MicroComm DXL

Digital Intercom System

Architectural & Engineering

Specifications

October 2018

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 1

1. **GENERAL**

    1.1 **INTENT**

    1.1.1 The intent of this contract is to provide an integrated intercom and communications system for the _____ facility.

    1.1.2 The system to include the following functions:

    1.1.2.1 door control intercom

    1.1.2.2 cell intercom

    1.1.2.3 reception intercom

    1.1.2.4 visiting booth intercom

    1.1.2.5 administrative intercom

    1.1.2.6 intercom station audio monitoring

    1.1.2.7 intercom station audio level alarm monitoring

    1.1.2.8 zoned public address

    1.1.2.9 multi-channel program distribution

    1.1.2.10 alarm point monitoring and annunciation

    1.1.2.11 output and event response control

    1.1.3 The system to integrate with the following other security and communication systems to form a comprehensive facility management network:

    1.1.3.1 touch screen control system

    1.1.3.2 graphic control panels

    1.1.3.3 PLC door control system

    1.1.3.4 closed circuit television system

    1.2 **SCOPE OF WORK**

    1.2.1 Work of this contract includes the supply and installation of an integrated intercom and communications system as specified herein.

    1.2.2 The system is to include all equipment, installation, installation materials, set up, and testing to form a complete operating system.

    1.2.3 Independent system functions and integrated system functions to be fully verified as part of system testing and commissioning.

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 2

1.2.4   Work of this contract also includes the provision operating and maintenance manuals, training and demonstration, and extended warranty. Manufacturers not offering extended warranty shall not be accepted.

1.3   PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

1.3.1   The following products are required to facilitate the system installation, but are specified in other sections.

   1.3.1.1   network wiring and devices

   1.3.1.2   equipment racks and accessories.

   1.3.1.3   terminal boards and cabinets.

   1.3.1.4   device outlet boxes.

   1.3.1.5   ac power sources for system equipment.

1.4   SYSTEM DESCRIPTION

1.4.1   The integrated intercom and communications system to include the following components as required to achieve a complete and functional system:

   1.4.1.1   Digital Communications Controllers (DCCs)

   1.4.1.2   Digital Communication Expanders (DCEs)

   1.4.1.3   Talkback Expanders (TBEs)

   1.4.1.4   Page Zone Expanders (PZEs)

   1.4.1.5   MicroComm DXL Administrator Software for configuring and maintaining the system

   1.4.1.6   intercom master stations

   1.4.1.7   telephone set master stations

   1.4.1.8   VoIP intercom master stations

   1.4.1.9   intercom stations

   1.4.1.10   VoIP intercom stations

   1.4.1.11   call operating devices

   1.4.1.12   discrete input/output modules

   1.4.1.13   auxiliary power supplies

   1.4.1.14   audio program sources

   1.4.1.15   paging amplifiers

   1.4.1.16   loudspeakers and horn loudspeakers

   1.4.1.17   VoIP paging/talkback amplifiers

1.4.2   Digital Communication Controllers, Digital Communication Expanders and Talkback Expanders to be interconnected to form intercom exchanges capable of standalone local operation. Each Digital Communication Controller to be capable of supporting up to four Digital Communication Expanders and/or Talkback Expanders.

1.4.3   Intercom system to consist of up to eight exchanges networked together to form a fully integrated operating system. System capacity to allow for up to:

      1.4.3.1   800 analog master stations and 1,040 VoIP master stations

      1.4.3.2   12,800 analog intercom stations and 16,000 VoIP intercom stations

1.4.4   Intercom system to include ability to be controlled by touch screen computers, graphic control panels, and switch selector panels.

1.4.5   Routing and switching of intercom station audio to be fully digital. Relay switching of intercom audio is not acceptable.

1.5   SYSTEM OPERATION

1.5.1   Intercom master station general operation:

      1.5.1.1   Display to provide alphanumeric descriptions of functions, station and device names, and current activity. Function key labeling to change depending on the location within the menu structure and the options available to the operator.

      1.5.1.2   Master station to display the current number of calls in the queue, number of acknowledged calls, and number of disabled stations.

      1.5.1.3   Master stations, through their command functions to have the ability to:

            1.5.1.3.1   place and answer calls

            1.5.1.3.2   place calls on hold

            1.5.1.3.3   call requests can be programmed to be received by another master station

            1.5.1.3.4   make group calls and zoned public address announcements

            1.5.1.3.5   monitor intercom stations

            1.5.1.3.6   receive intercom station audio level alarms

            1.5.1.3.7   control program distribution to stations and zones

            1.5.1.3.8   adjust their intercom volume level

            1.5.1.3.9   adjust their monitor volume level

            1.5.1.3.10   independently adjust each station's volume level

            1.5.1.3.11   disable and enable station switches

            1.5.1.3.12   monitor and control alarm points

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 4

1.5.1.3.13   remove stations from service

1.5.1.3.14   recall the last station with a single control

1.5.1.3.15   adjust display back lighting

1.5.1.3.16   select 12 or 24 hour clock display

1.5.1.3.17   adjust the step rate for switching between monitored stations

1.5.1.4   Volume adjustments of master station and intercom station levels to be controllable during communications. Each station's volume level is to be independently software controlled. Level settings are to remain in effect until modified by a future adjustment.

1.5.1.5   Master stations are to include the ability to be placed in an unmanned mode, which automatically routes all of the associated call handling functions to a pre-defined secondary master station.

1.5.2   Call placement from an intercom station:

1.5.2.1   Depressing an intercom station's call push-button to place a call request in the queue of the master station or stations assigned to receive that station's calls. Calls are to be queued in order of priority level associated with the intercom station and time the call was placed.

1.5.2.2   Master station to normally display the identity of the top three calls in its call request queue. Call identity includes the device ID number and/or an alphanumeric descriptor. The descriptor to be up to 20 characters in length.

1.5.2.3   The master station display to indicate the total number of calls currently in its queue. Scroll keys are to enable the master station to view all calls in the queue.

1.5.2.4   Calls not answered within a pre-programmed time are to place a secondary call request on an assigned master station.

1.5.3   Call answering at an intercom master station:

1.5.3.1   Intercom master stations are to be able to answer the top call request in its queue by depressing the 'Next' function key. At the completion of the call, the 'End' function key is to close the communication link and remove the call from the queue.

1.5.3.2   Queued calls may be answered out of sequence by scrolling through the queue to the desired call. The selected call is to flash on the display and may be answered by depressing the 'Enter' key. Pressing the 'End' key closes the communication link, remove the call from the queue and return the master station display to the top of the queue.

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 5

          1.5.3.3   Master station to display the identity and type of the connected device.

    1.5.4   Voice communication:

          1.5.4.1   Voice communication between handsets to be full duplex.

          1.5.4.2   Voice communications between intercom master stations and intercom stations to be automatically switched half duplex with press-to-talk override.

    1.5.5   Station audio monitoring:

          1.5.5.1   Master stations to be able to monitor an individual intercom station or a pre-defined group of intercom stations. A monitor group may consist of a list of intercom stations that are monitored in a sequential manner, or up to seven intercom stations on the same exchange that are monitored simultaneously.

          1.5.5.2   Each master station is to individually control the rate at which stations in the monitor group are sequenced through, and the level at which their monitor volume is set.

    1.5.6   Station audio level alarm detection:

          1.5.6.1   System to include station audio level alarm detection with adjustable detection settings for each individual station.

          1.5.6.2   Detection parameters for each station to be configurable for different time periods and automatically changed by the system master clock.

    1.5.7   Program distribution:

          1.5.7.1   System to receive audio program from tuners, tape decks, mp3 players, etc. for program distribution to intercom stations and/or loudspeaker circuits.

          1.5.7.2   System to distribute 8 channels of programs to all exchanges through the exchange network. Additional program sources can be connected locally at each exchange.

          1.5.7.3   System to permit each exchange to distribute up to 8 simultaneous program channels (each having two volume levels) to groups of stations. The program sources at an exchange may be selected from the 8 programs distributed through the exchange network or local exchange sources.

          1.5.7.4   Program distribution (channel, volume, on, off) control is from the intercom master stations. Each intercom station, station group, or page zone to be independently controllable.

          1.5.7.5   Intercom station program button to cycle through available channels.

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 6

1.5.7.6 Program distribution to be temporarily suspended to affected intercom stations or paging zones during paging announcements.

1.5.7.7 Program distribution to affected intercom stations to be temporarily suspended during voice communications.

1.5.8 Paging:

1.5.8.1 Master stations to have the ability to page to pre-determined groups of intercom stations and/or loudspeaker zones.

1.5.8.2 Paging selection to be made by selecting the page function and a group or zone from the selection list. Alternately, the zone number may be entered after the page function has been selected.

1.5.9 Telephone paging:

1.5.9.1 Zoned telephone paging access to enable telephones programmed to access the paging link to make zoned public address announcements.

1.5.9.2 First digit dialed to access the paging function, second digit to select all call or a primary zone, third digit to select a sub-zone. Pressing the # key to indicate zone selection is complete.

1.5.9.3 Upon completion of the zone selection, the intercom system to reply with a page ready signal signifying that all circuits have been freed and connected and are ready to receive the announcement.

1.5.10 Tone and message distribution:

1.5.10.1 System is to include the capability to configure up to 10 minutes of thirty-nine distinct signal tones or pre-recorded messages for distribution over intercoms and paging loudspeakers.

1.5.10.2 Tone signals may be triggered in response to a system input, or from the system program scheduler.

1.5.10.3 Program scheduler features to include complete 24 hour per day, 7 days per week, 365+ days per year scheduler with full week, weekday, weekend, and holiday configuration.

1.5.11 Visitation intercom

1.5.11.1 System to include external control for visitation intercom operation.

1.5.11.2 Visitation operation to include full duplex communications between handset stations.

1.5.11.3 Features to include off-hook detection, visitation messaging, non-secure visit recording, and master station communication to visiting booths.

1.5.12 Audio logging:

1.5.12.1 System is to include the capability to interface to audio logging recorders for archival recording of each master station's or intercom station' communication.

1.5.13 CCTV interface:

1.5.13.1 System to transmit command signals to the CCTV controller to route camera signals to viewing monitors.

1.5.13.2 Whenever a master station answers a call from an intercom station or places a call to an intercom station, the camera associated with the intercom station to be displayed on the monitor associated with the master station.

1.5.14 Alarm handling:

1.5.14.1 System to annunciate alarms and faults at designated intercom master stations.

1.5.14.2 Alarms to be selectively acknowledged and canceled.

1.5.14.3 Event response programming to permit system output action to be automatically initiated upon receipt of each specific alarm.

1.6　FUNCTIONAL REQUIREMENTS

1.6.1 Identification numbers for each category of device, group, zone, etc. to range from 1 to 99,999.

1.6.2 Alphanumeric description for each device, group, zone, etc. is to allow up to 20 characters and spaces.

1.6.3 All intercom station field wiring to be supervised for short circuit and open circuit faults.

1.6.4 All system boards to include self-diagnostic functions for complete operational and communication testing.

1.6.5 DCC's and DCE's and other devices to be capable of insertion or removal from service while the system is fully operational. Other system activity not directly related to the unit's insertion or removal to not be affected.

1.6.6 System diagnostics to include the ability to test system communications and devices from the front panel keyboard on the DCC's.

1.6.7 System to include the ability to make on-line changes to the system configuration.

1.6.8 System to include logging functions for system activity and system maintenance.

1.6.9 On-line factory support to be available through remote access to a local work station on the security network, or through a modem-installed in one of the DCCs.

1.7　　PERFORMANCE REQUIREMENTS

1.7.1　System frequency response: 300 to 3,500 Hz.

1.7.2　Intercom station output: 82 dB SPL at 3 feet with 82 dB SPL input at face of transmitting station.

1.7.3　All system equipment to comply with the radiation limits for Class A digital devices of FCC Rules Part 15, Subpart B.

1.7.4　Intercom audio switching shall be digital. Systems using mechanical relays shall not be accepted.

1.8　　QUALITY ASSURANCE

1.8.1　Intercom system equipment is to be designed and manufactured in accordance with ISO-9001 2000 Quality System Standard.

1.8.2　Manufacturer's quality control program to be registered in accordance with the above noted standard.

1.9　　OPERATION AND MAINTENANCE MANUALS

1.9.1　Contractor is to provide three (3) complete sets of operation and maintenance manuals for system supplied under this contract.

1.9.2　Operation and maintenance data to include:

　　　　1.9.2.1　　Contractor Design Data including:

　　　　　　　　1.9.2.1.1　system design criteria

　　　　　　　　1.9.2.1.2　system and controls descriptions

　　　　　　　　1.9.2.1.3　system and controls schematics

　　　　　　　　1.9.2.1.4　site specific operating instructions

　　　　1.9.2.2　Installation Instructions: manufacturer's printed instructions describing manufacturer's recommended installation procedures.

　　　　1.9.2.3　Operating Instructions: manufacturer's printed instructions describing proper operation.

　　　　1.9.2.4　Equipment Identification: Nameplate information for each piece of equipment.

　　　　1.9.2.5　Maintenance Instructions: manufacturer's printed instructions describing manufacturer's recommended maintenance.

　　　　1.9.2.6　Spare Parts Lists: parts listing of spares provided under the Contract.

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 9

1.9.2.7   Suppliers and Contractors List: list of contractors and suppliers who supplied and installed equipment, systems, materials or finishes. Includes company name, address, and telephone number.

1.9.2.8   Tag Directories: directory identifying tag number and equipment description and location.

1.9.2.9   Drawings List: list of contract and system drawings.

1.9.2.10   Product Data: manufacturer's product data for equipment, systems, materials and finishes.

1.9.2.11   Certifications: include the following:

     1.9.2.11.1   Copies of inspection reports are to be prepared by authorities having jurisdiction.

     1.9.2.11.2   Certified copies of test reports prepared by independent testing agencies.

     1.9.2.11.3   Any other certificates required by the Contract Documents.

1.9.2.12   Warranties and Bonds: Owner's copy of contractor's warranty, manufacturer's warranties, maintenance bonds and service contracts.

1.9.2.13   Reports: includes the following:

     1.9.2.13.1   Reports documenting the performance of tests required by the Contract Documents and the results of those tests.

2.   PRODUCTS

2.1   APPROVED MANUFACTURERS

2.1.1   The following manufacturers and their named products are approved for use in this Work:

     2.1.1.1   Harding Instrument Co. Ltd.
     MicroComm DXL

2.2   DIGITAL COMMUNICATION CONTROLLERS (DCC's)

2.2.1   Digital Communication Controllers to each form an intercom exchange capable of independent local operation. Exchange capacity to be increased by connecting up to four Digital Communication Expanders to each DCC.

2.2.2   Multiple DCC's to be networked together via digital audio trunks and/or Ethernet data networks to form larger systems. VoIP enabled systems shall utilize IEEE 802.1p/Q Quality of Service (QoS) compliant Ethernet networking equipment.

2.2.3   Each DCC to include:

     2.2.3.1   a Process Control Card (PCC)

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 10

2.2.3.2   a front panel keypad/display for system setup and maintenance.

2.2.3.3   a 110 VAC, 60 Hz power supply for internal functions.

2.2.3.4   Master Control Card (MCC) as required

2.2.3.5   one or two Station Control Cards (SCCs) as required

2.2.3.6   internal VoIP PCI accelerator card as required

2.2.4   Process Control Card:

2.2.4.1   Process Control Card to contain system configuration and data, control exchange operations and switching, and provide exchange network ports.

2.2.4.2   Process Control Card to include:

2.2.4.2.1   USB network ports for exchange expansion.

2.2.4.2.2   Ethernet network ports for system expansion and external control by touch screen computers and graphic control panels.

2.2.4.2.3   fiber optic or copper digital audio trunk ports. (not required for VoIP over Ethernet audio trunking)

2.2.4.2.4   two serial ports.

2.2.4.2.5   an internal modem for transmitting and receiving data over a telephone line.

2.2.5   Master Control Cards:

2.2.5.1   include ports for any combination of two intercom or telephone set master stations.

2.2.5.2   include two line level audio inputs with status and control.

2.2.5.3   include two line level audio outputs with status and control.

2.2.5.4   convert incoming audio signals to digital format and outgoing signals to analog format.

2.2.5.5   intercom master station audio, press-to-talk and hook switch status transmitted over two single shielded pair cables with wiring supervision to detect open circuit and short circuit faults.

2.2.5.6   telephone set master station functions transmitted over a single wiring pair.

2.2.6   Station Control Cards:

2.2.6.1   each provide sixteen half-duplex intercom station ports which can be employed in adjacent pairs for full duplex devices.

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 11

2.2.6.2   provide an interface for intercom stations. Units to convert incoming audio signals to digital format and outgoing signals to analog format. Each channel to monitor the status of up to two (2) switches associated with each intercom station.

2.2.6.3   each card interfaces with 16 half-duplex channels. Each channel includes a separate audio power amplifier for non-blocking call operation and sixteen (16) independent software controlled volume settings.

2.2.6.4   all station audio, switch, and power functions on 400-Series and 401-Series cards to be transmitted over a single shielded pair cable with supervision to detect open circuit and short circuit faults.

2.2.6.5   audio and switch functions on 300 Series (Generic Intercom) station control cards to be transmitted on separate wiring pairs.

2.3   DIGITAL COMMUNICATION EXPANDERS (DCE's)

2.3.1   Digital Communication Expanders to provide master station and intercom features similar to the DCCs to facilitate exchange expansion.

2.3.2   Each DCE to include:

2.3.2.1   a Process Control Card (PCC) without exchange control or network functions.

2.3.2.2   Master Control Card (MCC) as required

2.3.2.3   one or two Station Control Cards (SCCs) as required

2.3.2.4   a 110 VAC, 60 Hz power supply for internal functions.

2.4   TALKBACK EXPANDERS (TBEs)

2.4.1   Talkback Expanders to provide 8 amplified paging outputs that can drive 25 or 70 Vrms loudspeaker circuits.

2.4.2   Each TBE is to;

2.4.2.1   provide 5 watts output per channel

2.4.2.2   allow adjacent channels to be bridged to obtain higher power.

2.4.2.3   provide talkback capability on all channels.

2.4.2.4   include Audio Level Alarm capability on all channels.

2.5   PAGE ZONE EXPANDERS (PZEs)

2.5.1   Page Zone Expanders to provide 3 page inputs (from an audio amplifier) with each input having 6 selectable relay controlled outputs

2.5.2   Each PZE input to include

2.5.2.1   1 relay controlled output for each input that can be used to key an audio amplifier.

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 12

2.6   ADMINISTRATOR SOFTWARE

2.6.1   Administrator Software to function on a standard PC to support system configuration, diagnostics, maintenance, and logging but not be required for system operation.

2.6.2   Administrator Software to employ Windows features including views of system tree structure, tables of devices, screens for system settings and adjustments, and tables of operational data.

2.6.3   Configuration features to include:

2.6.3.1   creation of overall system architecture.

2.6.3.2   creation of multiple device templates.

2.6.3.3   copy and paste functions with auto-numbering and auto-assignment to create device schedules.

2.6.3.4   configuration error detection and alerts.

2.6.3.5   device naming and call routing functions.

2.6.3.6   device setting and performance functions.

2.6.4   Diagnostic and Maintenance features to include:

2.6.4.1   verification of system configuration and installation.

2.6.4.2   verification of system networks.

2.6.4.3   verification of device connections.

2.6.4.4   verification of system operation.

2.6.4.5   diagnostics via modem or Ethernet ports.

2.6.5   Logging features to include:

2.6.5.1   display of system activity with filtering options.

2.6.5.2   search by time and date.

2.6.5.3   search by device.

2.6.5.4   search by parameter.

2.7   PANEL, WALL AND RACK MOUNTED INTERCOM MASTER STATIONS

2.7.1   Panel, wall, and rack mounted intercom master stations are to consist of master audio interface module, and optional handset and/or loudspeaker/microphone modules mounted on custom faceplates to suit location.

2.7.2   VoIP master audio interface module to consist of:

2.7.2.1   network and power supply interface, audio amplification and processing module, network and operating status LED's.

2.7.2.2   external microphone interface with phantom power capability.

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 13

	2.7.2.3	external loudspeaker interface.

2.7.2.4   telephone handset with press-to-talk switch interface.

2.7.2.5   headset jack interface.

2.7.2.6   external buzzer contact closure interface.

2.7.2.7   surface wall mount enclosure

2.7.3   Wall mounted loudspeaker/microphone module to consist of:

2.7.3.1   2½" diameter mylar cone loudspeaker with offset baffle, volume control, electret microphone, and PTT switch.

2.7.3.2   above optionally pre-mounted on an 11-gauge stainless steel 2-gang faceplate

2.7.4   Wall mounted handset module to consist of:

2.7.4.1   telephone handset cradle with internal magnetic hookswitch mounted on a 2-gang, 11-gauge, brushed stainless steel plate.

2.7.4.2   black coiled cord *(armored cable)* telephone handset with press-to-talk bar.

2.8   VoIP DESKTOP INTERCOM MASTER STATIONS

2.8.1   VoIP desktop intercom master stations shall consist of a display, keypads, internal speaker & microphone, telephone handset with hook switch, headset jack, and large visual alarm indicator.

2.8.2   The display shall provide a 128x64 pixel graphical (backlit) LCD capable of displaying a "title" row, three "data" rows, and two "menu" selection rows of two fields each.

2.8.3   Four context sensitive "soft" keys shall be provided next to the "menu" selection rows (two on each side) to facilitate menu selections.

2.8.4   Four "navigation" keys shall be provided below the display to assist in navigating the menu system and to facilitate adjustment of various system settings.

2.8.5   A standard 12-key telephone as well as dedicated "Release", "Mic Mute", "Speaker", "Volume Up", and "Volume Down" keys shall be provided.

2.8.6   Fourteen programmable "feature" keys, each with an LED indicator shall be provided.

2.8.7   The VoIP master station shall provide an ADA compatible telephone handset with coiled cord, terminated on an RJ9 connector.

2.8.8   The VoIP master station shall be fabricated from ruggedized plastics and provide a scratch and impact resistant window for the display. A two position stand shall also be provided.

2.8.9   Overall dimensions (excluding the stand): 8.5" x 8" x 2".

MicroComm DXL   **Integrated Intercom and**
A & E Specifications   **Communications System**
April 2018   **Page 14**

2.8.10   The network connection shall be a 10/100Mbps (RJ45 connector) Ethernet port with support for IEEE 802.3af inline power. A separate power connector shall also be provided in case an IEEE 802.3af compliant Ethernet switch is not available. The master station shall also provide support for the IEEE 802.1p/Q Quality of Service (QoS) standard.

2.9   ANALOG TOUCH SCREEN INTERCOM MASTER STATIONS

2.9.1   Desktop loudspeaker/microphone unit is to include compact, slim line bottom plate with stainless steel face, and rubber shock isolation mounting feet.

2.9.2   Unit to include a 12 inch, black, slim line electret gooseneck (flush mounted electret) microphone, front mounted loudspeaker, front mounted rotary volume control, and front access headphone jack.

2.9.3   Unit to include support for a privacy handset.

2.9.4   Unit to include a line level audio output of the speaker signal.

2.10   VoIP TOUCH SCREEN INTERCOM MASTER STATIONS

2.10.1   Desktop loudspeaker/microphone unit is to include compact, slim line bottom plate with stainless steel face, and rubber shock isolation mounting feet.

2.10.2   Unit to include a 12 inch, black, slim line electret gooseneck (flush mounted electret) microphone, front mounted loudspeaker, front mounted rotary volume control, and front access headphone jack.

2.10.3   Unit to include support for a privacy handset.

2.10.4   Unit to include a line level audio output of the speaker signal.

2.10.5   The network connection shall be a 10/100Mbps (RJ45 connector) Ethernet port with support for IEEE 802.3af inline power. A separate power connector shall also be provided in case an IEEE 802.3af compliant Ethernet switch is not available. The master station shall also provide support for the IEEE 802.1p/Q Quality of Service (QoS) standard.

2.10.6   Unit to include a 2-port 10/100Mbps Ethernet switch to facilitate the connection of a second Ethernet device.

2.11   ANALOG INTERCOM STATIONS

2.11.1   Intercom stations are to be designed for mounting on standard 2-gang (*3-gang*) outlet boxes. Faceplates to be constructed of 11-gauge brushed stainless. Internal steel offset grille to restrict inserting objects through speaker grille. Stations to be ruggedly constructed and resistant to damage from soil and sprays.

2.11.2   Each intercom station is to incorporate an internal loudspeaker, microphone preamplifier and function multiplexing circuitry. One (*two*) pushbutton(s) is (*are*) to be provided on each station. Pushbuttons to be software assignable for placement of call requests or control of auxiliary functions.

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 15

2.11.3 Pushbuttons to be vandal resistant and of stainless steel. Switch to have positive tactile action with 1 million-operation lifetime. *(Pushbuttons to be solid metal piezo-electric type with no moving parts and a 50 million operation lifetime).*

2.11.4 Loudspeakers to be waterproof mylar cone type.

2.11.5 All intercom station functions to be transmitted over a single shielded pair cable. Stations to be provided with MTA type insulation displacement connector that requires no wire stripping for installation.

2.11.6 Intercom station shall provide support for wiring supervision of both open and short circuit conditions.

2.11.7 Outdoor intercom stations are to be identical in all respects to standard intercom stations except that all metal plates and hardware to be stainless steel, and internal circuitry and components to be conformally coated.

2.12 VoIP INTERCOM STATIONS

2.12.1 VoIP Intercom stations are to be designed for mounting on standard 2-gang (*3-gang*) outlet boxes. Faceplates to be constructed of 11-gauge brushed stainless. Internal steel offset grille to restrict inserting objects through speaker grille. Stations to be ruggedly constructed and resistant to damage from soil and sprays.

2.12.2 Each intercom station is to incorporate an internal loudspeaker, microphone preamplifier, and network interface circuitry. One (*two*) pushbutton(s) is (*are*) to be

2.12.3 components to be conformally coated.

2.13 HANDSET INTERCOM STATIONS

2.13.1 Handset intercom stations are to be designed for mounting on standard outlet boxes. Faceplates are to be constructed of 11 gauge brushed stainless. Handset cradle to include internal hook switch. Handset to be hearing aid compatible with armored cable. Stations to be ruggedly constructed and resistant to damage from soil and sprays.

2.13.2 Handset only stations are to be designed for mounting on two-gang outlet boxes.

2.13.3 Four-gang handset intercom stations to also incorporate an internal loudspeaker/microphone with an internal offset grille, and one (*two*) pushbutton(s) to be provided on each station. Pushbuttons to be software assignable for placement of call requests, etc.

2.13.4 Pushbuttons to be single piece stainless steel construction and are backstopped to prevent excessive travel. Switch to have positive tactile action with 1 million operation lifetime

2.13.5 Loudspeakers to be waterproof mylar cone type.

2.13.6 All handset intercom station functions to be transmitted over two shielded pair cables. Stations to be provided with MTA type insulation displacement connectors that require no wire stripping for installation.

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 16

2.14   CALL OPERATING DEVICES

2.14.1   Call operating devices to be pushbutton (call cord) switch actuators that are software assignable to call request, call cancellation, acknowledge, event initiation or other similar system function.

2.14.2   Units to be constructed with single gang 11 gauge brushed stainless steel faceplate suitable for mounting on standard single gang outlet box.

2.14.3   Pushbuttons to be vandal resistant and constructed of stainless steel. (Call cord to be 6' long pushbutton type with molded connectors).

2.15   INTERCOM STATION BOARDS

2.15.1   Intercom station boards are to be used to interface generic intercom stations and loudspeakers to system station audio boards for two-way voice communication or audio monitoring.

2.15.2   Units are to include microphone preamplifier, line supervision electronics, multiplexing electronics, and loudspeaker transformer.

2.15.3   Units are to include pigtail and switch options as required for each location.

2.16   PAGING AMPLIFIERS

2.16.1   Provide paging amplifiers and zone switching as required to perform the functions described herein and indicated on the drawings.

2.16.2   Paging amplifiers to be the constant voltage output type with power output capacities to drive the loudspeakers connected at sufficient levels with no more than 90% amplifier loading.

2.17   LOUDSPEAKERS

2.17.1   Loudspeakers to be nominal 8" diameter dual cone type units. Loudspeakers to incorporate 6-ounce permanent magnet and include a 5-watt multi tap transformer for use on 25-volt and 70-volt constant voltage type distribution systems.

2.17.2   Each loudspeaker to be provided with a standard (*security*) baffle plate and flush (*surface*) mounted enclosure. Baffle and enclosure to be all metal construction and finished in polar white baked on enamel.

2.18   HORN LOUDSPEAKERS

2.18.1   Horn loudspeakers to be weatherproof compression driver units with integral screwdriver adjustable multi-tap transformer for use on both 25-volt and 70-volt constant voltage distribution systems. Integral mounting plate suitable for mounting on a standard outlet box is to include a swivel type alignment bracket.

2.18.2   Units are to be rated to handle 15 watts input power. Nominal sensitivity 110 dB SPL at 3 feet with 1 watt input.

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 17

2.19   WIRE AND CABLE

2.19.1   Factory manufactured field interface cables to be provided, as required, for all:

2.19.1.1   CBL-MST-AA male DB-15 connector with 6 individually shielded twisted pairs for connecting to master station ports.

2.19.1.2   CBL-STN-AA-BC with male DB-37 connectors at both ends and with 16 individually shielded twisted pairs for connecting from station control card audio ports to QCB-120-1 Quick Connect Board, or a male DB-37 connector at one end with 16 individually shielded twisted pairs for connecting from station control card audio port to terminal blocks.

2.19.1.3   CBL-SWT-AA-BC male DB-25 connector at one end and male DB-37 connector at the other end for connecting from SCC- 300 station control card switch port to QCB-120-2 Quick Connect Board, or a male DB-25 connector for connecting from SCC- 300 station control card and 16 individually unshielded twisted pairs for connecting to a terminal block.

2.19.2   Field wiring to conform to manufacturer's recommendations.

2.20   QUICK CONNECT BOARDS

2.20.1   Quick Connect Boards are designed with a female DB connector to connect a cable from the station control card ports to screw clamp terminals that terminate the field wiring.

2.20.1.1   QCB-120-1 connects the audio port of either the SCC-300 or SCC-400/401 station control card to the field wiring.

2.20.1.2   QCB-120-2 connects the switch ports of an SCC-300 station control card to the field wiring.

2.20.1.3   QCB-120-5 is a 16-channel QCB that interfaces the output from a SCC-300 station control card to 45 ohm speakers.

2.20.1.4   QCB-120-6 is a 16 channel QCB, used in conjunction with up to four quick connect adapters QCA-120, converts the audio output from a SCC-300 or SCC-400/401 station control card to a line-level output or converts a line-level input to a audio levels compatible with SCC-300 or SCC-400/401 station control cards. Individual channels can be set to act as line-level inputs or line-level outputs.

2.21   STATION PORT ADAPTER

2.21.1   Station Port Adapter (SPA-120-0) provides a line-level output for use with external paging amplifiers.

2.21.1.1   Provides a single line-level output.

2.21.1.2   Provides a single control output (when connected to a 400 or 401 series station card audio port).

2.21.1.3   Screw terminal connections.

2.21.2   Station Port Adapter (SPA-120-1) provides a line-level input for use with external line level audio sources.

2.21.2.1   Provides a single line-level input.

2.21.2.2   Screw terminal connections.

2.22   STATION PAGING MICROPHONE

2.22.1   Stand alone paging microphone with press to talk switch that can be used for paging

2.22.1.1   High quality handheld electret microphone with push to talk switch

2.22.1.2   Durable, stretchable microphone cord that can extend up to 6 feet.

2.23   DISCRETE INPUT/OUTPUT

2.23.1   Controller module provides 18 open drain outputs and 18 discrete inputs that can be software configured for either supervised or non-supervised operation.

2.23.1.1   Control and monitoring of the discrete inputs and outputs provided through an Ethernet connection.

2.23.1.2   Expander units provide 24 open drain outputs and 24 discrete inputs that can be software configured for either supervised or non-supervised operation.

2.23.1.3   Up to three expander units can be daisy chained to a controller module.

3.   EXECUTION

3.1   GENERAL INSTALLATION PROVISIONS

3.1.1   Inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in and acceptable manner.

3.1.2   Verify the accuracy of all dimensions, allowances, and clearances on site prior to commencing with any work that may be affected by those dimensions, allowances, and clearances.

3.1.3   Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract Documents.

3.1.4   Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

3.1.5   Supervise construction activities to ensure that no part of the Work, completed or in progress is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 19

3.1.6 Precautions shall be taken to guard against electrostatic and electromagnetic susceptibility and interference.

3.1.7 Provide adequate ventilation for all heat radiating equipment.

3.1.8 Install equipment so as to provide maximum safety to the operating and maintenance personnel.

3.2 METHOD OF WORK

3.2.1 Work to be performed by fully competent technicians in a thorough manner.

3.2.2 All workmanship to be of the highest quality and meet recognized standards of craftsmanship.

3.2.3 Areas of installation deemed not acceptable by the Owner to be redone at the Contractor's expense.

3.3 PROTECTION OF EXISTING PROPERTY

3.3.1 Be responsible for protecting all existing property including floors, walls, ceilings, furniture, and furnishings from damage, dust and other construction related activities. Provide all necessary dust covers and protective pads required for performance of the Work.

3.3.2 Remove all debris and protective coverings at the end of each work period. Leave premises in condition found at start of work in each room or area of work.

3.3.3 Except for scheduled activities, do not inconvenience user due to construction operations.

3.4 INSTALLATION

3.4.1 Provide complete integrated intercom and communications system as indicated on the drawings and specified herein.

3.4.2 All material furnished shall be new and conform to the applicable requirements of the Underwriters Laboratories and the National Standards Institute.

3.4.3 Unless otherwise noted, all wiring is to be installed in conduit or wireways.

3.4.4 If more or larger conduit is required than exists or is indicated on the drawings, allow for such additional conduit in contract price.

3.4.5 All system equipment to be contained within equipment racks, cabinets, or closets. If more or larger racks or cabinets are required than exist or are indicated on the drawings, allow for such additional equipment racks and cabinets in contract price.

3.4.6 All system equipment and field devices to be held securely in place. Fastenings and supports shall be selected to provide a safety factor of three.

3.4.7 All system equipment equipped with plug in power connectors to be connected to a dedicated receptacle. Do not use tap connectors for plugging in multiple plugs into a single receptacle.

MicroComm DXL
A & E Specifications
April 2018

Integrated Intercom and
Communications System
Page 20

3.4.8   All cable within equipment racks, cupboards, and cabinets, or on backboards, to be neatly bundled and secured.

3.4.9   Wires shall not be nicked, have strands removed, or have frayed strands when removing insulation or terminating.

3.4.10   Factory manufactured interface cables to be provided for each field interface board. Terminal blocks to be provided in cabinet or on backboard for factory cable interface to field wiring.

3.4.11   Wiring shall be executed in strict adherence to standard broadcast practices.

3.4.12   Color identification of wiring:

   3.4.12.1   Identify wiring by continuous insulation color.

   3.4.12.2   Where multi-conductor cables are used, use the same color-coding system for identification of wiring throughout.

3.4.13   Maintain uniform phasing and color-coding throughout system.

3.4.14   Name identification of wiring:

   3.4.14.1   Identify wiring at all equipment locations, pull boxes, junction boxes and outlet boxes.

   3.4.14.2   Develop a uniform identification scheme for use throughout the system.

   3.4.14.3   Record wire name identification on all applicable drawings and provide wiring tables within the operating and installation manuals.

3.4.15   Use one of the following marking materials:

   3.4.15.1   heat shrink sleeves.

   3.4.15.2   clear plastic tape wrap-on strips with designated labeling section.

   3.4.15.3   slip-on identification bead markers or sleeves.

3.5   TESTING, ADJUSTING, AND BALANCING

3.5.1   Except where otherwise specified, arrange and pay for testing, adjusting and balancing of system.

3.5.2   If test results do not conform to applicable requirements, repair, replace, adjust, or balance equipment and systems. Repeat testing as necessary until acceptable results are achieved.

3.5.3   Log and tabulate test results on appropriate test report forms and as specified.

3.5.4   Submit forms to Owner prior to use.

3.5.5   Submit copy of completed test report forms to Owner immediately after tests are performed.

3.5.6   Insert a copy of completed test report forms in each copy of the operating and maintenance manuals.

3.5.7   Testing, adjusting, and balancing to verify the full and proper operation of each system component and integrated function.

3.6　　**DEMONSTRATION AND TRAINING**

3.6.1　　Provide demonstration and instruction sessions to familiarize Owner's operation and maintenance personnel with systems and their operation and maintenance.

3.6.2　　Establish agendas for demonstration and instruction sessions in conjunction with the Owner. Coordinate scheduling of sessions with the Owner.

3.6.3　　Provide _____ X-hour seminars to demonstrate operation of the systems.

3.6.4　　Provide _____ X-hour technical seminars to demonstrate configuration, troubleshooting, repair and maintenance of the system.