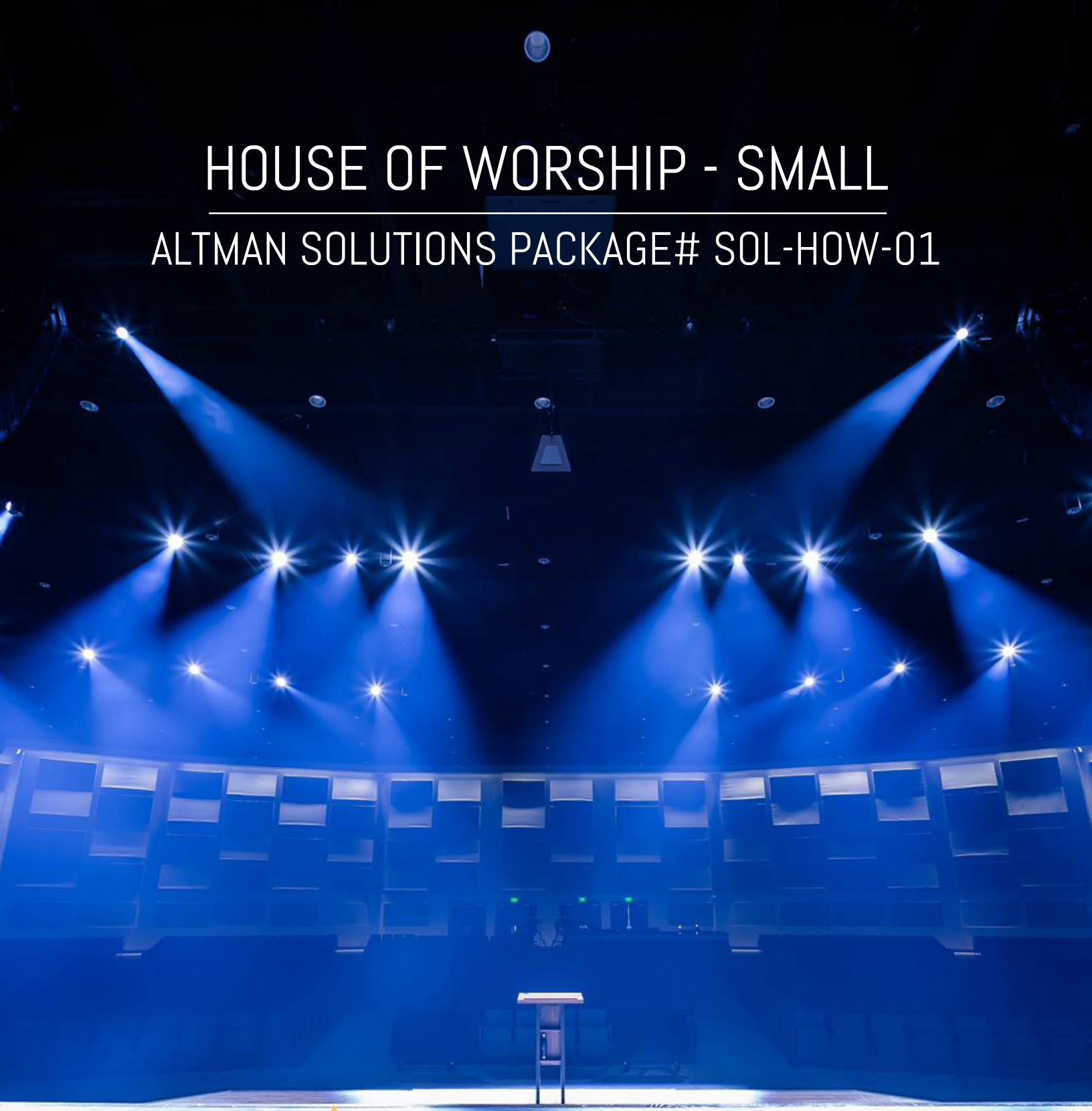
HOUSE OF WORSHIP - SMALL

ALTMAN SOLUTIONS PACKAGE# SOL-HOW-01



ALTMAN

LIGHTING

1 (303) 500-7072 1400 E. 66th Avenue, Denver, CO 80229 www.altmanlighting.com

CONTENTS

EQUIPMENT SUMMARY

Profile Fixtures | Gallery Profile

The Altman Gallery Profile is designed to serve as the most versatile lighting solution available to facilities: houses of worship, museums, art galleries, or anywhere aesthetic and performance expectations are high. The base Gallery engine can be used to build a mix and match variety of solutions that includes 15-35° and 25-50° profile lenses. Framing shutters and gobo slot is included.

Wash Fixtures | Gallery Beam Wash

The Gallery Wash luminaires have the same LED engine options as the profiles. The Gallery engine can be used to build a mix and match variety of wash lighting solutions that includes a beam wash with variable beam angle range of 15-60°, an asymmetric 85° vertical by 80° horizontal wall wash, and a fixed flood option at 85°.

Color Changing Fixtures | Spectra Cube

The Spectra Cube is a 50 Watt wash luminaire utilizing red, green, blue and amber or white LED emitters. Designed for theatrical and architectural applications, the power supply is convection cooled without the use of fans to provide silent, long term, high output performance.

Color Changing Fixtures | Spectra Cyc

The Spectra Cyc is a 50 Watt cyclorama wall wash luminaire utilizing red, green, blue and amber or white LED emitters. Designed for theatrical and architectural applications, the Spectra Cyc blends colors via a patented LED lens which reduces pixelation from direct view.

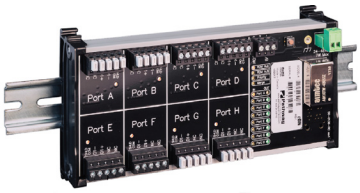
SOLUTION PACKAGE# SOL-HOW-01

EQUIPMENT SUMMARY cont.

Control | Genesis

The Genesis lighting control console combines the ease of use of a fader based lighting controller with the power of a touch screen. From simple fader control to advanced functionality supported with
features such as shape FX, chases, fan, and individual cue timing, Genesis is an ideal entry level console for tomorrow's lighting rigs.

DMX Hub



The eDIN #1016 Hub brings flexibility to single universe DMX512 distribution systems. Through the use of automatic signal sensing across four operating modes, any port may detect incoming DMX signals and act as an input; or two inputs may be merged; the user may choose between inputs; or a priority scheme may be invoked. The 1016 is RDM discoverable and configured.

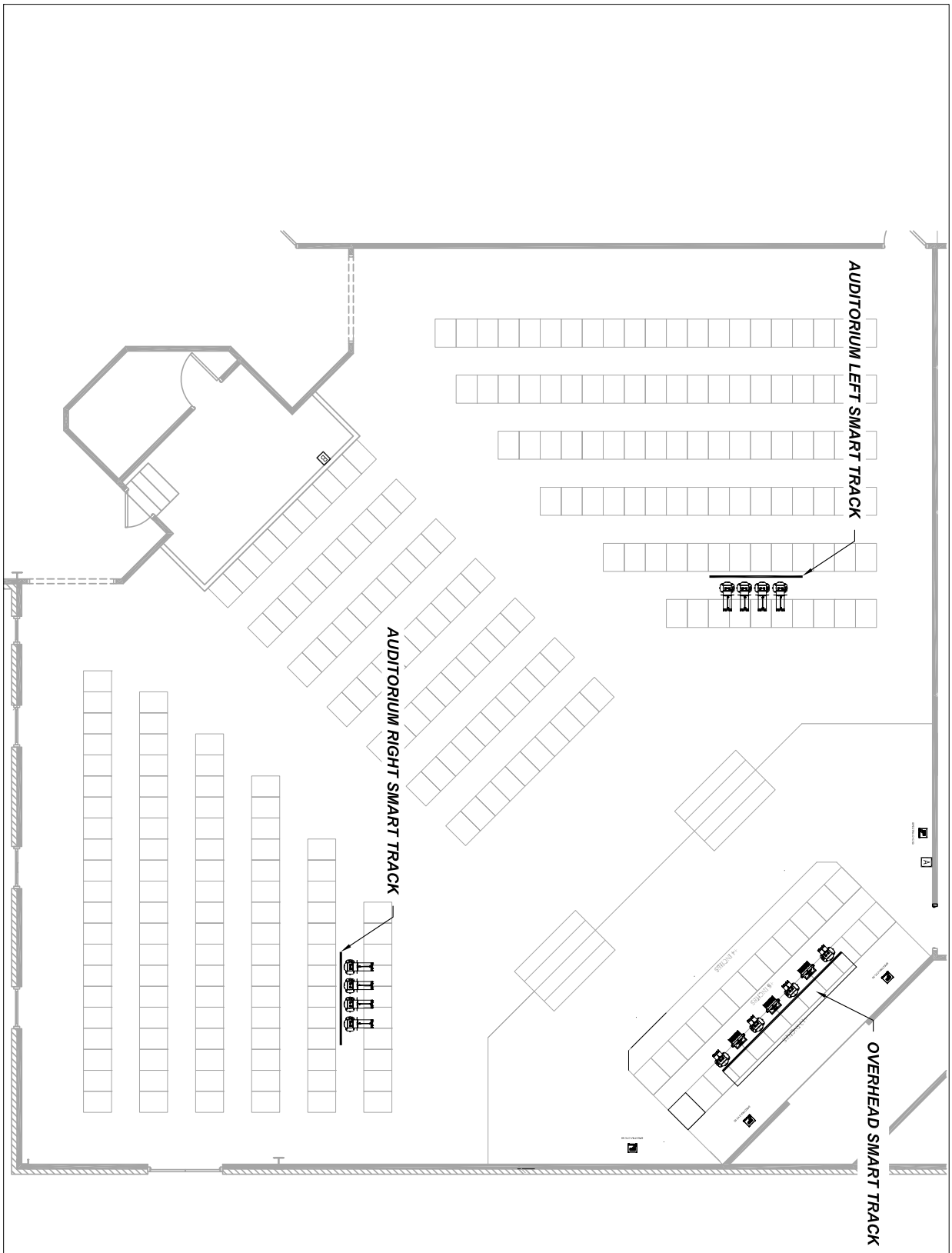
Distribution | Smart Track

Altman Lighting's Smart Track® Lighting System is a revolutionary way to power & control individually addressable luminaires without the need for dimmer packs, relay panels, and bulky cable runs. Smart Track® lighting systems are cost effective solutions that are easy to lay out, install, and maintain.

BILL OF MATERIALS

PART NUMBER	Part Name / Description	QTY.	UNITS
GAL-2550-3K-W-D-Y	Gallery 25-50° Profile	8	Fixtures
GAL-BW-3K-W-D-Y	Gallery 15-60° Beam Wash	4	Fixtures
SSCUBEY-RGBA-W	Spectra Cube RGBA	3	Fixtures
SSCYC50-RGBA-W	Spectra Cyc 50	4	Fixtures
450-PBS-1-XLR5F	450 Distribution Box Data Outlet “A” Box	1	Box
450-PBS-1-XLR5M	450 Distribution Box Data Input “B” Box	1	Box
ASL-233301-3	12’ Smart Track White	3	Tracks
ASL-999001-3	End Cap White	3	Caps
ASL-998021-3	Live End White	3	Live Ends
99-198000002-3	4 Inch Mounting Brackets White	12	Brackets
ASL-997801-3	Multi Adapter with DMX Terminator	3	Terminators
XLR-5-10	DMX Cable 10’	6	Cables
GEN-24	Altman Genesis Control Console	1	Console
61-0332	eDIN System Enclosure, c/w Power Supply and DMX Hub	1	Enclosure Kit

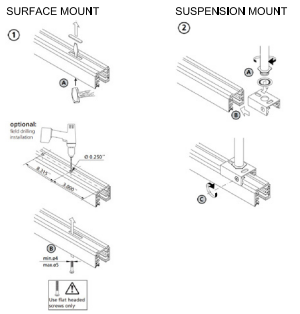
Note: Installation may require extra hardware as per individual site construction. A site survey is recommended to determine specific track suspension needs.



Gallery 3K 25-50 Zoom Profile	Gallery 3K Beam Wash 15-60	Spectra Cube RGBA	Spectra Cyc 50 RGBA	450 Series Surface Mount distribution box	450 Series Surface Mount control point box

REV:	DATE:	NOTE:	JOB: House of Worship - Small	ORDER No:	ALTMAN LIGHTING	1400 East 66th Avenue. Denver, CO 80229 www.altmanlighting.com
			LOCATION:	DRAWN BY: J Osterman		
			CUSTOMER:	DATE: 8/7/2020		
			PROJECT MANAGER:			
FILE NAME: light plot.dwg		8/7/2020 12:26:10 PM	TITLE: Sample Light Plot	SCALE: NTS	DWG#	+1-303-500-7072

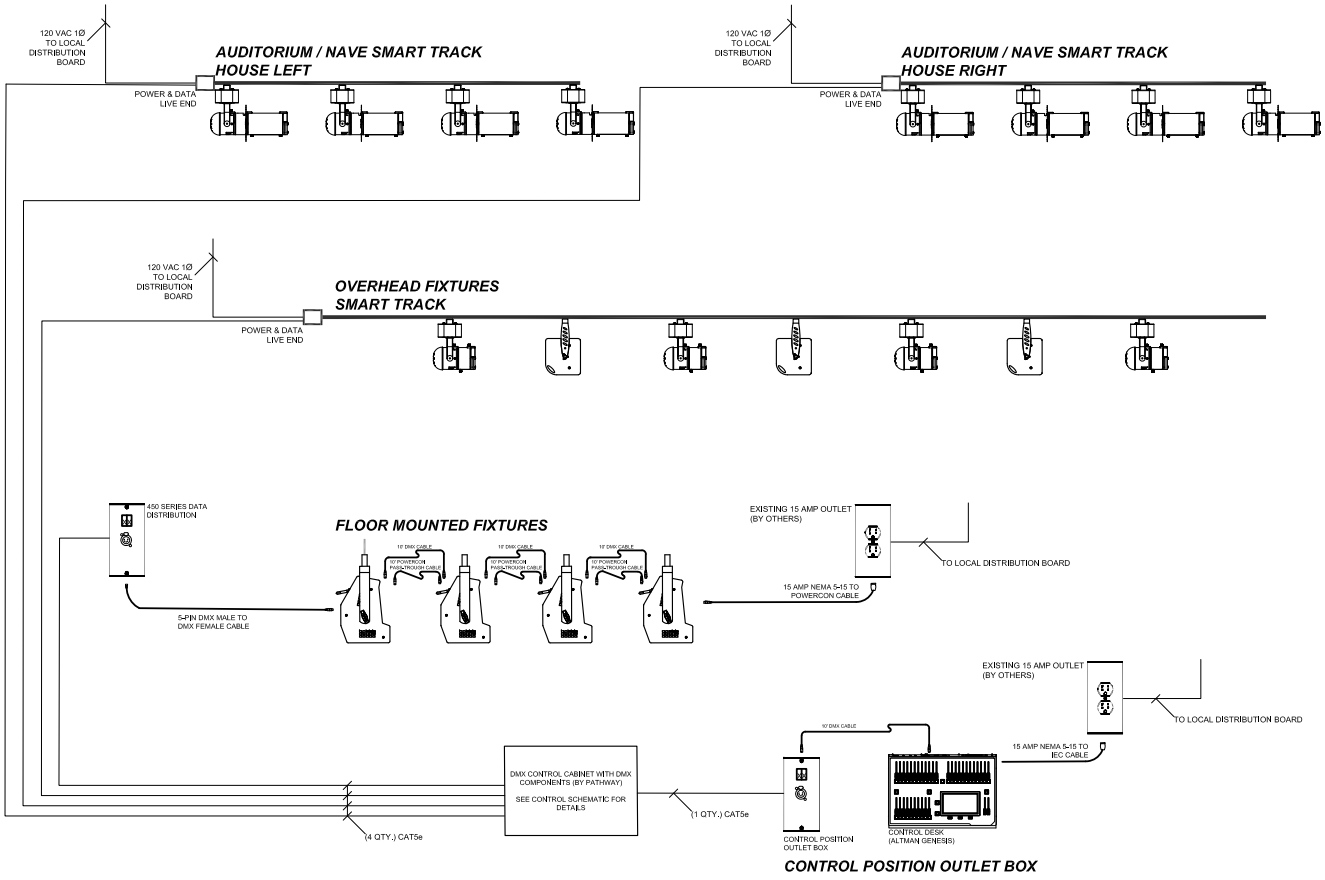
CONNECTION DETAIL OPTIONS



1. ALL SUSPENDED FIXTURES TO BE RIGGED ON SMART TRACK. TRACK CAN BE INSTALLED SURFACE MOUNTED OR SUSPENDED FROM THE CEILING ON STEMS/THREADED ROD IN CASE OF VAULTED OR ANGLED CEILING DESIGN.
2. SUSPENDED FIXTURES ATTACHED TO TRACK WITH INTEGRATED TRACK ADAPTERS INCLUDED WITH FIXTURE.

GENERAL NOTES

1. SUSPENSION STEMS, BUILDING RIGGING AND MECHANICAL CONNECTIONS ARE NOT PART OF THIS PACKAGE.
2. PORTABLE CABLE IS INCLUDED IN THIS PACKAGE. INSTALLED CABLING IS NOT PART OF THIS PACKAGE.
3. INSTALLED DMX CABLE CAN BE BELDEN 9729 OR CAT5E. ALL PORTABLE DMX CABLE SHOULD BE DUAL TWISTED PAIR & SHIELD, 22 AWG BLACK POLYURETHANE JACKET.
4. POWERCON CONNECTIONS ARE STANDARD POWERCON, NOT NEUTRIK TRUE 1.
5. ALL DMX CONNECTORS SHOULD BE 5-PIN XLR STYLE.
6. ALL FIXTURES OVER STAGE TO BE MOUNTED 15 FEET ABOVE FINISHED FLOOR LEVEL AT A MINIMUM.
7. ALL SUSPENDED FIXTURES TO BE HUNG ON TRACK DRIFTED NO FURTHER THAN 2' FROM FINISHED CEILING HEIGHT.
8. LABELING AND NUMBERING SCHEME TO BE AGREED PER PROJECT.



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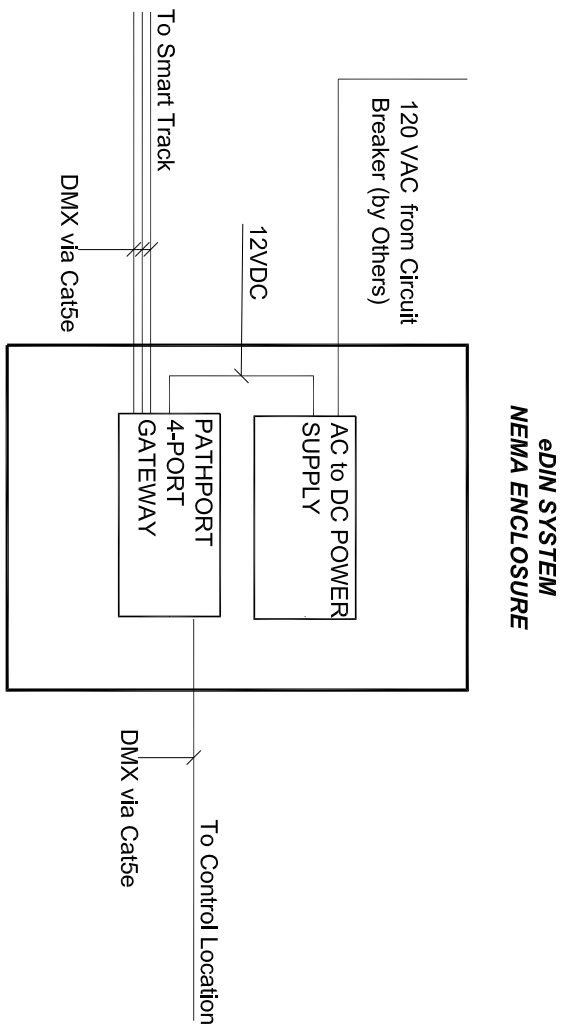
ORDER No:	
DRAWN BY:	J Osterman
DATE:	8/24/2020
SCALE:	NTS
DWG#	

JOB: House of Worship - Small
LOCATION:
CUSTOMER:
PROJECT MANAGER:
TITLE: Overview Schematic

REV:	DATE:	NOTE:

FILE NAME: schematic.dwg
8/24/2020 10:37:16 AM



REV:	DATE:	NOTE:	JOB: House of Worship - Small	ORDER No:	ALTMAN LIGHTING	1400 East 66th Avenue. Denver, CO 80229 www.altmanlighting.com
			LOCATION:	DRAWN BY: J Osterman		
			CUSTOMER:			
			PROJECT MANAGER:	DATE: 8/6/2020		
FILE NAME: schematic.dwg		8/6/2020 5:12:33 PM	TITLE: Control Schematic	SCALE: NTS	DWG#	+1-303-500-7072

SPECIFICATION

PART 1. GENERAL CONDITIONS

1.01 SUMMARY

A. The purpose of this document is to describe the performance criteria of the lighting systems in the Altman House of Worship Solutions package to provide a preliminary specification for worship lighting. The lighting equipment will be required to provide flexibility and efficiency while providing powerful tools for lighting in effective and engaging ways. It must include infrastructure with power and data tie lines within the worship space that will complement and complete the anticipated needs of worship service.

B. The lighting systems are based on the Altman Lighting line of products. All equipment shall be of high quality. The lighting systems will be designed to be efficient and configurable.

C. This document is preliminary. The latest set of architectural and HVAC arrangement drawings should be cross referenced to ensure a coordinated functioning system.

D. This document is a performance specification indicating design intent only. The integrator or specialist contractor which is contracted to install and commission the specified equipment shall accept full responsibility for supplying a complete, fit for purpose system which complies with the design intent and performance criteria specified herein.

E. If the integrator / specialist contractor believes any aspect of this performance specification is erroneous, impractical, incomplete or unachievable, this should be explained in writing before the contract is agreed. A detailed list of alternatives and additions shall be produced for the consideration of the design team.

F. This package does not include installation materials such as fasteners, infrastructure cabling, and termination equipment. All integration materials shall be furnished by others. Refer to Bill of Materials for details.

1.02 SCOPE

A. Scope of work in this package includes:

1. Power Control / Relays
2. Electronics Enclosures
3. Control Consoles and Accessories
4. Data Communications Devices and Network
5. Distribution Box facility panels
6. Production Lighting Luminaires and Accessories
7. Cables
8. Accessories

1.03 REFERENCES

A. Technical Reference Standards:

1. ANSI Standards
    a. ANSI E1.11 - 2008 (R2013) Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories

b. ANSI E1.17-2010 Entertainment Technology - Architecture for Control Networks

c. E1.20-2006 Entertainment technology – Remote Device Management

d. E1.20-2-2009 Entertainment Technology – Recommended Practice for Installing Control Cables

e. E1.30-7-2009, EP129 - Allocation of Internet Protocol Version 4 Addresses to ACN Hosts

f. E1.31-2009 Entertainment Technology - Lightweight streaming protocol for transport of DMX512 using ACN

2. Institute of Electrical and Electronics Engineers, Inc.:

a. 802.3 Gigabit Ethernet

b. 802.11 b-g-n Specifications for implementation of Wireless Local Area Networks

1.04 CODE REQUIREMENTS

A. Any specialist contractor shall be required to comply with all current statutory requirements, local and national regulations. These shall include but not be limited to:

1. National Fire Protection Association – National Electrical Code 2017
2. Local Authority and National Building Regulations
3. Local Authority and National Licensing Regulations

1.05 LIGHTING SYSTEMS SUMMARY

A. The Worship lighting system describes all lighting used to illuminate people or scenic elements during a service, for the purpose of enhancing their presentation.

1. Lighting - describes all functional luminaires used to illuminate the performers or scenic elements during a performance, for the purpose of enhancing their presentation.
2. Distribution – describes the power and data cabling, and infrastructure needed for the lighting.
3. Control – describes networked control equipment.

1.06 RELIABILITY

A. Equipment shall have a minimum expected useful operating life of 10 years, unless otherwise stated. LEDs shall be rated for a minimum of 50,000 hours to L70. Equipment shall be designed to require only minimal scheduled maintenance. In addition to requirements described elsewhere, the installing contractor shall provide a preventative maintenance and support program.

B. All major line item offered equipment must have a proven track record of reliable operation in a production environment.

C. High quality components and materials with known and predictable performance shall be used throughout. Care shall be taken in the selection of items known to be a frequent cause of reliability problems. Manufacturing, assembly and installation shall take place in a quality-controlled environment with comprehensive records kept of inspection and testing procedures.

D. Systems shall be tolerant of brief fluctuations to power supply and shall shut down in a controlled manner in case of power failure.

E. It is desirable for the system to have fault tolerant features wherever practical.

PART 2. INSTALLED AND PORTABLE EQUIPMENT

2.01 LIGHTING CONSOLE

A. General

1. The lighting control console shall be a microprocessor-based control surface that is purpose-made for controlling entertainment industry type intelligent luminaires. The console shall be the *Altman Genesis as manufactured by Altman Lighting Inc.*
2. The console and shall be based on industry standard protocols, namely DMX-512A, Art-Net, and sACN.
3. Maximum number of intelligent fixtures shall be 24 qty. It shall be possible to increase this qty. with the use if expansion wings.
4. No less than 1,000 cues/animations shall be available across 100 cuelists/chases. Addition of an expansion wing shall increase cuelist/chases by 100.
5. A 7” capacitive “multi-touch” touchscreen shall provide programming and configuration using an app-based structure.
6. Tips and onboard help shall be integrated into the software and guide the user through various operations.
7. An “Undo” history shall be recorded until the show save, a new show is started, an existing show is loaded or power is switched off.
8. Shows shall be able to be recorded internally or via USB drive.

B. Physical

1. Console shall measure no larger than 19.3 W x 13 D x 3.2 H inches and weigh no more than 14 lbs.
2. Console shall be equipped with 24 qty. fixture faders with direct select / bump buttons as well as 12 qty. memory faders with execute buttons.

C. Control

1. Each memory fader shall hold at least 250 cues, with a maximum of 1000 recorded cues possible.
2. Cue shall be able to be adjusted for:
    a. Fade In/Out
    b. Speed
    c. Cross fade time
    d. Tap-To-Beat
3. It shall be possible to page each row of memories. A minimum of 10 pages shall be possible.
4. Operation concept shall be based on Latest Takes Precedence (LTP).
5. The 7” touchscreen shall facilitate all necessary commands and programming features. No external screen or interface shall be necessary.
6. Programming of intelligent fixtures shall be via a combination of fader control for intensity and touchscreen for all other attributes.
7. Touchscreen shall offer “App” based control of fixture attributes for easy end user learning.
8. Touchscreen shall be able to show a “rig plan” based on icons representing individual fixtures. All icons shall be able to be re-arranged to represent physical locations of individual fixtures.
9. It shall be possible to view both cue stacks and rig plans on the same screen at once.

10. Position attributes shall be controlled in the following ways
    a. Dragging a finger on the position pad in the following modes:
        1) Fine
        2) Flip Pan / Flip Tilt
        3) Orthogonal
        4) Fan
    b. The “Shapes” app
    c. The “Pan/Tilt” app
11. Color attributes shall be able to be chosen in the following ways:
    a. Via a color rainbow screen
    b. Preset gel colors
    c. Hexadecimal value
    d. Via intelligent features such as fanning and fine + course adjustment.
12. Beam attributes shall be able to be chosen in the following ways:
    a. Sliders for individual attributes, toggled between fade or snap
    b. The “Animate” app
13. An effects engine shall be provided via “Animate” and “Shape” Apps. This shall offer adjustable, dynamic features for intensity, color, and beam for each fixture.
14. Any memory playback shall be able to be:
    a. A preset
    b. A cue stack
    c. A chase
15. Any memory buttons shall be able to be:
    a. Go
    b. Bump
16. A minimum of 5500 fixture profiles shall come preloaded. It shall be possible to create a new fixture profile using just the console and no external accessories.

D. Electrical and Interfaces
1. The console shall be equipped with 100V to 265V 50/60 Hz AC/DC external power supply.
2. Console shall have an internal UPS providing 5 seconds of power for Auto show save.
3. I/O:
    a. Console
        1) External power supply input
        2) 2 qty. USB connectors
        3) 1 qty. Ethernet (RJ45)
        4) 1 qty. DMX-512 (5 pin XLR)
        5) Kensington lock
    b. Wings
        1) 1 qty. USB-B

2) 1 qty. DMX-512 (5 pin XLR)

3) Kensington lock

4) The fixture shall have a die cast aluminum housing and major components, free of defects such as burrs, pits and malformations.

2.02 WHITE LIGHT LED PROFILE FIXTURE

A. General

1. The luminaire shall be an *Altman Lighting Gallery 25-50 Profile as manufactured by Altman Stage Lighting., or approved equal*
2. The unit shall be dimmable using ANSI 1.11 USITT DMX512-A / ANSI E1.20 RDM (Remote Device Management), Mains Dim Phase cut, DALI, and 0-10v control.
3. The Luminaire shall be a fully scalable fixture utilizing Five (5) different lens types to allow each luminaire to act as either a spot or a wash. Luminaires not employing this versatility and convertibility shall not be accepted.

B. Physical

1. The luminaire shall be constructed of die cast aluminum, free of burrs and pits, finished in high temperature powder coat paint.
2. Luminaires shall be available in black, white, silver and custom colors as specified
3. Accessories and painted parts shall be color-matched to the specified color.
4. Exceptions to color-matching shall be noted prior to custom paint approval.
5. Non-painted parts shall be available in black, white or silver.
6. Accessory Slots shall employ a three position locking slot allowing for color media and external beam shaping accessories such as top hats, concentric rings, barn doors, and tapered snoots.
7. Mounting options shall include:
    a. Altman Smart Track (DMX or DALI)
    b. Ceiling Canopy Mount
    c. Portable Mount
    d. Pendant
    e. Unistrut
8. Luminaire shall be a fully convertible fitting, a lens change shall be all that is necessary to change from a wash to a profile spot light. Lens changes shall be completely tool-free. Luminaires that do not offer this level of flexibility shall not be accepted.
9. The Lens offering shall include:
    a. Wall Wash at a fixed 85 degree asymmetric beam spread
    b. Beam Wash with a 15-60 degree beam spread
    c. Zoom Profile spot with a 15 – 35 degree beam spread
    d. Zoom Profile spot with a 25 –50 degree beam spread
    e. Flood at a fixed 85 degree beam spread
10. The luminaire profile optics shall feature stainless steel shutters coated in black oxide in a dual-plane arrangement.
11. Profile Lenses shall feature 360 degree rotation independent of shutter rotation.
12. Shutter and pattern assembly shall be a separate component and rotate interdependently.

13. Profile luminaire shall have a slot with a removable cover for patterns/ gobos and shall:
    a. Shall allow for use of E-sized metal and glass patterns
    b. Shall include a pattern holder
14. Shall have a single arm aluminum yoke allowing at least 320 -degree tilt of the fixture within the yoke.
15. Shall have tool-free tilt and beam adjustment, while allowing for tool-tightening at all movement points.

C. Electrical

1. The luminaire shall be available in:
    a. 100 – 277 VAC 50/60 Hz for Dali and DMX versions (40 Watt)
    b. 120 -277 VAC 50/60 Hz for Phase cut mains and 0-10vac dimming. (42 Watt)
2. The luminaire shall employ cooling system with an ambient dBa level no greater that 7dBa registered at the luminaire and shall be imperceptible to the human ear.
3. The Luminaire shall employ an active cooling sensing system which will shut down the led in the event of a cooling system failure. Luminaires not employing shut down safety circuity shall not be accepted.

D. Optical

1. The luminaire shall utilize high-contrast aspheric lenses, with an anti-reflective coating and edge blackened lensing to increase transmission, with:
    a. Adjustable hard and soft beam edges.
    b. Crisp pattern imaging without significant halation
    c. Sharp shutter cuts without halation
    d. Beam wash and wall wash to provide a soft beam from center to edge with a 2:1 cosine distribution from center to edge of beam.
2. The luminaire shall utilize a two plane shutter design to provide adjustable framing angles with the ability to overlap cuts.
3. The luminaire design shall have built-in active heat dissipation to prevent shutter warping and burnout in normal use.
4. The luminaire shall be capable of being fitted with barn-doors to further control beam shape.
5. The luminaire shall utilize a single LED >92 CRI emitter and be available in configurations that include:
    a. 2,700 Kelvin
    b. 3,000 Kelvin
    c. 4,000 Kelvin
    d. 5,000 Kelvin
6. The dimming of the luminaire shall be flicker free all the way to complete 0. Luminaires which do not dim smoothly to complete 0 shall not be acceptable.
7. The LED shall be rated for an average of 70% output after 50,000 hours of use (L70 Rating).
8. The luminaire shall have an expected average power consumption of 40W maximum.
9. The luminaire shall have a minimum output of 3600 lumens in DMX / Dali versions.

2.03 WHITE LIGHT LED BEAM WASH FIXTURE

A. General

1. The luminaire shall be an *Altman Lighting Gallery 15-60 Beam Wash as manufactured by Altman Stage Lighting., or approved equal*
2. The unit shall be dimmable using ANSI 1.11 USITT DMX512-A / ANSI E1.20 RDM (Remote Device Management), Mains Dim Phase cut, DALI, and 0-10v control.
3. The Luminaire shall be a fully scalable fixture utilizing Five (5) different lens types to allow each luminaire to act as either a spot or a wash. Luminaires not employing this versatility and convertibility shall not be accepted.

B. Physical

1. The luminaire shall be constructed of die cast aluminum, free of burrs and pits, finished in high temperature powder coat paint.
2. Luminaires shall be available in black, white, silver and custom colors as specified
3. Accessories and painted parts shall be color-matched to the specified color.
4. Exceptions to color-matching shall be noted prior to custom paint approval.
5. Non-painted parts shall be available in black, white or silver.
6. Accessory Slots shall employ a three position locking slot allowing for color media and external beam shaping accessories such as top hats, concentric rings, barn doors, and tapered snoots.
7. Mounting options shall include:
    a. Altman Smart Track (DMX or DALI)
    b. Ceiling Canopy Mount
    c. Portable Mount
    d. Pendant
    e. Unistrut
8. Luminaire shall be a fully convertible fitting, a lens change shall be all that is necessary to change from a wash to a profile spot light. Lens changes shall be completely tool-free. Luminaires that do not offer this level of flexibility shall not be accepted.
9. The Lens offering shall include:
    a. Wall Wash at a fixed 85 degree asymmetric beam spread
    b. Beam Wash with a 15-60 degree beam spread
    c. Zoom Profile spot with a 15 – 35 degree beam spread
    d. Zoom Profile spot with a 25 –50 degree beam spread
    e. Flood at a fixed 85 degree beam spread
10. The luminaire profile optics shall feature stainless steel shutters coated in black oxide in a dual-plane arrangement.
11. Profile Lenses shall feature 360 degree rotation independent of shutter rotation.
12. Shutter and pattern assembly shall be a separate component and rotate interdependently.
13. Profile luminaire shall have a slot with a removable cover for patterns/ gobos and shall:
    a. Shall allow for use of E-sized metal and glass patterns
    b. Shall include a pattern holder
14. Shall have a single arm aluminum yoke allowing at least 320 -degree tilt of the fixture within the yoke.

15. Shall have tool-free tilt and beam adjustment, while allowing for tool-tightening at all movement points.

C. Electrical

1. The luminaire shall be available in:
   a. 100 – 277 VAC 50/60 Hz for Dali and DMX versions (40 Watt)
   b. 120 -277 VAC 50/60 Hz for Phase cut mains and 0-10vac dimming. (42 Watt)
2. The luminaire shall employ cooling system with an ambient dBa level no greater that 7dBa registered at the luminaire and shall be imperceptible to the human ear.
3. The Luminaire shall employ an active cooling sensing system which will shut down the led in the event of a cooling system failure. Luminaires not employing shut down safety circuity shall not be accepted.

D. Optical

1. The luminaire shall utilize high-contrast aspheric lenses, with an anti-reflective coating and edge blackened lensing to increase transmission, with:
   a. Adjustable hard and soft beam edges.
   b. Crisp pattern imaging without significant halation
   c. Sharp shutter cuts without halation
   d. Beam wash and wall wash to provide a soft beam from center to edge with a 2:1 cosine distribution from center to edge of beam.
2. The luminaire shall utilize a two plane shutter design to provide adjustable framing angles with the ability to overlap cuts.
3. The luminaire design shall have built-in active heat dissipation to prevent shutter warping and burnout in normal use.
4. The luminaire shall be capable of being fitted with barn-doors to further control beam shape.
5. The luminaire shall utilize a single LED >92 CRI emitter and be available in configurations that include:
   a. 2,700 Kelvin
   b. 3,000 Kelvin
   c. 4,000 Kelvin
   d. 5,000 Kelvin
6. The dimming of the luminaire shall be flicker free all the way to complete 0. Luminaires which do not dim smoothly to complete 0 shall not be acceptable.
7. The LED shall be rated for an average of 70% output after 50,000 hours of use (L70 Rating).
8. The luminaire shall have an expected average power consumption of 40W maximum.
9. The luminaire shall have a minimum output of 3600 lumens in DMX / Dali versions.

2.04 COLOR MIXING LED WASH FIXTURE

A. General

1. The fixture shall be a compact, lightweight color-mixing LED wash fixture with 8 or 16 bit DMX control of intensity and color. The fixture shall be the *Spectra Cube 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 Red, Green, Blue, Amber / White color LEDs, and an on-board power supply.

3. The fixture shall incorporate a single cell multi-channel design in combination with an LED engine to provide even coverage on vertical and horizontal surfaces through use of diffusion.
4. The fixture shall be incorporate silent, convection cooling without employing the use of fans or filters. Fixtures incorporating fan cooling systems generate unacceptable levels of noise are not equal and shall not be accepted.
5. IES Photometric files shall be available 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).
7. The fixture shall be UL1573, and UL8750 LED listed for stage and studio use.
8. Fixtures which do not comply with this specification shall not be accepted.

B. Physical

1. The fixture shall be constructed of 18-gauge steel and extruded aluminum components. Construction shall employ all corrosion-resistant materials and hardware and shall be free of pits and burrs.
2. Standard Finish shall be Epoxy Sandtex black, electrostatic application and shall be available in white, black, and custom color finishes as specified.
3. Power supply, cooling and electronics shall be integral to each unit.
4. 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.
5. Fixture dimensions shall be 8.2” (208.2mm) L x 10” (254mm) H x 6.25” (158.75mm) D. and weigh 5lbs (2.26kg).
6. The fixture shall incorporate a “kick stand” style yoke for both floor and pipe mounting. The integrated rigid flat steel yoke with locking dog tilt handle shall be available for overhead pipe mounting.
7. Pipe mounted fixtures shall be supplied with a cast iron C-clamp Altman #510 suitable for use on up to 2” (50mm) 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.
8. Fixtures shall be supplied with safety cable for use when securing the fixture to a pipe.
9. The design of the fixture shall allow for track mounting options and shall be ETL listed for track use.
10. Power supply, cooling and electronics shall be integral to each unit.

C. Thermal

1. The luminaire shall be cooled via natural convention with no aide of fans or other cooling systems.
2. Under normal operating conditions, the LED engine shall be capable of 50,000 hours rated lifespan to Led manufacturers recommended LM-70 / 70% maximum calibrated intensity with convective cooling, units utilizing active cooling shall not be accepted.
3. Ambient operating temperature shall be 32°F to 104°F (0 – 40 °C) non-condensing and IP-20 rated for indoor dry location use.
4. 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.

D. Electrical

1. The fixture shall be equipped with 100V to 240V 50/60 Hz auto-ranging internal power supply and requires power from a constant “non-dim” power source.
2. The fixture shall receive power via a Neutrik power con blue connector and 5’-0” (1.5m) power cord with:
    a. 2 P&G (Stage Pin)
    b. NEMA 5-15P
    c. NEMA L520 (Twistlok)
    d. Territory Power Plug
3. The fixture shall be equipped with a Neutrik Power con Gray to allow for “Daisy Chaining” of fixtures from a single power source.

E. Control and User Interface

1. A local control keypad with a three digit LCD display shall be provided for configuration and control of:
    a. DMX-512A Device Address
    b. Fixture Personality
    c. Stand Alone (Manual) Operation
2. It shall be possible to lock out the control keypad at the fixture 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.
4. The DMX-512A device address for each fixture shall be user selectable.
5. 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.
6. 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.
7. The fixture shall have an available “Master Channel” function to provide control of intensity without changing the 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.
8. 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 DMX operation
    b. Master Channel On/Off
    c. Strobe (up to 30 hz)
    d. Smoothing On/Off
    e. Stand-alone effects
    f. Stand-alone fixed output
9. The fixture shall be capable of standalone operation, activated and configured at the control keypad. Standalone modes shall include the following:
    a. Fixed color temperature defined with local controls
    b. Strobe with user selectable color and speed
    c. Primary / Replica

F. Optical

1. Fixture shall feature a custom matrix of LED Cells to provide color or tunable white light or fixed white light. Variations of LED matrices to include:
    a. Red, Green, Blue, Amber
    b. Red, Green, Blue, White
    c. 3000, 6000 Kelvin white tune-able
    d. Fixed white (3000 or 6000 Kelvin)
    e. Custom arrays.
2. The fixture shall 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 cannot produce sufficient skin saturate ambers, lavenders, or oranges and shall not be accepted.
3. Lens assemblies shall be available in variations of:
    a. 60° x 1° light shaping diffuser
    b. 95° x 25° light shaping diffuser
    c. 30° spread lens
    d. 40° spread lens
    e. 60° spread lens

G. Light Emitting Diodes

1. The fixture shall use a variety of LEDs for a wide range of color mixing or tuning for color models the standard configurations shall be Red, Green, Blue, and Amber LEDs or Red, Green, Blue and White LEDs. For white models the standard configurations shall be white LEDs at 3,000° Kelvin color temperatures or variable white between 3,000° and 6,000° Kelvin, with custom arrays available.
2. Manufacturer of LED systems shall utilize an advanced production LED binning process to maintain color consistency.
3. LED emitters should be rated for nominal 50,000 hour LED life
4. LED system shall comply with all relevant patents.

H. Dimming Engine

1. Luminaire shall provide full range dimming performance based upon its DMX input control signal and configuration and shall be equipped with an LED system compatible with standard 8-bit and 16-bit input, with high resolution dimming.
2. Dimming curves shall be optimized for smooth dimming at low intensities and over longer timed fades.
3. LEDs shall be driven by Pulse Width Modulation. (PWM)
4. Additional smoothing algorithms shall be available to augment the high resolution dimming engine.

2.05 CYCLORAMA LIGHTING

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 50 RGBA 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 Red, Green, Blue, Amber / White color LEDs, and an on-board power supply.

3. The fixture shall incorporate a hammer-tone 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 be incorporate silent, convection cooling without employing the use of fans or filters. Fixtures incorporating fan cooling systems generate unacceptable levels of noise are not equal and shall not be accepted.
5. IES Photometric files shall be available 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).
7. The fixture shall be UL1573, and UL8750 LED listed and CE compliant for stage and studio use.
8. Fixtures which do not comply with this specification shall not be accepted.

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 and shall be available in white, black, 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 7.2” (182.8mm) L x 8.28” (210 mm) H x 6.4” (162.5) D. and weigh 7 lbs. (3.175 kg).
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 hammer-tone 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 a “kick stand” style yoke for both floor and pipe mounting. The integrated rigid flat steel yoke with locking dog tilt handle shall be available for overhead pipe mounting.
    a. Pipe mounted fixtures shall be supplied with a cast iron C-clamp Altman #510 suitable for use on up to 2” (50mm) 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.
5. The fixture shall be designed to provide flat and even coverage of light when placed 4’-0” (1.2m) away from the surface being lit, 4’-0” (1.2m) on center.
6. There shall be no visible dip in coverage or “scalloping” between fixtures when so placed.
7. Power supply, cooling and electronics shall be integral to each unit.

C. Thermal

1. The luminaire shall be cooled via natural convention with no aide of fans or other cooling systems.
2. Under normal operating conditions, the LED engine shall be capable of 50,000 hours rated lifespan to Led manufacturers recommended LM-70 / 70% maximum calibrated intensity with convective cooling, units utilizing active cooling shall not be accepted.
3. Ambient operating temperature shall be 32°F to 104°F (0 – 40 °C) non-condensing and IP-20 rated for indoor dry location use.

4. 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.

D. Electrical

1. The fixture shall be equipped with 100V to 240V 50/60 Hz auto-ranging internal power supply and requires power from a constant “non-dim” power source.
2. The fixture shall receive power via a Neutrik power con blue connector and 5’-0” (1.5m) power cord with:
    a. 2 P&G (Stage Pin)
    b. NEMA 5-15P
    c. NEMA L520 (Twistlock)
    d. Territory Power Plug
3. The fixture shall be equipped with a Neutrik Power con Gray to allow for “Daisy Chaining” of fixtures from a single power source. The receptacle shall be protected by an integral 10amp circuit breaker.

E. Control and User Interface

1. A local control keypad with a three digit LCD display shall be provided for configuration and control of:
    a. DMX-512A Device Address
    b. Fixture Personality
    c. Stand Alone (Manual) Operation
2. It shall be possible to lock out the control keypad at the fixture 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.
4. The DMX-512A device address for each fixture shall be user selectable.
5. 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.
6. 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.
7. The fixture shall have an available “Master Channel” function to provide control of intensity without changing the 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.
8. 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 DMX operation
    b. Master Channel On / Off
    c. Smoothing On / Off
    d. Stand-alone effects
    e. Stand-alone fixed output

9. The fixture shall be capable of standalone operation, activated and configured at the control keypad. Standalone modes shall include the following:
    a. Fixed color temperature defined with local controls
    b. Strobe with user selectable color and speed
    c. Slave

F. Optical

1. Fixture shall feature a custom matrix of LEDs to provide color or tunable white light or fixed white light. Variations of LED matrices to include:
    a. Red, Green, Blue, Amber
    b. Red, Green, Blue, White
    c. 3000, 6000 Kelvin white tune-able
    d. Fixed white (3000 or 6000 Kelvin)
    e. Custom arrays.
2. Fixture shall utilize a patented mixing lens and reflector system to deliver an asymmetrical beam pattern onto the projection back drop or wall. Cyc lights utilizing only a lens system and not utilizing the aforementioned style system shall not be accepted.
3. The fixture shall 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 cannot produce sufficient skin saturate ambers, lavenders, or oranges and shall not be accepted.

G. Light Emitting Diodes

1. The fixture shall use a variety of LEDs for a wide range of color mixing or tuning for color models the standard configurations shall be Red, Green, Blue, and Amber LEDs or Red, Green, Blue and White LEDs. For white models the standard configurations shall be white LEDs at 3,000° Kelvin color temperatures or variable white between 3,000° and 6,000° Kelvin, with custom arrays available.
2. Manufacturer of LED systems shall utilize an advanced production LED binning process to maintain color consistency.
3. LED emitters should be rated for nominal 50,000 hour LED life
4. LED system shall comply with all relevant patents.

H. Dimming Engine

1. Luminaire shall provide full range dimming performance based upon its DMX input control signal and configuration and shall be equipped with an LED system compatible with standard 8-bit and 16-bit input, with high resolution dimming.
2. Dimming curves shall be optimized for smooth dimming at low intensities and over longer timed fades.
3. LEDs shall be driven by Pulse Width Modulation. (PWM)
4. Additional smoothing algorithms shall be available to augment the high resolution dimming engine

2.06 NETWORK EQUIPMENT

A. Equipment Enclosure

1. Enclosure shall be the *Pathway 1108 eDIN system enclosure*.
2. Enclosure shall be an ETL-Listed NEMA1 Enclosure for eDIN modules with a power supply.

3. Dimensions
    a. 10” x 13” x 4.5” Power Supply
4. Power supply shall be the *Pathway 1001-100-48-DIN 100 Watt, 48VDC Power Supply, DIN-Mountable*
5. Power supply shall be a permanent install applications product for NEMA1 enclosures.

B. DIN Mount DMX Hub

1. Switch shall be the *Pathway 1016 VIA8 8 Port DMX Hub, eDIN*
2. Hub shall feature 8 bi-directional DMX ports feature automatic signal sensing on each port.
3. Hub shall be designed to mount to 35mm DIN rail, and be engineered specifically for DMX data distribution.

2.07 POWER AND DATA DISTRIBUTION BOXES

A. Data distribution boxes shall be the *Altman Lighting 450 Series distribution system.*

B. General

1. Materials shall be
    a. 18-gauge mild steel backbox and faceplates
    b. Steel and black oxide fasteners
2. Knock outs on each side of the back box for permanent installation.
3. All mounting hardware included with pipe-mount devices
4. Flush mounted receptacles wired directly
5. 1-inch die-cut white numbering standard
6. PBU and PBO provided with U-bolt clamps, pipe clamp is optional
7. White, Baked epoxy sandtex, electrostatic application finish

C. Type A

1. 450-PBS-4-520R-HW-1-XLR5F-SDR – Altman 450 Series surface mount wall distribution box

D. Type B

1. 450-PBS-4-520R-HW-1-XLR5M-SDR – Altman 450 Series surface mount control position distribution box.

2.08 POWER AND DATA DISTRIBUTION TRACK

A. The Lighting System shall consist of high quality aluminum lighting track with integral data distribution, rugged multi adapters to support fixtures and to transfer power and data from the track to devices mounted on the track system, and controllable devices such as lighting fixtures. The Lighting System shall be the *Smart-Track System as manufactured by Altman Stage Lighting.*

B. Track shall be capable of distributing a single DMX-512A (ANSI E.1.11-2004) and RDM (ANSI E1.20-universe and circuits of 120V AC.

C. Dimensions

1. 4’, 8’, & 12’ lengths
2. 1.375” x .8125” in section

D. Each load or fixture in the lighting system shall incorporate its own dimmer, relay, or LED driver. Submittals for systems requiring installation and provision of dimmer panels relay panels, or external LED Drivers shall be rejected without review.

E. Each load or device connected to the Lighting System shall be independently controlled via a unique digital address. Control zones shall be determined on a fixture by fixture basis, shall be field changeable, and shall be completely independent of circuitry and wiring used to power the load.

F. Track Sections shall include a data bus track with two 22 gauge nickel plated copper conductors integrated into the bottom slot of the track for distribution of DMX-512A and RDM control signals.

G. The track system shall be compatible with any Lighting Controller fully compliant with the DMX-512A (ANSI E.1.11-2004) standard. Connection points shall be provided for wired connection of controls to the Lighting System.

H. The track system shall have a complete line of components to join data and energize separate track pieces, including:

1. Live & Dead End Feeds
2. In-Line couplers
3. Feed through connectors
4. L-turns (left and right)
5. X-Connections
6. Data terminators

I. All components of the Lighting System shall be U.L. or ETL listed

J. All track shall be white and field cut-able.

K. Multi Adapters

1. Shall be rugged, highly compact components that connect lighting fixtures and other controllable devices to the Smart Track system.
2. Shall include a double lock mechanism allowing for connection of 22 lbs maximum spotlights using two (2) mechanical locks. One mechanical lock shall securing the adapter to the track. One mechanical lock shall connect the power contacts and shall be used for selecting circuit 1, circuit 2 (2-circuit tracks only), or “off”.
3. Wiring terminals shall have nickel plated spring contacts.
4. Approval and listing for 120V
5. Integral ground contact and on/off switch.
6. Shall be constructed of self-extinguishing polycarbonate according to class V0.
7. Multi Adapters shall be available in white, black, or silver finish.

L. Refer to one line schematics for hanging and connection detail.