Installation and Operation Manual

AllSync Plus® Wired Clocks

american time®

Integrated Solutions

Part # H004881
Rev. 4
September 2018

Safety Precautions

All wiring to AllSync Plus clock(s) and Master must be installed by qualified persons in conformance with applicable national and local electrical codes. Improper installation of this equipment can result in lethal electrical shock and fire.

Disconnect and lock out electrical power to AC clocks before wiring.

There are no user serviceable parts inside AllSync Plus clocks.

The AllSync Plus clock(s) should be installed in a location protected from:

Water, including condensation

Physical damage

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Fax: **800-789-1882**
american-time.com

Table of Contents

The AllSync Plus Clock Manual explains how to install AllSync Plus Clocks and understand their operation.

The American Time AllSync Plus clock is the second generation of the AllSync Chameleon clock.

The AllSync Plus clock incorporates all of the first generation AllSync clock features with improved accuracy and 15 minutes of reserve power for short power outages.

FEATURES

- 5 Year Warranty
- Microprocessor controlled movement
- 15 minutes of backup power (no batteries required)
- Accuracy to within ±1 second of a consistent master clock
- Reduced power consumption
- Diagnostic LED

DESCRIPTION

The american time® AllSync Plus clock is designed to work with multiple master clocks and correction signals. This unit is programmed to identify the signal it receives from the master and operate as that style of clock. Changing clock operation from one style to another is as easy as unplugging the clock from one system and plugging it into another. If needed, changing the placement of 2 small jumpers on the circuit board can change the voltage required to run this clock from 120vac to 24vac or 24vac to 120vac. This clock provides 15 minutes of backup run power without the use of batteries. If a power outage should last longer than 15 minutes, the clock will synchronize to the master clock at the hourly and 12 hour correction cycles.

CORRECTION SIGNALS

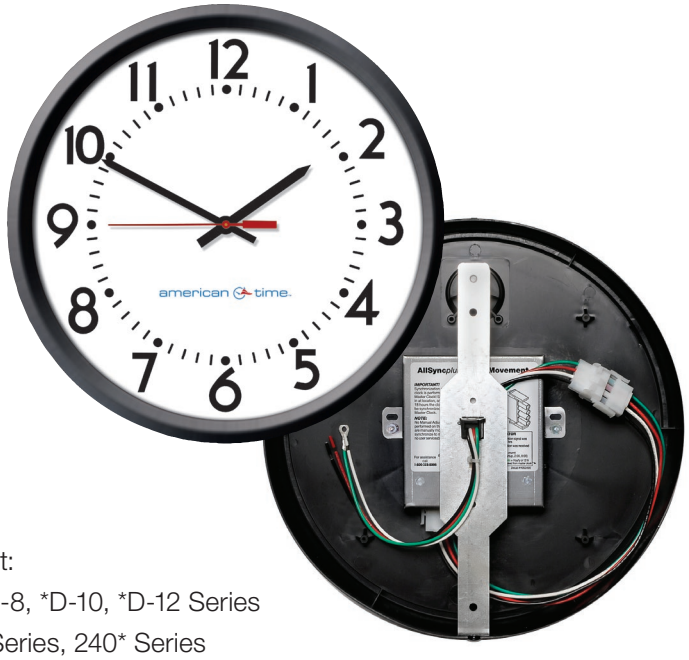
Works on:

- Hourly correction: 7-9 seconds starting at the 57th minute and 54th second. 12 hour correction: 13-18 seconds starting at 5:57:54 (am and pm).
- Hourly correction: 24-28.5 seconds starting at the 0 minute and 0 second. 12 hour correction: 24-32 minutes starting at 6:00:00 (am and pm).
- *Hourly correction: 54-56 seconds starting at the 58th minute and 5th second. 12 hour correction: 10 pulses of 94-96 seconds starting at 5:05:00 (am and pm) and repeating every 120 seconds.*
- Hourly correction: 24-26 seconds starting at 0 minute and 0 second. 12 hour correction: 25 pulses of 24-26 seconds starting at 6:00:00 (am and pm) and repeating every 60 seconds.
- Hourly correction: 63-67 seconds starting at the 58th minute and 0 second. 12 hour correction: 14 pulses of 63-67 seconds starting at 5:06:00 (am and pm) and repeating every 120 seconds.
- Hourly Correction: 28.75-35 seconds starting at the 59th minute and 30th second. 12 hour correction: 13 minutes and 52 seconds-18 minutes and 8 seconds starting at 5:12:00 (am and pm). *Note: Standard Electric version part number required for this correction type.

■ **Note:** When switching between these correction protocols, you must use a different correction protocol to complete the transition. The AllSync Plus clock needs to distinguish between hourly corrections before it can change correction protocols internally.

SPECIFICATIONS

- 120vac 50/60 Hz or 24vac 50/60 Hz
- Current draw:
  - 24vac, 1 watt, .030 amps
  - 110vac, 3 watts, .026 amps
- Maximum operating voltage:
  - 24vac setting = 32vac
  - 120vac setting = 140vac
- Minimum operating voltage:
  - 24vac setting = 18vac
  - 120vac setting = 105vac



GENERAL

Types of secondary clocks compatible with this movement:

Cincinnati ..... WS*, *D-8, *D-10, *D-12 Series

Dukane ..... 24SS* Series, 240* Series

Edwards ..... *010 & *012 Series

Faraday ..... 2315*, 2316*, 2335*, 2336*, 2370*, 2372*, 2380*, 2382*, 2310*, 2311*, 2320*, 2321*, 2330*, 2331*, 2313*, 2314*, 2333* 2334* and 1310 through 1431 Series

Honeywell ..... ST402A* Series

Lathem ..... SS* Series

National Time ..... *EX-HH and *EX-LL Series

Simplex® & IBM ..... 77* Series, 82* Series, 2310 – 92* Series, 6310 – 92* Series

American Time ..... X* Series

Standard™ Electric ..... CR & GRC 109106 through 109155 Series and 105047 through 105066 Series

*Indicates more numbers before or after. Different part number required for Standard Electric version.

COMPLIANCE

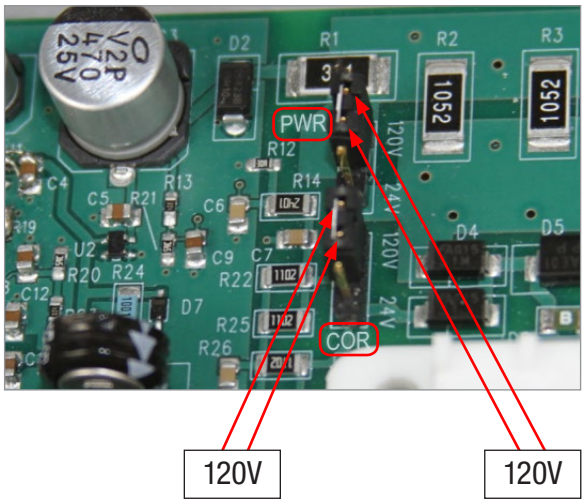
- FCC Part 15 Class B
- ICES-003

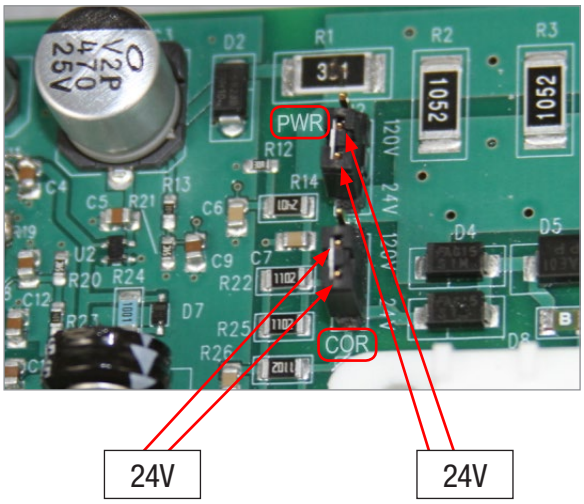
Electrical Connections

Warning:

To prevent electrical shock, do not apply electrical power to master, clock relays and clock wiring before completing all wiring connections.

The AllSync Plus clock can run off either 120vac 50/60 Hz or 24vac 50/60 Hz. To change between the two different supply voltages two jumpers must be set inside each clock. This setting is completed by American Time when your clock(s) are built according to the part number ordered.





CAUTION:

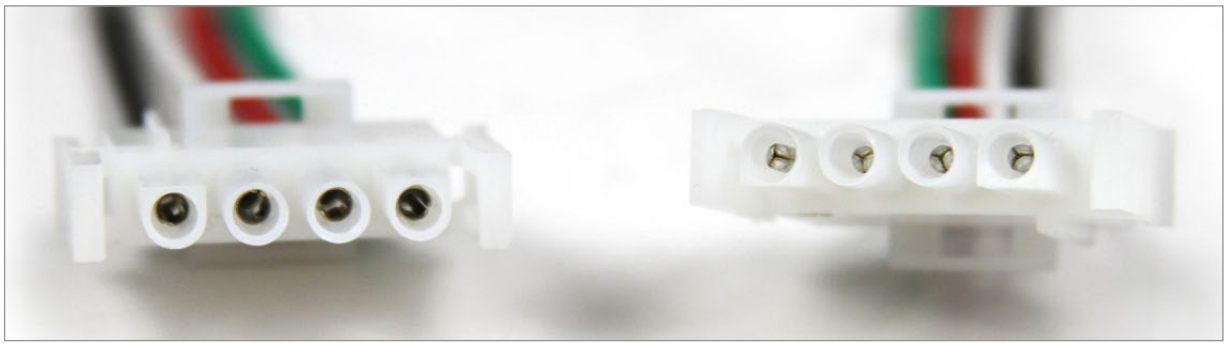
Setting the AllSync Plus clock for 24vac and powering it with 120vac will damage the circuit board.

Red wire = Correction White wire = Neutral Black wire = Run Green wire = Ground

New Installation Note

Warning:

While both ends of the wire harness look the same, they are not. The male pin connector is for the clock side. The female pin connector is for the wall side and can be cut off if there is no mating connector available.



Female pin connection to wall.

Cut this end if necessary.

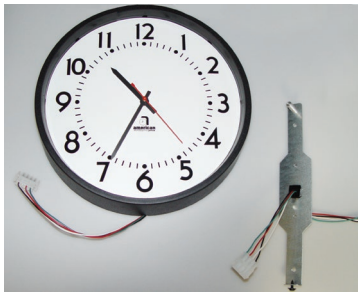
Male pin connection to clock.

DO NOT CUT.

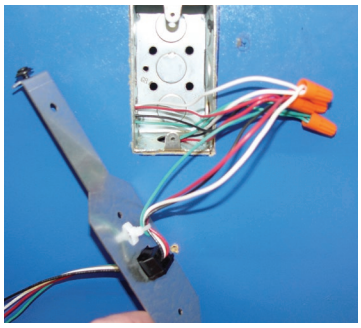
Plastic Surface Mount Clock Installation

Warning:

The AllSync Plus plastic surface mount clock should be mounted according to these instructions to meet UL clock listing.



1. Remove the AllSync Plus clock, mounting bracket, and wiring harness (if applicable) from the packaging.



2. Using UL approved wire nuts, make connections between flying leads and wiring inside electrical box.

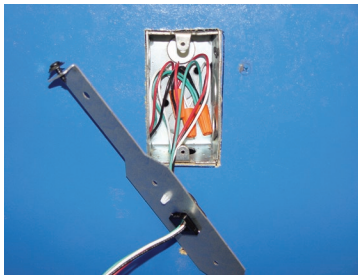
a. Black wire should be connected to hot (run) wire from the master.

b. Red wire should be connected to the correction line from the master clock.

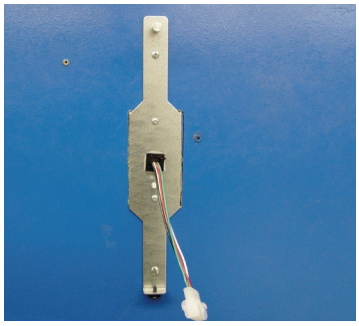
c. White wire should be connected to the neutral line.

d. Green wire should be connected to earth ground.

Note: All wiring connections should be made in accordance to local and national electrical codes.

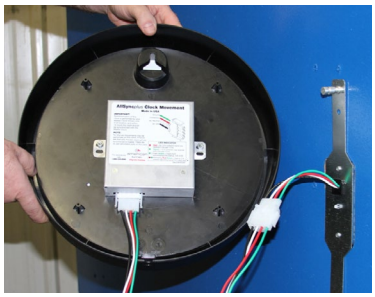


3. Bundle all wall wiring and female connector wiring inside back box and place mounting bracket over back box opening.



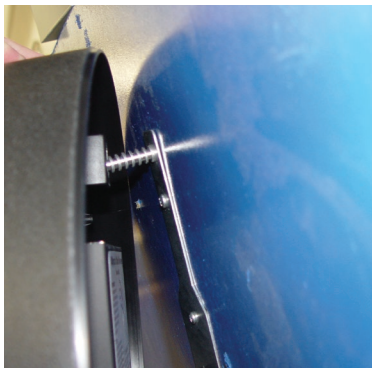
4. Attach mounting bracket to back box and wall, ribbed post up.
5. Secure bracket to wall using appropriate mounting screw and anchor for wall material. Screw and anchor are not included.

Plastic Surface Mount Clock Installation (cont)



6. Make connection between clock and wall wiring using attached four conductor mating connectors.

7. Bundle wires inside clock bezel.



8. Slide keyhole hanger over ribbed hanging stem on mounting bracket

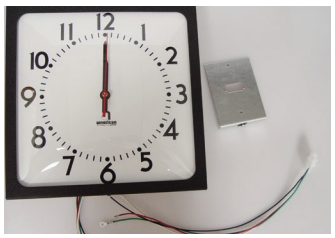
9. Screw bottom portion of clock to mounting bracket

   Note: Screw bottom portion of the clock to the point the screw bottoms out. Do not over tighten.

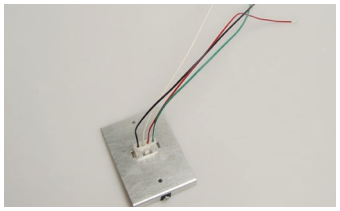
   Caution:
   Over tightening may damage clock bezel. If the clock bezel begins to deform, cease tightening.

Metal Surface Mount Clock Installation

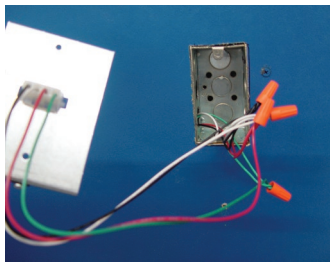
Warning: The AllSync Plus metal surface mount clock should be mounted according to these instructions to meet UL clock listing.



1. Remove the AllSync Plus clock, mounting bracket, and wiring harness (if applicable) from the packaging.

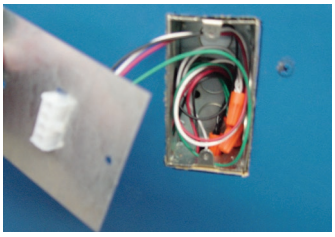


2. Snap female (wall half) connector into mounting bracket.



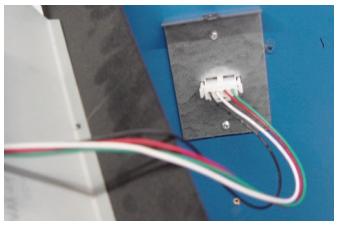
3. Using UL approved wire nuts, make connections between flying leads and wiring inside electrical box.
   a. Black wire should be connected to hot (run) wire from the master.
   b. Red wire should be connected to the correction line from the master clock.
   c. White wire should be connected to the neutral line.
   d. Green wire should be connected to earth ground.

   Note: All wiring connections should be made in accordance to local and national electrical codes.

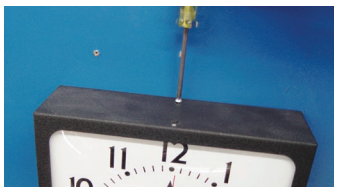


4. Bundle all wall wiring and female connector wiring inside back box and place mounting bracket over back box opening, bent side up.

5. Screw mounting bracket to electrical box.



6. Connect clock wiring using connector attached to clock.



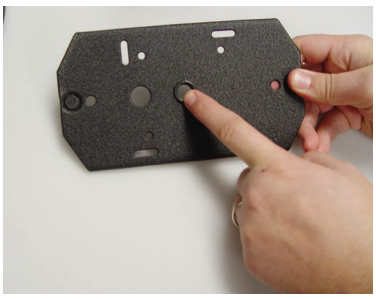
7. Hang clock on mounting bracket and secure using screw through the top of the clock.

Metal Round Double Dial Clock Installation

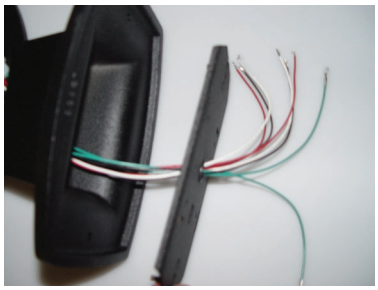
Warning:

The AllSync Plus metal double dial clock should be mounted according to these instructions to meet UL clock listing.

1. Remove the AllSync Plus clocks, double dial ring, wiring harnesses, backbox plate and plastic bushings from the packaging.



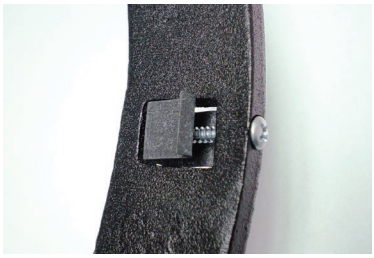
2. Insert plastic bushing into box plate to protect wires



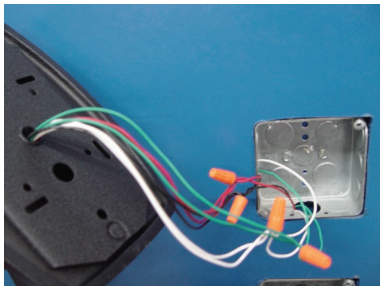
3. Thread back box wire harnesses through double dial ring base and box plate.

4. Insert 1 1/2" screws into either side of double dial ring. Thread both screws half way through ring using same threaded hole.

   Note: ceiling mount screw location should be directly above ring base and wall mount screw location should be 90 degrees from base. (Wall mount shown).

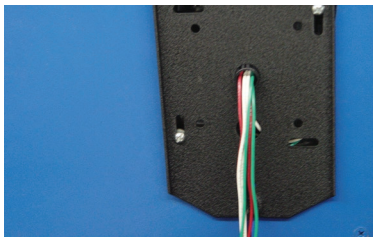


5. Attach mounting clips by threading the 1¼" screws included through them in each of the three positions. Do not completely tighten, they should be loose at this point.

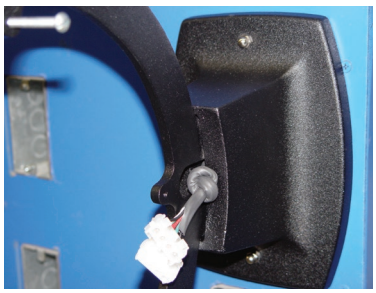


6. Using UL approved wire nuts, make connections between flying leads and wiring inside electrical box.
    a. Black wire should be connected to hot (run) wire from the master.
    b. Red wire should be connected to the correction line from the master clock.
    c. White wire should be connected to the neutral line.
    d. Green wire should be connected to earth ground.

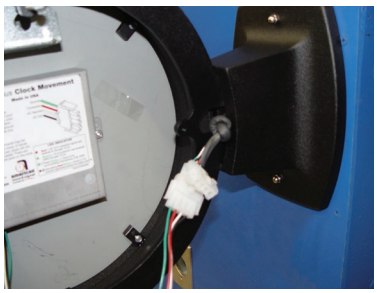
    Note: All wiring connections should be made in accordance to local and national electrical codes



7. Attach box plate to electrical box.



8. Attach double dial ring to box plate using acorn style nuts.



9. Hang one side of the double dial clock on mounting ring using protruding screw and connect clock wires to one of the wall ends.

    Note: The knot in the wall side wire harness may block clock installation. By simply pulling it away from ring base about half an inch will provide adequate space to install both clock sides.

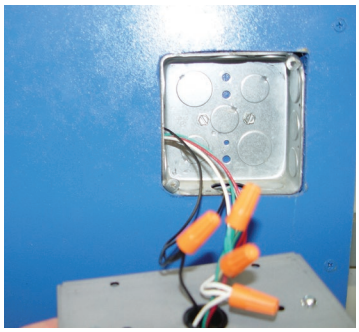
10. Connect remaining side of double dial clock to remaining wire harness wall end and hang on remaining screw.
11. Tighten mounting clips installed in step 5 to firmly secure both side of double dial clock.

Plastic Double Dial Clock Installation

Warning:

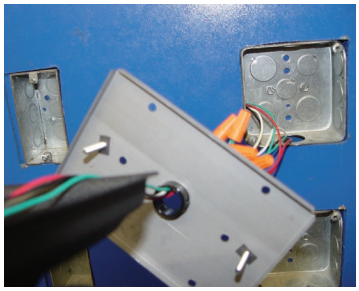
The AllSync Plus plastic double dial clock should be mounted according to these instructions to meet UL clock listing.

1. Remove the AllSync Plus plastic double dial clock from packaging.

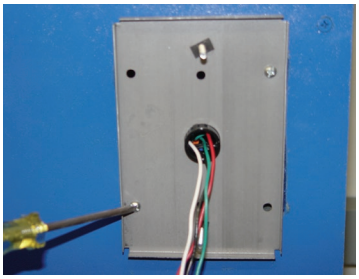


2. Using UL approved wire nuts, make connections between flying leads and wiring inside electrical box.
    a. Black wire should be connected to hot (run) wire from the master.
    b. Red wire should be connected to the correction line from the master clock.
    c. White wire should be connected to the neutral line.
    d. Green wire should be connected to earth ground.

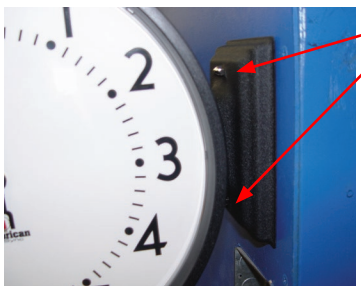
    Note: All wiring connections should be made in accordance to local and national electrical codes



3. Remove box plate from double dial clock by removing acorn nuts at base of clock.
4. Bundle wires inside electrical box.



5. Attach box plate to electrical box.

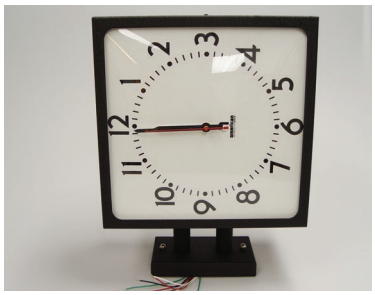


6. Connect clock to box plate using acorn nuts removed in step 3.

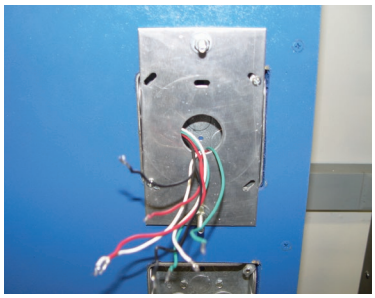
Metal Square Double Dial Clock Installation

Warning:

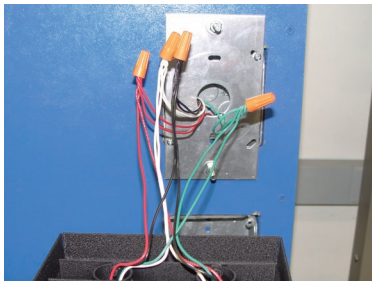
The AllSync Plus metal square double dial clock should be mounted according to these instructions to meet UL clock listing.



1. Remove the AllSync Plus square metal double dial clock from packaging.

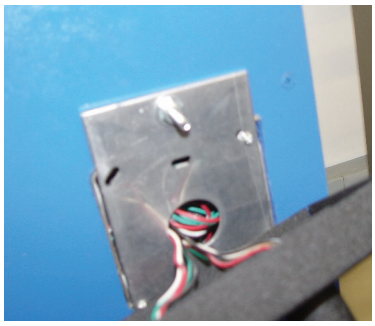


2. Remove box plate from clock by removing acorn nuts at the base of the clock. Pull wall wiring through plate hole and attach to electrical box.

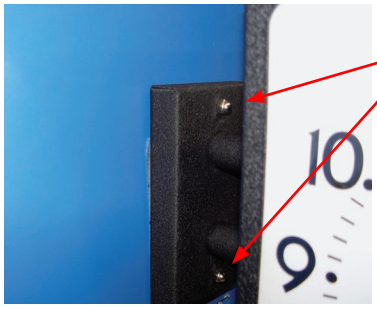


3. Using UL approved wire nuts, make connections between flying leads and wiring inside back box.
    a. Black wire should be connected to hot (run) wire from the master.
    b. Red wire should be connected to the correction line from the master clock.
    c. White wire should be connected to the neutral line.
    d. Green wire should be connected to earth ground.

    Note: All wiring connections should be made in accordance to local and national electrical codes



4. Bundle wires inside electrical box.



5. Connect clock to box plate using acorn nuts removed in step 2.

AllSync Plus Startup Routine

LED location on back of clock

The AllSync Plus clocks operate differently from their fixed clock protocol mechanical counterparts and from the older AllSync clocks.

After power is initially supplied to the AllSync Plus clock run line, the following will occur:

1. The clock will charge its internal backup power cell and undergo startup diagnostics.

Note: This may take from 1-9 minutes. During this charge period the clock will run through the start up diagnostics indicated by the LED on the back of the clock and the clock hands will remain still.

2. The green flashing LED indicates the microprocessor is telling the movement what time it is. The default time for the circuit board is 12:50. This is the time the movement receives on startup and after extended power outages (greater than 15-20 minutes).

3. The LED will turn solid red.

Note: The solid red LED indicates the clock circuit board has not received a 12 hour correction.

4. The clock will rapidly advance to the microprocessor time.

Note: Rapid advancement may last as long as 10 minutes. Total rapid advancement time depends on hand location prior to startup.

5. The clock will stop rapid advancement sometime between 12:50 and 1:15 as seen on the clock face and begin running at the correct pace (1 tick per second).

6. The movement will receive the hourly correction 2.5 minutes after the microprocessor receives the hourly correction from the master. The clock hands will then rapidly advance to match the minutes and seconds on the master clock connected to it.

Note: If a master does not send a valid correction, the AllSync Plus clock cannot synchronize its minutes to the master.

Note: The minute and second hands will be on time with the master after this rapid correction.

7. Approximately 2.5 minutes after the conclusion of the first 12 hour correction from the connected master the AllSync Plus clock will rapidly advance to match the exact time on the master (hour hand will correct).

Note: The AllSync Plus clock is set up at the factory for clock code 01 (xx:57:54 – 8 second hourly correction, 5:57:54 – 14 second 12 hour correction). If running a different clock protocol, the AllSync Plus clock may require an additional 12 hour correction to recognize the different clock protocol. If this is the case, allow 24 hours for the clock to synchronize.

AllSync Plus accuracy

The AllSync Plus clock will be ±1 second to the master system clock.

Movement corrections

The AllSync Plus clock has two primary yet completely separate parts: the circuit board and the movement. The circuit board listens to your master and tells your movement, when asked, the time in its own language. The AllSync Translator Board will send time to the movement 2.5 minutes after every hourly and 12 hour correction.

Note: The AllSync Plus clock(s) starts its internal clock at 12:50 when power has been removed from it by more than about 25 minutes.

Start Up Example Operation:

Note: This is an example of how the AllSync Plus clock will operate with an ATS master running clock code 01 and actual (master) plug in time at 9 am.

				
Timeline	**Actual Time (Master Time)**	**Clock Microcontroller**	**Time shown on clock**	**Description**
0 minutes	9:00 :00 AM WED JUL 12, 2017	12:50		Power is applied to clock at 9 am actual time with the clock displaying 6:30. The clock microcontroller starts counting at 12:50.
5 minutes	9:05 :00 AM WED JUL 12, 2017	12:55		5 minutes after power has been applied clock face matches microcontroller time.
1 hour	10:00 :20 AM WED JUL 12, 2017	2:00		Microcontroller updates its time using an hourly correction from master clock. Clock movement requests the time from the clock microcontroller and synchronizes with the clock microcontroller.
9 hours 1 minute	6:01 :00 PM WED JUL 12, 2017	6:01		Master clock sends a 12 hour correction out shortly before 6 o'clock. The microcontroller resets clock movement. Clock movement requests the time.
9 hours 10 minutes	6:10 :00 PM WED JUL 12, 2017	6:10		Clock movement has finished fast correction and is now on time with the master.

Note: The LED indicator on the back of the AllSync Plus clock is intended for troubleshooting purposes.

AllSync Plus Clock not correcting the hour hand

- LED is solid green 
  - o Disconnect clock for 1 hour, reconnect and wait for 24 hours.
- LED is solid red 
  - o Wait for 12 hour correction

Note: LED on back of clock will alternate red-green while master is sending it a correction.

- o If AllSync Plus clock(s) have been moved from one clock protocol to another with identical hourly correction it may not recognize the switch. Set master for synchronous style correction with different hourly correction, then, if needed change clock protocol back (refer to your master clock instructions for setting clock protocol).

AllSync Plus Clock Synchronized to the correct hour and seconds but minutes are off.

- LED is green 

Note: LED on back of clock will alternate red-green while master is sending it a correction.

- o Clock may have been jarred during shipment.
  Contact American Time Technical support for assistance regarding Homing the Hands (INST 3104).
  800-328-8996.

- LED is red 
  - o Wait for 12 hour correction and green LED.
  - o If AllSync Plus clock has been moved from one clock protocol to another with identical hourly correction it may not recognize the switch. Set master for synchronous style correction with different hourly correction, then if needed, change clock protocol back. Refer to your master clock instructions for setting clock protocol.

AllSync Plus Clock not running with power applied

- LED not lit 
  - o Verify master clock is wired and operating correctly
  - o Verify wiring to clock (check voltage using voltmeter)
  - o Contact American Time Technical support at **800-328-8996**

Note: You will damage clock by changing the power supply settings to 24vac and applying 120vac.

- LED lit  or 
  - o Wait for 30 minutes. The AllSync Plus clock requires a short period (up to 15 minutes) to charge its backup power supply.
  - o Remove dust cover on the back of the clock and verify connection between circuit board and movement.

Appendix A - LED Indication

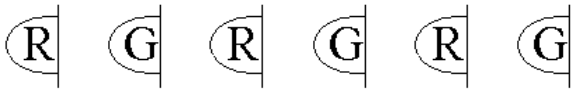
Note: LED indicator can be found on the back of the AllSync Plus clock on the side of the dust cover as indicated by the decal, or refer to picture on page 16.

Normal Operation:

Flashing Green (0.5 sec. ON – 0.5 sec OFF) = Microprocessor is sending an update to the movement.

Note: Time is sent after every hourly and 12 hour correction.

Alternating Red and Green (0.5 sec Red – 0.5 sec. Green) = AllSync Plus circuit board receiving correction signal from master.



Continuous Red = Power is on and the AllSync Plus circuit board has not received a 12 hour correction in last 15 hours.

Note: If the AllSync Plus clock is installed in a clock system running a correction protocol different than 01 (factory) or its previously recognized protocol, it may require more than one 12 hour correction to adjust its internal clock. In this case the LED will remain red after one 12 hour correction.

Continuous Green = Power is on and the AllSync Plus circuit board has received at least one 12 hour correction in the last 15 hours.

Clock Protocol - A specific time and duration of a set of correction pulses sent from a master clock to synchronize a clock system. Through the development of clock systems many different clock system manufacturers designed their own clock protocols. For this reason clocks cannot generally move from one system to another unless the system has the same clock protocol. The AllSync Plus clock is designed to recognize many different clock protocols.

Cold Start - AllSync Plus operational state in which power is applied for the first time or after the clock has not had power for a sufficient amount of time to drain it to the point it resets its internal processor.

LED - Light Emitting Diode - Indicator light on the back of the AllSync Plus clock.

Master Clock - In a clock system, a device that acts as the source of time. The master clock transmits the time to any number of secondary (or slave) clocks.

Movement - The inner mechanism of an analog clock that moves the clock's hands.

Secondary Clock - Also known as a slave clock, this is a clock that synchronizes its timekeeping to that of a connected master clock.

Synchronization - The process of bringing two clocks or time sources into phase so their difference is zero. In the case of a timekeeping system, time synchronization takes place between the master clock and all secondary clocks.

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