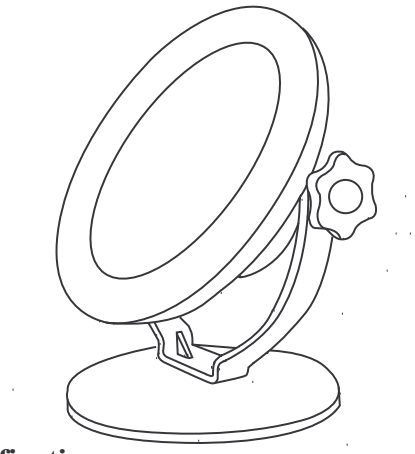
SUPER | VISION
INTERNATIONAL

Model SaViSPOT

SaVi Spot Light Fixture



Specifications:

Application:	Wet & Dry Locations
Location Listing:	UL Listed, CE Certified
IP Rating Aluminum:	IP 67
IP Rating Stainless Steel:	IP 68
Dimensions:	10.70"L x 7.08"W x 9.75"H 271.7mm 179.8mm 247.6mm
Beam Angle:	25 Degree Angles
Lamps:	360 Red, Green and Blue 5mm LED (Light Emitting Diode)
Operating Temperature:	-4º F ~ +104º F / 20º C ~ +40º C
Working Voltage:	120 / 240VAC 50/60Hz
Wattage / Current:	25 Watt / 3A Max.
Weight:	7 LBS. / 3.1 Kg.
Available Colors:	White, Black, Polished Stainless Steel

Installation Manual

Rev. B 12-30-2004

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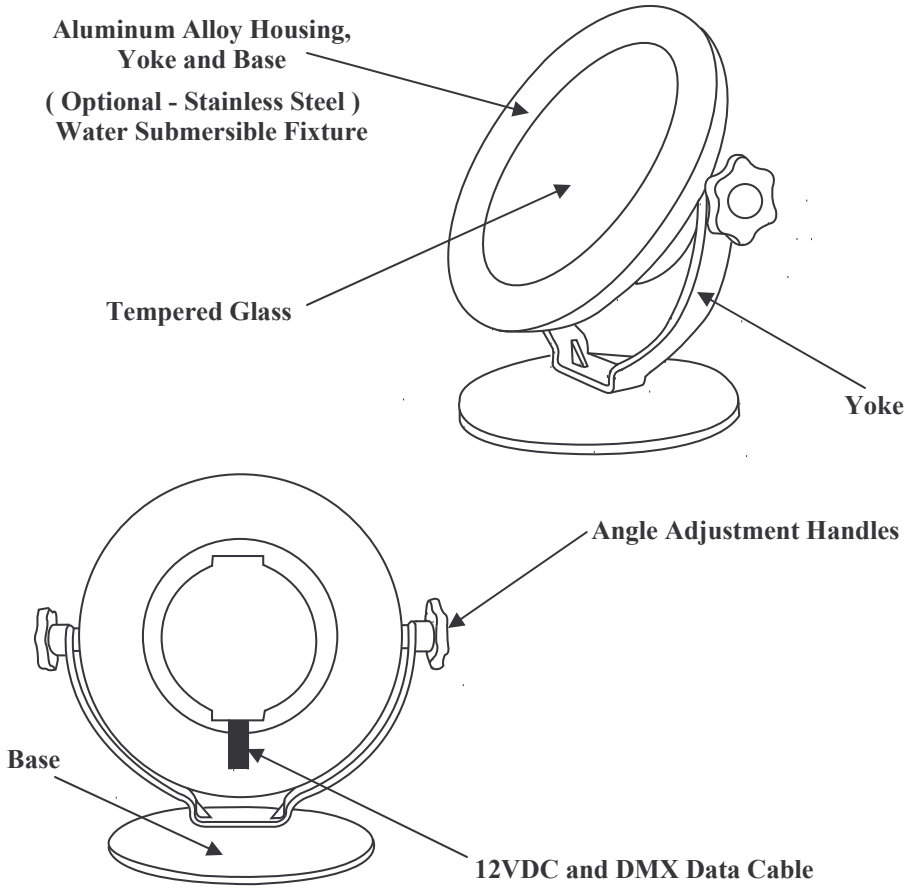
1.0 General Information: Model SaViSPOT

Illuminator Spot Fixture Should Only Be Installed By a Qualified Electrician



The SaVi Spot uses a total of 360 LED's, Red, Green, Blue, as a source of illumination. The RGB LED technology will display up to 16.7 million color variations. The SaVi Spot is a high powered fixture, that is ideal for both indoor/outdoor or submersible application that requires color mixing capabilities, such as fountains, exhibits, theme parks, commercial and architectural projects. This fixture is also energy efficient and easy to install, simply connect up to 6 fixtures through a watertight power distribution junction box, connected to a 16.5 Amp power source, just add DMX signal from any standard controller. The housing, yoke and base of this fixture is constructed of aluminum or stainless steel alloy with a tempered glass face, the stainless steel material is designed to have no corrosive effects in water treated with chlorine or bromine. This fixture is completely sealed through a triple redundant proprietary design to keep the fixture free from dust, dirt, rain and moisture. The SaVi Spot has an protection rating of IP68 and the optional stainless steel fixture is suitable for submersion up to15 feet, and is equipped with an adjustable handle which allows easy angle adjustments. Supervision International backs each SaVi Spot fixture with a full two year warranty.

2.0 Introduction to DMX: Model SaViSPOT

The DMX512/1990 protocol was introduced in 1986 by a committee of the United States Institute of Theater Technology (USITT) as a standard method for controlling dimmers for lighting consoles. Since then, this practice has been widely adopted by many manufactures, making it the most universally accepted controlled procedure in the lighting industry today.

Super Vision's SaVi Spot Fixture is controlled by this procedure and uses the DMX signal to bring the LED Lighting Systems to world. The SaVi Spot Fixture can be controlled from any standard lighting console or computer with DMX512/1990 compliant output.

Numerous LED SaVi Spot Fixtures can be linked to the same DMX signal cable by using a power distribution junction boxes and DMX Amp/Splitters to achieve synchronized operation and/or individual control of every fixture in the system. Use of the external DMX signal distributors, hundreds of fixtures can be connected and controlled simultaneously. (**Ref. Page 4**)
(For DMX Termination Ref. Page 12)

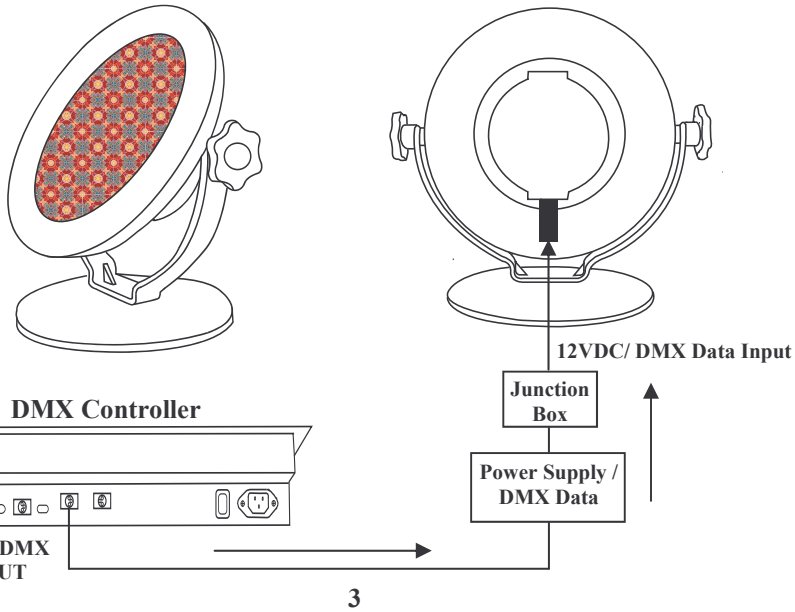
3.0 Cable Connections:

The DMX512 uses a sophisticated, high-speed digital communication system. The use of a high quality data cable and professional grade connectors is critical to the systems reliability and dependability. The interconnecting cables must be rated for EIA-485 use and with one or more shielded wire twisted pairs and characteristic impedance near 120 ohms.

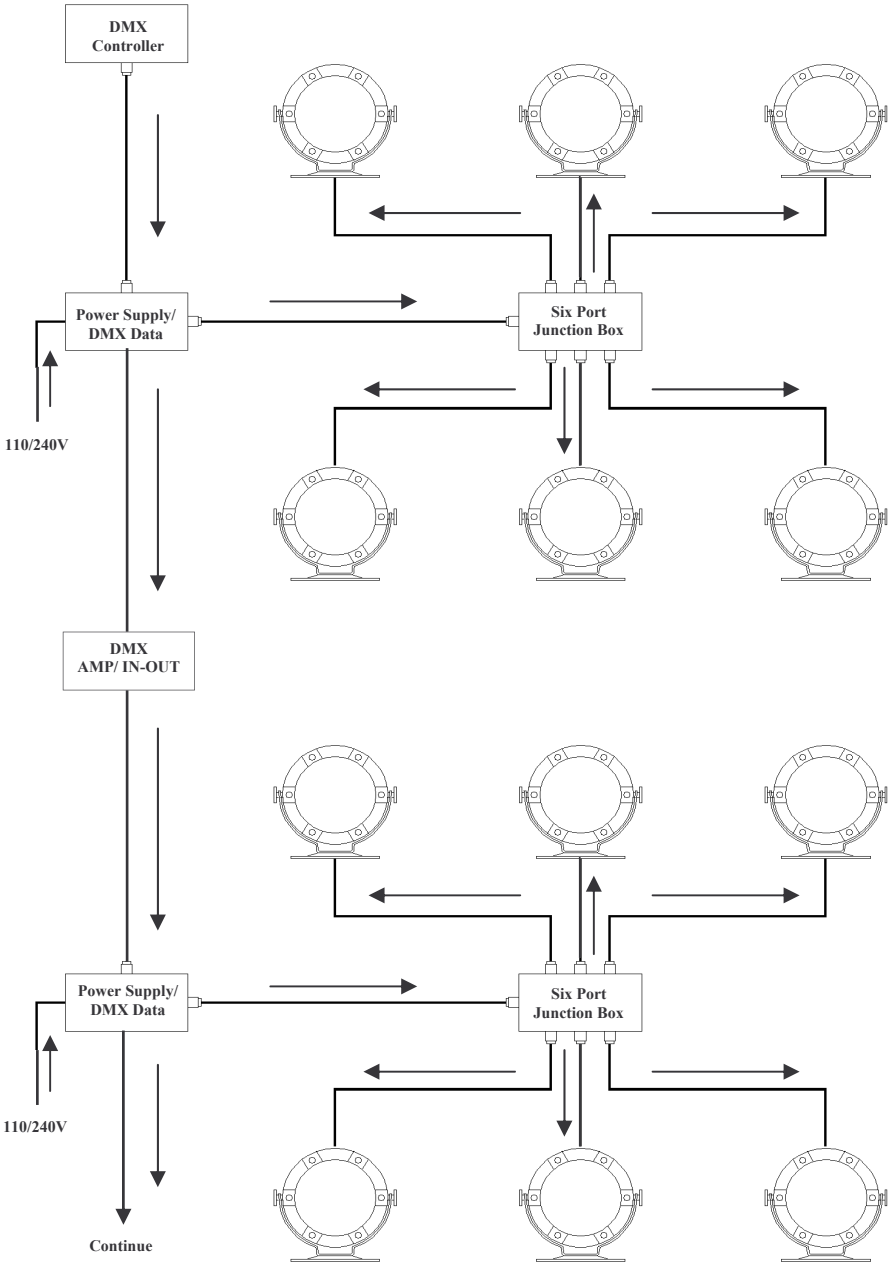
Any cable rated by the manufacturer that compiles with the EIA-485 use may be substituted. Examples: Suitable cables include Belden 9841 or 9842, Proplex PC22P or PC224P and Alpha 9817.

DMX IN	
Pin 1	Ground
Pin 2	Data (-)
Pin 3	Data (+)

DMX OUT	
Pin 1	Ground
Pin 2	Data (-)
Pin 3	Data (+)

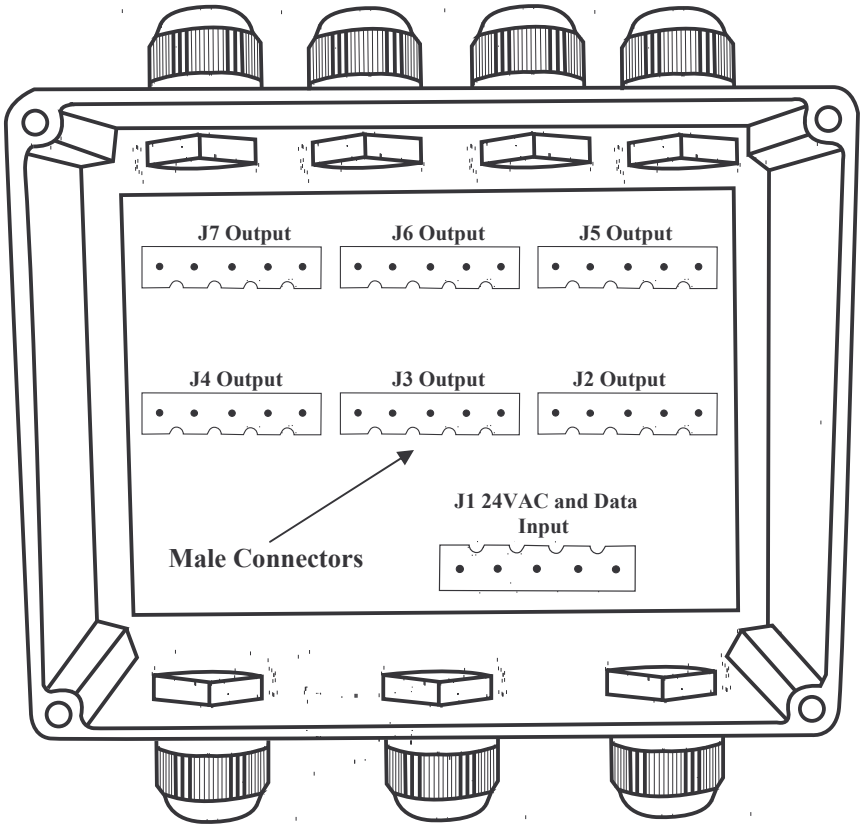


4.0 Wiring Application: Model SaViSPOT

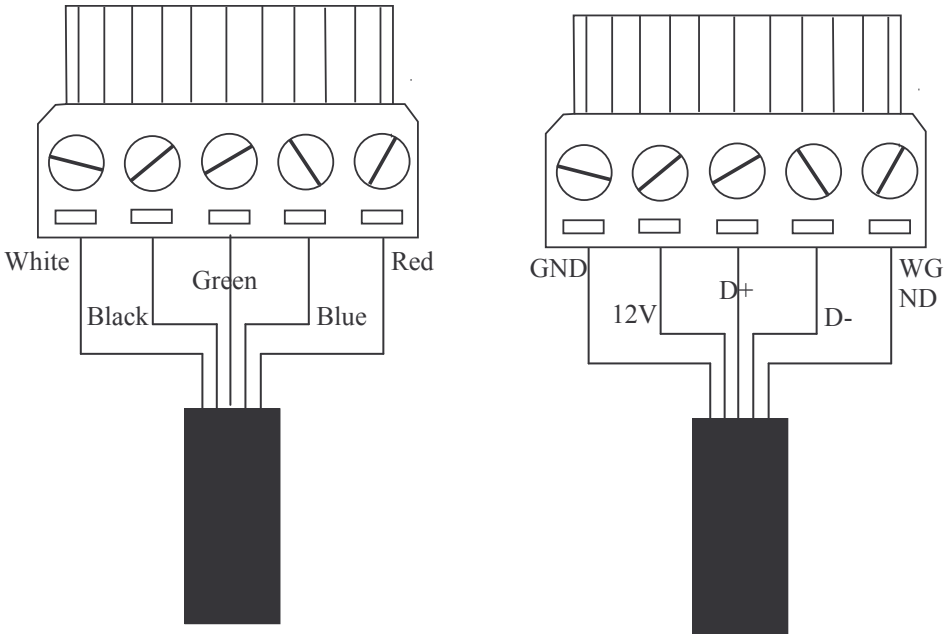


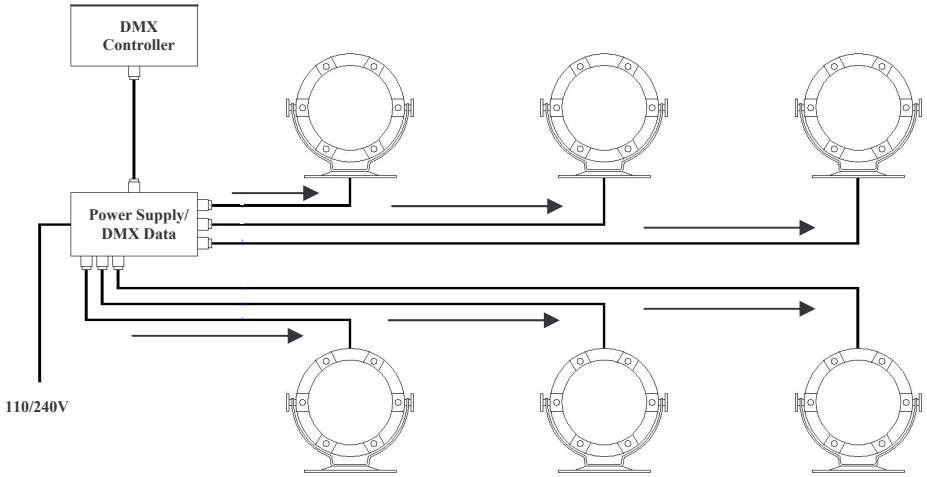
4.0 Wiring Application Con'd:

Junction Box Internal Connections



Note: Prior to assembling any cable connectors to the 5 strand, large black insulated cable attached to your SaVi Spot Fixture, you must first feed the end of the cable through the water tight stress relief fitting, prior to putting on any connectors. We recommend to connect **one cable and one connector at a time,** due to space constrains. Strip each color stranded wire approximately .25in. long. Insert each wire into connector terminals, exactly as shown **below** on wiring diagram and tighten down screws firmly, as wires tend to slip out from under screws. Insert wire connectors to junction box connections by pushing firmly down as required. Once all connectors are firmly in place, tighten down stress relief fittings and test system, install junction box cover and you are ready to go.





5.0 System Operation:

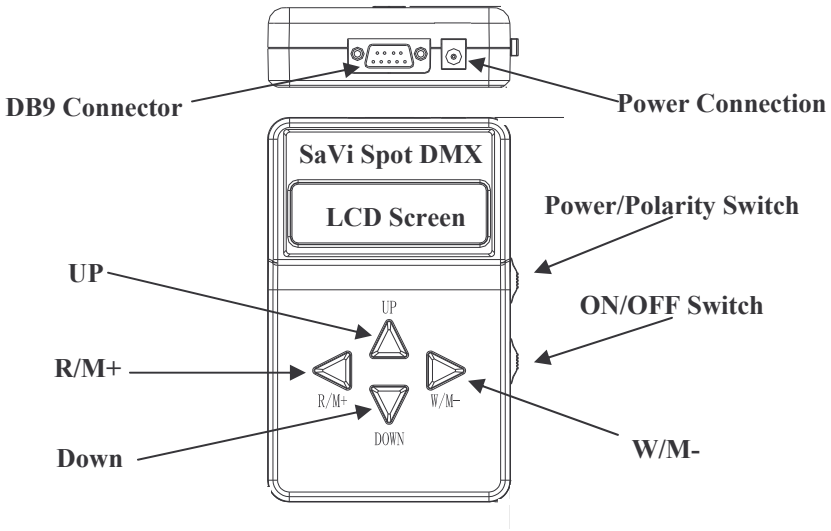
Every SaVi Spot Fixture contains a total of 360 LED's Red, Green and Blue, each color utilizes 1 channel.

- Channel # 1 controls the Red LED's,
- Channel # 2 controls the Green LED's
- Channel # 3 controls the Blue LED's.

6.0 Fixture Power Up / Normal Operation

Applying power to your SaVi Spot Fixture when there is no DMX signal, all LED's will go to full light intensity. Addressing this fixture is accomplished electronically, using the SaVi Spot smart controller and appropriate adapter cables.

7.0 Key Pad Operation: Model SaViSPOT



UP Key: When the SaVi-Spot DMX 512 Controller is in the address-writing mode, press the up key once, the value of the DMX address will increase by "1", if you press and hold the up key for more than 2 seconds, then the value will increase much faster, automatically, until released.
(2): When the SaVi-Spot DMX 512 Controller is in the control mode, it functions as a value increasing key for the parameters of "speed" or "gray level". Press it once, then the value of "speed" or "gray level" increase by "1", if you press and hold for over 2 seconds, the SaVi-Spot DMX 512 Controller will run faster until the desired value is achieved or the button is released.

Down Key: When the SaVi-Spot DMX 512 Controller is in the address-writing mode. Press the "down key" once, the value address will decrease by "1", press and hold for over 2 seconds, the value will decrease at speed. When it is in the controlling mode, the key functions, the value decreases for "speed" and "gray level".

R/M+ Key: When the SaVi-Spot DMX 512 Controller in the address-writing mode, it can read the address value of each fixture. Press it once, it will get one address value. When it in the controlling mode, press it to select the operating mode in sequence.

W/M- Key: When it is in the address-writing mode, it can write addresses for each lighting fixture, press it once, one address value will be written into the fixture. **(2):** When it is under the controlling mode, press it to select working mode in reverse sequence.

8.0 Operation for Address-Writing Function:

To write and verify the address value of each lighting source fixture. First, connect the SaVi-Spot DMX 512 Controller to the fixture and turn it on, then go into the address writing mode. **Note:** This product has polarity, so if the polarity does not match, press the polarity switch to adjust it. Press the **"Up" or "Down"** key to set an address value, and press the **W/M+** to assign the value to the lighting fixture. If the addressing is completed successfully, then the **LCD Screen** will display the address value, or it will show a failure message. Press **R/M+** to read the address value of each fixture. When there is a message, it will be displayed on the **LCD Screen**.

9.0 Address Writer or Show Controller: Model SaViSPOT

The SaVi-Spot DMX 512 Controller works in two distinct and separate modes, as either an **Address Writer**, or as a **Show Controller**, based on the application that is required for the user. To begin this process, First energize the SaVi-Spot DMX-512 Controller, using the **On/Off Switch** located on the right side of this Hand held Programmer. Upon power up the LCD screen will display a message that will appear as follows: **RW-ADDR [UP]**

Controller [DOWN]

Pressing the **"UP"** key, will place the system in address writing mode, pressing the **"DOWN"** key will place the system in control mode; if there is any type of DMX addressing such as show or operation on the SaVi-Spot DMX 512 Controller, then the controller will default to the control mode automatically.

Connecting the SaVi Spot DMX 152 Controller

Connect our specially designed connecting cable **(Ref. Figure 2.),** for writing address to SAVI-SPOT.

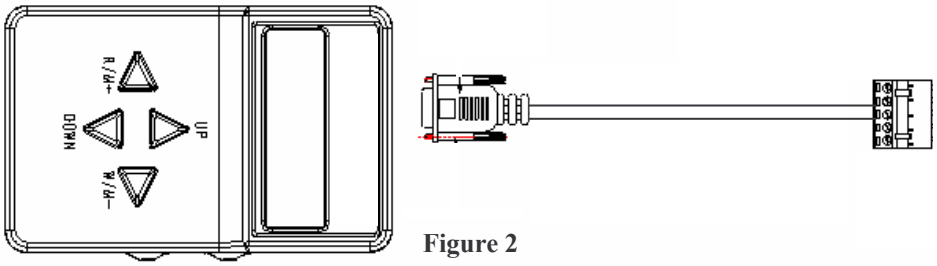


Figure 2

Connect our specially designed connecting cable **(Ref. Figure 3.),** for synchronous control of SAVI-SPOT.

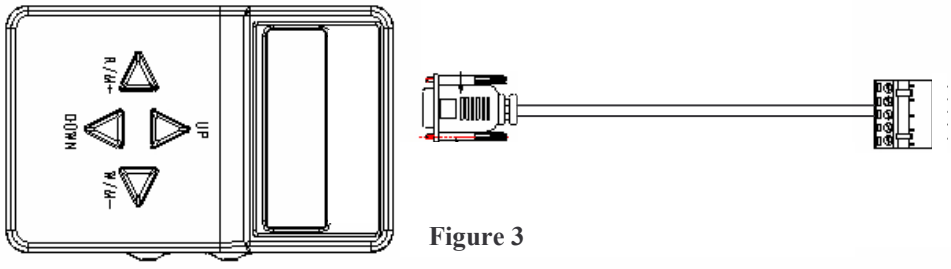


Figure 3

10.0 Synchronous Operation Procedure: Model SaViSPOT

To operate your SaVi Spot Fixture in a synchronous fashion, and also achieve synchronous color changing. Turn the SaVi-Spot DMX 512 Controller to the **"ON"** position, it will enter the control mode, then connect the SaVi-Spot DMX 512 Controller to the fixture with the signal cable. When the SaVi-Spot DMX 512 Controller is in the control mode, you must make sure that the polarity is matched, push the polarity switch to adjust it. Use the **"Up"** or **"Down"** key to adjust the speed, gray scale, and also use the **W/M+** to select working mode in sequence or **W/M-** to select in reverse sequence.

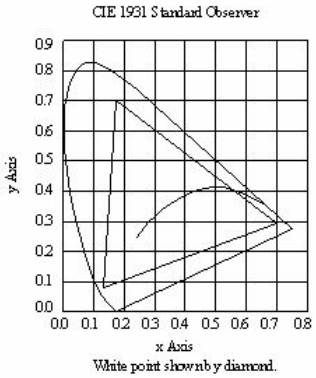
Controlling Mode	Speed/Level
Static Black	0-255
Static Red	0-255
Static Green	0-255
Static Yellow	0-255
Static Blue	0-255
Static Purple	0-255
Static Cyan	0-255
Static White	0-255
Color Change	0-255
Color Flash	0-255
Color Fade	0-255

11.0 PhotoMetrics: Model: SaViSpot

Source specifications

Optics: clear polycorbonte
Source: 360LEDs
(120 Reds, 120 Greens, 120 Blues)

GAMUT



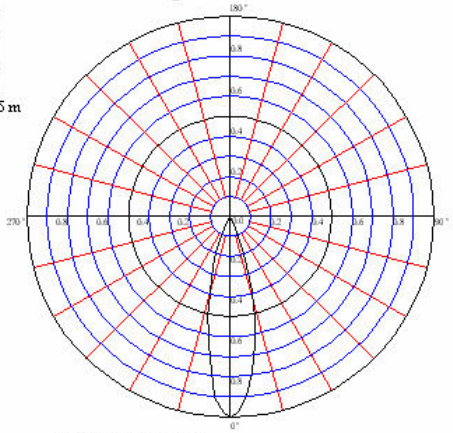
Illuminance distribution

60.1	70.4	83.4	104.0	117.7	124.3	108.6	90.3	74.9	63.7
76.2	97.5	155.1	248.6	314.0	308.4	240.2	153.3	129.1	77.6
101.9	163.6	320.6	593.5	751.4	684.1	473.8	265.4	149.5	94.4
136.4	269.2	629.9	1047.7	1242.0	1157.9	829.9	475.7	220.6	118.7
156.1	370.1	801.9	1255.1	1619.6	1535.5	1114.0	630.8	281.3	141.1
147.7	329.9	746.7	1205.6	1296.0	1528.9	1129.9	680.4	298.1	142.1
128.9	237.4	529.9	923.4	1203.7	1213.1	943.9	542.9	246.7	120.6
103.7	154.2	291.6	550.5	752.3	761.7	567.3	306.5	144.9	92.5
89.7	112.1	152.3	240.2	317.8	315.9	214.9	135.5	93.5	71.0
72.9	86.9	100.9	116.8	129.9	121.5	101.9	81.3	67.3	57.0

0.5 m (top) · 0 m (right) · 0.5 m (bottom-left) · 0 m (bottom) · 0.5 m (bottom-right)

Units: Lux
Measured on: White
Direction: On axls
Distance from surface: 1M
Multiplier: 0.115 Red 0.378 Green 0.506 Blue

Candle power distribution



Illuminance

Color \ bulb spacing	1	2	3	4	5
White	1724.3	456.1	208.4	118.1	74.6
Red	213.1	57.0	27.1	15.2	9.3
Green	700.9	185.9	85.9	47.9	30.4
Blue	937.4	242.9	110.3	62.4	40.4

Units: Lux
Direction: on axls

Testing circumsftance
installation position: horizontal
testing surface: A-A surface

Electrical parameters
current: 0.253A
voltage: 220V
power consumption: 35W

Testing result
Max. luminous intensity: 1022.806 cd
luminous max: 370.7 lm
luminous efficiency: 11.029 lm/w

12.0 Termination of DMX Control Run:

Why is it necessary to terminate the end of a DMX512 control run? In Recommended Practice for DMX512 by Adam Bennette, Mr. Bennette states "Incorrect or missing termination is probably the single most common reason for faulty DMX512 systems."

Reflections: DMX512 signals have electrical components in the Radio Frequency (RF) range. Cables carrying radio frequencies are called Transmission Lines and have a special set of rules and formulas that describe their behavior. One of these rules describes what happens to a signal traveling down the cable (at over half the speed of light) when it hits the end of the cable. No, the cable doesn't bulge or explode. Instead a percentage of the signal is "reflected" back up the cable. The way to prevent this reflected energy is to absorb it. To absorb the maximum amount of energy, a resistor which matches the "characteristic impedance" of the cable is placed across the data line. The DMX512 specification states the cable should have a characteristic impedance of 120 ohms (although most DMX512 technicians agree a value between 100 and 120 ohms is satisfactory). A value of 120 ohms is usually specified for proper DMX512 termination.

Why are reflections a problem? The signals travel down the cable at roughly 60% of the speed of light. Although fast, this is not instantaneous. The DMX512 data is digital. Each digit is placed on the line for only 4 millionths of a second (abbreviated 4uS). The receiving device looks at the value of the digit in the center of the 4uS. That is 2uS after the digit is placed on the line. In 2uS a signal can travel down and back about 590 feet of cable. If a device is sitting on a cable such that it receives the reflected signal as well as the initial signal, it sees two numbers at once. It gets confused! There has been DMX512 problems, which were corrected by termination, on cables much shorter than 590 feet. Although it can easily replicated, there are DMX512 problems with cable lengths over 500 feet. The following are some possible explanations:

1. The cable they were using was "slow" with the signals traveling at much less than 60% of the speed of light.

2. Reflections can occur at both ends of the cable. Perhaps the delayed signal had been reflected up and down the line several times causing a 2uS delay on shorter cables. A weak signal from the console may aggravate this problem. The problem was not caused by reflections, but by noise or signal distortion. The low resistance of the terminator helps to clean up the signal. **(See Below)**

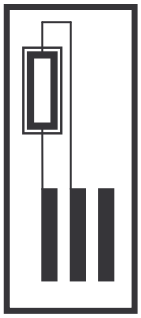
Cable Capacitance and Inductance: In looking at DMX512 signals on the oscilloscope I've noticed signal distortion on relatively short lines. Some distortion is caused by the fact that all cables have capacitance and inductance. This causes "ringing" (oscillation at the beginning or end of a digit) and rounding of the edges of the digit. Although any low value resistor across the end of the line will lower the effect of cable capacitance and inductance, using the proper termination resistance is differently recommended.

Noise: Low impedance cabling systems pick up less electrical noise than high impedance systems. By adding the proper termination, the susceptibility of the system to noise is reduced.

DMX Terminator: All DMX lines must be correctly terminated if reliable operation is to be obtained. Make sure that only the last item in the chain has a terminator connector on it. If the last item **(Farthest from data source)** does not have a terminator, then one is needed. To make one you will need the following parts :

- 1 Male 5 Pin XLR or Male 3 pin XLR connector.
- 1 120 ohm 0.5W resistor.

3 pin XLR connector, with 120 Ohm resistor soldered between pins #2 and # 3.



13.0 Trouble Shooting:

- **The fixture does not operate at all:** Make sure the fixture is wired properly. Check for the application of both the correct voltage as well as a DMX signal. Look for loose connectors within the junction box.

- **All LED's are lit, but there is no response to any DMX Command:** Check for DMX Signal between the Control Desk and the fixture. Once this is verified, check the fixture's DMX address. To insure that it is recognizing the address currently displayed. Use the SaVi Spot Smart Controller to Check/Write fixture addresses.

- **The fixture will not respond to any given command:** Check for DMX signal between the Control Desk and the fixture. Once this is verified, check the fixture's DMX address. To insure that it is recognizing the address currently displayed. Use the SaVi Spot Smart Controller to Check/Write fixture addresses.

- **One color responds to a DMX Signal, but the other colors will not respond to a given command from the Control Desk:** Check the fixture by removing the DMX cable from the fixture, and cycling the power. All LED's should now be lit. If this works as described, reattach the DMX signal cable and verify any failure. If the failure persists, check the patch in the DMX Control Desk for the proper channel assignments. Verify the address setting with the SaVi Spot Smart Controller. If all else fails, re-address the fixture to another address, retry the test. If the fixture is still not working correctly check the DMX cable for missing signals or broken conductors. Once the root trouble is isolated, re-address the fixture to the original setting and retry the test.

- **All LED's are lit, but the output appears to be dim:** Check the DMX command levels for all three channels controlling the fixture in question. Check the Grand Master fader of the DMX Control Desk. Bring these levels to full (255, or 100%) Verify that the power supplied to the fixture is not being supplied by a dimmable circuit, and that the full 120 or 240VAC is present, at the SaVi Spot - P/S.

- **SuperVision International,** maintains a full staff of highly qualified technicians who are available to assist you with any technical issue that may arise from the use of the SaVi Spot fixture.

Maintenance Notes

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