SECTION 16715
AUXILIARY SOUND REINFORCEMENT SYSTEMS

PART 1 - GENERAL

1.01 REQUIREMENTS

A. The general provisions of the Contracts, including General and Supplementary Conditions and General Requirements, apply to the work specified in this Section.

1.02 SCOPE

A. The work covered under this Section shall include furnishing and installing locally controlled complete and satisfactorily operating auxiliary stereo sound reinforcement systems in the Cafeteria (Elementary, Middle and High Schools), Gymnasium (Elementary and Middle Schools) and Lecture Halls (Middle and High Schools) for the pick up, amplification, and reproduction of voice and/or music at a remote locations.

1.03 QUALITY ASSURANCE

A. All equipment specified herein shall be the product of a manufacturer of established reputation and experience who shall have produced similar apparatus for a period of at least ten (10) years and who shall be able to refer to similar installations now rendering satisfactory service.

B. The auxiliary sound reinforcement system(s) shall be furnished by a factory authorized distributor certified to design, program, and service the system. The distributor must show evidence of successfully furnishing systems specified for at least five (5) years

C. All equipment for this system shall be listed by Underwriters Laboratories, Inc. (UL), bear the UL label and shall be installed in accordance with all requirements of the National Electrical Code (NEC), state and local codes, and these Specifications.

D. The auxiliary sound reinforcement system(s) shall be furnished and installed by this Contractor as shown on the Drawings and as specified herein.

E. Shop drawing submittals are required per SECTION 16010 and shall include the following for review. Submittals not containing all of the information listed below will be rejected.

1. A complete list of equipment shall be furnished indicating the specific quantities to be furnished by this Contractor. The catalog or model number for each module of the system(s) shall be listed next to the quantities. This information shall be furnished in the front of the submittal.
2. A specific description of the system(s) shall be furnished describing each module and how it shall function in the system.

3. A specific drawing shall be furnished of the (each) equipment rack. Each module shall be shown in its proper location with its terminal designations shown.

4. A data sheet shall be furnished for each module and device. The information shall be highlighted that applies to the particular module or device to be furnished.

5. A detailed diagram showing how to connect each device shall be furnished indicating the exact final connection information.

6. A detailed set of floor plans for the area(s) where the (each) auxiliary sound system(s) is (are) to be installed shall be furnished. The plans shall show the locations of all equipment, loudspeakers, and devices and their required interconnections. The interconnections shown shall indicate the number, size, and type of wires as described in this Specification. Loudspeakers shall be zoned as shown on the Drawings. The layout of all auxiliary sound reinforcement system(s) equipment, devices, and conduit routing shall closely follow that shown on the Drawings.

1.04 DOCUMENTATION

A. This Contractor shall furnish to the Contractor, one (1) set of "As Built" drawings depicting the complete field wiring system and component interconnections in the system equipment rack.

B. This Contractor shall furnish to the Contractor four (4) sets of factory operation and maintenance manuals. These manuals shall include factory service manuals with complete parts lists, wiring and component schematics including circuit diagrams, and all other information necessary for the proper operation and service maintenance of the system.

1.05 TRAINING

A. This Contractor shall furnish eight (8) hours of technical service training to the Owner's technical staff using the factory operation manuals previously specified.

B. This Contractor shall furnish eight (8) hours of operating and programming training to the Owner's operating staff which shall be delivered in two (2) separate four (4) hour sessions to be scheduled at the Owner's convenience over the warranty period.

C. All training specified herein shall be performed by a factory certified technician.
1.06 DESCRIPTION OF OPERATION

A. Each system shall provide for the distribution of voice and music to all associated loudspeakers.

B. Each system shall provide for the reproduction of standard cassette tapes and compact disc recordings and distribute them to all associated loudspeakers.

C. Each system shall provide for the input and output of an external tape recorder.

D. Each system shall provide for individual bass and treble controls.

E. Each system shall provide a personal listening system for use by hearing impaired listeners.

F. Each Auxiliary sound reinforcement system shall accept a priority override signal to mute the system when the main building Sound and Intercommunications System activates the priority override function.

1.07 SYSTEM TEST AND ACCEPTANCE

A. Prior to the final site visitation, and acceptance of each construction phased spaces, this Contractor shall conduct an operating test of each complete auxiliary sound reinforcement system. Each system shall test free from grounds, shorts, and other faults. All connections shall be checked for mechanical and electrical connection. All equipment shall be demonstrated to operate in accordance with the requirements set forth in these Specifications and as shown on the Drawings.

B. This Contractor shall perform all tests in the presence of the Architect/Engineer. This Contractor shall furnish all personnel and test instruments required for use in the test.

1.08 WARRANTY

A. This Contractor shall deliver the work described herein in a first class operating condition in every respect. This Contractor shall also warrant that the material, equipment, and workmanship shall be entirely free from defects. Any materials, equipment, or workmanship in which defects may develop before or during the warranty period shall be repaired or replaced at the Contractors own expense. Refer to SECTION 01740 for the start of the warranty period. The contractor shall further warrant that all material, equipment, and workmanship used in the installation, but not specifically mentioned in the Drawings and Specifications, is the best of their respective kinds and that the construction and installation was performed in accordance with the best accepted standard practices in all details.
PART 2 - PRODUCTS

2.01 MANUFACTURER

A. The auxiliary sound reinforcement system(s) equipment shall be manufactured by ATLAS SOUND, CROWN, PASO, SHURE, TASCAM and WILLIAMS SOUND as listed, or equal equipment as manufactured by and RAULAND.

2.02 AUXILIARY SOUND REINFORCEMENT SYSTEM EQUIPMENT RACKS

A. This Contractor shall furnish and install sectional wall mounted auxiliary sound system equipment racks as shown on the Drawings and herein specified. Each rack shall be ATLAS SOUND Model No. WMA24-23 providing a minimum of forty-two (42) vertical inches of standard nineteen (19) inch wide rack mounting space. Each rack shall be complete with a cylinder lock and textured black finish. Each auxiliary sound system equipment rack shall have a sign mounted to the front stating, “Personal Listening Devices Stored Here”. The sign shall be 1/16 inch thick laminated plastic with 3/16 inch high white letters on a black background. The following equipment shall be furnished and installed by this Contractor in each rack:

1. One (1) TOA Model No. D-901 twelve (12) input, eight (8) output, digital mixer. Mixer shall come complete with:
   a. One (1) D936R four (4) stereo input module (tuner, CD, MP3 outlets).
   b. One (1) D971E four (4) channel line output module (personal listening system, amplifier).
   c. Four (4) D921E 2-channel input modules (microphone/MP3 outlets).

2. One (1) TASCAM Model No. CD-200i, rack mounted CD player with MP3 dock.

3. One (1) TASCAM Model No. TU-690 rack mounted stereo AM/FM tuner.

4. One (1) CROWN Model No. CTs 600 dual channel amplifier with three hundred (300) watts per channel at eight (8) ohms. Amplifier shall be suitable for rack mounting.

5. One (1) ATLAS SOUND Model No. ACS-1 power strip complete with six (6) NEMA 5-15R duplex receptacles and mounting hardware.

6. One (1) WILLIAMS SOUND Model No. PPA T35 personal listening system base station transmitter complete with WILLIAMS SOUND Model No. RPK 005 rack mounting kit and ANT 005 coaxial antenna.

7. This Contractor shall furnish and install in the charging stations thirteen (13) WILLIAMS SOUND Model No. PPA R37, seventeen (17) channel personal
listening system receivers each complete with: WILLIAMS SOUND Model No. EAR 013 single earbud, rechargeable batteries, and belt clip.

8. This contractor shall furnish to the owners representative, four (4) WILLIAMS SOUND Model NKL 001 neckloops.

9. This Contractor shall furnish and install one (1) WILLIAMS SOUND Model No. CHG 3512 twelve (12) unit charging station and one 3502 two (2) unit charging station for the personal listening system receivers complete with one (1) ATLAS SOUND Model No. VTD1-16 rack sliding shelf.

10. One (1) SHURE “SLX” series UHF Wireless Microphone System complete with Model No. SLX4 wireless receiver complete with rack mounting hardware and detachable antennas.

2.03 MICROPHONES

A. This Contractor shall furnish a total of four (4) SHURE Model No. SM58S dynamic cardioid microphones complete with ON-OFF switch and lockplate for each system. Each microphone shall be furnished by this Contractor complete with a twenty five (25) foot connector cord with CANNON XLR connectors.

B. This Contractor shall furnish to the Owner’s representative, one (1) SHURE Model No. SLX2/SM58 dynamic cardioid wireless handheld microphone, and one (1) SHURE Model No WL183 lapel microphone with SLX1 transmitter. Each complete with an ON/OFF switch and batteries.

2.04 MICROPHONE FLOOR STANDS

A. This Contractor shall furnish a total of four (4) ATLAS SOUNDOLIER Model No. MS-20 adjustable microphone floor stands for each system.

2.05 MICROPHONE OUTLETS

A. This Contractor shall furnish and install where shown on the Drawings, flush or surface wall and/or ceiling mounted microphone outlets (Type “A”) consisting of CANNON "XLR" complete with 3 pin XLR (female) series audio jack of the type required so as to be compatible with the type of microphone cable connector furnished, and a stainless steel coverplate. A microphone outlet, which meets this Specification shall be as manufactured by CONQUEST AUDIO or approved equal.

B. This Contractor shall furnish and install where shown on the Drawings, flush or surface wall mounted Microphone outlets (Type "B") consisting of one (1) CANNON "XLR", complete with 3 pin XLR (female), series audio jack of the type required so as to be compatible with the type of microphone cable connector furnished, one (1) 3.5mm stereo audio jack (MP3), and a stainless steel coverplate. A Microphone/MP3 outlet which meets this Specification shall be as manufactured by CONQUEST AUDIO or approved equal.
2.06 FLUSH CEILING MOUNTED SPEAKER ASSEMBLIES

A. This Contractor shall furnish and install where shown on the Drawings, flush 1’x2’ drop-in ceiling speaker assemblies consisting of a loudspeaker, backbox, and baffle. A flush 1’x2’ drop-in ceiling speaker assembly that meets this specification is ATLAS SOUND Model No. IS125SYS complete with 2’ T-Bar.

B. Flush ceiling mounted speaker assemblies for drywall type ceiling construction shall be the following: Loudspeaker shall be ATLAS SOUNDOLIER Model No. C803AT72; Baffle shall be ATLAS SOUND Model No. 51-8; Backbox shall be ATLAS SOUND Model No. 95-8 and Model No. 8MT95-8-7 for drywall type ceiling installations.

2.07 SURFACE CEILING MOUNTED SPEAKER ASSEMBLIES

A. This Contractor shall furnish and install where shown on the Drawings, surface mounted speaker assemblies consisting of an ATLAS SOUND Model No. C803AT72 loudspeaker and an ATLAS SOUND Model No. Q428-SA backbox complete with regressed speaker grille and matte white finish.

2.08 AM/FM ANTENNA

A. This Contractor shall furnish and install a PIXEL TECHNOLOGIES Model No. AFHD-4 AM/FM and HD antenna complete with: L mounting bracket; weather boot; surge protector; 20dB attenuator; 10dB attenuator; AM/FM separator; U-bolts with washers and nuts; pole mount saddle brackets; F-female to twin-lead adaptor and push-on-F-female to DIN adaptor.. This Contractor shall furnish and install a weatherhead, rigid steel conduit mast, and two (2) RG-6 plenum rated cables from the antennas to the tuner located in the sound and intercommunication system equipment rack. This Contractor shall ground the antenna in accordance with the following specification.

2.09 AUXILLARY SOUND SYSTEM CABLE

A. This Contractor shall furnish and install field wiring for auxiliary sound systems loudspeakers as shown on the Drawings. Wiring shall be two (2) conductor, No. 16 AWG stranded and shielded cable. A cable that meets this Specification is WEST PENN Cat. No.25294B or equal as manufactured by BELDEN, CONSOLIDATED WIRE, GENERAL CABLE, PAIGE, or TAPPAN.

B. This Contractor shall furnish and install field wiring for microphone outlets as shown on the Drawings. Wiring shall be two (2) conductor, No. 20 AWG stranded and shielded cable. A cable that meets this Specification is WEST PENN Cat. No. 25292B or equal as manufactured by BELDEN, CONSOLIDATED WIRE, GENERAL CABLE, PAIGE, or TAPPAN.

C. This Contractor shall furnish and install field wiring for MP3 outlets as shown on the Drawings. Wiring shall be two (2) conductor, No. 20 AWG stranded and shielded cable. A cable that meets this Specification is WEST PENN Cat. No. 25292B or equal as manufactured by BELDEN, CONSOLIDATED WIRE, GENERAL CABLE, PAIGE, or TAPPAN.
D. This Contractor shall furnish and install antenna cable consisting of one (1) RG/59U coaxial cable installed by this Contractor in conduit.

E. (Engineer Note: Use This To Tie Two (2) Auxiliary Sound Systems Together) This Contractor shall furnish and install, for bridge cabling between auxiliary sound systems as shown on the drawings, two (2) conductor, No. 16 AWG stranded and shielded cable. A cable that meets this Specification is WEST PENN Cat. No. 25294B or equal as manufactured by BELDEN, CONSOLIDATED WIRE, GENERAL CABLE, PAIGE, or TAPPAN.

PART 3 - EXECUTION

3.01 INSTALLATION

A. All vertical low-voltage field wiring shall be installed by this Contractor in conduit and/or surface metal raceway as shown on the Drawings. Conduit fill shall not exceed the conduit space capacity.

B. All horizontal to be installed in areas without a ceiling or in areas without an accessible ceiling shall be installed by this Contractor in ½-inch conduit.

C. All horizontal low voltage field wiring to be installed in areas with accessible ceilings shall be installed by this Contractor bundled together and run exposed above the ceilings. Bundles shall be supported by "J" hooks mounted not more than four (4) feet on center. "J" hooks to be dedicated to the wiring specified in.

D. All low voltage wiring connections shall be made by this Contractor as directed by the manufacturer. Splices for circuits shall be made only in junction boxes and shall be crimp connected.

E. All wiring for the auxiliary sound reinforcement systems shall be checked and tested by this Contractor to insure the system is free from grounds, opens, and shorts.

F. All work shall be under the direct supervision of an accredited factory sound engineer. It shall be the responsibility of the sound engineer and this Contractor to check and inspect this installation to the Architect/Engineer's approval.

G. Flush mounted speaker assembly support bridges shall be supported by this Contractor from the building structure with a minimum of two (2) steel wires. Ceiling baffles shall be finished flush with the ceiling by this Contractor.

H. Surface mounted speakers shall be mounted by this Contractor between bar joists on 1-1/2" x 1-1/2" bridging, flush to the roof deck.

3.02 RACK MOUNTED EQUIPMENT

A. The auxiliary sound reinforcement system(s) rack mounted equipment shall be
installed by this Contractor with the proper adapters, rack mounting kits, brackets, and closure panels for unused spaces. All interconnecting wiring shall be labeled, bundled, secured, and terminated by this Contractor in a neat and professional manner.

B. All rack mounted equipment AC power cords shall be plugged into the mounted power strip by this Contractor.

3.03 SPEAKER
A. Flush ceiling mounted speaker assemblies shall be supported by this Contractor from the building structure with a minimum of two (2) steel wires. Ceiling baffles shall be finished flush with the ceiling. The T-Bar shall be securely attached to the ceiling grid with pop-rivets at both ends. Flush ceiling mounted speaker assemblies shall be tapped at 2.0 watts unless otherwise indicated.

B. Surface ceiling mounted speaker assemblies shall be securely fastened to the building structure by this Contractor with threaded rod, bolts and/or bridging as required for the mounting location. Surface ceiling mounted speaker assemblies shall be tapped at 2.0 watts unless otherwise indicated.

3.04 MICROPHONES
A. This Contractor shall unpack each microphone and assemble with cables and stands and connect ready for operation.

3.05 MICROPHONE OUTLETS
A. This Contractor shall assemble microphone outlets and install, connect, and label as shown on the Drawings.

3.06 ANTENNA INSTALLATION
A. The antenna shall be bracket mounted by this Contractor above the roof at a location approved by the Owner. The antenna cables shall be run by this Contractor to the equipment rack and connected ready for operation.

B. The antenna shall be grounded by this Contractor to the secondary building ground system with one (1) No. 10 AWG in 1/2 inch conduit.

END OF SECTION