PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. AV Drawings

1.2 REFERENCES
   A. National Fire Protection Association (NFPA).
   B. National Electrical Code (NEC).
   C. American National Safety Institute (ANSI).
   D. Telecommunications Industry Association (TIA)

1.3 RESPONSIBILITY AND RELATED WORK
   A. The written specification and drawings AV0.00 through AV7.03 shall be collectively referred to herein as the Contract Documents.
   B. Contractor shall provide, based on the Contract Documents, a complete, turnkey system, tested and ready for acceptance testing. The Contract Documents are developed to the extent required to properly convey design intent, signal flow, and system infrastructure. It is understood by the contractor that they are to supply additional equipment, as required, in order to provide a complete and working system.
   C. System features or devices which are mentioned in one part of the Contract Documents may not be shown in the other. In case of conflict between the written specifications and the drawings, Contractor must seek clarification from the Consultant. In the event that the Contractor fails to obtain such clarification, the interpretation of the Consultant will prevail.
   D. Contractor shall obtain all licenses and permits necessary for the execution of any work pertaining to the installation within this scope of work.
   E. Refer to AV0.00 for division of responsibilities related to the sound reinforcement system.

1.4 DEFINITION OF TERMS & ABBREVIATIONS:
   A. Provide: to supply and install.
   B. Furnish: to supply to another contractor for installation.
   C. Supply: to supply but not install.
   D. Install: to install but not supply.
   E. OFE: Owner furnished (supplied) equipment. Equipment will be provided to contractor for installation.

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F. NIC: Not In Contract. Refers to items that are not included in the scope of work outlined in this section but may be shown for coordination purposes or reference.

G. Future: Equipment that will be provided by owner at a later date. Accommodations shall be provided for future equipment as shown on the drawings.

1.5 SYSTEM DESCRIPTIONS

A. Sound Reinforcement System.
   1. Speaker systems will consist of the following:
      a. Left right speaker arrays located above the front of the stage. Each of these multi-way clusters will provide sound coverage to the seating areas.
      b. Front fill speakers mounted on the front lip of the stage. These speakers will provide sound coverage to the very front rows of seating. Audio signals to these speakers will be delayed with reference to the left /right arrays.
      c. Sub-bass speaker cabinets will be flown in the center above the front lip of the stage and as portable speakers located on each side of the stage. These speakers will provide sound reinforcement of sub-bass frequencies to the seating areas.
      d. Delay speakers will be utilized to cover seating areas under the balcony. These will be delayed with reference to the left and right arrays.
      e. Portable stage monitor speakers and amplifiers will be provided to support guest events.
      f. Overhead stage fill speakers will be mounted on an upstage and downstage batten to provide a general stage wash for dance and similar events.
   2. Microphone and Line Level inputs to the systems will be routed between the control booth, SR racks, and in house control booth location. Various intercom and tie lines will also interconnect to other support spaces within the complex. Paging to the support systems will be provided. Portable cabling will be used to extend between stage inputs and the SR equipment rack for connectivity by house and guest systems.
   3. All amplifiers and related equipment for the reinforcement system will be located in the equipment racks housed in the SR equipment racks.

B. Control Booth.
   1. A temporary control booth location will be located on the main floor in addition to the existing control room at the back of the under balcony. User-operated equipment, including the mixing console, patch panels and outboard processing equipment will be mounted in custom mixing cart which can easily moved to either mix location.

C. Stage Monitoring Systems.
   1. The system will provide remote amplified monitor mixes fed from the FOH mixing console. Accommodations will be provided for digital interconnect to a guest or rental monitor console via MADI and Dante.

D. Assistive Listening System.
   1. An existing OFE wireless transmission system with receivers is available for the hard of hearing.

E. Intercom System.
1. Wired and Wireless intercom system which will provide new equipment and stations at operator positions. Wireless system antennas will be placed in accordance with manufacturer recommendations and will provide appropriate coverage to stage, back of house and front of house areas.

F. Digital mixing console system

1. A digital mixing console system will be integrated into Texas Hall. The primary stage microphone and line input device will be installed in the audio racks on Stage right. OFE portable cabling will be used to connect to this device. Outputs to the sound systems and monitor amplifiers will also originate from this device. The mixing console control surface with local inputs and outputs will be portable and configured for use in both the control room and in house mix position. Interconnecting cables between console, front of house rack, and permanent infrastructure should be ruggedized, clearly labeled with colors markings easily readable in low light conditions, and loomed together for quick connect and disconnect. The mixing console will be supplemented with external playback, multitrack recording and playback, external effects processing, OFE control computers, outboard fx processing system, and monitors. Remote mixing via a tablet interface and associated local isolated wireless network access points will be included.

G. Wireless microphone system

1. A wireless microphone system will be integrated into Texas Hall. Receivers will be installed in stage right audio racks. Antennas will be installed on stage right column above existing infrastructure and equipment. The wireless microphone system shall use digital transmission coordinated within the 400 MHz to 600MHz frequency range, include Dante audio outputs, and remote monitoring via PC, Mac, and iOS devices. Receivers and associated microphones and accessories will be stored in provided, locking drawers.

H. Associated electrical work for cabling, pathways, and electrical service for equipment.

I. Holes, paint, and trim rings for ceiling to accommodate new systems and temporary rigging points.

J. Structural augmentation and miscellaneous steel necessary to support new systems.

K. Demolition and removal of existing sound system equipment replaced in this renovation. Document serial numbers, palletize, shrink wrap, and place in Owner’s designated storage location(s). Coordinate with Owner.

L. Lobby announcement and playback system to utilize OFE loudspeakers in lobby and outdoor area. System will include control station in front ticket office area with announcement microphone and portable media player input.

1.6 PRE-BID SUBMITTALS

A. Bid Clarifications. Contractor is responsible for reading and understanding all information presented in these specifications and related documents outlined in Section 1.1. Discrepancies between drawings and specifications or other errors or omissions should be brought to the Consultant’s attention a minimum of 5 days prior to bid date. Failure to do so does not relieve the contractor from the requirement to provide a fully operational and turnkey system as outlined in Section 1.3 above. In this event, the Contractor agrees to abide by the decision of the Consultant for resolution.

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B. Contractor Qualifications. Contractors will be considered by the Owner and Consultant upon receipt of qualifications as outlined in Bid Submittals section below.

1.7 BID SUBMITTALS

A. Submit according to conditions of the Construction Contract and Project Manual.

B. Bidders that have not been pre-qualified shall submit the following information:
   1. Company profile including history, number of employees, facility size and completed projects.
   2. Installer shall have previously installed at least three jobs of similar magnitude, completed within the last five years. A resume shall be provided for these projects including project name, scope of services, year completed, and contact information for a reference. Provide at least one such completed job for inspection by the Owner and/or consultant.
   3. Installer shall have five years of experience with equipment and systems of the types specified, shall maintain a fully staffed and equipped service facility, and shall be a franchised dealer and authorized service facility for the major brands specified, and shall be properly licensed to work in Arlington, Texas.
   4. Resume of key personnel to be used on this project, including but not limited to: Project Manager; Lead Engineer; Job-Site Superintendent.
   5. A sample set of shop drawings or as-built documents that confirm the Contractor’s capabilities to provide engineering and documentation for the project.
   6. A line sheet listing all manufacturers the Contractor is a dealer and/or authorized service center for.
   7. A description of the Contractor’s abilities for in-shop assembly, fabrication and testing.

C. The Bidder shall disclose in the bid whether any portions of the project work will be subcontracted out. All terms of this contract, including bidding and qualification statements, shall apply to the subcontractor. Provide the following information for each subcontractor to be used:
   1. Name of the proposed subcontractor.
   2. A statement of qualifications for each subcontractor.
   3. A scope of work outlining what portions of the project for which the subcontractor will be responsible.

D. Include the following information with the bid submittal:
   1. The total contract price.
   2. The total price for any add or deduct alternates.
   3. The price for contractor tests and adjustments as outlined in Section 3.2.
   4. An itemized equipment list.
   5. Unit pricing for all equipment listed above.
   6. A breakdown of the number of labor hours for each of the following:
      a. Engineering and documentation.
      b. On site coordination meetings and supervision.
      c. In shop fabrication and assembly.
      d. On site fabrication, assembly, and installation.
e. On site verification and testing.

E. Substitutions. Contractor shall note all substitutions at the time of bid. Comply with General Conditions. Any proposed substitutions must meet all specifications of the specified equipment. No product substitution will be accepted without the written approval of the Consultant or Owner. Consultant and owner retain the right to reject any proposed substitution.

F. Contractor to obtain all licenses and permits necessary for the execution of any work pertaining to the installation, or any operation by the Owner.

1.8 PROJECT SUBMITTALS

A. Submit according to conditions of the Construction Contract and Project Manual.

B. Each submittal shall be as a coordinated package complete with all required information. Uncoordinated sets will be returned without review.

C. Product Data: Submit within 15 days of contract award. Submit manufacturer's product data sheets for each item of equipment that will be provided as part of this contract. Submit electronically as a single PDF. All equipment cut sheets will be arranged per specification section number. Provide a table of contents and a bookmark at the start of every product sheet.

D. Cable and Connector Submittal. Submit sample cables with connections and wire labels. Cable samples should be no greater than 24” in length. Submit 2 cable/connector assemblies for each type of cable used on the project. Cable jacket ID lettering must be included on sample cable.

E. Speaker and Speaker Mount Colors. Submit according to conditions of the Construction Contract and Project Manual.

F. Millwork Colors and Samples. Submit according to conditions of the Construction Contract and Project Manual

G. Shop Drawings
   1. Submit within 30 days of contract award
      a. Failure to submit shop drawings with ample time for evaluation shall not entitle the contractor to an extension of contract time.
      b. There will be no work authorized on site without the prior submittal and subsequent approval of a complete set of shop drawings. Any exceptions to this must be in writing and approved by the Consultant.
      c. Review of shop drawings is for general conformance with the design intent and general compliance with the contract documents of the project. Corrections, comments or markings made do not relieve the Contractor from compliance with the Contract Documents nor allow departure therefrom. Contractor remains responsible for detailing and accuracy, confirming and correlating quantities and dimensions, selecting fabrication processing and techniques of construction, coordinating work with that of other trades, and performing work in a safe a satisfactory manner.
   2. Submit as a multi-sheet searchable PDF document with:
      a. 42” x 30” sheets
      b. Table of Contents
      c. Bookmarks for every sheet with Sheet Name and Number

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3. Drawings shall be a standalone package containing all information required for system installation. The package shall include:
   a. A legend of all symbols and abbreviations used in the drawing package
   b. Plan View Drawings showing:
      1) Locations of all equipment and devices
      2) Locations of junction boxes, with associated conduits and cable fill
      3) Coordinated layouts of:
         a) Equipment Rooms
         b) Control Booths
   c. Section and Elevation Drawings including but not limited to:
      1) Speakers
   d. Equipment Rack Elevations including:
      1) Location of all equipment within the rack
      2) Heat loads for each equipment rack and calculations showing how numbers were derived
   e. Custom Furniture and Millwork Details
      1) Show all dimensions and finishes for custom furniture and Millwork including equipment locations and mounting methods.
   f. AC Power Requirements
      1) For each equipment rack show:
         a) Power requirements and calculations showing how numbers were derived
         b) Power distribution details within each rack
   g. Speaker Orientation and Rigging Detail Drawings
      1) Details will be submitted with licensed engineer stamp licensed in the state in which the project resides.
      2) Drawings will include:
         a) Structural attachment details
         b) Welding calculations
         c) Types of hardware to be used
         d) Speaker aiming angles
      3) Provide structural calculations along with the stamped drawings for supplemental steel, rigging details, and attachment methods.
   h. Wiring Schematics
      1) Complete and detailed wiring schematic for all systems including:
         a) Cable types
         b) Identification by number and color codes
         c) Detailed wiring of connections to equipment and between equipment racks
   i. Schematic drawings of any custom circuitry or equipment modifications, including connector pin-outs and component lists.
   j. Schedules showing:
      1) Cable Types
         a) Type Identifier matching Contract Documents
         b) Manufacturer
         c) Part Number
d) Signal Group 

e) Nominal Outside Diameter 

2) Junction Boxes 

a) Box Name 

b) Drawing Reference 

c) Location 

d) Dimensions 

e) Mounting Height 

3) Pull Schedule 

a) Pull Length 

b) Source and Destination 

c) Wire Number 

4) Custom Color and Finishes for: 

a) Speakers 

b) Custom Panels 

c) Exposed Cabling 

d) Custom Cabling 

k. Conduit riser diagram showing interconnect of all systems 

l. Terminal strip layouts for all terminal strips to be used in junction boxes or equipment racks 

m. Connector wiring details including connector model numbers 

n. Network schematic showing: 

1) Logical Connections of all devices 

2) IP address scheme 

3) VLAN Scheme 

o. Custom Panel Details including: 

1) Materials 

2) Finishes 

3) Dimensions 

4) Connector Layout 

5) Connector Labeling 

p. Audio, Video and Data patch bay layouts and labeling scheme 

q. Mounting and orientation details for: 

1) Flat Panel Displays 

2) Surface Mount Speakers 

3) Wireless antenna 

H. Custom Software Programming including Graphical Interface. Provide for approval at least 1 weeks prior to system commissioning electronic copies of all custom software. It is the Contractor’s responsibility for all custom software programming for the audio systems. Coordination with the Consultant is required for the development of this software.
I. Wireless frequency analysis. It is the responsibility of the contractor to coordinate all wireless frequencies. The contractor shall perform a spectral sweep from 140 MHz through 3 GHz in the facility and then present a written report of proposed new frequencies. The Sound Contractor must arrange and perform this sweep at a time of day that reflects the time of performance/service. The contractor should also include in the report additional frequencies for future expansion. The Contractor will incorporate any existing and other new frequencies in the determination of the new frequencies to be used, including but not limited to wireless intercom, wireless cameras and wireless radios.

J. Final Inspection Notification Report - Two copies of a computer-generated checkout report for the entire system will be prepared and submitted 1 weeks prior to system commissioning. It will include:
   1. A complete listing of every piece of equipment including serial number, the date it was tested and by whom, the results and (if failure occurred during any previous tests) the date retested
   2. The final report will indicate that every device tested successfully.
   3. A performance test report indicating that the system meets all of the Contractor testing requirements in Section 3.2.

1.9 CONTRACT CLOSEOUT SUBMITTALS

A. Submit according to conditions of the Construction Contract and Project Manual.

B. Submit all contract closeout documentation within 30 days after substantial completion, unless otherwise noted.

C. Contractor shall work off of approved shop drawings only. Note changes made during installation on a single set of drawings. This set of marked up drawings will not leave the jobsite until after the final system commissioning. Submit 4 corrected sets of reproducible drawings showing work as installed. All “as-built” drawings to be provided both in electronic form (ACAD 2010 or later) and in hard copy (same size as design drawings).

D. Contractor to provide a Project Manual prior to acceptance testing. Provide a minimum of 1 hard copy and one electronic copy. This manual shall contain the following information:
   1. Table of Contents.
   2. Contractor’s contact information for warranty and/or service.
   3. A complete list of equipment, both installed and loose gear. Include manufacturer, model number, and serial number for all devices. Include settings (software or hardware) for any devices that required modification or adjustment during the acceptance testing.
   4. Operating manuals for each device.
   5. Documentation of all testing results as outlined in Section 3.2.
   6. Wireless microphone frequency coordination report
   7. A USB Drive containing all As-Built drawings in PDF & DWG format.
   8. Replacement parts lists of major items of equipment.
   9. Provide a suggested schedule of routine maintenance. Schedule should include dates of replacement of all batteries, cleaning of air filters and procedures for checking speaker components.
10. Create a quick start guide to provide information specific to the system, such as procedures for system power on/off, patching, different modes of operation etc.
   a. The guide should convey information specific to the installed system. It is not intended to be a guide on generic sound system operation.
   b. Anticipated length of the guide is less than 2 pages front and back.

E. Software Licensing and Manuals. Provide on a USB Drive to the client:

F. Provide a copy of all software installed on computers or equipment in the system, including all device configuration files on a USB Disk.

G. Produce compact system flow diagrams showing all components, cables, and wire numbers that will be mounted on the wall of each equipment room(s). Provide photographically reproducible as-built wiring diagrams at a reduced scale that are easy to handle and fully legible.

H. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, Contractor will certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB).

I. Provide a complete list of spares inventory to include quantity, manufacturer, model number, and serial number.

1.10 CODE COMPLIANCE

A. All work and materials shall comply with all applicable codes and regulations to meet or exceed Federal, State, City, and Local Building Codes and Regulations. Advise the Owner if anything in the Plans or Specifications is out of compliance with codes and/or laws prior to bidding.

1.11 PROJECT CONDITIONS

A. Verify conditions on the job site applicable to this work. Notify the General Contractor in writing of discrepancies, conflicts, or omissions promptly upon discovery.

B. The drawings diagrammatically show cabling, conduit, wiring, and arrangements of equipment fitting the space available without interference. If conditions exist which make it impossible to install work as shown, recommend solutions and/or submit drawings to the Consultant for approval, showing how the work may be installed.

1.12 WARRANTY

A. Installer shall warrant equipment to be free of defects in materials and workmanship for not less than one year after date of Substantial Completion. Defects occurring in labor or materials within one-year warranty shall be rectified by replacement or repair. Owner furnished equipment is excluded from the warranty, but terminations and wire leading to or from owner furnished equipment is included. Within the warranty period, provide answer to service calls and requests for information within a 48-hour period, and repair or replace any faulty item within a 72-hour period without charge, including parts and labor.

B. This warranty shall not void specific warranties issued by manufacturers for greater periods of time. Nor shall it void any rights guaranteed to the Owner by law.
C. Contractor to provide Owner with exact beginning and ending dates of the warranty period. Include the name of the person to call for service and telephone number. This information to be part of Project Record Drawings.

D. Contractor to provide a final site visit and verification that the system is operational and all items are functioning correctly at the end of the warranty period. The contractor shall not be responsible for correcting items that have obviously been changed by the owner or end user.

PART 2 - PRODUCTS

2.1 UNAUTHORIZED MATERIALS

A. Materials and products required for work of this section shall not contain asbestos, polychlorinated biphenyls (PCB) or other hazardous materials identified by the General Contractor or Owner.

B. All devices shall have applicable approvals from a Nationally Recognized Testing Laboratory and meet all applicable local codes and requirements. Should any equipment lack proper approval the Contractor will arrange for onsite inspections and certification at no additional expense to the Owner.

2.2 ACCEPTABLE MANUFACTURERS

A. Model numbers and manufacturers included in this specification are listed as a standard of quality.

B. Consultant will consider other qualified manufacturers subject to review. Submit according to conditions of the Construction Contract and Project Manual.

1. Proposed substitutions must meet all specifications of the specified equipment. The Contractor will supply complete technical data specifications at the time of proposed substitution.

2. The Contractor will arrange for product demo at the request of the Consultant or Owner Representative and will pay ground freight shipping to and from site, or to and from Consultant's office.

3. No product substitution will be accepted without the written approval of the Consultant and Owner. The Owner, General Contractor, and the Consultant reserve the right to accept or refuse any substitution without condition.

4. Upon acceptance of a substitution, Contractor assumes all responsibility for verification and coordination of all heat, power, rack space and architectural requirements.

C. If product is discontinued and/or no longer publicly advertised as a part of a manufacturer's current product line-up at time of installation, the project team reserves the right to request a substitution of product for new and currently offered product of like function fulfilling the design intent. Substitution value will be based on fair market value of original product at time of bid.

2.3 GENERAL

A. Equipment and materials shall be new, meet the latest published specifications of that product, and conform to applicable regulatory provisions. Take care during installation to prevent scratches, dents, chips, etc.
B. Install rack mounted equipment with black 10-32 button head machine screws.

C. Provide security covers on non-user operated equipment having front panel controls. Install covers at the conclusion of Acceptance Testing.

D. Provide engraved lamicoid labels at the front and rear of signal processing equipment mounted in racks. Mount labels on the equipment and attach in a neat, plumb, and permanent manner. Embossed labels will not be accepted. Only provide engraved labels at the rear of equipment mounted in furniture consoles.

E. Delivery, Storage and Handling.
   1. All products and materials to be handled and shipped in accordance with manufacturer's recommendation.
   2. Provide protective covering on equipment and furniture during construction to prevent damage or entrance of foreign matter.
   3. Replace at no expense to Owner, product damaged during delivery, storage, handling or construction.

2.4 MAIN LOUDSPEAKER SYSTEM

A. See Appendix A for equipment list

B. Rackmount UPS Backup.
   1. UPS must have contact closure for remote shut down of load circuits.
   2. UPS to have a minimum 10 min run time under load.
   3. Use fanless or silent operation UPS in noise control booths and control rooms.
   4. UPS must be uninterruptible and produce a pure sine wave output.
   5. Do not install power strips with surge suppressors between UPS and equipment.
   6. Power UPS, Consoles, and Switches from UPS.
      a. Middle Atlantic or APC (Quantity:3)

C. Data and Audio Transport Switches.
   1. Contractor to configure switches, set up trunking, spanning tree, and VLANS as required and noted. A minimum of 4 VLANS are anticipated, (control, Dante Primary, Dante Secondary, and Soundgrid)
   2. Configure network using Manufacturers guidelines and best networking practices. Confirm audio transport is free of audible glitches, dropouts and errors for a minimum of 48 hours after network and equipment configuration is completed while technical systems are operational. Verification can be based on event logs, network monitoring tools, inspection of network audio recording waveforms. Note that system may have multiple separated audio networks which all require test and verification.
   3. All network capable equipment shall be connected to the AV LAN, including but not limited to Amplifiers, DSP equipped speakers, intercom, wireless microphones and DSP.
   4. Configure wireless access point for secure access and control of mixing console and other audio equipment.
   5. Provide a manufacturer led training session on switch hardware, software configurator, basic maintenance and monitoring, directed toward a facility operator.
D. Computers
   1. Owner will provide computers, keyboards, mice, and monitors designated within the documents through educational institutional purchasing avenues. Integrator will install hardware, configure computers, install software, and complete integration of equipment into systems.
   2. OFE computer hardware is anticipated to be new equipment purchased for this renovation.
   3. Integrator to coordinate delivery schedule and computer hardware performance specifications with Owner. Allow Owner ample time for procurement.

E. Power Amplifiers
   1. Each amplifier to have an engraved laminoid strip, on the front and rear, stating amplifier number and which speakers it is feeding.
   2. Utilize DSP system to control power state of the amplifiers via IP or contact closure commands.

F. Loudspeaker systems.
   1. Provide manufacturer led calibration and system test and verification. This is primarily to confirm and verify equipment is installed, configured, and operating to manufacturer's expectations and in advance of commissioning and system optimization.
   2. Provide a training session for the loudspeakers, amplifiers, and associated software platform, directed toward a facility operator with a permanently installed system.

G. Main Line Array.
   2. Adjustment: Rigging to allow for +/- 10 deg of horizontal and vertical adjustment for the entire array. Allow for changes to the splay of each cabinet on site during acceptance testing. Contractor should anticipate as a part of the commission process that speaker aiming will be optimized, including inter-array splay angles.
   3. Each array shall have a manual winch system for maintenance use.

H. Flown Subwoofer Loudspeaker.
   2. Flown subwoofer array shall have a manual winch system for maintenance use.

I. Provide a support structure for speaker systems sized to safely handle the system weight. Structure to be aluminum or steel, treated to prevent corrosion. Retain the services of a registered professional structural engineer, licensed to practice in Arlington, Texas to oversee and certify the design, development, fabrication and installation of structure.
   1. Rigging to allow for adjustments as called out with each individual loudspeaker.
      a. APE Rigging
      b. Allen Products
      c. ATM Flyware
      d. Polar Focus
      e. Production Rigging and Resources
      f. Atlanta Rigging Systems
      g. L-Acoustics
h. D&B Audio
i. Mountain Productions
j. CM hoists

J. FM transmitter with headset receivers for Assistive Listening System.
   1. Install transmitter and antenna system in accordance with manufacturer’s recommendations.
   2. Transmitter
      1) OFE
   3. Receivers
      a. OFE

2.5 MAIN AUDIO CONTROL BOOTH

A. Audio Equipment Racks.
      a. See Drawings

B. Power/Light Strip.
   1. Mount at the top of each rack.
   2. Do not feed power strip from UPS outputs.

C. Digital Mixing Console
   a. Provide with cover and little lites.
   b. Provide 2 manufacturer led training sessions for mixing console system. One session should focus on basic mix operation. Technical operation, configuration, and troubleshooting of the console system and the other on advanced mixing and control surface operation.
   c. Provide with external FX processing engine and assortment of plugins.
   d. Provide manufacturer led training for FX package operation and use within the console mixing environment.

2.6 WIRELESS MICROPHONE SYSTEM

A. Wireless Microphone Receiver.
   1. Ensure all components necessary for a complete system are included.

B. Remote Antenna System
   1. Ensure all cabling required for a remote antenna location on stage are included.
   2. Contractor shall perform calculations to determine cable and connector loss based on install conditions. Include this report with shop drawing submittals.

2.7 AUDIO MIXING CONSOLE CART

A. Equipment furniture color and work surfaces to be coordinated with Owner.

B. Verify exact rack space requirements for accommodation of all new equipment, and provision of a service lamp in the top of each equipment rack.
C. Cart must be designed for easy mobility and maneuverability within Texas Hall. This includes negotiating ramps, narrow halls, uneven flooring, and existing doorways.

D. Cart must have custom, captive cable loom for connecting to production dry lines and AC power at both designated mixing locations.

E. Contractor to coordinate with owner to choose work surface color option.

F. Contractor to coordinate audio control surface integration into work surface. Contractor shall supply manufacturer with exact dimensions of each piece mounted in work surface.
   1. Audio Mixing Console Cart:
      a. R&R cases
      b. Forecast Consoles
      c. Sound Construction and Supply
   2. Finishes
      a. Above Countertop Equipment Turrets and Lower Front and Rear Doors to be Black Polyethylene, All Non-Exposed Surfaces to be Black. Countertop to Be Laminated (Choice of Standard Laminates) w/ Heavy Duty Bullnose T-Molding.
   3. Accessories
      a. Monitor mount system integrated into console cart
      b. Middle Atlantic Modular Power Raceway System Power Strips with 20 Amp Grounded Duplex Outlet modules OR as incorporated by console manufacturer.

2.8 CUSTOM PANELS

A. Panels to be fabricated by Contractor, engraved and loaded with connectors with information shown on Drawings.

B. Unless otherwise specified, all wall and ceiling panels shall be 1/8 inch thick, anodized aluminum. (Brush in direction of aluminum grain only.) Engraving shall be 1/8 inch block sans serif characters.
   1. Coordinate all panel colors/finishes with Owner.
   2. All custom panels shall have beveled edges.
   3. Text color shall be white for all black/dark colored panels and black for all white/light colored panels.
   4. Connector color shall be silver for all white/light colored panels and black for all black/dark colored panels.
   5. Plastic plates will not be accepted.
   6. Wall panels sizes to be coordinated with J-boxes dimensions and mounting conditions.
      a. Panels mounted on surface mount boxes shall not protrude beyond the edge of the box thereby creating a sharp edge condition.
      b. Panels mounted on flush mount boxes shall extend beyond the edge of the J-box by 1/4" on all sides.

C. Unless otherwise specified, all rack panels and floor box panels shall be 1/8 inch thick, black anodized aluminum. (Brush in direction of aluminum grain only.) Engraving shall be 1/8 inch block sans serif characters. Lettering shall be white.
1. Coordinate all panel finishes with Owner.
2. Connector color shall be silver for all white/light colored panels and black for all black panels.
3. Rack panels shall be standard EIA sizes.
4. Plastic plates will not be accepted.

D. Floor Boxes shall be flush mounted.

E. Panels in outdoor or harsh environmental conditions shall be stainless steel and contain connectors fit for their environment.

F. Contractor will submit panel engraving schedule and fabrication drawings for approval.

G. Panels to be manufactured by one of the following manufacturers:
   1. Panel Authority
   2. Proco
   3. RCI
   4. Whirlwind

H. Panel Connectors.
   1. Panels to contain components listed below:
      a. Female XLR: Neutrik NC3FD-L-B-1.
      b. Male XLR: Neutrik NC3MD-L-B-1.
      c. Locking 1/4": Neutrik NJ3FP6C-B.
      d. Female XLR-1/4" TRS Combo: Neutrik NCJ6FI-S
      e. Rugged RJ45: Neutrik NE8FDP-B
      f. BNC (75 Ohm): Neutrik NBB75DFIB-P
      g. BNC (50 Ohm): Kings KC-99-40
      h. 4-Pole Speaker: Neutrik NL4MP
      i. 8-Pole Speaker: Neutrik NL8MPR-BAG
      j. Mass Connectors: Whirlwind W-series

2.9 CABLE AND CONTROL WIRING & TERMINATIONS

A. Electrical conductors installed under this contract, except where otherwise specified, shall be soft drawn annealed stranded copper having a conductivity of not less than 98% of pure copper.

B. Refer to drawing AV0.00 for scope of work related to supply, installation, and termination of cable.

C. Refer to drawing AV0.00 for cables to be used.
   1. Use plenum and underground cables as required by code.
   2. It is assumed all underground cables, where they transition to cable tray or free-air, will not pass through plenum spaces outside of conduit.

D. Refer to drawing AV0.00 for minimum cable lengths required outside of boxes.
E. The Contractor will verify all connector details required for installation of equipment, including make, model, connector sex, attachment configuration, pin-outs, and cable clamp accessories.

F. Speaker Level Rail Mounted Terminal Blocks:
   1. To be used in speaker cluster and Equipment Room junction boxes where shown on schematic drawings or as required by field conditions
      a. Rail-Mounted Terminal Blocks
         1) Positive Terminal (+): Orange Part #2010-1302
         2) Negative Terminal (-): Gray Part #2010-1301
      b. Mount on non-corrosive DIN rail
         1) Wago 210-112
      c. Use insulated Ferrules on all terminations
         1) 8 AWG: Wago 216-289
         2) 10 AWG: Wago 216-288
         3) 12 AGW: Wago 216-287
         4) 14 AWG: Wago 216-286
      d. Crimp with
         1) 6-10 AWG: Wago 206-216
         2) 12-24 AWG: Wago 206-204
      e. Use end and intermediate plates
         1) Orange: Wago 2010-1392
         2) Grey: Wago 2010-1391
      f. Use push-in jumpers as required
         1) Wago 2010-4xx
      g. Use marking strip system
         1) Wago WFB Continuous Marking Strip

G. Microphone and Line Rail Mounted Terminal Blocks
   1. To be used in Equipment Room junction boxes where shown on schematic drawings or as required by field conditions
      a. Rail-Mounted Terminal Blocks
         1) Wago 280-550
      b. Mount on non-corrosive DIN rail
         1) Wago 210-112
      c. Use insulated Ferrules on all terminations
         1) 20 AWG: Wago 216-222
         2) 22 AWG: Wago 216-221
         3) 24 AGW: Wago 216-321
      d. Crimp with
         1) Wago 206-204
      e. Use end and intermediate plates
         1) Wago 280-305
f. Use push-in jumpers as required
   1) Wago 280-4xx

H. Cable Mount Connectors.
   1. Cables to use components listed below, unless otherwise noted:
      a. Female XLR: Whirlwind WI3F-BK
      b. Male XLR: Whirlwind WI3M-BK
      c. Male XLR Numbered: Whirlwind WI3M-BK-#
         1) To be used on all console and stage box inputs.
      d. 1/4” TS: Switchcraft 280
      e. 1/4” TRS: Switchcraft 297
      f. Rugged CAT5E RJ45: Neutrik NE8MC-B-1
      g. BNC (75 Ohm): Canare 75 Ohm
      h. BNC (50 Ohm) Type F Cables: Amphenol Connex 112563
      i. BNC (50 Ohm) Type G Cables: Amphenol Connex 112120
      j. 4-Pole Speaker smaller than 12AWG: Neutrik NL4FC
      k. 4-Pole Speaker greater than 12AWG: Neutrik NLT4FX-BAG
      l. 8-Pole Speaker smaller than 12AWG: Neutrik NL8FC
      m. 8-Pole Speaker greater than 12AWG: Neutrik NLT8FX-BAG
      n. Mass Connectors: Whirlwind W-series

I. Use the following chart for color coding cables for use in the AV systems. Please see the drawing package for specific cable part numbers

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<thead>
<tr>
<th>Signal Type</th>
<th>Letter</th>
<th>Color</th>
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<tr>
<td>Analog Line Level Audio</td>
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<tr>
<td>Analog Mic Level Audio</td>
<td>E</td>
<td>Orange</td>
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<td>Grey</td>
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<td>Yellow</td>
</tr>
<tr>
<td>Speaker</td>
<td>A</td>
<td>Black</td>
</tr>
</tbody>
</table>

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate work with other trades to avoid causing delays in construction schedule.

B. Mount equipment and enclosures plumb and square. Permanently installed equipment to be firmly and safely held in place.
C. Provide 16 hours of custom DSP programming 16 of this will be onsite programming during the audio systems commissioning. Programmer shall contact the consultant and receive guidance on the processing signal flow and layout.
   a. The software shall be provided for approval by consultant at least 1 weeks prior to system commissioning. Failure to do so may cause delays in the commissioning process and create the necessity for additional programming hours.

1. Contractor to provide custom control screens designed per owner’s and consultant’s instruction. The programming and GUI design shall allow for basic operations of each component in the system including monitoring, muting, and level adjustment. The following minimum screens shall be included:
   a. Home Screen – graphic of the room with some primary monitoring, mute, and status indicators (e.g. left cluster, upper balcony delays, etc.)
   b. Mute Screen - to include every processor output. Provide ability to mute by output, speaker, cluster, and zones.
   c. Monitor page – meters for all DSP outputs

2. Control System and DSP programs are the ownership of the client and it shall be given to the client via flash drive at the end of the system warranty period.
   a. Any passwords for the processor or its software shall be provided to the consultant.

D. Cover edges of cable pass-through holes in chassis, racks, boxes, etc., with rubber grommets or Brady GRNY nylon grommet material.

E. AC Power and Grounding
   1. Coordinate connection of power and ground wiring to racks. Provide j-box inside top or bottom of rack, as applicable, to make connections between internal rack wiring by the 27 41 36 Contractor and external power wiring by the Electrical Contractor.
   2. Install 3-conductor, grounded outlets in each rack. Provide a minimum of two spare outlets in each rack. Label each outlet as to which AC circuit is feeding it and provide the same information in the circuit breaker panel.

F. Equipment Racks
   1. Mount equipment in racks and consoles and fully wire and test before delivery to job site. If field conditions prevent prior assembly of racks, notify Consultant in writing that racks will be fabricated on site and the reasons for the change.
   2. Provide and install equipment racks as specified under this section in a manner in keeping with local seismic codes. Racks located on concrete floors in equipment rooms or non-finished spaces are to be mount on a 4 inch di-electrically isolated riser such as a 4 inch concrete riser, provided by Division 3. Ensure that all equipment racks are electrically decoupled from flooring to prevent coming into contact with any safety grounded items during operation by providing rubber mat-style isolation between racks and riser.
   3. Inspect all racks, consoles, and enclosures prior to installation. All rough or sharp edges that may cause injury to personnel must be deburred or a permanent protective coating applied.
   4. Design and provide ventilation adequate to keep temperature within the rack below 85 degrees Fahrenheit. This ventilation system must be temperature actuated.
5. Provide blank rack-mount panels installed in all rack openings not occupied by equipment. Blank filler panels will not exceed five rack units in size. Install rack mounted equipment with black 10-32 Phillips head machine screws.

6. Looking at the rack from the rear, locate AC power, digital control, DC control, and speaker wiring on the left; microphone, line level audio, and video wiring on the right. Panels or equipment mounted on the rear rack rails shall not block access to any front mounted components.

7. Provide security covers on non-user operated equipment having front panel controls. Install covers at the conclusion of Acceptance Testing.

8. Install rack mounted equipment with black 10-32 button head machine screws.

9. Panels or equipment mounted on the rear rack rails must not block access to any front mounted components. Front mounted equipment will be given ample space to allow for access to rear connection.


G. System Wiring

1. Take precautions to prevent and guard against electromagnetic and electrostatic hum. For line level audio signals, float cable shields at the output of source device. Shields not connected to be folded back over cable jacket and covered with heat-shrink tubing. Do not cut off unused shields.

2. Exercise care in wiring; damaged cables or equipment will not be accepted. Isolate cables of different signals or different levels; and separate, organize, and route to restrict channel crosstalk or feedback oscillation in any amplifier section. Keep wiring separated into groups for microphone level circuits, line level circuits, loudspeaker circuits, and power circuits.

3. Make joints and connections with rosin-core solder or with mechanical connectors approved by the Owner; where spade lugs are used, crimp properly with ratchet type tool. Spade lugs mounted on 22 gauge or smaller cable to be soldered after crimping.

4. Route unbroken microphone, audio line, and control wiring from receptacle plate/chassis to patch panel/rack. Remove spliced cables and replace without additional charge to the Owner.

5. Connect cable to active components through screw terminal connections and spade lugs whenever available. Make connections to speaker transformers with properly sized closed end connectors crimped with factory approved ratchet type tool. Wire nut or “Scotchlock” connectors are not acceptable. Do not wrap audio cable splices or connections with adhesive backed tape.

6. Execute wiring in strict adherence to “standard broadcast practices,” as excerpted from:
7. Run vertical wiring inside rack in properly sized plastic raceway with snap on covers (Panduit Type E series). Mount raceways on full length 3/4 inch plywood backboards attached to rack sides. Horizontal wiring in rack to be neatly tied in manageable bundles with cable lengths cut to minimize excess cable slack but still allow for service and testing. Provide horizontal support bars if cable bundles sag. Neatly bundle excess AC power cable from rack mounted equipment with plastic cable ties. Rack wiring to be bundled with plastic cable ties or lacing twine. Electrical tape and adhesive backed cable tie anchors are not acceptable.

8. Connect loudspeakers electrically in phase, using the same wire color code for speaker wiring throughout the project.

9. Wiring and connections shall be completely visible and labeled in rack.

H. Equipment and Cable Labeling

1. Provide engraved lamicoid labels on the front and rear of active equipment mounted in racks. Mount labels in a neat, plumb and permanent manner. Embossed labels are not acceptable. Equipment labels to have at least two lines of engraving with the first to include the schematic reference of the device, i.e., PA-29A or EQ-3. The bottom line to indicate what other devices or areas this equipment controls, i.e., FEEDS HF-3&4 or FEEDS XOVER-3.

2. Engraved labels to have 1/8 inch high characters minimum. Labels to be black with white characters except where indicated.

3. All cables within the system shall be labeled with a unique identifying number at each end of the cable. Use only pre-printed labels. Cover labels with clear heat shrink tubing. Self-adhesive labels will not be allowed without prior approval of Consultant.

4. Label each terminal strip with a unique identification code in addition to a numerical label (Cinch MS series) for each terminal. Show terminal strip codes on system schematic drawings included with Project Record Drawings.

3.2 CONTRACTOR TESTS AND ADJUSTMENTS

A. Provide a pre-commissioning systems report to the Consultant two weeks prior to the scheduled systems commissioning proving all systems to be in full compliance. Report shall include test results, date of each test, pertinent conditions such as control settings, etc., and test equipment employed. In addition, submit written notification that the installation has been completed in accordance with the requirements of the Contract Documents, and is ready for acceptance testing.

1. General
   a. Clean all control spaces, equipment rooms, productions rooms and equipment racks so they are free from dust, debris, solder, boxes, etc.
   b. Clean air filters for all devices with operable fans (amplifiers, power supplies, etc).

2. Electrical.
   a. Verify that all circuits feeding the audio system are derived from a technical power panel.
   b. Verify that grounded receptacles are used for the technical power systems at all locations as outlined in the grounding details of the AV drawings. Notify the Consultant of any deviation of this immediately. Check all outlets for proper termination of the hot, neutral, and ground conductors.
3. Loudspeaker System Tests. Perform the following tests and adjustments. Make corrections necessary to bring system(s) into compliance with the specifications.
   a. Measure and record the impedance of each loudspeaker at the equipment rack with the amplifier disconnected. Measurements shall be documented in a table that lists the impedance for each 1/3 octave band over the loudspeakers operating frequency. Measurements shall be accurate to within one-tenth of an ohm. As an alternative, contractor may perform and document full impedance sweeps over each individual device. Sweep to be performed over loudspeakers specified operating range.
   b. Check polarity of loudspeakers with an electronic polarity checker and by applying music program or constant power per octave (pink noise) signal to system while walking through the transition areas of coverage from one loudspeaker to the next. Transition should be smooth with no apparent shift in source from one speaker to the next.
   c. Apply sine wave sweep signal to each loudspeaker system, sweeping from 50 Hz to 5k Hz and at a level 10 dB below 1/8th amplifier output, and listen for rattles or noise. Correct if apparent.

4. Microphone, line level, and Tie Lines Systems. Confirm the following. Make corrections necessary to bring system(s) into compliance with the specifications.
   a. Proper circuits appearing at each termination location.
   b. Continuity of all conductors.
   c. Proper polarity is maintained.
   d. Absence of shorts between conductors.
   e. Absence of shorts between conductors and conduit.

5. Optical Fiber Cable Testing
   a. Test all fiber optic cable strands for continuity and performance before and after the cables are pulled and terminated.
   b. Test link attenuation of all installed fiber optic strands after splicing and termination in accordance with ANSI/TIA/EIA-568-C.0.
      1) One direction with an optical light source and an optical power meter.
      2) Test at two wavelengths to account for attenuation differences due to wavelength:
         a) 850 nm and 1300 nm for multimode strands.
         b) 1310 nm and 1550 nm for singlemode strands.
      4) For multimode strands, wrap reference jumper around mandrel to remove high-order mode transient losses as specified in ANSI/TIA/EIA-568-C.0.
      5) Test Singlemode strands in accordance with ANSI/EIA/TIA-526-7, Method A.1, One Reference Jumper.
   c. The total attenuation budget for each fiber cable length (end-to-end) shall equal the allowed attenuation for the fiber (0.2 dB per km times the length in km) plus the attenuation for each splice and connector. For example, a cable length of 3 km with 1 splice and 2 connectors would have an attenuation budget of (3 km x 0.2 dB/km) + (2 x 0.2 dB) = 1.2 dB.
c. Test all installed fiber optic strands after splicing and termination with an OTDR (Optical Time-Domain Reflectometer) per TIA/EIA-455-8:
   1) End-to-end bi-directional signature trace with fault finding, connection point reflection, fiber bend, pressure point location, etc.
   2) One wavelength, 1300 nm for multimode strands.
   3) One wavelength, 1550 nm for singlemode strands.
   4) Multimode fiber connector losses ≤ 0.5 dB at 850 nm
   5) Singlemode fiber connector losses ≤ 0.2 dB at 1310 nm
   6) Multimode fiber splice losses ≤ 0.3 dB at 850 nm
   7) Singlemode fiber splice losses ≤ 0.2 dB at 1310 nm
   8) Localized attenuation shall not exceed 0.5 dB at any point

d. Fibers that are broken or damaged shall be replaced at no cost to the owner and replaced fiber optic cables shall be re-tested.
e. Provide test results in both PDF and in the native file format of the OTDR.

3.3 TEST EQUIPMENT

A. Provide the following equipment on site for final acceptance testing. Test equipment to be available for the entire period through final system acceptance. Prior to start of testing, provide a list to the Owner of test equipment make and model numbers that will be used.
   a. Dual-trace oscilloscope - 20 MHz bandwidth, 1 mV/cm sensitivity.
   b. Digital Multimeter capable of 1% accuracy.
   c. Impedance Meter - Capable of testing audio lines at individual frequencies, between 250 Hz and 4k Hz. Measurement Range: 1 ohm to 100k ohms.
   d. Audio Oscillator: bandwidth 20 Hz to 20k Hz +1 dB at 0 dBm output. Output to be balanced. Oscillator to include adjustable output level.
   e. Polarity checker for mic and line level signals.
   f. Polarity checker for loudspeakers.
   g. (2) full height mic stands

3.4 ACCEPTANCE

A. The process of acceptance testing is estimated to take a minimum of 40 hours. During this time the Contractor shall have 2 technicians available to assist the Consultant and make adjustments or corrections to the system as required. Contractor shall be responsible for providing test equipment as outlined in Section 3.2A.5 above for the duration of the acceptance testing.

B. The following procedures will be performed by the Consultant on each System:
   1. The audio fidelity test shall consist of driving the system with pink noise and measuring the response from 40 Hz to 16k Hz. Digital Signal Processing will be used to adjust the response of the system (s) to fit the requirements of the space.
   2. Control functions shall be checked for proper operation, from controlling devices to controlled devices.
   3. Adjust, balance, and align equipment for optimum quality and to meet the manufacturer's published specifications. Establish and mark normal settings for each level control, and record these settings, in the "System Operation and Maintenance Manual".

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Arlington, Texas
June 12, 2017
4. Installed and loose equipment will be inventoried for correct quantity.
5. Any other test on any piece of equipment or system deemed appropriate.

C. The process of acceptance testing the System may necessitate moving and adjusting loudspeaker aiming. Contractor to make adjustments to loudspeaker aiming within parameters set in Part 2. Contractor to make changes without claim for additional payment, this includes the use of lifts, scaffold, etc. If the construction timeline or architecture interferes with the ability to make changes during acceptance testing, notify consultant in writing prior to loudspeakers becoming inaccessible so that final on-site aiming may be accomplished.

D. In the event the need for further adjustment or work becomes evident during equalization or acceptance testing, the Contractor will continue his work until the system is acceptable at no addition to the contract price. If approval is delayed because of defective equipment, or failure of equipment or installation to meet the requirements of these specifications, the Contractor will pay for additional time and expenses of the Owner's Consultant at the Consultant's standard rate in effect at that time, during any extension of the acceptance testing period.

3.5 INSTRUCTION OF OWNER PERSONNEL

A. Provide 8 hours instruction to Owner designated personnel on the use and operation of the System, scheduled as two sessions, by an instructor fully knowledgeable and qualified in system operation. The System Reference Manuals should be complete and on site at the time of this instruction. This training session shall be videotaped by the Contractor and two sets of DVD copies shall be provided to Owner.

B. A technician knowledgeable in mixing and operation of the mixing console and familiar with the system installation shall be present at the first formal music rehearsal and for the first formal use as designated by the Owner. The technician's role will be to support the Hall staff during the rehearsal and weekend services as well as troubleshoot any system issues that may arise.

END OF SECTION
## Audio

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</tr>
<tr>
<td>1 d&amp;b audiotechnik</td>
<td>30D Amplifier US/CA</td>
<td>30D Amplifier US/CA</td>
<td>1</td>
</tr>
<tr>
<td><strong>Platform Sub Bass Loudspeakers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 d&amp;b audiotechnik</td>
<td>Yi8 Loudspeaker NL4</td>
<td>Yi8 Loudspeaker NL4</td>
<td>1</td>
</tr>
<tr>
<td>2 d&amp;b audiotechnik</td>
<td>Yi12 Loudspeaker NL4</td>
<td>Yi12 Loudspeaker NL4</td>
<td>2</td>
</tr>
<tr>
<td><strong>Delay Loudspeakers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 d&amp;b audiotechnik</td>
<td>8S Loudspeaker black</td>
<td>8S Loudspeaker black</td>
<td>1</td>
</tr>
<tr>
<td>10 d&amp;b audiotechnik</td>
<td>Z5408.000</td>
<td>Horizontal bracket 8S black</td>
<td>1</td>
</tr>
<tr>
<td>Quantity</td>
<td>Manufacturer</td>
<td>Model Number</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>----------------</td>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>12</td>
<td>innovox</td>
<td>SL-2.1 RH blk</td>
<td>Dual 4&quot; LF, Horiz. HF ribbon, 2&quot; deep</td>
</tr>
<tr>
<td>12</td>
<td>innovox</td>
<td>SL-2.1 RH-SMG blk</td>
<td>12-gauge rectangular steel grille plate for SL-2.1 RH</td>
</tr>
<tr>
<td>1</td>
<td>L-Acoustics</td>
<td>L4X4 US</td>
<td>Amplified controller with PFC 4 x 1000 W 18 Ohms. Ethernet network. AES/EBU. US version</td>
</tr>
<tr>
<td>1</td>
<td>L-Acoustics</td>
<td>LA2XUS</td>
<td>Amplified controller 4 x 2600W/4 ohms US mains controller</td>
</tr>
<tr>
<td>2</td>
<td>L-Acoustics</td>
<td>KS28</td>
<td>Flyable subwoofer 2x18in.</td>
</tr>
<tr>
<td>4</td>
<td>L-Acoustics</td>
<td>SB18i</td>
<td>High power compact subwoofer: 1x18in. installation version</td>
</tr>
<tr>
<td>2</td>
<td>M-Barrier</td>
<td>M-BAR</td>
<td>Extension bar for M-BUMP</td>
</tr>
<tr>
<td>4</td>
<td>L-Acoustics</td>
<td>M-BUMP</td>
<td>Bumper for flying or stacking KARA/SB18i</td>
</tr>
<tr>
<td>1</td>
<td>CM</td>
<td>Hurricane</td>
<td>Manual Chain hoist. Verify required lift prior to order. Provide with Chain Bag.</td>
</tr>
<tr>
<td>1 custom</td>
<td>Rigging Hardware</td>
<td>Custom solution to connect two subwoofer columns at top and bottom and attach center fill below.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>L-Acoustics</td>
<td>X12</td>
<td>2-way passive coaxial enclosure: 12&quot; LF + 3&quot; HF diaphragm</td>
</tr>
<tr>
<td>2</td>
<td>L-Acoustics</td>
<td>L4X4 US</td>
<td>Amplified controller with PFC 4 x 1000 W 18 Ohms. Ethernet network. AES/EBU. US version</td>
</tr>
<tr>
<td>4</td>
<td>Whirlwind</td>
<td>NL4-075</td>
<td>Cable - Speaker, NL4 Speaker to NL4 Speaker, 75ft., 12 AWG, 4 conductor</td>
</tr>
<tr>
<td>4</td>
<td>Whirlwind</td>
<td>NL4-050</td>
<td>Cable - Speaker, NL4 Speaker to NL4 Speaker, 50ft., 12 AWG, 4 conductor</td>
</tr>
<tr>
<td>4</td>
<td>Whirlwind</td>
<td>NL4-030</td>
<td>Cable - Speaker, NL4 Speaker to NL4 Speaker, 30ft., 12 AWG, 4 conductor</td>
</tr>
<tr>
<td>4</td>
<td>Whirlwind</td>
<td>NL4-015</td>
<td>Cable - Speaker, NL4 Speaker to NL4 Speaker, 15ft., 12 AWG, 4 conductor</td>
</tr>
<tr>
<td>2</td>
<td>Whirlwind</td>
<td>SBNL18442</td>
<td>Splitter - Speaker, stagebox, 1 NL4, 4 NL4 wired as pairs (1+/-)</td>
</tr>
<tr>
<td>1</td>
<td>Whirlwind</td>
<td>NL8-100</td>
<td>Cable - Speaker, NL8 Speaker to NL8 Speaker, 100ft., 13 AWG, 8 conductor</td>
</tr>
<tr>
<td>1</td>
<td>Whirlwind</td>
<td>NL8-150</td>
<td>Cable - Speaker, NL8 Speaker to NL8 Speaker, 150ft., 13 AWG, 8 conductor</td>
</tr>
<tr>
<td>1 custom</td>
<td>Rigging Hardware</td>
<td>Custom hardware to connect two subwoofer columns at top and bottom and attach center fill below.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>L-Acoustics</td>
<td>LA4X US</td>
<td>Amplified controller with PFC 4 x 1000 W 18 Ohms. Ethernet network. AES/EBU. US version</td>
</tr>
<tr>
<td>4</td>
<td>Whirlwind</td>
<td>NL4-030</td>
<td>Cable - Speaker, NL4 Speaker to NL4 Speaker, 30ft., 12 AWG, 4 conductor</td>
</tr>
<tr>
<td>6 Allotment</td>
<td>n/a</td>
<td>n/a</td>
<td>Suitable batten clamp for attaching U-Bracket to batten pipe.</td>
</tr>
<tr>
<td>1</td>
<td>Whirlwind</td>
<td>NL4-100</td>
<td>Cable - Speaker, NL4 Speaker to NL4 Speaker, 100ft., 12 AWG, 4 conductor</td>
</tr>
<tr>
<td>1</td>
<td>Whirlwind</td>
<td>SBXL44442</td>
<td>Splitter - Speaker, stagebox, 1 NL4, 4 NL4 wired as pairs (1+/-)</td>
</tr>
<tr>
<td>2</td>
<td>Whirlwind</td>
<td>NL4-075</td>
<td>Cable - Speaker, NL4 Speaker to NL4 Speaker, 75ft., 12 AWG, 4 conductor</td>
</tr>
<tr>
<td>6</td>
<td>Fulcrum Acoustic</td>
<td>GX1277</td>
<td>12 inch Coaxial Loudspeaker</td>
</tr>
<tr>
<td>6</td>
<td>Fulcrum Acoustic</td>
<td>GX12 Series Yoke Bracket</td>
<td>GX12 Series Yoke Bracket (YK2413)</td>
</tr>
<tr>
<td>1</td>
<td>DigiCo</td>
<td>SD12 Package D2</td>
<td>SD12 surface with 8 mic/line, 8 line out and 8 AES Out with D2 rack 48 mic x16 line output (BNC) stage rack</td>
</tr>
<tr>
<td>1</td>
<td>DigiCo</td>
<td>MOD-OMNI-WVES</td>
<td>DMX Waves Sound Grid 32 stereo channels “N”</td>
</tr>
<tr>
<td>1</td>
<td>DigiCo</td>
<td>MOD-SDR-AES-O</td>
<td>SD series AES/EBU Output Card - 4 Outputs (8 Ch.) w/ SRC Connectors: XLR</td>
</tr>
<tr>
<td>1</td>
<td>Waves</td>
<td>SGS Extreme</td>
<td>Waves compatible SoundGrid Server 2u Rack Mount effects processor.</td>
</tr>
<tr>
<td>2</td>
<td>Cisco</td>
<td>MGBSX1</td>
<td>SFP Module</td>
</tr>
<tr>
<td>1</td>
<td>Cisco</td>
<td>SG300-28</td>
<td>28 Port Gigabit Managed Switch with 2 combo Gigabit SFP ports</td>
</tr>
<tr>
<td>1</td>
<td>Middle Atlantic Products</td>
<td>UPS-2200R-8</td>
<td>2200VA/1650W UPS/IND. OUT</td>
</tr>
<tr>
<td>1</td>
<td>Middle Atlantic Products</td>
<td>UPS-2200R-8</td>
<td>2200VA/1650W UPS/IND. OUT</td>
</tr>
<tr>
<td>1</td>
<td>Blackmagic Design</td>
<td>Multilux</td>
<td>4 bay thunderbolt dock for use with SSD drives</td>
</tr>
<tr>
<td>1</td>
<td>Denon Professional</td>
<td>DNS-700R</td>
<td>Network SD/USB Recorder</td>
</tr>
<tr>
<td>1</td>
<td>Furman</td>
<td>M-BOX</td>
<td>15A Standard Power Conditioner W/Lights &amp; Digital Volt Meter; 9 Outlets, 1RU, 60 Cord</td>
</tr>
<tr>
<td>1 Custom</td>
<td>Custom Millwork</td>
<td>Custom millwork</td>
<td>Custom Millwork with oversized, high quality casters. Refer to Sheet AV5.20 for concept details</td>
</tr>
<tr>
<td>1</td>
<td>OFE</td>
<td>FOH Infill Ramp</td>
<td>OFE leveling ramp for in house mix position, approximately 12’x6’</td>
</tr>
<tr>
<td>1</td>
<td>DSP</td>
<td>Core 110f</td>
<td>8x8+8flex plus 16x16 USB and 128x128 network</td>
</tr>
<tr>
<td>1</td>
<td>QSC</td>
<td>TSC-47W-G2</td>
<td>4.7” touchscreen for DSP control. Mount in 1 gang back box.</td>
</tr>
<tr>
<td>1</td>
<td>Cisco</td>
<td>SG300-28</td>
<td>28 Port Gigabit Managed Switch with 2 combo Gigabit SFP ports</td>
</tr>
<tr>
<td>1 Chief</td>
<td>Chief</td>
<td>DCB-3x4</td>
<td>3RU rack panel for Decora Mount Devices, supplied with 3 Decora blanks (ROD RM-DPP3 OR equivalent)</td>
</tr>
<tr>
<td>2</td>
<td>Cisco</td>
<td>MGBSX1</td>
<td>SFP Module</td>
</tr>
<tr>
<td>1</td>
<td>Ubiquity</td>
<td>UAP-AC-LR</td>
<td>2.4 and 5 ghz wireless access point, 24V POE. Mount to wall above SR racks.</td>
</tr>
<tr>
<td>1</td>
<td>Middle Atlantic Products</td>
<td>UPS-2200R-8</td>
<td>2200VA/1650W UPS/IND. OUT</td>
</tr>
<tr>
<td>1</td>
<td>RM-3</td>
<td>1RU rackmount speaker with analog and digital inputs and 1/4” headphone output.</td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td>Manufacturer</td>
<td>Model Number</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Control Booth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Cisco</td>
<td>SG300-28</td>
<td>28 Port Gigabit Managed Switch with 2 combo Gigabit SFP ports</td>
</tr>
<tr>
<td>1</td>
<td>Middle Atlantic</td>
<td>UPS-2200R-8</td>
<td>2200VA/1650W UPS/ND/OUT</td>
</tr>
<tr>
<td>3</td>
<td>Adam Audio</td>
<td>A7X</td>
<td>Nearfield Monitor 2-way, 3&quot; woofer</td>
</tr>
<tr>
<td>3</td>
<td>IsoAcoustics</td>
<td>ISO-LBR200</td>
<td>Small studio monitor stands with isolation enhancing design, tilt adjustment and height adjustment</td>
</tr>
<tr>
<td>1</td>
<td>Furman</td>
<td>M-BOX</td>
<td>15A Standard Power Conditioner W/Lights &amp; Digital Volt Meter, 9 Outlets, 1RU, 6P4 Cord</td>
</tr>
<tr>
<td>1</td>
<td>Apple</td>
<td>iPad Pro 9.7 and case</td>
<td>Tablet compatible with mixing console software with Otterbox protective case</td>
</tr>
<tr>
<td>1</td>
<td>OFE</td>
<td></td>
<td>Reuse existing equipment pack</td>
</tr>
<tr>
<td>1</td>
<td>Custom work</td>
<td></td>
<td>Modify existing control booth Millwork to fit custom mix cart</td>
</tr>
<tr>
<td>2</td>
<td>Middle Atlantic</td>
<td>PDT-1015C-NS20</td>
<td>10 outlet, 15amp circuit strip with 20' cord. Mount below control booth work surface.</td>
</tr>
<tr>
<td></td>
<td>Assistive Listening System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Custom work</td>
<td></td>
<td>Integration of owner furnished system</td>
</tr>
<tr>
<td></td>
<td>Infrastructure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Placeholder</td>
<td>extra labor</td>
<td>installed wire and labor to install</td>
</tr>
<tr>
<td>2</td>
<td>Middle Atlantic</td>
<td>MRX-4431</td>
<td>44SP/31D MULTIBAY MRX</td>
</tr>
<tr>
<td>1</td>
<td>Bittree</td>
<td>B96DC-HN5ST/E3 M20U7B</td>
<td>PATCHBAY - AUDIO TT (BANTAMI) FRONT PROGRAMMABLE PATCHBAY, 969-5 SERIES, 2X48, 2 RU, E3 REAR INTERFACE</td>
</tr>
<tr>
<td>24</td>
<td>Bittree</td>
<td>BPC2400-110</td>
<td>Audio Patchcord - Nickel Rantamett (FT) - 2 foot - Black</td>
</tr>
<tr>
<td>1</td>
<td>Bittree</td>
<td>DSKP124B-C6FS</td>
<td>FLUSH MOUNT MODULAR KEYSTONE PANEL, CAT 6, FEED-THROUGH, SHIELDED, 1X24, 1 RU</td>
</tr>
<tr>
<td>6</td>
<td>Bittree</td>
<td>DSP2406-Cat6</td>
<td>24&quot; Blue - DATA PATCH CABLE, CAT 6, RJ45 (BPRC), UNSHIELDED</td>
</tr>
<tr>
<td>6</td>
<td>Bittree</td>
<td>DSP2006-Cat6</td>
<td>6&quot; Blue - DATA PATCH CABLE, CAT 6, RJ45 (BPRC), UNSHIELDED</td>
</tr>
<tr>
<td>1</td>
<td>Black Box</td>
<td>JPM390A</td>
<td>Economy LC Fiber Optic Panel, Economy LC Fiber Optic Panel with (1) Duplex Ports</td>
</tr>
<tr>
<td>6</td>
<td>Bittree</td>
<td>DSP3606-LC/LC</td>
<td>FIBER OPTIC PATCH CABLE, LC TO LC, 50/125UM MULTI-MODE, LASER OPTIMIZED, OM3</td>
</tr>
<tr>
<td>1</td>
<td>Bittree</td>
<td>BI212S-1WNLHD</td>
<td>LOW DENSITY STANDARD WECO, 2X12, 1 RU LOW DENSITY STANDARD WECO, 2X12, 1 RU</td>
</tr>
<tr>
<td>2</td>
<td>Bittree</td>
<td>LPM7506</td>
<td>Looping Plug (Standard Size WECO Video) Blue</td>
</tr>
<tr>
<td>6</td>
<td>Bittree</td>
<td>vpc2406-7S</td>
<td>24&quot; Blue, STANDARD WECO 75 OHM VIDEO PATCH CABLE</td>
</tr>
<tr>
<td>1</td>
<td>Jensen</td>
<td>PI-2X</td>
<td>2 Channel Line Input Isolation Transformer, Balanced or unbalanced</td>
</tr>
<tr>
<td>4</td>
<td>Jensen</td>
<td>GLX</td>
<td>1 Channel Line Input Isolation Transformer, Balanced</td>
</tr>
<tr>
<td></td>
<td>Intercom Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Custom work</td>
<td></td>
<td>Wire, wall panels, labor</td>
</tr>
<tr>
<td>1</td>
<td>OFE Computer</td>
<td>OFE</td>
<td>OFE 3RU computer on shelf for recording intercom audio and POV video.</td>
</tr>
<tr>
<td>1</td>
<td>OFE Monitor and Keyboard</td>
<td>HP</td>
<td>TFTP5000RK</td>
</tr>
<tr>
<td></td>
<td>Wireless Digital Intercom plus multi channel channel partyline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Clear-Com</td>
<td>FSH-BASE</td>
<td>FreeSpeak II Digital wireless base station: FreeSpeak II Digital license-free wireless base station. Supports up to 20 Beltpacks and 10 antennas. (Two antennas can connect to the base station directly or up to 10 antennas can be connected by using two x P02203 splitters) The base station has connections for two party-lines and 4 wires plus a dedicated 5A output and dedicated program audio input.</td>
</tr>
<tr>
<td>5</td>
<td>Clear-Com</td>
<td>FSI-BP19-X4-US</td>
<td>FreeSpeak II digital wireless BP US: Digital wireless beltpack including four talk and listen buttons with integral crosstalk level rotary controls and answerback and menu key. LED level and call signalization and OLED menu. Includes XLR-4M headset connector, USB DC charging connections, belt clips, shoulder strap, BAT60 rechargeable Lithium Ion battery and single AC USB charger part 453G029. FCC approved for use in the USA and Canada.</td>
</tr>
<tr>
<td>1</td>
<td>Clear-Com</td>
<td>AC50</td>
<td>FreeSpeak II 5 way charger: FreeSpeak II 5 bay drop in beltpack charger and battery charger unit. Comes with AC adapter part 453G008-1.</td>
</tr>
<tr>
<td>1</td>
<td>Clear-Com</td>
<td>BAT60</td>
<td>Spare FreeSpeak II Battery: Spare FreeSpeak II beltpack spare Li-ion battery</td>
</tr>
<tr>
<td>5</td>
<td>Clear-Com</td>
<td>FSI-TV2R-19-US</td>
<td>Active Transceiver antenna : Freespeak system. Coordinate location with site conditions and mount per manufacturer recommendations.</td>
</tr>
<tr>
<td>1</td>
<td>Clear-Com</td>
<td>FSI-SPL</td>
<td>Active Transceiver antenna splitter and distribution</td>
</tr>
<tr>
<td>6</td>
<td>Clear-Com</td>
<td>CC-300-X4</td>
<td>Single-ear standard HS XLR-4F: Single enclosed ear headset with superior audio quality and on/off switch in gooseneck microphone boom, includes HS-ES ear sock and headset bag - field removable four-pin female XLR for standard Clear-Com connection.</td>
</tr>
</tbody>
</table>
### Analog Partyline - 4 channel

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Manufacturer</th>
<th>Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Clear-Com</td>
<td>CC-400-X4</td>
<td>Double-ear standard HS XLR-4F: Double enclosed ear headset with superior audio quality and on/off switch in gooseneck microphone boom includes HS-ES earsocks and headset bag. Field removable four-pin female XLR for standard Clear-Com connection.</td>
</tr>
<tr>
<td>4</td>
<td>Clear-Com</td>
<td>CC-300-X4</td>
<td>Single-ear standard HS XLR-4F: Single enclosed ear headset with superior audio quality and on/off switch in gooseneck microphone boom, includes HS-ES ear sock and headset bag - field removable four-pin female XLR for standard Clear-Com connection.</td>
</tr>
<tr>
<td>2</td>
<td>Clear-Com</td>
<td>HS-6</td>
<td>Telephone-style headset XLR-4F: Telephone-style headset with coiled cord and push to talk button on telephone handset - four-pin female XLR for standard Clear-Com connection.</td>
</tr>
<tr>
<td>2</td>
<td>Clear-Com</td>
<td>FL-7</td>
<td>Call signal flasher: Encore call signal flasher provides adjustable visual and/or audible indication of a call signal.</td>
</tr>
<tr>
<td>1</td>
<td>Clear-Com</td>
<td>MS-704</td>
<td>4 Ch. headset/speaker main station: Encore four-channel headset/speaker main station. Built-in 1-amp (2-amp peak) power supply, 2RU rack mount. Four pairs of XLR-3 Male connectors for partylines A-D, one XLR-3 female for Program Audio in and one XLR-3 Male for Stage Announce out on the rear panel. Jack for hot mic out.</td>
</tr>
<tr>
<td>1</td>
<td>Clear-Com</td>
<td>RM-704</td>
<td>4 Ch. remote station rack mount: Encore four-channel 2RU remote station rack mount with internal speaker and ports for gooseneck microphone and audio jack. Must be used in conjunction with a power supply such as a PS-704 or MS-704.</td>
</tr>
<tr>
<td>8</td>
<td>Clear-Com</td>
<td>RS-702</td>
<td>2 Ch. dual listen monaural beltpack: Encore two-channel standard dual listen monaural beltpack four-pin male headset connector. Six-pin female/male loop through intercom line connectors. Requires YC-38 adapter to connect with standard three-pin cabling.</td>
</tr>
<tr>
<td>8</td>
<td>Clear-Com</td>
<td>YC-36</td>
<td>2 Ch. beltpack adapter: Three-pin to six-pin adapter combines two single-channel three-pin cables into a single two-channel six-pin connector for use with RS-702 and RS-602 beltpacks.</td>
</tr>
<tr>
<td>3</td>
<td>Clear-Com</td>
<td>KB-702GM</td>
<td>2 Ch. flush mount headset/speaker GN Mic. Encore two-channel selectable flush mount headset/speaker station, gooseneck microphone jack and VOX. Mounts in four-gang box, console, or V-Box accessory enclosure 11.6cm/4.5” X 11.4cm/4.5”. Includes a Four-pin male headset connector.</td>
</tr>
<tr>
<td>1</td>
<td>Clear-Com</td>
<td>MT-701</td>
<td>Isolator PCB for PL interface: Isolator circuit box for party-line intercom systems. Electrically isolates ground, power and signal between two systems.</td>
</tr>
<tr>
<td>5</td>
<td>Clear-Com</td>
<td>GM-9</td>
<td>9 inch plug-in GN mic: 22.9cm/9” plug-in gooseneck microphone for party-line stations, I-series and ICS panels.</td>
</tr>
<tr>
<td>2</td>
<td>Clear-Com</td>
<td>V-BOX</td>
<td>Tablettop for KB-7020M, one for video and one for lighting in control booth.</td>
</tr>
</tbody>
</table>

### Computers and Hardware

#### FOH Mix Cart Computers

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell</td>
<td>OFE - P2418HT 24&quot; touchscreen, VESA compatible</td>
</tr>
<tr>
<td>Sonnet Technologies</td>
<td>RACK-MIN-2X RackMac Mini - 1U rackmount enclosure for 2 Mac Minis</td>
</tr>
<tr>
<td>Apple</td>
<td>OFE - Mac Mini 2.8GHz OFE Computer</td>
</tr>
<tr>
<td>Microsoft</td>
<td>Windows 10 pro Second OS</td>
</tr>
<tr>
<td>VMWARE</td>
<td>Fusion Install and Configure to use with boot camp partition.</td>
</tr>
<tr>
<td>Apple</td>
<td>Wireless Keyboard and Mouse Wireless keyboard and Mouse</td>
</tr>
<tr>
<td>Apple</td>
<td>Wired keyboard and Mouse Wired keyboard and Mouse</td>
</tr>
<tr>
<td>Apple</td>
<td>Thunderbolt to Ethernet adapter Thunderbolt to Ethernet adapter</td>
</tr>
<tr>
<td>Dell</td>
<td>OFE - P2214H OFE 22&quot;, 16/9, 1920x1080 LCD Monitor with LED Backlight</td>
</tr>
<tr>
<td>Chief Manufacturing</td>
<td>K2CLMN MINT SINGLE DISPLAY 1L ARM, BLK OR CUSTOM AS PART OF MIX CART</td>
</tr>
</tbody>
</table>

#### Control Booth Computer

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Manufacturing</td>
<td>K2CLMN MINT SINGLE DISPLAY 1L ARM, BLK OR CUSTOM AS PART OF MIX CART</td>
</tr>
<tr>
<td>Sonnet Technologies</td>
<td>RACK-MIN-2X RackMac Mini - 1U rackmount enclosure for 2 Mac Minis</td>
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<tr>
<td>Dell</td>
<td>OFE - P2214H OFE 22&quot;, 16/9, 1920x1080 LCD Monitor with LED Backlight</td>
</tr>
<tr>
<td>Apple</td>
<td>OFE - Mac Mini 2.8GHz OFE Computer</td>
</tr>
<tr>
<td>Microsoft</td>
<td>Windows 10 pro Configure computer and install via Apple Bootcamp</td>
</tr>
<tr>
<td>Apple</td>
<td>Wireless Keyboard and Mouse Wireless keyboard and Mouse</td>
</tr>
<tr>
<td>Apple</td>
<td>Thunderbolt to Ethernet adapter Thunderbolt to Ethernet adapter</td>
</tr>
</tbody>
</table>

### Spotlight Booth and Existing Distributed

#### Electrical and Structural Work

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AtlasIED</td>
<td>AT3S 35 Watt Single Gang Stainless Steel 70.7V Commercial Attenuator</td>
</tr>
<tr>
<td>QSC</td>
<td>SPA4-100 1/2 RU 4 Channel ENERGY STAR amplifier / Multichannel Operation 100 watts into 8ohm &amp; 4ohm, and 350 watts into 70v and 100V / 100-240 VAC Operation</td>
</tr>
<tr>
<td>JBL</td>
<td>Control 25-1 5.25” Two-Way Vented Loudspeaker, 8 ohms plus 70v/100v taps at 30W, 15W, 7.5W (&amp; 3.7W at 70v only).</td>
</tr>
<tr>
<td>Furman</td>
<td>M-BDX 15A Standard Power Conditioner W/Lights &amp; Digital Volt Meter, 9 Outlets, 1RU, 6ft Cord</td>
</tr>
</tbody>
</table>

### Demo and Training

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custom work</td>
<td>Electrical Work Electrical work to support renovation. Refer to AV and E series drawings.</td>
</tr>
<tr>
<td>Custom work</td>
<td>Structural Work Structural work to support renovation. Refer to AV drawings.</td>
</tr>
<tr>
<td>Custom work</td>
<td>Ceiling Work Holes, paint, and trim rings for plaster ceiling</td>
</tr>
<tr>
<td>Custom work</td>
<td>Demo and store Demo and removal of existing equipment, loudspeakers, and cable</td>
</tr>
<tr>
<td>DiGiCo</td>
<td>Digico-Train-L2 Training and manufacturer commissioning for SD12 console, Console Ecosystem, and Waves integration.</td>
</tr>
<tr>
<td>L-Acoustics/D&amp;B</td>
<td>Calibration Training and manufacturer commissioning for loudspeaker system and amplified controllers</td>
</tr>
<tr>
<td>Clearcomm</td>
<td>Commissioning Training and manufacturer commissioning for Intercom system</td>
</tr>
<tr>
<td>Add Alternates</td>
<td>Quantity</td>
</tr>
<tr>
<td>---------------</td>
<td>----------</td>
</tr>
<tr>
<td><strong>Add/Alt #1</strong></td>
<td>Lobby Announce</td>
</tr>
<tr>
<td>1 QSC</td>
<td>TSC-47W-G2</td>
</tr>
<tr>
<td>1 Shure</td>
<td>SM58S</td>
</tr>
<tr>
<td>1 Radio Design Labs</td>
<td>DB-CIJ3</td>
</tr>
<tr>
<td>1 Radio Design Labs</td>
<td>DB-XLR2</td>
</tr>
<tr>
<td>1 Generic</td>
<td>2 position decora keystone plate</td>
</tr>
<tr>
<td>1 custom</td>
<td></td>
</tr>
<tr>
<td>3 gang decora panel mounted low for AV i/o and 1 gang mounted at 42” for control.</td>
<td></td>
</tr>
<tr>
<td><strong>Add/Alt #2</strong></td>
<td>Wireless Microphone System</td>
</tr>
<tr>
<td>2 Shure</td>
<td>UXD4Q</td>
</tr>
<tr>
<td>2 Shure</td>
<td>UA874US</td>
</tr>
<tr>
<td>8 Shure</td>
<td>UXD2/BS8</td>
</tr>
<tr>
<td>8 Shure</td>
<td>UXD1</td>
</tr>
<tr>
<td>8 Shure</td>
<td>MX150B/O-TQG</td>
</tr>
<tr>
<td>16 Shure</td>
<td>SB900</td>
</tr>
<tr>
<td>8 Shure</td>
<td>SBC000-LUS</td>
</tr>
<tr>
<td>1 Placeholder</td>
<td>extra labor</td>
</tr>
</tbody>
</table>