PPN Trouble Shooting Guide

This document is intended to give you the tools to self-diagnose and possibly fix any problems that come up while using the PPN RTK system.

JDB-150 Modem

If your John Deere Receiver is not in 3D RTK mode there are various issues that could be causing this problem. By following the instructions on the next page of this document, and clicking on the links that correspond to your issue, you will be walked step by step through the solutions to your problem.

<Start Trouble Shooting>

PPN Online Tools

Ordering parts and subscriptions

http://order.prairieprecision.com/

Username is first initial and last name. Example: IDrake
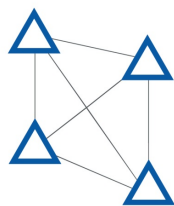
- o

Online troubleshooting tool

https://admin.prairieprecision.com

Username and passwords are case sensitive

**You may have to continue through security certificates that will show up in your browser. Just choose continue and get to the login page**

Trouble Shooting Instructions

To view the pages required to problem solve the issue you must first navigate to the Starfire position page of your John Deere receiver. Press the menu button on the bottom-right of the screen and select the Starfire button.

After looking at the Starfire position page and finding that the receiver is not in 3D RTK mode, check the RTK status. If the RTK status is complete and the issue has not been fixed check the modem status. If the modem is connect properly but fails to boot up or the lights are not functioning properly, you will need to reset the modem.
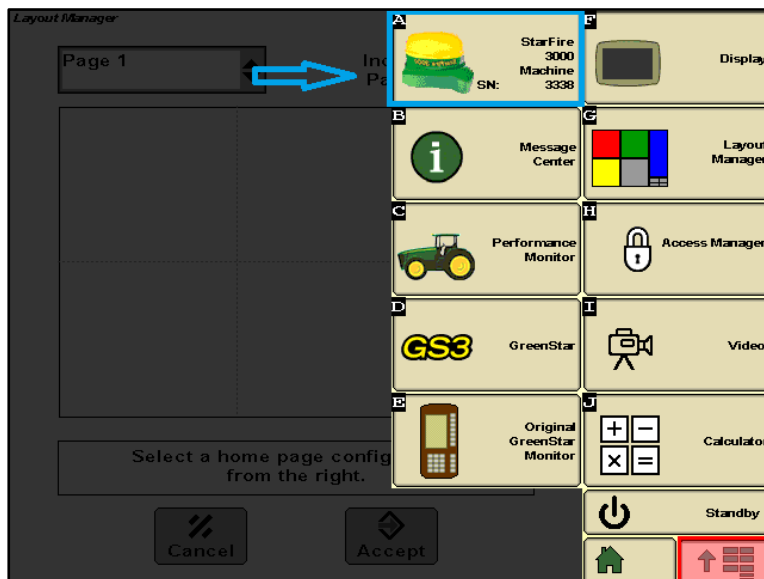
Starfire Position Page Selection

Assuming the modem status and RTK status are in correct working order and you are still not receiving RTK data you will need to check the distance from base station, check satellites, and if you are using an SF3000 receiver you will need to also check GLONASS.

If the issue persists there may be a problem with the modem configuration. Use the online configuration tool or call PPN to check the settings. If after completing this document your issue has not been resolved contact PPN. If your issue is one that we cannot fix we will arrange for your modem to be returned for repair.

RTK Status:

Go into the Starfire diagnostic page. Under the readings tab select RTK from the dropdown box. See what "RTK status" the receiver is reporting.

RTK status

Warming up (for more than 2 minutes)
- o This indicates that the modem is not sending RTK data to the receiver. We need to determine the modem status; refer to the Modem Status section.
- Initializing (for more than 2 minutes)
  - o This indicates that the modem is talking to the receiver but is not passing RTK data. We need to look at the modem status; refer to the Modem Status section.
- Other Problem or Other Problem 6
  - o We need to look closer to see if we can determine what may be causing this. See the Other Problem section below.
- Complete
  - o The PPN modem is connected to the network and passing RTK data to the receiver but unable to obtain a position. Go to the Low Position Accuracy section.
- If the status is something other than one listed in this guide, contact your dealer.

The letter after the RTK Software version is another indicator of the current modem status.

- o X : no cell or WiFi connection
- o C: Cell of WiFi is connected but there is no RTK Data
- o N: Receiving RTK data, everything is good.

If your RTK status is complete and your problem has not been resolved, return to the top of this document.

Other Problem

The JD RTK statuses of "other problem" and "other problem 6" are reporting a very generic error. All we truly know from this error message is that the receiver is getting valid RTK data from the modem but still unable to compute an RTK position. We need to look at the things that we know could cause this error

- One problem that could cause this error is if the RTK data the modem is sending to the receiver is for a location that is too far away. Go to the Distance from Base section to check this.
- A low or marginal satellite count could also cause this error. Go to the Check Satellites section.
- Verify that the software on the modem is the latest. It software should be greater than 1.18, you can check with PPN to find out what the current release version is.
- High ionosperic disturbances from solar flares can cause this as well. If this is the problem we can verify if the solar activity level is high but, if it is the case, there is nothing we can do but wait for it to subside.
- If the cell light comes on but never flashes check the cell connection.

If your status has changed from "other problem" return to the RTK status section.

If your issue has not been resolved, return to the top of this document.

Modem Status

To check the modem status we will first look at the status lights on the top of the modem. If the modem has just powered up allow 45 seconds for it to go through its start-up routine and for the lights to stabilize.
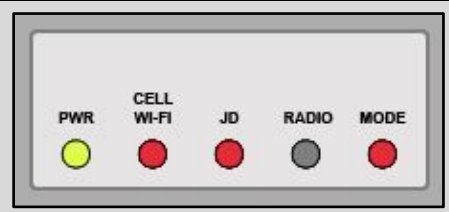
- Standard operating conditions are as seen above with the Cell/WiFi light flashing and all of the others solid except for the "radio" light

If the lights are not as seen above check below for trouble shooting information on each light.

- ALL lights (including the power light) are OFF
  - o The modem is not receiving power. Check the wiring and connections to verify that the modem is properly connected. There should be 12vdc power on the Receiver 4-pin connector on pin 1 with pin 4 as ground. If after verifying that the modem is properly connected and still no lights are on, the modem will require service. Contact PPN to arrange for the return of the modem.
- ONLY the power light is ON and BLINKING
  - o This denotes an update is being downloaded to the modem and it is functioning normally. Please be patient as the modem will power down and back on a couple of times. When update is done the power light will remain solid, other lights will come on
- ONLY the power light is ON (the mode light may be a dim green).
  - o The modem may need to be reset, view the Resetting the Modem section. If after resetting the modem the power light is still the only light on contact PPN to arrange return of the modem for repair
- Cell WiFi light is OFF
  - o There is no cell connection, Check for a valid SIM card or WiFi connection.
- Cell WiFi is solid
  - o The modem is not activated, check the online tool to ensure the modem has been activated, if it has an active subscription and is still not working contact PPN.
- JD Light is OFF
  - o This indicates there is no data connection between the receiver and the modem, check the wiring harness for a secure connection and ensure that the receiver is set up for RTK and has been configured to the radio.

If the lights on your modem are functioning properly, return to the RTK Status section or return to the top of this document.

Resetting the Modem

In the case that the modem is not booting up properly we can force a reset. To reset the modem use the 4-pin connector to cycle the power 6 times within 30 seconds. The best method is to disconnect the modem for 2- 3 seconds followed by reconnecting for 2-3 seconds and repeating 6 times leaving the modem plugged in on the sixth time.

- Once your modem has been reset it is best to recheck the settings if possible. It is possible that the modem software version and settings were reset as well and need to be reconfigured. This is easiest to do with a PPN interface cable and connecting the modem to a laptop. See Checking the Modem Configuration section.
- Once the modem has been reset and the configuration settings have been reset/verified the modem should be working properly.

If your problem still exists, return to the top of this document

Distance from Base

Each modem has a GPS module that reports to the PPN network its current location. The PPN network system will then send RTK data to the modem for that position. In doing so the PPN system creates a "virtual" base station near the reported position. We need to make sure the "virtual" base that the PPN network is using is close to the actual position of the receiver.

Make sure the antenna is mounted so the antenna connectors are facing up and the modem has a clear view of the sky so it may get a GPS position. Let the modem run for 10 – 15 minutes and then cycle the power on the modem and check the base distance once the modem cell light starts flashing again.
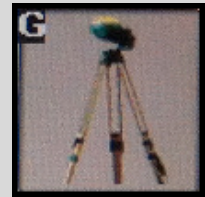
We check this by going into the RTK page and seeing what the distance to base is reported as.

- If the distance from Base is larger than 20KM (12 mi.) then the modem may be reporting the wrong position to the network. If the modem has been up and running for at least 5 minutes try cycling the power to see if the position will be corrected.

- If after cycling the power and waiting for longer than 5 minutes and the position to base is still reporting over 20Km, there may be a problem with the GPS module in the modem contact PPN to arrange for the modem to be returned for repair.
- In some very rare cases the GPS module within the modem takes a very long time to get a position. If at all possible let the modem run for 30 to 45 minutes and cycle power again. If this still does not fix the problem contact PPN to arrange for the modem to be returned for repair.

Distance from Base

If after completing the previous steps your distance from base has changed to a reasonable distance return to the RTK Status section to see if the status has changed.

If the distance from base is reporting correctly, return to the Other Problem section or return to the top of this document.
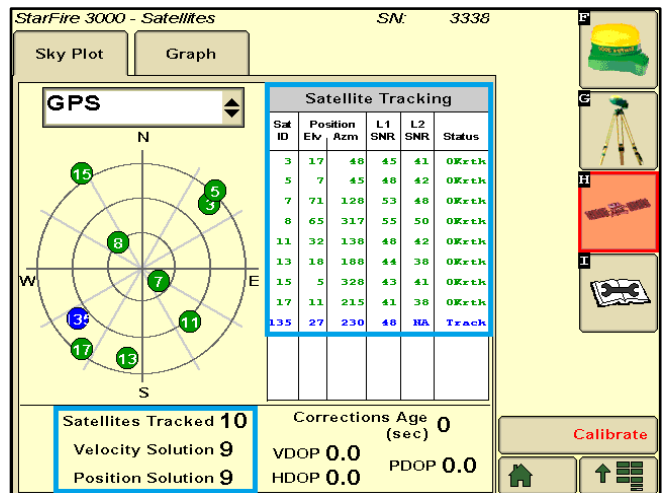
Check Satellites

To compute an RTK position the more satellites a receiver has the easier it is. RTK requires a minimum of 5 satellites and only uses satellites that are higher than 10 degrees above the horizon. In some circumstances if the satellite count is around the minimum, it may take the receiver several minutes to compute a position and in rare cases, the receiver is unable to compute a position until the satellite count improves.

- In the Starfire satellites page check on the bottom left corner to see the number of satellites tracked and how many are in the position Solution. For a GPS-only receiver (iTC or Gen 2) the number in Position Solution should be above 5. If not, check to see how many are being tracked.

- Look at the GPS satellites plot and table and notice that the satellites above 10 degrees are marked as "OK$_{rtk}$". If the status is only OK, there is no RTK data for that satellite.

- If the satellite count used in the position solution is less than 7 and it is a SF3000 receiver we should check to make sure that the modem is set to receive both GPS and Glonass data. Go to the Check Glonass Section.

Checking Satellites

If your system is connected and tracking sufficient GPS in rtk mode, return to the Other Problem section.

Check GLONASS

To take advantage of the capabilities the SF3000 receiver offers we must make sure that we are getting RTK corrections for GPS and GLONASS satellites. To check what corrections are being sent go to the Starfire satellites page.

- First look at the GLONASS satellites plot and table and notice that the satellites above 10 degrees are marked as "OK$_{rtk}$".

- If the satellites above the elevation mask are reporting "OK" and not "OK$_{rtk}$", this means the modem is set up to send GPS only corrections. We need to change the modem configuration and check the NTRIP settings.

Checking GLONASS

If your receiver is connecting to GLONASS satellites and the status is OKrtk, return to the Other Problem section of this document.

Check Cell Connection:

> Make sure the cell modem has an activated sim card installed and has been powered up with the cellular antenna connected for at least 2 minutes.

- Cell light is OFF
    - The modem does not have a cellular connection. Verify the sim card is installed properly and activated with the provider. If this persists check the modem carrier settings.
- Cell light is ON and not flashing
    - The cellular connection is working but the modem is unable to get RTK data from the PPN server. You will need to check the NTRIP settings in the modem.
- Cell light is FLASHING
    - The modem has a cellular connection and is receiving RTK data from the PPN server. If the receiver is still not in RTK mode check JD light on the modem.

If your cell connection is operating correctly, return to the Other Problem of this document.

Check JD Light:

> Before checking the JD modem light make sure them modem is powered up, connected to the JD receiver and the Cell/WiFi light is flashing indicating that the modem is receiving RTK data from the network.

- JD light is FLASHING
    - The modem is initializing communications with the receiver. If the light stops flashing but starts again after about 30 seconds the modem is talking to the receiver but the receiver either is not receiving or does not recognize the RTK data the modem is sending to it. Check the Network Connection.
- JD light is SOLID
    - The modem has finished the initialization with the JD receiver.
- JD light is OFF
    - The modem is unable to communicate with the receiver and therefore will require servicing.

If this does not solve your issue, return to the Other Problem section of this document.

Low Position Accuracy:

If the receiver is a SF3000 and reporting position mode of 3D WAAS or 3D NONE while the RTK status is complete, check to see if the receiver software version 1.52D.

- If your receiver software version is out of date contact your local John Deere Dealer.

If this does not solve your issue, return to the top of this document.