

# Mobile RTK

## Theory of Operation

Real time kinematic (RTK) uses stationary base stations to correct global positioning system (GPS) signal for greater accuracy.

John Deere Mobile RTK (M-RTK) signal is an RTK solution that provides RTK level accuracy over a cellular based network. Base stations within this network are linked together by a central server. JDLink™ equipped machines utilize these base station corrections using cellular signal and send them to the StarFire™ 3000 Receiver.

### Features

Since correction data is transferred over a cellular network, it may be available in areas limited by the line-of-sight requirement of traditional RTK radios. As long as the receiver is inside the M-RTK network and has adequate cell coverage, M-RTK corrections should be available. There is no need to switch base stations inside the network.

M-RTK signal utilizes M-RTK extend (M-RTK-X) which allows for up to 15 minutes of M-RTK corrections after M-RTK signal is lost.

*JDLink is a trademark of Deere & Company  
StarFire is a trademark of Deere & Company*

*NOTE: Do not use SF2 Fallback during operations when M-RTK accuracy is required. Accuracy while operating in SF2 mode does not equal the performance of M-RTK.*

SF2 Fallback allows the StarFire™ 3000 Receiver to go into SF2 mode once M-RTK-X has timed out. To enable this feature, select Main softkey > Setup tab > Use SF2 if RTK Signal Lost checkbox. SF2 signal must be present at the time M-RTK-X times out. SF2 Fallback can be used for up to 14 days after M-RTK corrections are lost. After 14 days, the receiver defaults to Wide Area Augmentation System (WAAS) or European Geostationary Navigation Overlay Service (EGNOS) (if available). A connection to M-RTK is required to use SF2 Fallback again.

Rover must operate in M-RTK mode for greater than 1 hour before M-RTK-X or SF2 Fallback are available.

RW00482,000057E -19-25JAN16-1/1

## John Deere Components

To operate the John Deere Mobile RTK system, the following components are required:

- GreenStar™ 2, GreenStar™ 3, or Generation 4 CommandCenter™ Display with AutoTrac™ SF2 activation

*GreenStar is a trademark of Deere & Company  
CommandCenter is a trademark of Deere & Company  
AutoTrac is a trademark of Deere & Company  
StarFire is a trademark of Deere & Company  
JDLink is a trademark of Deere & Company*

- StarFire™ 3000 Receiver
  - SF2 Ready activation
  - RTK activation
  - John Deere Mobile RTK Signal subscription
- JDLink™ enabled machine with an active subscription
- John Deere Mobile RTK Signal Web Portal:  
<http://my.jdmrtk.com>

RW00482,000057F -19-26JAN16-1/1

## John Deere Mobile RTK Setup Data Checklist

John Deere Mobile RTK Setup Data Checklist
<b>RTK Correction Data Provider Information</b>
<b>Correction Type:</b> ..... (for example, JD Mobile RTK Signal)
<b>Modem Settings</b>
<b>*Type:</b> ..... (for example, Mobile RTK MTG or Mobile RTK Modem)
<b>*Profile:</b> ..... (for example, JohnSmithFarm)
<b>Correction Data Settings</b>
<b>*URL Address:</b> ..... (for example, ne.jdmrtk.us)
<b>*Port:</b> ..... (for example, 9101)
<b>*Mount Point:</b> ..... (for example, jdmrtk3)
<b>*User ID:</b> ..... (for example, JD+PCGT3TA123456)
<b>*Password:</b> ..... (for example, 1a2b3c4d)

**NOTE:** \* Required data for modem configuration.

*Password cannot include ";" or "." or any other special characters.*

RW00482.0000580 -19-26JAN16-1/1

## Activation and License

**Activations (A)** for receiver:

- SF1 — Activated on every StarFire™ 3000 Receiver.
- SF2 Ready — SF2 Ready activation is required before activating Real Time Kinematic (RTK), and is required to use an SF2 or Mobile RTK (M-RTK) license. Receiver can either be ordered SF2 Ready, or an SF2 Ready upgrade can be purchased.
- RTK — Activated with valid RTK activation (requires SF2 Ready).

**SF2 License (B)**: Displays status of SF2 license of receiver, such as:

- Yes-Enabled — A valid SF2 license exists and SF2 is the differential correction mode selected.
- Yes-Disabled — A valid SF2 license exists, but SF2 is not the differential correction mode selected.
- No — No valid SF2 license exists or SF2 license has expired.

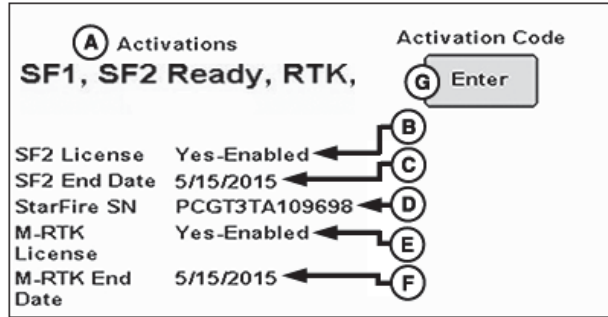
*NOTE: With John Deere Mobile RTK, SF2 fallback function is included and an SF2 license is not required.*

**SF2 End Date (C)**: Displays date when SF2 license expires.

**StarFire SN (D)**: Receiver serial number.

**M-RTK License (E)**: Displays M-RTK license status of receiver, such as:

*StarFire is a trademark of Deere & Company*



StarFire 3000 Main—Activations Tab

- A—Activations
- B—SF2 License
- C—SF2 End Date
- D—StarFire SN
- E—M-RTK License
- F—M-RTK End Date
- G—Activation Code Enter Button

- Yes-Enabled — A valid M-RTK license exists, and M-RTK is selected as the differential correction mode.
- Yes-Disabled — A valid M-RTK license exists, and M-RTK is not selected as the differential correction mode.
- No — No valid M-RTK license exists or M-RTK license has expired.

**M-RTK End Date (F)**: Displays date when M-RTK license expires.

CZ76372,0000684 -19-25FEB14-1/3

## Activation / License Status Window

Messages are displayed when SF2 license has expired.

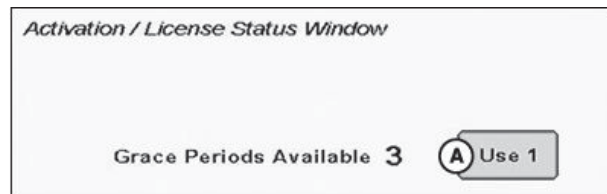
Option to use a grace period is provided.

*NOTE: Three 24 hour grace periods are available when a current license expires. These periods allow sufficient time for operator to renew a license. Grace periods provide SF2 differential correction signal.*

To use a grace period:

1. Select Use 1 button (A).
2. Select Yes button.

PC17364 —UN—22JAN14



A—Use Grace Period Button

Continued on next page

CZ76372,0000684 -19-25FEB14-2/3

### Activation Code

*NOTE: A 24-digit activation code is generated on StellarSupport.com. Contact your John Deere dealer for support.*

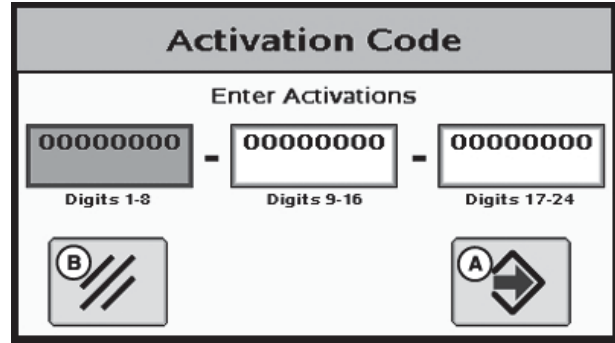
*Activation codes provide SF2 Ready and RTK activations, and SF2 and M-RTK licenses.*

Select Enter button to input 24-digit codes for SF2 Ready and RTK activations, SF2 and M-RTK licenses, and deactivation codes for transferring all activations and licenses.

1. After selecting Enter button, an Activation Code box appears with three input boxes.

*NOTE: If more than eight digits are entered into an input box, 9999999 appears. Reselect box and type only eight digits into input box.*

2. Select first input box labeled Digits 1-8, and enter first eight digits of 24-digit code.
3. Select second input box labeled Digits 9-16, and enter second eight digits of 24-digit code.
4. Select third input box labeled Digits 17-24, and enter last eight digits of 24-digit code.
5. Select Enter button (A).
6. If 24-digit code is valid and entered correctly, a confirmation message appears.



Activation Code

A—Enter button

B—Cancel button

### Deactivation Code Input

Deactivation codes are input the same as activation codes. Six-digit return codes for SF2 Ready and RTK activations, and SF2 and M-RTK licenses are displayed after deactivation code is entered. These codes are needed when transferring activations or licenses to another receiver.

CZ76372.0000684 -19-25FEB14-3/3

PC9708 —UN—10NOV06

### Mobile RTK Softkey

*NOTE: John Deere Mobile RTK softkey appears on screen only when Real Time Kinematic (RTK) has been activated and a Mobile RTK subscription code has been entered.*

To use John Deere Mobile RTK, the following activations and license are needed:

- SF2 Ready Activation
- RTK Activation
- John Deere Mobile RTK Signal Subscription

Select Menu button > StarFire™ 3000 button > Mobile RTK softkey. This page provides the following functions:

- System Status

*StarFire is a trademark of Deere & Company*

PC17361 —UN—11DEC13



Mobile RTK Softkey

- Mobile RTK (M-RTK) Correction
- StarFire™ 3000 Global Positioning System (GPS) Signal
- RTK Port Configuration
  - Serial Settings and National Marine Electronics Association (NMEA) message
  - Modem and Network

CZ76372.000067D -19-25FEB14-1/1

## Mobile RTK Page

### System Status M-RTK Correction:

**Correction Type (A):**

Operator must select one of the following mobile real time kinematic (M-RTK) correction sources:

- Off
- JD Mobile RTK Signal

**Corrections Age (B):** Indicates M-RTK correction data stream during maximum correction message age (MCMA).

*NOTE: Status bar is green when M-RTK correction is streaming. It is red when M-RTK correction streaming is not detected during MCMA.*

*If status bar is displayed in red while StarFire™ 3000 status bars (C, D, and E) are displayed in green, there is a problem with M-RTK. Check settings (Correction Type [A] and RTK Port Configuration [F and G]) and contact your John Deere dealer.*

**Signal Strength (H):** Indicates cellular signal strength of current location. Select Read button (I) to get the current cellular signal strength.

**Data Received (kb) (J):** Indicates total kilobytes (kb) of data received. Calculation starts once connection is accepted and used by receiver.

**Connection Duration (hr) (K):** Indicates duration in hours (hr) of connection. Calculation starts once connection is accepted and used by receiver.

*NOTE: If correction messages are not recognized or received, Data received (J) and Connection duration (K) totals do not accumulate.*

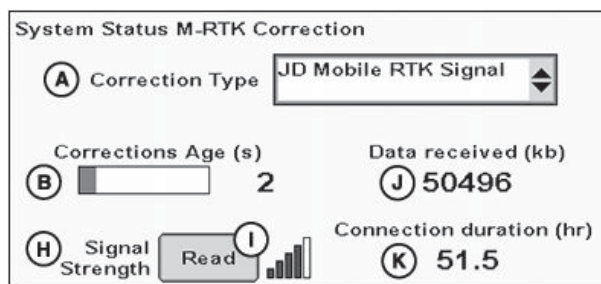
### System Status - StarFire™ 3000:

*NOTE: Global positioning system (GPS) Accuracy (C), GPS Signal (D), and SF Signal (E) are also displayed on Main softkey > Info tab.*

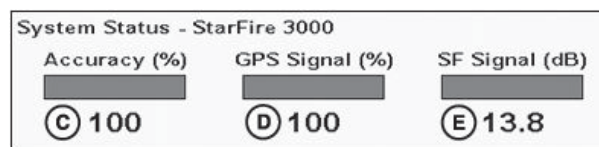
**GPS Accuracy Indicator (GPS AI) (C):** GPS AI displays percentage (0-100%) of GPS position accuracy achieved by receiver.

When receiver is initially powered, GPS AI displays 0 percent. As receiver acquires satellites and calculates a position, GPS AI increases as accuracy improves. Acceptable guidance performance for Parallel Tracking™ and AutoTrac™ is achieved when GPS AI displays 80 percent or greater. This may take up to 20 minutes. Many factors affect GPS accuracy. If 80 percent accuracy or greater is not achieved within 25 minutes, consider the following possibilities:

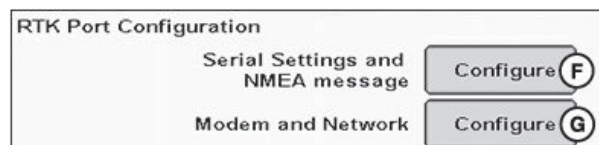
- Obstructed view of sky — Trees, buildings, or other structures may block GPS signal from available satellites.
- L1/L2 signal to noise ratio (SNR) — Radio interference from 2-way radios or other sources may cause low SNR (Satellites softkey > Graph tab).



System Status M-RTK Correction  
PC22084 —UN—25JAN16



System Status - StarFire 3000  
PC22085 —UN—25JAN16



RTK Port Configuration

- |   |                                      |
|---|--------------------------------------|
| A—Correction Type                                   | G—Configure Modem and Network Button |
| B—Correction Age                                    | H—Signal Strength                    |
| C—Accuracy (%)                                      | I—Read Button                        |
| D—GPS Signal (%)                                    | J—Data Received (kb)                 |
| E—SF Signal (dB)                                    | K—Connection Duration (hr)           |
| F—Configure Serial Settings and NMEA Message Button |                                      |

- Satellite position in sky — Poor GPS satellite geometry can reduce accuracy (Satellites softkey > Sky Plot tab).
- Number of satellites above elevation mask — Total number of GPS satellites available to receiver that are above seven degrees elevation mask (Satellites softkey > Sky Plot tab).
- Number of satellites in solution — Total number of satellites used by receiver to calculate a position (Satellites softkey > Sky Plot tab).

- **GPS Signal (D):** Displays quality of signal received from constellation of GPS satellites.
- **SF Signal (E):** Displays quality of differential correction signal received from correction satellites.

### RTK Port Configuration:

- Select Configure button (F) to setup recommended standard 232 (RS232) serial port setting and National Marine Electronics Association (NMEA) message.
- Select Configure button (G) to setup modem and network. (Reference Modem and Network Configuration for more information.)

Continued on next page

RW00482,0000582 -19-26JAN16-1/2

PC22083 —UN—25JAN16

StarFire is a trademark of Deere & Company  
Parallel Tracking is a trademark of Deere & Company  
AutoTrac is a trademark of Deere & Company

RW00482,0000582 -19-26JAN16-2/2

## Modem and Network Configuration

### Modem Settings:

- **Type (A):** Defines modem type. Select Mobile RTK MTG.
- **Profile (B):** Defines profile name. Default is NEW.
- **Edit Profile Name (C):** Select button to input a profile name.

Select Next Page button (D) to access Modem and Network Configuration Page 2.

A—Type  
B—Profile

C—Edit Profile Name Button  
D—Next Page Button

Modem and Network Configuration Page 1 of 2

Continued on next page

RW00482,0000581 -19-25JAN16-1/2

PC22003—UN—11JAN16

- **Profile (A):** Modem profile name defined on previous page.

**Correction Data Settings:**

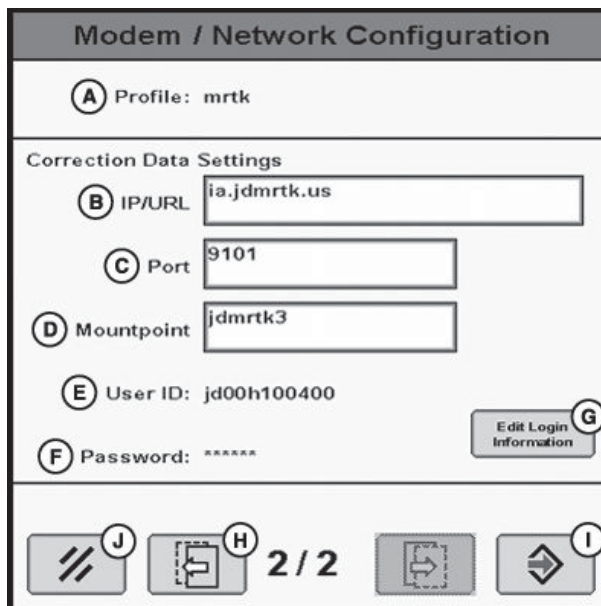
- **IP/URL (B):** Input domain name provided by correction data provider (xx.jdmrkt.yy).  
 - xx = state or province abbreviation  
 - yy = country abbreviation  
 For example, Iowa, US is ia.jdmrkt.us or Ontario, CA is on.jdmrkt.ca.
- **Port (C):** Input port number provided by correction data provider (for example, 9101).
- **Mountpoint (D):** Input virtual reference station provided by correction data provider (for example, jdmrkt3).
- **User ID (E):** Displays user identifier (for example, JD+PCGT3TA123456).
- **Password (F):** Displays hidden password characters as asterisks (\*\*\*\*).
- **Edit Login Information (G):** Select button to display Correction Data Settings page. Enter User ID (E) and Password (F) provided by correction data provider.

(For more Correction Data Settings information, reference <http://connect.jdmrkt.com>.)

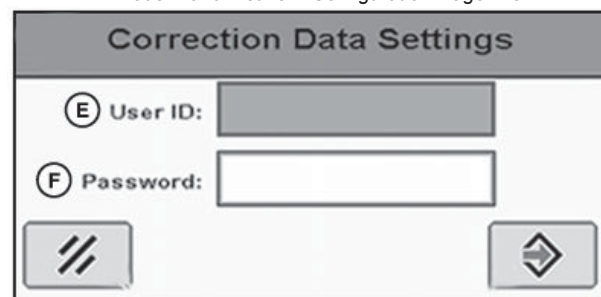
Select Previous Page button (H) to access Modem and Network Configuration page 1.

Select Enter button (I) to store all settings or Cancel button (J) to abort setup.

- |              |                                 |
|--------------|---------------------------------|
| A—Profile    | F—Password                      |
| B—IP/URL     | G—Edit Login Information Button |
| C—Port       | H—Previous Page Button          |
| D—Mountpoint | I—Enter Button                  |
| E—User ID    | J—Cancel Button                 |



Modem and Network Configuration Page 2 of 2



Correction Data Settings

PC22004—UN—11JAN16

PC17372—UN—23JAN14

RW00482,0000581 -19-25JAN16-2/2

# Troubleshooting

## Diagnostic Softkey

PC17373 —UN—23JAN14

StarFire™ 3000 – Diagnostic page contains three tabs:

**Readings tab (A)** has detailed information about receiver, including:

- Unswitched Voltage
- Switched Voltage
- Controller Area Network (CAN) High Voltage (Vehicle CAN Bus)
- CAN Low Voltage (Vehicle CAN Bus)
- Software Part Number
- Software Version Number
- Hardware Part Number
- Hardware Serial Number
- Receiver Hours (h)
- Receiver Address
- QuickStart Status
- External Antenna
- Serial National Marine Electronics Association (NMEA)

**Data Logs tab (B)** has seven pages of graphed global positioning system (GPS) data logged over the previous 60 minutes, including:

- GPS Accuracy (0 to 100%)
- Positional Dilution of Precision (PDOP) (0—10)
- Satellites Used (Amount)
- SF Signal Quality (0 to 100)
- Nav Mode (0, 2D, or 3D)
- Differential Mode (None, Wide Area Augmentation System [WAAS], Wide Area Correction Transform [WCT], Real-Time GIPSY [RTG], or Real Time Kinematic [RTK])

**Over the Air tab (C)** displays Over the Air (OTA) messages which allow StarFire™ 3000 to receive licenses and activations through the StarFire™ network.

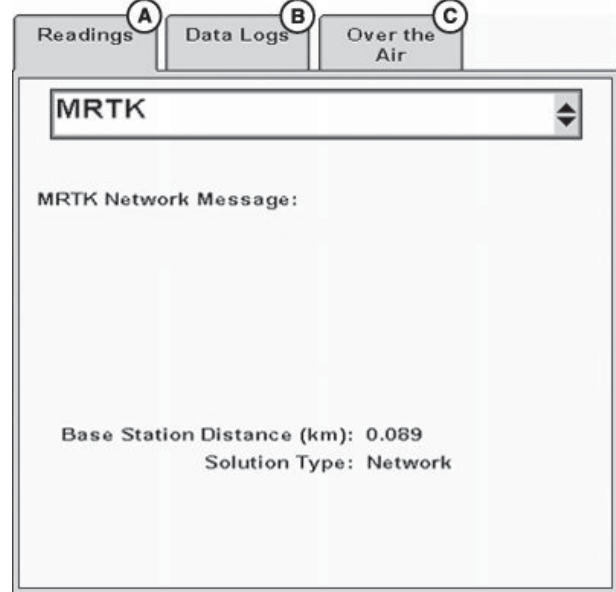
Rather than getting a license code over the cell phone or internet, the license code is transmitted wirelessly from a StarFire™ satellite.

*NOTE: A message history shows OTA messages that have been received since the receiver has been*

*StarFire is a trademark of Deere & Company*



Diagnostics Softkey



StarFire™ 3000 – Diagnostic Page

A—Readings Tab  
B—Data Logs Tab

C—Over the Air Tab

*powered on. History shows whether an OTA activation was applied successfully or not. OTA message history can be cleared.*

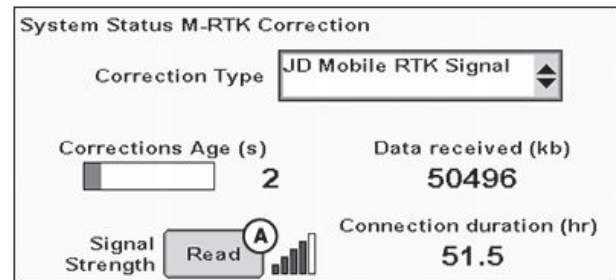
PC22082 —UN—25JAN16

RW00482.0000583 -19-26JAN16-1/1

## Read Signal

Select Read button (A) to measure cellular signal strength at current location.

A—Read Signal Button



PC17374 —UN—23JAN14

CZ76372.0000708 -19-10MAR14-1/1