

1. 1.01 Color Mixing LED CYCLORAMA FIXTURE

A. General

1. The fixture shall be a compact, lightweight, color-mixing LED asymmetrical wash fixture with 8 or 16 bit DMX control of intensity and color. The fixture shall be the Spectra-Cyc 400 as manufactured by Altman Stage Lighting, Inc. or approved equal.
2. The fixture shall incorporate a state of the art microprocessor-controlled solid-state LED light engine incorporating 3-Watt Luxeon K2 Red, Green, Blue, and Amber color LEDs, and an on-board power supply
3. The fixture shall incorporate a hammertone aluminum asymmetrical reflector in combination with a blended linear LED engine to provide even coverage on vertical and horizontal surfaces without “scalloping” or hot spots.
4. The fixture shall incorporate silent, convection cooling without employing the use of fans or filters. Fixtures incorporating fan cooling systems are not equal and shall not be accepted.
5. IES Photometrics files shall be available upon request from the manufacturer to model light output using industry standard design software.
6. The fixture shall comply with USITT DMX-512 A and ANSI E1.20-2006 Remote Device Management over USITT DMX-512A Standard (RDM).

B. Physical

1. The fixture shall be constructed of 18-gauge steel. Construction shall employ all corrosion-resistant materials and hardware and shall be free of pits and burrs.
  - a. Standard Finish shall be Epoxy Sandtex black, electrostatic application. The fixture shall be available with optional white, gray, and custom color finishes as specified.
  - b. Power supply, cooling and electronics shall be integral to each unit.
  - c. The housing shall serve as a convection chimney when installed in a vertical or horizontal orientation to provide for convection cooling of the LED array, integral driver, and integral power supply.

2. Fixture dimensions shall be 48" w x 14" h x 7.5" d. The fixture shall weigh approximately 35 lbs.
3. The fixture shall provide even asymmetrical distribution of light on a vertical or horizontal surface by use of a linear LED source and a hammertone asymmetrical reflector. Fixtures requiring the installation of spread lenses or other linear diffusion media to approximate asymmetrical distribution of light are not equal and shall not be accepted.
4. The fixture shall incorporate independently adjustable rubber leveling feet on the bottom of the fixture to provide for adjustment when used to light a vertical surface from the bottom.
5. An optional rigid steel yoke with locking handles shall be available for overhead pipe mounting.
  - a. Yoke shall be supplied with a cast iron C-clamp Altman #510 suitable for use on up to 2" O.D. pipe. Clamp must incorporate a 360-degree rotational "safety stud" with locking bolt. Any clamp not offering this safety feature will not be acceptable.
  - b. Fixtures shall be supplied with safety cable for use when securing the fixture to a pipe.
6. An optional rugged 18-gauge steel joining bracket shall be available to safely lock multiple units together. Units not incorporating this feature shall not be acceptable. Hanging Irons shall be available to support multiple fixture configurations from a pipe batten.
7. The fixture shall be designed to provide flat and even coverage of light when placed 4'-6' away from the surface being lit, 10' on center or closer. There shall be no visible dip in coverage or "scalloping" between fixtures when so placed.

C. Environmental

1. The fixture shall operate in an ambient temperature range of 1°C minimum, to 40° C (104°F) maximum ambient temperature. The fixture shall be rated for IP-20 dry location use.
2. The LED substrate is coupled to a highly efficient heat sink and cooling system for prolonged life of the LEDs. LED fixture housing shall transfer heat from the

LED board and associated electronics to the outside environment.

3. The fixture shall be ETL and cETL LISTED, and shall be so labeled when delivered to the job site.

D. ELECTRICAL

1. The fixture shall be equipped with 100V to 240V 50/60 Hz internal power supplies.
2. The fixture shall receive power via a Neutrik powerCON locking connector and 2m power cord with molded U-Ground plug. Optional power cords of other lengths shall be available.
3. The fixture may be equipped with an appropriate male connector. Available connectors shall include:
  - a. 2P&G (Stage Pin)
  - b. NEMA 5-15P (U-Ground)
  - c. NEMA L520 (Twistlock)
4. The fixture requires power from non-dim source.
5. The fixture shall be equipped with a Neutrik powerCON Receptacle to allow for "Daisy Chaining" of fixtures from a single power source. The receptacle shall be protected by an integral circuit breaker.

E. LED Emitters

1. The fixture shall utilize Red, Green, Blue, and Amber LEDs for a wide variety of color mixing options and selectable CRI.
2. All LEDs used in the LED fixture shall be high brightness and proven quality from established and reputable LED manufacturers.
3. Manufacturer of LED systems shall utilize an advanced production LED binning process to maintain color consistency.
4. LED emitters should be rated for nominal 50,000 hour LED life
5. Fixture shall utilize Luxeon® Rebel LED emitters

6. LED system shall comply with all relevant patents.

F. COLOR

1. The fixture shall be provided with a 4-Color (Red, Blue, Green, and Amber) color mixing system to achieve full spectrum color rendition and excellent CRI.
2. The fixture shall be equipped with an LED system compatible with standard 8-bit or user selectable 16-bit control for full range high-resolution dimming.
  - a. In 8-Bit Mode, one DMX Channel shall be utilized for each color:
    1. Red
    2. Green
    3. Blue
    4. Amber
  - b. In 16-Bit Mode, (2) DMX Channels shall be utilized for each color in the fixture:
    1. Red
    2. Red fine
    3. Green
    4. Green Fine
    5. Blue
    6. Blue Fine
    7. Amber
    8. Amber Fine
3. The fixture shall be optimized for low saturate colors (pastels) as well as high saturate colors used in theatrical applications. Fixtures utilizing 3-color (Red, Green, and Blue) mixing systems shall not be accepted.
4. The LED system shall be capable of at least 16-bit control of each color level in each.
5. The fixture shall interact seamlessly with conventional sources and shall render light tints and skin tones as well as saturate colors similar to tungsten-based fixtures.

6. The fixture shall incorporate blending optics to reduce the projection of multiple shadows from the different color sources in the fixture. The LED system shall be digitally driven using high-speed pulse width modulation (PWM).
7. The fixture shall have an available “smoothing” mode which makes PWM control of LED levels imperceptible to video cameras and related broadcast equipment.

G. CONTROL

1. A local control keypad with LED display shall be provided for configuration and control of:
  - a. DMX-512A Device Address
  - b. Fixture Personality
  - c. Stand Alone Operation
2. The fixture shall provide for lock out of the control keypad to prevent accidental change in fixture configuration during operation. Locking and unlocking the control keypad shall be via predefined key sequence.
3. Each fixture shall be compatible with the USITT DMX512-A control protocol and ANSI E1.20-2006 Remote Device Management over DMX512-A (RDM) standard.
  - a. DMX and RDM Control shall be connected via integral flush mount 5-Pin XLR input and output connectors.
  - b. Fixture shall include integral flush mount 5-pin XLR output connector for DMX pass through or “Daisy Chain”. Fixtures not including an output receptacle for DMX pass through shall not be acceptable.
  - c. The DMX-512A device address for each fixture shall be user selectable.
  - d. It shall be possible to set the DMX-512A device address for the fixture while the fixture is installed and connected to the system via the RDM (ANSI E1.20-2006 protocol) and an appropriate device such as a PC or a handheld programmer.
  - e. Fixtures which do not allow for setting of the DMX address via both local controls at the fixture and remotely while installed via RDM shall not be accepted.
4. System shall provide full range (0-100%) dimming without exhibiting flicker or

stepping. Dimming curves shall be optimized for smooth dimming at low intensities and over longer timed fades.

5. The fixture shall have an available "Master" function to provide control of intensity without changing to color of the output of the fixture. The Master shall operate in either 8-bit or 16-bit resolution as defined by the configuration of the fixture.
6. The fixture shall have user selected personalities to correctly match response to the application and control system utilized. Personalities shall provide the following options which may be combined as desired:
  - a. 8 or 16 bit operation
  - b. With Master or without Master
  - c. With smoothing or without smoothing
7. The fixture shall be capable of standalone operation, activated and configured at the control keypad. Standalone modes shall include the following:
  - a. Color Chase with selectable colors and speed
  - b. Fixed Color defined with local controls
  - c. Strobe with user selectable color and speed
  - d. Slave

#### H. Quantities

1. Provide Color Mixing LED Wash Fixtures as shown on the drawings and schedules.