SECTION 275116

IP INTEGRATED, PUBLIC ADDRESS ZONE PAGING SYSTEM

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**NOTE TO SPECIFIER**

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 2 Specification with primarily editable text; therefore, most of the text can be edited, but there is some required text which is noted within the Section with a “Note to Specifier.” Do not revise these paragraphs without an approved Deviation from USPS Headquarters, Facilities Program Management, through the USPS Project Manager.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

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1. GENERAL
   1. SUMMARY
      1. Section Includes:
         1. IP integrated, public address zone paging system.
      2. Related Documents:
         1. The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section.
         2. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
      3. Related Sections:
         1. Section 260500 - Common Work Results for Electrical.
         2. Section 270500 - Common Work Results for Communications.
   2. REFERENCES
      1. As specified in section 260500 – Common Work Results for Electrical.
      2. As specified in section 270500 – Common Work Results for Communications.
   3. GENERAL
      1. Deliver a complete and working system, fully tested, that meet the requirements of this specification. The zone paging system shall seamlessly integrate with the USPS BroadWorks VoIP equipment. All systems shall be completed and ready for immediate use.
      2. Review specifications and prints sufficient to become familiar with the interface requirements for this project. Provide any items not included, but required, to make this a complete and working system.
      3. Cabling plant consists of an Equipment Room or Consolidated Computer Room (ER or CCR) (which shall mean the same as Main Cross-Connect (MDF or MC or MXC)) and multiple Telecommunication Rooms (TRs) (which shall mean the same as Intermediate Cross-Connects (IDF or HCs or IXCs). Provide all cable, which interconnects the MC or HC's to the end point devices.
   4. SCOPE OF WORK
      1. Provide an IP integrated, multicast, zone paging communications system to include the sub-systems as required in Part 2, Products, of this specification.
      2. Provide coordination services with USPS telephone installer (throughout the warranty period) in order to achieve a functional interface between the two systems.
      3. The intent is to utilize the facility LAN (and USPS WAN). Provide any cross connects or hardware requirements (excluding USPS furnished LAN switches) to provide a complete and working paging system. Provide the equipment and connections for an integrated and operational system and coordination of the programming with the USPS Raleigh IT Group.
   5. ZONE PAGING FUNCTIONAL DESCRIPTION
      1. Provide fully-operational IP platform for zone paging communications system incorporating safety notifications and general communications. The paging system shall consist of software and IP addressable hardware that shall reside in MC or HC equipment racks (provided and configured by the SCS Integrator).
      2. The platform shall provide communications employing state-of-the-art IP technology including the following minimum functions.
         1. IP paging.
         2. Emergency announcement that shall override any pre-programmed zones assuring that Emergency/Lockdown etc. are heard at every speaker location utilizing pre-recorded audio - tones, music and voice or live voice paging.
         3. Capability of pre-recording emergency announcements.
         4. Utilization of computers and telephones throughout the facility for zone paging function.
         5. System software to synchronize time with network timeserver or web-based time server.
         6. Capability for paging configurability ranging from Plant-wide to individual end-point.
         7. The solution must be capable of sending synchronized pages to all “BroadWorks” Phone types used in the facility.
         8. The Contractor's solution must be recommended by and supported as integrated partner with the “BroadWorks” Cloud PBX and Unified Communications IT Management Platform utilized in the facility.
         9. System software shall interface with the facilities Motorolla Mobile Radio System using analog DTMF connection and dialer.
   6. SUBMITTALS
      1. Submit electronic copy of required information prior to proceeding with the work.
      2. Provide detailed equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, location of each field connection, and a complete schedule of all equipment and materials with associated manufacturer's product information n which are to be used.
         1. Indicate that the rack space and power requirements for equipment are adequate.
      3. Provide a Visio, or simpler diagram, describing IP addressing and proposed VLAN scheme and multicast containment.
      4. Submit termination schedule (matrix) of PoE ports utilized for proposed IP speakers, and zone adapters (immediately after award of contract) to the USPS. The quantity of ports will determine the number of USPS furnished PoE network switches required. Termination schedule shall include:
         1. Speaker or zone adapter identification.
         2. Cable identification number.
         3. Room location.
         4. Patch panel identification number.
         5. Patch panel port identification number.
         6. Indicate quantities of patch panels and port counts.
         7. Indicate patch cords count.
      5. Provide UPS consumption power chart and product specifications.
      6. Provide wiring diagrams: Each diagram shall have a descriptive title and all sub-parts of each drawing shall be labeled. All drawings shall have the name and locations of the project as well as System Installation Company's name in the title block.
      7. Provide details and descriptions of any other aspect of the system, which would differ from the contract documents due to field conditions or equipment furnished.
      8. Review and approval of shop drawings by the Engineer does not supersede the requirement to provide a complete and functioning system in compliance with the Contract Documents.
   7. CONTRACTOR QUALIFICATIONS
      1. Installer shall have successfully completed installations of similar network equipment and project magnitude to that specified herein within the last three years of the bid submittal.
      2. Installer to be an authorized representative of the equipment manufacturer and can demonstrate they have personnel that have experience in the design, installation, testing, and maintenance of IP paging systems.
      3. Installer to be certified in the installation of IP Phone systems to be deployed in conjunction with the IP paging system.
      4. Before work begins, submit certificates of successfully completed manufacturers' training classes, specifically related to the equipment being installed.
   8. DELIVERY, STORAGE, AND HANDLING
      1. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.
   9. MAINTENANCE
      1. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
2. PRODUCTS

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**NOTE TO SPECIFIER**

Verify manufacturer information, product numbers, and availability at time of Project Manual preparation for Project.

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* 1. MANUFACTURERS
     1. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
        1. Algo Communications Products, LTD, Burnaby BC, Canada (604) 454-3792.
     2. Alternate manufactures compatible with “BroadWorks” IP Telephony may be considered for prior approval.
  2. ACCEPTABLE ZONED PAGING SYSTEM MANUFACTURERS

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**NOTE TO SPECIFIER**

**REQUIRED**: Do not modify the basis of design.

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* + 1. The zoned paging system software and hardware shall seamlessly integrate with the “BroadWorks” Cloud PBX and Unified Communications IT Management Platform utilized by the facility.
    2. Basis of Design: Algo SIP Endpoints, Algo Communication Products, Ltd.
  1. PAGING ZONES
     1. Provide configuration for the zones, as directed by USPS. System shall not limit the number of zones.
  2. ACCEPTABLE SYSTEMS MUST MEET THE FOLLOWING MINIMUM FUNCTIONS
     1. Paging system shall function with the facilities BroadWorks VOIP equipment and shall leverage multicast technology on the network to efficiently send messages to all devices without flooding the network. SIP communications are acceptable for devices initiating a page or for non-page device communication messages. Actual pages must be via multicast to ensure synchronization and illuminate echo effect as well as unneeded network traffic.
     2. Paging system shall be able to reach all designated IP endpoints, IP phones, overhead speakers, email, SMS, and integrate with outbound dialers from one send event.
     3. Paging software shall override the physical volume setting on the phones.
     4. Paging software shall send site-based page to all phones, speakers, and/or zones synchronously to ensure audio clarity when multiple phones are near each other.
     5. System shall be able to monitor all telephones and trigger a page to a distribution list when specified number, such as 911, is dialed. When 911 is dialed, the system shall automatically derive the origination point of the call from the Call Manager appliance and inform the recipients of the message and of that location. This functionality or call awareness must be seamless from the phone system to the paging system and correctly identify the source of the call.
     6. The system shall have the ability to interface with “BroadWorks” to send instant messages to all users or have screen popups available that do not take excessive system resources.
     7. System shall include the ability to pre-record and auto-trigger a notification (i.e., pre-recorded message, text alert, email, etc.). System shall provide hands free, two-way intercom between all phones.
  3. ZONE PAGING EQUIPMENT AND MATERIAL
     1. Server Software/Hardware
        1. Server provided by USPS. Install in USPS rack and coordinate to provide software programming, as needed, to complete the system. Server shall be installed within the “MC” rack or location, as designated by USPS.
        2. Facility shall have a locally-survivable solution for IP paging and local emergency notification, such as lockdowns.
        3. System shall be configured to provide local live paging and additional scheduling, as determined by USPS.
        4. Additional configuration shall be provided to include system configuration to broadcast pre-recorded emergency notifications triggered by calling a specified extension on a local IP phone; sending an all clear broadcast to notifications triggered by calling a specified extension; and sending a pre-recorded all-clear page following a fire alarm drill.
        5. Reports on feature usage, system activity, etc. shall be provided via web-based interface.
        6. Configuration of system and initiation of system features shall be provided via web-based interface.
        7. System shall sync the time to the facility’s network time server or network-based time server.
        8. Web-browser shall be provided to deliver facility-wide emergency paging and pre-recorded messages from any authorized user in the Plant. The software shall be capable of automatically notifying facility personnel via pre-recorded page, text, and or email over available LAN/WAN network.
        9. Provide and install an IP speaker and RJ45 jack and install USPS-provided telephone, at the main server location, to be zoned and used for web-interface to test source material or microphone inputs.
        10. Initially, set volume through software and provide documentation to the facility staff for further adjustments. IP speakers shall not use manual or in-room volume attenuation.
        11. Connect system to the facility-provided IP telephone network. See integration and configuration steps below.
        12. System shall support a flexible numbering plan allowing two, three, four, five, or six digit extensions to activate various paging activities, according to facility’s dial plan.
        13. Server shall not need direct connection to any speaker via home run or distributed wiring. The intent is to communicate solely through the IP LAN network.
        14. Server shall store all Plant specific messages, schedules etc. The server shall have a backup and restore capability accessible via web interface.
        15. System's Voice Interface shall provide:
            1. Live audio paging access from any IP telephone to any IP endpoint. This shall include all zone controllers or any combination of IP endpoints.
            2. Triggering of pre-recorded notifications, emergency and non-emergency, from any IP telephone to any IP endpoint. This shall include all zone adapters or any combination of IP endpoints registered to the server.
        16. System shall utilize a web-browser and audio input device (like a USB microphone) to deliver facility-wide, live emergency paging, pre-recorded messages, and tones from any authorized computer in the facility.
        17. System shall be capable of automatically broadcasting page emergency instructions throughout the entire facility when an alarm (i.e., lockdown, lockout, security, fire, etc.) is tripped or manually activated. The emergency instructions shall be pre-programmed and shall require no user intervention. The system shall provide redundant, alarm annunciation over the paging speakers and shall not be meant to replace primary fire alarm or security systems.
     2. IP Addressable Endpoints
        1. IP Speakers shall interface to each facility’s data network.
           1. Provide the ability to belong to one or more independent zones for zone paging, program distribution, and tone reception. This assignment shall be a programmable function. Each IP speaker location or common zone shall be programmed in software and shall be able to belong to any combination of software defined zones.
           2. Basis of design for the IP speakers shall be non-plenum rated. However, supply plenum-rated, where required. Contractor may propose an all plenum-rated solution.
           3. Provide a contact that shall detect a closed/open switch activity that may be programed to trigger a function such as strobe, panic, or other urgent message.
        2. SIP Audio Alerter (interior wall mount) – Provide high efficiency integrated amplifier and tuned high quality loudspeaker with polycarbonate enclosure suitable for surface wall mounting and the following features:
           1. Networked Managed SIP Endpoint.
           2. Voice Paging with talk back capability.
           3. Multicast receive or broadcast capability.
           4. Outputs for external speaker and slave Amp.
           5. Power Input: 48V PoE, 12 Watts (max).
           6. SPL: 106 dBA at 1m internal speaker.
           7. Speaker Output: 8 Watts rms, 8 ohm.
           8. Configuration: TFTP, FTP, HTTP.
           9. Dimensions: 7”H x 4”W x 2.6”D.
           10. Basis of Design: Algo Communications Products #8180
        3. SIP Ceiling Speaker (interior, recess ceiling mount) – Provide high efficiency integrated amplifier and tuned high quality, 8-inch round loudspeaker with 2 ft. x 2 ft. drop-in ceiling panel suitable for recess mounting within an acoustical dropped ceiling and the following features:
           1. Networked Managed SIP Endpoint.
           2. Voice Paging with talk back capability.
           3. Multicast receive or broadcast capability.
           4. Outputs for external speaker and slave Amp.
           5. Power Input: 48 V PoE IEEE 802.3af Class 0 (Max 12.95 W - Idle nominal 2W)
           6. Dimensions:

8" Diameter without trim ring

9.8" Diameter with trim ring

Total height 7.0"

* + - * 1. Weight: 6 lb
        2. Speaker: 6.5" Coaxial with PEI Dome Tweeter Mica filled outdoor rated polypropylene cone
        3. SPL: 102 dBA at 1m (1 kHz tone)
        4. Frequency Response: 55 - 18,000 Hz (+/- 10 dB)
        5. Microphone: Electret omnidirectional wideband
        6. Audio Delay: 10 to 1000 ms selectable for synchronization
        7. Audio Memory: 1 GByte available
        8. Relay Output: Normally open, activated when 8188 is in use; Max 30 V 50 mA.
        9. Relay Input: Normally open or normally closed dry contact
        10. Configuration: TFTP, FTP, HTTP.
        11. Environmental: 32 to 104 deg F, 10-95% RH non-condensing. Dry indoor locations only.
        12. Basis of Design: Algo Communication Products #8188/#8188T2X2.
      1. SIP Ceiling Speaker (interior, surface ceiling mount) – Provide high efficiency integrated amplifier and tuned high quality, 8” round loudspeaker with 12” square polycarbonate enclosure suitable for surface mounting to a hard ceiling and the following features:
         1. Networked Managed SIP Endpoint.
         2. Voice Paging with talk back capability.
         3. Multicast receive or broadcast capability.
         4. Outputs for external speaker and slave Amp.
         5. Power Input: 48 V PoE IEEE 802.3af Class 0 (Max 12.95 W - Idle nominal 2W)
         6. Dimensions:

12" square

Total height 7.0"

* + - * 1. Weight: 6 lb
        2. Speaker: 6.5" Coaxial with PEI Dome Tweeter Mica filled outdoor rated polypropylene cone
        3. SPL: 102 dBA at 1m (1 kHz tone)
        4. Frequency Response: 55 - 18,000 Hz (+/- 10 dB)
        5. Microphone: Electret omnidirectional wideband
        6. Audio Delay: 10 to 1000 ms selectable for synchronization
        7. Audio Memory: 1 GByte available
        8. Relay Output: Normally open, activated when 8188 is in use; Max 30 V 50 mA.
        9. Relay Input: Normally open or normally closed dry contact
        10. Configuration: TFTP, FTP, HTTP.
        11. Environmental: 32 to 104 deg F, 10-95% RH non-condensing. Dry indoor locations only.
        12. Basis of Design: Algo Communication Products #8189 with [recessed] [surface] backbox.
      1. SIP Horn Speaker (indoor/outdoor, wall or ceiling mount) – Provide high efficiency integrated amplifier and tuned high quality, double re-entrant, rectangular horn speaker with UV stabilized plastic weatherproof housing and the following features:
         1. Networked Managed SIP Endpoint.
         2. Voice Paging with talk back capability.
         3. Multicast receive or broadcast capability.
         4. Outputs for external speaker and slave Amp.
         5. Power Input: 48 V PoE IEEE 802.3af Class 0 (Max 12.95 W - Idle nominal 2W)
         6. Dimensions: 11.8” x 6.6” x 10.2”.
         7. Weight: 6 lb
         8. SPL: 116 dBA at 1m (1 kHz tone)
         9. Frequency Response: 350 - 9,000 Hz (+/- 10 dB)
         10. Microphone: Electret omnidirectional wideband
         11. Audio Delay: 1 to 1000 ms selectable for synchronization
         12. Audio Memory: 1 GByte available
         13. Relay Output: Normally open or normally closed; Max 30 V 50 mA.
         14. Relay Input: Normally open or normally closed dry contact
         15. Configuration: TFTP, FTP, HTTP, HTTPS.
         16. Environmental: -40 to 122 deg F, suitable for wet locations.
         17. Basis of Design: Algo Communication Products #8186.
      2. IP-Addressable Zone Paging Adapter
         1. Provide PoE IP Paging Adapters for integrating analog speakers and amplifiers into a Unified Communication Environment as a third party SIP endpoint. Paging adapters shall support all page, zone paging, audio events, and emergency notifications and shall meet the following specifications:

SIP: 50 page extensions; 10 Alerting Extensions.

Multicast: Receive or transmit.

Code Support: G.711 A-law, G.711 u-law, G.722, Polycom Group Page.

Processor: Linux OS ARM Cortex-A8 32-Bit RISC Processor.

AUX Input: 3.5mm jack for analog music input.

AUX Output: 3.5mm jack for headset or PC speakers.

Line Input:

Female mini-XLR 10 kOhm balanced maximum level +4 dBu.

Transformer isolated internally.

Line Output:

Low impedance balanced output.

Line level – 10 dBm / 0 dBm / +4 dBu.

Transformer isolated internally.

Male mini XLR connector and pluggable terminal block.

Frequency response 100-7000 Hz +/- 3dB.

Audio Memory: 1 GByte.

Relay Output: Normally open or normally closed; Max 30 V 50 mA.

Relay Input: Normally open or normally closed dry contact supervision.

Configuration: Web interface (HTTP or HTTPS).

Power Requirements: PoE IEEE 802.3af Class 0 Nominal 2W Maximum 3.9W.

Environmental: +32 to +122 deg F.

Dimensions: 6.5” x 4.3” x 1.3” (16.5 cm x 10.9 cm x 3.3 cm)

Basis of Design: Algo Communication Products #8301.

* + - 1. Shall be end user configurable (with respect to accepting a Dynamic or Static IP address) must provide support for variable length subnet masks according to the facility’s IP addressing scheme and allow an interface to manually set the zone controller to a static IP.
      2. Basis of Design: Algo Communication Products #8301.

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**NOTE TO SPECIFIER**

Individual IP speakers do not provide the speaker coverage or voice intelligibility required within large, open areas with high ambient noise levels. Medium power speaker arrays shall be provided within large workrooms or platforms with ceiling heights exceeding 25’ AFF.

Include Paragraph 2.5.C below when MPSA clusters are to be utilized.

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* + 1. Interior Medium Power Speaker Arrays (MPSA’s):
       1. Provide UL864 interior medium power speaker arrays MPSA at the locations shown on the drawings.
       2. Each MPSA site shall include a local control unit, amplifier, standby batteries, charger, power supply, mounting bracket.
          1. Sound levels at any location where personnel may be located shall be at least 15dBA above ambient but not exceed 120 dBA when measured on the A-scale of a standard sound level meter at slow response.
       3. Speakers and control unit
          1. 650 Watt Omni-directional MPSA Assembly (5 of 5 Active Panels) with lockable cabinet, 250 Watt amplifiers, amplifier terminal panel(s), universal riser supervisory module(s) and 110V/60 Hz. battery backup.
          2. Provide MPSA amplifier cabinets and components as indicated on the drawings.
          3. A paging adapter shall be provided for integration with the analog amplifier.
       4. Basis of Design: Edwards MN-HSMP650G70 series.
    2. IP Paging Management
       1. Provide audio paging access from any PC to any zone (i.e., group) of paging speakers or all speakers/paging horns throughout the entire facility. Access controlled by User ID and/or password.
    3. Audio Paging Components
       1. Category 6 cable and cabling from IP Endpoints to the USPS-furnished PoE network switches shall be provided. Total cable length shall not exceed 295 ft. Refer to spec sections 270500 and 271500 for applicable requirements.
       2. Install in rack, power, and cable the USPS-pre-configured PoE network switches with Contractor-supplied cables.
       3. Cooordinate testing switches' connectivity with USPS Raleigh IT network staff.
       4. Provide a line-interactive UPS unit adequate to operate the system for a period of 30 minutes during a power outage. Tripp-Lite, APC or prior approved equal.
  1. IP PHONE INTEGRATION
     1. Coordinate with the facility to integrate with IP Phone hardware supplier and software supplier.
     2. Telco Interface and Cutover: Coordinate testing and eventual cutover of pre-determined numbers to new SIP service. Configure and support testing of new SIP service with Raleigh Information Telecommunications Support Center (RITSC) Subject Matter Expert and the District IS Manager.
  2. CATEGORY 6 HORIZONTAL CABLING
     1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
        1. Belden.
        2. Berk-Tek.
        3. CommScope Uniprise.
        4. General Cable
        5. Leviton
        6. Ortronics (Legrand) - Preferred
        7. Panduit
        8. Product options and substitutions. Substitutions: Not permitted.
     2. Conductors: 4 twisted pair, minimum 24 AWG, solid copper.
        1. Individually insulated plenum rated conductors under common plenum rated sheath unless entire cable is installed within conduit/EMT or if area where cable is installed is not considered a return air plenum according to any applicable codes.
        2. Complies with individual characteristics established in TIA-568-C, and all addendums for Category 6 cable performance specification.
        3. Nominal Impedance: 100 ohms plus or minus 15 percent.
        4. Certified and capable of performing to a minimum of 250 MHz.
     3. Connector:
        1. 8-pin modular, Category 6/6A, non-keyed.
        2. Complies with TIA-568-C “T568A” pinning configuration.
        3. Color: Clear.
     4. Cable Testing: Provide Category 6 copper testing as outlined in Section 271500 – Communications Horizontal Cabling.
  3. CATEGORY 6 COPPER PATCH CORDS
     1. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
        1. Belden
        2. Berk-Tek
        3. CommScope Uniprise
        4. General Cable
        5. Leviton
        6. Ortronics (Legrand) - Preferred
        7. Panduit
        8. Product options and substitutions. Substitutions: Not permitted.
     2. Conductors: Straight through type 4 twisted pair minimum 24 AWG, stranded copper.
        1. Terminated with male 8-pin modular plugs.
        2. Complies with individual characteristics established in TIA-568-C, and all addendums for Category 6 cable performance specification.
        3. Nominal Impedance: 100 ohms plus or minus 15 per cent. Certified and capable of performing to a minimum of 250 MHz.
        4. Match performance and impedance characteristics of the installed horizontal unshielded twisted pair cable.
        5. Each patch cord shall have a plastic arch for ease of removal of the connector (rubber boots are not acceptable). Preferred Copper Patch type: Ortronics (Legrand) #OR-MC615-06.
        6. Patch cords shall be factory made, tested and individually factory wrapped within non-clear plastic bags. The plastic bag shall clearly identify the manufacturer/testing agency with silk screen on the outside and shall contain the cable test results. Plastic bags shall have perforated or zip-lock top for easy removal of cord.
     3. Connector:
        1. 8-pin modular, Category 6/6A, non-keyed.
        2. Complies with TIA-568-C “T568A” pinning configuration.
        3. Color: Clear.
  4. MISCELLANEOUS
     1. Cooperate in the integration and programming of telephone and paging system to create the functions specified in this bid. Paging system and telephone system shall be individually tested but acceptance of the service shall only occur when a fully integrated system is delivered. This shall include testing of all notification features and calls that are to be configured.
     2. Special Requirements for Cable Routing and Installation
        1. The majority of paging system wiring in this building will be installed above ceilings without conduit. All communications cabling used throughout this project shall comply with the requirements as outlined in the National Electric Code (NEC) article 725. All cabling shall bare CMP and/or appropriate markings for the environment in which they are installed.
        2. Seal openings between floors, through rated fire and smoke walls, existing or created by the Contractor for cable pass through. Create openings as are necessary for cable passage between locations as shown on the drawings. Any openings created and left unused shall also be sealed.
        3. Cabling routed underground, exterior of the building, through inaccessible ceilings or less than 10 feet A.F.F. in the workroom shall be contained in conduit. Provide flush boxes within finished areas and factory boxes in unfinished areas. Provide 3/4" conduit risers with 90 degree bend and bushing for all wall mounted devices.

1. EXECUTION
   1. EXAMINATION
      1. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
      2. Report in writing to the USPS Project Manager prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
      3. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.
   2. INSTALLATION
      1. General: Install system in accordance with NFPA 70 and other applicable codes. Install equipment in accordance with manufacturer's written instructions.
      2. Furnish and install all material, devices, components and equipment for a complete operational system.
      3. Install exposed cables parallel and perpendicular to surfaces or exposed structural members, and follow surface contours. Secure and support cables by straps, staples, or similar fittings so designed and installed to avoid damage to cables. Secure cable at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, or fittings.
      4. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess. Use lacing bars in cabinets.
      5. Control-Circuit Wiring: Install number and size of conductors as recommended by system manufacturer for control functions indicated.
      6. Separation of Wires: Separate speaker-telephone, line-level, and power wiring runs. Where exposed or in same enclosure, separate conductors at least 12 inches for speaker microphones and adjacent parallel power and voice wiring. Separate other intercommunication equipment conductors as recommended by equipment manufacturer.
      7. Provide necessary transient protection as recommended by the equipment supplier and referenced to earth ground.
      8. Match input and output impedances and signal levels at signal interfaces. Provide matching networks where required.
      9. Identification of Conductors and Cables: Color-code conductors and apply wire and cable marking tape to designate wires and cables to identify media in coordination with system wiring diagrams.
      10. Conductor Sizing: Unless otherwise indicated, size speaker circuit conductors from racks to loudspeaker outlets not smaller than number 14 AWG and conductors from microphone receptacles to amplifiers not smaller than number 20 AWG.
      11. Weatherproof Equipment: Install units that are mounted outdoors, in damp locations, or where exposed to weather consistent with requirements of weatherproof rating. Provide surge protection where required.
   3. FIELD QUALITY CONTROL
      1. As specified in section 260500 – Common Work Results for Electrical.
      2. Section 014000 – Quality Requirements: Field testing and inspection.
      3. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installations, including connections. Report results in writing.
      4. Inspection: Make observations to verify that units and controls are properly labeled and interconnecting wires and terminals are identified.
      5. Testing: Rectify deficiencies indicated by tests and completely re-test work affected by such deficiencies at Contractor's expense. Verify, by the system test, that the total system meets the Specifications and complies with applicable standards.
   4. ADJUST AND CLEAN
      1. Adjust equipment for proper operation.
      2. Prior to final acceptance, vacuum and clean all system components and protect them from damage and deterioration.
   5. FINAL ACCEPTANCE TESTING
      1. The Final Acceptance Testing shall be provided to the USPS or designated representative only. Final acceptance testing to any other trade or service provider for the project does not comply with the requirements of this section.
      2. Provide a Final Acceptance Test record document signed by both the Contractor and USPS or designated representative establishing the “In Warranty” date. The warranty period shall not commence until the Final Acceptance Test is completed.
      3. Verify the performance of any portion of the installation by demonstration, listening and viewing test, and instrumented measurements. Make additional adjustments which are deemed necessary by USPS because of the acceptance test.
   6. PROJECT SUBMITTALS PRIOR TO ACCEPTANCE
      1. Installer Certificates: Signed by Contractor certifying that installers complied with requirements.
      2. Acceptance Documents (include record of final settings and measurements certified by Installer).
      3. Electronic documentation of method to load music, to create and edit zones, to adjust volume, etc.
      4. Maintenance Data: For equipment to be included in maintenance manuals.
         1. Record of USPS equipment-programming option decisions.
         2. All instructions necessary for proper operation and manufacturer’s instructions (three hard copies and one electronic copy).
         3. Manufacturer’s maintenance information (document with updated and accurate web links).
         4. Electronic copies of software programs and system information on all programmable features of the installed platform.
   7. IN-SERVICE TRAINING
      1. The facility shall provide a space for the training sessions.
      2. Provide videotaped training: one for maintenance session and one for each plant’s staff training session. Submit to USPS Project Manager.
      3. Maintenance Personnel: Provide on-site training for the USPS maintenance personnel in the procedures involved in operating, troubleshooting, servicing, and preventative maintenance of the system. Over a 14 day period, schedule, with facility maintenance personnel, two complete sessions to accommodate personnel’s schedules. The two sessions are intended to accommodate facility staff being trained prior to system being actively used in the facility.
         1. In addition to the Training Materials provided, furnish Operators Manuals and User’s Guides at the time of this training via electronic or online media.
         2. Schedule training with USPS (through the USPS Project Manager) with at least seven days advance notice.
      4. Facility Staff: Provide and implement a complete and comprehensive, on-site, facility staff training program. This mandatory training program shall provide facility staff a complete understanding of how to utilize and properly operate the system functions. The intent is to provide two sessions, one session would be provided upon production activation of the phone and paging system. The second session, timing as requested by the facility, shall be provided within six months of the first session. Additional training is outside the scope of this bid and would be procured separately.
         1. The training program shall be implemented by a staff member/trainer employed by the Contractor. The trainer must be qualified to provide training on their product.
         2. All staff development training is to be coordinated through the USPS Project Manager with at least seven days advance notice. The trainer shall provide the facility’s staff a document listing all of the staff members who attended, received, and completed the training program.
   8. AS-BUILT/RECORD DRAWINGS
      1. Prior to final acceptance, provide three sets of drawings and one AutoCAD disc (Release 2014 or later) and a PDF file indicating all cable numbers and construction details in accordance with the actual system installation before final payment shall be issued. Revise all shop drawings to represent actual installation conditions. These Record Drawings shall be used during “Final Acceptance Testing.”
   9. WARRANTY
      1. Provide a [1] [2] [3] year warranty on all Contractor-supplied equipment against defects in material and workmanship. This warranty shall cover all electronic equipment, as well as speakers. If any defects are found within the warranty period, replace the defective equipment at no cost to the USPS (i.e., to include equipment and labor).
      2. If the equipment cannot be repaired within 24 hours of service visit, provide “loaner” equipment to the facility at no additional charge.
      3. If requested, provide a quote for a service contract offering continuing factory authorized service of the system after the warranty period.
      4. Any software updates, during the warranty period, shall be provided to the facility as part of this contract (i.e., no additional charge). This effort shall include travel to the site for installation and configuration of the updates.
   10. EMERGENCY SERVICE
       1. Maintain sales and service presence in the area of adequate size and quality to assure the USPS rapid response to emergency service requests. Rapid emergency service response shall mean arrival of service personnel at trouble site within four hours of notice during normal business hours (i.e., 8:00 AM to 6:00 PM) and within 24 hours of said notice during all other hours on a 7-day per week basis. Service personnel shall arrive on site within 48 hours of receiving a request for routine or non-emergency service.

END OF SECTION

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