

Primex XR 72MHz Synchronized Time Solution

# XR Series Transmitter 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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# Contents

XR Series Transmitter Troubleshooting	4
Site and Transmitter Evaluation Procedure .....	4
Red LED flashing and Transmitter GPS communication symbol is not displayed on front display .....	6
Red LED flashing and Transmitter GPS communication symbol displayed, but no parentheses .....	8
Red LED flashing and Transmitter has no S symbol with NTP Time Source .....	10
Transmitter front display does not light up .....	12
Transmitter front display time and date are not correct .....	13
Transmitter continues to power cycle and does not stay synced .....	16
Overview of Front Display .....	17
VWSR error code .....	21
Bad Output Power error, no or low output Transmitter power .....	23
Bad Output Power error, no or low output Transmitter power .....	25
Extremely weak or no signal .....	26
Weak signal and limited coverage area .....	28
Support	30

# XR Series Transmitter Troubleshooting

Learn more about common troubleshooting procedures for XR Series Transmitters. Before beginning any troubleshooting be sure to perform the Site and Transmitter Site Evaluation Procedure.

## Site and Transmitter Evaluation Procedure

Before completing any troubleshooting on an XR Series Transmitter, it's recommended to complete the procedure below. Also learn about the Transmitter Broadcasting Frequency and Clock Signal Search Frequency, and when use to a Transmitter's Diagnostic Error Codes.

### Procedure

Completing the steps allow you to observe and log the current state of the system clocks and Transmitter(s).

1. Record all issues reported from the system clocks.
  - Are all the clocks involved or just some clocks?
  - If just some clocks, where are they installed and how many? Smaller quantities could be clock issues and not Transmitter related.
2. Once it's determined to check a Transmitter, look it over and take notes of the information below.
  - Is the red LED flashing on front display of the Transmitter?
  - Write down all information displayed on the Transmitter front display, including the time displayed. It's recommended to take a photo of the front display.
  - GPS time source: is the GPS communication symbol  displayed in the upper right hand corner of the Transmitter's front display? When the symbol is displayed, this indicates the Transmitter and GPS Receiver are communicating. If the symbol is not displayed, complete steps in Red LED flashing and Transmitter GPS communication symbol is not displayed on front display.
  - NTP time source: is the NTP communication symbol  displayed in the upper right hand corner of Transmitter's front display? When the symbol is displayed, this indicates the Transmitter is communicating with its NTP time source. If the symbol is not displayed, complete steps in Red LED flashing and Transmitter has no S symbol with NTP Time Source.

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## Transmitter Broadcasting Frequency and Clock Signal Search Frequency

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.

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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.

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## **Diagnostic Error Codes**

XR Transmitters are able to diagnose some issues, but when troubleshooting these units, it's important to clear up preliminary issues first before exploring the Diagnostic Error Codes. For additional information on the Transmitter display, see topic [Overview of Front Display](#).

As a first step in troubleshooting, perform all procedures provided in the troubleshooting topics to resolve any issues. Once issues are resolved, then review the Diagnostic Error Codes, clear all errors, and determine if the Transmitter logs any new error codes. If new error codes, refer to the related Error Code troubleshooting topics.

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# Red LED flashing and Transmitter GPS communication symbol is not displayed on front display

## Symptoms

All or some of the below symptoms may be present.

- Red LED is flashing on the Transmitter front display.
- Green LED may or may not be illuminated. When the green LED is illuminated, the Transmitter is currently broadcasting (broadcast mode). When the green LED is NOT illuminated, the Transmitter is not broadcasting (standby mode).
- Transmitter front display does NOT display its GPS communication symbol , this indicates it's not communicating with the GPS Receiver.
- Clocks may be displaying a visual signal loss indicator due to they have not received a time update for three days; Analog Clock second hand is stepping and a Digital Clock/Timer colon is flashing.

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## Problem

Transmitter is not receiving a time update.

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## Analyze

1. From the switch panel on the back of the Transmitter, verify switch #1 is set to GPS and switch #2 is set to Local.
2. Reseat all GPS and cable connections, check to make sure they are not wet or corroded, and look for damage to the cable.
3. Is there is a GPS extension cable in use? Identify if it's a factory supplied cable or is not factory supplied. If it's not factory supplied, is it longer than 200 ft. and/or is the pin out correct? Step 3 will identify if the extension cable is an issue.
4. If the GPS communication symbol is not displayed and extension cables are in use, take the GPS Receiver from its location and plug it directly into the back of the Transmitter.

If the GPS communication symbol appears, the extension cables are the cause of the issue and are required to be replaced. If the GPS communication symbol is not displayed, replace the GPS Receiver as the first step.

5. If after replacing the GPS Receiver and/or cable and the GPS communication symbol is NOT displayed, the import on the Transmitter may be bad, which will require the Transmitter to be replaced.
6. Poor power output at the Transmitter can also be the cause of the Transmitter not being able to pull the time update.  
Complete the steps in Extremely weak or no signal
7. From the Transmitter front display screen, verify the GPS communication symbol is present, which indicate it's communicating with the GPS Receiver. If the symbol is present, watch for parentheses  coming towards the GPS communication symbol which indicates the GPS Receiver unit is receiving a time update from the GPS satellites. If the

parentheses are not displayed, complete the steps in Red LED flashing and Transmitter GPS communication symbol displayed, but no parentheses

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## **Solution**

1. If the GPS communication symbol is displayed when direct to the Transmitter, replace the GPS extension cables.
  2. If no GPS communication symbol is displayed when direct to the Transmitter, replace the GPS Receiver.
  3. After replacing all GPS components and the GPS communication symbol is not displayed and the power supply is good, the Transmitter may need to be replaced. For further assistance, contact Primex Technical Support at 1-262-729-4860.
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# Red LED flashing and Transmitter GPS communication symbol displayed, but no parentheses

## Symptoms

All or some of the below symptoms may be present.

- Red LED is flashing on the Transmitter front display.
  - Green LED may or may not be illuminated. When the green LED is illuminated, the Transmitter is currently broadcasting (broadcast mode). When the green LED is NOT illuminated, the Transmitter is not broadcasting (standby mode).
  - Transmitter front display has a GPS communication symbol , but does not display the parentheses  to the right of the symbol.
  - Clocks may be displaying a visual signal loss indicator due to they have not received a time update for three days; Analog Clock second hand is stepping and a Digital Clock/Timer colon is flashing.
- 

## Problem

Transmitter is communicating with the GPS Receiver, but is not receiving a time update from the GPS satellites.

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## Analyze

1. Is the GPS Receiver inside? If it's mounted to a window or mounted where its signal has to go through the roof, the GPS Receiver may need to be relocated outdoors. A GPS Receiver located indoors may not allow for an adequate signal. Low-E glass windows are coated with a transparent metal layer that reflects infrared heat rays; which can also reflect the GPS signal.
  2. Check the GPS Receiver mounting location. Verify its mounting did not slip or change and it has a clear view of the sky. Resolve any obstructions.
  3. There may be local interference affecting GPS signal reception. Try moving the location of the GPS Receiver to improve reception. Weather conditions, solar flares, time of day, and exact satellite position may also effect signal reception; however, these conditions are normally of a short duration.
  4. Poor GPS cable connections or a faulty GPS Receiver can cause the unit not to pick up a signal. If steps 1 and 2 do not resolve the issue, replace the GPS Receiver and its extension cables.
  5. Poor Transmitter power output can also result in the Transmitter not being able to pull the time update. Check voltage at the Transmitter by completing the steps in Transmitter continues to power cycle and does not stay synced
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## Solution

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1. Move the GPS Receiver into a better location; outdoors with a clear view of the sky.
  2. Replace the GPS Receiver and its extension cables.
  3. After replacing all GPS components and still no parentheses, the Transmitter may need to be replaced.
  4. If none of the above steps resolved the issue, the import on the Transmitter may be bad and need replacing. For further assistance, contact Primex Technical Support at 1-262-729-4860.
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# Red LED flashing and Transmitter has no S symbol with NTP Time Source

## Symptoms

All or some of the below symptoms may be present.

- Red LED is flashing on the Transmitter front display.
  - Green LED may or may not be illuminated. When the green LED is illuminated, the Transmitter is currently broadcasting (broadcast mode). When the green LED is NOT illuminated, the Transmitter is not broadcasting (standby mode).
  - Transmitter front display does NOT display its NTP communication symbol  (upper right hand corner of front display screen) - indicates it's not communicating with its NTP time source.
  - Clocks may be displaying a visual signal loss indicator due to they have not received a time update for three days; Analog Clock second hand is stepping and a Digital Clock/Timer colon is flashing.
- 

## Problem

Transmitter is not receiving a time update.

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## Analyze

1. From the switch settings on the back of the unit: verify dip switch #1 is set to NTP and dip switch # 2 is set to LAN.
  2. Verify an Ethernet cable is connected to the Transmitter Network LAN Port and the cable is properly inserted into an active LAN port.
  3. Verify the Ethernet cable and network port drop does not have any damage or degradation.
  4. Verify the Transmitter Network LAN Port is indicating an active network connection - 1 flashing LED and 1 solid LED.
  5. Contact the facility's IT staff to inquire as to what may have changed on the system or their site's designated NTP time source (server), that may be causing the unit to not see its configured NTP time source.
  6. Request assistance from the facility's IT staff to access the Transmitter to verify the configured NTP server. You will need a laptop with the Firefox web browser for this process.
  7. Poor power output, can result in the Transmitter not being able to pull the time update. Check voltage at the transmitter by completing the steps in Transmitter continues to power cycle and does not stay synced
  8. If none of the above steps resolved the issue, the import on the Transmitter may be bad and need replacing. For further assistance, contact Primex Technical Support at 1-262-729-4860.
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## Solution

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1. Validate and correct NTP time source switch settings.
  2. Replace defective cables.
  3. Obtain Transmitter NTP server details and update Transmitter NTP configuration as required.
  4. Replace power supply if bad output.
  5. After replacing all defective components, the power supply is good, and still no "S" symbol, replace the Transmitter. For further assistance, contact Primex Technical Support at 1-262-729-4860.
-

# Transmitter front display does not light up

## Symptoms

All or some of the below symptoms may be present.

- Transmitter front display does not light up or has light black boxes across it.
  - Red LED is flashing on the Transmitter front display.
  - No information is displayed on the Transmitter front display.
  - Clocks may be displaying a visual signal loss indicator due to they have not received a time update for three days; Analog Clock second hand is stepping and a Digital Clock/Timer colon is flashing.
- 

## Problem

This may be due to a power issue or communication between the EPROM chip and the front display screen.

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## Analyze

1. Using a multimeter, check for 9V at least 2.0A output from the power supply to the Transmitter.
  2. Verify the power coming to the Transmitter power supply is 120 volts.
  3. If the power to the Transmitter is not correct, complete steps in Transmitter continues to power cycle and does not stay synced
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## Solution

1. Correct all 120 volt issues.
  2. If power output is not correct, replace the power supply.
  3. From the Transmitter front display, verify the correct time, day, date and channel number is displayed.
  4. If these steps do not resolve the problem, the Transmitter may be required to be replaced. For further assistance, contact Primex Technical Support at 1-262-729-4860.
-

# Transmitter front display time and date are not correct

## Symptoms

All or some of the below symptoms may be present.

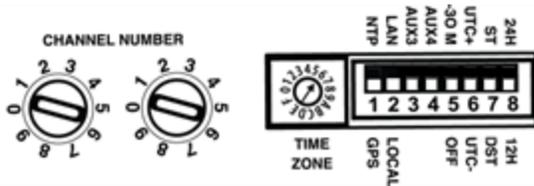
- Time and date is not correct on the Transmitter front display.
- Red LED is flashing on the Transmitter front display.
- Green LED may or may not be illuminated. When the green LED is illuminated, the Transmitter is currently broadcasting (broadcast mode). When the green LED is NOT illuminated, the Transmitter is not broadcasting (standby mode).
- GPS communication symbol  may not be displayed on the Transmitter front display. GPS communication parentheses symbol  may not be displayed on the Transmitter front display.
- NTP communication symbol  may not be displayed on the Transmitter front display.

## Problem

This may be due to the Transmitter switch position(s), bad or lacking information from the GPS Receiver or loss of NTP time source.

## Analyze

1. Verify the GPS communication symbol and parentheses are present or the NTP communication symbol is present.
2. From the switch panel on the back of the Transmitter, verify dip switch's #1 through #8, which they may be in the wrong position.



Switch	Function	Up Position	Down Position
1	NTP/GPS	Receive time from NTP server.	Receive time from a GPS Receiver.
Transmitter switch settings must be set for NTP time, which is specific to the transmitter's firmware version. The firmware version is displayed on the transmitter front LCD display in the lower-left corner. For version 1.79, set switch 1 to the UP position and switch 2 to the DOWN position. For versions below 1.79, set switch 1 and 2 to the UP position.			

Switch	Function	Up Position	Down Position
2	LAN/Local	LAN network connection is enabled.  Required for use of NTP time source.	Local USB and/or serial port attached to unit is enabled.
3	Aux 3 (setting unassigned)	Not applicable	Not applicable
4	Aux 4 (setting unassigned)	Not applicable	Not applicable
5	-30M	-30 minute offset enabled  Transmitter is installed in Newfoundland or other countries with a -30 minute off set.	-30 minute off set disabled  (default position)
6	UTC Offset	Transmitter is installed in Europe.	Transmitter is installed in North America
7	Daylight Saving Time	Daylight Saving Time is disabled.	Daylight Saving Time is enabled.
8	12-Hour or 24-Hour Time	Time is displayed in 24 hour time.	Time is displayed in a 12 hour time.

- Verify the time zone selector is set to the correct position. Use a small slotted screwdriver to adjust the rotary switch.

"4" for Atlantic Time Zone, "5" for Eastern Time Zone, "6" for Central Time Zone, "7" for Mountain Time Zone, "8" for Pacific Time Zone, "9" for Alaska Time Zone, "A" for Hawaii Time Zone

#### WARNING

Do NOT adjust Rotary Switch A, which is the Channel Switch. The Channel Switch is set to the frequency specified on the FCC/IC application and is preset by the factory.

A 14000 series Transmitter has 16 available channels and an XR Series Transmitters has 49 available channels.

- If all switch settings are correct, the time source symbols are present, and the time and/or date are still not correct, it may be due to a bad GPS cable connection or a bad GPS Receiver.

#### Solution

- If the time source communication symbols are not displayed, complete troubleshooting steps in sections 1 through 3.
- If the switch settings are wrong, correct them, and then power cycle the Transmitter.

3. If the GPS communication symbol and parentheses are showing and all switch settings are correct, and the time and/or date are still wrong, replace the GPS Receiver and cable.
  4. If the switch settings are correct, the GPS Receiver and cabling have been replaced, and the time and/or date is still not correct, the Transmitter may be required to be replaced. For further assistance, contact Primex Technical Support at 1-262-729-4860.
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# Transmitter continues to power cycle and does not stay synced

## Symptoms

All or some of the below symptoms may be present.

- Transmitter front display screen is dim.
  - Transmitter syncs its time, cycles back to counting up, syncs its time, and then cycles again.
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## Cause

This may be due to a power issue.

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## Analyze

1. Verify power is present at the 120 VAC outlet.
  2. Verify the power supply connection to the Transmitter and to the 120 VAC outlet is secure.
  3. Using a multimeter, check for 9V at least 2.0A output from the power supply to the Transmitter.
  4. If there is a UPS (surge protector/battery backup) in use, check the voltage carefully or bypass the UPS it to determine if it has become defective.
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## Solution

1. If power to the Transmitter power supply is bad, resolve the issue.
  2. If it's determine the UPS (surge protector/battery backup) is defective, replace UPS and bypass until replaced.
  3. If power to the Transmitter power supply is good, replace the power supply as the first step.
  4. If these steps do not resolve the problem, the Transmitter may be required to be replaced. For further assistance, contact Primex Technical Support at 1-262-729-4860.
-

# Overview of Front Display

The front LCD display of the Transmitter displays its current status, a menu that allows you to view its configured settings, and a diagnostic menu that identifies Transmitter errors. Listed below is a brief overview of a Transmitter's front display screen.

## Transmitter Status (Normal)

The front LCD display of the Transmitter in a normal operating status should display the following information.

- Time: current time set in the Transmitter.
  - Time Zone: Time Zone set in the Transmitter.
  - Daylight Saving Time Status: DST setting. DT (Daylight Saving Time) or ST (Standard Time) is displayed.
  - Time Source Connection: indicates the configured time source; GPS (📶 tower symbol), NTP (S symbol), Repeater (Satellite) (R symbol).
  - Time Source Communication: status of GPS or NTP communication (📶 parentheses)
  - Firmware Version: firmware version of the Transmitter.
  - Day/Date: day and date received from the GPS or NTP time source.
  - Channel Number: channel number that the Transmitter is set to.
  - LED Status Indicator: status and operating condition of the Transmitter unit.
  - Menu: view Transmitter settings and Diagnostic Error Codes. For details, see topic Front Display Main Menu - Settings & Diagnostics.
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## Transmitter Status (Error)

The front LCD display of the Transmitter in an error status should display the following information.

- Time: may display current time or could be counting up from when the issue occurred.
  - Time Zone: Time Zone set in the Transmitter.
  - Scrolling Error Code Message 1: Call Tech Support
  - Scrolling Error Code Message 2: Use Diagnostic Error Code Menu.
  - Time Source Connection: indicates the configured time source; GPS (tower symbol), NTP (S symbol), Repeater (R symbol), or Satellite.
  - Time Source Communication: Status of GPS or NTP communication.
  - Firmware Version: firmware version of the Transmitter.
  - Day/Date: day and date received from the GPS or NTP time source.
  - Channel Number: Channel number that the Transmitter is set to may or may not be displayed.
  - LED: Green transmit light should be on.
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## Front Display Menu

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Pushing the right arrow once to access the menu, pushing the down arrow navigates through the categories. When the arrow is on a category, pushing the right arrow again selects the category, pressing the down arrow again scrolls through information in that category.

Listed below are the 5 menu categories with a short definition.

### Switch settings menu

- Displays what the eight dip switches, on the back of the unit, are set to

### GPS set up menu

- Displays GPS information and perform a manual reset of the GPS sync.

### Diagnostics menu

- Displays the Transmitter factory setting information, categories listed below.
  - a. Firmware revision
  - b. Time since last GPS
  - c. Hardware Revision
  - d. GPS/Repeater
  - e. Last Repeater Update
  - f. Serial Number
  - g. Mac Address
  - h. Radio Call Sign

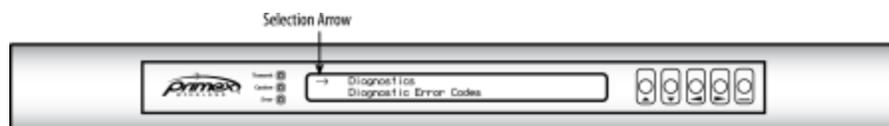
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## Diagnostic Error Codes Specifications

There are six Diagnostic Error Codes that identify the cause of the error occurring.

### How to view Diagnostic Error Code(s)

1. Move the selection arrow so that it's pointing to the Diagnostic Error Codes, then press the  button once.



## Diagnostic Error Codes definitions

Bad Output Power: indicates the Transmitter is not transmitting at the appropriate power level.

PLL Diagnostics: indicates the Transmitter is having trouble locking onto a channel; rendering it unable to broadcast time or schedules.

No GPS or Repeater Connected: indicates the Transmitter is not connected to a time source.

VSWR Errors: indicates there is a problem with either the High Power Antenna (may need repositioning) or the antenna cabling.

No GPS in 48 Hours: indicates the Transmitter has not synchronized to a time source for more than 48 hours.

No 1PPS in 48 Hours: indicates the time on the display has not been synchronized by 1PPS (1 Pulse Per Second) for more than 48 hours.

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## Clear Error Codes

Clearing an error code stops the yellow and red LEDs from flashing.

### How to clear error codes

1. From the front panel, press right arrow  button once to access the Main Menu.
2. Use the down arrow button to select Diagnostic Error Codes, then press the right arrow  button once.
3. Use the down arrow button to scroll to the error, which is indicated by a preceding dot next to the error.
4. Press the right arrow  button once. The display will show when the error was logged. Note the time and data of the error.
5. Press the right arrow  button once.
6. Display will read: "Clear all errors?. Press the right arrow  button once.
7. "Yes" and "No" are displayed with a selection arrow.

Selecting "Yes" followed by the pressing the ENTER button clears the errors.

Selecting "No" followed by pressing the ENTER button cancels the process and takes you back to the main menu.



8. Wait several seconds for the time/date to be displayed.

NOTE

If the LEDs continue to flash, repeat procedure as there may be additional errors to be cleared. If same errors continue to be logged, additional troubleshooting may be required. For further assistance, contact Primex Technical Support at 1-262-729-4860.

# VWSR error code

## Symptoms

All or some of the below symptoms may be present.

- Red LED is flashing on the Transmitter front display.
  - Transmitter Diagnostic Menu displays VWSR Errors -indicates there is a problem with either the external antenna or the antenna cabling.
  - Clocks may be displaying a visual signal loss indicator due to they have not received a time update for three days; Analog Clock second hand is stepping and a Digital Clock/Timer colon is flashing.
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## Problem

Transmitter might have an antenna or antenna cable issue, or the antenna might be located too close to something in its environment that is causing signal return on the line.

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## Analyze

### Internal Antenna

1. Verify the antenna is not cross threaded and is down tight to the top of the Transmitter.
2. Verify the location of the Transmitter does not place the antenna close to metal or wiring that may interfere with the dispersal of the signal or signal return back to the Transmitter.
3. Verify the location of the Transmitter does not place the antenna close to equipment that may interfere with the dispersal of the signal or signal return back to the Transmitter.

### External Antenna

Verify connections and inspect external antenna. Verify the antenna and cables running to it are in good shape, cables aren't bent or kinked, and antenna is not mounted with the head of the antenna near other objects on the roof. Detailed inspection steps provided below.

1. Verify the LMR 400 Coaxial Cable connections are secure both at the Transmitter and at the Omni Directional Antenna.
  2. Visually inspect the LMR 400 Coaxial Cable from the back of the Transmitter out to the Omni Directional Antenna - look for any damage (cuts, kinks compressions). If cable is damaged, replace the cable.
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3. Visually inspect the Omni Directional Antenna for a bent radiator (top of the antenna that looks like a trombone slide that wider at the top and tapers at the antenna base). There should be three radials attached to the antenna base at 30 degree angles. Make sure all three radials are attached and securely fastened. Replace any damaged or missing components.
  4. Verify a GelWrap splice closure is in use to protect connection from outdoor elements. Open and inspect the connection to ensure it's secure and has not been not compromised by moisture or corrosion. Dry connection if it's wet.
  5. Verify the LMR 400 Coaxial Cable is routed and secured with a UV Resistant cable tied to the outside of the antenna mast. Be sure it is NOT routed to the inside of the mast, which may cause the connection to become wet due to condensation from ongoing seasonal climate changes.
  6. Inspect the area where the antenna is installed, make sure the antenna head is well above the roof line and not near obstacles on the roof that could cause the signal to return on the line.
  7. Verify the antenna has 15 ft. of clearance from other antennas and any metal.
- 

## **Solution**

1. Correct all issues with installation of the antenna.
  2. Internal antenna: relocate the Transmitter into an area where it is clear of any obstacles.
  3. External Antenna: relocate the antenna to an area where it's clear from any obstacles. Replace questionable looking antenna components and cabling.
  4. If after all corrections are performed and the error won't clear, the Transmitter may need to be replaced. For further assistance, contact Primex Technical Support at 1-262-729-4860.
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# Bad Output Power error, no or low output Transmitter power

## Symptoms

All or some of the below symptoms may be present.

- Red LED is flashing on the Transmitter front display.
  - Transmitter Diagnostic Menu displays Bad Output Power - indicates the Transmitter is not transmitting at the appropriate power level.
  - Clocks may be displaying a visual signal loss indicator due to they have not received a time update for three days; Analog Clock second hand is stepping and a Digital Clock/Timer colon is flashing.
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## Problem

Transmitter has no or low power that may be due to hardware failure event or bad power.

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## Analyze

1. If the red LED is flashing, start at Red LED flashing and Transmitter GPS communication symbol is not displayed on front display and work your way through all subsequent troubleshooting sections.
  2. If the red LED is not flashing, check power using the same steps in topic Transmitter front display time and date are not correct.
  3. Look for the letter "LP" (Low power) behind the time on the front display of the Transmitter.
  4. Check Transmitter for power issues, completing the steps in Transmitter continues to power cycle and does not stay synced.
  5. Verify the antenna connections and cables look good showing no damage and the antenna is mounted correctly and not touching anything or extremely close to anything by completing the steps in VWSR error code.
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## Solution

1. If power to the Transmitter power supply is bad, resolve the issue.
  2. If the UPS (surge protector/battery backup) is defective, bypass it until it can be replaced.
  3. If power to the Transmitter power supply is good, but its output is bad replace the power supply as the first step.
  4. If power to the AMP is bad, replace the sun power supply.
-

5. If there is an "LP" behind the time and cannot get it cleared, the Transmitter may need to be replaced. For further assistance, contact Primex Technical Support at 1-262-729-4860.
  6. Relocate the Transmitter antenna if there might be antenna issues.
  7. If you have completed all of the previous steps and there is still no signal or it only reaches out less than 100 feet, the Transmitter may need to be replaced. For further assistance, contact Primex Technical Support at 1-262-729-4860.
-

# Bad Output Power error, no or low output Transmitter power

## Symptoms

All or some of the below symptoms may be present.

- Red LED is flashing on the Transmitter front display.
  - Transmitter Diagnostic Menu displays Bad Output Power - indicates the Transmitter is not transmitting at the appropriate power level.
  - Clocks may be displaying a visual signal loss indicator due to they have not received a time update for three days; Analog Clock second hand is stepping and a Digital Clock/Timer colon is flashing.
- 

## Problem

Transmitter has no or low power that may be due to hardware failure event or bad power.

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## Analyze

1. Verify low power condition. Check for clocks indicating they are not getting a signal.
  2. From the Transmitter front display, check for the presence of LP to the right of the time. If LP is present, this indicates the Transmitter has a low power condition.
  3. Check Transmitter for power issues, completing the steps in Transmitter continues to power cycle and does not stay synced.
- 

## Solution

1. If power to the Transmitter power supply is bad, resolve the issue.
  2. If the UPS (surge protector/battery backup) is defective, bypass it until it can be replaced.
  3. If power to the Transmitter power supply is good, but its output is bad replace the power supply as the first step.
  4. Relocates the Transmitter if there may be antenna interference issues.
  5. If you have completed all of the previous steps and there is still no signal or it only reaches out less than 100 feet, the Transmitter may need to be replaced. For further assistance, contact Primex Technical Support at 1-262-729-4860.
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# Extremely weak or no signal

## Symptoms

All or some of the below symptoms may be present.

- The signal from the Transmitter will only set a clock or show up on a signal meter up to 100 feet or less.
  - Red LED is flashing on the Transmitter front display.
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## Problem

This may be due to a power issue, a defective Transmitter, or antenna issues.

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## Analyze

1. If the red LED is flashing on the Transmitter, first complete all troubleshooting in topic Red LED flashing and Transmitter GPS communication symbol is not displayed on front display and work through all subsequent troubleshooting topics. Resolve any issues found.
2. If the red LED is not flashing, check power by completing the steps in Transmitter front display time and date are not correct.
3. Look for the letter "L" (Loop Lock Failure) behind the time on the Transmitter front display.
4. Check Transmitter for power issues by completing the steps in Transmitter continues to power cycle and does not stay synced.
5. Verify antenna connections and placement.

Internal Antenna: verify antenna connection is not cross threaded and the base of the antenna is flat and secured to the top of the Transmitter case. Verify the antenna is straight up vertically and is not touching anything or extremely close to any metal.

External Antenna: verify connections and inspect external antenna. Verify the antenna and cables running to it are in good shape, cables aren't bent or kinked, and antenna is not mounted with the head of the antenna near other objects on the roof. Detailed inspection steps provided below.

- a. Verify the LMR 400 Coaxial Cable connections are secure both at the Transmitter and at the Omni Directional Antenna.
  - b. Visually inspect the LMR 400 Coaxial Cable from the back of the Transmitter out to the Omni Directional Antenna - look for any damage (cuts, kinks compressions). If cable is damaged, replace the cable.
  - c. Visually inspect the Omni Directional Antenna for a bent radiator (top of the antenna that looks like a trombone slide that wider at the top and tapers at the antenna base). There should be three radials attached to the antenna base at 30
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degree angles. Make sure all three radials are attached and securely fastened. Replace any damaged or missing components.

- d. Verify a GelWrap splice closure is in use to protect connection from outdoor elements. Open and inspect the connection to ensure it's secure and has not been not compromised by moisture or corrosion. Dry connection if it's wet.
  - e. Verify the LMR 400 Coaxial Cable is routed and secured with a UV Resistant cable tied to the outside of the antenna mast. Be sure it is NOT routed to the inside of the mast, which may cause the connection to become wet due to condensation from ongoing seasonal climate changes.
  - f. Inspect the area where the antenna is installed, make sure the antenna head is well above the roof line and not near obstacles on the roof that could cause the signal to return on the line.
  - g. Verify the antenna has 15 ft. of clearance from other antennas and any metal.
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## **Solution**

1. If power to the Transmitter power supply is bad, resolve the issue.
  2. If the UPS (surge protector/battery backup) is defective, bypass it until the UPS can be replaced.
  3. If power to the Transmitter power supply is good, but its output is bad replace the power supply as the first step.
  4. External Antenna: If power to the AMP is bad, replace the sun power supply.
  5. If there is an "LP" behind the time and cannot get it cleared, replace the Transmitter. For further assistance, contact Primex Technical Support at 1-262-729-4860.
  6. Internal antenna: relocate the Transmitter if there are antenna interference issues present at its current location.
  7. External antenna: replace damaged antenna components and/or antenna cables. Relocate the antenna if there are interference issues present at its current mounting location.
  8. If you have completed all troubleshooting steps and still have no signal or it only reaches out less than 100 feet, the Transmitter may need to be replaced. For further assistance, contact Primex Technical Support at 1-262-729-4860.
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## Weak signal and limited coverage area

This is the toughest issue to diagnose due to there are many variables that can cause a weak signal, or symptoms that may lead to indicate there is a weak signal when it's not a signal issue.

The coverage area is determined by many factors. One of the primary factors is the transmitted signal compared to the background interference. For clocks to receive a clear signal from a Transmitter, the signal must be several times stronger than the background interference. Therefore, Transmitters located in areas with generally higher background interference will have reduced signal coverage.

### 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.

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## Symptoms

All or some of the below symptoms may be present.

- Clocks may be displaying a visual signal loss indicator due to they have not received a time update for three days; Analog Clock second hand is stepping and a Digital Clock/Timer colon is flashing.
- Clocks may not set to the correct time.
- Clock issues may increase based on their distance from the Transmitter.
- Clock issues may not have a consistent, identifiable pattern.

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## Cause

This may be due to a power issue, a defective Transmitter, interference, wrong size Transmitter for facility, construction of the building, contents of the building, or poor clock maintenance.

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## Analyze

1. Complete all troubleshooting steps, first Transmitter GPS communication symbol is not displayed on front display (section 1) and work through all subsequent troubleshooting topics. Resolve any issues found.
2. After resolving all issues and the signal coverage is not improved, it's recommended to test the signal coverage.
3. Check clocks to determine if the issue is a maintenance issue, such as weak batteries, or if the issue seems to be only present

in a specific clock version or model.

4. Make a site map. On the map, mark the clocks that have an issue to determine if there is a pattern to the issue.
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#### Solution

1. Correct all issues found while completing all troubleshooting steps.
  2. Correct all issues found with the clocks.
  3. Re-evaluate the situation with a site map and test results of the Transmitter.
  4. Contact Primex Technical Support for additional assistance when:
    - It's determined it may be a weak Transmitter.
    - The Transmitter is operating as expected, but may be too small to cover the facility.
    - There may be other circumstances causing the issue.
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# Support

To obtain additional technical documentation for Primex products, visit the Support area on our website at [www.primexinc.com](http://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 inquiries.

## 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

Hours: 8:00 a.m. to 5:00 p.m CST | Monday through Friday

Phone: 1-262-729-4860

Email: [techservices@primexinc.com](mailto:techservices@primexinc.com) | Web: [www.primexinc.com/support](http://www.primexinc.com/support)

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