SECTION 27 5141

PLATFORM SOUND REINFORCEMENT SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Middle school platform sound reinforcement system: Locally controlled complete independent operating auxiliary sound reinforcement system for the pick-up, and amplification of voice and/or music.

1.2 RELATED SECTIONS

A. Installing cable rated below 100-volts: Section 26 0519.

B. Conduit: Section 26 0533.

C. Boxes: Section 26 0534.

1.3 SYSTEM DESCRIPTION

A. Audio inputs (voice and music) via XLR microphone jacks and 3.5 mm stereo jack, and CD player and Bluetooth receiver in equipment rack, at locations indicated on Drawings

B. Audio output (voice and music) to associated loudspeakers via amplifier.

C. Mixer with bass and treble controls.

D. Assistive listening system for use by the hearing impaired.

E. Priority override signal to mute the system when the main building Sound and Intercommunications System activates the priority override function.

1.4 SUBMITTALS

A. Bill of materials: Complete detailed list of components (equipment, modules, devices, accessories) and wiring (cabling) indicating specific quantities, and catalog or model number for each product.

B. Product data: For each type of product.

C. Shop drawings:

1. Schematic wiring diagrams indicating interconnections of each component and terminal designations. Indicate number, size, and type of wiring.
2. Description of system describing how each component functions in the system.
3. Elevation of equipment rack, showing each rack-mounted component location.
4. Floor plans showing locations of components, wiring (cabling) routing and interconnections. Indicate number, size, and type of wiring.

D. Record drawings: Specified in Division 01 and Section 26 0101 showing location of components, wiring (cabling) routing and interconnections, indicating number, size, and type of wiring. Include with operation and maintenance manuals.

E. Operation and maintenance data: Include operation and maintenance manual for each rack-mounted component and speakers.

1.5 QUALITY ASSURANCE

A. Components specified herein shall be the product of manufacturers of established reputation and experience who shall have produced similar apparatus for a period of at least ten years and who shall be able to refer to similar installations now rendering satisfactory service.

B. System shall be furnished by a duly authorized distributor of the components specified, certified to design, program, and service the system, and showing evidence of successfully furnishing systems specified for at least five years.

C. Installer shall be an established communications and electronics contractor currently maintaining a locally run and operated business for at least five years.

D. Components for this system shall be listed by Underwriters Laboratories, Inc. (UL), bear the UL label and shall be installed in accordance with requirements of NFPA 70 National Electrical Code (NEC), state and local codes.

E. Electrical components, devices, and accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

F. Comply with NFPA 70.

1.6 WARRANTY

A. Refer to Division 01 and Section 26 0101 for warranty requirements and warranty correction period.

B. Warrant that components are new and free from defects in material and workmanship, and will, within the specified terms of the warranty, repair or replace any component found to be defective.

1.7 MAINTENANCE SERVICE

A. Installer shall be prepared to offer a service contract for the maintenance of the system beyond the warranty correction period.

PART 2- PRODUCTS

2.1 MANUFACTURERS

A. Sound reinforcement system(s) components shall be manufactured by ART AV DIRECT, ATLAS SOUND/IED, BTX, CROWN, DENON, ELECTRO-VOICE, IDEC, PASO, RCI, SHURE, TASCAM, WHIRLWIND, and WILLIAMS SOUND as specified.

B. Field wiring: WEST PENN WIRE, or approved equal by CONSOLIDATED WIRE, GENERAL CABLE, PAIGE, or TAPPAN.

2.2 AUXILIARY SOUND REINFORCEMENT SYSTEM EQUIPMENT RACK

A. Wall-mounted equipment rack by ATLAS SOUND/IED Model No. WMA24-23, textured black finish, with minimum of 42 vertical inches of standard 19-inch-wide rack mounting space, complete with SFD24 solid front door, cylinder lock with keys, and CB Series blank panels.

B. Provide equipment rack with the following components:

1. Digital mixer/preamplifier: PASO Model No. DMS360P, 360-watt, 10-channel, with 27/3501 rack mounting kit and PM01ML microphone/line input module, complete with treble and bass controls, and phantom power supply for condenser microphones.
2. CD player: TASCAM Model No. CD-400U, rack-mounted, with audio playback from CDs, USB memory devices and SD cards, and Bluetooth receiver up to 30 feet of reception.
3. Bluetooth receiver: DENON Model No. DN-300BR, rack-mounted, with Bluetooth 4.0 audio receiver, XLR output, and Bluetooth antenna facilitating up to 100 feet of reception.
4. Power amplifier: CROWN Model No. CDi-1000, two-channel, with 275 watts per channel at 8 ohms and 500 watts per channel at 70.7 volts, suitable for rack mounting.
5. AC power conditioner and distribution unit: ATLAS SOUND/IED Model No. AP-S15LA, rack-mounted, complete with seven switched rear outlets, one unswitched rear outlet, one unswitched front outlet, front panel pull-out dimmable LED tube light, noise filtering, and voltage surge suppression.
6. Assistive listening system for hearing impaired:

   a. Transmitter: WILLIAMS SOUND Model No. FM-T55, complete with RPK-005 single rack mounting kit and ANT-005 coaxial antenna.
   b. Receivers: Twelve (12) WILLIAMS SOUND Model No. PPA-R37-8, eight-channel personal listening system receivers, each with EAR-013 single mono earbud, BAT-026 two AA NiMH rechargeable batteries, and belt clip, set to operating frequency of 72.1 MHz (receiver channel 1).
   c. WILLIAMS SOUND Model No. CHG-3512, twelve-unit battery charger for the personal listening system receivers.

7. Wireless microphones:

   a. Two (2) SHURE Model No. ULXS124/85, wireless microphone systems, each system complete with the following:

      (1) ULXS4 receiver with 1/4-inch wave antenna.
      (2) ULX1 wireless bodypack transmitter and WL185 lavalier condenser microphone, with microphone clip, 95A2313 zipper bag, and 9-volt alkaline battery.
      (3) ULX2 wireless handheld transmitter and SM58 cardioid microphone, with WA555 grip/switch cover, 95B2313 zipper bag, and 9-volt alkaline battery.

   b. SHURE Model No. UA844SWB, wideband UHF (470-952 MHz) four-way active antenna splitter and power distribution system, allowing incoming signal to be split and distributed into multiple receivers.
   c. Two (2) SHURE Model No. UA8, 1/2 wave omnidirectional receiver antennas, with frequency ranges as required.
   d. SHURE Model No. UA507, dual rack mount hardware kit for double receiver.

2.3 MICROPHONES

A. Handheld microphones: Four (4) SHURE Model No. SM58S, unidirectional (cardioid) dynamic microphones with on/off switch.

B. Microphone floor stands: Six (6) ATLAS SOUND/IED Model No. MS-20, heavy-duty, chrome finish, ebony base, adjustable.

C. Microphone cables: Four (4) WHIRLWIND Model No. MK425, 25-foot long microphone cable with male XLR connector on one end and female XLR connector on the other end.

D. Microphone outlets:

1. XLR jack: BTX Model No. PL-103F, female XLR jack and single-gang stainless steel cover plate.
2. XLR jack and 3.5 mm stereo jack: Equal to RCI custom wall plate with female XLR jack and female 3.5 mm stereo jack, single-gang stainless steel cover plate.

E. Overhead microphone:

1. Low profile element, designed for hanging applications
2. Cardioid pickup pattern.
3. Condenser element.
4. Built-in low frequency roll off.
5. Acceptable products, provide three:

a. Audio-Technica ES 933C
b. Peavey VCM-3
c. Shure MX202/C

2.4 AUDIO/VIDEO XLR OUTPUT CONVERTER

A. ART AV DIRECT Model No. AVDIBOX, audio/video direct box, with stereo RCA, 1/8-inch and 1/4-inch TRS line level inputs and transformer isolated XLR microphone level output.

2.5 LOUDSPEAKERS

A. Two (4) ELECTRO-VOICE Model No. SX-100+, performance loudspeakers, 200 watts tapped at 8 ohms nominal, complete with Mb200 wall mounting kit.

2.6 SOUND AND INTERCOMMUNICATIONS SYSTEM OVERRIDE

A. Relays: IDEC Model No. RH2B-UDC12V, plug-in type, 12 volts DC input, 10-ampere contacts, double-pole, double-throw.

B. Terminals: IDEC Model No. SH2B-05, socket DIN rail mount screw-type.

2.7 FIELD WIRING

A. Microphone outlets: WEST PENN WIRE Catalog No. 25292B, two-conductor No. 20 AWG stranded, twisted shielded plenum cable.

B. Loudspeakers: WEST PENN WIRE, Catalog No. 25226B, two-conductor, No. 14 AWG stranded, unshielded plenum cable.

C. Sound and intercommunications system override: WEST PENN WIRE, Catalog No. 25359B, two-pair, No. 20 AWG stranded, unshielded and twisted shielded plenum cable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install field wiring as follows:

1. Comply with Section 26 0519 for installing cables rated below 100 volts.
2. Open ceilings and inaccessible ceilings: In minimum 3/4-inch conduit.
3. Accessible ceilings: Support on J-hooks at intervals not exceeding 60 inches.
4. Existing walls: In surface metal raceway.
5. Horizontal runs:

a. At right angles to the building structure.
b. Below the roof/floor structural supports (joist, beams, girders, etc.). Wiring installed between the structural supports and the roof or floor deck will not be acceptable.
c. Penetrations through new and/or existing walls shall be sleeved. For exposed cabling in accessible ceilings, provide bushings on each end of sleeve.

B. Identification: On outside covers of junction boxes, mark with permanent waterproof black marker.

C. Securely fasten conduits, device mounting boxes, junction boxes, and enclosures with appropriate fittings to ensure a positive ground throughout entire system.

D. Make low-voltage wiring connections per manufacturer recommendations. Splices for circuits shall be made in junction boxes and shall be crimp connected.

E. Rack-mounted equipment:

1. Install with the proper adapters, rack mounting kits, brackets, and closure panels for unused spaces. Interconnecting wiring shall be labeled, bundled, secured, and terminated in a neat and professional manner.
2. AC power cords shall be plugged into the AC power conditioner and distribution unit.

F. Loudspeakers: Securely fasten mounting bracket to the wall. Do not install on drywall partitions, unless wood blocking is installed behind drywall Provide additional safety cable for each speaker properly secured to wall.

G. Microphones: Unpack each microphone and assemble with cables and stands, and connect ready for operation.

H. Microphone outlets: Assemble, install as shown on Drawings, connect, and label.

3.2 FIELD QUALITY CONTROL

A. Test and inspect components, assemblies, and equipment installations, including connections.

B. Tests and inspections:

1. Schedule tests with the Owner with at least seven days' advance notice of testing.
2. Perform tests in the presence of the Owner.
3. After installing auxiliary sound reinforcement system and after electrical circuitry has been energized, test for compliance with requirements.
4. Perform visual and mechanical inspection of equipment and wiring connections.
5. Furnish test instruments required for use in the tests.
6. Check and test wiring to ensure the system is free from grounds, opens, and shorts.

7. Operational test: Test each audio input and audio output. Verify proper routing and volume levels and that system is free of noise and distortion.
8. Frequency response test: Determine frequency response of two transmission paths by transmitting and recording audio tones. Minimum acceptable performance is within 3 dB from 150 to 2500 Hz.
9. Signal-to-noise ratio test: Measure signal-to-noise ratio of complete system at normal gain settings as follows:

    a. Connect signal generator at microphone outlet using a 1000-Hz signal. Measure signal-to-noise ratio at speakers.
    b. Repeat test for each microphone outlet and audio input.
    c. Minimum acceptable ratio is 45 dB.

10. Distortion test: Measure distortion at normal gain settings and rated power. Feed signals at frequencies of 150, 200, 400, 1000, and 2500 Hz into each amplifier. For each frequency, measure distortion in the amplifier outputs. Maximum acceptable distortion at any frequency is 5 percent total harmonics.
11. Power output test: Measure electrical power output of each amplifier at normal gain settings of 150, 1000, and 2500 Hz. Maximum variation in power output at these frequencies is plus or minus 3 dB.
12. Signal ground test: Measure and report ground resistance at system signal ground.

C. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.

D. Correct malfunctioning components, wiring, and connections on-site, where possible, and retest to demonstrate compliance. System is considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.3 OPERATING INSTRUCTIONS

A. As specified in Section 26 0500, provide operating instructions.

B. Provide at least two sessions of four consecutive hours for equipment instruction to operating personnel.

END OF SECTION