



## BULLETIN 5

### 1. INTRODUCTION

Bulletins are issued as supplemental directions as necessary between complete Design Guideline revisions. Revisions made by bulletin will be incorporated into the next revised issue of the Guidelines.

### 2. DIRECTIONS

Bulletin 5 is issued to revise the Intercom requirements as outlined in Section 27 of the Design Guidelines. This revision takes effect immediately for all projects.

Items deleted by this revision are struck through, ~~ITEM~~ and new items will be underlined, ITEM. A new Guideline issue will remove struck through items and remove underlines from the previous issue. The new issue will then follow the strike through, underline process listed above.

### 3. ATTACHMENT(S)

Section 27 50 00

Section 27 50 00

DISTRIBUTED COMMUNICATIONS AND MONITORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Provisions of a Contract, including conditions of the Contract and Division 1 of the Specifications, shall apply to the Work in this Section.
- B. Drawings and general provisions of the Contract, including all portions of the Project Manual are hereby made a part of this Section. Refer to paragraph titled "Quality Assurance" in this section and to Division 1 for requirements for Communications Subcontractors. Throughout this and related Sections, "Subcontractor" shall not be limited to the singular and masculine and shall refer to one, or more than one, Communications Subcontractor. The Terms "Communications Subcontractor" and "Communications System Integrator " shall be used interchangeably and shall be understood to represent the bidder responsible for all work of this identified in this SECTION.

1.2 SUMMARY

- A. Work Included. The scope of work of this Section consists of the designing, installation, and programming of all materials to be furnished under this SECTION, and without limiting the generality thereof, consists of providing all labor, materials, equipment, plant, transportation, appurtenances and services necessary and/or incidental to properly complete all work as shown on the drawings, as described in the specifications, or as reasonable inferred from either or, in the opinion of the Architect and Owner, as being required and in general, is as follows:
  - 1. Public Address System, including but not limited to:
    - a. Public address system amplifiers, zone controls, back boxes, cabling/support, and all other equipment required.
    - b. Public Address System Speakers, ceiling mounted, wall flush horn, mounted both interior and exterior.
    - c. Cabling to support the Public Address System (NOTE: 18/2 shielded pair cabling should be used for hallways and 22/4 shielded pair cabling should be used for class rooms. The use of Cat 5/6 cabling is only permissible when transitioning from MDF to IDF.)
    - d. Equipment rack or cabinet
    - e. Volume attenuators where shown on the drawings to adjust the PA speaker sound level.
    - f. Master Clock System as an integral part of the Intercom head end with a minimum of 16 programmable bell schedules, each having a minimum of 1536 programmable events, clocks and cabling. Elapsed time indicator control panels where shown on the drawings. (NOTE: There should be no secondary clocks integrated into the system)
    - g. PA override signal to local sound systems (Gym, Student Dining, Lecture Hall, Auditorium and PE Alternatives/Fitness Center and Multi-Purpose Building. Coordinate with 27 40 00 contractor.)

- B. Actual control room and rack layouts will be based upon the specific designs submitted by the contractors. Needs for equipment, specific speakers, etc. will be dependent on actual product manufacturers. Contractors shall coordinate room layout, actual speaker and equipment placement and programming options with owner prior to installation.

### 1.3 SECTION INCLUDES

- A. Central processor assembly
- B. Administrative consoles (at locations on the drawings; i.e. Admin Phone Console)
- C. Bell/Class change signaling system.
- D. Public Address/intercom System
- E. Controls, Amplifiers, and Terminal Equipment
- F. Power Supplies
- G. Battery Backup for System Programming
- H. Program Distribution System.
- I. Master Clock System
- J. Telephone controlled intercom system
- K. Programmable, individual control of inputs and outputs
- L. Ceiling/Wall Mounted loudspeaker assemblies
- M. Surface and flush clocks and clock and loudspeaker baffles
- N. Accessories
- O. Wiring
- P. Interior and Exterior Enclosed Horn Type PA Speakers
- Q. Speaker volume attenuators where shown on the drawings.

### 1.4 RELATED SECTIONS

- A. Field Painting: DIVISION "FINISHES"
- B. Electrical: DIVISION 26 00 00
- C. All Communication Sections, 27 and 28.

### 1.5 SUBMITTALS

- A. Submit the following under provisions of Section 01 33 00- SUBMITTAL PROCEDURES:
- B. Product Literature: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions for each item furnished hereunder. Ensure submittal is

tabulated with index referencing the specification sections. Non tabulated and indexed submittal shall be returned without action.

- C. Alternate systems being submitted for this bid shall provide a tabulation specification clearly comparing the submitted item with the specified item, being able to refer to all written expressed functions and capabilities. Specification sheets shall be submitted on all items including cable types. See section 1.12 for more details.
- D. Shop drawings, detailing the communications network system including, but not limited to, the following:
  - E. Built-in station arrangement.
  - F. Equipment cabinet arrangement
  - G. Wiring diagrams, detailing wiring for power, signal, and control, differentiating clearly between manufacturer installed wiring and field installed wiring. Identify terminals to facilitate installation, operation and maintenance.
  - H. Submit wiring diagrams showing typical connections for all equipment.
  - I. Provide a riser diagram for the system showing in technically accurate detail all connections, interconnections, and all provisions available and made for adaptability of all specified future functions and including all calculations, charts, and test data necessary to demonstrate that all systems and system components deliver the specified signals, grades, and levels at all required points and locations.
  - J. Submit a valid certificate from the manufacturer indicating the distributed communications network system bidder is an authorized distributor for the system (or systems) being submitted.
  - K. Submit a valid certificate of completion of installation and service training from the communications network system (or systems) manufacturer by a present employee of the systems integrator/contractor.
  - L. As-built drawings: 3 sets. They should include up-to-date drawings that include any changes made to the system during installation. Circuit diagrams and other information necessary for the proper operation and maintenance of the system shall be included. Drawings must be provided on CD in AutoCAD 2000 format.
  - M. All material and/or equipment necessary for the proper operation of the system, even though not specifically mentioned in the contract documents, shall be deemed part of this contract.

#### 1.6 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Section for "Closeout Submittals".
- B. Include operator instructions for each required mode of operation, routine troubleshooting procedures, manufacturer's operation and maintenance manual for each item of equipment and accessory, and routine cleaning methods and materials.

#### 1.7 DELIVERY, STORAGE AND HANDLING:

- A. Deliver products in factory containers. Store in clean, dry space in original containers. Protect products from fumes and construction traffic. Handle carefully to avoid damage.

## 1.8 QUALITY ASSURANCE

- A. To establish continuity in manufacturer, systems components shall be the standard product of one manufacturer when available. The combining of multiple manufacturer components in order to meet the complete functionality as described in these specification and includes the internal communication, calendar clock messaging, graphical user interface and multiple system interface is acceptable. Further, an effort shall be made to establish common sources for equipment of all systems. The manufacturer shall have a minimum of ten (10) years experience in the manufacture of products specified in this Section.
- B. The work to be provided under this Section consists of furnishing and installing all equipment, cabling, and labor required for complete, operable, new intercommunications systems. These systems shall be referred to as the Intercom System and their supplier as the CONTRACTOR.
- C. All empty conduit and power required for the electronic systems shall be supplied by the electrical contractor as a complete raceway system.
- D. The contractor must be a factory-authorized representative or distributor of all equipment used in the electronic systems. Further, this contractor must have a minimum of five years of experience in the specific application of the equipment proposed for these systems. Provide a letter signed by an officer of the manufacturer attesting to the contractor's direct affiliation with the manufacturer.

## 1.9 REGULATORY REQUIREMENTS

- A. The entire installation shall comply with all applicable and safety codes. All central equipment and additional applicable equipment shall be listed by Underwriters' Laboratories, per US requirements. Note: Furnish an original, dated specimen of the test agency's listing card with the submittal.
- B. All equipment with digital apparatus (microprocessors) that generate and use timing signals at a rate in excess of 9,000 pulses per second to compute and operate must be Federal Communications Commission (FCC) and DOC CSA standards C108.8 (Electromagnetic Emissions) compliant. Any non-compliant equipment supplied or installed shall not be accepted and shall nullify the contract. Note: Provide documents supporting and verifying compliance.
- C. Systems shall be considered non-compliant unless they completely meet the criteria as outlined in this section. All supporting documentation shall be included as part of the initial submittal package. Letters regarding "future approval" or "approval pending" shall not be considered.

## 1.10 MAINTENANCE SERVICE

- A. The bidder supplying the equipment shall show satisfactory evidence that they maintain a fully equipped service organization capable of furnishing adequate inspection and service to the system, including replacement parts. The bidder shall be prepared to offer a service contract for the maintenance of the system after the guarantee period. The bidder shall produce evidence that they have had a fully experienced and established service organization for at least five years and proven satisfactory installations during that time.
- B. Furnish service, maintenance, and labor of communications systems for three 3 years from Date of Substantial Completion.

## 1.11 MANUFACTURERS

- 1. Telecor- T2/XL System
- 2. Any other manufacturer actively engaged in the manufacturing of systems specifically designed for K-12 internal communication and done so for a period of no less than 10 years will be considered and deemed an equal to these specifications only after systems have been installed.

Any system not meeting owners satisfaction as it relates to the provision of all functionalities as described in this specification will be removed and replaced with acceptable system at the cost of the contractor.

## 1.12 SUBSTITUTION

Any system seeking prior approval must submit the following a minimum of 10days prior to bid for approval:

1. Data sheets on all components of the system. The data sheet must be highlighted clearly indicating where it performs with the performance specified in the specification for that item.
2. Complete shop drawings showing device locations and cable counts and routing
3. Riser diagram providing detailed circuits with number of speakers on each circuit. Zoning shall also be indicated on the riser drawings
4. A list of at least 5 projects with similar scope with references. Projects should date back a minimum of 5 years.
5. If approved the installing contractor will need to demonstrate all of the features and functions outlined in the specification at the final testing of the system.

Approval can only be granted in an official addendum to the bid documents. Verbal agreements are not acceptable.

## PART 2- PRODUCTS

### 2.1 PUBLIC ADDRESS SYSTEM

Performance specification based upon telecor T2/XL systems, other system must meet the minimum criteria specified herein to be considered as equal.

- A. The Public Address System shall consist of the Central Control Unit, Administrative Consoles, rack equipment and all other necessary devices that are required to create a complete and operational system such as Speakers, Horns, Amplifiers, and Visual Message Devices, etc. All Public Address main equipment including card cages and all cards, power amplifiers, program sources, etc., shall be rack mounted in the MDF room. All system programming of Public Address and Master Clock features shall be accomplished by an Administrative Console located in the Main Office area. The browser based programming tool shall be separate from graphical user interface and shall not be accepted as a substitution of graphical user interface. It shall not be necessary to attend to the main equipment in the Head End for normal day-to-day operation of the system. The system shall be a 25-Volt two-way paging system providing paging zones as indicated and determined by the Owner. The system shall be of modular design utilizing plug-in circuit cards to enable quick on-site replacement or addition of components for system expansion and modification. The system head end equipment shall be rack-mounted in the MDF where shown on the drawings with side panels and stationary platform base. Provide shelves, doors, blank panels, AC power distribution, etc. as required to support all equipment and fill empty rack space. System shall be comprised of all solid-state electronics, utilizing a microprocessor-based central processor unit, power supplies, audio interface cards, control cards, input/output cards, telephone interface cards, transformers, paging amplifiers, etc., as required for a complete system. The interface must comply with loop-start central office (CO) trunk standards in North America as defined by Bellcore and/or industry-standard 2500 analog station ports.
- B. The main system shall include a Telecor T2/XL head-end and all associated system components to provide:

1. Direct dialing, two-way “amplified voice” communications between all locations equipped with Control Console, Visual Console and/or telephone system handset, and all locations equipped with a public address system speaker; excluding corridor speakers.
2. An Administrative Control Console (located at all symbols) for facilitating all Public Address System announcements and programming, to include but not be limited to: Emergency all-call; paging zone and number assignments; call-in priority levels with tone characteristics; Master Clock event and tone signaling; monitor and reporting on call-in line faults; and manually distribute unique tones to all zones and speakers in the system.
3. User-programmable zone paging to all classroom and office speakers using microphone, Control Console, Visual Console or telephone. Public address zones shall be software programmable to include 1- and 2-digit numbers. Zone paging shall be independent of time and program zones and shall provide easy access to groups of zones or all-zone pages.
4. Distribution of general announcements over School loudspeakers using a microphone or telephone handset, on an All-Call basis, pre-selected zone basis, or multiple-zone basis to any paging zone. Speaker assignments to any zones shall be programmable from the Web Editor.
5. Distribution of emergency paging announcements over school loudspeakers using a microphone or telephone handset. Emergency announcements shall have the highest priority over all other system functions, including the Local Audio Systems. Emergency announcements shall automatically disconnect and override all Local Audio Systems. Provide programming source to override local audio systems in Auditorium, Cafe, Fitness Center, Multi-Purpose Building, Lecture Hall and Gym. Coordinate with 27 40 00 contractor.
  6. Microphone shall transmit to all rooms or specific speaker zones as programmed in the system software.
  7. The capability of multiple open-voice intercom paths. Intercom paths shall be global.
8. Automatic gain-control of intercom speech to assure constant speech level.
9. Automatic sounding of a warning tone over any loudspeaker selected for two-way communications to alert the classroom teacher to an incoming announcement.
10. A minimum of two channels for intercom communications or audio program distribution. The System shall be user-programmable to allocate, upon demand, either of the two channels for intercom or audio program.
11. The ability to monitor the school building either on or off the premises from a single telephone.
12. Inputs shall be provided for five (5) low-impedance microphones, tuner, tape player and auxiliary source. Program material shall include audio programs from standard AM/FM tuner, tape deck, CD player, or auxiliary source. Coordinate location of antenna(e) with architect. Locate and install for optimal performance.
13. Audio Source equipment shall have the ability to be located remotely from the main system control electronics, and shall have the ability to distribute two channels of audio simultaneously if so desired. School shall be equipped with (1) rack-mounted AM/FM tuner and (1) rack-mounted CD player.

14. The ability to interface to the power supplies of door strikes provided by others, to allow remote control of door strike through the paging system.
  15. Time Signal tones of an integrated Master Clock System to be distributed throughout zone(s) selected for time signaling over programmed loudspeakers on a manual or automatic basis.
  16. Power amplifiers that provide a minimum power capacity of 2 watts per cone speaker location and Door Signaling device plus 15 watts of power per horn type speaker locations.
  17. Cabling that is specified by the manufacturer, which provides shielding of conductors so that the Public Address System does not interfere with the Telephone Systems and Telephone System cabling.
  18. Pre-announce tones will alert the listeners of incoming calls with distinct tones for each priority level. To prevent unauthorized monitoring, the tone will sound whenever an area is being monitored, and will repeat at regular intervals. Facilities shall also be provided to defeat the tone repeat function from the administrative console if it is not desired.
  19. Emergency and All Call paging and a minimum of 32 zones of group paging. The paging zones shall be independent of the time tone and audio program distribution zones and a minimum of 8 clock messaging zones and 5 microphone zones. Systems sharing zones for both paging and tone shall not be acceptable.
- C. The system shall be capable of monitoring 32 different sections of the building, either on the premises from a control console, or off premises from a telephone instrument.
  - D. Distribution of paging announcements can be made from any administrative control console, visual console, telephone, or dedicated microphone set-up.
  - E. Emergency announcements shall have the highest priority over any other system function and seize all system loudspeakers regardless of their current mode of operation.
  - F. System shall support general announcements made from a conventional microphone to facilitate reading a script and the participation of multiple announcers. Keying the microphone shall automatically mute all other audio programs at a lower priority in the system and transmit the microphone audio to all buildings or specific speaker zones, as programmed into the system software.
  - G. System will provide Emergency and All Call Paging and a minimum of 32 zones of group paging. The paging zones shall be independent of the tone signal and audio program distribution zones.
  - H. Pre-announce tones will alert zones of incoming pages with distinct tones for each priority level.
  - I. The system must have the capability of distributing audio program sources from any administrative telephone or authorized building telephone. Program distribution shall be accomplished on an all zone, selected zone, or individual zone basis.
  - J. The system shall support the automatic distribution of tone and up to 63 character text signals to all selected areas.
  - K. The system shall support a minimum of 1536 events and 16 schedules. Building zones shall be used to select which areas receive the tone. They must be totally independent from page zones and program zones and clock messaging zones.



- L. The duration of the tone, as well as frequency, burst length and output level shall be software programmable from a web browser.
- M. All system tones shall be user-programmable for the following durations in seconds: 2, 3.5, 5,6,8,10,12.
- N. The system shall be capable of an open-voice intercom path used for monitoring, emergency paging, and intercom.
- O. Corridor speakers, and outside horns in each building shall be combined into groups of owner's preference. There must be 32 independent software paging zones that each circuit may be a part of. Each individual circuit must also have the ability to be paged independent of the software zones.
- P. Station wiring shall be connected to the system using insulation displacement connectors to allow quick disconnection of field cables from the System terminal boards.
- Q. All user-programmable data shall be stored in a non-volatile FLASH memory to prevent memory loss during a power failure. Systems that use EEPROM chips for system memory will not be accepted. The CPU must have dual partitioned FLASH memory capable of storing the CURRENT Firmware and allowing for any and all updates to be loaded onto the NEW side of the FLASH memory so as not to lose CURRENT Firmware in the case of a power outage or other situation that may happen during a system Firmware update. The system must also be capable of a system restore to the CURRENT firmware in the case of an incomplete or failed firmware update. The system time clock shall be capable of maintaining correct time for a period of 14 days in the event of a power failure. It shall be possible to return the system programming to the original factory default setting by keying a special code from the Console.
- R. The user shall have the capability to change system programming for all paging functions, bell functions, and clock functions. The Owner shall be provided with the required training, documentation, and software to accomplish these functions.
- S. The user-interface shall support user names and passwords. There shall be multiple levels of access allowed. Some users may have view privileges only while others may edit their site. All editing shall be by means of the Web Editor or programming software. This user-interface must also contain a "one button remove" feature to be able to delete users out of the system with one click of this button on the interface.
- T. The program shall also serve as part of the documentation process. Page Zones and bell schedules shall support user-definable names and display as pick lists when editing the configuration.
- U. Diagnostic functions shall be accomplished through any PC connected to the school network and provided with the proper authorization and diagnostic software. Any off-site PC shall have access to the system for diagnostics through the use of the public internet, provided that they have been granted proper authorization and have been provided diagnostic software.
- V. Although the system is programmed through a PC interface, the system shall not have to rely upon a personal computer for day-to-day operation. All programming information shall be loaded into the XL system allowing independent operation of the system.
- W. Provide a -1dB balanced audio line-level output from the public address system to each local sound system and provide equipment as required for emergency pages to over-ride the local sound systems. Coordinate with the owner prior to installation during paging zone identification.

- X. The final copy of the program and the configuration of data files shall be provided to the school in electronic format.
- Y. Provide Microphone for general announcements; unit shall be a hand-held microphone device with a table stand. Contractor shall use XLR type connectors manufacturer recommended cabling or approved equal between the front office location and the Public Address microphone interfaces. Locate microphone and cabling at one of the three A3 faceplates, coordinate location with Owner. Use open ports for VES cabling in A3 faceplate and terminate XLR connector to cable, not faceplate.
- Z. Unspecified Equipment and Material. Any item of equipment or material not specifically addressed on the Drawings or in this Document and required to provide a complete and functional installation shall be provided in a level of quality consistent with other specified items.
- AA. CALL BUTTONS- The system must be capable of utilizing supervised normal and emergency call buttons in all locations shown on the drawings. The system must be capable of displaying shorts or opens on call switch circuits. The trouble indication shall display on the administrative console, be capable of being silenced and annunciate again in 24 hours if problem has not been fixed. This trouble should not be able to be cleared until the wiring issue has been fixed.
- BB. LOUDSPEAKERS, BAFFLES, AND BACKBOXES
  - 1. Speaker/Baffles: Provide backboxes to electrical subcontractor for installation.
    - a. As indicated on plans (SP), provide a ceiling mounted round speaker and baffle assembly. The baffle shall be 12-7/8" in diameter and 3/8" deep. The circular design shall match the room ceiling tiles.
    - b. Baffle shall be constructed of 22 gauge, cold rolled steel, coated with a baked on white powered epoxy that is resistant to scratches.
    - c. Holes in the baffle shall allowing mounting to speaker backbox.
    - d. Room speakers must allow hands free talk back when room is paged.
    - e. Speakers must meet the following:
      - 1. Type: Flush mounted 8" cone
      - 2. Frequency Response: 50 to 18,000 Cycles
      - 3. Magnet: 6 oz.
      - 4. Axial Sensitivity 95 dB at 4 ft. with 1-watt input
      - 5. Quam System 12
  - 2. Provide Volume attenuators where shown on the drawings (A symbol in a circle) to adjust the volume of the local PA speaker.
  - 3. Horn Speakers: Indoor/Outdoor (External Building PA Speakers (as shown on technology drawings ES (recessed, enclosed), Internal PA Speakers for the Gymnasiums (as shown on technology drawings FS, recessed with protective enclosures)
    - a. Double re-entrant type: flush mount installation.
    - b. Frequency Response: 600 to 14,000 Hz.
    - c. Power Handling: 15 Watts RMS, 30 Watts Peak.
    - d. Variable screw taps, 25 V transformer
    - e. Sound Pressure Level: 110 dB at 1 meter with 1-watt input
    - f. Color: Coordinate with Architect.
    - g. Atlas/Soundolier APF-15T Horn Speaker with 193-8-6 backbox (9-5/8" Sq X 6" Deep) and VP-161APF Speaker Baffle or equal.

CC. ADMINISTRATIVE PHONE- MCC-300

Administrative phones shall be installed in all locations indicated on the drawings. The administrative phone shall be wired with a single Cat 5 cable and be hot swappable. The administrative phone must have alphanumeric display built in. Administrative phones with optional mounted displays are not acceptable. The system must be able to have a capacity of 32 total administrative phones as a minimum. You must be able to be able to perform programming of the system from the administrative phone without a computer when required.

DD. INTERFACE WITH REMOTE SPEAKER SYSTEMS

1. The system will interface and override local use of remote audio systems in the following locations:
  - a. Student Dining
  - b. Gymnasium
  - c. Auditorium Control Room
  - d. PE Alternatives/Fitness Center
  - e. Lecture Hall
  - f. Multi-Purpose Building

2.2 MASTER CLOCK AND SECONDARY CLOCK SYSTEM

- A. The system shall provide "State of the Art" Technology for Master Clock and Secondary Clocks, so that they form an integrated system together and with the Public Address System. Time programming shall be accomplished by way of a microprocessor-based and user-programmable master control system. The system shall be easy to learn and operate. All standard system programming shall be user-friendly to allow the system administrator the ability to easily reprogram system features. Features offered by this system shall be implemented and controlled by software programs that can be changed and expanded as customer needs evolve. The Master Clock shall use an integrated master controller capable of operating and correcting both digital and analog secondary clocks as well as controlling class change signals to all speakers. The Master Clock systems shall provide the required signals to assure synchronization of all Secondary Clocks. The Master Clock System shall be by Telecor, Inc. or equal.
- B. Master Clock System shall provide the ability to:
  1. Provide automatic distribution of user-programmable time signals controlled from an integrated, 24-schedule, 1536-event time clock. Time signal programming for 16 of the 24 schedules shall be available from the Web Editor. Eight (8) of the 24 shall be available at the Control Console.
  2. Provide for program override to support manual distribution of class change time signals to all areas, or select groups of speakers from the control console.
  3. Transmit class change tones to selected areas of the school. Duration of the tone, as well as frequency and burst length and output level shall be software-programmable from the Control Console with 500 different combinations possible. User-programmable time signals shall be available to any of 32 time zones independent from paging and program zones.
  4. Incorporate a built-in calendar with the capability to program in all holidays, and provide for automatic clock correction for Daylight Saving Time and Leap Year changes.
  5. The unit will further permit programming, diagnostic, and activity logging through connection to an external computer (server).

6. Provide a 10-year battery back-up real time clock.
7. Battery back-up shall be provided to the Public Address/Intercom/Clock System, ensuring correct timekeeping of the Master Clock System during power failures. Once power is restored, the Master Clock shall instantaneously update all clocks with the correct time.
8. The Master Clock shall be capable of correcting analog secondary Clocks without the need for special hardware.
9. The ability to connect through the facilities Ethernet Network to obtain time synchronization from a Time Server.
10. The system shall have the capability of providing alpha-messaging as part of the time/tone schedules. The integrated Master Clock shall provide sixteen (30) user-programmable messages which may be activated as a part of the time/tone schedules, external relay, remotely located buttons, through the front panel of the unit or the GUI. Messages displayed in the classrooms shall not interrupt the display of time at any time.

### PART 3—EXECUTION

#### 3.1. EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Verify that required utilities are available, in proper location, and ready for use.
- C. Beginning of installation means installer accepts conditions.

#### 3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions. The contractor shall have equipment installed on the AC voltage supply, taking care to arrest damaging electrical transients and spikes that can cause damage to the microprocessor components of the system.
- B. Install digital clocks as specified on the drawings and elevations. Where conflict occurs, notify the architect.
- C. Install classroom and hallway loudspeakers into the suspended ceiling tiles.
- D. Install and wire system in accordance with manufacturer's approved drawings and diagrams.
- E. Mount clock power supplies in IDF locations, and service via cable tray to classroom location.
- F. Provide floor plan layouts for internal communication system GUI program utilizing owner provided image files of building floor plans. Tag and label all rooms and provide full programming to maximize GUI capabilities.

#### 3.3 INTERFACE WITH OTHERS

- A. All equipment shall be installed and connected in strict accordance with the manufacturer's recommended instructions.
- B. Provide interface with Owner's telephone system.

- C. Interface remote sound systems in Gymnasium, Auditorium, Student Dining, Multi-Purpose Room and Lecture Hall to provide all-call and emergency notifications over these systems. Coordinate with 27 40 00 contractor.

#### 3.4 FIELD QUALITY CONTROL

- A. Provide field inspection and testing.
- B. Perform operational test on each item of equipment and on system.

#### 3.5 MANUFACTURER'S FIELD SERVICES

- A. Observe installation of communications system.
- B. Provide field technician services to make final signal cable connections to equipment.
- C. Prepare and start systems.

#### 3.6 ADJUSTING

- A. Adjust controls to achieve proper operations.
- B. Set status of each classroom call-in device and other stations as indicated.
- C. The specified equipment shall be supplied, installed, adjusted, tested, and guaranteed by a factory-authorized contractor for the products furnished. The contractor shall be responsible for verifying the completeness of the parts list and the suitability of the equipment to meet the intended purpose of the specifications and to serve the best interests of the owner.

#### 3.7 DEMONSTRATION

- A. Provide systems demonstration and instructions. Allow a minimum of 8 hours of training in two 4 hour blocks.
- B. Employ manufacturer's field representative to demonstrate system operation to designated Owner personnel.
- C. Use submitted operation and maintenance manual as reference during demonstration and training.
- D. Training: Provide the Owner with a training program designed to make all administrative control station users familiar with the operation of the voice communications system.
- E. Submit field reports indicating satisfactory installation and testing of system.

#### 3.8 WALK THROUGH

- A. Conduct walking tour of project and describe function, operation, and maintenance of components. Provide volume adjustments as necessary to provide acceptable sound levels to the Owner.

END OF SECTION