SECTION 275123 - CENTRAL SOUND AND PAGING SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Contractor shall provide a public address paging system that shall include, but not be limited to, provision of all call and zoned paging, as well as bi-directional communications. Zoning shall include, but not be limited to, partitioning to operate high school/middle school areas, separate from the elementary school area, separate from the commons areas as delineated on the Drawings, as well as within these partitions, each classroom or instructional space. Finally, all calls shall be capable of being processed from each of the administration areas to their associated grade levels only, or as intentionally triggered as an all facility all call.

B. Contractor shall provide an extension of the District's existing system: Singlewire InformaCast Fusion

C. Integrated into the system shall also be the required processing and interface for the generation of class change tones.

D. Access to the system shall be by dedicated handset, as well as, by means of a telephone system interface.

E. The Contractor shall coordinate and implement all required hardware not specifically required by the network/telephony system to provide a DTMF dialup access and zone routing interface to the phone system.

F. The system shall provide separate and dedicated local program sources for the high school/middle school area, the elementary school area, and the commons areas as three separate and distinct areas.

G. The system shall be configured so as to allow dial in from the District's telephony system, which shall be an IP telephony system. This system provider shall provide any necessary interface to allow connection to the system and facilitate DTMF triggers into the system to allow full operational, not programming, access into the system.

H. The system, in whole, shall be backed up by one or more UPS's as recommended by the manufacturer, to provide uninterrupted service during power outages or irregularities for up to two (2) hours.

1.2 GENERAL REQUIREMENTS

A. The conditions of the General Contract (General, Supplementary, and other Conditions) and the General Requirements are hereby made a part of this Section.

B. The contractor for this work shall be held to have read all of the bidding requirements, the general requirements of division 1, and contract proposal forms, and the execution of this work. The contractor will be bound by all of the conditions and requirements therein.

C. The contractor shall be responsible for providing a complete functional system including all necessary components whether included in this specification or not.

D. In preparing the bid, the contractor should consider that no claim will be made against the owner for any costs incurred by the contractor for any equipment demonstrations which the owner requests.

1.3 SCOPE OF WORK

A. Furnish and install all equipment, accessories, and materials in accordance with these Specifications and Drawings to provide a complete and operating school paging and inter-communications system including but not limited to:

1. Administrative display phone with integrated 4x16 character display, one for each of the administration areas.
2. Classroom speaker(s), ceiling-mounted unless otherwise noted.
3. Call initiation switches capable of placing normal, urgent or emergency calls.
4. Built in Master Clock with 1024 events, 32 Schedules, including Daylight Savings Time, and 32 custom holiday events that can be assigned to any of the 64 multi-purpose zones
5. Wall-mounted paging horns
6. Wall and ceiling mounted speakers
7. Amplifiers as required for multi-speaker zones in common areas
8. One built-in network interface port for system combining and LAN station-to-station calling and district-wide all-calls
9. One built-in network interface port for first-time system configuration
10. Built-in Web Server for full system programming with Quantum Commander
11. Administrative Web-Browser Application for Programming and System Operation

1.4 RELATED SECTIONS

A. Section 27 05 00 – Technology Common Work Results

B. Section 27 05 24 – Technology Firestopping

C. Section 27 05 26 – Technology Grounding System

D. Section 27 05 28 – Pathways for Communications Systems

E. Section 27 15 01 – Structured Cabling System

F. Section 27 51 75 – Wireless Clock System

G. Division 1 – General Requirements

H. Division 7 – Firestopping

I. Division 9 – Finish Painting

J. Division 11 – Equipment

K. Division 26 – Electrical

1.5 REFERENCES

A. The provisions of these specifications along with all Drawings, Alternates, Addenda, Bulletins, RFP's or other related documents shall be considered an integral part of the scope of work for this/these Contractor(s). These Documents along with the Division 1 and other related division's documentation shall be examined by this Contractor and any/all sub-contractors prior to submission of their bid.

1.6 SUBMITTALS

A. Specification Sheets shall be submitted on all items including cable types.

B. Submit outline drawing of system control cabinet showing relative position of all major components.

C. Shop drawings, detailing integrated electronic communications network system including, but not limited to, the following:

D. Station wiring arrangement

E. Equipment cabinet detail drawing

F. Submit wiring diagrams showing typical connections for all equipment.

G. Submit a numbered Certificate of Completion for installation, programming, and service training, which identifies the installing technician(s) as having successfully completed the technical training course(s) provided by the system manufacturer.

1.7 SUBSTITUTIONS

A. Contractors that wish to submit alternate equipment shall provide the specifying authority with the appropriate documentation, at least 10 business days prior to bid opening. The submitted documentation must provide a feature-by-feature comparison identifying how the proposed equipment meets the operation and functionality of the system described in this specification. Contractor shall provide adequate and complete submittal information, prior to bid date, which shall include but not limited to specification sheets, working drawings, shop drawings, and a demonstration of the system. Alternate supplier-contractor must also provide a list to include six installations identical to the system proposed.

B. The contractor shall also provide the FCC registration number of the proposed system.

C. Final approval of the alternate system shall be determined at the time of job completion. Failure to provide the "precise functional equivalent" shall result in the removal of the alternate system at the contractor's expense.

1.8 QUALITY ASSURANCE

A. All items of equipment shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.

B. The contractor shall be an established communications and electronics contractor that has had and currently maintains a locally run and operated business for at least 5 years. The contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges.

C. The contractor shall show satisfactory evidence, upon request, that he or she maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The contractor shall maintain at his or her facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

1.9 COORDINATION

A. Coordinate layout and installation of ceiling-mounted speaker microphones and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.10 REGULATORY REQUIREMENTS

A. Equipment and components furnished shall be of manufacturer’s latest model.

B. All equipment both discrete and in full assembly shall comply with the following:

C. NFPA 70 – The National Electrical Code.

D. BICSI – Telecommunications Distribution Methods Manual, Latest Revision.

E. American with Disabilities Act.

F. FCC Part 15

G. The system shall be new UL listed.

H. System shall be installed in compliance with local and state authorities having jurisdiction.

1.11 SINGLE SOURCE RESPONSIBILITY

A. Except where specifically noted otherwise, all equipment supplied shall be the standard product of a single manufacturer of known reputation and minimum of 10 years’ experience in the industry. The supplying contractor shall have attended the manufacturer's installation and service school. A certificate of this training shall be provided with the contractor's submittal.

1.12 SAFETY / COMPLIANCE TESTING

A. The communications system shall bear the label of a Nationally Recognized Testing Laboratory (NRTL) such as ETL, and be listed by their re-examination service. All work must be completed in strict accordance with all applicable electrical codes, under direction of a qualified and factory approved distributor, to the approval of the owner.

B. The system is to be designed and configured for maximum ease of service and repair. All major components of the system shall be designed as a standard component of one type of card cage. All internal connections of the system shall be with factory-keyed plugs designed for fault-free connection.

C. The printed circuit card of the card cage shall be silk-screened to indicate the location of each connection.

1.13 SERVICE AND MAINTENANCE

A. The contractor shall provide a 5 (five) year equipment warranty of the installed system against defects in material and workmanship. All materials shall be provided at no expense to the owner during normal working hours. The warranty period shall begin on the date of acceptance by the owner/engineer.

B. The contractor shall, at the owner's request, make available a service contract offering continuing factory authorized service of this system after the initial warranty period.

C. The system manufacturer shall maintain engineering and service departments capable of rendering advice regarding installation and final adjustment of the system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufactures: Subject to compliance with requirements specifications, provide the following system:
   1. Basis for design: Extension of existing District wide paging system
      a. Singlewire InformaCast Fusion

B. The intent is to establish a standard of quality, function, and features. It is the responsibility of the bidder to ensure that the proposed product meets or exceeds every standard set forth in these specifications.

C. The functions and features specified are vital to the operation of this facility; therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

2.2 EQUIPMENT

A. CONSOLE
   1. Rack-mounted console equipment shall be housed in an enclosure or enclosures sized as required by the system drawn and/or specified herein, with a growth factor of 25%. Utilize a cabinet that shall have a minimum of 40 rack units of EIA standard 19” rack within.
   2. Rack System
      a. Rack Mount System. Shall include the following components:
         1) Voice paging gateway
         2) SIP based
         3) IP-based amplifiers in each TR
   3. Program Sources (Provide one set of each per Administrative area, at the reception area.)
      a. Desktop Paging Microphone

4. Power Amplifiers
   a. 60-Watt Amplifier
   b. 125-Watt Amplifier
   c. 250-Watt Amplifier
5. Basis of Design: Singlewire InformaCast Fusion system

2.3 COMPONENTS AND DESCRIPTIONS

A. Systems that don't allow processors to be seamlessly integrated via the LAN are not considered equal.

B. Central Cabinet
1. The Paging System shall contain natively RS232, RS485, USB, and Ethernet ports for communication to any third party system.
2. The Paging System shall contain five open collectors, three dry contacts, and six general purpose inputs for third party system integration or for general panic buttons. It shall be possible to expand inputs or outputs to any number needed.
3. The Paging System central cabinet shall be rack or wall mounted.
4. The Paging System shall contain no moving parts that suffer from wear or that require maintenance.
5. The Paging System shall draw no more than 3.5A of current at full load including all system accessories.
6. The Paging System shall have integrated surge protection for all audio ports and switching/line card ports. Said surge protection shall be replaceable in the field with no need to return parts for repair.

C. Administrative Display Phone
1. The Paging System shall not require an Administrative console to operate. All system functions shall be accessible via telephone codes from any internal or external telephone.
2. The Paging System optional Administrative telephone shall have the following features.
   a. Desk & wall mountable
   b. Minimum 8 line by 20 character back lit display
   c. Wizard driven menu system for ease of use
   d. 200 speed dials
   e. Head set compatible
   f. Integrated speaker phone for hands free use
3. The administrative telephone display panel shows the time of day and day of week, the current time signaling schedule, and the station numbers and call-in priority of staff stations that have called that particular station. A 3-key response is used to scroll the display, and answer or erase normal, urgent, and security calls. Depending upon the system programming, an administrative station can use display menus to activate zone pages, alarm signals and external functions, as well as select program sources and distribute or cancel a program to any or all speakers or zones.
4. Administrative Display Phones shall have the ability to dial and have the option of dialing either the loudspeaker or phone at each station location.
5. The Administrative Display Phone shall display the classroom number of any station that calls.
6. The display phone shall have "Push-to-Talk: Informacast functionality.

D. Amplifier

1. The amplifier shall be sized based on the load, per TR.

E. Tones
1. The Paging System shall have at least 25 tones available for bells, reminders, and other events. Paging System with less than 25 tones shall not be considered.
2. The Paging System shall support WAV type audio files. The user shall be able to add 25+ custom WAV files for use as pre-recorded announcements, bells, reminders, pre-announce tones, or any other system tone. Paging System not allowing users to add WAV files or do not allow for the use of WAV files for any system tone shall not be considered.
3.

2.4 VOIP TELEPHONE INTERFACE

A. The Contractor shall provide a SIP VoIP telephone interface and shall program the Paging system to accept calls from the District's VoIP telephone system

B. The Contractor shall verify exact requirements with the District.

2.5 SYSTEM SPEAKERS

A. Classroom Speakers shall be Quam: Equals by Atlas, Bogen, Telecor and Rauland-Borg
1. Ceiling Speakers: Drop-In Ceiling Speakers, provide manufacturer's plenum enclosure where required, and ceiling tile bridge or either recommended support mechanism.
2. Provide 8" round speakers with associated ceiling bridges and plenum enclosures in all hard ceilings.
3. Provide pendant mounted speakers, associated mounting brackets and cabling supports in all exposed ceilings.

B. Hallway Speakers shall be Quam: Equals by Atlas, Bogen, Rauland-Borg or Telecor.
1. Ceiling Speakers: Drop-In Ceiling Speakers, provide manufacturer's plenum enclosure where required, and ceiling tile bridge or either recommended support mechanism.
2. Provide 8" round speakers with associated ceiling bridges and plenum enclosures in all hard ceilings.
3. Provide pendant mounted speakers, associated mounting brackets and cabling supports in all exposed ceilings.

C. Outdoor / Gym / Locker Room Speakers shall be Atlas Sound: Equals by Bogen, Telecor and Rauland-Borg
1. Wide Dispersion Reentrant Horn Loudspeakers with minimum 15W load.

2.6 SYSTEM PARAMETERS

A. The communication system shall provide a comprehensive communication network between administrative areas and staff locations throughout the facility. Nonvolatile memory shall store permanent memory and field-programmable memory. A system, which uses a battery to maintain system configuration information, shall not be acceptable.

2.7 SPEAKER CABLING

A. Plenum cabling shall be provided per manufacturer's recommendation, including Category 6 UTP cabling per Specification Section 271501 and West Penn #357. All terminal connections to be on barrier strips, as indicated on the associated riser diagram. All cables to be labeled by room.
   1. Speaker cabling equals by General Cable or Belden.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with the installer present, for compliance with requirements and other conditions affecting the performance of the Integrated Telecommunications/Time/Audio/Media System.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. The installation, adjustment, testing and final connection of all conduits, wiring, boxes, cabinets, etc., shall conform to local electrical requirements and shall be sized and installed in accordance with manufacturer’s approved shop drawings.

B. Low-voltage wiring may be run exposed above ceiling areas where they are easily accessible.

C. Contractor shall install new rack console at location shown on plans.
   1. Solder each speaker line splice and tape each individual wire.
   2. Connect remote slave clocks to master clock in console.

D. All Administrative Phones shall be desk- or counter-mounted.

   1. Provide standard wall 120V AC receptacle 16" AFF
   2. Verify exact location with Architect

E. Speaker and telephone lines run above ceiling and not in conduit shall be tie-wrapped to ceiling joist with a maximum spacing of 8' between supports. No wires shall be laid on top of ceiling tile.

F. Connect field cable to each speaker transformer using UL butt splices for 22 AWG wire.

G. Terminate field wiring on wall adjacent to rack using Telco 110 type blocks or screw terminal strips. Provide neat cross connect system for wiring. Wiring to be labeled to indicate final architectural room number that it services on the Telco block, and no the wire using machine generated labeling permanently affixed to the wall field and/or wire.

H. Rack shall be labeled in numerical order with speaker/phone combinations first, speaker/outside horn combinations last. Labeling and order shall reflect final Architectural room numbers posted outside the rooms. Use three- (3), four- (4), five- (5), or six- (6) digit dialing extensions.

I. Contractor shall provide and program Paging System to accept Lockdown input from Access Control System.

J. On the first school day following installation of the system, the Contractor shall provide a technician to standby and assist in system operation.

K. Mark and label all telephone outlets and/or sets with the graphic room numbers. Label all demarks IDF and MDF points with destination point numbers. Rooms with more than one outlet shall be marked XXX-1, XXX-2, XXX-3, etc. where XXX is the room number.

L. No graphic room number shall exceed the sequence from 000001 through 899999.
1. All outside speakers shall be on a separate page zone and time zone.
2. All zones shall be laid out not to exceed 10 watts maximum audio power zone.
3. All hallway speakers shall be tapped at 1 watt maximum.
4. All outside horns shall be tapped at 7.5 watts maximum.
5. All classroom speakers shall be tapped at ½ to 1 watt maximum.
6. Large rooms, such as cafeterias, shall be tapped at 2 watts maximum.
7. Additional building zones:
    a. (1) zone for each grade
        1) Coordinate exact groupings with District
    b. Each Gym
    c. Each Student Dining
    d. Multi-Use Room
    e. Exterior paging horns
        1) Inclusive of Bus Loop and exterior playground areas
        2) Contractor shall provide a separate volume control for this zone

3.3 WIRING

A. System wiring and equipment installation shall be in accordance with good engineering practices as established by the EIA and the NEC. Wiring shall meet all state and local electrical codes. All wiring shall test free from all grounds and shorts.

B. All communication system wiring shall be labeled at both ends of the cable. All labeling shall be based on the room numbers as indicated in the architectural graphics package.

C. All applicable cabling utilized shall be in full compliance with Section 27 15 01 Structured Cabling System.

3.4 PROTECTION

A. The contractor shall provide all necessary transient protection on the AC power feed and on all station, lines leaving or entering the building

B. The contractor shall note in his system drawings, the type and location of these protection devices as well as all wiring information. Such devices are not to be installed above the ceiling.

3.5 GROUNDING

A. Provide equipment grounding connections for Integrated Telecommunications/Time/ Audio/Media System as indicated. Tighten connections to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounds.

B. Ground equipment, conductor, and cable shields to eliminate shock hazard and to minimize the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments.

C. Comply fully with the requirements of the Technology Grounding Specifications Section.

D. The contractor shall provide all necessary transient protection on the AC power feed and on all station, lines leaving or entering the building.

E. The contractor shall note in his drawing, the type and locations of these protection devices as well as all wiring information.

F. The contractor shall furnish and install a dedicated, isolated earth ground from the central equipment rack and bond to the incoming electrical service ground buss bar.

3.6 DIVISION OF WORK

A. While all work included under this specification is the complete responsibility of the contractor, the following division of actual work listed shall occur.
   1. The conduit, outlets, terminal cabinets, etc., which form part of the rough-in work shall be furnished and installed completely by the electrical contractor. The balance of the system, including installation of speakers and equipment, making all connections, etc., shall be performed by the manufacturer's authorized representative, and provided as a turnkey package to the Owner.

3.7 EQUIPMENT MANUFACTURER'S REPRESENTATIVE

A. All work described herein to be done by the manufacturer's authorized representative shall be provided by a documented factory authorized representative of the basic line of equipment to be utilized.

B. As further qualification for bidding and participating in the work under this specification, the manufacturer's representative shall hold a valid C-10 Contractor's License issued by the Contractors State License Board of Ohio. The manufacturer's representative shall have completed at least ten (10) projects of equal scope, giving satisfactory performance and have been in the business of furnishing and installing sound systems of this type for at least five (5) years. The manufacturer's representative shall be capable of being bonded to assure the owner of performance and satisfactory service during the guarantee period.

C. The manufacturer's representative shall provide a letter with submittals from the manufacturer of all major equipment stating that the manufacturer's representative is an authorized distributor. This letter shall also state the manufacturer guarantees service performance for the life of the equipment, and that there will always be an authorized distributor assigned to service the area in which the system has been installed.

D. The contractor shall furnish a letter from the manufacturer of the equipment, which certifies that the equipment has been installed according to factory intended practices, that all the components used in the system are compatible and that all new portions of the systems are operating satisfactorily. Further, the contractor shall furnish a written unconditional guarantee, guaranteeing all parts and all labor for a period of five (5) years after final acceptance of the

project by the owner.

3.8 INSTALLATION

A. Plugs disconnect: All major equipment components shall be fully pluggable by means of multi-pin receptacles and matching plugs to provide for ease of maintenance and service.

B. Protection of cables: Cables within terminal cabinets, equipment racks, etc., shall be grouped and bundled (harnessed) as to type and laced with Velcro wire wraps or Milli-Tie tie wraps only. Edge protection material shall be installed on edges of holes, lips of ducts or any other point where cables or harnesses cross metallic edge.

C. Cable identification: Cable conductors shall be color-coded, and individual cables shall be individually identified. Each cable identification shall have a unique number located approximately 1-1/2" from cable connection at both ends of cable. Numbers shall be approximately 1/4" in height. These unique numbers shall appear on the As-Built Drawings. All labeling shall be created by a machine generating accessory that is designed specifically for generation of such labeling in a Contracting environment on label stock specifically manufactured for the environment in which it is being used. Utilization of general-purpose office labeling stock shall not be accepted, and upon discovery of same shall be required to be removed and replaced with appropriate labeling.

D. Shielding: Cable shielding shall be capable of being connected to common ground at point of lowest audio level and shall be free from ground at any other point. Cable shields shall be terminated in same manner as conductors.

E. Provide complete "in service" instructions of system operation to school personnel. Assist in programming of telephone system.

3.9 TRAINING

A. The contractor shall provide a minimum of forty (40) hours of in-service training with this system. These sessions shall be broken into segments, which will facilitate the training of individuals in the operation of this system. Operators Manuals and Users Guides shall be provided at the time of this training.

3.10 DOCUMENTATION

A. Provide the following directly to the District’s Technology Director one of each of the following per Operation and Maintenance Manual required by the entirety of these Documents.
   1. One printed copy of all field programming for all components in system.
   2. One copy of all diagnostic software with copy of field program for each unit.
   3. One copy of all service manuals, parts list, and internal wiring diagrams of each component of system.
   4. One copy of all field wiring runs location and end designation of system.

3.11 WARRANTY

A. The entire responsibility of the system, its operation, function, testing and complete maintenance for three (3) years after final acceptance of the project by the owner, shall also be the responsibility of the manufacturer's authorized representative.

END OF SECTION 27 51 23