

## SECTION 13805 - WIRELESS CLOCK SYSTEM

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*SPECIFIER:*

*CSI MasterFormat 2004 number: 275313*  
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### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Provide a complete satellite based, synchronized wireless clock system, including clocks, transmitter, receiver, and related accessories as shown on the Drawings and as specified herein.
- B. Related Sections:
  - 1. 13740 - Intercom and Clock/Bell Raceway System.
  - 2. 13745 - Intercom and Clock/Bell Systems.
  - 3. Division 7 - Thermal and Moisture Protection.
  - 4. Division 16 - Electrical.

#### 1.2 SYSTEM DESCRIPTION

- A. Wireless Master Clock System:
  - 1. Clock system shall continually synchronize all clocks throughout the facility.
  - 2. System shall be capable of clock readouts in multiple time zones.
  - 3. The system shall utilize GPS technology to provide "atomic" time.
  - 4. The system shall not require hard wiring.
  - 5. Clocks shall automatically adjust for Daylight Saving Time.
  - 6. Clocks shall be synchronized to within 10 milliseconds once a day. Clock accuracy shall be within  $\pm 0.2$  seconds per day.
  - 7. The system shall include an internal clock so failure of the GPS signal shall not cause the clocks to fail in indicating time.
  - 8. The system shall incorporate fail-safe design so failure of any component shall not cause failure of the system. Upon restoration of power or repair of failed component, the system shall resume normal operation without the need to reset the system or any system component.
  - 9. Clock locations shall be as indicated on Contract Drawings, and clocks shall be fully portable, capable of being relocated at any time.
  - 10. The transmitter shall continuously broadcast (transmit) a time data packet to remote clock units. The transmitter shall operate on regulated FCC licensed frequencies to minimize interference on the selected channel.
  - 11. The GPS unit shall receive the precise time via satellite from its vantage point with a "view of the sky" and continuously provide this precise time to the transmitter.

#### 1.3 REGULATORY REQUIREMENTS

- A. Equipment and components shall be manufacturer's latest model.

- B. Transmitter and receiver shall comply with Part 15 and Part 90 of FCC rules, as follows:
  - 1. The equipment shall not cause harmful interference.
  - 2. Transmitter frequency shall be governed by FCC Part 90.35.
  - 3. Transmitter output power shall be governed by FCC Part 90.257 (b).
- C. System shall be installed in compliance with local and state authorities having jurisdiction.

#### 1.4 SUBMITTALS

##### A. Product Data:

- 1. Complete catalog data for each component, describing physical characteristics and method of installation.
- 2. Brochure or color card showing available colors and finishes of clocks.
- 3. Complete installation, set-up and maintenance instructions.
- 4. Software programming instructions, coordinated with M-DCPS requirements for timing and sequencing of the equipment.

##### B. Operating License:

- 1. Submit evidence of application for operating license before installing equipment.
- 2. Furnish the license, or if the license has not been received, a copy of the application for the license, to M-DCPS Project Manager before operating the equipment.
- 3. Final acceptance of the wireless clock system shall be contingent on installer proving a fully executed original operating license to M-DCPS Project Manager upon Substantial Completion of the project.

##### C. Samples:

- 1. One fully operating clock for approval.
- 2. Approved sample shall be tagged and shall be installed in the work at location directed.

##### D. Manufacturer's and Installer's Qualifications: Evidence of qualifications of manufacturer and installer, as specified.

#### 1.5 QUALITY ASSURANCE

##### A. Perform preliminary inspection and testing to verify signal strength from GPS antenna and transmitter to remote facility clock locations before completion of related work.

##### B. Permits: Obtain operating license for the transmitter from the FCC.

##### C. Qualifications:

- 1. Manufacturer: Company specializing in manufacturing commercial time systems with a minimum of 10 continuous years of documented experience.
- 2. Installer: Company with documented experience in the installation of commercial computer controlled, time-actuated control systems. Company shall have a valid license to perform electrical work in the jurisdiction in which the project is located.

- D. Systems requiring wiring and/or conduit between master clock and individual clock units are not acceptable.
- E. Principal components of the system shall be the product of a single manufacturer.
- F. The installer shall be an authorized distributor for the equipment being provided with full manufacturer's warranty privileges. Work includes supervision and termination work.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver components to the site in the manufacturer's original packaging. Packaging shall contain manufacturer's name and address, product identification number, and other related information.
- B. Store equipment in unopened containers until ready for installation. Store in building in finished, air conditioned space.

#### 1.7 PROJECT SITE CONDITIONS

- A. Coordinate installation of GPS receiver with Division 7 - Thermal and Moisture Protection to provide a watertight installation of the bracket and related fasteners.
- B. Clocks shall not be installed until painting and other finish work in each room is complete.

#### 1.8 SYSTEM STARTUP

- A. At completion of installation and before final acceptance, start up the equipment to assure entire system is operating properly.

#### 1.9 WARRANTY

- A. Provide a minimum of 5 year warranty of the installed system against defects in material and construction and 2 year warranty on labor from the date of Substantial Completion for the Project.
- B. Warranty labor and materials shall be provided at no expense to M-DCPS. Provide a 4 hour response time for routine service and trouble conditions and a 48 hour turnaround for repairs or parts replacement.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Wireless Clock System:
  - 1. Primex Wireless, Lake Geneva, WI.
  - 2. or equivalent as approved by A/E and M-DCPS.

#### 2.2 EQUIPMENT:

- A. Transmitter:

1. Primex Wireless XR Time Synchronization Series or equivalent as approved by A/E and M-DCPS.
  - a. Unit shall obtain current "atomic" time from satellite.
  - b. The system shall transmit time and control packets continuously to all clocks in the system.
2. Transmitter Power Supply: Input: 120 volt AC 50/60 Hz, 0.4 amp
3. Transmission:
  - a. Frequency Range: In compliance with FCC.
  - b. Transmitter output power: In compliance with FCC and as may be required to satisfy site specific requirements.
  - c. Frequency deviation + 4 kHz.
  - d. Transmission Range: One mile, open field.
  - e. Radio technology: Narrowband FM.
  - f. Number of channels: 16.
  - g. Channel bandwidth: Narrow-banded in compliance with FCC.
  - h. Transition mode: one-way communication.
  - i. Operating range: 0 degrees C. to 70 degrees C.
4. Transmitter shall have option to modulate frequency of operation to assure interference-free reception.
5. Transmitter shall have the following switches:
  - a. Time zone adjust switches for all time zones.
  - b. Daylight Saving Time bypass switch.
  - c. 12-hour or 24-hour display.
6. Transmitter shall include a display for:
  - a. Time readout.
  - b. AM and PM indicator if 12 hour time display is set.
  - c. Day and date readout.
  - d. Indicator for Daylight Saving or Standard Time.
  - e. LED indicator which shall flash red in event of reception problem.
  - f. GPS reception indicator.
7. Transmitter shall contain an internal clock to prevent disabling the operation of reception from the GPS.
8. Transmitter shall have capability of using Ethernet time synchronization via Simple Network Time Protocol (SNTP).
9. Transmitter shall have a wired or wireless programmable synch output connected to the synch input at the school's P/A console, in order to synchronize the time on all clocks located throughout the facility.
10. Transmitter Antenna: Commercial grade, mounted on top center of transmitter housing.
11. GPS/Transmitter Cable: A specially designed low resistance data cable shall be used to allow extending the distance between the transmitter and the GPS unit.
12. Cable Connection Sealant: Radio Shack Coaxial Cable Connector Sealant 278-1645, or accepted equivalent electrical grade silicone sealant.

B. GPS Receiver:

1. Manufacturer: Primex Wireless or equivalent approved by A/E and M-DCPS. GPS receiver shall be roof mounted and have adequate length of weatherproof cable to reach transmitter and accommodate installation in accordance with Contract Documents.
2. Receiver shall be a complete GPS receiver including an antenna in an enclosed weatherproof case designed for roof or outdoor mounting. Provide mounting bracket for attachment to roof structure.

C. Wireless Clocks:

1. Manufacturer: Primex Wireless clocks or equivalent as approved by A/E and M-DCPS.
2. Clocks shall be capable of automatically adjusting for Daylight Saving Time. Function shall be disabled with an on-off switch located on the transmitter.
3. Time shall be automatically updated from the transmitter a minimum of once per day.
4. Clocks shall remember the time during changing of batteries.
5. Clock Lock: Tamper-proof/theft resistant hangers and slots in the backs of the clocks.
6. Clock receivers shall have internal antenna.
7. If transmitter stops transmitting valid time signals due to power failure, the clocks shall continue to function as accurate quartz clocks until a valid time signal is decoded.
8. Clock Wire Guard: Provide clock wire guards where specified on Drawing. Wire guard shall be as follows:
  - a. Primex Model No. 14131, 14" x 14" x 3" deep, for nominal 12" diameter clocks, or equivalent as approved by A/E.

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*NOTE TO SPECIFIER: Edit the following selection to suit project design requirements. Digital secondary clocks may be used only with prior written permission from M-DCPS Facilities Design and Standards on a per project basis.*  
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9. Clock type shall be: **[Analog][Digital]**
  - a. Analog Clocks:
    - 1) Size: Nominal 12" diameter.
    - 2) Clock motion: Mechanical.
    - 3) Display: Standard 12-hour dial-face with black numerals.
    - 4) Clock dial face shall be white and impervious to discoloration.
    - 5) The hour and minute hands shall be black.
    - 6) The clock case shall be metal or ABS, with a black or silver finish.
    - 7) Clocks shall have a polycarbonate lens.
    - 8) Clock shall be supplied with a sway-proof hinge for secure mounting.
  - b. Digital Clocks:
    - 1) Provide a 4-digits (hours and minutes) 12-hour display, with red color 4" inch high LED digits.

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*NOTE TO SPECIFIER: Select between battery powered or 120 V. powered clocks to suit project specific design requirements. For New Construction and New Additions Projects, wireless clocks shall be 120 V. plug-in type unless otherwise approved in writing by M-DCPS Facilities Design and Standards on a per project basis.*  
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- 10. Power Requirements: Clocks shall be **[battery operated with a 5-year battery life]** **[120 V. operated]**.

### PART 3 EXECUTION

#### 3.1 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 acceptable manner.
- B. Verify that construction is complete in spaces to receive equipment and that rooms are clean, dry, and permanent air conditioning systems are operating.
- C. Verify 120 volt electrical outlets are located within 6 feet of location of transmitter and outlet is operational and properly grounded.

#### 3.2 EQUIPMENT INSTALLATION

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*NOTE TO SPECIFIER: The following GPS unit can be mounted on the roof, on a pole, or at a window for a clear view of the sky. If the GPS unit is mounted on the roof, it must be located on a suitable bracket, well above the level of standing or incidental water. If the GPS unit is mounted at a window, it must be located away from low-E glass.*  
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- A. GPS Unit: Install on roof in location indicated, in clear view of the sky. Install unit in location free from standing water, and above accumulations of leaves or debris. Seal cable connection to GPS with cable connection sealant.

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*NOTE TO SPECIFIER: Provide a platform or Primex Wireless Wall Mount Rack Model No. 14005 for installation of the following transmitter, 2 to 3 feet above the floor. The preferred transmitter location for best transmission coverage is on the top floor of the building. The transmitter is designed for interior use only. It is not weatherproof.*  
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- B. Transmitter:
  - 1. Locate the transmitter as recommended by the manufacturer's written instructions, and away from large metal objects such as filing cabinets, lockers or metal framed walls.
  - 2. Set the channel number on the display to correspond to the FCC license.

C. Clocks:

1. Perform the following operations with each clock:

- a. Set clock to correct time in accordance with manufacturer's instructions.
- b. Observe clock until valid signals are received and clock adjusts itself to correct time.
- c. Install the clock on the wall in the indicated location, plumb, level and tight against wall. Attach using Clock-Lock hanging method and tamper-resistant fasteners as approved by clock manufacturer.

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*NOTE TO SPECIFIER: Delete the following if wire guards are not required.*  
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2. Wire Guards: Secure to wall, using approved tamper-resistant fasteners.

3.3 ADJUSTING

- A. Before final acceptance, inspect each item, adjust as required, modify the software as directed, and replace parts found defective.

3.4 CLEANING

- A. Before final acceptance, clean exposed surfaces of clocks, using cleaning methods recommended by clock manufacturer. Remove temporary labels from clock faces. Do not remove labels from backs of clocks.

3.5 DEMONSTRATION

- A. Provide a minimum of 2 hours of training to M-DCPS selected representatives on installing the software, adjusting and programming the transmitter, setting and adjusting WT generators, setting and adjusting clocks, replacing batteries, and routine maintenance.

3.6 PROTECTION

- A. Protect finished installation until final acceptance of the project.

END OF SECTION