

## **SECTION 27 76 00**

### **PUBLIC ADDRESS and CLOCK SYSTEM**

#### **PART 1 GENERAL**

##### **1.01 RELATED DOCUMENTS**

- A. The drawings and general provisions of the Contract Documents apply to this Section.

##### **1.02 SUMMARY**

- A. This section includes a fully operational IP platform for a district-wide internal and school Critical Communications Solution, incorporating school safety notifications and general communications including but not limited to the following: (Note- As the owner has standardized on the specified system for ease of training and maintenance, no substitutes will be considered.)
1. The platform shall provide complete internal communications and employ state of the art IP Technology including the minimum functions listed.
    - a. Two-way internal intercommunications between staff locations and classrooms.
    - b. Scheduled bell events.
    - c. Emergency announcements that will override any pre-programmed audio, assuring that all Emergency/Lockdown etc., are heard at each speaker location.
    - d. Capability of prerecording emergency announcements that can be activated by a Soft Key on an administrative console, panic button, dial string, mobile app, or web browser.
    - e. Atomic Time Synchronization with Class Change Tones utilizing multiple, programmable schedules for each zone.
    - f. District-wide, Emergency, Group, All School and Zone live voice paging.
    - g. District-wide, Emergency, group, All School and Zone visual messaging.
    - h. District-wide, Emergency, Group, All School and Zone paging for pre-recorded audio - tones, music and voice.
    - i. Single sign on web-based user interface for multi-school functionality.
  2. The system shall support a minimum of 1000 level priorities which shall be user-definable, allowing each end point to place a minimum of 5 different priority calls at the same time.
  3. Any authorized administrator shall be able to call from outside the school into any classroom, zone, or entire school directly via the School District supplied SIP enabled Telephone Network. This shall allow remote monitoring, call-in annunciation, and two-way conversation from outside the facility as well as paging into the system. (Compliance with NEMA Standard SB-40 for emergency communications in K-12 Schools).
  4. Authorized system users shall be able to create a minimum of 100 automated sequences with voice instructions, tones, emails, program distribution, and relay activations and replay them.
  5. Automated message strings shall be manually initiated from a single-button access on the console, on a SIP connected telephone, panic button, mobile app, from the web-based user interface or via interface with third party systems.
  6. Paging and two-way intercom features shall be accessible from any system console or SIP connected telephone for each campus.
  7. The platform shall synchronize its system time to the network timeserver or a web-based time server.
  8. Each single campus installation shall be locally survivable for intercom, paging, bells, and emergencies such as lockdown, even when the district connection is unavailable.
  9. This specification establishes a minimum level of quality, features, and performance for individual components as well as the integrated system.
  10. Systems that do not comply with the feature-sets highlighted in this Specification will not be considered.
  11. Included in the emergency procedures is the ability to send specific messages and or instructions. These features can be added to the emergency sequences.

12. The ability to require an access code to initiate or clear an emergency from the administrative console.
13. An app that can run on either Android or Apple phones. This app will give the user the ability to initiate one of 18 emergency procedures programmed into the app. This app will also allow you to view all classrooms check in status. This process will update during the emergency to make sure all information is current.
14. The ability to allow the fire alarm system to signal an active fire alarm to TCU. This will allow supplemental visual and audio messaging from Telecenter U. Telecenter U can be programmed to change system state, dependent on the active emergency. Both fire and emergency will be displayed on the administrative console and mobile application.
15. Any system that requires more than one Cat drop to a classroom to control an IP speaker, up to 5 call-in switches, status lights (up to 2) and message board/digital clock will not be considered equal to the specified system.

### **1.03 DEFINITION OF TERMS**

- A. Installer(s): Shall refer to the person, persons, or company who or which contracts to perform the work specified herein.

### **1.04 SUBMITTALS**

- A. Product data for each component.
- B. Shop Drawings: Prior to proceeding with the work: Provide detailed equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, location of each field connection, and a complete schedule of all equipment and materials with associated manufacturer's cuts sheets which are to be used.
  1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Identify terminals to facilitate installation, operation, and maintenance. Include a single-line diagram showing cabling interconnection of components and levels throughout system and impedances.
  2. Artwork drawings and lists indicating proposed nameplate nomenclature and arrangements for control panels and plug panels prior to fabrication reflecting equipment used.
  3. Each drawing shall have a descriptive title and all sub-parts of each drawing shall be labeled. All drawings shall have the name and locations of the project, Systems Contractor's name in the title block.
  4. Details and descriptions of any other aspect of the system, which must differ from the contract documents due to field conditions or equipment, furnished.
- C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements. Include record of final matching transformer-tap settings, and signal ground-resistance measurement certified by Installer.
- D. Maintenance Data: For equipment to be included in maintenance manuals.
  1. Record of Owners equipment-programming option decisions.
  2. All instructions necessary for proper operation and manufacturer's instructions.
  3. "Proof of Performance" information.
  4. Manufacturer's maintenance information.
  5. Copies of non-proprietary computer programs and system set up disks documenting all programmable features of the installed system.
- E. Record Drawings: Prior to final acceptance, provide three (3) complete sets of drawings indicating all cable numbers and construction details in accordance with the actual system installation. Revise all shop drawings to represent actual installation conditions. These Record Drawings will be used during "Final Acceptance Testing".
- F. System Training: Submit the following information describing the training programs and system trainers as outlined in paragraph 1.6 of this specification.
  1. Include with the submittal a preliminary staff development training program in outline form for review and approval by the owner's representative.

2. Include with the submittal a current copy of the trainer's certification from the manufacturer that certifies and identifies the trainer(s) who are eligible to provide training and support for the project.
  3. Include with the submittal a current copy of trainer's needs assessment form which will be reviewed with the owner's designated representative for the system's preliminary system programming and configuration.
  4. Include with the submittal copies of all documentation used to identify for the owner those participants attending and completing the training programs.
- G. A copy of the manufacturer's standard statement of warranty proving all equipment provided for the school communications network is covered with the required five-year warranty shall be included with the project submittal. This statement of warranty shall be provided on the manufacturer's stationary.

## **1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced Installer who is an authorized representative of equipment manufacturer for both installation and maintenance of equipment required for this Section. Provide the following within thirty (30) days after notification to proceed:
1. Provide a list of installations that the Installer has specifically installed for verification by the Owner. Random installations from other vendors and/or Installers shall not be accepted. The Installer, not its employees, must meet these qualifications.
  2. The Installer shall be bondable.
  3. The Installer shall demonstrate to the satisfaction of the Owner or his representative that he has:
    - a. Adequate plant and equipment to pursue the work properly and expeditiously.
    - b. Adequate staff and technical experience to implement the work.
    - c. Suitable financial status to meet the obligations of the work.
    - d. Technically capable and factory trained service personnel at a local service facility to provide routine and emergency service for all products used in this project.
- B. Any Contractor, who intends to bid on this work and does not meet the requirements of the "Quality Assurance" paragraph(s), shall employ the services of an "Installer" who does meet the requirements and who shall provide the equipment, make all connections and continuously supervise the installation. A subcontractor so employed as the "Installer" must be acceptable to the Engineer. The "Installer" shall be identified within thirty (30) days of notification to proceed for acceptance by the Engineer.
- C. Because the life expectancy of this type of communications structure normally exceeds 10 years, the owner expects continuity from the service provider. If the installing/servicing company has not been an authorized provider of the manufacturers product for at least 10 years, the following is required:
1. A list of (2) systems manufacturers of which they currently are authorized service providers where the relationship exceeds 10 years.
  2. A letter from the manufacturer outlining the details of changes in service providers over the last 10 years and what actions they will take to ensure continuity of service to the customer.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- E. Comply with NFPA 70
- F. Comply with NEMA Standard SB-40 for Emergency Communications in K-12 schools.
- G. Comply with UL 60950.

## **1.06 IN-SERVICE TRAINING**

- A. The contractor shall provide and implement a complete and comprehensive staff training program for all administrators, facility staff members, and teachers. This mandatory training program will provide school staff a complete understanding of how to utilize and properly operate all functions.

- B. The training program shall be implemented by a staff member/trainer employed by the contractor. The trainer must be factory certified to provide training on their product.
- C. All staff development training is to be coordinated through the owner's designated representative. As training sessions are completed, the trainer will provide the school's administrative staff and school district's staff a document listing all the staff and faculty members who attended, received, and completed the training program.

#### **1.07 WARRANTY**

- A. Provide a manufacturer's five-year warranty of the school communications network equipment against defects in material and workmanship. This warranty will cover all electronic system components. Additional warranties cover clocks, speakers, and call in switches. If any defects are found within the warranty period, the defective equipment shall be replaced at no cost (equipment only); a one-year warranty shall be provided for labor.
- B. A copy of the manufacturer's standard statement of warranty proving all equipment provided for the school communications network is covered with the required five-year warranty shall be included with the project submittal. This statement of warranty shall be provided on the manufacturer's stationary. The standard five-year warranty is an important element in establishing a standard in quality. Manufacturers who circumvent the five-year warranty by offering special "extended warranties" that are not part of their normal published warranty will not be accepted.
- C. Contractor shall respond, excluding weekends and holidays, within 24 hours to any warranty service calls. If equipment cannot be repaired within 24 hours of service visit, the contractor shall provide "loaner" equipment to the facility at no charge.
- D. Make available a service contract offering continuing factory authorized service of the system after the initial warranty period.

#### **1.08 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide the following system: (Note- As the owner has standardized on the specified system for ease of training and maintenance, no substitutes will be considered.)
  - 1. Telecenter manufactured by Rauland
    - a. Authorized Rauland Distributor contact:
      - 1) Comtel Systems Technology, Inc. (408) 543-5651; Email: gregs@comtelsys.com

### **PART 2 PRODUCTS**

#### **2.01 SYSTEM REQUIREMENTS**

- A. The platform shall utilize state of the art IP Technology for Emergency automation, Call-in Notification, School Safety Paging and Evacuation tones, Class Change Tones utilizing multiple, programmable schedules for each zone, two-way hands-free everyday internal communications and paging, visual messaging, and program distribution. The system shall be easy to learn and operate. All standard programming shall be web-based, district-wide and user friendly to allow the system administrator the ability to easily program system features.
- B. Provide complete and satisfactorily operating district/school communications and district/school safety as described herein, using materials and equipment of types, sizes, ratings, and performances as indicated. Use materials and equipment that comply with referenced standards and manufacturers' standard design and construction, in accordance with published product information. Coordinate the features of all materials and equipment so they form an integrated system, with components and interconnections matched for optimum performance of specified functions.
- C. The platform shall be a single electronic system consisting of a minimum of 10 audio channels for each campus, (classroom) IP Speaker Modules and call switches, IP Zone Modules connecting corridor speakers, inside and outside horns, IP Administrative Consoles, SIP enabled PBX integration and district-wide integration for paging, emergency notifications,

calendar scheduling and configuration.

- D. Each Classroom can be provided with a Speaker Module interface, a status light, and a minimum of 5 different call switches, each with their own annunciation path and priority.
- E. Call-ins may automatically annunciate (display of priority and location) to administrative consoles, SIP enabled phones, and outside phones.
- F. Call-ins shall be programmed to automatically change priority and annunciation route based on age of call-in and original priority.
- G. Call-ins may have priority (and annunciation route) changed by user action from a console or SIP enabled phone.
- H. Call-in annunciation route shall include playing pre-recorded audio over speakers, sending a pre-configured email, and activating relays.
- I. The platform shall lend itself to expansion by simple addition of hardware modules.
- J. The platform shall connect directly to an existing, standard protocol WAN/LAN network, without the need for a separate server at each school location. Configuration, including bell schedules, calendars, and emergency sequences can be remotely created, changed, stored and downloaded to the system by an authorized user from a web-based user interface.
- K. The platform shall provide the ability to initiate school safety paging announcements, evacuation tones and take cover tones from any telephone or connected web browser within the facility or outside the facility to any other location within the facility or district.
- L. The platform shall provide the ability to selectively communicate or monitor individual classrooms in emergency situations from any telephone within the facility or outside the facility to any other location within the facility; all communication within the classroom shall be hands-free and will not require any interaction by the classroom user.
- M. The platform shall provide classroom users the ability to confirm that they have safely secured their classrooms during an emergency with a single button press. The front office administrator will receive confirmation that the classroom is safely secured via an administrative console and web-based user interface. The front office administrator can view classrooms that are not safely secured via the administrative console. The front office administrator can view classrooms that are not safely secured via the web-based user interface. The front office administrator shall be able to initiate two-way communication, without a pre-announcement tone, to the classroom during an emergency via the administrative console. Web-based user interface will still identify that a school is in an emergency, even if all classrooms are safely secured. Individual classroom check-in and school emergency status shall be viewed from the web-based user interface, both on-site and remotely.
- N. IP Addressable and POE powered Speaker Modules for individual rooms shall be system programmable and may be assigned any two, three, four, five- or six-digit number as well as name and description. Any extension may be reassigned at any time.
- O. IP-enabled two-way voice communication shall be available from any provided telephone or administrative console through any speaker in a campus. This shall allow hands-free communication to any classroom or any individual loudspeaker unit. A programmable pre-announce tone shall sound immediately before the intercom path is opened and a supervisory tone shall continue to sound at regular intervals when speaker monitoring is active, complying fully with all privacy legislation. Pre announce tone and supervisory tones shall be disabled during designated emergencies automatically.
- P. The platform shall allow users to configure multiple schedules per school, with a minimum of 500 unique events per schedule, and automatic Daylight Savings time correction. Schedules can be programmed to occur once, daily, weekly, monthly, or in any combination of the preceding recurrences. Each school may have a minimum of 20 unique bell schedules, with a minimum of 5 active schedules on any given day for each campus. User shall be able to select from 25 standard included tones as well additional user created and uploaded audio files for class change signaling and messaging. In addition, scheduled events shall include relay



actions, email notifications, visual messaging, status lights and paging exclusions as system configuration changes. The platform shall allow control of the bell schedules via the district WAN/LAN without the need for a separate server at each school location. Bell schedules can be remotely created, changed, stored and assigned to calendar days for the local school by an authorized user from a single web-based user interface, without logging into multiple systems.

- Q. The platform shall be able to integrate with an existing PA system or operate as a fully independent IP solution. The platform shall be able to function in combination of said configurations and allow for seamless communication within a school or district-wide, regardless of the type of configuration used. The platform shall be scalable, with the ability to easily add, install, and configure additional equipment to a system.
- R. The platform allows for customization of preprogrammed sequences, used for emergencies, events, and everyday communications. Preprogrammed sequences can be activated from the push of a relay button, soft key of an administrative console, a dial string of a SIP phone, or a web browser configured to the district network. Sequences can be initiated automatically as part of a schedule or on the fly. Preprogrammed sequences can be customized to utilize any combination of audio tones, emails, relays, tone exclusions, swings, delays, duples, SIP phone notifications, and program distribution. Audio tones can include customized audio files and voice messages, recorded in any language. Uploaded audio tones and messages can be preprogrammed to announce repeatedly or individually, as part of a scheduled sequence or on the fly. Each school in a district can have its own customized sequences, and can be activated individually, in groups, or district-wide.
- S. The platform allows for emergencies to be initiated in a drill environment, separate from real emergencies. Drill emergencies can be initiated from panic buttons, consoles, SIP phones, or a web browser.
- T. The platform shall provide status lights that will display the status of individual classrooms and school-wide status, including for emergencies, at the same time. Status lights will be customizable in color and flash rate based on event type and priority.
- U. Visual message boards are available in 2 sizes. Small message boards have 8 by 40 LED display with 3 color LED's. the large message board will have 2 lines with 16 by 80 LED display with 3 color LED's. During idle time the message boards can display date and time. They can also display countdowns for class change or status of an emergency. You will have the ability to change the messages on the fly to display instructions or directions. Status lights can be tied to message boards to give more information as to status of classrooms that checked in or groups of rooms that checked in.
- V. POE zone page amplifier module. This component will give the schools the ability to play audio to drive groups of speakers from a single device. Depending upon configuration you can have 14 or 35 watts of output. The module can be either wall or rack mounted.
- W. First Responders Notification. This feature can be initiated so the status lights do not display the rooms that checked in until the first responders are on site. This will not influence any of the other check-in notifications. The App, console and computers can still display the rooms that checked in.
- X. TCU Emergency Initiation App. This app can be installed on either Android or Apple devices. The app can process up to 18 different emergencies. The app will update in real time rooms that have checked in OK. It can also display a Fire emergency is in effect during an emergency.

## **2.02 EQUIPMENT AND MATERIAL**

- A. Server Software
  - 1. Provides district-wide paging, bell event scheduling, emergency notification and configuration for entire district.
  - 2. Ability to configure system and initiate system features, per school and district-wide via web-based user interface.
  - 3. The software can sync system time to the Atomic Clock Signal or to the school's or district's network time server.

4. The software will provide a web browser to deliver district-wide emergency paging, pre-recorded messages and tones from any authorized computer in the facility or the district. The software must be capable of automatically notifying district personnel via the WAN/LAN of an alarm condition.
5. The software can automatically broadcast emergency instructions via associated system hardware throughout an entire district when an alarm (e.g. lockdown, lockout, security, fire) is initiated via the web-based user interface. The emergency instructions are preprogrammed and require no user intervention. Bell tones can be halted during an emergency. The system provides redundant alarm annunciation over intercom/paging speakers and is not meant to replace primary fire alarm or security systems.
6. The software allows for user-uploaded pre-recorded messages and tones. Software supports the upload of MP3 and WAV file types. User-uploaded pre-recorded messages and tones can be part of emergencies, sequences, and bell schedules.
7. The software can be installed in cloud, virtual or physical server environments.
8. The web-based user interface supports secure HTTP browsing.
9. The software supports encryption to ensure secure access.
10. The system shall monitor itself if devices go offline and system actions are not received. Specified users shall receive email notifications when devices go offline. The software shall be able to keep a log and report on system activity within a school or all schools district-wide for a minimum of one year. These reports can be exported to excel spreadsheets.
11. The system shall allow administrators to run reports on all system activities including emergencies, drills, paging, call-ins, check-ins and system trouble on a per school, multi-school and district-wide basis.
12. The software will support a minimum of 20 bell schedules per school, with 5 schedules assignable to a specific school day. Bell schedules can be programmed to annunciate tones, activate relays, send emails, activate program distribution, and notify SIP phones.
13. The system allows programmable end points to be automatically included or excluded for live paging, bell tones, or prerecorded audio, depending on the time or day or day of the week. These inclusions/exclusions can be applied manually or automatically depending on their schedule.
14. The software can automatically send an email, as part of a programmed sequence of events, to district administrators alerting them of an emergency within the district.
15. The software provides the ability to view schools that are in an emergency status, using any web browser on the district's network. The software shall identify the name of the school in an emergency as well the type of emergency that school is in.
16. The software provides the ability to view individual classrooms that are not checked-in during an emergency, using any web browser on the district's network. The software shall identify the name, extension, and description of the classroom that is not checked-in during the emergency.
17. The system has a minimum of 5 customizable emergencies, one of them being an All-Clear - with the ability to return the system from an emergency to normal status. Each emergency shall have a minimum of 500 unique events.
18. As a district-wide communications solution, the system shall be able to provide simultaneous communications to all schools or groups of schools within a district. The system shall allow a user to initiate district-wide communications to individual schools, all schools or groups of schools, from a web-based user interface. The system shall allow a user to initiate prerecorded audio, live paging, or programmed sequences to individual schools, all schools or groups of schools, from the web-based user interface. Programmed sequences shall be customizable per school, and the system shall be able to activate them simultaneously to individual schools, all schools or groups of schools, from the web-based user interface.
19. The communications software must allow upgrade from an individual school system to multiple schools, or an entire school district, using the same web-based user interface. The communications software from an individual school system must be identical in typical

user operation to the multiple schools or entire school district communications system software.

20. The system allows for emergencies to be initiated as drills for practice. Drills may include all or some of the associated steps as its corresponding emergency sequence. Drills are recorded in the event history report.
21. The system provides the ability to export lists of bell schedule steps, emergency sequences, staff directory, users, peripherals, and zone targets.

**B. Campus Controller**

1. Provides call routing for paging and intercom for a single facility.
2. System shall connect to the district provided Telephone Network via a SIP connection.
3. Support a flexible numbering plan allowing two, three, four, five, or six-digit extensions.
4. SIP interface to a district provided Telephone Network shall be capable of allowing connected phones to display classroom call-ins, answer internal intercom call-ins, make pages and change priorities of call-ins in progress.
5. Direct dialing, two-way amplified voice intercom between any provided telephone or admin console and speaker without the use of a press-to-talk or talk-listen switch.
6. Ability to upgrade priority level from individual call switch.
7. The ability to answer intercom call-ins registered at administrative consoles and pre-selected telephones.
8. The ability to automatically escalate incoming call-ins to an alternate telephone or group of telephones if they remain unanswered for a predetermined amount of time.
9. The ability to manually upgrade an intercom call-in to an alternate telephone or group of telephones.
10. The ability for classrooms to "check-in" via push button when they have successfully secured their location during emergency.
11. Administrative console shall display locations that have not checked in to confirm their secured location and provide hands-free audio monitoring and communication to unsecured locations.
12. The controller shall not need direct connection to any classroom via home run or distributed wiring. It shall communicate solely through the IP network.
13. Single button access from any console on the system to distribute emergency announcements within the facility to all or select locations equipped with speakers. Emergency announcements originating from any assigned administrative console shall have priority over all regular system functions.
14. Ability for administrative consoles and connected phones to selectively monitor audio at any two-way speaker during an emergency.
15. Stores a minimum of 48 hours' worth of Bell Event Schedules, all emergency notification sequences as well as facility wide configuration.
16. System can sync system time to the Atomic Clock Signal or to the school's or districts network time server.
17. System's SIP Interface shall provide:
  - a. Audio paging access from any telephone to any single intercom speaker, zone (group) of intercom/paging speakers, or all speakers/paging horns throughout the entire facility.
  - b. Ability to answer a call-in directed to that SIP extension.
  - c. Ability to upgrade a call-in directed to that SIP extension.
  - d. Single button access from any telephone on the system to initiate alarm signals within the facility to all or select locations equipped with speakers. A minimum of 25 separate distinct alarm signals shall be provided. Alarm signals originating from any assigned administrative telephone shall have priority over all regular system functions.
  - e. Ability to initiate a school-wide emergency including lockdown and evacuate sequences.
  - f. SIP device shall display call-in information from call in switch. Information will include



- a minimum of Classroom Name, Number, and Priority Level.
18. The system will have the ability to utilize a web browser and a USB microphone connected to the PC to deliver district-wide live emergency paging, pre-recorded messages and tones from any authorized computer in the facility or the district. The system must be capable of automatically notifying district personnel via the WAN of an alarm condition.
  19. The system will have the ability to utilize a desktop microphone to deliver school-wide live emergency paging and zone paging throughout the facility.
  20. The system can automatically broadcast emergency instructions throughout an entire campus when an alarm (e.g. lockdown, lockout, security, fire) is tripped or manually activated. The emergency instructions are preprogrammed and require no user intervention. Bell tones can be halted during an emergency. The system provides redundant alarm annunciation over intercom/paging speakers and is not meant to replace primary fire alarm or security systems.
  21. The system can integrate with emergency weather radios to generate live emergency broadcasts notification throughout a facility.
- C. IP Addressable Modules:
1. System shall provide multiple IP Addressable Modules for intercom, paging and relay activation.
    - a. All Modules are POE 802.3af compliant
    - b. All Modules support DHCP.
    - c. All Modules connect to network with a single RJ45 connector
  2. IP Addressable Speaker Module
    - a. Shall interface to school's data network, a classroom speaker, and multiple call switches.
    - b. A minimum of 5 levels of call-in can be placed from an IP Speaker Module. The call-ins are routed to administrative consoles and select SIP connected telephones and can only be cleared from the system once answered. If a call-in is not answered within a preprogrammed time the call-in may reroute to other telephones, consoles, and speakers.
    - c. An option for Privacy call in switches is supported. When the Privacy switch is activated it prevents administrative or classroom telephones from monitoring the specific classroom/location intercom speaker.
    - d. The ability to belong to one or more of a minimum of 100 independent zones for zone paging, program/music distribution zones and class change tone zones; this assignment is a programmable function, changeable by time of day. Each IP Speaker Module's location shall be programmed in software to belong to any combination of software zones. IP Speaker Modules shall be designed to mount near ceiling and wall speakers and in the plenum space.
    - e. Intercom and paging volume adjustable from Software interface.
    - f. Module will support and power a status light that displays individual classroom information including call-ins placed, testing status and emergency check-in status.
  3. IP Addressable Zone Paging Module
    - a. Zone Paging Module shall connect multiple speakers for district all page, all page, zone paging, bells, audio events and, emergency notification.
    - b. Zone Paging Modules shall be rack and wall mountable.
    - c. Zone Paging Modules shall be able to belong to one or more of 100 independent zones for live paging, bells, pre-recorded audio and emergency notification.
  4. IP Addressable Aux I/O Module
    - a. Aux I/O Module shall have two input contacts and two output contacts.
    - b. Input and output contacts are individually addressable.
    - c. Aux I/O Module shall be wall and rack mountable.
    - d. User can program relays to be activated manually, through an event/bell schedule, or during emergency notification.

- e. Aux I/O Module can perform school lockdown from a single press of a panic button.
- 5. IP Addressable Program Line Input Module
  - a. Program Line Input Module shall provide line level audio program distribution into system.
  - b. Program Line Input Module shall have a 3.5mm cable jack.
  - c. Program Line Input Module shall be configured via web-based user interface.
  - d. User can configure program distribution to be activated manually or automatically through an event/bell schedule.
  - e. Program Line Input Module will have a system priority level such that emergency communications override program distribution.
- 6. IP Addressable Microphone Input Module
  - a. The system shall support a minimum of five (5) Microphone Input Modules per school.
  - b. Microphone Input Module shall support dynamic and condenser style microphones.
  - c. Microphone Input Module shall support microphones with or without Push-To-Talk functionality.
  - d. Microphone Input Module shall support configurable paging priorities.
  - e. Microphone Input Module shall provide user feedback for paging activity.
  - f. Microphone Input Module shall have adjustable microphone gain levels.
  - g. Microphone Input Module shall be configurable from the web-based user interface.
  - h. Live pages from the Microphone Input Module can automatically increase audio priority during an emergency.
- D. IP Addressable Analog Gateway
  - 1. IP Addressable Gateway provides integration with existing analog wiring infrastructure - consisting of shielded two-pair classroom field wiring. The Gateway provides the ability to reuse speaker wiring, speakers, and punch blocks to integrate analog infrastructure with IP platform.
  - 2. Each Gateway will have 5 watts of power per port and 25 watts total per device.
  - 3. Supports 24 classrooms that utilize 25 Volt speakers and all current Telecenter call switches for front office notification.
  - 4. Supports minimum of 5 call switch priorities per classroom, capable of lockdown check-in functionality, while reusing existing shielded two-pair classroom field wiring.
  - 5. Classroom intercom volume adjustable from Software interface.
  - 6. Classroom paging volume adjustable from Software interface.
  - 7. Configured to the school network and can be used in conjunction with IP Addressable Modules.
- E. IP Addressable Administrative Console
  - 1. A full color screen with 64 soft keys, 3 line select, volume control, push to talk, speakerphone mode and left/right and up/down scrolling.
  - 2. Audio paging access from any Console to any single intercom speaker, zone (group) of intercom/paging speakers, or all speakers/paging horns throughout the entire school.
  - 3. Programmable soft key access from any console on the system to initiate alarm signals within the school to all or select locations equipped with speakers. A minimum of 25 separate distinct alarm signals shall be provided. Alarm signals originating from any assigned administrative console shall have priority over all regular system functions.
  - 4. Programmable soft key access from any console to automatically broadcast page emergency instructions throughout an entire school when an alarm (e.g. lockdown, lockout, security, fire) is tripped or manually activated. The emergency instructions are preprogrammed and require no user intervention. The system provides redundant alarm annunciation over intercom/paging speakers and is not meant to replace primary fire alarm or security systems.
  - 5. Ability to perform intercom to any single IP Addressable Speaker Module.
  - 6. Ability to display 3 call-ins at a time on the screen while other call-ins are annunciating and the ability to scroll to view all call-ins.

7. Ability to upgrade a call-in via soft key.
  8. Programmable soft key access from any console for activating relays, campus wide.
  9. Ability to maintain, along with controller and other IP Modules system functions, including intercom, bells and paging for the local campus in the event of district-wide connection loss.
  10. Classrooms that have not 'checked-in' during an emergency are listed on the Administrative Console's screen.
  11. The time duration of an emergency is shown on the screen of the administrative console. The check-in timer is shown on the screen of the administrative console.
- F. Audio Paging/Program Amplifiers
1. Power amplifier(s) shall be provided to provide a minimum of 2 watts of power to all paging speakers, and 15 watts of power to all paging horns.
  2. The maximum load on the paging/program amplifiers shall be 80% of the rated maximum output of the amplifiers.
- G. Zone Page Amplifier Module
1. Depending on configuration the amp output is either 14 or 35 watts output.
  2. Can be wall or rack mounted.
  3. Powered with either a wall wort or POE+
- H. Visual message boards.
1. Can be powered by either POE or POE+ depending on size and features.
  2. Comes in 2 sizes
  3. Large 2 lines 16 by 80 LED display
  4. Small 1 line 8 by 40 LED
  5. 3 color LEDs: Red, Amber and Green
- I. Equipment Racks (By Owner)
1. All equipment racks shall provide 44 spaces (77") minimum for mounted system equipment.
  2. All equipment racks shall be multi-rack format ("gangable") style, bolted together, and open cavity.
  3. All equipment racks will be provided with lockable rear doors.
  4. Equipment rack(s) shall be in climate-controlled areas/rooms as shown on drawings.
  5. All head-end, distribution, and source equipment, including data and power, shall be in racks configured as approved by the Engineer.
  6. Rack mounted equipment shall be accessible from front and rear.
  7. All unused rack spaces will be covered with appropriate blank/vent panels.
- J. Wall Mounted Horns
1. Provide double re-entrant type horn loudspeakers with integral driver. The horn loudspeaker shall be impervious to weather and vandalism. Horn shall be constructed of heavy-duty ABS plastic. Horn loudspeaker drivers shall be rated at 15 watts with a frequency response of 480 Hz to 14 KHz. Sensitivity shall be 106 dB 1 watt, 1 meter. Transformer assembly shall be dual voltage multi-tap type suitable for 25 or 70-volt installations. Dispersion pattern shall be 180 degrees conical. The horn loudspeaker shall be constructed of treated heavy gauge aluminum, with all exposed parts potted and a sealed driver. Wiring terminal shall be fully enclosed. The speaker flange and mounting surface shall have a cork-rubber gasket. The horn loudspeakers finish shall be gray baked on enamel.
  2. The recessed back box shall be of heavy gauge cold-rolled steel, spot welded for stability with a rust-retardant gray primer finish. Acoustically treat the interior to eliminate mechanical resonance. The back box shall be 10-3/4"x10-3/4"x6" deep.
  3. The baffle shall be vandal proof, the faceplate constructed of 14-gauge carbon steel with a minimum tensile strength of 55,000 PSI. A lattice grid sub-plate shall deny access to the horn but be acoustically transparent for sound projection. Provide tamper proof, stainless steel mounting hardware. The baffle shall a mar/scratch baked epoxy rust inhibitive finish.

**K. EQUIPMENT AND MATERIALS**

1. The following equipment will be provided at a minimum, per site/system and per classroom:
  - a. Rauland TCC2000 Telecenter U Campus Controller
  - b. Rauland TCC2044 Telecenter U Administrative Control Console
  - c. Rauland TCC2022 Telecenter U Zone Page Module
  - d. Rauland TCC2099 Telecenter U Universal Rack Mount Kit
  - e. Rauland CVA25-1 25V Telecenter U Page Amplifier
  - f. Rauland TCC2011A Telecenter U Telecenter U IP Classroom Module
  - g. Rauland ACC3011S Message Board Speaker/Baffle and 8" speaker
  - h. Rauland TCC3011S Telecenter U Small Message Board
  - i. Rauland ACC3011SBB ACC3011S Surface Mount Backbox
  - j. Rauland ACC1411 Exterior Paging Horn/Baffle Assembly
  - k. Rauland ACC1113 Exterior Vandal-Proof Surface Square Backbox
  - l. Rauland ACC1003 Interior White Square Speaker Baffle
  - m. Rauland USO880 8" 10oz Interior Speaker 8-Ohm w/RJ45
2. \*The above main system equipment will be installed into existing IDF/MDF data racks, or new as provided by the School District. Connections for all field devices and equipment will be through PoE+ ports of the active data network, into PoE+ switch ports as provided by the School District. The contractor will be responsible for the complete operation and set-up/programming of the new systems into the existing District TCU server, and to provide an update to the existing TCU server software to the latest update version.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Examine conditions, with the Installer present, for compliance with requirements and other conditions affecting the performance of the School Communications and School Safety Network.
- B. Do not proceed until unsatisfactory conditions have been corrected.

**3.02 INSTALLATION**

- A. General: Install system in accordance with NFPA 70 and other applicable codes. Install equipment in accordance with manufacturer's written instructions.
- B. Furnish and install all material, devices, components and equipment for a complete operational system.
- C. Impedance and Level Matching: Carefully match input and output impedance's and signal levels at signal interfaces. Provide matching networks where required.
- D. Control Circuit Wiring: Install control circuits in accordance with NFPA 70 and as indicated. Provide number of conductors as recommended by system manufacturer to provide control functions indicated or specified.
- E. All housings are to be located as indicated.
- F. The contractor shall provide necessary transient protection on the AC power feed, all copper station lines leaving or entering the building, and all central office trunks. All protection shall be as recommended by the equipment supplier and referenced to earth ground.
- G. Wiring within Enclosures: Provide adequate length of conductors. Bundle, lace, and train the conductors to terminal points with no excess. Provide and use lacing bars.
- H. Provide physical isolation from speaker-microphone, telephone, line-level wiring, and power wiring. Run in separate raceways, or where exposed or in same enclosure, provide 12-inch minimum separation between conductors to speaker-microphones, telephone wiring and adjacent parallel power. Provide physical separation as recommended by equipment manufacturer for other system conductors.

- I. Identification of Conductors and Cables: Use color coding of conductors and apply wire and cable marking tape to designate wires and cables so all media are identified in coordination with system wiring diagrams.
- J. Weatherproofing: Provide weatherproof enclosures for items to be mounted outdoors or exposed to weather.

### **3.03 GROUNDING**

- A. Provide equipment grounding connections for Integrated Electronic Communications Network systems 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 to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.
- C. Provide all necessary transient protection on the AC power feed and on all copper station lines leaving or entering the building. Note in system drawings, the type and location of these protection devices as well as all wiring information.

### **3.04 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Services: Provide services of a duly factory authorized service representative for this project location to supervise the field assembly and connection of components and the pre-testing, testing, and adjustment of the system.
- B. Inspection: Make observations to verify that units and controls are properly labeled, and interconnecting wires and terminals are identified. Provide a list of final tap settings of paging speaker line matching transformers.
- C. Testing: Rectify deficiencies indicated by tests and completely re-test work affected by such deficiencies at Contractor's expense. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

### **3.05 FINAL ACCEPTANCE TESTING**

- A. The Final Acceptance Testing shall be provided to the Owner or the Owners designated representative only. Final acceptance testing to any other trade or service provider for the project will not comply with the requirements of this section.
- B. The contractor will provide a Final Acceptance Test record document signed by both the contractor and the Owner or designated Owner's Representative establishing the "In Warranty" date. The warranty period will not commence until the Final Acceptance Test is completed.
- C. Be prepared to verify the performance of any portion of the installation by demonstration, listening and viewing test, and instrumented measurements. Make additional adjustments within the scope of work and which are deemed necessary by the Owner because of the acceptance test.

### **3.06 COMMISSIONING**

- A. The contractor shall train the Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventative maintenance of the system. This training will be in accordance with the training as outlined in Section 1.6 of these specifications. In addition to the Training Materials provided, the contractor will also furnish Operators Manuals and Users Guides at the time of this training.
- B. Schedule training with Owner through the owner's representative, with at least seven days advance notice.

### **3.07 OCCUPANCY ADJUSTMENTS**

- A. The contractor shall provide Occupancy Adjustments in accordance with Section 1.6 of these specifications. A response scenario amenable to both the owner and the contractor will be established and followed for the first year of service.



### **3.08 CLEANING AND PROTECTION**

- A. Prior to final acceptance, the contractor shall vacuum and clean all system components and protect them from damage and deterioration. All blank spaces in equipment cabinets will be covered with blank panels. Top and side panels, and all cabinet doors will be installed. All general areas within and around all equipment rack/cabinets in the facility will be swept, vacuumed, and cleaned up. No cabinets will be left unlocked and all cabinet keys will be turned over to the owner or designated owner's representative.

**END OF SECTION**