

## **PAGING SYSTEM GENERAL NOTES – APPLY TO 5/E311:**

1. The work included under this detail consists of the installation of a microprocessor controlled public address sound system throughout the facility. Provide all labor, materials, equipment and supervision to install, calibrate, adjust, and check-out the public address and sound system.
2. The system shall include a public address amplifier and all necessary controller boards, power supplies, master control stations, substations, receptacles, special mounting boxes, loudspeakers terminal boards, paging speakers, cable, connectors, and accessories for a complete operational public address system.
3. The contractor shall interface with telephone system to allow paging from individual telephone sets.
4. Contractor shall size audio circuit conductors based on manufacturer requirements and routing distances.
5. Furnish and install a complete microprocessor controlled, voice communication system as described herein and shown on the plans. The system shall accommodate paging into individual areas, as well as paging into all public and administrative spaces.
6. Voice announcements shall be placed through a telephone interface unit and individual telephone sets.
7. Industry Referenced Standards. The following specifications and standards are incorporated into and become a part of this Specification by reference: FCC compliance, UL compliance, NEC compliance
8. Submit manufacturer's technical product data, including specifications and installation instructions, for each type of system equipment. Include drawings, which contain complete wiring and schematic diagrams and other details required to demonstrate that the system has been coordinated, and will function properly as a system. Drawings shall include floor plan layouts of devices, components, vertical riser diagrams, equipment rack details, elevation drawings of equipment racks, sizes, and types of all cables and conduits.
9. Test Plan: Contractor shall submit a test plan which defines the tests required to ensure that the system meets technical, operational, and performance specifications, 15 days prior to the proposed test date.
10. Owner/User must approve the test plan before the start of any testing. The test plan shall identify the capabilities and functions to be tested. The test plan shall include detailed instructions for the setup and execution of each test and procedure for evaluation and documentation of the results.
11. Manufacturer Certification: Submit a letter from the manufacturer's representative stating the proposed system being submitted for review are in accordance with the recommendations of the manufacturer.
12. The Contract Drawings indicate the arrangement of the sound system equipment. Coordinate installation of
13. equipment with the structural, mechanical, and electrical equipment and access thereto. Coordinate installation of recessed equipment with concealed ductwork and piping, and wall thickness.
14. All raceways required for the Sound System are not shown on the Contract Drawings. Raceways that are shown are minimum sizes and quantities. Contractor shall provide all additional quantities, routing, sizes, and types of raceways and pull/junction boxes to meet all codes, plans and specification requirements for a complete installation.
15. All record drawings shall include "as built" system interconnection diagrams with major components identified and number and type of interconnecting conductors. Provide Maintenance and operating instructions on all systems; certification from system manufacturers that systems are installed in accordance with manufacturer's recommendations and are functioning correctly at the time of final inspection. As-built drawings to show layout and

- wiring for all systems shall include corrected point-to-point drawings for all systems with color code to show the actual as-built conditions.
16. The system shall be a microprocessor controlled, fully "digital", central switching exchange. Master station to be provided with a condenser microphone and preamplifier.
  17. A complete operational system shall be provided; basis of design for the system is a Bogen PCM2000 System.
  18. The power supplies, amplifiers, batteries, interfaces, page adapters, accessories, and main distribution board, shall be located in a dedicated TIA/EIA equipment rack. See floor plan drawings.
  19. Equalizer shall provide built-in equalization filtering for even sound quality balance and wide-area intelligibility.
  20. The equalizer shall have low cut switch for reducing low frequencies. Equalizer shall meet the following
  21. requirements; Distortion: Less than 0.05% (+4dBu, 1kHz); Hum & Noise: Less than -94dB (20Hz-20kHz); Channel Input: Nominal input level: +4dB, 10Kohms, electronically balanced, 1/4" jack. Max output level: +20 dB; Channel Output: Nominal output level: +4dB, 600Kohms, electronically balanced, 1/4" jack. Max output level: +20 dB, filter cutoff frequency: 100Hz, 12 db/oct; Low Cut: 100 Hz, 6 dB cut
  22. Equalizers shall be the product of TOA, Altec Lansing, or Phase Linear.
  23. Lay-in Ceiling speakers shall be Bogen Model CSD1X2. Speakers shall be a steel assembly comprised of a damped high compliance factory mounted 8" loudspeaker; 70V/25V transformer; fully enclosed, and 1' x 2' non-reflective, white metal finish grill. A support rail crossbar shall be included. Ceiling speakers shall include an 8" treated paper main cone with a secondary high frequency cone and a 10 ounce magnet. Ceiling speaker transformers shall have power taps of 4, 2, 1, 0.5, and 0.25 watts, selectable by rotary switch. Output shall be 94 dB @ 1 watt / 1 meter (min.). Frequency response shall be 110 Hz – 20 kHz (min).
  24. Surface mount ceiling speakers provided in all-steel, surface mounted painted enclosures. Speakers shall be a steel assembly comprised of a damped high-compliance factory mounted 8" loudspeaker; 70V/25V transformer; fully enclosed, and 1' x 2' non-reflective, white metal finish grill. Ceiling speakers shall include an 8" treated paper main cone with a secondary high frequency cone and a 10 ounce magnet. Ceiling speaker transformers shall have power taps of 4, 2, 1, 0.5, and 0.25 watts, selectable by rotary switch. Output shall be 94 dB @ 1 watt / 1 meter (min.). Frequency response shall be 110 Hz – 20 kHz (min). Surface mount speakers shall be Bogen Model #MB series.
  25. Provide volume control attenuators in individual rooms; volume control shall have a power rating of 50W and attenuation per step of 3 dB. Plate style shall be standard one-piece stainless steel. Switch to be rotary type and have 10-positions. Mount device inside deep single gang back box.
  26. Amplifier(s) shall be rack mounted where indicated on the drawings. Where mounted in same location as other audio equipment, all such equipment shall be mounted in a common rack. Amplifier(s) shall be solid state type for use with the public address/sound system. Amplifier(s) shall contain circuit breaker for overload protection, high temperature automatic reset protection, and electronic output protection. Amplifiers shall have on/off switch and pilot light, master gain control, bass and treble controls with tone defeat switch, bridging and signal input/output, input channel controls, etc. Amplifier(s) shall conform to the following minimum requirements: (Contractor shall provide necessary quantity of amplifiers to properly power all facility-wide paging speaker/horn devices. Amplifiers shall not be loaded over 70% of the power output rating).
  27. Power Amplifier: Watts RMS: 100 watts; Distortion (1dB, rated output): less than .05%, 30Hz to 17KHz; Frequency Response: +/- 1 dB from 20 to 20,000 Hz @ 1W; Phase Response: +/- 10 degrees from 10 to 20 kHz @ 1 W; Input Impedance: 20 kohms balanced, 10 kohms unbalanced;

- Outputs: 70 volts, 4 and 8 ohms; The amplifier shall be a Bogen Power Vector Amplifier, Model V100. Amplifiers shall be compatible with Bogen PCM2000 Public Address System.
28. Sound system cabling may be routed in ceiling space, supported with j-hooks on 4'-0" centers and be secured with plenum rated tie-wraps. All sound system cable shall be plenum grade. Provide conduit for cabling where installed in exposed-structure areas, 3/4" minimum. Basic speaker cables shall be single twisted pair shielded cables, minimum of 16 gauge, stranded, tinned copper, aluminum-polyester shield, with stranded tinned copper drain wire. Cable shall be UL listed type 246A. Where indicated on the drawings or where required by equipment provided, conductor size shall be increased to provide satisfactory system performance. Cables routed underground shall be rated for wet applications. Multi-conductor shielded pair cables conforming to basic speaker cable specifications are not acceptable.
  29. Floor mounted equipment racks shall be aluminum relay racks with uprights to mount equipment. Uprights shall be 3 inch deep channel, 1-1/4 inches wide, drilled and tapped 12-24 in a 1/2 inch pattern. Racks shall be provided with a standard top cross-member and pre-drilled base plate to allow floor fastening. Equipment cabinets shall be provided with side panels, rear louvered metal doors, depth-adjustable front and rear mounting rails, and louvered top. Ventilation fans shall be included. Equipment racks shall mount equipment 480 mm (19 inches) wide and shall be 1828 mm (84 inches) high and 760 mm (30 inches) deep. Cabinet exteriors shall be painted beige. Rack to be provided with 10 outlet power strip with transient voltage surge suppression.
  30. Execution: Speakers shall be securely mounted at ceiling level where shown on the Contract Drawings. Seal all penetrations where made through building structure or through exterior walls. Adjust speakers for maximum audio coverage within areas. Prior to final balancing, all speaker transformer power taps to be set at 1 watt.
  31. Execution: Headend equipment, i.e., power amplifiers, pre-amps, page adapter units, input modules and other auxiliary headend equipment shall be rack mounted in standard EIA rack. Contractor to be responsible for providing a fully operational system. Contractor shall provide components and equipment with compatible impedances and signal levels to effect a fully operational and functional system.
  32. All system wiring shall be plenum rated and routed in ceiling space. All cabling shall be supported with j-hooks on 4'-0" centers and be secured with plenum rated tie-wraps All terminations shall be made on identified terminal strips. No splices will be allowed except in equipment cabinets. Maintain continuous cable shields where required to provided undistorted audio signal quality. Clear all cables and wires from shorts, grounds and breaks. Tape all unterminated wires and cables to prevent shorting and grounding. Terminate all speaker device wiring using manufacturers recommended termination devices, i.e., spade and/or ring terminals where screw terminations are provided on the speaker devices.
  33. System components and appurtenances shall be installed in accordance with NFPA, FCC, UL, NEC compliance, manufacturer's instructions, and as specified and shown on the Contract Drawings. The Contractor shall provide all necessary interconnections, services, and adjustments required for a complete and operational public address and sound system. Penetrations in fire-rated construction shall be fire-stopped in accordance with fire codes. Conduits and raceways shall be installed in accordance with the electrical specifications. Provide surge suppression at headend and at all locations where cables enter and exit buildings to protect against AC transients and transients on audio signal cables.
  34. Testing: Materials and documentation to be furnished under this specification are subject to inspections and tests. All components shall be terminated prior to testing. Equipment and system will not be accepted until the required inspections and tests have been made, demonstrating that the sound system conforms to the specified requirements, and that the required equipment, system, and documentation have been provided. Unless stated otherwise, tests shall be performed from both connectorized ends of each circuit of audio cable. Connectors shall be

visually inspected for scratches, pits and chips and shall be re-terminated if any of these conditions exist. Each circuit leg and complete circuit shall be tested for shorts, ground and breaks with test equipment used for the intended Communication equipment. The Contractor shall perform all required and recommended manufacturer testing procedures with the proper type equipment used for testing sound systems.

35. Training: Include in the base Contract all costs required to train the Owner operating and maintenance personnel in the use and maintenance of systems provided under this section of the Specifications. Instructors certified in writing by the manufacturer of the specific system shall conduct training sessions. Sessions shall be conducted for not less than four-hour periods during normal working hours, schedules shall be submitted to Owner for approval not less than two weeks prior to the training session. All training sessions shall be videotaped for future use.

END OF GENERAL NOTES FOR 5/E311.