

Innovation Wireless  
KRONOsync® GPS or NTP Wireless Clock System

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### Product Guide Specification

This product specification is written According to the Construction Specifications Institute (CSI), *MasterFormat*™, Section Format, and Page Format, contained in the CSI Manual of Practice.

Reference section 16730, 16735.  
Reference Master Format 2004 section 275313 (27 53 13 Clock Systems)

Specifier Note: The following list should be reviewed and edited by Architect/Engineer as required for specific project

#### 1. GENERAL

##### 1.1. General Requirements and Scope

Furnish and install a complete and new GPS or NTP Wireless Synchronised Clock system using the Innovation Wireless KRONOsync® System.

- 1.1.1. Specify GPS or NTP time source.
- 1.1.2. All bids shall be based on Innovations Wireless' product specification as contained herein.
- 1.1.3. Bidders wishing to submit alternative equipment must supply alternative specification documents which contain technical documentation to prove it is a technical and functional equivalent.
- 1.1.4. Final approval of any alternative system shall be determined at the time of job completion. Failure to provide the "precise functional equivalent" shall result in the removal of the alternative system at the contractor's expense.

##### 1.2. Summary

###### 1.2.1. GPS, NTP Wireless Transmission System

1.2.1.1. Transmitter with GPS Receiver or NTP (Network Time Protocol).

1.2.1.2. Secondary Transmitter

###### 1.2.2. Wireless Receiving Devices

1.2.2.1. Analogue Clocks – Battery/AC Powered

1.2.2.2. Digital Clocks – AC Powered

### 1.3. Definitions

#### 1.3.1. (GPS):

- 1.3.1.1. Global Positioning System, a worldwide system that employs 24 orbiting satellites in an integrated network to determine geographic location anywhere in the world, and which employs and transmits atomic time (UTC).

#### 1.3.2. (NTP):

- 1.3.2.1. Network Time Protocol, an Internet Standard [protocol](#) (built on top of TCP/IP) that assures accurate synchronisation to the millisecond of computer clock times in a network of computers. Based on [UTC](#), NTP synchronises [client workstation](#) clocks to the U.S. Naval Observatory Master Clocks in Washington, DC and Colorado Springs CO. Running as a continuous background client programme on a computer, NTP sends periodic time requests to [servers](#), obtaining server time stamps and using them to adjust computers clocks.

### 1.4. Submittals

#### 1.4.1. System Product Data:

- 1.4.1.1. Submit all data for each component, describing its operational and physical characteristics along with the method of installation.
- 1.4.1.2. Submit a brochure showing all available colours and dimensions of clocks.

#### 1.4.2. Samples:

- 1.4.2.1. Submit one clock for approval. The approved sample is to be tagged and installed as part of the final operating system.

#### 1.4.3. Manufacturer's Instructions:

- 1.4.3.1. Submit complete installation, set-up and maintenance instructions.
- 1.4.3.2. Schematic indicating the location of the transmitter(s) and all clocks must be submitted by owner prior to installation.

### 1.5. Quality Assurance

#### 1.5.1. Qualifications:

##### 1.5.1.1. Manufacturer:

- 1.5.1.1.1. Company specialising in manufacturing of timekeeping products with a minimum of 30 continuous years of documented experience.

##### 1.5.1.2. Installer:

- 1.5.1.2.1. Company with documented experience in the installation of commercial timekeeping systems.

### 1.6. Substitutions

- 1.6.1. Proposed substitutions, if considered, shall be manufactured of equivalent materials and meet or exceed all detailed operational features of the specified requirements of this section.
- 1.6.2. Submission of an alternative shall contain an original draft point by point comparison of the submitted product relative to the requirements of this specification.
- 1.6.3. Any proposed substitutions must be identified not less than 10 days prior to bid date.
- 1.6.4. Other master clock systems requiring wiring or conduit between the master and clocks are not acceptable.
- 1.6.5. Final Approval of any alternative system shall be determined at the time of job completion. Failure to provide the "precise functional

equivalent” shall result in the removal of the alternative system at the contractor’s expense.

#### 1.7. Delivery, Storage and Handling

1.7.1.1. 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.

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

#### 1.8. Project Field Conditions

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

1.8.2. Coordinate installation of GPS receiver to an exterior wall or to an access point on the roof.

### 2. PRODUCTS

#### 2.1. Acceptable Manufacturer

Innovation Wireless Ltd: KRONOsync® Wireless Time System, Mayden House, Long Bennington Business Park, Long Bennington, Newark, Nottinghamshire NG23 5DJ. Phone: 08000 248 091. Website: [www.innovation-wireless.co.uk](http://www.innovation-wireless.co.uk)

#### 2.2. System Description and Operation

2.2.1. The KRONOsync® Wireless GPS, NTP timekeeping system consists of a master Transmitter located on the inside the building, a GPS receiver mounted on the roof, exterior of the building or window, or NTP receiver box connected via an RJ45 Ethernet cable from an in-house computer network to the transmitter, along with Analogue or digital clocks, and accessories. Once operational, the transmitter shall keep all system clocks synchronised to the second all day, each day and every day.

2.2.2. System shall synchronise all clocks to each other.

2.2.3. System shall utilise GPS or NTP technology to provide atomic time to components.

2.2.4. System shall not require hard wiring for its components except for AC power. Analogue clocks may be battery operated for full portability if required.

2.2.5. Clocks shall automatically adjust for Daylight Saving Time (GMT and BST) per the Daylight-Saving time settings in the Master Clock.

2.2.6. Analogue Clocks shall synchronise to +/- 1 second of the master clock displayed time.

2.2.7. The master clock shall have an internal clock that will continuously be updated by the GPS or NTP.

2.2.8. In the event of a GPS or NTP failure, all system clocks shall continue to be synchronised to the internal clock and shall not deviate from one another. Upon restoration of the failed GPS or NTP signal to normal, all system clocks shall update to the correct time.

2.2.9. The system shall have a fail-safe design so that if a power interruption were to occur, the clocks would continue to operate. Upon the restoration of power, the transmitter shall once again communicate with the clocks and normal operation resume.

2.2.10. Analogue clocks shall require 2 “D” cell batteries and be portable. If AC powered, they shall be wired as per end user specifications.

2.2.11. System shall be 100% programmable from the front operation panel with lights that indicate power status, and GPS or NTP reception.

- 2.2.12. System programming for Time Zone, 12- or 24-hour operation and DST on/off shall be available from the front of transmitter.
- 2.3. Equipment:
  - 2.3.1. Master Clock/Wireless Transmitter:
    - 2.3.1.1. The Master Clock/Wireless Transmitter is to be installed in an internal location as a stand-alone unit or as part of a rack system.
    - 2.3.1.2. LED and associated buttons on front panel of the transmitter shall allow for the programming and display of the following operating features:
      - 2.3.1.3. The Master Clock/Wireless Transmitter shall be the KRONOsync® Model # 101005 that shall have an internal clock which will guarantee that the operation of the clocks and will continue to be synchronised in the event of a temporary GPS failure.
      - 2.3.1.4. Time Zones:
        - 2.3.1.4.1. Display and programming must allow for the selection and display of Time zones for the United Kingdom and all of North America: Eastern, Central, Mountain, Pacific, Alaska and Hawaii. It must also allow for all international time zone options.
      - 2.3.1.5. Daylight Saving Time:
        - 2.3.1.5.1. The Master Clock/Wireless Transmitter must allow for automatic adjustment of DST, allowing it to be active or inactive in whatever part of the world it is used.
      - 2.3.1.6. 12hr or 24hr Operation:
        - 2.3.1.6.1. The system must allow for programming of desired method of operation on the face of the transmitter.
      - 2.3.1.7. Programming: All programming of operating features must occur on the front of the Transmitter and all changes must be able to be viewed on the digital display as the changes are being made.
      - 2.3.1.8. Specifier Note: Specify the time source as either GPS or NTP. Select additional GPS Cable length (if needed) for the appropriate distance between transmitter and the GPS unit. GPS unit must have an unobstructed view of the sky.
      - 2.3.1.9. GPS Receiver:
        - 2.3.1.9.1. A GPS receiver shall be furnished and shall be fitted with a 15' (3m) long cable.
        - 2.3.1.9.2. The GPS receiver will be watertight and have a built-in receiver. Ready to use extension cable lengths of 25' 50' and 100' to be available from the supplier.
        - 2.3.1.9.3. A GPS mounting bracket shall be provided for secure roof mount or side wall installation.
      - 2.3.1.10. NTP Receiver:
        - 2.3.1.10.1. An NTP Receiver module shall be available with an attached 20" Ethernet cable.
        - 2.3.1.10.2. Transmitter Power shall be not less than 5 watts.
        - 2.3.1.10.3. Transmission Range shall be up to 2 miles radius (transmitter power dependent)
        - 2.3.1.10.4. Transmitter Operating Range to be 32 degrees F to 158 degrees F (0 degrees C. to 70degrees C.)

- 2.3.1.10.5. An antenna shall be used for indoor applications and be attached to the rear of the transmitter using a bayonet fitting. No external antenna required.
- 2.3.1.10.6. Power Supply: (to be included with transmitter) shall have:
  - 2.3.1.10.6.1. Input: 220-250-volt AC 50/60 Hz
  - 2.3.1.10.6.2. Output: 12-volt DC, 3 Amps
  - 2.3.1.10.6.3. Recommended: Surge Protector/Battery Backup:
  - 2.3.1.10.6.4. Input: 220-250-volt AC 60 Hz +/- 1 Hz.
  - 2.3.1.10.6.5. Output: 220-250-volt AC, 550VA, 300 watts
  - 2.3.1.10.6.6. Surge Energy Rating: 365 joules
- 2.3.2. Analogue Clocks:
  - 2.3.2.1. Analogue clocks will be battery operated using 2 “D” cell batteries provided by the manufacturer or AC power based on specification.
  - 2.3.2.2. All clocks shall be wall mounted.
  - 2.3.2.3. Clocks shall have ABS, Wood, or Metal Frame and polycarbonate or glass lens. But shall also have other options available.
  - 2.3.2.4. Clock face shall be white or antique.
  - 2.3.2.5. Hour and minute hands shall be black, second hand to be red.
- 2.3.3. Clock features:
  - 2.3.3.1. Clocks shall automatically update from the transmitter 6 times each day at 2:00, 6:00, and 10:00 AM/PM.
  - 2.3.3.2. Clocks shall use manufacturers provided “D” cell batteries or AC power adapter.
  - 2.3.3.3. Logo Clock Faces:
    - 2.3.3.3.1. Analogue clocks shall bear the manufacturer’s logo as indicated. Custom logos shall be available as an option.
    - 2.3.3.3.2. Additional finishes and colours should be available.
  - 2.3.3.4. Clocks shall automatically adjust for Daylight Savings Time, if option is selected.
  - 2.3.3.5. Clocks must continue operating in synchronised mode if GPS or NTP signal is lost due to GPS or NTP failure. Once signal is re-acquired, clocks to resume GPS or NTP time synchronisation.
  - 2.3.3.6. Clocks will keep operating as quartz-based clocks if there is a transmitter malfunction.
- 2.3.4. Clock Models: (Battery/Electric)
  - 2.3.4.1. 13” Standard Models
    - 2.3.4.1.1. # 210001 Battery
    - 2.3.4.1.2. #312001 240VAC
    - 2.3.4.1.3. #311001 24VAC
  - 2.3.4.2. 16” Standard Models
    - 2.3.4.2.1. # 220001 Battery
    - 2.3.4.2.2. #322001 240VAC
    - 2.3.4.2.3. #321001 24 VAC
  - 2.3.4.3. Wood Clocks: (see brochure or [website](#) for specific model)
  - 2.3.4.4. Brushed Aluminium Clocks: (see brochure or website for specific model)
  - 2.3.4.5. Digital Display Clocks: (see brochure or website for specific model)
  - 2.3.4.6. Security Brackets:

- 2.3.4.6.1. Built in to rear of clocks for wall mounting – to be optional.
  - 2.3.4.7. Digital Clocks must be able to receive synchronised time signals from the Innovation Wireless KRONOsyc Transmitter and possess the same operating features as all Analogue clocks.
  - 2.3.4.8. Wire guards to provide protection of clocks in harsh environments shall be as follows:
    - 2.3.4.8.1. 16 x 16-inch Wire Guard for 13-inch diameter Analogue clocks. Model #104001
    - 2.3.4.8.2. 19 x 19-inch Wire Guard for 16-inch diameter Analogue clocks. Model #104002
3. System Operation and Start-up
- 3.1. Transmission System shall receive Atomic Time information every second from the GPS receiver which shall be mounted with an unobstructed view of the sky and connected to the system master transmitter, or the NTP receiver mounted on and connected to transmitter.
  - 3.2. Upon power up and receipt of GPS or NTP time, the Transmitter will then transmit GPS or NTP synchronised time to all receiving devices programmed to the system output. The transmitter and all receiving devices will monitor receipt of GPS or NTP time and remain synchronised.
  - 3.3. Wireless Master Transmitter Operation
    - 3.3.1. When power is first applied to the master transmitter, the power light shall illuminate and the transmitter shall simultaneously search for a valid GPS or NTP signal that, upon receipt, will set the internal clock of the transmitter. The transmitter shall update its internal clock whenever it receives a valid time signal from the GPS or NTP receiver. It shall transmit GPS or NTP time 3 times per minute continuously to all receiving devices.
  - 3.4. Analogue Clock Operation:
    - 3.4.1. For battery clocks, the two “D” cell batteries supplied shall be inserted into a battery housing at the rear of the clock. The clock’s wireless receiver shall then search for a signal from the transmitter by scanning all frequencies. Upon receipt of the signal, the clock shall store the frequency in memory and set the clock to the exact second of the transmitter. The clocks shall locate the position of their hands and automatically set them to be in perfect synchronisation to the Master Transmitter. The clock hands shall move in a quick “clockwise” motion until they achieve synchronised time with the transmitter and all other clocks.
  - 3.5. Digital Clock Operation:
    - 3.5.1. An AC to DC adapter (to be supplied with each digital clock) shall be connected to the appropriate local power source. A built-in wireless receiver shall search for a signal from the transmitter by scanning all frequencies. Upon receipt of signal confirmation, the digital clock will store the frequency in its own non-volatile memory and synchronise to the exact time of transmitter.
4. EXECUTION
- 4.1. Examination
    - 4.1.1. Verify that construction is complete in spaces to receive equipment and that rooms are clean and dry.
    - 4.1.2. Verify that 240-volt electrical outlet is located within 6 feet of location of transmitter and the outlet is operational and properly grounded.

- 4.1.3. Verify that all 240-volt electrical outlets for the AC powered clocks are located at the exact installation point and the outlet is operational and properly grounded.
- 4.2. System Installation
  - 4.2.1. Install in accordance with manufacturer's installation manual furnished with system.
  - 4.2.2. The GPS receiver shall be mounted on the outside wall of the building, roof, or inside window. In all cases the GPS unit must have a clear view of the sky. If mounted on exterior side wall, there is to be no overhanging structure that can block its view of the sky. If located on the roof, it must be at a height that will prevent it from contacting potentially standing water or buried under snow. If inside window mounted, the window glass shall not contain chemical shielding. (Low E)
  - 4.2.3. The NTP receiver shall be located next to or sit on top of the Transmitter.
    - 4.2.3.1. Connect the RJ45 Ethernet cable from the computer network to back of the NTP receiver.
    - 4.2.3.2. Connect the NTP receiver to the Transmitter with the supplied cable. The NTP receiver does not require individual power supply.
- 4.3. Cleaning
- 4.4. Prior to final acceptance, clean exposed surfaces of all system components, using cleaning methods recommended by the manufacturer. Remove any labels from the faces of the clocks.
- 4.5. Manufacturer Services/Demonstration
- 4.6. Provide technical assistance to owner's representatives on functioning of the system and ongoing operation requirements. Use operations manual or call 08000 248 091.
- 4.7. Field Inspection
  - 4.7.1. Prior to final acceptance, inspect entire system to ensure proper functioning and synchronisation of components and replace any parts found defective. Contact Innovation Wireless at 08000 248 091