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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

#### CommandPoint™ – GPS Wireless Synchronized Time System

**Specifier Note: This section covers the Primex Wireless CommandPoint™ GPS Wireless Time 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 **1.1 Section Includes**

- 2  
3 Transmission Systems  
4 G.P.S. Receiver  
5 CommandPoint 72XR series transmitters  
6 CommandPoint 72XR series antenna  
7 Clocks  
8 Analog  
9 Digital

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

- 14 1.2 **Related Sections** Division 16 – Electrical (120 volt grounded outlet required for  
15 transmitter). Division 16735 – Wireless Bell & Tone Synchronization

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

20 **1.3 References**

- 21  
22 This Technical Specification and Associated Drawings  
23 Primex Wireless CommandPoint 72XR System User Guide  
24 National Electric Code, Article 250, “Grounding”  
25 ANSI/EIA/TIA – 569, “Communications Pathways and Spaces”  
26 ANSI/EIA/TIA – 607, “Communications Grounding and Bonding”  
27

28 **1.4 Definitions**

29  
30 Global Positioning System, a worldwide system that employs 24 satellites in an  
31 integrated network to determine geographic location anywhere in the world, and which  
32 employs and transmits Universal Coordinated Time, the world’s most accurate and  
33 reliable time.

34  
35 UTC: Universal Coordinated Time

36  
37 **1.5 System Description**

38  
39 GPS wireless clock system shall continually synchronize clocks throughout the facility,  
40 and shall be capable of clock readouts in multiple time zones where desired. The  
41 system shall provide wireless time using GPS and be synchronized to UTC. The  
42 system shall not require hard wiring. Clocks shall automatically adjust for Daylight  
43 Saving Time.  
44

1 The system shall synchronize all clocks to each other. The system shall utilize GPS  
2 technology to provide atomic time. The system shall not require hard wiring. Clocks  
3 shall automatically adjust for Daylight Savings Time.

4  
5 Analog Clocks shall be synchronized to within 10 milliseconds 6 times per day, and  
6 the system shall have an internal oscillator that maintains plus or minus one second per  
7  
8 day between synchronizations, so that clock accuracy shall not exceed plus or minus  
9 0.2 seconds.

10  
11 The system shall include an internal clock reference so that failure of the GPS signal  
12 shall not cause the clocks to fail in indicating time.

13  
14 The system shall incorporate a “fail-safe” design so that failure of any component shall  
15 not cause failure of the system. Upon restoration of power or repair of failed  
16 component, the system shall resume normal operation without the need to reset the  
17 system or any component thereof.

18  
19 Clock locations shall be as indicated, and clocks shall be fully portable, capable of  
20 being relocated at any time.

21  
22 The system must operate in accordance with a “Technical Acceptance Certificate”  
23 issued under the authority of Industry Canada and the Ministry of Industry. This  
24 license will be granted to and held by the end user.

## 25 26 **1.6 Regulatory Requirements**

27  
28 Equipment and components furnished shall be of manufacturer’s latest model.

29  
30 The end user will hold a license, known as a “Non Complex Fixed Station” Radio  
31 License granted by Industry Canada and the Ministry of Industry

32  
33 This license grants the end user protected use for wireless transmission at the  
34 designated frequency.

35  
36 IC-2365: Application for “License to Install and Operate a Radio Station in Canada”  
37 must be completed and signed by end user prior to license issuance. The end user will  
38 grant permission for Primex Wireless to apply for the license on their behalf.  
39 Primex Wireless will provide all application documents and technical information  
40 including power calculations to Industry Canada for approval

41  
42 This license will designate a unique “call sign” for each end user.

43  
44 Transmitter and receiver shall comply with RSS 119 of Issue 6 of Industry Canada  
45 specifications as follows:  
46

1 This device may not cause harmful interference, and

2  
3 This device must accept interference received, including interference that may cause  
4 undesired operation.

5  
6 Transmitter frequency shall be governed by IC: RSS119 Issue 6.

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

8  
9 System shall be installed in compliance with local and state authorities having  
10 jurisdiction.

### 11 12 1.7 Submittals

13  
14 Product Data: Submit complete catalog data for each component, describing physical  
15 characteristics and method of installation. Submit brochure showing available colors  
16 and finishes of clocks

17  
18 **Specifier Note: In accordance with Industry Canada regulations, an**  
19 **application for “Technical Acceptance Certificate” must be filed prior to use**  
20 **of the equipment. Normally, the manufacturer will have completed the filing**  
21 **and obtaining the license. If not, the Owner will be required to file the**  
22 **application with the Industry Canada prior to use. Furnishing the license, or a**  
23 **copy of the application, will confirm that Industry Canada approval has been**

24  
25 Operating License: Submit IC Technical Acceptance Certificate prior to installing  
26 equipment. Furnish the license or a copy of the application for the license, to the  
27 Owner/End User prior to operating the equipment. The original license must be  
28 delivered to the Owner/End User.

29  
30 Samples: Submit one clock for approval. Approved sample shall be tagged and shall  
31 be installed in the work at location directed.

32  
33 Manufacturer's Instructions: Submit complete installation, set-up and maintenance  
34 instructions.

### 35 36 1.8 Substitutions

37  
38 Proposed substitutions, to be considered, shall be manufactured of equivalent materials  
39 that meet or exceed specified requirements of this Section.

40  
41 Proposed substitutions shall be identified not less than 10 days prior to bid date.

42  
43 Other systems requiring wiring and/or conduit between master and clocks will  
44 not be accepted.

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

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**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: Primex Wireless or a Certified Primex Wireless installation company.

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

Coordinate installation of system antenna for access to the roof to comply with safety standards detailed in manufacturers instructions.

**1.12 System Startup**

At completion of installation and prior to final acceptance a system set up procedure must be followed. This set up procedure must be performed by Primex Wireless or a Certified Primex Wireless installer. Per manufacturer's instructions:

Validate Industry Canada call sign on transmitter display matches call sign assigned by Industry Canada as indicated by a red sticker located in transmitter chassis.

Perform power level test as detailed in manufacturer's instructions.

Calculate Voltage Standing Wave Ratio (VSWR). Verify VSWR is less than 1.5:1

Reboot system and verify call sign and channel number

Complete Industry Canada compliance form.

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**1.13 Warranty**

Manufacturer will provide a warranty on GPS receiver, transmitter, and antenna.  
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, Ontario 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 manufacturers  
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, a roof mounted antenna system, indicating clocks, and all accessories for  
complete operation.

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

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

4 The GPS Receiver shall be a complete GPS receiver including antenna in a waterproof  
5 case, designed for roof or outdoor mounting. Provide mounting bracket for attachment  
6 to roof structure.

7 The GPS Receiver cable must be plenum rated where required by local code.  
8

9 **Specifier Note: Proper coverage is dependant on several factors: size of campus,  
10 number of building, topology, etc. Contact Primex Wireless to determine the power  
11 level and number of transmitter best suited for the project.**  
12

13  
14 Transmitter: Primex Wireless **CommandPoint 72XR** series. Transmitter enclosure  
15 includes transmitter, amplifier, and lightning arrestor. An external antenna is included  
16 with model number. Transmitter obtains current atomic time from at least three  
17 satellites. The system shall transmit time continuously to all clocks and secondary  
18 devices in the system.

19  
20 Transmission:

21  
22 Frequency Range: 72.100 to 72.400 MHz.  
23

24 Transmission Power (at antenna):

25 72XR5 – 5 watts (37dBm) ERP

26 72XR30 – 30 watts (45dBm) ERP  
27

28 Radio technology: narrowband FM

29  
30 Number of channels: 16

31  
32 Channel bandwidth: 20 kHz maximum  
33

34 Transition mode: one-way communication  
35

36 Data rate: 2 kbps  
37

38  
39 Base Transmitter:

40  
41 Transmitter output power: +29 to +30 dBm  
42

43 Frequency deviation: +/- 4 kHz

44 Transmitter power requirements: 120 VAC 60 Hz  
45

46 Internal power requirements: 3.3 VDC

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- 1
- 2 Carrier frequency stability: +/- 5 ppm
- 3
- 4 Amplifier:
- 5 Output Bandwidth (max): 20MHz
- 6 Gain Flatness: +/- 1 db at 72 - 76 MHz
- 7
- 8 Fixed output
- 9 72XR5 – 5W output (37dBm) ERP
- 10 72XR30 – 30W output (45 dBm) ERP
- 11
- 12 Harmonics (-dBc): See FCC Part 90 requirements
- 13
- 14 Spurious: -60 dBc
- 15 VSWR (max): 1:3
- 16
- 17 Impedance: 50 ohm
- 18
- 19 Connector to antenna: N-female
- 20
- 21 Transmitter shall have 16 selectable channels to assure interference-free reception.
- 22
- 23 Transmitter shall have the following switches:
- 24
- 25 Time zone adjustment switches for all time zones in the world.
- 26 Includes: Atlantic, Newfoundland, Eastern, Central, Mountain, and
- 27 Pacific.
- 28
- 29 Daylight Saving Time bypass switch.
- 30
- 31 12-hour or 24-hour display.
- 32
- 33 Transmitter enclosure shall be a metal case.
- 34
- 35 Transmitter housing shall incorporate a display which shall include the following:
- 36
- 37 Time readout
- 38
- 39 AM and PM indicator if 12-hour time display is set
- 40
- 41 Day and date readout
- 42
- 43 Indicator for daylight savings or standard time
- 44 LED which shall flash red in event of reception problem
- 45
- 46 GPS reception indicator

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

Power supply requirements:

120 VAC, 50/60Hz

72XR5: <5amps

72XR30: <10amps

Antenna: An external antenna is included with the transmitter model number. The antenna connects to the transmitter via a 50 ohm coaxial cable, 100 ft. (30.5m) typical. The antenna must be installed by Primex Wireless or a Certified Primex Wireless installer.

Antenna:

Dimensions: 5.08 ft. (1.55m) x 8.67 ft.(2.64m) x 8.67ft (2.64m)

Polarization: vertical

Gain: unity

VSWR (max): 1:1.5

Impedance: 50 ohms

Lightning Protection: Direct Ground  
Pole or Wall Mountable

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, 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.

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

2  
3 Analog clocks shall remember the time during changing of batteries.

4  
5 9 inch (228.6mm) and 12.5 inch (317.5mm) analog clocks shall have a tamper  
6 proof/theft resistant clock lock mounting slots.

7 Installer will furnish lock batteries in accordance with manufacturer's instructions (9  
8 inch /228.6mm– 2 C cells, 12.5inch/317.5mm, 16 inch/406.4mm – 2 D cells and 24  
9 inch/610mm – 2 C cells)

10  
11 **Specifier Note: Select optional dial designs, colors, case options and hands from**  
12 **manufacturer's brochure**

13  
14  
15 Analog clock receivers shall be as follows:

16  
17 Receiver sensitivity: >-110 dBm

18  
19 Receiver power: dual lithium battery pack supplied by manufacturer.

20  
21 Antenna type: internal

22  
23 Antenna gain: -7 dBd

24  
25 If the transmitter stops transmitting valid time signals due to power failure, the clocks  
26 will continue to function as accurate quartz clocks until a valid time signal is decoded.  
27 If signal transmission is not restored after 96 hours, the second hand will “five step” as  
28 a visual indicator that the signal has been lost. Should the clocks lose power and  
29 signal, the clocks will not function.

30  
31 **Specifier Note: Analog clock faces can be made with Owner's logo as an option. If**  
32 **desired, leave in the following, and arrange for Owner to provide hard copy or**  
33 **digital copy of logo in format required by Primex Wireless. Contact Primex**  
34 **Wireless for details**

35  
36 Traditional analog clocks (AC): Analog clocks shall be wall mounted. Clocks shall  
37 have polycarbonate frame and polycarbonate lens. Face shall be white. Hour and  
38 minute hands shall be black.

39  
40 12-1/2 inch (317.5mm) diameter analog clock, 24 VAC: Primex Wireless Model  
41 **14323**

42 12-1/2 inch (317.5mm) diameter analog clock, 120 VAC, Primex Wireless Model  
43 **14306**

44 Additional colors, finishes, and dial faces are available from manufacturer.  
45

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

3  
4 Analog clocks shall be capable of adjusting for Daylight Savings Time.

5  
6 Time shall be automatically be updated from the transmitter 6 times per day.

7  
8 If power is interrupted, the clock will stop until power resumes. Upon resumption of  
9 power, the clock will self correct to the current time.

10  
11 Clocks shall have a tamper proof/theft resistant clock lock mounting slots.

12  
13 Analog clock receivers shall be as follows:

14  
15 Receiver sensitivity: >-110 dBm

16  
17 Receiver power: 24 VAC or 120 VAC (see model #)

18  
19 Antenna type: internal

20  
21 Antenna gain: -7 dBd

22  
23 If transmitter stops transmitting valid time signals due to power failure, the clocks will  
24 continue to function as accurate quartz clocks until a valid time signal is decoded. If  
25 signal transmission is not restored after 96 hours, the second hand will “five step” as a  
26 visual indicator that the signal has been lost. Should the clocks lose power and signal,  
27 the clocks will not function.

28  
29 **Specifier Note: Analog clock faces can be made with Owner's logo as an option. If**  
30 **desired, leave in the following, and arrange for Owner to provide hard copy or**  
31 **digital copy of logo in format required by Primex Wireless. Contact Primex**  
32 **Wireless for details**

33  
34 Analog clock faces shall bear Owner’s logo as indicated.

35  
36 Digital Clocks: Primex Wireless Model **14201**, 4 inch (101.6mm), 6 digit - 7 segment  
37 LED display.

38  
39 **Specifier Note: Base part number comes with red LED digits. Add letter “G” to**  
40 **base number for green LED digits**

41  
42 **Select optional digit style, colors, and case styles from manufacturer’s brochure.**

43  
44 Digital clocks must be able to receive synchronized time signal

45  
46 From Primex Wireless master or satellite transmitter.

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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 analog 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" (63.5mm)

LED digital clocks

Digital clock wire guard Primex Wireless Model **14389** for 4" (101.6mm)

LED digital clocks.

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

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

**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 10 feet (1.83m) of location of transmitter and the outlet is operational and properly grounded.

**3.2 Installation**

**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.**

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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.

Transmitter:  
Locate transmitter in a penthouse, electrical closet, or telecommunications room in a central location in the building. Clearance around all sides of the transmitter to comply with local building codes.

**Specifier Note: To assure optimum performance of the CommandPoint System, a site survey must be performed by Primex Wireless or a Certified Primex Wireless installation company. Contact Primex Wireless Technical Support at 1-800-404-8112.**

Transmitter is connected to external antenna via a 50 ohm coaxial cable. Typical length – 100ft (30.5m) Cable routing should comply with ANSI EIA/TIA-569 and local building codes. If the cable is routed through conduit, the conduit should be a minimum of 2 inch (50.8mm) diameter

Transmitter enclosure must be bonded to an earth ground per ANSI EIA/TIA 607, NEC Article 250, and local building codes

Antenna

Antenna should be mounted to a mast on the roof of the building connecting to the transmitter via a 50 ohm coaxial cable.  
Consult manufacturer's instruction manual for specific clearances and mounting instructions.

Antenna must be bonded to an earth ground per ANSI EIA/TIA 607, NEC Article 250 and local building codes.

Antenna must be installed by Primex Wireless or a Certified Primex Wireless installation company.

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

Install D-cell batteries.

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

1 Install the analog clock on the wall in the indicated location, plumb, level and tight  
2 against the wall. If using 12-1/2 inch (317.5mm) clock, attach using clock-lock  
3 hanging method and suitable fasteners as approved by clock manufacturer.  
4

5 Analog clocks (AC): Perform the following operations with each clock:  
6 Apply power (24 VAC or 120 VAC)  
7

8 Set clock to correct time in accordance with manufacturer's instructions.  
9

10 Install the analog clock on the wall in the indicated location, plumb, level, and tight  
11 against the wall. Attach using clock-lock hanging method and suitable fasteners as  
12 approved by clock manufacturer.  
13

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

14  
15  
16 Wire guards: Secure to wall, using approved theft-resistant fasteners.  
17

### 18 **3.3 Adjusting**

19  
20 Prior to final acceptance, inspect each clock, adjust as required, and replace parts  
21 which are found defective.  
22

### 23 **3.4 Cleaning**

24  
25 Prior to final acceptance, clean exposed surfaces of clocks, using cleaning methods  
26 recommended by clock manufacturer. Remove temporary labels from clock faces. Do  
27 not remove labels from backs of clocks.  
28

### 29 **3.5 Demonstration**

30  
31 Provide training to Owner's representative on setting and adjusting clocks, replacing  
32 batteries and routine maintenance.  
33

### 34 **3.6 Protection**

35  
36 Protect finished installation until final acceptance of the project.  
37

### 37 **3.7 Precautions**

38  
39 Primex Wireless must be notified if other high power (>30W) are operating on same  
40 roof. A cavity filter may be required.  
41

42 An antenna warning sign must be posted to the door or hatch leading to the roof in  
43 accordance with Industry Canada rules on emissions.  
44

### 45 **3.8 Testing**

46

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- 1 All devices must be tested at their operational location under normal operational
- 2 conditions to assure reception of signal.
- 3
- 4 **END OF SECTION**