DCY

StarFire 3000

OPERATOR'S MANUAL

StarFire 3000

OMPFP11008 ISSUE F1 (ENGLISH)

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

If this product contains a gasoline engine:

⚠ WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

The State of California requires the above two warnings.

Additional Proposition 65 Warnings can be found in this manual.

John Deere Ag Management Solutions
(This manual replaces OMPFP10786)
PRINTED IN THE U.S.A.

OMPFP11008

Introduction

www.StellarSupport.com

NOTE: Product functionality may not be fully represented in this document due to product changes occurring after the time of printing. Read the latest Operator's Manual and Quick Reference Guide prior to operation. To obtain a copy, see your dealer or visit www.StellarSupport.com

OUO6050,0000FB1 -19-10AUG10-1/1

Contents

Original Instructions. All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

Recognize Safety Information

This is a safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.

T81389 —UN—07DEC88

DX,ALERT -19-29SEP98-1/1

Understand Signal Words

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

TS187 —19—30SEP88

DX,SIGNAL -19-03MAR93-1/1

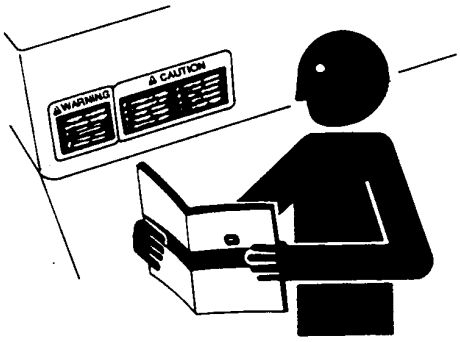
Follow Safety Instructions

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your John Deere dealer.

There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this operator's manual.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.



TS201 —UN—23AUG88

If you do not understand any part of this manual and need assistance, contact your John Deere dealer.

DX,READ -19-16JUN09-1/1

Practice Safe Maintenance

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet , and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.

TS218 —UN—23AUG88

DX,SERV -19-17FEB99-1/1

Handle Electronic Components and Brackets Safely

Falling while installing or removing electronic components mounted on equipment can cause serious injury. Use a ladder or platform to easily reach each mounting location. Use sturdy and secure footholds and handholds. Do not install or remove components in wet or icy conditions.

If installing or servicing a RTK base station on a tower or other tall structure, use a certified climber.

If installing or servicing a global positioning receiver mast used on an implement, use proper lifting techniques and wear proper protective equipment. The mast is heavy and can be awkward to handle. Two people are required when mounting locations are not accessible from the ground or from a service platform.

TS249 —UN—23AUG88

DX,WW,RECEIVER -19-24AUG10-1/1

FCC NOTIFICATIONS TO USER

FCC NOTIFICATION

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This device must be operated as supplied by John Deere Ag Management Solutions. Any changes or modifications made to this device without the express written approval of John Deere Ag Management Solutions may void the user's authority to operate this device.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, no guarantee shall be made that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

BA31779,00001DB -19-25MAY11-1/1

StarFire 3000 Receiver

StarFire 3000 is a 55 channel, 5 frequency, GNSS receiver with integrated 3-axis Terrain Compensation. It is capable of using all 3 GPS Bands and it is GLONASS and GALILEO-Ready. The integration eliminates the need for a stand-alone Terrain Compensation Module (TCM) for improved guidance performance.

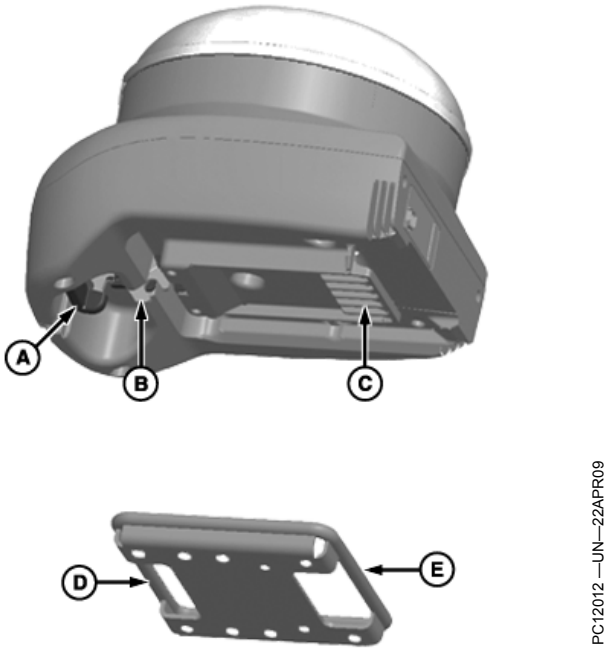
StarFire 3000 provides three different levels of accuracy. It can be upgraded to higher levels of accuracy as farming needs change without buying a new receiver.

Receiver is located on cab of machine. It receives global positioning and differential correction signal through a single receiver and integrates signal for use with system.

Terrain Compensation Module (TCM) is integrated into receiver and is a navigational aid used with receiver to enhance vehicle position and course parameters that GPS provides. TCM corrects for vehicle dynamics such as roll and pitch on side-slopes, rough terrain, or varying soil conditions.

Signal Level	Accuracy
SF1	+/- 25 cm (10 in.)
SF2	+/- 10 cm (4 in.)
RTK	+/- 2.5 cm (1 in.)

StarFire 3000 Accuracy



PC12012 —UN—22APR09

A—Latch Release Lever
B—Latch
C—Rear Hook
D—Latch Bar
E—Rear Hook Pivot Bar

StarFire 3000 Deluxe Shroud Bracket Mounting Instructions

1. Read “Handle Global Positioning Receivers and Brackets Safely” in the Safety section.

Continued on next page

BA31779,00001B6 -19-17MAY11-1/7

2. Slide rear hook (A) back under rear hook pivot bar (B).

A—Rear Hook **B—Rear Hook Pivot Bar**

PC12152 —UN—14JUL09

BA31779,00001B6 -19-17MAY11-2/7

3. Pull receiver shroud downward until latch locks.

   Pull upward on front of shroud to verify positive latch.

PC11120 —UN—10JUL08

Continued on next page

BA31779,00001B6 -19-17MAY11-3/7

Remove Deluxe Shroud

1. Pull release lever (A) to release latch.
2. Pull up on front of shroud to remove.

A—Latch Release Lever

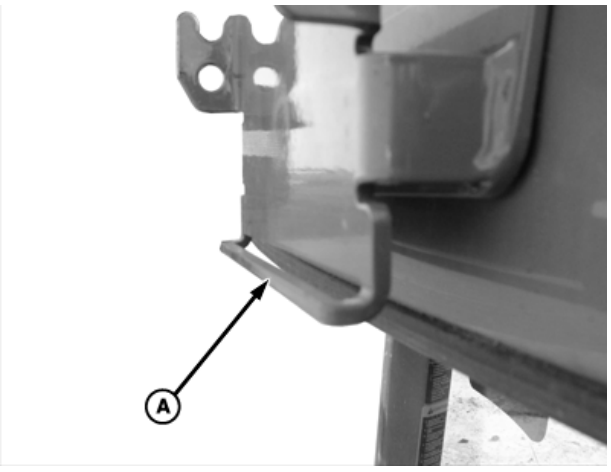
PC12014 —UN—22APR09

BA31779,00001B6 -19-17MAY11-4/7

StarFire Original Shroud Bracket Mounting Instructions

1. Read “Handle Electronic Components and Brackets Safely” in the Safety section.
2. Verify that vehicle side receiver bracket bar (A) is not bent inward or outward.

A—Bracket Bar



PC8328 —UN—02SEP04

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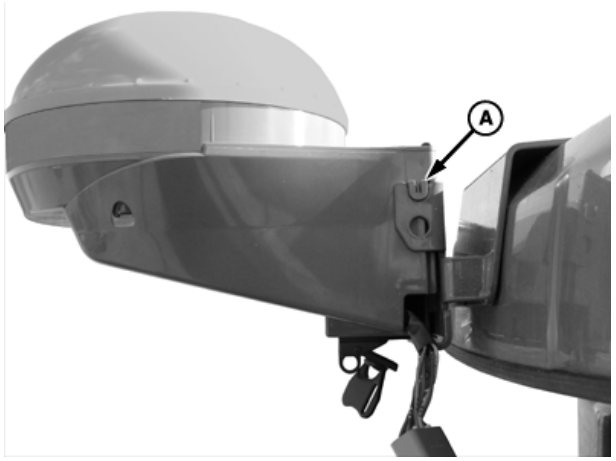
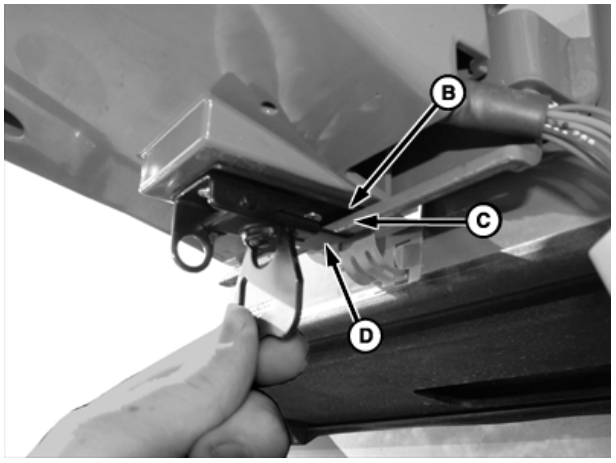
BA31779,00001B6 -19-17MAY11-5/7

3. Position StarFire iTC on bracket. Align mounting pegs (A) on receiver with notches in vehicle bracket. Ensure pegs are firmly seated in notches and metal tab (B) is above bracket bar (C).
4. Position receiver latch (D) around bracket bar. Turn latch handle to tighten latch around bracket bar. Bracket bar should compress slightly.

A—Mounting Peg
B—Metal Tab
C—Bracket Bar
D—Receiver Latch



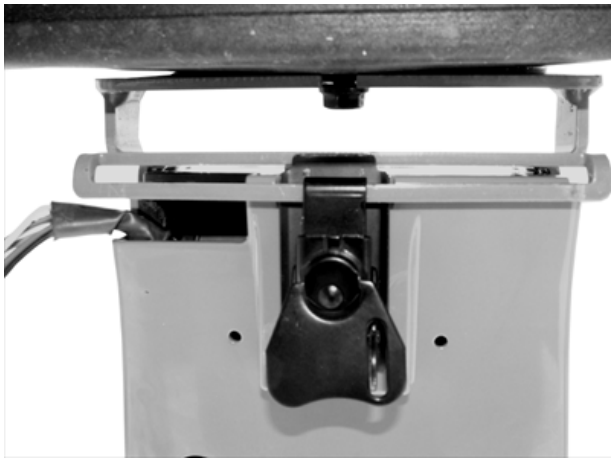
PC12153 —UN—14JUL09



PC8329 —UN—31AUG04

BA31779,00001B6 -19-17MAY11-6/7

5. Fold latch handle upwards against receiver.



PC8330 —UN—31AUG04

BA31779,00001B6 -19-17MAY11-7/7

StarFire 3000 softkey

The StarFire 3000 - MAIN screen contains four tabs:

INFO tab

SETUP tab

ACTIVATIONS tab

SERIAL PORT tab

NOTE: If StarFire 3000 is hooked into the CAN Bus with an Original GreenStar display and either a GS2 or GS3, the StarFire 3000 appears on the GS2 or GS3.

PC8663 —UN—05AUG05

MeNU button

PC13006 —UN—08NOV10

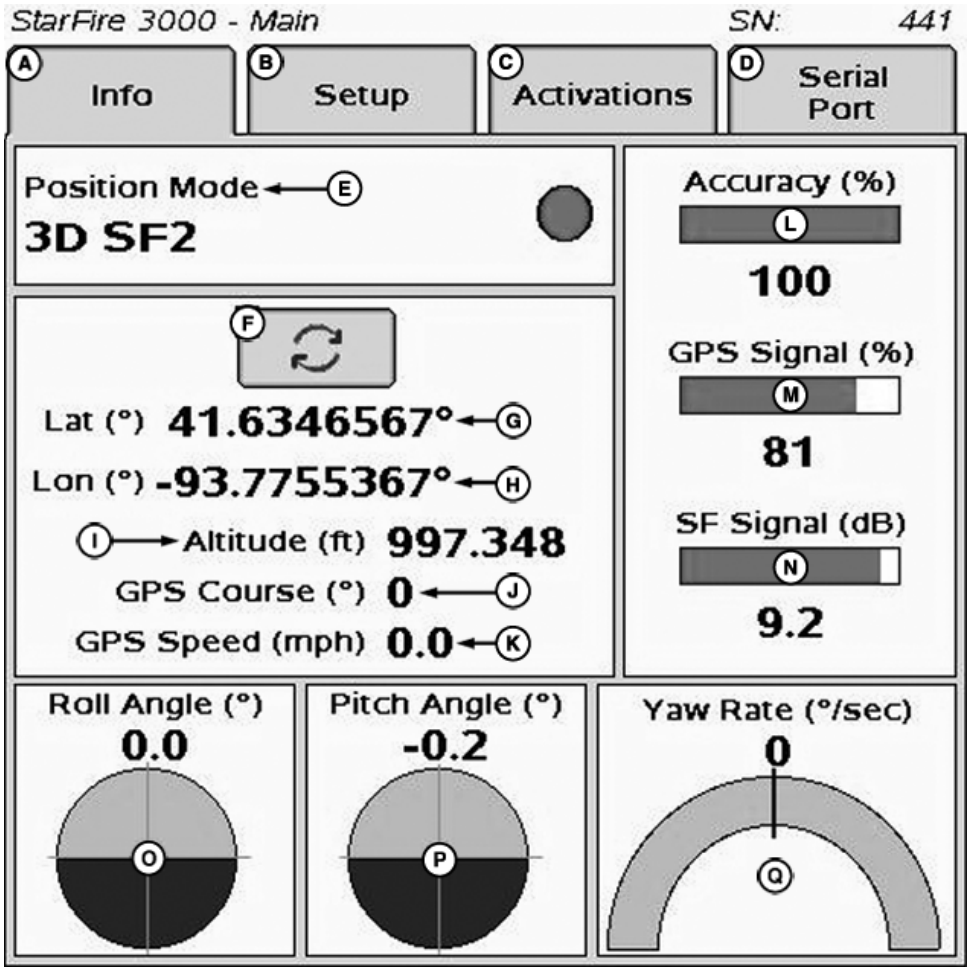
StarFire 3000 button

PC13047 —UN—10NOV10

StarFire 3000 softkey

BA31779,000013D -19-25APR11-1/1

INFO tab



PC13046 —UN—10NOV10

StarFire 3000 - Main—Info Tab

A—Info tab
B—Setup tab
C—Activations tab
D—Serial Port tab
E—Position Mode
F—Degrees/Minutes/Seconds to Decimal Toggle
G—Latitude
H—Longitude
I— Altitude
J— GPS Course
K—GPS Speed
L—Accuracy
M—GPS Signal
N—SF Signal
O—Roll Angle
P—Pitch Angle
Q—Yaw Rate

The INFO tab shows information and status of incoming GPS and SF correction signals. No information on this screen can be changed. It is for viewing only:

- Position Mode: Indicates whether receiver is calculating a 3-D position, 2-D position, or no position (No Navigation). It also shows status of SF signal: SF1 (StarFire 1 differential), SF2 (StarFire 2 differential), RTK (Real Time Kinematic differential), and RTK-X (Real Time Kinematic—Extended differential).
- Lat (G): Displays vehicle location latitude coordinates with respect to Equator (north or south).
- Lon (H): Displays vehicle location longitude coordinates with respect to Prime Meridian (east or west).

NOTE: TOGGLE button allows operator to change the way latitude and longitude are displayed from degrees/minutes/seconds to decimal degrees.

- Altitude: displays height of receiver, measured from top of dome, in meters (feet) above sea level.
- GPS course: Displays direction of travel, in degrees relative to true north (zero degrees) as measured by receiver. Angle is measured in clockwise direction.

NOTE: Course and speed normally show small speeds and various courses even when machine is not moving.

- GPS speed: displays ground speed of machine in miles per hour (kilometer per hour) as measured by receiver.
- GPS Accuracy Indicator (GPS AI): GPS AI gives indication of GPS position accuracy achieved by receiver, and is displayed as a percentage (0-100%)

Continued on next page

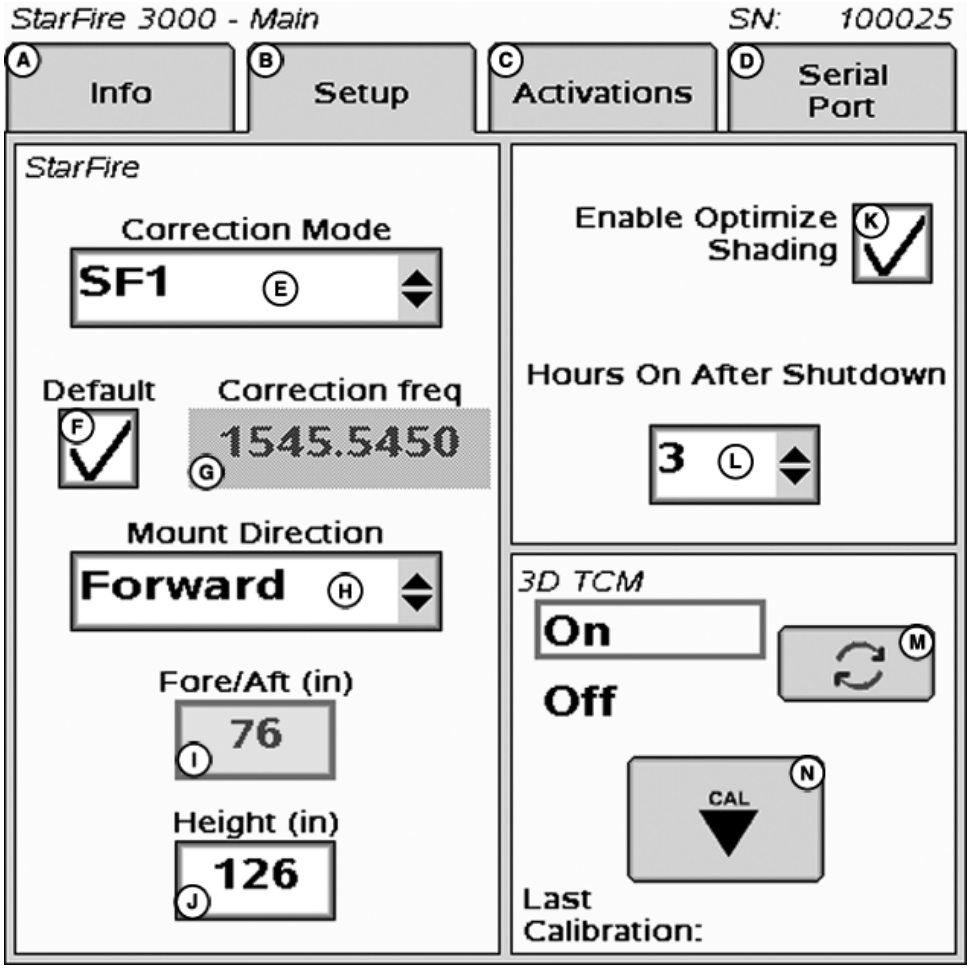
CF86321,000003C -19-04APR11-1/2

When receiver is initially powered, GPS AI displays 0%. 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% or greater. Satellite acquisition may take up to 20 minutes. Many factors affect GPS accuracy. If 80% accuracy or greater is not achieved within 25 minutes, consider the following possibilities:

- Unobstructed view of sky – trees, buildings, or other structures block receiver signals from available satellites.
- L1/L2 signal to noise ratio (SNR) – radio interference from 2-way radios or other sources causes low SNR (check satellite button – Graph).
- Satellite position in sky – poor GPS satellite geometry can reduce accuracy (check satellite button – SkyPlot).
- Number of satellites in solution – total number of satellites receiver uses to calculate a position (check satellite button– SkyPlot).
- GPS Signal Quality: Displays quality of signals being received from constellation of GPS satellites.
- SF Signal Quality: Displays quality of SF correction signal received by receiver.
- TCM (Terrain Compensation Module):
  - Roll Angle: Is both a graphical and numerical representation of amount of roll TCM is measuring, relative to calibrated zero degree reference. Positive roll angle—vehicle is rolled to the right (depicts what horizon would look like from cab).
  - Yaw Rate: Graphic representation and a numeric figure for amount of rotation TCM is measuring. Positive yaw rate—vehicle is turning right.
  - Pitch Angle: Positive pitch angle occurs when vehicle cab is tilted back and negative pitch angle occurs when vehicle cab is tilted forward.

CF86321,000003C -19-04APR11-2/2

SETUP tab



PC13045 —UN—10NOV10

StarFire 3000 - Main—Setup tab

A—Info tab
B—Setup tab
C—Activations tab
D—Serial Port tab
E—Correction Mode
F—Default Correction Frequency
G—Correction Frequency
H—Mount Direction
I— Fore/Aft
J— Height
K—Enable Optimize Shading
L—Hours On After Shutdown
M—TCM On/Off toggle button
N—TCM Calibration button

The SETUP tab allows for setup of the following:

- Correction Mode
- Correction Frequency
- Mount Direction
- Fore/Aft
- Height
- QuickStart
- Hours ON After Shutdown
- TCM Calibration

CF86321,000003D -19-04APR11-1/1

Correction Mode

Correction Mode—Contains available StarFire corrections licensed for receiver. SF1 and OFF are always displayed, however, SF2 is displayed with a valid SF2 license (See Activations section). RTK is displayed when a RTK mode is selected from the RTK softkey.

NOTE: Selecting OFF prohibits the StarFire receiver from receiving SF1 and SF2 correction signals, but still receive WAAS/EGNOS correction signals.

CF86321,000003E -19-04APR11-1/1

Correction Frequency

Correction Frequency—frequency used to receive differential correction signals. The default frequency is a view only field when default check box is checked. By de-selecting default check box, a correction frequency can be manually entered.

John Deere broadcasts differential GPS corrections from its StarFire network on 6 satellites around the Earth for global coverage. When the default box is checked, the receiver automatically tunes to the StarFire receiver based on which satellites are visible at its location. The receiver searches for StarFire signals starting with the highest elevation satellite and then search for the lowest until it acquires a signal. The manual tuning option is available by de-selecting the default frequency box, but it should only be used under direction from AMS personnel or a John Deere dealer.

IMPORTANT: DO NOT change default StarFire Correction Frequency unless instructed to do so by a John Deere Dealer or by John Deere AG Management Solutions.

CF86321,000003F -19-04APR11-1/1

Mount Direction

NOTE: Receivers attached to tractors, sprayers, and combines are typically in FORWARD position. Receivers attached to GATORS are typically in BACKWARD position.

Mounting direction is direction receiver is facing.

This setting defines mounting orientation of receiver. TCM uses this setting to determine correct direction of vehicle roll and pitch.

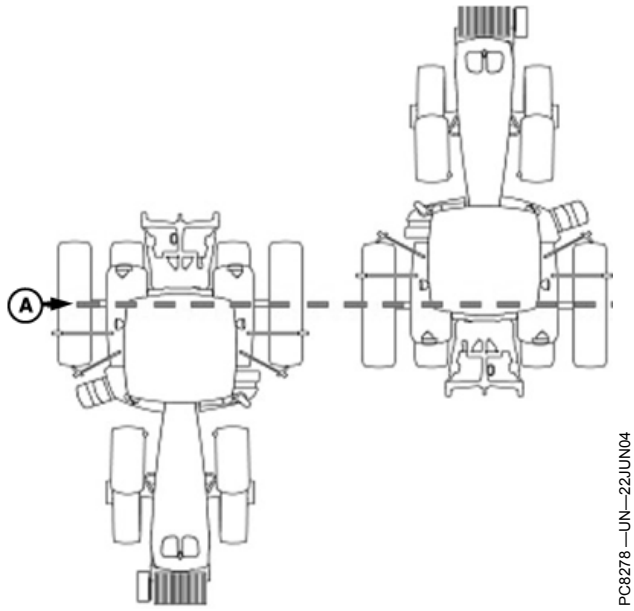
Mounting direction options

- FORWARD
- BACKWARD

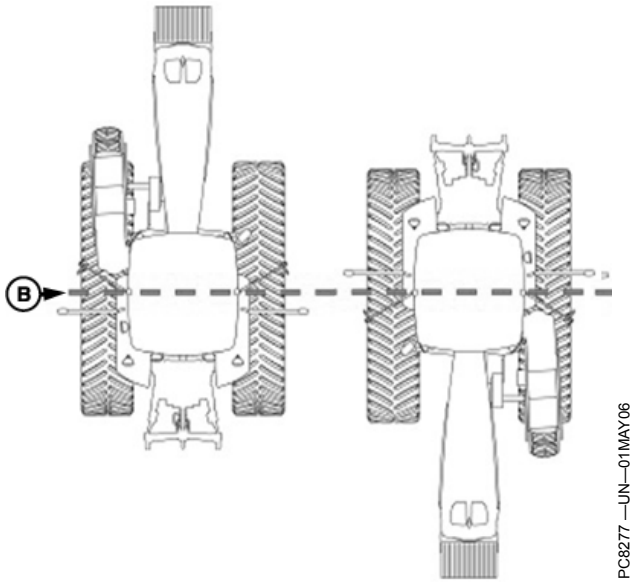
Select desired mounting direction.

CF86321,0000040 -19-04APR11-1/1

Fore/Aft—TCM



Floating Front Axle Vehicles



Fixed Axis Wheels or Tracks Vehicles

A—Pivot Point—Floating Front Axle Vehicles-

B—Pivot Point—-Fixed Axis Wheels or Tracks Vehicles

The fore/aft value is the distance that receiver is located from pivot point of tractor.

On some AutoTrac-equipped vehicles, fore/aft value is automatically detected and entered during power up.

- Fore/Aft value is shown and input box is disabled – value has been automatically set and cannot be changed. The value shown may not be the exact distance that the receiver is located from pivot point of tractor, but the best Fore/Aft value for AutoTrac.
- Fore/Aft value is shown and input box is enabled – value must be entered manually.

To enter Fore/Aft value:

- Select FORE/AFT input box
- Enter value using numeric keypad

NOTE: For greatest accuracy, manually measure Fore/Aft distance.

John Deere Vehicle	StarFire Original Shroud Fore/Aft cm (in.)	Deluxe Shroud Fore/Aft cm (in.)
6000 Series Tractors	180 cm (71 in.)	154 cm (60.5 in.)
7000 Series Tractors	210 cm (82.5 in.)	183 cm (72 in.)
8000 Series Tractors	210 cm (82.5 in.)	183 cm (72 in.)
8000T Series Tractors	51 cm (20 in.)	24 cm (9.5 in.)
9000 Series Tractors	-51 cm (-20 in.)	-77 cm (-30.5 in.)
9000T Series Tractors	51 cm (20 in.)	24 cm (9.5 in.)
4700 Series Sprayers	280 cm (110 in.)	253 cm (99.5 in.)
4900 Series Sprayers	460 cm (181 in.)	433 cm (170.5 in.)
Combine	220 cm (87 in.)	220 cm (87 in.)
Forage Harvester	157 cm (62 in.)	157 cm (62 in.)

Recommended StarFire Fore/Aft values For John Deere Machines

CF86321,0000041 -19-04APR11-1/1

Height—TCM

Height is measured from ground to middle of receiver dome.

Select input box and use numeric keypad to enter height.

IMPORTANT: Under or over compensation for vehicle roll angles will occurs if height is incorrectly entered during setup.

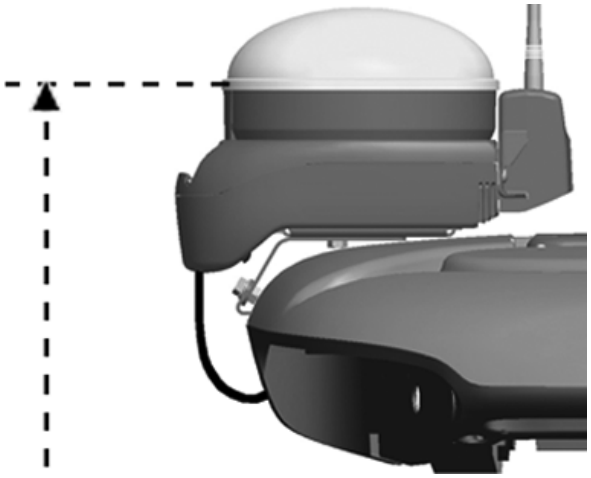
Example: On a 10 degree slope with a StarFire height error of 30.5 cm (12 in.) results in a position offset of 5 cm (2 in.) on ground).

Factory default setting is 320 cm (126 in.). On some AutoTrac-equipped vehicles, height value is automatically detected and entered during power up. Because this dimension is critical for proper operation of TCM and can vary due to vehicle configuration and tire sizes, operator should measure actual distance each time TCM is installed on a different vehicle.

NOTE: Use chart for example StarFire height values.

Chart figures are approximate heights.

NOTE: For greatest accuracy, manually measure receiver height distance.



PC12016 —UN—22APR09

John Deere Vehicle	StarFire Original Shroud Height cm (in.)	Deluxe Shroud Height cm (in.)
6000 Series Tractors	280 cm (111 in.)	291 cm (114.5 in.)
7000 Series Tractors	305 cm (120 in.)	314 cm (123.5 in.)
8000 Series Tractors	320 cm (126 in.)	329 cm (129.5 in.)
8000T Series Tractors	320 cm (126 in.)	329 cm (129.5 in.)
9000 Series Tractors	361 cm (142 in.)	370 cm (145.5 in.)
9000T Series Tractors	356 cm (140 in.)	365 cm (143.5 in.)
4700 Series Sprayers	389 cm (153 in.)	396 cm (156 in.)
4900 Series Sprayers	396 cm (156 in.)	396 cm (156 in.)
Combine	396 cm (156 in.)	396 cm (156 in.)

NOTE: Actual height varies depending on tire size or tire inflation.

CF86321,0000042 -19-04APR11-1/1

QuickStart

QuickStart reduces amount of time required before full accuracy is achieved. If receiver has SF1 or SF2 when it is powered down, a position is saved for future QuickStart. If power is restored to receiver within time period defined under Hours On After Shutdown, QuickStart is not used since receiver power was never disrupted. If duration has exceeded Hours On After Shutdown, QuickStart is initiated. Saved position is used to bypass warm up period. QuickStart takes up to 6 minutes for completion.

NOTE: Do not move vehicle or StarFire receiver until QuickStart is complete.

CF86321,0000043 -19-04APR11-1/1

Hours On After Shutdown

Defines how long receiver remains powered up after ignition is turned off (0, 3, 6, 12, 24 hours). If ignition is turned on within number of hours defined, receiver re-establishes full SF1 or SF2 accuracy within a few seconds (assuming it had SF1 or SF2 when ignition was turned off).

Define desired number of hours by selecting drop-down box.

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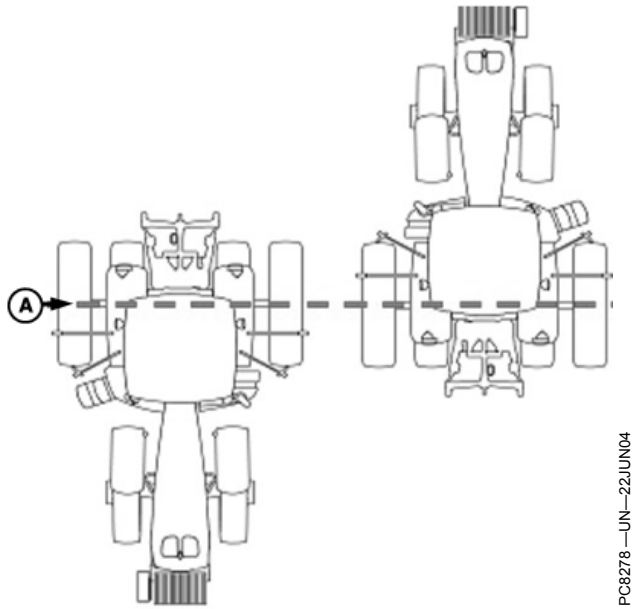
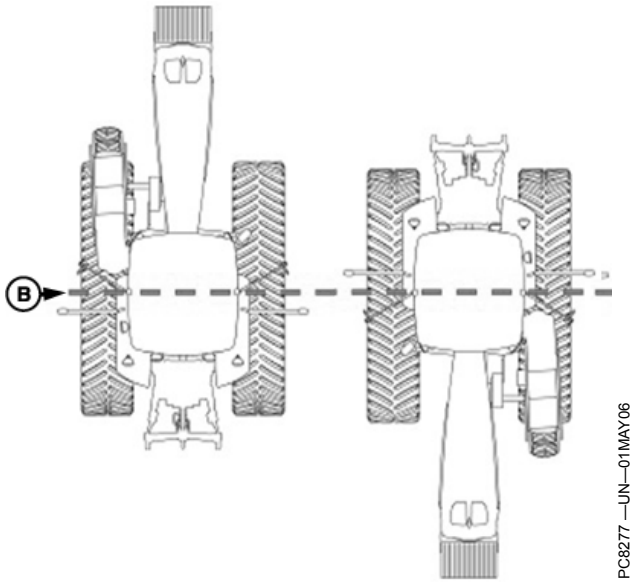
TCM Calibration



Floating Front Axle Vehicles



Fixed-Axis Wheels Or Tracks Vehicles

A—Rear Axle **B—Vehicle Pivot Point**

TCM can be toggled ON or OFF by selecting TOGGLE button. When TCM is turned off, StarFire GPS message is not corrected for vehicle dynamics or side slopes. TCM defaults to ON when cycling power.

NOTE: TCM must be turned on for AutoTrac to activate.

TCM must be calibrated so receiver can determine zero degree roll angle and pitch angle.

NOTE: Calibrate receiver when it is attached or reattached to machine. Receiver does not require recalibration until removed from machine and reattached.

Positioning Machine during Calibration

IMPORTANT: When calibrating, it is important that TCM is at same angle when facing either direction. If roll angle is positive 2 degrees when facing one direction, place vehicle negative 2 degrees when facing opposite direction. To position TCM at same angle it is important when turning vehicle around and facing other direction that tires are placed in correct location. Once vehicle is parked on a hard flat surface, note location of tires on ground. When turning around use following instructions:

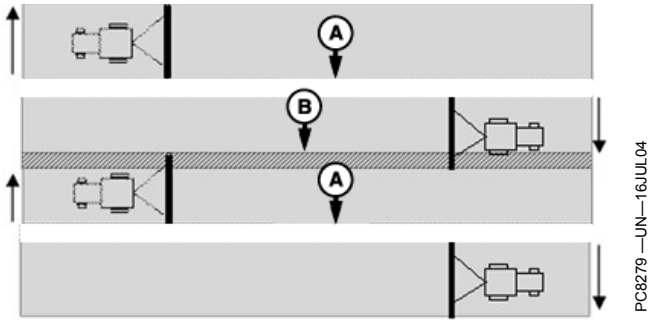
- **Floating Front Axle Vehicles (MFWD, ILS, TLS)—put rear axle/wheels in same location when performing 2 point calibration. See previousdiagram for Floating Front Axle Vehicles.**
- **Fixed-Axis Wheels Or Tracks Vehicles (Track Tractors, 47X0 and 49X0 Series Sprayers, 9000, And 9020 Series Wheel Tractors)—Place all in same location when facing either direction. See diagram for Fixed-Axis Wheels Or Tracks Vehicles.**

Continued on next page

CF86321,0000045 -19-04APR11-1/2

Calibration Surface

IMPORTANT: Vehicle must be on a hard, flat level surface for calibration. If TCM is not calibrated on a level surface or TCM mounting angle is not level in relation to vehicle angle (StarFire mounting bracket or vehicle cab being slightly offset, uneven tire pressures from one side to other, etc.), an offset is created during operation. This offset could look like a consistent skip (A) or overlap (B) in pass-to-pass operation. To eliminate offset, re-calibrate on a level surface, drive down a pass, turn around, and drive down same pass in opposite direction. If vehicle does not follow same pass, measure offset distance and enter in implement offset. After initial calibration of TCM, it is not necessary to calibrate again unless TCM angle in relation to vehicle has changed. For example, tire pressure has been lowered on one side of vehicle causing vehicle angle in relation to ground to change.



A—Skip **B—Overlap**

Calibration Procedure:

1. Press CALIBRATION button.
2. Park vehicle on a hard, level surface and come to a complete stop (cab is not rocking).
3. Press ENTER button.
4. Calibrating Status bar appears.
5. Turn vehicle 180 degrees to face opposite direction. Ensure that tires are in proper location for fixed or floating front axle and vehicle has come to a complete stop (cab is not rocking).
6. Press ENTER CALIBRATION button.
7. Calibrating Status bar appears.
8. A calibration value is displayed upon completion. 0 degree calibration value is the difference between factory calibration value and actual calibration value just determined.
9. Press ENTER button to return to SETUP tab.

TCM Calibration Failure Alert Screens	
Error description	**Cause**
Vehicle motion unkown.	TCM could not detect vehicle speed.
Results out of range: check vehicle position and bracket alignment.	Roll and/or pitch values exceed limits. Vehicle is on too severe a slope or SF mounting bracket is not properly aligned.
Vehicle motion detected.	Vehicle motion exceeded limits during calibration.
User defined.	Invalid values entered through display.

CF86321,0000045 -19-04APR11-2/2

Enable Optimized Shading

When enabled this feature allows AutoTrac SF1 and SF2 to function in partially shaded conditions using a minimum of 4 L1 satellites. Utilizing this function could cause a reduction in guidance accuracy when only L1 satellites are being utilized. Do not enable Optimized Shading in areas not covered by shade.

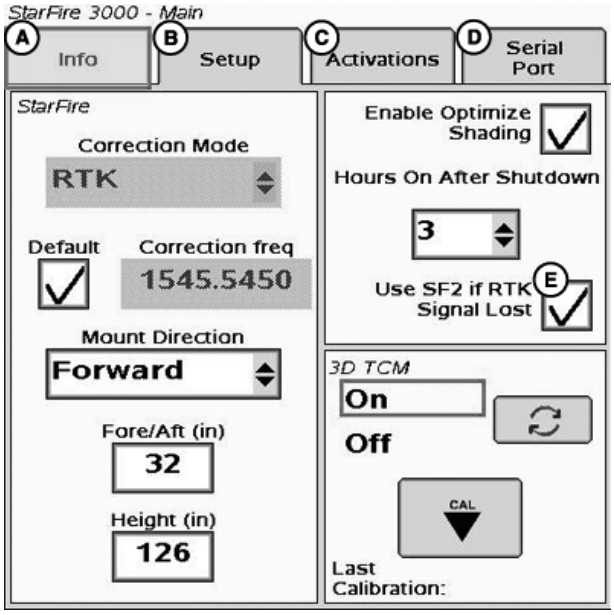
BA31779,0000151 -19-26APR11-1/1

SF2 Fallback

Enabling SF2 Fallback allows RTK users to transition directly to SF2 after RTK signal corrections are lost and RTK-Extend times out. By default, SF2 fallback system is Off. Enable SF2 Fallback by placing a check in “Use SF2 if RTK Signal Lost” checkbox on StarFire 3000 Main page.

IMPORTANT: Do not enable SF2 Fallback in situations where RTK accuracy is critical. Accuracy while operating in SF2 mode will not be equal to performance of RTK.

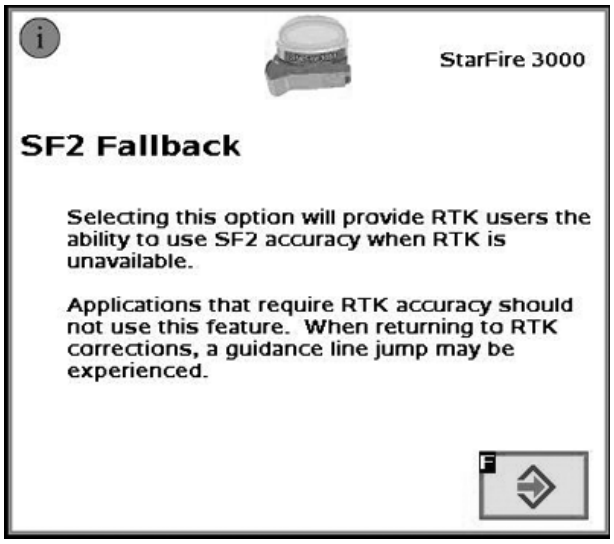
A—Info tab
B—Setup tab
C—Activations tab
D—Serial Port tab
E—Use SF2 if RTK Signal Lost



Enable SF2 Fallback

BA31779,000015F -19-27APR11-1/2

A—Selecting this option will provide RTK users the ability to use SF2 accuracy when RTK is unavailable. Applications that require RTK accuracy should not use this feature. When returning to RTK corrections, a Guidance line jump be experienced.



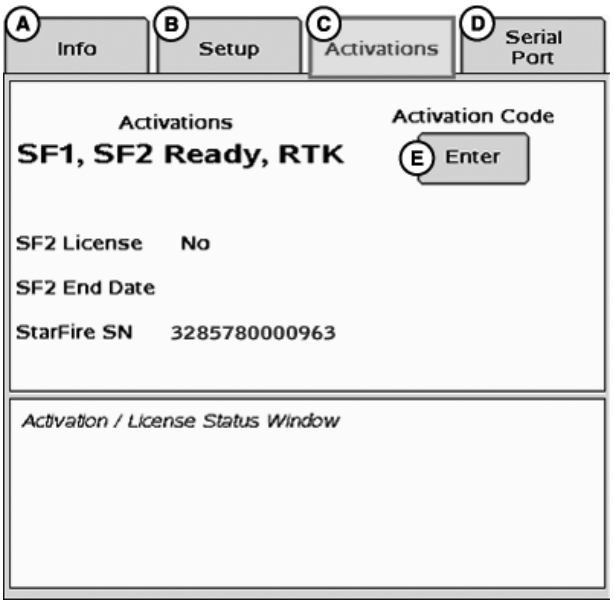
SF2 Fallback

BA31779,000015F -19-27APR11-2/2

ACTIVATIONS tab

ACTIVATIONS tab contains the following:

- Valid activations for receiver:
  - SF1 – activated on every StarFire 3000.
  - SF2 Ready – receiver must be SF2 Ready or an upgrade to SF2 ready from SF1 World Solution must be purchased.
  - RTK – activated with valid RTK activation (requires receiver to be SF2 Ready).
- SF2 License: Displays status of receiver's SF2 License.
  - 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 – Appears when no valid SF2 license exists or SF2 license has expired.
- SF2 End Date: Displays date at which SF2 License expires.
- StarFire SN: StarFire serial number



StarFire 3000 - Main—Activations tab

A—Info tab
B—Setup tab
C—Activations tab
D—Serial Port tab
E—Activation Code Enter button

Continued on next page

CF86321,0000047 -19-04APR11-1/2

Activation Code

NOTE: Activation Codes are required to obtain SF2 Ready and RTK Activations, and SF2 license subscription.

ENTER button is used to enter 24-digit codes for SF2 Ready and RTK Activations, SF2 license subscription, and deactivation codes for transferring all StarFire activations and licenses.

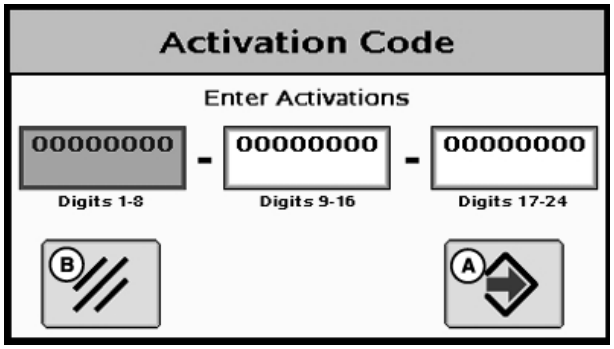
1. Upon selecting ENTER button, an Activation Code box appears with three input boxes.

   NOTE: If more than 8 digits are entered into an input box, "99999999" appears. Reselect box and type only 8 digits into input box.

2. Select first input box labeled Digits 1-8 and enter first 8 digits of 24-digit code.
3. Select second input box labeled Digits 9-16 and enter second 8 digits of 24-digit code.
4. Select third input box labeled Digits 17-24 and enter last 8 digits of 24 digit code.
5. Press ENTER button.
6. A confirmation message appears when the 24-digit code is valid and entered correctly.

Deactivation Code input

Deactivation Code input appears when a deactivation code has been entered following previous procedure. It displays 6-digit deactivation codes for SF2 License, SF2 Ready, and RTK activations. These codes are needed when transferring activations or licenses to another receiver.



PC9708 —UN—10NOV06

Activation Code

A—Enter button **B—Cancel button**

Activation/License Status Window

Displays messages when SF2 License has expired and provides user with option to use a Grace Period.

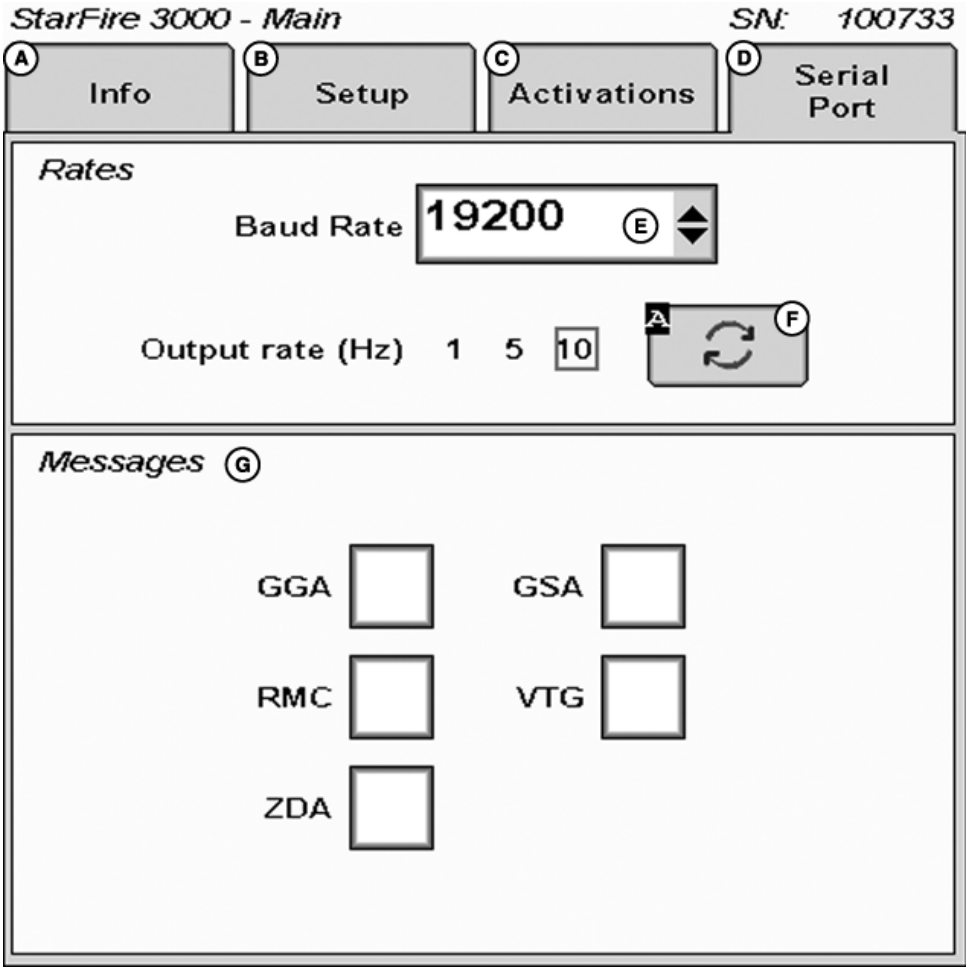
NOTE: Three 24 hour Grace periods are available when the current license expires. Grace periods are provided to allow sufficient time to renew a license. Grace period signal is SF2 differential correction signal.

Using a Grace Period

1. Select USE 1 button from status window
2. Select YES button

CF86321,0000047 -19-04APR11-2/2

SERIAL PORT tab



PC13044 —UN—10NOV10

StarFire 3000 - Main—Serial Port tab

A—Info tab
B—Setup tab
C—Activations tab
D—Serial Port tab
E—Baud Rate
F—Output Rate
G—Messages

Configure RS232 and NMEA message information.

Rates:

- Define Baud Rate by selecting list input
  - Baud Rates: 4800, 9600, 19200, 38400, 57600 and 115200
- Define output rate by toggling
  - 1 Hz, 5 Hz, or 10 Hz

Messages:

- Allows for output of 5 different NMEA strings:
  - GGA, GSA, RMC, VTG, and ZDA

CF86321,0000048 -19-04APR11-1/1

NMEA Strings

NMEA String Data – Utilizing a third-party GPS receiver or utilizing a StarFire 3000

National Marine Electronics Association (NMEA) has developed a specification that defines the interface between various pieces of electronic equipment.

NOTE: In order to use NMEA data, purchase a radar harness kit.

One of the most important NMEA sentences include the GGA which provides the current Fix data, the RMC which provides the minimum GPS sentences information, and the GSA which provides the satellite status data.

GGA - essential fix data which provide 3D location and accuracy data.

GGA STRING EXAMPLE:

$GPGGA,123519,4807.038,N,01131.000,

E,1,08,0.9,545.4,M,46.9,M,,*47

Where:

GGA	Global Positioning System Fix Data
123519	Fix taken at 12:35:19 UTC
4807.038,N	Latitude 48 degrees 07.038' N
01131.000,E	Longitude 11 degrees 31.000' E
1	Fix quality: 0 = invalid 1 = GPS fix (SPS) 2 = DGPS fix 3 = PPS fix 4 = Real Time Kinematic 5 = Float RTK 6 = estimated (dead reckoning) 7 = Manual input mode 8 = Simulation mode
08	Number of satellites being tracked
0.9	Horizontal dilution of position
545.4,M	Altitude, Meters, above mean sea level
46.9,M	Height of geoid (mean sea level) above WGS84

GSA - GPS DOP and active satellites. This sentence provides details on the nature of the satellite constellation fix. It includes the numbers of the satellites being used in the current solution and the DOP. DOP (dilution of precision) is an indication of the effect of satellite geometry on the accuracy of the fix. It is a unitless number where smaller is better. For 3D fixes using 4 satellites a 1.0 would be considered to be a perfect number. However, for overdetermined solutions it is possible to see numbers below 1.0.

There are differences in the way the PRN's are presented which can effect the ability of some programs to display this data. In the following example, there are 5 satellites in the solution and the null fields are scattered indicating the almanac would show satellites in the null positions that are not being used as part of this solution. Other receivers output all of the satellites used at the beginning of the sentence with the null field all stacked up at the end. This difference accounts for some satellite display programs not always being able to display the satellites being tracked. Some units show all satellites that have ephemeris data without regard to their use as part of the solution but this is non-standard.

GSA String Example

$GPGSA,A,3,04,05,,09,12,,,24,,,,,2.5,1.3,2.1*39

Where:

GSA	Satellite status
A	Auto selection of 2D or 3D fix (M = manual)
3	3D fix - values include:: 1 = no fix 2 = 2D fix 3 = 3D fix
04,05	PRNs of satellites used for fix (space for 12)
2.5	PDOP (dilution of precision)
1.3	Horizontal dilution of precision (HDOP)
2.1	Vertical dilution of precision (VDOP)
*39	the checksum data, always begins with *

RMC - NMEA has its own version of essential gps pvt (position, velocity, time) data. It is called RMC, The Recommended Minimum, which looks like:

RMC String Example

$GPRMC,123519,A,4807.038,N,01131.000,

E,022.4,084.4,230394,003.1,W*6A

Where:

RMC	Recommended Minimum sentence C
123519	Fix taken at 12:35:19 UTC
A	Status A=active or V=Void.
4807.038,N	Latitude 48 deg 07.038' N
01131.000,E	Longitude 11 deg 31.000' E
022.4	Speed over the ground in knots
084.4	Track angle in degrees True
230394	Date - 23rd of March 1994
003.1,W	Magnetic Variation
*6A	The checksum data, always begins with *

VTG - Velocity made good. The GPS receiver may use the LC prefix instead of GP if it is emulating Loran output.

VTG String Example

$GPVTG,054.7,T,034.4,M,005.5,N,010.2,K*33

where:

Continued on next page

VTG	Track made good and ground speed
054.7,T	True track made good (degrees)
034.4,M	Magnetic track made good
005.5,N	Ground speed, knots
010.2,K	Ground speed, Kilometers per hour
*33	Checksum

ZDA - Data and Time

ZDA String Example

$GPZDA,hhmmss.ss,dd,mm,yyyy,xx,yy*CC

$GPZDA,201530.00,04,07,2002,00,00*6E

where:

hhmmss	HrMinSec(UTC)
dd,mm,yyy	Day,Month,Year
xx	local zone hours -13..13
yy	local zone minutes 0..59
*CC	checksum

CF86321,0000049 -19-04APR11-2/2

SATELLITE INFORMATION softkey

Press: MENU button >> StarFire 3000 button >> SATELLITE INFORMATION softkey.

The StarFire 3000 - Satellite Information screen contains SKY PLOT and GRAPH tabs.

PC8663 —UN—05AUG05

MENU button

PC13006 —UN—08NOV10

StarFire 3000 button

PC13048 —UN—10NOV10

SATELLITE INFORMATION softkey

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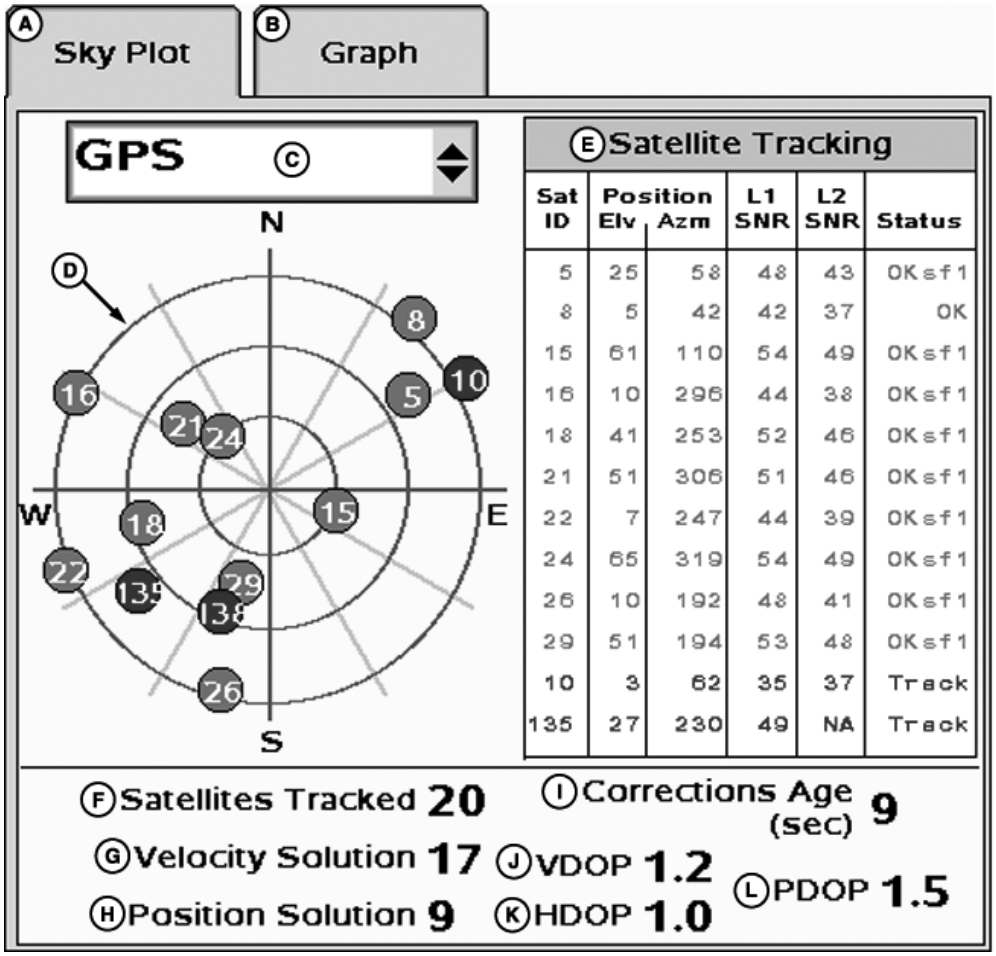
CF86321,000004A -19-04APR11-1/6



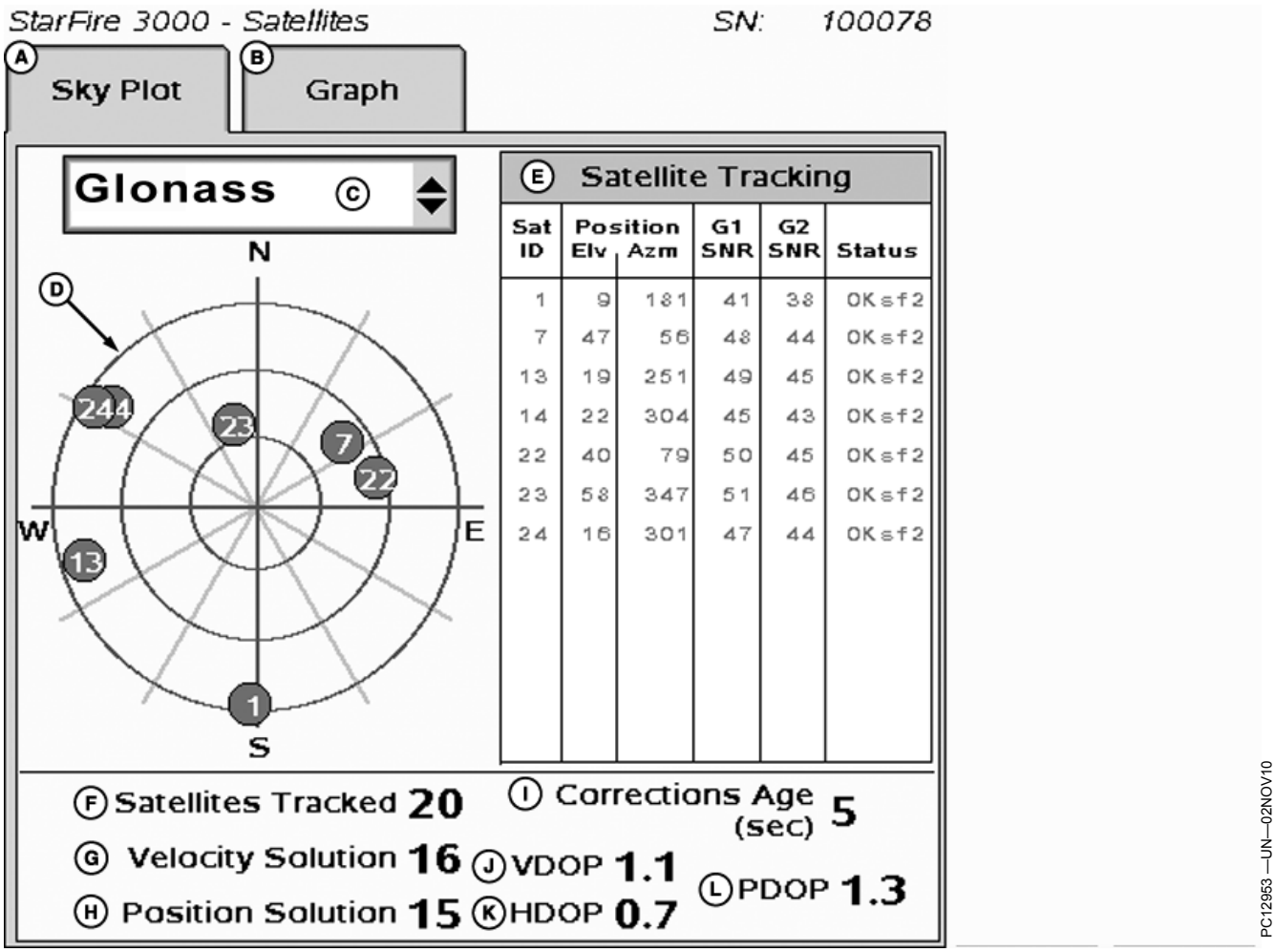
PC12569 —UN—14APR10

StarFire 3000 Satellite Skyplot

A—Sky Plot tab
B—Graph tab
C—Satellite Drop-down
D—Satellites on Sky Plot
E—Satellite Tracking
F—Satellites Tracked
G—Velocity Solution
H—Position Solution
I— Corrections Age
J— VDOP
K—HDOP
L—PDOP

Continued on next page

CF86321,000004A -19-04APR11-2/6



StarFire 3000 GLONASS Skyplot

A—Sky Plot tab
B—Graph tab
C—Satellite Drop-down
D—Satellites on Sky Plot
E—Satellite Tracking
F—Satellites Tracked
G—Velocity Solution
H—Position Solution
I— Corrections Age
J— VDOP
K—HDOP
L—PDOP

SKY PLOT tab

Illustrates where satellites are in relation to vehicles receiver. Sky Plot allows operator to look at satellite geometry.

The satellite information pages now show the number of satellites used in the Velocity Solution (G) and in the Position Solution (H). On previous receivers, only the number of satellites used in the Velocity Solution was displayed. The Position Solution uses only data with the highest confidence levels in order to calculate the receiver's true position. The Velocity Solution uses data from as many satellites as possible to calculate intermediate values based on the previously calculated position solution. As a result, the Velocity Solution count will usually display a higher number of satellites than the Position Solution.

- Sky Plot is fixed so that North is always at top.
- Satellites are displayed as their satellite ID number that correspond to Satellite Tracking Chart located right of Sky Plot
  - Red – indicates satellite is in search mode
  - Blue – indicates satellite is being tracked
  - Green – indicates satellite is OK (being used for corrections)
- Sky Plot consists of 3 concentric rings depicting 0, 30, and 60 degrees of elevation with directional crossbar intersection representing 90 degrees of elevation.
- Gray radial lines extending from center of Sky Plot represent azimuth. They are spaced 30 degrees apart and represent 30 and 60 degrees.
- Directional crossbar representing North, South, East, and West also represent azimuth at 0, 90, 180, and 270 degrees.

Reading Satellite Sky Plot

Continued on next page

Satellite Tracking Chart

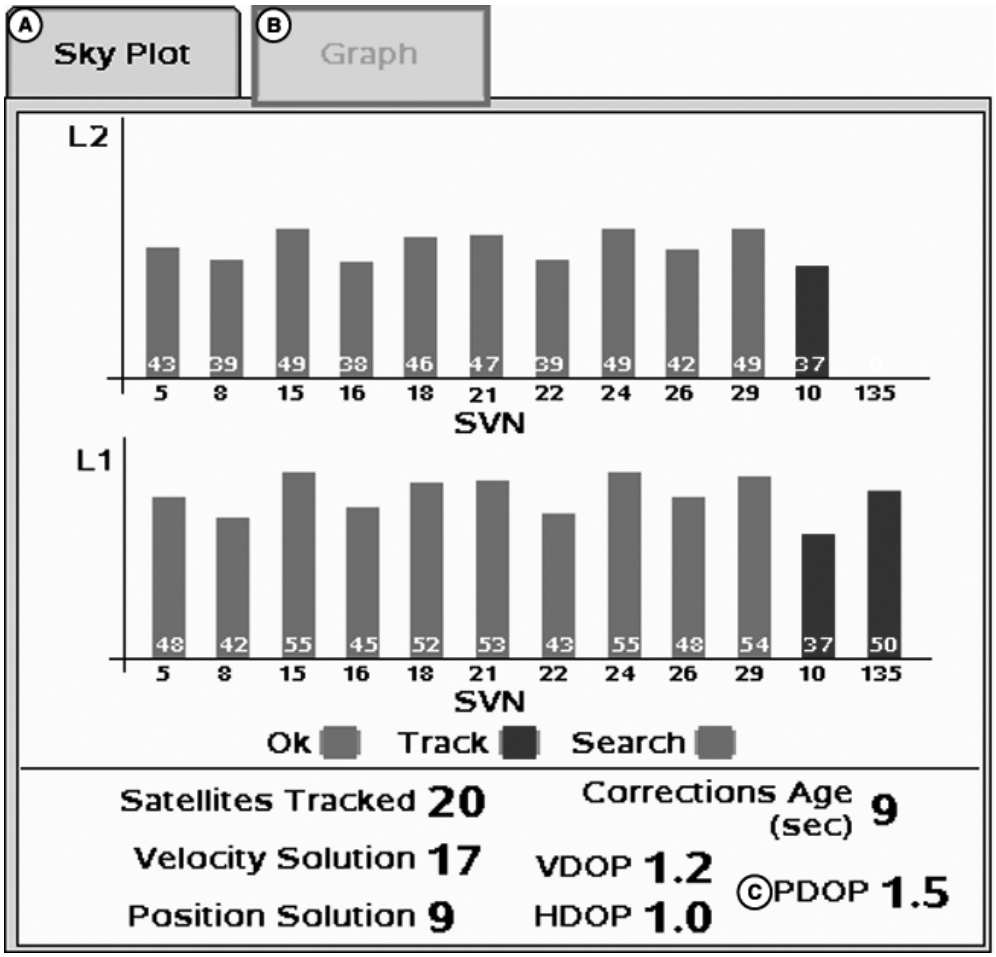
- SAT ID – (Satellite Identification Number) Identification number for GPS Satellite.
- ELV – (Position Elevation) Elevation in degrees above horizon for GPS satellite position
- AZM – (Position Azimuth) Azimuth in degrees from true North for GPS satellite
- L1 SNR – (L1 Signal to Noise Ratio) Signal strength for L1 GPS signal (signal to noise ratio)
- L2 SNR – (L2 Signal to Noise Ratio) Signal strength for L2 GPS signal (signal to noise ratio)
- G1 SNR – (G1 Signal to Noise Ratio) Signal strength for G1 GLONASS signal (signal to noise ratio)
- G2 SNR – (G2 Signal to Noise Ratio) Signal strength for G2 GLONASS signal (signal to noise ratio)
- Status – (GPS Signal Status) Status of GPS signal
  - Search – searching for satellite signal
  - Track – tracking satellite signal and using it for positioning
  - OK – tracking satellite signal and using it for positioning
  - OK SF1 – Tracking satellite signal and using it for positioning with StarFire single frequency
  - OK SF2 – Tracking satellite signal and using it for positioning with StarFire dual frequency
  - OK RTK – Tracking satellite signal and using it for positioning with StarFire RTK signal

Satellite Tracking Information

Satellite Tracking information is displayed at bottom of SKY PLOT and GRAPH tabs.

- Satellites in Solution – number of satellites used to compute position.
- Satellites Above Elevation Mask – total number of GPS satellites available to receiver that are above 5 degree elevation mask.
- Satellites Tracked – total number of GPS satellites tracked by receiver.
- Corrections Age (seconds) – age of differential correction signal to GPS (normally less than 10 seconds)
- VDOP – Vertical Dilution of Precision
- HDOP – Horizontal Dilution of Precision
- PDOP – Positional Dilution of Precision is an indicator of GPS satellite geometry as viewed by receiver. A lower PDOP indicates better satellite geometry for calculating both horizontal and vertical position.

Continued on next page



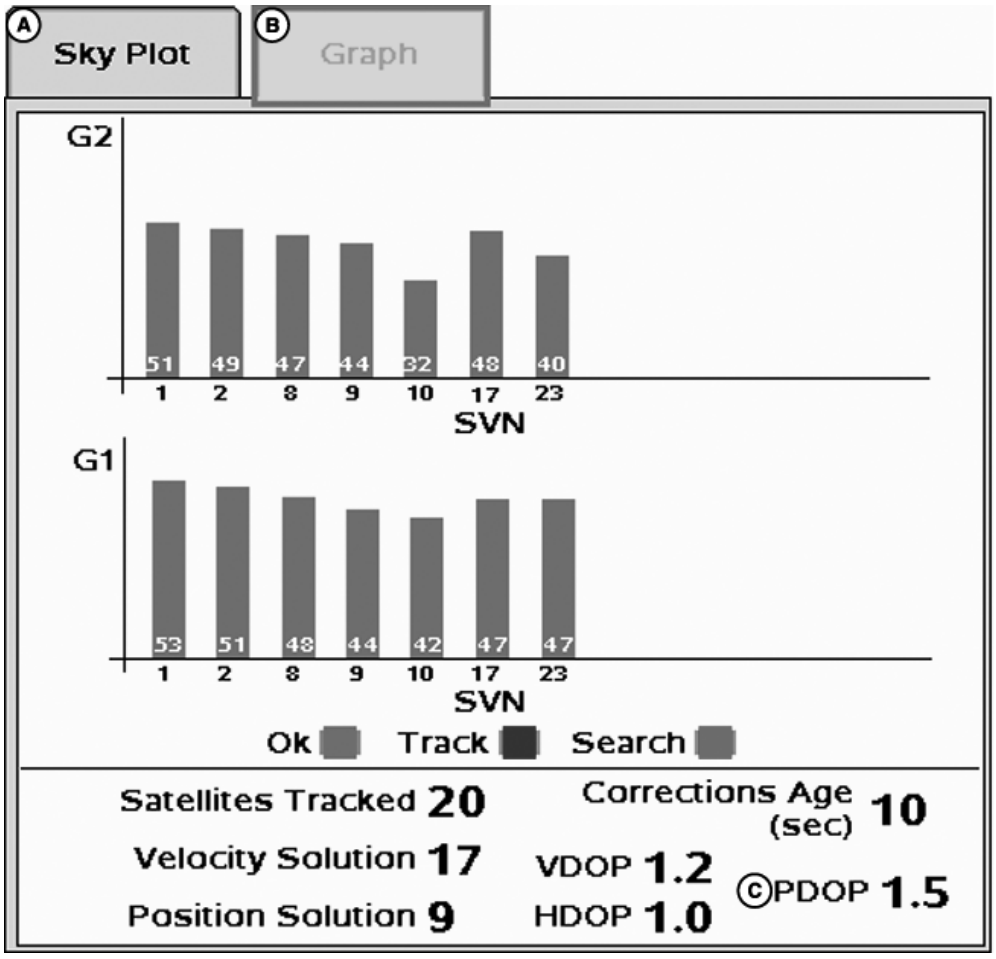
PC12570 —UN—15APR10

StarFire 3000 Satellite Graph

A—SkyPlot tab **B—Graph tab** **D—PDOP**

Continued on next page

CF86321,000004A -19-04APR11-5/6



PC12572 —UN—15APR10

StarFire 3000 GLONASS Graph

Graph

A graph illustrating L1 and L2 (G1 and G2 for GLONASS satellites) SNR values.

- Bars are colored to satellites current status.
- SNR values (colored bar) are above dashed line running horizontally across the bar graph.

NOTE: ONLY GREEN bars are used in calculation of PDOP, VDOP, AND HDOP. SNR's are considered good when above dashed line.

CF86321,000004A -19-04APR11-6/6

DIAGNOSTIC softkey

The StarFire 3000 - Diagnostic screen contains three tabs:

READINGS tab

DATA LOGS tab

OVER THE AIR tab

READINGS tab has detailed information about receiver.

- Unswitched voltage
- Switched voltage
- CAN High voltage (Vehicle Bus)
- CAN Low voltage (Vehicle Bus)
- Software Part Number
- Software Version Number
- Hardware Part Number
- Hardware Serial Number
- Receiver Hours (h)
- Receiver Address
- QuickStart Status
- External Antenna
- Serial NMEA

The following reading only appears when receiver has a RTK activation.

- RTK Software Version Number (RTK Radio Software Version)

PC8663 —UN—05AUG05

MENU button

PC13006 —UN—08NOV10

StarFire 3000 button

PC13049 —UN—10NOV10

DIAGNOSTIC softkey

- RTK Serial Number (RTK Radio Serial Number)
- RTK Status
- RTK Search Time (sec.)
- RTK Satellites in Search (above 10 degrees elevation)

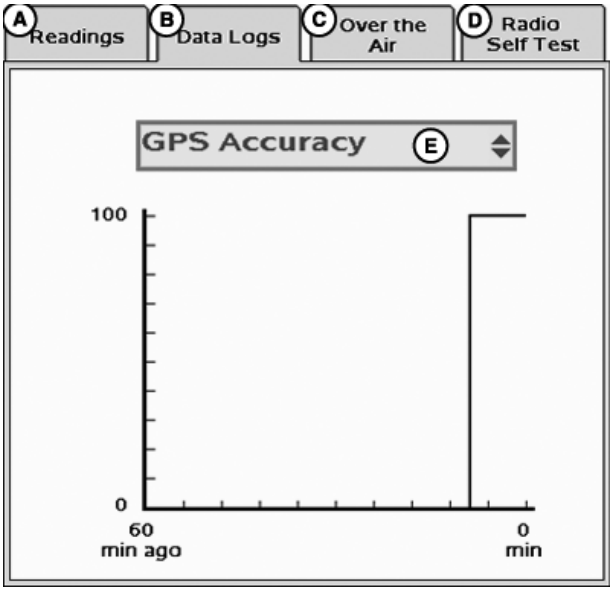
DATA LOGS tab has graphed GPS data, logged over the previous 60 minutes.

CF86321,000004B -19-04APR11-1/1

DATA LOGS tab

GPS Accuracy is a relative indication of overall differential GPS performance.

A—Readings tab
B—Data Logs tab
C—Over the Air tab
D—Radio Self Test tab (North America Only)
E—GPS Accuracy



PC12054 —UN—12MAY09

StarFire 3000 - Diagnostic

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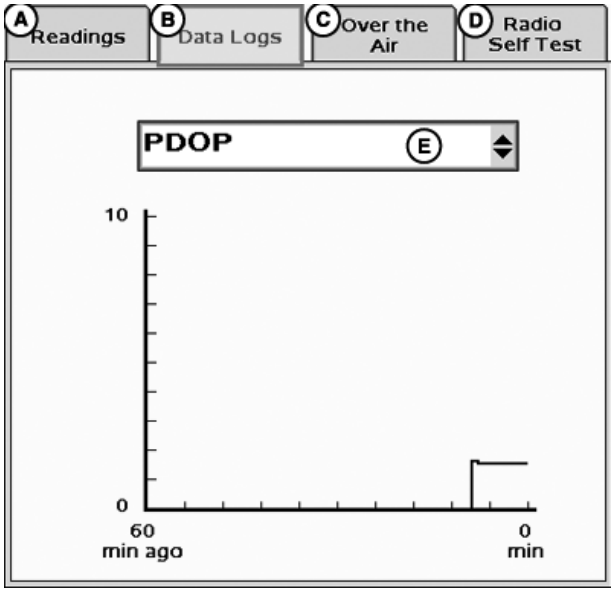
CF86321,000004C -19-04APR11-1/7

PDOP (Position Dilution of Precision) is a combination of vertical and horizontal error (or three dimensional). Lower PDOP is better. A value below 2 is considered optimal.

A—Readings tab
B—Data Logs tab
C—Over the Air tab
D—Radio Self Test tab (North America Only)
E—Position Dilution of Precision (PDOP)



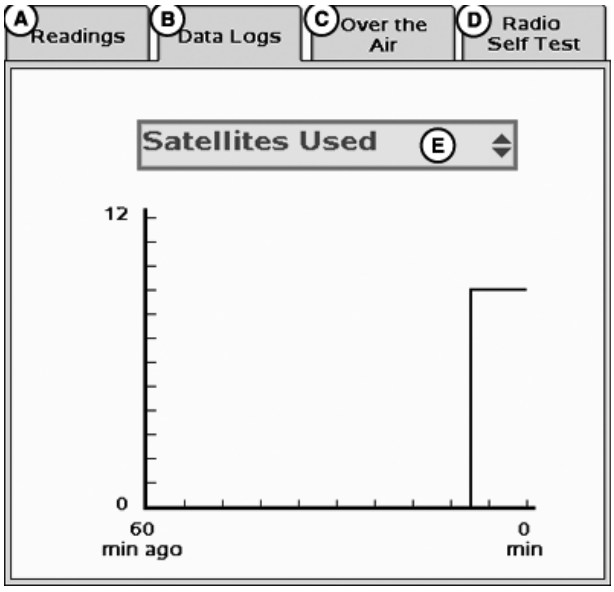
PC12053 —UN—12MAY09

StarFire 3000 - Diagnostic

CF86321,000004C -19-04APR11-2/7

Satellites in Solution is the number of satellites that receiver is using in current position solution. Satellites are not used in solution until they get above 5 degrees elevation mask for WAAS/EGNOS, SF1, or SF2. Satellites are used until they drop below 5 degrees elevation mask for WAAS/EGNOS, SF1, SF2 or RTK.

A—Readings tab
B—Data Logs tab
C—Over the Air tab
D—Radio Self Test tab (North America Only)
E—Satellites Used



PC12052 —UN—12MAY09

StarFire 3000 - Diagnostic

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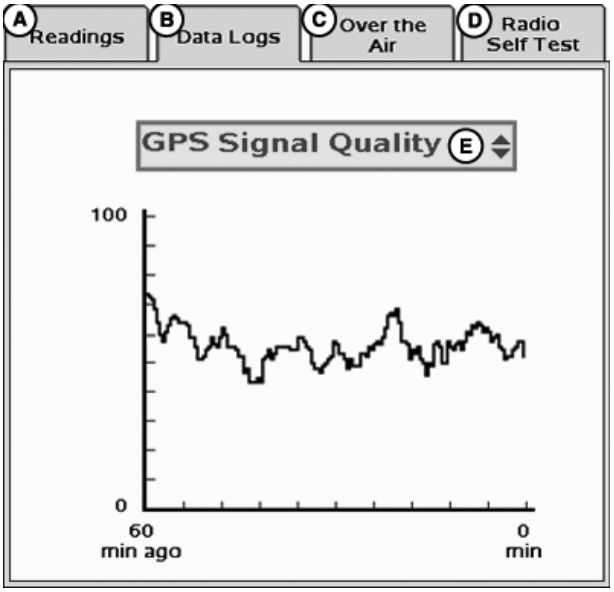
CF86321,000004C -19-04APR11-3/7

GPS Signal Quality shows quality of signals being received from GPS satellites. Unlike GPS Accuracy Indicator, Signal Quality does not include WAAS/EGNOS, SF1, SF2, or amount of time signal is received.

A—Readings tab
B—Data Logs tab
C—Over the Air tab
D—Radio Self Test tab (North America Only)
E—GPS Signal Quality



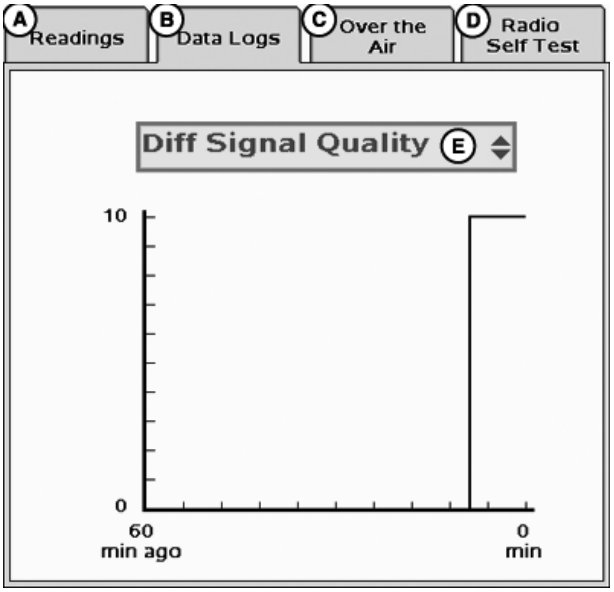
PC12056 —UN—12MAY09

StarFire 3000 - Diagnostic

CF86321,000004C -19-04APR11-4/7

Differential Signal Quality is the strength of StarFire network signal (SF2 or SF1). Normal range is from 5 to 15, but maximum reading on indicator is 10. Numerical value is displayed to right of indicator. Any value above 5 is normal.

A—Readings tab
B—Data Logs tab
C—Over the Air tab
D—Radio Self Test tab (North America Only)
E—Differential Signal Quality



PC12051 —UN—12MAY09

StarFire 3000 - Diagnostic

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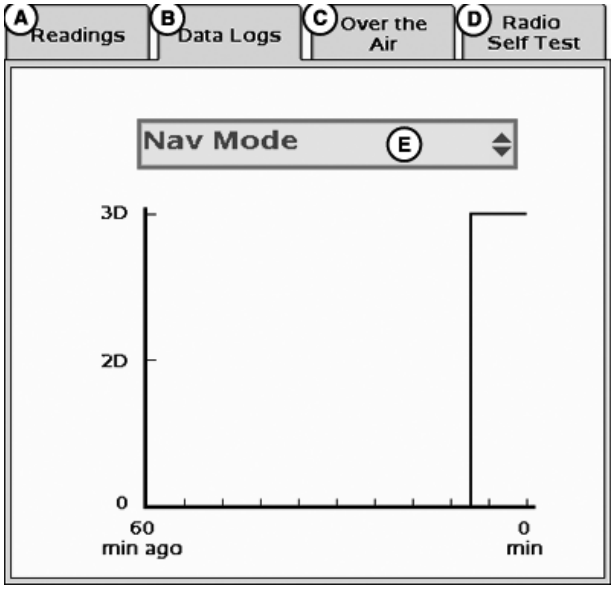
CF86321,000004C -19-04APR11-5/7

Navigation Mode is represented as three different types; No Nav, 2D and 3D. Navigation Mode helps determine if GPS position has been dropped in last 60 minutes.

A—Readings tab
B—Data Logs tab
C—Over the Air tab
D—Radio Self Test tab (North America Only)
E—Navigation Mode



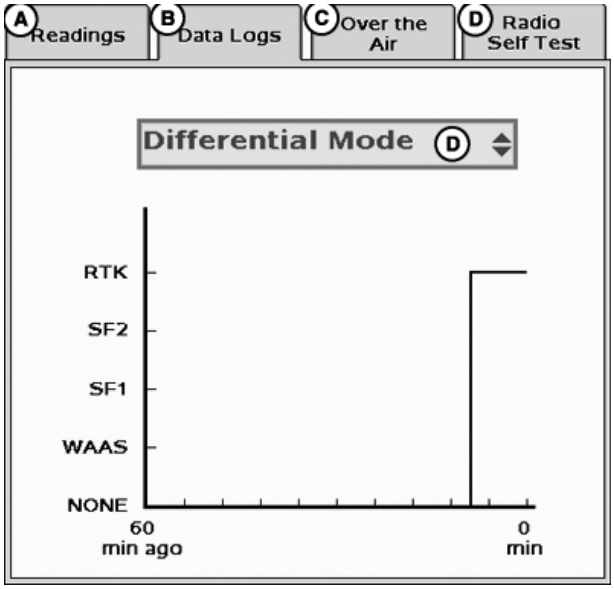
PC12050 —UN—12MAY09

StarFire 3000 - Diagnostic

CF86321,000004C -19-04APR11-6/7

Differential Mode shows the level of differential signal that receiver has received over past 60 minutes. Level of signal purchased on receiver determines highest point on bar graph.

A—Readings tab
B—Data Logs tab
C—Over the Air tab
D—Radio Self Test tab (North America Only)
E—Differential Mode



PC12049 —UN—12MAY09

StarFire 3000 - Diagnostic

CF86321,000004C -19-04APR11-7/7

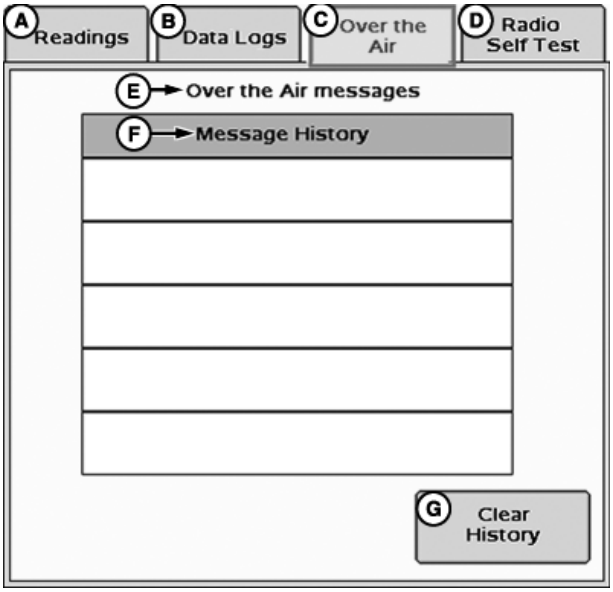
Over the Air tab

Over-the-Air (OTA) messages allow the StarFire 3000 to receive licenses and activations through the StarFire network. Rather than getting a license code over the phone or the internet, the license code is transmitted wirelessly from a StarFire satellite.

The operator must first go to StellarSupport website and enter a request to be send the license immediately or after a certain time delay. In either case, the receiver must be powered up and tracking satellites to accept the Over-the-Air activation. If the activation does not successfully load, the user should call StellarSupport to have the activation re-generated.

Message History (F)— Shows OTA messages that have been received since the receiver has been powered on. History shows whether an OTA activation was applied successfully or not.

Clear History button (G)— Erases the OTA message history.



PC12114 —UN—09JUN09

A—Readings tab
B—Data Logs tab
C—Over the Air tab
D—Radio Self Test tab (North America Only)
E—Over the Air Messages
F—Message History
G—Clear History button

BA31779,0000194 -19-04MAY11-1/1

GPS Accuracy Indicator

GREENSTAR softkey >> GUIDANCE softkey

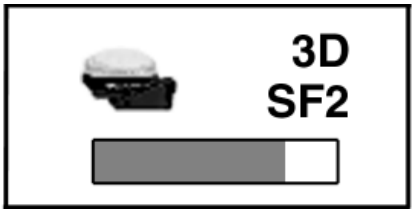
The GS2/GS3 alerts the operator when the current StarFire signal is not optimal for high accuracy operations. There are three levels of this alarm system (Normal, Marginal, and Poor). The levels are determined both by the StarFire receiver's PDOP value and the number of satellites being tracked.

Use care when the StarFire receiver is being used in high accuracy operations as accuracy degradation may occur.

NOTE: When operating in RTK or RTK-X, both PDOP and "Number of Satellites" are used to determine the level of alarm.

When operating at a signal level less than RTK (SF2, SF1, WAAS, etc.), only PDOP is used to determine the level of alarm.

PC9387 —UN—17OCT06



Normal

Normal

- Green Bar
- Normal Operating Range
- Acceptable range for high accuracy operations
- PDOP value: 0 - 3.5
- 6 or more satellites in solution

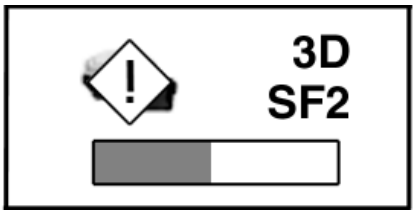
Continued on next page

BA31779,000013E -19-25APR11-1/3

Marginal

- Orange bar with permanent operator alert sign
- Marginal operating range
- Moderate risk of accuracy degradation
- PDOP value: 3.5 - 4.5
- 5 satellites in solution

PC9388 —UN—17OCT07



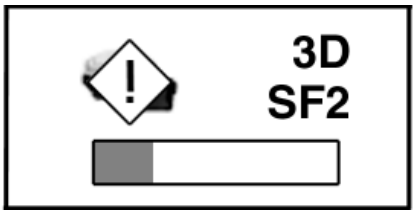
Marginal

BA31779,000013E -19-25APR11-2/3

Poor

- Red bar and flashing operator alert sign
- Poor operating range
- Significant risk of accuracy degradation - high accuracy operations are not advised
- PDOP value greater than 4.6
- 4 satellites or less in solution

PC10384 —UN—17OCT07



Poor

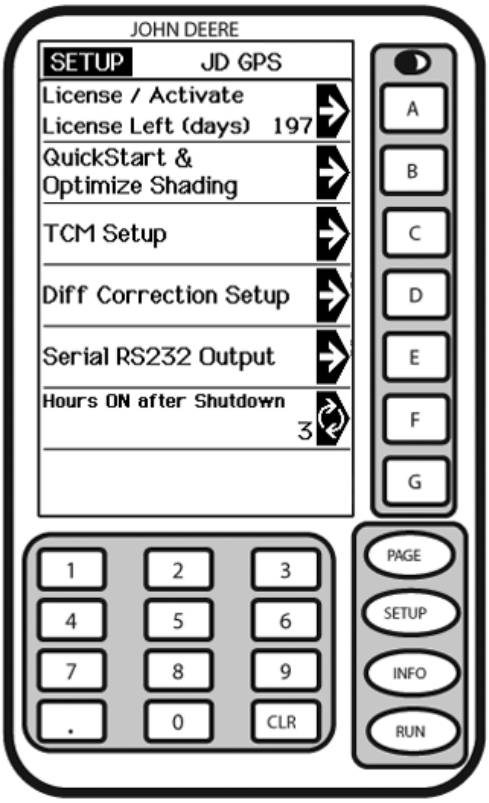
BA31779,000013E -19-25APR11-3/3

Auto-Update

NOTE: To acquire latest version of software visit www.StellarSupport.com or contact your John Deere dealer.

When KeyCard is installed in mobile processor and power is ON, system will check version of software on mobile processor, display, and receiver. If KeyCard contains a more recent version of software, system will ask if operator wants to update with most recent version. Follow on screen procedures to update software. (See Automatic Software Load).

A—License/Activate License Left (days)
B—QuickStart & Optimize Shading
C—TCM Setup
D—Diff Correction Setup
E—Serial RS232 Output
F—Hours ON after Shutdown
G——



ORIGINAL GREENSTAR DISPLAY

JS56696,0000561 -19-10JUL09-1/1

Manual Software Update

NOTE: Whenever new or revised software programs are available, it will be necessary to load new software to system.

Use this procedure if automatic software load does not work.

To acquire latest version of software, visit www.stellarsupport.com or contact your John Deere dealer.

1. Install KeyCard containing new software in top slot of mobile processor.
2. Turn ignition key to RUN position.

NOTE: To cancel new software load press G.

3. **Press:** SETUP >> KEYCARD

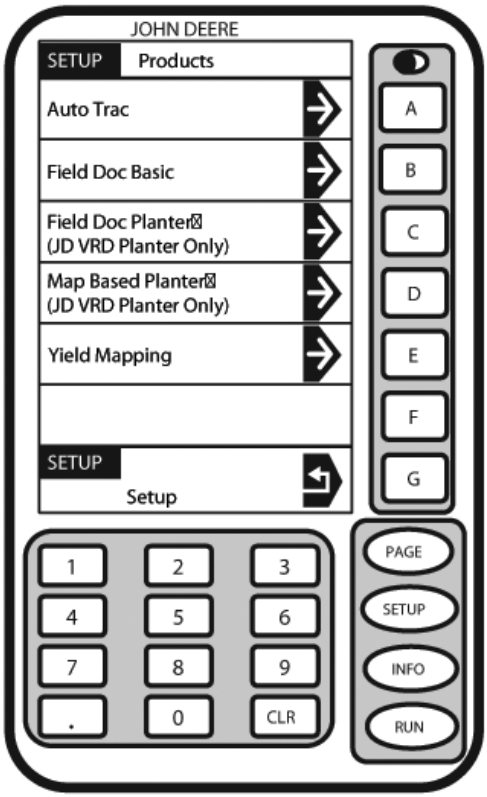
   Press letter button next to desired selection on SETUP - PRODUCTS screen.

4. Wait until WARNING PROGRAMMING screen appears and follow directions on screen.

   DO NOT REMOVE PC CARD

   DO NOT REMOVE POWER

5. Press letter button next to OK.
6. You may proceed as usual.



PC9559 —UN—12MAY09

SETUP - PRODUCTS

A—Auto Track
B—Field Doc Basic
C—Field Doc Planter
D—Map Based Planter
E—Yield Mapping
F——
G—Setup Return

JS56696,0000562 -19-10JUL09-1/1

StarFire Receiver

IMPORTANT: If a SF2 correction signal is being used, accuracy of system may continue to increase after SF2 is verified on screen. There may be a slight shift in position between two modes. If machine was receiving SF2 when it was shut down, warm-up period will not occur unless it has been shut down for longer that time specified for HOURS ON AFTER SHUTDOWN.

IMPORTANT: The first time StarFire 3000 is powered up, it may take up to 15 minutes for receiver to acquire updated GPS almanac.

JS56696,0000563 -19-10JUL09-1/1

SETUP-GPS-PAGE 1

Screen: SETUP - GPS

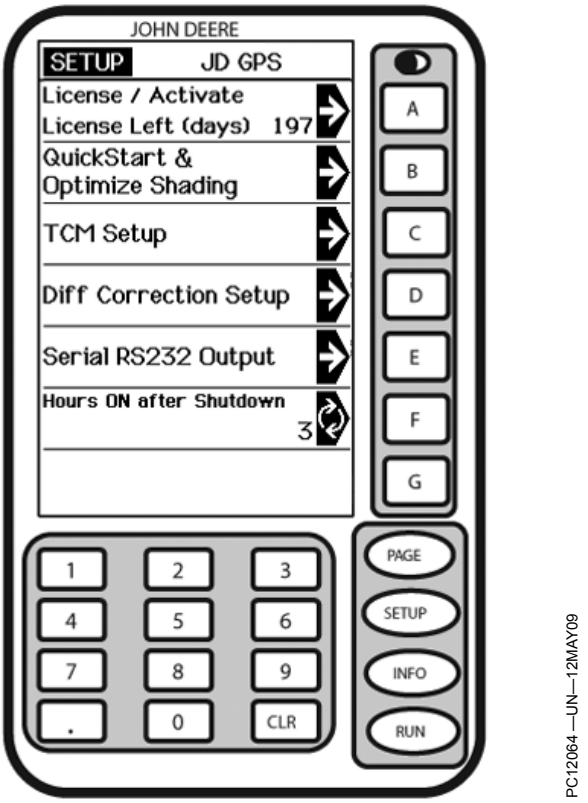
Press: SETUP >> StarFire 3000

The following items can be setup in SETUP - GPS

- License/Activate
- QuickStart Setup
- TCM Setup
- Differential Correction Setup
- Hours on after shutdown

Press corresponding button to access option being changed.

A—License/Activate License Left (days)
B—QuickStart & Optimize Shading
C—TCM Setup
D—Diff Correction Setup
E—Serial RS232 Output
F—Hours ON after Shutdown
G——



PC12064 —UN—12MAY09

ORIGINAL GREENSTAR DISPLAY

JS56696,0000564 -19-10JUL09-1/1

Overview: SF2/RTK Activations, SF2 Subscription

StarFire 3000 is offered in 2 configurations: SF1 World Solution and SF2 Ready.

SF1 World Solution: SF1 is a no-charge satellite-based differential correction signal offered exclusively by John Deere, delivering accuracy adequate for non row crop applications. SF1 StarFire 3000 can be upgraded to SF2-Ready by visiting your John Deere dealer or www.StellarSupport.com and purchasing SF2 Ready activation.

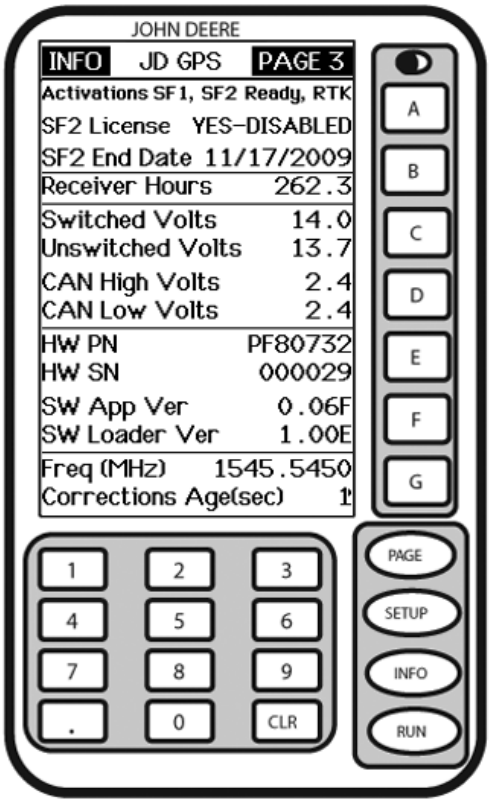
NOTE: Serial port GPS information (NMEA) is only outputted for SF1 when connected to a GreenStar system.

SF2 Ready: SF2 is a +/- 10 cm (4 in.) pass to pass differential correction signal provided exclusively by John Deere. While StarFire 3000 can be ordered SF2 Ready, SF2 Ready activation must be obtained by visiting www.StellarSupport.com (COMAR order number and receiver serial number are needed) and manually entered into receiver. Once activation has been entered, SF2 license can be purchased for either a few months or a few years.

NOTE: StarFire 3000 must be SF2 Ready prior to upgrading receiver to RTK.

RTK: RTK us the highest accuracy correction signal. It requires use of a local base station and radio communication equipment. Each receiver used in the RTK system must be activated for RTK. This activation exists for the life of the receiver and can be transferred.

i



PC12065 —UN—12MAY09

INFO - GPS - PAGE 3

A—Activations SF1, SF2 Ready, RTK
SF2 License YES—DISABLED
B—SF2 End Date
Receiver Hours
C—Switched Volt
Unswitched Volt
D—CAN High Volt
CAN Low Volt
E—Hardware Part Number
Hardware Serial Number
F—Software Application Version
Software Loader Version
G—Frequency (MHz)
Corrections Age (sec)

Continued on next page

JS56696,0000565 -19-10JUL09-1/2

Obtaining and Entering SF2 or RTK activation and SF2 license

NOTE: Receiver serial number is required to obtain SF2 Ready or RTK activation codes. SF2 Ready and RTK also require corresponding COMAR order number if purchased from your John Deere dealer.

1. **Press:** INFO >> StarFire 3000 >> PAGE >> PAGE

   Locate serial number (Hardware SN).

NOTE: A 24-digit activation code will be provided by www.StellarSupport.com either through postal service or E-mail.

For RTK customers only: RTK activation is purchased as part of each RTK base station and vehicle bundle. To obtain 24 digit RTK activation code, visit StellarSupport.com and provide COMAR order number for RTK system and receiver serial numbers.

2. Login to www.stellarsupport.com to obtain activation code.

NOTE: Enter 24 digit activation code number in three cells that have eight zero digits.

3. **Screen:** SETUP - STARFIRE LICENSE

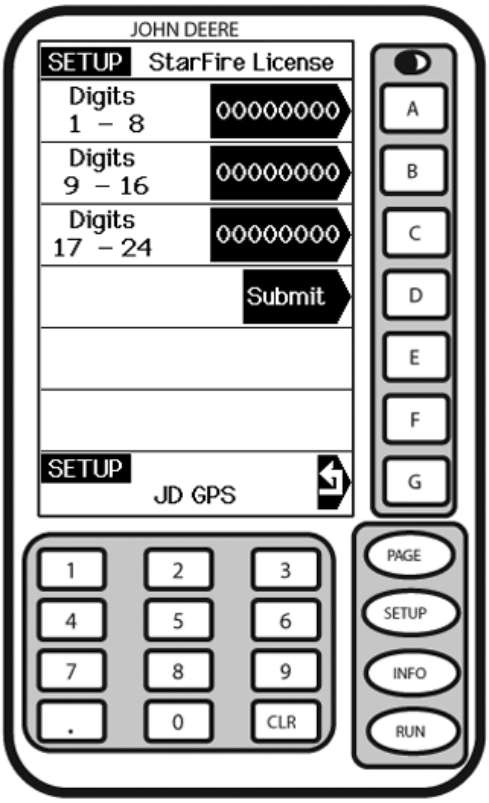
   Press: SETUP >> StarFire 3000 >> LICENSE/ACTIVATE

   Press letter button next to DIGITS 1—8 and enter first eight digits of activation code. Press letter button next to DIGITS 1—8 again to enter value.

4. Press letter button next to DIGITS 9—16 and enter second eight digits of activation code. Press letter button next to DIGITS 9—16 again to enter value.
5. Press letter button next to DIGITS 17—24 and enter last eight digits of activation code. Press letter button next to DIGITS 17—24 again to enter value.
6. Press letter button next to SUBMIT.
7. Press letter button next to SETUP to return or SETUP button to continue setup operations.

License Expired Alarm

NOTE: Three 24 hour grace periods are available when current license expires. This is provided to allow sufficient time for customer to renew a license. Grace period signal will be SF 2 differential correction signal.



PC12116 —UN—09JUN09

SETUP - STARFIRE LICENSE

A—Digits 1-8
B—Digits 9-16
C—Digits 17-24
D—Submit
E——
F——
G—Return to GPS

If license expires while operating or since last operated, an alarm screen will appear.

Alarm screen can be cleared by pressing letter button next to CONTINUE or a grace period can be activated by pressing letter button next to USE 1 if needed.

JS56696,0000565 -19-10JUL09-2/2

QuickStart Setup

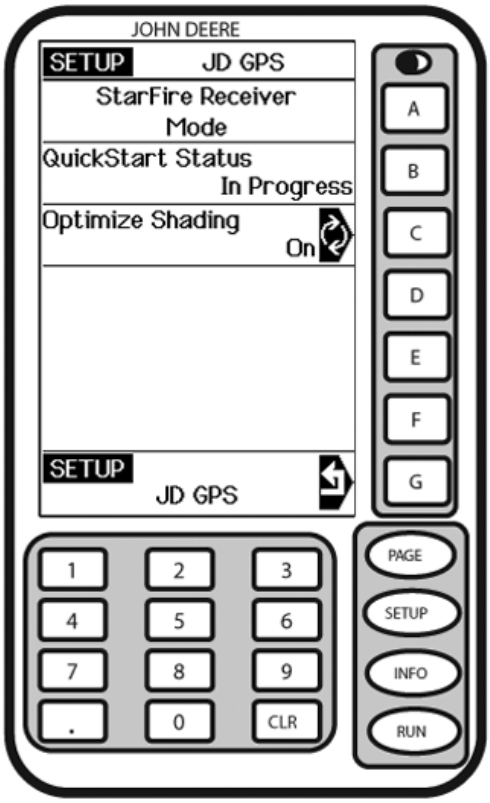
Screen: SETUP - GPS

Press: SETUP >> StarFire 3000 >> QUICKSTART SETUP

QuickStart reduces amount of time required before full accuracy is achieved. If receiver has SF2 when it is powered down, a position is saved for future QuickStart. If power is restored to receiver within time period defined under HOURS ON AFTER SHUTDOWN, QuickStart won't be needed since receiver power was never disrupted. If duration has exceeded HOURS ON AFTER SHUTDOWN, QuickStart will be initiated. Saved position will be used to bypass startup warm up period that is usually required. Receiver cannot move while this QuickStart is taking place. It may take up 6 minutes for QuickStart to complete. User will be notified on screen when it's done.

Optimize Shading When selected\enabled this feature allows AutoTrac SF1 and SF2 to function in partially shaded conditions using a minimum of 4 L1 satellites. Utilizing this function could cause a reduction in guidance accuracy when only L1 satellites are being utilized. Operators that will not be operating in a shaded area should not have this feature selected\enabled.

A—StarFire Receiver Mode
B—QuickStart Status
C—Optimize Shading
D——
E——
F——
G—Return to GPS Setup



PC12066 —UN—12MAY09

SETUP - GPS

JS56696,0000566 -19-10JUL09-1/1

Setup—TCM

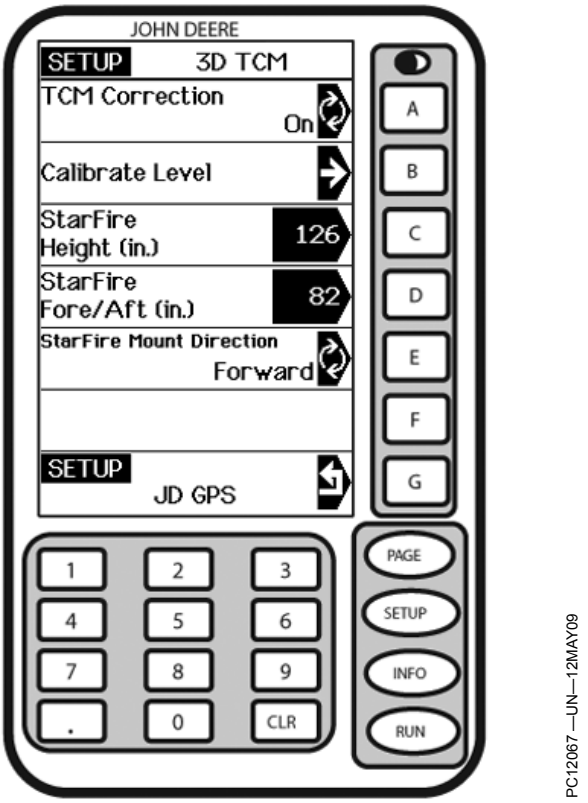
Screen: SETUP - TCM

Press: SETUP >> StarFire 3000 >> TCM SETUP

This screen allows operator to:

- Turn TCM ON/OFF
- Calibrate TCM for zero degree roll angle
- Manually insert height of receiver
- Manually insert fore/aft
- Change mounting direction of receiver

A—TCM Correction
B—Calibrate Level
C—StarFire Height
D—StarFire Fore/Aft
E—StarFire Mount Direction
F——
G—Return to Setup



PC12067 —UN—12MAY09

SETUP - TCM

JS56696,0000567 -19-10JUL09-1/1

ON/OFF—TCM

NOTE: There is no indication on Run Pages if TCM is ON or OFF.

TCM will default to ON when cycling power.

Press letter button A to toggle between ON and OFF selection will appear boxed and in capital letters.

When TCM is turned off , StarFire GPS messages will not be corrected for vehicle dynamics or side slopes.

JS56696,0000568 -19-10JUL09-1/1

Mounting Direction—TCM

NOTE: Receivers attached to tractors, sprayers, and combines are typically in FORWARD position.

Receivers attached to GATORS are typically in BACKWARD position.

Mounting direction is direction receiver is facing.

This setting defines mounting orientation of receiver. TCM uses this setting to determine correct direction of vehicle roll and pitch.

A StarFire receiver that extends forward from attaching bracket in direction of vehicle travel is in **FORWARD** mounting direction.

A StarFire receiver that extends backward from attaching bracket away from direction of vehicle travel is in **BACKWARD** mounting direction.

Desired selection will appear boxed and in capital letters.

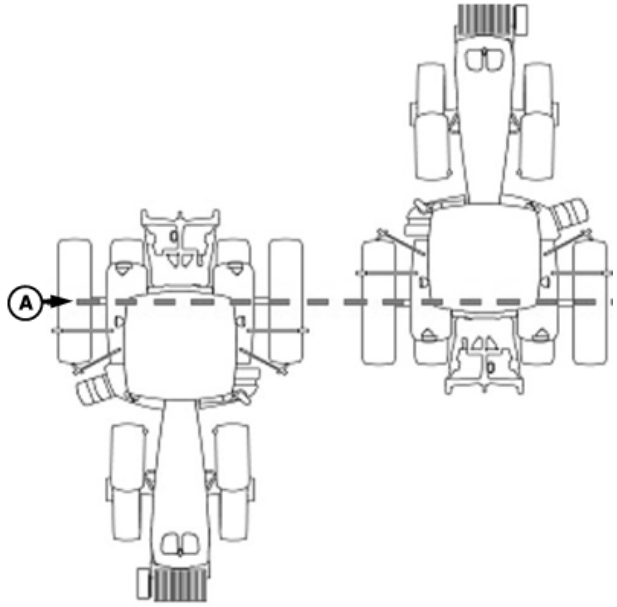
Press letter button next to STARFIRE MOUNT DIRECTION and select desired mounting direction, backward or forward.

JS56696,0000569 -19-10JUL09-1/1

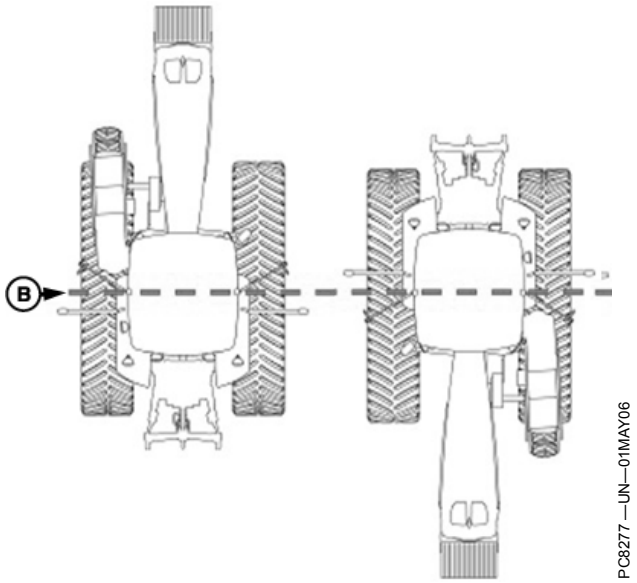
Calibrate Level—TCM

NOTE: Calibrate receiver when it is attached or reattached to machine. Receiver does not require recalibration until removed from machine and reattached.

Positioning Machine during Calibration



Floating Front Axle Vehicles



Fixed-Axis Wheels Or Tracks Vehicles

A—Rear Axle **B—Vehicle Pivot Point**

IMPORTANT: When calibrating, it is important that TCM is at same angle when facing either direction. If roll angle is a positive 2° when facing one direction, vehicle needs to be a negative 2° when facing opposite direction. To position TCM at same angle it is important when turning vehicle around and facing other direction that tires are placed in correct location. Once vehicle is parked on a hard flat surface, note location of tires on ground. When turning around use following instructions:

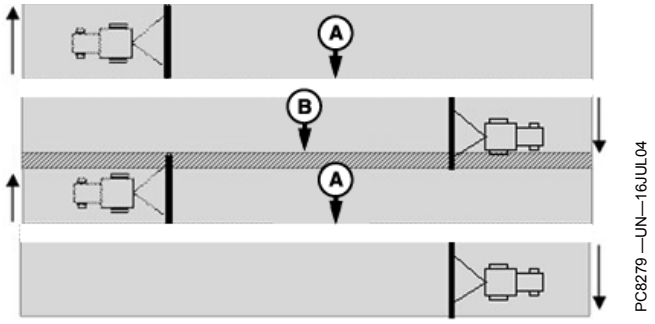
- **Floating Front Axle Vehicles (MFWD, ILS, TLS)—put rear axle/wheels in same location when performing 2 point calibration. See above diagram for Floating Front Axle Vehicles.**
- **Fixed-Axis Wheels Or Tracks Vehicles (Track Tractors, 9000 and 9020 Series Wheel Tractors, 4700 and 4900 Series Sprayers,)—Place all in same location when facing either direction. See above diagram for Fixed-Axis Wheels Or Tracks Vehicles.**

Continued on next page

JS56696,000056A -19-10JUL09-1/5

Calibration Surface

IMPORTANT: Vehicle must be on a hard, flat level surface for calibration. If TCM is not calibrated on a level surface or TCM mounting angle is not level in relation to vehicle angle (StarFire mounting bracket or vehicle cab being slightly offset, uneven tire pressures from one side to other, etc.) operator may see offset during operation. This offset could look like a consistent skip (A) or overlap (B) in pass-to-pass operation. To eliminate offset, re-calibrate on a level surface, drive down a pass, turn around and drive down same pass in opposite direction. If vehicle does not follow same pass, measure offset distance and enter in implement offset in SETUP - TRACKING - PAGE 2. See implement offset section. After initial calibration of TCM, it is not necessary to calibrate again unless TCM angle in relation to vehicle has changed. For example, tire pressure has been lowered on one side of vehicle causing vehicle angle in relation to ground to change.



A—Skip **B—Overlap**

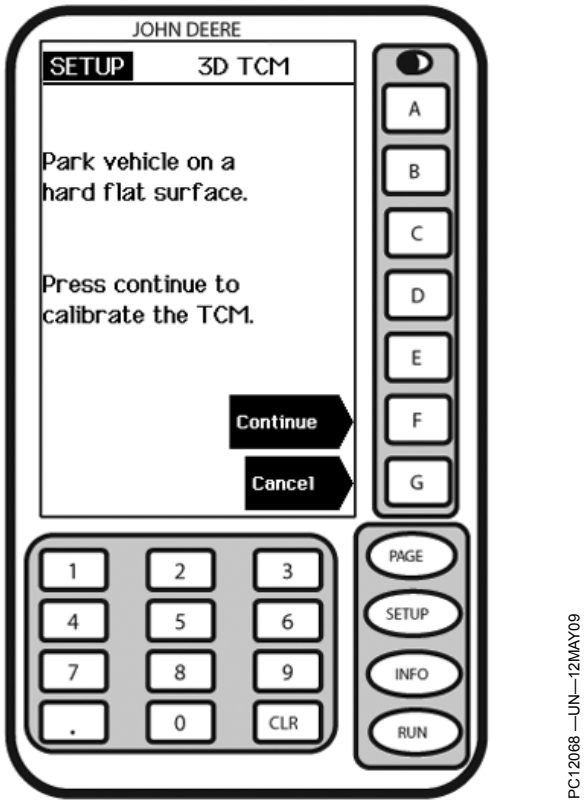
JS56696,000056A -19-10JUL09-2/5

Screen: SETUP - TCM

Press: SETUP >> StarFire 3000 >> TCM SETUP >> CALIBRATE LEVEL

1. Once vehicle is on a hard, level surface and has come to a complete stop (cab is not rocking), Press letter button next to CONTINUE.

A——
B—Park Vehicle on a hard flat surface.
C——
D—Press Continue to calibrate the TCM
E——
F—Continue
G—Cancel



SETUP - TCM

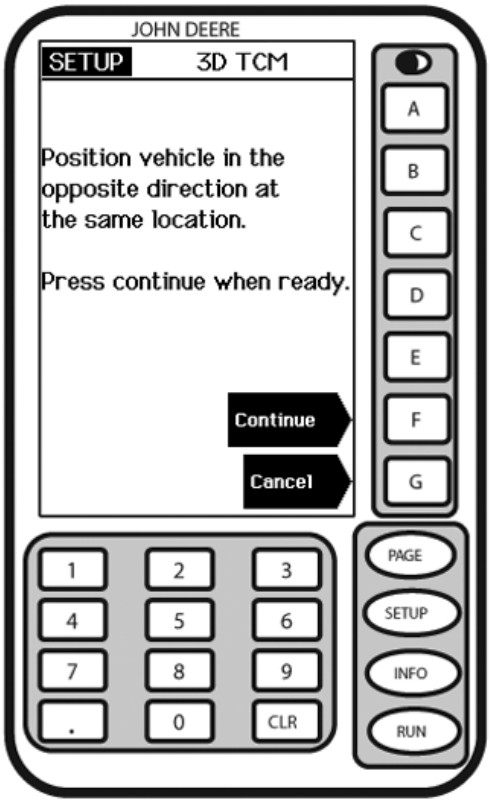
Continued on next page

JS56696,000056A -19-10JUL09-3/5

NOTE: While calibrating, TCM will provide an alarm if it detects vehicle roll angle is greater than 10° relative to internal axis of TCM. If vehicle is on a level surface and yet alarm is displayed, check mounting orientation of TCM and verify it is aligned within 10° of vehicle axis.

2. Turn vehicle 180° to face opposite direction. Ensure that tires are in proper location for fixed or floating front axle.
3. Ensure vehicle has come to a complete stop (cab is not rocking) and Press letter button next to CONTINUE.

A——
B—Position Vehicle in the opposite direction at
C—the same location.
D—Press continue when ready.
E——
F—Continue
G—Cancel



PC12069 —UN—12MAY09

TCM calibration complete

Continued on next page

4. Press letter button next to OK.

A——
B——
C——
D—TCM calibration complete.
E——
F——
G—OK

Setup - TCM

JS56696,000056A -19-10JUL09-5/5

Height—TCM

Height is measured from ground to middle of receiver dome.

IMPORTANT: Under or over compensation for vehicle roll angles will occur if height is incorrectly entered during setup (i.e. on a 10° slope with a StarFire height error of 30.5 cm (12 in.) will result in a position offset of 5 cm (2 in.) on ground).

Factory default setting is "126". On some AutoTrac-equipped vehicles, height value will be automatically detected and entered during power up. Because this dimension is critical for proper operation of TCM and can vary due to vehicle configuration and tire sizes, operator should still measure actual distance to be entered each time TCM is installed on a different vehicle.

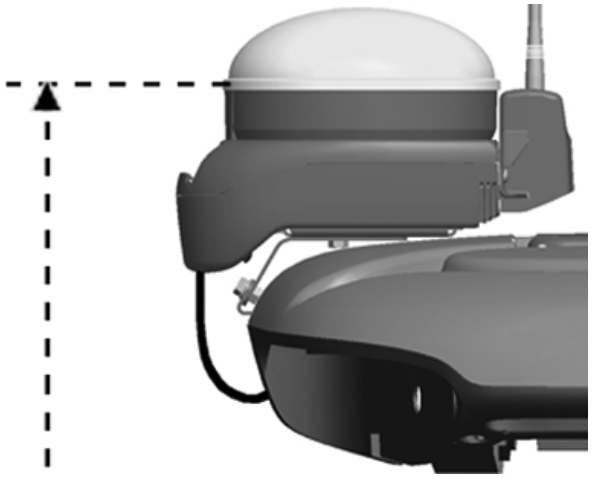
NOTE: Use chart for example StarFire Height values.

Press letter button next to STARFIRE HEIGHT and enter height using numeric keypad.

Press letter button next to STARFIRE HEIGHT again to save number.

NOTE: Chart figures are approximate heights.

NOTE: For greatest accuracy, manually measure receiver height distance.

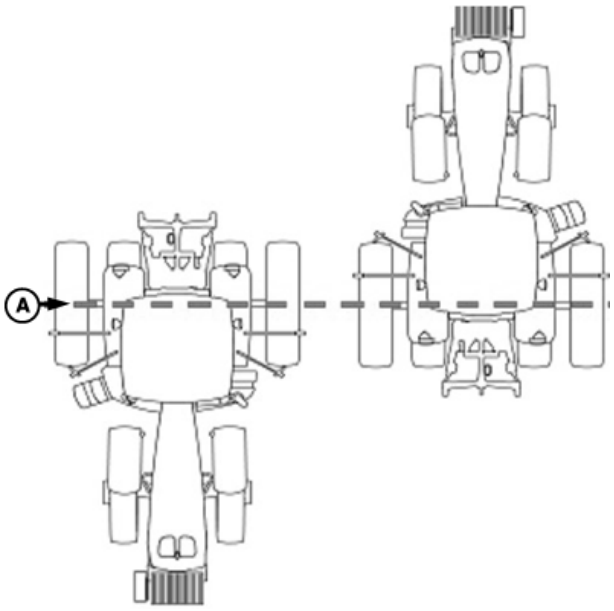


PC12016 —UN—22APR09

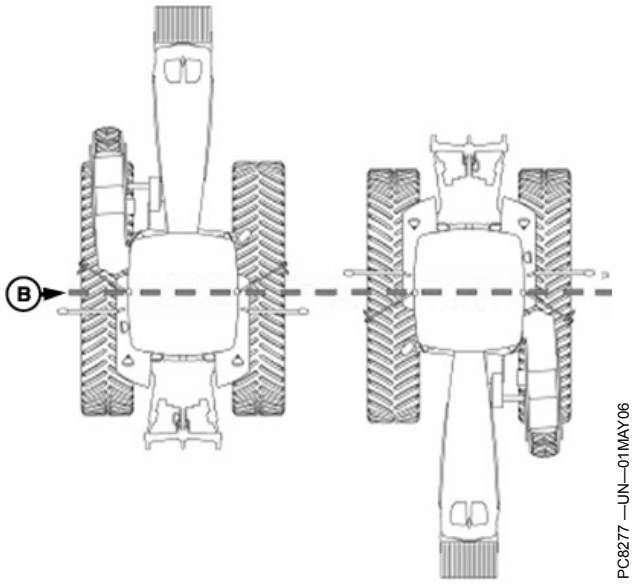
John Deere Vehicle	StarFire Original Shroud Height cm (in.)	Deluxe Shroud Height cm (in.)
6000 Series Tractors	280 cm (111 in.)	291 cm (114.5 in.)
7000 Series Tractors	305 cm (120 in.)	314 cm (123.5 in.)
8000 Series Tractors	320 cm (126 in.)	329 cm (129.5 in.)
8000T Series Tractors	320 cm (126 in.)	329 cm (129.5 in.)
9000 Series Tractors	361 cm (142 in.)	370 cm (145.5 in.)
9000T Series Tractors	356 cm (140 in.)	365 cm (143.5 in.)
4700 Series Sprayers	389 cm (153 in.)	396 cm (156 in.)
4900 Series Sprayers	396 cm (156 in.)	396 cm (156 in.)
Combine	396 cm (156 in.)	396 cm (156 in.)

JS56696,000056B -19-10JUL09-1/1

Fore/Aft—TCM



Floating Front Axle Vehicles



Fixed Axis Wheels or Tracks Vehicles

A—Pivot Point—Floating Front Axle Vehicles-

B—Pivot Point—-Fixed Axis Wheels or Tracks Vehicles

TCM Fore/Aft value is distance that receiver is located from pivot point of tractor.

On some AutoTrac-equipped vehicles, fore/aft value will be automatically detected and entered during power up.

- Fore/Aft value is shown **without** black text box—Automatically detected and cannot be changed. The value shown may not be the exact distance that the receiver is located from pivot point of tractor, but the best value for AutoTrac.
- Fore/Aft value is shown **with** black text box—Must be entered manually.

Perform following procedure to select and manually enter value. Use chart to select StarFire Fore/Aft values if necessary.

If using TCM for Parallel Tracking on a vehicle not listed in chart, then enter "1" for fore/aft setting.

Press letter button next to STARFIRE FORE/AFT and enter value using numeric keypad.

Press letter button next to STARFIRE FORE/AFT again to save entered value.

NOTE: For greatest accuracy, manually measure Fore/Aft distance.

John Deere Vehicle	StarFire Original Shroud Fore/Aft cm (in.)	Deluxe Shroud Fore/Aft cm (in.)
6000 Series Tractors	180 cm (71 in.)	154 cm (60.5 in.)
7000 Series Tractors	210 cm (82.5 in.)	183 cm (72 in.)
8000 Series Tractors	210 cm (82.5 in.)	183 cm (72 in.)
8000T Series Tractors	51 cm (20 in.)	24 cm (9.5 in.)
9000 Series Tractors	-51 cm (-20 in.)	-77 cm (-30.5 in.)
9000T Series Tractors	51 cm (20 in.)	24 cm (9.5 in.)
4700 Series Sprayers	280 cm (110 in.)	253 cm (99.5 in.)
4900 Series Sprayers	460 cm (181 in.)	433 cm (170.5 in.)
Combine	220 cm (87 in.)	220 cm (87 in.)
Forage Harvester	157 cm (62 in.)	157 cm (62 in.)

Recommended StarFire Fore/Aft values For John Deere Machines

JS56696,000056C -19-10JUL09-1/1

Differential Correction Setup

Differential correction is the process by which GPS accuracy is improved. (See OVERVIEW: SF1/SF2 ACTIVATIONS, SF2 SUBSCRIPTION in this section.)

Screen: SETUP - DIFF CORRECTION

Press: SETUP >> StarFire 3000 >> DIFF CORRECTION SETUP

(See RTK section for RTK Setup.)

IMPORTANT: DO NOT change default StarFire Correction Frequency unless instructed to do so by your John Deere Dealer or by John Deere Ag Management Solutions.

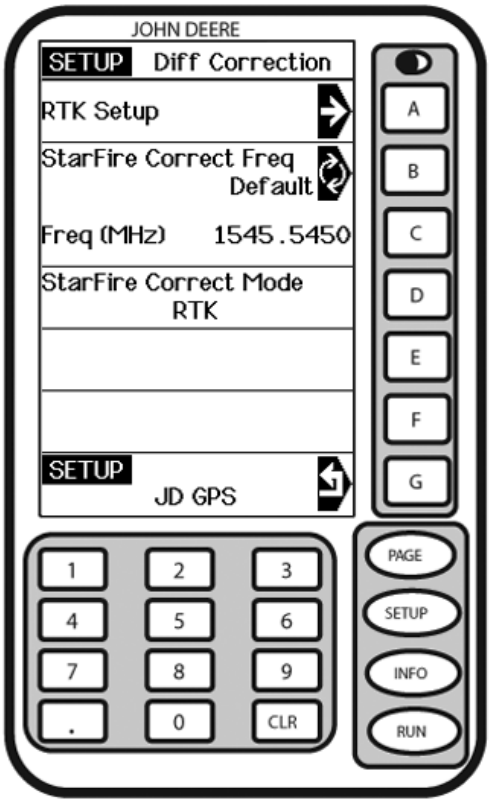
NOTE: Some information will only appear when receiver has a license.

Press letter button next to STARFIRE CORRECT FREQ to toggle between DEFAULT and BELOW.

When STARFIRE CORRECT FREQ is set to BELOW—press letter button next to FREQ (MHz) then input a frequency.

Press letter button next to STARFIRE CORRECTION to toggle between OFF, SF1, and SF2. If toggled to OFF, StarFire will not receive SF1 or SF2 correction signals. If receiver does not have a valid SF2 license then SF2 will not appear on screen.

NOTE: Default refers to Auto-Select StarFire frequency.



PC12071—UN—12MAY09

SETUP - DIFF CORRECTION

A—RTK Setup
B—StarFire Correction Frequency, Default
C—Frequency
D—StarFire Correction Mode
E——
F——
G—Return to GPS Setup

JS56696,000056D -19-10JUL09-1/1

Serial RS232 Output

Screen: SETUP - SERIAL PORT

Press: SETUP >> StarFire 3000 >> SERIAL RS232 OUTPUT

NOTE: These settings are only for NMEA serial port messages for communication with **non-GREENSTAR systems**.

Serial port baud output rates are: 4800, 9600, 19200, 38400, 57600 and 115200

The following items can be setup in SETUP - SERIAL PORT screen:

- Serial Port Baud Rate
- Serial Port Output Rate
- GGA Port Message
- GSA Port Message
- RMC Port Message
- VTG Port Message
- ZDA Port Message

Press letter button next to desired cell, toggle to desired selection.

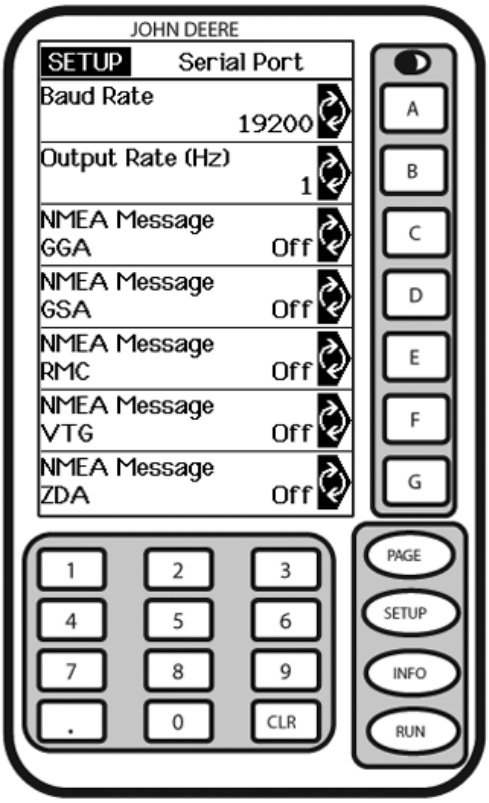
Serial Port Output Rate

NOTE: Serial port settings do not affect GreenStar applications.

Press letter button next to SERIAL PORT OUTPUT RATE to toggle/select 1, 5, or 10 Hz.

Serial Port Messages

Press letter button next to SERIAL PORT MESSAGE to toggle/select between ON and OFF.



PC12072 —UN—12MAY09

SETUP - SERIAL PORT

A—Baud Rate
B—Output Rate
C—NMEA Message, GGA
D—NMEA Message, GSA
E—NMEA Message, RMC
F—NMEA Message, VTG
G—NMEA Message, ZDA

JS56696,000056E -19-10JUL09-1/1

Hours On After Shutdown

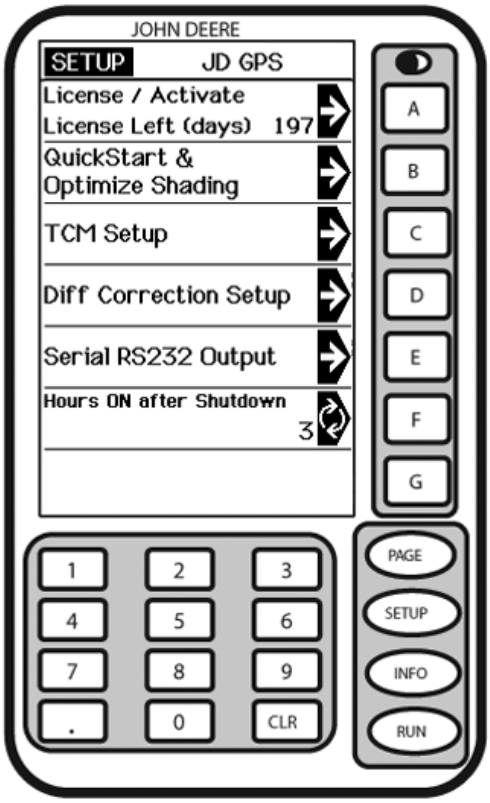
Screen: SETUP - GPS

Press: SETUP >> StarFire 3000

Button next to HOURS ON AFTER SHUTDOWN defines how long receiver remains powered after ignition is turned off (0, 3, 6, 12 or 24 hours). If ignition is turned on within number of hours defined, receiver will re-establish full SF2 accuracy within a few seconds (assuming it had SF2 when ignition was turned off).

Operator can select amount time in hours system will stay on. Press letter button next to HOURS ON AFTER SHUTDOWN to toggle between settings. Setting from factory is 3 hours.

A—License/Activate License Left (days)
B—QuickStart & Optimize Shading
C—TCM Setup
D—Diff Correction Setup
E—Serial RS232 Output
F—Hours ON after Shutdown
G——



PC12064 —UN—12MAY09

ORIGINAL GREENSTAR DISPLAY

JS56696,000056F -19-10JUL09-1/1

INFO - GPS - PAGE 1

Screen: INFO - GPS - PAGE 1

Press: INFO >> StarFire 3000

This screen shows information and status of incoming GPS and differential correction signals. No information on this screen can be changed. It is for viewing only.

Date and Time: This cell shows date and time for Greenwich Mean time.

Lat: This cell displays vehicle location latitude coordinates with respect to Equator (north or south).

Lon: This cell shows vehicle location longitude coordinates with respect to Prime Meridian (east or west).

NOTE: Toggle button allows operator to change the way latitude and longitude are displayed between degrees, minutes, seconds and decimal degrees.

Altitude: This cell shows height of receiver, measured from top of dome, in meters (feet) above sea level.

GPS Course: This cell displays direction of travel, in degrees, relative to true north (zero degrees) as measured by receiver. Angle is measured in clockwise direction.

NOTE: Course and speed normally show small speeds and various courses even when machine is not moving.

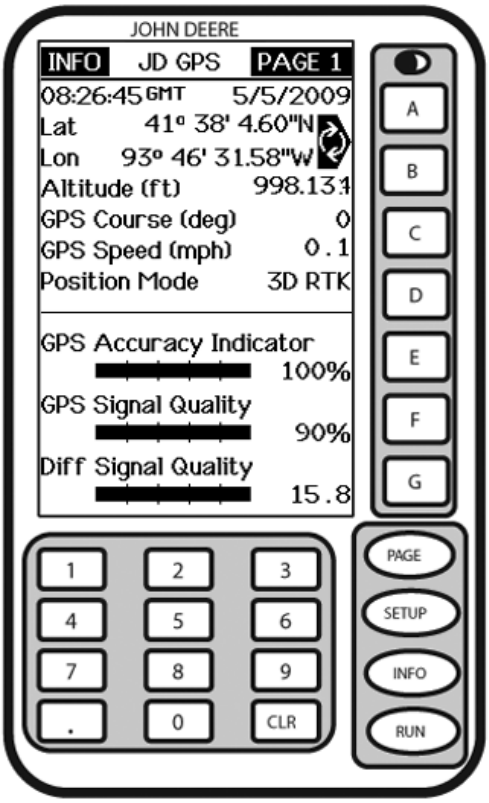
GPS Speed: This cell shows ground speed of machine in kilometers per hour (mile per hour) as measured by receiver.

Position Mode: This cell indicates whether receiver is calculating a 3D position, 2D position, or no position (no nav). It also shows status of differential signal: SF 1 (StarFire 1 differential), SF 2 (StarFire 2 differential).

GPS Accuracy Indicator: StarFire 3000 includes GPS Accuracy Indicator (GPS AI). GPS AI gives indication of GPS position accuracy achieved by receiver, and is displayed as a percentage (0-100%). GPS AI is displayed on RUN Page of Parallel Tracking (Figure 1), AutoTrac, and Field Doc and INFO – GPS – Page 1 (Figure 2).

When receiver is initially powered, GPS AI will display 0%. As receiver acquires satellites and calculates a position, GPS AI will increase as accuracy improves. Acceptable guidance performance for Parallel Tracking and AutoTrac is achieved when GPS AI displays 80% or greater. This may take up to 20 minutes. GPS accuracy is affected by many factors. If 80% accuracy or greater is not achieved within 25 minutes, consider following possibilities:

- Unobstructed view of sky – trees, buildings, or other structures may block receiver from receiving signals from all available satellites



PC12073 —UN—12MAY09

INFO - GPS - PAGE 1

A—Latitude
B—Longitude
Altitude
C—GPS Course
GPS Speed
D—Position Mode
E—GPS Accuracy Indicator
F—GPS Signal Quality
G—Differential Signal Quality

- L1/L2 signal to noise ratio (SNR) – radio interference from 2-way radios or other sources may cause low SNR
- Satellite position in sky – poor GPS satellite geometry can reduce accuracy
- Number of satellites above elevation mask – this is total number of GPS satellites available to your receiver that are above 5 degrees elevation mask
- Number of satellites in solution – this is total number of satellites that are being used by receiver to calculate a position

GPS Signal Quality: This cell shows quality of signals being received from constellation of GPS satellites.

Differential Signal Quality: This cell shows quality of differential correction signal being received by receiver.

JS56696,0000570 -19-10JUL09-1/1

INFO - GPS - PAGE 2

Screen: INFO - GPS - PAGE 2

Press: INFO >> StarFire 3000 >> PAGE

Diagnostic Trouble Codes: (See DIAGNOSTIC TROUBLE CODES in Troubleshooting section.)

Data Log: Three data log pages consist of graphs showing GPS information for up to previous 60 minutes. Graphs can be used to show user any variation that has occurred in last 60 minutes.

Freq (MHz): This cell shows frequency of differential correction signal that receiver is set to receive.

Corrections Age (SEC): This cell shows age of differential correction signal to GPS (normally less than 10 seconds).

Sats Above Elev Mask: This is total number of GPS satellites available to your receiver that are above 5 degrees elevation mask.

Satellites Tracked: This is total number of GPS satellites tracked by your receiver.

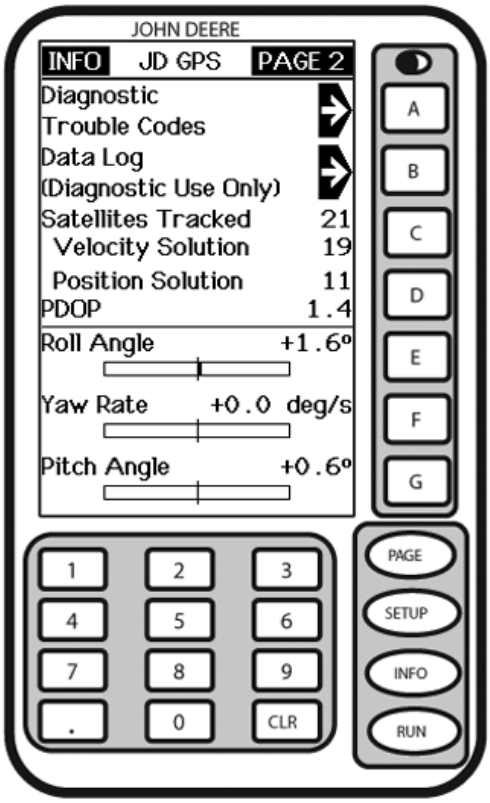
Satellites in Solution: This cell shows number of satellites actively used to compute position.

PDOP: PDOP (Position Dilution of Precision) is an indicator of GPS satellite geometry as viewed by receiver. A lower PDOP indicates better satellite geometry for calculating both a horizontal and vertical position.

Roll Angle: Is both graphical and numerical representation of amount of roll TCM is measuring, relative to calibrated zero degree reference. A positive roll angle means vehicle is rolled to right.

Yaw Rate: This gives a graphic representation and a numeric figure for amount of rotation TCM is measuring. Positive yaw rate means vehicle is turning to right.

Pitch Angle: Is both graphical and numerical representation of amount of pitch TCM is measuring, relative to calibrated zero degree reference. A positive pitch angle means vehicle's nose is pointed upward. A negative pitch angle means vehicle's nose is pointed downward.



PC12574 —UN—15APR10

INFO - GPS - PAGE 2

A—Diagnostic Trouble Codes
B—Data Log (Diagnostic Use Only)
C—Satellites Tracked Velocity Solution
D—Position Solution PDOP
E—Roll Angle
F—Yaw Rate
G—Pitch Angle

JS56696,0000571 -19-10JUL09-1/1

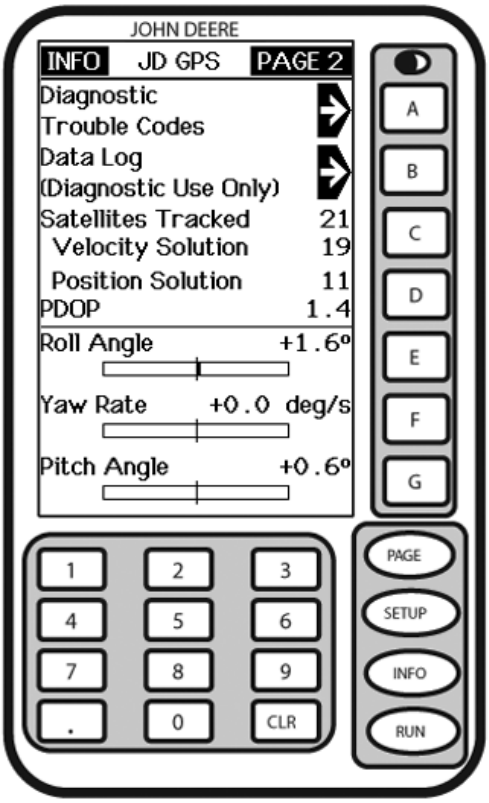
Data Log

Screen: INFO - GPS - PAGE 2

Press: INFO >> StarFire 3000 >> PAGE

Press letter button next to DATA LOG to access three data log pages. These pages consist of graphs showing GPS information for up to previous 60 minutes. Graphs can be used to show user any variation that has occurred in last 60 minutes.

A—Diagnostic Trouble Codes
B—Data Log (Diagnostic Use Only)
C—Satellites Tracked
Velocity Solution
D—Position Solution
PDOP
E—Roll Angle
F—Yaw Rate
G—Pitch Angle



PC12574 —UN—15APR10

INFO - GPS - PAGE 2

Continued on next page

JS56696,0000572 -19-15APR10-1/4

INFO - DATA LOG - PAGE 1

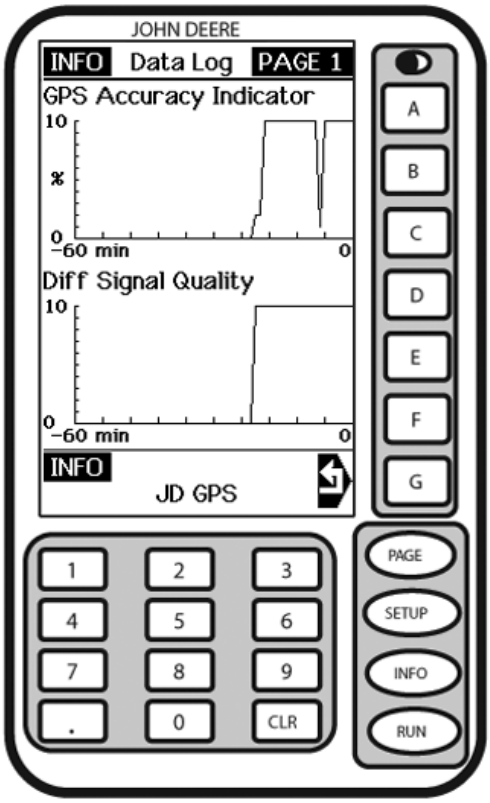
Screen: INFO - DATA LOG - PAGE 1

Press: INFO >> StarFire 3000 >> PAGE >> DATA LOG

GPS Accuracy Indicator: GPS Accuracy Indicator is a relative indication of overall differential GPS performance.

Differential Signal Quality: Differential signal quality is strength of StarFire network signal (SF2 or SF1). Normal range is from 5 to 15, but maximum reading on indicator is 10. Numerical value is displayed to right of indicator. Any value above 5 is normal.

A—GPS Accuracy Indicator
B——
C—GPS Signal Quality
D—Differential Signal Quality
E——
F——
G—Return to GPS Info



PC12075 —UN—13MAY09

INFO - DATA LOG - PAGE 1

Continued on next page

JS56696,0000572 -19-15APR10-2/4

INFO - DATA LOG - PAGE 2

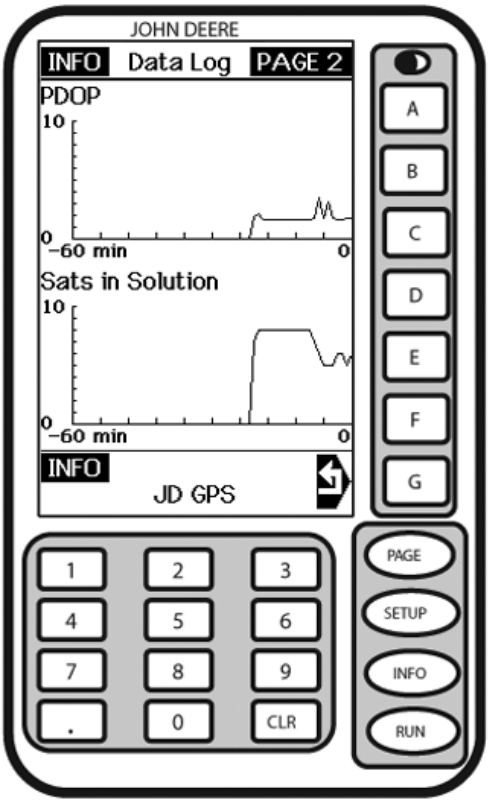
Screen: INFO - DATA LOG - PAGE 2

Press: INFO >> StarFire 3000 >> PAGE >> DATA LOG >> PAGE

PDOP: (Position Dilution Of Precision) is a combination of vertical and horizontal error (or three dimensional). Lower PDOP is better. A value below 2 is considered optimal.

Satellites in Solution: Number of satellites that receiver is using in current position solution. Satellites in solution are not tracked until they get above 5 degrees elevation mask.

A—PDOP
B——
C——
D—Satellites Used
E——
F——
G—Return to GPS Info



PC12076 —UN—13MAY09

INFO - DATA LOG - PAGE 2

Continued on next page

JS56696,0000572 -19-15APR10-3/4

INFO - DATA LOG - PAGE 3

Screen: INFO - DATA LOG - PAGE 3

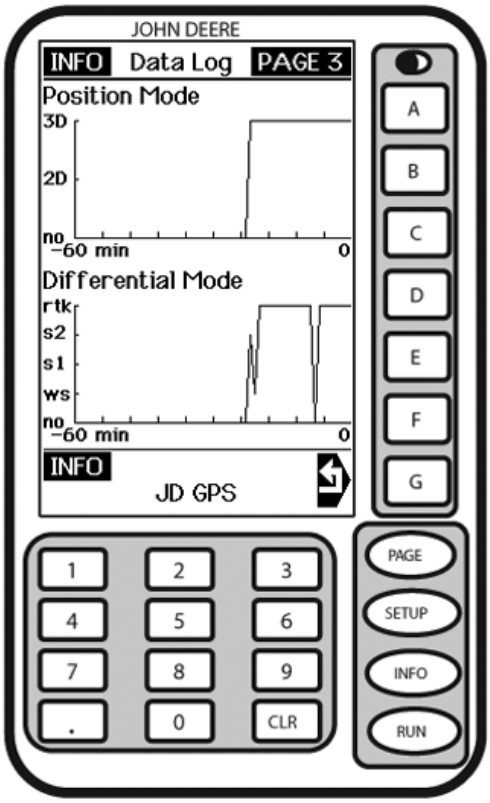
Press: INFO >> StarFire 3000 >> PAGE >> DATA LOG >> PAGE >> PAGE

Position Mode: Position mode is represented as three different types; No Nav, 2D and 3D. This helps determine if GPS position has been dropped in last 60 minutes.

Differential Mode: This shows level of differential signal that you have been receiving over past 60 minutes. Level of signal that you purchased on your receiver will determine highest point on bar graph that you will see.

- RK - RTK
- S2 - SF2
- S1 - SF1
- WS - WAAS
- NO - none

A—Position Mode
B——
C——
D—Differential Mode
E——
F——
G—Return to GPS Info



PC12077 —UN—13MAY09

INFO - DATA LOG - PAGE 3

JS56696,0000572 -19-15APR10-4/4

INFO - GPS - PAGE 3

Screen: INFO- GPS - PAGE 3

Press: INFO >> StarFire 3000 >> PAGE >> PAGE

This page shows detailed information about receiver. This information will help troubleshoot receiver if a problem occurs.

Activations: Activations displays all activation codes that have been entered into receiver. SF1, SF2, and/or RTK. Visit www.StellarSupport.com for additional activations.

SF2 License: If receiver currently has active SF2 license, YES will be displayed. If not, NO will be displayed.

SF2 End Date: Date SF2 license will expire.

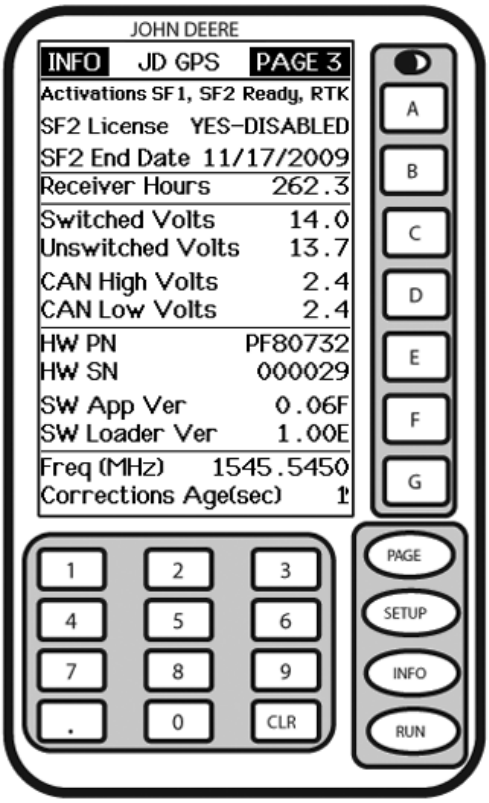
Receiver Hours: This cell displays number of hours on receiver.

Serial Number: This cell shows receiver serial number. This is required to obtain a StarFire signal license.

Hardware Version: This cell shows part number of receiver.

Software Version: This cell displays version of software being used by receiver.

NOTE: To acquire the latest version of software, visit www.stellarsupport.com or contact your John Deere dealer.



PC12078 —UN—13MAY09

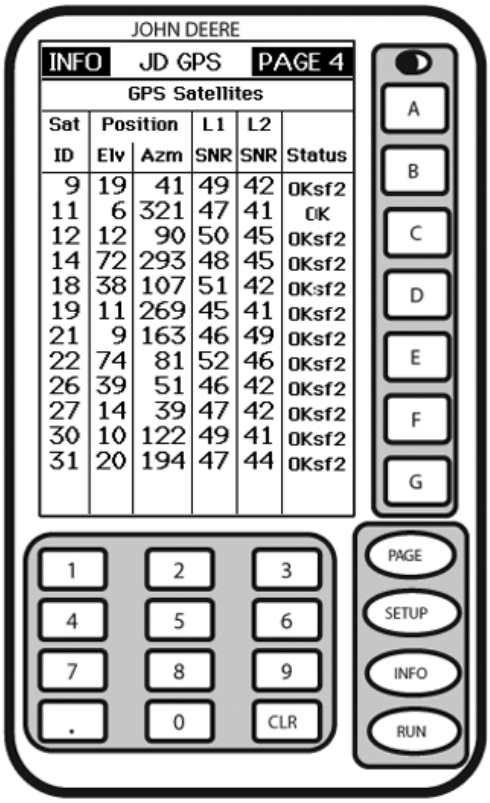
INFO - GPS - PAGE 3

A—Activations SF1, SF2 Ready, RTK
SF2 License
B—SF2 End Date
Receiver Hours
C—Switched Volts
Unswitched Volts
D—CAN High Volts
CAN Low Volts
E—Hardware Part Number
Hardware Serial Number
F—Software Application Version
Software Loader Version
G—Frequency (MHz)
Corrections Age (sec)

JS56696,0000573 -19-10JUL09-1/1

Satellite Tracking

A—GPS Satellites
B—Satellite ID, Elevation, Azimuth, L1 SNR, L2 SNR, Status
C——
D——
E——
F——
G——



PC12575 —UN—15APR10

INFO - GPS - PAGE 4

Continued on next page

JS56696,0000574 -19-10JUL09-1/2

Screen: INFO- GPS - PAGE 4

Press: INFO >> StarFire 3000 >> PAGE >> PAGE >> PAGE

This page shows satellites being tracked by GPS receiver and associated information.

SAT ID: (Satellite Identification Number): Identification number for GPS satellite

ELV: (Position Elevation): Elevation in degrees above horizon for GPS satellite position

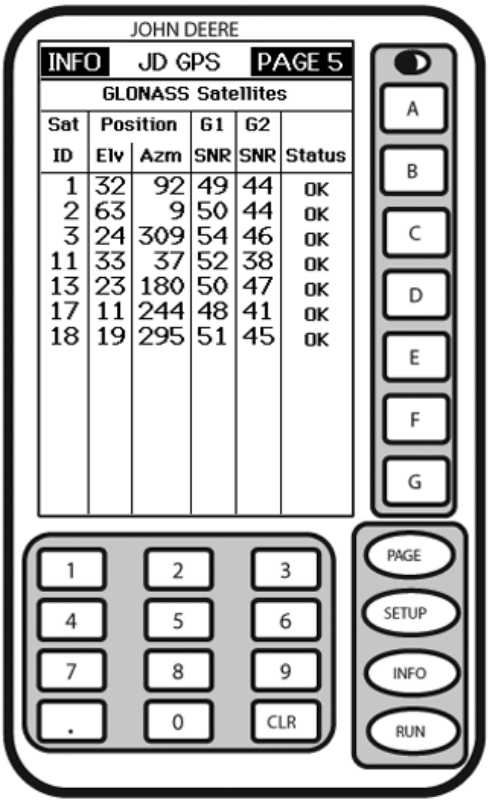
AZM: (Position Azimuth): Azimuth in degrees from true North for GPS satellite

L1 SNR: (L1 Signal to Noise Ratio): Signal strength for L1 GPS signal (signal to noise ratio)

L2 SNR: (L2 Signal to Noise Ratio): Signal strength for L2 GPS signal (signal to noise ratio)

Status: (GPS Signal Status): Status of GPS signal

- **Search:** searching for satellite signal
- **Track:** tracking satellite signal and using it for positioning
- **OK:** tracking satellite signal and using it for positioning
- **OK SF1:** tracking satellite signal and using it for positioning with STARFIRE signal frequency
- **OK SF2:** tracking satellite signal and using it for positioning with STARFIRE dual frequency
- **OK RTK:** tracking satellite signal and using it for positioning with STARFIRE RTK signal



PC12576 —UN—15APR10

INFO - GPS - PAGE 4

A—GLONASS Satellites
B—Satellite ID, Elevation, Azimuth, G1 SNR, G2 SNR, Status
C——
D——
E——
F——
G——

JS56696,0000574 -19-10JUL09-2/2

Accessing GS2 / GS3 Diagnostic Addresses

PC8664 —UN—05AUG05

MESSAGE CENTER button (showing time)

PC8663 —UN—05AUG05

MENU button

Message Center screen can be reached by pressing MESSAGE CENTER button (showing time) or MENU button then MESSAGE CENTER button (With Info Icon).

PC8655 —UN—05AUG05

MESSAGE CENTER button (With Info Icon)

BA31779,000013F -19-25APR11-1/3

Select Diagnostic Address icon (softkey G)

Message center displays all active alarm messages.

PC8668 —UN—05AUG05

DIAGNOSTIC ADDRESSES softkey (G)

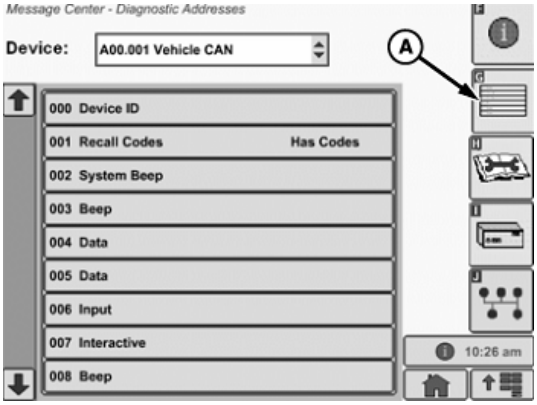
BA31779,000013F -19-25APR11-2/3

Diagnostic Addresses

NOTE: Diagnostic addresses are available to access specific diagnostic information. This information can assist the John Deere Dealer in diagnosing problems. Different device controllers can be selected from drop-down box, as shown.

Select DIAGNOSTIC ADDRESS button (A). The number of devices available depends upon machine configuration. The list of addresses can be scrolled up or down with the input device. Selecting an address shows data for that address.

A—Diagnostic Address icon (softkey G)



PC8643 —UN—07DEC05

Diagnostic Address Main Screen

BA31779,000013F -19-25APR11-3/3

Accessing Original GREENSTAR Display Fault Codes

GreenStar™ Display IV Fault Codes

Select **Menu** -> **Original GreenStar Display** icon (softkey H). The GS2/GS3 display now is emulating the GreenStar IV display. Then follow directions for each components' fault codes.

Press the INFO button on the GREENSTAR Display. Then press the button next to the entry **GreenStar Display** followed by pressing the button next to the words **Recent Problems**. The codes are displayed on this page with a short description following the code. To clear these Fault Codes, press the button next to the words **Clear**.

Messages generated by a problem controllers are sent to the GREENSTAR Display over the CAN Bus network.

StarFire 300 Diagnostic Trouble Codes

StarFire 300 Diagnostic Trouble Codes can be viewed by pressing the INFO button on the GREENSTAR Display.

GreenStar is a trademark of Deere & Company

Then pressing the button next to the entry **StarFire Receiver**. Then press the Page button once to get to Page 2. Then press the button next to **Diagnostic Trouble Codes**. This page shows the **Active** and **Previously Active** codes. Pressing the button next to a code supplies the operator or technician more information about the code. It gives a detailed description, time of last occurrence, and occurrence count. To clear the codes go back to previous page and press button next to **Clear All Codes**.

Parallel Tracking Fault Codes

Parallel Tracking Fault Codes can be viewed by pressing the INFO button on the GREENSTAR Display. Then pressing the button next to the entry. **Tracking** followed by pressing the button next to the words **Fault Codes** . The codes are displayed on this page with a short description following the code. To clear these Fault Codes, press the button next to the words **Clear**.

BA31779,0000140 -19-25APR11-1/1

StarFire 3000 Diagnostic Addresses

StarFire 3000 Diagnostic Addresses

NOTE: Invalid address values are noted as all 9's (99999999).

Address	Description
0	Display device picture
1	Recall DTCs
2	System Beep
3	UTC Time
4	UTC Date
5	Corrected Lat (post IMU)
6	Corrected Lon (post IMU)
7	Altitude (post IMU)
8	Corrected Course (IMU yaw)
9	Speed
10	Position Mode
11	Differential Mode
12	Accuracy Indicator
13	GPS Signal Quality Indicator
14	StarFire Signal Strength
15	Corrections Age
16	Elevation Mask
17	Satellites Tracked
18	Satellites used in velocity solution
19	PDOP
20	Satellites used in position solution
21	Yaw Rate
22	License Level
23	SF2 License End (Expiration Date)
24	SF2 License Days Left
25	Switched Voltage
26	Unswitched Voltage
27	CAN High Voltage
28	CAN Low Voltage
29	Hour Meter
30	Hours On After Shutdown
32	QuickStart Status
34	StarFire Height Dimension
35	StarFire Fore-Aft Dimension
36	StarFire Mount Direction
37	RTK Base Status
38	L Band reception index
39	StarFire Correction Frequency
41	RS232 Baud Rate
42	RS232 NMEA Message Rate
43	GGA Output Status
44	GSA Output Status
45	RMC Output Status
46	VTG Output Status
47	ZDA Output Status
48	Pitch Angle from IMU
49	Roll Angle from IMU

Continued on next page

54	Raw Lat (uncorrected)
55	Raw Lon (uncorrected)
56	Raw Altitude (uncorrected)
57	Raw Course (uncorrected)
58	Roll Field Calibration Value
59	Steering Type (0=Invalid, 1=Integrated CAN SSU, 2=Univeral CAN SSU, 3= Integrated CCD SSU)
60	Transmission Direction (0=neutral, 1=forward, 2=reverse, 0xFF=unknown)
62	CAN Source Address
63	L1 AGC (0.1 volt resolution)
64	L2 AGC (0.1 volt resolution)
65	L5 AGC (0.1 volt resolution)
66	G1 AGC (0.1 volt resolution)
67	G2 AGC (0.1 volt resolution)
68	L-band AGC (0.1 volt resolution)
70	RTK Operating Mode
71	Radio Type
72	Radio State
73	Remaining RTK-X seconds left
74	Remaining Time for RTK Base Station Survey (0 means done)
75	Distance from RTK Base Station
77	RTK Noise Level (Freewave) RTK Signal Level (Satellite)
78	RTK Network ID
79	RTK Channel (Freewave) RTK Time Slot (Satellite)
80	RTK Percent Packet Received in Last 30 seconds
81	RTK Base Station Battery Voltage
82	RTK Radio Hardware Serial Number
83	RTK Radio Application Software Version Number
84	GLONASS enable (0 = disable, 1 = enable, 2 = G1 only)
85	StarFire GPS + GLONASS enable (0 = StarFire GPS only, 1 = StarFire GPS + GLONASS
89	Pitch Field Calibration value
90	L-Band Frequency Search Mode
91	Vertical Accuracy Indicator (mm)
120	Preferred VT functionality
121	Preferred VT wait time
132	Most recent license/activation error codes
140	24 hour survey position standard deviation, east (in cm)
141	24 hour survey position standard deviation, north (in cm)
142	24 hour survey position standard deviation, up (in cm)
143	Percentage of time that GAI is less than 6 (percentage value)
144	Number of times during the last 24 hour survey that the unit was not navigating in SF2 mode
180	Factory Settings Reset
191	IMU Software Version
192	L-Band DSP Software Version
193	Loader1 Software Part Number (5200)
194	Loader1 Software Version Number (5200)
195	Loader2 Software Part Number (5200)
196	Loader2 Software Version Number (5200)
197	Navigation processor (5200) part number
198	Navigation processor (5200) software version number
227	Loader Software Part Number (5216)
228	Loader Software Version Number (5216)

Continued on next page

BA31779,000019B -19-12MAY11-2/3

231	JDOS Part Number
232	JDOS Version Number
233	Application Software (5216) Part Number
234	Application Software (5216) Version Number
235	Hardware Part Number
236	Hardware Serial Number
237	Software Assembly Part Number
238	Software Assembly Version Number

BA31779,000019B -19-12MAY11-3/3

Fault Codes—StarFire 3000

Stored fault codes indicate that a problem has been detected. Stored fault codes will remain in memory until they are cleared by operator. It is possible that fault condition is no longer active.

Fault Code	Description	Problem	Solution
523319.18	Low switched voltage	low voltage on key switched power supply.	Check battery voltage, check grounds, check harness. Contact dealer if problem persists.
523792.18	Low unswitched voltage	TCM has detected low voltage on unswitched battery power supply.	Check battery voltage, check grounds, check harness. Contact dealer if problem persists.
523792.1	No unswitched voltage	TCM has detected no voltage on unswitched battery power supply. TCM is unable to save setup changes when key is turned off.	Check battery voltage, check grounds, check fuses and harness. Contact your John Deere dealer.
2028.12	No STARFIRE communication	TCM has lost communication with STARFIRE receiver	Check TCM harness to ensure proper connection between STARFIRE Receiver and TCM. Check CAN voltages. Contact your John Deere dealer.
523773.3	StarFire CAN voltage out of range	StarFire CAN High signal voltage is out of range high.	Check TCM harness to ensure proper connection between STARFIRE Receiver and TCM. Check CAN STARFIRE voltages. Contact your John Deere dealer.
523773.4	StarFire CAN voltage out of range	StarFire CAN High signal voltage is out of range low.	Check TCM harness to ensure proper connection between Receiver and TCM. Check CAN voltages. Contact your John Deere dealer.
523774.3	StarFire CAN voltage out of range	StarFire CAN Low signal voltage is out of range high.	Check TCM harness to ensure proper connection between STARFIRE Receiver and TCM. Check CAN voltages. Contact dealer.
523774.4	StarFire CAN voltage out of range	StarFire CAN Low signal voltage is out of range low.	Check TCM harness to ensure proper connection between STARFIRE Receiver and TCM. Check CAN voltage. Contact your John Deere dealer.
956.16	Roll Sensor out of range	Internal Roll Sensor is out of normal operating range. TCM cannot correct position for roll angles.	Contact your John Deere dealer.
2146.14	Temp Sensor out of range	Internal Temperature Sensor is out of normal operating range.	Contact your John Deere dealer.
523309.7	Yaw Sensor not responding	Internal Yaw Sensor is not responding. TCM cannot compensate for terrain changes.	Contact your John Deere dealer.
523309.16	Yaw Sensor out of range	Internal Yaw Sensor is out of normal operating range. TCM cannot compensate for terrain changes.	Contact your John Deere dealer.
523310.2	Memory Error	An internal memory error has occurred.	Contact your John Deere dealer.
523442.31	No StarFire Fore/Aft setting	StarFire Fore/Aft setting has not been entered for this vehicle. Please go to SETUP TCM.	See FORE/AFT in TCM or StarFire 300 section.
523441.31	No StarFire Height setting	StarFire Height setting has not been entered for this vehicle. Go to SETUP TCM.	See HEIGHT in TCM or StarFire 300 section.
2146.13	TCM not calibrated	TCM has not been calibrated for this vehicle. Please go to SETUP TCM to calibrate.	See Calibrating in TCM or StarFire 300 section.

JS56696,0000592 -19-10JUL09-1/1

Diagnostic Trouble Codes—StarFire 3000

SPN Number	SPN Name	FMI Address	FMI Name	DM1 Lamp Status	Engineering Code Description	Level 1 Text	Level 2 Text
158.03	Keyswitch Battery Potential	3	Voltage Above Normal or Shorted to High Source	Amber Warning Lamp	The StarFire is operating with high switched voltage. Check wiring.	System Voltage	Switched power > 32V. Check vehicle charging system,wiring, and connections
158.04	Keyswitch Battery Potential	4	Voltage Below Normal or Shorted to Low Source	Amber Warning Lamp	The StarFire is operating with low switched voltage. Check wiring.	System Voltage	Switched power <9V. Check vehicle battery, harnessing and connectors.
168.03	Battery Potential/Power Input 1	3	Voltage Above Normal or Shorted to High Source	Protect Lamp	Unswitched power to GPS receiver has high voltage.	System Voltage	Unswitched power > 32V. Check vehicle charging system, wiring, and connections.
168.04	Battery Potential/Power Input 1	4	Voltage Below Normal or Shorted to Low Source	Protect Lamp	Unswitched power to GPS receiver has low voltage.	System Voltage	Unswitched power < 9V. Check vehicle charging system, wiring, and connections.
232.02	DGPS Differential Correction	2	Data Erratic, Intermittent, or Incorrect	Amber Warning Lamp	Corrected GPS position is not available.	GPS System	Corrected GPS position is not available.
444.04	Configuration	4	Special Instructions	Amber Warning Lamp	Invalid application configuration	Configuration	Invalid application configuration
639.12	J1939 Network #1, Primary Vehicle Network (previously SAE J1939 Data Link	12	Special Instructions	Amber Warning Lamp	Missing messages from the CAN bus	CAN Net Work	Loss of CAN Data
639.14	J1939 Network #1, Primary Vehicle Network (previously SAE J1939 Data Link)	14	Special Instructions	Amber Warning Lamp	CAN in bus-off. Check wiring and connections.	CAN Net Work	Loss of CAN Data
841.07	Global Positioning System (GPS)	7	Mechanical System not Responding or Out of Adjustment	Red	The GPS receiver controller has lost serial communication with the Navigation Processor (MPC5200)	GPS	Communication Lost with GPS Processor
841.31	Global Positioning System (GPS)	31	Not Available or Condition Exists	Amber Warning Lamp	Signal interference (from jammer).	GPS Position	Signal interference (from jammer).
2850.05	Communications Carrier	5	Not Available or Condition Exists	Protect Lamp	Reflected antenna power level too high	RTK Rover	Reflected antenna power
2854.09	Communications Carrier	9	Not Available or Condition Exists	Protect Lamp	Corrections age has been exceeded for mobile RTK corrections	RTK Rover	Corrections age exceeded
2854.31	Communications Carrier	31	Not Available or Condition Exists	Protect Lamp	Loss of RTK radio link at Rover	RTK Rover	Loss of Radio Link
3141.14	GPS Differential Corrections License	14	Special Instructions	Protect Lamp	The GPS receiver is not authorized to receive corrections on the RTK base station.	RTK Rover	The GPS receiver is not authorized on this RTK network.

Continued on next page

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SPN Number	SPN Name	FMI Address	FMI Name	DM1 Lamp Status	Engineering Code Description	Level 1 Text	Level 2 Text
3141.31	GPS Differential Corrections License	31	Not Available or Condition Exists	Protect Lamp	The GPS corrections license has expired.	GPS Corrections	The GPS corrections license has expired.
3144.13	Differential Source, Secondary	13	Out of Calibration	Amber Warning Lamp	The StarFire receiver cannot link to the StarFire network on the alternate frequency.	SF1/SF2	StarFire Signal Not Found
522394.13	Terrain Compensation Module	13	Out of Calibration	Protect Lamp	The TCM has not been calibrated. Run the level calibration prior to operation.	TCM not calibrated	The system has detected that the TCM was previously calibrated on a machine but is now mounted on an implement or has not yet been calibrated. Please calibrate the TCM to ensure optimized system performance.
522552.11	Navigation Bus 1	11	Root Cause not Known	Protect Lamp	The StarFire network has a problem.	StarFire Network	Problem with StarFire Network. Resolution in Progress.
523187.02	Remote License Activation	2	Data Erratic, Intermittent or Incorrect	Protect Lamp	Incorrect license activation received from StarFire satellite.	Over-the-Air Messaging	Invalid license code received
523274.02	Navigational System Position Data	2	Data Erratic, Intermittent or Incorrect	Protect Lamp	GPS position is not available.	GPS Position	GPS position is not available.
523310.02	Non-Volatile Memory read/write	2	Data Erratic, Intermittent or Incorrect	Amber Warning Lamp	StarFire memory error has occurred.	Critical Memory	Read/Write Failure
523348.07	Inertial Measurement Unit (IMU)	7	Data Erratic, Intermittent or Incorrect	Amber Warning Lamp	DTC created from Table 6-6 of 5200-5216 ICD (Value -1: IMU Communication Failure)	TCM	TCM Communication Failure
523348.16	Inertial Measurement Unit (IMU)	16	Data Valid but Above Normal Operating Range - Moderately Severe Level	Protect Lamp	The reported temperature from the IMU is outside of its calibrated range. This can lead to inaccurate pitch, roll, and heading.	TCM	TCM Temperature out of range
523348.12	Inertial Measurement Unit (IMU)	12	Bad Intelligent Device or Component	Amber Warning Lamp	DTC created from Table 6-6 of 5200-5216 ICD (Value -2: IMU Sensor Failure)	TCM	TCM Sensor Failure
523441.31	Antenna location (Z axis)	31	Not Available or Condition Exists	None	The GPS antenna height not set.	TCM	StarFire Height Dimension Not Set, press setup tab on main page
523442.31	Antenna location (X axis)	31	Not Available or Condition Exists	None	The GPS fore-aft dimension not set.	TCM	StarFire Fore/Aft Dimension Not Set, Press setup tab on main page
523773.03	CAN High line	3	Voltage Above Normal or Shorted to High Source	None	The StarFire CAN HI voltage is too high. Check wiring.	CAN HI Voltage Too High	

Continued on next page

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SPN Number	SPN Name	FMI Address	FMI Name	DM1 Lamp Status	Engineering Code Description	Level 1 Text	Level 2 Text
523773.04	CAN High line	4	Voltage Below Normal or Shorted to Low Source	None	StarFire CAN HI voltage is too low. Check wiring.	CAN HI voltage is too low	
523774.03	CAN Low line	3	Voltage Above Normal or Shorted to High Source	None	The StarFire CAN LO voltage is too high. Check wiring.	CAN LO voltage is too high	
523774.04	CAN Low line	4	Voltage Below Normal or Shorted to Low Source	None	The StarFire CAN LO voltage is too low. Check wiring.	CAN LO voltage is too low	
524209.16	RTK Rover relative distance	16	Data Valid but Above Normal Operating Range - Moderately Severe Level	Protect Lamp	The RTK rover is too far from the base station for the corrections to be valid.	RTK Rover	Vehicle too far from Base Station
524257.14	RTK base station location	14	Special Instructions	Protect Lamp	The RTK base station is in survey mode. Corrections are unavailable.	RTK Base Station	The RTK base station is in survey mode. Corrections are not available.
524257.16	RTK base station location	16	Data Valid but Above Normal Operating Range - Moderately Severe Level	Protect Lamp	The RTK base station has been moved. Corrections are not valid.	RTK Base Station	Base Station has been Moved
524257.19	RTK base station location	19	Received Network Data in Error	Protect Lamp	Multiple RTK Base Stations Detected	RTK system	Interference between neighboring RTK base stations. Adjust your RTK Network settings to unique values.

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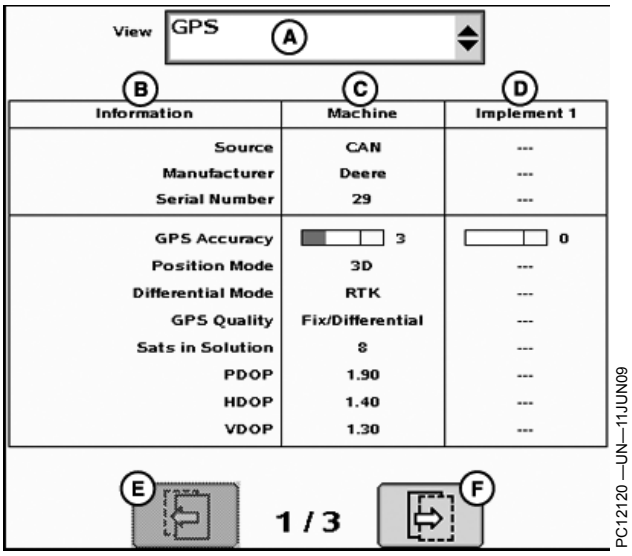
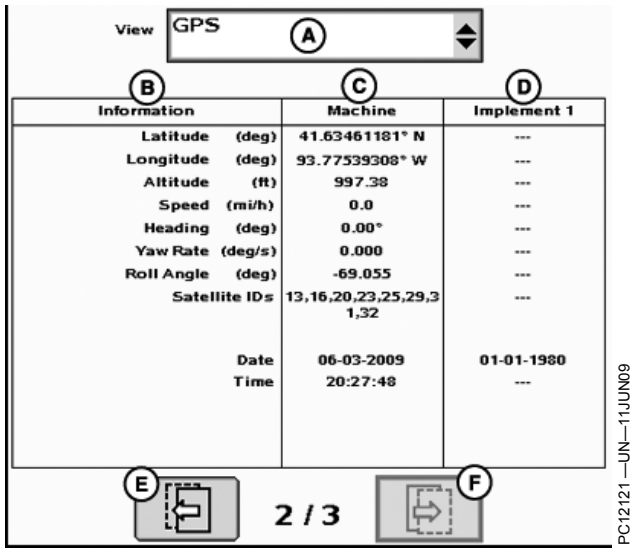
GreenStar—Diagnostic Readings



GreenStar—Diagnostic Readings 1/3



GreenStar—Diagnostic Readings 2/3

A—View—GPS
B—Information
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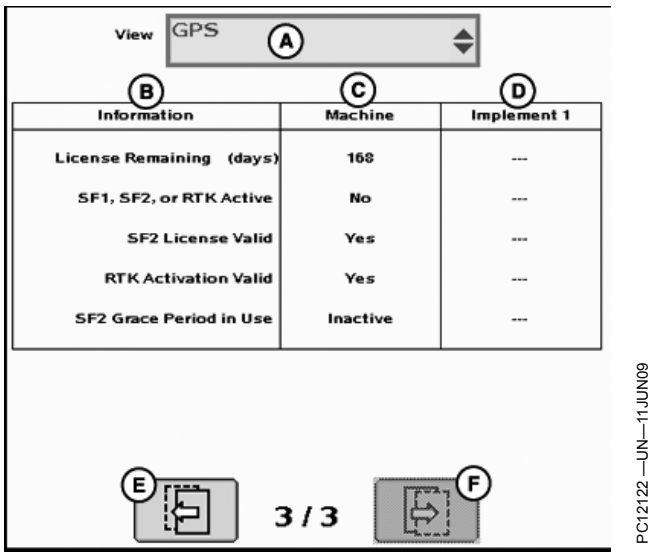
D—Implement 1
E—Previous Page
F—Next Page



GreenStar—Diagnostic Readings 3/3

BA31779,0000141 -19-25APR11-1/1

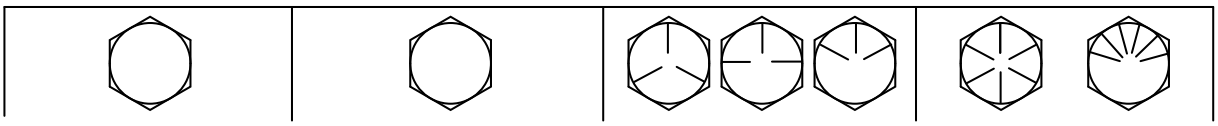
StarFire 3000 LED Status

Base Station	Vehicle	Status Message
OFF	OFF	Switched Power is OFF
Flashing Red	Flashing Red	Low Power (System voltage under 9 VDC)
Flashing Blue	N/A	Quick Survey: Corrections transmitted for fewer than 5 satellites
Steady Blue	N/A	Quick Survey: Corrections transmitted for at least 5 satellites
Flashing Green	N/A	Absolute Survey: Corrections transmitted for fewer than 5 satellites
Steady Green	N/A	Absolute Survey: Corrections transmitted for at least 5 satellites
N/A	Flashing Blue	Acquiring Solution (Rover Only)
N/A	Flashing Green	2D/3D Fix Achieved below user-selected accuracy level
N/A	Steady Green	2D/3D Fix Achieved at user-selected accuracy level

JS56696,0000613 -19-10JUL09-1/1

Unified Inch Bolt and Screw Torque Values

TS1671 —UN—01MAY03



Bolt or	SAE Grade 1				SAE Grade 2[a]				SAE Grade 5, 5.1 or 5.2				SAE Grade 8 or 8.2			
Screw	Lubricated[b]		Dry[c]		Lubricated[b]		Dry[c]		Lubricated[b]		Dry[c]		Lubricated[b]		Dry[c]	
Size	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in
1/4	3.7	33	4.7	42	6	53	7.5	66	9.5	84	12	106	13.5	120	17	150
													N·m	lb-ft	N·m	lb-ft
5/16	7.7	68	9.8	86	12	106	15.5	137	19.5	172	25	221	28	20.5	35	26
									N·m	lb-ft	N·m	lb-ft				
3/8	13.5	120	17.5	155	22	194	27	240	35	26	44	32.5	49	36	63	46
			N·m	lb-ft	N·m	lb-ft	N·m	lb-ft								
7/16	22	194	28	20.5	35	26	44	32.5	56	41	70	52	80	59	100	74
	N·m	lb-ft														
1/2	34	25	42	31	53	39	67	49	85	63	110	80	120	88	155	115
9/16	48	35.5	60	45	76	56	95	70	125	92	155	115	175	130	220	165
5/8	67	49	85	63	105	77	135	100	170	125	215	160	240	175	305	225
3/4	120	88	150	110	190	140	240	175	300	220	380	280	425	315	540	400
7/8	190	140	240	175	190	140	240	175	490	360	615	455	690	510	870	640
1	285	210	360	265	285	210	360	265	730	540	920	680	1030	760	1300	960
1-1/8	400	300	510	375	400	300	510	375	910	670	1150	850	1450	1075	1850	1350
1-1/4	570	420	725	535	570	420	725	535	1280	945	1630	1200	2050	1500	2600	1920
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2140	1580	2700	2000	3400	2500
1-1/2	990	730	1250	930	990	730	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For plastic insert or crimped steel type lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application. Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Replace fasteners with the same or higher grade. If higher grade fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

[a] Grade 2 applies for hex cap screws (not hex bolts) up to 6. in (152 mm) long. Grade 1 applies for hex cap screws over 6 in. (152 mm) long, and for all other types of bolts and screws of any length.

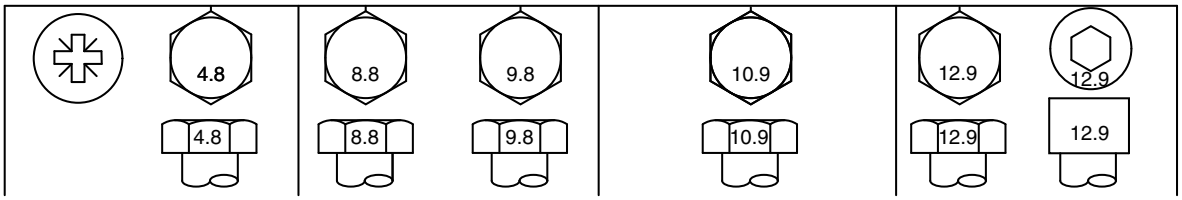
[b] "Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or 7/8 in. and larger fasteners with JDM F13C zinc flake coating.

[c] "Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in. fasteners with JDM F13B zinc flake coating.

JS56696,0000596 -19-10JUL09-1/1

Metric Bolt and Screw Torque Values

TS1670 —UN—01MAY03



Bolt or	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
Screw	Lubricated[a]		Dry[b]		Lubricated[a]		Dry[b]		Lubricated[a]		Dry[b]		Lubricated[a]		Dry[b]	
Size	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in
M6	4.7	42	6	53	8.9	79	11.3	100	13	115	16.5	146	15.5	137	19.5	172
									N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
M8	11.5	102	14.5	128	22	194	27.5	243	32	23.5	40	29.5	37	27.5	47	35
			N·m	lb-ft	N·m	lb-ft	N·m	lb-ft								
M10	23	204	29	21	43	32	55	40	63	46	80	59	75	55	95	70
	N·m	lb-ft														
M12	40	29.5	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	46	80	59	120	88	150	110	175	130	220	165	205	150	260	190
M16	100	74	125	92	190	140	240	175	275	200	350	255	320	235	400	300
M18	135	100	170	125	265	195	330	245	375	275	475	350	440	325	560	410
M20	190	140	245	180	375	275	475	350	530	390	675	500	625	460	790	580
M22	265	195	330	245	510	375	650	480	725	535	920	680	850	625	1080	800
M24	330	245	425	315	650	480	820	600	920	680	1150	850	1080	800	1350	1000
M27	490	360	625	460	950	700	1200	885	1350	1000	1700	1250	1580	1160	2000	1475
M30	660	490	850	625	1290	950	1630	1200	1850	1350	2300	1700	2140	1580	2700	2000
M33	900	665	1150	850	1750	1300	2200	1625	2500	1850	3150	2325	2900	2150	3700	2730
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2770	4750	3500

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For stainless steel fasteners or for nuts on U-bolts, see the tightening instructions for the specific application. Tighten plastic insert or crimped steel type lock nuts by turning the nut to the dry torque shown in the chart, unless different instructions are given for the specific application.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class. Replace fasteners with the same or higher property class. If higher property class fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

[a] *"Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C zinc flake coating.*

[b] *"Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B zinc flake coating.*

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EC Declaration of Conformity

Deere & Company
Moline, Illinois U.S.A.

The person named below declares that

Product: StarFire 3000 Receiver

fulfills all relevant provisions and essential requirements of the following directives:

Directive	Number	Certification Method
Electromagnetic Compatibility Directive	2004/108/EC	Self certified, per Annex II of the Directive

Name and address of the person in the European Community authorized to compile the technical construction file:

Henning Oppermann
Deere & Company European Office
John Deere Strasse 70
Mannheim, Germany D-68163
EUConformity@johndeere.com

Place of declaration: Kaiserslautern, Germany

Date of declaration: 15 September, 2009

Manufacturing unit: Phoenix International Corporation

Name: John H. Leinart

Title: Engineering Manager, Ag Management Solutions

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John Deere Service Literature Available

Technical Information

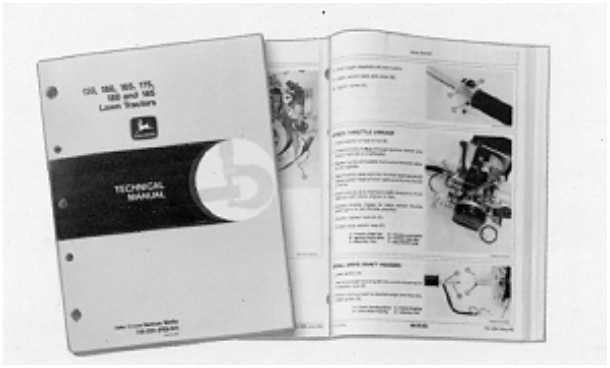
Technical information can be purchased from John Deere. Some of this information is available in electronic media, such as CD-ROM disks, and in printed form. There are many ways to order. Contact your John Deere dealer. Call **1-800-522-7448** to order using a credit card. Search online from http://www.JohnDeere.com. Please have available the model number, serial number, and name of the product.

Available information includes:

- PARTS CATALOGS list service parts available for your machine with exploded view illustrations to help you identify the correct parts. It is also useful in assembling and disassembling.
- OPERATOR'S MANUALS providing safety, operating, maintenance, and service information. These manuals and safety signs on your machine may also be available in other languages.
- OPERATOR'S VIDEO TAPES showing highlights of safety, operating, maintenance, and service information. These tapes may be available in multiple languages and formats.
- TECHNICAL MANUALS outlining service information for your machine. Included are specifications, illustrated assembly and disassembly procedures, hydraulic oil flow diagrams, and wiring diagrams. Some products have separate manuals for repair and diagnostic information. Some components, such as engines, are available in separate component technical manuals
- FUNDAMENTAL MANUALS detailing basic information regardless of manufacturer:
  - Agricultural Primer series covers technology in farming and ranching, featuring subjects like computers, the Internet, and precision farming.
  - Farm Business Management series examines "real-world" problems and offers practical solutions in the areas of marketing, financing, equipment selection, and compliance.
  - Fundamentals of Services manuals show you how to repair and maintain off-road equipment.
  - Fundamentals of Machine Operation manuals explain machine capacities and adjustments, how to improve machine performance, and how to eliminate unnecessary field operations.

TS189 —UN—17JAN89

TS191 —UN—02DEC88



TS224 —UN—17JAN89

TS1663 —UN—10OCT97

03-1/1

John Deere Service Keeps You On The Job

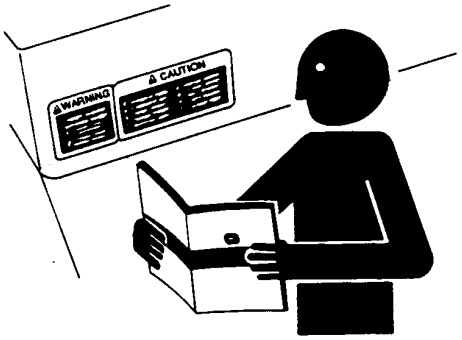
John Deere Is At Your Service

CUSTOMER SATISFACTION is important to John Deere.

Our dealers strive to provide you with prompt, efficient parts and service:

–Maintenance and service parts to support your equipment.

–Trained service technicians and the necessary diagnostic and repair tools to service your equipment.



TS201—UN—23AUG88

CUSTOMER SATISFACTION PROBLEM RESOLUTION PROCESS

Your John Deere dealer is dedicated to supporting your equipment and resolving any problem you may experience.

1. When contacting your dealer, be prepared with the following information:

–Machine model and product identification number

–Date of purchase

–Nature of problem

2. Discuss problem with dealer service manager.

3. If unable to resolve, explain problem to dealership manager and request assistance.

4. If you have a persistent problem your dealership is unable to resolve, ask your dealer to contact John Deere for assistance. Or contact the Ag Customer Assistance Center at 1-866-99DEERE (866-993-3373) or e-mail us at www.deere.com/en_US/ag/contactus/.

DX,IBC,2 -19-02APR02-1/1