SECTION 13745

INTERCOM AND CLOCK/BELL SYSTEM

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NOTE TO SPECIFIER: Contact M-DCPS Maintenance during all design phases for assistance in equipment requirements and detailed information. Review and implement additional information from the M-DCPS Design Criteria as required to suit project conditions.

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PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Intercom and clock/bell systems, including necessary accessories.

1. Furnish and install the following, but not limited to, significant items of work:

a. Central system control console including intercom, master clock, AM/FM radio receiver, and audio tape cassette player/recorder.
b. Clock/speaker units, speakers, administrative telephones, call displays, dual call buttons, broadcast FM receiving antenna, uninterruptible power supply, and room program selector switches, if used.
c. Secondary clocks.
d. Main equipment rack(s).
e. Metal cabinet for wiring to main equipment rack.
f. Terminal blocks.
g. Testing and certification.
h. Record Drawings.
i. Raceway and pull box systems including conduits and outlet boxes.
j. Speaker/clock backboxes furnished to the General Contractor by the intercom equipment contractor.

B. Related Sections:

1. 13740 - Intercom and Clock/bell Raceway Systems.
2. 13741 - Intercom and Clock/bell Raceway Systems for PLCs.
3. 13770 - Stage Sound System.
4. 13780 - Television Systems.
5. 13805 - Wireless Clock/Tone Generator System.

6. 16112 - Raceways and Conduits.
7. 16131 - Outlet, Pull, and Junction Boxes.
8. 16160 - Terminal Cabinets.

1.02 DEFINITIONS

A. Cutover: System is functioning with no problems occurring after equipment has been installed, connections made, power applied, and system tested.

B. Acceptance: A minimum of 30 calendar days after cutover, the verification by the Board of the operation of the specified features of the equipment installed, inspection of associated wiring, and completion of adequate user training.

1.03 SYSTEM DESCRIPTION

A. Design and Performance Requirements: Comply with the Board's Design Criteria, latest edition.

1.04 SUBMITTALS

A. Submit properly identified manufacturer's literature and technical data before starting work.

B. Shop drawings shall include, but not be limited to, the following:

1. Wiring diagram prepared for the project indicating components and external wiring and connections.
2. Cuts and data sheets for components.
3. Use of standard symbols for clocks, speakers, and call-in switches.

C. Quality Control Submittals:

1. Submit 5 copies of final test and system certification to A/E for distribution.
2. Provide 2 copies of the system programming on IBM-compatible 3-1/2" diskette at the time of substantial completion for the Board□s use.
3. Provide certification from system manufacturer stating the installer has attended the manufacturer's installation and service school. A certificate of this training shall be provided with the intercom equipment contractor's submittal.

D. Closeout Submittals:

1. Provide 5 operating and maintenance manuals complete with replacement parts data for all systems.
2. Submit 2 copies of the system description and operation.

1.05 QUALITY ASSURANCE

A. Systems shall be listed and labeled by Underwriters Laboratories (UL).

B. The intercommunications system shall be a standard product produced by a manufacturer of known reputation and experience in the industry.

C. Any equipment, device, system component, or part provided or installed containing or using date processing shall be Year 2000 (Y2K) compliant. Before substantial completion, provide a manufacturer□s statement of Year 2000 compliance and manufacturer□s and contractor□s warranty against date-related failures.

D. The intercom equipment contractor shall provide a letter from the manufacturer certifying the relationship with the manufacturer before bidding.

E. Systems being proposed shall provide an FCC registration number with equipment proposal submittal if the system contains a built-in telephone system.

a. Indicate compliance to Part 68 of FCC for any items that may be attached to the Public Switched Telephone Network (PSTN).

F. The installer shall be an authorized distributor for the equipment being provided with full manufacturer's warranty privileges.

1. Work includes supervision and termination work.

G. The intercom equipment contractor shall maintain at a local facility the necessary spare parts in the proper proportion as recommended by the equipment manufacturer to maintain and service the equipment being supplied. This facility

shall be available for inspection by the A/E and the Board at any time.

H. Cable Connections:

1. Make actual connection of the wiring to the equipment, either by a certified factory trained technician employed by equipment manufacturer or under equipment manufacturer's direct supervision, without exception.
2. Same factory trained technician shall perform system test and provide certification for same and verify the final Record Drawing.

I. The system may have components approved for direct interconnection to the utility services under Part 68 of FCC rules and regulations.

1.06 WARRANTY

A. Provide a minimum of 1 year warranty of the installed system against defects in material and construction.

B. Warranty labor and materials shall be provided at no expense to the Board. Provide a 4 hour response time for routine service and trouble conditions and a 48 hour turnaround for repairs or parts replacement.

C. Warranty period shall begin on the date of acceptance as defined in the bid document.

D. A maintenance contract offering extended continuing factory authorized service of this system shall be made available, if requested by the Board.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Model numbers listed in this specification indicate the type of equipment to be furnished. Listed accepted manufacturers shall submit equivalent products as specified in this section and as noted in the Board's Design Criteria.

B. Accepted Manufacturers:

1. Dukane, Starcall.
2. Rauland, Telecenter V System.
3. Simplex, 5120 Series Communications Network Controller (for 360 or less station point capacity).
4. Simplex, 5130 Series Controller (for more than 360 point capacity).

2.02 MANUFACTURED SYSTEM

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NOTE TO SPECIFIER: Contact M-DCPS Information Technology Services - Network Expansion Services ((ITS) at 305-994-1451 for the configuration and type of telephone system provided and installed by ITS. The following system description includes the functions of the intercom system.

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A. Installation shall include a comprehensive intercommunications system, as specified and as shown on the Drawings, of the modern, dual tone electronic switching type, consisting of the following:

1. A central control incorporating a voice amplified intercom channel.
2. Program bells.
3. Classroom speakers and dual call buttons.
4. Display of calling stations.
5. Uninterruptible power supply.
6. Telephone interface to PBX and hybrid telephone systems.
7. Clocks.
8. Telephones:

    a. Three telephones, except as noted, with pushbutton dialing and display, for the administration of the system.

        1) Administrative front office area.
        2) Media center.
        3) Location to be determined.

    b. Two telephones at Primary Learning Centers (PLCs).

        1) Administrative front office area.
        2) Location to be determined.

B. The central control shall be of the modular plug-in printed circuit board type, using solid-state microprocessor and memory, solid-state sensing and logic. It shall also

provide 2-wire balanced transmission with dial-tone, ringing, and busy signal capabilities, if applicable.

C. The system shall provide at least the following features and functions:

1. Administrative Telephones: Standard Dual-Tone Multi-Frequency (DTMF to AT&T standards) dialing telephones, identical to those supplied by public telephone companies. Systems using membrane-type administrative telephones are not allowed.
2. Capability for expanding the system to accommodate 200 call-in or speaker locations for elementary schools and 500 call-in or speaker locations for middle and high schools. Systems not accommodating these quantities of speakers/call-in switches are not allowed.
3. Direct-dialing, 2-way intercom between locations equipped with administrative telephone and staff/ classroom station speakers, without the use of a press-to-talk or talk-listen switch.
4. The addition of multiple intercom channels without any modification of the basic system, to provide simultaneous communication on channels from administrative telephones.
5. Provisions for user-programmable "executive override", allowing assigned administrative telephones (to be programmed by a designated administrative telephone), to "break-in" on ongoing conversations in the system.
6. Facilities for the instantaneous distribution of emergency announcements simultaneously to locations equipped with speakers, by dialing a predetermined code number.
7. Provisions for restricting emergency announcements and alarm signal origination to certain assigned administrative telephones. This assignment shall be user programmed by a designated administrative telephone.
8. Provisions for zone-page and all-page restriction. This assignment shall be user-programmed by a designated administrative telephone.
9. Capability for assigning speaker locations within any one or more of the 8 zones for zone paging or time signal reception. This assignment will be user-programmed by a designated administrative telephone. Systems without this feature are not allowed.
10. Facilities for a minimum of 4 digital readout displays (in telephones or on the wall), where incoming calls

are identified by their designated numbers in the order received. The display system shall show visually in the order received, 3 calls at one time, and shall also "store" additional calls. Priority (emergency) calls shall be displayed immediately in an identifiable manner with the calling station number and they shall be displayed at the principal's administrative telephone and the emergency call answer panel only.

11. Provision for calls originating from any staff/ classroom station location shall be user-programmed by a designated administrative telephone for assignment to any location having displays. Systems unable to so direct station calls are not allowed. Classroom stations shall be provided with dual call-in switches. Locate wall display next to the fire alarm and the main display phone.
12. Facilities for answering calls registered in the readout display by dialing their number. Provide facilities for activating graphic display panels (lighted annunciators).
13. Provide provisions to cancel all staff/classroom station-originated calls from any authorized administrative telephone.
14. The system shall be capable of restricting and authorizing functions by software programming from the designated programming administrative telephone. This programming shall be capable of allowing the individual ports to work with any of the following combinations of station equipment:

    a. Administrative telephone (with dial).
    b. Administrative telephone with speaker circuit.
    c. Speaker with call-in switch.
    d. Speaker only.

15. An emergency call-in switch shall be associated with any of the above as required.

    a. Emergency Calls: An emergency call to the office from any "call-in" station shall have a priority alert over other existing communications in the console at the time of the emergency call by means of a high-pitch continuous buzzer/ring until call is acknowledged.

16. It shall be possible to make software-feature assignments from the designated programming

administrative telephone as follows:

a. Assignment of each speaker to any combination of 8 paging zones for time-tone zones.
b. Assignment of loudspeaker intercom access to a group of 1 or more administrative telephones.
c. Assignment of "executive override" to authorized administrative instruments.
d. Hotline ringing of a programmed telephone station automatically to a designated location without digital readout capability.
e. Allow/disallow paging, emergency tones, zone page, outside (trunks) line access.
f. Assignment of numbering system (3 or 4 digit and selected one-digit access codes).

17. The central console shall provide a serial data port for the connection of on-site or off-site diagnostics by a distributor or other factory authorized personnel. It shall be possible to determine circuit and software faults via these diagnostics and facilities and to make remote software changes to the system. The system shall also maintain statistics of operations of the main system functions for use by the individual administering the system.
18. The system shall be capable of operating with loop start trunks. In addition, it may use ground start or 4 wire audio and 2 wire signal (E&M) for compatibility with existing and future utility services. It shall interface with the telephone systems installed in schools.
19. Software updates to the program shall be accomplished via serial port or by an "allowed" programming instrument.
20. The system shall be compatible with standard PBX signaling for connection to any existing or future PBX if it contains a built-in telephone system.
21. The system shall include a wall mounted (flush or surface) emergency call answer panel that shall operate as follows:

a. Incoming emergency calls shall be identified by room number on the visual display.
b. Incoming emergency calls shall be answered at the emergency call answer panel if one is included in the system and the principal's display telephone.
c. Incoming emergency call shall be able to be

answered for a hands-free intercom conversation between the emergency calling station and the emergency call answer panel or a telephone.

22. Provide one of the following:

    a. Provisions for manual or automatic switching to use backup common control portion of the intercommunication system.
    b. Provisions to use backup communication systems if available.
    c. One spare circuit board for each type in use.
    d. One secondary micro-processor assembly.

D. Components:

1. If the installation includes a 2-channel program distribution system, it shall consist of the following components:

    a. An "A" [first path (green)] channel master control panel.
    b. A "B" [second path (blue)] channel master control panel.
    c. Two program power amplifiers.
    d. A minimum of 3-position program distribution selector switches, if required by drawings.
    e. An AM/FM radio tuner/cassette tape player/recorder shall be provided.

2. Master Control Panels:

    a. Design the master control panels for absolute simplicity of operation, made possible by functionally identified color-coded illuminated pushbuttons with associated color guidelines, supported by step-by-step instructions printed on the control panel itself.
    b. The master control panels may incorporate a complete program preamplifier providing a minimum of 5 program inputs (2 microphone and 3 auxiliary), each selected by fluorescent color display pushbuttons, with full aural and visual monitoring facilities by means of a built-in monitor speaker and LED output level indicators, and separate "All-Call" and "Emergency" announcement facilities.

3. Program Preamplifier:

   a. The program preamplifier shall have an output rating of 1.5 volts into 10,000 ohms at less than 1 percent distortion from 40 to 15,000 Hertz.
   b. Frequency response shall be flat within ±2 dB over this range.
   c. Microphone inputs shall be balanced 150 ohms.
   d. Auxiliary inputs shall be 500K ohms unbalanced with a 0.25 volt sensitivity.
   e. Provide a tone control.

4. AM/FM Radio Tuner/Cassette Player/Recorder:

   a. Design the AM/FM radio tuner/cassette player/ recorder for continuous duty service in institutional, commercial, and industrial sound and communication systems.
   b. The equipment shall be of advanced solid-state design, to assure reduced power consumption, greater reliability, and longer life expectancy.
   c. The AM portion shall have a tuning range of 525 to 1620 KHz, and a sensitivity of at least 15 microvolts for 20 dB quieting.
   d. The FM section shall have a tuning range of 88 to 108 MHZ, with sensitivity of 2.5 microvolts for 30 dB quieting.
   e. Frequency response shall be ±3 dB, 50 to 10,000 Hz.
   f. Front panel controls shall include an on-off/volume switch, a tuning control, an AM-FM selector switch, and tuning balance.
   g. Tuning shall be accomplished on an illuminated digital read out dial.

5. Cassette Player:

   a. The cassette player section shall play standard cassettes at a tape speed of 1-7/8" (4.8 cm) per second.
   b. Frequency response shall be ±3 dB 50 to 10,000 Hz, with less than 0.25 percent wow and flutter. Signal-to-noise ratio shall be 50 dB or better.
   c. When used with a C-60 cassette, rewind time and fast forward time shall be approximately 165 seconds.
   d. Controls shall include locking Fast-Forward and Eject.

e. The unit shall be designed for easy mounting in any standard 19 inch rack. It shall not occupy more than 3-1/2" of vertical space and the face panel shall be finished in tinted brushed chrome.
f. When in record operation, it shall be able to record from the AM/FM tuner, the system microphone used for announcements, or an external audio source.

6. Power Amplifiers:

a. Design the power amplifiers, if used, for completely dependable continuous operation in alarm, paging, and sound reinforcement use.
b. They shall meet the UL 1480 standard requirements for amplifiers intended for use in fire-protective signaling systems.
c. The amplifiers shall deliver an output as designed for the system at elementary, middle, and high schools at less than 2 percent harmonic distortion at full rated output.
d. Manual reset DC circuit breakers shall be provided as needed to safeguard against damage from prolonged overloads and from extreme overloads, such as a shorted output line.
e. Input power protection shall be provided by an easily replaceable slo-blo fuse. Controls shall be provided for level control and lo-cut filter to protect horn-type speakers.
f. A LED protection indicator shall be provided.
g. The amplifier shall operate continuously from 120 VAC. The 120 VAC shall be supplied from a panel fed from the emergency generator if there is a power failure.

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NOTE TO SPECIFIER: Not all of the manufacturer's systems listed include switch panels, since intercoms can be installed with or without switch panels. Edit the following paragraph 7 to suit project conditions.

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7. Manufacturer's option:

a. Room selector switch panels shall contain 25 lever-action, 3-position, four-pole selector switches of the positive detent type, for selection of rooms to either one of 2 program channels and 1 intercom

channel.
b. Switch contacts shall be self-wiping type with precious metal contact surfaces.
c. Switch handles shall be aluminum sheathed and permanently attached to the levers.
d. Switch positions shall be legibly identified as "Program A", "Off", and "Program B". The "A" channel shall be identified by a green guideline and the "B" channel by a blue guideline, according to the color-coding of the Master Control Panels.

8. For the program distribution system, provide the following functions:

a. Transmit 2 separate programs from 2 separate sources to any one or any group of several loudspeakers simultaneously.
b. Select from 7 program sources for each of the 2 program channels.
c. Distribute a program to all speakers by means of an all-call switch.
d. Provide an AM/FM tuner, a cassette recorder, and a microphone as program sources.
e. Provide a Switchcraft B3F microphone jack on the front of the equipment rack wired to microphone 1 input.
f. Provide for recording or playing back a taped program either on the internal cassette deck or on an external deck via an input or output jack.
g. Aurally and visually monitor a program before and during distribution to speakers.
h. Provide an ON/OFF switch on the front panel of the rack that, together with switchbanks (if applicable), will cut off exterior horns/speakers.

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NOTE TO SPECIFIER: The following Tone Generator and Master Clock System are integral to the intercom system. See Section 13805 for an optional wireless clock/tone generator system not requiring a separate clock conduit.

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E. Tone Generator:

1. The installation shall include a tone generator system for distributing class change and emergency signaling tones to loudspeakers.

2. The tone generator shall be capable of producing at least 7 different and distinct tone signals. The tones shall be activated in the following 3 ways:

   a. Tones shall be activated by dialing access codes from authorized administrative phones via the communications system central control.
   b. Tones shall be activated via momentary pushbutton switches on the front panel.
   c. Tones shall be activated via signals from the master program clock.

F. Master Clock System:

1. Micro-processor base programmable by the user through electronic means.

   a. Provide a step-by-step guide to enable the user to accomplish the programming easily and correctly.
   b. Master control clocks not micro-processor based and require a technician to perform the original programming and subsequent program changes, at additional cost, are not allowed.

2. The programmable master control clock shall be capable of storing in non-volatile memory and controlling a minimum of 350 events (such as ringing bells, regulating lighting, etc.). It shall program and control:

   a. The time the event is to occur and whether AM or PM.
   b. The selection of any zone or any combination of zones (up to 8) where the event is to occur.
   c. A minimum of 6 schedules to allow flexible rearrangement of events to accommodate special circumstances.

3. The clock shall provide for the electronic selection of the following operational "modes":

   a. "TIME": Allow the entry of "present" time display on the clock panel.
   b. "DATE": Allow the entry of the current date.
   c. "LOAD": Access entry of each element into the clock memory.
   d. "EDIT": Allow the sequential display of programs

entered, for the purpose of review, correction, change, or deletion.

e. "SELECT": Allow the activation of zones and schedules.
f. "RUN": The mode for normal operation.

4. The clock shall provide pushbuttons for accomplishing the programming and shall require no special skill or training to perform.

   a. By following a simple set of step-by-step instructions, operation of these buttons shall insert into the clock memory the following elements required for programming an event:

      1) The time it is to occur.
      2) AM or PM.
      3) The zone or zones it is to occur.
      4) The day or days each zone is to be active.
      5) The selection of up to 4 schedules required to accommodate normal or special circumstances.

   b. Once the programming for an event has been completed, the entire program shall be clearly displayed for review before it is entered in the memory.

5. The Master Control Clock shall provide:

   a. Digital display.
   b. Pushbuttons for manually controlling each zone.
   c. A pushbutton for manually activating all zones simultaneously.
   d. Pushbuttons for selecting schedules.
   e. Interface with secondary clocks, either analog or digital, with provision for hourly and 12-hour corrections.
   f. Ability to program for automatic holiday operation.
   g. Ability to program for required secondary clock correction.
   h. Software selection of user zones (4, 6, or 8) or schedules.
   i. Ability to program a combination of zones or schedules for each day.
   j. Automatic daylight-saving time change, easily accomplished by user programming.
   k. Display of the next scheduled event on the clock by

pushing a single button.

l. A key lock to prevent tampering with the clock or making unauthorized program changes.
m. A 1 to 59 second programmable signal duration.
n. User programming of different duration for each zone.
o. A "zero" duration programmable for latched operation.
p. Selection of 12-hour or 24-hour display format.
q. A battery backup kit.
r. Instruction panel for rack mount, detailing programming procedure in step-by-step sequence.
s. DC output buffer module.

6. The power requirements for the programmable master clock shall be 120 volts AC, 60 Hz. It shall be available for standard rack or for wall mount. The clock shall incorporate all-solid-state circuitry, and shall meet requirements of UL 813.
7. The master control clock shall be capable of driving both analog and digital secondary clock simultaneously through solid-state-relay type buffer modules.
8. Secondary Clock:

a. Secondary clocks shall be analog.
b. Regulated by the master control clock each hour for minute hand correction and every 12 hours for hour hand correction.
c. It shall be a 24-volt DC impulse clock.
d. Provide a standard 12-hour display with black numerals.
e. The hour and minute hands shall be black.
f. The clock case shall be metal, finished in satin aluminum enamel.
g. The clock dial shall be white and impervious to discoloration.
h. The clock shall be supplied with a swayproof hinge for secure mounting.

G. Equipment Racks:

1. Mount control components of the communications system, the program distribution system, the tone generation system, and the master program clock system in free standing upright metal equipment rack(s) designed to mount standard 19 inch components.
2. Properly size the racks to accommodate necessary

equipment panels with 20 percent spare blank panel space.

3. At least 61.25 inches of total vertical panel space shall be provided.
4. Controls shall be handicapped accessible according to Americans with Disabilities Act (ADA).
5. Construct the rack of at least 16 gage steel, heavily reinforced for maximum strength and durability.
6. Provide a hinged and key-locking rear door providing authorized personnel with easy access to the equipment.
7. The rack shall be finished in ebony black baked enamel, and shall be listed by Underwriters Laboratories (UL).
8. Included in the rack shall be a roll-out storage drawer 8.75 inches high by 14.25 inches deep, with a face panel styled to match the other equipment panels in the rack. The roll-out mechanism shall be of the dual-section type providing at least 12.25 inches total extension.
9. Include in the rack a shelf 12 inches deep across the front of the rack.

2.03 EQUIPMENT

A. Intercommunications System: As supplied by the intercom equipment contractor.

B. Master Control Clock System: As supplied by the intercom equipment contractor.

C. Tone Generator System: As supplied by the intercom equipment contractor.

D. Rack and Associated Hardware:

1. Microphone input jack, exterior speaker ON/OFF switch, and tone signaling pushbuttons (1 required).
2. Fill unused panel spaces with blank panels.
3. Label inputs, switches, and controls with permanent markings. Indicate rooms and areas served.

E. Speakers:

1. Room Speakers: Mounted in clock/speaker combination baffles.
2. Ceiling Speakers:

a. Mounted in baffle with backbox and T-bar Support.

b. Adequately support speakers in acoustical ceilings by hanger wires to eliminate panel deflection.

3. Speakers shall be tapped according to room requirements.
4. Provide keyed operated speaker controls (On/Off) at:

a. TV production workroom.
b. Cafetorium/auditorium.

F. Call-in Switches:

1. Classroom call-in switches shall be Rauland RS508 or accepted equivalent.

G. Clock/Speaker Enclosures: As supplied by the intercom equipment contractor.

H. Wire:

1. Wiring shall be according to good engineering practices as established by the EIA and NEC.
2. Wiring shall meet established state and local electrical codes.
3. Wiring shall test free from grounds and shorts.
4. Install wiring according to the following:

a. Cable Requirements:

1) Administrative Telephones, Speakers, Call-in Switches, Emergency Call Answer Panel: West Penn #373 for aboveground use and West Penn AQC#373 for underground use or accepted equivalent.

b. Speaker wire shall be a shielded cable. Conductors shall be color-coded.
c. Microphone wire shall be a 2-conductor shielded cable, No.18 AWG, with PVC jacket, for microphone use, West Penn Cable No.293 or equal.
d. Digital Wall Display: As determined by system supplier.
e. Secondary Clocks: Three No.12 AWG THHN.

5. Whenever possible, install homerun wiring in continuous runs from field device to head-end terminal cabinet with no breaks or splices.

6. Splices in wire trays are not allowed. Clock splices/ taps shall be on screw terminals or terminal strips in an accessible junction box. Wire terminations for the intercom and clocks at the central equipment rack shall be made on terminal blocks, Suttle SE-66M1-50 with SE-89D brackets, or accepted equivalent. The terminal blocks shall be installed in a flush mounted terminal cabinet where possible, Brenner-Newman Model BN7036 or accepted equivalent.

I. Antenna System:

1. FM Reception: Provide a separate antenna for the FM tuner section, Rauland Model FMT65 with Rauland QCO126 Lightning Arrestor or accepted equivalent (see detail Drawing for mounted; one required).
2. Extend one 3/4" riser conduit from the headend unit to antenna structure/pole for wiring connection to FM antenna.
3. Provide solid dielectric coaxial lead-in cable, CAC-6 type, West Penn #842.
4. AM Reception: Provide a separate antenna for the AM tuner section.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an accepted manner.

3.02 PREPARATION

A. Provide necessary transient protection on the AC power feed, station lines leaving or entering a building, and central office trunks. Protection shall be as recommended by the equipment supplier and referenced to earth ground.

1. Lightning Protection and Transient Voltage and Surge Suppression:

a. Atlantic Scientific.
b. Diversified Technology Group (DITEK).
c. EDCO.
d. Hubbell-Kellems Milford, CT.
e. LEA International by Power Logics, Apollo Beach,

FL.
f. Transtector, Hayden Lake, ID.

B. The system shall be powered by a separately fused, 110 volt AC circuit fused with a circuit breaker of 20 Amps. The circuit shall be on an electrical panel on the emergency generator in case of a power failure.

C. Speaker wires and call-in circuits shall be protected by an EDCO OPX-series surge suppressor or accepted equivalent at the central rack termination equipment cabinet.

D. Note in system drawings the type, locations, and wiring information of protection devices.

E. Wiring termination shall be accomplished on standard telephone-type punch down blocks.

F. Provide a Tripp-Lite Sb-series battery backup system or accepted equivalent with a capacity for operating the headend under normal idle load for 2 hours and then operating the system in at full power to all speakers for 5 minutes. Automatic transfer to backup power shall occur within 10 seconds of power loss.

3.03 INSTALLATION

A. Install the intercom and clock systems according to applicable codes.

B. System equipment and wiring installation shall be by the properly licensed company, either the original equipment manufacturer or the factory distributer for the brand of equipment used. Furnish wiring diagrams and wire runs for the raceway system installed by the licensed electrical contractor, under Division 16.

C. The system shall be tested for shorts, grounds, continuity, and finally for proper functioning and operation.

D. Final connections of equipment, testing of system, and any other necessary adjustments shall be performed by a certified factory trained technician, employed by the equipment manufacturer, and under the manufacturer's direct supervision.

E. Equipment shall be installed according to manufacturer's

recommendations.

F. Installation of head-end or control equipment shall be done only by the employees of the factory authorized distributor of the equipment being installed.

G. Install wiring, conduit, boxes and the like required for installation of a complete system as specified in this section and as shown on the drawings according to manufacturer's instructions, accepted submittals, and the requirements of this section.

1. Color code wires.
2. Tag wires at junction points. Wire terminations shall be made at equipment terminals or at terminal cabinets. No splices are allowed in the systems.
3. Install wiring in conduit free from opens, grounds, or crosses between conductors.

a. Do not use PVC or other plastic conduit above ground.

H. Number of wires shall be according to manufacturer's wiring diagram, as required for proper operation of the System. Install wiring in conduit. Pull and junction boxes and terminal cabinets for the system shall be provided with terminal strips, identified for wire terminations, and painted yellow.

1. Terminations shall be in hinged terminal cabinets and provided with wire tabs. Solder or taped joints are not allowed. Loop through wiring is allowed, but spares shall be terminated.

I. Furnish and install entire system according to accepted shop drawings of equipment and wiring diagrams.

J. Mount antenna to withstand wind velocities determined by American Society of Civil Engineers (ASCE) 7-98.

1. Use a map wind speed of 146 mph, exposure category "C", and a wind load importance factor of 1.15.

3.04 FIELD QUALITY CONTROL

A. Factory trained technician shall check and test system for shorts, grounds, and circuit continuity and finally for

proper function and operation before scheduling initial system test with the Board.

B. After the Board's initial testing approval, a continuous 30 calendar day period of trouble-free operation is required before system acceptance.

3.05 DEMONSTRATION

A. After system has been tested, checked, and certified as complete and operational, technician shall demonstrate various functions and operations of system to A/E and the Board's maintenance and administrative staff.

B. Demonstrate and explain system functions and operations in detail to school personnel designated by the school's principal.

C. Furnish a minimum of 8 hours or as needed to provide adequate in-service training with this system. These sessions will be broken into segments to facilitate the training of individuals in operating station equipment, administrative devices, user programming functions, and program distribution equipment. Operating manuals and user's guides shall be provided at training sessions.

D. Training for software updates to the program (via serial port or by an "allowed" programming instrument) shall be given to a person designated by The Board in making these updates to the restriction tables.

3.06 EXISTING BUILDINGS

A. Existing intercom and clock/bell systems replaced with a new intercom and clock/bell system installation shall have existing panels, sub-panels, power supplies, speaker/clock assemblies, and any other non-operational component removed after the new intercom and clock/bell system certificate of completion is accepted by the Board.

END OF SECTION