



Cartersville School System

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REQUEST FOR PROPOSAL

June 11, 2019

Dear Sir or Madam:

The Cartersville School System invites you to submit a proposal on the following items.

Provide and Install Stage Lighting, Dimming and Control System for the Auditorium at Cartersville High School

Return your sealed pricing bid clearly marked **on the outside of the envelope or package to:**

**Dr. Marc Feuerbach, Superintendent
Cartersville School System
RFP # 0440-0611-120 ENCLOSED
P.O. Box 3310, 15 Nelson Street
Cartersville, Georgia 30120**

no later than 10:00 am., Monday, July 8, 2019.

The Cartersville School Board reserves the right to accept and/or reject any and all bids.

We invite your participation.

Respectfully,

Richard Dyke
Director of Finance

Enclosures

INSTRUCTION TO BIDDERS

1. Proposals are due no later than 10:00 AM., Monday, July 8, 2019, and shall be opened publicly at that time.
2. **Proposals must be submitted on the forms enclosed.** Bidders may attach other appropriate information to best evaluate the proposal.
3. Proposals must meet the requirements relating to all Georgia Department of Education guidelines.
4. The Cartersville School Board reserves the right to accept or reject any and all proposals.
5. Payment will be made within 30 days of the completion of project.
6. Proposals will be evaluated on price, starting date and completion date.
9. Contractor must provide a copy of **Certificate of Liability Insurance, E-Verification number, Workers Compensation Insurance and a W-9 form.**
10. Further information regarding the RFP can be obtained by email only:

Ken Paige
Director of Operations
Cartersville City Schools
kpaige@cartersvilleschools.org

PROPOSAL FORM

Please include this cover sheet as (page 1) of your proposal

Cartersville School System
P.O. Box 3310
15 Nelson Street
Cartersville, Georgia 30120

We have carefully examined and fully understand the Instructions to Bidders and other documents found in the specifications as prepared by you.

We propose to enter into a contract to furnish the materials and deliver services as specified at the price listed below. We also assure you that a company representative will be readily available to assist in reviewing the materials and services.

Total bid proposal price to Provide and Install Stage Lighting, Dimming and Control System for the Auditorium at Cartersville High School

\$ _____

Name of Company

Signature of Company Representative Authorized to Submit this Proposal

Printed Name of Representative

Business Address/ Street, City, State, Zip Code

Phone Number

Fax Number

Email

Office Use Only

1. GENERAL REQUIREMENTS

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 GOVERNING CLAUSE

- A. For the sake of brevity these specifications shall omit phrases such as "Contractor shall furnish and install", "unless otherwise indicated or specified", etc., but these phrases are nevertheless implied. Mention of materials and operations requires the Contractor to furnish and install such materials and perform such operations completely to the satisfaction of the Owner.

1.3 SCOPE OF WORK

- A. One company shall be responsible for the installation of all aspects of the stage equipment in the Auditorium. Work under this section shall include the furnishing of all labor, materials, tools, transportation services, supervision, etc., necessary to complete installation of new stage equipment as well as any other items as herein listed, all as described in these specifications, as illustrated on the accompanying drawings; or as directed by the owner. Work includes the following:

Stage Lighting, Dimming & Control System

1.4 SUBSTITUTIONS:

- A. Specific items of equipment are specified by trade names. It has been determined by the Owner that these are the particular items desired by the owner and established a standard of quality, equipment function and/or process. It is not the purpose nor intent of these documents to eliminate competitive bids. In order to allow proper and fair comparison of pricing, contractors are required to submit their base bid price on the specified equipment. A contractor may submit an alternate bid based on equipment different from that specified only if that Contractor has received prior approval in writing from the Owner at least 15 days prior to bid. Accompanying each request shall be a letter specifically detailing each substitution including catalog data, specifications, swatches, operative samples, technical information, drawings, performance and test data, and complete descriptive and functional information to assist in a fair evaluation. Failure to submit any substitution for prior approval or not providing sufficient data for evaluation shall require the exact item specified to be furnished. Owner's approval of a substitution for bid purposes will not relieve the contractor from the responsibility of meeting all specification criteria. If an approval of a substitution is granted, the Contractor shall be fully responsible for any and all changes (wiring, power, distribution, support structure, etc.) such substitution shall require.

1.5 DEFECTIVE OR NON-APPROVED MATERIALS

- A. Should any stage equipment be found defective, not meeting specifications, or that which has not been approved in writing by the Owner shall, upon discovery (including any time within the period of the guarantee), be replaced with the specified equipment or material at no additional cost.

1.6 GUARANTEE

- A. The Contractor shall guarantee all of the work that is performed under this contract, including all materials, and workmanship, for a period of one (1) year from the date of full acceptance of the work.

- B. Lamps for lighting fixtures shall be guaranteed against failure for thirty (30) days.
- C. Nothing in this guarantee shall cause repair or replacement by the Contractor where negligence, neglect or improper operation by the Owner has caused the failure of any equipment installed under this contract.

1.7 DISCREPANCIES

- A. All equipment shall be sized to fit properly. The exact measurements are the responsibility of the Contractor. If there are discrepancies in the specifications, the Contractor shall ask for a clarification from the Owner. If no clarification is requested, the Owner's judgment shall rule.

1.8 PRE-APPROVED STAGE EQUIPMENT CONTRACTORS

- A. One company shall be responsible for the installation of all aspects of the stage equipment as specified in this section. This shall include but not be limited to all rigging, stage lighting fixtures, stage/house dimming, dimming controls, low voltage cable, low voltage terminations, programming of ETC system, and miscellaneous equipment. The following companies have prior approval as STAGE EQUIPMENT CONTRACTORS (NO EQUALS):
 - 1. Barbizon 404-681-5124
 - 2. Magnum Companies 404-872-0553
 - 3. Stage Front 1-800-736-9242
- B. In order to be considered as a Stage Equipment Contractor on this project, each Contractor requesting approval must submit to the Architect at least fifteen (15) days prior to the date of bid opening a letter expressing his intent to bid. This letter shall include a list of at least five (5) projects of similar size and scope completed by this firm within the last five (5) years. Inspection of one completed installation may be requested by the Architect/Architect's Representative prior to consideration of request to bid. The stage equipment contractor shall have been in business under the same name for five (5) full years preceding the date of this bid doing work similar to the type specified. The decision of the Architect as to the capability of the Bidder to successfully complete and maintain the system, based on this pre-qualification information shall be final.
- C. Pre-Bid request letter shall include a statement that all major items of equipment shall be bid and supplied as specified or shall contain details of all proposed substitute equipment for review by the Architect/Architect's Representative. ETCP certification in theatre rigging is required for approval. Verification of this certification must be provided to be considered for approval. Substitute equipment items to include specifications, parts numbers, and details of interconnection to proposed system. The decision of the owner as to the acceptability of substitute equipment shall be final.
- D. The Stage Equipment Contractor shall employ only fully trained stage riggers and mechanics, assisted by common laborers, for the erection of the stage equipment. The stage riggers shall be completely familiar with the type of equipment to be installed. A competent Job Superintendent shall be on the job at all times when work is in progress. He shall represent the Stage Equipment Contractor and all directions given by him shall be as binding as if given by the Stage Equipment Contractor. The job superintendent must be ETCP certified in theatre rigging. A copy of the certification must be furnished to the General Contractor prior to the start of the installation.

1.9 ACCEPTABLE EQUIPMENT MANUFACTURERS

- A. The stage lighting dimming and control of Electronic Theatre Controls of Middleton, Wisconsin are specified. No equal.
- B. The stage lighting fixtures and accessories of Electronic Theatre Controls of Middleton, Wisconsin are specified. No equal.

1.10 DOCUMENTATION

- A. **SHOP DRAWINGS:** Shop drawings and equipment data sheets shall be submitted to the Owner under general provisions within 45 days after award of the contract. Failure to comply with this 45 day requirement shall be cause for disqualification of the selected Contractor and cancellation of contract without cost to the Owner, on the basis that the selected Contractor does not have the ability or intention to comply with the specifications. Approval of submitted equipment shall be obtained prior to equipment purchasing or fabrication. If shop drawings are rejected, correct and resubmit in the manner as specified. All shop drawing information shall be submitted at the same time; no partial submittal will be accepted. Drawings shall indicate complete details, dimensions, product types and locations of all equipment, clearances required, guides, cables, sets, Contractor fabricated equipment, and all other details required to completely describe the work to be performed. Submittals drawings shall be presented at a scale of not less than 1/8" = 1'-0" for conduit plans, 1/4" for equipment layouts, 1/2" = 1'-0" for mounting details, and 1/2" = 1'-0" for plate and panel details. Each sheet to allow space for approval stamps and have the name of the project, the contractors and/or the supplier's name, address telephone number, and the date submitted. Submit the following items for Owner's approval, prior to fabrication:
 - 1. Electrical riser diagrams indicating the necessary control wiring for all dimming, distribution, and controls wire tag number for every connection. Show all terminal blocks with wire numbers and location.
 - 2. Provide full dimensions for panel layouts with finishes and materials for all custom panels.
 - 3. Details of installation and erection, including adjoining conditions and necessary clearances.
 - 4. Indication by arrow and boxed caption of each variation from contract drawing and specifications, except those indicated as acceptable in specifications or on drawings
- B. **RECORD DRAWINGS AND DATA:** Submit in accordance with General Provisions. Also within 30 days of final test and completion of the installation, submit the following to the Owner:
 - 1. Three (3) complete sets of "as built and approved" drawings showing systems and elements as installed, including field modifications and adjustments.
 - 2. Three (3) sets of maintenance data including a list indicating replacement parts lists for all items of equipment, wiring diagrams, control diagrams, any and all keys for cabinets, racks, key operated switches etc. and complete operation manuals.
- C. **INSTRUCTION OF OWNER PERSONNEL:** This contractor or his representative, fully knowledgeable and qualified in systems operation, shall provide eight (8) hours of instruction to the Owner-designated personnel on the use and operation of this System. Designated instruction times shall be arranged through the Owner.
- D. **PERMITS:** Obtain all permits necessary for the execution of any work pertaining to the installation and conform in all trades with all applicable local codes and with the National Electric Code. Obtain all permits necessary for operation of any equipment by the Owner.

- E. **CLEAN UP:** It shall be the responsibility of this Contractor to remove all debris from the building or site caused by his operations to a common trash point or receptacle on the job site, as determined by the Owner.

2. EQUIPMENT

2.1 STAGE DIMMING AND CONTROL SYSTEM

A. GENERAL

1. **Electrical requirements of the Stage Equipment Contractor:** The Stage Equipment Contractor shall be responsible for providing to the electrical contractor all stage lighting and dimming hardware as specifically detailed in these specifications. This shall include:
 - a. Furnishing all equipment specified.
 - b. Hanging of connector strips over stage on specified stage rigging hardware.
 - c. Set-up of the control console.
 - d. Demonstration of equipment to owner's representatives.
 - e. Lamping & hanging all stage lighting fixtures.
 - f. All low voltage lighting control terminations.
2. **The Stage Equipment Contractor shall not be responsible for the following work; to be performed by the electrical contractor.:**
 - a. Any conduit
 - b. Any wiring
 - c. Power requirements and termination of same in dimmer rack
 - d. Any load wiring, fixtures, or termination at fixtures for house lighting or emergency lighting
 - e. Mounting of plugboxes, floor pockets, back boxes and gridiron junction boxes (locations to be coordinated with stage equipment contractor)
3. **FACTORY CHECK-OUT:** This contract shall also include the services of a qualified engineer regularly employed by the manufacturer of the system who shall check the installation and ensure its proper operation. No part of the system shall be energized before being so checked and the installation approved. Failure to observe this provision shall automatically relieve the manufacturer of any responsibility concerning the proper operation of the system or any part thereof and the replacement of parts which may have been damaged by the premature energizing. This engineer shall be made promptly available on the job site within fourteen (14) days after the manufacturer has received written notice.

B. RACK ENCLOSURES – DRD6

1. The rack enclosure shall be the Unison DRd Series Control Enclosure as manufactured by Electronic Theatre Controls, Inc., or equal.
2. **Mechanical**
 - a. The Rack Enclosure shall be a surface mounted, deadfront switchboard, constructed of 18-gauge formed steel panels with a hinged, lockable full-height door containing an integral electrostatic air filter.
 - 1) Filter shall be removable for easy cleaning.
 - 2) The enclosure shall support one control processor and one station power module plus accessories

- 3) The enclosure door shall have an opening to allow limited access to the control module face panel.
 - b. All rack components shall be properly treated and finished.
 - 1) Exterior surfaces shall be finished in fine textured, scratch-resistant, epoxy paint.
 - c. The fully digital rack enclosure shall be available with six or twelve dimmer module spaces, one processor and a single station power supply, Rack dimensions and weights (without modules) shall not exceed:
 - 1) DRd6 21.9" H x 17" W x 9.6" D 38 lb.
 - d. A single low-noise fan shall be located at the top of each rack. The fan shall draw all intake air through the integral electrostatic air filter, over the surfaces of the module housing and out the top of the rack.
 - 1) The fan shall maintain the temperature of all components at proper operating levels with dimmers under full load, provided the ambient temperature of the dimmer room does not exceed 40°C/104°F.
 - 2) In the event of an over-temperature condition, only the affected dimmer module(s) shall shut down. A red indicator LED will flash and an error message shall appear on the Control Processor.
 - e. Rack Enclosures shall be designed to allow easy insertion and removal of dimmer and control modules without the use of tools. (230 volt racks with CE certification shall require a screwdriver.)
 - 1) Supports shall be provided for precise alignment of modules into power and signal connector blocks.
 - 2) With modules removed, racks shall provide clear front access to all load, neutral and control wire terminations.
 - f. Rack Enclosures shall support use of any combination of rack option cards designed to provide additional rack features. Rack option cards shall include:
 - 1) FLO - The Fluorescent Option Board shall provide termination for 4 wire low voltage electronic fluorescent dimming ballasts. FLO shall provide 24, 0-10Vdc outputs.
 - g. Optional floor mounting pedestal shall be available for the 12-module rack.
 - h. Racks enclosures shall be designed for use with AX series auxiliary racks for Main Circuit Breaker, Main Lug, and cross bussing applications.
3. Electrical
- a. Rack enclosures shall be available in 100, 120, 230, 240 and 277 volt, three-phase, main lug configurations.
 - 1) 120 volt rack enclosures shall be field configurable for single phase operation without the need for additional components
 - b. Rack enclosures shall be completely pre-wired by the manufacturer. The contractor shall provide input feed, load, and control wiring.
 - c. Standard Short Circuit Current Ratings (SCCR) shall be 22,000 at 100-277 Volt
 - 1) Higher SCCR ratings, up to 100,000 amps SCCR at 120V, shall be possible when used with an AX series Auxiliary Rack Enclosure.

- 2) Higher SCCR ratings, up to 65,000 amps SCCR at 240V and 277V, shall be possible when used with an AX series Auxiliary Rack Enclosure.
 - d. All control wire connections shall be terminated via factory provided connectors.
 - e. Rack enclosures shall support dimming for incandescent, fluorescent, neon, cold cathode, electronic low voltage and magnetic low voltage transformer load types.
 - f. The rack enclosure shall support 16-bit DMX input
 - g. The rack enclosure shall support 65,000 steps of dimming.
 - h. The rack enclosure dimming engine shall support multiple dimmer curves including modified square law, linear, switched, fluorescent, pre-heat and electronic low voltage.
 - i. The rack enclosure shall support voltage regulation including, minimum and maximum scale voltages with offsets
 - j. Rack enclosure shall support a UL924 listed contact input for emergency lighting control bypass.
 - 1) Emergency lighting input shall support load shedding
 - k. Rack enclosures shall be designed to support the following wire terminations:
 - 1) AC
 - 2) Echelon link power (Belden 8471 or equivalent)
 - 3) 24Vdc (2- 16AWG Wire)
 - 4) DMX512A Port A (In or Out) (Belden 9729 or equivalent)
 - 5) DMX512A Port B (Out) (Belden 9729 or equivalent)
 - 6) RS232 Serial In/Out (Belden 9729 or equivalent)
 - 7) Unshielded Twisted Pair (UTP) Category 5/5e Ethernet
 - 8) Contact Closure In (14AWG to 26AWG Wire)
 - 9) Contact Closure Out (14AWG to 26AWG Wire)
 - (i) Contact Closure Out shall provide 1A @ 30vDC
 - l. Station Power Modules
 - 1) Station power modules shall provide power for the connected control bus. Options shall be available for use with Paradigm, Echo and SmartLink control protocols
 - 2) Station power modules shall support over-current/short protection
 - 3) Station Power Modules shall support fault detection for the data bus.
 - m. All control wire connections shall be terminated via factory provided connectors.
 - n. Main feed lugs shall accept a maximum of 350 MCM wire.
 - o. Load terminals shall accept a maximum of #6 AWG wire.
4. Thermal
- a. Ambient room temperature: 0-40°C / 32-104°F
 - b. Ambient humidity: 10-90% non-condensing

C. ARCHITECTURAL CONTROL PROCESSOR MODULES

1. Control Processor Modules

- a. The Architectural Control Processor shall be the Unison Paradigm P-ACP Series Control Processor as manufactured by Electronic Theatre Controls, Inc., or equal.
- b. The Architectural Control Processor (ACP) assembly shall be designed for use in DRd Series Dimming Enclosures and ERn Series Control Enclosures.
- c. The processor shall utilize microprocessor based, solid state technology to provide multi-scene lighting and building control.
 - 1) ACP shall support functions such as station programming, macro sequencing, electronic lockout, room combine and astronomical time clock events. ACP station processor shall allow configuration of the control system via the menus. See software section for additional system details.
 - 2) When used in a dimming enclosure, the ACP shall allow access to dimming control menus including the status screen, dimming configuration screen, backup menu, test menu and configuration menu.
 - 3) One ACP shall be rated to drive 1024 channels of control, 1024 zones, 64 rooms, 512 presets, 62 button or button/fader stations and 6 Touchscreen Stations
- d. ACP module electronics shall be convection cooled.
- e. The ACP shall provide front-panel RJ45 jack, Secure Digital (SD) card slot, and Universal Serial Bus (USB) Port for configuration and data exchange.
- f. Architectural Lighting System configuration and program information shall be stored in flash memory, which does not require battery backup.
- g. The ACP shall be contained in a plug-in assembly and require no discrete wiring connections; all wiring shall be terminated into Dimming or Control Enclosure.
 - 1) The ACP shall support the following communications:
 - (i) Echelon LinkPower
 - (ii) 10/100BaseTX, auto MDI/MDIX, 802.3af compliant Ethernet networking with TCP/IP, ESTA BSR E1.17 Advanced Control Networks (ACN) and ESTA BSR E1.31 (sACN) Protocols
 - (iii) EIA-232 serial protocol
 - (iv) ESTA DMX512A, configurable as input or output ports
 - (v) Dry contact closure inputs
 - (vi) Dry contact closure outputs, rated at 1A@30VDC

D. STATION POWER MODULES

1. Station processor Modules

- a. The Station Power Module shall be the Unison Paradigm P-SPM Series Station Power Module as manufactured by Electronic Theatre Controls, Inc., or equal.
- b. Mechanical
 - 1) The Station Power Module (SPM) assembly shall be designed for use in DRd Series or ERn Rack Enclosures.

- 2) The SPM shall convert input power into low-voltage (Class II) power with data line and a secondary auxiliary low-voltage line to energize button, button/fader, touchscreen, and interface devices for multi-scene lighting and building control.
- 3) SPM module shall be contained in a plug-in assembly.
 - (i) The module shall be housed in a formed steel body and contain no discrete wire connections.
 - (a) No tools shall be required for module removal or insertion.
- 4) The SPM shall be convection cooled.
- 5) User Interface
 - (i) The SPM shall utilize light emitting diodes (LED's) to indication function, status and fault.
- 6) The SPM shall be secured behind the locking door.
- 7) Wall-mounted, direct wire and 19" rack-mount, connectorized repeater and dual-repeater variants shall be available from the same manufacturer where required on the project.

c. Electrical

- 1) The SPM shall require no discrete wiring connections; all wiring shall be terminated into the dimming enclosure, unless required by a variant.
- 2) The SPM shall require line-voltage power supplied by the contractor, terminated inside the dimming or control enclosure.
- 3) The SPM shall be hot-swap capable.
- 4) The SPM, in conjunction with a matching Architectural Control Processor (ACP), shall support Echelon LinkPower communications with remote devices, including button, button/fader, touchscreen and interface stations, and shall interoperate with LonMARK-approved third-party devices.
 - (i) The LinkPower network shall utilize polarity-independent, low-voltage Class II twisted pair wiring, type Belden 8471 (unshielded) or Belden 8719 (shielded) or equivalent. One # 14 AWG drain wire will be required for system not using grounded metal conduit.
 - (ii) The LinkPower network shall be topology free. Network wiring may be bus, loop, home run, star or any combination of these.
 - (iii) Link power wiring shall permit a total wire run of 1640 ft. (500m)
 - (a) Repeaters allow an additional wire run of 1640 ft. (500m)
 - (b) Dual-repeaters allow two additional wire runs of 1640 ft. (500m)
 - (iv) Link power wiring between stations shall not exceed 1313 ft. (400m).
- 5) The SPM shall support auxiliary power for certain remote devices, including touchscreen and interface stations, as required by the device.

- (i) The auxiliary power network shall utilize polarity-dependent, low-voltage Class II wiring, consisting of two # 16 AWG wires.
- (ii) Auxiliary wiring shall permit a total wire run of 1640 ft. (500m)
 - (a) Repeaters allow an additional wire run of 1640 ft. (500m)
 - (b) Dual-repeaters allow two additional wire runs of 1640 ft. (500m)
- (iii) The SPM shall supply 1.25 amps at 24v DC continuously.

d. Functional

1) Capacity

- (i) Each SPM shall:
 - (a) Supply power for up to 32 button and button/fader stations.
 - (b) Repeaters and dual-repeaters allow 30 additional stations, 62 total
 - (c) Supply auxiliary power for a similar number of interface stations.
 - (d) Shall supply auxiliary power for up to four Touchscreen stations, when a like number of other stations are deducted from the total.
 - (e) Repeaters and dual-repeaters allow two additional Touchscreens (six total) when a like number of other stations are deducted from the total.

2) Operation

- (i) The SPM shall not require configuration or programming.
- (ii) The SPM shall automatically detect faults in the wiring, indicate the fault, including the fault polarity, and shut down the output power.
 - (a) The SPM shall automatically reset when the fault is clear, and can be manually reset by removing and re-inserting the module.

E. DIMMER MODULES

1. Mechanical

- a. ETC dimmer modules shall be designed for use with Unison or Sensor dimming racks.
- b. Dimmer modules shall consist of a heavy-duty, die-cast aluminum chassis with an integral faceplate. All parts shall be properly treated, primed and finished in fine-texture, scratch-resistant gray epoxy powder coat.
- c. With the exception of the circuit breaker, the module shall contain no moving parts.
- d. Each module shall be labeled with the manufacturer's name, catalog number and rating.

- e. All electronic components (current/voltage sensors and indicators) shall be contained in a single field-replaceable housing.

2. Electrical

- a. Each dimmer shall consist of the following components:

- 1) One or two single-pole circuit breakers

- (i) Circuit breakers shall be fully magnetic so the trip current is not affected by ambient temperature.
- (ii) Circuit breakers shall be rated for tungsten loads having an inrush rating of no less than 20 times normal current.
- (iii) Circuit breakers shall be rated for 100 percent switching duty applications.

- 2) A solid-state switching module

- (i) Each dimmer module shall use a solid-state relay (SSR) consisting of two silicon-controlled rectifiers (SCRs) in an inverse parallel configuration, and all required gating circuitry on the high-voltage side of an integral, opto-coupled control voltage isolator. Rectifiers, copper leads and a ceramic substrate shall be reflow soldered to an integral heat sink for maximum heat dissipation. Dimmers employing triac power devices, pulse transformers, or other isolating devices not providing at least 2,500V RMS isolation shall not be acceptable.
- (ii) The SSR shall also contain a control LED, a thermistor for temperature sensing, and silver-plated control and load contacts.
- (iii) The entire SSR shall be sealed in a plastic housing requiring only a screwdriver to replace.
- (iv) Dimmer modules requiring disassembly, heat sink grease, or additional tools for repair shall not be acceptable.

- 3) Toroidal filters

- (i) Dimmer modules shall include toroidal filters to reduce the rate of current rise time resulting from switching the SCRs. The filter shall limit objectionable harmonics, reduce lamp filament sing and limit radio frequency interference on line and load conductors.
- (ii) Modules shall be available in models offering 200-500 microsecond filter rise times depending upon model. Rise time shall be measured at the worst case slew rate (about 50 percent) from 10 to 90 percent of the output waveform with the dimmer operating at full load.

- 4) Power and control connectors.

- (i) Modules shall not have any protruding pins subject to physical damage when the module is not installed.
- (ii) Power efficiency for standard dimmers shall be at least 97 percent at full load with a no-load loss of 3V RMS.
- (iii) The dimmer shall accept hot patching of a cold incandescent load up to the full rated capacity of the dimmer.

- (iv) Standard AIC fault current protection shall be 10,000 at 120V and 14,000 at 230V/277V.

2.2 CONTROL STATIONS

A. DIGITAL BUTTON

1. Button

a. General

- 1) The control station shall be the Paradigm Inspire Station Series or Unison Heritage as manufactured by ETC, Inc., or equal
- 2) It shall be a remote station on a LinkConnect network that can recall presets, provide direct zone control, play macros and provide room combine actions for a control system
- 3) The station shall consist of a dual function (control/ record) push-button with an integral tri-color backlight for each corresponding button and fader

b. Mechanical

- 1) Control stations shall operate using one, two, four, six or eight buttons. A four button with fader station shall also be available
- 2) All button stations shall be available with cream, grey, black or white decorator style faceplates
 - (i) Manufacturer's standard colors shall conform to the RAL CLASSIC Standard
- 3) Stations shall have tri-color backlights for each button and fader
 - (i) Indicators shall utilize a configurable color backlight for active status
 - (ii) Indicators shall utilize a configurable color backlight for inactive status to assist in locating stations in dark environments. Stations that do not support a lit inactive or deactivated state shall not be accepted
 - (iii) Stations shall support an off backlight state of inactive status when required
- 4) All faceplates shall be designed for flush or surface mounting and have no visible means of attachment
- 5) Station faceplates shall be constructed of ABS plastic and designed based on a standard decorator style faceplate.
- 6) Buttons shall be indelibly laser marked for each button function
- 7) Control station electronics shall mount directly behind the faceplate. The entire assembly shall mount into a single gang back box. Back boxes for flush mounted stations shall be industry standard back boxes. The manufacturer shall supply back boxes for surface mounted stations.

c. Electrical

- 1) Control station wiring shall be LinkConnect control wiring utilizing low-voltage, Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
- 2) The station shall operate on class 2 voltage provided by the control system via the LinkConnect network.

- 3) Station wiring must be topology free. It may be point-to-point, bus, loop, home run or any combination of these.
 - 4) Wiring termination connectors shall be provided with all stations.
 - 5) Control stations shall be UL/ cUL listed and CE marked and meet WEEE Compliance
- d. Functional
- 1) The Control System shall be designed to allow control of lighting and associated systems via Button and Fader controls.
 - (i) System presets shall be programmable via LightDesigner configuration software.
 - (a) Presets shall have a discrete fade time, programmable from zero to 1,000 hours with a resolution of one millisecond.
 - (ii) System macros and sequences shall be programmable via LightDesigner configuration software.
 - (a) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
 - (b) Macro and sequences shall be activated by button, time clock event or LightDesigner software.
 - 2) Control components shall be designed to operate default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the software-based configuration program.
 - (i) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, or room join/separate.
 - (ii) Optional fader functions include manual master control, individual zone control, color control fade rate control or preset master control.
 - 3) Stations (Button and Button/Fader) shall allow programming of station and component electronic lockout levels via LightDesigner.

2.3 LIGHTING FIXTURES

A. Color mixing or White-light Light Emitting Diode Profile fixture

1. General

- a. The fixture shall be a color-mixing high-intensity LED illuminator with DMX control of intensity and color. The fixture shall be a ColorSource Spot, as manufactured by Electronic Theatre Controls, Inc.
- b. All LED fixtures shall be provided by a single manufacturer to ensure compatibility
- c. The fixture shall be UL 1573 listed for stage and studio use
- d. The fixture shall comply with the USITT DMX512-A standard
- e. The fixture shall be provided with the minimum warranty of 5 years full fixture coverage and 10 years LED array coverage

2. Physical

- a. The unit shall be constructed of rugged, die cast aluminum, free of burrs and pits.
- b. The following shall be provided:
 - 1) Lens secured with silicone shock mounts
 - 2) Shutter assembly shall allow for +/-25° rotation
 - 3) 20 gauge stainless steel shutters
 - 4) Interchangeable lens tubes for different field angles with Teflon guides for smooth tube movement
 - 5) Sturdy integral die cast gel frame holders with two accessory slots, and a top-mounted, quick release gel frame retainer
 - 6) Rugged steel yoke with two mounting positions allowing 300°+ rotation of the fixture within the yoke
 - 7) Positive locking, hand operated yoke clutch
 - 8) Slot with sliding cover for motorized pattern devices or optional iris
- c. The housing shall have a rugged black powder coat finish
 - 1) White or silver/gray powder coat finishes shall be available as color options
 - 2) Other powder coat color options shall be available on request
- d. Power supply, cooling and electronics shall be integral to each unit.
- e. The unit shall ship with:
 - 1) Theatrical-style hanging yoke as standard
 - 2) 5' cable with Neutrik powerCON™ to choice of connector as standard
 - 3) Gate diffuser
 - 4) A-size pattern holder
- f. Available options shall include but not be limited to:
 - 1) Bare-end, Stage-Pin or Twist-lock type-equipped power leads
 - 2) powerCON to powerCON cables for fixture power linking
 - 3) Smooth Wash Diffuser for overlapping beams of light from multiple fixtures

3. Optical

- a. The light beam should have a 2-to-1 center-to-edge drop-off ratio
- b. The unit shall provide, but not be limited to:
 - 1) Low gate and beam temperature
 - 2) Sharp imaging through a three-plane shutter design
- c. The unit shall provide, but not be limited to:
 - 1) 5, 10, 14, 19, 26, 36, 50, 70 and 90 degree field angles
 - 2) High-quality pattern imaging
 - 3) Sharp shutter cuts without halation
 - 4) Shutter warping and burnout in normal use shall be unacceptable
 - 5) Adjustable hard and soft beam edges

- d. 19, 26, 36, and 50 degree units shall have optional lens tubes available for precision, high-contrast imaging.
 - e. Shall work with S4 LED CYC and Fresnel adapters
4. Environmental and Agency Compliance
- a. The fixture shall be ETL and cETL LISTED and/or CE rated, and shall be so labeled when delivered to the job site.
 - b. The fixture shall be ETL LISTED to the UL1573 standard for stage and studio use
 - c. The fixture shall be rated for IP-20 dry location use.
5. Thermal
- a. Fixture shall be equipped with a cooling fan.
 - b. The fixture shall utilize advanced thermal management systems to maintain LED life to an average of 70% intensity after 54,000 hours of use for color mixing versions and 36,000 hours for Pearl
 - 1) Thermal management shall include multiple temperature sensors within the housing to include:
 - (i) LED array circuit board temperatures
 - (ii) Fixture ambient internal temperature
 - 2) The fixture shall operate in an ambient temperature range of 0°C (32°F) minimum, to 40° C (104°F) maximum ambient temperature.
6. Electrical
- a. The fixture shall be equipped with a 100V to 240V 50/60Hz internal power supply
 - b. The fixture shall support power in and thru operation
 - 1) Power in shall be via Neutrik® powerCON™ input connector
 - 2) Power thru shall be via Neutrik ® powerCON™ output connector
 - 3) Fixture power wiring and accessory power cables shall be rated to support linking of multiple fixtures up to the capacity of a 15A breaker
 - c. The fixture requires power from a non-dim source
 - d. Fixtures shall have droop compensation to prevent thermal shift of color or intensity
 - e. Power supply outputs shall have self-resetting current-limiting protection
 - f. Power supply shall have power factor correction
7. LED Emitters
- a. The fixture shall contain a minimum of four different LED colors to provide color characteristics or two color temperature white LEDs for the Pearl products, as described in the Color Section below
 - b. All LEDs used in the fixture shall be high brightness and proven quality from established and reputable LED manufacturers.
 - 1) Fixture shall utilize Luxeon® Rebel™ LED emitters
 - c. Manufacturer of LED emitters shall utilize an advanced production LED binning process to maintain color consistency.
 - d. LED emitters should be rated for nominal 54,000-hour L70 rating for color mixing versions and 36,000-hour L70 rating for Pearl variant

- e. LED system shall comply with all relevant patents
8. Calibration
- a. Fixture shall be calibrated at factory for achieve consistent color and intensity output between fixtures built at different times and/or from different LED lots or bins
 - 1) Calibration data shall be stored on the control card as a permanent part of on-board operating system
 - 2) All arrays, including replacement arrays shall be calibrated to the same standard to insure consistency
 - 3) Fixtures not offering LED calibration shall not be acceptable
9. Color
- a. The fixture shall utilize an minimum of 60 LED emitters
 - 1) These emitters shall be made up of Red, Green, Blue and Lime for ColorSource
 - 2) These emitters shall be made up of Red, Green, Indigo and Lime for ColorSource Deep Blue
 - 3) These emitters shall be made up of 2700 K and 6500 K for ColorSource Pearl
10. Dimming
- a. The LED system shall use 15-bit nonlinear scaling techniques for high-resolution dimming.
 - b. The fixture shall utilize an Incandescent dimming curve
 - c. Dimming curve shall be optimized for smooth dimming over longer timed fades.
 - d. The LED system shall be digitally driven using high-speed pulse width modulation (PWM)
 - e. LED control shall be compatible with broadcast equipment in the following ways:
 - 1) PWM control of LED levels shall be imperceptible to video cameras and related equipment
 - 2) PWM shall be capable of being set via RDM to 25,000hz
11. Control and User interface
- a. The fixture shall be USITT DMX512-A compatible via In and Thru 5-pin XLR connectors or RJ45 connectors
 - b. The fixture shall be compatible with the ANSI RDM E1.20 standard
 - 1) All fixture functions shall accessible via RDM protocol for modification from suitably equipped control console
 - 2) Temperature sensors within the luminaire shall be viewable in real time via RDM
 - 3) Fixtures not offering RDM compatibility, feature set access or temperature monitoring via RDM shall not be compatible
 - c. The fixture shall be equipped with a 7-segment display
 - d. The fixture shall be equipped with a three-button user-interface
 - e. A variable-rate strobe channel shall be provided
 - f. The fixture shall offer stand-alone functionality eliminating the need for a console

- 1) Fixture shall ship with 12 preset colors or color temperatures accessible as a stand-alone feature
- 2) Fixture shall ship with 5 sequences accessible as a stand-alone feature
- 3) Each color and sequence can be modified by the end user via RDM
- 4) Fixtures can be linked together with standard DMX cables and controlled from designated master fixture
 - (i) Up to 32 fixtures may be linked
- 5) Fixtures in a stand-alone state shall restore to the settings present prior to power cycling, eliminating the need for reprogramming
- 6) Fixtures without stand-alone operation features described above shall not be acceptable.

B. Color mixing Light Emitting Diode Wash fixture

1. General

- a. The fixture shall be a color-mixing high-intensity LED illuminator with DMX control of intensity and color. The fixture shall be a ColorSource Par as manufactured by Electronic Theatre Controls, Inc.
- b. All LED fixtures shall be provided by a single manufacturer to ensure compatibility
- c. The fixture shall be UL 1573 listed for stage and studio use
- d. The fixture shall comply with the USITT DMX-512 A standard

2. Physical

- a. The fixture shall be contained in a rugged all-metal die-cast housing, free of burrs and pits.
- b. The housing shall have a rugged black powdercoat finish
 - 1) White or silver/gray powdercoat finishes shall be available as color options
 - 2) Other powdercoat color options shall be available on request
- c. Power supply, cooling and electronics shall be integral to each unit.
- d. Fixture housing shall provide two easy-access slots for secondary lenses and other accessories
 - 1) Slots shall be equipped with locking retaining clip
- e. The unit shall ship with:
 - 1) Theatrical-style hanging yoke as standard
 - 2) 5' power lead with Edison connector as standard
- f. Available options shall include but not be limited to:
 - 1) Floor stand conversion Kit
 - 2) Bare-end, Stage-Pin or Twist-lock type-equipped power leads
 - 3) PowerCon to PowerCon cables for fixture power linking
 - 4) Multiple secondary lens options to include multiple angles in the following patterns:
 - (i) Linear
 - (ii) Round

- (iii) Oblong
- g. Light output shall be via a round aperture
 - 1) Aperture and accessory slots shall accommodate standard 7.5" accessories such as used in other similar-sized fixtures
 - 2) Accessories available as options shall include but not be limited to:
 - (i) Gel/diffusion frames
 - (ii) Top hats
 - (iii) Barndoors
 - (iv) Egg crate louvers
 - (v) Concentric ring louvers
 - (vi) Multiple secondary lensing options
- 3. Environmental And Agency Compliance
 - a. The fixture shall be UL and cUL LISTED and/or CE rated, and shall be so labeled when delivered to the job site.
 - b. The fixture shall be UL LISTED to the UL1573 standard for stage and studio use
 - c. The fixture shall be rated for IP-20 dry location use.
- 4. Thermal
 - a. The fixture shall be cooled with a variable speed fan.
 - b. The fixture shall utilize advanced thermal management systems to maintain LED life to an average of 70% intensity after 20,000 hours of use
 - 1) Thermal management shall include multiple temperature sensors within the housing to include:
 - (i) The LED array
 - (ii) The control board
 - c. The fixture shall operate in an ambient temperature range of 0°C (32°F) minimum, to 40° C (104°F) maximum ambient temperature.
- 5. Electrical
 - a. The fixture shall be equipped with 100V to 240V 50/60 Hz internal power supply
 - b. The fixture shall support power in and thru operation
 - 1) Power in shall be via Neutrik® PowerCon™ input connector
 - 2) Power thru shall be via Neutrik ® PowerCon™ output connector
 - 3) Fixture power wiring and accessory power cables shall be rated to support linking of multiple fixtures up to the capacity of a 15A breaker
 - c. The fixture requires power from non-dim source
 - d. Power supply outputs shall have self-resetting current limiting protection
 - e. Power supply shall have power factor correction
- 6. LED Emitters
 - a. The fixture shall contain 4 different LED colors to provide color characteristics as described in Section H below.
 - b. All LEDs used in the fixture shall be high brightness and proven quality from established and reputable LED manufacturers.

- 1) Fixture shall utilize Luxeon® Z™ LED emitters
 - c. Manufacturer of LED emitters shall utilize an advanced production LED binning process to maintain color consistency.
 - d. LED emitters should be rated for nominal 20,000 hour LED life to 70% intensity
 - e. All LED fixtures (100% of each lot) shall undergo a minimum three-hour burn-in test during manufacturing.
 - f. LED system shall comply with all relevant patents
7. Calibration
- a. Fixture shall be calibrated at factory for achieve consistent color between fixtures built at different times and/or from different LED lots or bins
 - 1) Calibration data shall be stored in the fixture as a permanent part of on-board operating system
 - 2) All arrays, including replacement arrays shall be calibrated to the same standard to insure consistency
 - 3) Fixtures not offering LED calibration shall not be acceptable
8. Color
- a. The fixture shall utilize an minimum of 40 LED emitters
 - 1) These emitters shall be made up of Red, Green, Blue and Lime for ColorSource
 - 2) These emitters shall be made up of Red, Green, Indigo and Lime for ColorSource Deep Blue
9. Dimming
- a. The LED system shall use 15-bit nonlinear scaling techniques for high-resolution dimming.
 - b. The dimming curve shall be optimized for smooth dimming over longer timed fades.
 - c. The LED system shall be digitally driven using high-speed pulse width modulation (PWM)
 - d. LED control shall be compatible with broadcast equipment in the following ways:
 - 1) PWM control of LED levels shall be imperceptible to video cameras and related equipment
 - 2) PWM rates shall be adjustable by the user via RDM to avoid any visible interference to video cameras and related equipment
10. Control And User Interface
- a. The fixture shall be USITT DMX 512A-compatible via In and Thru 5-pin XLR connectors
 - b. The fixture shall be compatible with the ANSI RDM E1.20 standard
 - 1) All fixture functions shall accessible via RDM protocol for modification from suitably equipped control console
 - 2) Temperature sensors within the luminaire shall be viewable in real time via RDM
 - 3) Fixtures not offering RDM compatibility, feature set access or temperature monitoring via RDM shall not be compatible

- c. The fixture shall be equipped with a 7-segment display for easy-to-read status and control
- d. The fixture shall be equipped with a three-button user-interface
- e. The fixture shall offer RGB control
- f. The fixture shall operate in Regulated mode for droop compensation
- g. The fixture shall offer stand-alone functionality eliminating the need for a console
 - 1) Fixture shall ship with 12 preset colors accessible as a stand-alone feature
 - 2) Fixture shall ship with 5 Sequences accessible as a stand-alone feature
 - 3) Each color and sequence can be modified by the end user
 - 4) Fixtures can be linked together with standard DMX cables and controlled from designated master fixture
 - (i) Up to 32 fixtures may be linked
 - 5) Fixtures in a stand-alone state shall restore to the settings present prior to power cycling, eliminating the need for reprogramming
 - 6) Fixtures without stand-alone operation features described in a, b, c, d, and e shall not be acceptable.

C. White-light Light Emitting Diode Retrofit for the Source Four fixture

1. General

- a. The fixture shall be a white-light high-intensity LED illuminator with DMX control of intensity. The fixture shall also be able to be dimmed via a line-dimmed source. The fixture shall be a Source 4WRD LED as manufactured by Electronics Theatre Controls, Inc. or approved equal.
- b. All LED fixtures shall be provided by a single manufacturer to ensure compatibility
- c. The fixture shall be UL 1573 (full fixture) or UL 1598C (retrofit kit) listed.
- d. The fixture shall comply with the USITT DMX-512A standard
- e. The fixture shall carry a 3-year warranty

2. Physical

- a. The unit shall be constructed of rugged, die cast aluminum, free of burrs and pits, finished in black.
- b. The following shall be provided:
 - 1) Shutter assembly shall allow for +/-25° rotation*
 - 2) 20 gauge stainless steel shutters*
 - 3) Interchangeable lens tubes for different field angles with Teflon guides for smooth tube movement*
 - 4) Sturdy integral die cast gel frame holders with two accessory slots, and a top-mounted, quick release gel frame retainer*
 - 5) Rugged steel yoke with two mounting positions allowing 300°+ rotation of the fixture within the yoke*
 - 6) Positive locking, hand operated yoke clutch*
 - 7) Slot with sliding cover for motorized pattern devices or optional iris*

- c. The housing shall have a rugged black powder coat finish
 - 1) White or silver/gray powder coat finishes shall be available as color options
 - 2) Other powder coat color options shall be available on request
 - d. Power supply, cooling and electronics shall be integral to each unit.
 - e. The retrofit shall utilize all existing components of the Source Four except for the HPL burner assembly
 - f. The unit shall ship with:
 - 1) Theatrical-style hanging yoke as standard*
 - 2) Bare end power cable (1m) attached with option for choice of connector
 - (i) Edison
 - (ii) Stage pin
 - (iii) Twist
 - 3) A-size pattern holder*
3. Optical
- a. The unit shall provide, but not be limited to:
 - 1) Molded borosilicate reflector with multiple dichroic layers*
 - 2) Low gate and beam temperature
 - 3) Sharp imaging through a three-plane shutter design*
 - b. The unit shall provide, but not be limited to:
 - 1) 5, 10, 14, 19, 26, 36, 50, 70 and 90 degree field angles*
 - 2) High-quality pattern imaging*
 - 3) Sharp shutter cuts without halation*
 - 4) Shutter warping and burnout in normal use shall be unacceptable*
 - 5) Adjustable hard and soft beam edges*
 - c. 19, 26, 36, and 50 degree units shall have optional lens tubes available for precision, high-contrast imaging.*
 - d. The fixture shall allow for tool-free field adjustment (z-knob adjustment)
 - * These items refer to the full fixture assembly
4. Environmental and Agency Compliance
- a. The fixture shall be ETL and cETL LISTED, and shall be so labeled when delivered to the job site.
 - b. The fixture shall be UL LISTED to the UL1573 or UL 1598C standard.
 - c. The fixture shall be rated for IP-20 dry location use.
5. Thermal
- a. Fixture shall be equipped with a cooling fan.
 - b. The fixture shall utilize advanced thermal management systems to maintain LED life to an average of 70% intensity after an estimated 60,000+ hours of use
 - 1) Thermal management shall include a temperature sensor within the housing.
 - c. The fixture shall operate in an ambient temperature range of 5°C (41°F) minimum, to 50C (122F) maximum ambient temperature.

- 6. Electrical
 - a. The fixture shall be equipped with a 114V to 125V 60Hz internal power supply
 - b. The fixture shall be dimmable via a line-dimmed source
 - c. The fixture shall be dimmable via DMX-512
- 7. LED Emitters
 - a. All LEDs used in the fixture shall be high brightness and proven quality from established and reputable LED manufacturers.
 - 1) Fixture shall utilize CREE LED emitters
 - b. Manufacturer of LED emitters shall utilize an advanced production LED binning process to maintain color consistency.
 - c. LED emitters should be rated for an estimated nominal 60,000-hour LED life to 70% intensity
 - d. All LED fixtures (100% of each lot) shall undergo a minimum three-hour burn-in test during manufacturing.
 - e. LED system shall comply with all relevant patents
- 8. Color
 - a. The fixture shall be available in the following varieties:
 - 1) 3000K (80+ CRI)
 - 2) 3000K Gallery (90+ CRI)
 - 3) 5300K Daylight Gallery (90+ CRI)
- 9. Dimming
 - a. The LED system shall be dimmable via DMX or a line-dimmed source
- 10. Control and User interface
 - a. The fixture shall be USITT DMX 512A-compatible via In and Thru RJ-45 connectors
 - b. The fixture shall be compatible with the ANSI RDM E1.20 standard
 - 1) All fixture functions shall accessible via RDM protocol for modification from suitably equipped control console
 - 2) Fixtures not offering RDM compatibility shall not be compatible
 - c. The fixture shall be equipped with a two-button user-interface
 - d. The fixture shall be equipped with a 7-segment display

3. BILL OF MATERIALS

3.1 LIGHTING SYSTEM:

1	DRd6-12-120	7183A1005	100-120V 6 module Rack Enclosure
1	DRd-FLO	7183A1069	DRd 0-10V Control Option Kit
6	R20	7083A1085	Dual 2.4KW Relay Module
1	P-ACP	7180A1029	Paradigm Architectural Control Processor
1	P-SPM	7182A1001	Paradigm Station Power Module
1	P-DRd-TK	7180A1007	Paradigm DRd Termination Kit
2	P-TS7-1	7184A1501-1	Paradigm 7" Wall-mount Touchscreen -Cream
2	UH10005-11	7181A2203-1A	Cream 1-gang faceplate assembly to accept the following: 4 - Preset X Select Switch 1 - Off Select Switch

2	UH10005	7181B2006	1-gang, 5-button electronics assembly
2	P-LCD-FBB	7184A1502	Paradigm Flush-mount Touchscreen Backbox
1	ERP-24R1-24B1	7123A1012	Echo Relay Panel, 120/208, 3-phase 24 Single Pole Relays, No Door
1	ERP-FMD	7123A1702	Echo Relay Panel, 120V Flush-mount Metal Door
1	ERP MCB 3P 200A 10kA	7123K1004	Echo Relay Panel, 120/208, 200A MCB, 10K SCCR
1	CSR-T	4410A1000	ColorSource Relay Wireless Transmitter
4	CSR-W	4410A1010	ColorSource Relay Wireless Receiver
4	CSR-PMT	4410K1001	ColorSource Relay Pipe-mount Kit

3.2 FRONT OF HOUSE LED FIXTURE PACKAGE:

18	CSSPOTS-0	7413A1001	ColorSource Spot Fixture with shutter barrel, Black
4	419EDLT	7060A2046	19-deg EDLT Lens tube with lens installed
10	426EDLT	7060A2047	26-deg EDLT Lens tube with lens installed
4	LED50LT	7460A2008	50-deg S4LED Specific Lens Tube (mounted to Pipe ends)

3.3 OVER STAGE LED FIXTURE PACKAGE:

18	CSPAR	7412A1005	ColorSource PAR, Black
18	SELRM-7.5	7410K1012	D40 Medium Round Diffuser in Frame
18	-C	7099A1051	c-clamp kit (one pair)

3.1 RETROFIT LAMPS FOR EXISTING FIXTURES:

8	S4WRD-B	7067A1100-B	S4WRD Retrofit, 120V, Stage Pin, black
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3.2 REQUIRED ACCESSORIES:

36	DPA-B	7410B7037-B	Desire PowerCon to Stage Pin
44	CD25-DMX	1085A1002	25ft.DMX Control Cable
36	400SC	7060A1022	Safety Cable (32-inch)
4	EDTRDMXT	7066A1030	DMX Terminator , Black

3.1 ADDITIONAL ACCESSORIES TO BE PROVIDED:

LOT - Stagepin Extension Cables/2fers			
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3.2 NOTE: *ALL FIXTURES TO BE PROVIDED COMPLETE WITH SAFETY CABLE, C-CLAMP, COLOR FRAME, GROUNDED STAGE PIN CONNECTOR, LAMP, LENSES, DMX, POWER CABLES AND EXTENSION CABLES AS NEEDED.

4. INSTALLATION

4.1 GENERAL

- A. Verify that job conditions are ready to receive work of this section. Notify Architect of any existing condition, which will adversely affect execution. Beginning of execution will constitute acceptance of existing conditions.
- B. Verify that field measurements are as shown on shop drawings.
- C. Verify that mechanical, electrical, and other items affecting work of this section are in place and ready to receive the work.

4.2 INSTALLATION

- A. Install using skilled workmen in accordance with manufacturer's printed instructions and recommendations.
- B. Install work in accordance highest industry standards. Handle materials to avoid dents and other damages.
- C. Set and secure materials and components rigid, plumb, and square.

4.3 WARRANTY

- A. Theatrical installer to provided 2 annual service inspections of the rigging equipment.
- B. Warranty on all theatrical equipment is to begin upon substantial completion of construction or upon commissioning of the dimming system.