SPECIFIER NOTE: This specification section includes guide notes identified as "PTS COMMENT" for information purposes and to assist the specification writer in making appropriate product selections. The PTS COMMENT precedes the text to which it is referring. Each section serves as a guideline only and should be edited with deletions and additions to meet specific project requirements and local building codes. This section covers Pyramid Time Systems TimeTrax Sync™ RF Wireless Synchronized Clock Systems. Consult with Pyramid Time Systems for assistance in editing this section for the specific application.

PTS NOTE: This specification section is written in accordance to the Construction Specifications Institute, Project Resource Manual including MasterFormat™, SectionFormat™, and PageFormat™ contained in the CSI Manual of Practice. Optional text is indicated by square brackets [_]; delete the optional text including the brackets in the final copy of the specification and retain only text pertaining directly to the project. Delete the PTS COMMENTS in the final copy of the specification. Trade/brand names with appropriate product model numbers, styles, and types are used in PYRAMID COMMENTS and in the specification text titled "Basis of Design".

1 GENERAL

1.01 SUMMARY OF WORK

A. This Section specifies materials and accessories for a radio frequency wireless clock system.

B. Section Includes:
   1. RF Wireless Transmitter;
   2. RF Wireless Analog Clock;
   3. RF Wireless Digital Clock;
   4. Elapsed Digital Timer;
   5. Accessories.

1.02 RELATED REQUIREMENTS

PTS COMMENT: Include in this Paragraph only those sections and documents that directly affect the work of this section. If a product or component is specified elsewhere, the related section number(s) should be listed in the Paragraph below. Edit the following paragraphs according to specific project.

A. Section [27 05 00 - Common Work Results for Communications: conductors and cables].

B. Section [27 10 53 - Clock System Commissioning].

PTS COMMENT: In the following section, include only those reference standards included in the final version of the project specification.

1.03 REFERENCE STANDARDS

A. Federal Communications Division (FCC)
   1. Part 15 - Code of Federal Regulations.

B. National Fire Protection Association (NFPA).
   1. NFPA 70E-[2012], Standard for Electrical safety in the Workplace.

C. US Green Building Council (USGBC).
   1. LEED® NC Version 2.2-[2009], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package for New Construction and Major Renovations.

D. Underwriter's Laboratories (UL).
   1. UL

1.04 ADMINISTRATIVE REQUIREMENTS

A. Co-ordination: Co-ordinate work of this Section with communications and electronics work and with work of other trades for proper time and sequence to avoid construction delays.

PTS COMMENT: The pre-installation meeting may be omitted if the size and complexity of the project does not require prior co-ordination and review of the system installation.

B. Pre-installation Meeting: Convene pre-installation meeting after Award of Contract and [one week] before starting work of this Section to verify project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturer's written installation instructions.
   1. Comply with Section 01 31 19 - Project Meetings and co-ordinate with other similar pre-installation meetings.
   2. Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:
   3. Ensure meeting agenda includes review of methods and procedures related to installation including co-ordination with related work.
   4. Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within [one week] of meeting.

PTS COMMENT: Article below includes submittal of relevant data to be furnished by Contractor.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

A. Make submittals in accordance with Contract Conditions and Section 01 33 00 - Submittal Procedures.

B. Product Data: Submit product data including manufacturer's literature for clock system materials and accessories, indicating compliance with specified requirements and material characteristics.
   1. Submit list of materials and accessories to be incorporated into Work.
   2. Include product name.
   3. Include preparation instructions and recommendations, installation methods, and storage and handling requirements.
   4. Include contact information for manufacturer and their representative for this Project.

C. Shop Drawings: Submit shop drawings with information as follows:
   1. Diagram of proposed system showing system platform appliance, communication pathway, and schedule of individual device locations.
   2. Indicate integration with the Owner's network and servers. Include line diagram of network relationships.
   3. Show system power requirements.

D. Samples:
   1. Submit one sample of each type of device used on project. Samples will be returned to Contractor for incorporation into the Work after Consultant's review.

E. Test Reports:
   1. Submit evaluation and test reports or other independent testing agency reports showing compliance with specified performance characteristics and physical properties.

F. Subcontractor Experience: Submit verification of communication and electronics subcontractor's experience.

G. Sustainable Design (LEED).
   1. LEED Submittals: In accordance with Section [01 35 21 – LEED Requirements]

1.06

PTS COMMENT: If LEED is not a part of the project, delete the following Paragraph in its entirety as well as the reference standards in 1.03.

A. Sustainable Design Closeout Documentation (LEED).
   1. Provide calculations on end-of-project recycling rates, salvage rates, and landfill rates for work of this Section demonstrating percentage of construction wastes which were recycled.
   2. Submit verification from recycling facility showing receipt of materials.

B. Record Documentation: In accordance with Section 01 78 00 - Closeout Submittals.
   1. List materials used in clock system work.
   2. Warranty: Submit warranty documents specified.

1.07 QUALITY ASSURANCE

A. Communications and Electronics Subcontractor Quality Assurance:
   1. Work experience of [3] years minimum with work similar to work of this Section.
   2. Manufacturer with minimum of [5] year minimum record of satisfactory product manufacturing and support of systems similar in size and scope.

B. Supplier's Accreditation: Use only authorized dealers of clock system manufacturer.

PTS COMMENT: If LEED is not a part of the project delete the following Paragraph in its entirety as well as the reference standards in Articles 1.03 and 1.05.

C. Sustainability Standards Certification (LEED).
   1. LEED submittals: In accordance with Section [01 35 21 - LEED Requirements].

PTS COMMENT: The following Article, although not part of Quality Assurance, can be used to enhance the quality of materials by ensuring that they are delivered and handled properly at the work site.

1.08 DELIVERY STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:
   1. Deliver material in accordance with Section 01 61 00 - Common Product Requirements.
   2. Deliver materials and accessories in clock system manufacturer's original packaging with identification labels intact and to suit project.
   3. Ensure clock system materials are not exposed to moisture during delivery.
   4. Replace damaged clock system materials.

B. Storage and Handling Requirements: Store materials off ground in dry location and protected from exposure to fumes and harmful weather conditions and at temperature conditions recommended by manufacturer.
   1. Store in original packaging until installed.

C. Packaging Waste Management:

PTS COMMENT: For smaller projects that do not have a separate Section for waste management and disposal, delete the following paragraph.

   1. Separate and recycle waste packaging materials in accordance with Section [01 74 19 - Construction Waste Management and Disposal].
   2. Remove waste packaging materials from site and dispose of packaging materials at appropriate recycling facilities.

PTS COMMENT: For smaller projects that do not have a Waste Management Plan, delete the option referring to a Waste Management Plan.

3. Collect and separate for disposal, paper and plastic material in appropriate on-site storage containers for recycling [in accordance with Waste Management Plan].

1.09 WARRANTY

A. Project Warranty: Refer to Contract Conditions for project warranty provisions.

B. Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.

PTS COMMENT: Co-ordinate article below with manufacturer's warranty requirements.

C. Warranty period: [3] years commencing on Date of Purchase.

2 PRODUCTS

2.01 MANUFACTURER

A. Manufacturer: Pyramid Time Systems, 45 Gracey Avenue, Meriden, CT 06451, Phone: 1.888.479.7264, URL: pyramidtimesystems.com

2.02 SYSTEM REQUIREMENTS

A. Ensure clock system components are designed to operate as an RF wireless clock system and as part of complete system including "fail-proof" design to ensure power interruption does not cause system failure.

PTS COMMENT: Use the following paragraph only if system is being installed as part of a renovation in an existing building.

B. Ensure system can work in conjunction with existing wiring.

C. Ensure system synchronizes all clocks and devices to each other.

D. Ensure system does not require FCC licensing.

E. Ensure system uses frequency-hopping technology (902-928MHz)

F. Ensure system is capable of correcting clocks immediately upon receipt of wireless signal.
1. Analog and digital clocks automatically correct themselves on receipt of wireless signal.

G. Ensure each individual product is bench tested at manufacturer's facility.
1. Random testing is unacceptable.

H. Ensure each product is designed, assembled and tested in the United States of America.

Basis of Design: Pyramid Time Systems, TimeTrax Sync™ RF Wireless Clock System.

2.03 TRANSMITTER

A. Transmitter: UL and cUL 863/Power Supply.
1. Ensure transmitter includes 8 pre-programmed (S)NTP backup addresses.
2. Ensure transmitter is capable of receiving (S)NTP time signal via Ethernet.

3. Ensure transmitter is capable of receiving digital signals through RJ45 connection.
4. Ensure transmitter is capable of correcting clocks for Daylight Saving Time.
5. Ensure transmitter is capable of customizing Daylight Saving Time, in the event of international use or a change in government regulations.
6. Ensure transmitter is capable of outputting RS485 signals/BCD correction.
7. Ensure transmitter is capable of outputting signals including:
   a. NTP
   b. Custom/PC time
   c. Continuous RF pulse
8. Ensure transmitter does not require FCC license for operation.
9. Ensure transmitter power output is 30 dBM (1 Watt).
10. Ensure transmitter operation frequency range is 902-928 MHz frequency hopping technology (128 channels).

PTS COMMENT: The RF Wireless transmitter is available in wall or shelf mount options. If using wall mount, the housing measures 6.5 x 5.0625 x 1.75 inches. If using shelf mount, the housing measures 6.5 x 6.5 x 2.5 inches.

11. Mounting: [wall mount] [shelf mount].
12. Housing: [6.5 x 5.0625 x 1.75 inches] [6.5 x 6.5 2.5 inches] black smooth surface metal enclosure with 5 inch antenna.
13. Communications Interface: Ensure transmitter is capable of being programmed through software interface.
    a. Ensure interface includes functions as follows:
       1) Allow users to schedule bells and other events;
       2) Display features;
       3) Show IP settings;
       4) Show associated devices;
       4) Show other transmitter settings;
       5) Set time and date.
14. Display: Two row, 20 character, backlit LCD display including day of week, date and time, am/pm.

PTS COMMENT: Include the following paragraph if optional relays are required. Identify the number of optional relays required. Number of relays is dependent on the number of systems or system events scheduled for the facility.

15. Optional relays: Include [ ] relays to ensure transmitter is capable of utilizing [ ] zones that are used for scheduling facility systems as follows:

PTS COMMENT: Identify systems which require event scheduling.

    a. Bells;
    b. Horns.

16. Ensure transmitter software can manage event schedule.
17. Ensure transmitter software can manage up to 255 events.

PTS COMMENT: The transmitter must be capable of running a wireless system with GPS option.

18. Clock System: Wireless with transmitter to FCC, Part 15.
    a. Transmitter: Capable of transmitting data to TimeTrax Sync™ RF wireless analog and digital clocks, and receiving signal from (S)NTP time server
    b. Automatic bi-annual Daylight Saving Time changes.

PTS COMMENT: The transmitter must be able to interface with elapsed digital timers. Include the following paragraph if a countdown function is required for digital clocks.

19. Digital Countdown Clocks: Ensure transmitter is capable of interfacing with digital countdown clocks.
20. Power Requirements: 105-240V AC, 50/60Hz
    a. Ensure transmitter is capable of 30 day battery memory backup in event of power failure.
21. Basis of design: Pyramid Time Systems, TimeTrax Sync™ Count Up/Down or Code Blue Series

Digital Timers.

PTS COMMENT: Include the following paragraph if a GPS option is required.

22. GPS: GPS receiver capable of receiving synchronization signal from satellites with roof mounted antenna and connected with 75 foot long cable with options for 150 or 300 foot cable.

PTS COMMENT: The transmitter must be able to act as an (S)NTP Server. Include the following paragraph if a NTP Server is required.

23. (S)NTP Server: Ensure transmitter is capable of acting as (S)NTP server which other devices can point to receive time through (S)NTP protocol (optional).
24. Basis of Design: Pyramid Time Systems., TimeTrax Sync™ RF Wireless Transmitter 9T1WI or S9DWXSLAUB.

2.04 CLOCKS

A. Analog Clocks: UL and cUL 863, designed for RF wireless system with fully automatic plug and play capability.
1. Ensure clock is capable of receiving wireless signals from transmitter.

PTS COMMENT: Analog clocks are available in 12 hour, 12 hour with seconds and 12/24 hour options. Custom logo clocks are available and may be specified in the following paragraph. Contact Pyramid Time Systems directly for complete analog clock display format offering.

2. Clock display: [12] [12 with seconds] [12/24] hour [white face with black numbers] [black face with white numbers] [custom]

PTS COMMENT: The 105-120V AC/60Hz analog clock receives time update every twenty (20) seconds. The battery operated analog clock receives time every twenty four (24) hours.

3. Ensure analog clock is capable of receiving Pyramid Time System wireless signals [every twenty (20) seconds] [every twenty four (24) hours].
4. Materials:
   a. Dial: Polystyrene

PTS COMMENT: Analog clocks are available in black bezel (white face with black numbers), silver bezel (white face with black numbers or black face with white numbers), hardwood cherry finish bezel (white face with black numbers, battery operated only), hardwood oak finish (white face with black numbers, battery operated only) or hardwood walnut finish bezel (white face with black numbers, battery operated only). The 105-265V AC analog clock receives time update every twenty (20) seconds. The battery operated analog clock receives time every twenty four (24) hours.

   b. Bezel: [Low profile, smooth surface ABS, black] [Low profile, smooth surface ABS, silver] [Hardwood cherry finish] [Hardwood Oak finish] [Hardwood walnut finish]
   c. Crystal: Shatter-proof, side-molded, polycarbonate.
5. Hand tolerance:
   a. Hour and minute hands: ±1/4 minute.
   b. Second hand: ± 1/2 minute.
6. Power Requirements: [Battery operated] [105-120V AC, 60Hz].
7. Clock mounting: [Surface mount security bracket] [double wall mount] [double ceiling mount].

PTS COMMENT: Pyramid Time Systems recommends using Pyramid Duration L 3.6V C-size Lithium batteries for battery applications. Choose the following paragraph if clocks are to be battery operated.

   a. Batteries: One (1) "C" cell 3.6V Lithium batteries.
      1) Basis for design: Pyramid Duration L "C" Cell 3.6V Lithium (#42224) batteries.
8. Basis of design: Pyramid Time System, [TimeTrax Sync™ 13" Series RF Wireless Analog Clock] [TimeTrax Sync™ 17" Series RF Wireless Analog Clock] [TimeTrax Sync™ 16" Wood Series RF Wireless Analog Clock].

B. Digital Clocks: UL and cUL 863, designed for wireless system.
1. Ensure clock is capable of receiving wireless signals from transmitter.

a. Operation frequency range: 902 – 928 MHz frequency-hopping technology.

2. Display Size/Format:
   a. 7 segment [high-efficiency 4" red LED numeral with 4 digits] [high-efficiency 3" red LED numeral with 4 digits] [high-efficiency 2.5" red LED numeral with 6 digits] [high-efficiency 4" red LED numeral with 6 digits] [2.5" LCD with 6 digits].
   b. Format: 12/24

PYRAMID COMMENT: For LED clocks, choose either black or silver bezel. For LCD clocks, bezel available in black only.

c. Bezel: Low profile, smooth surface ABS, [black] [silver].

PYRAMID COMMENT: For visibility from 75 feet away, choose 2.5 inches x 6 digit LCD format or 2.5 x 6 digit LED format. For visibility from 100 feet away, choose either 2.5 inches x 6 digit LED format. For visibility from 200 feet away, choose 4 inches x 4 digit. For visibility from 250 feet away, choose either the 4 inches x 4 digit or 4 inches x 6 digit LED format.

d. Visibility: [75] [200] [100] [250]

PYRAMID COMMENT: For LED clocks, choose twenty (20) seconds. For LCD battery operated clocks, choose every twenty four (24) hours.

3. Ensure system is capable of receiving wireless signals every [twenty (20) seconds] [twenty four (24) hours].

PYRAMID COMMENT: For LED clocks, choose 105-240V AC 50/60Hz. For LCD clocks choose 3.6V Lithium C-Cell Battery.

4. Power Requirements: [105-240VAC 50/60Hz] [Two (2) 3.6V Lithium C Cell Batteries].

PYRAMID COMMENT: For LED 105-265V AC 50/60Hz, choose security surface mount, double wall mount or ceiling mount. For LED 105-120AC, choose security surface mount, for LCD battery operated clocks, choose security surface mount, double wall mount or double ceiling mount.

5. Clock mounting: [security surface mount] [double wall mount] [double ceiling mount].

PYRAMID COMMENT: Choose the Count Up/Count Down or Code Blue Series Digital Wireless Clock if the clock is to be used in conjunction with an Elapsed Timer.

6. Power Requirements: 105-240V AC 50/60/Hz
7. Elapsed Timer Interface: Input for receiving pulses to activate count up or countdown functions.
8. Basis of design: Pyramid Time System, [TimeTrax Sync™ Count Up/Countdown Series Digital Wireless Clock] [TimeTrax Sync™ Code Blue Series Digital Wireless Clock].

2.05 ACCESSORIES

A. Elapsed Timer Control Plate: Interface capability with [TimeTrax Sync™ Count Up/Countdown Timer Series] [TimeTrax Sync™ Code Blue Series] digital clock.

1. Capable of working with 6-digit LED digital clocks.
2. Count up functionality from 00:00:00 to 99:99:59.
3. Programmable countdown functionality starting at 99:59:00.
4. Ensure timer is capable of controlling digital clock functions.
5. Ensure timer is capable of activating relay at completion of count down on the digital clock.
6. Basis of design: Pyramid Time Systems, TimeTrax Sync™ Count Up/Countdown Digital Timer Controller or TimeTrax Sync™ Code Blue Digital Timer Controller.
7. Basis of design: Pyramid Time System, [TimeTrax Sync™ Count Up/Countdown Controller CTBUZZKIT] [TimeTrax Sync™ Code Blue Controller CBBUZZKIT].

B. Signal and Control Circuits: Manufacturer's recommended stranded, single conductors or twisted pair cable.

C. Data Circuits: Category 5 minimum, twisted pair cable.

PTS COMMENT: Clock systems work best when all of the components come from a single manufacturer. However, it is possible for components from manufacturers to be mixed within a system as long as the components are compatible. In renovation projects existing systems may differ from new additions to the system. Check with the manufacturers of both the existing system and the new components to ensure compatibility before specifying different manufacturers of the components. It is recommended that for new projects all system components come from the same manufacturer.

2.06 SOURCE QUALITY CONTROL

A. Ensure clock system components and accessories are supplied or approved in writing by single manufacturer.

2.07 PRODUCT SUBSTITUTIONS

A. Substitutions: [In accordance with Section 01 23 13 - Product Substitution Procedures] [No substitutions permitted].

3 EXECUTION

3.01 INSTALLERS

A. Use only installers with [3] years minimum experience with work similar to work of this Section.

B. Ensure all clock system components are installed by single communications and electronics subcontractor.

3.02 EXAMINATION

A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for clock system installation in accordance with manufacturer's written recommendations.
   1. Visually inspect substrate in presence of Consultant.
   2. Ensure surfaces are free of snow, ice, frost, grease and other deleterious materials.
   3. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

B. Start of clock system installation indicates installer's acceptance of substrate installation conditions.

3.03 INSTALLATION

PTS COMMENT: Refer to the manufacturer's current installation guide for detailed information regarding installation.

A. Install wireless clock system in accordance with manufacturer's written recommendations and in accordance with NFPA 70E.

B. Integrate clock system with Owner's electrical and communications network.

C. Install wiring in accordance with requirements of local Authority Having Jurisdiction.
   1. Do cabling in accordance with Section [27 15 00 - Communications Horizontal Cabling].

D. Conceal wiring except in unfinished spaces and as approved in writing by Consultant.

E. Install clocks only after painting and other finish work is completed in each room.

F. Install clocks and other devices square and plumb.

3.04 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with Section [01 45 00 - Quality Control].

PTS COMMENT: Specify requirements if manufacturers are to provide field quality control with onsite personnel for instruction or

supervision of product installation, application, or construction. Manufacturer field reports are included under PART 1, Action and Informational Submittals.

3.05 SYSTEM STARTUP

A. At completion of installation and before final acceptance, turn on equipment and ensure equipment is operating properly, and clock system devices and components are functioning.

B. Evaluate and test each device in clock system on room-by-room basis using factory-trained technicians.
   1. Fix or replace devices which fail test or are functioning incorrectly.
   2. Submit evaluation and report showing results of room-by-room tests and overall system compliance within 3 days of testing being carried out.

3.06 CLEANING

PTS COMMENT: For smaller projects that do not have a separate Division 01 Section for cleaning, delete the reference to Section 01

A. Progress Cleaning: Perform cleanup as work progresses [in accordance with Section 01 74 00 - Cleaning and Waste Management].
   1. Leave work area clean at end of each day.

B Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment [in accordance with Section 01 74 00 – Cleaning and Waste Management].

C. Waste Management:
   1. Co-ordinate recycling of waste materials with [01 74 19 - Construction Waste Management and Disposal].
   2. Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.
   3. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.07 DEMONSTRATION AND TRAINING

A. Arrange system demonstration and training session for Owner’s operation and maintenance personnel.
   1. Allow Owner and Consultant [7] days minimum advance notice before training session.

B. Break down system demonstration and training session into logical segments for Owner’s operations and maintenance personnel.

C. Train Owner’s maintenance personnel in procedures and schedules involved in operating, troubleshooting, servicing, and preventative maintenance of clock system.

3.08 SYSTEM COMMISSIONING

A. Do clock system commissioning in accordance with Section [27 10 53 - Clock System Commissioning].

3.09 PROTECTION

A. Protect installed products and accessories from damage during construction.

B. Repair damage to adjacent materials caused by clock system installation.

END OF SECTION 27 53 13 - WIRELESS CLOCK SYSTEM