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HNHS -Ceiling, Lights, PA, Piping Systems Replacement

Project # 2024.0003

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ADDENDUM NO. A-3

This addendum is issued as a supplement to the plans and specifications and shall be considered an integral part of the same. Acknowledgement of receipt of this addendum is required on the Bid Form.

Item: **A-3.1**
Location: General Information
Description: Delete Specification Section 275116 – Public Address Systems in its entirety and replace with attached exhibits 275116 - Public Address Systems – BOGEN and 275116 – Public Address Systems – EPIC. Contractor to provide separate pricing for each of these systems on the Bid Form. EPIC system is to align with BOGEN system (basis of design).

EXHIBITS

a. A-3.1: Specification Section 275116 – Public Address Systems - BOGEN
b. A-3.2: Specification Section 275116 – Public Address Systems - EPIC

SECTION 275116 – PUBLIC ADDRESS SYSTEMS - **BOGEN**

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

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

B. All bids shall be based on the equipment as specified herein. The catalog numbers and model designations are that of the Bogen Nyquist E7000 Series IP-Based Communications System. All other manufacturers shall submit for approval no less than 10 days prior to bids being due.

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

D. The contractor shall provide the FCC registration number of the proposed system, where applicable.

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

F. The contractor shall be responsible for providing a complete functional system, including all necessary components whether included in both the construction drawings and these specifications.

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

1.02 SCOPE OF WORK

A. The contractor shall supply and install all equipment, accessories, and materials in accordance with these specifications and drawings to provide a complete and operating IP-Based Communications System including but not limited to:

1. The platform shall provide complete Nyquist E7000 intercom and employ state of the art IP Technology including the minimum functions listed.

a. Intercom call between staff locations and classrooms with Unlimited Station capacity
b. Interactive Facility Maps
c. User customizable Announcements with priority
d. Text-to-Speech Announcements
e. Emergency Classroom Check-In can be used to enhances campus security
f. Emergency or Normal Announcements are capable of being recorded and activated by a speed dial on an administrative console, DTMF, wireless panic button, mobile app, web browser or external IP networked system using HTTPS URL-based Application Programming Interface (API)

g. Internal clock is synchronized with NTP network time server whether on the LAN, WAN or Internet keeping the Scheduled events (Bells) and Announcements accurate within milliseconds.
h. Audio distribution allow for scheduled or manually activated audio to be activated from the Admin Web UI, contact closure, Admin phone and/or by use of Routines
i. Unlimited Schedules
j. Unlimited Time, Paging, and Audio Zones
k. Unlimited Page Stacking/Queueing
l. Unlimited Scheduled events
m. Unlimited Scheduled Audio events
n. Integrated Internet Radio Source
o. Email Notifications and Alerts the system can send an email with a system event, contact closure, or when a Routine has been activated to name a few
p. Supervised Station Status system can be setup to send an email when a Nyquist device goes offline.
q. Clock / Messaging Display capability improves school communications
r. Alert Filters – Allow facilities to monitor for such as weather events, earthquakes, tornados, tsunami, volcanoes, public health, power outages, and many other National Weather Alerts emergencies and warnings.
s. Multi-Site All Call paging allows authorized users to make normal district wide pages
t. Multi-Facility Emergency All-Call paging allows authorized users to make emergency district wide pages
u. Administrative Graphical User Interface or GUI that can be used by technicians or Administrative: CoS and Roles define who has access to what parts of the GUI
v. Push-to-Talk Microphone
w. Ambient Noise Sensing

2. The system shall have a Routines feature that allows staff to activate via Admin Web UI, dial string, panic button, mobile app, API or with an Admin phone touch interface. Routines can automatically launch a procedure, or sequence of actions, that the E7000 system executes as a result of an input trigger. Routines are designed with school security plans and can support crisis plans for situations such as school lockdown, weather events, or emergency evacuation.

3. Direct Inward Station Access or DISA allows administrator or first responder or emergency personnel with proper login codes to call into the system from outside the school into any classroom, zone, or entire facility with customer supplied SIP enabled Telephone Network. DISA is designed to allow remote monitoring, Facility All-Call or Zone Paging, and two-way conversation from outside the facility.

4. Authorized staff can use the Admin Web UI to configure the Clock/Messaging Display function. They can use it to create messages that will display on monitors connected to the 10-Watt plenum-rated Intercom Modules with HDMI 1.3 (max. 1920 x 1080 @ 24/30 Hz) output or the NQ-GA10PV devices in a selected zone, multiple zones, or to specific stations. When creating the message, you can set several options, including when and how long the messages are displayed, priority of messages, and the appearance of the messages. The schedule programming allows the event names to be displayed analog or digital clock along with day and date on an NQ-GA10PV Display. You can also remove messages from the message queue either manually or via a Routine.

5. The ADA requires that title II entities (State and local governments) and title III entities (businesses and nonprofit organizations that serve the public) communicate effectively with people who have communication disabilities. The goal is to ensure that communication with people with these disabilities is equally effective as communication with people without disabilities. With this in mind the

Bogen Nyquist E7000 helps people who have vision disabilities with clear audio paging, massaging and hearing disabilities with visual messaging to any display to assist in communicating.

6. Interactive Facility Maps that are intuitive to use. Simply click on a classroom or area of the GUI and it can initiate an intercom, page or drill to another map level. I addition when the system is in Check-In mode the classroom has a pop up of a room's video feed via the Maps view if equipped. The system shall allow authorized staff to use the Map-based Audio/Video room monitoring during emergency check-in. Systems that don't have provisions for this are not considered equal.

7. In the event of wide area network or WAN outage every facility must be capable of operating standalone and allow for all features listed within this specification to work. Systems that rely on the WAN to operate shall not be considered for comparison in this bid.

8. Manage Check-In functionality that allows staff to quickly verify that they are aware that a check-in event is underway and are reporting classroom status for their assigned classrooms or areas. For staff to check-in all they have to do is press their Call Switch after they have completed their required check-in procedure. Examples of check-in events include but are not limited to weather related shelter-in-place, safety related lockdown, fire evacuation, room occupancy.

9. The E7000 has a Disable Audio feature that can be activated via contact closure from fire alarm or security system, Admin Web UI, dial string, panic button, mobile app., API or with an Admin phone touch interface. When the E7000 has its Audio Disabled the follow features are disabled: programmed or manually activated audio distribution, Zone Paging, normal announcement files, All-Call Paging, manual normal tones and scheduled event tones.

10. Optional password protection for multi-site emergency all-Call, multi-site all-call, facility page. Emergency all-call page, all-call page, emergency announcement, announcement, zone page, alarm, and tone are used to prevent unauthorized use of the system.

11. Text-to-Speech option allows Admin Web UI users to add custom announcements into the system by simply typing the text that you want converted to speech for this announcement. The system will then generate a .wav file that can be used by the E7000 system. Systems that don't offer Text-to-Speech options shall not be equivalent.

12. Installation Wizards are available for installers to reduce the setup time on major components in the system programming. Included wizards are as follows: Customer Information, Dialing Length, Station, User, Time Zone, Network Time Server, and Zones as a minimum.

1.03 SUBMITTALS

A. Specification sheets on all items including cable types

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

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

   1. Station wiring arrangement
   2. Equipment cabinet detail drawing

D. Wiring diagrams showing typical connections for all equipment

E. Numbered Certificate of Completion for installation, programming, and service training, which identifies the installing technician(s) as having successfully completed the Nyquist E7000 technical training course provided by the Bogen Communications LLC.

1.04 QUALITY ASSURANCE

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

B. The contractor shall be an established communications and electronics contractor that maintains a locally run and operated business and has done so for at least 10 years. The contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges.

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

1.05 SINGLE SOURCE RESPONSIBILITY

A. Except where specifically noted otherwise, all equipment supplied shall be the standard product of a single manufacturer of known reputation and a minimum of 30 years of experience in the industry. The supplying contractor shall have attended the manufacturer's installation and service training classes. A certificate of this training shall be provided with the contractor's submittal.

1.06 SAFETY / COMPLIANCE TESTING

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

B. Bogen’s Nyquist E7000 solution is consistent with those NEMA SB 40-2015 requirements that specifically apply to school paging and intercom systems only as outlined within the ANSI/NEMA SB 40-2015 standards publication.

1.07 IN-SERVICE TRAINING

A. The contractor shall provide a minimum of eight hours of in-service training with this system. These sessions shall be broken into segments, which will facilitate the training of individuals in the operation of this system including Admin Web UI Dashboard operation, Scheduling, and Audio Distribution as a minimum. Operation manuals shall be provided at the time of this training.

1.08 WIRING

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

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

C. Wiring shall be done per manufacturer's recommendation West Penn #357. All terminal connections are to be on barrier strips.

1.09 PROTECTION

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

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

1.10 SERVICE AND MAINTENANCE

A. The contractor shall, at the owner's request, make available a service contract offering continuing factory authorized service of this system after the initial hardware and software warranty periods.

B. System shall include software maintenance that includes bug fixes and new feature releases for a period of five years. In addition, the contractor shall provide at the owner’s request additional maintenance contracts that are available as one-year, three-year, and five-year extensions. The contractor shall provide a 24-hour response time from call by customer.

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

1.11 WARRANTY

A. The Bogen Nyquist hardware products identified in this specification shall be warranted to be free from defects in materials and workmanship for five (5) years from the date of sale to the original purchaser; except for the NQ-SYSCTRL, NQ-T1100 and NQ-T1000 which each carry a two (2) year warranty. The Bogen Nyquist software products identified on this specification are warranted to be free from defects in material and workmanship for ninety (90) days from the date of sale to the original purchaser.

PART 2 - SYSTEM SPECIFICATION

2.01 MANUFACTURERS

A. Manufacturers, subject to compliance with requirements specifications, provide the following system:

1. Bogen Nyquist E7000 IP-based paging and intercom solution manufactured by Bogen Communications LLC.

B. The specifying authority must approve any alternative system 10 days prior to bid day.

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

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

2.02 EQUIPMENT

A. Nyquist NQ-SYSCTRL System Controller

1. Configuration and management via a Web-based Graphical User Interface (GUI)
2. Wizard based setup for quick installation
3. Remote access from virtually any PC/MAC, tablet, or mobile device
4. Continuous monitoring of stations and appliances to ensure system operation
5. Dual network adapters to allow the System Controller to operate on two separate networks
6. Music automatically added to music library and playlist from USB port
7. Network-based audio that can be sourced (input) from any number of Nyquist appliances (NQ-P0100, NQ-A2xxx, NQ-A4xxx, etc.)
8. Ample storage for music files, recorded announcements, and call recordings
9. G722 and OPUS audio codec support to deliver superior HD audio quality
10. Convection air cooled; fan-less design for quiet, maintenance-free operation
11. Rack mounted.

B. Nyquist NQ-E7030 Analog Station Bridge (ASB)

1. 24 station interface supporting analog speakers and call switches
2. 120-Watts of available power at 25-Volts
3. Two dynamic talk paths/amplification channels
4. Support Category G wiring or better
5. 25/70-volt speaker(s), ceiling-mounted, wall-mounted, and paging horns
6. CAN Bus 2.0 interface designed for support of Nyquist Digital Call Switch (DCS) NQ-E7020 that can initiate Normal, Urgent, or Emergency priority calls, all with options for Privacy Mode

7. Analog/Mechanical Call Switches capable of placing Normal, Urgent, or Emergency priority calls, Bogen CA15C rocker style momentary call button

8. Wall, rack, or shelf mountable

C. Nyquist NQ-P0100 Matrix Mixer Pre-Amplifier (MMPA)

1. No less than four Mic/Line inputs used for analog audio input like AM/FM Tuner or CD Player

2. Channel 4 configurable for Push-to-Talk MIC application

3. Line Level output to drive external amplifier

4. Software programmable configuration and operation

   a. Push-to-Talk Channel
   b. Push-to-Talk Type
   c. Push-to-Talk Zone
   d. Mixer Channels

5. Configurable built-in DSP

   a. Noise Gate
   b. Compressor/Limiter functions, etc.
   c. Tone Controls: Low Shelving, Mid Bandpass and Hi Shelving
   d. Multi-band Parametric EQ
   e. Variable Low-Cut/High-Pass filters
   f. CH1 can be configured as a digital AES/EBU (AES3) input

6. USB 2.0 host port, Type-A connector (future use)

7. Powered by 100V – 240V Universal AC Mains

8. Rack mountable in the MDF.

D. Nyquist NQ-E7010 Input/Output Controller

1. Power over Ethernet 802.3af compliant

2. 8 x Dry Contact Closure Inputs

3. 8 x Relay Driver Outputs (Open-Collector)

4. USB 2.0 host port, Type-A connector (future use)

5. Software programmable configuration and operation including; Contact Type, Extension, Name, Close Interval, Actions (911, Audio, Alarm, Announcement, All-Call, Multi-Site-Emergency-All-Call, Emergency-Call, Emergency-All-Call, Hourly, Audio-Disabled, No Action, Page, Tone, Enable-Audio and Manual), Action ID, Zones, Close Extension, Dashboard Type, Dashboard Title, Dashboard Scope, Dashboard Text, Dashboard Style, Email and Routines

6. Wall, rack, or shelf mountable
7. Number of devices to be determined by system integrator.

E. Nyquist NQ-GA20P2 Plenum-Rated 20-Watt Integrated Amplifier

1. Single 20-watt, 8-ohm speaker output
2. Single Balanced Line Output
3. Power over Ethernet Plus (PoE+) 802.3at compliant
4. Nyquist network-based audio output (paging, intercom, audio distribution)
5. Web-based configuration
6. Front panel Power and Status LEDs
7. In-wall, in-ceiling, shelf, or device mountable UL 2043 plenum-rated package
8. Integrated slotted mounting flanges
9. Available PS4830W 48VDC External Power Supply when PoE+ isn’t available

F. NQ-T1100 VoIP Admin Phone Color Touch Display (aka Admin Station)

1. 7” 800 x 480-pixel color display with backlight
2. Touch screen display for one touch operation
3. Full-duplex hands-free speakerphone with AEC
4. Call hold
5. Mute
6. Redial, call return, auto answer
7. PoE (802.3af) Class-3 support
8. Headset with EHS support
9. Dual Gigabit Ethernet ports
10. Desk Mountable
11. Provide (2) total.

G. Third-party equipment support

1. Telephony interface device(s) for FXO/FXS analog port connectivity

2. Third-party hardware FXS gateway support includes:

    a. Two port FXS gateway Cisco SPA-112 typically used for analog interface to existing PBX CO port support
    b. 24 port FXS gateway Yeastar TA-2400 typically used for analog staff phone support

2.03 COMPONENTS AND DESCRIPTIONS

A. The Nyquist E7000 Series Educational System is a software-based VoIP paging and intercom system.

B. Nyquist E7000 Software

1. The Nyquist E7000 software is pre-installed on a Nyquist NQ-SYSCTRL System Controller or can be optionally installed on a dedicated dealer or customer supplied server. An unlimited number of facilities can be networked into a Nyquist-based District.

2. If the Nyquist Software is not a Nyquist NQ-SYSCTRL System Controller than the Minimum Server Requirements apply to dealer or customer supplied Server

    a. Debian Linux OS (AMD 64-bit version) release 8.4.x – 8.11.0
    b. Quad-core Intel-based processor running at 3.0 GHz or higher
    c. 8 GB RAM
    d. One 250 GB disk drive or larger

3. Redundant Array of Independent Disks (RAID) is recommended for redundancy and high availability.

4. Consider using a larger drive if large amounts of audio (for example, voice mail, announcements, recordings, and music) are being stored on the system. Other factors that should be considered are:

    a. How often will backups be performed?
    b. Will the system be backed up locally or remotely on a detachable drive, SAN/NAS, or NFS?
    c. How many users will have voicemail ability?
    d. How long will voicemail messages be stored?
    e. Will voicemail messages be part of the local system backups?
    f. NIC 10/100/1000 MB Ethernet port
    g. One or more PCI/PCI Express (PCIe) slots if telephony network connectivity other than, or in addition to, SIP trunking
    h. One or more PCI/PCIe type third-party telephony interface cards (for example, FXO, FXS, etc.) if telephony network connectivity other than, or in addition to, SIP trunking

5. Audio shall be transmitted between the System Controller and the Nyquist appliances using the customer supplied LAN/WAN using both G.722 and Opus 48k audio encoding and streaming technology to deliver High Definition DVD quality audio. Systems that do not use G.722 and Opus for audio encoding and streaming shall not be deemed equivalent.

6. Installers have the ability to verify that the Nyquist System Controller can access Internet-based URLs required for the system to run properly by clicking on the "Check Internet Site Access" on the license activation wizard. If the installer made mistakes in configuring the network the install has the ability to go back and make changes to the network by clicking on the “Network Wizard” button.

7. The Nyquist software and Nyquist appliances firmware shall be upgradeable via the Nyquist Web UI System Update page that contains a list of available Nyquist software updates. When automatic software check and download are enabled, new software updates will automatically be downloaded and appear in the System Update list, and a dashboard message will be displayed to announce newly available software. Release notes can be viewed for each available update. System updates can be started via the System Update list. The System Update page includes a "Check for System Updates" button that can be used to manually check for and download available Nyquist software updates.

8. Prior to preforming Nyquist updates the technician shall have the ability to verify if the default gateway, Network Time Protocol, and Domain Name Servers are configured and available, to obtain network interface and routing tables status, and to display the Nyquist E7000's public IP address. See "Check Internet Site Access" under "System Parameters". The E7000 system can be setup to automatic check for new Nyquist System software and automatic download of new Nyquist System Software

9. It shall be possible for a Nyquist facility to make "station-to-station" calls and "remote facility" All-Call pages to a single facility or to all Nyquist facilities in a district via the Nyquist Web UI or an Admin Station. Systems that require remote viewing software or other application software to be installed/loaded on to additional servers or PCs to make station-to-station calls and remote facility All-Call or district paging shall not be considered equivalent.

10. The Nyquist software is designed to handle all facility and district-wide communications, including but not limited to, inter-facility intercom calling and paging, district-wide Emergency All-Call and local facility point-to-point calls. Via the Nyquist Web UI, every facility shall be configured with the IP addresses of all the other remote facilities within the district. To ensure that these communications are operating correctly at all times the Nyquist appliances are supervised and remote facilities are monitored, if a device or facility has a fault the system can send and/or email and also display a message if a device changes state. System that don't provide Station Supervision and remote Facility Monitoring shall not be considered.

11. Nyquist can support an unlimited number of facilities; however, the maximum number of simultaneous remote facility intercom calls supported is based on the actual performance of the WAN and the Nyquist System Controller CPU load.

12. The voice quality of the facility calls may vary based on the WAN conditions. The maximum network bandwidth that All-Call and Zone Paging uses is average of 0.086 Mbps (Multicast G.722), and intercom calls average of 0.171 Mbps (unicast, G.722).

13. The system shall facilitate the repetitive playing of Normal or Emergency audio tones or announcements directed to an All-Call or a Paging Zone until stopped by the Nyquist user via the Web UI, an Admin Station, or a dry contact closure connected to the Nyquist I/O Controller NQ-E7010.

14. Through the use of Routines, a trained individual can create a routine that can perform a sequence of events that can include the repetitive playing of normal or emergency audio files, make or break contact closure(s), display different messages in different areas, send email(s), and place a phone call (if equipped) offsite and play a pre-recorded message. Routines can be triggered/started by Application Programming Interface (API) or the playing of normal or emergency audio files, make or break contact closure(s) or almost any feature or function in the E7000 system. The system must also be capable of executing multi-site Routines (e.g., supports District-wide lockdown). System that don't provide Routines are not equal.

15. A built-in Master Clock shall be included to automatically control class change bells or other time-based events. The Master Clock shall have an unlimited number of Events that may be programmed into any of the unlimited number of Facilities, unlimited number of Schedules, and unlimited number of Holiday events. The schedules shall be nameable for easy selection when assigning schedules to days or overriding a schedule. Schedules can be overridden via the Admin Web UI or Admin phone.

16. Network Time Synchronization. The system shall be capable of periodically updating/synchronizing the processor's time with a Network Time Server running Network Time Protocol (NTP) via the school's LAN network. Systems that do not provide Network Time Synchronization will not be deemed equivalent. The Nyquist server can be the NTP server for other devices on the LAN such as IP clocks and other IP devices.

C. Nyquist E7000 System Software Application

1. The Nyquist software is pre-installed on the Nyquist System Controller, and upon boot-up, users can log in to the Nyquist application via a web browser that supports WebRTC. Systems that require Com Port redirect software, client PC application, software or serial-to-Ethernet adapters for user access are not deemed equal. Communications between the System Controller and the Web UI(s) shall be via secure Hyper Text Transfer Protocol (HTTPS) connections (i.e., https://).

2. The Nyquist Web UI shall be configured with four different default user access levels, based on four unique user roles. Systems that do not provide unlimited access levels and unlimited number of user roles are not considered equal.

3. The four default roles shall be: admin, optech, operator, and user. These roles provide a starting point/example for administrators to create additional roles

4. Only a user assigned the admin role shall be able to provide access to users, giving them the ability to create, delete, edit, and view system parameters.

5. Only an Administrator shall have the ability to adjust roles and Class of Service (CoS) of users. The roles determine if users can view the definable data objects that can include configuration, alarms, and performance data and if users can perform certain operations based on the user's role and station's CoS. All changes to roles and CoS are effective immediately, without the need to restart the browser or reboot the System controller or server.

6. The Nyquist Web UI Dashboard shall provide full administrative capabilities to manage/operate the following system features:

    a. Calling/Paging – Used to access directory, dial pad, Page Exclusion, Call Forwarding, Zone Page, Record Page, Prepending Page, All-Call, Emergency All-Call, Manage Check-in and operate Routines.
    b. Multi-Site Calling/Paging – Used for Facility Page, Multi-Site All Call, and Multi-Site Emergency All Call.
    c. Tones/Announcements – Used for Tones, Announcements, Alarms, Stop Announcement, Display Message, and Remove Message.
    d. View Weekly Schedule – Used to show the current active Bell Schedules.
    e. Audio Distribution – Used to distribute audio sources to Stations, Audio Zones or entire facility. Operators can create an unlimited number Audio Distributions as needed by the facility

f. Enable or Disable Audio – Used to place the Nyquist system into Page Exclusion mode (i.e., “mute” the system) when a contact closure is supplied from the fire alarm panel. Systems that do not provide this capability are deemed not equal.

7. Systems that require application software to be installed on a PC to manage the above features shall not be considered.

8. To facilitate installation and configuration of the system, additional Web UI menus are required. The menus shall only be visible to users with the correct roles and CoS. The navigation menus found on the Web UI shall be as follows:

   a. System Parameters – Allow installers to adjust core system parameters including Product License, Restart Server, Station Supervision, Email Configuration, System Update, Shut Down Server, Check Internet Site Access, Check Server Status, Edit system tools and adjust all the System Parameters.
   b. Zones and Queues – Allow installers to create and modify Paging, Time, and Audio Zones. Installers can also setup Queues that can be used to eliminate feedback.
   c. Schedules – Allow installers and administrators to create bell schedules for multiple Schools, predefine alternative schedules to run, prevent the bells from ringing on a holiday, and schedule an announcement to play. The system shall allow an unlimited number of schedules to operate simultaneously within a facility.
   d. CoS Configuration – Allow the installer to create, modify, and delete CoS groups that control station access to the following features: Call-in Level, Zone Paging, All-Call Paging, Emergency All-Call, Inter-Facility Call/Page, Audio Distribution, Remote Pickup, Join Conversation, Call Forwarding, Walking Class of Service, External Call Routing, Call Transfer/3-way Calling, Manually Activate Tone Signals, Call Any Station, Manage Recording, Monitor Calls, Monitor Locations, Conference Admin, Conference User, Voicemail, Record Calls, Activate Alarm Signals, Disable Audio, Enable Audio, Allow Callee Auto-answer, District Paging, Inter-Facility Features, Manage Output Contacts, and Execute Routines.
   e. Admin Groups – Allow the installer to create, modify, and delete software groupings of admin phones, staff phones, and Admin Web UIs that can ring when a station calls in with a call switch.
   f. Stations – Allow the installer to set up, modify, and delete stations; set up Page Exclusion; view Station Status; and add New Stations.
   g. Bridge Devices – Allow the installer to configure the Nyquist ASBs.
   h. Amplifier Devices – Allow the installer to configure Nyquist Two and Four and PA Amplifiers
   i. Audio – Allow the installer to upload and manage Announcements, Playlists, Recordings, Songs, Tones, and Internet Radio Services. The system must support the uploading of both MP3 and WAV files and make Audio file management simple for users. Systems that limit the size of Audio files shall not be considered equal.
   j. Users – Allow the installer to manage users by giving them the proper roles and assign extensions if needed.
   k. Roles – Allow the installer to grant users rights to Create, Delete, Edit, Restart System, Sort Menu, Systems Update, Manage, Import/Export, Restore, Settings, or View.
   l. Facilities – Allow the installer to set up the district wide facilities for remote paging and calling.
   m. Outside Lines – Allow the installer to set up FXS and FXO ports for inbound and outbound system calling.
   n. SIP Trunks – Allow the installer to set up SIP trunks into the facility for inbound or outbound calling.
   o. Call Details – Allow the installer to review the historical system activities that can be used for incident investigation or system troubleshooting.

p. System Backup/Restore – Allow the installer to preform system backups or restores and allow the backups to be schedule to run automatically.
q. System Logs – Allow the installer to view and export log files, Nyquist-Intercom, and Web Server logs that can be used for troubleshooting and technical assistance.
r. Paging Exclusions – Allow the installer to view and edit stations that are excluded from paging.
s. Firmware – Update firmware for Nyquist speakers and appliances.
t. Routines – Allow installers to create routines that are a sequence of actions, that the Nyquist system executes as a result of an input trigger. Routines can support crisis plans for situations such as school lockdowns, weather events, or emergency evacuations.
u. Alert Filters – Allow installers to select the National Weather Alerts that the facility needs to monitor for such as weather events, earthquakes, tsunami, volcanoes, public health, power outages, and many other emergencies.
v. Systems that do not provide these options as a minimum shall not be considered equal.

D. Nyquist NQ-E7030 Analog Station Bridge

1. The Nyquist NQ-E7030 ASB allows facilities with existing Multicom or Quantum or compatible intercom systems to upgrade to Nyquist. Each ASB supports up to 24 speakers and call switches with 120-Watts of embedded 25 Volt power. The ASB is designed to drive almost any combination of 25 Volt speakers and horns.

2. The Nyquist ASB contains two 120-Watt amplifiers that are used dynamically by the system and allows two simultaneous amplified audio paths through the ASB. Either amplifier can be used for an intercom call and/or program (Paging, Time Tones and Audio) distribution.

3. Each of the 24 station interface ports - Support connections to as many as 24 individual 25 Volt speakers with one 25 Volt speaker connection per interface used for direct communication between the admin area and the classroom via Half-duplex talkback using the speaker as pickup and the 24 dry contact closure-type analog Call Switch connections allow for support of legacy Call-Switches like the CA15C.

4. On the back of the ASB is a CAN Bus 2.0 Interface designed to support the connection of 24 or more Nyquist NQ-E7020 Digital Call Switches DCS that can be associated with the programmed stations. Systems that don’t support Digital Call Switches shall not be considered equal.

5. On the front of the ASB are two (2) x RGB full spectrum LED’s. The POWER LED appears as solid red during initial power up, flashes green during a boot sequence, and appears solid green when fully booted. The STATUS LED uses the following indicators to provide information about the appliance:

   a. Flashing red – No network connection found
   b. Solid blue – The ASB is in an uninitialized state and is not associated to a server. (The server may be in a discovery mode.)
   c. Solid green – The ASB is registered to a Nyquist server and is in normal operation
   d. Flashing green – The ASB has an IP address but is not registered with the Nyquist server
   e. Solid red – The ASB needs to be rebooted or reset so that the Nyquist application can resume
   f. Flashing Blue – The ASB is updating.

6. USB 2.0 host port, type A connector designed for future applications.

7. On the front of the ASB you will also find the 10/100 Ethernet network connection. The ASB can be configured with a static IP address or use DHCP for connection to the customers network as required by the Network Administrator

8. The ASB gets its power from a universal mains power supply (100VAC – 240VAC)

9. The Nyquist NQ-E7030 ASB shall be rack, wall, or shelf mountable and shall include the required mounting bracket hardware.

E. Nyquist NQ-P0100 Matrix Mixer Pre-Amplifier (MMPA)

1. The Nyquist NQ-P0100 MMPA is designed to bring external audio into the Nyquist system. The MMPA interfaces with a local sound system by accepting one or more analog audio sources, mixing them, and outputting them to either, a) the network for Audio Distribution, or b) the MMPA's line level output that can then be inserted into an external amplifier to drive local sound system in gyms, cafeterias, auditoriums, etc. The MMPA supports the following:

    a. Four software selectable Line/MIC Input channels via three XLR connectors and four sets of screw-terminals. Input channel four (4) shall be capable of being configured to support a Push-to-Talk microphone Bogen model DDU-250. Channel-1 can be configured as a digital AES/EBU (AES3) input. Line/Monitor output – The MMPA becomes a station on the Nyquist system, allowing users to call it directly or to include it in any of the Page, Time, or Audio Zones and can be direct one-way page by calling it extension.
    b. The MMPA shall support the following features: Line-Level output to drive input on a local amplifier or self-amplified speaker; One USB 2.0 host port (Type-A connector) for future use; two (2) x RGB full spectrum LED status indicators.
    c. Configurable built-in Digital Signal Processing for Noise Gate, Compressor/Limiter functions, etc., Tone Controls: Low Shelving, Mid Bandpass and Hi Shelving, Multi-band Parametric EQ, and Variable Low-Cut/High-Pass filters.
    d. The MMPA is powered by Universal mains supply (100VAC – 240VAC).
    e. The MMPA shall be wall or shelf mountable and shall include the required mounting bracket hardware.

2. The system shall be equipped a minimum of one (1) Nyquist MMPA that allows for up to four user-configurable audio inputs. The MMPA shall support Line, MIC, and digital AES/EBU (AES3) input sources. The system supports an unlimited number of MMPAs.

F. Nyquist NQ-E7010 Input/Output Controller

1. The Nyquist NQ-E7010 I/O Controller is designed to accept contact closure inputs and activate open-collector outputs to drive relay coils. These inputs and outputs are used to trigger events or to be triggered by an event or Routine within the Nyquist system.

    a. PoE Class-1; IEEE 802.3af compliant with Optional 48VDC 15W power supply
    b. Eight Dry Contact Closure Inputs that can be used with Fire Alarm Override Relays, external event triggers (for example, Lockdown Buttons, etc.)
    c. Eight Relay Driver Outputs (Open-Collector) for use with Clock Correction (Sync Pulse), response to contact closure inputs, etc.
    d. USB 2.0 host port, Type-A connector (future use)
    e. Two (2) x RGB full spectrum LED Power and Status indicators

2. The Nyquist NQ-E7010 I/O Controller shall support wall or shelf-mounting options and shall include the required mounting bracket hardware.

3. The Nyquist NQ-E7010 I/O Controller shall be designed for wall or shelf mounting.

G. Nyquist NQ-T1100 VoIP Admin Phone – Color Touch Display (Admin Station)

1. The Nyquist Admin Station shall have the following features:

a. 7” 800 x 480-pixel color display with backlight
b. Touch screen display for one touch operation
c. Full-duplex hands-free speakerphone with AEC
d. Call hold
e. Mute
f. Redial, call return, auto answer
g. PoE (802.3af) Class-3 support
h. Headset with EHS support
i. Dual Gigabit Ethernet ports
j. Desk Mountable
k. Optional Wall mount capable

2. The Nyquist Admin Station display panel shall show the time of day and day of week, the current bell schedule(s), and the station numbers and call-in priority of staff stations that are calling in. Depending upon the system programming, an Admin Station shall display menus to activate Zone Paging, All-Call Paging, Emergency All-Call Paging, District All-Call paging, alarm signals, and external functions.

3. The Admin Station shall be capable of calling either the loudspeaker or Staff Station at each classroom location.

4. The Admin Station shall display the classroom number of any station that calls 911. This allows front-office administrators to direct emergency personnel to the correct physical location in the building when they arrive. If a system is not connected to outside phone lines, then 911 calls can be routed to a designated station within the facility. The system shall automatically record all 911 calls made from any station. The 911 call recording shall begin as soon as 911 is dialed and continue unit the call is terminated. Recorded calls shall be maintained on the system for later playback review and/or retrieval by authorized personnel and/or authorities. Systems that do not provide this feature will not be deemed equal.

H. Additional Loudspeakers for use with the Nyquist ASB

1. 25-Volt Hallway and Classroom Speakers shall be Bogen:

a. Ceiling Mounted Speakers: CSD2X2U Drop-In Ceiling Speaker shall be alternate bid.
b. Ceiling Mounted Speakers: S86T725PU Ceiling Speaker

2. 25-Volt Outdoor/Gym/Shop Area Horn-Type Speakers shall be Bogen:

a. SPT15A horn-speaker. Wire guards shall be provided in Gymnasium and Field House.

2.04 SYSTEM CAPABILITIES

A. The communication system shall be a Bogen Nyquist E7000 Series Educational System and shall provide a comprehensive communications network between administrative areas and staff locations throughout the facility.

B. The system shall provide no less than the following features and functions:

1. Software-based, state-of-the-art, Voice over IP (VoIP) paging and intercom solution.

2. The system shall provide a Web User Interface (Web UI) that shall allow users to configure and control the system, in accordance with their assigned User Role, from any Chrome or MS Edge Web browser enabled PC, Mac, or Android tablet or mobile device.

3. Amplified-voice communication with analog loudspeakers shall use a shielded audio pair when connected to an ASB.

4. The system shall support any combination of the following VoIP phone station types: NQ-T1100 Administrative VoIP Phone – Color Touch Display (Admin Station) or NQ-T1000 Staff VoIP Phone – LCD Display (Staff Station).

   a. All VoIP phone station types shall utilize the same type of field wiring.
   b. There shall be no limit to the number of Admin Stations that can be connected to a facility. Systems that require different head-end equipment to make Admin Stations function, or systems that limit the number of Admin or Staff Stations shall not be deemed acceptable.

5. Future station alterations shall only require the Station Type to be changed in system programming. Alterations shall not require field wiring or system head-end alterations, unless an analog station device is being replaced by a VoIP station device or vice-versa.

6. The system shall be a global non-blocking system. The system shall be capable of unlimited amplified intercom paths per facility. Two amplified intercom paths shall be provided with each ASB for its complement of 24 stations. All hardware, etc., required to achieve the necessary number of amplified-voice intercom channels for this system shall be included in this submittal. ASB amplified-voice intercom channels shall provide voice-activated switching. Systems requiring the use of a push-to-talk switch on administrative telephones shall not be acceptable. There shall be an automatic level control for return speech during amplified-voice communications. The intercom amplifier shall also provide control over the voice switching sensitivity and delay times of the VOX circuitry on the ASB.

7. The system shall provide 911 Dial-Through via outside FXO/FXS lines or SIP trunks to ensure that one or more lines are always available for 911 calls. The 911 Dial-Through is available to any properly configured station (via CoS). When a station dials 911, the 911 call is processed as follows:

   a. Call routes to an Emergency Group where the call can be answered.
   b. The 911 CO lines can be pre-configured and reserved. If the 911 reserved lines are busy, the normal CO lines will be connected to route the 911 calls. If all the normal CO lines are busy, then one of the ongoing calls shall be disconnected and the 911 call shall be placed.
   c. When 911 is dialed from any station, its designated Admin Station or Admin Group will receive a message that the station has dialed 911.
   d. The system shall automatically record all 911 calls made from any station. The 911 call recording shall begin as soon as 911 is dialed and shall continue until the call is terminated. Recorded calls

shall be maintained on the system for later playback review and/or retrieval by authorized personnel and/or authorities.

8. It is of highest importance that Emergency calls from stations receive prompt attention. Therefore, it is important that there be an alternative destination in case the Emergency call does not get answered at the primary location. Details are as follows:

    a. Staff-generated Emergency calls shall be treated as the second highest system priority. Therefore, all Emergency calls shall annunciate at the top of the call queue of their respective Admin Station or Admin Group. Should that Emergency call go unanswered for 15 seconds, the call shall be re-routed to an alternative speaker station. Then, a tone will prompt the caller to make a verbal call for help and annunciates to the Emergency link station “Emergency.” During the transfer, the original administrative telephone shall continue to ring the distinctive Emergency Ring. Should the Emergency Transfer-to-Station have an associated Admin Station, it will also ring for the Emergency call.
    b. The Emergency Transfer-to-Station shall be software configurable.
    c. Systems failing to transfer unanswered Emergency calls or failing to immediately connect to the designated Admin Station shall not be deemed as equal.

9. There shall be a Facility Wide Emergency All-Call feature. The Emergency All-Call shall be accessed from designated Admin Stations or the Nyquist Dashboard or by the activation of an external contact closure that shall give a microphone input Emergency status. The Emergency All-Call function shall have the highest system priority and shall override all other loudspeaker-related functions including Time Tones, Normal All-Call or Zone Pages, or Audio Distribution.

    a. Considering that Emergency calls are to be treated with the highest level of concern, systems that do not regard Emergency All-Call with the highest priority shall not be deemed as equal.
    b. Upon touching the Directory icon, a menu shall appear on the Admin Station display prompting the user to select the desired menu.
    c. The Emergency All-Call shall capture the highest-level system priority and shall be transmitted over all speakers in the facility. It shall also be capable of activating an external control output, which can be used to activate external relays to automatically override volume controls, local sound systems, or strobe circuits.
    d. This Emergency All-Call feature can have a four-digit pin number associated with it that would be required to use the feature or override someone that is already using this feature.
    e. Systems without Emergency All-Call or systems with All-Call that cannot be activated by external means or that do not capture complete system priority or activate an external relay, shall not be acceptable.

10. There shall be unlimited Alarm Tones (four by default). Each may be accessed by dialing *91 and the two-digit tone number from any Admin Station, SIP Trunk, or FXO/FXS system interface. These Alarm Tones are separate from the Time Tones. Users shall be able to add an unlimited number of Alarm Tones to the system by uploading MP3 or WAV files. Systems that do not allow the user to upload MP3 and WAV files to customize the Alarm Tones or need to use external alarm/tone generators or special software or have less than four Emergency Alarm Tones shall not be acceptable.

11. Upon touching the Directory icon on an Admin Station, a menu shall appear on the display prompting the user to select from the sub-menus. The Alarms sub-menu is the first available. This precludes the user from having to memorize complicated key sequences to access Alarm Tones.

12. There shall be unlimited I/O Controller relay driver outputs accessible and controllable by properly authorized users via an Administrative Web UI. These outputs remain set until accessed and reset. Users shall have the ability to review the status of each relay driver output. Users shall be prompted through fields via a plain English menu, precluding users from having to remember any dialing sequences to control this feature. The system shall support an unlimited number of I/O Controllers, and each I/O Controller shall be able to interact with any and all other I/O Controllers on the system (i.e., an input on one I/O Controller can trigger an output on one or more different I/O Controllers). Systems that require the user to remember complicated dialing schemes or prompt the user via cryptic commands shall not be acceptable.

13. The I/O Controller can create a contact closure when the following operations are performed in the system:

    a. 911 call placed
    b. Audio Distributed
    c. Alarm is played
    d. Announcement is played
    e. All-Call preformed
    f. Multi-Site All-Call performed
    g. Multi-Site Emergency-All-Call
    h. Emergency-Call
    i. Emergency-All-Call
    j. Audio-Disabled
    k. Page

14. The system shall provide software controlled and programmable control outputs for external relay activation for use with strobe lights, magnetic locks, card access systems, motion detectors, cameras, or any low-voltage, dry contact creating device. Systems using dedicated security stations for control of external functions shall not be acceptable.

15. The system shall be capable of interfacing to PSTN/PBX/iPBX via both FXO/FXS line and SIP trunk connectivity.

16. The system shall be capable of providing each facility (i.e., (i.e., Nyquist location) an unlimited number of incoming FXO/FXS or SIP trunk lines that can be designated by the user to ring the designated Day Admin or Night Admin. Where an Admin Station is designated to receive outside line calls, the incoming call's Caller ID information shall appear on the display. The system shall also provide the ability to make outside line calls from Admin Stations. This ability shall be programmable for each Admin Station and there shall be an unlimited number of CoS available to assign to any station.

17. The system shall be capable of supporting DID, DISA, and Security DISA functions.

    a. The system shall provide a password-protected Security DISA feature that shall only be accessible from authorized Police, Fire, Emergency personnel, or an off-premise security office that monitors the facility's security system. The Security DISA feature shall function as follows: Upon dialing the Security DISA phone number, the caller will receive a dial tone from the system, after which he or she must enter the assigned Security DISA passcode on the dial pad. Upon confirmation, the system will present the dial tone again and will allow the authorized personnel to dial any station/classroom on the system and monitor the activity without any pre-announce tone

or privacy beep. This will allow the authorized personnel to audibly assess the situation and determine what actions need to be taken.
b. All DISA and Security DISA calls shall be automatically recorded by the system for later playback review and/or retrieval by authorized personnel and/or authorities.

18. The system shall provide for field-programmable three-, four-, five-, or six-digit architectural station numbers.

19. There shall be an automatic level control for return speech during amplified-voice communications.

20. Each station loudspeaker shall be assignable to all or any combination of Paging, Time, and/or Audio Zones. Systems that do not provide unlimited Paging, Time, and/or Audio Zones shall not be acceptable.

21. There shall be unlimited schedules with unlimited programmable events per facility. Each event shall sound one user-selected tone or external audio source. It shall be possible to assign each schedule to a day of the week or to manually change schedules from an authorized user via a web-based UI. Systems that do not provide unlimited schedules, events, and tones, or that require software to be installed on a PC to perform these functions shall not be acceptable.

    a. The system shall provide multiple concurrent schedules per facility/location to accommodate split facilities (for example., combined Elementary and Middle School, combined Middle and High School, etc.).
    b. The system must be capable of providing Class Change Music to be played from an external audio source or audio files that are stored in playlists on the system during class change periods or whenever a facility wants music to be played in an area (i.e., (i.e., one or more Time Zones) on an automated schedule.
    c. Each event shall be able to be directed to any one or more of the unlimited Time Zones.
    d. Each of the unlimited Time Zones shall have a programmable, customizable Preannounce Tone and volume control that is unique unto itself.
    e. Each event shall play any of the Normal tones or external audio. Each event may utilize a different tone. For example, the system shall be capable of sending the gymnasium, shop classes, and pool a separate, unique time tone to indicate “clean up.” Minutes later, the entire facility can be sent a different time tone to indicate class change.
    f. Each of the unlimited Time Tones may be manually activated by selected VoIP Admin Phones or via an authorized user with access to the Web UI. These tones shall remain active as long as the telephone remains off-hook or until canceled from the keypad or the Nyquist Web UI.
    g. Systems that do not provide an unlimited number of schedules or do not provide automatic activation of schedules shall not be acceptable.

22. Internal Master Clock shall be included, allowing an unlimited number of events per facility. Systems that do not provide an internal master clock or that must supply an external master clock to meet these specifications shall not be acceptable.

23. The Nyquist E7000 is capable of synchronizing with an NTP server and automatically adjusting the Daylight Savings Time for any time zone in the world. The server that the Nyquist E7000 application is running on can also be used as an NTP server for other systems on the LAN (for example, IP Clocks and control systems).

24. There shall be a Zone Page/All-Call Page feature that is accessible by selected Admin Phones and FXO/FXS or SIP connection to the PSTN or PBX/iPBX.

25. There shall be an option to play a pre-announce tone at any loudspeaker selected for voice paging.

26. There shall be a voice-intercom feature that is accessible by CoS authorized staff phones, all Admin VoIP phones, and Admin Web UIs.

    a. There shall be a privacy beep played every 15 seconds at any selected loudspeaker to indicate that an intercom call is in progress.
    b. There shall be a pre-announce tone played at any selected loudspeaker for intercom call communication.
    c. For special applications, the privacy and pre-announce tone signals shall be capable of being disabled during system initialization.
    d. There shall be a switch over to private telephone communications should the person at the classroom loudspeaker pick up his or her Staff Station and dial *3 to transfer the call down to the associated classroom Staff Station.

27. There shall be various levels of telephonic communication accessible by all Admin Stations and Staff Stations.

    a. Staff Stations must be capable of being programmed to ring one Admin Station during day hours and a different Admin Station during night hours. Day and Night start hours shall be configurable. Staff Stations shall be capable of being assigned to any Admin station. Systems that limit the number and assignment of staff call-ins to an Admin Station shall not be acceptable.

28. Each VoIP speaker or ASB speaker equipped with a call switch (analog or digital) shall be configurable as one of three call-in types, as follows:

    a. Normal/Emergency
    b. Urgent/Emergency
    c. Emergency

29. Call buttons programmed for access Normal / Emergency or Urgent / Emergency shall be able to initiate an Emergency call by repeated flashing of the phone’s hook switch, or repeated pressing of the DCS or the Call Switch. Systems that require additional switches and/or conductors to initiate an Emergency call, shall not be acceptable.

30. Normal and Urgent calls shall be placed into the queue for the designated Admin Station or Admin Web UI.

31. Each Admin Station call queue shall first be sorted per call priority (for example, Emergency, then Urgent, and then Normal). Calls are sorted within each priority level on a first-in, first-out basis. When a call is answered, it shall automatically be removed from the queue. Systems that do not sort calls per priority and order received shall not be acceptable.

    a. The display shall simultaneously display a minimum of three intercom calls pending.
    b. Additional calls beyond three shall be indicated by a scrolling option on the right-hand side of the screen thus prompting the user that additional calls are waiting.

32. It shall be possible to answer any incoming call by picking up the handset while it is ringing. It shall not be necessary to press any buttons to answer a call unless the call has dropped into the queue.

33. Staff Stations shall receive a dial tone upon going off-hook. Outgoing calls are made by dialing the desired station. Incoming calls can be directed to the telephone or to the associated loudspeaker for a hands-free reply. There shall be a switchover from loudspeaker to private telephone communication when a person picks up the handset, dials *3, and presses Enter/OK.

34. Staff Stations shall be programmable for any type of system access, provided by or restricted by the following CoS options:

    a. CoS Name
    b. Call-in Level
    c. Zone Paging
    d. All-Call Paging
    e. Emergency All-Call
    f. Inter-Facility Call/Page
    g. Audio Distribution
    h. Remote Pickup
    i. Join Conversation
    j. Call Forwarding
    k. Walking Class of Service
    l. External Call Routing
    m. Call Transfer/3-way Calling
    n. Manually Activate Tone Signals
    o. Call Any Station
    p. Manage Recordings
    q. Monitor Calls
    r. Monitor Locations
    s. Conference Admin
    t. Conference User
    u. Voicemail
    v. Record Calls
    w. Activate Alarm Signals
    x. Disable Audio
    y. Enable Audio
    z. Allow Callee Auto-answer
    aa. District Paging
    bb. Inter-Facility Features
    cc. Manage Output Contacts
    dd. Execute Routines

35. Each Station in a facility can have a unique CoS programmed with an unlimited number of CoS combinations.

36. Staff Stations shall be able to make a Normal call to any Admin Station by dialing the Admin Station's extension number. Staff Stations shall also be able to initiate an Emergency Intercom Call by dialing ****. Emergency Calls shall ring the Designated Day/Night Admin Station. The system shall provide for each station to have a Personal Identification Number (PIN). By dialing the PIN at any system telephone, the administrator shall have access to Emergency paging regardless of the restrictions on the phone being used.

37. Admin Stations shall receive a dial tone upon going off-hook. Outgoing calls are made by dialing the desired stations. Incoming calls can be directed to the telephone or to the associated loudspeaker for a hands-free reply. There shall be an automatic switchover from loudspeaker to private telephone communication should the person pick up his or her handset.

38. The display shall normally show the time of day and day of week, bell schedule name, and the numbers of a minimum of three stations calling-in, along with the call-in status of each station (Normal, Urgent, Emergency). The Admin Station's display shall indicate the station number being dialed from the Admin Station.

39. The display shall also provide user-friendly menu selections to assist the operator when using the Nyquist system. Displays shall be in English for maximum ease-of-use. Systems that require the operator to memorize long lists of operating symbols or control codes shall not be acceptable.

40. Admin Stations shall be programmable for any type of system access, providing or restricting the following CoS options:

a. Call-in Level
b. Zone Paging
c. All-Call Paging
d. Emergency All-Call
e. Inter-Facility Call/Page
f. Audio Distribution
g. Remote Pickup
h. Join Conversation
i. Call Forwarding
j. Walking Class of Service
k. External Call Routing
l. Call Transfer/3-way Calling
m. Manually Activate Tone Signals
n. Call Any Station
o. Manage Recordings
p. Monitor Calls
q. Monitor Locations
r. Conference Admin
s. Conference User
t. Voicemail
u. Record Calls
v. Activate Alarm Signals
w. Disable Audio
x. Enable Audio
y. Allow Callee Auto-answer
z. District Paging
aa. Inter-Facility Features
bb. Manage Output Contacts
cc. Execute Routines

41. Program selection and its distribution or cancellation shall be accomplished from a designated Admin Station with the assistance of the menu display system. Distribution and cancellation shall be to any one or combination of speakers, any Audio Zone or Audio Zones, or All Zones. It shall be possible to provide an unlimited number of program channels for the user to pick from.

    a. It shall be possible via an Admin Station to manually initiate any of the unlimited Normal Tones or Emergency Tones. The Tones shall be separate and distinctly different from the Alarm Tones. The Tone selected shall be capable of being played one time, continuously until it is canceled, or until the administrative display phone is placed back on-hook.
    b. Each Admin Station shall maintain a unique queue of all stations calling that Admin VoIP phone.

42. VoIP Wall Baffle and VoIP Ceiling Speakers shall be configurable as either a VoIP Speaker Only or as a VoIP Speaker with DCS.

    a. The Bogen Nyquist VoIP speakers are powered via PoE. Use an 802.3af compliant PoE network switch port or PoE Injector to power these speakers. One PoE network switch port or PoE Injector is required per VoIP speaker.
    b. VoIP speakers can be equipped with a DCS that can be programmed as a Normal/Emergency, Urgent/Emergency, or Emergency Only and shall be able to initiate an Emergency call by touching the DCS one, two, or three times depending on the CoS and current call state of the DCS. If the station is authorized for Privacy Mode, the users can touch and hold for 4 seconds to enable Privacy Mode or hold for four seconds to disable Privacy Mode. Systems that require mechanical, membrane, or an additional number of switches to initiate an Emergency call, shall not be acceptable.
    c. Emergency Calls from VoIP Speaker with DCS shall have priority over the Normal and Urgent calls in the queue on the Admin Stations and will show up at the top of the list. Systems that do not provide priority for Emergency Call shall not be acceptable.

    d. Normal and Urgent calls shall be logged into queue for the designated Admin Stations.

        1. Admin Stations shall ring for when they receive a call, and then the call will be removed from the queue when the call is answered or when the Admin Queue times out (default is 30 minutes).

e. Each queue call shall first be sorted by call priority (Emergency, then Urgent, and then Normal). Calls are sorted within each priority level on a first-in, first-out basis. When a call is answered, it shall automatically be removed from the queue. Systems that do not sort calls by priority and order received, shall not be acceptable. The display shall simultaneously show a minimum of three staff calls pending. Additional staff calls beyond three shall be indicated by an arrow pointing down thus prompting the Admin user that additional calls are waiting.
f. It shall be possible to answer any incoming call simply by picking up the handset while it is ringing. It shall not be necessary to hit any buttons to answer a call unless the call has dropped into the queue.

43. System programming shall be from an authorized Nyquist Admin User via any web browser. A valid username and password shall be required to gain access to the following programmable functions:

a. System Parameters – Allow installers to adjust core system parameters.
b. Zones – Allow installers to create and modify Paging, Time, and Audio Zones.
c. Schedules – Allow installers and administrators to create Bell Schedules for the facility, predefine alternative schedules to run. Holiday Events prevent the bells from ringing on a school holiday. The system shall allow an unlimited number of schedules to operate simultaneous within a facility.
d. Admin Groups – Allow the installer to create, modify, and delete software groupings of admin phones that can ring when a station calls in with a call switch.
e. CoS Configuration – Allow the installer to create, modify, and delete CoS groups that can have the following features defined: Call in Level, Zone Paging, All-Call Paging, Emergency All-Call, Inter-Facility Call/Page, Audio Distribution, Remote Pickup, Join Conversation, Call Forwarding, Walking Class of Service, External Call Routing, Call Transfer/3-way Calling, Manually Activate Tone Signals, Call any Station, Manage Recording, Monitor Calls, Monitor Locations, Conference Admin, Conference User, Voicemail, Record Calls, Activate Alarm Signals, Disable Audio, Enable Audio, Allow Callee Auto-answer, District Paging, Inter-Facility Features, and Execute Routines.
f. Stations – Allow the installer to set up, modify, delete stations, set up Page Exclusion, view stations' status, and add a station.
g. Bridge Devices – Allow the installer to install the Nyquist ASBs.
h. Audio – Allow the installer to upload and manage Announcements, Playlists, Announcements, Songs, and Tones. The must support the uploading of both MP3 and WAV files making Audio file management simple for users. Systems that limit the size of Audio files shall not be considered equal.
i. Users – Allow the installer to manage users by giving them the proper Role and assign an Extension if needed.
j. Roles – Allow the installer to limit user to the following: create, delete, edit, restart server, sort menu, systems update, manage, import/export, restore, settings, or view.
k. Facilities – Allow the installer to set up the district wide facilities for remote paging and calling.
l. Outside Line – allow the installer to set up FXS and FXO ports for inbound and outbound system calling.
m. SIP Trunks – allow the installer to set up SIP trunks into the facility for inbound or outbound calling.
n. Call Details – allow the installer to review the historical system activities that can be used for incident investigation or system troubleshooting.
o. System Backup/Restore – allow the installer to preform system backup or restores and allow the backups to be schedule to run automatically.
p. System Logs – allow the installer to view and export Server, Nyquist-Intercom, and Web Server logs that can be used for trouble shooting and technical assistance.
q. Paging Exclusions – allow the installer to view and edit station that are excluded from paging.

r. Firmware – is used to update Nyquist appliances.
s. Routines – Allow installers to create routines that are a sequence of actions, that the Nyquist system executes as a result of an input trigger. Routines can support crisis plans for situations such as school lockdowns, weather events, or emergency evacuations
t. Alert Filters – Allow installers to select the National Weather Alerts that the facility needs to monitor for such as weather events, earthquakes, tsunami, volcanoes, public health, power outages, and many other emergencies.
u. Help –Provides information about the system, online help topics, and System Administrator Manual.
v. Systems not capable of supporting web-based configuration and control, or require plugins or dedicated application software, shall not be deemed as equal.
w. Systems that require a Serial-to-Ethernet converter, or require additional application software on a PC for configuration and/or control shall not be deemed as equal.

44. Admin Groups

45. Admin Stations can be placed into Admin Groups, which are used if incoming calls are not answered by the assigned Admin Station or the Day or Night Admin associated with the Admin Station. Admin Groups act as an always answer feature by providing an alternate list of Admin Stations. If an incoming call is not answered by the assigned Admin Station within 30 seconds for normal calls or 15 seconds for emergency calls, all Admin Stations in the Admin Group will ring.

46. If Call Forwarding is enabled at the Admin Station, Nyquist tries the forwarded extension. If that station does not answer or is busy, the call timeout is reduced to 15 seconds. After 15 seconds, the call rolls over to the Admin Group.

47. If an Emergency level call receives no answer, the Admin Group will ring if the Day Admin or Night Admin does not answer.

48. Admin Stations can be assigned to multiple Admin Groups. A Day or Night Admin can also be assigned to one or more Admin Groups.

49. Call Detail Reporting

    a. The Call Details feature allows the viewing and/or printing of detail records of every call in a facility in a call log format. Calls include scheduled announcements, paging, and internally and externally made or received telephone calls.

50. System Backup/Restore

    a. The system backup feature allows users with access to back up the system database, voicemail, and recordings.
    b. The system restore allows users with access to perform a system restore of previously backed up database, voicemail, and/or recordings.
    c. The installer also can set up an automatic backup that can be performed daily, weekly, or monthly.

51. System Log Files

    a. A log file records either events or messages that occur when software runs and is used when troubleshooting the system. The following parts of the Nyquist system generate log files:

1. Server (This provides access to the Debian Linux OS server log files.)
2. Intercom (This provides access to the Intercom application server log files
3. Web Server (This provides access to the web server log files.)

b. From the web-based UI, system logs can be viewed directly or exported via download to a PC, Mac, or Android device and then copied to removable media or attached to an email to technical support.

52. Paging Exclusions

    a. For school testing and exams, the administrators shall be able to put stations into Page Exclusion mode. During this time, the stations will only receive Emergency All-Call pages – not music, tones, or All-Calls. Emergency pages will still be heard at the station even if that station is set to exclude paging.

53. Firmware

    a. Installers can manage the available firmware. Because the Nyquist E7000 is constantly evolving and changing new versions of firmware will become available and the Firmware section allow installers or authorized users the ability to upload, check for updates, or configure the system to automatically download new firmware for later installation. Systems that can't automatically check for new software are not considered equivalent.

54. Routines are designed to automatically launch a procedure, or sequence of actions, that the Nyquist system executes as a result of an input trigger.

55. Some of the events (triggered by dashboard, IP Phone, I/O Controller contact, or Routines API) that can be created are as follows:

    a. Lockdown Routines
    b. Emergency Evacuation Routines
    c. Fire Alarm Routines
    d. Weather Alert Routines

56. As you can see the power of Routines can support your facilities crisis plans for situations such as lockdown, lockout, weather events, or emergency evacuations.

57. Alert Filters Configuration - The Common Alerting Protocol (CAP) is an international standard format for emergency alerting and public warning. It is designed for all hazards related to weather events, earthquakes, tornado, tsunami, volcanoes, public health, power outages, and many other emergencies.

58. CAP elements and values are used when configuring alert filters for your Nyquist system. This part of the configuration allows installers to select or "Enable" or disable the filters needed for each facility. This filtered information can then be displayed on the NQ-GA10PV through the campus.

59. The growing list of information that can currently be displayed are as follows: 911 Telephone Outage, Administrative Message, Air Quality Alert, Air Stagnation Advisory, Arroyo And Small Stream Flood Advisory, Ashfall Advisory, Ashfall Warning, Avalanche Advisory, Avalanche Warning, Avalanche Watch, Beach Hazards Statement, Blizzard Warning, Blizzard Watch, Blowing Dust Advisory, Blowing

Dust Warning, Brisk Wind Advisory, Child Abduction Emergency, Civil Danger Warning, Civil Emergency Message, Coastal Flood Advisory, Coastal Flood Statement, Coastal Flood Warning, Coastal Flood Watch, Dense Fog Advisory, Dense Smoke Advisory, Dust Advisory, Dust Storm Warning, Earthquake Warning, Evacuation - Immediate, Excessive Heat Warning, Excessive Heat Watch, Extreme Cold Warning, Extreme Cold Watch, Extreme Fire Danger, Extreme Wind Warning, Fire Warning, Fire Weather Watch, Flash Flood Statement, Flash Flood Warning, Flash Flood Watch, Flood Advisory, Flood Statement, Flood Warning, Flood Watch, Freeze Warning, Freeze Watch, Freezing Fog Advisory, Freezing Rain Advisory, Freezing Spray Advisory, Frost Advisory, Gale Warning, Gale Watch, Hard Freeze Warning, Hard Freeze Watch, Hazardous Materials Warning, Hazardous Seas Warning, Hazardous Seas Watch, Hazardous Weather Outlook, Heat Advisory, Heavy Freezing Spray Warning, Heavy Freezing Spray Watch, High Surf Advisory, High Surf Warning, High Wind Warning, High Wind Watch, Hurricane Force Wind Warning, Hurricane Force Wind Watch, Hurricane Local Statement, Hurricane Warning, Hurricane Watch, Hydrologic Advisory, Hydrologic Outlook, Ice Storm Warning, Lake Effect Snow Advisory, Lake Effect Snow Warning, Lake Effect Snow Watch, Lake Wind Advisory, Lakeshore Flood Advisory, Lakeshore Flood Statement, Lakeshore Flood Warning, Lakeshore Flood Watch, Law Enforcement Warning, Local Area Emergency, Low Water Advisory, Marine Weather Statement, Nuclear Power Plant Warning, Radiological Hazard Warning, Red Flag Warning, Rip Current Statement, Severe Thunderstorm Warning, Severe Thunderstorm Watch, Severe Weather Statement, Shelter In Place Warning, Short Term Forecast, Small Craft Advisory, Small Craft Advisory For Hazardous Seas, Small Craft Advisory For Rough Bar, Small Craft Advisory For Winds, Small Stream Flood Advisory, Snow Squall Warning, Special Marine Warning, Special Weather Statement, Storm Surge Warning, Storm Surge Watch, Storm Warning, Storm Watch, Test, Tornado Warning, Tornado Watch, Tropical Depression Local Statement, Tropical Storm Local Statement, Tropical Storm Warning, Tropical Storm Watch, Tsunami Advisory, Tsunami Warning, Tsunami Watch, Typhoon Local Statement, Typhoon Warning, Typhoon Watch, Urban And Small Stream Flood Advisory, Volcano Warning, Wind Advisory, Wind Chill Advisory, Wind Chill Warning, Wind Chill Watch, Winter Storm Warning, Winter Storm Watch, and Winter Weather Advisory.

60. Systems that are not capable of displaying National Weather Service CAP information to give advanced warning to facilities shall not be considered equal.

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 Nyquist E7000 Series Educational System.

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

3.02 EQUIPMENT MANUFACTURER'S REPRESENTATIVE

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

B. The manufacturer's representative shall have completed at least 10 projects of equal scope, giving satisfactory performance, and shall have been in the business of furnishing and installing sound systems

of this type for at least five years. The manufacturer's representative shall be capable of being bonded to ensure the owner of performance and satisfactory service during the guarantee period.

3.03 DIVISION OF WORK

A. While all work included under this specification is the complete responsibility of the contractor, the following division of actual work listed shall occur:

B. The conduit, outlets, terminal cabinets, etc., which form part of the rough-in work, shall be furnished and installed completely by the electrical contractor.

C. The balance of the system, including installation of speakers and equipment, making all connections, etc., shall be performed by the manufacturer's authorized representative. The entire responsibility of the system, its operation, function, testing and complete maintenance for one year after final acceptance of the project by the owner, shall also be the responsibility of the manufacturer's authorized representative.

3.04 INSTALLATION

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

B. Low-voltage wiring may be run exposed above ceiling areas where they are easily accessible in j-hooks or cable tray.

C. The contractor shall install the new system at the location shown on the plans.

D. Admin Stations can be desk or wall mounted.

E. Speaker and telephone lines run above ceiling and not in conduit shall be run in existing j-hooks and/or cable tray. No wires shall be laid on top of ceiling tile.

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

G. Contractor shall provide a minimum of eight hours of configuration and operational instruction to school personnel.

H. On the first school day following installation of the Nyquist System, the contractor shall provide a technician to stand by and assist in system operation.

I. Mark and label all demarks IDF and MDF points with destination point numbers. Rooms with more than one outlet shall be marked XXX-1, XXX-2, XXX-3, etc. where XXX is the room number.

J. No graphic room number shall exceed the sequence from 000001 through 899999.

1. All outside speakers shall be on a separate Page Zone and Time Zone.
2. All zones shall be laid out not to exceed 40 Watts (@25V) maximum per zone.
3. All hallway speakers shall be tapped at 1 Watt (@25V) maximum.
4. All outside horns shall be tapped at 3.75 Watts (@25V) maximum.
5. All classroom speakers shall be tapped at ½ Watt (@25V) maximum.

6. Large rooms, such as cafeterias, shall be tapped at 2 Watts (@25V) maximum.

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

L. Protection of cables: Cables within terminal cabinets, equipment racks, etc., shall be grouped and bundled (harnessed) as to type and laced with No. 12 cord waxed linen lacing twine or T and B wire-ties, or hook and loop cable management. Edge protection material shall be installed on edges of holes, lips of ducts, or any other point where cables or harnesses cross a metallic edge.

M. Cable identification: Cable conductors shall be color-coded and individual cables shall be individually identified. Each cable identification shall have a unique number located approximately 1-1/2" from cable connection at both ends of cable. Numbers shall be approximately 1/4" in height. These unique numbers shall appear on the As-Built Drawings.

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

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

4.01 DOCUMENTATION

A. Provide the following directly to the Supervisor of Technology Services.

1. One printed copy of all field programming for all components in system
2. One copy of all diagnostic software with a copy of field programming data for each unit
3. One copy of all field wiring runs, location, and end designation of system

++ END OF SECTION ++

SECTION 275116 – PUBLIC ADDRESS SYSTEMS - **EPIC**

PART 1 – GENERAL

1.01 DESCRIPTION

A. The requirements of the contract documents, including the General and Supplementary General Conditions and Division 1 – General Requirements shall apply to the work of this section.
B. At the time of proposal, any exceptions taken of these specifications, all variances from these specifications and all substitutions of operating capabilities or equipment called for in these specifications shall be listed in writing and forwarded to the Architect / Engineer. Any such exception, variances or substitutions which were not listed at the time of bid and are identified in the submittal, shall be grounds for immediate disapproval with comment.

1.02 SCOPE OF WORK

A. The work covered by this section of the specifications shall include all material, labor, hardware, software, firmware and programming to install a completed operating system as described herein and shown in the drawings. The system shall utilize the school's shared data network, and not require the use of any proprietary switches, routers, or other network components. The physical network components shall be provided by the owner or the contractor, the scope of this document does not include the physical network including switches, routers, or network cabling. Beyond the shared data network hardware, the rest of the system shall be complete with all necessary materials, labor, hardware, software, firmware and programming specifically tailored for the installation. It shall be possible to permanently modify the software on site by using a system administrator software network interface.
B. The intent of this specification shall maximize communications between the classroom and administrative areas utilizing VoIP (Voice over Internet Protocol) Technology while allowing for expansion for enhancing school safety and reducing maintenance, operational, and installation cost. Intended system shall integrate seamlessly as a complete system for local sound reinforcement as well as supporting intercom, paging, and bells functionality.
C. Under this specification, the system shall provide a complete VoIP Communication System for all classrooms and flex spaces as indicated on the drawings. An analog solution using speakers and volume controls in the offices, corridors, exterior locations, restrooms, gymnasium, cafeteria, and ancillary support buildings shall also be part of this project.
D. System shall support strobes or Visual Messaging Displays to alert of notifications as an integrated component of the system.
E. The Communication System shall provide VoIP or network distribution of intercom, overhead paging, emergency paging, class change time tones, emergency tones and program material. The system shall also support visual messaging that will match the audible messages from the system including automated setup of the devices.
F. Any and all miscellaneous materials, labor, hardware, software, firmware and programming that is not listed in the specification section that is required to provide a complete and operating system shall be provided as part of the scope of work for this installation.
G. The work covered by this section of the specifications shall be coordinated with all trades that are affected by the installation of this system. All work shall be complete and as required and specified elsewhere under these project specifications.
H. All the actual required system components and cabling are not shown or specified as this caries between acceptable manufactures and suppliers. It shall be the responsibility of the contractor to obtain this information from the acceptable supplier and or manufacturer and include the cost of the same in his bid.

1.03 APPLICABLE CODES AND STANDARDS

A. Any devices that are subject to UL (Underwriters Laboratory) requirements using high voltage will bear the UL Label.
B. The system shall be installed in strict accordance with all the requirements of the National Electric Code.
C. The system shall be installation in strict accordance with the requirements of the Americans with Disabilities Act (ADA).
D. The system shall be installed in strict accordance with the requirements of all other applicable codes as well as all Federal, State, and local codes.

1.04 RELATED DOCUMENTS

A. Secure all required permits and approvals prior to installation.

1.05 RELATED WORK

A. The contractor shall coordinate work in this section with all related trades that the system effects of integrates with. Work and / or equipment provided in other sections and related to the system shall include but not be limited to the following:
   1. Cable support system
   2. Structured Cabling System installer
   3. Network Infrastructure Supplier – switches/routers

1.06 SUBMITTALS

A. Furnish to the Architect / Engineer complete equipment submittal technical specification sheets and shop drawing submittals in .pdf format for this system including but not limited to the following:
   1. A material list with the quantity of each piece of equipment, names of manufacturers, model numbers and the technical data information on all equipment the contractor proposes to install. This material list shall be broken out and listed by Specification Section, per piece of equipment. If a piece of equipment is needed but not listed in this specification section, it shall be listed in the area of the submittal it pertains to. The technical information shall be a piece of the manufacturer's printed literature that is produced by the equipment manufacturer. Internet web page listings will not be accepted. Provide a description of any special installation procedures that will differ from what is specified or shown on drawings.
   2. Compete system circuit diagrams of the entire system, point to point on scaled floor plans scaled to match that of the scale of the project documents. The shop drawings are required to clearly illustrate how all components are related to each other and how they interconnect to each other. A complete point to point wiring diagram of any and all panels and how they interconnect with all the components and or devices that are part of the system as well as any ancillary devices that are being provided by other trades. All cables run shall be shown of the shop drawing submittals. Cable tags shown on the shop drawing submittals shall correspond with cable tags that are located inside equipment enclosures as well as documented on the as-built drawing. The shop drawing submittals shall include scaled drawings of all racks, panels, consoles and special assemblies. The show drawing shall include all circuit numbers of all cables and terminal connections as well as how they are labeled. Each drawing shall have a descriptive title and all subparts of each drawing shall be completely described. All drawings shall have the name of the project, Architect / Engineer and contractor in the title block. The floor plans, rooms names and numbers for the submittal drawings shall match that of the project documents. The symbol used on the submittal drawings shall match that of the project documents. The only information to be

shown on the submittal drawings for this Specification Section shall be information that pertains to the system that is being submitted on.

3. Provide a detailed custom description of the operation of the submitted system for this installation and a statement listing every technical and operation parameter wherein the submitted equipment varies from what was originally specified. If the submitter fails to list a particular variance and his submittal is accepted; but subsequently, deemed to be unsatisfactory because of the unlisted variance, the submitter shall replace or modify such equipment at once without cost to the Owner. A letter or certificate from the manufacturer stating that the system contractor is an authorized distributor and installer of the submitted equipment shall be supplied.
4. The contractor shall be responsible for providing to the Architect / Engineer any and all additional information required and as deemed necessary by the Architect / Engineer for submittal and shop drawing submittal review.

1.07 QUALITY ASSURANCE

A. This specification section shall be a one (1) manufacturer responsibility or as specified herein with no exceptions. Any variances to this specification item shall be submitted to the Architect / Engineer ten (10) working days prior to proposal for review by the Architect / Engineer. The equipment manufacturer for this specification section has been in business manufacturing the specified equipment for a minimum of ten (10) years.
B. The contractor shall be the factory authorized and factory certified distributor and installer of the equipment to be provided for this specification section. The installation contractor’s factory certification shall be submitted to the Architect / Engineer as part of the contractor’s subcontractor and materials list at the time of the bid as well as with the ship drawing submittal.
C. The contract for the systems described herein shall be assigned to the general contractor for the building construction. The intercommunication system contractor shall coordinate all work and work sequencing with the general contractor.
D. Owner and Architect / Engineer Inspections: The Owners technology staff and Architect / Engineer shall provide advice as requested. The Owners' technology staff shall inspect the project as the work progresses. Prior to final acceptance of the work, the Contractor shall decide with the appropriate authorized Owner personal to inspect the construction areas, both to ensure satisfactory completion of the work and to ensure complete cleanup and restoration of areas affected by the work. Temporary protection, coverings, and structures shall be removed at or before the time of inspection.

1.08 CIRCUITING GUIDELINES

A. All wiring shall be Cat. 6/6a for connections to speakers, call switches, etc… for future migration to a complete IP (Internet Protocol) based intercom paging system. Cabling from the MDF or IDF to each classroom enclosure shall be provided by others. A patch cable, providing connectivity from the work outlet faceplate to the MS-500 shall be provided by others to the AV contractor for connection to the network.
B. Each classroom / education space to have a dedicated network connection to the intercom paging system head-end to provide 2-way communications from the integrated paging system console as well as the district IP based phone system.
C. Each office / administrative space to have 1-way communications from the paging system and is capable to being addressed from the building telephone system handset.
D. Each corridor / common space / exterior space including library, cafeteria and gymnasium to have 1-way communications from the paging system and be capable of being addressed from the building telephone system handset.
E. All wiring shall be in accordance with the manufacturer's specifications and certified for performance.

1.09 SEQUENCE OF OPERATIONS

A. The ability to be distributed via a fiber 10/100/1000Mb switched, VLAN enabled network or 10/100/1000Mb switched stand-alone intercom network. It shall be possible to eliminate the need for copper feeder cables between the Main and Intermediate distribution frames using fiber optic cabling.
B. Shall have SIP (Session Initiation Protocol) Integration to connect all talk-paths to the VoIP phone system of choice. This shall support registering as an extension on the system or through he use of a SIP Trunk.
C. The system shall provide the ability to support a SIP tunnel from the building's VoIP phone system to provide two-way communication from all administrative telephones to any location equipped with a talkback speaker or audio system with room microphone.
D. System shall interface with any VoIP telephone system using SIP type integration thus allowing the school(s) to upgrade or replace their telephone system without suffering a requirement to replace, or lose any feature of, their internal communications (intercom) system. Any system that limits system features based upon any selected telephone system and is not SIP based shall not be acceptable.
E. The system shall have the ability to call 911 or any other programmed number/extension from the classroom as a part of the intercom communication system giving opportunity of messages to identified individuals or groups.
F. System alerts must be able to be self-configured and triggered from both classroom and headend. Alerts for example are medical, lockdown, evacuation, hold in place, disturbance, etc.
G. Automatically sound a tone or play a pre-page WAV file over any loudspeaker connected for two-way communication to alert the classroom teacher that this 2-way call has been established. This is intended to prevent unauthorized monitoring.
H. Distribution of emergency announcement(s) from any authorized telephone to all areas furnished with a loudspeaker. Emergency announcements shall have the highest system priority
I. Distribution of general announcements from any administrative telephone, staff telephone, or classroom telephone. The system shall be capable of providing all-call, group call, or multiple group call.
J. Classroom speakers or audio systems with room microphone shall be software assignable to unlimited paging groups.
K. Provide the ability to define and archive unlimited schedules with up to three hundred (300) events per schedule. Each scheduled event shall be capable of activating included tones or playing custom audio/voice phrases or controlling any I/O port on a system network interface for building control and scheduled along with a bell. Schedule administration, modification and creation functions shall be available through web access on remote computers and mobile devices.
L. The system shall automatically make audible messages display on scrolling LED displays as needed with no additional programming.
M. The system shall support a strobe light to be used in conjunction with audible messages for loud areas.
N. The system shall support room reporting features during emergency events and an opportunity to advise they are secure in place.
O. The system shall support CAP and allow for API interoperability such as gunshot detection, weapon detection, vape detection, and other 3rd party hardware.
P. The system shall provide an administrative console for the front office, consisting of a touch screen interface no less than 22" diagonal interface.
Q. The User Interface shall be map based and support full touch operation. The manufacturer shall provide the ability to take a map in any format, including paper copy, PDF, Visio, etc. and create from that the map used for the primary user interface. Non map-based User Interfaces will not be considered.
R. The system must allow 3rd party IP Cameras integrations into the system map to display during emergency events.
S. The system shall be capable of dynamic room/zone paging.

T. The WAV or MP3 files shall be activated via the administration software, telephone and / or telephone system and / or pushbuttons.
U. The WAV or MP3 files shall be programmable as to what level of priority they can be broadcast. They shall be programmable to override any class change tones, normal all call, music, and intercom in the event of an emergency.
V. The WAV or MP3 files shall also have the ability to be broadcast into any one or all of the zones with the system. Simultaneous playback of different audio to different zones must be possible.
W. The WAV or MP3 files shall have the ability to be broadcast via a schedule for any day of the week or time of the day. They shall also have the ability to be broadcast for any duration of time and repeat number of plays with the ability to select how long the duration is between each repeated broadcast.
X. The WAV or MP3 files shall also have the ability to be a part of the classroom change tones within the system. These files shall be able to replace any tone within the class change schedules as to offer the flexibility of customizable tones and or phrases in this class change mode.
Y. The system shall be capable of automatically listening into a classroom in the event of an alert or lockdown.
Z. It shall be possible without the cost of additional hardware/software to incorporate a LAN / WAN district wide paging system by means of the built in VoIP district Paging Adapter or district software. This adapter shall give the district the ability to page each school independently, as a group of schools, or all schools.
AA. The system shall allow for the integration of changeable message signs to support bells and notifications. These signs shall be multi-color, multi segment LED scrolling displays and powered and controlled via a network PoE (Power over Ethernet) connection.
BB. The system shall also allow for the integration of third-party system through the use of contact closure, TCP (Transmission Control Protocol) communication, RS-232 communications and HTTP (HyperText Transfer Protocol) communications.
CC. The system shall support and allow for devices to be managed within the system itself including device discovery, automated programming and automated assignment to rooms and zones.
DD. System must support device programming templates per device per site and support making individual adjustments to those templates on a per device basis and that setting would supersede the template for that device only.
EE. System shall support monitoring and upgrading firmware of supported devices.
FF. The system shall support door status monitoring with alerts and warning based on defined times. There must be the ability to bypass reporting based on bell schedules and special events.
GG. System shall support management of IP based PoE visual message displays and automate the programming of devices through the interface including automatically applying visual messages for bells and notifications without the use of a secondary application or software.
HH. The system shall support an automated commissioning function that allows the system to be placed into a test mode and monitors and reports the commissioning status of the devices.
II. System shall support a district server that will allow for management and monitoring of all schools in the district. Server must support physical and virtualized server deployments. The district central server will allow for centralized paging to entire district, groups of schools or individual schools. Server will support the ability to record and preview the page before it sends to the sever. Server will also support sending notifications to a school, group of schools or entire district. Server will support defining associated campuses for schools to automate events and notifications at those sites. Shall support centralized reporting of alerts and allow to directly interact with alert. Server interface shall be map based and support nested maps allowing for closer detail on an area or grouping of schools. District server shall support monitoring servers and devices at campus and alert via UI on any degraded or offline devices. Server shall support direct access of campus servers through single pane of glass and will not require authenticating into individual sites.

1.10 WARRANTY

A. The manufacturer and installation contractor shall guarantee the system, equipment and all its components for a minimum of one (1) year from date of final acceptance of the system as documented by the Architect / Engineer. This guarantee shall cover the replacement of all parts and labor to replace the same made necessary by normal usage and wear.
B. Upon completion of the installation of the system, the contractor shall provide to the Architect / Engineer and Owner a signed written statement, on company letterhead, substantially in form as follows: “The undersigned, have engaged as the Intercom paging system contractor for the Huntington North High School building project confirms that the system was installed in accordance with the wiring diagrams, instructions and directions provided by the manufacturer.”
C. Contractor shall repair, adjust, and / or replace, whichever the Owner and / or Architect / Engineer determines to be in its best interests, any defective equipment, materials, or workmanship, as well as such parts of the work damaged or destroyed by such defect, during warranty period, at the contractor’s sole cost and expense.
D. In the event that any of the equipment specified, supplied, and / or installed as part of the work should fail to produce capacities or meet design specification as published or warranted by the manufacturer of the equipment involved or as specified in this document, the contractor shall, in conjunction with the equipment manufacturer, remove and replace such equipment with equipment that will meet requirements without additional cost to the Owner.

1.11 TRAINING AND INSTRUCTION FOR OWNER MAINTENANCE

A. A training program including a minimum of four (4) hours on the use of the system shall be provided to the Owner to use at their discretion. A full and complete overview of the system shall be included in this training as well as any literature required by the Owner to allow complete and total use of the system by the Owner’s designated staff. System maintenance requirements for the equipment will also be documented and turned over the Owner. User and help videos shall also be made available to the customer via USB thumb drive or via an online fashion.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. The following manufacturers are approved to submit proposals for this project:
   1. Audio Enhancement – EPIC (Education Paging & Intercom Communications) System™

2.02 EQUIPMENT

A. INTERCOM PAGING SYSTEM:
   1. The system shall be a software-controlled system, whose primary interface is a web-based portal, accessible from any authorized computer. The system shall support being deployed on physical server hardware or through vitalization on the customer’s hardware. For the physical server, the system shall utilize a 1U rack server, operating as an appliance, dedicated to the operation of the IPB (Intercom Paging and Bells) & SAFE (Signal Alert For Education) System™ only. The rack server shall have industry standard redundancy, including RAID1, Dual Power Supplies, and hot swappable hard drives. The entire system shall be Linux based. If virtualized the system shall support VMWare ESXI version 6.5 or later.
   2. The system shall be based on standards compliant SIP and RTP communications across the network and shall allow direct Trunk Integration to the VoIP telephone system.

3. The system shall provide a simple calendar-based scheduling system for bells. It shall provide the ability to have an unlimited number of bell schedules.
4. The system shall provide a map-based User Interface. All major functions, including Intercom, Paging, Notifications and Alerts shall be done using the map as the foundation for those actions. Paging shall clearly show on the map where the page audio will be transmitted to.
5. Bell Schedules shall be easily assigned to days and changed simply with authenticated access to the system through any browser-based device. Bell schedules shall be able to be changed even if a current schedule is active in the system same day and apply immediately.
6. The system shall support utilizing a shared data network and support (VLAN [Virtual Local Area Network] enabled) or dedicated network as means of distribution for all voice overhead paging, emergency paging, emergency tones, intercom, and class change tones. System shall support routing of traffic across multiple subnets and network segments.
7. The system shall be capable of accessing remote classrooms (trailers, temporary classrooms etc.) via IP interface or room audio system with room microphone. This shall provide intercom, class change tones, emergency tones, and normal / emergency paging via a wired network to these remote locations.
8. Exterior speakers shall be capable of being on separate zones and programmed separately.
9. The system shall have the ability to synchronize to the same NTP server utilized for the Master Clock system.
10. The system shall have the ability to produce user defined tone signals for time tones or emergency tones.
11. The system shall have SIP Integration to connect all talk-paths to the VoIP phone system of choice.
12. The system shall provide the ability to support a SIP trunk from the building's VoIP phone system to provide two-way communication from all administrative telephones to any location equipped with a talkback speaker or audio system with room microphone.
13. The system shall interface with any VoIP telephone system using SIP type integration thus allowing the school (s) to upgrade or replace their telephone system without suffering a requirement to replace, or lose any feature of, their internal communications (intercom) system. Any system that limits system features based upon any selected telephone system and is not SIP based shall not be acceptable.
14. The system shall provide its own SIP environment, and in the case of a failure of the schools VoIP telephone system, be capable of operating completely independently for all functions, save access from the handsets connected to the schools VoIP system.
15. The system shall not be reliant on WAN or internet connectivity for operation.
16. The system shall provide web access, which will give ability to monitor operations and functions of the system.
17. The system monitors the status of all connected devices for health, SIP connectivity and connected devices including the XD receiver. If a device becomes in a degraded or offline state, the system will monitor a technical contact via email and or SMS as well as show status on the map of the console.
18. The system shall provide web-based off-site programming and diagnostics of the system. It shall also be capable of determining basic circuit faults.
19. The system shall have a Web based administration programming tool which allows the administrative personnel to easily manage Audio Sources, Class Change schedules, paging groups, time updates, holiday schedules and day/night mode operation from an internet browser. System shall support HTML5.
20. The system shall provide calendar-based scheduling up to four years in advance. The system shall be capable of displaying a fully year calendar and differentiating which bell program is scheduled to run on each day. The calendar shall be based on a standard school year and provide a selectable start month for example, it can be configured to run from August to July.

21. The system shall be capable of being fully integrated with the school's existing LDAP (Lightweight Directory Access Protocol) or Active Directory system. Systems that do not provide LDAP or Active Directory integration shall not be considered.
22. The system shall provide discreet control over roles for the system. Roles shall be definable down to the individual feature level and provide the district with the ability to restrict or grant access to any roll individual features or groups of features.
23. The system shall provide web browser access to the system specifically for a teacher. Teacher access shall be assigned through LDAP or Active Directory. The Teacher screen shall provide information specific to the room that the teacher is assigned to. That information shall consist of, but not limited to, the next scheduled event for the room (Bell, Announcement, etc.), Audio/Visual Controls for their classroom technology, Teacher Name, Room Number, an Intercom Call button, and an Emergency call button.
24. The system shall have the ability to carry IP Communications to the edge of the classroom Audio/visual Systems. It shall be able to control connected A/V Devices, provided that those devices are controllable by RS-232
25. The system shall be based on a database structure, utilizing a robust commercially available database such as SQL (Structured Query Language).
26. The system shall provide 2-way handsfree communication in each classroom.
27. System Classroom and Common Zone network interfaces shall be capable of utilizing standard Cat 6/6a infrastructure for installation from the Telecommunications Closets only to the classroom and/or zone, thus allowing for only one type of wiring infrastructure within the school. Distribution of all voice signaling shall utilize a shared or dedicated network. Systems that require homerun, dedicated, 18 gauge shielded wiring shall not be acceptable.
28. The system shall provide a flexible and robust event engine. In addition to pre-programmed events and actions, the event engine shall be capable of accepting Java-based programming to accomplish advanced integrations and functions.
29. The system shall 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 shall be preprogrammed and require no user intervention. The system shall provide redundant alarm annunciation over intercom/paging speakers and is not meant to replace primary fire alarm or security systems.
30. The system shall provide the ability for the school to upload their own recorded files for both Bell Tones, and Notifications
31. The system shall provide the ability to initiate school safety paging announcements, evacuation tones and take cover tones from any telephone within the facility or outside the facility to any other location within the facility or district.
32. IP-enabled two-way voice communication shall be available from any provided telephone or administrative console through any speaker in the system. This shall allow handsfree communication to any classroom or any individual loudspeaker unit. A pre-announce tone shall sound immediately before the intercom path is opened.
33. The system shall provide a complete personal alert function for each teacher. The alert functionality shall be an integrated part of the administrative head end software and shall not require any separate application or hardware to support this functionality.
34. The teacher personal alert functionality shall be integrated into the classroom microphones and the teacher web screen.
35. The system shall be capable of displaying on the map the location of the alert in the case of a microphone that is within range of its paired receiver, or from the teacher's web access screen. The system shall also be capable of approximately locating the location of the alert in the case of a microphone that is not in range of its paired receiver. A system, either the microphone system, or the administrative system that is not capable of receiving an alert from a microphone that is not within range of its paired receiver shall not be considered.
36. Upon alert, the system shall have the ability to provide notification on the dedicated console at the front office, or on any other computer which is currently logged into the

administrative interface and has the appropriate credentials. The system shall provide both an audible tone, and a change on the screen that clearly indicates that an emergency alert has been received.

37. Upon alert, the system shall also be capable of sending e-mail and SMS Text messages to the designated school personnel. These alerts shall include a web link to the administrative console.
38. If cameras are installed in the classrooms, the system shall be capable of showing a live video from the classroom that received an alert. This shall only be shown in the case of an alert where the microphone is within range of its paired receiver.
39. The system shall have the ability to acknowledge the receipt of the alert by changing the indicators on the classroom microphone receiver in the room where the alert was received from. In the case of an alert received from a microphone not in range of its paired receiver, no acknowledgement shall be sent.
40. The system shall have the capability of maintaining a record of all alerts that are received and provide appropriate school personnel with the capability to enter information about the alert, which shall be maintained in the systems database. That information shall also be made available to appropriate school personnel in the form of a report that shows all alerts that have occurred, their date, time, and the end alert information.
41. The system shall contain a rules-based integration engine that allows for input of TCP, HTTP, or Serial Data and allows for the parsing of data for actions or triggering other systems via TCP, HTTP or Serial.
42. The system shall support digital message displays that provide visual feedback in the form of scrolling messages via an LCD or LED display all controlled from the network.
43. The system shall allow for integration into the classroom audio system including teacher microphone as required by design. This includes integration to ensure that system notifications, pages and intercom calls take priority over classroom audio sources.
44. The system must include perpetual licensing and include all in version software upgrades at no additional cost.
45. The base functionality of the system including the map interface, intercom, paging, bells, classroom audio control, SAFE System and Event engine must be part of the base licensing of the product and not require additional licensing.
46. The system shall have the ability to control signage displays for display of clocks, messages, digital signage, countdown timers as well as allow for automated messages to be displayed automatically for notifications.
47. The system will allow for the building of clock signs, message signs as and notifications signs using the HTML EPIC interface allowing for using predefined templates and assets.
48. Clocks and emergency signs shall be a onetime perpetual license.
49. Server software shall require end user to create complex unique passwords for each system on first use. Systems that allow for generic or repeated passwords will not be acceptable.
50. System shall utilize a visual based event editor to define custom actions, inputs and outputs.
51. System shall support connection to District View Server for centralized management and licensing and services must be included as part of the system to support that connection, integration and programming.

B. INTERCOM PAGING SYSTEM NETWORK INTERCOM INTERFACE:
   1. Shall allow users to install intercom paging systems spanning multiple building or facilities connected through a VLAN.
   2. Network Requirements:
      a. 100/1000 Ethernet switch port configured on a dedicated VLAN.
      b. Systems requiring a specific network or subnet size are not allowable.

C. INTERCOM PAGING SYSTEM POWER:
   1. All Network interfaces used in the classroom and for the common zones shall be powered via PoE from the district provided network switches.

a. PoE switches and network cabling from MDF (Main Distribution Frame) and IDF (Intermediate Distribution Frame) to devices provided by others.

2. All network switches shall include an uninterruptable power source to provide adequate runtime. In the event the school has a generator the UPS systems shall hold the switches long enough until generator power can be provided. Customer to provide all necessary UPS for network switches.

D. EPIC Common Zone Amp CZA-1300
1. LED Information
a. AC Power
b. Green – Powered On
c. Orange – Standby Status
d. Red – Booting
e. Green – Ready
f. GPIO (General Purpose I/O)
g. Yellow – Input Active
h. Blue – Output Active
i. White – Input & Output Active
2. 1 x 300W output
2. Built-in 70V
3. Space-saving 1 RU design
4. Control Port:
a. (1) RS-232 Communication port to facilitate SAFE System Communications or 3rd party device control such as a projector
b. (1) Remote Control Port: Integration with LCD Wall Plate
c. (1) XD Port, RJ45
5. Ethernet I/F: 10/100 Mbs
6. Line Inputs
a. For PC, DVD audio, MP3, auxiliary mic, or other multimedia sources
b. (1) Unbalanced input (3.5mm)
c. (2) Balanced inputs RJ45 connector
d. Internal Network Audio
7. Line outputs
a. (1) Unbalanced (3.5mm) output
b. (1) Balanced line output (RJ45 connector)
8. Signal-to-Noise Ratio >89dB @ 20Hz – 20kHz at Maximum Output
9. Input Sensitivity 780mV
10. Output Power: (3) 24v RJ45
11. 5 Band Equalizer
12. USB: Control and configuration via software. BLE Dongle for easy setup
13. Power Supply
a. 100V – 120V/240V – 240V @ 300W power amplifiers
b. PoE (PoE 802.11 af) Powers all electronics except for the 70v Speaker out Amplifier
c. Both AC Power and PoE Power must be connected for unit to operate
14. Operating Temperature/Humidity -32 – 122 F (0- +50C) / 10-90%
15. Storage Temperature -40°C to 70°C/10-90% non-condensing

E. INTERCOM PAGING SYSTEM ADMINISTRATIVE KIOSK:
1. The administrative Kiosk shall be customizable, flexible and provide full access to the intercom paging system.
2. Kiosk shall be embed Android OS into the touch screen and only display the intercom interface.
3. The supplier is required to provide a dedicated touch screen Kiosk for the front office, with a minimum size of 22” Diagonally. The Kiosk shall not require the district to provide any additional hardware, software or licensing. The Kiosk shall also provide a boom microphone attached to the screen that wires directly to the Kiosk.

4. Administrative access to the system shall be browser based and shall also be capable of being any administrative computer.
5. Functionality to provide full access to all features such as all call, paging groups, emergency tones, control music, WAV file distribution, test rooms, crisis mode, schedules, etc…

F. NETWORK INTERFACE
1. Provide a Network Interface with performance as follows:
   a. Full-Duplex, Hands Free communications on Intercom Call
   b. Amplifier powered only by the PoE power source for emergency paging applications
   c. Mounting Bracket as required
   d. Connections – The following connections shall be available:
      i. Line Output for connecting to auxiliary amplifiers
      ii. 2 External I/O Connections – Terminal Block
         1. Ability to support relay output for interface into other systems.
      iii. RJ45 for PoE Network Connection
      iv. Serial interface for connecting to other equipment or SAFE Compatible equipment.
   e. 1 speaker connection
      i. The system shall provide a speaker connection which is powered exclusively by the PoE power from the network
      ii. Can power up to 2 speakers per device.
   f. Network Connection
      i. The system shall have a network connection with PoE power.
      ii. PoE shall be present on the system to provide power for the amplifier during a power emergency.
      iii. Shall support LLDP-MED for two level 802.3 power negotiation and device information.
   g. Integrated Network Based Communications
      i. The System shall support the following protocols:
         1. Directed UDP (User Datagram Protocol)
         2. Unicast Audio
         3. Multicast Audio
         4. SIP
         5. TCP Control
            a. Integrated Serial Tunnel over TCP
            b. The system shall have integrated SIP communications and be able to communication bi-directionally with any VoIP communications system that follows the standard SIP protocols.

            c. The system shall also have the ability to operate with multi-cast IP messages as well.
         6. Serial Gateway for Control via the network

G. NETWORK INTERFACE FOR 2-WAY INTERCOM
1. Line Input - Internal Network Audio Line
2. Outputs - 1 Unbalanced (3.5 mm) output
3. Minimum Load Impedance - 4 Ohms
4. Amplifier Type - 92% Efficient Class D for network audio only
5. Continuous Power @ 1% THD - 25 Watts powered by PoE†
6. S/N - >89 dB @ 20 Hz to 20 kHz at maximum output
7. Protection Circuits - Thermal and short circuit protected
8. PA Connector - Connects to public address system and mutes amplifier during announcements
9. Input Voltage - 4.0 Volts RMS to 74 Volts RMS
   a. Control Port - RS-232, 3-pin screw terminal block header, RJ45 remote control port

10. RS-232 communication port
11. Intercom call, emergency alert, room microphone wall plate port (WPA-50x)
12. Input/output (I/O) aux port for sense, strobe, etc.
13. Power Supply - PoE + 802.3af/at†
14. Temperature/Humidity
    a. Storage: -40 to 1580F (-400 to +700C) 10-90% non-condensing
    b. Operating: -32-1220F (0 to +500C) / 10-90%
15. Enclosure Type - Metal
16. Ethernet I/F - 10/100 Mbps
17. Power Input (Network) - PoE 802.3af/at†
18. Operating Temperature - 14 F to 1220F (-100C to 500C)
19. Protocols
    a. SIP RFC 3261 compatible
    b. UDP Directed Broadcast
    c. Multi-cast and VoIP enabled
20. Lineout Output Signal Amplitudes - 2.0 VPP maximum
21. Output Level - +2 dBm nominal
22. Total Harmonic Distortion - 0.5% maximum
23. Weight 1.3 lbs (589.67 g)
24. Dimensions 1.125 (H) x 9.19(W) x 3.56 (D) in. (28.57 x 233.43 x 90.42 mm

H. ANALOG INTERCOM SYSTEM CABLING:
1. West Penn
2. Belden
3. General Cable
4. Mohawk

I. INTERCOM PAGING SYSTEM VOLUME CONTROL:
1. Volume control shall be capable of controlling the volume of up to one hundred-fifty (150) 1-way speakers.
2. Volume control shall be mounted on a brushed stainless-steel single gang wall plate with the plate being embossed with a dial scale of “0 through 10.”
3. Volume control shall be equipped with a skirted black knob with white position indicator.
4. Volume control shall include a stainless-steel mounting box and hardware.

J. INTERCOM PAGING SYSTEM CEILING SPEAKER:
1. Ceiling Speaker Specifications
    a. Lay-in ceiling speaker shall consist of a white 13.5” grill, a speaker and integral back box or equivalent ceiling speaker with appropriate backbox, grille and tile bridge.
    b. Integrated 25/70/100V Transformer with tap settings accessible without disassembling speaker from 1.25W to 15W or 8Ohm bypass.
    c. The speaker shall be capable of handling minimum 50 watts continuous power.
    d. Sound pressure level at 1 meter on axis with a 1 Watt input shall be 96 dB.
    e. The frequency response shall be 86 Hz to 16 kHz.
    f. The baffle shall be constructed with a single piece of perforated steel with a white baked on acrylic enamel finish.
    g. Shall support seismic cabling from 3 points.
    h. The back box shall meet or exceeds UL 2043 for installation in a plenum space
    i. Approximate weight shall be 7.1 lbs. (2.49 kg).
    j. Basis of Design Audio Enhancement SP-0300.

K. INTERCOM PAGING SYSTEM PAGING HORN:
1. The paging horn shall be a weather-resistant, high efficiency reentrant type horn speaker.
2. The paging horn shall be equipped with an amplifier and externally accessible volume control.
3. The paging horn shall include an adjustable swivel base.
4. The frequency response shall be 275 Hz to 14 kHz.

5. Dispersion shall be 90° horizontal and 90° vertical.
6. Sound pressure level shall be 121 dB measured at 4 feet (1.22 m) on axis with an input to the amplifier module being -10 dBm at 1 kHz.
7. Distortion shall be less than 2.0% at rated output of 15 watts RMS.
8. Input impedance shall be 600 ohms nominal.
9. The amplifier shall operate on a -24 Vdc nominal, positive ground power supply.
10. Operating current shall be 900 mA at -24Vdc
11. Operating temperature shall be -20 to 55 °C (-4 to 131 °F).
12. Operating humidity shall be 0-95% noncondensing.
13. Dimension of the horn shall be 8” (20.3 cm) W x 8” (20.3 cm) H x 9:” (22.9 cm) D.
14. Approximate weight shall be 4.0 lbs (1.8 kg).

L. INTERCOM PAGING SYSTEM VOLUME CONTROL
1. The volume control must support a rotary selector switch with 11 positions.
2. Volume control shall be white in color and be sized to fit a decora style plate.
3. Inputs on control shall support incoming 25/70V signal on both the + and – with outgoing signal on + and -. Support for up to 12 AWG Wire.
4. 25W RMS
5. Basis of Design EPIC-V70v

M. CLASSROOM SOUND AMPLIFICATION SYSTEM (CSAS) EQUIPMENT: OPTIMUM AMPLIFIER WITH INTEGRATED XD RECEIVER:
1. Provide a fully PoE Powered Receiver/Amplifier with ability to provide functions described above with performance as follows:
   a. Audio Power: 30 watts RMS mains powered amplifier
   b. 92% Efficient Class D Amplifier
   c. 1% percent THD across full frequency range of amplifier
   d. Frequency Response: 20 Hz to 20 kHz
   e. Power Requirements: PoE 802.3af/at 25.5W Maximum
   f. Shall support LLDP-MED for two level 802.3 power negotiation and device information.
   g. Signal-to-noise: >89dB
   h. Integrated mounting tabs
   i. Thermal and short circuited protected
   j. Integrated 3 channel DECT RF Receiver
2. Controls:
   a. The primary control of the system shall be done through the teacher microphone.
   b. The following functions shall be available via USB connection for setup during installation:
      i. Input Control for multi-media sources and mixed XD source
      ii. Equalizer Controls
         a. 5 Band Digital Equalizer
      iii. Discreet Output volume controls for each input
   c. RS-232 Control
      i. Provide 4 RS-232 ports which provide pass-through control of a downstream device like a projector, etc.
      ii. RS-232 processor shall be capable of differentiating between commands destined for the amplifier, and responding to those commands, and commands intended for the downstream and passing those commands through to the alternative RS-232 ports
      iii. Command pass through shall be bi-directional
   d. Connections – The following connections shall be available:
      i. Four (5) Multi-Media inputs
      ii. Dedicated Line output – for Assistive Listening Device Connection
      iii. Color Coded Connection
      iv. Ethernet Connection (8P8C RJ45 with PoE Power)

v. 8P8C RJ45 Connection for Intercom Paging Wall plate
vi. Support for Touch Based Wall Controller on Remote Port
vii. General Purpose I/O Output on 8P8C RJ45

3. Integrated DECT Technology RF Receiver The Receiver shall utilize DECT technology. DECT is a radio technology for voice applications. DECT is ideal for the classroom because the use of both frequency and time domain is ideally suited to smaller areas with a large number of users. In each classroom, it will be an independent system, with all necessary electronics to support the receiving & pairing functionality mounted on the wall near the amplifier or in the ceiling. The receiver will be connected to the amplifier through a universal twisted pair cable, using balanced audio connections. Power for the receiver shall be provided through the same cable as the balanced audio connections.
   a. The receiver shall provide the following functionality. These features shall be included on board the receiver, and not require any external support to perform these functions.
      i. Three Channel DECT based reception
      ii. Pairing Button for Linking microphone to the receiver
      iii. Remote control of all three microphone channels
      iv. Advanced Feedback Blocker
         a. The system shall have the ability to actively control feedback. This shall be done via an analog circuit that provides up to five active filters to control specific frequencies,
         b. The Feedback Blocker shall also have the ability to lower the overall of the system by up to 6dB, during a user error situation where the overall system gain is manually turned up too high
         c. The Feedback Blocker system shall automatically remove the filtering upon resolution of the user-initiated error condition
            1. The Feedback Blocker shall be of an analog design – in order to avoid the detrimental effects of digital sampling, only analog systems shall be considered in order to implement this feature.
      v. Emergency Alert Function
         a. The system shall provide a trigger signal when the teacher presses and holds a button on her transmitter for more than two (2) seconds.
         b. The system shall be capable of providing a visual indication of three (3) red LED’s when the teacher initiates a trigger signal
         c. The system shall also be capable of receiving a trigger acknowledgement signal back from an external source, and altering the visual indicator from three (3) red LED’s to two (2) Green and one (1) red LED
      vi. Recording Function
         a. The system shall provide for a secondary notification that can be used for future applications such as signaling an NDVR (Network Digital Video Recorder) to start a recording
      vii. Control System Integration
         a. The system shall have on board the capability of being controlled via RS-232 protocol.
      viii. The system shall also have the capability of broadcasting RS-232 commands when the teacher presses the up/down volume controls on their microphone
   b. Power Requirements: Inegrated power from PoE, receivers requiring secondary power not allowable.
   c. Operating Frequency – 1.9 GHz Band
   d. Receiver Type: DECT
      i. Controls: System shall have available the following controls
         a. Channel 1 Volume Control – Fully controllable from the teacher microphone remotely through the DECT system
         b. Channel 2 Volume Control – Fully controllable from the teacher microphone remotely through the DECT system
         c. Auxiliary Input Volume Control – Fully controllable from the teacher

microphone remotely through the DECT system
d. Alert Controls on Teacher Microphone – Two (2) buttons on the sides of the microphone
e. Recording Control on Teacher Microphone – One (1) button on the front of the microphone

N. CLASSROOM SPEAKER PERFORMANCE SPECIFICATIONS
1. FS-22
a. 1’ x 2’ Lay in style speaker
b. Vented Enclosure
c. 8Ohm Nominal, 50W Continuous Pink Noise
d. Sensitivity - 88 dB (1W/1M)
e. Frequency Response 70 Hz - 15 kHz (-10 dB) 100 Hz - 14 kHz +/-2 dB)
f. Speaker back can meets UL2043 criteria for plenum installation.
g. Depth not to exceed 3.75”
2. FS-21
a. 2’ x 2’ Lay in style speaker
b. Vented Enclosure
c. 8 Ohm Nominal, 50W Continuous Pink Noise
d. Sensitivity - 88 dB (1W/1M)
e. Frequency Response 70 Hz - 15 kHz (-10 dB) 100 Hz - 14 kHz +/-2 dB)
f. Speaker back can meets UL2043 criteria for plenum installation.
g. Depth not to exceed 3.75”

PART 3 – EXECUTION

3.01 INSTALLATION

A. The entire system shall be installed in a workmanlike manner, in accordance with approved manufacturers wiring diagrams and these specifications. The contractor shall furnish all conduits, cable tray, surface raceway, wiring, outlet boxes, junction boxes, cabinets etc… as well as all required miscellaneous materials and labor necessary for the complete installation of the cable support / pathway system.
B. Wiring may be opened wired in cable tray or "J" hooks above accessible suspended lay-in ceilings. Wiring in walls or exposed on walls shall be enclosed in EMT conduit. Cable shall be supported at a minimum of every 5’.
C. A nylon pull string shall be installed in each conduit / surface raceway run.
D. Any locations where flexible metal conduit has to be used, it shall terminate to a junction box on both ends and be securely anchored for proper support.
E. Conduit indications in the drawings are a minimum standard.
F. All equipment shall be mounted with sufficient clearance for observation, servicing, testing and accessible from either the floor or ladder. If any device is installed in a location that is deemed inaccessible by the Owner and or Architect / Engineer, it will be moved to an accessible location by the contractor at no additional cost to the Owner.
G. The contractor shall supply access panels where required and as defined by the Architect / Engineer. Contractor to notify the Architect / Engineer immediately if this issue arises during construction.
H. All penetration of floor slabs and firewalls shall be fire stopped in accordance with all Federal, State and local codes.
I. All wiring shall be color coded per National Electrical Code requirements and standards.
J. All conduit ends shall have plastic grommets to protect cable from damage due to sharp edges on the conduit.
K. Mounting heights and mounting requirements shall be as shown on the drawings.
L. All junction boxes shall be clearly marked and labeled for easy identification. Flexible connectors shall be used for all devices mounted in suspended lay-in ceiling panels. All

conduits, outlet boxes, junction boxes and panels shall be securely installed and anchored with appropriate fittings and connectors to insure positive grounding throughout the entire system.

M. No wiring except that of this system shall be installed in this systems cable support / pathway system.
N. Wiring splices shall be made only in designated junction boxes and tagged on both sides of the junction. The junction shall be made on clearly labeled, insulated terminal strip. Transposing or changing the color-coding of the cable is not permitted. Wire nut connectors are not acceptable. System cable and the 120vac power cable shall be in separate conduits.
O. It shall be the responsibility of the contractor to wire and connect ancillary devices to this system as listed in this specification section.
P. Any circuits leaving the building to the outside shall be protected by the appropriate transient protection devices as required by the manufacturer to avoid damage to the system if transient surges are inducted on to these circuits (i.e., lighting strikes).
Q. Contractor to provide in-wall bracing support for all devices that are to be wall mounted to walls that are not masonry block walls.
R. All devices shall be protected throughout the entire project. All devices shall be kept free of construction dirt and debris during the entire project. The contractor shall be responsible for replacing at no additional cost to the Owner any devices that are deemed dirty or unsuitable for use by the Owner and or Architect / Engineer throughout the entire project.
S. All cabling and devices shall be labeled with type written labels. Device labels and cable labels shall match the labeling information that is documented on the as-built drawings. Contractor to coordinate labeling schemes and labeling requirements with A/E prior to commencing with final labeling. Labeling system shall be by Brady or Panduit.

3.02 INSTALLER QUALIFICATION

A. Installer shall have a BICSI RCDD (Registered Communication Distribution Designer) on staff.
B. Installer shall have an Avixa CTS (Certified Technology Specialist) on staff.
C. Installer shall be an Authorized Audio Enhancement reseller and be certified in EPIC System, level 1 and level 2.
D. Installer shall hold an appropriate State Contracting or Electrical License as required.

3.03 FIELD QUALITY CONTROLL

A. The system shall be installed and fully tested as listed in these specifications. The system shall be demonstrated to perform all features and functions as listed in these specifications at a minimum.

3.04 TESTING

A. Reports of any field-testing during the system installation shall be forwarded to the Owner and Architect / Engineer for review and comment.
B. Each individual system operation on a circuit-by-circuit basis shall be tested for its complete operation. Any devices that are to be connected to the system shall be tested as specified. Device locations and address / circuit numbers shall be documented on the as-built drawings as well as the wiring configuration of the device circuits. Device locations shall be field verified by the contractor and shall include any costs in the bid that is relating to all devices being connected to the system. The procedure for testing the entire system shall be set forth in these specifications and with the consent and approval of the Architect / Engineer, Owner and equipment manufacturer. Confirm testing requirements with the Owner and Architect / Engineer prior to commencing with system testing.
C. Perform the tests and adjustments necessary to assure the satisfactory quality and level of performance of the system under normal operating conditions.
D. Establish the normal settings for all controls and devices for all system operational and functional features and record the same for future reference. All levels shall be set and recorded in the as-built documentation for optimum system performance.

E. The installation technician from the installer / manufacturer shall perform all system tests as specified. Perform all tests in the presence of the Owner, Architect / Engineer and any designated personnel as deemed necessary by the Owner or Architect / Engineer. This test shall be performed with the devices at their operational location and under normal operational conditions. Bench or default settings for devices are not acceptable. All test and test report costs shall be included in the contractors bid. A checkout report shall be generated by the installation technician and submitted to the Owner and Architect. The report shall include but not be limited to the following:
   1. A complete list of all equipment installed with corresponding serial numbers.
   2. Indication that all equipment is properly installed, functions and conforms to the specifications.
   3. Serial numbers, locations by device and model number for each installed device.
   4. Technicians name, specified certification credentials and date of system test.
   5. Any additional information as deemed necessary by the Owner and or Architect / Engineer.

F. A substantial completion test shall be performed before the final test and acceptance of the system by the Owner and Architect / Engineer. At the time of the substantial completion system test, provide to the Owner or his representative an oral explanation of the operation and maintenance of the system. Before starting the tests and adjustments listed above, the contractor shall submit the following to the Owner and the Architect / Engineer for review during the substantial completion test:
   1. Preliminary as-built wiring diagrams of the entire system.
   2. Preliminary copy of the operation and maintenance manuals.
   3. Preliminary copy of the system test report form.

G. If no system performance issues arise during the substantial completion test that need to be repaired by the installation contractor, this can be approved as the final system test by the Owner and or Architect / Engineer. If there are performance issues that arise that do need to be repaired, another complete and comprehensive system test shall be scheduled and performed to show that the necessary repairs have been properly addressed. These tests shall be performed at no cost to the Owner until a time that the system is shown to be in complete operating condition as approved by the Owner and Architect / Engineer.

H. A commissioning report of all the tested functionality of the system shall be provided by a certified L2 technician by the manufacture or by the manufacture themselves.

3.05 DOCUMENTATION AND TRAINING

A. After the final system test and the Owner and Architect / Engineer has accepted the system to be in the proper operating condition, the contractor shall compile and provide to the Owner three (3) complete operation and maintenance manuals and three (3) sets of as-built drawings on the completed system to include but not be limited to the following:
   1. Operating and maintenance instruction sheets for each piece of equipment showing the proper operation and maintenance of the system component.
   2. Individual factory issued operation and maintenance catalog brochures of all equipment and components that were installed as part of the system. Advertising brochures, submittal data sheets and operational materials shall also be included but shall not be used in lieu of the required technical manuals.
   3. Complete as-built wiring diagrams and floor plan drawings of the complete system installation showing how the system was installed. These drawings shall include any devices that are connected to the system with their address / circuit number documented as well as the wiring configuration of all device circuits. The as-built drawings shall be an updated and revised copy of the submittal drawings showing all modifications made during the installation of the system. A copy of the as-built drawings in electronic format in AutoCAD Release 2014 or higher will be forwarded on to the Owner and Architect / Engineer for archiving in the operation and maintenance manuals.
   4. A statement of guarantee including the date of the termination of the warranty as well as the phone number of the person to be called in the event of equipment failure.

5. A cover letter, for the above mentioned tests, certifying the entire system and its components, application and installation meets or exceeds the recommendations of the manufacturer, all applicable code requirements and test specifications.

B. The final and installed version of the system software shall be provided to the Owner on a via electronic means the operation and maintenance manuals. These manuals shall be used for final check out of the system.

END OF SECTION