Outback S3

User Guide

Part No. 875-0196-000 Rev C1

Outback® GUIDANCE by Hemisphere GPS

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.

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The Outback S™ and S-Lite™ automated navigation and steering guide systems are covered by U.S. Patents No. 6,539,303 and No. 6,711,501. The Outback Hitch™ automated hitch control system is covered by U.S. Patent No. 6,631,916. The Outback eDriveTC™ GPS assisted steering system is covered by U.S. Patent No. 7,142,956. Hemisphere GPS products may be covered by one or more of the following U.S. Patents:

6,111,549	6,397,147	6,469,663	6,501,346	6,539,303
6,549,091	6,631,916	6,711,501	6,744,404	6,865,465
6,876,920	7,142,956	7,162,348	7,277,792	7,292,185
7,292,186	7,373,231	7,400,956	7,400,294	7,388,539
7,429,952	7,437,230	7,460,942		

Other U.S. and foreign patents pending.

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Contact your local dealer for technical assistance. To find the authorized dealer near you:

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Overview

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Overview

The Outback™ S3™ GPS guidance system features a high-resolution touch screen, multi-language support, and clear, easy-to-read job data and system status information in real time. The electronically integrated Outback Steering Guide™ uses GPS data and specific job details to display heading direction and provide guidance.

As a first-time or experienced user of Outback products, you should acquaint yourself with the instructions contained in this user guide. You will find many useful tips and suggestions to help you get the most from your investment.

S3 accuracy and functionality is extended by using it in combination with an Outback GPS-assisted steering system (Outback eDriveTC™, Outback VSi™, or Outback eDriveX™) and the Outback BaseLineX™ RTK base station. Once eDriveTC/eDriveVSi/eDriveX is engaged it uses GPS technology to automatically steer the vehicle, resulting in more uniform treatments, extended hours of operation, and less driver skill required. eDriveTC/eDriveVSi/eDriveX also correct for GPS position errors caused when driving on slopes in the terrain—essential for precision applications.

Outback S3 and eDriveTC/eDriveVSi/eDriveX combined with BaseLineX provide repeatable accuracy to within +/- 4 inches pass to pass. With BaseLineX, the minimum guidance speed is 0.25 m.p.h. and elevation is available as a display option on the S3.

What's Included

An S3 kits consists of the following components:

- S3 console assembly
- Antenna assembly, cable, and mounting plate
- Power cable
- Run/Hold floor switch
- FieldNotes application CD
- Hemisphere GPS USB flash drive

Figure 1-1 shows some of the parts that comprise an S3 kit, Figure 1-2 illustrates the S3 wiring connections, and Table 1-1 on page 4 provides part numbers and descriptions.

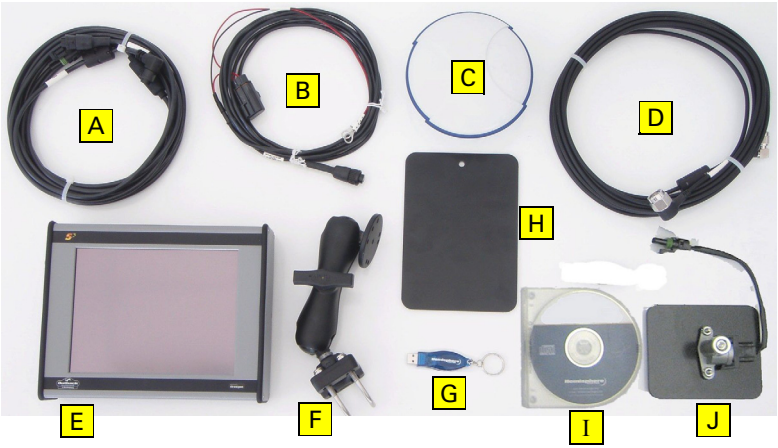


Figure 1-1: Outback S3 kit components

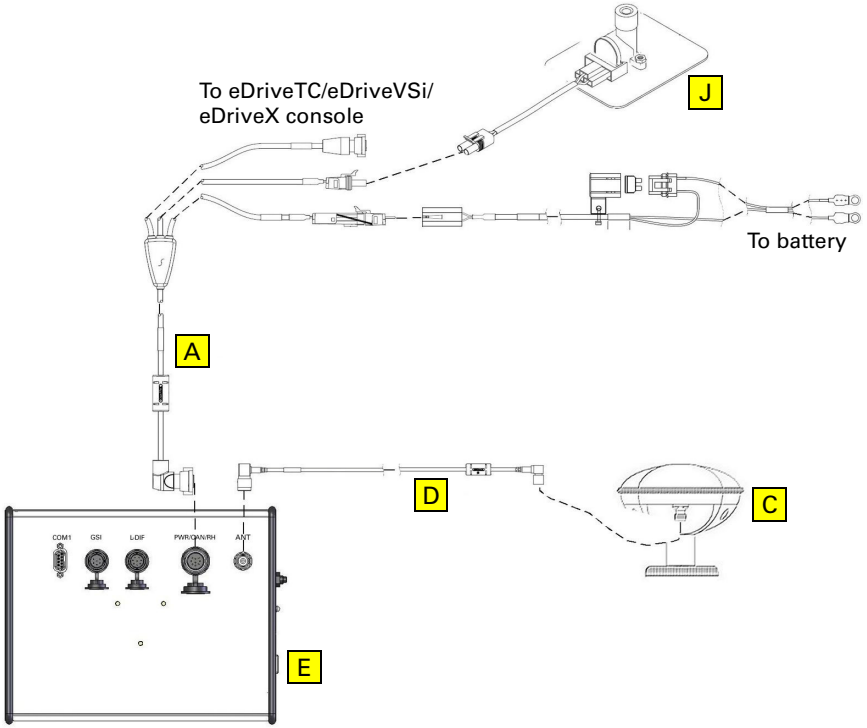


Figure 1-2: S3 connection diagram

Table 1-1: S3 parts list

Item	Part No.	Description	Qty
A	051-0166-000#	CAN/power cable	1
B	054-0123-000#	Battery cable, 3m	1
C	804-3037-000#	Antenna	1
D	050-0033-002#	Antenna cable, 26 ft	1
E	802-1059-000#	S3 console	1
F	604-0015-000#	Ram mount assembly (mount S3 console, see Figure 1-3 on page 5 and Table 1-2 on page 5)	1
G	750-1063-000	USB flash drive, 512 MB	1
H	601-1136	Antenna mounting plate	1
Not shown	710-0095-000#	Antenna mounting kit	1
	676-0021-000#	Antenna adapter	1
I	878-0009-000	Field Notes software CD	1
J	720-0035	Run/Hold foot switch assembly	1
Not shown	485-2022-000#	Label, Outback/Hemisphere GPS, reverse printed	1
	677-2002	Tie strap, 7" releasable	6
	875-0196-000	Outback S3 User Guide (this manual)	1
	875-0197-000	Outback S3 Quick Reference Guide	1
	875-0201-000	Field Notes Quick Reference Guide	1

For the Ram ball mount assembly, Figure 1-3 provides a parts/connection diagram and Table 1-2 provides component descriptions.

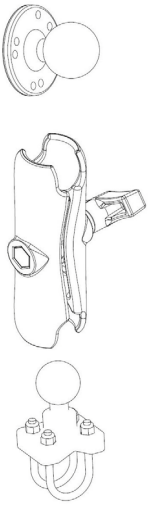


Figure 1-3: Ram ball mount assembly

Table 1-2: Ram ball mount assembly part descriptions

Item	Part No.	Description	Qty
1	RAM202U	Round base	1
2	RAM-201U	Double socket arm mount	1
3	RAM235U	Bar mount base	1
4	RAM235U	U-bolts for 3/4" to 1 1/4" diameter bars	2

Chapter 2: Installation and Setup

Overview

Before using the Outback S3 for the first time, complete the following tasks:

- Install the Outback S3 and related components (see below)
- Power the Outback S3 and related components (see page 11)
- Configure the system (see page 17)

Installing the Outback S3

Proper installation is critical for safe and correct S3 operation and includes locating, routing, and installing the antenna, antenna cable, main cable, and floor switch.

Determining Antenna Location

You should install the GPS antenna:

- **On the vehicle in a location that will optimize its performance**

  In most cases (with the exception of high-speed self-propelled sprayers) you should mount the antenna on the leading edge of the vehicle cab. This usually provides an open view of the sky and prevents multipath reflections and signal masking from nearby vertical obstructions.

  For high-speed self-propelled sprayers, install the GPS antenna on the back edge of the vehicle cab for more stable control.

- **In the center (left and right) of the vehicle**

  This prevents swath offsets resulting in skips and overlaps. If the center of the working implement is not in line with the center of the guided vehicle, enter an appropriate left/right offset into the S3 during setup (see “Vehicle Tab” on page 81 for more information on entering offsets).

Mounting the Antenna

Do not place the antenna within 2 feet of a transmitting radio antenna (such as for a 2-way or business band radio). If you cannot place the antenna on the vehicle’s centerline, you must enter a swath offset in the Vehicle screen (see “Configuring Vehicle Settings” on page 21).

1. Clean and dry the surface where you will attach the antenna mounting plate.
2. Remove the paper backing from the adhesive strips on the back of the mounting plate.
3. Position the mounting plate and press down hard for proper adhesion.

4. Place the magnetic mounted antenna on the plate and on the vehicle's exact centerline.

Mounting the Console

Normally, you mount the console in the front, right corner of the cab within the driver's reach.

1. Determine the desired console location. It should be located within easy reach and visibility of the driver.
2. Loosen the knob and remove the ball mount from the Ram ball mount assembly.
3. Use the Ram mount to attach the console assembly base to a flat surface.

   or

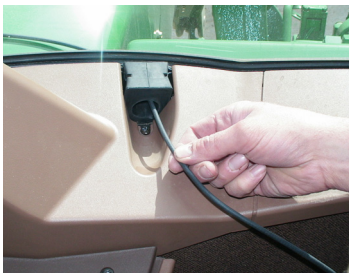
   Use the provided U-bolts to attach the assembly base to a rail.
4. Insert the console ball mount into the Ram base assembly.
5. Tighten the knob.
6. Adjust the console to the desired viewing angle.

Routing the Antenna Cable

Keep the following in mind before routing the antenna cable:

- Turn off the S3 before attaching or removing cables
- Do not bend the cable to a radius of less than 6 inches
- Do not route the cable within 12 inches of radio wires, power generator wires, a heat source or moving parts
- Coil excess cable in a protected location and secure the installation with tie straps

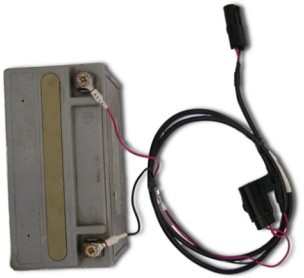
To route the antenna cable:



1. Securely attach one end of the cable to the GPS antenna.
2. Route the cable through a cab opening (such as a closed window) where rubber protection exists that will protect the cable.
3. Attach the other end of the cable to the console.

Attaching the Battery Cable

1. Connect the battery cable to a reliable 12 VDC power source with the red lead to positive and the black lead to negative.
2. Route the battery cable for connection to the main cable in the next section.
3. Coil excess cable in a protected location and secure the installation with tie straps.



Installing the Main Cable

1. Connect the 2-pin power connector of the main cable to the battery cable.
2. Route the main cable in the vehicle cab in a protected location.
3. Connect the main cable to the PWR/CAN/RH port on the back of the S3 console.

Attaching the Floor Switch

You can use the floor switch as a remote to pause or restart the S3's mapping/data logging function (you can also perform this function using the Apply control button on the S3 display—see "Using the Map Modes and Views" on page 26).

1. Remove the 2-pin cap from the run/hold portion of the main cable and connect the floor switch.
2. Install the floor switch in an easily accessible position.

Powering Up the S3

This section describes how to power up:

- S3 as a standalone product
- S3 with eDriveTC/eDriveX
- S3 with BaseLineX

Powering Up the S3 as a Standalone Product

Push the power button located on the left end of the console.

Powering Up S3 and eDriveTC/eDriveX

Turn on the power switches of the S3 and the eDriveTC (flip the toggle switch) or eDriveX (set power switch to ON) in any order. eDriveTC/eDriveX will establish communication with the S3 and wait for the DGPS signal to be acquired.

- The S PRESENT light on the eDriveTC console indicates communication has been established.
- The red power LED (outer - nearest the edge) indicates power when illuminated.

eDriveTC

eDriveX

Figure 2-1: eDriveTC/eDriveX power switches

See “Configuring Steering Settings” on page 21 for a brief overview of eDriveTC/eDriveX steering options. For complete steering information regarding eDriveTC/eDriveX refer to the eDriveTC User Guide or eDriveX User Guide (both available from the Outback Guidance website at www.outbackguidance.com).

Powering Up S3 and BaseLineX

1. Turn on the S3. The BaseLineX rover radio power LED illuminates, indicating connection.
2. Make sure the LOCRTK button is selected on the GPS Setup screen of the GPS tab.
3. Turn on the BaseLineX base station. Set the power switch all the way up on the BaseLineX base station to use the internal battery or all the way down to use an external battery.

   The power status indicator LED on the base station illuminates red when it is powered up. The base station's green GPS/radio indicator flashes when it is broadcasting GPS corrections. For more information on BaseLineX refer to the BaseLineX User Guide (available from the Outback Guidance website at www.outbackguidance.com).

Note: The S3 must receive consistent corrections from the base station for up to 15 minutes to achieve RTK lock (maximum accuracy.) However, the vehicle can be moving during this time.

The Map screen displays BaseLineX status information as soon as radio communication has been established.

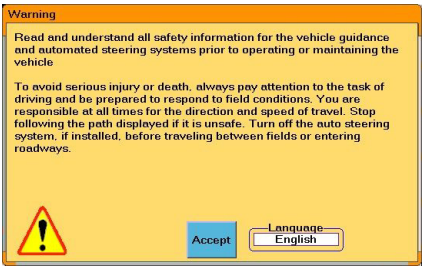
Indicator	Description
	Local base battery status Displays the charge remaining on the local base station battery.
	Radio Tower (top part of icon) Indicates the S3 is receiving corrections for the local base station (pulsates when it receives a signal).
	Radio Communication Status Bar (base of icon) The status bar fills after 15 minutes of consistent communication with the base station and is cleared if communication with the base station is lost.
	Signal Strength The vertical bars indicate the quality of the GPS signal. 5 bars are typical with RTK.
	Signal (Correction) Type "RTK" indicates it is receiving Real Time Kinematic corrections.

Note: For more information on installing and configuring BaseLineX, refer to the BaseLineX User Guide (available from the Outback Guidance website at www.outbackguidance.com).

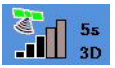
Starting the S3

To start the S3:

1. Power up the S3. If you have any additional components connected to the S3 power them up as well. See “Powering Up the S3” on page 11 for more information. Upon powerup the S3 completes a self test, the LED illuminates green, and the following screen appears.



Note: Upon startup the S3 starts acquiring a DGPS signal (as long as the antenna has a clear view of the sky)—this may take several minutes, during which the vehicle can be moving and you can perform certain functions. Upon achieving a GPS signal, the satellite icon on the GPS tab turns from red to orange. Upon acquiring a DGPS signal, the satellite icon turns green and the GPS tab displays “3D”. The S3 must have DGPS present to begin a job and provide guidance. See “Viewing GPS Signal Information” on page 30 for more information.



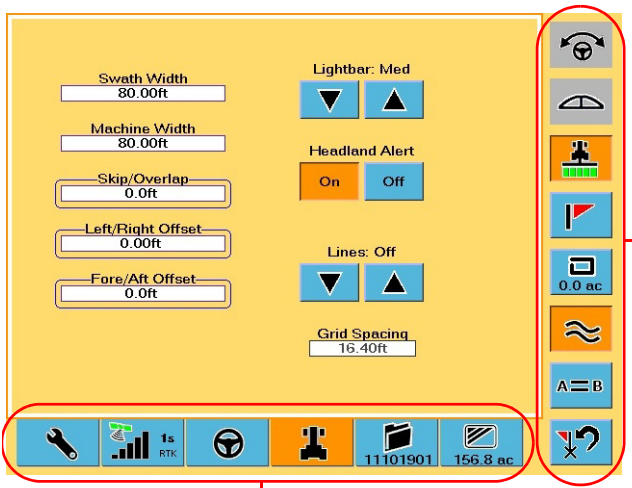
2. Touch **Accept**. The Getting Started window appears.

3. Touch any of the Job buttons to work with a job or touch **Cancel** to close the Getting Started window without selecting a Job option.
   - Touch the **New Job** button to begin a new job. S3 automatically assigns a job name and displays the Map screen.
   - Touch the **Continue Job** button. S3 automatically loads the most recently performed job and displays the Map screen. If this is your first time starting S3 there is no previous job to continue and the Continue Job button is unavailable (gray).
   - Touch the **List Jobs** button to display the Manage Jobs window. See “Loading or Deleting Job Data” on page 45 for more information on working with the Manage Jobs window.
   - Touch the **Cancel** button to start working with S3 with no job.

   See “Managing a Job” on page 44 for more information on jobs.

S3 Display

The S3 display consists of control buttons, screen tabs, and screens. Figure 2-2 shows the Vehicle screen.



Control Buttons
Can be on the left or the right of the screen (orange indicates an active button)

Screen Tabs
Orange indicates the screen for that tab is displayed

Figure 2-2: S3 console display

Control Buttons

Control buttons allow you to perform such tasks as engaging automated steering, displaying the lightbar, and activating contour guidance. Table 2-1 describes each control button and includes links to other sections within this manual with more detailed information on these buttons.

Table 2-1: Control buttons

Control Button	Description
	Auto Steering (available if eDriveTC, eDriveVSi, or eDriveX is installed) The button is not available (gray) if eDriveTC, eDriveVSi, or eDriveX is not installed on the system or not available to engage.
	If AutoEngage is set to Manual on the Steering screen, the button appears as shown at left. Touch to manually engage or disengage automated steering. Blue indicates it is disengaged; orange indicates it is engaged.
	If AutoEngage is set to Auto on the Steering screen, the button appears as shown at left. The system automatically engages when it detects a guidance line and all steering criteria are met. Flashing blue and orange indicates that it is disengaged and not automatically steering (but the Auto Engage feature remains active); orange indicates it is engaged and automatically steering.

Table 2-1: Control buttons (*continued*)

Control Button	Description
	Lightbar Manually display or hide the Steering Guide lightbar. See “Using the Map Modes and Views” on page 26.
	Apply Select to have the S3 log application or coverage data for the current job. Touch this button (or press the floor switch) to stop or hold logging job data. Blue indicates no data logging; orange indicates data logging.
	Mark Flag Display the Marks window, where you can drop various flags to mark an area or return point. See “Using Mark Flags” on page 53.
	Perimeter Display the Perimeter window, where you can record a perimeter and calculate the area within it. The area included by the perimeter is displayed on the Perimeter button for quick reference. See “Setting a Perimeter” on page 51 for more information.
	Contour Guidance Activate Contour Guidance mode, a freeform guidance mode where guidance is relative to any previous pass. Blue indicates this mode is inactive; orange indicates it is active. See “Creating and Following Free Form Paths (Contour Guidance)” on page 39.
	Straight Guidance Display the Straight Guidance window, where you can create linear or pivot (circular) parallel guidance passes, or return to point guidance. Blue indicates the mode is inactive; orange indicates it is active. See “Creating and Following Parallel Paths (Straight and Pivot Guidance)” on page 33.
	Return to Point Return to an A point, a B point, last applied, any marker or flag, or the centerpoint of a pivot. Wherever you are in the field touch this button and then select any of the these options from a drop-down. The selected point appears on the Map screen and the light bar guides you to the point.

Note: This manual makes a distinction between control buttons (that appear along the left or right side of the display) and buttons that appear on each screen. If you have to touch a control button the text will specifically say “control button.”

Tabs and Screens

You navigate the S3 interface using tabs and screens. Tabs are the buttons along the bottom of the screen. You touch a tab to display the screen (or one of several screens) for that tab. Some tabs display only one screen; for example, when you touch the Map tab the Map screen appears. Other tabs display one of several screens; for example, when you touch the GPS tab the GPS Details screen appears with several buttons along the right of the screen—you use these buttons to display other GPS screens.

Table 2-2 describes the S3 tabs. For more information on each tab refer to the other sections in this manual noted in Table 2-2.

Table 2-2: Tabs and screens

Tab	Description
	Setup tab Provides access to the following screens: System, Display, Codes. Set options such as screen lighting for day or night work, displaying the control buttons on the right or left side of the screen, or US or Metric units of measure; view system information such as application version and operating system; calibrate the touchscreen and upload updates. See “Configuring Display Settings” on page 18 for more information.
	GPS tab Provides access to the following screens (depending on your installed components): Setup, NMEA, Radio, L-Band, e-Dif, GPS Details, RTK Status. View system-generated GPS information such as latitude and longitude, altitude, Diff Age, and the number of satellites tracked; view/change message rates; configure radio settings; select differential correction options. See “Configuring GPS Settings” on page 19 for more information.
	Steering tab Provides access to the Steering screen (depending on your installed components other screens may be available). View steering-related GPS information such as GPS course; set steering related options such as track or wheel vehicle type; calibrate the tilt sensor for eDriveTC. See “Configuring Steering Settings” on page 21 for more information.
	Vehicle tab Provides access to the Steering screen. Set vehicle related values such as swath and machine width; set guidance sensitivity and headland alerts. See “Configuring Vehicle Settings” on page 21 for more information.
	Job tab Create new jobs, continue a previous job, use templates, and import or export job data; record job specific data such as the farm, field, and operator ID; view system-generated current job number for quick reference. See “Managing a Job” on page 44 for more information on jobs.
	Map tab View a moving graphical representation of the field operation; use zoom features and steering indicators; view the applied area total for quick reference. See “Using the Map Modes and Views” on page 26 for more information on the Map screen.

Editing Field Data

Line indicates you can edit the field

If a field has a line around it (see figure at right) you can touch the field to display a window in which you can edit the current value. If a button or field is gray, it is not available (you cannot touch the button or edit the field's value). For example, in Figure 2-3 below you can touch the Defaults button or edit the Language field but you cannot touch the Update S3 button or edit the OS field.

Configuring the System

The S3 has several screens in which you configure important settings before beginning your initial pass. For information on all buttons and fields on all screens see Appendix C, "S3 Screen Description Reference."

Configuring System Settings

The System screen (Figure 2-3) allows you to view hardware and software information as well as change the system language and calibrate the touch screen.

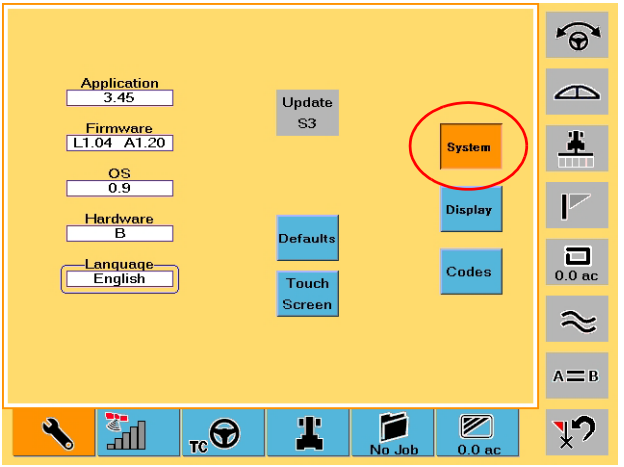


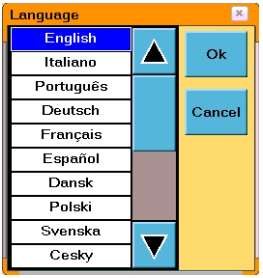
Figure 2-3: System screen

To access the System screen:

1. Touch the **Setup** tab.
2. Touch the **System** button.

To change the system language:

1. On the System screen touch the **Language** field.
2. In the Language window select the desired language.
3. Touch **OK**. The Language window closes and the selected language is used throughout the S3 interface.



You S3 is shipped factory-calibrated. However, if necessary you can calibrate the touch screen in just a few steps.

To calibrate the touch screen:

1. On the System screen touch the **Touch Screen** button. The calibration screen appears.
2. Each time a “Press” message appears press and hold until “Release” appears until the following message appears:

   Touch the screen to verify the target moves to your finger.
3. Press and drag around the screen to verify the onscreen image follows your finger.
4. Touch **OK**. You are returned to the System screen.

Configuring Display Settings

The Display screen has various settings that affect the way the system displays and records information.

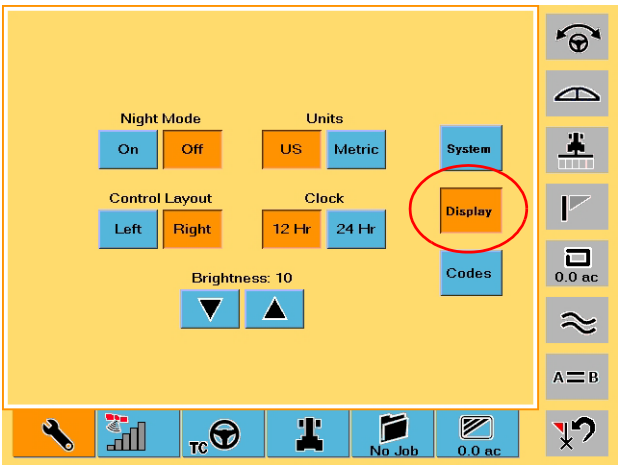


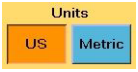
Figure 2-4: Display screen

To access the Display screen:

1. Touch the **Setup** tab.
2. Touch the **Display** button.

Table 2-3 describes the buttons and fields on the Setup screen.

Table 2-3: Display screen button and field descriptions

Button/Field	Description
	Night Mode Set the display for easy viewing in daytime or nighttime lighting.
	Control Layout Set the control buttons on either the left or the right side of the screen for your preferred access.
	Units Set the unit of measurement (US or Metric) in which the system displays and records all measurements.
	Clock Set the clock to either a 12-hour or 24-hour format.
	Brightness Adjust the display brightness—range is 1 (dim) to 10 (bright).

Configuring GPS Settings

The GPS Setup screen has various settings that relate to the type of GPS differential correction the system uses. Several of the fields on the GPS Setup screen provide useful diagnostic information.

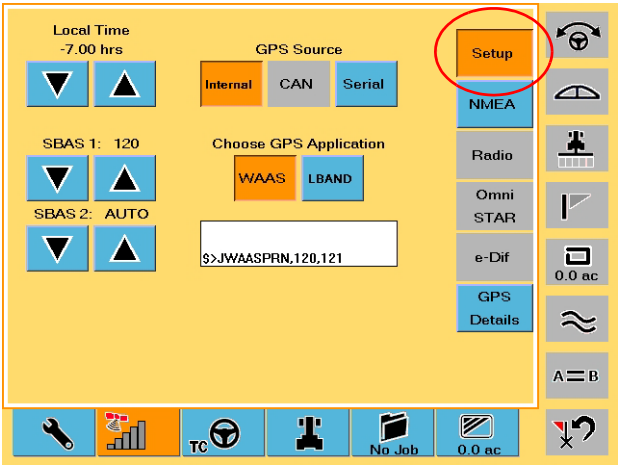


Figure 2-5: GPS Setup screen

To access the GPS Setup screen:

1. Touch the **GPS** tab.
2. Touch the **Setup** button.

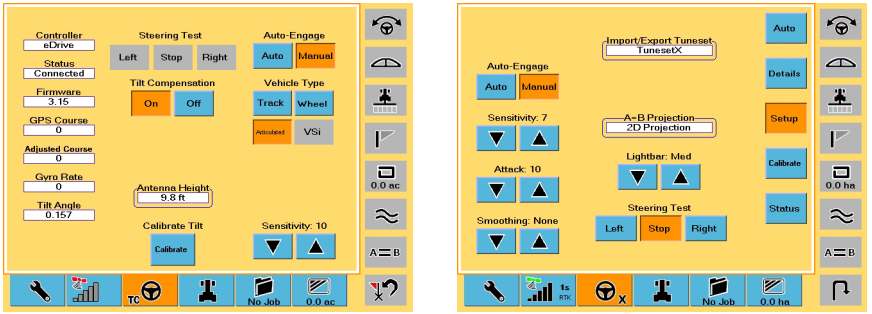
Table 2-4 describes the buttons and fields on the GPS Setup screen.

Table 2-4: GPS Setup screen button and field descriptions

Button/Field	Description
	Local Time Set the system clock to the local time.
	SBAS 1 Change 1 of 2 SBAS satellites used in the system's position calculation (default value is Auto, which allows the S3 to automatically select from the available satellites).
	SBAS 2 Change 2 of 2 SBAS satellites used in the system's position calculation (default value is Auto, which allows the S3 to automatically select from the available satellites).
	GPS Source Select the GPS source: • Internal • CAN • Serial (S3 uses GPS data from the RS-232 source instead of from the internal Crescent receiver) • Radio—see "Radio Screen" on page 75 for more information on setting radio options
	Choose GPS Application Set the type of differential corrections S3 uses to calculate a position (S3 has two of three factory installed differential correction types from which to choose—available options are: SBAS (WAAS), e-Dif, L-Band, and RTK). See Chapter 5, "Differential Correction Types" for more information on differential corrections.
	Message window Displays system generated messages (useful when performing diagnostics). Refer to the Hemisphere GPS Technical Reference (go to www.hemispheregps.com/support and click the GPS Reference icon) for more information on system-generated messages.

Configuring Steering Settings

S3 uses the settings on the Steering tab when you are using an optional automated steering control unit, such as Hemisphere GPS' Outback eDriveTC/eDriveVSi or eDriveX. Several fields on the Steering screen provide useful diagnostic information. Figure 2-6 shows the Steering screen when either eDriveTC/eDriveVSi or eDriveX is connected.



eDriveTC or eDriveVsi

eDriveX

Figure 2-6: Steering screen - with eDriveTC or eDriveX connected

To access the Steering screen:

- Touch the **Steering** tab.

Refer to the eDriveTC User Guide or eDriveX User Guide (both available from the Outback Guidance website at www.outbackguidance.com) for more information on using the Steering screen.

Configuring Vehicle Settings

The Vehicle screen (Figure 2-7) has various settings related to the machinery and implements you use in the current job.

Figure 2-7: Vehicle screen

To access the Vehicle screen:

- Touch the **Vehicle** tab.

Table 2-5 describes the buttons and fields on the Vehicle screen.

Table 2-5: Vehicle screen button and field descriptions

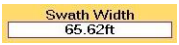
Button/Field	Description
	Swath Width S3-generated value that is the sum of the Machine Width and the Skip/Overlap values.
	Machine Width Width of the vehicle or implement for the current job. Touch this field to display the Edit Machine Width window where you enter the machine width and then touch OK.
	Skip/Overlap Set this value to drive a pattern where rows intentionally skip or overlap. Touch this field to display the Edit Skip/Overlap window where you touch the appropriate button (Skip or Overlap), enter a value, and then touch OK. When you touch the Skip button or Overlap button the Edit Skip/Overlap window visually displays a skip or overlap. For an example of setting field values on the S3 see “Setting the Fore/Aft Offset” on page 23. When you enter a skip or overlap the Map screen shows this as an area between swaths in the green coverage lines, where a skip is the white area between swaths and an overlap is the dark green overlap between swaths.
	Left/Right Offset Distance between the GPS antenna centerline and the vehicle or implement centerline and used to correct for an antenna that is not installed on the vehicle or implement centerline. Set to the right or left. Touch this field to display the Left/Right Offset window where you touch the appropriate button (Left or Right), enter a value, and then touch OK. When you touch the Left button or Right button the Left/Right Offset window visually displays a left offset or right offset. For an example of setting field values on the S3 see “Setting the Fore/Aft Offset” on page 23.
	Fore/Aft Offset Fore or aft offset of the antenna from any implement. If the implement is in front of the vehicle, such as on a harvester, enter the distance between the implement and the antenna as a fore offset. If the implement is located behind the vehicle, such as a drawn planter, enter the distance as an aft offset. For instructions on setting a fore or aft offset see “Setting the Fore/Aft Offset” on page 23.
	Lightbar Reaction speed of the virtual lightbar (manual guidance indicator sensitivity). Set to Low, Med (Medium) or High.

Table 2-5: Vehicle screen button and field descriptions (*continued*)

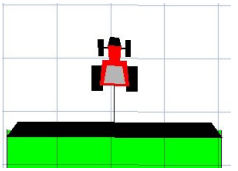
Button/Field	Description
	Headland Alert Notifies you with an audible beep when the machine enters a previously worked area. Set to On or Off.
	Lines Guidance lines display a regular pattern over an area by which to guide. There are three line display options available: Off, AB, and Grid. When Grid is selected the spacing between the pass lines is equal to the swath width. The distance between the grid lines is based on the value set in the Grid Spacing field. See “Creating Guidance Lines” on page 49 for more information on using this feature.
	Grid Spacing Set the distance between the grid lines on the Map screen. See “Grid” on page 50 for more information.

Setting the Fore/Aft Offset

If the antenna offset is set to be ahead (fore) of the antenna, you will see the implement projected in front of the tractor icon on the Map screen. If the antenna offset is set to be behind (aft of) the antenna, you will see the implement trail behind the tractor icon.

Fore offset

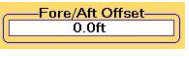
Whether the antenna is set fore or aft, it is also important to install the GPS antenna in the center (left and right) of the vehicle. This prevents swath offsets resulting in skips and overlaps. If the center of the working implement is not in line with the center of the guided vehicle, be sure to enter an appropriate swath offset into the S3 during setup.

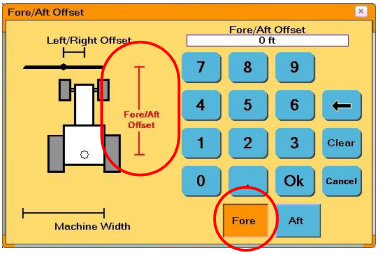


Aft offset

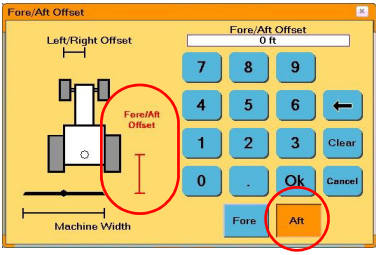
Complete the following steps to set the fore/aft offset:

1. On the Vehicle screen touch the **Fore/Aft Offset** button. The Fore/Aft Offset window appears.





Set fore offset



Set aft offset

2. If setting the fore value, touch the **Fore** button (the Fore button turns orange) and then use the keypad to enter a value.

3. If setting the aft value, touch the **Aft** button (the Aft button turns orange) and then use the keypad to enter a value.

4. Touch the **Ok** button. The window closes and the Map screen displays the tractor and implement with the appropriate offset.

Chapter 3: Basic Operation

Using the Map Modes and Views
Viewing GPS Signal Information
Viewing Job and Guidance Status Information
Performing Basic Field Operations

This chapter explains the multiple view options you have in the Map screen, describes various information display features on screens tabs, and takes you through some basic operations such as straight and contour guidance.

Using the Map Modes and Views

S3 offers two view modes: Machine mode and Field mode. Both modes display the machines position on the field and direction of travel. When you use the Apply function, the views display the applied areas on the screen in green. Multiple zoom levels are available in either view mode. Use the Zoom + and Zoom - buttons to zoom in and out respectively in any of the different view screens.

Selecting Modes and Views

You use the Mode and View/Fit buttons on the Map screen to select the mode (machine or field) and specific view. The black text on the View/Fit button displays View when you select Machine mode and displays Fit when you select Field mode. The text in red on buttons indicate the current mode and view. For example, Figure 3-1 shows that the S3 is in Machine mode and 3D view.

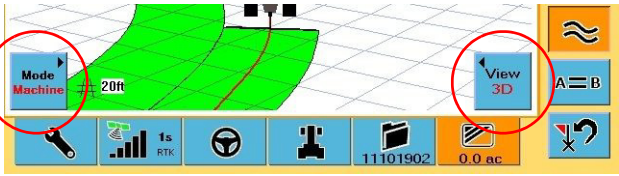


Figure 3-1: Mode and View buttons on Map screen

To select a view:

1. On the bottom left of the Map screen touch the **Mode** button. The Machine and Field buttons appear to the right of the Mode button.

2. Touch either button to select it as the current mode.
3. On the bottom right of the Map screen touch the **View/Fit** button. The available options appear as buttons to the left of the View/Fit button.

View buttons in Machine mode

View buttons in Field mode

4. Touch a button to select it as the current view.

Using Machine Mode Views

Use Machine mode views to “follow” the machine while work is in progress. In this view the map moves while the vehicle appears stationary on the screen. See “Selecting Modes and Views” on page 26 on how to select the desired Machine mode view.

There are four different Machine mode views: AB, Course, North, and 3D.

In the **AB** perspective, the A=B line direction is always at the top of the screen.

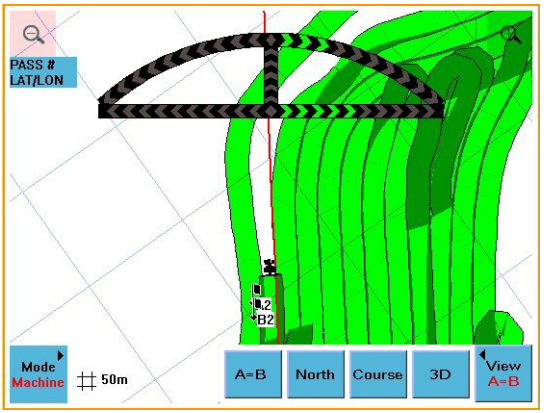


Figure 3-2: AB perspective

In the **Course** perspective, the direction of travel is always at the top of the screen.

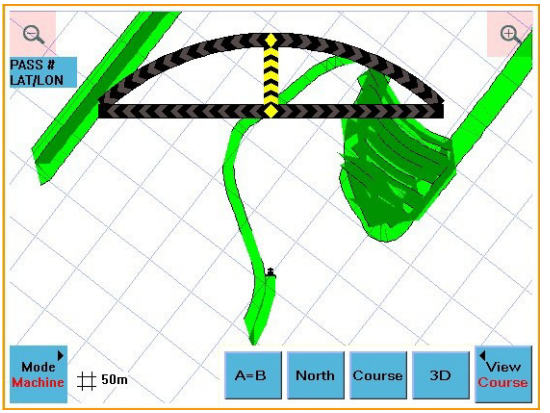


Figure 3-3: Course perspective

As the name indicates, **North** is always at the top of the screen, regardless of the vehicle's direction of travel.

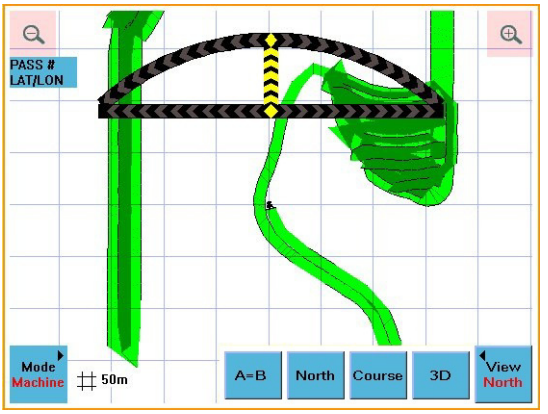


Figure 3-4: North perspective

The **3D** perspective gives a three-dimensional view down the field in the direction of travel.

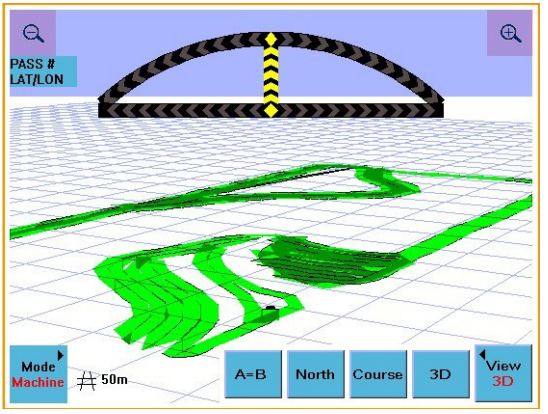


Figure 3-5: 3D (down field) perspective

Using Field Views

Field mode views give you a bird's eye view of the job. In this view, the vehicle appears to move while the map appears stationary on the screen. See "Selecting Modes and Views" on page 26 on how to select the desired Field mode view.

You can pan to a specific area on the map by touching the screen and dragging the area into view.

There are two different perspectives available in Field view: Machine Fit and Field Fit.

Machine Fit perspective automatically zooms in on the vehicle's current position on the map.

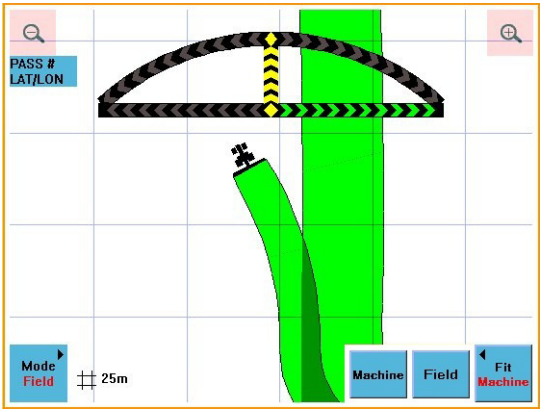


Figure 3-6: Machine Fit

Field Fit perspective automatically zooms out over the entire field that you are working.

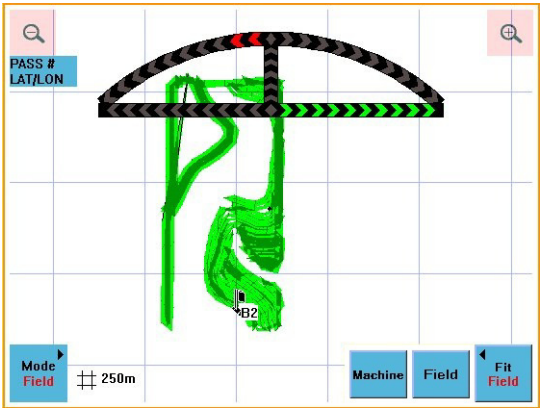


Figure 3-7: Field Fit

Viewing GPS Signal Information

The GPS signal information is located on the GPS tab (Figure 3-8) for quick reference.

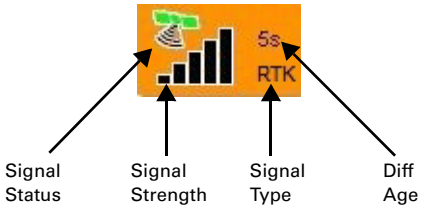


Figure 3-8: GPS tab information

Table 3-1 describes the information shown on the GPS tab.

Table 3-1: GPS tab information

Tab Element	Description
Signal Status	A red satellite icon indicates that the S3 does not have a fix on a DGPS signal. The orange satellite icon indicates that it is tracking satellites. The green satellite icon indicates that the S3 is receiving a GPS signal.
Signal Strength	The vertical bars indicate the quality of the GPS signal related to the standard deviation of the solution. 3 to 4 bars are typical with SBAS signals. 5 bars are typical with RTK.
Signal (Correction) Type	“No Fix” indicates that the S3 is not receiving a GPS signal. “3d” indicates it is receiving a 3 dimensional signal. “3D” indicates it is receiving a 3 dimensional differential signal (DGPS). “RTK” indicates that it is receiving Real Time Kinematic corrections.
Diff Age	The Diff Age number indicates the age of the corrections used in the DGPS correction. For SBAS signals, it is typically 6 to 10 seconds. For RTK, optimal operating values are less than 5 seconds.

Viewing Job and Guidance Status Information

The S3 has several operational status indicators that appear on the Map screen or on individual tabs and buttons for quick reference.

Table 3-2: Job and guidance status information

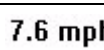
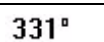
Indicator	Description
	Local base battery status *(Only appears when using an RTK signal from a BaseLineX station)* Displays the charge remaining on the local base station battery.
	Radio Tower (top part of icon) *(Only appears when using an RTK signal from a BaseLineX station)* Indicates that the S3 is receiving corrections for the local base station (pulsates when it receives a signal).
	Radio Communication Status Bar (base of icon) *(Only appears when using an RTK signal from a BaseLineX station)* The rover radio in the vehicle must receive consistent correction signals from the base station for up to 15 minutes to achieve RTK lock. • Status bar is full when it has received consistent base corrections for 15 minutes • Status bar is clear if communication is lost with the base station for 5 seconds or more
	Headland Indicator is on any time the antenna crosses into a previously applied area. You set the headland audible alert feature On or Off on the Vehicle tab.
	Perimeter Indicator is on and blinking anytime the system is recording a perimeter.
	Logging Pivot Blinks when the S3 logs the initial pivot pass.
	Speed Rate at which the vehicle is traveling.
	Direction of travel in degrees.
	Pass Number Once the A-B line is set, all passes are numbered. Pass 1 is to the right of the A-B line, and Pass -1 to the left. Touch the Pass # button to display the current pass number, speed, direction, and time. This button toggles between pass information and location information (see next row in this table).

Table 3-2: Job and guidance status information (*continued*)

Indicator	Description
	Latitude/Longitude Touch the button to display the latitude, longitude, and altitude of the vehicle location. This button toggles between pass information and location information (see previous row in this table).
	Zoom Distance Distance between the grid lines on the S3 display (value increases or decreases as you zoom in or out).
	Steering Guide Lightbar Shows the vehicle's position relative to the guidance line. When the Steering Guide indicators are centered (indicated by a vertical yellow row as shown), the vehicle is aligned with the previous pass.To make accurate steering corrections, simply steer in the direction indicated by the lighted arrows, left or right.
	Applied Area Total of the applied or recorded area in either acres or hectares. It is displayed on the Map tab for quick reference.
	Job Number S3-generated number for the current job that is displayed on the Job tab for quick reference.
	Perimeter Area When a perimeter is defined, S3 calculates the perimeter area and displays the total. It is displayed on the Perimeter control button for quick reference.
	Steering Controller Connected An indicator appears on the Steering tab when: • eDriveTC is connected and Tilt Compensation is enabled (TC appears on the lower left of the tab) • eDriveX is connected (X appears on the lower right of the tab)

Performing Basic Field Operations

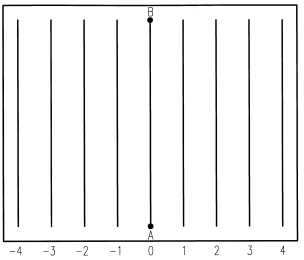
This section describes straight guidance (linear and circular/pivot) and contour guidance.

Starting a Job

- To begin a new job, touch the **New** button on the Job screen.
- To continue the last job, touch the **Continue** button on the Job screen.

Creating and Following Parallel Paths (Straight and Pivot Guidance)

Choose Straight guidance to generate **linear (straight)** or **circular (pivot)** parallel paths for the S3 to follow.



Creating Straight Paths : You can establish the first pass either along a straight side of the field or by dividing the field with a straight swath working out each side. Either way, all passes are perfectly and uniformly spaced across the field.

The A-B line is an imaginary line that passes through two points to define the first pass. All other passes are perfectly spaced on both sides of the first pass.

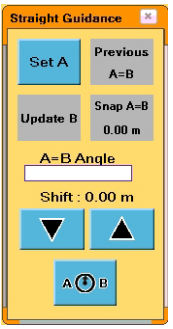
You can define an A-B line either by:

- Marking a Point A and a Point B
- Marking a Point A and entering the required heading

When traveling on or near a pivot guideline, the nearest guideline is shown on the map as a red circular line (similar to the guideline used in other guidance modes.)

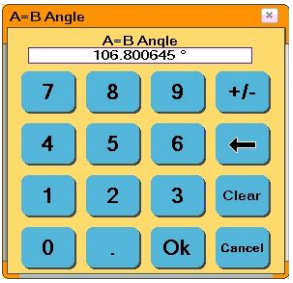
Marking Point A and Point B While Driving

1. Position the vehicle at the beginning of the first pass.
2. Touch the **Straight Guidance** control button. The Straight Guidance window appears.
3. Touch the **Set A** button to mark Point A. The text on the button changes from *Set A* to *Set B*.
4. Drive the first pass.
5. At the end of the pass, touch the **Set B** button to mark Point B.



Note: You can also touch the **A=B Angle** field and then enter an angle in the A=B Angle window. If you set your own B point using the Set B button, the S3 polls the angle of the A=B line and displays it in the A=B Angle field. The A=B Angle field is only editable while creating a new A=B line.

Marking Point A and Entering a Heading Manually



1. Position the vehicle at the beginning of the first pass.
2. Touch the **Straight Guidance** control button. The Straight Guidance window appears.
3. Touch the **Set A** button to mark Point A.
4. Touch the **A=B Angle** field. The A=B Angle window appears.
5. Enter the direction (angle) and touch the **Ok** button. The S3 applies the A-B line.

Beginning Straight Guidance

After setting the A-B line, the S3 automatically begins guiding.

1. Turn the steering wheel in the direction indicated by the Steering Guide lightbar to remain centered on the current pass.
2. At the end of the current pass, turn around. The S3 automatically detects the next pass and begins guiding.

Switching Modes

You can switch the S3 guidance modes by touching the Straight Guidance or Contour Guidance control button. When switching to straight mode for the second time, you can set a new A-B line by touching the Set A button and then the Set B button. To proceed without setting a new A-B line, touch the Straight Guidance control button.

Adjusting the A-B Line

While operating in Straight Guidance mode, you can adjust the A-B line on-the-go, that is, without interrupting normal guidance operation. This feature is especially useful to correct for DGPS drift over time.

- **Snap A-B**: You can "snap" the A-B line to the vehicle's current location parallel to the original A-B line. The Snap AB feature is best used to insert a required gap between consecutive parallel swaths (for example, a conservation barrier strip). The Snap A=B button displays the distance (in ft. or m) the A=B line was moved when you touched the Snap A=B button.

- **Shift A-B**: You can shift the A-B line left or right in small increments rather than re-establishing a new A-B line. The Shift buttons display the distance (in ft. or m) the A=B line was moved when you touched the Shift Arrow buttons.

- **Update B Point**: If you need to correct the B point, you can adjust the A-B line by touching the Update B button on the initial pass.

- **New A=B / Previous A=B:** You can set a new A-B line at any point during the job and use a previously defined A-B line for guidance.

- **Return Points**: You can return to a previously recorded point, including any A or B point in the current job.

Snapping the A-B Line to the Current Location

1. While in Straight Guidance mode, touch the **Straight Guidance** control button. The Straight Guidance window appears.
2. Touch the **Snap A=B** button. This aligns the nearest A-B guide line with the current vehicle position (snap A-B to here).
3. Touch the **Straight Guidance** control button to close the Straight Guidance window.

Shifting the A-B Line

1. While in Straight Guidance mode, touch the **Straight Guidance** control button. The Straight Guidance window appears.
2. Touch the appropriate Shift button to nudge the A-B line left (down arrow button) or right (up arrow button) relative to the direction of travel.
3. Touch the **Straight Guidance** control button to close the Straight Guidance window.

Updating Point B

1. While in Straight Guidance mode, touch the **Straight Guidance** control button. The Straight Guidance window appears.
2. Touch the **Update B** button to set a new Point B.
3. Touch the **Straight Guidance** control button to close the Straight Guidance window.

Defining a New A-B Line

If you have previously defined an A-B line and want to define a new A-B line, the Set A button in the Straight Guidance window displays as New A=B.

1. While in Straight Guidance mode, touch the **Straight Guidance** control button. The Straight Guidance window appears.
2. Touch the **New A=B** button to set a new A-B line. The button text changes to Set A.

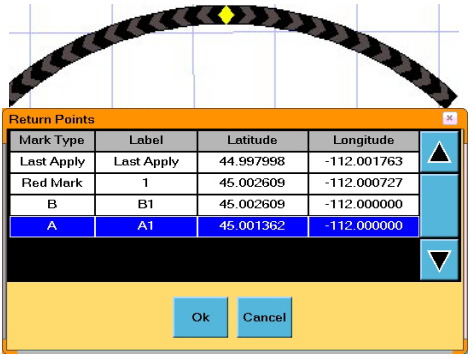
3. Touch the **Set A** button to mark Point A.
4. Drive the new pass.
5. At the end of the pass, touch the **Set B** button to mark Point B.

Using a Previously Defined A-B Line

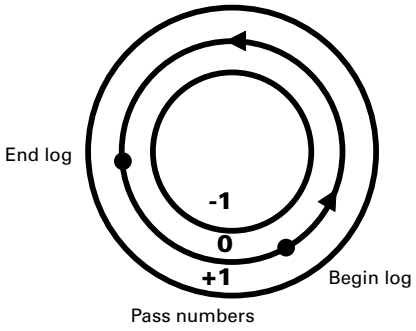
1. While in Straight Guidance mode, touch the **Straight Guidance** control button. The Straight Guidance window appears.
2. Touch the **Previous A=B** button. The AB Lines window appears.
3. Select the A-B line you want to use from the list and touch the **OK** button. The selected A-B line is set as the guidance line.

Returning to a Previously Recorded Point

1. While in Straight Guidance mode, touch the **Straight Guidance** control button. The Straight Guidance window appears.
2. Touch the **Return to Point** control button. The Return Points window appears.
3. Select the return point you want to use from the list and touch the **OK** button. The Map screen displays the Return to Point guide to guide you to the selected point.



Creating Pivot Paths: Pivot guidance is similar to straight guidance except that you define the circumference of a circle rather than a straight line with A and B points. To do so, drive as much of the circumference of a representative circle as possible.



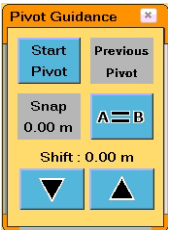
Note: The more of the circumference you drive, the better the S3's accuracy.

Setting the Pivot Line

1. Position the vehicle at the beginning of the first pass.
2. Touch the **Straight Guidance** control button. The Straight Guidance window appears.

3. In the Straight Guidance window touch the **Pivot** button.

   The Pivot Guidance window appears and the Straight Guidance control button changes to the Pivot Guidance control button.



4. Touch the **Start Pivot** button and begin driving the circle.
   a. The Start Pivot button changes to gray and displays “Learning Point” while logging data.
   b. When enough data has been collected for the S3 to calculate the circumference of the circle being driven, the button displays End Pivot.

5. At the end of the circle, touch the **End Pivot** button to end the pivot log.

Beginning Pivot Guidance

After setting the Pivot Log, the S3 automatically begins guiding.

1. Turn the steering wheel in the direction indicated by the Steering Guide lights to remain centered on the current pass.

2. When you have finished one pass, just move to either the right or left of the original circle and the S3 automatically begins guiding the new pass.

Numbering Passes

After you establish the Pivot Log the S3 numbers all passes. Pass +1 is always to the right of the original circle and Pass -1 to the left.

- If you drive the circle counterclockwise Pass +1 is on the outside.
- If you drive the circle clockwise, Pass +1 is on the inside of the original circle.

You can work passes in any order.

Snapping the A-B Pivot Line to the Current Location

When traveling on or near a pivot guideline and you use the Snap function, the S3 moves the guideline position by the designated distance and the current pass number.

1. While in Pivot Guidance mode touch the **Pivot Guidance** control button. The Pivot Guidance window appears.

2. Touch the **Snap** button. The nearest A-B pivot guide line aligns with the current vehicle position (snap A-B to here).
3. Touch the **Pivot Guidance** control button to close the Pivot Guidance window.

Shifting the A-B Pivot Line

When traveling on or near a pivot guideline and you use the Shift function, the S3 moves the guideline position by the designated distance and the current pass number.

1. While in Pivot Guidance mode touch the **Pivot Guidance** control button. The Pivot Guidance window appears.

2. Touch the appropriate **Shift** button to nudge the A-B line left (down arrow button) or right (up arrow button) relative to the direction of travel.
3. Touch the **Pivot Guidance** control button to close the Pivot Guidance window.

Creating and Following Free Form Paths (Contour Guidance)

Choose Contour guidance to create free form (non-parallel) paths or to follow any previous passes (linear, circular, or free form.) In this mode, the S3 is either logging an initial pass or guiding from a previous pass. After choosing Contour guidance, proceed by making the initial pass during which the Steering Guide lights are not active and cannot be used. Later, when attempting to follow a previous pass, the guidance engages and the Steering Guide lights reactivate. You generally use Contour guidance for working with borders, turn areas and following the contours created by obstacles. When operating in Contour mode, a red guideline appears on the Map screen for additional guidance support (see Figure 3-9).

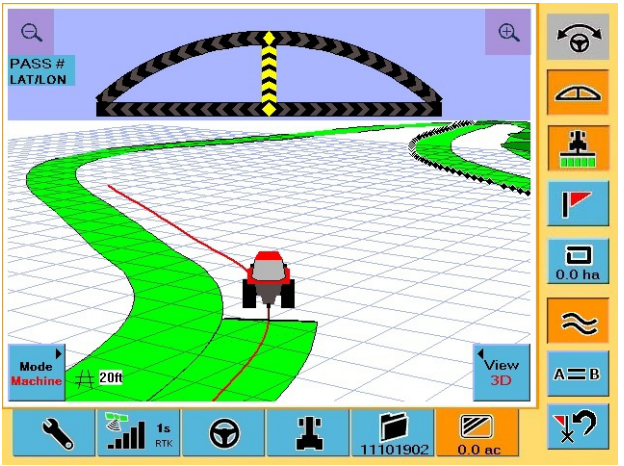


Figure 3-9: Map screen showing red contour guidance guideline

Creating an Initial Contour Pass

1. Touch the **Contour Guidance** control button before beginning the initial pass.
2. Make the initial pass. The Steering Guide will not display during the initial pass.
3. At the end of the initial pass, turn around and begin the next pass. The S3 automatically detects the previous pass, the Steering Guide appears, and the S3 begins guiding.

Guiding on Subsequent Passes

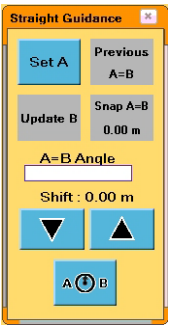
Any time the vehicle is within a half a swath width of a previously logged pass, the S3 automatically begins to guide. In Contour mode, the S3 can guide from any previous pass, even those made in Straight guidance mode.

Making a New First Pass

Occasionally a situation arises in the middle of a job when you need to make a pass that follows a different path than the previous passes. Simply drive the new path. Once it becomes obvious that you are defining a new pass, the S3 goes into logging pass mode. Subsequent passes are guided from this newly defined pass.

Setting A-B Points While in Contour Mode

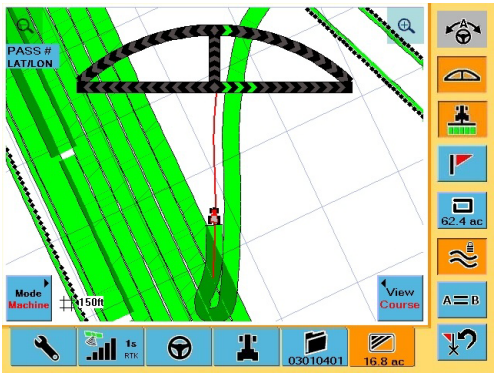
1. While in Contour mode, position the vehicle at the beginning of the first pass.
2. Touch the **Straight Guidance** control button. The Straight Guidance window appears.
3. Touch the **Set A** button to mark Point A.
4. Drive the first pass. The Set A button changes to the Set B button.
5. At the end of the pass, touch the **Set B** button to mark Point B.
6. Continue making passes in Straight Guidance mode or switch back to Contour mode by touching the **Contour Guidance** control button again.



Contour Lock

When using contour guidance, S3 constantly searches for the nearest swath from which to provide guidance. Contour Lock™ enables you to stop the S3's search for the closest swath. In the Contour Lock mode, guidance:

- Remains locked on its current swath until you manually unlock it
- Automatically unlocks if you drive offline by 2 m (or 10% of the swath width) and begins searching for the closest swath again



Contour Lock is helpful when you use guidance in close proximity to multiple swaths, such as when working with "point-rows". In these situations without Contour Lock, S3 guidance could jump around and guide you off on the wrong path whenever other swaths come close to your current one. With Contour Lock, you can decide if you want to stay on the current swath all the way until the end of the field or let the S3 continue searching for the closest swath.

Note: When not in Contour Lock mode, the S3, when searching for the closest path, only picks up a different path if it is at a small angle to the path you are on. For example, if you cross a path at right angles, the S3 will not 'find' the crossed path and switch guidance to it. Only paths at a small angle (close to parallel) to the path you are on may be selected. The Contour Lock feature prevents this.

Complete the following steps to work with Contour Lock:

Step	Screen Item (where applicable)
1. In contour guidance, when on or approaching the required guidance contour touch the **Contour Guidance** control button. This puts you in Contour Lock mode (lock engaged) and a locked padlock appears on the Contour Guidance control button. S3 stops searching for, and providing guidance on, passes for other defined contours (no matter how close). If you move more than 2 m off the current guidance line, contour lock, while still engaged, becomes inactive and the padlock appears unlocked. S3 resumes its contour search and locks again when you are within 2 m of any guidance line.	
2. To deactivate the contour lock, touch the **Contour Guidance** control button. The padlock disappears. Contour lock can be active (padlock locked) or inactive (padlock unlocked) when you disengage it.	

Chapter 4: Advanced Features

Overview

This chapter covers the following topics:

- Job management with detailed descriptions of the Job screen features and functionality
- Advanced operations such as using guidance lines and grids, dropping mark flags, and setting perimeters

Managing a Job

The S3 includes the following job management options:

- Loading previously recorded job data
- Creating job templates
- Recording such job information as farm, field, crop, operator, and weather data

You can also transfer this information to Field Notes software (available for download from the Outback Guidance website at www.outbackguidance.com) via USB drive to generate maps and reports.

Note: Portable music players, USB extension cables, and USB-to-CompactFlash® adaptors are not compatible with S3. Do not try to reformat these devices to work with S3 as this can delete their firmware and prevent them from operating correctly.

Working with jobs begins with the Job screen (Figure 4-1).

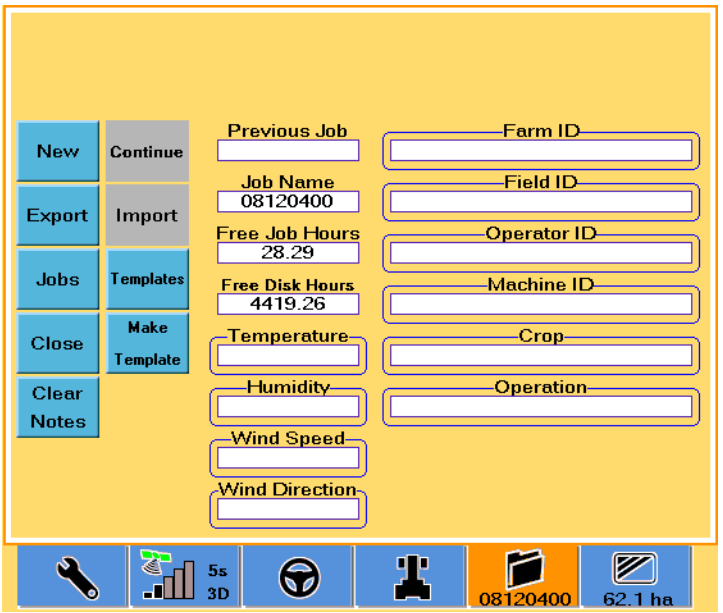


Figure 4-1: Job screen

Loading or Deleting Job Data

Using the Manage Jobs window (Figure 4-2) you can load a job (to continue work, add or edit annotations, or to view coverage data), delete a job, or delete all jobs.

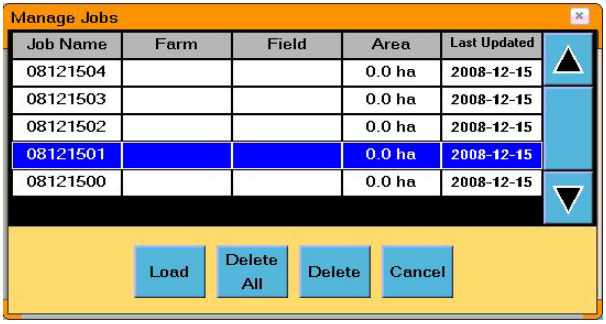


Figure 4-2: Manage Jobs window

To display the Manage Jobs window:

- On the Jobs screen touch the **Jobs** button.

To load a job:

1. In the Manage Jobs window, select the job you want to load.
2. Touch the **Load** button. The selected job (and its data) is loaded as the current job.

To delete a job:

1. In the Manage Jobs window, select the job you want to delete.
2. Touch the **Delete** button. The selected job (and its data) is deleted from the S3.

To delete all jobs:

1. In the Manage Jobs window, touch the **Delete All** button. A confirmation message appears.
2. Touch **Yes** to continue. All jobs (and their data) are deleted from the S3.

Beginning a New Job

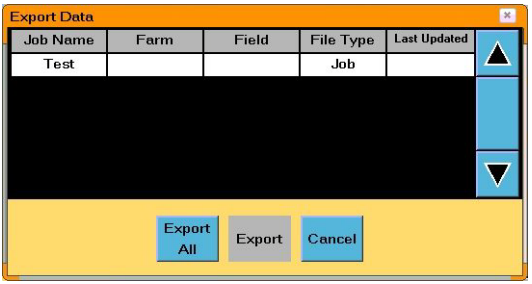
To begin a new job:

- On the Jobs screen touch the **New** button. The number in the Job Name field and on the bottom of the Job tab change.

Exporting Data to the USB Drive

1. Insert a USB drive into the USB port on the side of the S3.
2. On the S3 touch the **Job** tab.

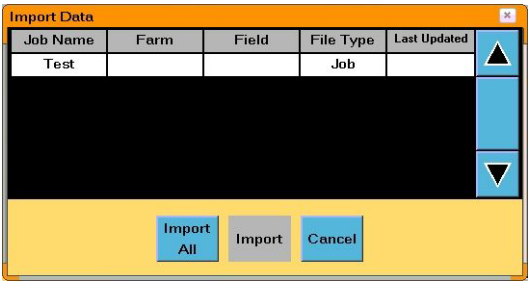
3. Touch the **Export** button. The Export Data window appears.



4. Select the job data (which includes associated templates) to export and then touch the **Export** button or touch the **Export All** button to export all job data. A confirmation message appears.
5. Select **Yes** to continue. The data is exported.

Importing Job Data from the USB Drive

1. Insert a USB drive into the USB port on the side of the S3.
2. On the S3 touch the **Job** tab.
3. Touch the **Import** button. The Import Data window appears.



Note: Only job data contained in the S3jobs folder on the USB drive will appear in the Import Data window.

4. Select the data files to import and then touch the **Import** button or touch the **Import All** button to import all data files. A confirmation message appears.
5. Touch **Yes** to continue. The job is imported.

Loading or Deleting a Template

Templates allow you to take a previously completed job and save the perimeter, A-B lines, and marks to create an outline for future jobs.

Using the Manage Templates window (Figure 4-2) you can load a template, delete a template, or delete all templates.

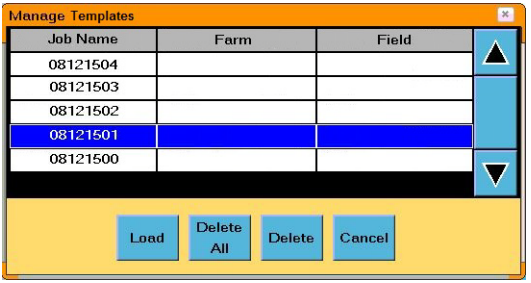


Figure 4-3: Manage Templates window

To display the Manage Templates window:

- On the Jobs screen touch the **Templates** button.

To load a template:

1. In the Manage Templates window, select the template you want to load.
2. Touch the **Load** button. The selected template is loaded and applied to the current job.

To delete a template:

1. In the Manage Templates window, select the template you want to delete.
2. Touch the **Delete** button. The selected template is deleted from the S3.

To delete all templates:

1. In the Manage Templates window, touch the **Delete All** button. A confirmation message appears.
2. Touch **Yes** to continue. All templates are deleted from the S3.

Creating a Template

1. On the Jobs screen touch the **Make Template** button. The Create Templates window appears.
2. Select a job from the list and touch the **Template** button. The S3 creates a template from the selected job. The template is then listed in the Manage Templates window.

Closing a Job

1. On the Jobs screen touch the **Close** button. A confirmation message appears.
2. Touch the **OK** button. The job closes.

Continuing a Job

To continue working with your most recent job:

- On the Jobs screen touch the **Continue** button. The most recently closed job (and its data) is activated.

Clearing Job Notes

You have the option of clearing the contents of all job annotation fields (Farm ID, Field ID, Operator ID, Machine ID, Crop, Operation, Temperature, Humidity, Wind Speed, and Wind Direction).

To clear job notes:

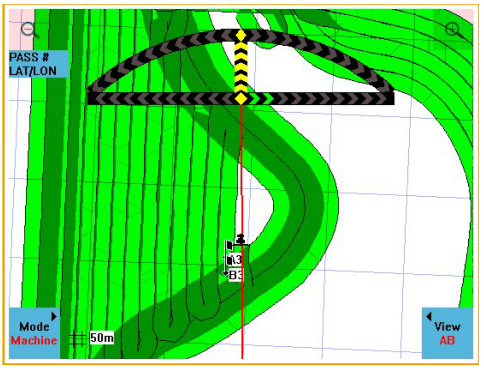
- On the Jobs screen touch the **Clear Notes** button. Job notes are cleared from the fields shown at right.

Creating Guidance Lines

Guidance lines provide a regular pattern over an area by which to guide. There are three line display options available and you select your option in the Lines field of the Vehicle screen: Off, A-B, and Grid.

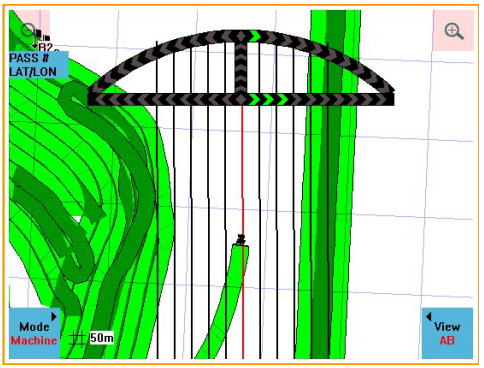
Off

Off displays A and B points and the current A-B line without any additional guidance lines.



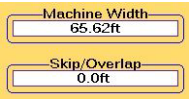
A-B

A-B displays guidance lines that run parallel to the A-B line. The parallel lines are spaced a swath width apart and are centered off the A-B line. The red line indicates the line on which the vehicle is currently aligned.



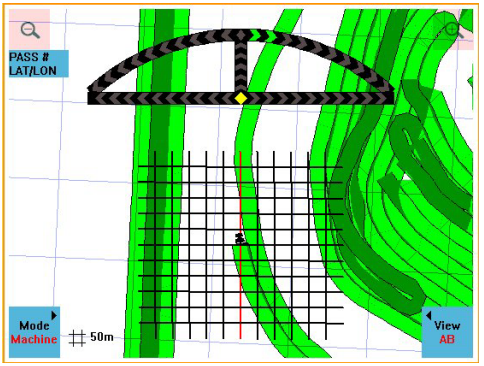
Setting Up Parallel A-B Lines

1. Enter the machine width in the Machine Width field on the Vehicle screen.
2. If any skip or overlap is required, enter its value in the Skip/Overlap field. The S3 adds this value to the Machine Width value to calculate the Swath Width.
3. Toggle the arrows on the Lines field on the Vehicle screen to “A-B”.
4. Set an A-B line in the desired direction. Parallel lines display on either side of the A-B line.



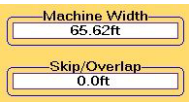
Grid

Grid lines are useful if you need to guide from point to point on a grid in successive order (such as for soil sampling, tree planting or staking out regular areas).

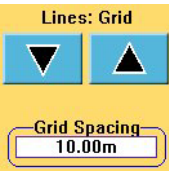


Grid areas are defined by the parallel A-B lines going in one direction and 90° grid lines in a crossing pattern. The A-B line establishes the direction of the pass lines and the “A” point establishes the first ‘crossing’ point. The spacing between the pass lines is equal to the swath width. The distance between the grid lines is based on the value set in the Grid Spacing field on the Vehicle screen.

Setting Up a Grid Pattern



1. Enter the machine width in the Machine Width field on the Vehicle screen.
2. If any skip or overlap is required enter its value in the Skip/Overlap field. The S3 adds this value to the Machine Width value to calculate the Swath Width.
3. Toggle the arrows on the Lines field (on the Vehicle screen) to Grid. This activates the Grid Spacing field.
4. Touch the **Grid Spacing** field to display the Edit Grid Spacing window, enter a value, and then touch **OK**.
5. Set an A-B line in the desired direction, with the A point indicating where the first grid line will appear.



Setting a Perimeter

Normally, you complete the first operational pass to set and record the perimeter of the field. The Perimeter feature of the S3 enables you to record field perimeters and save them as templates for future operations—allowing perimeter information to remains consistent from job to job, season after season.

You can include multiple perimeters in a single job. When a field is divided into multiple areas, S3 adds the areas defined by the perimeters to calculate the total job area.

You can also exclude perimeters. For example, if there is an obstacle in the field, such as a body of water, you may want to excluded it from the total area calculation. Use the same perimeter function, except touch the Exclude button—the resulting excluded area is deducted from the total job area calculation.

1. Drive to the starting position of the field.

Note: To record the perimeter for future use as a template, make sure you have selected the Apply control button. While the Apply feature is activated, the S3 records all job data including the perimeter.

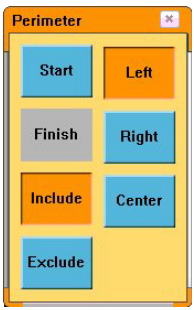
---

2. Touch the **Perimeter** control button. The Perimeter window appears.

3. Touch **Left**, **Center**, or **Right** button to determine if the calculations should start from the left edge, center, or right edge of the swath width.
4. Touch the **Include** button to get the total area calculation.

   or

   Touch the **Exclude** button to subtract the defined area from the total area calculation.



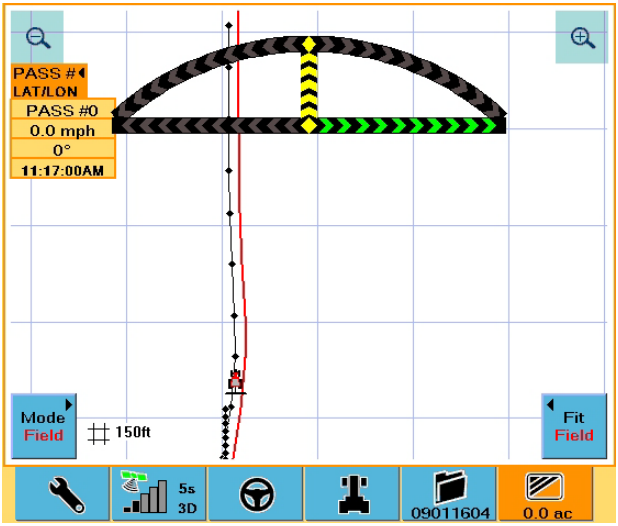
5. Touch the **Start** button. Drive around the outside of the field as accurately as possible. A black dotted line on the screen shows the perimeter line. An approximate area calculation appears at the bottom of the Perimeter control button as the S3 records the perimeter.

   The perimeter automatically closes anytime the vehicle is within a swath width of the perimeter's starting point.
6. To manually close the perimeter at any time, touch the **Perimeter** control button to display the Perimeter window and then touch the **Finish** button.

Note: You should close the perimeter as close to the starting point as possible.

Guidance from a Template Perimeter

When using a previously saved template, the S3 will use the perimeter line to provide steering guidance, if desired. Also, when you want to record a perimeter line for future use as a template, the S3 automatically records all perimeters and flags as part of the template.



Using Mark Flags

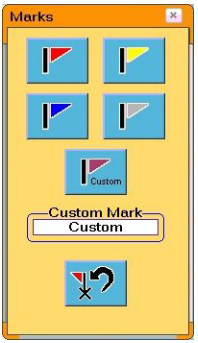
The most useful way to utilize marks is to use them to create sub-areas before and after any changes. A typical use of marks is when applying treatment that requires several refills—you create a mark between each refill and from those marks you can create separate maps of each load. You can also use marks when changing seed depth during planting—drop a mark when you make the change and you can later analyze the two separate areas for yield differences.

Marking a Single Point

You can use marks to record a single point, such as a weed patch. Simply drop a mark and record what it is on a note pad to input into Field Notes software at a later time. Field Notes is available for download from the Outback Guidance website at www.outbackguidance.com.

1. Touch the **Mark Flag** control button. The Marks window appears.

2. Touch the mark button of the desired color. S3 saves the current location and identifies it by the color and by a number. S3 numbers marks in the order you drop them, making later identification easier.
3. Annotate all marks and any other pertinent information about the job on a note pad.
4. After you finish the job, transfer the information to a PC using Field Notes software.



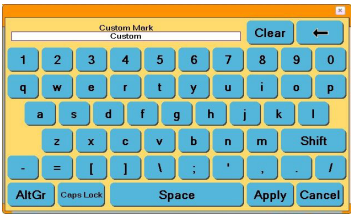
Creating Custom Flags

You can create custom marks to supplement the standard S3 marks.

1. Touch the **Mark Flag** control button. The Marks window appears.
2. Touch the **Custom Mark** field. The Custom Mark window appears.

3. Type the name of the custom mark and then touch the **Apply** button.

   The name you typed appears in the Custom Mark field and on the mark button just above the Custom Mark field.



4. Mark flags (including the custom mark flag, if desired) as outlined in “Marking a Single Point” above.

Example: If you type “testmark” and touch Apply then “testmark” appears in the Custom Mark field and on the flag button above it.

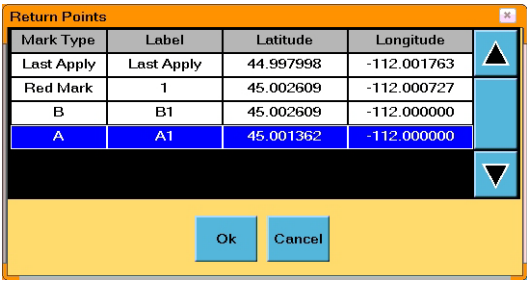
Return to Point Guidance

Return to Point guidance allows you to cancel the current guidance mode and select a point to which to return.

To select a return point:

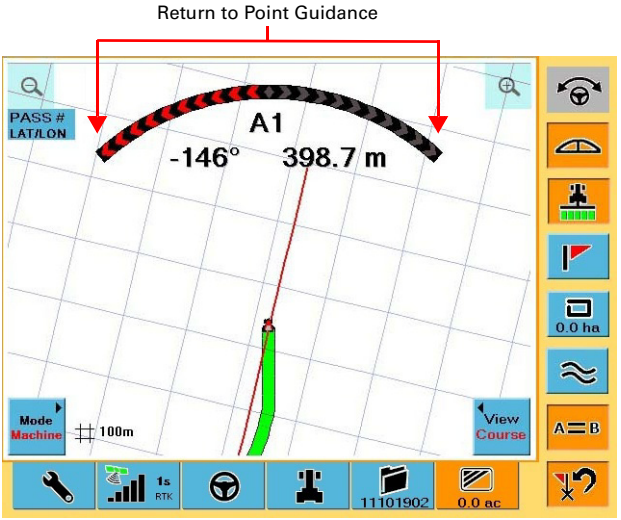
1. Touch the **Return to Point** control button.

The Return Points window appears.



2. Select a Return Point from the list and touch the **Ok** button.

The S3 displays the Return to Point Guidance on the Map screen.



Chapter 5: Differential Correction Types

Overview

Using e-Dif

Overview

This chapter provides an overview of the differential correction types used by the S3. The S3 supports several differential correction types including SBAS (Space Based Augmentation System), e-Dif, LOCRTK, and L-Band.

- For North American distribution SBAS (WAAS) and LOCRTK are the factory installed options. WAAS is free and is available throughout most of North America. To use LOCRTK, you must have an Outback BaseLineX or Outback A220/A221 system.
- For European distribution SBAS (EGNOS) and LOCRTK are the factory installed options. EGNOS, like WAAS, is also free and is available throughout most of Europe. Again, to use LOCRTK, you must have a BaseLineX or A220/A221 system.

If you are in a location that does not have access to SBAS corrections like WAAS or EGNOS, then e-Dif and LOCRTK are the factory installed options. You will not need any additional hardware to use e-Dif. However, to use LOCRTK, you will need a BaseLineX or A220/A221.

Review the following information regarding correction types:

- **LOCRTK**

  LOCRTK, as factory installed, is not pre-activated. To use LOCRTK, you will need a BaseLineX rover unit or A220 smart antenna, a base station, and a one-time subscription code. For more information on using the LOCRTK correction type refer to the BaseLineX, A220, or A221 User Guide (all available from the Outback Guidance website at www.outbackguidance.com).

- **e-Dif**

  S3's e-Dif application comes with a pre-activated one-time primary subscription that you can use anywhere in the world. e-Dif should be used only for relative guidance applications and is not recommended for data recording and subsequent comparative analysis. Relative positional accuracy will typically drift at a rate of 1-2 m (3-6.5 ft) per hour making pass to pass accuracy for broad-acre applications acceptable. However, absolute positional accuracy errors may approach ±10 m (±33 ft).

- **RTK/BaseLineX**

  Real Time Kinematic (RTK) technology provides high levels of positional accuracy. RTK technology uses a base receiver on a site of known coordinates and broadcasts corrections to a rover unit.

  BaseLineX and A221 offer Differential GPS (DGPS) that uses RTK technology. Both use a base station (stationary) to broadcast corrections over a wireless link to a rover radio (mobile) or multiple rover radios. The localized corrections from the base station are processed in the rover GPS system to achieve accuracy and repeatability that is not possible with SBAS, beacon, e-Dif or most other differential correction methods.

  One of the advantages of using BaseLineX or A221 is that one base station can be used with multiple rover radios.

  For more information on BaseLineX or A221 refer to the BaseLineX or A221 User Guide (both available from the Outback Guidance website at www.outbackguidance.com).

Using e-Dif

e-Dif uses only the standard GPS satellites and does not require an external correction signal of any type.

e-Dif generates internal differential corrections based on the starting location. The differential corrections are modeled over time and applied to the GPS data to maintain a consistent relative position. This technique is stable and accurate within short time frames, making it perfect for progressive pass-to-pass guidance. As long as each pass is within a few minutes of the last pass, the accuracy performance is very good.

Selecting e-Dif

1. Touch the **GPS** tab.
2. Touch the **Setup** button.
3. In the *Choose GPS Application* area touch the **e-Dif** button (the e-Dif button along the right of the screen is now active).

Initialization of the S3 on Powerup

After powerup the S3 must track GPS satellites for approximately 10 minutes before it can generate differential corrections. The vehicle may be moving or stationary during this time but the antenna should have a clear view of the sky.

While tracking, on the GPS Details screen the e-Dif Status field displays “Waiting” and an estimate of how much longer it will take to start generating corrections. The GPS Status field displays “Warming Up” during this period (see Figure 5-1).

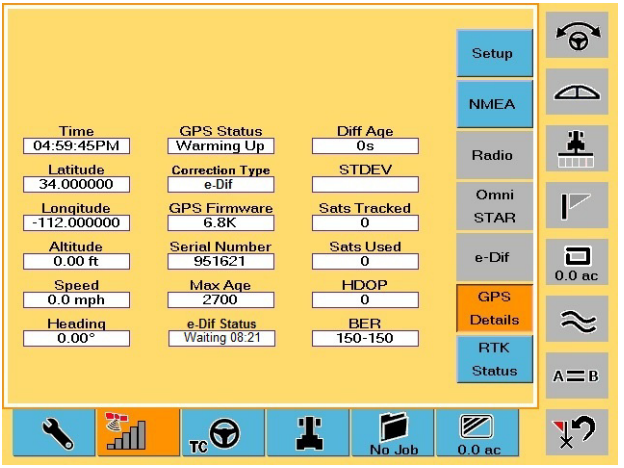


Figure 5-1: e-Dif status information on GPS Details screen

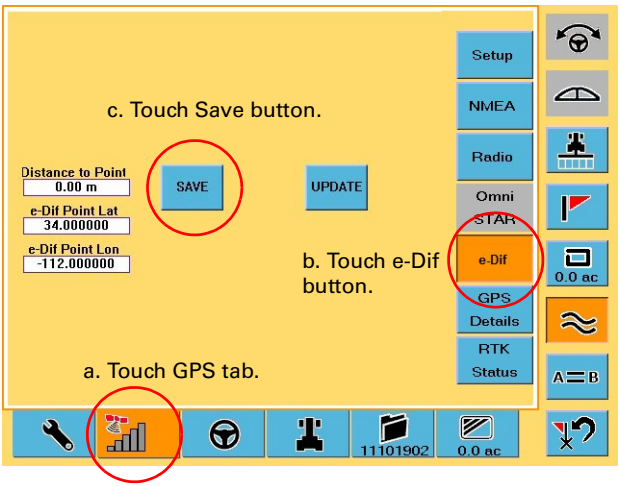
When the S3 has finished tracking, the GPS Status field displays “Ready.”

Updating e-Dif

If a job is interrupted and suspended, for hours or days for example, you need to be able to restart the job at the point (exact location) at which it was suspended. An update procedure enables you to return to that point and update e-Dif.

You record (and physically mark as a backup) the point at which the job is suspended. When you are ready to resume the job, you use S3 guidance to return to that point (which you can confirm with your physical marker). Once at that point, you update the e-Dif correction and restart where you left off.

1. At the point at which the job is suspended:
   a. Touch the **GPS** tab.
   b. Touch the **e-Dif** button.
   c. On the e-Dif screen touch the **Save** button. The S3 records the vehicle's exact location.

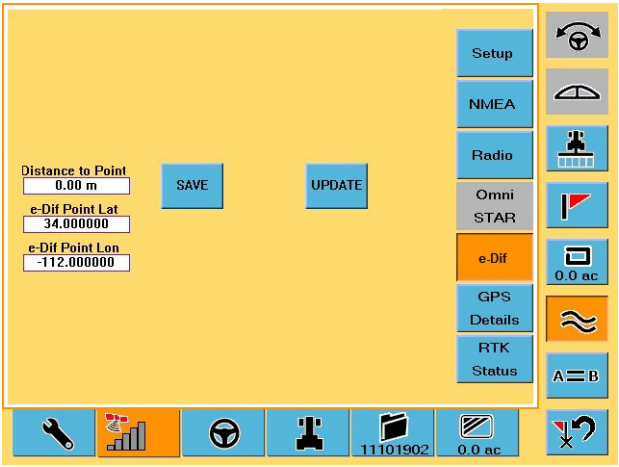


2. Touch the **Close** button on the Job screen to save the current job.

3. Place a physical marker at the exact location as required (recommended).
4. When you are ready to resume the job select the job using the Job screen. See "Loading or Deleting Job Data" on page 45 for how to select a job.
5. Select the Last Spray Point in the Return Points window. See "Returning to a Previously Recorded Point" on page 36 for more information.

   The S3 guides you back to the point where it last logged any job data. Since it is important to return to the exact physical location, Hemisphere GPS recommends you use S3 guidance and your physical marker to return to that exact location.
6. When you reach that exact location (the return point) stop the vehicle and confirm the S3 is not logging data.

7. Touch the **GPS** tab and then touch the **e-Dif** button to display the e-Dif Setup screen. Confirm you have reached the exact location using the Distance to Point field.



8. Touch the **Update** button. The S3 resets the e-Dif correction.
9. Resume guidance by touching either the **Straight Guidance** control button or the **Contour Guidance** control button.

Chapter 6: Communicating with Third Party Applications

Available Applications

Changing Default Settings

Available Applications

You can share Outback DGPS signals with third-party mobile applications. Any application designed to receive DGPS signals from an external receiver over an RS-232 serial interface using either NMEA 0183 or RTCM will work with the S3. NMEA 2000 messages are also available over the CAN bus. Various cables and kits are available for specific applications such as yield monitors, rate controllers, laptops, PDAs, etc. For successful communication both the S3 and the external application must be configured to communicate similarly. Many applications can use the default settings, while some applications may require changes to the default settings.

Changing Default Settings

You use the NMEA screen (Figure 6-1) to change the default communication settings.

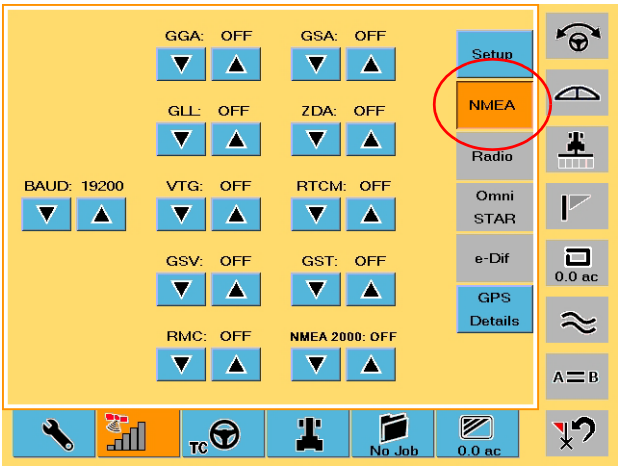


Figure 6-1: NMEA screen

To display the NMEA screen:

- On the GPS tab touch the **NMEA** button.

The following options are available: (Default options are in bold)

BAUD: 57600, 19200, 9600, **4800**
GGA RATE: OFF,.2 Hz, **1 Hz**, 5 Hz, 10 Hz
GLL RATE: **OFF**,.2 Hz, 1 Hz, 5 Hz
VTG RATE: OFF,.2 Hz, **1 Hz**, 5 Hz
GSV RATE: **OFF**,.2 Hz, 1 Hz
RMC RATE: **OFF**,.2 Hz, 1 Hz, 5 Hz
GSA RATE: **OFF**,.2 Hz, 1 Hz
ZDA RATE: **OFF**,.2 Hz, 1 Hz, 5 Hz
RTCM RATE: **OFF**, 1 Hz
GST RATE: **OFF**,.2 Hz, 1 Hz, 5 Hz
NMEA 2000: **OFF**, ON (CAN output messages)

If you select a higher output rate (5 HZ or 10 HZ), you must also select a faster NMEA PORT BAUD (57600 or 19200) for proper communication.

Appendix A: Basic Troubleshooting

Testing Antenna Voltage

Checking the SBAS Differential Signal by Verifying the BER

Testing Antenna Voltage

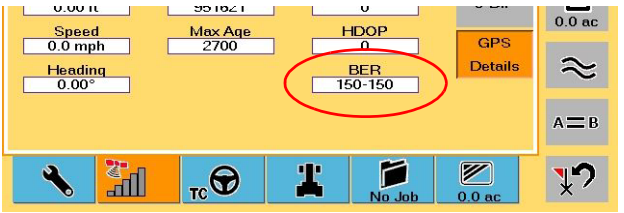
The S3 antenna is an “active” antenna that requires power to operate. Power is supplied to the antenna via the coaxial cable connecting it to the S3. Testing the antenna voltage can ensure the S3 receiver is supplying power to the antenna and verify the antenna cable is not damaged.

To test antenna voltage:

1. Turn off the S3 and then disconnect the antenna cable from the S3 antenna.
2. Turn on the S3.
3. Using a voltmeter set to VDC, measure the voltage output across the antenna cable. It should measure +5 VDC between the center conductor and exterior connector shell.
   - If the measurement is +5 VDC across the antenna cable, then neither the cable nor the receiver is damaged (antenna voltage test complete).
   - If the measurement is not +5 VDC across the antenna cable, go to step 4.
4. Turn off the S3 and then disconnect the antenna cable from the S3.
5. Turn on the S3.
6. Using a voltmeter set to VDC, measure the voltage output across the antenna output on the console. It should measure +5 VDC between the center conductor and exterior housing.
   - If the measurement is +5 VDC at the console connector, but not at the end of the antenna cable, the cable is damaged. Replace the antenna cable and return to step 1.
   - If the measurement is not +5 VDC from the S3, contact Outback Customer Service to return the console for servicing.

Checking the SBAS Differential Signal by Verifying the BER

You can check the bit error rate (BER) via the BER field on the GPS Details screen.



BER is a check of the quality of the SBAS correction signal reception and is based on a scale of 0 to 500. BER < 20 is ideal. If BER > 20 verify the antenna has a clear view of the sky to properly find and track correction satellites. When using SBAS for the correction type, S3 tracks one or two correction satellites. Each satellite has a different BER and the value in the BER field represents each value separated by a hyphen.

For example, a value of 8-500 means the S3 has a very good signal on one satellite (BER=8) and is not receiving corrections from the other satellite (BER=500, the lowest reception value). Only one satellite must have a low BER value (less than 20) to provide differential corrections.

Appendix B: Frequently Asked Questions

About GPS Guidance
About Outback S3

About GPS Guidance

Q: What is GPS?

A: Global Positioning System (GPS) is a satellite-based signal operated by the U.S. Department of Defense and is available to anyone to provide position information to receivers on the ground. Several satellites are used by the receiver to pinpoint the exact position.

Q: What is DGPS?

A: DGPS stands for differential GPS (or differential correction GPS). It means that a second signal is used to correct inherent errors in the GPS signal making it even more precise. S3 can utilize SBAS, e-Dif, or RTK corrections.

Q: What is WAAS?

A: Wide Area Augmentation System (WAAS) is a satellite-based correction signal operated by the U.S. Federal Aviation Administration that is free to those who use it. WAAS provides relatively uniform accuracy and coverage from the Arctic Ocean to Hawaii to the mid-Caribbean to the mid-Atlantic and the shores of Greenland. Other SBAS systems, such as EGNOS (Europe) and MSAS (Japan), offer corrections in other areas of the world. For more information about WAAS go to http://gps.faa.gov/.

Q: What is LOCRTK?

A: LOCRTK is a proprietary localized differential correction signal generated by a BaseLineX system consisting of a stationary base station receiver that broadcasts the LOCRTK corrections over a radio link to a moving rover receiver.

Q: What is e-Dif?

A: Hemisphere GPS' patented e-Dif technology is capable of achieving GPS accuracies of a few feet without the need for a differential signal broadcast. e-Dif generates internal differential corrections based on the starting location—these corrections are modeled over time and applied to the GPS data to maintain a very consistent relative position. You can use e-Dif over long time periods with minimal accuracy drift or return to the starting location at any time to update the differential corrections.

Q: How accurate is S3 DGPS?

A: Using SBAS corrections and operating under normal conditions (where each subsequent pass is being made within minutes of the last), swath to swath accuracy is just a few inches. The more time elapsed from one pass to the next may reduce accuracy.

Q: What about foam markers and disk markers?

A: The answer is … use them if they help. The best guidance is what works for you. The more visual indicators to guide from the better; however, GPS guidance will be the primary guidance means and everything else will be secondary.

Q: Can I plant using GPS guidance?

A: GPS guidance is a great planting aid, especially for making the straightest rows possible. Outback Guidance recommends differential GPS (like RTK) to provide you with every possible advantage.

Q: How does weather affect the GPS signal?

A: Rain, sleet, snow, thunderstorms, and wind normally do not affect the GPS signal. Lightning is not a problem unless it is a close strike—direct lightning strikes will damage the S3. Snow and ice accumulation on the antenna may also cause problems.

Q: How do power transmission lines affect the GPS signal?

A: Normally, high voltage power transmission lines do not affect the GPS signal at all.

About Outback S3

Q: What's the difference between Steering Guide and Current Position?

A: Steering Guide calculates the nose heading for you to steer to correctly follow the intended path. Current Position only reports the distance left or right of the intended path. You drive using the Steering Guide and check results using Current Position.

Q: Can I use S3 as a receiver for other uses?

A: Yes. S3 accommodates NMEA 0183 serial and NMEA 2000 CAN communication protocols. Contact your Outback Guidance dealer for the latest compatibility list.

Q: How long does it take S3 to obtain a usable signal?

A: It normally takes 1 - 3 minutes. S3 first acquires the GPS signal (“3d” appears on the GPS tab). Next, S3 acquires the DGPS correction (“3D” appears on the GPS tab). S3 takes 10 minutes to generate e-Dif corrections and, for RTK corrections, it may take 15 minutes of consistent corrections to establish an RTK lock. The vehicle can be in motion during this process.

Q: Does the S3 have memory?

A: S3 records all movement as long as guidance is on. When you pause a job using either the Run/Hold Floor Switch or the Apply control button, no data is recorded. S3 can record up to 30 hours of data for a single job. When the job is finished, S3 automatically saves the job data. Historical data for each job is collected and stored on the system. You can import, export, or erase all data on the Job screen.

Q: How do I erase memory?

A: To erase the memory in the S3, touch or click the Jobs button on the Job tab. The Manage Jobs screen appears. Select the job to delete and touch the Delete button. To delete all the recorded job data touch the Delete All button. Touch the Yes button to continue or touch the No button to cancel.

Q: What is Straight Guidance?

A: In straight guidance mode S3 generates straight, parallel lines. S3 locks on the closest line based on the first A-B pass and the entered swath width and then records the actual movement over those lines while guiding. You can generate a new A-B line at any time with S3. You can also use straight guidance to create circular (pivot) rows.

Q: What is Contour Guidance?

A: In contour guidance mode S3 records all movement as the machine moves around, unless you pause S3 using the Run/Hold Floor Switch or the Apply control button. During the initial pass, no guidance is given. When you make a second pass and subsequent passes, S3 guides along the previous pass.

Q: Can I switch from Straight to Contour in one job?

A: You can switch back and forth between straight and contour modes, as needed. When the S3 is in contour guidance mode, it follows any pass (straight, circular, or contour) recorded in the current job.

Q: How do I perform headlands?

A: On the Vehicle screen, set the Headlands Alert field to "On". The headlands alert icon flashes and an audio alarm sounds anytime the current pass (swath width) crosses a previously applied area.

Q: How do I mark the A-B Line?

A: When performing straight passes, you define the initial pass by marking two points in the field. S3 generates a line through the two points defining the first pass. Since you can work passes in any order, you can define the A-B line along the edge of the field, down the middle of the field, or at any point in between. You define the A-B line in two ways: marking Point A at the beginning of the initial pass and marking Point B at the end **or** marking Point A at the beginning of the initial pass and entering a desired heading.

Q: Can the S3 store a waypoint?

A: You can store a waypoint to guide back to that point. Waypoints are used primarily when a job is paused. For example, when stopping for a refill you would pause the job, save the point, and return back to that point to resume. S3 automatically records multiple points you can use as waypoints, including the last point any data was recorded. You can also drop a flag to mark a waypoint and the S3 can guide to it.

Q: How is the console mounted?

A: The console, equipped with a Ram Ball mount, mounts directly on a rail using the enclosed U-bolts.

Q: Does bright sunlight affect the display?

A: Day and Night display modes makes the display screen easily viewable in any ambient light situation. You can also use the brightness option on the Display screen to further adjust the display.

Q: How is the antenna mounted?

A: Mount the antenna along the front edge of the top of the cab on the exact center line of the vehicle. Avoid close proximity to a transmitting radio antenna. Do not drill holes in the cab roof. Use the adhesive plate provided for mounting. Additional plates are available for multiple vehicles.

Q: How does the S3 account for implement lag in turns?

A: S3 does not account for implement lag—it assumes turning lag will be approximately the same on each pass. As long as tractor spacing is correct, implement spacing will follow. This also applies to side hills. Do not attempt to put the antenna on the implement to account for lag.

Q: What electrical power do I need for the S3?

A: A standard DC power supply of 9 to 16 VDC is required. Current is 1.5 A at 12 VDC. S3 is not damaged by reverse polarity (positive to negative), but it will not operate.

Appendix C: S3 Screen Description Reference

Setup Tab
GPS Tab
Steering Tab
Vehicle Tab
Job Tab
Map Tab

This appendix provides descriptions of each S3 screen (including descriptions of each button and field on the screens). Your screens may vary depending on the application and/or system components (such as eDriveTC/eDriveVSi or eDriveX) being used.

Setup Tab

The Setup tab provides access to the System, Display, and Codes screens.

System Screen

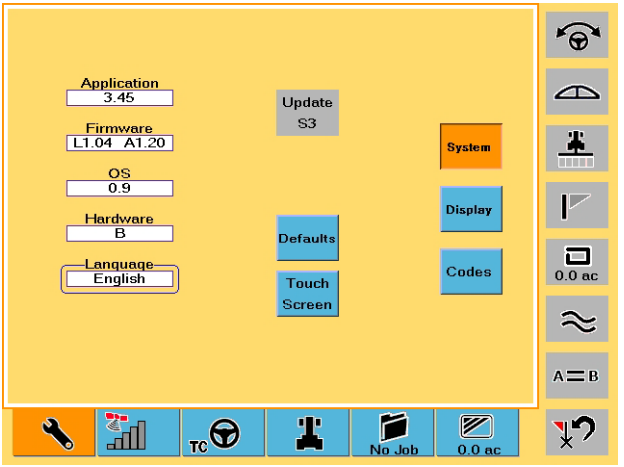


Table C-1: System screen button and field descriptions

Button/Field	Description
Application 3.45	Application field Version of the application software the S3 system is running.
Firmware L1.04 A1.20	Firmware field Version of the firmware the S3 system is running.
OS 0.9	OS field Version of the operating system the S3 system is running.
Hardware B	Hardware field Hardware version of the S3.
Language English	Language field Language currently in use on the S3.
Defaults	Defaults button Restores S3 to default values.
Touch Screen	Touch Screen button Starts the touch screen calibration process.

Display Screen

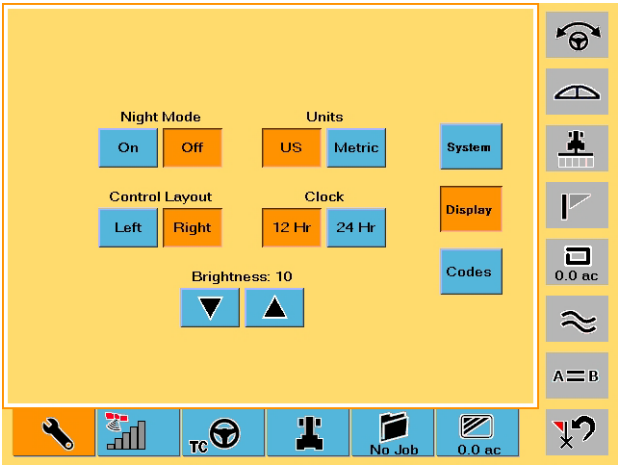
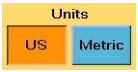
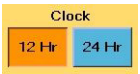


Table C-2: Display screen button and field descriptions

Button/Field	Description
	Night Mode buttons Set the display for viewing in daytime or nighttime lighting.
	Control Layout buttons Set the control buttons on either the left or the right side of the screen for your preferred access.
	Units buttons Set the unit of measurement (US or Metric) in which the system displays and records all measurements.
	Clock buttons Set the clock to either a 12-hour or 24-hour format.
	Brightness buttons Adjust the display brightness—range is 1 (dim) to 10 (bright).

Codes Screen

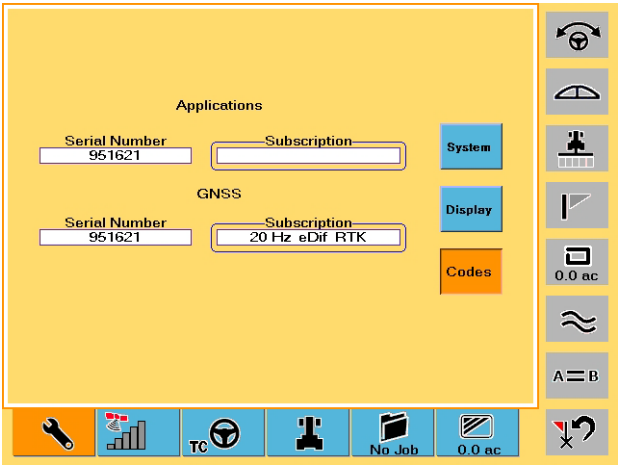


Table C-3: Codes screen button and field descriptions

Button/Field	Description
Serial Number 951621	Serial Number (Applications) Serial number of the S3.
Subscription	Subscription (Applications) Application to which you are subscribed (such as eTurns™).
Serial Number 951621	Serial Number (GNSS) S3 serial number, unless A220 is connected (will show A220 serial number in this instance).
Subscription 20 Hz eDif RTK	Subscription (GNSS) GNSS applications to which you are subscribed.

GPS Tab

The GPS tab provides access to the Setup, NMEA, Radio, L-Band, e-Dif, and GPS options screens.

Setup Screen

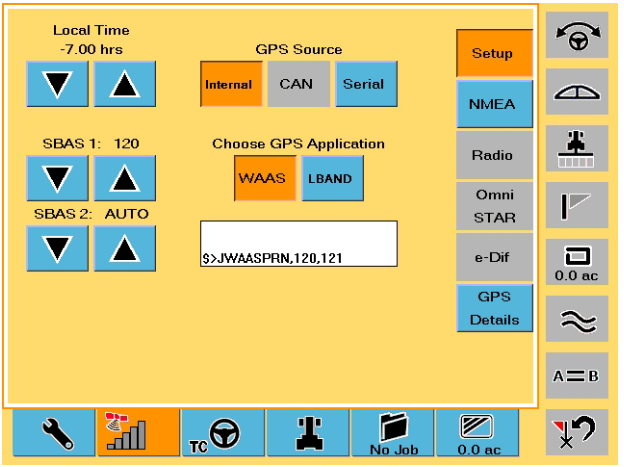


Table C-4: Setup screen button and field descriptions

Button/Field	Description
	Local Time buttons Set the system clock to the local time.
	SBAS 1 Change 1 of 2 SBAS satellites used in the system's position calculation. The default value is Auto, which allows the S3 to automatically select from the available satellites.
	SBAS 2 Change 2 of 2 SBAS satellites used in the system's position calculation. The default value is Auto, which allows the S3 to automatically select from the available satellites.
	GPS Source Select the GPS source: • Internal • CAN • Serial (S3 uses GPS data from the RS-232 source instead of from the internal Crescent receiver) • Radio—see "Radio Screen" on page 75 for more information on setting radio options

Table C-4: Setup screen button and field descriptions (*continued*)

Button/Field	Description
	Choose GPS Application Sets the differential correction type S3 uses to calculate a position. Available options depend on what is installed on your S3 (WAAS, SBAS, LBAND, RTK, etc.). See Chapter 5, “Differential Correction Types” for more information on differential corrections.
	Message window Displays system-generated messages. The system messages are useful when performing diagnostics. Refer to the Hemisphere GPS Technical Reference (go to www.hemispheregps.com/support and click the GPS Reference icon) has detailed information on system generated messages.

NMEA Screen

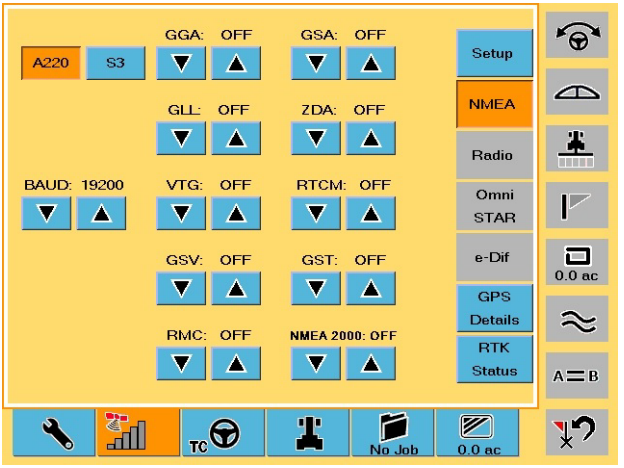
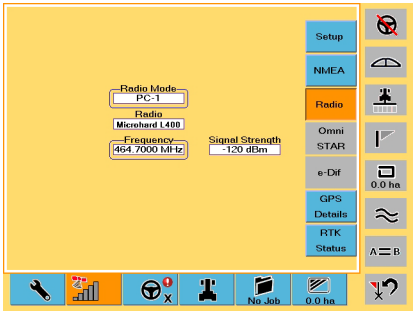


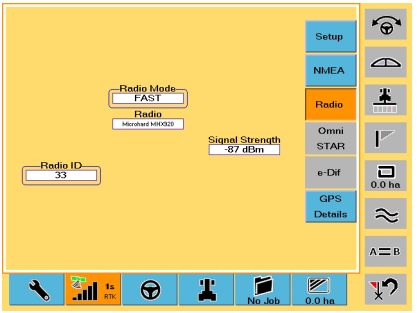
Table C-5: NMEA screen button and field descriptions

Button/Field	Description
	Device selection buttons Select the device for which you want to set baud/message rates.
	BAUD buttons Adjust the baud rate up or down.
	Message buttons (GGA buttons shown at left) GGA,GLL,VTG,GSV,RMC,GSA,ZDA,RTCM,GST,NMEA 2000 Each message button allows you to turn that message on (and select the rate) or off.

Radio Screen

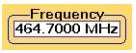
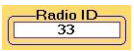
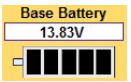


Microhard L400 radio



Microhard MHX920 radio

Table C-6: Radio screen button and field descriptions

Button/Field	Description
	Radio Mode field Refer to your antenna user guide for additional details on this field.
	Radio field (read-only) Radio installed in your antenna.
	Signal Strength field (read-only) Displays the strength of the radio signal.
	Frequency field Set the radio frequency.
	Radio ID field Set the radio receiver channel.
	Base Battery field (only appears when using BaseLine) Radio battery voltage and charge level (5 bars = 100%, 4 bars = 80%, 3 bars = 60%, 2 bars = 40%, 1 bar = 20%, and no bars indicate that the battery needs to be charged).

L-Band Screen

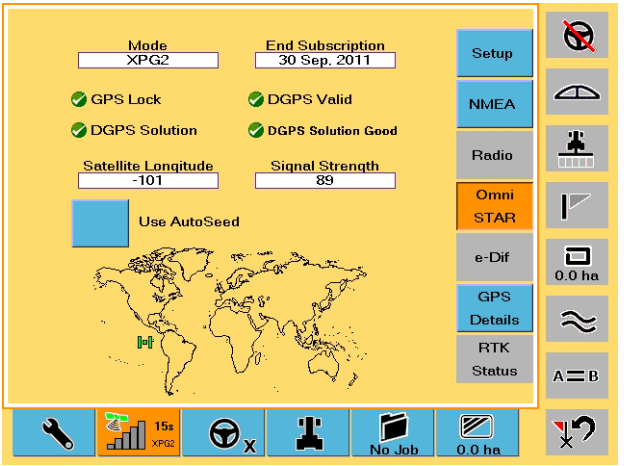


Table C-7: L-Band screen button and field descriptions

Button/Field	Description
Mode XPG2	Mode field L-Band level of service (purchased from provider).
End Subscription 30 Sep, 2011	End Subscription field Subscription expiration date.
GPS Lock DGPS Valid DGPS Solution DGPS Solution Good	Status indicators (green check mark indicates good status; red exclamation point indicates poor status): • GPS Lock • DGPS Valid • DGPS Solution • DGPS Solution Good
Satellite Longitude -101	Satellite Longitude field Satellite location (longitude) that covers the area in which you will be working.
Signal Strength 89	Signal Strength field Strength of L-Band signal.
Use AutoSeed	Use Autoseed button Improves convergence time when on (checks if receiver has moved when it was last powered down and uses that location if it has not moved).

e-Dif Screen

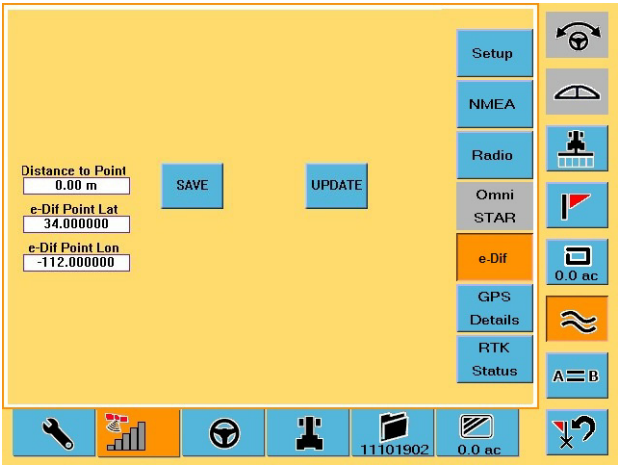


Table C-8: e-Dif screen button and field descriptions

Button/Field	Description
Distance to Point 0.00 m	Distance to Point Displays the distance from the vehicle's current position to the last point that e-Dif was saved.
e-Dif Point Lat 34.000000	e-Dif Point Lat Latitude of the point where e-Dif was last saved.
e-Dif Point Lon -112.000000	e-Dif Point Lon Longitude of the point where e-Dif was last saved.
SAVE	Save button Save the current location.
UPDATE	Update button Update e-Dif to the current location.

GPS Details Screen

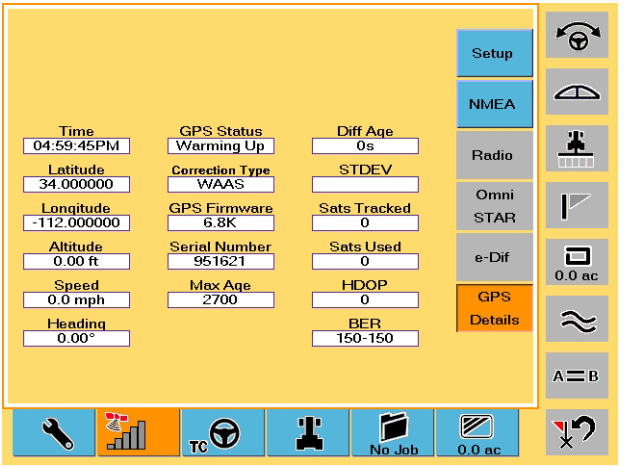
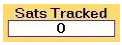
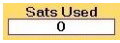
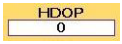


Table C-9: GPS Details screen button and field descriptions

Button/Field	Description
Time 04:59:45PM	Time Current time.
Latitude 34.000000	Latitude Vehicle's current latitudinal position.
Longitude -112.000000	Longitude Vehicle's current longitudinal position.
Altitude 0.00 ft	Altitude Vehicle's current altitude.
Speed 0.0 mph	Speed Vehicle's current speed.
Heading 0.00°	Heading Vehicle's current heading in degrees.
GPS Status Warming Up	GPS Status Status of the GPS receiver to receive GPS differential corrections.
Correction Type WAAS	Correction Type Type of differential correction being used. There are two GPS applications loaded into the receiver. SBAS (WAAS) and LOCRTK are the factory installed options for North America. Other types may be field-installed.
GPS Firmware 6.8K	GPS Firmware GPS firmware version used by the S3.

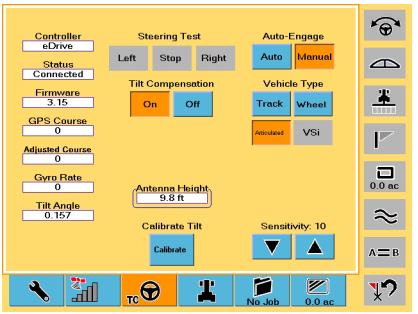
Table C-9: GPS Details screen button and field descriptions (*continued*)

Button/Field	Description
	Serial Number Serial number of the receiver (it should match the number on the serial number tag on the back of the S3).
	Max Age Maximum time (in seconds) the GPS receiver can maintain a differential lock after differential corrections are lost.
	Diff Age Age of the corrections used in the DGPS calculation. For LOCRTK, optimal operating values are < 5 seconds. Values > 120 seconds require acquiring a new RTK lock. Values > 5 seconds will cause the radio icon to appear as an "X". For SBAS, the DiffAge is typically 6 to 10 seconds.
	STDEV Pseudo-estimate of the DGPS solution accuracy determined as the RMS value of the positional residual errors. STDEV is valid only if 6 or more satellites are used in the solution calculation. Typical values for SBAS correction are 0.5 ft – 1.5 ft (0.15m – 0.45m). Typical values for RTK corrections are < 0.1 ft (3 cm).
	Sats Tracked Number of satellites currently visible in the sky (this is only GPS satellites and does not include the correction satellites).
	Sats Used Number of satellites used to calculate the position.
	HDOP (Horizontal Dilution Of Precision) The influence of the current GPS satellite constellation geometry on the horizontal accuracy of the position solution. Lower HDOP values indicate better geometry. Typical valves are 0.8 – 2.0.
	BER Relative strength of the correction satellites. In the case of WAAS, two numbers are shown separated by a hyphen. The number can be from 0 to 500, with 0 being the best and 500 being the worst.

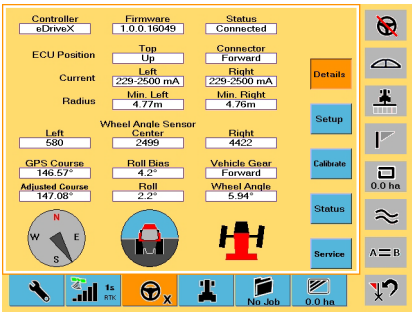
Steering Tab

The fields that appear on the Steering screen depend on whether you have an automated steering component installed and connected to the S3 and the type of automated steering component (eDriveTC/eDriveVSi or eDriveX).

Refer to either the eDriveTC User Guide or the eDriveX User Guide (both available for download from www.outbackguidance.com) for more information about the fields on the Steering screen.



eDriveTC or eDriveVSi



eDriveX

Vehicle Tab

Table C-10: Vehicle screen button and field descriptions

Button/Field	Description
Swath Width 65.62ft	Swath Width S3-generated value that is the sum of the Machine Width and the Skip/Overlap values.
Machine Width 65.62ft	Machine Width Width of the vehicle or implement for the current job. Touch this field to display the Edit Machine Width window where you enter the machine width and then touch OK.
Skip/Overlap 0.0ft	Skip/Overlap Set this value to drive a pattern where rows intentionally skip or overlap. Touch this field to display the Edit Skip/Overlap window where you touch the appropriate button (Skip or Overlap), enter a value, and then touch OK. When you touch the Skip button or Overlap button the Edit Skip/Overlap window visually displays a skip or overlap. For an example of setting field values on the S3 see “Setting the Fore/Aft Offset” on page 23. When you enter a skip or overlap the Map screen shows this as an area between swaths in the green coverage lines, where a skip is as the white area between swaths and an overlap is the dark green overlap between swaths.

Table C-10: Vehicle screen button and field descriptions (*continued*)

Button/Field	Description
	Left/Right Offset Distance between the GPS antenna centerline and the vehicle or implement centerline and used to correct for an antenna that is not installed on the vehicle or implement centerline. Set to the right or left. Touch this field to display the Left/Right Offset window where you touch the appropriate button (Left or Right), enter a value, and then touch OK. When you touch the Left button or Right button the Left/Right Offset window visually displays a left offset or right offset. For an example of setting field values on the S3 see “Setting the Fore/Aft Offset” on page 23.
	Fore/Aft Offset Fore or aft offset of the antenna from any implement. If the implement is in front of the vehicle, such as on a harvester, enter the distance between the implement and the antenna as a fore offset. If the implement is located behind the vehicle, such as a drawn planter, enter the distance as an aft offset. For instructions on setting a fore or aft offset see “Setting the Fore/Aft Offset” on page 23.
	Lightbar Reaction speed of the virtual lightbar (manual guidance indicator sensitivity). Set to Low, Med (Medium) or High.
	Headland Alert Notifies you with an audible beep when the machine enters a previously worked area. Set to On or Off.
	Lines Guidance lines display a regular pattern over an area by which to guide. There are three line display options available: Off, AB, and Grid. When Grid is selected the spacing between the pass lines is equal to the swath width. The distance between the grid lines is based on the value set in the Grid Spacing field. See “Creating Guidance Lines” on page 49 for more information on using this feature.
	Grid Spacing Set the distance between the grid lines on the Map screen. See “Grid” on page 50 for more information.

Job Tab

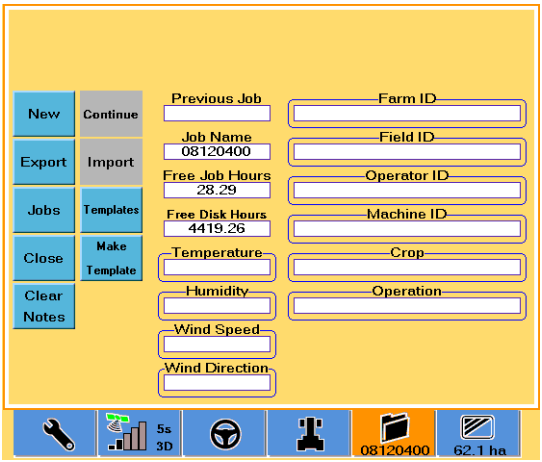
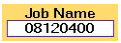
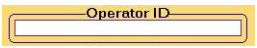
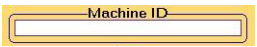
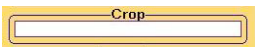
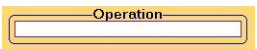
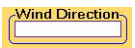


Table C-11: Job screen button and field descriptions

Button/Field	Description
New	New button Begin a new job. The number in the Job Name field and on the bottom of the Job tab change.
Continue	Continue button Continue the most recent job. The most recently closed job (and all its data) is activated.
Export	Export button Export selected job data to a USB drive.
Import	Import button Import job data from a USB drive.
Jobs	Jobs button Load jobs to or delete jobs from the S3.
Templates	Templates button Load templates to or delete templates from the S3.
Close	Close button Close and save the current job.
Make Template	Make Template button Create a template from a selected job.
Clear Notes	Clear Notes button Clear the contents of all job annotation fields (Farm ID, Field ID, Operator ID, Machine ID, Crop, Operation, Temperature, Humidity, Wind Speed, and Wind Direction).

Table C-11: Job screen button and field descriptions (*continued*)

Button/Field	Description
	Previous Job field Display the last job recorded in the S3.
	Farm ID field Set name or number of the farm where the job is performed.
	Job Name field Display the system-generated job number.
	Field ID field Set name or number of the field where the job is performed.
	Free Job Hours field Display the available job hours on the S3.
	Operator ID field Set the name or ID # of the machine operator.
	Free Disk Hours field Display the available hours of memory storage on the S3.
	Machine ID field Set the name or ID# of the machine.
	Temperature field Set the outside temperature.
	Crop field Set the type of crop being worked.
	Humidity field Set the humidity during the job.
	Operation field Set the type of operation performed (planting, tilling, etc.).
	Wind Speed field Set the wind speed during the job.
	Wind Direction field Set the direction of the wind during the job.

Map Tab

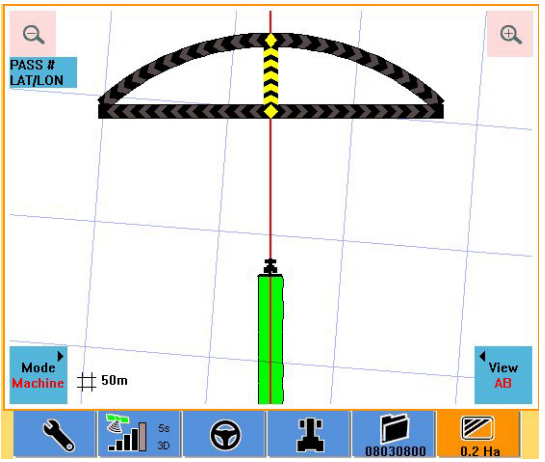


Table C-12: Map screen button and field descriptions

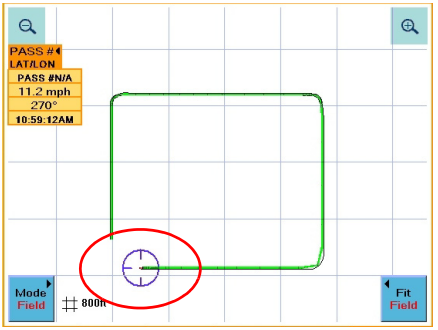
Button/Field	Description
	Zoom In and Zoom Out buttons Allow you to zoom in and zoom out of the view. When you zoom out a cross hairs symbol indicates the position of the vehicle. 

Table C-12: Map screen button and field descriptions (*continued*)

Button/Field	Description
	Pass #/Lat/Lon button Works as a toggle between displaying either pass information or location information. A black arrow appears to the right of the currently selected information. When PASS is selected touch to display the following information (example at right): • Current pass you are driving (#5 at right) • Current speed (0.0 kph at right) • Angle of direction (320° at right) • Current time (02:49:15PM at right)  When LAT/LON is selected touch to display the following information (example at right): • Vehicle latitude (LAT at right) • Vehicle longitude (LON at right) • Vehicle altitude (ALT at right) 
	Mode button Select the mode; available modes are machine or field.
	View/Fit button Select the view; available views are: • AB, Course, North, 3D for Machine mode • Machine, Fit for Fit mode

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LIMITED WARRANTY: Hemisphere GPS warrants solely to the end purchaser of the Products, subject to the exclusions and procedures set forth below, that the Products sold to such end purchaser and its internal components shall be free, under normal use and maintenance, from defects in materials, and workmanship and will substantially conform to Hemisphere GPS's applicable specifications for the Product, for a period of 12 months from delivery of such Product to such end purchaser (the "Warranty Period"). Repairs and replacement components for the Products are warranted, subject to the exclusions and procedures set forth below, to be free, under normal use and maintenance, from defects in material and workmanship, and will substantially conform to Hemisphere GPS's applicable specifications for the Product, for 90 days from performance or delivery, or for the balance of the original Warranty Period, whichever is greater.

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LIMITATION OF REMEDIES. The purchaser's EXCLUSIVE REMEDY against Hemisphere GPS shall be, at Hemisphere GPS's option, the repair or replacement of any defective Product or components thereof. The purchaser shall notify Hemisphere GPS or a Hemisphere GPS's approved service center immediately of any defect. Repairs shall be made through a Hemisphere GPS approved service center only. Repair, modification or service of Hemisphere GPS products by any party other than a Hemisphere GPS approved service center shall render this warranty null and void. The remedy in this paragraph shall only be applied in the event that the Product is properly and correctly installed, configured, interfaced, maintained, stored, and operated in accordance with Hemisphere GPS's relevant User's Manual and Specifications, AND the Product is not modified or misused. NO OTHER REMEDY (INCLUDING, BUT NOT LIMITED TO, SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR CONTINGENT DAMAGES FOR LOST PROFITS, LOST SALES, INJURY TO PERSON OR PROPERTY, OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL LOSS) SHALL BE AVAILABLE TO PURCHASER, even if Hemisphere GPS has been advised of the possibility of such damages. Without limiting the foregoing, Hemisphere GPS shall not be liable for any damages of any kind resulting from installation, use, quality, performance or accuracy of any Product.

HEMISPHERE IS NOT RESPONSIBLE FOR PURCHASER'S NEGLIGENCE OR UNAUTHORIZED USES OF THE PRODUCT. IN NO EVENT SHALL HEMISPHERE GPS BE IN ANY WAY RESPONSIBLE FOR ANY DAMAGES RESULTING FROM PURCHASER'S OWN NEGLIGENCE, OR FROM OPERATION OF THE PRODUCT IN ANY WAY OTHER THAN AS SPECIFIED IN HEMISPHERE GPS'S RELEVANT USER'S MANUAL AND SPECIFICATIONS. Hemisphere GPS is NOT RESPONSIBLE for defects or performance problems resulting from (1) misuse, abuse, improper installation, neglect of Product; (2) the utilization of the Product with hardware or software products, information, data, systems, interfaces or devices not made, supplied or specified by Hemisphere GPS; (3) the operation of the Product under any specification other than, or in addition to, the specifications set forth in Hemisphere GPS's relevant User's Manual and Specifications; (4) damage caused by accident or natural events, such as lightning (or other electrical discharge) or fresh/salt water immersion of Product; (5) damage occurring in transit; (6) normal wear and tear; or (7) the operation or failure of operation of any satellite-based positioning system or differential correction service; or the availability or performance of any satellite-based positioning signal or differential correction signal.

THE PURCHASER IS RESPONSIBLE FOR OPERATING THE VEHICLE SAFELY. The purchaser is solely responsible for the safe operation of the vehicle used in connection with the Product, and for maintaining proper system control settings. UNSAFE DRIVING OR SYSTEM CONTROL SETTINGS CAN RESULT IN PROPERTY DAMAGE, INJURY, OR DEATH. The purchaser is solely responsible for his/her safety and for the safety of others. The purchaser is solely responsible for maintaining control of the automated steering system at all times. THE PURCHASER IS SOLELY RESPONSIBLE FOR ENSURING THE PRODUCT IS PROPERLY AND CORRECTLY INSTALLED, CONFIGURED, INTERFACED, MAINTAINED, STORED, AND OPERATED IN ACCORDANCE WITH HEMISPHERE GPS'S RELEVANT USER'S MANUAL AND SPECIFICATIONS. Hemisphere GPS does not warrant or guarantee the positioning and navigation precision or accuracy obtained when using Products. Products are not intended for primary navigation or for use in safety of life applications. The potential accuracy of Products as stated in Hemisphere GPS literature and/or Product specifications serves to provide only an estimate of achievable accuracy based on performance specifications provided by the satellite service operator (i.e. US Department of Defense in the case of GPS) and differential correction service provider. Hemisphere GPS reserves the right to modify Products without any obligation to notify, supply or install any improvements or alterations to existing Products.

GOVERNING LAW. This agreement and any disputes relating to, concerning or based upon the Product shall be governed by and interpreted in accordance with the laws of the State of Arizona.

OBTAINING WARRANTY SERVICE. In order to obtain warranty service, the end purchaser must bring the Product to a Hemisphere GPS approved service center along with the end purchaser's proof of purchase. Hemisphere GPS does not warrant claims asserted after the end of the warranty period. For any questions regarding warranty service or to obtain information regarding the location of any of Hemisphere GPS approved service center, contact Hemisphere GPS at the following address:

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