Primex XR 72MHz Synchronized Time Solution

XR Analog Clock - Automatic Setting Model Troubleshooting Guide

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Primex, Inc.

Primex is a leading provider of synchronized time and environmental monitoring solutions. Our solutions automate and maintain facility compliance, increase efficiencies, enhance safety and reduce risk for organizations in the healthcare, education, manufacturing and government vertical markets.

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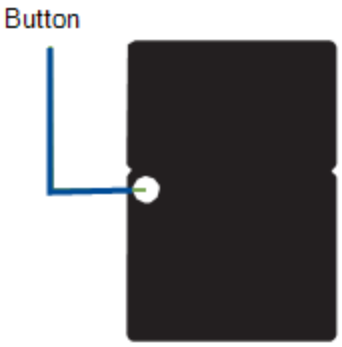
Automatic Setting Analog Clock Troubleshooting

Learn more about common troubleshooting procedures for an XR Analog Clock - Automatic Setting model (current generation).

Primex has two types of battery-operated analog clocks, an Automatic Setting Analog Clock (current generation) and Manual Setting Analog Clock (first generation). Both clocks receive their signal from the Primex Transmitter in the same way, but the set up and operation of each clock type is different.

The type of model can be determined by viewing the back of the clock. An automatic setting model only has a button on the back of the clock.



Clock time is not correct

Symptoms

All or some of the symptoms may be present.

- Clock does not set to the correct time.

Problem

May be due to the clock hands being out of alignment or Transmitter is in an error state.

Analyze

1. Identify scope of clocks experiencing issue - single clock or all clocks/clocks in specific area.

   Single clock

   a. Perform a Hand Alignment Check: press and hold the button on the back of the clock for 3 seconds until it beeps. The hands begin to move at an accelerated speed until all three hands align at the 12 o'clock position. The hands stop in this position to confirm the hands are all properly aligned.

   If hands do not rotate clockwise and stop at 12:00 position, the hands are out of alignment and the clock may need to be replaced. For further assistance, contact Primex Technical Support at 1-262-729-4860.

   All clocks/clocks in specific area

   a. Verify the Transmitter(s) is not in an error state. If multiple Transmitters on site, start with the Master Transmitter and then proceed by verifying the other units.

   b. Is the Transmitter's red LED flashing and/or is information displayed on its front display not correct? If yes, the Transmitter is an error state that may result in the clocks not receiving a broadcasting signal. Resolve the issue by completing the troubleshooting topics for the Transmitter model. Once the Transmitter is in a normal state and broadcasting, clocks correct at their next scheduled update.

2. If a clock(s) continues not to set its time, check the channel number on the Transmitter(s). If broadcasting on a channel greater than 16, there is a potential the clock(s) may not be able to receive a signal from the Transmitter.

   a. Identify firmware version: on the back of the clock locate the small sticker commonly located on its mechanism cover. The sticker provides its factory specifications including its assembly number, catalog number, firmware code (V1.5, V1.6, V2.0, V3.0), and date code.

b. If the clock firmware code is less than 2.0, a clock can only receive a signal from channels 1-16. If the clock firmware is 2.0 or greater, the clock can receive signal from all available channels/frequencies. If issue is related to clock firmware version, the frequencies/FCC licenses at the facility need to be reviewed. For further assistance, contact Primex Technical Support at 1-262-729-4860.

> NOTE
>
> Clocks with 2.0 firmware do not conform to the 5x stepping for low battery, nor do they scan for a new frequency once they lock onto a Transmitter's frequency. Issues may be more frequent during a DST change, or if when there are multiple Transmitters due the clocks do not search for another frequency. To resolve an issue with a clock that has 2.0 firmware, physically visit the clock and reset it. To manually reset an Automatic Setting Analog Clock after installation, simply remove its power source for at least 10 seconds and then reapply its power source. The clock automatically initiates the Self Initialization procedure.

3. If a clock(s) in a specific area continues not set its time, it may be due to interference preventing a clock from receiving a broadcasting signal.

> NOTE
>
> When certain types of electronic light ballasts become defective they may radiate broadband noise, which can interfere with wireless devices. While interference issues are unlikely with the Primex system, high levels of noise present in the 72-76MHz range could potentially cause clocks which are located far from the Transmitter and also within the close proximity of these ballasts to not receive a signal. Very limited instances have occurred in the past, which has only been found to happen when ballasts become defective.

Solution

1. Single clock - perform Hand Alignment Check.
2. More than one clock - verify Transmitter status and resolve error state.
3. Check Channel Number on Transmitter and verify clock firmware version.
4. Verify area does not have interference - possible defective ballast in install area.

Clock second hand is continuously advancing and pausing (stepping)

Symptoms

All or some of the symptoms may be present.

- Second hand is advancing in 5 second increments and pausing, advancing 5 seconds and pausing. Applies to firmware version prior to V3.0.
- Second hand is advancing in 2 second increments and pausing. Applies to firmware V3.0 and greater.

Problem

Clock has not received a signal from a Transmitter for three consecutive days or clock has low battery power.

> NOTE
>
> Analog Clock signal search frequency: six pre-scheduled times a day at 10:01, 2:01 and 6:01 a.m. and p.m. lock time (not the actual time of the day), a clock's receiver turns on to search for a Transmitter signal to receive a time update, starting with the previously stored channel number.

If a clock's second hand is stepping (continuously advancing and pausing), its receiver only turns on at 2:01 AM & PM. The stepping indicates the clock has not received a time signal from the Transmitter for three consecutive days.

If the Transmitter is broadcasting, a manual search can be initiated locally at the clock. Press and immediately release the button on the back of the clock or remove it's batteries for 10 seconds, stretch the battery tabs in the battery holder out slightly to apply more pressure to the battery contacts, and re-insert the batteries.

Analyze

1. Identify scope of clocks experiencing issue - single clock or all clocks/clocks in specific area.

   Single clock:

   a. Check the expiration date of the batteries - normal battery life is four to five years.

   b. Remove its batteries and wait 10 seconds. If batteries are expired, replace with new batteries.

   c. Stretch the battery tabs in the battery holder out slightly to apply more pressure to the battery contacts, then insert two alkaline batteries into the battery holder. If replacing batteries, they must be new, superior-quality alkaline batteries with an expiration date that exceeds five years past the current year.

d. The clock will update its time at its next scheduled update. If the Transmitter is broadcasting and you need to verify its signal to update its time, perform a Manual Signal Search - press and immediately release the button on the back of the clock.

All clocks/clocks in specific area

a. Verify the Transmitter(s) is not in an error state. If multiple Transmitters on site, start with the Master Transmitter and then proceed by verifying the other units.

b. Is the Transmitter's red LED flashing and/or is information displayed on its front display not correct? If yes, the Transmitter is an error state that may result in the clocks not receiving a broadcasting signal. Resolve the issue by completing the troubleshooting topics for the Transmitter model. Once the Transmitter is in a normal state and broadcasting, clocks correct at their next scheduled update.

Solution

1. Single clock - check battery expiration date and replace batteries.
2. More than one clock - verify Transmitter status and resolve error state.

Clock hands stop or remain 12:00 position

Symptoms

All or some of the symptoms may be present.

- Clock hands stopped and not set to correct time.
- Clock hands remain at 12:00 position.

Problem

May result when initiating a Hand Alignment Check or Manual Signal Test.

The button on the back of the clock has two purposes, to initiate a Manual Signal Test or Hand Alignment Check.

- Manual Signal Test: to be performed after a clock has been set to the correct time. To initiate a signal test, press and immediately release the button once. The clock begins to beep once per indicating it's communicating with the Transmitter and continues to beep for one minute. Once the minute lapses, the clock goes silent. You can continue this process as needed during troubleshooting.
- Hand Alignment Check: to be performed after new batteries are installed. Once the batteries are installed, press and hold the button for at least three seconds. The second, minute and hour hands begin to rotate clockwise and stop at 12:00. If the hands do not stop at 12:00 the hands are out of alignment, the clock may need to be replaced.

Analyze

Perform a clock reset.

1. Remove its batteries.
2. Place a paper clip, pocket knife blade or another metal item across the two battery contacts located on the outside of the battery holder at the 9 Volt Battery style connector for a few seconds. This discharges any residual current from the clock mechanism and provide a fresh initialization for the clock.
3. Stretch the battery contact tabs in the battery holder out. When the batteries are re-inserted, the tabs apply more pressure to the battery contacts.
4. Reinsert the batteries or new batteries if expired (typical battery life is 4 to 5 years).

   The second hand begins advancing one second and pausing as the clock searches for the channel and frequency (signal) the Transmitter is broadcasting at.

   Once it receives a signal, it rapidly spins the second hand to 12:00 and stops. Next, the hour and minute hands advance toward the correct time, the hands pause for approximately five seconds at a displayed hand position of either 4, 8 or 12 o'clock (whichever of these positions falls just before the actual time). The minute and hour hand begin to advance to the proper hour, minute and second hand is last to the proper second.

> NOTE
>
> Analog Clock signal search frequency: six pre-scheduled times a day at 10:01, 2:01 and 6:01 a.m. and p.m. lock time (not the actual time of the day), a clock's receiver turns on to search for a Transmitter signal to receive a time update, starting with the previously stored channel number.

Solution

1. Reset the clock.
2. If the issue cannot be resolved, the clock may be defective. For further assistance, contact Primex Technical Support at 1-262-729-4860.

Clock miss steps as it goes up the dial

Symptoms

All or some of the symptoms may be present.

- Clock appears to miss-step as it goes up the dial.
- Clock appears to miss step as it goes between 6 and 12.

Problem

The clock gearbox is possibly damaged and/or battery level is low.

Analyze

1. Replace the clock batteries.
2. Stretch the battery tabs in the battery holder out slightly to apply more pressure to the battery contacts, then insert two alkaline batteries into the battery holder. If replacing batteries, they must be new, superior-quality alkaline batteries with an expiration date that exceeds five years past the current year.

Solution

1. Replace the clock batteries.
2. If that doesn't resolve the issue, the clock gearbox may be compromised. For further assistance, contact Primex Technical Support at 1-262-729-4860.

Clock hands randomly move throughout the day

Symptoms

- Clock randomly starts moving its hands throughout the day.

Problem

Clock gearbox may be causing an issue with the optic motor. The gearbox is lubricated and may have accumulated dust particles.

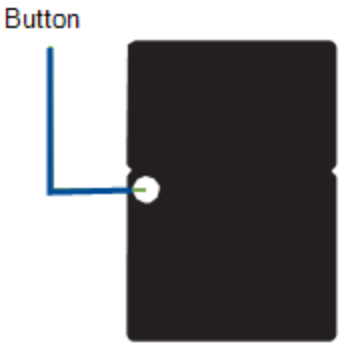
Analyze

1. Take the clock to a warm room; allows the gearbox lubricant to warm up.
2. Remove its batteries and place it on its backside for the day.
3. The following day, grasp the clock firmly by its outside rim and tap the backside of the clock against a solid, protected surface a few times - do not tap it too hard to avoid damaging the clock.
4. Reset the clock by removing and re-inserting its batteries. Stretch the battery tabs in the battery holder out slightly to apply more pressure to the battery contacts, then insert two alkaline batteries into the battery holder. If replacing batteries, they must be new, superior-quality alkaline batteries with an expiration date that exceeds five years past the current year.
5. If this does not resolve the issue, the clock motor may be compromised. For further assistance, contact Primex Technical Support at 1-262-729-4860.

Automatic Setting Analog Clock Set Up and Operation

A battery-operated Automatic Setting Analog Clock does not require initial set up, due to upon installing its batteries the clock automatically initializes to receive its time from the system Transmitter. An electric-powered clock also initializes upon power-on.

An automatic setting model only has a button on the back of the clock.



Set up an Automatic Setting Analog Clock

To set up an Automatic Setting Analog Clock, apply power to the clock and it automatically initializes its setup and searches for a signal from Transmitter to receive its time.

> WARNING
>
> Battery-powered clocks: for sites with multiple Transmitters or repeaters it's important that batteries are inserted when the clock is at its permanent installation location.

Clock signal search frequency - time update

A clock's search frequency is when its receiver turns to search for a Transmitter signal, starting with the previously stored channel, to receive a time update. When a clock is first powered on, it automatically initializes its set up and searches for a signal to receive its time. The only model that requires a specific setup is a Manual Setting Analog Clock.

The scheduled search frequency varies by clock model as defined below.

Analog Clock signal search frequency: six pre-scheduled times a day at 10:01, 2:01 and 6:01 a.m. and p.m. lock time (not the actual time of the day), a clock's receiver turns on to search for a Transmitter signal to receive a time update, starting with the previously stored channel number.

Digital Clock/Timer signal search frequency: every 10 minutes on the 5's (5, 15, 25, 35, 45, 55 minutes) of the hour, a clock's receiver turns on to search for a Transmitter signal to receive a time update.

When a clock has not received a valid signal/time update for three consecutive days, it displays a visual signal loss indicator; an analog clock's second hand advances and pauses continuously (stepping) and a digital clock/timer's colons flash.

Transmitter broadcast schedule

The type of antenna determines a Transmitter's broadcast schedule, which should be taken into consideration when installing new system devices. System devices receive a time update during its scheduled signal search or when powered on from a broadcasting Transmitter.

Broadcast (Transmit) Schedule Transmitter with Internal Antenna: broadcasts its synchronized time continuously to the system clocks and devices.

Broadcast (Transmit) Schedule Transmitter with External Antenna: broadcasts its synchronized time to the system clocks and devices from the 39th to the 6th minute of the next hour and changes to a standby mode during the 7th to the 38th minute of the hour (standard broadcast schedule). During initial power-up, the Transmitter broadcasts for 8 consecutive hours. After the 8 hour power-up period, the Transmitter reverts to its timed broadcast schedule.

> NOTE
>
> In the event of a facility wide power outage, a Transmitter with an External Antenna will broadcast for 8 hours upon the restoration of power. This will synchronize all devices. In the event power to a Transmitter is shut off and turned back on (power cycle), the Transmitter will broadcast continuously for 8 hours. Power cycling the Transmitter can be used to set/reset system devices. Do not power cycle a Transmitter when it's in an error status - red LED is flashing; refer to the troubleshooting topics to resolve the error status.

Clock installation considerations - Transmitter with External Antenna

If installing clocks after the initial Transmitter 8 hour power up transmission, there are three options.

1. Install clocks between 39 minutes past the hour and 6 minutes after the next hour. They will set right away.
2. Install the clocks at any time of the day. They will set their time at the next 39 minutes after the hour.
3. Power cycle the Transmitter. It will then broadcast for 8 consecutive hours and clocks will set immediately on power up.

How to confirm an clock is located in a good signal area

Once set up, a clock should be tested at its final installation location to verify it can receive a signal from a Transmitter.

1. At its installation location, press and IMMEDIATELY release the button located on the backside of clock and hang the clock in place.

> NOTE
>
> When clocks are being installed or signal tested, it's very important not to hold the button down too long or the hands

> will proceed to the 12 o'clock position and remain there indefinitely. If this should happen, remove its batteries and wait 10 seconds, and then re-insert the batteries. The clock will self initialize and set to the correct time.

2. The clock scans all channels looking for a Transmitter signal. Once the clock finds a channel, a series of beeps emit from the clock.

- Good signal area - clock beeps each time a valid time signal is received, which should be once per second and will continue for one minute.
- Marginal signal area - clock beeps once every few seconds. A clock will work in marginal signal areas, but may have a slightly reduced battery life.
- No signal received - clock does not emit a beep, indicating no signal was received.

Battery Maintenance

The battery life of an Analog Clock is over four years with use of high-quality alkaline batteries. Therefore, it's important that fresh, superior-quality batteries are used with an expiration date that exceeds five years past the current year.

Low battery notification

When the batteries of an Analog Clock need to be replaced its second hand advances and pauses continuously (stepping), instead of one second at a time until the batteries are replaced. The clock may display the correct time, but the batteries should be replaced promptly to restore normal operation. The stepping pattern continues until its batteries are replaced.

Battery requirements

- New, high quality alkaline batteries.
- Batteries should be the same type and date code.
- The battery expiration date should be at least 5 years in the future.
- The use of heavy duty and zinc carbon batteries is NOT recommended as they have a shorter life span and have risk of leakage if over discharged.
- Do NOT use rechargeable NiCad batteries as their output voltage is too low to assure proper operation.
- Do NOT use standard lithium batteries.

Replace Batteries

When the batteries of an Analog Clock need to be replaced, its second hand advances and pauses continuously (stepping) until the batteries are replaced. The clock may display the correct time, but the batteries should be replaced promptly to restore normal operation. The stepping pattern continues until its batteries are replaced.

Battery use requirements

- New, high quality alkaline batteries.
- Batteries should be the same type and date code.
- The battery expiration date should be at least 5 years in the future.

- The use of heavy duty and zinc carbon batteries is NOT recommended as they have a shorter life span and have risk of leakage if over discharged.
- Do NOT use rechargeable NiCad batteries as their output voltage is too low to assure proper operation.
- Do NOT use standard lithium batteries.

How to replace batteries for an Automatic Setting Analog Clock

1. Remove the clock from its location to access the back of the clock.
2. Remove its batteries and wait 10 seconds.
3. Stretch the battery tabs in the battery holder out slightly to apply more pressure to the battery contacts.
4. Insert two new alkaline batteries. It's important to insert the batteries with the battery '+' end to '+' end of the battery holder to achieve proper battery orientation.

When both batteries are in place, the clock automatically initiates the Self Initialization procedure to set its time.

Automatic Daily Transmitter Signal Check

At six pre-scheduled times a day, at 2, 10, and 6 AM and PM clock time (not actual time), a clock's receiver automatically turns on and begins searching for a Transmitter signal, starting with the previously stored channel number. If a signal is not received on the first channel, the clock scans all channels to search for a signal.

Clock has not received a signal from the Transmitter for three days - indicated by second hand two second stepping pattern

The clock second hand begins to step twice at two second intervals to call attention to a problem with the clock. This pattern is repeated and the clock may display the correct time, but it's not synchronized and its time may drift.

The stepping pattern continues until the clock receives a valid time signal from the Transmitter. Once a valid time is received, the clock hands are set to the correct time and resume moving normally.

Automatic Midnight Verification

Every day at midnight, an Automatic Setting Analog Clock checks to ensure its hand positions are correct and automatically corrects if they are off. This resetting of the hands is the same as the Hand Alignment Check and Self Initialization procedure.

Self Initialization

When the button on the back of an Automatic Setting Analog Clock is pressed and immediately released or its batteries are replaced, the clock emits a double-beep and the clock begins to search for a signal from the Transmitter.

Clock signal strength indicator

- If a signal is received - the clock emits a beep once per second, for one minute, every time a valid packet is decoded. The clock hands automatically adjust to the correct time.

- If the clock is in a marginal signal area - it emits a beep once every few seconds. Battery operated models will work in marginal signal areas, but may result in reduced battery life.
- No beeping - indicates a signal is not received from the Transmitter.

Setting its received time

Once a time signal has been received, the clock AUTOMATICALLY sets to the correct time as follows:

1. First, the second hand steps at eight times its normal speed until it finds the 12 o'clock position.

> NOTE
> The minute hand and second hand may take turns stepping while the second hand is moving to the 12 o'clock position.

2. After the second hand is set to 12, the minute hand begins to advance around the dial quickly towards the correct time.
3. As the hour and minute hands advance toward the correct time, the hands pause for about 5 seconds at a displayed hand position of either 4, 8 or 12 o'clock, whichever of these positions falls just before the actual time.
4. After the hands pause, the hour and minute hands proceed to advance quickly until the correct hour and minute are reached. Once this occurs, the second hand then steps at eight times its normal speed until it reaches the correct time. It then continues to move once per second. The time displayed on the clock should match the time displayed on the Transmitter.

Reset Clock

To manually reset an Automatic Setting Analog Clock after installation, simply remove its power source for at least 10 seconds and then reapply its power source. The clock automatically initiates the Self Initialization procedure.

Hand Alignment Check

If the hand alignment of an Automatic Setting Analog Clock is in question, a hand alignment check can be initiated manually.

How to initiate a hand alignment check

1. Press and hold the button on the back of the clock for 3 seconds until it beeps.

   The hands begin to move at an accelerated speed until all three hands align at the 12 o'clock position. The hands stop in this position to confirm the hands are all properly aligned.

2. The hands remain in this position until the button is again held down for 3 seconds. Press and hold the button for 3 seconds for a second time; the clock enters the Self Initialization procedure. Self Initialization

Support

To obtain additional technical documentation for Primex products, visit the Support area on our website at www.primexinc.com

You may require Technical Support when you have questions about product features, system configuration, or troubleshooting. Support services are delivered in accordance with your organization's support agreement, end user licenses agreements, and warranties, either with a Primex Certified Sales and Service Partner or directly with Primex.

Support through Primex Certified Sales and Service Partners

Ensuring our customers experience excellent service is of utmost importance to Primex. Our network of Certified Sales and Service Partners offer technical support services for Primex products.

If you have purchased Primex products or have a service agreement with a Primex Partner, they are your primary contact for all Technical Support inquires.

When contacting Primex Technical Support

Make sure you have satisfied the system requirements listed in your product documentation. Also, you should be at the computer or device on which the problem occurred, in case it's necessary to replicate the problem.

When you contact Primex Technical Support, please have the following information available:

- Customer ID/Account Name
- Problem description/error messages
- Device hardware information
- Troubleshooting performed before contacting Primex

Primex Technical Support

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