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Product Guide Specification

Specifier Note: This product specification is written according to the Construction Specifications Institute (CSI), *MasterFormat*™, *SectionFormat,* and *PageFormat,* contained in the CSI *Manual of Practice.*

The section must be carefully reviewed and edited by the Architect/Engineer/Consultant to meet the requirements of the project and local building code. Coordinate this section with other specification sections and the drawings.

Delete all "Specifier Notes" when editing this section.

DIVISION 16730

GPS WIRELESS CLOCK SYSTEMS

Specifier Note: This section covers the Primex Wireless GPS Synchronized Clock System. Consult Primex Wireless for assistance in editing this section for the specific application.

Part 1 General Requirements and Scope

Furnish and install a complete new GPS wireless clock system using Primex Wireless Inc. GPS wireless system.
All bids shall be based on the equipment as specified herein. The specifying authority must approve any alternate system.

(Reference Division 16730 Clock Systems)

Specifier Note: Edit the following list as required for the project.

1.1 Section Includes

Transmission Systems GPS Receiver Primary Transmitter
Satellite Transmitter
Clocks
Analog
Digital

Specifier Note: Edit the following list as required for the project. List other sections with work directly related to this section.

1.2 Related Sections

Division 16 – Electrical (120 volt grounded outlet required for transmitter. Division
Division 16735 – Wireless Tone Generator
Division 16731 – Digital Display Clocks and Timers

Specifier Note: List standards referenced in this section, complete with designations and titles. This article does not require compliance with

1.3 References

This Technical Specification and Associated Drawings
Primex Wireless GPS Satellite Time System User Manual.

1.4 Definitions

GPS: Global Positioning System, a worldwide system that employs 24 satellites in an integrated network to determine geographic location anywhere in the world, and which employs and transmits Universal Coordinated Time, the world's most accurate and reliable time.

UTC: Universal Coordinated Time

1.5 System Description

GPS wireless clock system shall continually synchronize clocks throughout the facility, and shall be capable of clock readouts in multiple time zones where desired.

The system shall provide wireless time using GPS and be synchronized to UTC. The system shall not require hard wiring. Clocks shall automatically adjust for Daylight Saving Time

Analog Clocks shall be synchronized to within 10 milliseconds 6 times per day, and the system shall have an internal oscillator that maintains plus or minus one second per day between synchronizations, so that clock accuracy shall not exceed plus or minus 0.2 seconds.

The system shall include an internal clock reference so that failure of the GPS signal shall not cause the clocks to fail in indicating time.

The system shall incorporate a "fail-safe" design so that 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 component thereof.

Clock locations shall be as indicated, and clocks shall be fully portable, capable of being relocated at any time.

The system must operate in accordance with a “Technical Acceptance Certificate” issued under the authority of Industry Canada and the Ministry of Industry. This license will be granted to and held by the end user.

1.6 Regulatory Requirements

Equipment and components furnished shall be of manufacturer’s latest model.

The end user will hold a license, known as a “Non Complex Fixed Station” Radio License granted by Industry Canada and the Ministry of Industry

This license grants the end user protected use for wireless transmission at the designated frequency.

IC-2365: Application for “License to Install and Operate a Radio Station in Canada” must be completed and signed by end user prior to license issuance. The end user will grant permission for Primex Wireless to apply for the license on their behalf. Primex Wireless will provide all documents and technical information to Industry Canada for approval.

This license will designate a unique “call sign” for each end user.

Transmitter and receiver shall comply with RSS 119 of Issue 6 of Industry Canada specifications as follows Equipment and components furnished shall be of manufacturer’s latest model.

The end user will hold a license, known as a “Radio Station Authorization” granted by the ICC.

This license grants the end user protected use for wireless transmission at the designated frequency.

This license will designate a unique “call sign” for each end user.

Transmitter and receiver shall comply with RSS 119 of Issue 6 of Industry Canada specifications as follows:

This device may not cause harmful interference, and

This device must accept interference received, including interference that may cause undesired operation.

Transmitter frequency shall be governed by IC: RSS119 Issue 6.

Transmitter output power shall be governed by IC: RSS119 Issue 6

System shall be installed in compliance with local and state authorities having jurisdiction.

1.7 Submittals

Product Data: Submit complete catalog data for each component, describing physical characteristics and method of installation. Submit brochure showing available colors and finishes of clocks.

Specifier Note: In accordance with Industry Canada regulations, an application for "Technical Acceptance Certificate" must be filed prior to use of the equipment. Normally, the manufacturer will have completed the filing and obtaining the license. If not, the Owner will be required to file the application with the Industry Canada prior to use. Furnishing the license, or a copy of the application, will

Operating License: Submit evidence of application for IC Radio Station Authorization prior to installing equipment. Furnish the license or a copy of the application for the license, to the Owner/End User prior to operating the equipment. The original license must be delivered to the Owner/End User.

Samples: Submit one clock for approval. Approved sample shall be tagged and shall be installed in the work at location directed.

Manufacturer's Instructions: Submit complete installation, set-up and maintenance instructions.

Floor plans indicating the location of system transmitter(s), approved by manufacturer, will be submitted to owner prior to installation.

1.8 Substitutions

Proposed substitutions, to be considered, shall be manufactured of equivalent materials that meet or exceed specified requirements of this Section.

Proposed substitutions shall be identified not less than 10 days prior to bid date.

Other systems requiring wiring and/or conduit between master and clocks will not be accepted.

Other systems using wireless technology in an unlicensed frequency range will not be accepted.

Other systems using wireless technology where the license is held by any party other than the end user will not be accepted.

1.9 Quality Assurance

Permits: Obtain operating license for the transmitter from the Industry Canada

Qualifications:

Manufacturer: Company specializing in manufacturing commercial time system products with a minimum of 30 continuous years of documented experience including 4 years experience producing GPS wireless time systems.

Installer: Company with documented experience in the installation of commercial time systems.

Prior to installation, a site survey must be performed to determine proper transmitter placement.

1.10 Delivery Storage and Handling

Deliver all 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.

Store equipment in finished building, unopened containers until ready for installation.

1.11 Project Site Conditions

Clocks shall not be installed until painting and other finish work in each room is complete.

Coordinate installation of GPS receiver for access to the roof or exterior side wall so that the bracket and related fasteners are watertight.

1.12 System Startup

At completion of installation and prior to final acceptance, turn on the equipment; ensure that all equipment is operating properly, and that all clocks are functioning.

1.13 Warranty

Manufacturer will provide a 1 year warranty on GPS receiver, transmitter, and satellite transmitter. All other components will have a 1 year warranty.

Part 2 – Products

2.1 Manufacturer

GPS wireless clock system shall be manufactured by Primex Wireless, Inc., 1310 Kerrisdale Blvd., Unit 4, Newmarket ON L3Y 8V6, 800-330-1459 www.primexwireless.com.

2.2 Sequence of Operation

Transmitter Operation: When power is first applied to the transmitter, it checks for and displays the software version. It then checks the position of the switches and stores their position in memory. The transmitter looks for the GPS time signal. Once the transmitter has received the GPS time, it sets its internal clock to that time. The transmitter then starts to transmit its internal time once every second. The transmitter updates its internal clock every time it receives valid time data from the GPS.

Analog Clock Operation:

Apply power or insert batteries. Follow set up procedures detailed in manufacturer's instructions.

After initial setup, the clock will shut off the receiver. Six times each day, the microprocessor will activate the receiver and starting with the stored channel, it will again look for a valid time signal. If necessary, the clocks will resynchronize to the correct time.

If the clock has not decoded a valid time signal for a pre-determined number of days, it will go to a step mode. Non signal reception can be caused by low battery voltage. If this occurs, replace the batteries.

2.3 Equipment

General: The clock system shall include a transmitter, a roof or window mounted GPS receiver, indicating clocks, and all accessories for complete operation.

Specifier Note: Select appropriate cable length for distance between GPS unit and transmitter, from the following:

GPS Receiver: GPS roof mounted, with 10 foot cable (3m) attached (additional Primex Wireless extension cable available: 50ft (15.25m), 100 ft (30.5m), and 200 ft (61m).

The GPS Receiver shall be a complete GPS receiver including antenna in a waterproof case, designed for roof or outdoor mounting. Provide mounting bracket for attachment to roof structure.
The GPS Receiver cable must be plenum rated where required by local code.

Transmitter: Primex Wireless Model **14143**, consisting of wireless transmitter with GPS receiver, a surge suppressor/battery backup, and a mounting shelf. Unit shall obtain current atomic time from satellite. The clock system shall transmit time continuously to all clocks in the system.

Transmission:

Frequency Range: 72.100 to 72.400 MHz.

Transmission Power: 1 watt (30dBm) maximum

Radio technology: narrowband FM

Number of channels: 16

Channel bandwidth: 20 kHz maximum

Transition mode: one-way communication

Data rate: 2 KBps
Operating range: 32 degree F to 158 degrees F (0 degrees C. to 70 degrees C).

Transmitter:

Transmitter output power: +26 to +30 dBm

Frequency deviation: +/- 4 kHz

Transmitter power requirements: 120 VAC 60 Hz

Internal power requirements: 5 VDC

Carrier frequency stability: +/- 20 ppm

Transmitter shall have 16 selectable channels to assure interference-free reception.

Transmitter shall have the following switches:
Time zone adjustment switches for all time zones in the world. Includes: Eastern, Central, Mountain, Pacific, Alaska, and Hawaii.

Daylight Saving Time bypass switch.

12-hour or 24-hour display.
Transmitter housing shall be black metal case, 16-3/4 inches (424.4mm) by 12 inches (304.8mm) by 1-7/8 inches (46.4mm) in size.

Antenna shall be 46 inches (1168mm) high, commercial type, mounted on top center of transmitter housing. Antenna gain shall be < 2.2 dB. Antenna polarization shall be vertical.

Transmitter housing shall incorporate a display which shall include the following:

Time readout

AM and PM indicator if 12-hour time display is set

Day and date readout

Indicator for daylight savings or standard time

LED which shall flash red in event of reception problem

GPS reception indicator

Transmitter shall contain an internal clock such that failure of reception from the GPS will not disable the operation of the clocks.

Power supply (included)
Input: 120 volt AC 50/60 Hz, 0.4 amps.
Output: 9 volt DC, 1.5 amps.
Surge Protector/Battery Backup (included).
Input: 120 volt AC 60 Hz +/- 1 Hz.
Output: 120 volt AC, 500VA, 300 watts
Surge Energy Rating: 365 joules

Additional Equipment

Specifier Note: Large buildings and multi-building projects may require satellite transmitters to provide proper coverage. Consult Primex Wireless for assistance in making this determination. If satellite transmitters are required, include the following two items in the project specification.

Wireless Receiver Switches: Switches shall receive time packets from the Primary Transmitter and relay the synchronized time to the Satellite Transmitter connected to it. The unit shall include the following:

Antenna mounted on top of the switch housing, 11-1/2 inches (292mm) long.

Power Supply:
Input 120 VAC 50/60 Hz, 0.4 amps

output: 9 volt DC, 1.5 amps

RS 232 data cable, 5 feet (1.5mm) long

Daylight Savings Time bypass switch

Dimensions: 4-1/4 inches (108mm) long, 5/-3/4 inches (146mm) wide, 1-1/4 inches (31.75mm) deep.

Weight: 12 ounces (.34kg)

Operating Range: 32 degrees F to 158 degrees F (0 to 70 degrees C)

Satellite Transmitters Primex Wireless Model **14144**: Satellite Transmitters shall receive the signal from the Wireless Receiver Switches and transmit the signal to the devices in its vicinity, which are out of the range from the Master Transmitter. The unit shall include the following:

Antenna mounted on top of the housing, 46 inches (1168mm) long.

Wireless Receiver Switch.

Power Supply Input: 120 VAC, 50/60 Hz, 0.4 amps
Output: 9 volt DC, 1.5 amps.

6 foot (1.83m) cord

Surge Suppressor/Battery Backup

Mounting Shelf.

Transmission Power: 1 watt maximum

72 MHz frequency.

Traditional analog clocks (battery): Analog clocks shall be wall mounted. Clocks shall

have polycarbonate frame and polycarbonate lens. Face shall be white. Hour and minute hands shall be black.

9 inch (228.6mm) diameter analog clock: Primex Wireless Model **14280**
12-1/2 inch (317.5mm) diameter analog clock: Primex Wireless Model **14155**
16 inch (406.4mm) diameter analog clock: Primex Wireless Model **14163**
24 inch (610mm) diameter analog clock: Primex Wireless Model **14346**
Additional colors, finishes, and dial faces are available from manufacturer.

Analog clocks shall be battery-operated,

Analog clocks shall be capable of automatically adjusting for Daylight Saving Time. An on-off switch located on the transmitter shall disable this function If desired.

Time shall be automatically updated from the transmitter 6 times per day.

Analog clocks shall remember the time during changing of batteries.

9 inch (228.6mm) and 12.5 inch (317.5mm) analog clocks shall have a tamper proof/theft resistant clock lock mounting slots.

Specifier Note: Select optional dial designs, colors, case options and hands from manufacturer's brochure

Analog clock receivers shall be as follows:

Receiver sensitivity: >-110 dBm

Receiver power: dual lithium battery pack supplied by manufacturer.

Antenna type: internal

Antenna gain: -7 dBd

If the transmitter stops transmitting valid time signals due to power failure, the clocks will continue to function as accurate quartz clocks until a valid time signal is decoded. If signal transmission is not restored after 96 hours, the second hand will "five step" as a visual indicator that the signal has been lost. Should the clocks lose power and signal, the clocks will not function.

Specifier Note: Analog clock faces can be made with Owner's logo as an option. If desired, leave in the following, and arrange for Owner to provide hard copy or digital copy of logo in format required by Primex Wireless. Contact Primex Wireless for details

Traditional analog clocks (AC): Analog clocks shall be wall mounted. Clocks shall have polycarbonate frame and polycarbonate lens. Face shall be white. Hour and minute hands shall be black.

12-1/2 inch (317.5mm) diameter analog clock, 24 VAC: Primex Wireless Model **14323** 12-1/2 inch (317.5mm) diameter analog clock, 120 VAC, Primex Wireless Model **14306**, Additional colors, finishes, and dial faces are available from manufacturer.

Analog clocks shall be AC powered (24 VAC or 120 VAC). Clocks must have an 18 inch (457.2mm) cord with 2 prong plug 9120 VAC) or pigtail(24 VAC) to connect to power source.

Analog clocks shall be capable of adjusting for Daylight Saving Time.

Time shall be automatically be updated from the transmitter 6 times per day.

If power is interrupted, the clock will stop until power resumes. Upon resumption of power, the clock will self correct to the current time.

Clocks shall have a tamper proof/theft resistant clock lock mounting slots.

Analog clock receivers shall be as follows:

Receiver sensitivity: >-110 dBm

Receiver power: 24 VAC or 120 VAC (see model #)

Antenna type: internal

Antenna gain: -7 dBd

If transmitter stops transmitting valid time signals due to power failure, the clocks will continue to function as accurate quartz clocks until a valid time signal is decoded. If signal transmission is not restored after 96 hours, the second hand will “five step” as a visual indicator that the signal has been lost. Should the clocks lose power and signal, the clocks will not function.

Specifier Note: Analog clock faces can be made with Owner's logo as an option. If desired, leave in the following, and arrange for Owner to provide hard copy or digital copy of logo in format required by Primex Wireless. Contact Primex Wireless for details

Analog clock faces shall bear Owner’s logo as indicated.

Digital Clocks: Primex Wireless Model **14201**, 6 digit -4 inch (101.6mm), 7 segment red LED display.

Specifier Note:
Select optional digit style, colors, and case styles from manufacturer’s brochure.

Digital clocks must be able to receive synchronized time signal
From Primex Wireless master or satellite transmitter.

Digital clocks must have time and date option.

Digital clocks shall be capable of automatically adjusting for Daylight Saving Time

Power Supply: 120 VAC, 50-60 cycle.

Digital clocks must be viewable from 150 feet (45.7m)

Specifier Note: Where desired for protection of clocks, specify the following optional equipment

Wire guards: Provide one for each analog clock as follows:

Analog clock wire guard Primex Wireless Model **14131**, 14 by 14 inch (355.6 by 355.6
mm) size, for nominal 12-1/2 inch (317.5 mm) diameter analog clocks.

Analog clock wire guard Primex Wireless Model 14123, 18 by 18 inch (457.2 by 457.2mm) size, for 16 inch (406.4mm) diameter analog clocks.

Digital clock wire guard Primex Wireless Model **14388** for 2. 5 inch LED digital clocks
Digital wire guard Primex Wireless Model **14389** for 4 inch LED digital clocks

Dual D Lithium Battery Pack Primex Wireless Model **14885** contains two sealed parallel lithium batteries.

Cable Connection Sealant: Radio Shack Coaxial Cable Connector Sealant 278-1645, or approved electrical grade silicone sealant.

Part 3 – Execution

3.1 Examination

Verify that construction is complete in spaces to receive equipment and that rooms are clean and dry.

Verify that 120 volt electrical outlet is located within 6 feet (1.83m) of location of transmitter and the outlet is operational and properly grounded.

3.2 Installation

Provide all equipment necessary for a complete and operable system.

Specifier Note: The GPS unit can be mounted on the roof, on a pole, or at a window. In each case, the GPS unit must have 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.

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. Any added cable lengths must be protected from outside elements.

Specifier Note: Where desired for mounting transmitter, specify the following equipment: One Model Number 14005, 18 inches long, by 3 inches wide by 15 inches deep

Transmitter:

Locate transmitter where indicated, a minimum of 2 to 3 feet (.6 to 1 meter) above the floor, away from large metal objects such as filing cabinets, lockers or metal framed walls. Transmitter(s) will be placed at locations indicated below:

Specifier Note: To assure optimum performance of the GPS Wireless Clock System, transmitter(s) location (s) must be specified in the construction documents. Primex Wireless Applications Engineering Dept. should be consulted to determine the number and placement of transmitter(s) required for the project.
Contact Primex Wireless Technical Support at 1-800-404-8112.

Attach receiver to transmitter using cable.

Connect antenna to transmitter, using care not to strip threads.

Connect power supply to the transmitter.
Set the channel number on the display to correspond to the Industry Canada license.

Plug power supply into electrical outlet.

Analog clocks perform the following operations with each clock:

Set clock to correct time in accordance with manufacturer's instructions.

Observe analog clock until valid signals are received and analog clock adjusts itself to correct time.

Install the analog clock on the wall in the indicated location, plumb, level and tight against the wall. If using 12-1/2 inch (317.5mm) clock, attach using clock-lock hanging method and suitable fasteners as approved by clock manufacturer.

Analog clocks (AC): Perform the following operations with each clock:

Observe clock until valid time signals are received and analog clock adjusts itself to correct time.

Install the analog clock on the wall in the indicated location, plumb, level, and tight against the wall. Attach using clock-lock hanging method and suitable fasteners as approved by clock manufacturer.

Specifier Note: Delete the following if wire guards are not required

Wire guards: Secure to wall, using approved theft-resistant fasteners.

3.3 Adjusting

Prior to final acceptance, inspect each clock, adjust as required, and replace parts which are found defective.

3.4 Cleaning

Prior to 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

Provide training to Owner's representative on setting and adjusting clocks, replacing batteries and routine maintenance.

3.6 Protection

Protect finished installation until final acceptance of the project.

3.7 Testing

All devices must be tested at their operational location under normal operational conditions to assure reception of signal.

END OF SECTION