

## SECTION 27 41 16.51 - AUDIO VIDEO SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- a. The Contractor, Subcontractors and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.1A, entitled "Related Documents."
- B. Related Drawings:
  - 1. "IT" Drawings – Technology Plans
- C. Section Includes
  - 1. Interactive Display with Mounts
  - 2. Document Cameras
  - 3. Video conferencing Cameras

#### 1.2 BIDDER RESPONSIBILITY

- A. This specification and the AV drawings are detailed only to the extent necessary to show design intent and signal flow. The bidder shall examine and be thoroughly familiar with all contract drawings, design intent, systems specified, their installation, configuration, and industry best practices. The contractor is responsible for all devices and configuration required to produce a fully functional system, including devices that may not be documented on either this specification or the AV drawings. Equipment required to meet this requirement shall be provided without claim for additional payment. Specific products to meet the required functionality are listed within this specification and notated within the AV drawing package.

#### 1.3 FUNCTIONAL REQUIREMENTS

- A. The contractor shall furnish and install the AV devices specified herein and within the IT drawings and integrate them into the owner furnished audio visual systems.

#### 1.4 SUMMARY

- A. Furnish and install interactive boards, document cameras, and video cameras as shown on drawings and as specified herein, complete with all apparatus, equipment, power supplies, wiring, labor, and services necessary to ensure a complete working system. Verify completeness of equipment listed and correctness of type numbers. Furnish and install supplementary equipment needed to meet system requirements, without claim for added payment. Labor furnished shall be specialized and experienced in systems installation.
- B. Interconnection from/to all devices and teachers station outlets, testing, and all configurations, are part of this section.
- C. This work includes, but is not limited to the following:

1. Secure all devices specified within existing plenum rated enclosures, or backboxes, or on wall behind displays, as required and specified.
2. Furnish and install interactive displays with the specified display mounts.
3. Furnish any additional items, not specifically mentioned herein, to meet system requirements as specified, without claim for additional payment. Such items may include hardware, transformers, line/distribution amplifiers, and other devices for proper installation, interface, isolation or gain structure.
4. Submission of shop drawings prior to fabrication.
5. Verification of dimensions and conditions at the job site.
6. Installation in accordance with these specifications, manufacturer's recommendations, and all applicable code requirements.
7. Setup and adjustment of signal processing, system tests and adjustments, written report, demonstration for approval, participation in acceptance tests, and final adjustments as required.
8. Coordination with the Electrical Contractor is required to assure correct Systems conduit routing, Systems backbox locations, and clean power circuit locations as specified in Division 26 – Electrical.
9. Coordination with the Public Address Systems Contractor
10. Coordination with the Tel/Data Contractor and other Low Voltage Contractors
11. Coordination with the Owner's IT department and installers
12. Performance standards, without claim for additional payment
13. System Documentation
14. Instruction of owner's operating personnel
15. Maintenance and services for two years
16. Guarantee all equipment and components for the specified period from the date of acceptance.

- D. All work described within this section must be coordinated with other trades to ensure a successful installation.

## 1.5 SUBMITTALS

- A. Provide Submittals in accordance with requirements of Division 01 – General Requirements and as described within this specification.
- B. Bidder Qualifications (Pre-Bid Submittal):
1. Perspective bidders must be thoroughly experienced in installing, engineering, configuring and testing systems of the scope and size specified. Bidders must be a system integrator, normally engaged in the business of audiovisual and sound reinforcement system installation. Bidder shall provide a list of systems their company has furnished and installed of similar size and scope within the last (5) years. Indicate project name, address, and reference.
  2. Bidder shall have qualified CTS, CTS-D, and CTS-I engineers, technicians, and project managers who will be assigned to this project. A CTS-D and CTS-I shall be employed on this project for the entirety of the installation and close-out.
  3. The bidder shall have a qualified and certified system programmer who will program the system. Submit all manufacturer certifications related to system programming, DSP programming, and control programming.

- C. Bid Submittals:
  - 1. In conjunction with the bidding requirements set forth in the Division 01 documents, the bidder shall submit itemized unit prices for all devices, or their equivalents, listed within this specification or documented on the AV drawings.
  - 2. The bid price shall include any Add-Alternates described.
- D. Product Data: Submit manufacturer's technical data, product specifications, installation instructions, and other pertinent information as applicable for each product or material specified or required. Do not procure material or begin work until product data and shop drawing submittals have been approved. All product data shall be submitted in one submission, in PDF format, with manufacturer provided specifications and cutsheets.
- E. Shop Drawings: Shop drawings shall be created in ACAD or equivalent and submitted electronically in DWG and PDF.
  - 1. Include plan view locations, elevations, installation details, and accessories.
  - 2. Complete list of wire run numbers and termination locations of each end.
  - 3. Provide IP address table and addressing protocol in coordination with Owner's IT department.
  - 4. Submit samples of lettering/label size and typeface for custom plates, panels, or other equipment where required.
  - 5. Provide EDID and HDCP management plan for all video signals.
  - 6. Consultant and Architect shall approve all panel and furniture finishes. The Consultant and Architect may request samples of finishes which the Contractor shall provide at no additional cost to the project.
  - 7. Provide conduit riser documented in plan and elevation view.
- F. Closeout Submittals:
  - 1. Create user manuals for all devices within the system, including instructions for how to use the device.

#### 1.6 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain all materials from one source from a single approved manufacturer for each different product required.
- B. Certification: CE, FCC Class A

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Take care in handling products in accordance with manufacturer's instructions.
- B. Store indoors in original undamaged packaging, in a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity. Store products upright in

secure, protected area. Do not stack! Verify with manufacturer that site conditions are acceptable before receiving material.

- C. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:
  - 1. Interior, Controlled Environment: System components installed in temperature-controlled interior environments shall be rated for continuous operation in ambient temperatures of 36 to 122 deg F (2 to 50 deg C) dry bulb and 20 to 90 percent relative humidity.

#### 1.8 WARRANTY AND GUARANTEE

- A. All systems and components shall be guaranteed free of defects in materials and workmanship for a period of one (1) year (or to the length of the Manufacturer's warranty if longer) from the date of acceptance and shall be repaired or replaced within forty-eight (48) hours following report of such defects by the owner.
- B. The Contractor shall be available on call and on eight (8) hour notice during the first month following acceptance of the system, to assist the Owner's representatives in any problems which may arise during the initial period of operation. If corrective measures on-site are required, they will be performed within 12 hours of the determination of a need for a site visit.
- C. If, during the Guarantee period, any component is out of service for more than seven (7) days due to unavailability of parts or service, Contractor shall supply and install an identical new component. If an identical component is not available, the Contractor will substitute equivalent equipment, with the approval of the Owner.
- D. During the Guarantee period, the Systems Contractor will provide the Owner with a 24 hour service phone number for emergency calls. A service engineer will respond to all emergency calls within one (1) hour. The personnel answering this call must be fully qualified to troubleshoot problems and propose solutions. A qualifying emergency event is defined as an event that may cause severe hardship or cause the systems to be inoperable or unusable for a scheduled class or event.
- E. During the course of the Guarantee period, the Contractor shall provide a minimum of three (3) service visits to the site for inspection and adjustment of equipment. Contractor shall submit proposed schedule for these visits and shall notify Owner and Systems Designer in writing at least one month in advance of each visit.
- F. During the course of the guarantee period, the Systems Contractor will supply the Owner with any published updates of manufacturer provided operating programs for any and all software-controlled equipment that are issued to correct "bugs". During the Guarantee period, the Owner will rely on the Systems Contractor to determine when to update the software, unless it is needed to correct a situation that renders the systems unstable, non-functional, or otherwise affects operations.
- G. Repeated device failures, defined as the failure of a device or a single type of device three or more times over three contiguous months, will be considered as a failure of a manufactured system and all items of this type shall be replaced at no charge to the Owner.

## PART 2 - PRODUCTS

### 2.1 INTERACTIVE DISPLAY AND MOUNTS

- A. The interactive display manufacturer shall be SMART Technologies.
- B. All Audio Visual and associated cabling required for each system specified within this document is to be furnished, installed, terminated and tested as part of this section.
- C. Wiring Method: Install cables in raceways unless otherwise indicated.
- D. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

### 2.2 BILL OF MATERIAL – BOM

- A. The following bill of material is a guideline for what is minimally required. The AV integrator shall furnish, install, and configure devices required for a fully functional system.
- B. The following devices are offered as REFERENCE only. Actual quantities of all devices MUST be verified with the IT drawings.

| # | MFG    | PART NO.    | PRODUCT DESCRIPTION                                       | QTY |
|---|--------|-------------|-----------------------------------------------------------|-----|
| 1 | SMART  | MX265-V5    | 65" SMART Board MX065-V5 interactive display with IQ      | 6   |
| 2 | SMART  | MX275-V5    | 75" SMART Board MX075-V5 interactive display with IQ      | 16  |
| 3 | SMART  | MX286-V5    | 86" SMART Board MX085-V5 interactive display with IQ      | 12  |
| 4 | SMART  | WM-SBID-200 | SMART Wall Mount for SMART MX series interactive displays | 34  |
| 5 | SMART  |             | SMART Document Camera                                     | 32  |
| 6 | SMART  | SWC-120UHD  | SMART Ultra HD Camera 120                                 | 34  |
| 7 | Lu Uno |             | Interactive Gym Wall Audio System w/1-Year Subscription   | 1   |
| 8 |        |             | Installation                                              | 1   |

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. This specification shall include all installation and setup labor and configuration of all devices to furnish a complete, efficient and effective system.
- B. All cables, connectors and peripheral equipment's required to attain a fully functional system shall be furnished, installed and performed by the contractor awarded this project.
- C. Locate all apparatus requiring adjustments, cleaning or similar attention so that it will be accessible for such attention.

- D. Furnish and install brackets, braces and supports. The minimum fastening or support safety factor shall be at least three (3). Design shall be to the approval of the Architect.
- E. Provide custom color or finish for any equipment or materials supplied which are exposed to public view. Color and finish of all such equipment or materials shall be approved in writing by the Architect. This does not exclude equipment or materials where standard colors and finishes may be specified herein.
- F. The equipment specified herein is designed to operate in environments of normal humidity, dust and temperature. Protect equipment and related wiring where extreme environmental conditions can occur.
- G. Secure equipment firmly in place.
- H. Take precautions to prevent electromagnetic and electrostatic hum. Install equipment to provide safe operation.
- I. Clearly, consistently, logically, and permanently mark connectors, jacks, relays, receptacles, cables, and cable terminations.
- J. SECURE ATTACHMENT OF AUDIO-VISUAL ITEMS
  - 1. To ensure proper attachment of Fixtures, Furnishings & Equipment items, including and Technology items, where "items" are attached to wall, ceiling, overhead structure, and/or floor, Contractor shall provide information adequate for architect to verify items, attached to wall, ceiling, and/or floor are attached securely and per manufacturer's recommendations. Architect's review may be implemented during submittal process.
  - 2. The contractor shall provide struts, hangers, fasteners, safety harnesses, channels, bolts, screws, rods, etc. to securely attach items to existing structure as required to meet field conditions and applicable codes.

### 3.2 COMMISSIONING OF SYSTEMS AND EQUIPMENT

- A. Engage a factory-authorized service representative or technician who is familiar with this project to participate and assist, if necessary, in the functional performance testing of the equipment included in this Division with the Commissioning Agent.

### 3.3 EXAMINATION

- A. Examine room conditions, ceiling and wall surfaces to assure they are in compliance with requirements and other conditions affecting installation and operation of Interactive Whiteboards projectors and speakers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.4 FIELD QUALITY CONTROL

- A. Verify that accessories required for each unit have been properly installed.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements.
3. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation.

3.5 CLEANING

- A. Remove rubbish and debris: Installation contractor is not allowed you use the onsite dumpster and is responsible to discard their own debris off site.
- B. Clean installed items using methods and materials recommended in writing by manufacturer.

3.6 DEMONSTRATION

- A. Bidding contractor shall engage a factory-authorized service representative to train the Owner's maintenance personnel to adjust, operate, and maintain each system described within this specification for the audio-visual equipment. This training shall include twenty (20) hours, in the blocks of hours that shall be described by the Owner.
- B. Upon approval of the above test report by the Architect and at a mutually agreeable time, demonstrate operation of each major component and of the complete installation. After demonstration, assist as required in acceptance tests.
- C. Final Adjustments:
  1. Make control adjustments as directed by the Architect. Make a record of these control settings. Provide covers, caps, or shaft locks for controls not used in system operation.

3.7 COMPLETION

- A. Warranty service shall commence 1 year after acceptance. Warranty service shall be provided during standard business hours within 24 hours after notice of concern.
- B. Labor and materials provided under the scope of project shall be covered under 1-year warranty. Devices shall be free of defects from installation of manufacturer. If an item requires replacement, this shall be provided at no additional cost to the owner. If items are abused or rendered inoperable from misuse, they shall not be covered under said warranty.
- C. The contractor shall engage a factory-authorized service representative to train the Owner's maintenance personnel to adjust, operate, and maintain each system described within this specification for the audio-visual equipment. This training shall include twenty (20) hours, in

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the blocks of hours that shall be described by the Owner. These services shall be considered as part of the contract and at no additional fees charged to owner.

END OF SECTION 27 4116.51