SECTION 27 40 00

AUDIO VISUAL

1.1 SUMMARY

A. Section Includes:
1. Conference Room installed audio-visual and conferencing systems.
2. Security Operations Center installed audio-visual system.
3. Network Operations Center installed audio-visual system.
4. Common area flat panel information displays.

1.2 DEFINITIONS

A. AV System: Installed audio-visual system with display content sources, display content signal transport, displays, user connectivity, and user control interfaces.

B. Conferencing System: AV system with cameras, microphones, speakers, and BYOD (bring your own device) for conferencing platform.

1.3 REGULATORY REQUIREMENTS

A. Installation must comply with the latest requirements of the following codes and Standards.
1. All current local, city, state electrical code & amendments
2. NFPA 70/NEC-2017 (National Electrical Code) 1993 BOCA
3. 2009 NFPA 101
4. 1998 ICC/ANSI A117.1 Handicap Code
5. ANSI-(American National Standards Institute)
6. TIA/EIA-(Telecommunications Industry Association) / (Electronics Industries Association)
7. TIA-568-C.0 - Generic Telecommunications Cabling for Customer Premises
8. TIA-568-C.1 - Commercial Building Telecommunications Cabling Standards - Part 1 General Requirements
9. TIA-569 - Commercial Building Standard for Telecommunications Pathways and Spaces
10. TIA-606 - Administration Standard for the Commercial Telecommunications Infrastructure
11. ANSI/TIA-607-B - Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
12. ISO/IEC 11801 - (International Organization for Standardization) / (International Electrotechnic Commission) Standards
13. ADA-1990 - the Americans with Disabilities Act of 1990 as it relates to telecommunications is covered in "Title IV: Telecommunications," which covers the functionality of devices for hearing and speech impaired individuals and in "Appendix B. Section 4.3.1: telephones," which covers accessibility to telephones and communications devices by the physically impaired.
14. National Electrical Contractors Association/National Electrical Installation Standards (NECA/NEIS) requirements.

15. ANSI/IEEE C2 National Electrical Safety Code TIA/EIA Standards 568 A (including TSB 67), and 607.
16. IEE/ANSI 142 1982 Recommended Practice for Grounding of Industrial and Commercial Power Systems.
17. ANSI/TIA-569B Commercial Building Standard for Telecommunications Pathways and Spaces

1.4 QUALIFICATIONS:

A. Contractor must be licensed by the authority having jurisdiction over the location of the project to perform their scope of work

B. Contractor must have successfully completed (3) similar projects in the past (36) months. Similar refers to size, scope and project type.

C. A minimum of one credentialed project team member is required for applicable industry certifications including:
   1. Audiovisual scope: InfoComm - CTS or CTS-I

D. Project team members must be certified by the manufacturer for all products being provided that require special termination, extended warranty, programming or special configuration. At least one team member must be certified for each product being provided.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
   3. Dimensioned plan and elevations of equipment racks.
   4. Wiring Diagrams: For power, signal, and control wiring.

C. Design Data: Include equipment list consisting of every piece of equipment by model number, manufacturer, serial number, location, and date of original installation.
   1. List of owner IT requirements for addresses, login, access, etc.
   2. Heat loads and power and plug requirements for all active components.

D. Mockups:
   a. One of each device that will be installed into furniture that will be provided by AVC shall be delivered to the furniture vendor to verify form, fit, clearance and cutting required.

b. Each custom touch panel page or custom control programming for an integrated AV system must be submitted with graphical representation of the page, and an outline of purpose for each button or function.

1.6 CLOSEOUT SUBMITTALS

1. Copies of all manufacturer user manuals for products provided as part of the project.
2. Documentation of all final device locations, cable pathways, and labeling
3. Passing test result for all structured cabling.
4. Full report from each active system installed confirming each function has been tested and is functional at the time of the test.
5. An export of all custom programming in an editable and user configurable format.
6. An export of each system with all settings and configurations at the time of the export.
7. Letter of warranty.
8. Service and support contact list.

1.7 WARRANTY

1. A full one-year material, labor and workmanship warranty is required for all systems, products and services provided by the contractor.
2. Extended warranty by manufacturer for end-to-end solution is required with project manufacturer registration
3. Within (6) months of the project completion a technician shall be dispatched back to the project location to verify device positioning, labeling and owner training. A second visit must be completed within (12) months of project completion. This shall be provided at no additional cost to the owner.
4. Firmware and software upgrades including patches shall be included and installed during the warranty period.
5. Service level terms required.
6. On-site support in the event of a system or component error or failure.
7. Monday - Friday 8:00am - 5:00pm local time: 2-hour response.
8. Monday - Friday 5:00pm - 8:00am local time, Saturday and Sunday: 4-hour response.
9. Upon failure of any hardware, repair or replacement shall be provided within 24 hours.
10. A log of all warranty issues and calls shall be provided to the owner at the end of the warranty period.

1.8 SYSTEM REQUIREMENTS

1. General
   a. Each typical room type includes a general functional summary outlining the general scope required for that space.
   b. Each typical room type includes a manufacturer and model for major components required to complete the function summary in the space. It is the responsibility of the AVC to provide all minor components, connectors and cables to complete the system based upon the locations shown on the drawings and the requirements outlined in the function summaries. Equipment model numbers change frequently in the av industry - any discontinued model shall be brought to engineering plus attention with a cut sheet of the replacement.

2. End User Cabling
    a. Unless noted otherwise, each AV system shall be provided with (1) end user connection cable for each connection type and location placed within the room.
    b. End user cabling shall be sized as follows unless noted otherwise.
    c. Tables or furniture connections shall be 6'.
    d. Tables or furniture connections where cabling is fed through grommets for user access the cabling shall be sized to allow for 6' of travel from the grommet for user connections.
    e. Wall or floor connection cables for rooms designed shall be 12'.
    f. Rack connection cables shall be sized as necessary based on the intended distance of the device.
    g. All end user cables shall be designed for commercial use.
    h. Cables to be provided and connected to faceplate prior to punch list for use with testing.
    i. AVC to provide adapters to meet client needs for all end user cables.
3. Control Systems
    a. The systems installed shall generally be easy to use without required training.
    b. The AVC shall be responsible for turning over all equipment manufacturer remotes to the owner.
4. Transmission & Cabling
    a. All video transport exceeding 10 feet or through conduit shall be converted to a digital twisted pair transport.
    b. Streaming: network-based video stream over standard UTP cabling and switches and transceivers at each endpoint.
    c. HDBaseT: shielded twisted pair cabling with converters on each endpoint.
    d. For all transmitter/receiver pairs utilizing twisted pair cabling, also provide an 18 AWG 2-conductor wire along the same path.
    e. Unless noted otherwise all cabling required to complete av interconnections shall be furnished and installed by the AVC.
    f. Audio AVB/Dante: routing out of a controlled space shall be converted to a digital transport allowing multiple channels to be transmitted over single data cables.
    g. Audio Analog: within control environments (e.g., under table, within same room) shielded balanced cabling shall be provided.
    h. Audio Speaker: all speaker cabling shall be routed in separate pathways from audio signal and sized based upon the distance. No speaker cabling shall be smaller than 16awg.
    i. The color of all exposed audio-visual cabling in the ceiling to be confirmed with architect.
    j. All audio-visual cabling to be black unless noted otherwise.
    k. AVC shall mitigate all RF interference and make adjustments as necessary.
5. Flat Panel Displays
    a. Unless noted otherwise, all displays shall be commercially rated and designed for a commercial environment. This includes a full 3-year warranty with commercial use.

b. The number of unique manufacturers and model numbers shall be minimized within a site for service and support.
c. Displays rated for commercial use shall be rated for 12 hours, 5 days per week.
d. Minimum brightness of displays (nits): no windows=250 | with windows=400
e. Flat panel mounts shall be provided by the AVC with proper rating and certification from the mount manufacturer for the display provided.
f. The maximum depth of the display and the mount must be less than 4" from the finished wall in any path of travel per ADA.
g. Lock out or block inputs that are not being utilized on the displays. The AVC is required to go into the menu and blank out the inputs that are not used.
h. The final installation, elevation and coordination of the flat panel displays shall be completed by the AVC.
i. In rooms that utilize the manufacturer's remote for control, remotes must be attached with velcro to the back of display in a location that is accessible to end users.

6. Audio
   a. AVC shall integrate all audio systems into fire alarm system for emergency communications as required by AHJ. AVC to coordinate with fire alarm contractor. Fire alarm contractor to provide relays and cabling from fire alarm system as needed.
   b. AVC shall provide all DSP programming for the system and tune the inputs and outputs to optimum levels.
   c. Equalizer setting shall be configured for all input and output channels and tuned to the device and room configuration including loudness.
   d. Auto gain shall be set on all variable input sources
7. Furniture
   a. User connectivity boxes: AVC shall coordinate with the furniture vendor inserts or grommets required for av connectivity within furniture.
   b. A sketch shall be provided by the AVC and approved by owner prior to hole drilling or cutting.
8. Rack requirements
   a. The AVC is required to provide all rack mounting hardware for all source equipment.
   b. The AVC is required to provide a blank rack panel as needed in between all equipment to fully populate the rack front.
   c. Ul listed cords and power strips are required for all rack and equipment power.
   d. Cooling fans and ventilation are required for adequate airflow.
   e. Proper grounding is required at each rack
   f. Existing equipment
   g. AVC is responsible for the removal and relocation of all owner equipment that will be reused.

1.9 AUDIO VISUAL FUNCTION SUMMARIES

1. Functional summaries identified on the drawings.

1.10 AUDIO VISUAL EQUIPMENT SCHEDULE

1. Acceptable equipment identified on the drawings.

END OF SECTION 27 40 00