2. Press and hold <MENU> until the fixture unlocks the menu system (if necessary).
3. Using the up and down arrow buttons, scroll to the *PRST* and press <ENTER>.
4. Using the up and down arrow buttons, scroll to the *CAPT* and press <ENTER>. *SND1* will appear on the display.
5. Using the up and down arrow buttons, select the destination scene. **Do not** press <ENTER> yet.
6. Using your console, program the desired look(s).
7. Press <ENTER> to capture the DMX data to the selected scene. The display will indicate *DONE*.
8. Press <MENU> to back out of the *CAPT* menu.
9. Using the up and down arrow keys, scroll to *EDIT* and press <ENTER>.
10. Edit the *TIME*, *XFAJ*, and *DELAY* parameters using the menu system. Refer steps 8 through 10 located in “Menu System Scene Editing” on page 4-2 for assistance.

11. Repeat the steps 3 through 9 of this procedure for additional fixtures and scenes.

Resetting (Re-Initializing) a Scene

Scenes are quickly reset to their blank (nullified) factory settings with the menu system. To reset a scene:

1. Press and hold <MENU> until the fixture unlocks the menu system (if necessary).
2. Using the up and down arrow buttons, scroll to the `PRST` and press <ENTER>.
3. Using the up and down arrow buttons, scroll to the `EDIT` and press <ENTER>. `SN01` (scene 1) will appear on the display.
4. Using the up and down arrow buttons, scroll the scene to reset (`SN01-SN16`) and press <ENTER>.
5. Using the up and down arrow buttons, scroll to the `ZERO` and press <ENTER>. `OK?` will appear on the display.
6. Press <ENTER> to reset the selected scene.

4

Playing Back Scenes in Stand-Alone Mode

Scenes can be played back on each fixture without a console through the menu system.

Notes: If a fixture is connected to a DMX link, the fixture will not respond to data while it is in playback mode.

If power is removed during playback, when power is reapplied the fixture will home and begin playback at the first scene. Thus it is not necessary to manually start playback.

To playback scenes in stand-alone mode:

1. Press and hold <MENU> until the fixture unlocks the menu system (if necessary).
2. Using the up and down arrow buttons, scroll to the `PRST` and press <ENTER>.
3. Using the up and down arrow buttons, scroll to the `PLAY` and press <ENTER>. `OFF` will appear on the display.
4. Using the up and down arrow buttons, scroll to the `ON` and press <ENTER>. The display will indicate `PRST` with a dot in the lower right-hand corner to indicate you are in playback mode and the programmed scenes will begin playback. When playback finishes playing scene 16 or it comes to the first blank scene, the sequence will loop and restart at scene 1.

Determining the Active Scene

To determine the active scene during playback:

1. Press and hold <MENU> until the fixture unlocks the menu system (if necessary).
2. Using the up and down arrow buttons, scroll to the *PRST* and press <ENTER>.
3. Using the up and down arrow buttons, scroll to the *PLAY* and press <ENTER>. *OFF* will appear on the display.
4. Using the up and down arrow buttons, scroll to the *SCN* and press <ENTER>. The display will indicate the scene that is playing.

Synchronizing Preset Playback

Studio Spot provides synchronized playback for up to 32 supported fixtures in any combination.

Note: You may use a DMX splitter to connect more than 32 fixtures for synchronized playback.

Synchronized playback is accomplished by a proprietary time code signal generated by the master fixture and sent to the slave fixtures via DMX cables. The time code signal is similar to SMPTE and uses a 30 frame per second clock (non-drop frame).

The master fixture determines the total sequence length from the sum of its delay times. When the master fixture reaches the end of its last scene, all fixtures will restart at scene 1 and the clocks will be reset to zero. Thus playback is not dependent on the number of programmed scenes or the sequence length of the slave fixtures.

If the sequence length of slave fixture(s) is less than the master's, the slave fixture(s) will repeat their sequence until the master fixture resets the clock (slave 1 in Figure 4-

2). If a slave fixture's sequence is longer than the master's, the slave fixture will restart its sequence before it has completed its entire sequence (slave 2 in Figure 4-2).

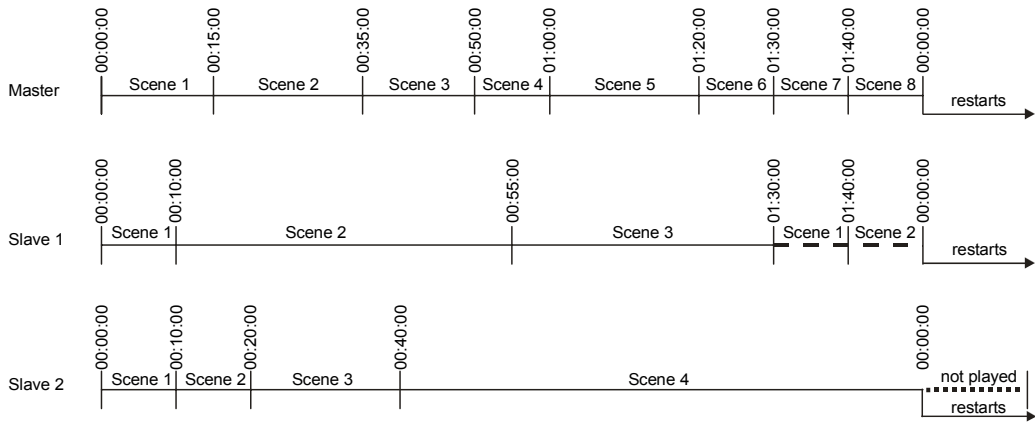


Figure 4-2 Synchronized Playback Example

4

Connecting and Addressing Fixtures for Synchronized Playback

In this application, the first fixture (Master) in a link will act as the controller for the link. To connect and address fixtures for synchronized playback:

1. Link the fixtures together as described in but without a console connection.
2. Install terminators on both ends of the link.
3. Power on all fixtures.
4. Press and hold <MENU> until the each fixture unlocks the menu system (if necessary).
5. Press <ENTER> to address the fixture.
6. Using the up and down arrow keys, set the master's DMX starting channel to `□□□□` or to fixture `F □□` (depending on which address mode you are in).
7. Set the slave fixtures' starting channels/fixture numbers to any address other than `□□□□` or `F □□`.

Playing Back Synchronized Scenes

To playback synchronized scenes:

1. Press and hold <MENU> until the fixture unlocks the menu system (if necessary).
2. Using the up and down arrow buttons, scroll to the `PRST` and press <ENTER>.
3. Using the up and down arrow buttons, scroll to the `PLAY` and press <ENTER>. `□FF` will appear on the display.

- Using the up and down arrow buttons, scroll to the `ON` and press `<ENTER>`. The display will indicate `PRST` with a dot in the lower right-hand corner to indicate you are in playback mode and the programmed scenes will begin playback. The slave fixtures will then synchronize their clocks to the master fixture.

Note: If the master fixture is turned on after the slaves, it may take up to one sequence for all fixtures to synchronize.

DMX Parameter Descriptions

The following sections describe the Channel parameters for the Studio Spot 575 fixture. See “Appendix A: DMX Protocol” for protocol tables on all the available Studio Spot models that include Channel assignments.

Note: Any DMX values indicated in the detailed parameter descriptions are in decimal units.

Pan and Tilt

Pan (Channels 1 and 2) and Tilt (Channels 3 and 4) movement are each controlled by two channels of DMX to provide 16-bit control (up to 65536 steps).

MSpeed values control the pan and tilt motion for Studio Spot fixtures by default, see “Appendix B: MSpeed Conversion Table”. To control the Pan and Tilt parameters with DMX console crossfading, set Pan/Tilt MSpeed off in the Control parameter (see Table 4-9, “Control Functions,” on page 4-20 and “Appendix A: DMX Protocol”).

4

Color Parameters (Studio Spot 575/575 Zoom models)

Color Parameters on Channels 5-8 differ between models offering CMY color mixing and Standard models.

Color Function

The Color Function parameters determine how each color wheel moves. Parameter options available in the Color Position channels will change based on which Color Function option is selected. Each Color Function can run at *full speed* or *MSpeed*. See Appendix B for more information on MSpeed.

Color Wheel 1(Channel 5) and Color Wheel 2(Channel 6) each use one channel for independent Color Function control. The Color Wheel 2 Color Function parameter also allows a Combined mode (DMX values 0-15). When the Color Function is set for Combined mode, applying a Color Function setting for Color Wheel 1 sets both wheels to the same function. This allows creation of additional color combinations (see “Colors Options in Combined Mode” on page 4-12). Table 4-1 describes the Studio Spot 575 Color Function settings.

Table 4-1 Color Functions

Function	Description
Combined Mode (<i>Color Wheel 2 only</i>)	Sets both wheels to the same function to allow creation of additional color combinations.
Indexed	Color wheel(s) to take the quickest path and snap to whole and half colors.
Forward spin	Color wheel spins forward at a variable speed.
Reverse spin	Color wheel spins in reverse at a variable speed.

Table 4-1 Color Functions

Function	Description
Continuous	Wheel rotates continually for one complete revolution (0-360°). Combined continuous mode rotates both wheels to allow all 36 positions to be reached.
Fast scan	Fast scanning between whole and half colors.
Slow scan	Slow scanning between whole and half colors.
Random	Randomly selects colors at variable speeds.
Blink-indexed ¹	Quickly closes dim flags during color change. The flags will instantly reopen when the next programmed position is reached.

¹ Long crossfade and MSpeed times could result in undesirable effects as there will be no light output.

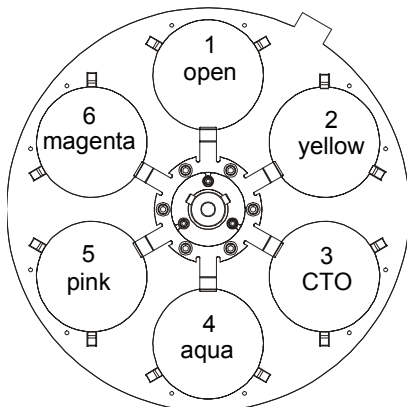
Color Position

Color Position for each color wheel is independently controlled by a separate DMX channel unless the Combined Mode is selected for Color Position on Color Wheel 2.

Note: Color wheel 1 is physically located closest to the lamp.

Figure 4-3 shows the standard dichroic colors for each color wheel. Table 4-2 shows the Combined Mode color combinations achieved with standard factory colors.

Color Wheel 1 (Closest to lamp)



Color Wheel 2

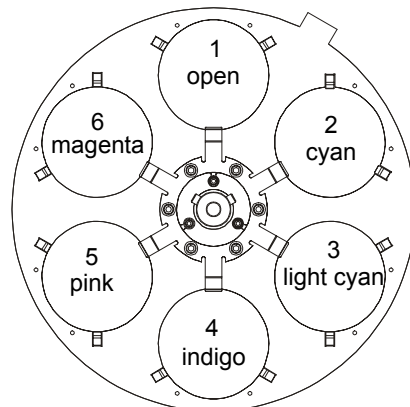


Figure 4-3 Studio Spot 575 factory color wheels

Table 4-2 Colors Options in Combined Mode

Combined Color	Wheel 1		Wheel 2		Resultant Color
	Position	Color	Position	Color	
Color 1	1	Open	1	Open	Open
Color 2	2	Yellow	1	Open	Yellow
Color 3	3	CTO	1	Open	CTO
Color 4	4	Aqua	1	Open	Aqua
Color 5	5	Pink	1	Open	Pink

Table 4-2 Colors Options in Combined Mode

Combined Color	Wheel 1		Wheel 2		Resultant Color
	Position	Color	Position	Color	
Color 6	6	Magenta	1	Open	Magenta
Color 7	1	Open	2	Cyan	Cyan
Color 8	2	Yellow	2	Cyan	Dark Green
Color 9	3	CTO	2	Cyan	Moonlight Blue
Color 10	4	Aqua	2	Cyan	Primary Green
Color 11	5	Pink	2	Cyan	Medium Blue
Color 12	6	Magenta	2	Cyan	Indigo
Color 13	1	Open	3	Light Cyan	Light Cyan
Color 14	2	Yellow	3	Light Cyan	Dark Yellow Green
Color 15	3	CTO	3	Light Cyan	Bulgarian
Color 16	4	Aqua	3	Light Cyan	Indigo
Color 17	5	Pink	3	Light Cyan	Congo Blue
Color 18	6	Magenta	3	Light Cyan	Rose Indigo
Color 19	1	Open	4	Indigo	Indigo
Color 20	2	Yellow	4	Indigo	Indigo
Color 21	3	CTO	4	Indigo	Does Not Mix
Color 22	4	Aqua	4	Indigo	Dark Indigo
Color 23	5	Pink	4	Indigo	Does Not Mix
Color 24	6	Magenta	4	Indigo	Indigo
Color 25	1	Open	5	Pink	Pink
Color 26	2	Yellow	5	Pink	Orange
Color 27	3	CTO	5	Pink	Cherry Rose
Color 28	4	Aqua	5	Pink	Does Not Mix
Color 29	5	Pink	5	Pink	Pink
Color 30	6	Magenta	5	Pink	Broadway Pink
Color 31	1	Open	6	Magenta	Magenta
Color 32	2	Yellow	6	Magenta	Red
Color 33	3	CTO	6	Magenta	Red Rose
Color 34	4	Aqua	6	Magenta	Does Not Mix
Color 35	5	Pink	6	Magenta	Broadway Pink
Color 36	6	Magenta	6	Magenta	Magenta

Color Parameters (StudioSpot575CMY/CMY Zoom models)

CMY models replace the standard wheels with two dual wheels using graduated Cyan, Magenta, and Yellow wheels.

Color Function

Studio Spot 575 CMY models use Channel 5 for a Color Function options of continuous color selection at full speed (DMX values of 0-31) or Mspeed (DMX values 128-159).

CMY Color Channels

In CMY models, Cyan, Magenta and Yellow are each controlled by 1 DMX channel. Color mixing is achieved by setting different combinations of positions on each of the dual color wheels. A color can be adjusted continuously from a value of 0 (full saturation) to 255 (Open White).

Litho Wheel Function

All Studio Spot models have two Wheels containing 5 positions for lithopatterns or effects. Litho functions are independently controlled by separate channels for each wheel. The Litho Function Parameters (Channels 9 and 13) determine how each litho wheel moves. Each litho function can run at *full speed* (eight functions) or *MSpeed* (eight functions). Refer to Table 4-3 for the available litho wheel function and descriptions.

Table 4-3 Litho Functions

Function	Description
Indexed	Allows the litho wheel to be indexed (rotated) to a specific litho position.
Forward rotate	Allows variable forward rotation of the selected litho aperture.
Reverse rotate	Allows variable reverse rotation of the selected litho aperture.
Wheel spin	Allows variable forward and reverse rotation of the litho wheel.
Indexed scan	Allows variable speed scans between adjoining litho positions.
Random	Allows random litho selection at variable speeds.
Blink wheel ¹	Allows the shutter to quickly close during a litho change. The shutter will reopen when the wheel has reached its destination.
Blink aperture ¹	Allows the shutter to quickly close when a litho is indexed. The shutter will reopen when the litho has reached its destination.

Note: Long crossfade and MSpeed times could result in undesirable effects as there will be no light output.

Litho Wheel Position

Litho Wheel Position parameter controls aperture selection for each litho wheel with 16-bit accuracy. Channels 11 and 12 control Litho Wheel 1 Position and Channels 15 and 16 control Litho Wheel 2 Position.

Note: Litho Wheel Position will not override Litho Function parameter settings of wheel spin or random.

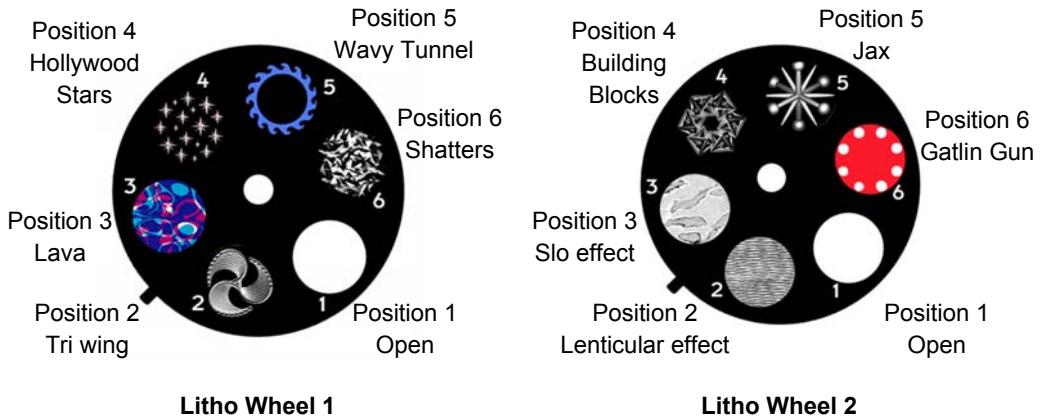


Figure 4-4 Studio Spot 575 factory litho wheels

Litho Wheel Rotation

The litho rotation channels control litho aperture spin, litho scan, and random litho functions. Separate channels control each litho wheel for independent rotation (Channels 11 and 12 for Litho Wheel 1, and Channels 15 and 16 for Litho Wheel 2) Table 4-4 shows the available rotation options and descriptions.

Table 4-4 Litho Rotation

Option	Description
Indexed	Indexes the litho from 0-360°.
Forward rotate	Stops or rotates the litho clockwise (projected view) at variable speeds.
Reverse rotate	Stops or rotates the litho counter-clockwise (projected view) at variable speeds.
Wheel spin	Stops or spins the litho wheel in either direction at variable speeds.
Scan	Scans between two lithos at variable speeds.
Random	Randomly switches between lithos at variable speeds.

Frost (Studio Spot 575 and CMY models)

DMX Channel 17 controls the Frost options on Standard and CMY models equipped with Frost flags. The frost system provides infinite beam diffusion, variable and random frost strobing, and variable and random ramp/snap effects. Table 4-5 describes the available frost functions.

Note: This parameter is replaced by the Zoom parameter in models that have the Zoom lens installed.

Table 4-5 Frost Functions

Function	Description
No Frost	Removes the frost flags from the optical path.
Variable	Allows variable diffusion.
Full Frost	Allows variable full diffusion.
Periodic strobe	Allows variable strobing of the frost flags.
Random frost strobe	Allows random strobing of the frost flags.
Ramp open/snap shut	Allows the system to ramp open at variable speeds and snap shut at full speed.
Snap open/ramp shut	Allows the system snap open at full speed and ramp shut at variable speeds.
Random ramp open/snap shut	Allows the system to ramp open at random speeds and snap shut at full speed.
Random snap open/ramp shut	Allows the system to snap open at full speed and ramp shut random speeds.

Zoom (Studio Spot 575 Zoom/CMY Zoom models)

For Studio Spot 575 fixtures fitted with a zoom lens, DMX channel 17 controls the variable mechanical zoom from 18° (DMX value of 0) to 30° (DMX value of 255).

Focus

Channel 18 controls the variable Focus mechanism that physically moves the lens assembly inside the bezel. This allows both litho wheels to be brought in or out of focus from 1 meter to infinity. Due to the short focal distance between litho wheels, patterns can be easily morphed. Additionally, combination patterns can be created by mixing patterns and/or effects.

Iris

The precision iris (Channel 19) manipulates the beam diameter. Additionally, the iris offers strobing, random strobing, and ramp/snap effects. Table 4-6 shows iris functions and descriptions. Iris Strobing effects are created by quickly opening and shutting the iris. Iris Strobing closes the iris to a pinhole and does not go completely black.

Note: Iris and Shutter Strobing Effects operate independently.

Table 4-6 Iris and Iris Strobing Effects

Function	Description
Variable	Varies the beam diameter from closed to open.
Variable strobe	Allows variable strobing of the beam diameter.
Random strobe	Allows random strobing of the beam diameter.
Ramp open/snap shut	The Iris ramps open at variable speeds and snaps shut at full speed.
Snap open/ramp shut	The Iris snaps open at full speed and ramps shut at variable speeds.
Random ramp open/snap shut	The Iris ramps open at random speeds and snaps shut at full speed.
Random snap open/ ramp shut	The Iris snaps open at full speed and ramps shut at random speeds.

Shutter

Channel 20 controls Shutter effects. Studio Spot fixtures utilize a dimming system to produce instant blackout, variable and random speed strobes, and variable and random ramp/snap strobes. Additionally, Studio Spot can dim while strobing. Refer to Table 4-7 for strobe channel functions and descriptions.

Table 4-7 Shutter Strobe Functions

Function	Description
Open	Opens the strobe system.
Closed	Allows instant blackout.
Variable	Allows variable speed strobing.
Random	Allows random speed strobing.
Ramp open/snap shut	Dim flags ramp open at variable speeds and snap shut at full speed.
Snap open/ramp shut	Dim flags snap open at variable speeds and ramp shut at full speed.
Random ramp open/ snap shut	Dim flags ramp open at random speeds and snap shut at full speed.
Random snap open/ ramp shut	Dim flags snap open at full speed and ramp shut at random speeds.

Dimming

Dimming is controlled by DMX Channel 21 with values from 0 (Shutter closed) to 255 (Shutter Open). Studio Spot has full dimming capability without changing the color temperature or the shape of the projection. This is accomplished with dimming flags that are positioned out of the focal length.

MSpeed

MSpeed (movement speed) is a separate timing option provided on all High End Systems fixtures.

The MSpeed (Channel 22) parameter is the amount of time required to complete a movement from one position to another. All fixtures that have the same MSpeed value reach their destination at the same time,

regardless of the

distance traveled. This technique smooths the motion, since it is no longer dependent on DMX refresh rates. MSpeed is not linearly scaled, it is exponentially scaled as shown in Figure 4-5.

Note: The darker region in the above “MSpeed Values” indicates DMX values 0-3 which disable MSpeed and allow the console to crossfade the fixture.

Typically, MSpeed applies to pan and tilt positioning; however, it can be selectively applied to color selection, litho selection, and litho rotation.

To determine exact MSpeed times, refer to “Appendix B: MSpeed Conversion Table” . To control the Pan and Tilt parameters with DMX console crossfading, set Pan/Tilt MSpeed off in the Control parameter, see Table 4-9, “Control Functions,” on page 4-20 and “Appendix A: DMX Protocol” .

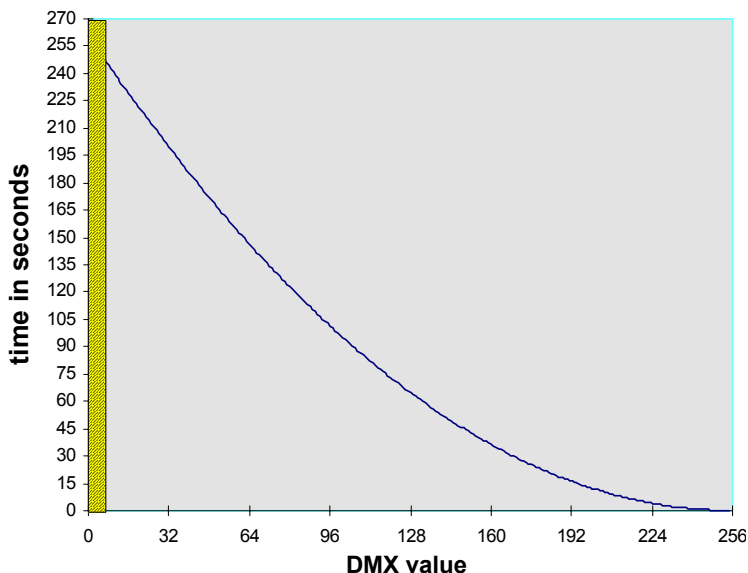


Figure 4-5 MSpeed Values

Macro Parameter

Complicated looks can be quickly programmed by using one of the 8 factory-programmed macros controlled by the Macro Parameter (Channel 23). Sequences can also be created using the variable speed random macro which randomly plays all the macros. Each macro modifies a specific set of constructs to produce a unique look, while allowing you to retain control of all other constructs.

When a macro is in use, you will be unable to manipulate the constructs it controls. For example, if you turn on a Macro and it sets Litho wheel 1 to position 5 and rotates it forward at 20 r.p.m., you will be unable to change the litho position, rotational direction (function), or rotational speed.

Table 4-8 describes the factory macros available for Studio Spot 575 fixtures.

Table 4-8 Macro Functions

Macro	Description	Constructs Used
1	Odd addressed fixtures perform a 'lazy 8' movement followed by even addressed fixtures.	PAN, TILT
2	Sequentially addressed fixtures in groups of two perform 'ballyhoo' movements.	PAN, TILT
3	Sequentially addressed fixtures in groups of four perform a tilt 'wave.' This moves tilt from back to front with the shutter open and then moves tilt from front to back with the shutter closed.	TILT, SHUTTER
4	Odd addressed fixtures perform a pan 'lighthouse' movement followed by even addressed fixtures. This moves pan from left to right for 360° with the shutter open and then moves pan from right to left for 360° with the shutter closed.	PAN, SHUTTER
5	Odd addressed fixtures perform 'swoop' movement followed by even addressed fixtures.	PAN, TILT, DIM
6	Sequentially addressed fixtures in groups of four perform 'swoop' movements.	PAN, TILT, DIM
7	Odd addressed fixtures perform a slow dim ramp up and ramp down followed by even addressed fixtures.	DIM
8	Sequentially addressed fixtures in groups of four perform a slow dim ramp up and ramp down.	DIM

Control Channel

Channel 24 functions as the Control channel, allowing access and control of special fixture functions. Table 4-9 describes the Control functions.

Table 4-9 Control Functions

Control Setting	Description
Safe	Disables all Control settings for normal operation. The Control channel should not be crossfaded.
Disable MSpeed for Pan and Tilt	Disables pan and tilt to allow the console to crossfade fixture positions. When MSpeed is disabled for pan and tilt, you can selectively use MSpeed for litho and color wheels movements.
Display Off	Sets display to off.
Display Dim	Dims display characters.
Display Bright	Brightens the display characters.
Home	Recalibrates the fixture's mechanical positions to ensure that fixtures attain the correct positions from DMX data.
Lamp On	The lamp can be turned off at any time. If the fixture has been in operation, the lamp must cool for approximately 5 minutes before it can restrike.
Lamp Off	
Lock	Returns all fixtures to a "known" position (128° tilt and either 90° or 450° pan). This option is used when you are ready to shut down the fixtures and pack them for transport.
Shutdown	Extinguishes lamp, removes power to the motor systems, and turns off the front panel display and indicators. Fixture shutdown allows you to remotely deactivate a fixture or a range of fixtures without manually turning off each breaker. Fixtures must be home on a restart after shutdown.

Chapter 5:

General Maintenance

This chapter includes information on replacing parts, and cleaning the fixture. Please note the warnings under each heading before servicing the fixture.



Warning: This fixture must be serviced by qualified personnel. The information listed in this chapter is intended to assist qualified personnel only.

If other maintenance is required, refer servicing to a qualified technician. Technical support can provide you with faster service if you can provide the following information:

- Customer and company name
- Country, if other than U.S.A.
- Phone number and fax number
- Fixture serial number
- Error message(s) on your Studio Spot display
- Description of your problem and the troubleshooting procedures that you have performed so far to diagnose and resolve your problem
- Software version

The following toolset is sufficient for the maintenance procedures in this chapter:

- 2.0, 2.5, and 3 mm allen wrench
- Flathead screwdriver
- Gloves

Several of the maintenance operations described in this chapter require bezel removal.

Before You Begin

Before you begin, read and understand the following warnings:



Warning: Do not submerge in liquid! If any liquid has been spilled on or into the fixture, contact High End Systems technical support before attempting to service the fixture.

There are no user serviceable parts inside the top box. Servicing should only be conducted by a qualified technician.

High Voltage! Touching internal electrical components can result in electric shock!



Disconnect the fixture from power before servicing.

Exterior surfaces can reach 200° C and interior surfaces can exceed 250° C. Allow the fixture to cool for five minutes before touching any surface.

Always wear hand and eye protection when servicing the fixture.

Replacing the Lamp

You will need the following items to replace the lamp:

- ¼ inch hex wrench
- Phillips MSR 575/2, MSD 575, or other factory approved GX 9.5 base, 575 watt, metal-halide lamp
- Protective gloves
- Protective goggles

To replace the lamp:

1. Remove power from fixture.
2. Using the ¼-inch hex wrench, loosen the hex screws located at the rear of the fixture and remove the lamp access cover. See Figure 5-1.
3. Remove the old lamp from the socket by lifting straight off the base.
4. Holding the new lamp by its base, align the base pins to the socket and carefully push the lamp into the socket. See Figure 5-2.

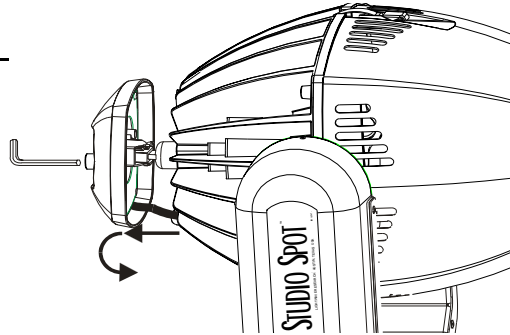


Figure 5-1 Removing Lamp Access Cap

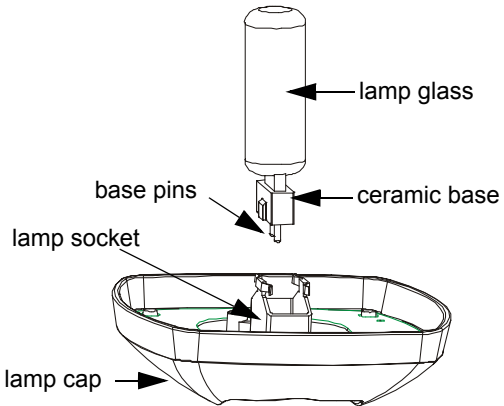


Figure 5-2 Installing the Lamp



Warning: Do not touch the lamp with bare fingers. The oils from your skin can damage the lamp and cause it to explode. If the lamp is accidentally touched, clean it immediately with a soft cloth and isopropyl alcohol ((CH₃)₂CHOH). An alcohol cloth is provided with each lamp.

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



Caution: do not overtighten the hex screws.

Notes: When a lamp is replaced, remember to reset the lamp hours as outlined in “Resetting Lamp Hours” on page 3-6 and optimize the lamp as outlined below.

Optimizing the Lamp

When a lamp is replaced, you will need to optimize the new lamp’s position in the optical path. Optimizing the lamp ensures that you will have a flat field across the entire beam diameter.

To optimize the lamp:

1. Mount the fixture in an orientation so that it may be squarely projected onto a smooth white surface no less than 10 feet (3 meters) away.
2. Using a console or the menu system, focus an open (white) beam onto the surface and observe the beam.
3. Using a #2 phillips-head screw driver, rotate the three lamp adjust screws until you achieve a uniform flat field as shown in Figure 5-3.

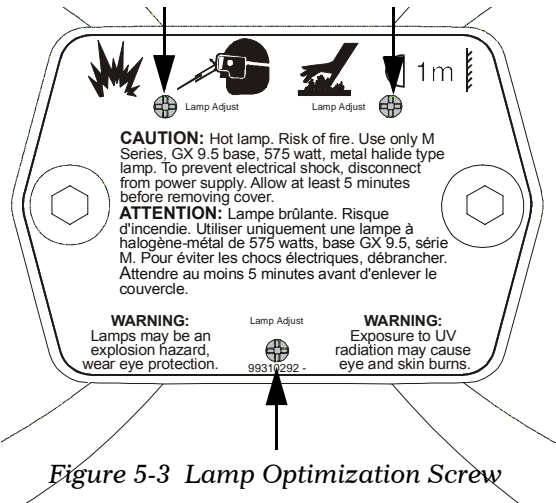


Figure 5-3 Lamp Optimization Screw

When the lamp is correctly optimized, the field will have an even disbursement of light throughout the entire beam diameter.

Lens Installation

Studio Spot offers three lenses to accommodate all applications. To determine the best lens for a specific application, use Table 5-1 for calculating the beam diameter with each type of lens. Calculations can be used for feet or meters.

To install an accessory lens, complete the following procedure:

1. Remove power from the fixture and place it upright on a flat surface.
2. Remove the bezel by releasing the two latches located in the middle of the head, see Figure 2-1 on page 2-1.
3. Remove the safety cable from its latch and set the bezel on a flat surface.
4. Loosen the thumb screw which holds the lens ring in place and pivot the ring away from the lens, see Figure 5-4.
5. Remove the lens from the assembly and set it aside.
6. Align the lip of the new lens with the ring and slide it into the assembly as shown in Figure 5-4.
7. Pivot the ring back to secure the lens to assembly and retighten the thumb screw.
8. Replace the bezel, attach the safety cable, and secure its latches.

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

Table 5-1 Calculating Beam Angle

Distance From Fixture	13° Lens Diameter	18° Lens Diameter	30° Lens Diameter
5	1.1	1.6	2.7
10	2.3	3.2	5.4
15	3.4	4.8	8
20	4.5	6.3	10.7
25	5.7	7.9	13.4
30	6.8	9.5	16.1
35	8	11.1	18.8
40	9.1	12.7	21.4
45	10.3	14.3	24.1
50	11.4	15.8	26.8
55	12.5	17.4	29.5
60	13.7	19	32.2
65	14.8	20.6	34.8
70	16	22.2	37.5
75	17.1	23.8	40.2
80	18.2	25.3	42.9
85	19.4	26.9	45.6
90	20.5	28.5	48.2
95	21.6	30.1	50.9
100	22.8	31.7	53.6

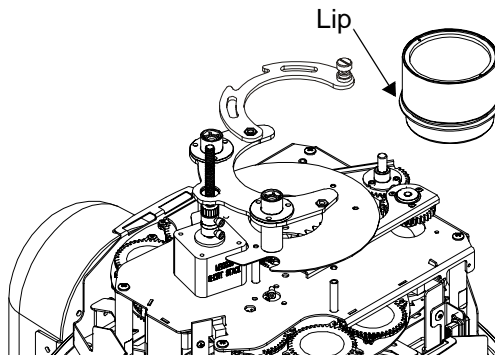
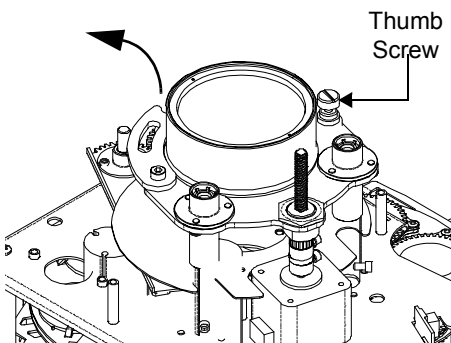


Figure 5-4 Removing and replacing Lens

Replacing Dichroic Glass

Studio Spot uses the same dichroic glass catalog as Cyberlight, Cyberlight CX, and Studio Color. Custom colors can also be ordered from High End Systems.

When replacing colors, plan ahead to ensure you will acquire the desired color combinations. Colors such as indigo and aqua can only be created by a dedicated filter and they do not mix with other colors.

To install dichroic glass:

1. Remove power from the fixture and place it upright on a flat surface.
2. Remove the bezel by releasing the two latches located in the middle of the fixture head, see Figure 2-1 on page 2-1.
3. Remove the safety cable from its latch and set the bezel aside.
4. Locate the color wheels as shown in Figure 5-5.
5. Rotate the desired color wheel so that the color you wish to replace is accessible from the edge and rotate the opposing color wheel so that its open position is at the edge.

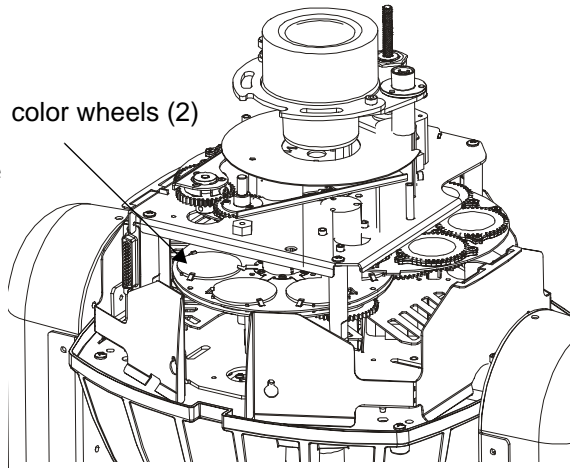


Figure 5-5 Locating the Color Wheels

- Note: Color wheel 1 is inversely oriented in the optical module.*
6. Gently push the dichroic glass towards the spindle in the center of the color wheel (A), lift the edge away from the wheel (B), and remove the glass as shown in Figure 5-6.

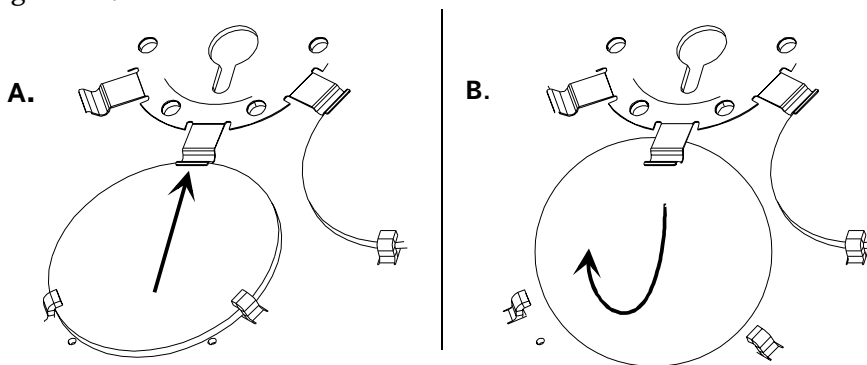


Figure 5-6 Removing Dichroic Glass



Caution: Be careful not bend or lift the inner tabs up.

7. Install the new dichroic into the color wheel with the *coated side towards the wheel*. See Figure 5-7 To determine the coated side, see Figure 5-8.

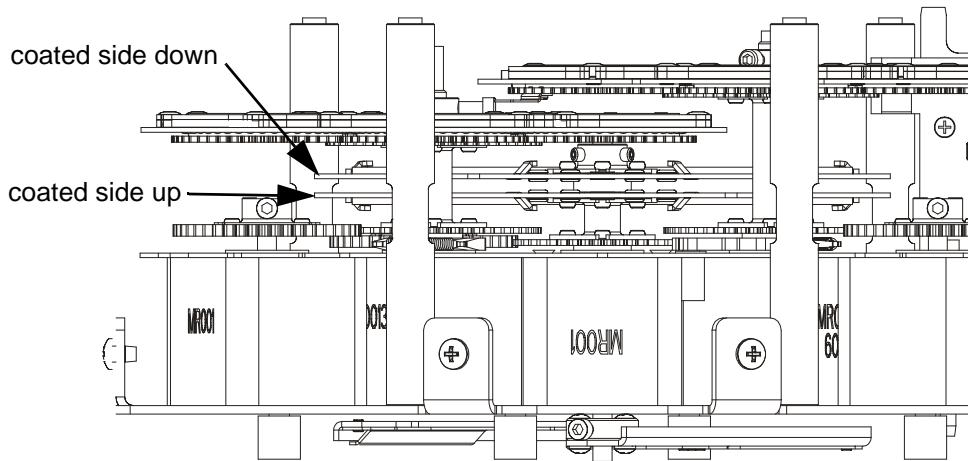
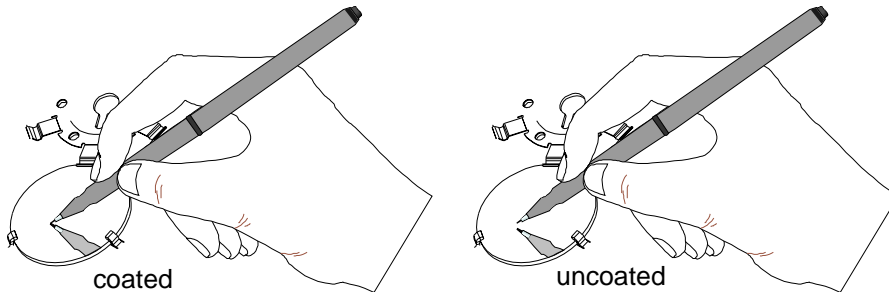


Figure 5-7 Dichroic Glass Orientation

Caution: Improper installation can cause color shifts around the edge of the beam.



Place an object near the surface, the reflection will appear to touch the object on the coated side.

Figure 5-8 Determining The Coated Side of Dichroic Glass

8. Replace the bezel, secure the safety cable to its clamp, and re-latch the bezel.

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

LithoPattern and Effect Installation

To install LithoPatterns or effects:

1. Remove power from the fixture and place it upright on a flat surface.
2. Remove the bezel by releasing the two latches located in the middle of the fixture head. see Figure 2-1 on page 2-1.
3. Remove the safety cable from its latch and set the bezel aside.
4. Locate the litho wheels as shown in Figure 5-9.
5. Rotate the desired wheel to the litho or effect you want to replace. Take note of the positions in relation to the tabs, see Figure 5-10.
6. Locate the spring securing the litho or effect to the wheel. Pull the spring tip towards the center of the aperture, see Figure 5-11. The spring will release from its groove inside the aperture.
7. Remove the spring and litho/effect from the aperture.
8. Place the new litho, effect, or gobo into the aperture and replace the spring. If you are installing a litho, insert it with the *coated side away from the lamp*. To determine the coated side, see Figure 5-8. However, if you are installing an effect, insert it with the smooth side towards the wheel.

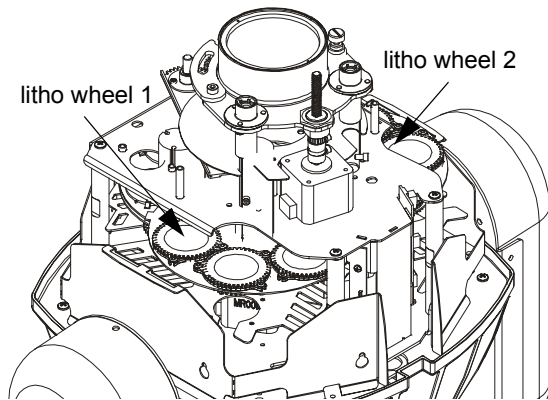


Figure 5-9 Locating the Litho/Effect Wheels

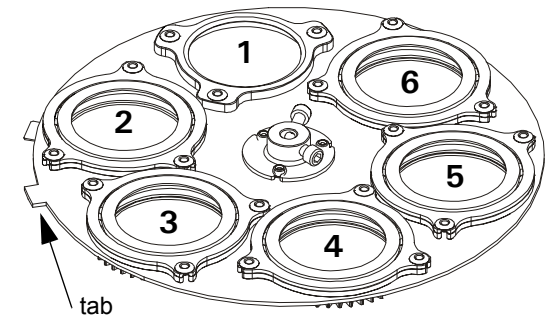


Figure 5-10 Factory Litho Wheel Position

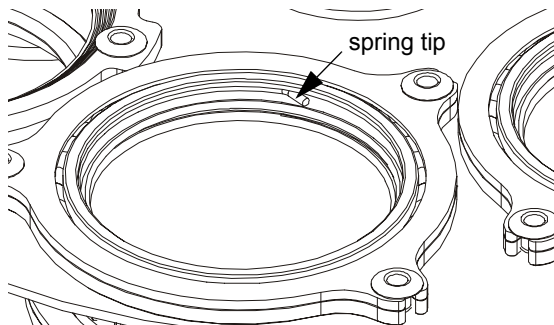


Figure 5-11 Removing the Securing Spring



Caution: Improper installation is likely to cause lithos to fail.

9. Replace the bezel, secure the safety cable to its clamp, and re-latch the bezel.

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

Cleaning Components

You should clean your Studio Spot on a regular basis. Dust, fog, and smoke particles can accumulate and cause malfunctions.

To clean the exterior surfaces, wipe with a soft lint-free polyester cloth or use a small vacuum to remove any built-up dust and dirt. For stubborn substances (grime and serious build up), use Industrial Strength Green 409™ cleaner (sparingly) and a soft cloth.



Caution: Do not use a blower because it will force foreign particles into the fixture.

To clean interior surfaces and optical components, use a soft lint-free polyester cloth with isopropyl ((CH₃)₂CHOH) or ethyl (CH₃CH₂OH) alcohol.

Tip: for optimal cleaning, use a mixture of 70% alcohol to 30% water for the initial cleaning. Then clean the same parts with 100% alcohol.

Chapter 6:

Troubleshooting

This Chapter 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. Before contacting Technical Support, please have information outlined in the “Support Checklist” at the end of this chapter ready.

If you need to return your fixture for warranty or non-warranty service, please follow the procedures outlined in “Returning an Item Under Warranty for Repair” on page vii.

Before You Begin

Before you begin, read and understand the following warnings:



Warning: Do not submerge in liquid! If any liquid has been spilled on or into the fixture, contact High End Systems technical support before attempting to service the fixture.

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There are no user serviceable parts inside the top box. Servicing should only be conducted by a qualified technician.

High Voltage! Touching internal electrical components can result in electric shock!

Disconnect the fixture from power before servicing.

Exterior surfaces can reach 200° C and interior surfaces can exceed 250° C. Allow the fixture to cool for five minutes before touching any surface.



Always wear hand and eye protection when servicing the fixture.

Status LEDs

Five status LEDs are located on the side panel above the display and provide the following indications:

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

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

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

Transmit data indicator. This LED is on when the fixture is the bus master (not the console), when the fixture is the master during a crossload, and during preset playback.

Receive data indicator. This LED flickers to indicate received data.

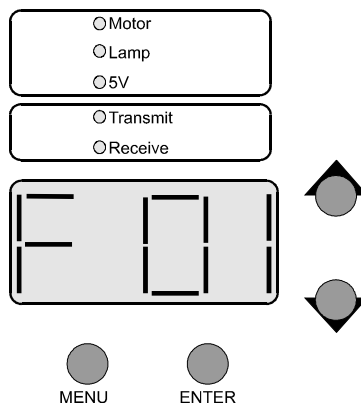


Figure 6-1 Status LEDs on front panel above

Display Error Messages

Studio Spot fixtures contains a comprehensive set of tests and messaging that will display errors automatically when present. Use Table 6-1 to identify and solve or report errors to a qualified service technician.

Table 6-1 Display Error Messages

Display Message	Problem	Troubleshooting Step(s)
ADDR LOST	Fixture address can't be read from EEPROM	Refer to qualified service personnel
ADDR OVER	Stored address exceeds fixture limit	Set a valid fixture address
BOOT DIFF	Boot code does not match old boot code	Store new boot code. Refer to "Changing Boot Codes" on page 3-9
COOL	Lamp needs to cool	The fixture will restrike the lamp as soon as it cools
EMEM ERR	Data is not readable from the EEPROM for various fields	Refer to qualified service personnel
FMEM ERR	Flash memory error	Refer to qualified service personnel
ERSE FLSH	Flash ROM could not be erased during an upload	Refer to qualified service personnel

Table 6-1 Display Error Messages (Continued)

Display Message	Problem	Troubleshooting Step(s)
FPGA ERR	Read/write error from Field Programmable Gate Array	Refer to qualified service personnel
ID ERR	ID or unique number error	Refer to qualified service personnel
LAMP OUT ERR	Lamp has burned out during operation	Replace lamp, see “Replacing the Lamp” on page 5-2
LAMP TOUT ERR	Lamp will not strike	<ol style="list-style-type: none"> 1. Allow time for the lamp to cool and try restriking the lamp 2. Replace lamp, see “Replacing the Lamp” on page 5-2 3. Refer to qualified service personnel
LINK BUSY	Other data present on the link during a crossload	Disconnect console
LINK EMTY	No fixtures were found to crossload to	<ol style="list-style-type: none"> 1. Check that other Studio Spot fixtures are connected to the master through the link. 2. Check cabling
LINK ERR	Link error	<ol style="list-style-type: none"> 1. Test and replace cable(s) as necessary 2. Test fixture output by bypassing each fixture 3. Refer to qualified service personnel
OVER TEMP	Logic board temperature exceeds limit	<ol style="list-style-type: none"> 1. Reduce ambient temperature and move significant heat sources 2. Refer to qualified service personnel
PAN DRV ERR	Pan driver error	<ol style="list-style-type: none"> 1. Check that motor wire isn’t shorted to ground 2. Refer to qualified service personnel
PAN ENCD	Pan encoder error	<ol style="list-style-type: none"> 1. Re-connect encoder 2. Refer to qualified service personnel
PAN ERR	Pan homing error	<ol style="list-style-type: none"> 1. Check for loose pinion gear 2. Check for loose motor cable 3. Check cabling to pan input 4. Run self-test, see “Self Tests” on page 3-11. 5. Replace sensor if non functional on self-test 6. Replace motor if non functional on self-test 7. Refer to qualified service personnel
PAN STOP	Pan encoder position does not match physical position	<ol style="list-style-type: none"> 1. Remove any physical obstruction and home the fixture 2. Refer to qualified service personnel
PRGM TIME	Fixture failed to upload within allotted time	<ol style="list-style-type: none"> 1. Try to upload again 2. Refer to qualified service personnel
SVCC ERR	Sensor power error	<ol style="list-style-type: none"> 1. Check cable connection 2. Refer to qualified service personnel

Table 6-1 Display Error Messages (Continued)

Display Message	Problem	Troubleshooting Step(s)
SENS TOUT	Pan or Tilt sensor unable to correct position	1. Remove any physical obstruction and home the fixture 2. Refer to qualified service personnel
SEN1 ERR	Litho wheel 1 sensor error	1. Check to ensure tab crosses sensor 2. Perform Self test 3. Refer to qualified service personnel
SEN2 ERR	Litho wheel 2 sensor error	1. Check to ensure tab crosses sensor 2. Perform Self test 3. Refer to qualified service personnel
SENC ERR	Color wheel sensor error	1. Check to ensure tab crosses sensor 2. Perform Self test 3. Refer to qualified service personnel
THRM CHIP	Microprocessor is over temperature	Reduce ambient temperature or proximity to other heat sources
THRM PAN	Pan driver is over temperature	Reduce ambient temperature or proximity to other heat sources
THRM TILT	Tilt driver is over temperature	Reduce ambient temperature or proximity to other heat sources
TILT CONN	Tilt sensor error	1. Check sensor connections 2. Refer to qualified service personnel
TILT DRV ERR	Tilt driver error	<i>motor wire shorted to ground</i> <i>driver chip bad</i> refer to qualified service personnel
TILT ENCD	Tilt encoder error	<i>encoder sensor is not connected</i> connect encoder <i>encoder is not functioning properly</i> refer to qualified service personnel
TILT ERR	Tilt homing error	1. Check for: <ul style="list-style-type: none"> • loose pinion gear • loose motor cable • incorrect cabling to tilt input • bad sensor • bad motor 2. Run self-test 3. Refer to qualified service personnel
TILT STOP	Tilt encoder position not matching physical position	1. Remove any physical obstruction and home the fixture 2. Refer to qualified service personnel

General Troubleshooting

Use the following table to troubleshoot problems that are not identified by the menu system.

Problem	Troubleshooting Step(s)
Unit will not turn on	<ol style="list-style-type: none"> 1. Verify that power is connected. 2. Verify that breaker is on. 3. For possible faulty power connector or power line filter, refer to qualified technician.
Unit functions but lamp does not strike	<ol style="list-style-type: none"> 1. If lamp is still hot from recent operation, leave the unit turned on and when the lamp's temperature drops, it will restrike. 2. Check for loose ignitor connection. 3. Replace lamp, see "Replacing the Lamp" on page 5-2.
Lamp is dimmer than other units	<ol style="list-style-type: none"> 1. Clean optics, see "Replacing the Lamp" on page 5-2. 2. Replace lamp.
Unit will not home properly	<ol style="list-style-type: none"> 1. Verify that all belts are tight. 2. Replace sensor(s).
Color system is not producing the correct color	Re-home the fixture.
Pan or tilt position is off	<ol style="list-style-type: none"> 1. Verify that all belts are tight. 2. Home the fixture.
Unit is not responding to console	<ol style="list-style-type: none"> 1. Verify that the fixture has the correct DMX address, see "Setting the Fixture Address" on page 2-10. 2. Check and replace bad data cables, see "DMX Data Cables" on page 1-6. 3. Verify that the last fixture on the link is terminated, see "Constructing a Terminator" on page 2-8.
Unit is producing unexpected results	<ol style="list-style-type: none"> 1. Check DMX starting address on the fixture and console match, see "Setting the Fixture Address" on page 2-10. 2. Verify that the last fixture on the link is terminated, see "Constructing a Terminator" on page 2-8.
Display is not functioning	<ol style="list-style-type: none"> 1. Verify that the display is turned on, see "Using the up and down buttons, select either <i>F i x t u r e</i> (fixture number mode) or <i>d M X</i> (DMX starting channel mode) and press <ENTER>. The options in the <i>F i x t u r e</i> will now reflect the numbering for the selected method. Setting Display Intensity" on page 3-14. 2. Check that power connectors are firmly seated. 3. Replace logic board (Call High End Systems technical support for assistance).

Upload Troubleshooting

The following table provides information for troubleshooting upload problems.

Problem	Troubleshooting steps
Not all fixtures on link are receiving download	<ol style="list-style-type: none">1. Check that all the units are turned on.2. Reconnect cable(s).3. Test and replace cable(s) as necessary.
Fixture displays: <code>b□□T dIFF</code>	<ol style="list-style-type: none">1. Store new boot code. See “Changing Boot Codes” on page 3-9.
Fixtures are not crossloading	<ol style="list-style-type: none">1. Disconnect any console connected to the link and attempt the upload again.2. Remove the fixture(s) from the data link or move them after Studio Spot fixtures.

Onboard Self-Tests

Studio Spot 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 3-11.

Testing DMX Data

Studio Spot has the ability to view any of the 512 DMX channels on its link. This is a very useful feature to ensure Studio Spot and other fixtures are receiving the correct data from your DMX console. To test individual DMX data by channel, perform the procedures outlined in “Viewing DMX Data by Channel Number” on page 3-8. To view DMX errors, overrun errors, framing errors, and start code errors refer to the procedures outlined in “Viewing DMX Values” on page 3-8.

Support Checklist

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

- Customer and company name
- Country, if other than U.S.A.
- Phone number and fax number
- Fixture serial number
- Error message(s) on your Studio Spot display
- Description of your problem and the troubleshooting procedures that you have performed so far to diagnose and resolve your problem
- Software version

Appendix A: DMX Protocol

Standard Studio Spot® 575DMX Protocol

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
1	Pan Coarse	Coarse-adjusts pan to approximately 2 degrees of desired position	0-255	0-100	00-FF
2	Pan Fine	Fine-adjusts pan position in increments less than 1 degree	0-255	0-100	00-FF
3	Tilt Coarse	Coarse-adjusts tilt to approximately 2 degrees of desired position	0-255	0-100	00-FF
4	Tilt Fine	Fine-adjusts tilt position in increments less than 1 degree	0-255	0-100	00-FF
5	Color Wheel 1 Function	Full Speeds			
		Indexed	0-31	0-12	00-1F
		Forward spin	32-47	13-18	2D-2F
		Reverse spin	48-63	16-24	30-3F
		Continuous	64-79	25-30	40-4F
		Fast scan	80-87	31-33	50-57
		Slow scan	88-95	34-37	58-5F
		Random	96-111	37-43	60-6F
		Blink-indexed	112-127	44-49	70-7F
		MSpeed Controlled			
		Indexed	128-159	50-62	80-9F
		Forward spin	160-175	63-68	A0-AF
		Reverse spin	176-191	69-74	B0-BF
		Continuous	192-207	75-80	C0-CF
		Fast scan	208-215	81-83	D0-D7
		Slow scan	216-223	84-87	D8-DF
		Random	224-239	88-93	E0-EF
Blink-indexed	240-255	94-100	F0-FF		
6	Color Wheel 1 Position <i>Color designations for standard factory-configured color wheels only. Custom colors in color wheels will change combined color results</i>	Indexed Mode			
		Color 1	0-19	0-7	0-13
		Color 1 and 2	20-39	8-15	14-27
		Color 2	40-59	16-23	28-3B
		Color 2 and 3	60-78	24-30	3C-4E
		Color 3	79-98	31-38	4F-62
		Color 3 and 4	99-118	39-46	63-76
		Color 4	119-137	47-53	77-89
		Color 4 and 5	138-157	54-61	8A-9D
		Color 5	158-177	62-69	9E-B1

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Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)		
6	Color Wheel 1 Position, cont.	Color 5 and 6	178-196	70-76	B2-C4		
		Color 6	197-216	77-84	C5-D8		
		Color 6 and 1	217-236	85-92	D9-EC		
		Color 1	237-255	93-100	ED-FF		
		Continuously Variable Mode					
		Color 1	0	0	0		
		Color 2	43	16	2B		
		Color 3	85	33	55		
		Color 4	128	50	80		
		Color 5	170	66	AA		
		Color 6	213	83	D5		
		Color 1	255	100	FF		
		Continuously Variable Forward Spin Mode					
		Spin stop	0-3	0-1	0-3		
		Spin forward slowest	4	2	4		
		Spin forward fastest	255	100	FF		
		Continuously Variable Reverse Spin Mode					
		Spin stop	0-3	0-1	0-3		
		Spin reverse slowest	4	2	4		
		Spin reverse fastest	255	100	FF		
		Random Mode					
		Random stop	0-3	0-1	0-3		
		Random slowest	4	2	4		
		Random fastest	255	100	FF		
		Combined Mode*					
		Color 1, Open	0-6	0-2	0-6		
		Color 2, Yellow	7-13	3-5	7-0D		
		Color 3, CTO	14-20	6-7	0E-14		
		Color 4, Aqua	21-27	8-10	15-1B		
		Color 5, Pink	28-34	11-13	1C-22		
		Color 6, Magenta	35-41	14-16	23-29		
		Color 7, Cyan	42-47	17-18	2A-2F		
		Color 8, Dark Green	48-54	19-21	30-36		
		Color 9, Moonlight Blue	55-61	22-23	37-3D		
		Color 10, Primary Green	62-68	24-26	3E-44		
		Color 11, Medium Blue	69-75	27-29	45-4B		
		Color 12, Indigo	76-82	30-32	4C-52		
		Color 13, Light Cyan	83-89	33-34	53-59		
		Color 14, Dark Yellow Green	90-96	35-37	5A-60		
		Color 15, BlueGreen	97-103	38-40	61-67		
Color 16, Indigo	104-110	41-42	68-6E				
Color 17, Congo Blue	111-117	43-45	6F-75				
Color 18, Rose Indigo	118-124	46-48	76-7C				
Color 19, Indigo	125-130	49-50	7D-82				

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)		
6	Color Wheel 1 Position, cont.	Color 20, Indigo	131-137	51-53	83-89		
		Color 21, Does Not Mix	138-144	54-56	8A-90		
		Color 22, Dark Indigo	145-151	57-58	91-97		
		Color 23, Does Not Mix	152-158	59-61	98-9E		
		Color 24, Indigo	159-165	61-64	9F-A5		
		Color 25, Magenta	166-172	65-67	A6-AC		
		Color 26, Orange	173-179	68-69	AD-B3		
		Color 27, Cherry Rose	180-186	70-72	B4-BA		
		Color 28, Does Not Mix	187-193	73-75	BB-C1		
		Color 29, Pink	194-200	76-78	C2-C8		
		Color 30, Broadwayway Pink	201-207	79-80	C9-CF		
		Color 31, Magenta	208-213	81-83	D0-D2		
		Color 32, Red	214-220	84-85	D3-D9		
		Color 33, Red Rose	221-227	86-88	DA-E3		
		Color 34, Does Not Mix	228-234	89-91	E4-EA		
		Color 35, Broadway Pink	235-241	92-94	EB-F1		
		Color 36, Magenta	242-248	95-96	F2-F8		
		Color 1, Open	249-255	97-100	F9-FF		
		Combined Continuous Mode*					
			Color 1, Open	0	0	0	
			Color 2, Yellow	8	3	8	
			Color 3, CTO	15	5	0F	
			Color 4, Aqua	22	8	16	
			Color 5, Pink	29	11	1D	
			Color 6, Magenta	36	14	24	
			Color 7, Cyan	43	16	2B	
			Color 8, Dark Green	50	19	32	
			Color 9, Moonlight Blue	57	22	39	
			Color 10, Primary Green	64	25	40	
			Color 11, Medium Blue	72	28	48	
			Color 12, Indigo	79	30	4F	
			Color 13, Light Cyan	86	33	56	
			Color 14, Dark Yellow Green	93	36	5D	
			Color 15, Blue Green	100	39	64	
			Color 16, Indigo	107	41	6B	
			Color 17, Congo Blue	114	44	72	
			Color 18, Rose Indigo	121	47	79	
			Color 19, Indigo	128	50	80	
			Color 20, Indigo	136	53	88	
			Color 21, Does Not Mix	143	55	8F	
			Color 22, Dark Indigo	150	58	96	
			Color 23, Does Not Mix	157	61	9D	
			Color 24, Indigo	164	64	A4	
	Color 25, Magenta	171	66	AB			

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Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
6	Color Wheel 1 Position, cont.	Color 26, Orange	178	69	B2
		Color 27, Cherry Rose	185	72	B9
		Color 28, Does Not Mix	193	75	C1
		Color 29, Pink	200	78	C8
		Color 30, Broadwayway Pink	207	80	CF
		Color 31, Magenta	214	83	D3
		Color 32, Red	221	86	DA
		Color 33, Red Rose	228	89	E4
		Color 34, Does Not Mix	235	91	EB
		Color 35, Broadway Pink	242	94	F2
		Color 36, Magenta	249	97	F9
			Color 1, Open	255	100
7	Color Wheel 2 Function	Full Speed			
		Combined Operation	0-15	0-5	0-f
		Indexed	16-31	6-12	10-1F
		Forward spin	32-47	13-18	2D-2F
		Reverse spin	48-63	19-24	30-3F
		Continuous	64-79	25-30	40-4F
		Fast scan	80-87	31-33	50-57
		Slow scan	88-95	34-37	58-5F
		Random	96-111	37-43	60-6F
		Blink-indexed	112-127	44-49	70-7F
		MSpeed Controlled			
		Indexed	128-159	50-62	80-9F
		Forward spin	160-175	63-68	A0-AF
		Reverse spin	176-191	69-74	B0-BF
		Continuous	192-207	75-80	C0-CF
		Fast scan	208-215	81-83	D0-D7
		Slow scan	216-223	84-87	D8-DF
		Random	224-239	88-93	E0-EF
		Blink-indexed	240-255	94-100	F0-FF
		8	Color Wheel 2 Position	Indexed Mode	
Color 1	0-19			0-7	0-13
Color 1 and 2	20-39			8-15	14-27
Color 2	40-59			16-23	28-3B
Color 2 and 3	60-78			24-30	3C-4E
Color 3	79-98			31-38	4F-62
Color 3 and 4	99-118			39-46	63-76
Color 4	119-137			47-53	77-89
Color 4 and 5	138-157			54-61	8A-9D
Color 5	158-177			62-69	9E-B1
Color 5 and 6	178-196			70-76	B2-C4
Color 6	197-216			77-84	C5-D8
Color 6 and 1	217-236			85-92	D9-EC
Color 1	237-255			93-100	ED-FF

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
8	Color Wheel 2 Position	Continuously Variable Mode			
		Color 1	0	0	0
		Color 2	43	16	2B
		Color 3	85	33	55
		Color 4	128	50	80
		Color 5	170	66	AA
		Color 6	213	83	D5
		Color 1	255	100	FF
		Continuously Variable Forward Spin Mode			
		Spin stop	0-3	0-1	0-3
		Spin forward slowest	4	2	4
		Spin forward fastest	255	100	FF
		Continuously Variable Reverse Spin Mode			
		Spin stop	0-3	0-1	0-3
		Spin reverse slowest	4	2	4
		Spin reverse fastest	255	100	FF
		Random Mode			
Random stop	0-3	0-1	0-3		
Random slowest	4	2	4		
Random fastest	255	100	FF		
9	Litho Wheel 1 Function	Full Speed			
		Indexed	0-15	0-5	0-f
		Forward rotate	16-31	6-12	10-1F
		Reverse rotate	32-47	13-18	2D-2F
		Wheel Spin	48-63	16-24	30-3F
		Scan	64-79	25-30	40-4F
		Random	80-95	31-37	50-6F
		Blink wheel (Indexed)	96-111	38-43	60-6F
		Blink aperture (Indexed)	112-127	44-49	70-7F
		MSpeed Controlled			
		Indexed	128-143	50-55	80-8F
		Forward rotate	144-159	56-62	90-9F
		Reverse rotate	160-175	63-68	A0-AF
		Wheel Spin	176-191	69-74	B0-BF
		Scan	192-207	75-80	C0-CF
		Random	208-223	81-83	D0-D7
		Blink wheel (Indexed)	224-239	88-93	E0-EF
Blink aperture (Indexed)	240-255	94-100	F0-FF		

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Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
10	Litho Wheel 1 Position	Position 0	0-36	0-14	0-24
		Position 1	37-73	15-28	25-49
		Position 2	74-109	29-42	4A-6D
		Position 3	110-146	43-57	6E-92
		Position 4	147-182	58-71	93-B6
		Position 5	183-219	72-85	B7-D8
		Position 6	220-255	86-100	D9-FF
11	Litho Wheel 1 Coarse Rotation	Indexed Mode	0-255	0-100	00-FF
		Variable Forward Rotate Mode			
		Rotate stop	0-3	0-1	0-3
		Rotate forward slowest	4-255	2-100	04-FF
		Variable Reverse Rotate Mode			
		Reotate stop	0-3	0-1	0-3
		Reverse rotate slowest to fastest	4-255	2-100	04-FF
		Continuously Variable Wheel Spin Mode			
		Forward spin slowest to fastest	0-127	0-49	0-7F
		Reverse spin, slowest to fastest	128-255	50-100	80-FF
		Scan Mode			
		Scan slowest to fastest	0-255	0-100	00-FF
		Random Mode			
Random stop	0-3	0-1	0-3		
Random slowest to fastest	4-255	2-100	04-FF		
12	Litho Wheel 1 Fine Rotation	Indexed Mode	0-255	0-100	00-FF
13	Litho Wheel 2 Function	Full Speed			
		Indexed	0-15	0-5	0-f
		Forward rotate	16-31	6-12	10-1F
		Reverse rotate	32-47	13-18	2D-2F
		Wheel Spin	48-63	16-24	30-3F
		Scan	64-79	25-30	40-4F
		Random	80-95	31-37	50-6F
		Blink wheel (Indexed)	96-111	38-43	60-6F
		Blink aperture (Indexed)	112-127	44-49	70-7F
		MSpeed Controlled			
		Indexed	128-143	50-55	80-8F
		Forward rotate	144-159	56-62	90-9F
		Reverse rotate	160-175	63-68	A0-AF
		Wheel Spin	176-191	69-74	B0-BF
		Scan	192-207	75-80	C0-CF
		Random	208-223	81-83	D0-D7
		Blink wheel (Indexed)	224-239	88-93	E0-EF
Blink aperture (Indexed)	240-255	94-100	F0-FF		

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
14	Litho Wheel 2 Position	Position 0	0-36	0-14	0-24
		Position 1	37-73	15-28	25-49
		Position 2	74-109	29-42	4A-6D
		Position 3	110-146	43-57	6E-92
		Position 4	147-182	58-71	93-B6
		Position 5	183-219	72-85	B7-D8
		Position 6	220-255	86-100	D9-FF
15	Litho Wheel 2 Coarse Rotation	Indexed Mode	0-255	0-100	00-FF
		Variable Forward Rotate Mode			
		Rotate stop	0-3	0-1	0-3
		Rotate forward slowest	4-255	2-100	04-FF
		Variable Reverse Rotate Mode			
		Reotate stop	0-3	0-1	0-3
		Reverse rotate slowest to fastest	4-255	2-100	04-FF
		Continuously Variable Wheel Spin Mode			
		Forward spin slowest to fastest	0-127	0-49	0-7F
		Reverse spin, slowest to fastest	128-255	50-100	80-FF
		Scan Mode			
		Scan slowest to fastest	0-255	0-100	00-FF
		Random Mode			
		Random stop	0-3	0-1	0-3
Random slowest to fastest	4-255	2-100	04-FF		
16	Litho Wheel 2 Fine Rotation	Indexed Mode	0-255	0-100	00-FF
17	Frost	No frost	0	0	0
		Variable frost	1-127	1-49	1-7F
		Full frost	128-143	50-55	80-8F
		Periodic frost strobes	144-159	56-62	90-9F
		Random frost strobes	160-175	63-68	A0-AF
		Ramp open/ snap shut	176-191	69-74	B0-BF
		Snap open/ ramp shut	192-207	75-80	C0-CF
		Random ramp/ snap	208-223	81-87	D0-DF
		Random snap/ ramp	224-239	88-93	E0-EF
		Open	240-255	94-100	FO-FF
18	Focus	Focus image from closer to farther	0-255	0-100	0-FF
19	Iris	Closed	0	0	0
		Variable	1-127	1-49	1-7F
		Open	128-143	50-55	80-8F
		Periodic strobes	144-159	56-62	90-9F
		Random strobes	160-175	63-68	A0-AF
		Ramp open/ snap shut	176-191	69-74	B0-BF
		Snap open/ ramp shut	192-207	75-80	C0-CF
		Random ramp/ snap	208-223	81-87	D0-DF
		Random snap/ ramp	224-239	88-93	E0-EF
		Open	240-255	94-100	FO-FF



Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
20	Shutter	Closed	0-31	0-12	0-1F
		Periodic strobes	32-63	13-24	20-3F
		Random strobes	64-95	25-37	40-5F
		Ramp open/ snap shut	96-127	38-49	60-7F
		Snap open/ ramp shut	128-159	50-62	80-9F
		Random ramp open/ snap shut	160-191	63-74	A0-BF
		Random snap open/ ramp shut	192-223	75-87	C0-DF
		Open	224-255	88-100	E0-FF
21	Dim	Closed to open	0-255	0-100	00-FF
22	MSpeed (See Appendix B)	Controller Crossfade	0-3	0-1	0-3
		Longest to shortest MSPEED	4-255	2-100	4-FF
23	Factory Macros	No macro	0-7	0-2	0-7
		Macro 1	8-15	3-5	8-0F
		Macro 2	16-23	6-9	10-17
		Macro 3	24-31	10-12	18-1F
		Macro 4	32-39	13-15	20-27
		Macro 5	40-47	16-18	28-2F
		Macro 6	48-55	19-21	30-37
		Macro 7	56-63	22-24	38-3F
		Macro 8	64-71	25-27	40-47
		Reserved	72-215	28-84	48-D4
		Variable speed random macros	216-247	85-96	D5-F7
		No macro	248-255	97-100	F8-FF
24	Control	Safe	0-9	0-3	0-9
		Disable MSPEED for pan and tilt	10-19	4-7	0A-13
		Display off	20-28	8-11	14-1C
		Display dim	30-38	12-14	1E-26
		Display bright	40-48	15-18	28-30
		Home	60-68	23-26	3C-44
		Lamp on	80-88	31-34	50-58
		Lamp off	90-98	35-38	5A-62
		Shutdown	120-130	46-50	78-82
		Reserved	131-255	51-100	83-FF

Studio Spot® 575 Zoom DMX Protocol

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
1	Pan Coarse	Coarse-adjusts pan to approximately 2 degrees of desired position	0-255	0-100	00-FF
2	Pan Fine	Fine-adjusts pan position in increments less than 1 degree	0-255	0-100	00-FF
3	Tilt Coarse	Coarse-adjusts tilt to approximately 2 degrees of desired position	0-255	0-100	00-FF
4	Tilt Fine	Fine-adjusts tilt position in increments less than 1 degree	0-255	0-100	00-FF
5	Color Wheel 1 Function	Full Speeds			
		Indexed	0-31	0-12	00-1F
		Forward spin	32-47	13-18	2D-2F
		Reverse spin	48-63	16-24	30-3F
		Continuous	64-79	25-30	40-4F
		Fast scan	80-87	31-33	50-57
		Slow scan	88-95	34-37	58-5F
		Random	96-111	37-43	60-6F
		Blink-indexed	112-127	44-49	70-7F
		MSpeed Controlled			
		Indexed	128-159	50-62	80-9F
		Forward spin	160-175	63-68	A0-AF
		Reverse spin	176-191	69-74	B0-BF
		Continuous	192-207	75-80	C0-CF
		Fast scan	208-215	81-83	D0-D7
		Slow scan	216-223	84-87	D8-DF
		Random	224-239	88-93	E0-EF
Blink-indexed	240-255	94-100	F0-FF		
6	Color Wheel 1 Position	Indexed Mode			
		Color 1	0-19	0-7	0-13
		Color 1 and 2	20-39	8-15	14-27
		Color 2	40-59	16-23	28-3B
		Color 2 and 3	60-78	24-30	3C-4E
		Color 3	79-98	31-38	4F-62
		Color 3 and 4	99-118	39-46	63-76
		Color 4	119-137	47-53	77-89
		Color 4 and 5	138-157	54-61	8A-9D
		Color 5	158-177	62-69	9E-B1
		Color 5 and 6	178-196	70-76	B2-C4
		Color 6	197-216	77-84	C5-D8
		Color 6 and 1	217-236	85-92	D9-EC
		Color 1	237-255	93-100	ED-FF



Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
6	Color Wheel 1 Position, cont.	Continuously Variable Mode			
		Color 1	0	0	0
		Color 2	43	16	2B
		Color 3	85	33	55
		Color 4	128	50	80
		Color 5	170	66	AA
		Color 6	213	83	D5
		Color 1	255	100	FF
		Continuously Variable Forward Spin Mode			
		Spin stop	0-3	0-1	0-3
		Spin forward slowest	4	2	4
		Spin forward fastest	255	100	FF
		Continuously Variable Reverse Spin Mode			
		Spin stop	0-3	0-1	0-3
		Spin reverse slowest	4	2	4
		Spin reverse fastest	255	100	FF
		Random Mode			
		Random stop	0-3	0-1	0-3
		Random slowest	4	2	4
		Random fastest	255	100	FF
		Combined Mode*			
		Color 1, Open	0-6	0-2	0-6
		Color 2, Yellow	7-13	3-5	7-0D
		Color 3, CTO	14-20	6-7	0E-14
		Color 4, Aqua	21-27	8-10	15-1B
		Color 5, Pink	28-34	11-13	1C-22
		Color 6, Magenta	35-41	14-16	23-29
		Color 7, Cyan	42-47	17-18	2A-2F
		Color 8, Dark Green	48-54	19-21	30-36
		Color 9, Moonlight Blue	55-61	22-23	37-3D
		Color 10, Primary Green	62-68	24-26	3E-44
		Color 11, Medium Blue	69-75	27-29	45-4B
		Color 12, Indigo	76-82	30-32	4C-52
		Color 13, Light Cyan	83-89	33-34	53-59
		Color 14, Dark Yellow Green	90-96	35-37	5A-60
		Color 15, BlueGreen	97-103	38-40	61-67
		Color 16, Indigo	104-110	41-42	68-6E
		Color 17, Congo Blue	111-117	43-45	6F-75
		Color 18, Rose Indigo	118-124	46-48	76-7C
		Color 19, Indigo	125-130	49-50	7D-82
		Color 20, Indigo	131-137	51-53	83-89
		Color 21, Does Not Mix	138-144	54-56	8A-90
		Color 22, Dark Indigo	145-151	57-58	91-97
Color 23, Does Not Mix	152-158	59-61	98-9E		

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)		
6	Color Wheel 1 Position, cont.	Color 24, Indigo	159-165	61-64	9F-A5		
		Color 25, Magenta	166-172	65-67	A6-AC		
		Color 26, Orange	173-179	68-69	AD-B3		
		Color 27, Cherry Rose	180-186	70-72	B4-BA		
		Color 28, Does Not Mix	187-193	73-75	BB-C1		
		Color 29, Pink	194-200	76-78	C2-C8		
		Color 30, Broadwayway Pink	201-207	79-80	C9-CF		
		Color 31, Magenta	208-213	81-83	D0-D2		
		Color 32, Red	214-220	84-85	D3-D9		
		Color 33, Red Rose	221-227	86-88	DA-E3		
		Color 34, Does Not Mix	228-234	89-91	E4-EA		
		Color 35, Broadway Pink	235-241	92-94	EB-F1		
		Color 36, Magenta	242-248	95-96	F2-F8		
		Color 1, Open	249-255	97-100	F9-FF		
		Combined Continuous Mode*					
			Color 1, Open	0	0	0	
			Color 2, Yellow	8	3	8	
			Color 3, CTO	15	5	0F	
			Color 4, Aqua	22	8	16	
			Color 5, Pink	29	11	1D	
			Color 6, Magenta	36	14	24	
			Color 7, Cyan	43	16	2B	
			Color 8, Dark Green	50	19	32	
			Color 9, Moonlight Blue	57	22	39	
			Color 10, Primary Green	64	25	40	
			Color 11, Medium Blue	72	28	48	
			Color 12, Indigo	79	30	4F	
			Color 13, Light Cyan	86	33	56	
			Color 14, Dark Yellow Green	93	36	5D	
			Color 15, Blue Green	100	39	64	
			Color 16, Indigo	107	41	6B	
			Color 17, Congo Blue	114	44	72	
			Color 18, Rose Indigo	121	47	79	
			Color 19, Indigo	128	50	80	
			Color 20, Indigo	136	53	88	
			Color 21, Does Not Mix	143	55	8F	
			Color 22, Dark Indigo	150	58	96	
			Color 23, Does Not Mix	157	61	9D	
			Color 24, Indigo	164	64	A4	
			Color 25, Magenta	171	66	AB	
			Color 26, Orange	178	69	B2	
			Color 27, Cherry Rose	185	72	B9	
	Color 28, Does Not Mix	193	75	C1			
	Color 29, Pink	200	78	C8			



Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
6	Color Wheel 1 Position, cont.	Color 30, Broadwayway Pink	207	80	CF
		Color 31, Magenta	214	83	D3
		Color 32, Red	221	86	DA
		Color 33, Red Rose	228	89	E4
		Color 34, Does Not Mix	235	91	EB
		Color 35, Broadway Pink	242	94	F2
		Color 36, Magenta	249	97	F9
		Color 1, Open	255	100	FF
7	Color Wheel 2 Function	Full Speed			
		Combined Operation	0-15	0-5	0-f
		Indexed	16-31	6-12	10-1F
		Forward spin	32-47	13-18	2D-2F
		Reverse spin	48-63	16-24	30-3F
		Continuous	64-79	25-30	40-4F
		Fast scan	80-87	31-33	50-57
		Slow scan	88-95	34-37	58-5F
		Random	96-111	37-43	60-6F
		Blink-indexed	112-127	44-49	70-7F
		MSpeed Controlled			
		Indexed	128-159	50-62	80-9F
		Forward spin	160-175	63-68	A0-AF
		Reverse spin	176-191	69-74	B0-BF
		Continuous	192-207	75-80	C0-CF
		Fast scan	208-215	81-83	D0-D7
		Slow scan	216-223	84-87	D8-DF
		Random	224-239	88-93	E0-EF
Blink-indexed	240-255	94-100	F0-FF		
8	Color Wheel 2 Position	Indexed Mode			
		Color 1	0-19	0-7	0-13
		Color 1 and 2	20-39	8-15	14-27
		Color 2	40-59	16-23	28-3B
		Color 2 and 3	60-78	24-30	3C-4E
		Color 3	79-98	31-38	4F-62
		Color 3 and 4	99-118	39-46	63-76
		Color 4	119-137	47-53	77-89
		Color 4 and 5	138-157	54-61	8A-9D
		Color 5	158-177	62-69	9E-B1
		Color 5 and 6	178-196	70-76	B2-C4
		Color 6	197-216	77-84	C5-D8
		Color 6 and 1	217-236	85-92	D9-EC
		Color 1	237-255	93-100	ED-FF

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
8	Color Wheel 2 Position, cont.	Continuously Variable Mode			
		Color 1	0	0	0
		Color 2	43	16	2B
		Color 3	85	33	55
		Color 4	128	50	80
		Color 5	170	66	AA
		Color 6	213	83	D5
		Color 1	255	100	FF
		Continuously Variable Forward Spin Mode			
		Spin stop	0-3	0-1	0-3
		Spin forward slowest	4	2	4
		Spin forward fastest	255	100	FF
		Continuously Variable Reverse Spin Mode			
		Spin stop	0-3	0-1	0-3
		Spin reverse slowest	4	2	4
		Spin reverse fastest	255	100	FF
Random Mode					
Random stop	0-3	0-1	0-3		
Random slowest	4	2	4		
Random fastest	255	100	FF		
9	Litho Wheel 1 Function	Full Speed			
		Indexed	0-15	0-5	0-f
		Forward rotate	16-31	6-12	10-1F
		Reverse rotate	32-47	13-18	2D-2F
		Wheel Spin	48-63	16-24	30-3F
		Scan	64-79	25-30	40-4F
		Random	80-95	31-37	50-6F
		Blink wheel (Indexed)	96-111	38-43	60-6F
		Blink aperture (Indexed)	112-127	44-49	70-7F
		MSpeed Controlled			
		Indexed	128-143	50-55	80-8F
		Forward rotate	144-159	56-62	90-9F
		Reverse rotate	160-175	63-68	A0-AF
		Wheel Spin	176-191	69-74	B0-BF
		Scan	192-207	75-80	C0-CF
		Random	208-223	81-83	D0-D7
Blink wheel (Indexed)	224-239	88-93	E0-EF		
Blink aperture (Indexed)	240-255	94-100	F0-FF		

A

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
10	Litho Wheel 1 Posiiton	Position 0	0-36	0-14	0-24
		Position 1	37-73	15-28	25-49
		Position 2	74-109	29-42	4A-6D
		Position 3	110-146	43-57	6E-92
		Position 4	147-182	58-71	93-B6
		Position 5	183-219	72-85	B7-D8
		Position 6	220-255	86-100	D9-FF
11	Litho Wheel 1 Coarse Rotation	Indexed Mode	0-255	0-100	00-FF
		Variable Forward Rotate Mode			
		Rotate stop	0-3	0-1	0-3
		Rotate forward slowest	4-255	2-100	04-FF
		Variable Reverse Rotate Mode			
		Reotate stop	0-3	0-1	0-3
		Reverse rotate slowest to fastest	4-255	2-100	04-FF
		Continuously Variable Wheel Spin Mode			
		Forward spin slowest to fastest	0-127	0-49	0-7F
		Reverse spin, slowest to fastest	128-255	50-100	80-FF
		Scan Mode			
		Scan slowest to fastest	0-255	0-100	00-FF
		Random Mode			
Random stop	0-3	0-1	0-3		
Random slowest to fastest	4-255	2-100	04-FF		
12	Litho Wheel 1 Fine Rotation	Indexed Mode	0-255	0-100	00-FF
13	Litho Wheel 2 Function	Full Speed			
		Indexed	0-15	0-5	0-f
		Forward rotate	16-31	6-12	10-1F
		Reverse rotate	32-47	13-18	2D-2F
		Wheel Spin	48-63	16-24	30-3F
		Scan	64-79	25-30	40-4F
		Random	80-95	31-37	50-6F
		Blink wheel (Indexed)	96-111	38-43	60-6F
		Blink aperture (Indexed)	112-127	44-49	70-7F
		MSpeed Controlled			
		Indexed	128-143	50-55	80-8F
		Forward rotate	144-159	56-62	90-9F
		Reverse rotate	160-175	63-68	A0-AF
		Wheel Spin	176-191	69-74	B0-BF
		Scan	192-207	75-80	C0-CF
		Random	208-223	81-83	D0-D7
		Blink wheel (Indexed)	224-239	88-93	E0-EF
		Blink aperture (Indexed)	240-255	94-100	F0-FF

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
14	Litho Wheel 2 Posiiton	Position 0	0-36	0-14	0-24
		Position 1	37-73	15-28	25-49
		Position 2	74-109	29-42	4A-6D
		Position 3	110-146	43-57	6E-92
		Position 4	147-182	58-71	93-B6
		Position 5	183-219	72-85	B7-D8
		Position 6	220-255	86-100	D9-FF
15	Litho Wheel 2 Coarse Rotation	Indexed Mode	0-255	0-100	00-FF
		Variable Forward Rotate Mode			
		Rotate stop	0-3	0-1	0-3
		Rotate forward slowest	4-255	2-100	04-FF
		Variable Reverse Rotate Mode			
		Reotate stop	0-3	0-1	0-3
		Reverse rotate slowest to fastest	4-255	2-100	04-FF
		Continuously Variable Wheel Spin Mode			
		Forward spin slowest to fastest	0-127	0-49	0-7F
		Reverse spin, slowest to fastest	128-255	50-100	80-FF
		Scan Mode			
		Scan slowest to fastest	0-255	0-100	00-FF
		Random Mode			
Random stop	0-3	0-1	0-3		
Random slowest to fastest	4-255	2-100	04-FF		
16	Litho Wheel 2 Fine Rotation	Indexed Mode	0-255	0-100	00-FF
17	Zoom	Variable zoom from 18° - 30°	0-255	0-100	00-FF
18	Focus	Focus image from closer to farther	0-255	0-100	0-FF
19	Iris	Closed	0	0	0
		Variable	1-127	1-49	1-7F
		Open	128-143	50-55	80-8F
		Periodic strobes	144-159	56-62	90-9F
		Random strobes	160-175	63-68	A0-AF
		Ramp open/ snap shut	176-191	69-74	B0-BF
		Snap open/ ramp shut	192-207	75-80	C0-CF
		Random ramp/ snap	208-223	81-87	D0-DF
		Random snap/ ramp	224-239	88-93	E0-EF
Open	240-255	94-100	FO-FF		



Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
20	Shutter	Closed	0-31	0-12	0-1F
		Periodic strobes	32-63	13-24	20-3F
		Random strobes	64-95	25-37	40-5F
		Ramp open/ snap shut	96-127	38-49	60-7F
		Snap open/ ramp shut	128-159	50-62	80-9F
		Random ramp open/ snap shut	160-191	63-74	A0-BF
		Random snap open/ ramp shut	192-223	75-87	C0-DF
		Open	224-255	88-100	E0-FF
21	Dim	Closed to open	0-255	0-100	00-FF
22	MSpeed (See Appendix B)	Controller Crossfade	0-3	0-1	0-3
		Longest to shortest MSpeed	4-255	2-100	4-FF
23	Factory Macros	No macro	0-7	0-2	0-7
		Macro 1	8-15	3-5	8-0F
		Macro 2	16-23	6-9	10-17
		Macro 3	24-31	10-12	18-1F
		Macro 4	32-39	13-15	20-27
		Macro 5	40-47	16-18	28-2F
		Macro 6	48-55	19-21	30-37
		Macro 7	56-63	22-24	38-3F
		Macro 8	64-71	25-27	40-47
		Reserved	72-215	28-84	48-D4
		Variable speed random macros	216-247	85-96	D5-F7
		No macro	248-255	97-100	F8-FF
24	Control	Safe	0-9	0-3	0-9
		Disable MSpeed for pan and tilt	10-19	4-7	0A-13
		Display off	20-28	8-11	14-1C
		Display dim	30-38	12-14	1E-26
		Display bright	40-48	15-18	28-30
		Home	60-68	23-26	3C-44
		Lamp on	80-88	31-34	50-58
		Lamp off	90-98	35-38	5A-62
		Shutdown	120-130	46-50	78-82
		Reserved	131-255	51-100	83-FF

Studio Spot® 575 CMY DMX Protocol

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
1	Pan (high)	Pan coarse adjustment (8-bit)	0 - 255	0 - 100	00 - FF
2	Pan (low)	Pan fine adjustment (8-bit)	0 - 255	0 - 100	00 - FF
3	Tilt (high)	Tilt coarse adjustment (8-bit)	0 - 255	0 - 100	00 - FF
4	Tilt (low)	Tilt fine adjustment (8-bit)	0 - 255	0 - 100	00 - FF
5	CMY Color Function	Full Speed			
		Continuous	0-31	0-12	00-1F
		Reserved	32-127	13-49	2D-7F
		MSpeed			
		Continuous	128-159	50-62	80-9F
	Reserved	160-255	63-100	A0-FF	
6	Cyan	Full Cyan	0	0	00
		Open "white" position	255	100	FF
7	Magenta	Full Magenta	0	0	00
		Open "white" position	255	100	FF
8	Yellow	Full Yellow	0	0	00
		Open "white" position	255	100	FF
9	Litho Wheel 1 Function	Full Speed			
		Indexed	0-15	0-5	00-0F
		Forward rotate	16-31	6-12	10-1F
		Reverse rotate	32-47	13-18	20-2F
		Wheel spin	48-63	19-24	30-3F
		Scan	64-79	25-30	40-4F
		Random	80-95	31-37	50-6F
		Blink wheel (indexed)	96-111	38-42	60-6F
		Blink aperture (indexed)	112-127	43-49	70-7F
		MSpeed			
		Indexed	128-143	50-55	80-8F
		Forward rotate	144-159	56-62	90-9F
		Reverse rotate	160-175	63-68	A0-AF
		Wheel spin	176-191	69-74	B0-BF
		Scan	192-207	75-80	C0-CF
Random	208-223	81-87	D0-DF		
Blink wheel (indexed)	224-239	88-93	E0-EF		
Blink aperture (indexed)	240-255	94-100	F0-FF		
10	Litho Wheel 1 Position	Position 0	0-36	0-14	00-24
		Position 1	37-73	15-28	25-49
		Position 2	74-109	29-42	4A-6D
		Position 3	110-146	43-57	6E-92
		Position 4	147-182	58-71	93-B6
		Position 5	183-219	72-85	B7-D8
		Position 0	220-255	86-100	D9-FF

A

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)	
11	Litho Wheel 1 Rotation High Byte	Indexed Mode	0-255	0-100	00-FF	
		Variable Forward Rotate Mode				
		Rotate stop	0-3	0-1	00-03	
		Rotate forward slowest	4	2	04	
		Rotate forward fastest	225	100	FF	
		Variable Reverse Rotate Mode				
		Rotate stop	0-3	0-1	00-03	
		Rotate reverse slowest	4	2	04	
		Rotate reverse fastest	225	100	FF	
		Continuously Variable Wheel Spin Mode				
		Fastest forward spin	0	0	00	
		Slowest forward spin	127	49	7F	
		Slowest reverse spin	128	50	80	
		Fastest reverse spin	255	100	FF	
		Scan Mode				
		Scan slowest	0	0	00	
		Scan fastest	255	100	FF	
		Random Mode				
		Random stop	0-3	0-1	00-03	
		Random slowest	4	2	04	
Random fastest	255	100	FF			
12	Litho Wheel 1 Rotation Low Byte	Indexed Mode	0-255	0-100	00-FF	
13	Litho Wheel 2 Function	Full Speed				
		Indexed	0-15	0-5	00-0F	
		Forward rotate	16-31	6-12	10-1F	
		Reverse rotate	32-47	13-18	20-2F	
		Wheel spin	48-63	19-24	30-3F	
		Scan	64-79	25-30	40-4F	
		Random	80-95	31-37	50-6F	
		Blink wheel (indexed)	96-111	38-42	60-6F	
		Blink aperture (indexed)	112-127	43-49	70-7F	
		MSpeed				
		Indexed	128-143	50-55	80-8F	
		Forward rotate	144-159	56-62	90-9F	
		Reverse rotate	160-175	63-68	A0-AF	
		Wheel spin	176-191	69-74	B0-BF	
		Scan	192-207	75-80	C0-CF	
		Random	208-223	81-87	D0-DF	
		Blink wheel (indexed)	224-239	88-93	E0-EF	
		Blink aperture (indexed)	240-255	94-100	F0-FF	

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)	
14	Litho Wheel 2 Position	Position 0	0-36	0-14	00-24	
		Position 1	37-73	15-28	25-49	
		Position 2	74-109	29-42	4A-6D	
		Position 3	110-146	43-57	6E-92	
		Position 4	147-182	58-71	93-B6	
		Position 5	183-219	72-85	B7-D8	
		Position 0	220-255	86-100	D9-FF	
15	Litho Wheel 2 Rotation High Byte	Indexed Mode	0-255	0-100	00-FF	
		Variable Forward Rotate Mode				
		Rotate stop	0-3	0-1	00-03	
		Rotate forward slowest	4	2	04	
		Rotate forward fastest	225	100	FF	
		Variable Reverse Rotate Mode				
		Rotate stop	0-3	0-1	00-03	
		Rotate reverse slowest	4	2	04	
		Rotate reverse fastest	225	100	FF	
		Continuously Variable Wheel Spin Mode				
		Fastest forward spin	0	0	00	
		Slowest forward spin	127	49	7F	
		Slowest reverse spin	128	50	80	
		Fastest reverse spin	255	100	FF	
		Scan Mode				
		Scan slowest	0	0	00	
		Scan fastest	255	100	FF	
		Random Mode				
Random stop	0-3	0-1	00-03			
Random slowest	4	2	04			
Random fastest	255	100	FF			
16	Litho Wheel 2 Rotation Low Byte	Indexed Mode	0-255	0-100	00-FF	
17	Frost	No frost	0	0	00	
		Variable frost	1-127	1-49	01-7F	
		Full frost	128-143	50-55	80-8F	
		Periodic frost strobes	144-159	56-62	90-9F	
		Random frost strobes	160-175	63-68	A0-AF	
		Ramp open/ snap shut	176-191	69-74	B0-BF	
		Snap open/ ramp shut	192-207	75-80	C0-CF	
		Random ramp/ snap	208-223	81-87	D0-DF	
		Random snap/ ramp	224-239	88-93	E0-EF	
		Open	240-255	94-100	FO-FF	
18	Focus	Focus image closer	0	0	00	
		Focus image farther	256	100	FF	



Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
19	Iris	Closed	0	0	00
		Variable	1-127	1-49	01-7F
		Open	128-143	50-55	80-8F
		Periodic strobe	144-159	56-62	90-9F
		Random strobe	160-175	63-68	A0-AF
		Ramp open/ snap shut	176-191	69-74	B0-BE
		Snap open/ ramp shut	192-207	75-80	BF-CF
		Random ramp/ snap	208-223	81-87	DD-DC
		Random snap/ ramp	224-239	88-93	E0-EF
		Open	240-255	94-100	F0-FF
20	Shutter	Closed	0-31	0-12	00-1F
		Periodic strobes	32-63	13-24	20-3F
		Random strobes	64-95	25-37	40-5F
		Ramp open/ snap shut	96-127	38-49	60-7F
		Snap open/ ramp shut	128-159	50-62	80-9F
		Random ramp open/ snap shut	160-191	63-74	A0-BF
		Random snap open/ ramp shut	192-223	75-87	C0-DF
		Open	224-255	88-100	E0-FF
21	Dim	Closed	0	0	00
		Open	255	100	FF
22	MSpeed	Disabled (controller crossfade)	0-3	0-1	00-03
		longest (252.7 sec.)	4	2	04
		shortest (0.15 sec.)	255	100	FF
23	Factory Macros	No macro	0-7	0-2	00-07
		Macro 1	8-15	3-5	08-0F
		Macro 2	16-23	6-9	10-17
		Macro 3	24-31	10-12	18-1F
		Macro 4	32-39	13-15	20-27
		Macro 5	40-47	16-18	28-2F
		Macro 6	48-55	19-21	30-37
		Macro 7	56-63	22-24	38-3F
		Macro 8	64-71	25-27	40-47
		Reserved	72-215	28-84	48-D4
		Variable speed random macros	216-247	85-96	D5-F7
No macro	248-255	97-100	F8-FF		
24	Control <i>(Note: The Shutter channel must be closed to access the Control channel settings.)</i>	Safe	0-9	0-3	00-09
		Disable MSPEED for pan and tilt	10-19	4-7	0A-13
		Display off	20-28	8-11	14-1C
		Display dim	30-38	12-14	1E-26
		Display bright	40-48	15-18	28-30
		Home	60-68	23-26	3C-44
		Lamp on	80-88	31-34	50-58
		Lamp off	90-98	35-38	5A-62
		Shutdown	120-130	46-50	78-82
		TBD	131-255	51-100	83-FF

Studio Spot® 575CMY Zoom DMX Protocol

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
1	Pan (high)	Pan coarse adjustment (8-bit)	0-255	0 - 100	00 - FF
2	Pan (low)	Pan fine adjustment (8-bit)	0-255	0 - 100	00 - FF
3	Tilt (high)	Tilt coarse adjustment (8-bit)	0-255	0 - 100	00 - FF
4	Tilt (low)	Tilt fine adjustment (8-bit)	0-255	0 - 100	00 - FF
5	CMY Color Function	Full Speed			
		Continuous	0-31	0-12	00-1F
		Reserved	32-127	13-49	2D-7F
		MSpeed			
		Continuous	128-159	50-62	80-9F
		Reserved	160-255	63-100	A0-FF
6	Cyan	Full Cyan	0	0	00
		Open "white" position	255	100	FF
7	Magenta	Full Magenta	0	0	00
		Open "white" position	255	100	FF
8	Yellow	Full Yellow	0	0	00
		Open "white" position	255	100	FF
9	Litho Wheel 1 Function	Full Speed			
		Indexed	0-15	0-5	00-0F
		Forward rotate	16-31	6-12	10-1F
		Reverse rotate	32-47	13-18	20-2F
		Wheel spin	48-63	19-24	30-3F
		Scan	64-79	25-30	40-4F
		Random	80-95	31-37	50-6F
		Blink wheel (indexed)	96-111	38-42	60-6F
		Blink aperture (indexed)	112-127	43-49	70-7F
		MSpeed			
		Indexed	128-143	50-55	80-8F
		Forward rotate	144-159	56-62	90-9F
		Reverse rotate	160-175	63-68	A0-AF
Wheel spin	176-191	69-74	B0-BF		
9	Litho Wheel 1 Function, cont.	Scan	192-207	75-80	C0-CF
		Random	208-223	81-87	D0-DF
		Blink wheel (indexed)	224-239	88-93	E0-EF
		Blink aperture (indexed)	240-255	94-100	F0-FF
10	Litho Wheel 1 Position	Position 0	0-36	0-14	00-24
		Position 1	37-73	15-28	25-49
		Position 2	74-109	29-42	4A-6D
		Position 3	110-146	43-57	6E-92
		Position 4	147-182	58-71	93-B6
		Position 5	183-219	72-85	B7-D8
		Position 0	220-255	86-100	D9-FF

A

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)	
11	Litho Wheel 1 Rotation High Byte	Indexed Mode	0-255	0-100	00-FF	
		Variable Forward Rotate Mode				
		Rotate stop	0-3	0-1	00-03	
		Rotate forward slowest	4	2	04	
		Rotate forward fastest	225	100	FF	
		Variable Reverse Rotate Mode				
		Rotate stop	0-3	0-1	00-03	
		Rotate reverse slowest	4	2	04	
		Rotate reverse fastest	225	100	FF	
		Continuously Variable Wheel Spin Mode				
		Fastest forward spin	0	0	00	
		Slowest forward spin	127	49	7F	
		Slowest reverse spin	128	50	80	
		Fastest reverse spin	255	100	FF	
		Scan Mode				
		Scan slowest	0	0	00	
		Scan fastest	255	100	FF	
		Random Mode				
Random stop	0-3	0-1	00-03			
Random slowest	4	2	04			
Random fastest	255	100	FF			
12	Litho Wheel 1 Rotation Low Byte	Indexed Mode	0-255	0-100	00-FF	
13	Litho Wheel 2 Function	Full Speed				
		Indexed	0-15	0-5	00-0F	
		Forward rotate	16-31	6-12	10-1F	
		Reverse rotate	32-47	13-18	20-2F	
		Wheel spin	48-63	19-24	30-3F	
		Scan	64-79	25-30	40-4F	
		Random	80-95	31-37	50-6F	
		Blink wheel (indexed)	96-111	38-42	60-6F	
		Blink aperture (indexed)	112-127	43-49	70-7F	
		MSpeed				
		Indexed	128-143	50-55	80-8F	
		Forward rotate	144-159	56-62	90-9F	
		Reverse rotate	160-175	63-68	A0-AF	
		Wheel spin	176-191	69-74	B0-BF	
		Scan	192-207	75-80	C0-CF	
		Random	208-223	81-87	D0-DF	
		Blink wheel (indexed)	224-239	88-93	E0-EF	
		Blink aperture (indexed)	240-255	94-100	F0-FF	
14	Litho Wheel 2 Position	Position 0	0-36	0-14	00-24	
		Position 1	37-73	15-28	25-49	
		Position 2	74-109	29-42	4A-6D	
		Position 3	110-146	43-57	6E-92	
		Position 4	147-182	58-71	93-B6	
		Position 5	183-219	72-85	B7-D8	
		Position 0	220-255	86-100	D9-FF	

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
15	Litho Wheel 2 Rotation High Byte	Indexed Mode	0-255	0-100	00-FF
		Variable Forward Rotate Mode			
		Rotate stop	0-3	0-1	00-03
		Rotate forward slowest	4	2	04
		Rotate forward fastest	225	100	FF
		Variable Reverse Rotate Mode			
		Rotate stop	0-3	0-1	00-03
		Rotate reverse slowest	4	2	04
		Rotate reverse fastest	225	100	FF
		Continuously Variable Wheel Spin Mode			
		Fastest forward spin	0	0	00
		Slowest forward spin	127	49	7F
		Slowest reverse spin	128	50	80
		Fastest reverse spin	255	100	FF
		Scan Mode			
		Scan slowest	0	0	00
		Scan fastest	255	100	FF
		Random Mode			
		Random stop	0-3	0-1	00-03
		Random slowest	4	2	04
Random fastest	255	100	FF		
16	Litho Wheel 2 Rotation Low Byte	Indexed Mode	0-255	0-100	00-FF
17	Zoom	Variable zoom from 18° - 30°	0-255	0-100	00-FF
18	Focus	Focus image closer	0	0	00
		Focus image farther	256	100	FF
19	Iris	Closed	0	0	00
		Variable	1-127	1-49	01-7F
		Open	128-143	50-55	80-8F
		Periodic strobe	144-159	56-62	90-9F
		Random strobe	160-175	63-68	A0-AF
		Ramp open/ snap shut	176-191	69-74	B0-BE
		Snap open/ ramp shut	192-207	75-80	BF-CF
		Random ramp/ snap	208-223	81-87	DD-DC
		Random snap/ ramp	224-239	88-93	E0-EF
Open	240-255	94-100	F0-FF		
20	Shutter	Closed	0-31	0-12	00-1F
		Periodic strobes	32-63	13-24	20-3F
		Random strobes	64-95	25-37	40-5F
		Ramp open/ snap shut	96-127	38-49	60-7F
		Snap open/ ramp shut	128-159	50-62	80-9F
		Random ramp open/ snap shut	160-191	63-74	A0-BF
		Random snap open/ ramp shut	192-223	75-87	C0-DF
		Open	224-255	88-100	E0-FF
21	Dim	Closed	0	0	00
		Open	255	100	FF
22	MSpeed	Disabled (controller crossfade)	0-3	0-1	00-03
		longest (252.7 sec.)	4	2	04
		shortest (0.15 sec.)	255	100	FF

A

Chan #	Parameter	Description	Value (dec.)	Value (%)	Value (hex)
23	Factory Macros	No macro	0-7	0-2	00-07
		Macro 1	8-15	3-5	08-0F
		Macro 2	16-23	6-9	10-17
		Macro 3	24-31	10-12	18-1F
		Macro 4	32-39	13-15	20-27
		Macro 5	40-47	16-18	28-2F
		Macro 6	48-55	19-21	30-37
		Macro 7	56-63	22-24	38-3F
		Macro 8	64-71	25-27	40-47
		Reserved	72-215	28-84	48-D4
		Variable speed random macros	216-247	85-96	D5-F7
	No macro	248-255	97-100	F8-FF	
24	Control <i>(Note: The Shutter channel must be closed to access the Control channel settings.)</i>	Safe	0-9	0-3	00-09
		Disable MSpeed for pan and tilt	10-19	4-7	0A-13
		Display off	20-28	8-11	14-1C
		Display dim	30-38	12-14	1E-26
		Display bright	40-48	15-18	28-30
		Home	60-68	23-26	3C-44
		Lamp on	80-88	31-34	50-58
		Lamp off	90-98	35-38	5A-62
		Shutdown	120-130	46-50	78-82
		TBD	131-255	51-100	83-FF

Appendix B:

MSpeed Conversion Table

The following table lists the MSpeed (motor) movement times and their corresponding DMX console values. If you have a numeric-type console, use the Value Decimal (dec.) column. If you have a fader-type console, use the Value Percentage (%) column. If your console allows you to program hex values, use the Value (hex) column.

Time (sec.)	Value (dec.)	Value (%)	Value (hex)
0.15	255	100	FF
0.15	254	100	FE
0.17	253	99	FD
0.19	252	99	FC
0.21	251	98	FB
0.25	250	98	FA
0.29	249	98	F9
0.35	248	97	F8
0.41	247	97	F7
0.47	246	96	F6
0.55	245	96	F5
0.63	244	96	F4
0.73	243	95	F3
0.83	242	95	F2
0.94	241	95	F1
1.05	240	94	F0
1.18	239	94	EF
1.31	238	93	EE
1.45	237	93	ED
1.60	236	93	EC
1.75	235	92	EB
1.92	234	92	EA
2.09	233	91	E9
2.27	232	91	E8
2.46	231	91	E7
2.66	230	90	E6
2.86	229	90	E5

Time (sec.)	Value (dec.)	Value (%)	Value (hex)
3.07	228	89	E4h
3.29	227	89	E3
3.52	226	89	E2
3.76	225	88	E1
4.00	224	88	E0
4.25	223	87	DF
4.52	222	87	DE
4.78	221	87	DD
5.06	220	86	DC
5.34	219	86	DB
5.64	218	85	DA
5.94	217	85	D9
6.25	216	85	D8
6.56	215	84	D7
6.89	214	84	D6
7.22	213	84	D5
7.56	212	83	D4
7.91	211	83	D3
8.27	210	82	D2
8.63	209	82	D1
9.00	208	82	D0
9.39	207	81	CF
9.77	206	81	CE
10.17	205	80	CD
10.58	204	80	CC
10.99	203	80	CB
11.41	202	79	CA

Time (sec.)	Value (dec.)	Value (%)	Value (hex)
11.84	201	79	C9
12.28	200	78	C8
12.72	199	78	C7
13.17	198	78	C6
13.63	197	77	C5
14.10	196	77	C4
14.58	195	76	C3
15.07	194	76	C2
15.56	193	76	C1
16.06	192	75	C0
16.57	191	75	BF
17.09	190	75	BE
17.61	189	74	BD
18.14	188	74	BC
18.68	187	73	BB
19.23	186	73	BA
19.79	185	73	B9
20.36	184	72	B8
20.93	183	72	B7
21.51	182	71	B6
22.10	181	71	B5
22.70	180	71	B4
23.30	179	70	B3
23.92	178	70	B2
24.54	177	69	B1
25.17	176	69	B0
25.80	175	69	AF

B

Time (sec.)	Value (dec.)	Value (%)	Value (hex)
26.45	174	68	AE
27.10	173	68	AD
27.76	172	67	AC
28.43	171	67	AB
29.11	170	67	AA
29.80	169	66	A9
30.49	168	66	A8
31.19	167	65	A7
31.90	166	65	A6
32.62	165	65	A5
33.34	164	64	A4
34.08	163	64	A3
34.82	162	64	A2
35.57	161	63	A1
36.33	160	63	A0
37.09	159	62	9F
37.87	158	62	9E
38.65	157	62	9D
39.44	156	61	9C
39.44v	156	61	9C
40.23	155	61	9B
41.04	154	60	9A
41.85	153	60	99
42.68	152	60	98
43.50	151	59	97
44.34	150	59	96
45.19	149	58	95
46.04	148	58	94
46.90	147	58	93
47.77	146	57	92
48.65	145	57	91
49.54	144	56	90
50.43	143	56	8F
51.33	142	56	8E
52.24	141	55	8D
53.16	140	55	8C
54.09	139	55	8h
55.02	138	54	8A

Time (sec.)	Value (dec.)	Value (%)	Value (hex)
55.96v	137	54	89
56.91	136	53	88
57.87	135	53	87
58.84	134	53	86
59.81	133	52	85
60.79	132	52	84
61.78	131	51	83
62.78	130	51	82
63.79	129	51	81
64.80	128	50	80
65.82	127	50	7F
66.85	126	49	7E
67.89	125	49	7D
68.94	124	49	7C
69.99	123	48	7B
71.05	122	48	7A
72.13	121	47	79
73.20	120	47	78
74.29	119	47	77
75.38	118	46	76
76.49	117	46	75
77.60	116	45	74
78.71	115	45	73
79.84	114	45	72
80.98	113	44	71
82.12	112	44	70
83.27	111	44	6F
84.43	110	43	6E
85.59	109	43	6D
86.77	108	42	6C
87.95	107	42	6B
89.14	106	42	6A
90.34	105	41	69
91.55	104	41	68
92.76	103	40	67
93.98	102	40	66
95.21	101	40	65
96.45	100	39	64

Time (sec.)	Value (dec.)	Value (%)	Value (hex)
97.70	99	39	63
98.95	98	38	62
100.22	97	38	61
101.49	96	38	60
102.77	95	37	5F
104.05	94	37	5E
105.35	93	36	5D
106.65	92	36	5C
107.96	91	36	5B
109.28	90	35	5A
110.61	89	35	59
111.94	88	35	58
113.28	87	34	57
114.63	86	34	56
115.99	85	33	55
117.36	84	33	54
118.73	83	33	53
120.12	82	32	52
121.5v	81	32	51
122.91	80	31	50
124.31	79	31	4F
125.73	78	31	4E
127.15	77	30	4D
128.58	76	30	4C
130.02	75	29	4B
134.39	72	28	48
135.86	71	28	47
137.34	70	27	46
138.82	69	27	45
140.32	68	27	44
141.82	67	26	43
143.33	66	26	42
144.85	65	25	41
146.38	64	25	40
147.92	63	25	3F
149.46	62	24	3E
151.01	61	24	3D
152.57	60	24	3C

Time (sec.)	Value (dec.)	Value (%)	Value (hex)
154.14	59	23	3B
155.71	58	23	3A
157.30	57	22	39
158.89	56	22	38
160.49	55	22	37
162.09	54	21	36
163.71	53	21	35
165.33	52	20	34
166.96	51	20	33
168.60	50	20	32
170.25	49	19	31
171.91	48	19	30
173.57	47	18	2F
175.24	46	18	2E
176.92	45	18	2D
178.61	44	17	2C
180.30	43	17	2B
182.01	42	16	2A
183.72	41	16	29
185.44	40	16	28
187.17	39	15	27
188.90	38	15	26
190.65	37	15	25
192.40	36	14	24
194.16	35	14	23
195.92	34	13	22
197.70	33	13	21
199.48	32	13	20
201.28	31	12	1F
203.08	30	12	1E
204.88	29	11	1D
206.70	28	11	1C
208.52	27	11	1B
210.36	26	10	1A
212.19	25	10	19
214.04	24	9	18
215.90	23	9	17
217.76	22	9	16




Time (sec.)	Value (dec.)	Value (%)	Value (hex)
219.63	21	8	15
221.51	20	8	14
223.40	19	7	13
225.30	18	7	12
227.20	17	7	11
229.11	16	6	10
231.03	15	6	0F
232.96	14	5	0E
234.90	13	5	0D
236.84	12	5	0C
238.79	11	4	0B
240.75	10	4	0A
242.72	9	4	09
244.70	8	3	08
246.68	7	3	07
248.68	6	2	06
250.68	5	2	05
246.68	7	3	07
248.68	6	2	06
250.68	5	2	05
252.68	4	2	04

B


Appendix C:

Safety Information

Warning: For Continued Protection Against Fire

1. This equipment is designed for use with a Philips 700 Watt, GY 9.5 base, metal halide lamp only. Use of any other type lamp may be hazardous and may 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 2.0 meters (6.6 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. Equipment suitable for dry locations only. Do not expose this equipment to rain or moisture.
5. Disconnect power before re-lamping or servicing.
6. Refer servicing to qualified personnel; no user serviceable parts inside.

C

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 100° C (212° F). Allow 5 minutes for cooling before handling.
4. Change the lamp if it becomes damaged or thermally deformed.

Appendice C

Importantes Informations Sur La Sécurité

Mise En Garde: Pour Une Protection Permanente Contre Les Incendies

1. Cet appareil est conçu uniquement pour une lampe métallique à halogène Philips, de 700 watts, à base GY 9.5. Son utilisation avec tout autre type de lampe peut être dangereuse et annuler 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 2.0 mètre par rapport aux objets éclairés.
6. Cet appareil de connection au circuit comporte une protection contre les surcharges de 20 A.

Mise En Garde: Pour Une Protection Permanente Contre Les Chocs Électriques

1. Si cet équipement est livré sans prise de cable, veuillez connecter la prise de cable correcte selon le code suivant:
 - marron - phase
 - bleu - neutre
 - vert/jaune - terre
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. Cet équipement doit être mis à la terre.

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 100 C. Laisser refroidir pendant 5 minutes avant la manipulation.
4. Changer la lampe si elle est endommagée ou thermiquement déformée.

Anhang C

Wichtige Hinweise Für Ihre Sicherheit

Warnung: Zum Schutz Vor Brandgefahr

1. Dieses Gerät ist nur für den Gebrauch mit einer 700-Watt, Philips, Metall-Halogen-Lampe mit GY 9.5-Sockel konzipiert. Der Gebrauch irgend eines anderen Lampentyps könnte Sie gefährden und Ihre Garantie außer Kraft setzen.
-  2. Das Gerät nie auf einer feuergefährlichen Fläche montieren.
-  1m 3. Stets einen Mindestabstand von 1 Meter zu brennbaren Materialien einhalten.
4. Zum Ersatz nur Sicherungen verwenden, die dem vorgeschriebenen Typ und Nennwert entsprechen.
-  2m 5. Einen Mindestabstand von 2 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. Wenn dieses Gerät ohne einen Netzkabelstecker erhalten wurde, ist der entsprechende Netzkabelstecker entsprechend dem folgenden Code anzubringen:
 - Braun - Unter Spannung stehend
 - Blau - Neutral
 - Grün/Gelb - Erde
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. Dieses Gerät muß geerdet werden.

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 100 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 C

Información Importante De Seguridad

Advertencia: Para Protección Continua Contra Incendios

1. Este equipo está diseñado para utilizarse únicamente con la lámpara de haluro metálico Philips serie M, de 700 vatios y base GY 9.5. El uso de cualquier otro tipo de lámpara podrá resultar peligroso, y podrá anular 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. Guarda una distancia mínima a objetos iluminados de 2.0 metro.
6. Este equipo debe conectarse a un circuito que tenga una protección máxima contra las sobrecargas de 20 A.

Advertencia: Para La Protección Continua Contra Electrocuiones

1. Si se recibió este equipo sin el enchufe de alimentación, monte usted el enchufe correcto según el clave siguiente:
 - moreno - vivo
 - azul - neutral
 - verde/amarillo - tierra
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. Este equipo debe conectarse a la tierra.

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 100 grados centígrados. Deje que se enfrien por 5 minutos antes de tocarlas.
4. Cambie la lámpara si ésta se avería o deforma por acción térmica.

Appendice C

Importanti Informazioni Di Sicurezza

Avvertenza: Per Prevenire Incendi

1. Questa apparecchiatura è stata progettata per l'uso esclusivo con lampada a sali metallici Philips da 700 watt, base GY 9.5. L'uso di qualsiasi altro tipo di lampada può essere pericoloso e può annullare la 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. Rimpiazzare i fusibili usando soltanto quelli del tipo e della taratura adatta.
5.  2m // Mantenere una distanza minima di 2.0 metri dagli oggetti accesi.
6. Questa apparecchiatura e' da collegarsi ad un circuito con una protezione da sovraccarico massima di 20 amperes.

Avvertenza: Per Prevenire Le Scosse Elettriche

1. Se questa apparecchiatura è stata consegnata senza una spina del cavo di alimentazione, collegare la spina appropriata del cavo di alimentazione in base ai seguenti codici:
 - marrone - sotto tensione
 - blu - neutro
 - verde/giallo - terra
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'umidità'.
4. Per qualsiasi riparazione rivolgersi al personale specializzato. L'utente non deve riparare nessuna parte dentro l'unita'.
5. Apparecchio di Classe I. Questa apparecchiatura deve essere messa a terra.

Avvertenza: Per Proteggersi Contro Le Radiazioni Dei Raggi Ultravioletti

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 apparecchiatura, usare un secondo cavo di sicurezza.

2. Avvertenza: la lampadina calda potrebbe esplodere. Spegnerla per 5 minuti prima di aprirla. Usare protezioni per le mani e per gli occhi prima di cambiare la lampadina.
3. Le superfici della apparecchiatura possono arrivare a temperature di 100 gradi centigradi (212 gradi f). Aspettare 5 minuti prima di maneggiare.
4. Cambiare la lampadina se si danneggia o se si e' deformata dovuto alle alte temperature.

Vigtig Sikkerhedsinformation

Advarsel: Beskyttelse mod elektrisk chock.

VIGTIGT! LEDEREN MED GUL/GROEN ISOLATION MAA KUN TILSLUTTES
KLEMME MAERKET  ELLER .

Appendix D:

Menu Maps

Studio Spot 575/575 Zoom Models

Level 1	Level 2	Level 3	Level 4	Option/ Display Range	Description	
AddR				F###/C###	change existing Fixture number or DMX start channel (Menu option selected in INFO/DMx/FixT/SRCE)	
INFO	LAMP			LON/OFF	Displays Lamp State	
	L/HR			####	Displays current lamp hours ## and minutes ##	
	L/ST			####	Displays number of lamp strikes	
	VER			#### ####	Displays fixture's software version	
	L/RS			HOLd/0000	Press and hold the <Enter> button until the display shows "0000" to reset lamp hours to zero	
	F/HR			H### M ##	Displays total hours and minutes the fixture has run	
	F/RS			HOLd/0000	Press and hold the <Enter> button until the display shows "0000" to reset fixture hours to zero	
	TEMP	CURR			###C	Displays current internal temperature in centigrade
		MINT			###C	Displays minimum internal temperature in centigrade
		MAxT			###C	Displays maximum internal temperature in centigrade
		RST			HOLd/0000	Press and hold the <Enter> button until the display shows "0000" to reset min and max temp to zero
	dMx	FixT	ERRS	####	Displays DMX errors	
			CNTL	0001-0255	Displays control channel DMX value	
			MACR	0001-0255	Displays macro DMX value	
			MSPd	0001-0255	Displays MSpeed DMX value	
			dIM	0001-0255	Displays dim DMX value	
			SHUT	0001-0255	Displays shutter DMX value	
			IRIS	0001-0255	Displays iris DMX value	
			FCUS	0001-0255	Displays focus DMX value	
			FRST	0001-0255	Displays frost DMX value (Zoom value in models with zoom lens)	
			LR2L	0001-0255	Displays litho wheel 2 rotation DMX value (low byte)	
			LR2H	0001-0255	Displays litho wheel 2 rotation DMX value (high byte)	
			LT2	0001-0255	Displays litho wheel 2 aperture position DMX value	
			LTC2	0001-0255	Displays litho wheel 2 control channel DMX value	
			LR1L	0001-0255	Displays litho wheel 1 rotation DMX value (low byte)	
			LR1H	0001-0255	Displays litho wheel 1 rotation DMX value (high byte)	
			LT1	0001-0255	Displays litho wheel 1 aperture position DMX value	
			LTC1	0001-0255	Displays litho wheel 1 control channel DMX value	
CO2			0001-0255	Displays color wheel 2 position DMX value		
CO2C	0001-0255	Displays color wheel 2 control channel DMX value				
CO1	0001-0255	Displays color wheel 1 position DMX value				
CO1C	0001-0255	Displays color wheel 1 control channel DMX value				
TLTL	0001-0255	Displays tilt DMX value (low byte)				

D

Level 1	Level 2	Level 3	Level 4	Option/ Display Range	Description
INFO (cont.)	dMx	FixT	TLTH	0001-0255	Displays tilt DMX value (high byte)
			PANL	0001-0255	Displays pan DMX value (low byte)
			PANH	0001-0255	Displays pan DMX value (high byte)
			STRT	0001-0255	Displays start code
			CE		Not used
			SRCE	####	Indicates the fixture data source values
			OV	####	Displays overrun errors
		FE	####	Displays framing errors	
	dATA	C001 -C512		Views data on the selected DMX channel	
	SENS	PPOS		####	Checks that the pan position sensor is functioning (A working sensor will change value in the display as the pan position of fixture head is manually changed)
		TPOS		####	Checks that the tilt position sensor is functioning (A working sensor will change value in the display as the pan position of fixture head is manually changed)
		SENP		####	Checks the pan homing tab sensor
		SENT		####	Checks the tilt homing tab sensor
		COL		####	Checks color wheel homing tab sensor
		LT1		####	Checks the litho wheel 1 homing tab sensor
LT2			####	Checks the litho wheel 2 homing tab sensor	
SVCC		ON OFF	Displays power- to-sensor status		
TEST	HOME			Homes the fixture	
	FAN			Fan test	
	ENCd			Encoder test	
	S/UP			Places the fixture in setup position for servicing	
	SELF <i>Lamp strikes automatically to perform tests.</i>	ALL			Runs each self-test twice and repeats until stopped
		PAN			Pan test
		TILT			Tilt test
		CO1			Color wheel 1 test
		CO2			Color wheel 2 test
		LT1			Litho wheel 1 test
		LT2			Litho wheel 2 test
		FTST			Frost flag test (Tests Zoom lens in fixtures with that option)
		FCUS			Focus test
		IRIS			Iris test
		SHUT			Shutter test
		dIM			Dimmer test
	dSPL			Display test	
	LAMP	BOOT			Replaces the current boot code with the new one when the display indicates bBOOT dIFF
LON			Turns the lamp on		
LOFF			Turns the lamp off		
	STAT			Lamp status	
MOdE	xLd			Begins fixture crossload	

Level 1	Level 2	Level 3	Level 4	Option/ Display Range	Description
SET	FACT				Returns fixture to factory defaults
	LENS			NORM	Selects Standard lens option
				ZOOM	Selects Zoom lens option
	dLOS			LONG	Shuts fixture down 3 minutes after DMX data loss
				SHRT	Shuts fixture down 1 second after DMX data loss
	CHNL	AddR	F01 - F 21		Addresses fixtures by fixture number
		dMx	C001 - C512		Addresses fixture by DMX starting channel
	dSPL			ON	Turns the display on
				OFF	Turns the display off
				dIM	Dims the display
	d/IN				Inverts the display (future)
	P/IN				Inverts pan
	T/IN				Inverts tilt
	SWAP				Swaps pan and tilt
S/dN			5 MN	Sets shutdown time for 5 minutes	
			10 MN	Sets shutdown time for 10 minutes	
COdE				Factory use test only	
PRST	PLAY			ON	Starts playback
				OFF	Stops playback
				SCN	Displays which scene is playing
	Send			OK?	Selects a scene to capture a pre-programmed scene to (from your DMX controller)
	dfft			OK?	Enables the factory-programmed preset scene sequence (self-demo) / erases any preset scenes previously programmed
	capt			SN01-SN16	Selects the scene information to capture from the DMX controller.
	copy	from		F00-F16	Selects a scene to copy from (source scene)
		to		T00-T16	Selects a scene to copy to (destination scene)
	EdIT	SN01-SN16	SHUT	OPEN	Fully opens the shutter
				CLSd	Closes the shutter
				P 01–P 32	Strobes the shutter at specified periodic intervals from slow (P 01) to fast (P 32)
				N 01–N 32	Strobes the shutter at random intervals from slow (N 01) to fast (N 32)
				RS01–RS32	Snaps shutter open, ramps shut slow (RS01) to fast (RS32)
				SR01–SR32	Ramps shutter open from slow (SR01) to fast (SR32), then snaps shutter closed
				NS0–NS32	Snaps shutter open randomly, then ramps closed from slow (NS01) to fast (NS32)
				NR0–NR32	Ramps shutter ramp open randomly, from slow (NR01) to fast (NR32), then snaps shutter closed
				dIM	d000–d255
PAN				-185–+185	Selects a pan value
TILT	-112–+112	Selects a tilt value			

D

Level 1	Level 2	Level 3	Level 4	Option/ Display Range	Description
PRST	Edit	SN01-SN16	CO1C	<i>Idx</i>	Indexes color wheel 1
				<i>FSP</i>	Spins color wheel 1 forward
				<i>RSP</i>	Spins color wheel 1 in reverse
				<i>CON</i>	color wheel 1 continuous
				<i>FSC</i>	color wheel 1 fast scan
				<i>SSC</i>	color wheel 1 slow scan
				<i>RNd</i>	color wheel 1 random color
				<i>bLK</i>	color wheel 1 indexed blink
				<i>MIdx</i>	color wheel 1 index with MSpeed
				<i>MFSP</i>	color wheel 1 forward spin with MSpeed
				<i>MRSP</i>	color wheel 1 reverse spin with MSpeed
				<i>MCON</i>	color wheel 1 continuous with MSpeed
				<i>MFSC</i>	color wheel 1 fast scan with MSpeed
				<i>MSSC</i>	color wheel 1 slow scan with MSpeed
				<i>MRNd</i>	color wheel 1 random color with MSpeed
			<i>MbLK</i>	color wheel 1 indexed blink with MSpeed	
			CO1	<i>C1-C6</i>	colors 1 to 6 (C01C = Idx)
				<i>HC1-HC6</i>	half-colors 1 to 6 (C01C = Idx)
				<i>F000- F255</i>	forward spin stop to fastest (C01C=FSP)
				<i>R000- R255</i>	reverse spin stop to fastest(C01C=RSP)
				<i>d000-d358</i>	position in degrees (C01C = CON)
				<i>FC1FC12</i>	position with half colors (C01C = FSC)
				<i>MC1-MC12</i>	position with half colors (C01C = MFSC)
				<i>N000-N255</i>	random colors slow to fast (C01C = RNd)
				<i>b1- b6</i>	whole color blink (C01C = bLK)
				<i>Hb1-Hb6</i>	half-color blink (C01C = bLK)
			CO2C	<i>C1- C36</i>	colors 1 to 36 (C01C = Idx) (C02C = CMbd)
				<i>b1- b36</i>	colors 1 to 36 (C01C = Idx) (C02C = CMbd)
				<i>CMbd</i>	combined mode
				<i>IDx</i>	color wheel 2 index
				<i>FSP</i>	color wheel 2 forward spin
				<i>RSP</i>	color wheel 2 reverse spin
				<i>CON</i>	color wheel 2 continuous
				<i>FSC</i>	color wheel 2 fast scan
				<i>SSC</i>	color wheel 2 slow scan
				<i>RNd</i>	color wheel 2 random color
				<i>bLK</i>	color wheel 2 indexed blink
				<i>MIdx</i>	color wheel 2 index with MSpeed
			<i>MFSP</i>	color wheel 2 forward spin with MSpeed	
			<i>MRSP</i>	color wheel 2 reverse spin with MSpeed	
			<i>MCON</i>	color wheel 2 continuous with MSpeed	
			<i>MFSC</i>	color wheel 2 fast scan with MSpeed	
			<i>MSSC</i>	color wheel 2 slow scan with MSpeed	
			<i>MRNd</i>	color wheel 2 random color with MSpeed	
			<i>MbLK</i>	color wheel 2 indexed blink with MSpeed	

Level 1	Level 2	Level 3	Level 4	Option/ Display Range	Description
PRST	Edit	SN01-SN16	CO2	C1-C6	colors 1 to 6 (C02C = ldx)
				HC1-HC6	half-colors 1 to 6 (C02C = ldx)
				F000- F255	forward spin stop to fastest (C02C=FSP)
				R000- R255	reverse spin stop to fastest(C02C=RSP)
				d000-d358	position in degrees (C02C = CON)
				FC1FC12	position with half colors (C02C = FSC)
				MC1-MC12	position with half colors (C02C = MFSC)
				N000-N255	random colors slow to fast (C02C = RNd)
				b1- b6	whole color blink (C02C = bLK)
			Hb1-Hb6	half-color blink (C02C = bLK)	
			LTC1	ldx	Litho wheel 1 indexed
				FSP	Litho wheel 1 forward litho rotate
				RSP	Litho wheel 1 reverse litho rotate
				WSP	Litho wheel 1 spin
				FSC	Litho wheel 1 scan
				RNd	Litho wheel 1 random
				bKW	Litho wheel 1 blink (during litho to litho change)
				bKA	Litho wheel 1 blink aperture (during index change)
				Mldx	Litho wheel 1 indexed with MSpeed
				MFSP	Litho wheel 1 forward litho rotate with MSpeed
				MRSP	Litho wheel 1 reverse litho rotate with MSpeed
				MWSP	Litho wheel 1 spin with MSpeed
				MFSC	Litho wheel 1 fast scan with MSpeed
				MRNd	Litho wheel 1 random with MSpeed
			LT1	MbKW	Litho wheel 1 blink wheel (during litho to litho change) with MSpeed
				MbKA	Litho wheel 1 blink aperture (during index change) with MSpeed
				L1-L6	litho selection (indexed modes)
				LF1-LF6	litho selection (forward rotate modes)
				LR1-LR6	litho selection (reverse rotate modes)
				SC1-SC8	litho selection (scan modes)
			LTR1	bW1-bW8	litho selection (blink wheel modes)
				bA1-bA8	litho selection (blink aperture modes)
				d000-d358	litho rotate (indexed modes)
				F000-F255	forward spin rotation speed stop to fastest (forward rotate modes)
				R000- R255	reverse spin rotation speed stop to fastest (reverse rotate modes)
				S000-S255	fast scan speed stop to fastest
				N000-N255	random speed stop to fastest (random modes)
			WF01-WF99	litho wheel spin speed forward slowest to fastest	
			WR01-WR99	litho wheel spin speed reverse slowest to fastest	

D

Level 1	Level 2	Level 3	Level 4	Option/ Display Range	Description
PRST	Edit	SN01- SN16	LTC2	<i>Idx</i>	Litho wheel 2 indexed
				<i>FSP</i>	Litho wheel 2 forward litho rotate
				<i>RSP</i>	Litho wheel 2 reverse litho rotate
				<i>WSP</i>	Litho wheel 2 spin
				<i>FSC</i>	Litho wheel 2 scan
				<i>RNd</i>	Litho wheel 2 random
				<i>bKW</i>	Litho wheel 2 blink (during litho to litho change)
				<i>bKA</i>	Litho wheel 2 blink aperture (during index change)
				<i>MIdx</i>	Litho wheel 2 indexed with MSpeed
				<i>MFSP</i>	Litho wheel 2 forward litho rotate with MSpeed
				<i>MRSP</i>	Litho wheel 2 reverse litho rotate with MSpeed
				<i>MWSP</i>	Litho wheel 2 spin with MSpeed
				<i>MFSC</i>	Litho wheel 2 fast scan with MSpeed
				<i>MRNd</i>	Litho wheel 2 random with MSpeed
				<i>MbKW</i>	Litho wheel 2 blink wheel (during litho to litho change) with MSpeed
			<i>MbKA</i>	Litho wheel 2 blink aperture (during index change) with MSpeed	
			LT1	<i>L1-L6</i>	litho selection (indexed modes)
				<i>LF1-LF6</i>	litho selection (forward rotate modes)
				<i>LR1-LR6</i>	litho selection (reverse rotate modes)
				<i>SC1-SC8</i>	litho selection (scan modes)
				<i>bW1-bW8</i>	litho selection (blink wheel modes)
				<i>bA1-bA8</i>	litho selection (blink aperture modes)
			LTR1	<i>d000-d358</i>	litho rotate (indexed modes)
				<i>F000-F255</i>	forward spin rotation speed stop to fastest (forward rotate modes)
				<i>R000- R255</i>	reverse spin rotation speed stop to fastest (reverse rotate modes)
				<i>S000-S255</i>	fast scan speed stop to fastest
				<i>N000-N255</i>	random speed stop to fastest (random modes)
				<i>WF01-WF99</i>	litho wheel spin speed forward slowest to fastest
				<i>WR01-WR99</i>	litho wheel spin speed reverse slowest to fastest
				<i>RS1- RS15</i>	ramp open and snap shut strobe
				<i>SR1- SR15</i>	snap open and ramp shut strobe
				<i>NR1- NR15</i>	random ramp open and snap shut strobe
			<i>NS1- NS15</i>	random snap open and ramp shut strobe	
			FCUS	<i>0- 255</i>	focusing
			IRIS	<i>OPEN</i>	open iris
				<i>F001- F127</i>	variable iris
				<i>P1 - P15</i>	periodic (variable) strobe
				<i>R1- R15</i>	random strobe
				<i>RS1- RS15</i>	ramp open and snap shut strobe
				<i>SR1 - SR15</i>	snap open and ramp shut strobe
				<i>NR1- NR15</i>	random ramp open and snap shut strobe
			<i>NS1-NS15</i>	random snap open and ramp shut strobe	

Level 1	Level 2	Level 3	Level 4	Option/ Display Range	Description
PRST	EDIT	SN01- SN16	SHUT	CLSd	shutter closed
				OPEN	shutter open
				P1 - P30	periodic strobe
				N1- N30	random strobe
				RS1- RS30	ramp open and snap shut strobe
				SR1 - SR30	snap open and ramp shut strobe
				NR1- NR30	random ramp open and snap shut strobe
				NS1- NS30	random snap open and ramp shut strobe
			dIM	d000 - d255	dimming
			MSPd	fULL	full speed
				dIS- 0.15	disable from fastest to slowest
			MACR	MR01-MR26	macro 1 to macro 26
			xFA d	x0.1 - x9.9	increments of 0.1
				x10 -x166	increments of 1.0
			dLAY	x0.1 -x9.9	increments of 0.1
				x10 -x166	increments of 1.0
			TIME	SEC	sets time by seconds
				MIN	sets time by minutes
				HOURL	sets time by hour
			ZERO	OK?	confirmation to reset scene to its null setting

D

Studio Spot 575 CMY/CMY Zoom Models

Menu Level 1	Menu Level 2	Menu Level 3	Menu Level 4	Options/ Display Range	Description
AddrR				F### C###	change existing Fixture number or DMX start channel (Menu option selected in INFO/DMx/FixT/SRCE)
INFO	LAMP			LON LOFF	Displays Lamp State
	L/HR			####	Displays current lamp hours ## and minutes ##
	L/ST			####	Displays number of lamp strikes
	VER			####	Displays fixture's software version
	L/RS			HOLd 0000	Press and hold the <Enter> button until the display shows "0000" to reset lamp hours to zero
	F/HR			H### M ##	Displays total hours and minutes the fixture has run
	F/RS			HOLd 0000	Press and hold the <Enter> button until the display shows "0000" to reset fixture hours to zero
	TEMP	CURR		###C	Displays current internal temperature in centigrade
		MINT		###C	Displays minimum internal temperature in centigrade
		MAXT		###C	Displays maximum internal temperature in centigrade
		RST		HOLd 0000	Press and hold the <Enter> button until the display shows "0000" to reset min and max temp to zero
	dMx	FixT	ERRS	####	Displays DMX errors
			CNTL	0001-0255	Displays control channel DMX value
			MACR	0001-0255	Displays macro DMX value
			MSPd	0001-0255	Displays MSpeed DMX value
			dIM	0001-0255	Displays dim DMX value
			SHUT	0001-0255	Displays shutter DMX value
			IRIS	0001-0255	Displays iris DMX value
			FCUS	0001-0255	Displays focus DMX value
			FRST	0001-0255	Displays frost DMX value (Zoom value in models with zoom lens)
			LR2L	0001-0255	Displays litho wheel 2 rotation DMX value (low byte)
			LR2H	0001-0255	Displays litho wheel 2 rotation DMX value (high byte)
			LT2	0001-0255	Displays litho wheel 2 aperture position DMX value
			LTC2	0001-0255	Displays litho wheel 2 control channel DMX value
			LR1L	0001-0255	Displays litho wheel 1 rotation DMX value (low byte)
			LR1H	0001-0255	Displays litho wheel 1 rotation DMX value (high byte)
			LT1	0001-0255	Displays litho wheel 1 aperture position DMX value
			LTC1	0001-0255	Displays litho wheel 1 control channel DMX value
			YELW	0001-0255	Displays yellow channel DMX value
			MAGN	0001-0255	Displays magenta channel DMX value
			CYAN	0001-0255	Displays cyan channel DMX value
	COLC	0001-0255	Displays color control channel DMX value		
	TLTL	0001-0255	Displays tilt DMX value (low byte)		
	TLTH	0001-0255	Displays tilt DMX value (high byte)		
	PANL	0001-0255	Displays pan DMX value (low byte)		
	PANH	0001-0255	Displays pan DMX value (high byte)		
	STRT	0001-0255	Displays start code DMX value		

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Menu Level 1	Menu Level 2	Menu Level 3	Menu Level 4	Options/ Display Range	Description
INFO	dMx cont.	FlxT	SRCE	0001-0255	Displays current data source DMX values
			CE	0001-0255	Displays the number of DMX checksum errors
			OV	0001-0255	Displays the number of DMX overruns
			FE	0001-0255	Displays the number of framing errors
		dATA	C001- C512	0001-0255	Displays the DMX data for the selected DMX channel
	SENS	PPOS		####	Checks that the pan encoder is functioning (<i>A working encoder will change value in the display as the pan position of fixture head is manually changed</i>)
		TPOS		####	Checks that the tilt encoder is functioning (<i>A working encoder will change value in the display as the pan position of fixture head is manually changed</i>)
		SENP		####	Checks the pan homing tab sensor
		SENT		####	Checks the tilt homing tab sensor
		COL		####	Checks color wheel homing tab sensor
		LT1		####	Checks the litho wheel 1 homing tab sensor
		LT2		####	Checks the litho wheel 2 homing tab sensor
		SVCC		ON OFF	Displays power- to-sensor status
	TEST	HOME			
FAN				FULL	Selects fan speed
				3/4	
				1/2	
				1/4	
				OFF	
ENCd			ON	Turns on power to the encoders	
			OFF	Disables the encoders for servicing	
S/UP			SET NOW	Places the fixture in setup mode for mechanical homing. (Press menu button to exit.)	
SELF Lamp strikes automatically to perform tests.		ALL			Tests all constructs
		SHUT			Tests shutter strobe movement
		IRIS			Tests iris movement
		FCUS			Tests focus lens movement
		FRST			Tests frost flag (<i>Tests lens in models with Zoom option</i>)
		LTR2			Tests litho wheel 2 rotation
		LTR1			Tests litho wheel 1 rotation
		LT2			Tests litho wheel 2 movement
		LT1			Tests litho wheel 1 movement
		MAGN			Tests color mixing wheel pair 2 movement
		YEL			Tests color mixing wheel pair 2 movement
		CYAN			Tests color mixing wheel pair 1 movement
		TILT			Tests tilt movement
PAN			Tests pan movement		
bOOT				Reboots the fixture	
LAMP			STAT	Displays the current lamp status	
			LOFF	Extinguishes the lamp	
			LON	Strikes the lamp	
dISP				Tests the alphanumeric LED display	

Menu Level 1	Menu Level 2	Menu Level 3	Menu Level 4	Options/ Display Range	Description
MOdE	xLd				Crossloads fixture software to all other Studio 575 Series fixtures on the link
	TYPE			COLR	Sets fixture type to Studio Color
				SPOT	Sets fixture type to Studio Spot
SET	FACT			ON	Sets factory defaults on
				OFF	Current settings are overriding factory defaults
	LENS			NORM	Normal Lens configuration
				ZOOM	Zoom lens configuration
	dLOS			SHRT	Closes shutter and brings focus in at data loss
				LONG	Closes shutter and brings focus in 3 min after data loss
	CHNL			AddR	Sets control method to fixture number
				dMx	Sets control method to DMX start channel
	dSPL			ON	Sets the alphanumeric LED display on
				OFF	Sets the alphanumeric LED display off
				dIM	Dims the alphanumeric LED display
	d/IN			ON	Selecting ON inverts the alphanumeric display orientation
				OFF	
	P/IN			ON	Selecting ON inverts pan movement direction
				OFF	
	T/IN			ON	Selecting ON inverts tilt movement direction
				OFF	
	SWAP			ON	Selecting ON swaps pan and tilt movement
				OFF	
	S/dN			5 MN	Sets shutdown time at 5 minutes
10 MN				Sets shutdown time at 10 minutes	
COdE				FACTORY USE ONLY	
CMY			FAST	Selects the speed of CMY changes. Factory default is slow.	
			MEd		
			SLOW		
PRST	PLAY			ON	Starts playback
				OFF	Stops playback
				SCN	Displays which scene is playing
	SEND			OK?	Selects a scene to capture a pre-programmed scene to (from your DMX controller)
	dFLT			OK?	Enables the factory-programmed preset scene sequence (self-demo) / erases any preset scenes previously programmed
	CAPT			SN01-SN16	Selects the scene information to capture from the DMX controller.
	COPY	FROM		F00-F16	Selects a scene to copy from (source scene)
		TO		T00-T16	Selects a scene to copy to (destination scene)

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Menu Level 1	Menu Level 2	Menu Level 3	Menu Level 4	Options/ Display Range	Description
PRST (cont.)	EdIT	SN01- SN16	SHUT	OPEN	Fully opens the shutter
				CLSD	Closes the shutter
				P 01–P 32	Strobes the shutter at specified periodic intervals from slow (P 01) to fast (P 32)
				N 01–N 32	Strobes the shutter at random intervals from slow (N 01) to fast (N 32)
				RS01–RS32	Snaps shutter open, ramps shut slow (RS01) to fast (RS32)
				SR01–SR32	Ramps shutter open from slow (SR01) to fast (SR32), then snaps shutter closed
				NS01–NS32	Snaps shutter open randomly, then ramps closed from slow (NS01) to fast (NS32)
				NR0–NR32	Ramps shutter ramp open randomly, from slow (NR01) to fast (NR32), then snaps shutter closed
			dIM	d000–d255	Selects a dim value from dark (d000) to bright (d255)
			PAN	-185–+185	Selects a pan value
			TILT	-112–+112	Selects a tilt value
			COLC	CON	Positions the color wheels in continuously-variable, Full speed mode
				MCON	Positions the color wheels in continuously-variable Mspeed mode
				Tbd	To be Determined - Reserved for future use
				MTbd	To be Determined - Reserved for future use
			CYAN	0 - 255	Selects cyan value from full (0) to open white (255)
			MAGN	0 - 255	Selects magenta value from full (0) to open white (255)
			YELW	0 - 255	Select yellow value from full (0) to open white (255)
			LTC1 (litho wheel 1 control)	Idx	Snaps to center of selected aperture (index mode) Full speed
				FSP	Spins selected aperture forward, Full speed
				RSP	Spins selected aperture reverse, Full speed
				WSP	litho wheel spin mode, full speed
				FSC	litho wheel scan mode (wheel scans one full position on each side of the selected litho), full speed
				RNd	litho wheel random selection mode, full speed
				bKW	litho wheel blink mode (same as "Idx" mode with shutter blink between litho positions), full speed
				bKA	litho aperture blink mode (same as "Idx" mode with shutter blink between litho orientation changes), full speed
				MIdx	litho wheel indexed mode (wheel snaps to center of selected litho), Mspeed
				MFSP	litho forward spin mode, Mspeed
				MRSP	litho reverse spin mode, Mspeed
				MWSP	litho wheel spin mode, Mspeed
				MFSC	litho wheel scan mode (wheel scans one full position on each side of the selected litho), Mspeed

Menu Level 1	Menu Level 2	Menu Level 3	Menu Level 4	Options/ Display Range	Description	
PRST (cont.)	EdIT (cont.)	SN01 - SN16 (cont.)	LTC1	MRNd	litho wheel random selection mode, Mspeed	
				MbKW	litho wheel blink mode (same as "Idx" mode with shutter blink between litho wheel changes), Mspeed	
				MbKA	litho aperture blink mode (same as "Idx" mode with shutter blink between litho orientation changes), Mspeed	
			LT1 (litho wheel 1 position)	L1-L6	select a litho wheel position (only available if you selected an LTC1 construct value of Idx or MIdx)	
				LF -LF6	select a forward spinning litho position (only available if you selected an LTC1 construct value or RSP or MRSP)	
				LR -LR6	select a reverse spinning litho position (only available if you selected an LTC1 construct value or RSP or MRSP)	
				SC1-C8	select a litho base position to scan (only available if you selected an LTC1 construct value of FSC or MFSC)	
				bW1-W8	select a litho wheel position (only available if you selected an LTC1 construct value of bKW or MbKW)	
				bA1 - A8	select an individual litho orientation position (only available if you selected an LTC1 construct value of bKA or MbKA)	
				RANd	(Note: because you selected an LTC1 construct value of RNd, no litho position can be assigned.)	
				WSPN	(Note: because you selected an LTC1 construct value of WSP, no litho position can be assigned.)	
				LTR1 (litho wheel1 rotation)	d000 - d358	select a litho angle from 0° (d000) to 358° (d358) (only available if you selected an LTC1 construct value of Idx, bKW, bKA, MIdx, MbKW, or MbKA)
					F000 - F255	select a litho's forward spin speed from none (F000) to fast (F255) (only available if you selected an LTC1 construct value of FSP or MFSP)
			R000 - R255		select a litho's reverse spin speed from none (R000) to fast (R255) (only available if you selected an LTC1 construct value of RSP or MRSP)	
			S000 - S255		select a litho scan speed from slow (S000) to fast (S255) (only available if you selected an LTC1 construct value of FSC or MFSC)	
			N000 - N255		select a pause time between random litho selections from stop (N000) to fast (N255) (only available if you selected an LTC1 construct of RNd or MRNd)	
			WF01 - WF99		select a litho wheel forward spin speed from slow (WF01) to fast (WF99) only available if you selected an LTC1 construct value of WSP or MWSP)	
			WR01 - WR99		select a litho wheel reverse spin speed from slow (WR01) to fast (WR99) only available if you selected an LTC1 construct value of WSP or MWSP)	

D

Menu Level 1	Menu Level 2	Menu Level 3	Menu Level 4	Options/ Display Range	Description
PRST (cont.)	EdIT (cont.)	SN01 - SN16 (cont.)	LTC2 (litho wheel 2 control)	Idx	litho wheel indexed mode (wheel snaps to center of selected litho), full speed
				FSP	individual litho forward spin mode, full speed
				RSP	individual litho reverse spin mode, full speed
				WSP	litho wheel spin mode, full speed
				FSC	litho wheel scan mode (wheel scans one full position on each side of the selected litho), full speed
				RNd	litho wheel random selection mode, full speed
				bKW	litho wheel blink mode (same as "Idx" mode with shutter blink between litho positions), full speed
				bKA	litho aperture blink mode (same as "Idx" mode with shutter blink between litho orientation changes), full speed
				MIdx	litho wheel indexed mode (wheel snaps to center of selected litho), Mspeed
				MFSP	litho forward spin mode, Mspeed
				MRNd	litho wheel random selection mode, Mspeed
				MbKW	litho wheel blink mode (same as "Idx" mode with shutter blink between litho wheel changes), Mspeed
			MbKA	litho aperture blink mode (same as "Idx" mode with shutter blink between litho orientation changes), Mspeed	
			LT2 (litho wheel 2 position, cont.)	L1 - L6	select a litho wheel position (only available if you selected an LTC2 construct value of Idx or MIdx)
				LF1-LF6	select a forward spinning litho position (only available if you selected an LTC2 construct value or RSP or MRSP)
				LR -LR6	select a reverse spinning litho position (only available if you selected an LTC2 construct value or RSP or MRSP)
				SC1-SC8	select a litho base position to scan (only available if you selected an LTC2 construct value of FSC or MFSC)
				bW1-bW8	select a litho wheel position (only available if you selected an LTC2 construct value of bKW or MbKW)
				bA1 -bA8	select an individual litho orientation position (only available if you selected an LTC2 construct value of bKA or MbKA)
				RANd	(Note: because you selected an LTC2 construct value of RNd, no litho position can be assigned.)
WSPN	(Note: because you selected an LTC2 construct value of WSP, no litho position can be assigned.)				

Menu Level 1	Menu Level 2	Menu Level 3	Menu Level 4	Options/ Display Range	Description	
			LTR2 (litho wheel2 rotation)	d000 -d358	select a litho angle from 0° (d000) to 358° (d358) (only available if you selected an LTC2 construct value of ldx, bKW, bKA, Mldx, MbKW, or MbKA)	
				F000 - F255	select a litho's forward spin speed from none (F000) to fast (F255) (only available if you selected an LTC2 construct value of FSP or MFSP)	
				R000 - R255	select a litho's reverse spin speed from none (R000) to fast (R255) (only available if you selected an LTC2 construct value of RSP or MRSP)	
				S000 -S255	select a litho scan speed from slow (S000) to fast (S255) (only available if you selected an LTC2 construct value of FSC or MFSC)	
				N000 -N255	select a pause time between random litho selections from stop (N000) to fast (N255) (only available if you selected an LTC2 construct of RNd or MRNd)	
				WF01 - WF99	select a litho wheel forward spin speed from slow (WF01) to fast (WF99) only available if you selected an LTC2 construct value of WSP or MWSP)	
				WR01 - WR99	select a litho wheel reverse spin speed from slow (WR01) to fast (WR99) only available if you selected an LTC2 construct value of WSP or MWSP)	
				MSPd	0.15 - 252.7	select an MSpeed value in decimal seconds from fast (0.15) to slow (252.7)
				MACR	MROF	set the macro option off
					MR01 - MR26	select a factory-programmed macro from 1 to 26
				xFAd	x0.1 - x9.9	select the dIM and FCUS construct's crossfade time in increments of 0.1
					x10 - x166	select the dIM and FCUS construct's crossfade time in increments of 1.0
				dLAY	x0.1 - x9.9	select the scene delay time in increments of 0.1
					x10 - x166	select the scene delay time in increments of 1.0
			TIME	SEC	select seconds as the units of time used for the xFAd and dLAY constructs	
				MIN	select minutes as the units of time used for the xFAd and dLAY constructs	
				HOURL	select hours as the units of time used for the xFAd and dLAY constructs	
			ZERO	OK?	erase any programming of the current scene by voiding all construct values / mark the end of a loop	

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