## Color mixing or White-light Light Emitting Diode Fresnel fixture

### General

#### The fixture shall be a color-mixing high-intensity LED illuminator with DMX control of intensity and color. The fixture shall be a fos/4 Fresnel as manufactured by Electronic Theatre Controls, Inc. or approved equal.

#### All LED fixtures shall be provided by a single manufacturer to ensure compatibility

#### The fixture shall be UL 1573 listed for stage and studio use

#### The fixture shall comply with the USITT DMX-512A standard

### Physical

#### The unit shall be constructed of rugged, die cast and extruded aluminum, free of burrs and pits, finished in 2-tone (black and studio gray).

#### The following shall be provided:

##### Rugged aluminum yoke allowing 360° rotation of the fixture within the yoke

###### Regional mounting hardware

##### 5’ Neutrik powerCON TRUE1 power cable with power input connector

###### Available options shall include but not be limited to:

Bare-end, Stage-Pin or Twist-lock type-equipped power leads

powerCON TRUE1 to TRUE1 cables for fixture power linking

#### The housing shall have a rugged 2-tone black/studio gray powder coat finish

#### Fixture shall have integrated zoom with mechanical adjustment on the front and rear

#### Fixture shall have adjustable yoke position to allow for weight balancing

#### Fixture shall have two accessory slots on the front

##### Accessory slots shall be accessible from the top and bottom of fixture

#### Power supply, cooling and electronics shall be integral to each unit.

### Optical

#### The light shall be full homogenized without multi-colored shadows

#### Fixtures shall have an aperture of 7” / 18 cm

#### Fixture shall have a glass Fresnel lens

#### Fixture beam shall allow barn door accessories that shape the beam with a single, soft edge

#### Fixture shall have an integrated zoom

##### Zoom range shall be 1355 degrees

### Environmental and Agency Compliance

#### The fixture shall be ETL and cETL LISTED and/or CE rated, and shall be so labeled when delivered to the job site.

#### The fixture shall be ETL LISTED to the UL1573 standard for stage and studio use

#### The fixture shall be rated for IP20 dry location use.

### Thermal

#### Fixture shall be equipped with a cooling fan.

##### Fan speed control via a DMX channel shall be possible

##### Fan speed software shall permit the fixture to override DMX fan speed setting or reduce output to prevent heat damage to the fixture

#### The fixture shall utilize advanced thermal management systems to maintain LED life to an average of 70% intensity after 54,000 hours of use

##### Thermal management shall include multiple temperature sensors within the housing to include:

###### LED array circuit board temperatures

###### Temperature sensors placed on each individual LED color circuit

###### Control temperature

##### Fixtures that do not provide active thermal monitoring of LED circuits and other temperature readings shall not be acceptable

#### The fixture shall operate in an ambient temperature range of 0°C (32°F) minimum, to 40° C (104°F) maximum ambient temperature.

### Electrical

#### The fixture shall be equipped with a 100V to 240V 50/60Hz internal power supply

#### The fixture shall support power in and thru operation

##### Power in shall be via Neutrik*®* TRUE1*™* input connector

##### Power thru shall be via Neutrik ® TRUE1™ output connector

##### Fixture power wiring and accessory power cables shall be rated to support linking of multiple fixtures up to the capacity of a 15A breaker

#### Fixture shall support 24-36 VDC battery input via 3-pin XLR

#### The fixture requires power from a non-dim source

#### Power supply outputs shall have self-resetting current-limiting protection

#### Power supply shall have power factor correction

### LED Emitters

#### The fixture shall contain a minimum of six different LED colors to provide color characteristics as described in the Color Section below.

#### All LEDs used in the fixture shall be high brightness and proven quality from established and reputable LED manufacturers.

##### Fixture shall utilize Luxeon*®* C LED emitters

#### Manufacturer of LED emitters shall utilize an advanced production LED binning process to maintain color consistency.

#### All LED fixtures (100% of each lot) shall undergo a burn-in test during manufacturing.

#### LED system shall comply with all relevant patents

#### Fixtures shall have a PWM frequency of 5,000 hz or 25,000hz to avoid flicker on camera

### Longevity

#### L70 rating shall be no less than 54,000 hours

#### All fixtures shall be provided with the minimum warranty:

##### 5 years full fixture coverage

##### 10 years LED coverage

### Calibration

#### Fixture shall be calibrated at factory to achieve consistent color and intensity output between fixtures built at different times and/or from different LED lots or bins

##### Calibration data shall be stored on the LED array as a permanent part of on-board operating system

##### All arrays, including replacement arrays shall be calibrated to the same standard to ensure consistency

##### Fixtures not offering LED calibration shall not be acceptable

### Color

#### The fixture shall utilize a minimum of 60 LED emitters

#### Fixtures shall have a color temperature range of 1900 K – 10,450 K

#### The fixture shall be available in specialized LED arrays as outlined below:

##### fos/4 Fresnel Lustr X8

###### Deep Red, Red, Amber, Lime, Green, Cyan, Blue and Indigo LEDs in an array designed for broad spectrum color, light tints, and variable whites. This array shall be the Lustr X8 array as manufactured by Electronic Theatre Controls, or approved equal

##### fos/4 Fresnel Daylight HDR

###### Deep Red, Red, Mint, Cyan, Blue and Indigo in an array designed to provide a variable white-light adjustable from 2700 K to 6500 K. (Designed for highest CRI and output between 4000 K and 6500 K) This array shall be the Daylight HDR array as manufactured by Electronic Theatre Controls, or approved equal

### Dimming

#### The LED system shall use 15-bit nonlinear scaling techniques for high-resolution dimming.

#### Dimming curves shall be optimized for smooth dimming over longer timed fades.

#### The LED system shall be digitally driven using high-speed pulse width modulation (PWM)

###### PWM shall allow for settings to eliminate or reduce flicker when lighting for camera

### Control and User interface

#### The fixture shall be USITT DMX 512A-compatible via In and Thru 5-pin XLR connectors

#### The fixture shall be compatible with the ANSI RDM E1.20 standard

##### All fixture functions shall be accessible via RDM protocol for modification from suitably equipped control console

##### Temperature sensors within the luminaire shall be viewable in real time via RDM

##### Fixtures not offering RDM compatibility, feature set access or temperature monitoring via RDM shall not be compatible

#### The fixtures shall have integrated radios for City Theatrical Multiverse® technologies

#### The fixtures shall have integrated Near Field Communication (NFC) hardware for configuration from mobile devices

#### The fixture shall be equipped with color LCD display for easy-to-read status reports and configuration changes

#### The fixtures shall have a USB port for software updates, diagnostic reports and configuration saving and loading

#### The fixture shall be equipped with a two-button, 4 encoder user-interface

###### Encoders shall be RGB backlit

#### The fixtures shall be equipped with a hard lockout switch to prevent nuisance bumping of the UI

#### The fixture shall offer multiple DMX input profile options to include:

##### RGB - control of all individual LED colors via a three-channel profile

###### Red, Green, Blue

##### Single Channel – Control of intensity of prerecorded preset

###### Intensity

##### Expanded- Full control of all attributes

###### Intensity, CCT, Tint, Tuning, Mix, RGB Color Control, Strobe, Curve, Fan

##### Direct – control of each individual color channel via an independent channel

###### Intensity, Direct Color Control, Strobe, Curve, Fan

##### Studio – Control of the fixture in a white-light profile

###### Intensity, CCT, Tint, Tuning, Strobe, Curve, Fan

#### All fixtures shall have droop compensation to prevent intensity and color shifts as fixtures reach thermal stability

#### The fixture shall offer additional user-definable options including but not limited to:

##### Display time out options

##### Loss of data behavior options

##### White point settings

##### Red-shift option for tungsten dimming emulation

#### Fixtures shall have the following local control modes:

##### Studio- for white light operations

##### Color- HSI color picker for quick access to selecting and storing user defined colors

##### Presets- for quick access to default or user defined colors

##### Effects- for playback of built-in effects engine

##### DMX- for setup of DMX parameters

#### The fixture shall offer stand-alone functionality eliminating the need for a console

##### Fixture shall ship with 24 preset colors accessible as a stand-alone feature

##### Fixture shall ship with a built-in effects engine that will allow adjustable parameters including but not limited to rate, frequency and delay

##### Fixtures can be linked together with standard DMX cables and controlled from designated primary fixture

###### Up to 32 fixtures may be linked

##### Fixtures in a stand-alone state shall restore to the settings present prior to power cycling, eliminating the need for reprogramming

##### Fixtures without stand-alone operation features described above shall not be acceptable.

#### The fixture shall be capable of copying all performance settings to other fixtures of the same type via a 5 pin XLR DMX cable