

Section 27 51 23 Education Intercommunications and Program Systems

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1 General

1.1 Related Division, Sections, and Documents

- A 27 41 00 - Audio-Video Systems
- B 27 41 16 - Integrated Audio-Video Systems and Equipment

1.2 Definitions

- A Documents: The complete package of Procurement and Contract Requirements, General Technology Requirements, related Division 27 sections, drawings, schedules, and addenda that make up this Request for Bid.
- B Work: The provision of products and/or services to meet the requirements specified in these documents.
- C Owner: The party named, (**Replace with School District**), in the Procurement and Contract Requirements as the advertising party.
- D Contractor: Contractor responsible for the installing and testing the system, and all related infrastructure cabling requirements in this bid package.
- E NIC: Not in Contract. Item(s) will be the responsibility of others.
- F Approved or Approval: Where approval is called for, only persons with the authorized authority may grant approval. Owner reserves all rights to govern over and grant approval and will appoint authority of agents acting on their behalf.
- G OFE: Owner Furnished Equipment. Item(s) will be provided and integrated by Owner.
- H OFCI: Owner Furnished Contractor Installed. Item(s) will be provided by Owner and installed by the Contractor.
- I OFOI: Owner Furnished Owner Installed. Item(s) will be provided and installed by Owner.
- J As Required: Contractor shall provide the quantity of said item(s) that is necessary. The Owner reserves the right to make the final determination of necessary quantities to provide for a complete system.

1.3 Scope of Work

- A Described herein this Section is the scope-of-work requirements, criteria, and equipment necessary for the successful Proposer to:
 - 1 Furnish and install campus wide Bell, Intercom, Paging, Alerting & Monitoring system what is commonly known as an Integrated Communication System, hereafter referred to as (ICS) which shall include the following typical subsystems:
 - a IP based General Public Address System
 - b IP based Intercom System
 - c IP based Door Intercom System
 - d IP based Video Door Intercom System
 - e IP based Audio & Video capable Intercom Station
 - I Intercom Station must be integrated with the ICS
 - a) The following add/remove from the ICS will be auto updated on the Intercom Station:
 - i) Paging Zone
 - ii) Intercom Extension
 - iii) Alert

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- iv) Announcement
 - f IP based Audio Notification System
 - g Visual Notification System
 - I Android Panel(s)
 - II Windows computer(s)
 - III MAC computer(s)
 - IV Chromebook computer(s)
 - h Bell & Audio Signaling System
 - i Visual Notifications must be activated via:
 - I Intercom Console
 - II ICS Web User Interface
 - III "Panic" button
 - IV IOS & Android application
 - a) Application will auto update an Alert or Announcement is added/removed on the ICS.
- 2 The ICS will be Cloud based or locally installed
 - a The ICS will use Linux – Debian as an operating system
 - b ICS will not require proprietary hardware to interface with
 - c ICS will be accessible via a web browser
- 3 General Public Address System may be 100% IP based, or a hybrid IP/analog 70v distributed common area, corridor, and outside loudspeaker system.
- B The Contractor shall furnish their lump sum price offer to provide a turn-key package in response to the specific work found in the Construction Documents and specifically for the work contained herein.
- C The successful (ICS) Proposer shall provide materials & labor to install new equipment as described herein and depicted in the construction drawings.
- D The Successful Proposer's responsibilities shall include, but are not limited to, the following:
 - 1 Provide necessary services to integrate each component into a fully functional package with seamless functionality as described herein.
 - 2 Integrate into the construction any owner furnished equipment and miscellaneous hardware as may be described herein.
 - 3 Maintain timely installations according to the project construction schedule.
 - 4 Provide Owner System Training, As-Built documentation, and project manuals as required by this construction package.

1.4 Submittals

- A Prior to Work: Submittals shall be provided to Owner within ten (10) days after the notice to proceed.
- B Project Timeline: Project timeline will not be altered due to lateness of submittals. Contractor will remain bound to deliver a timely, complete, and finished project as stipulated in their contract.
- C Submit two (2) sets, (one (1) printed copy and one (1) digital copy), of Detail Drawings, Product Data, Manufacturer's Recommendations, Operations and Maintenance, and applicable Manufacturer's Warranties for all materials.

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- D Block diagrams are intended to indicate general intent and scope of the design. Contractor shall provide shop drawing submittals in order to document details of installation.
- E Shop drawing submittals shall show the following:
 - 1 Detail Drawings shall include block diagrams and interconnection diagrams, including cable identification detail, and specific input/output port identification.
 - 2 Detail Drawings shall contain plan view locations, elevations, installation details, rack elevations, and all accessories.
 - 3 Mounted Elements: Structurally mounted elements, generally include monitors, speakers, horns, amplifiers, etc... This shall include both plan view of placement, as well as detail of structural mounting techniques to be used.
 - 4 Identification: Layout and labeling/engraving of custom products, including wall plates and interconnection panels.
 - 5 Changes: Proposed changes to block diagrams and elevations provided with the bid documents. Required changes are detailed in Section(s) to follow.
- F Manufacturer's Recommendations:
 - 1 Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be provided prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received and approved.
 - 2 Work shall not proceed without approved submittals.
- G Operations and Maintenance information and instructions for each product.
- H All applicable Manufacturer's Warranties, standard and extended.
 - 1 Submittals shall be received and stamped "Reviewed" by Owner prior to the procurement of material or the commencement of work. Any procurement or work performed prior to this approval is at Contractor's own risk.
 - 2 The failure of Contractor to provide submittals as required herein may result in the withholding of payment for work and/or the cancellation of the contract.
- I Re-Submittals
 - 1 Make re-submittals under procedures specified for initial submittals.
 - 2 Identify changes made since previous submittal by clouding or highlighting.

1.5 Correction Period

- A Contractor's obligation for correction period shall not abrogate manufacturers' warranty periods.

1.6 Certificates

- A Where materials or equipment are specified to conform, be constructed, or be tested to meet specific requirements, certification that the items provided conform to such requirements. Certification by a nationally recognized testing laboratory that a representative sample has been tested to meet the requirements, or a published catalog specification statement to the effect that the item meets the referenced standard, will be acceptable as evidence that the item conforms.
- B Installers

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- 1 The Contractor shall have an appropriately certified installer on staff assigned to manage this Project; documented proof shall accompany the proposal response.
- 2 All installing personnel shall have completed and be certified in manufacturer training or the Contractor shall contract with manufacturer for installation of all proposed components. Company Certifications shall accompany the proposal response.
- 3 The Contractor shall submit certification that installers are factory certified to install and test the provided products. No less than half of the crew to be used for the installation shall be trained by that manufacturer for the work.

1.7 Delivery Storage, and Handling

- A Contractor shall be responsible for all materials until completion of Project.
- B The Project General Contractor shall have final approval authority for any Subcontractor's needs regarding material Delivery, Storage, and Protection.
- C The Contractor shall coordinate with the General Contractor any delivery requirements they may have.
- D Products and materials shall be stored according to manufacturer's recommendations at minimum. In addition, products and materials shall be stored in a secure location, protected from vandalism, weather, moisture, and extremes in temperature.
- E Products and materials shall be stored upright inside in original packaging. Contractor shall insure that packaging is undamaged.
- F If the Contractor wishes to have a trailer on site for storage of materials, arrangements shall be made with the Owner.
- G Storage of materials shall remain the full responsibility of the Contractor, until the Owner has accepted the work and materials in writing.
- H Contractor shall verify the acceptability of site conditions with the manufacturer prior to receiving any products and materials.
- I The installed materials remain the responsibility of the Contractor until the Owner accepts the completed system in writing. The Contractor shall take necessary precautions to ensure the safety of installed materials.

1.8 Warranty

- A The Contractor shall provide to the Owner a Corrective Period to repair all equipment and cabling problems for a period of one (1) year and shall include all labor, materials, and travel time required for correction. Upon successful completion of the installation and subsequent inspection, the Owner shall receive a numbered certificate. Corrective Period shall begin at date of Final Acceptance.
- B Final Acceptance: Shall be defined as the date at which all contract work, (save for a correction period), is complete, including punch list completion & verification, closeout submittals, and written verification by the Owner is obtained by the Contractor that the systems have been accepted.
- C Response: Contractor shall respond by phone within 1 hour to calls for service or assistance from Owner during normal business hours for the duration of the correction period.
- D On-site Response: Contractor shall respond on-site within 24 business hours from the time of the initial phone contact in the event that the issue cannot be resolved over the phone.
- E The warranty shall ensure against product defects.

- F The warranty shall cover the replacement or repair of defective product(s) and labor for the replacement or repair of such defective products(s) at no cost to the Owner.
- G The Contract shall provide information on available extended warranties.

1.9 Project Conditions

- A The Contractor shall be responsible to closely coordinate with the Owner and any other contractors related to the project:
- B Electrical rough ins shall be provided by the electrical contractor, including conduit, raceways and electrical back boxes or box eliminators. Any exceptions shall be specifically noted in the construction document drawings.
- C Locations not requiring electrical rough ins where Contractor requires a special device shall be placed in fishable walls.
- D In locations where electrical conduits or raceways are shown and not provided by the Owner, the Contractor shall provide their sleeved penetrations, raceways, and cable pathways, including coring as may be required.

1.10 Owner Training

- A Provide, at a minimum, training as required herein for each Division 27 specification section Scope of Work.
- B Prior to scheduling or delivering Owner Instruction / Training, confirm the following:
 - 1 System as-built documentation must be provided for review to the Owner.
 - 2 System final walkthrough inspection and punch list must be completed.
 - 3 The Contractor proposed training materials and program outline must be provided and approved by the Owner.
 - 4 Training schedule dates must be coordinated and approved with the Owner.
- C System Training for Software Applications
- D Training is to include:
 - 1 Detailed training plan and handout materials that have been reviewed and approved by the Owner.
 - 2 Practical and comprehensive operation of system.
 - 3 Basic system troubleshooting techniques.
- E Training Hours
 - 1 Provide each group of users, as defined below, with the minimum training hours as specified.
 - 2 Unless otherwise noted, provide a minimum of (4) four hours of training for Owner selected trainees. This training shall be divided into training session "Blocks" as coordinated with the Owner.
 - 3 The first training session shall occur after final acceptance of the system installation and before first Owner scheduled use of the system.
 - 4 The first-training session block shall consist of training intended for the common system operators. The training shall include use of the administration control functions installed equipment and software.
- F Training sessions shall cover at a minimum:
 - 1 Basic System Configuration and Operation Knowledge
 - 2 Advanced System Configuration and Operation Knowledge

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- 3 Typical system usage
- 4 Typical user troubleshooting skills
- 5 Service and maintenance requirements
- G The Owner reserves the right to establish training times, duration, and topics.

1.11 Final Close-Out Documentation

- A Contractor shall provide written notification to the Owner when Contractor is satisfied that the work has been completed and is ready for inspection.
- B Contractor shall provide closeout submittals to the Owner in accordance with the requirements found in these documents. Owner shall receive the closeout submittals no less than three (3) business days prior to the scheduled final inspection.
- C Contractor is required to be present for the final inspection by Owner.
- D Work or materials found to be incomplete, of unsatisfactory quality, failing to meet the specifications in these documents, and/or unacceptable to the Owner shall be documented by the Owner and provided to Contractor to rectify.
- E If more than one (1) re-inspection is necessary, the costs of the additional travel, hours, and expenses of the Owner may be deducted by Owner from the contract amount due Contractor.
- F Once all punch list items are complete, the Contractor shall return an initialed punch list to the Owner for verification. Punch list shall be considered complete only after having been signed by the Owner.
- G Upon completion of the installation, the Contractor shall provide two (2) full sets, (one (1) printed, and one (1) digital copy), of documentation to the Owner for approval.
- H Close out documents should include three (3) 3-ring binder with the following:
 - 1 Includes project description.
 - 2 Includes project completion date and warranty start/finish dates.
 - 3 Any/all moves, adds, or changes between submittal process and project completion.
 - 4 As-built drawings.
 - 5 Certificate of testing/completion.
 - 6 Warranty certification from manufacturer.
 - 7 Letter of completion.
 - a Signed by an Authorized Agent
 - 8 All documentation, including hard copy and electronic forms, shall become the property of the Owner.
 - 9 USB Drive containing:
 - a As-built drawings (CAD format)
 - b As-built drawings (PDF format)

2 Products

2.1 Governing Work Clause

- A General
 - 1 All equipment furnished for this project shall be new and unused and shall be designed for the intended use and for uninterrupted duty cycle.

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- 2 Acceptance or implied approval of submitted products, product cut-sheets, or substitutions of equipment, equipment manufacturers, or system designs other than that specified herein does not relieve the Contractor of the responsibility to provide the functions and detail of the systems as found in the specified system.
 - 3 The Contractor shall not receive final written acceptance of work and materials until the Contractor provides written release of any and all liens to the Owner.
- B Software Terms & Conditions
- 1 The successful Contractor providing software for this project affirms that it possesses complete and valid title and rights to furnish the said software.
- C Ancillary and Accessory Items
- 1 The Proposer shall provide ancillary and required accessory items necessary to furnish to the Owner a complete and fully functional system.
 - 2 The exclusion of / or limitation in the language used in the drawings or specifications shall not be interpreted as meaning that ancillary or accessories items of work or equipment necessary to complete or make the installed system fully functional can be omitted.
 - 3 The mention in writing or representation by depiction materials, services, or operations within this specification document and/or Proposal package is binding upon the Proposer to include and provides such items, services, and operations without additional charge to Owner. Exceptions shall be noted by the acronym (NIC) "Not In Contract" or (OFE) "Owner Furnished Equipment." If this notation does not appear, then the Proposer shall assume the need to provide the item in question.
 - 4 The Proposer shall receive no allowances because of omissions in work due to unfamiliarity or their misunderstanding of Proposal package documents.
- D Document Discrepancy
- 1 In the event of an inconsistency or discrepancy that may exist in, or between parts of these Construction Documents, the following direction shall be followed and shall govern:
 - a The document, section, phrase, or requirement with better quality, more stringent requirement, or greater amount, or quantity of work, or material shall apply and shall be expected, delivered, and used. Such work or material shall be provided by the Contractor and installed at no additional cost to the Owner.
- E Omissions
- 1 The omission of or express reference to any part(s) necessary for or reasonably incidental to a complete and fully functional system and installation as intended shall not be construed as a release from the Proposer providing and installing such parts.

2.2 The (ICS) System Description

A General

- 1 The (ICS) system shall provide for an "Open Architecture Approach" Bell, Intercom, Paging & Alerting Systems of the campus that considers flexibility and is future ready for growth.
- 2 The (ICS) system shall provide a platform ranging from a single district building to the entire school district system.

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- 3 The (ICS) system shall provide a platform allowing a central system interface with a single school or a group of schools.
- 4 The overall system flexibility shall be the result of shared system communications and a range of optional control devices to interface with the outside world for both current and future needs.
- 5 The ICS shall provide user control from web browser interface.
- 6 The ICS equipment headend shall consist of:
 - a Cloud based or locally installed
 - I Cloud system will reside on a Tier 1 Cloud Provider.
 - b The ICS will use Linux – Debian as an operating system.
 - c ICS will not require proprietary hardware to interface with.
 - d ICS will be accessible via a web browser.
 - e IP Audio Encoder(s) for creating Bell signaling and event audio.
 - f 70-volt amplifier with required channels and wattage to meet the needs for the project.
 - I No speaker array will exceed 80% of the total amplifier wattage.
 - g Telephone Audio Interface for PA announcements from POT Line or integrate with existing VOIP phone system.
 - h Zoned Public Address, Alert Audio, Bell Audio, Background Music, and other communications audio shall be delivered to the classrooms and other far points via the IP network and through the local room IP audio decoders with attached speaker.
- 7 Campus IP based Bell, Paging, Intercom & Alerting System
 - a The ICS shall provide campus-wide IP based:
 - I Public Address (PA)
 - II Bell (Scheduled Audio)
 - a) Visual Bells
 - i) Windows PC
 - ii) MAC
 - III Two-way intercom functionality
 - IV Audio and Visual Alerting functions shall be initiated via:
 - a) Intercom Console
 - b) ICS Web User Interface
 - c) "Panic" button
 - d) IOS & Android application
 - i) Application will auto update an Alert or Announcement is added/removed on the ICS.
 - V Audio Public Address and Intercom shall integrate with building phone system.
 - b The Bell or audio event scheduler shall be programmable and use common WAV or MP3 audio files.
 - c The Intercom system shall include the ability for remote IP audio encoders to send and return audio through the Intercom or from the Intercom from remote local sound systems. This feature shall include IP virtual Push-to-talk functionality.
 - I IP audio encoder must use SIP and Multicast protocols.
 - II IP audio encoder must support 5 or more Multicast channels.

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- 8 Campus IP based Doorbell and Video Doorbell
 - a The ISC shall include SIP doorbell(s) with and without a video camera component.
 - I The doorbells shall be included they ability to release door actuators through DTFM Tone.
 - II The doorbell shall include option for proximity card access.
 - III The doorbell video stream shall be able to be integrated into video security systems.
- 9 Integrated Intercom & Paging Console
 - a The system shall include an integrated SIP intercom and paging console.
 - I The console shall auto-update any add or removal of any device extension, zone, announcement, or alert.
 - II The console shall display video from the doorbell or camera integrated classroom speaker.
 - III The console shall be able to start pre-recorded or set, Announcements, (audible and visual), and Alerts, (audible and visual).
- 10 The ICS will provide monitoring and daily reporting via:
 - a SMS Text
 - b Email alert
 - c Email Daily report
- 11 The ICS will provide Visual bells to play on PC and MAC workstations.

2.3 Manufactures

- A Governing Clauses
- B It is not the intent of these specifications to limit or restrict submission of proposals for products or systems by manufacturers other than those specified. The products specified are intended to establish a minimum baseline of operational, functional, and performance-based system expectations that all proposed products must meet or exceed by features, functionality, and quality. The Owner reserves the right to govern over and proclaim whether proposed products are equal to the specified system standards.
- C If the proposed system does not meet all the following features or functions described herein, then the Proposer shall identify and list those exceptions in their proposal submittal by separate cover titled "System Exceptions" in red letters. The Proposer shall not be automatically disqualified for not meeting one or more requirements. The Owner shall evaluate proposals on their overall value; all proposals shall be fully considered for best value.
- D Reference to a manufacturer that may appear in this specification is not intended to imply that all products available from said manufacturer meet in full all requirements of this specification. The Proposing Vendor shall be responsible for full compliance or the specification requirements.

2.4 Equipment & Software

- A Governing Clauses

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- 1 The following sets forth the minimum IMS equipment requirements. Described are both technical performance specifications along with certain desired features and functions that the Contractor must provide with their proposed system solution.
 - a The Proposer must state clearly in their proposal any exceptions to the equipment and/or requirements found in the construction documents too that offered in the Contractors proposal.
 - b Additionally, to exceptions, the Proposer shall list clearly, any value-added features and/or functions their proposed equipment may offer over and above the stated minimums.
 - c IMS equipment provided and installed shall be as depicted, or shown on the construction drawings, described herein this document, or more specifically under the System Description above.
 - d The Contractor shall be aware that the construction documents in totality identifies the requirements and equipment required to deliver the desired performance, this means the written specifications, drawings, and associated equipment list or generally known in totality as the "Construction Documents."
- 2 The Contractor shall be solely responsible for all equipment needed for a turn-key project based on their lump sum proposal, and the construction document's descriptive requirements.
 - a Provide:
 - I All Equipment and Systems as depicted on the Project Construction Drawings.
 - II All features and functions as described herein this document.
 - b The Proposer shall provide one lump sum price for a complete turn-key-system installation per the construction documents. This lump sum price shall be inclusive of all work and material needed for fully functional systems.
 - I Features to be provided by this software application shall include, but not be limited to, the following and as further described under System Description herein:
 - a) Bell Scheduling
 - i) The system shall be capable of hosting virtually unlimited bell schedules.
 - ii) The system shall be capable of running two schedules on any given day.
 - iii) The system shall be capable of creating, modifying, duplicating, exporting, and deleting bell schedules.
 - iv) The system shall be capable of color-coding bell schedules.
 - v) The system shall be capable of displaying a calendar which shows the daily schedule for the month.
 - vi) The system shall be capable of filtering bell schedules by zone.
 - vii) The system shall be capable of providing a name, description, and time, (down to the 1/100 of a second) for each bell tone.
 - viii) The system shall be capable of scheduling bell tones at pre-defined intervals.
 - ix) The system shall include over 60 pre-recorded audio files.
 - a) Include audio files shall be leveled.

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- x) The system shall be capable of selecting from over 60 pre-recorded audio files for bell, alerts and announcements.
 - xi) The system shall be capable of playing, (sampling), the audio file prior to selecting it for the schedule bell tone.
 - xii) The system shall be capable of uploading and playing both MP3 and/or WAV audio files.
 - xiii) The system shall be capable of setting a default schedule for each day of the week, setting schedules for 12 months in advance and setting exceptions to daily bell schedules 12 months in advance.
 - xiv) The system shall be capable of setting exception schedule base on per-day or a range of days.
 - xv) The system shall be capable of selecting pre-defined or user defined colors for Bell Schedules and Zones.
 - xvi) The system shall be capable of playing bells via Multicast, SIP and RTP protocols.
 - xvii)The system shall allow bell tones to be played on a scheduled and/or manual basis.
 - viii)The system will broadcast visual (text based) descriptions for each scheduled tone displayed on visual IP end points.
- b) Combined Bell and Paging Zones
- i) The system shall allow for virtually unlimited bell and paging zones incorporating as few as one common area or classroom to all common areas and classroom devices or any combination desired by the school.
 - ii) The system shall allow zones to be created and managed through the systems web interface.
 - iii) The system will allow all zones to have an assigned extension and color, (Colors are used in conjunction with the school map.)
 - iv) The system shall allow schoolwide, and zone based recorded audio distribution.
 - v) The system shall allow schoolwide, and zone based scheduled audio distribution.
 - vi) The system shall allow schoolwide and zone based live paging.
 - vii) The system shall allow All zones to be available for District wide emergency notification via microphone, soft button, or telephone.
- c) Paging
- i) They system shall allow a broadcast page to a single zone containing one or many IP audio endpoints.
 - ii) In the event the SIP server is nonfunctional, the system must be able to page via multicast to all IP audio endpoints.
- d) Intercom
- i) The system shall allow all Galaxy Next Generation certified SIP devices work as intercom endpoints.

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- ii) The system shall allow intercom endpoints to receive intercom calls from the dedicated Intercom phone and the school / district phone.
- iii) The system shall allow authorized users to initiate intercom calls from outside of the school / district.
- iv) The system shall allow capable endpoints to initiate two distinctive endpoint notifications, (Standard Intercom and Emergency Intercom).
- e) Intercom Console
 - i) The system shall include a dedicated Intercom Console.
 - ii) The system shall be capable of connecting multiple dedicated intercom consoles.
 - iii) The system shall ring multiple dedicated intercom consoles concurrently when a classroom endpoint initiated an intercom call.
 - iv) The intercom console shall be programmed and able to auto update to work with all added or removed paging, announcement, and alert extensions.
 - v) The intercom console shall be able to call all endpoints.
 - vi) All classroom devices shall be able to call the intercom console.
 - vii) The intercom console will ring a standard ring tone when an intercom call is received from a classroom. When an emergency call is received from a dual line supported classroom endpoint, the emergency ring tone will ring.
 - viii) The system shall be capable of receiving and answering multiple concurrent calls from the classroom endpoints.
 - ix) The intercom console shall be capable of receiving a video signal from the systems video doorbells.
 - x) The intercom console will be fully integrated with the system whereas any new extension, zone, announcement, or alert is automatically integrated into the console.
 - xi) The intercom console shall be able to multicast page all IP audio endpoints installed in the building.
- f) Sounds
 - i) The system shall allow audio files to be tagged as Bell, Announcement, Playlist, Alert, or any combination of the four.
 - ii) The system shall have a minimum of sixty, (60) pre-recorded bell audio tones.
 - iii) The system shall allow for virtually unlimited user created audio files to be uploaded.
 - iv) The system shall allow for audio files to be grouped to play in sequence for use in both scheduled and on demand play.
 - v) The system shall allow for user created audio, (wav and MP3), to be added, as well as school / district specific notifications.
 - vi) The system shall allow all audio files to grouped together and played as a bell or announcement. "Playlist"
- g) Announcements

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- i) The system shall allow for the creation, management, and playback of pre-recorded audio files.
- ii) The system shall allow pre-recorded files to be played via extension dial from the intercom console, school phone, cell phone application or web interface.
- h) Alerts (Audio and Visual)
 - i) The system shall allow emergency instructions “alerts”, (e.g., lockdown, lockout, security, other announcement), throughout the entire building when triggered from a manual button, dialed extension from the intercom phone, school phone, cell phone application or web interface.
 - ii) The system shall allow a minimum of ninety-nine, (99) user created message which may be played one time or repeated “x” number of times.
 - iii) The system shall allow post-alert messages to be played one time or repeated “x” number of times.
 - iv) The system shall work in conjunction with network-based trigger devices.
 - v) The system shall be capable of sending unique SMS message on a per-alert basis to a standard group and/or unique group of recipients.
- i) Visual Communication
 - i) The system shall include a Visual Communications, (Alert and Announcements), feature.
 - ii) The system shall broadcast Visual Communications to a single device, group, (zone), of devices or all devices in the building.

Devices include:

 - a) PC
 - b) MAC
 - c) Chromebook
 - d) Android 5.0 or newer
 - iii) The system shall include a minimum of three announcement templates.
 - iv) The system shall include the ability to display text, images, and video clips within messaging.
 - v) The system shall include the ability to display an alert once, more than once or until shut off.
- j) Device Management and monitoring
 - i) The system shall work with any Galaxy Next Generation certified SIP, RTP, or multicast IP audio endpoint.
 - ii) The system shall work with any certified SIP loud ringer.
 - iii) The system shall work with any certified SIP strobe.
 - iv) The system shall monitor a connected IP device and show if the device is online or offline.
 - v) The system shall monitor SIP devices and show if the device is online or offline.

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- vi) The system shall allow users add additional “certified” IP audio, IP strobe, IP loud ringers and IP phones.
- vii) The system shall track, monitor extension notifies the user when an extension is in use when adding a new device.
- viii) The system shall provide an SMS text message in the event a device is offline.
- ix) The system shall provide an email message in the event a device is offline.
- x) The system shall provide a daily device report via email.
- xi) The system shall monitor the status connected Haven Locks
- k) Door Security Access Control
 - i) The system shall support SIP enabled doorbells with integrated relay.
 - ii) The system shall support SIP enabled video doorbells with integrated relay.
 - iii) The video doorbell shall display the video image on the video support intercom console.
- l) Map
 - i) The system shall include user managed map(s).
 - ii) The system shall display devices by color based on zone.
 - iii) The system shall allow the user to select an endpoint and initiate a call between the endpoint and the intercom phone.
 - iv) The system shall display the device status, and extension.
- m) Backup
 - i) The system shall allow three types of backup options.
 - 1.) FTP
 - 2.) Local USB
 - 3.) Local Network
 - ii) The system shall include an optional scheduled weekly backup with the manufacture.
- n) NTP Server
 - i) System shall have the ability to sync system time to the Atomic Clock Signal or to the school’s or district’s network time server.
 - ii) The system shall be the responsible time server for all Intercom connected devices.
- c ICS IP Audio Encoder
 - I The IP Audio Encoder shall be a network-enabled analog and digital audio-to-Ethernet converter for commercial audio distribution. The Encoder shall convert Audio from any analog or digital device into high-quality streams in real-time and the generated audio stream can be distributed via an IP-based network or the Internet. The Encoder shall be managed via the (ICS) software or integrated web page. Multiple encoders shall sit on the data network and allow for separate audio streams to address classroom decoders as needed by audio zones and sources.

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- d Audio Distribution Amplifier
 - I To maintain the audio signal integrity at the input of power amplifiers for the multiple common area speaker zones (Hallways, Exterior, etc....). The Contractor shall provide an audio distribution amplifier (DA). The DA shall be capable of balanced input and outputs. The (DA) shall have adjustable output levels of 0db or +6db of gain.
 - II The large zone amplifier shall power no more than (24) – 70v, (tapped at 4 watt), speakers per homerun zone channel. Each 70v homerun feed to the speakers shall be connected with a minimum of #18 stranded twisted pair plenum jacketed cable.
 - III The amplifier shall contain one or more independent amplifier channels powered by a low impedance switching power supply. Each channel shall have circuitry to protect against short circuits or mismatched loads.
- e Hall and Common Area Ceiling Speakers Locations
 - I The speakers for common area zones with drop ceilings shall be provided in locations as shown on the construction drawings as (S1). The hallways shall have the speakers connected in a distributed topology with 70V audio transformers taped at a minimum of 2.5 watts. No more than 35 speakers shall be placed on a 70v homerun feed from the associated amplifier channel. Each 70v feed to the speaker shall be connected with a minimum of #18 stranded twisted pair plenum jacketed cable.
- f Outside Speakers
 - I The outside speakers shall provide for exterior building coverage. These speakers shall be weatherproof units with baffle/ grill covers that are of a UV resistant plastic or corrosion resistant aluminum material that shall not rust. The speaker driver shall have a continuous audio power rating of 15 watts with horn loading. Frequency response range shall be 475Hz to 14KHz. Sound pressure level shall be 121dB measured at 4' on axis at 15 watts. Sound dispersion shall be 160 degrees. The speaker shall incorporate a transformer equipped loudspeaker with impedance selection for power taps of 1,2,3,8,7.5, and 15W to a 70v line. The "S3" speakers shall be taped at a minimum of 15 watts.
- g Office Volume Controls
 - I Provide each office shown with "SVC" a ceiling mounted volume controlled 70v speaker.
- h Call Switch
 - I Call Switch to provide the ability to call the office with a single push button. Push Button call a predefined location as defined by the school.
- i Classroom Microphone
 - I A wall mounted microphone shall be used to transmit intercom audio to the office location.
- j System shall operate stand-alone from all any district required equipment.

3 Acceptable Products

- a ICS – G2 Communicator by Galaxy Next Generation

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- b IP Audio Endpoint – HUB 2 by Galaxy Next Generation
- c Distribution Amplifier – G2-AN4120 by Galaxy Next Generation
- d Intercom Call Button – 1201-WP2BM by Galaxy Next Generation
- e Intercom Console – ICX7 by Galaxy Next Generation
- f Wall Speaker – Quam SYSTEM-1-QUAM
- g Ceiling Speaker – Quam Solution 1 or equivalent
- h Ceiling Speaker – Quam System 12/8
- i Exterior Horn – Atlas VP161A-APF
- j IP Exterior Horn - Algo 8186 Horn Speaker

3 Execution

3.1 Contractor Requirement and Responsibilities

A General

- 1 The Contractor shall provide, furnish, deliver, transport, erect, install, configure, and connect completely all the material and equipment described herein or depicted on any Proposal package construction document or drawing. The Contractor shall supply all other incidental material required, such as interconnecting cables, connectors, and hardware to make the work complete and leave all systems in first class operating condition.
- 2 The Contractor shall consider this a “Turnkey Project” for use by the Owner.
- 3 The Contractor shall coordinate with all other trades to avoid causing delays in the installation schedule.
- 4 In the event of any conflicts, delays, or improper preparatory work by other trades, notify the General Contractor, Consultant, and Owner.
- 5 Equipment and enclosures shall be mounted, plumb, and square in relation to the structure.
- 6 Provide cut-in boxes or approved clamping rings where back boxes are required, but not provided by Electrical Contractor.
- 7 The Contractor shall coordinate their requirements for proper ground system to all equipment.
- 8 Coordinate and verify with the Electrical Contractor, the installation of needed cable raceways.
- 9 Devices, wire raceways, and equipment, except for portable equipment, shall be permanently attached to equipment racks or building structure and held firmly in place with screws or fasteners. Adhesives alone shall not be accepted as fasteners.
- 10 The Contractor cannot shoot, fasten, or screw hangers to the roof deck. Any exceptions shall be noted or coordinated in writing with the General Contractor.
- 11 The Contractor shall coordinate clearance for cable paths, and coordinate clearance for access above cable tray to easily add or remove cable from the cable tray they install.
- 12 A Contractor installing any equipment shall be responsible for providing all interconnecting cables to, and/or between same equipment that may be required to make equipment fully operational.
- 13 Consideration shall be given not only to operational efficiency of installed equipment, but additionally to overall aesthetic factors; Contractor shall comply with industry

standard practices in the installation of equipment and the wiring of the equipment cabinets.

- 14 Contractor's construction, fabrication, installation, or delivery of materials must comply with applicable standards and practices.
 - 15 The Contractor shall coordinate and field-verify the electrical rough-ins provided for their use by the Electrical Contractor.
 - 16 The Contractor shall exercise care during installation. Damage to cables or equipment shall not be accepted. Damaged cable or equipment must be replaced.
 - 17 The Contractor shall remove and replace cabling that is found to have been stretched or pulled past the recommended pulling tension during installation.
 - 18 The Contractor shall install all operational software, as required by equipment and ensure that such software is fully functional and operational. In the event of software conflicts due to upgrades, bugs, or other reasons, the Contractor shall provide solutions suitable to Owner at no additional cost.
 - 19 The Contractor shall be responsible for coordination with Owner's staff the software configuration options of software configurable systems.
 - 20 The Contractor shall provide, the Owner, installable and exact copies of all software used by or running on any system installed.
 - 21 The Contractor shall provide to the Owner keys for all lockable equipment installed.
 - 22 The Contractor shall provide all passwords for any system or equipment that may use or be locked with a password.
 - 23 The Contractor shall provide to the Owner a completed warranty card with filled in information for every installed device where the original manufacturer provides a product warranty over and above the Contractor's required warranty.
- B Audio System Adjusting
- 1 Prior to energizing or testing the system, ensure the following:
 - a All products are installed in a proper and safe manner per the manufacturer's instructions.
 - b Dust, debris, solder, splatter, etc., is removed.
 - c Cable is dressed, routed, and labeled; connections are consistent with regard to polarity.
 - d All products are neat, clean, unmarred and parts securely attached.
 - e Electronic devices are properly grounded.

3.2 Examination

- A The Contractor's Responsibilities:
- 1 The Contractor shall examine all related construction documents and ensure compliance to them.
 - 2 The Contractor shall coordinate their installation schedule to comply with General Contractor's timeline.
 - 3 The Contractor shall examine the project construction schedule against their need for sequences of completed spaces and coordinate those needs with the General Contractor. Example: MDF and IDF closets, etc.
 - 4 The Contractor shall coordinate their work with other trades to facilitate a seamless installation.

3.3 Protection

A Equipment

- 1 The Contractor shall coordinate with other trades to provide an acceptable environment for installed equipment.
- 2 Cover installed equipment racks for protection during high dust periods.
- 3 Do not operate equipment with fans during high dust periods.
- 4 Coil and protect cabling from damage prior to termination to equipment.

3.4 Installation and Construction

A Procedures & Methods

- 1 The Contractor shall provide rack shelves or rack mounting ears for any equipment that is not rack mountable. All equipment installed using shelves shall be fastened to the rack shelf. If Velcro is used to fasten any equipment, the Velcro must be self-fastened with screws. Adhesive is not an acceptable means to fasten any equipment.
- 2 All equipment installed within the equipment racks shall be fastened in an approved manner with serviceability in mind.
- 3 Supplementary equipment within equipment racks, such as special assemblies that are not rack mountable, or fastened to rack shelves, shall be mounted on painted black high-grade wooden boards running vertically on side rails of equipment racks. The same wooden strips shall also be used to support cable tie support bars for lacing cables to equipment.
- 4 All equipment mounting boards in head-end rooms, MDF's, electrical, or IDF closets shall be painted white or black as location dictates with fire retardant paint. The mounting boards shall be made of high-grade plywood.
- 5 Equipment shall be mounted into racks and consoles, and fully wired and tested, before delivery to job site.
- 6 With the installation of equipment and cables, consideration shall be given not only to operation efficiency, but also to overall aesthetic factors, to comply with industry standards and practices.

B Equipment Programming and Configuration

- 1 Most of the network devices, (black boxes), that makeup the IP signal platform are what are commonly called "Network Appliances." These devices are relatively easy to configure and connect. Each box has very similar needs and require the same basic understanding to configure. In most every case where the device to be installed has a data network port, the Contractor will need to configure the following:
 - a Device IP Address (This shall be assigned by the Owner.)
 - b Network Subnet Mask (This shall be assigned by the Owner.)
 - c Default Gateway (This shall be assigned by the Owner.)
 - d DNS Address (This shall be assigned by the Owner.)
- 2 The Owner's IT department shall provide the above-needed information in IP ranges it shall be up to the contractor to assign and track each box and IP address as well as the room it went into.

C Wire and Cable Requirements

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- 1 Cable installation must follow related TIA/EIA standards and recommendations, including methodology as noted in TIA/EIA 569 - Part 4.6 Ceiling Pathways. Specifically, including sections 4.6.1 General, 4.6.2 Design Guidelines, and 4.6.5 Cable Support.
- 2 All cables, regardless of length, shall be marked with indelible color-coded labels at each end. Labels shall be directly hot stamped or factory-stamped, closed sleeve method. Adhesive strip labels may only be used if protected by transparent heat-shrink tubing.
- 3 There shall be no unmarked cables at any place in any part of any system, this includes both in equipment racks and outside of equipment racks. Label marking codes used on cables shall correspond and be shown clearly on as built drawings.
- 4 All cables shall be separated into like groups according to signal or power levels and routed separately to eliminate signal contamination and crosstalk, this includes both in equipment racks, and outside of equipment racks.
- 5 All power cables, control cables, and high-level cables shall be grouped to one side of the equipment rack while low level cables shall be grouped to the other side.
- 6 All equipment rack wiring and cabling shall be neatly laced, ends dressed, and all cables shall have service loops between the horizontal tie bar, and the connection to equipment. Rack cabling shall be adequately supported with tie wraps, or Velcro wire wraps and horizontal support bars to rack frame as it enters or exits the front or back of equipment.
- 7 Cables between cable support bars and equipment shall have a minimum of 3" of sag between the bar and connector and be consistent with other cables installed in the rack.
- 8 All cables within equipment racks shall use Velcro wire wraps to manage and bundle cables. Velcro strips shall be no more than a ¼" wide.
- 9 Equipment and Cable Labels:
 - a All Cables shall be labeled at each end and referenced on the As-Built Drawings.
 - b Provide all proposed wording and / or numbering scheme for labeling to the Consultant for review and written approval prior to procurement or installation.
 - c All labels used must be permanent and secure. Provide labeling as follows unless otherwise noted in a specific section.
 - d The Contractor shall use actual room identifications in their labeling scheme. Contractor shall obtain written approval from the Owner for the actual room numbers, and labeling scheme, to be used prior to installation.
 - e All labeling information shall appear on the As-Built drawings.
- 10 Service Loops
 - a Provide ample service loops at each termination so that plates, panels, and equipment can be removed for service, re-termination, or inspection. Provide the following as a minimum:
 - I Wall plate outlet box: minimum of ten (10) inches from wall surface to jack.
 - II Termination panel: Six (6) inches behind termination panel from cable tie to jack.
- 11 Connections and Connectors
 - a Connections shall be made with approved connectors on cables, terminal blocks, or punch blocks. Crimp style connectors shall be made with proper crimping tool.

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- b Cables shall be terminated with the proper connector specifically produced for use with each type of cable.
- c Connector adapters shall not be allowed in any part of the system.
- d RF cable connectors shall be made with hex crimp.
- e Two-point crimps shall not be accepted.
- f Solder joints shall be made with rosin-core solder.
- g Mechanical connectors must be specially made for type of cable or wire used.
- h Twist on connectors shall not be allowed.

3.5 Close-Out Quality Control

- A The following should be complete and in place before final system inspection & demonstration is scheduled and performed with the Owner's consultant:
 - 1 Contractor has provided substantial completion report to consultant.
 - 2 All equipment shall be operating normally.
 - 3 All equipment software is installed and configured.
 - 4 All electronic devices are properly grounded.
 - 5 All powered devices have AC power from the proper circuit.
 - 6 All patch cables and jumpers are in place.
 - 7 Insulation and shrink tubing are present on cable ends.
 - 8 Equipment labels are in place.
 - 9 The system documentation is complete with "as- built" drawings available.
 - 10 Dust, debris, solder splatter, etc. is removed.
 - 11 All cables are dressed, routed, and labeled; all connections are consistent with regard to polarity.
 - 12 To the best of the Contractor's knowledge, all contractual system specifications are fully met, in detail and intent.
- B System Documentation
 - 1 Prior to final acceptance by the Owner, all system closeout documentation must be delivered and made available during final acceptance walkthrough.
 - a As-Built drawings
 - b Equipment Manuals
 - 2 All documentation requirements stated in the Submittal requirements shall be updated and made a part of the As-built documents.
- C Final Acceptance Testing Verification
 - 1 Acceptance Testing shall be the responsibility of and performed by the Contractor in the presence of the Consultant and other Owner's representatives. Coordinate this testing so that free access, work lighting, and electricity are available on the site.
 - 2 Fully balance all audio endpoints. This also means that all room or zones be set to 20 dB above ambient sound level.
 - 3 The Contractor must complete all previous punch-list items prior to final acceptance test verification by the Owner and Consultant.

3.6 Cleaning

- A Prior to system turnover to the Owner
 - 1 Remove all dirt and debris from equipment racks and equipment rooms.

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- 2 Clean all equipment filters, vents, and fans.
- 3 Clean all enclosures and back box interiors thoroughly before installing plates, panels, or covers.

3.7 Demonstration

- A The Contractor shall be responsible for the following:
- 1 The Contractor shall demonstrate all systems to the Owner/Owner's representatives. This demonstration shall occur after all the submittal documents are supplied, including As-Built drawings, substantial completion report, and test results, and after notifying the Owner/Owner's representative in writing that the system meets the specification and is complete and ready for verification.
 - 2 Demonstrate operation of each major component and functional requirement as specified herein. If any portion of the system does not appear to be functioning properly, further test, along with corrective actions shall be performed by the Contractor. If the need for further adjustments becomes evident during the demonstration and testing, the demonstration shall be discontinued until the system operates properly.
 - 3 The Contractor shall remain responsible for all equipment, labor, hardware, and documentation, in part and in total, until the Owner accepts such work or material in writing.
 - 4 The Contractor shall be responsible for equipment adjustments to ensure normal and proper operation. Owner required system adjustments shall be made by the Contractor as directed by Owner or during final testing.
 - 5 Provide a minimum of two (2) installation technicians to assist the Owner as required during final test verification and final acceptance walkthrough. The technicians shall be equipped to perform necessary corrections to the system. They shall have test equipment capable of testing any and all parts of the equipment, cabling, or systems.
 - 6 The technicians shall be prepared to make final adjustments as directed by the consultant. Equipment adjustments may be either electrical or physical.

END OF SECTION