

**AUDIO VISUAL SYSTEMS  
REQUEST FOR PROPOSAL**

**TAB 1  
Scope and Specifications of the Bid**

**SCOPE:** This bid intends to secure Supplies and services to complete a boardroom upgrade for the Raymore-Peculiar School District.

**Bid Due Date: Friday, May 31st, 2019 11:30 am**

The Board of Education reserves the right to modify the Scope and Specifications as circumstances require, including but not limited to adding, changing, or deleting proposed locations, equipment, and services. The Board of Education reserves the right to reject any or all bids and to waive any informality or technicality in bidding if it is in their best interest to do so.

**BID SUBMITTED BY:**

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(Company Name)

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(Address)

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(City/State/Zip Code)

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(Typed Name of Person Submitting the Bid)

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(Phone #)

(Fax #)

**TAB - 2**

**IMPORTANT DATES:**

**Bid opening: Friday, May 31st, 2019, 11:30 am**

**Location:** Administrative Services Center  
21005 S. School Rd  
Peculiar, MO 64078  
Room 121

**Bid Due Date: Friday, May 31st, 2019, 11:30 am**

**SUBMITTAL REQUIREMENTS and CONTACT INFORMATION:**

One original and one (1) copy for a total of two (2) complete sets of the boardroom upgrade bid must be submitted on or before May 31st, 11:30 am CST. Send bids to the following address:

Administrative Services Center – Boardroom Upgrade Bid  
21005 S. School Rd.  
Peculiar, MO 64078  
Technology Department  
Attn: Ryan Gooding

A copy of the bid specifications can be found at <http://www.raypec.k12.mo.us/bids.aspx>. All questions and inquiries concerning the content of this bid shall be directed to:

Ryan Gooding  
Director of Technology  
[ryan.gooding@raypec.org](mailto:ryan.gooding@raypec.org)

The bid is to be signed only by an authorized representative of the bidder who has authority to enter into a contract with the District on behalf of the bidder, such as a President, Vice President, or another corporate officer.

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AUTHORIZED SIGNATURE

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COMPANY NAME

## Part 1 - GENERAL

### 1.1 INTRODUCTION

- A. This document describes the audio-visual (AV) system (hereafter referred to as the “technical system”) to be furnished and installed in the Raymore-Peculiar School District Board Room, Peculiar, Missouri.
- B. Work related to this RFP includes all labor, equipment, and installation as required to provide a complete technical system in compliance with the contract documents
- C. At the request of the Owner, the Technical System Contractor shall employ the services of a qualified structural engineer to review all overhead mounting, suspension, and rigging details of the technical system equipment.
- D. When possible, the system shall use existing cable pathways, conduit, AC power, etc.

### 1.2 SYSTEM DESCRIPTION AND CAPABILITIES

- A. The AV system shall include the following features and capabilities:
  - a. General Audio Visual presentation capabilities to support school board meeting and other regularly occurring functions.
  - b. The visual display shall be via one large drop down screen (already in location) located at the front of each two-room segments.
  - c. Screen size shall be calibrated to the specification of the projector.
  - d. The native video resolution of the AV system shall be 1920x1080 pixels.
  - e. The AV system shall be able to scale a wide range of source resolutions to 1920x1080 pixels.
  - f. The AV system shall facilitate the display of HDCP content.
  - g. A single wired connection to the AV system shall be available along the front wall of each room section. Each connection point shall feature HDMI and VGA (analog computer video/audio) capability.
  - h. An additional wired connection shall be available near the touch screen located near the AV closet. This connection point shall feature HDMI and analog computer video/audio (VGA) capability and will be used to support activities when the room is in combined mode, such as during a school board meeting.
  - i. Wireless connection of input devices to the AV system shall be available as an option. Compatible device types must include PC, Mac, Android, and iOS devices.
    - i. The wireless interface must support a minimum of 30 frames/sec refresh rate.
    - ii. The wireless connection must feature enterprise-level IT security.
    - iii. Independent wireless connection must be available for each room section when divided.
    - iv. Each wireless interface must simultaneously connect to a minimum of 4 devices.
  - j. The audio system shall be replaced with an 8-speaker system, four on each side of the room. The speakers shall be wired into two zones (reflecting the two-room sections) and powered by a two-channel audio power amplifier of appropriate output capability.

- k. The audio system shall continue to work with the current recording and microphone equipment utilized during Board meetings for recording and amplification of the wireless microphone system.
- l. System components such as control processor, fixed sources network switches, etc., shall be installed in the existing AV equipment closet located at the side of the board room.
- m. A wall mount touch screen in each of the room sections will allow system control — coordinate location with Owner.
- n. To facilitate room set up by untrained users, the control system programming should exhibit a “wizard-style” interface on the touch screen(s).
- o. Additionally, complete control of all system features shall be available. The design philosophy outlined in the InfoComm Dashboard for Controls Design Guide shall be followed.
- p. The boardroom is divisible along the center line of the room. Combine/separate capability to support the room in multiple configurations will be required.
- q. When in “separate” mode, the portion of the system supporting each room section shall be completely independent of the other, allowing concurrent functions in two spaces.
- r. When the room is “combined,” the AV system shall operate as a single presentation support tool. Control shall be via the touch panel located next to the AV closet. The supplemental panel shall be disabled.

### **1.3 EXAMINATION OF SITE**

- A. This project shall occur at an existing facility.
- B. Before submitting a proposal, the Technical System Contractor shall personally examine the site of the proposed work and verify the conditions which involve his work.
- C. By the act of submitting a proposal, the Technical System Contractor will be deemed to have made reasonable allowances for site examinations, site conditions, and included all costs in his proposal. Failure to verify these conditions will not be considered a basis for the granting of additional compensation.

### **1.4 MATERIAL AND WORKMANSHIP**

- A. All equipment shall be new and in proper operating condition. All workmanship shall be of the finest quality by experienced installation technicians.
- B. The Technical System Contractor shall contact the Owner, in writing, regarding the selection of colors for all equipment such as loudspeaker grilles, exposed loudspeaker boxes, wall plates, millwork, laminate, and other items specific to the project.
- C. The Technical System Contractor shall maintain at the job site a complete set of manufacturer's original operation, instruction, installation, and service manuals for each equipment item, for reference.

### **1.5 ORDINANCE AND CODES**

- A. The Technical System Contractor shall comply with all applicable national and local codes, ordinances, and obtain all required permits. The Technical System Contractor shall be held responsible for any violations of the law within the scope of his work.

## 1.6 DEFINITIONS

### A. Owner

- a. Raymore Peculiar School District  
21005 S School Rd  
Peculiar, MO 64078  
(816) 892-1300  
[www.raypec.k12.mo.us](http://www.raypec.k12.mo.us)

B. **Technical System Contractor:** Contracting firm that has been retained to do the work

## 1.7 CONTRACTOR QUALIFICATIONS

- A. Work in this section shall be performed by a Technical System Contractor who:
  - a. complies with the requirements of Division 1, and
  - b. is licensed to perform work of this type in the project jurisdiction, and
  - c. has at least five (5) years of verifiable direct experience with the devices, equipment, and systems of the type and scope specified herein, and
  - d. has a minimum of one full-time staff member who has attended technical system engineering courses taught by Syn-Aud-Con in the past ten years, and
  - e. has achieved Silver level membership in Infocomm, and
  - f. has a minimum of one Infocomm CTS-I (Certified Technology Specialist - Installation) systems technician, and
  - g. has a minimum of one Crestron Digital Media Certified Engineer (DMC-E), and
  - h. has a fully staffed and equipped maintenance and repair facility.
- B. The Technical System Contractor shall include, with his proposal, a list of credentialed staff who will be actively involved in this project, including specific tasks each will perform.
- C. The Technical System Contractor shall use sufficient numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for the proper performance of the work in this section. This personnel shall have at least three (3) years of direct experience in similar work.
- D. The Technical System Contractor shall appoint a designated supervisor who shall have at least five (5) years of direct experience in similar work. The supervisor shall be present and in responsible charge of all work in the fabrication shop and on the project site during all phases of the installation and testing of the system(s). To assure continuity, this supervisor shall be the same individual throughout the execution of the work unless illness, loss of personnel, or other reasonable circumstances intervene.
- E. The Technical System Contractor shall have a minimum of one full-time staff member, who has a minimum of three (3) years direct experience, and who is factory-certified on the most recent version of the selected Digital Signal Processor (DSP) and technology. This individual shall be responsible for the implementation of the system, including software. This individual shall be the same throughout the execution of the work unless illness, loss of personnel, or other reasonable circumstances intervene.

- F. The Technical System Contractor shall have a minimum of one full-time staff member, who has a minimum of three (3) years direct experience with network based-AV transport and who is factory-certified on the most recent version of the selected AV transport technology. The individual shall hold a current manufacturer's certification (i.e., Crestron DMC-E). This individual shall be responsible for the implementation and preliminary commissioning of the AV transport system. This individual shall be the same throughout the execution of the work unless illness, loss of personnel, or other reasonable circumstances intervene.
- G. The Technical System Contractor shall have a minimum of one full-time staff member who has a minimum of three (3) years direct experience and is a factory certified Master Level Programmer on the most recent version of the AV control system software and technology. This individual shall be the same throughout the execution of the work unless illness or loss of personnel intervenes. A factory authorized independent programmer (i.e., Crestron Master CAIP) will also be accepted, providing the programmer meets the criteria identified in this paragraph.
- H. The Technical System Contractor shall be a factory-authorized dealer for the major components specified including items such as loudspeakers, control systems, power amplifiers, and video switchers.
- I. The Owner's Representative may request a prospective Technical System Contractor to provide additional information as desired to determine the Technical System Contractor's acceptability.
- J. Other contractors bidding this work who cannot meet the above qualifications must employ the services of a qualified Technical System Contractor who meets the above qualifications. This Technical System Contractor shall supervise the installation and perform all wiring connections.

#### **1.8 SUBSTITUTIONS**

- A. The project shall be bid based on the equipment/materials listed in this document. After award of a technical system contract, the Technical System Contractor may wish to substitute equipment/materials other than that specified, subject to approval. The Technical System Contractor shall bear the "burden of proof" for demonstrating substitute equipment/materials equivalency and suitability.
- B. Information regarding the substitution of equipment/materials shall be presented in writing to the Owners for review. This written request shall contain copies of complete manufacturer's literature regarding the proposed substitute item(s), specifications, and front/rear views (if applicable).
- C. Submission of substitute equipment/materials (including any associated software) may be required for evaluation by the Owner at his discretion, before acceptance, and subject to evaluation fees. The Technical System Contractor shall be responsible for the substituted equipment/materials and all related shipping costs and evaluation fees.
- D. The Technical System Contractor shall be required to replace such installed substitute equipment/materials if an unforeseen defect appears, or if operational characteristics do not fulfill the design intent of the technical system.

## 1.9 SUBMITTALS

- A. All submittal information shall be submitted in a sealed envelope.
- B. Submittals shall comply with the overall project schedule. Failure to make timely, complete submittals is considered to be a lack of substantial progress of the work in the section.
- C. Each submittal package noted below shall be submitted clearly stating the contents of the submittal (i.e., "Equipment List & Literature"; "Loudspeaker Mounting/Suspension"; etc.).
- D. For the first submittal, the Technical System Contractor shall provide the following:
  - a. Complete list of all equipment and materials intended for the project. The material and equipment lists shall be submitted and reviewed before any equipment and material are purchased.
  - b. Manufacturer's specification sheets on all MAJOR pieces of equipment.
    - i. Including items that:
      - 1. Constitute a major portion of the project (such as power amplifiers and control systems)
      - 2. Are visible (such as loudspeakers and flat panel displays)
      - 3. Are handled/operated by the staff.
    - ii. Not including:
      - 1. Minor pieces of equipment such as Connectors; Hardware and Accessories; Cable; Portable Accessories.
  - c. Substitute equipment documentation. Complete cut sheets are required for all substitutes or other equipment not specified herein. Substitute equipment/materials shall be so noted as a "Proposed Substitute," along with a footnote briefly stating the reason for the proposed substitution.
  - d. A progress schedule, based on the project completion date and working backward.
    - i. The schedule shall include specific dates based on the current completion date and shall include duration and milestones for at least the following:
      - 1. Off-site items under the scope of the Technical System Contractor including shop drawings, touch screen layouts, DSP configuration.
      - 2. On-site items under the scope of the Technical System Contractor including completion of equipment buy-out, completion of shop fabrication, loudspeaker installation, rack installation, preliminary field testing of the system, system programming, system commissioning, and system first use.
    - ii. System commissioning, including quiet time on site.
- E. For subsequent submittals, sufficiently before installation of each respective portion of work, the Technical System Contractor shall submit the following:
  - a. Loudspeaker, suspension, and rigging details, including weights of supported equipment and mounting/suspension materials.
  - b. All panel, and plate layouts (such as for wall/floor boxes) indicating locations of connectors, engraving, nomenclature, panel material, and finish.
  - c. Equipment rack front elevation showing equipment and panel layout.
  - d. Multi-conductor cable system details, including a detailed PIN and wire color schedule.
  - e. AV control system panel/screen layouts suitable for the Owner's Representative to understand the operation and flow.

- f. DSP signal flow configuration.
- g. For any permanent exposed (not in conduit) cable applications, written authorization from the Customer as to which locations do and do not require plenum-rated cable.
- h. Shop drawings as indicated elsewhere in these specifications and on the project drawings.
- i. Copies of all reviewed submittals shall be kept at the project site during the construction of the project, for reference.

#### **1.10 PROTECTION OF WORK**

- A. The Technical System Contractor shall protect all work, materials, and equipment from damage due to any cause. He shall provide for the safety and new condition of the equipment and materials until final acceptance by the Owner's Representative. The Technical System Contractor will replace all damaged or defective materials and equipment as directed by the Owner.
- B. Equipment racks and other exposed equipment shall be kept covered and protected from airborne contaminants. The Technical System Contractor shall clean all debris from the equipment room(s) and control console area, and shall clean all equipment and the interior rack floor, before system commissioning activities.

### Part 2 PRODUCTS

#### **2.1 GENERAL**

- A. Unless otherwise designated, the Technical System Contractor shall provide all of one type of equipment from one manufacturer; for example, microphones of one type to be provided by one manufacturer; video projectors of one type by one manufacturer, all loudspeakers of one type by one manufacturer.
- B. The Technical System Contractor shall ensure similar or better performance is achieved by the use of equipment other than that shown.
- C. All major components of technical system equipment shall be provided and installed by a qualified Technical System Contractor, as outlined in Part 1 of this section.
- D. All equipment shall be new and of professional quality. All electronic audio devices shall have electronic, or transformer balanced inputs and outputs except for specific program source equipment and specific mixing console inputs and outputs. If an electronic device specified or furnished has an unbalanced input and output, the Technical System Contractor shall make provisions to balance said input/output (i.e., outboard line-level transformer as approved) unless other arrangements have been agreed upon.
- E. Some items listed in these specifications are custom-made products. Ensure when pricing and ordering equipment that the exact part number called out is used. If there is a discrepancy, the Technical System Contractor shall contact the Owner for clarification.
- F. Each software programmable device furnished (i.e., Digital Signal Processor, control system, etc.) shall include most recent software on a flash drive and appropriate computer interface cable - minimum 25' (device to PC). Cable, software, source (uncompiled) code, binary code, and all related aspects of all software-controlled equipment shall become the property of



the Owner and will be furnished as a portion of the Operation & Maintenance (O&M) manuals (see Operation & Maintenance Manuals near the end of Part 3).

## **2.2 AV INTEGRATOR SERVICES**

- A. The successful audio-visual contractor shall furnish a detailed line item proposal.
- B. The audio-visual system integrator awarded this project shall be required to provide the following services and deliverables:
  - a. System “one-line” drawings, fully defining system design and component interconnection.
  - b. Coordination with Owner’s representative(s) regarding scheduling, architectural, and other elements.
  - c. Coordinate with Owner’s IT department representative to develop and implement appropriate network settings for the entire AV system.
  - d. Control system programming yielding intuitive “user-friendly” operation.
  - e. Equalization for the audio systems, to provide uniform frequency response.
  - f. Calibration of all visual displays to yield uniform color, brightness, and contrast.
  - g. Fully functional audiovisual system.
  - h. Post-installation verbal instruction and first-use operating assistance.
  - i. Close-out documents to include Operation & Maintenance manuals, written instructions, system testing documentation, and record drawings.

## **2.3 BASE SYSTEM - RECOMMENDED KEY COMPONENTS**

- A. The following components are typical of those necessary to fulfill the system requirements listed above.
  - a. System Control and Signal Routing: A complete presentation control and signal routing solution for the boardroom. The DMPS-300-C affords signal routing flexibility and high-performance signal processing without the need for separate components (one required):
    - i. Crestron DigitalMedia™ Presentation System 300
  - b. User Interface: A space-saving wall, lectern or tabletop touch screen featuring a clean, contemporary appearance with edge-to-edge glass and Core 3 UI™ graphics. Additional features include high-performance H.264 video, SIP Intercom, PoE and standard gang-box installation (two required):
    - i. Crestron TSW-750
  - c. AV Connection Point: Provides a remote wall plate or floor box input connection for HDMI® and RGB sources as part of a complete DigitalMedia™ System (two required –one at the front of each room section):
    - i. Crestron DM-TX-200-C-2G
  - d. Display Control Interface/ Signal Receiver: Provides a one-box interface solution for a single display device as part of a complete Crestron® DigitalMedia™ system. It functions as a DM 8G+™ receiver, video scaler, and control interface, providing a single HDMI® output along with Ethernet, USB HID, RS-232, and IR control ports (two required):

- i. Crestron DM-RMC-SCALER-C
- e. Power Amplifier: 1RU, convection-cooled power amplifier delivering two channels of 200 watts RMS. 100 dB signal-to-noise ratio with 0.1% THD+N. ENERGY STAR® qualified Class D amplifier design (one required)::
  - i. Extron XPA 2002
- f. UPS: An Uninterruptible Power Supply will be located in an equipment rack to protect the sensitive digital signal processing equipment. Provides certified fail-safe protection from surges, spikes, blackouts, and brownouts. Automatic voltage regulation provides a stable AC source during less than optimal power conditions without constant use of internal batteries. Surge elimination technology stops all surges up to 6,000 volts without producing harmful side effects such as ground contamination or common-mode disturbances. Over/Under Voltage Protection:
  - i. Middle Atlantic; UPS

## **2.4 SYSTEM ALTERNATES:**

- A. Wireless AV Interface - Recommended Components
  - a. The following components are typical of those necessary to fulfill the system requirements for the secondary/confidence monitor system option. The prospective contractor should provide components and necessary accessories in quantity necessary to fulfill system requirements.
  - b. Wireless AV Interface: Rack mount device which supplies HDMI signal to display/switcher, etc. Capable of a WiFi connection to up to four sources, including PC, Mac, Android, or iOS devices. (two required):
    - i. Crestron Air Media AM-100

## **2.5 AC POWER**

- A. The Technical System Contractor shall furnish a multi-receptacle power strip for each AC circuit within the equipment rack(s). Furnish a minimum of 2 spare receptacles (beyond that required for the connected equipment, rack fan, etc.) within each equipment rack. Each equipment rack shall contain a minimum of 2 un-switched AC power receptacles.
- B. UPS Surge Suppressor, two rack space UPS with 1000 VA power rating, 15A input. UPS provides power conditioning and non-MOV based surge suppression. Two receptacles with battery back-up and surge suppression, four receptacles with surge suppression (two required for each rack):
  - a. SurgeX SU 1000Li.
- C. All equipment shall be connected so that maximum rated performance can be obtained without exceeding the AC circuit capability.

## **Part 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Coordinate with the project Owner for the required location of junction boxes, outlets, and conduit.

- B. Carefully inspect areas where equipment will be installed. Notify the Owner of any conditions that would adversely affect the installation and subsequent operation of the system.

### **3.2 PHYSICAL INSTALLATION**

- A. Each conduit shall include a minimum of one spare cable or 10%, whichever is greater for each type of cable pulled including line-level, microphone-level, loudspeaker, control, video, and control system. Neatly bundle a minimum of 10-feet of cable at each end of each spare circuit. All spare circuits shall be labeled and noted on the Technical System Contractor's field drawings for inclusion into the record drawings. Spare cabling requirements do not apply to the television distribution system.
- B. Install any floor-mounted receptacles, so that release buttons (for both receptacles and cable connectors) are easily accessible when cable connectors are installed.
- C. Blank panels and vent panels shall be installed in unused rack spaces. Ensure that air flow within the rack is maintained (i.e., cool air can enter the rack, and hot air can exit the rack).
- D. Equipment racks and other exposed equipment shall be kept covered and protected from airborne contaminants. The Technical System Contractor shall clean all equipment racks and the interior rack floor, before system commissioning activities.
- E. For racks installed in credenzas, fasten carpet tiles or low friction sliders to the bottom of the rack to protect the finish of the furniture.
- F. Where the design location requires that products, materials, or equipment are visible to the public, no manufacturer's logos shall be visible. Unless otherwise directed, neatly remove or permanently paint out such logos.
- G. Furnish all equipment with factory finish where possible using the standard available factory color(s) as selected by the Owner. The Technical System Contractor shall retain responsibility for notifying the Owner regarding color options of relevant technical system equipment before ordering equipment from each manufacturer.

### **3.3 CABLE MANAGEMENT AND TERMINATION**

- A. Install all rack-mounted equipment without IEC removable power cords so that the power cords are dressed using removable fasteners such as velcro and there are no obstructions to the item being pulled out from the front of the rack.
- B. When dressing cables within the rack, do not tighten tie wraps so that the cable is deformed.
- C. Use Velcro tie wraps for all laced or bound UTP cables, hand tightened and spaced at various inconsistent distance intervals. Do not use zip ties for UTP cables.
- D. All work associated with data-related cabling such as CAT5e, CAT6, and/or fiber shall comply with the most recent requirements set forth in EIA/TIA 568B, 569, 607, TSB-40A, ISO 8877, Bell Publication 47102, or related standards. All terminations shall meet or exceed the Category rating of the cable to which they are attached. All data-related cabling entering a rack shall be terminated to a Data Patch Panel. Rack intra-connect cabling utilizing factory-terminated cable assemblies are not required to pass thru a Data Patch Panel. Racks with less than five (5) category cables entering the rack do not require a patch panel.
- E. Factory terminated cable assemblies are only permitted for use within racks, between devices external to racks, or as portable equipment. Not permitted for use in conduit unless specifically noted as such. It is permitted for rack inter-connect when racks are in close proximity (same

room) and may pass thru conduit if necessary in this situation. Required for rack intra-connect where applicable. Cable assemblies should be the minimum length needed to accomplish the connection.

- F. Dress cables so that terminations are free from stress due to gravity acting on the cabling. Use cable supports as required depending on the size and stiffness of the cable.
- G. Do not exceed the maximum cable bend radius as specified by the cable manufacturer.
- H. Terminate cables with sufficient service loop to allow for at least one re-termination without having to open a cable bundle or pathway.
- I. All audio circuits shall be separated according to function; e.g., microphone circuits shall be separated from line-level circuits which are separated from video circuits which are separated from loudspeaker circuits. Where audio and video circuits are installed in conduit or other raceways, separate conduits are required for the various circuit functions.
- J. Control and video circuits can be routed with line-level circuits if separate conduit is not furnished for these circuits. Intercom circuits may be run with microphone circuits in limited cases where so shown on the drawings.
- K. Where circuits are exposed in the equipment racks or large junction or pull boxes, the circuits shall be bundled according to function.
- L. Circuits shall not be spliced except as shown on approved shop drawings. Unused transformer tap leads shall be bundled, insulated (with splice caps or plastic electrical tape), and secured inside the junction box so that lead conductors contact neither each other nor the junction box.
- M. All solder connections shall be made with soldering iron and rosin core solder. All solder connections shall be checked for "cold" solder joints by the Technical System Contractor.
- N. All audio circuits terminating to screw-type connectors shall be installed with non-insulated brazed seam spade lugs of the proper size for wire and screw connection.
- O. Install equipment so that it can be pulled out for repair or replacement without hindrance. If there are obstructions prohibiting the disconnection of terminations on the back side of the technical equipment, there must be sufficient cabling to permit the equipment to be pulled from the front allowing for easy disconnection.
- P. If the equipment is removed or replaced for service, ensure that it is very easy to find the proper cable termination points when the equipment is re-installed.

### **3.4 LABELING**

- A. All permanent labeling of equipment shall be Lamacoid plates or other engraved plastic laminate plates.
- B. All labeling of cables within equipment racks shall be clearly legible with unambiguous identifying labels. Identify all cables clearly with permanent labels wrapped about the full circumference within one (1) inch of each connection. Assign wire or cable designations consistently throughout a given system. Each wire or cable shall carry the same labeled designation over its entire run, regardless of intermediate terminations. Document all cable labels for record drawings.
- C. Cable labels shall be located near both ends of the termination and shall be visible without system disassembly (i.e., not hidden within a cable bundle). Labels shall be permanent and non-slipping. Use clear heat shrink tubing if needed to protect cable labels.
- D. All labeling of exposed cables shall be printed to match the labels shown on the drawings. The label shall be covered with clear heat shrink tubing near the termination.

- E. Embossed plastic tape labeling is not acceptable for labels in any location.
- F. All equipment in equipment racks shall be labeled front and rear for ease of identification. Equipment shall be labeled as indicated within quotation marks shown on technical system drawings. Labels shall be of a contrasting color with that of equipment color to promote visibility.
- G. Install permanent labeling on the front of each equipment rack in a row of racks identifying the rack designation (number).
- H. Label data patch panels according to the far-end device name.
- I. All labels for input/output plates, touch panels, and other control panels shall be consistent with the final room numbering for the facility.
- J. Label each end of each AC power cable for each device. Label shall be clearly visible at both ends.
- K. Within each rack and at other remote locations for technical system equipment, label all associated AC power receptacles reflecting the appropriate circuit breaker. Ensure that the circuit breakers are labeled as to the rack or remote equipment location.

### **3.5 POWER AND GROUNDING**

- A. Equipment rack ground shall be only via the insulated ground wire provided by the Electrical Contractor for technical system ground. Equipment racks shall be isolated from other ground paths such as building steel and from the ground via conduit.
- B. All technical system equipment shall be connected to the appropriate circuits of the technical power system.
- C. AC power switches located on the front panel of equipment mounted in the racks shall be covered by a security covers. Exclusions from this list are items requiring user interface such as compact disc players, DVD players, tuners, and wireless microphone receivers.

### **3.6 AUDIO EQUIPMENT INSTALLATION**

- A. All audio circuits shall be balanced two-wire circuits, with a separate grounding shield conductor, unless noted otherwise. All circuits shall have either the red or white wires as the "high" or "+" side of the line and connect to pin 2 of microphone-type XLR audio connectors and the tip of 3-conductor phone connectors. The black wire of the two-wire circuit shall be the "low" or "-" side of the line and connect to pin 3 of microphone connectors and the ring of 3-conductor phone connectors. The shield conductor shall connect to pin 1 of microphone connectors or to the sleeve of phone connectors.
- B. Shields shall be connected at each end of each wire to the pin 1 of each XLR, shield connection for each electronic device, etc. No shield wires shall be left unconnected except where noted on the drawings, nor shall any shield come in contact with conduit, pull boxes, or other building steel. Audio line-level circuit shield wires shall be grounded to rack sheet metal only via rack-mounted equipment. Shields shall be electrically isolated in multi-conductor cables. Shields for audio line-level circuits connected to audio transformers shall be connected to transformer electro-static shields and case ground.
- C. In the case of an unbalanced source feeding into a balanced input and the cable run is short (i.e., less than fifteen feet), connect the signal connection of the unbalanced connector to the "high"

side of the balanced input. Connect the “ground” connection of the unbalanced line to the “low” side of the balanced connector. Connect the cable shield to the shield connection of the balanced input but do not connect it to the unbalanced connector. If the cable run is longer than fifteen feet, balance the line at the unbalanced source using specified balancing devices.

- D. In the case of a balanced source feeding into an unbalanced input and the cable run is short (i.e., less than fifteen feet), connect the “high” side of the balanced output to the signal input of the unbalanced connection. Connect the “shield” to the “ground” of the unbalanced connection. Leave the “low” side of the balanced output floating.
- E. Loudspeakers in the same acoustic space shall all be wired to produce consistent polarity with a mono input signal. They shall also be polarized such that positive acoustic pressure on a microphone results in a positive acoustic pressure at all loudspeakers.
- F. Loudspeakers shall be installed such that they do not produce nor cause mechanical rattles in the surrounding structure. There shall be no audible vibration or noise caused by the improper mechanical installation or defective components.

### **3.7 VIDEO EQUIPMENT INSTALLATION**

- A. Compression fittings shall be used for all BNC and F connector terminations.
- B. For fixed projector installations, signal cables shall be routed within the mounted pipe. Signal cables shall not be tied to the outside of the pipe. Bundle excess cable above the ceiling, not at the projector. Ensure that the maximum bend radius for the cables is not exceeded.

### **3.8 NETWORK CABLING, TESTING, AND DOCUMENTATION**

- A. The Technical System Contractor shall be responsible for coordinating all aspects of the network, including connection and configuration with the Owner’s LAN. Utilize the Owner’s designated configuration style.
- B. All technical system devices with an Ethernet port shall be connected to the associated AV network.
- C. The Technical System Contractor shall document the IP and MAC addresses of all IP capable equipment for inclusion with the Operation & Maintenance Manuals.
- D. The Technical System Contractor shall secure the entire network, documenting all passwords. Coordinate this with the Owner’s Representative.
- E. The Technical System Contractor shall test all (100%) data cabling, copper and fiber, throughout the entire network where audio, video, control, or other system-related signals travel.
- F. Copper testing shall include the following:
  - a. Test procedures shall meet or exceed the most demanding of the ANSI/TIA-568-C.2, IEEE 802.3, or the current standard.
  - b. Tester shall be a minimum Level III test unit and comply with the accuracy requirements as defined in ANSI/TIA-1152. Suggested test equipment includes:
    - i. Fluke MicroScanner Cable Verifier
    - ii. Hobbes LanSmart TDR
    - iii. Test-Um TP600 LanRoverPro.

- c. Cables shall be tested from the patch panel to patch panel, patch panel to device, device to device, patch cord, etc.
- d. Pass/Fail results shall comply with Section 4.2.2 of ANSI/TIA-1152 or the current standard. Any Fail or Fail\* result yields a Fail for the cable/link tested. All cabling must achieve a Pass or Pass\* result to pass.
- e. Testing shall include, but not be limited to, the following:
  - i. Wire Map
  - ii. Length
  - iii. Insertion Loss
  - iv. NEXT Loss
  - v. PS-NEXT Loss
  - vi. ACR-F Loss
  - vii. PS ACR-F Loss
  - viii. Return Loss
  - ix. Propagation Delay
  - x. Delay Skew
- f. Fiber testing shall include the following:
  - i. Test procedures shall meet or exceed the ANSI/EIA/TIA-526-14 standard, Method B, or the current standard.
  - ii. Tester shall have the ability to measure end-to-end performance per EIA/TIA-455-53A. Record each fiber length, source reference power, bandwidth, optical power tested at the receiving end, and optical loss. Recommended test equipment includes:
    - 1. Fluke FTK1450 Fiber Verification Kit
    - 2. Approved equal.
- g. Cables shall be tested from end point to end point including patch connections.
- h. The Technical System Contractor shall implement remedial measures to achieve 100% Pass results.
- i. Test results shall be transferred from the measurement device to a Windows-based database utility that allows for the maintenance, inspection, and archiving of these test records. These shall be included as a portion of the Operation/Maintenance manuals described later in these specifications.
- j. The Technical System Contractor shall demonstrate field testing as/when requested by the Owner's Representative on any portion of the cabling system.

### **3.9 CONTRACTOR'S TESTING AND ADJUSTMENT**

- A. At the completion of the installation, the Technical System Contractor shall perform the following tests on the system to ensure proper installation and operation. The technical system shall be fully tested with all equipment on site, installed, connected, and fully operational. The Technical System Contractor shall record the results of all tests, provide this information to the Owner prior to the time of commissioning, and provide written notice to the Owner that the system(s) is (are) ready. All test equipment used for these tests shall be on site during the system commissioning activities should verification of submitted measurements be required.

The Technical System Contractor shall utilize the technical support services offered by the manufacturers of the various technical system components to ensure optimum performance.

- B. Tests shall include the following:
- a. Measure and record the impedance of all loudspeaker circuits at the output of each amplifier. During this process, also check each loudspeaker circuit for shorts to ground.
    - i. Recommended impedance measuring equipment includes the following:
      1. Dayton Audio WT3
      2. NTI Minirator MR-PRO
      3. Sennheiser ZP-3
      4. Terrasonde/Sencore Audio Toolbox
    - ii. Unacceptable measurement devices for loudspeaker impedance include the following:
      1. Digital Multimeter (DMM)
      2. TOA ZM-104
      3. TOA ZM-104A
  - b. Verify that each masking loudspeaker is connected to the respective power amplifier channel (A or B) and the respective loudspeaker circuits for each floor.
  - c. Verify subjectively that each loudspeaker is issuing full spectrum signal (both woofer and tweeter/horn are operating) using full spectrum pink noise at a sufficient level.
  - d. Verify each loudspeaker works in conjunction with the current recording and broadcasting system in the room.
  - e. Verify each loudspeaker is connected to the respective power amplifier and supply approximately 2-watts of 1/3-octave bands of pink noise to each loudspeaker to ensure loudspeakers do not rattle. Recommended 1/3-octave band pink noise sources include:
    - i. Terrasonde/Sencore Audio-Toolbox
    - ii. Japan Audio Society CD-1 test compact disc
    - iii. NTI Minirator MR-PRO.
  - f. Feed a 1-KHz 0dBm (0.775 volts) sine wave signal into all system line-level input locations, including the program source devices (with the power amplifiers turned off). The gain adjustment controls for all electronic devices shall be initially set for unity gain throughout the system electronics through to the inputs of all power amplifiers, assistive listening transmitter, system outputs, codecs, recording devices, and other system outputs.
  - g. Test all system audio electronic components for frequency response from input to the power amplifier output.
  - h. Verify that all microphone, line level, and production intercom cabling are installed with Pins 1, 2, and three wired properly, and there are no shorts to the ground (make sure production intercom power supply is disconnected for these tests). Recommended test equipment includes:
    - i. Alphonson ACT-100 Remote Tester
    - ii. NTI Minirator MR-PRO with Cable Test Adapter
    - iii. A microphone is NOT an acceptable measurement device for cable tests.
  - i. Verify that all video cables pass a DC continuity cable test. Recommended test equipment includes:



- i. Fluke MicroScanner Cable Verifier
    - ii. Test-Um CX200
    - iii. Triplet 8-Way WireMaster Coax
  - j. Setup and configure each wireless microphone system using the software provided by the manufacturer of the wireless microphone system. Adjust the transmitter audio output so as to not clip during maximum usage. Verify each microphone transmitter/receiver combination operates flawlessly without dropouts, interference, or other anomalies.
  - k. Setup and calibrate each visual display to optimize the image for each source and a variety of resolutions. For projector/screen combinations, the screen drop shall be set so as to maximize observation from all seats, and the image shall fill the available space on the screen.
  - l. Setup and configure the audio signal flows within the DSP. Utilize the information provided on the drawings and specifications if no information is available contact the Owner to discuss the configuration. The Technical System Contractor shall be responsible for complete and accurate signal flows.
  - m. Verify performance of the Control System, including the operation of all control features.
  - n. Setup and configure the assistive listening system. Walk the entire facility using speech as the program material to verify uniform coverage in all areas.
  - o. Functional tests of all equipment and software. The functional tests shall include operational tests of all program source equipment (record and playback), wireless microphone system, mixing console, system inputs and outputs, all patch panel receptacles, intercom system, video switching, video distribution, operational controls, AC power sequencing, operation of software, and all system electronics. Functional tests include examination for hum, buzz, hiss, ghosts, hum bars, oscillation, thumps, unintended reception of other signals such as AM or FM radio, TV, CB, ham radio, cell phones, or any other unwanted signals through the system.
  - p. Verify that all microphone connectors, extension cables, and microphones are wired properly and in polarity.
  - q. Ensure that all equipment is on the job-site and fully operational. This includes portable (not installed) items such as microphones, microphone stands, cable tester, microphone, and video cables, headphones, adapters, and other loose equipment. Remove all devices from shipping or packaging containers, ready for use, and place in the equipment storage cabinet.
  - r. Repair or replace any defects or malfunctions found before the commencement of commissioning activities by the Owner.
  - s. The Technical System Contractor is encouraged to contact the Owner should problems or concerns that arise during the testing activities.
- C. The Technical System Contractor shall record all products used, wire numbers, connection numbers, and any changes to the systems accurately mapping the system installation, including the data network components. This information shall be used for inclusion with the system record drawings as described later in the specifications.

### **3.10 SOUND AND AV COMMISSIONING**

- A. Sound and A/V systems will be commissioned by the contractor. This process involves extensive tests and adjustments, requiring the room(s) to be clean and quiet. After commissioning, the Contractor shall demonstrate the use of all system features and parameters to the Owners Representative. Any outstanding or non-functioning items (including control system functions that are non-intuitive) shall be documented by the Owner and transmitted to the Contractor as tasks required for revision and completion. Adequate opportunity shall be provided to the Contractor to remedy outstanding items in a timely manner.

### **3.11 TRAINING/FIRST USE**

- A. After the technical system is operational, the Technical System Contractor shall provide verbal instruction to the designated Owner's Representative as to proper methods of system operation.
- B. The Technical System Contractor shall provide operational assistance for the first major use of the completed system as directed by the Owner's Representative, including being present for one prior rehearsal associated with the first event (if applicable); a technical-check immediately before the first event, and the first event itself.

### **3.12 OPERATION & MAINTENANCE (O&M) MANUALS**

- A. At the completion of the project, the Technical System Contractor shall compile a minimum of one hard copy of Operation/Maintenance manuals.
- B. Operation Maintenance hard copy shall include the following:
  - a. Complete list of all equipment supplied for the project.
  - b. Drawings of record.
  - c. Original copies of manufacturers' engineering data sheets on ALL supplied equipment.
  - d. Original copies of ALL literature supplied with each item of equipment, including operating instructions and maintenance manuals. Manuals not routinely supplied with an item of equipment are not required.
  - e. AV Network documentation including a list of all devices connected to the AV network along with their respective MAC and IP addresses, and passwords.
  - f. Results of the data network and preliminary systems testing.
  - g. Other "as installed" contractor-generated or vendor-generated drawings of the system which are not otherwise reflected in the project drawings or these specifications.
- C. Where equipment is adjusted via computer, each binder shall include one complete clearly labeled copy of all current software, data files, as un-compiled source code, on CD-ROM(s). Each time the software, data files, or control system source code is updated during the warranty period, the Technical System Contractor shall provide the Owner's Representative with updated copies on CD-ROM(s). Install the CD-ROM(s) in the binders using plastic CD/DVD binder sheets, Fellowes No. 95304 or equivalent.

### **3.13 WARRANTY**

- A. The Technical System Contractor shall warrant all work executed under this contract, including all in-shop and onsite material, parts and labor, for a period of twelve months after the date of final acceptance.
- B. The warranty services are limited to normal business hours unless additional agreements are made between the Owner's Representative and the Technical System Contractor.

- C. Warranty work relating to technically complex equipment and/or programming such as for video projectors, digital signal processing, control systems, and codecs shall be performed by a factory authorized technician.
- D. The Technical System Contractor shall visit the job just prior to the end of the warranty period to check all equipment for proper system operation. Any defective equipment found shall be replaced or repaired under the terms of the system warranty.
- E. The Technical System Contractor shall not be responsible for damage to the system resultant from improper use or adjustment by others, negligence, acts of nature, or other causes which are beyond the Technical System Contractor's control.

**4.1 Bid Clarification Questions:** After reviewing all bids received in response to this bid, the District may develop a list of clarification questions to be addressed by the Bidder. The District or its agent will send these questions to the Bidder for clarification. The Bidder shall respond within three (3) working days following the inquiry.

**4.2 Bid Format:** Bids shall be submitted by tab number as instructed below. The Bidder agrees and will comply with all provisions and specifications as stated in this bid unless otherwise stated in the Exceptions section of this bid. Any additional cost or factors to meet a specification or requirement must be noted in the exceptions section. Failure to respond to these requirements may result in the bid being considered non-responsive or not within specifications.

- A. Tab 1 – Minimum Criteria with Bid Submission Information
- B. Tab 2 – Required Documents - Authorized officer's signature
- C. Tab 3 – Completed pricing sheet
- D. Tab 4 – Exceptions

**4.3 Request for Bid:** It is the sole responsibility of the Bidder to ensure that they have received the entire bid.

**4.4 Descriptive Material:** The District is not responsible for locating or securing any information that is not identified in the bid and reasonably available to the District. To ensure that sufficient information is available, Bidder must furnish as a part of this bid all descriptive material necessary for the District to (1) determine whether the product offered meets the requirements of the proposal and (2) establish exactly what the Bidder proposes to furnish in terms of supplies, materials, and services.

**4.5 Request for Additional Information:** Prior to the final selection, Bidders may be required to submit additional information regarding the Bidder's qualifications and experience that the District may deem necessary to further evaluate the bidder's qualifications.

**4.6 Bid Award:** The bid consists of a base configuration that will be accepted or rejected in its entirety and bid options that the District may accept or reject individually without regard to the listing order of the option, but only as the District determines it is in its best interest.

**4.7 Right to Accept/Reject:** The District reserves the right to reject any bids that do not conform to the requirements of this bid or all bids.

- 4.8 Denial of Reimbursement:** The District will not reimburse Bidders nor have any liability for any costs associated with the preparation and submittal of any bid, or for any travel and/or per diem costs that are incurred.
- 4.9 Gratuity Prohibition:** Bidders shall not offer any gratuities, favors, or anything of monetary value to any official, employee, or agent of the District to influence consideration of this bid.
- 4.10 Right of Withdrawal:** A bid may not be withdrawn before the expiration of Ninety (90) days from the bid due date.
- 4.11 Rights to Submitted Material:**
- A. All bids, responses, inquiries, or correspondence relating to or in reference to this bid, and all reports, charts, and other documentation submitted by Bidders shall become the property of the District when received.
  - B. The District reserves the right to retain all bids submitted and to use any ideas in a bid regardless of whether that bid is selected. Submission of a bid indicates acceptance by the Bidder of the conditions contained in this bid.
- 4.12 Submittal of Qualifications:** Bidders must submit experience and qualifications as described in the bid. Additional information may be submitted and/or requested by the District as appropriate to further describe vendor and provide product capabilities.
- 4.13 Code Integrity Warranty:** The Vendor warrants and represents that the Vendor's software, other than the key software, does not and will not contain any program routine, device, code or instructions (including any code or instructions provided by third parties) or other undisclosed feature, including, without limitation, a time bomb, virus, software lock, drop-dead device, malicious logic, worm, Trojan horse, bug, error, defect or trap door that is capable of accessing, modifying, deleting, damaging, disabling, deactivating, interfering with or otherwise harming the software, any computers, networks, data or other electronically stored information, or computer programs or systems (collectively, "disabling procedures"). Such representation and warranty apply regardless of whether such disabling procedures are authorized by the Vendor to be included in the Vendor's software. If the Vendor incorporates into the software programs or routines supplied by other vendors, licensors or contractors (other than the key software), the Vendor shall obtain comparable warranties from such providers or the Vendor shall take appropriate action to ensure that such programs or routines are free of disabling procedures. Notwithstanding any other limitations in this agreement, the Vendor agrees to notify the District immediately upon discovery of any disabling procedures that are or may be included in the software, and, if disabling procedures are discovered or reasonably suspected to be present in the Vendor's software, The Vendor, as its entire liability and District's sole and exclusive remedy for the breach of the warranty agrees to take action immediately, at its own expense, to identify and eradicate (or to equip the District to identify and eradicate) such disabling procedures and carry out any recovery necessary to remedy any impact of such disabling procedures.

TAB 3 - Completed Pricing Sheet

TAB 4 - Exceptions