Primex Wireless, Inc.
965 Wells Street
Lake Geneva, WI 53147
800-537-0464
www.primexwireless.com

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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 275313

XR WIRELESS CLOCK SYSTEMS

Specifier Note: This section covers the Primex Wireless XR 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 XR wireless clock system using Primex Wireless Inc. XR wireless system.

all bids shall be based on the equipment as specified herein. The specifying authority must approve any alternate system.

(Reference Division 27 53 13Clock Systems)

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

1.1 Section Includes

Transmission Systems GPS Receiver Primary Transmitter
Satellite Transmitter

A. 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 26 00 00 – Electrical (120 volt grounded outlet required for transmitter).
Division 27 51 16 – Wireless Tone Generator
Division 27 42 10 - Digital Clocks and Timers

Specifier Note: List standards referenced in this section, complete with designations and titles. This article does not require compliance with standards, but is merely a list of those used.

1.3 References

This Technical Specification and Associated Drawings
Primex Wireless XR 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 atomic time, the most accurate and reliable time.

UTC: Universal Coordinated Time

NTP: Network Time Protocol, used for synchronizing the clocks on computer networks and devices from either a public server or a separate server on a private local area network.

1.5 System Description

XR 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 from a master time source. This time source will either be the atomic clock on the GPS system or the clock from a defined NTP server that the XR transmitter can access via the customer Ethernet. The master time will be synchronized to UTC. Hard wiring will not

be required to the clocks installed for the system. Clocks shall automatically adjust for Daylight Saving Time in locations where DST is observed.

The system shall include an internal clock reference so that failure to detect the master time source shall not result in the clocks failing to indicate time. Additionally, XR transmitters will have an internal battery backup of up to eight hours in the event of a power failure so that settings and the correct master time will be instantly recalled upon restoration of power.

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.

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 “Radio Station Authorization” , Form FCC 601 – LM, granted by the Federal Communications Commission (FCC). This license will be issued 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 “Radio Station Authorization” granted by the FCC.

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 Part 90 of FCC rules 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 FCC Part 90.35.

Transmitter output power shall be governed by FCC Part 90 257 (b)

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.

Operating License: Submit evidence of application for FCC 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.

E. 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 FCC.

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

XR wireless clock system shall be manufactured by Primex Wireless, Inc., 965 Wells Street, Lake Geneva WI 53147 (800) 537-0464 FAX (262) 248-0061 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 master time source.

Specifier Note: Select procedure appropriate to the master time source from either of the following:

GPS Time Source

With the XR transmitter in GPS mode, it powers a connected GPS engine mounted with a clear view of the sky. Upon power, the GPS module seeks the GPS satellites in orbit to determine position and UTC time. Once the transmitter acknowledges receivable GPS data, it downloads time data and synchronizes its internal master clock to GPS 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.

NTP Time Source

With the XR transmitter in NTP mode, it connects over the Ethernet to the IP address of the NTP server. This IP address is programmed into the transmitter as part of its configuration. Once the connection to the NTP server is acknowledged, it downloads time data and synchronizes its internal master clock to NTP time. The transmitter then starts to transmit its internal time once every second. The transmitter updates its internal clock in this mode once per hour.

. **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: If NTP transmitter package is purchased, delete GPS Receiver statement, otherwise, select extension cable length, if applicable.

GPS Receiver

GPS roof mounted, with 10 foot cable (3m) attached
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

Specifier Note: Select procedure appropriate to the master time source from either of the following:

Primex Wireless Model **XR01IM**, consisting of wireless transmitter with Ethernet port for NTP time input and GPS receiver for GPS satellite time input, a surge suppressor/battery backup, and a mounting shelf. Unit shall obtain current atomic time from either satellite via GPS or via NTP through the Ethernet port. The clock system shall transmit time continuously to all clocks in the system.

Primex Wireless Model **XR01IN**, consisting of a wireless transmitter, surge suppressor/battery backup, and a mounting shelf. Unit shall obtain current NTP time from Ethernet network. The clock system shall transmit time continuously to all clocks in the system.

Transmission:

Frequency Ranges: 72.020 to 72.980 MHz, 74.610 to 74.790 MHz, 75.210 to 75.390 MHz, 75.440 to 75.600 MHz. Each range is reserved by the FCC for licensed fixed mobile broadcasts.

Transmission Power: 1 watt (30dBm) maximum

Radio technology: narrowband FM

Number of channels: 74

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).

2. 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 74 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.

DIP Switch to allow the following configuration: Daylight Saving Time bypass option, 12-hour or 24-hour display, GPS or NTP time source, Local or LAN configuration, UTC+ or UTC-, 30 minute UTC offset option.

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

Time zone indicator including Standard or Daylight Savings Time

Status LEDs: Green, which when solid indicates transmitter is broadcasting, yellow which flashes in the event of lack of time update after 48 hours, red which flashes to indicate connection or internal transmitter problem.

Internal clock: Transmitter shall contain an internal clock such that failure to update time from source will not disable the operation of the clocks.

Power supply (included)
Input: 120 volt AC 50/60 Hz, 0.4 amp.
Output: 9 volt DC, 1.5 amp.

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 **XR01R**: 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 amp 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 Model **14280**
12-1/2 inch (317.5mm) diameter analog clock: Primex Model **14155**
16 inch (406.4mm) diameter analog clock: Primex Model **14163**
24 inch (610mm) diameter analog clock: Primex Model **14346**

Additional colors, finishes, and dial faces are available from manufacturer.

Analog clocks shall be battery-operated, and shall have minimum 5-year battery life.

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 48 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 **XRA1B203**, 6-digit, 4 inch (101.6mm), 7 segment LED display. Clocks shall have polycarbonate frame and polycarbonate lens. LED digits shall be red or green. Overall dimensions: 18 inches (457.2mm) long, 8 inches (203.2mm) wide, 3 inches (76.2mm) deep.

Specifier Note: Base part number comes with red LED digits. Add letter "G" to base number for green LED digits

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 Savings 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 primary 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 – valid for transmitter with GPS input: 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. If transmitter to use NTP as source, delete following work instruction with this note.

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 XR 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 1-800-404-8117.

Specifier Note: Select procedure appropriate to the master time source from either of the following:

If GPS Unit will be used as master time source
Attach GPS receiver to transmitter using cable. Set GPS/LAN DIP switch to GPS.

If NTP will be used as master time source
Connect CAT5/CAT5e/CAT6 EIA/TIA standard Ethernet cable from transmitter LAN port to available network drop. Set GPS/LAN DIP switch to NTP.

Specifier Note: If NTP is the master time source, the network drop used to connect the XR transmitter must have connectivity to the NTP server, which can be verified by the customer IT manager. The default NTP address is time.nist.gov. If the network has a different NTP IP address, it may be programmed into the transmitter by the installer to allow connection to the proper network time.
Contact Primex Wireless Technical Support at 1-800-404-8117.

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 FCC license.

Plug power supply into electrical outlet.

C. 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