Hemisphere GPS

Outback S^{ts}

User Guide

Part No. 875-0227-000 Rev. A1

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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Patents

The OUTBACK S™ and S-Lite™ automated navigation and steering guide system is 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.

Notice to Customers

Contact your local dealer for technical assistance. To find the authorized dealer near you, call or write us at:

Warranty Notice

Covered Products

This warranty covers all products manufactured by Hemisphere GPS (the "Products").

Hemisphere GPS Limited Warranty

Hemisphere GPS hereby warrants solely to the end purchaser of the Products, subject to the exclusions and procedures set forth herein below, that the Products sold to such end purchaser shall be free, under normal use and maintenance, from defects in material and workmanship for a period of 12 months from delivery to such end purchaser. Repairs and replacement components 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 for 90 days from performance or delivery, or for the balance of the original warranty period, whichever is greater.

Purchaser's Exclusive Remedy

The end purchaser's exclusive remedy under this warranty shall be limited to the repair or replacement, at the option of Hemisphere GPS, of any defective Products or components thereof. The end user shall notify Hemisphere GPS or a Hemisphere GPS approved service center immediately of any claimed defect. Repairs shall be made through a Hemisphere GPS approved service center only.

Exclusions

Hemisphere GPS does not warrant damage occurring in transit or due to misuse, abuse, improper installation, neglect, lightning (or other electrical discharge) or fresh/salt water immersion of Products. 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. Hemisphere GPS does not warrant claims asserted after the end of the warranty period. Hemisphere GPS does not warrant or guarantee the precision or accuracy of positions 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:

- Specifications provided by the US Department of Defense for GPS Positioning,
- DGPS service provider performance specifications.

Hemisphere GPS reserves the right to modify Products without any obligation to notify, supply or install any improvements or alterations to existing Products.

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THE EXTENT OF HEMISPHERE GPS' LIABILITY FOR DAMAGES OF ANY NATURE TO THE END PURCHASER OR ANY OTHER PERSON OR ENTITY WHETHER IN CONTRACT OR TORT AND WHETHER TO PERSONS OR PROPERTY SHALL IN NO CASE EXCEED, THE AGGREGATE, THE COST OF CORRECTING THE DEFECTIVE ITEM. IN NO EVENT WILL HEMISPHERE GPS BE LIABLE FOR ANY LOSS OF PROFITS, LOSS OF USE OR FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR CONTINGENT DAMAGES, 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 PRODUCTS.

Governing Legislation

To the greatest extent possible, this warranty shall be governed by the laws of the State of Arizona. In the event that any provision hereof is held to be invalid by a court of competent jurisdiction, such provision shall be severed from this warranty and the remaining provisions shall remain in full force and effect.

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. For any questions regarding warranty service or to obtain information regarding the location of any of Hemisphere GPS' approved service centers, contact Hemisphere GPS at the following address:

Hemisphere GPS
8444 N. 90th Street, Suite 130
Scottsdale, AZ 85258
Phone: 480-348-9919 Fax: 480-348-6370
techsupport@hemispheregps.com
www.hemispheregps.com

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Chapter 5   **Job and Field Management**

End User License Agreement

Safety

I n this user guide, you will see the heading, Warning, and the safety alert symbol. They indicate a hazardous situation that, if not avoided, could result in death or serious injury. The safety messages will provide information to identify a hazard associated with potential injury, and tell you how to avoid it.

You will find some safety messages at the beginning of this user guide. They apply whenever the Outback Sts™ is being used during tractor operation. Other safety messages are located at the beginning of a section for a specific topic (e.g. installation and removal). In other instances, a warning may appear within the text of a particular procedure.

Read and understand the Outback Sts User Guide and all of the safety information before installing, operating, or performing maintenance or service on the Outback Sts. If you install the eDriveTC™ with the Outback Sts, make sure to read and understand the eDriveTC User Guide. Do not allow anyone to operate without instruction. If you have a question or need assistance, contact your local dealer or call Hemisphere GPS at 1-800-247-3808.

Keep this user guide and all related safety information with the manuals for your tractor and other implements.

Important Safety Information

Role of Operator

As with other navigation guidance systems within vehicles, the tractor operator must still pay attention to driving the tractor. To avoid serious injury or death, operators should not be distracted by other tasks and should be prepared to respond to field conditions by resuming control of the direction or speed of travel. The operator must stay seated while the vehicle is moving.

Manual Override

The operator must stop following the path displayed by the Outback Sts if it is unsafe to proceed, such as when an obstacle is in the line of travel

or there is an emergency. To stop following the displayed path, depress the brake or turn the steering wheel in either direction.

Tractor Overturns

Overturns account for the largest number of tractor-related fatalities each year on farms. Overturns are more likely to occur on slopes. The Outback Sts cannot identify environments that pose an increased risk of overturn, only the operator can do this.

Collisions with People and Objects

The second leading cause of tractor-related fatalities occurs when tractors run over people. The Outback Sts cannot identify bystanders or other objects (e.g., trees, fences, boulders, other equipment). The operator must stop following the path guided by the Outback Sts to avoid people and objects.

Operator Position

You must manually control the direction and speed of the tractor. Always remain in the operator's position in the tractor when the Outback Sts is being used.

Safety

Chapter 1: Introducing Outback Sts

T he Outback Sts is the latest addition to the company's Outback Guidance® line of precision farming guidance systems. Combining the most popular features of the market-proven Outback S2™ with a 7 inch, high resolution color touch screen, Outback Sts offers performance with the simplistic approach to guidance, visual awareness, and job and file management as seen in the Outback S3™. This powerful combination will be the platform for years of future upgrades and additions.

If you are a first time user of Outback products, please acquaint yourself with these simple step-by-step instructions. You will find many useful tips and suggestions to help you get the most from your investment.

If you are a seasoned Outback user, you will immediately appreciate the numerous enhancements that have been made, most notably the color touch screen. Hemisphere GPS suggests that you acquaint yourself with these new features.

The accuracy and functionality of Outback Sts is extended by using it in combination with the Outback eDriveTC GPS assisted steering system.

Once eDriveTC is engaged, it uses GPS technology to automatically steer the vehicle. As a result it provides more uniform treatments, extends hours of operation, and requires less driver skill. Not only does eDriveTC steer more accurately than humanly possible, it now includes the Tilt Compensation (TC) feature. Tilt Compensation corrects for GPS position errors caused when driving on slopes in the terrain. This compensation is essential for precision applications.

Outback Sts also works with Outback AutoMate™, an automatic boom control system that monitors and controls individual sprayer sections to minimize overlaps and skips.

What's Included

The Outback Sts system comprises the following components:

- Sts (touch screen) console assembly

- Antenna assembly

- Power cable

- Antenna cable

- Antenna mounting plate

- RAM suction cup twist lock mount

- Run/Hold floor switch (not shown - optional, see "Appendix B: Optional Floor Switch & Cable" on page 121)
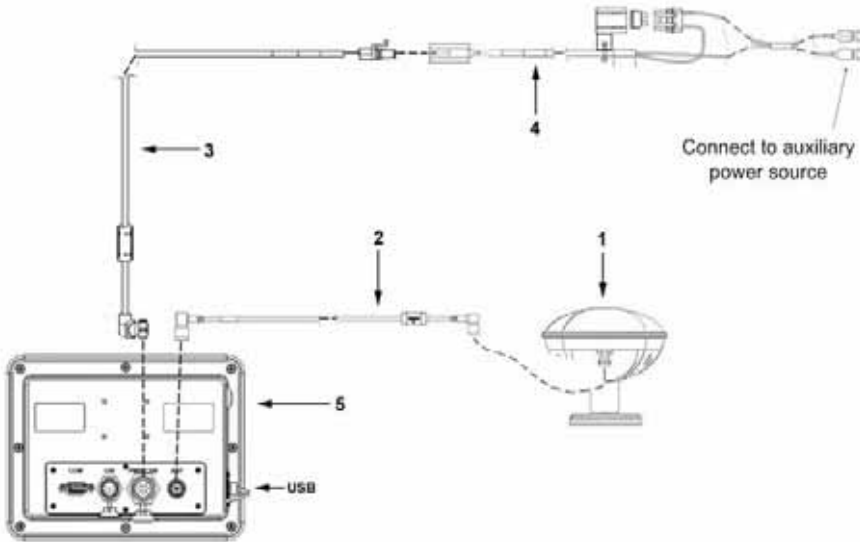

Figure 1-1: The Sts Kit

Connections and Parts

Figure 1-2: Connecting the Outback Sts

Note: The power cable must be connected to auxiliary power, **not** directly to the battery.

Table 1-1: Sts Part List

Diagram No.	Part No.	Description	Qty
	875-0227-000	Outback Sts User Guide (UG)	1
	875-0228-000	Outback Sts Quick Reference Guide (QRG)	1
1	726-1055-00A	Antenna, GPS N-Type, Model CDA-3 RTK	1
	601-1136	Antenna Mounting Plate with Adhesive	1
2	050-0033-002#	Antenna Cable, OBK-S/S2 - 26ft Lg	1

Table 1-1: Sts Part List (Continued)

Diagram No.	Part No.	Description	Qty
3	051-0200-000#	Main Cable, CIRC(F)7, Solstice	1
4	054-0065-000#	Power Cable, OBK-360/eDrive	1
	604-0019-000#	4-part Suction-Cup Base, S-Lite	1
5	802-1049-000#	Outback Sts Receiver/Console	1
	485-2022-000#	LBL,LOGO,REVERSE OBK/HEM GPS	1

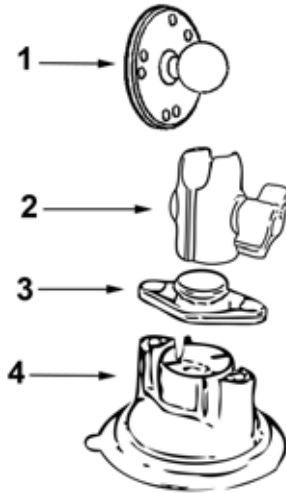# Console Mounting Detail and Parts

Figure 1-3: Suction Cup and Console Mounting

Table 1-2: Suction Cup, Ball Mount Assembly Parts List

Diagram No.	Part No.	Description	Qty
1	RAM-B-202	1" Ball Mount Base	1
2	RAP-B-200-1U	Arm with Ball and Button Sockets	1
3	RAP-272U	Diamond Plate with Button	1
4	RAP-224-1U	3.25" diameter Locking Suction Cup Base	1
Not shown		Screws - Tapping (Connect 3 to 4)	2
Not shown		Screws (Connect 1 to Sts Receiver\console)	4

Chapter 2: Getting Started

Before using Outback Sts for the first time, you need to complete the following tasks:

- Install Sts

- Power Sts

- Set up additional system components

⚠️ **Warning:** Inspect the tractor and perform any needed maintenance (e.g. loose steering wheel, wheels out of alignment, uneven tire pressure, contaminated hydraulic fluid) before installing the Outback Sts. The operator cannot perform as intended using the Outback Sts on a tractor that is not maintained properly. Errors in tractor performance while following the Outback Sts path increase the risk of operator and bystander injury or death.

Turn off the tractor and disengage the Outback Sts when installing or performing maintenance.

Installing Outback Sts

Correct installation of Sts is critical for safe and correct operation. Correct installation includes determining the location to install as well as the actual installation and routing of cables. Components that you need to correctly locate, route and install are the antenna, the antenna cable, the main cable and the floor switch (if fitted - optional).

⚠️ **Warning:** To avoid serious injury or death, install the Outback Sts in a manner that is appropriate for your tractor make and model.

To avoid a fall injury, use an appropriate ladder or platform when installing or performing maintenance on cables, the antenna, and other components of the Outback Sts.

To avoid burn or electrical shock injury when installing or removing the Outback Sts, do not touch parts of the tractor that are heated or electrically charged.

Determining Antenna Location

Make sure to 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) it is best to have the GPS antenna mounted on the leading edge of the vehicle cab. This usually provides an open view of the sky and prevents multi-path reflections and signal masking from near-by vertical obstructions.

In the case of high-speed self-propelled sprayers, installing the GPS antenna on the back edge of the vehicle cab allows more stable control.

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 Sts during setup.

Mounting the Antenna

Do not place the antenna within 2 feet of a transmitting radio antenna, for example a 2-way or business band radio. If you cannot place the antenna on the vehicle's centerline, a swath offset will need to be set in the Vehicle screen. See "Configuring Steering and Vehicle Settings: The Vehicle/Steering/Tilt Screens" on page 32.

1. Clean and dry the surface where the antenna mounting plate will be attached.

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 good adhesion.

4. Place the magnetic mounted antenna on the plate making sure it is on the vehicle's exact centerline.

Mounting the Console

⚠ **Warning:** Mount the console of the Outback Sts where it can be seen clearly and is within reach. Do not place in a location where it interferes with seeing other information, controls, or the field. Looking at the screen for too long while operating the tractor can cause a crash.

Normally, the display is located above and behind the center of the steering wheel just below the driver's line of sight. The easiest installation is on the front glass of the cab. If that's not possible, it can vacuum mount to any no porous (metal) surface or the vacuum mount can be removed and the bracket mounted with bolts.

1. Thoroughly clean the inside cab window surface directly in front of the steering wheel.

2. Press the vacuum mount to the window.

3. Turn the vacuum cup's twist lock counter-clockwise to create the seal.

4. Adjust the console to a suitable viewing angle.

Note: Do not leave the console unattended for extended periods of time. If possible, remove the unit from the glass when not in use. Continued exposure to the elements (such as direct sunlight) can be harmful to the suction cup. To extend the life of the suction cup, clean it periodically with a product like Armor All®.

Routing the Antenna Cable

Remember to always turn off the Outback Sts before attaching or removing cables.

1. Securely attach one end of the cable to the GPS antenna.

2. Route the cable to a cab opening where rubber protection exists that will protect the cable (a closed window works fine).

Note: Do not bend the cable to a radius of less than 6 inches. Avoid routing it within 12 inches of radio wires, power generator wires, heat sources or moving parts.

3. Attach the other end of the cable to the console.

4. Coil excess cable in a protected location and secure the installation with tie straps.

Attaching the Power Cable

⚠️ **Warning:** Avoid contact with cables that carry high current. Connect the power source to a stable 12 volt power supply, such as 12VDC accessory power source (key-swithched power). Connect the red wire to positive (+) and the black wire to negative (-) or ground.

⚠️ **Warning:** If the Outback Sts is connected to an "always-on" power source such as the vehicle battery, the system will continue to draw down the vehicle power.

1. Connect the power cable to the 12VDC accesory power source with the red lead to positive and the black lead to negative.

2. Route the power 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.

Tip: The best place to connect to accessory power is typically at the vehicle's auxiliary power port using a standard AMP connector (206037-2) as shown. When using an AMP connector, connect the red wire to Pin 1 of the auxilary plug and the black wire (ground) to Pin 3 in order to get key-switch power.
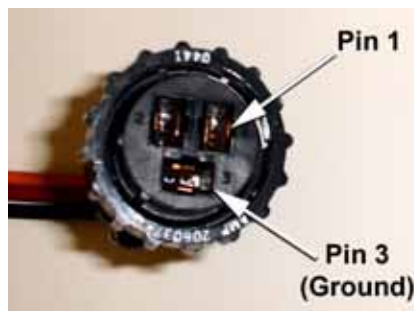
Installing the Main Cable and GPS Cable

1. Connect the 2-pin power connector of the main cable to the battery cable.

2. Connect the GPS antenna cable to the GPS antenna on the roof of the vehicle.

3. Route the cables into and through the vehicle cab in protected locations.

4. Connect the main cable to the PWR/CAN port on the back of the Sts console and the GPS antenna cable to the ANT port

Attaching the Floor Switch (Optional)

See "Appendix B: Optional Floor Switch & Cable" on page 121.

Powering the Outback Sts

Outback Sts is automatically
powered up when you turn the
ignition key on. Once Sts is powered
up, so long as the ignition remains
on, you can turn the console off and
on using its power button located on
the left end of the console.

Note: To ensure reliable saving of job data, make sure you turn Sts off
at its power button before turning the ignition off.

On power up, Sts will complete a self test, the LED will illuminate, then
the display will illuminate and default to the map screen showing the
quick start options for jobs (the Getting Started window)

Also, on power up, Outback Sts automatically begins acquiring a DGPS
signal. This process may take a few minutes. During this process, the
vehicle can be moving or the operator can perform menu functions.
Upon acquiring a GPS signal, the satellite icon on the GPS tab turns
from red to orange. Finally, once the Outback Sts has acquired a DGPS
correction signal, the satellite icon turns green, and the GPS tab
displays "3D". Sts must have DGPS present to begin a job and provide
guidance. See "Viewing GPS Screen Tab Information" on page 42.

Note: The antenna must have a clear view of the sky to acquire a DGPS
signal.

Powering Up Outback Sts and the eDriveTC

Turn on the power switches of Sts (see above) and the eDriveTC in any
order. The eDriveTC will establish communication with Sts and wait for

the DGPS signal to be acquired. The S PRESENT light on the eDriveTC console indicates that communication has been established.

The Auto Steering control button is activated, indicating that the eDriveTC is active and may be engaged at any time.

Note: For more information on installing and configuring the eDriveTC, please see the eDriveTC User Guide

Chapter 3: Introducing the User Interface

n this chapter, "Introducing the User Interface", we look at the Sts main display screen—the map screen—and point out the main features.

⚠️ **Warning:** To avoid serious injury or death, be prepared to respond to field conditions by resuming control of the direction and/or speed of travel. Do no become distracted by other tasks. Always pay attention to the task of driving the tractor and stay seated while the vehicle is in motion.

Introducing the Sts Start Up Screen

On start up, after accepting the disclaimer, you will see the Getting Started window overlaid on the map screen. From the start up screen you can select to:

- Start a new job

- Continue the previous job

- List all the jobs so that you can select from the complete list

Note: You can select X to remove the Getting Started overlay and use the screen tabs and control buttons directly if preferred.
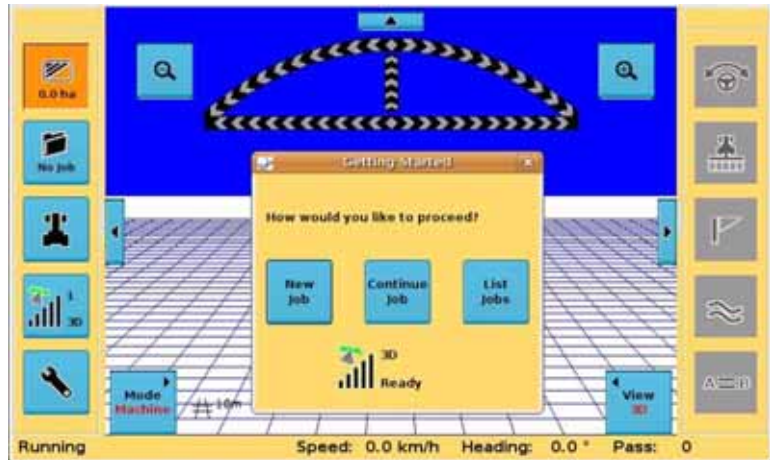
Figure 3-1: The Start Up Screen

Introducing the Map Screen View Modes

You can view the map screen in either full menu mode (shrunk map view) or full screen mode (expanded view). You switch between the views using the menu button icon.

Figure 3-2. shows the map screen in full menu mode. All the screen tabs and all the control buttons are visible.
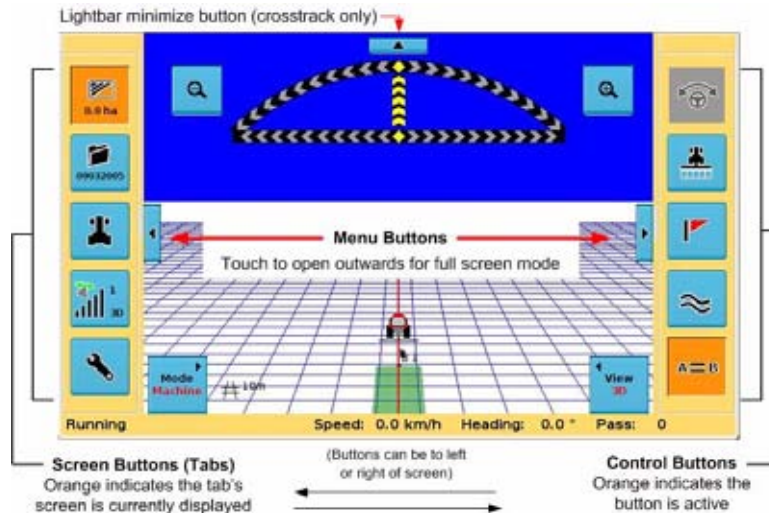
Figure 3-2: Map Screen - Full Menu Mode

Figure 3-3. shows the map screen in full screen mode. Only the steer and apply control buttons are displayed.
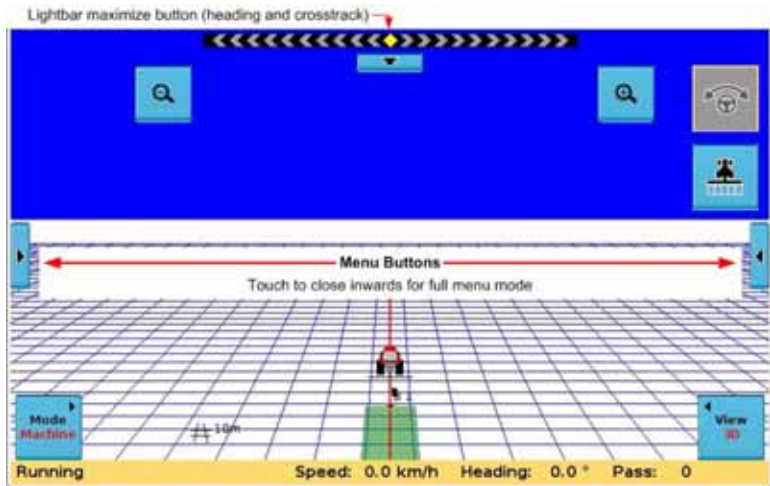
Figure 3-3: Map Screen - Full Screen Mode.

Introducing the Control Buttons

Table 3-1 shows the control button icons and their labels. The table also gives a brief description of what you use the buttons for. (The control buttons do not actually have labels on the console display, they are just used in the table.)

Table 3-1: The Control Buttons

Buttons	Descriptions
  Steering Engage set to Manual	(**Note:** eDriveTC must be installed to use the automated steering feature.) If the AutoEngage feature is set to Manual on the steering screen, this button appears. Touch to manually engage or disengage automated steering. Blue indicates it is disengaged, orange indicates it is engaged. **Warning:** To avoid injury or death, maintain manual control of the tractor when auto steering is not engaged.

Table 3-1: The Control Buttons (Continued)

Buttons	Descriptions
Steering Engage set to Auto Auto Steering (Off/On - *Auto* Engage). Auto steer criteria met - but not engaged Auto Steering engaged and steering	(**Note:** eDriveTC must be installed to use the automated steering feature.) If the AutoEngage feature is set to Auto on the steering screen, the grey steering button appears showing an 'A'. When all auto steering criteria are met, the button becomes blue and is ready to be set to auto engage. Touch the button to engage auto steering - the button turns orange indicating auto steering is engaged and active (that is, it is auto steering). If you take control at any time, such as at the end of a pass, the auto steer disengages and the button flashes between orange and blue. In this state auto steer is not steering but is ready to auto engage when steering criteria are met again. Provided auto steer criteria is met within 45 seconds (for example, you have completed a keyhole turn at the end of the swath) auto steer will resume. The button stops flashing and stays orange. If however, after disengaging (button flashing), the auto steer engage conditions are not met within 45 seconds, the system disables the button and it becomes greyed out. It will turn blue again when conditions are met but you'll need to touch the button to re-engage auto steering (orange). ⚠ **Warning:** To avoid injury or death, maintain manual control of the tractor when the Auto Steering (Auto Engage) symbol is alternating between orange and blue.

Table 3-1: The Control Buttons (Continued)

Buttons	Descriptions
Apply Off/On	Touch to have the system log application or coverage data for the current job. Press this button (or the optional floor switch if fitted) to stop or hold logging job data. Blue indicates it is not logging, orange (with green implement) indicates it is logging.
Mark Button Returning to a point Defining a perimeter	Touch to display the marks pop-up window from which you can drop various flags to mark an area or select to return to a point. You can also define a perimeter through the mark window. The button icon changes while you are returning to a mark or defining a perimeter. While defining a perimeter, the estimated area shows on the Mark button.
Contour Guidance Off/On	Touch to activate contour guidance. This is a freestyle guidance mode and the guidance is relative to any previous pass. Blue indicates this mode is inactive, orange indicates that it is active.
Straight Guidance Off/On	Touch to display the Straight Guidance pop-up window. Use Straight Guidance to create linear or circular predefined parallel passes. Blue indicates this mode is inactive, orange indicates it is active.

Introducing the Tabs and their Screens

Table 3-2 shows the screen tabs and provides a summary description of what you can do in the various screens.

Table 3-2: Tabs and Their Screens

Tabs	Descriptions
 Setup	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. There is also system information displayed in the Setup screen such as the application version and the operating system. You can also calibrate the touchscreen or upload updates from the Setup screen. See "Configuring System-Wide Settings: The Setup Screen" on page 27.
 GPS	View system-generated GPS information such as latitude and longitude, altitude, Diff Age, and the number of satellites tracked. The GPS screen has additional buttons you can use to access other screens. The GPS tab displays the Diff Age and the correction type for quick reference. See "GPS Differential Correction Types" on page 107.
 Vehicle/Steering	*Vehicle:* Set vehicle-related values such as swath and machine width. You can also set the guidance sensitivity, and headland alerts. See "Configuring Steering and Vehicle Settings: The Vehicle/Steering/Tilt Screens" on page 32. *Steering: (Selected from within the Vehicle screen)* View steering-related GPS information such as GPS Course and to specify steering related options such as track or wheel vehicle type. You can also calibrate the tilt sensor for the eDriveTC. See "Configuring Steering and Vehicle Settings: The Vehicle/Steering/Tilt Screens" on page 32.

Table 3-2: Tabs and Their Screens (Continued)

Tabs	Descriptions
09032005 Job	Create new jobs, continue a previous job, use templates, and import or export job data. You can also record job specific data such as the farm, field, and operator ID. The Job tab also displays the system generated current job name for quick reference. See "Managing Jobs" on page 82.
	Note: The job name is actually a system-generated number based on the date. It comprises the date and then the consecutive number starting at 00 for that date, for example 09012103 would be the third job created on January 21 2009.
2.8 Ha Map	Use the map screen in a variety of modes and views to see a moving graphical representation of the field operation. The map screen includes zoom features and steering indicators. The Map tab displays the applied area total for quick reference. See "Understanding Map Modes, Views and Fits" on page 38.

Configuring the System

Outback Sts has several screens in which you configure settings before beginning your initial pass.

Before proceeding please note these application fundamentals.

1. Grayed out buttons or fields are deactivated: you cannot use them.
2. Fields are editable or non-editable. Editable fields have a border.

Machine Width	Application
10.00m	1.0.3

Figure 3-4: Editable and Non-editable fields

Machine Width is editable, **Application** isn't (information only).

Touch the field to bring up an alphanumeric keypad or a number keypad.
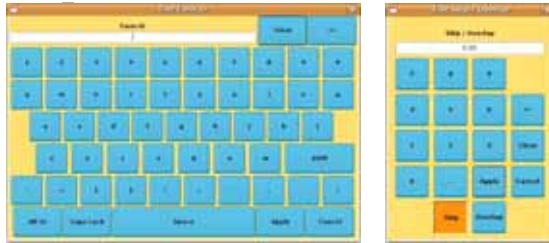

Figure 3-5: The Alphanumeric and Number Keypads

Configuring System-Wide Settings: The Setup Screen

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

Figure 3-6: Setup screen

Application, Operating System: These are display (or 'information') only fields.

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Update: Opens the update sub-screen from which you can select to update software, firmware or GPS.

Reset Defaults: Resets all the values to the factory default values. For example control layout will go back to right (side of screen) if it's been changed to left.

Day/Night Mode: Sets the display for easy viewing in daytime or nighttime lighting.

Controls: Sets the Control buttons (and therefore the screen tabs) on either the left or right side of the screen for your preferred access.

Units: Sets the unit of measurement (US or Metric) in which the system displays and records all measurements.

Clock: Sets the clock to display time in tither 12 hour (am/pm) or 24 hour formats.

Brightness: Adjusts the display brightness. The range is 1 (dim) to 10 (bright).

Touch Screen: Calibrate the touch screen. Follow the prompts

Configuring GPS Settings: The GPS Screens

The GPS tab accesses three screens. GPS Details (the default), Setup and NMEA. The following display-only fields are common to all three GPS screens.

(Time): the current time

Serial Number: the serial number of the GPS receiver

GPS Firmware: the firmware version number

The GPS Details Screen

Figure 3-7: GPS Details screen

Status: the status of the GPS receiver. The field values are:

- "No Fix" = No GPS

- "2d Fix" = has a 2 dimensional position

- "3d Fix" = has a 3 dimensional position

- "2D Fix" = has a 2 dimensional differential position

- "3D Fix" = has a 3 dimensional differential position

Note: the GPS screen tab will indicate these statuses showing 2d, 3d, 2D or 3D (or nothing, indicating no fix/no GPS).

Diff Age: the time elapsed since the last differential correction was calculated.

Correction Type: the differential correction type currently being used.

STDEV: Standard Deviation - can be described as 'a statistical measurement of the variability of the position solution'. More simply, it's a measurement of the quality of the position solution.

Latitude and Longitude: the current calculated position.

Satellites Tracked/Used: the number of satellites currently being tracked and the number of them being used for the current position fix.

HDOP: Horizontal Dilution of Position is a measure of how much the satellite constellation (the 'satellite geometry') currently in use is contributing to any uncertainty in the position fix.

Altitude: the currently calculated altitude of the GPS receiver

BER: the Bit Rate Error is the percentage of bits that have errors relative to the total number of bits received in a transmission.

The GPS Setup Screen
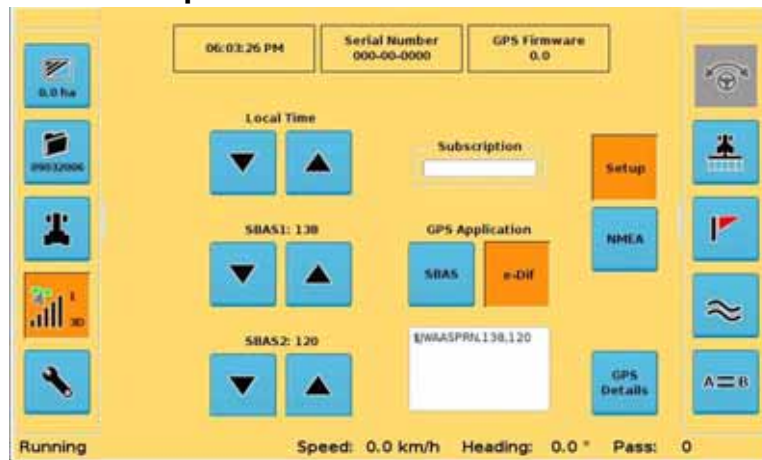
Local Time: change the local time in 0.5 hour increments.

Subscription: Enter the subscription code required to access some differential correction sources.

SBAS1 (and SBAS2): changes 1 of 2 (or 2 of 2) SBAS satellites used in the system's position calculation. You can scroll through the PRNs. The default is AUTO, which allows the system to automatically select from the available satellites.

GPS Application: Sets the type of differential correction the system will use to calculate a position. The Outback Sts has two of three factory installed differential corrections types from which to choose; SBAS (WAAS), e-Dif. See "GPS Differential Correction Types" on page 105 for more information on differential corrections.

Message Window (not labelled): Displays system generated messages. The system messages are useful when performing diagnostics. Hemisphere GPS' GPS Technical Reference has detailed information on system generated messages. You can access the GPS Technical Reference at www.hemispheregps.com.

The GPS NMEA Screen
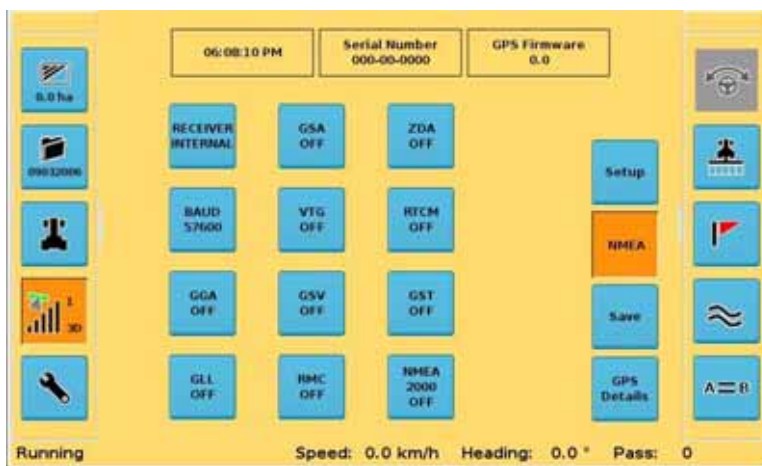
Figure 3-8: GPS NMEA screen

RECEIVER: Cycles through INTERNAL, SERIAL and CAN

BAUD: Cycles through 19200, 57600, 4800, 9600.

Data Messages (GSA - NMEA 2000): Sets data messages on or off and set message rates.

Note: Touch Save to keep settings after a reboot.

Configuring Steering and Vehicle Settings: The Vehicle/Steering/Tilt Screens

Within both the Steering and Vehicle screens you can select Vehicle or Steering respectively to get the required display. You can select the Tilt Setup screen in both.
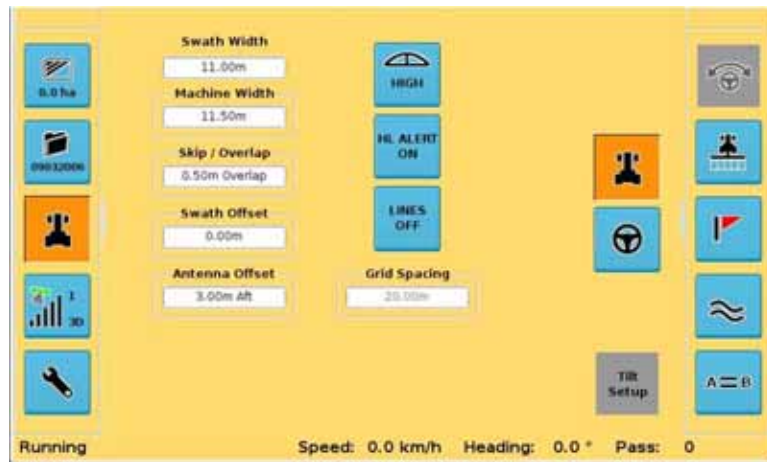
The Vehicle Screen

Figure 3-9: Vehicle screen

Swath Width (display only): Sts generates this value. It is the sum of the machine width and skip/overlap value.

Machine Width: Set this value to the width of the vehicle or implement for the current job.

Skip/Overlap: Set this value to drive a pattern where rows intentionally skip (non-applied working width) or overlap (double

coverage). Set a positive value and specify if it's skip or overlap. The field will show the value and if it's skip or overlap.

Swath Offset: Set this number to correct for an antenna that is not installed on the vehicle or implement centerline. Set a positive value and specify if the offset is to the right or left. The offset is equal to the distance between the GPS antenna centerline and the vehicle or implement centerline. The field will show the value and if the offset is to the right or left

Antenna Offset: Set this number to the value of the fore or aft offset of the antenna from any implement. Set a positive value then specify if the offset is fore or aft. If the rig is set up with the implement 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 a aft offset. The field will show the value and if the offset is fore or aft.

Lightbar (Icon): Cycles through HIGH, MEDIUM, and LOW (sensitivity) and OFF (lightbar not visible, though lightbar icon remains visible on the button)

HL Alert: Headland alert. Toggles between ON and OFF. When On, you get an on-screen and an audible alert when you reach a worked area.

LINES: Cycles through OFF, A=B lines and GRID. Guidance or pass lines (lines parallel to your A=B line) display a regular pattern over an area for you to guide by.

When you select A=B or GRID the spacing between the guidance lines is equal to the swath width.

The distance between the grid lines, which are perpendicular to the guidance line and thus create the grid, is the value you set in the Grid Spacing field.

Grid Spacing: Available when LINES is set to GRID. Sets the grid spacing.

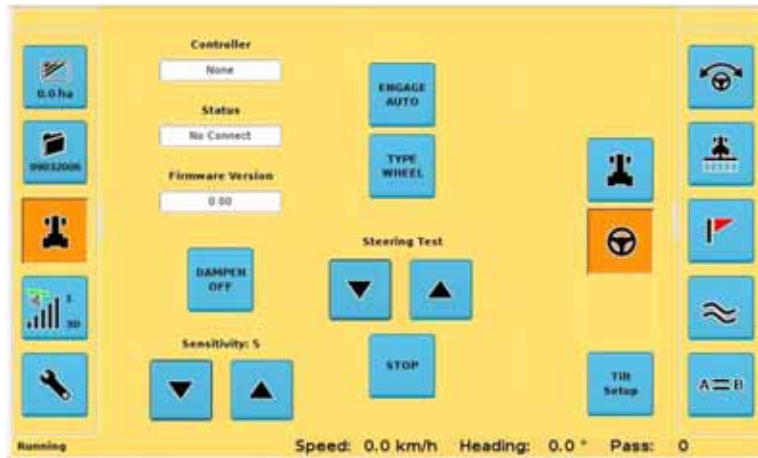For more information on Lines, see "Using Guidance Lines" on page 93

The Steering Screen

Figure 3-10: Steering screen

Controller, Status and Firmware Version: These are display only fields identifying the controller type (for example eDriveTC), the controller status (for example Connected) and the controller firmware version number.

ENGAGE: Toggles between Auto and Manual

TYPE: Toggles between Wheel and Track for eDriveTC

Sensitivity (Wheeled vehicles only): Allows for the adjustment of the eDriveTC (the 'dead band') to prevent overreaction in machines that are difficult to control.

DAMPEN: When turned on, dampening provides a smoothing effect to machines that have large amounts of body roll that might induce steering oscillations.

Steering Test/STOP: Allows for the testing and setting of the steering control rate after installing eDriveTC. Please see the Outback eDriveTC User Guide for detailed instructions on installing an eDriveTC and using the Steering Test functionality.

Tilt Setup: see next section

The Tilt Setup Screen
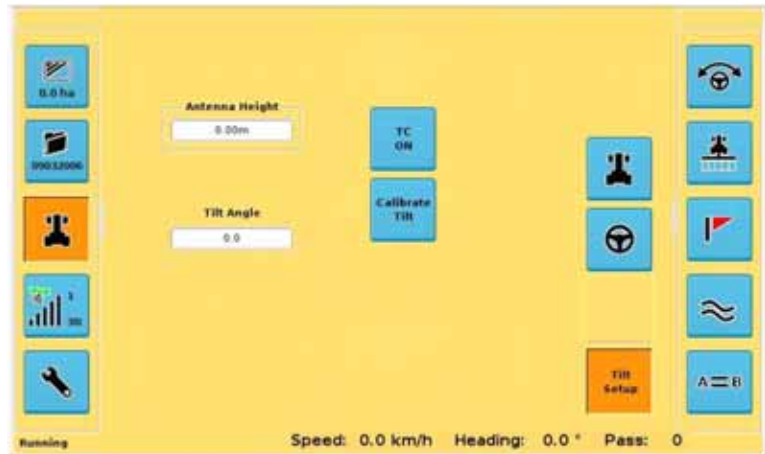
Figure 3-11: Tilt Setup screen

TC: toggles the tilt compensation On or Off

Calibrate Tilt: Runs the tilt calibration process (see Tilt Angle below and "Calibrating the Tilt Sensor (eDriveTC installed)" on page 46).

Antenna Height: For proper tilt compensation, you need to input the distance from the ground to the GPS antenna in feet or meters (depending on the selected units of measurement)

Tilt Angle (display only): The values you see in this field depend on what you are doing.

- *During calibration*: when you start the calibration process, the value is the current tilt of the vehicle (which should be on level ground, so close to zero tilt). When you complete the calibration process, the value should be zero.

- After calibration: The Tilt Angle field displays the current degree of tilt being sensed by the tilt sensor. The tilt compensation process uses the information to correct your position.

For the detailed calibration process, see "Calibrating the Tilt Sensor (eDriveTC installed)" on page 46.

Chapter 4: General Operations

T his chapter covers the mode/view options you have in the map screen and details the information displayed on screens tabs. Finally the section takes you through some general operations such as tilt sensor calibration and straight and contour guidance.

Understanding Map Modes, Views and Fits

When in the map screen, Sts offers two mode options, Machine or Field, and then either two view options or two fit options depending on the mode chosen. Figure 4-1 shows the relationship between the modes, views and fits.
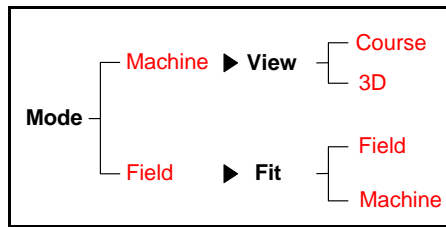
Figure 4-1: The Mode View/Fit Options

All mode view/fit combinations show the machine's position on the field and its direction and all combinations have multiple levels of zoom in and zoom out. When you use Apply, all combinations display the applied area in green.

Using the Machine Mode Views

Set the mode to Machine (touch the Mode button and select Machine if the Mode is Field). Then set the View to Course or 3D as required. In these views, the map moves across the screen under the apparently stationary vehicle.
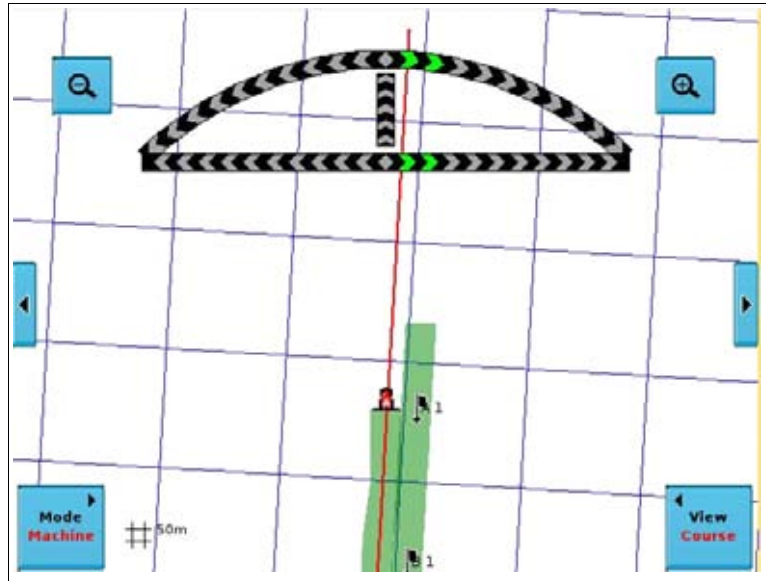
Figure 4-2: Machine Mode, View - Course

In the machine mode's course view, the direction of travel is always at the top of the screen.
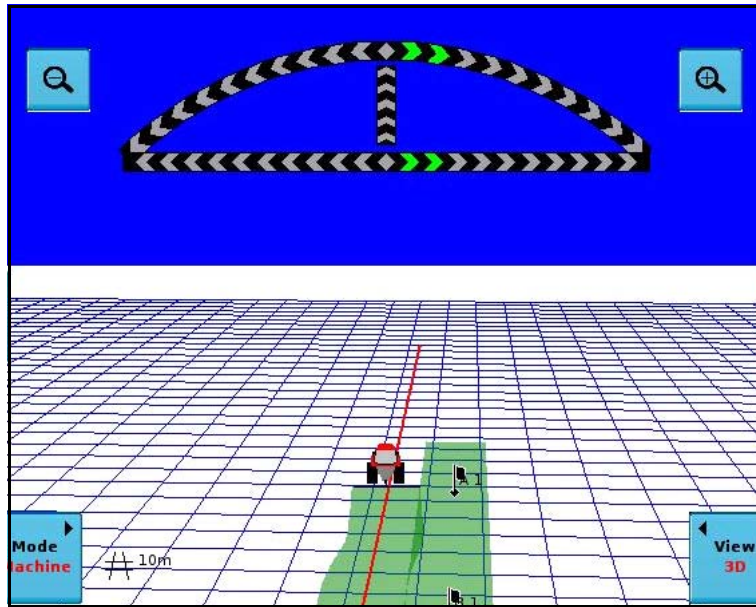
Figure 4-3: Machine Mode, View - 3-D

The machine mode's 3-D view gives a three dimensional view down the field, in the direction of travel.

Using the Field Mode Fit View

The field mode fit views give you a bird's eye view of the job. Use the views in conjunction with the zoom feature to view either the whole field (as defined by the applied area) or to focus on the machine relative its position in the field

Set the mode to Field (touch the Mode button and select Filed if the Mode is Machine). Then set the Fit to Machine or Field as required. In

the field mode fits, the vehicle appears to move while the map appears stationary on the screen.
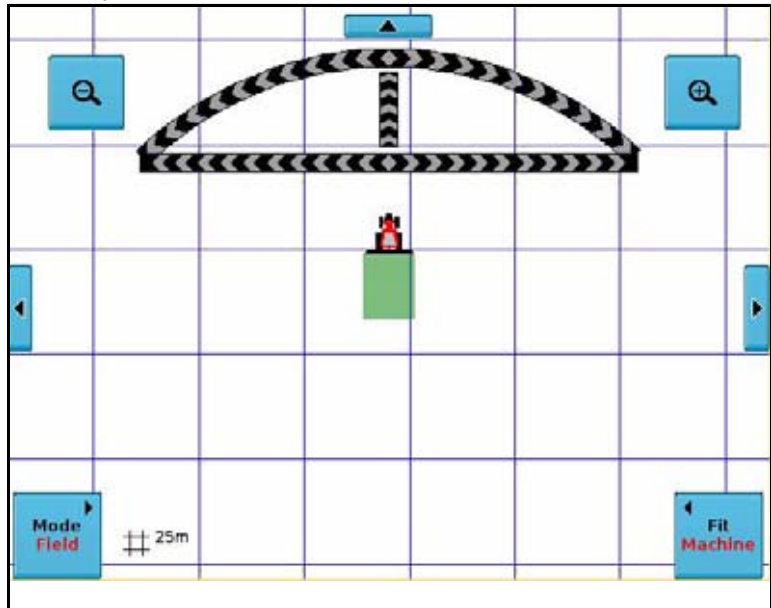
Figure 4-4: Field Mode, Fit Machine View

The field mode's machine fit view automatically zooms in on the vehicle's current position on the map.
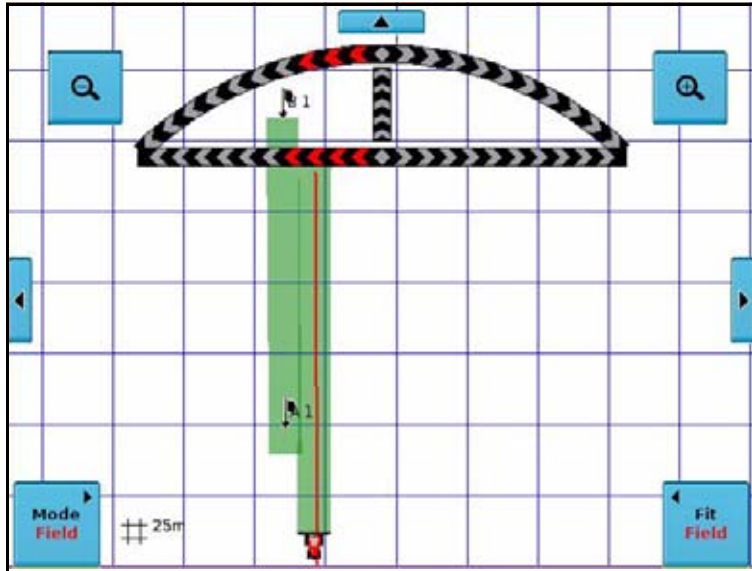
Figure 4-5: Field Mode, Fit Field View

The field mode's fit field view, automatically zooms out over the entire field that you are working.

Viewing GPS Screen Tab Information

The GPS signal information is located on the GPS tab for quick reference.

Signal Status: A red satellite icon indicates that Sts does not have a fix on a GPS signal. The orange satellite icon indicates that it is tracking GPS satellites. The green satellite icon indicates

that Sts is receiving GPS signals with a differentially corrected solution.
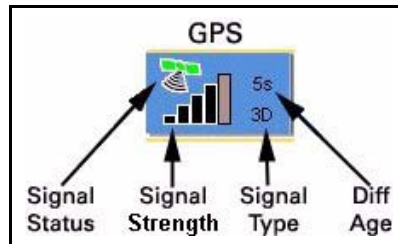
Signal Strength: The vertical bars indicate the quality of the GPS signal related to the standard deviation of the solution. 3 - 4 bars are typical with SBAS signals.

Signal (Correction) Type: The value on display here corresponds with the value in the Status field in the GPS Details screen, namely:

- Blank = No fix

- 2d = Has a 2 dimensional position

- 3d = Has a 3 dimensional position

- 2D = Has a 2 dimensional differential position

- 3D = Has a 3 dimensional differential position

Diff Age: The Diff Age number indicates the age of the corrections used in the DGPS solution. For SBAS signals, it is typically 6-10 seconds.

Viewing Job and Guidance Status Information

The Outback Sts has several operational status indicators that display on the map screen, on individual tabs and buttons for quick reference and at the bottom of the screen.

Headland : The Headland indicator is on any time the antenna crosses into a previously applied area. You set the headland alert feature (visual and audible) On or Off on the Vehicle tab. The visual alert appears beside the zoom out button.

: Zoom Distance: The distance between the grid lines on the Sts display. This value increases or decreases as you zoom in or out.
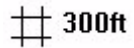
Speed, Heading, Pass (number): These are shown at the bottom of the screen (all screens).

Speed: 0.0 km/h   Heading: 0.0 °   Pass: 0

Steering Guide Lightbar

The Steering Guide lightbar shows the vehicle's position relative to the guidance line. The top arch shows heading and the bottom bar shows crosstrack. When the steering guide indicators are centered (indicated by a vertical yellow row as shown), the vehicle is aligned with (heading correct) and on (crosstrack 0) the current pass. To make accurate steering corrections, simply steer either left or right as indicated by the lighted arrows.

You can minimize and maximize the lightbar by touching:

- The diamond at the top or bottom of the vertical bar (bar only when minimized).

- The minimize or maximize arrows (above the are arch when maximized, below the bar when minimized).

- Anywhere in the area of the lightbar (even when minimized).

Lightbar Maximised – Heading and Crosstrack
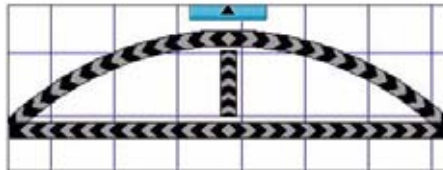
Lightbar Minimised – Crosstrack Only

Applied Area

Applied Area is the total of the applied or recorded area in either acres or hectares. It is displayed on the Map tab for quick reference.

Applied Area

Job Name

Job Name (on the Job screen) is actually a number generated by Sts for the current job. It is displayed on the Job tab for quick reference. The number is derived from the YYMMDD date plus the job consecutive number for the day.

Job Name (Number)

Tilt Compensation

If eDriveTC is installed, TC for Tilt Compensation is displayed on the Steering button (within the vehicle screen) when the tilt compensation feature of the eDriveTC is enabled.

Tilt Compensation
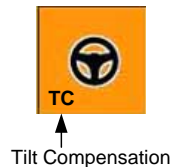
Perimeter Area

As you are defining a perimeter, an estimate of the current area enclosed by the perimeter displays on the Marks control button (which will be showing the perimeter icon).

Performing General Field Operations

In this section we look at calibration of the tilt sensor and the tilt angle, straight guidance—linear and circular (pivot)—and contour guidance.

Calibrating the Tilt Sensor (eDriveTC installed)

Calibration of your tilt sensor will enable the system to eliminate position errors that would otherwise occur due to the degree of tilt you are working at.
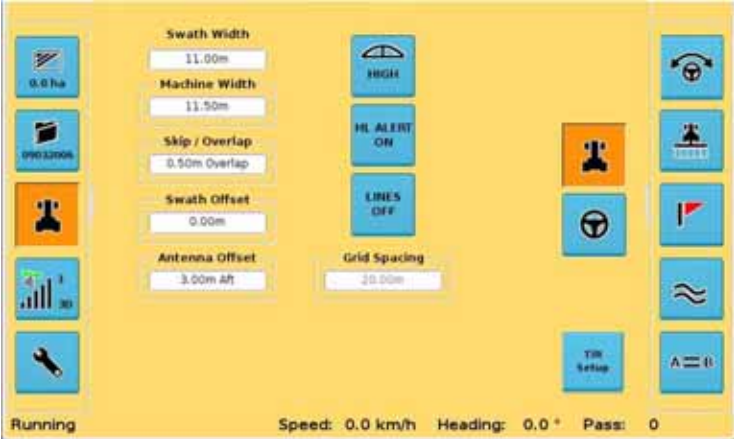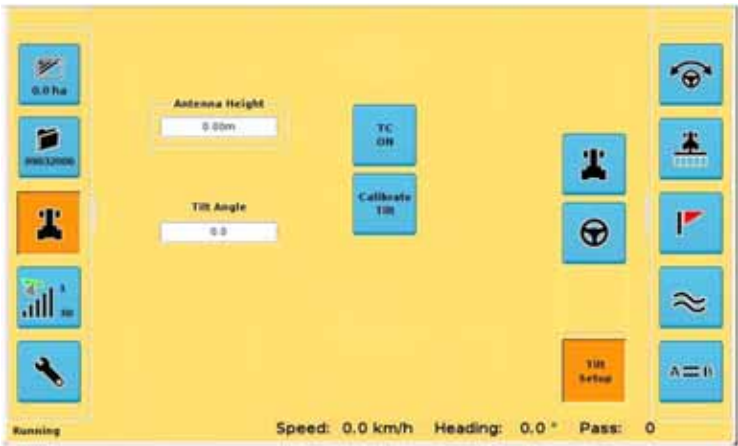
Step	Screen Item (when applicable)
1. Set the vehicle on level ground.	
2. Touch the **Vehicle** tab. The Vehicle screen appears.	

Figure 4-6: The Vehicle Screen

| 3.   Touch the **Tilt Setup** button, the Tilt Setup screen appears. | |

Step	Screen Item (when applicable)

Figure 4-7: The Tilt Setup screen

4.	If tilt compensation (TC) is Off, touch the **TC** button to set it On.	
5.	Touch the **Calibrate Tilt** button - it begins to flash (alternate blue/orange/blue). All existing calibration data is deleted.	

Step	Screen Item (when applicable)
6. Check the value in the **Tilt Angle** field. It is the current tilt of the vehicle (the 'raw' angle) and should be close to zero. The value will fluctuate slightly. This is normal.	**Tilt Angle** 1.678 **Tilt Angle** 1.679 **Tilt Angle** 1.677
7. If necessary, manually adjust the mounting of the eDrive unit (the tilt sensor is inside it) to get the tilt angle to less than 2°.	
8. Touch the flashing **Calibrate Tilt** button again to electronically zero the tilt angle. The button will stop flashing. Again, there will be slight fluctuations to the tilt angle but now around zero. Your tilt sensor is now calibrated and your position reporting will be accurate while working on sloping terrain.	Calibrate Tilt Calibrate Tilt

Starting a Job

To begin a new job, touch the New button in the Job screen. To continue the last job, touch the Continue button on the Job screen. (For complete details on starting, continuing and restarting jobs, see "Managing Jobs" on page 82.

New   Continue

Note: On start up Sts opens with the map view with a Getting Started window open. You can select New Job, Continue Job or List Jobs from that window. Alternatively you can close the Getting Started window and start your job from the Job screen.


Driving Parallel Paths - Straight and Pivot Guidance

Choose Straight guidance to generate linear (straight) or circular (pivot) parallel paths for Sts to guide or steer on.

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.
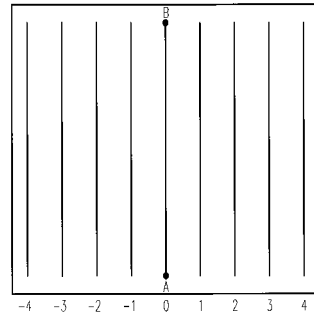
You can define an A-B line either by marking a Point A and a Point B, or by marking a Point A and entering the required heading.
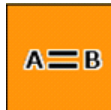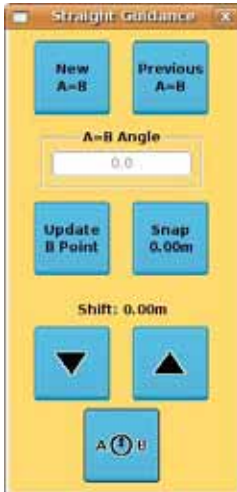
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Creating an A=B Line

Step	Screen Item (when applicable)
1. Enter the machine width and a skip or overlap value as required (this creates the swath width). See "The Vehicle Screen" on page 32.	**Swath Width** 11.50m **Machine Width** 12.00m **Skip / Overlap** 0.50m Overlap
2. Position the vehicle at the beginning of the first pass.	
3. Touch the **A=B button**. The Straight Guidance pop-up window appears.	A⚌B
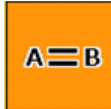
Figure 4-8: The Straight Guidance window
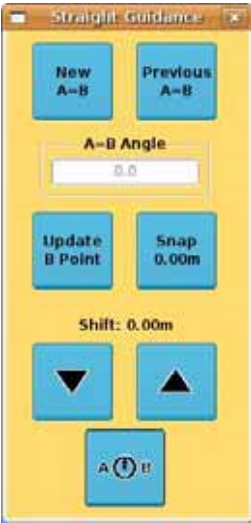
Step	Screen Item (when applicable)
4. Touch the **New A=B** button.	New A=B
The button label changes to Set A Point.	Set A Point
5. Touch the **Set A Point** button. Point A is marked on the map and the button label changes to Set B Point.	Set B Point
6. Drive the first pass.	
7. At the end of the pass, touch the **Set B Point** button to mark point B. The system populates the map with guidance lines parallel to the A=B line.	Set B Point

Setting an A=B line by Heading (A=B Angle)

Step	Screen Item (when applicable)
1. Enter the machine width and a skip or overlap value as required (this creates the swath width). See "The Vehicle Screen" on page 32.	
2. Position the vehicle at the beginning of the first pass.	
3. Touch the **A=B button**. The Straight Guidance pop-up window appears.	

Step	Screen Item (when applicable)
Figure 4-9: The Straight Guidance window	
4. Touch the **New A=B** button.	
The button label changes to **Set A Point.**	

Step	Screen Item (when applicable)
5. Touch the **A=B Angle** field. The number keypad appears.	A=B Angle 0.00
6. Touch the **Clear** button then enter the A=B Angle. Touch **Apply**. The system populates the map with guidance lines parallel to the A=B line.	A=B Angle 15.00

Using Straight Line Guidance

After setting the A=B line—by setting either a B point or an A=B Angle—Sts automatically begins guiding on the initial guidance line, that is Pass 0 (zero).

Turning Apply on and off as required, steer along the required guidance line using the lightbar to maintain the correct heading and crosstrack. The nearest guidance line is always shown red and its pass number is shown below the map screen.
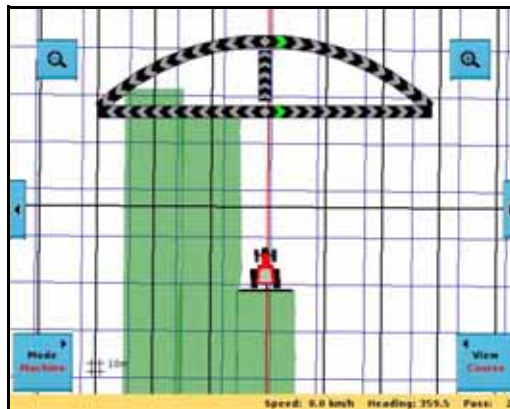

Figure 4-10: Straight Guidance on Pass 2

Switching Modes

You can switch the Sts guidance modes between straight and contour by touching the A=B or Contour button. When switching back to straight mode, you can set a new A=B line by touching the New A=B Set button and following the procedure for setting an A=B line or use the Previous A=B function.

Working with A=B Line Guidance Lines

As described above, when you set your point B, the system creates an array of parallel and perfectly-spaced guidance lines. While operating in straight guidance mode, there are various things you can do with your defined A=B lines. For example you can adjust the array on-the-go, that is, without creating a new A=B line and associated array. This functionality is especially useful to correct for DGPS drift over time or to negotiate physical features in a field.

The following sections describe the various features associated with A=B lines and A and B points and provide step-by-step guides through each feature.

Snap A=B Array: The A=B line guidance line array (guidance array) may be 'snapped' to the vehicle's current location parallel to the original A=B line. You might use the snap feature to insert a gap between consecutive, adjacent parallel swaths, for example to bypass a drainage ditch or to create a conservation barrier strip.

To snap, you take the vehicle off guidance, steer to a new location parallel to the original A=B line, then snap the guidance array the distance you have moved. The guidance line nearest to your vehicle becomes your current guidance line.

So when you snap, the whole array—including the originally defined A=B line—snaps the same distance. However, the original definition of the A=B line (its lat/long/heading) does not change. Thus, if you use **Previous A=B** and select the A=B line you've just snapped, the system re-populates the map with the A=B line, with its guidance line array, in its originally defined position.

To summarize, you first move to a new position then snap the guidance array to that new position and recommence straight guidance.

For step-by-step guidance through snapping AB lines, see "Snapping the A=B Line to the Current Location" on page 57

Shift A=B: If your guidance lines are not exactly where you want them, you can shift them, in.01m increments, to the left or right. The whole array, including the originally defined A=B line, shifts with each increment shift. You can now steer to the nearest of the shifted guidance lines.

As with snapping, the original definition of lat/long/heading of the A=B line isn't changed and using **Previous A=B** will have the original array restored.

To summarize, you shift the guidance array, then steer to it and recommence straight guidance.

For step-by-step guidance through shifting AB lines, see "Shifting the A=B Line" on page 58

Update B Point: You can update the B point any time you are on its A=B line, that is, during the initial pass or after returning to it. You must be travelling in the direction of A>B - you can't update B if travelling in the direction B>A.

When you update a point B, its number does not increment. For example, if you are creating a second A=B line and, having set point A2 and point B2, you use the Update B function, the new B point is still B2.

For step-by-step guidance through updating B point, see "Updating B Point" on page 60

Previous A-B: You can recall a previously defined A-B line's array for guidance. All the A=B lines defined for the job are listed for selection in a scrollable table.

For step-by-step guidance through recalling a previous AB line, see "Using a Previously Defined A=B Line/Array" on page 61

Return Points: You can return to a previously recorded point. Points to which you can return are: Points A and B, marks (flags) and the last application (Last Apply - the end of the last application).

For step-by-step guidance through returning to previously recorded points, see Chapter 5, "Job and Field Management", "Returning to a Previously Recorded (or Marked) Point" on page 102

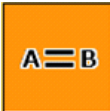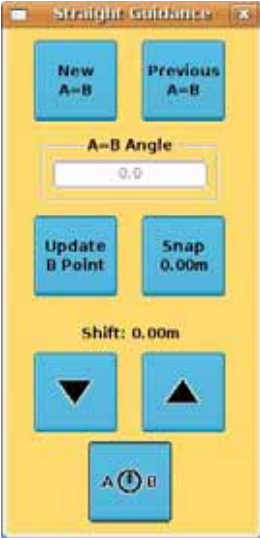**Snapping the A=B Line to the Current Location**

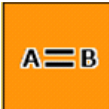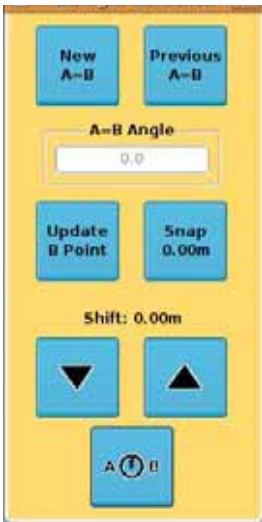| Step	Button (when applicable)
1. While in Straight Guidance mode, drive to a new location and resume a parallel pass (see Note at Step 2). Touch the **A=B** button. The Straight Guidance pop-up window appears.	A═B

Figure 4-11: The Straight Guidance window

Step	Button (when applicable)
2. Touch the **Snap** button. The nearest guidance line snaps to the current vehicle position. The Snap button will display the distance the guidance line array has moved.	**Snap 0.00m**
Note: If you didn't resume a parallel pass after repositioning the vehicle (at Step 1) the nearest guidance line will still snap to the vehicle but you will be immediately steering off line and have to steer back to the guidance line.	**Snap -0.37m**

Shifting the A=B Line

Step	Button (when applicable)
1. While in Straight Guidance mode, touch the **A=B button**. The Straight Guidance pop-up window appears.	**A≡B**

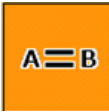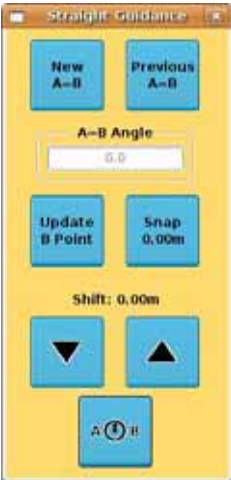| Step	Button (when applicable)
Figure 4-12: The Straight Guidance window	
2. Touch the down arrow or the up arrow to move the current guidance line left or right respectively, relative to the direction of travel. Each touch offsets the guidance line by 0.01m. Steer back onto the shifted guidance line. **Note:** using snap instead of steering to the shifted guidance line would bring your shifted guidance line back to where you are.	

> **Note:** Neither snapping nor shifting change the original definition of the A=B line. Its original lat/lon/heading specification remains unchanged. For more information, see Note in step 3 of "Using a Previously Defined A=B Line Array" on page 63
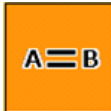
Updating B Point

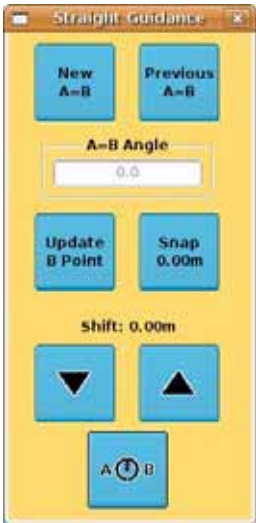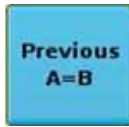| Step	Button (when applicable)
1. While in Straight Guidance mode, touch the **A=B** button. The Straight Guidance pop-up window appears.	A=B
Figure 4-13: The Straight Guidance window	

Step	Button (when applicable)
2. Touch the **Update B Point** button to set the new point B (only available if you have already set a B point for this initial pass or if you have returned to the A=B line).	Update B Point
Note: You can only update point B by travelling on the A=B line in the direction A>B. The Update B Point button is not available if you are travelling on the A=B line in the B>A direction.	

Using a Previously Defined A=B Line/Array

Step	Button (when applicable)
1. While in Straight Guidance mode, touch the **A=B** button. The Straight Guidance pop-up window appears.	A B

Step	Button (when applicable)
Figure 4-14: The Straight Guidance window	
2. Touch the **Previous A=B** button (only available if the job already has at least one A=B line defined). The A=B Lines list appears.	

Step	Button (when applicable)
Figure 4-15: The A=B Lines list	
3. Select the A=B line whose array you want to recall and press Ok (scroll the list up/down as necessary). The system populates the map with the guidance lines it generated when you first defined the A=B line you just selected. The guidance line from that array that's nearest to your vehicle will be in red. **Note:** If you snap the nearest guidance line for the A=B line you selected, to your current position, the whole array of guidance lines moves the snapped distance—including the A=B line itself. This does not, however, change the definition of the A=B line. If you view its position in the A=B lines list they are unchanged. Therefore, if you select that A=B line again (using Previous A=B) you will get the original array of guidelines back - in other words you will have unsnapped from the guideline.	

Creating Pivot Points/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—either counter-clockwise or clockwise—as much of the circumference of a representative circle as possible. Note that pass numbering depends on the direction you drive when creating the pivot path - See "Numbering Passes" on page 67.
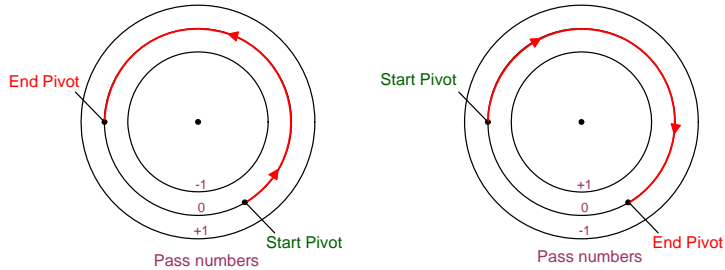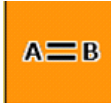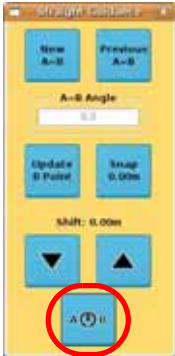

Figure 4-16: Left side - counter-clockwise. Right side - clockwise

Note: The more of the circumference you drive, the better Sts can estimate the required circle.
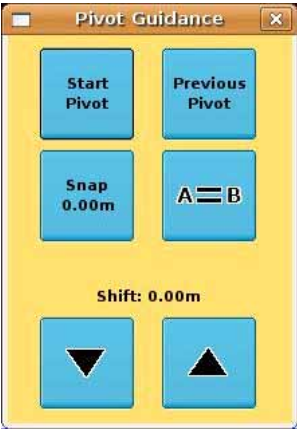
Setting the Pivot Circle

Step	Button (when applicable)
1. Position the vehicle at the beginning of the first pass.	

Step	Button (when applicable)
2. Touch the **Pivot** button. The Pivot Guidance pop-up window appears. If your last guidance operation was straight, touch the A=B button, then the Pivot Guidance button (circled) at the bottom of the Straight Guidance window to get to the Pivot Guidance window.	

Step	Button (when applicable)
Figure 4-17: The Pivot Guidance window	
3. Touch the **Start Pivot** button. The button label changes to Logging Pivot. Start driving the circle.	

Step	Button (when applicable)
4. When you have driven enough of the circle for the system to complete it, the Logging Pivot button label changes to End Pivot. When you are satisfied you have driven enough of the circle to get an accurate pivot, touch End Pivot.	End Pivot
Note: You do not get an array of guidance lines (circles) with pivot guidance as you do with straight guidance. The system will, however, display a new, current guidance circle when you approach its position inside or outside of the original pivot circle.	

Numbering Passes

Once you have established the pivot circle, the system will number all passes. Pass +1 will always be to the right of the original circle, and Pass -1 on the left. If you drove the circle counter-clockwise, Pass +1 will be on the outside. If you drove the circle clockwise, Pass +1 will be on the inside of the original circle. You can work passes in any order.

Using Pivot Guidance

Turning Apply on and off as required, steer along the required guidance line using the lightbar to maintain the correct heading and crosstrack.

The nearest guidance line is always shown red and its pass number is shown below the map screen.
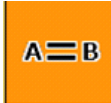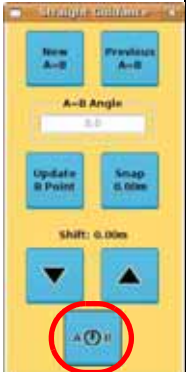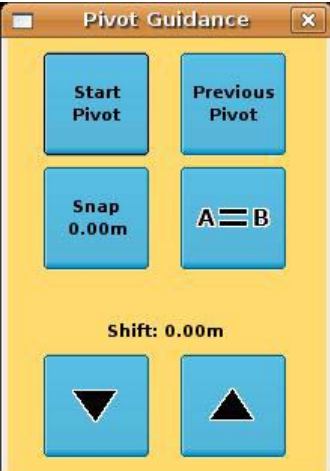
Figure 4-18: Pivot Guidance on Pass 1

Using a Previously Defined Pivot

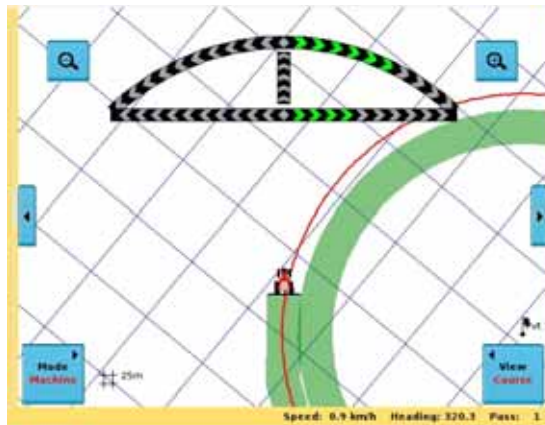| Step	Button (when applicable)
1. Touch the **Pivot** button. The Pivot Guidance pop-up window appears.	
If your last guidance operation was straight, touch the A=B button, then the Pivot Guidance button (circled) at the bottom of the Straight Guidance window to get to the Pivot Guidance window.	

Step	Button (when applicable)
 Figure 4-19: The Pivot Guidance window	
2. Touch the **Previous Pivot** button (only available if the current job already has at least one pivot defined). The Pivots list appears.	
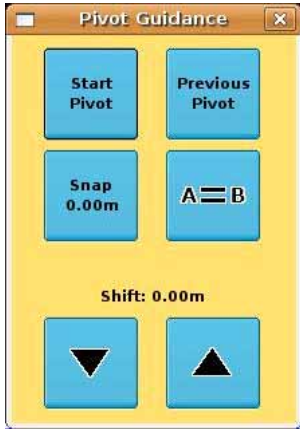
Step	Button (when applicable)
 Figure 4-20: The Pivots list	
3. Select the pivot you want to use guidance lines for and press Ok (scroll the list up/ down as necessary). The system populates the map with the pivot point showing and a guidance line nearest to your current (tractor) position. The pass number will be based on the pivot point you selected.	
Note: Whichever defined pivot point you pick, your current position will be on or near a pass based on that pivot. The pass number for that pivot is displayed. So, if you switch between pivot points, the pass number updates for the current pivot point.	

Snapping the Pivot Line to the Current Location

If you steer off your current guidance line, you can make the nearest guidance line (which may still be the one you've just steered off) snap to your new position.

Note: When you snap a guidance line, its originally calculated position, does not change. Thus, if after snapping, you use the Previous Pivot function, all guidance lines revert to their original positions.

Step	Button (when applicable)
1. Touch the **Pivot Guidance** button. The Pivot Guidance pop-up window appears (go through the Straight Guidance pop-up window if necessary).	

Figure 4-21: Pivot Guidance window

Step	Button (when applicable)
2. Touch the **Snap** button. The current guidance line snaps to your current position and the button shows the distance the guidance line has moved (negative 0.31m in the example).	Snap 0.00m Snap 0.31m

The Snapped Distance

The snapped distance is the distance the guidance circle has moved from its original position—its position as calculated by the system from the pivot circle you defined. The snapped distance will be positive or negative depending on the direction you drove to define the pivot circle.

The polarity of a snapped distance mirrors the polarity of the pass numbering.

See Figure 4-22. If you defined your initial pivot in a counter-clockwise direction, where inner passes are negative and outer passes are positive, and you snap a new guidance circle inward, the distance will be negative. Conversely, if you snap the circle outward, the snapped

distance will be positive.
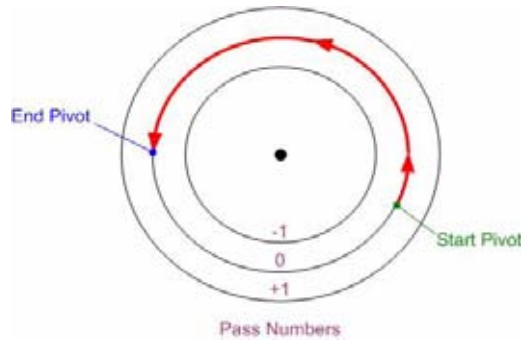
Figure 4-22: Pass numbering: counter-clockwise defined pivot

See Figure 4-23. If you defined your initial pivot in a clockwise direction, where inner passes are positive and outer passes negative, and snap a new guidance circle inward, the distance will be positive. If you snap the circle outward, it will be negative.
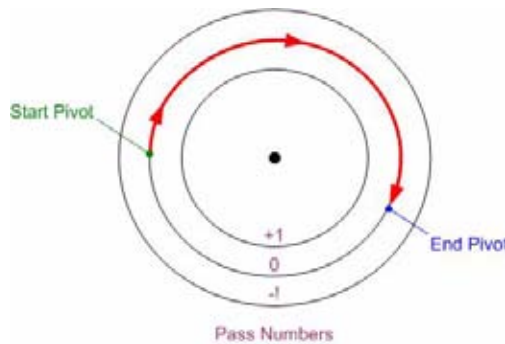
Figure 4-23: Pass numbering: clockwise defined pivot

Shifting the Pivot Line

Unlike snapping, where you move off a guidance line then have it, or another one, snap to your new position, with shifting you move the guidance line first then steer back onto it.
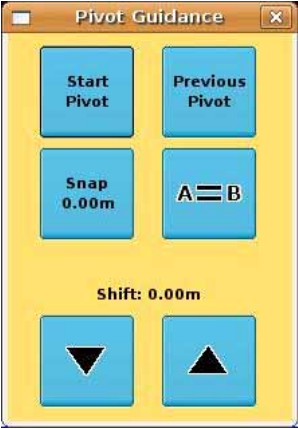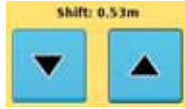
Step	Button (when applicable)
1. Touch the **Pivot Guidance** button. The Pivot Guidance pop-up window appears (go through the Straight Guidance pop-up window if necessary).	
Figure 4-24: Pivot Guidance window	

Step	Button (when applicable)
2. Touch the down arrow or the up arrow to move the current guidance line left or right respectively, relative to the direction of travel. Each touch offsets the guidance line by 0.01m. Steer back onto the shifted guidance line.	Shift: 0.00m ▼ ▲ Shift: 0.53m ▼ ▲
Note: using snap instead of steering to the shifted guidance line would bring your shifted guidance line back to where you are.	

Driving 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, Sts 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 lightbar is not active and cannot be used. Later, when attempting to follow a previous pass, the guidance engages and the lightbar provides guidance. You generally use contour guidance for working out borders, turn areas and following the contours created by water management systems and other obstacles.

At any time during contour guidance, you can switch to straight or pivot guidance by touching the A=B button and following the procedures detailed in "Driving Parallel Paths - Straight and Pivot Guidance" on page 49

Note: Apply must be active, or 'on', to record a contour. Without apply being active the system cannot know that you are have completed the defining pass for the contour and are driving back to start a new pass based on that definition. See Step 3 below.

Creating an Initial Contour Pass

Step	Button (when applicable)
1. Touch the **Contour** button before beginning the initial pass. Drive to where you want to start logging your contour and turn **Apply** on.	
2. Make the initial pass. The lightbar is visible but not active during the initial pass.	

Step	Button (when applicable)
3. At the end of the initial pass, with Apply on or off as required, turn round. When you are within half a swath of the previous contour, Sts provides a guidance line parallel to that previous contour. The lightbar becomes active to provide guidance.	

Guiding on Subsequent Passes

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

Making a New 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 (leave Apply on or turn it off and back on as required). Once it becomes obvious that you are defining a new pass (by turning Apply back on if you turned it off), Sts goes into logging pass mode. Subsequent passes are guided from this newly defined pass.

Contour Lock Guidance Mode

The contour lock guidance function enables you to turn off the system's 'search for closest path' functionality while under contour guidance. If passes of different contour definitions occur close enough together, without contour lock, the system might display guidance for a pass of a different contour definition from the one you are on.

Note: Without contour lock, the system, when searching for the closest path, will only pick 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 system 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. Contour lock prevents this.

When you are in contour lock mode, with contour lock active, the system maintains guidance on the current pass and ignores any close passes it might otherwise switch to guiding on. This is useful when you are guiding in close proximity to multiple swaths such as when working with 'point-rows'.

Note however, that contour lock can become inactive while still engaged. If you steer more than 2m, or 10 percent of your current swath width, from the pass you were being guided on, the system resumes its search for the closest pass.

Using Contour Lock During Contour Guidance

Step	Button (when applicable)
1. In contour guidance, when you are on or approaching the required guidance contour, touch the contour guidance button.	
This puts you in contour lock mode (with contour lock engaged) and a locked padlock appears within the button (indicating contour lock is active). The system stops searching for, and providing guidance on, passes for other defined contours, however close.	
If you move more than 2m, or 10 percent of your current swath width, off the current guidance line, contour lock, while still engaged, becomes inactive and the padlock appears unlocked. The system resumes its contour search and contour lock will become active again when you are within 2 meters of any guidance line.	
2. To disengage contour lock mode, touch the contour guidance mode button. The padlock disappears. It doesn't matter if contour lock is active (padlock locked) or inactive (padlock unlocked) at the time you disengage it.	

Chapter 5: Job and Field Management

Managing Jobs

Managing Fields

T his chapter looks at job management with detailed descriptions of the Job screen features and functionality, including operations such as using guidance lines and grids. It also looks at field management features such as setting perimeters and dropping mark flags.

Managing Jobs

Outback Sts boasts a wide array of job management options including loading previously recorded job data, creating job templates, and recording job specifics such farm, field, crop, operator, and weather information. All this information can be transferred to Field Notes PC software via USB drive to generate maps and reports.

You manage jobs through two main screens, both accessible from the Job screen tab. They are the Job Setup screen and the Job Notes screen. Each screen has direct access to the other.

The Job Setup Screen

Figure 5-1. The Job Setup screen

You use the job setup screen, as an alternative to using the Getting Started screen (discussed in "Managing Jobs from Startup" on

to start new jobs, continue the previous job, list all the jobs in the system. You also use the job setup screen to convert jobs to templates and use those templates for new jobs. The job setup screen also displays free job hours and free disk hours. You access the Job Notes screen from the Job Setup screen and vice versa.

The Job Notes Screen

Figure 5-2: Job Notes screen

Use the Job Notes screen to store information specific to one Job.

Note: USB drive compatibility. Outback Sts is compatible with the Hemisphere GPS (512 MB) USB drive. Other multi-function devices are *not* compatible with Sts.

Ipods, MP3 players, USB extension cables and USB to CompactFlash adaptors are not compatible with Outback Sts.

Do not attempt to reformat these devices to work with Sts. Reformatting can delete their firmware and prevent them from operating correctly.

Managing Jobs from Startup

Each time you power up Outback Sts you are presented with the Getting Started screen from which you can select to start a new job, continue the previous job, or get a list of jobs from which to choose.

Note: You can touch X to close the Getting Started screen and then use the screen tabs and control buttons as required.
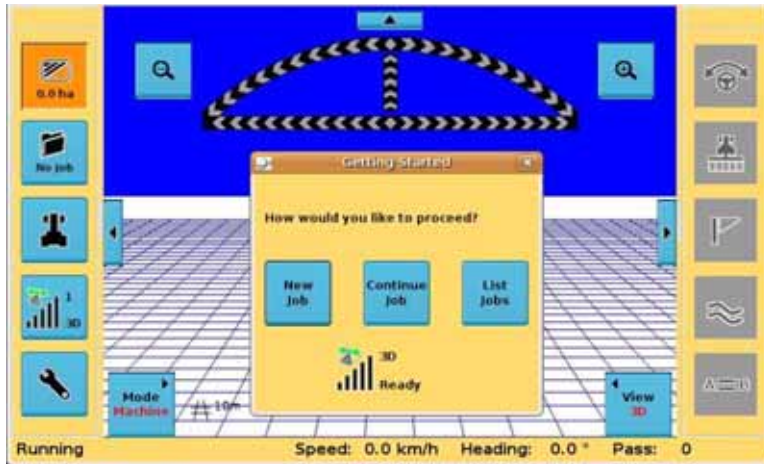
Figure 5-3: The Getting Started screen

Starting, Closing and Continuing New and Previous Jobs

Step	Button (when applicable)
1. To start a new job, touch the **New Job** button in the Getting Started screen. The Getting Started screen disappears and the map screen is on display. The system provides a new job name (visible within the job screen tab). You are ready to start.	New Job ⊡ 09011205
2. Start your job or touch the job screen tab to open the Job Setup/Notes screens and fill in the job details (Figure 5-2 on page 83).	⊡ 09011205
3. If you navigate to the job screens at Step 2, touch the map screen tab to return to the map.	▨ 0.0 ha
4. When you've finished working the job, touch the job screen tab and touch **Close** in the Job Setup screen. This saves all new job data and closes the job.	Close

Step	Button (when applicable)
5. To continue the previous job after a new startup touch the **Continue Job** button on the Getting Started screen. The Getting Started screen disappears and the map screen displays with the previous job loaded.	
Note: The previous job is the last one closed, which may not be the last job worked. If you close a job you've worked on then, before shutting down, reload another (to view its detail, for example) then close it, that job becomes the previous job even if you didn't do any further work.	

Listing, Loading and Deleting Jobs

You can call up the Manage Jobs list from the Getting Started screen on startup or by touching the jobs screen tab then the Jobs button,

Step	Button (when applicable)
1. Touch the **List Jobs** button in the Getting Started screen or the Jobs button in the Job Setup screen. The Manage Jobs list appears. With no row selected, the Load and Delete buttons are inactive.	**List Jobs** **Jobs**

Step	Button (when applicable)
Figure 5-4: The Manage Jobs list - no row selected	
2. Touch the row for the job you want to load (it turns blue). The Load button becomes active.	
3. Touch the **Load** button. The system loads the job into the map screen	
4. As required, touch the job screen tab to view, add or modify job data in the Job Notes screen then return to the map screen.	
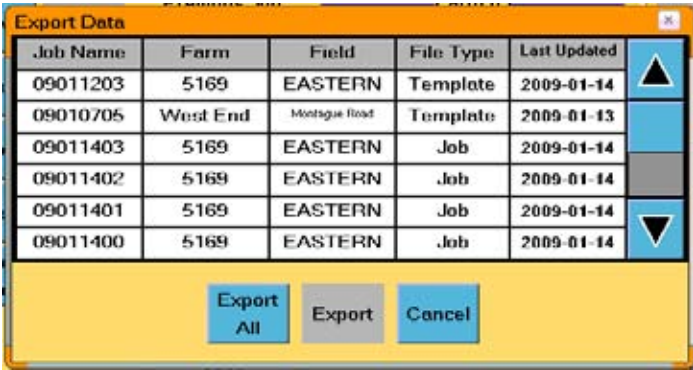
Step	Button (when applicable)
5. As required, use the Manage Jobs list to delete a single job or all jobs in the system. *Delete a Job:* Touch a job row to select it for deletion then touch the **Delete** button. You do not have to confirm the deletion - it just goes (unlike with Delete All - see following) *Delete All Jobs:* Touch **Delete All** then confirm that you want to permanently delete all jobs in the Delete All Jobs (Yes/No) confirmation screen.	Delete Delete All

Exporting Data to a USB Drive

You can export job data or template data to a USB drive. The system exports data to a folder named 'sts_data' on the USB drive. When you first export to the USB, the system will create the folder for you if it isn't already there. See also "Importing Data from a USB Drive" on page 89.

Step	Button (when applicable)
1. Connect the USB drive to the USB port in the Sts console.	
2. Touch the **Export** button in the Job Setup screen. The Export Data list appears. With no row selected, the Export button is inactive.	Export

Step	Button (when applicable)
Figure 5-5: The Export Data list (no row selected)	
3. Touch the row for the job or template you want to export (it turns blue). The Export button becomes active.	
4. Touch the **Export** button. The system copies the data to the export/import folder on the USB drive (creating the folder if it isn't already there).	

Importing Data from a USB Drive

The system imports data from a folder called 'sts_data' on the USB drive. If you want to import data from another source, that is, data not previously exported from this Sts, you will need to put that data into the

sts_data folder on the USB. See also "Exporting Data to a USB Drive" on page 88

Step	Button (when applicable)
1. Connect the USB drive to the USB port in the Sts console.	
2. Touch the **Import** button in the Job Setup screen. The Import Data list appears. With no row selected, the Import button is inactive.	Import

Figure 5-6: The Import Data list (no row selected)

Step	Button (when applicable)
3. Touch the row for the job or template you want to export (it turns blue). The Import button becomes active.	
4. Touch the **Import** button. The system copies the data to Sts's internal drive.	Import

Creating, Using and Deleting Templates

You can save the perimeter, A-B lines and marks (that is, everything except the applied area) of a completed or partially completed job to create a template for future jobs.

Creating a Template.

Step	Button (when applicable)
1. In the job screen, close the job you want to create a template from (if it isn't closed already). You cannot make templates from jobs while they are loaded (or 'open').	Close
2. Touch the **Make Template** button. The Create Templates list appears. With no row selected, the Template button is inactive.	Make Template

Figure 5-7: The Create Templates list (no row selected)

3. Touch the row for the job you want to create a template from (it turns blue). The Template button becomes active.	
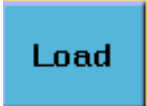
Step	Button (when applicable)
4. Touch the **Template** button. The job is saved as a template. The system returns you to the Job Setup screen.	Template
5. Touch the **Template** button in the Job Setup screen to open the Manage Templates list and confirm your job is now listed as a template.	Template

Managing Templates - Using and Deleting

Step	Button (when applicable)
1. In the Job Setup screen, touch the **Template** button. The Manage Templates list appears. With no rows selected the Load and Delete buttons are inactive.	Template

Figure 5-8: The Manage Templates list (no row selected)

Step	Button (when applicable)
2. Touch the row for the template you want to use for your new job (it turns blue). The Load and Delete buttons become active.	
3. Touch the **Load** button. The system returns you to the Job Setup screen having assigned a new job name. All the perimeter, guidance lines and marks saved with the job you created the template from becomes data for the new job.	Load
4. Edit the job data as required then touch the map screen tab to begin working the new job.	
5. As required, use the Manage Templates list to delete a single template or all templates in the system.	
Delete a Template: Touch a template row to select it for deletion then touch the Delete button. You do not have to confirm the deletion - it just goes (unlike with Delete All - see following)	Delete
Delete All Templates: Touch Delete All then confirm that you want to permanently delete all templates in the Delete All Jobs (Yes/No) confirmation screen.	Delete All

Using Guidance Lines

Guidance lines, or the guidance line array, provide a regular pattern over an area by which you can drive your passes.

Select from three line display options using the up and down arrows for the Lines field on the Vehicle screen.

Off

Displays A and B points and the current A=B line without any additional guidance lines, that is no array.
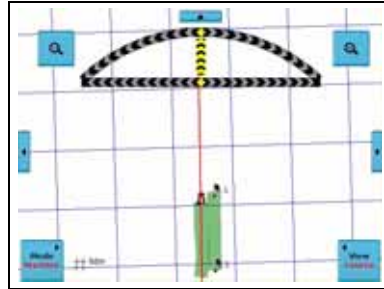
A=B

Displays the guidance line array created from the A-B line definition. The parallel lines are spaced a swath width apart and are centered off the A-B line. The red line is the line vehicle is currently nearest. For information on how to create guidance lines, see "Creating an A=B Line" on page 50 or "Setting an A=B line by Heading (A=B Angle)" on page 52.
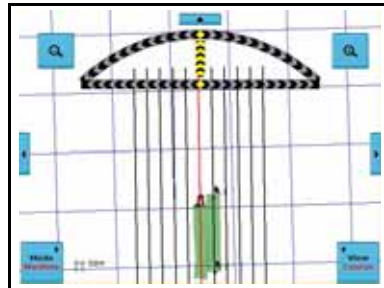
Grid
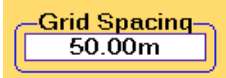
Grid lines are useful when it is necessary to guide from point to point on a grid in successive order. This is helpful for tasks such as soil sampling, tree planting or staking out regular areas.

Grid areas are defined by the parallel A=B lines going in one direction, and 90 degree 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.
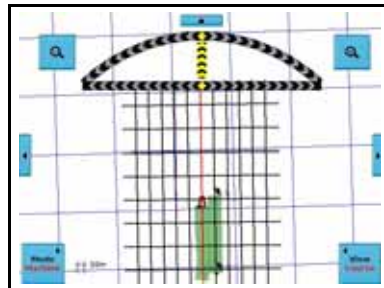
The spacing between the pass lines is equal to the swath width. The distance between the grid lines is based on the value set in the Grid Spacing field on the Vehicle tab.

Setting Up a Grid Pattern

Step	Screen Item (when applicable)
1. On the Vehicle screen, use the up or down arrows for the Lines field to select Grid. This activates the Grid Spacing field.	**Lines: Grid**
2. Set the distance between the grid lines in the Grid Spacing field.	**Grid Spacing** 50.00m
3. Define your A=B line in the required direction (see "Creating an A=B Line" on page 50 or "Setting an A=B line by Heading (A=B Angle)" on page 52). Set your A point where you want the first gridline to be.	**A = B**

Managing Fields
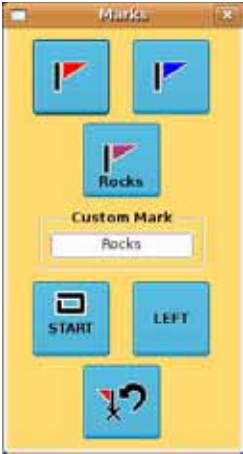
In this section we look at setting a perimeter within a field and using marks (flags) to create sub-areas within a field.

About Perimeters

Normally, you complete the first operational pass to set and record the perimeter of the field. The perimeter feature of Sts enables you to record a field perimeter and save it as a templates for future operations. This way, perimeter information remains consistent from job to job, season after season.

Setting a Perimeter

Step	Button (when applicable)
1. Drive to the starting position of the field.	
2. Touch the **Marks** button. The Marks screen appears.	
Figure 5-9: The Marks screen	
3. Accept the default Left or touch the button to select Center or again to select Right to specify where the perimeter is marked relative to the vehicle/implement.	

Step	Button (when applicable)
4. Touch the perimeter **START** button in the Marks window. Drive the perimeter you want to define as accurately as possible. A black, studded line on the screen shows the perimeter as it's being defined. The perimeter icon shows on the Marks button along with a progressive estimate of the perimeter area.	START 1.4ha
5. Touch the **FINISH** button in the Marks window when you want to close the perimeter. The closing line, which runs from your current position to the start position, is plain, not studded. Alternatively, drive to within half a machine width of the perimeter start point to have Sts automatically close (finish) the perimeter for you.	FINISH

Step	Button (when applicable)

Figure 5-10: Left - Manual Close; Right - Auto Close
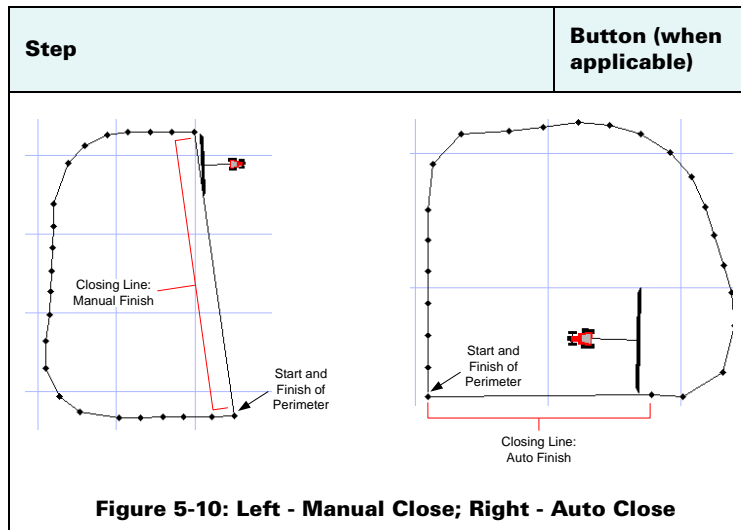
Note: It is best to close the perimeter as close to the starting point as possible (auto close)

Using Mark Flags

Mark flags are best used to create sub-areas, for example when applying treatment that requires several refills. In Field Notes you can use your marks in start/stop pairs to define sub-areas for exporting as layers.

You can also use marks as reference points to note obstacles such as rocks and trees. You create a mark between each refill and from those marks, you can create separate maps of each load.

Another use of marks is when changing seed variety, spacing or depth during planting. Drop a mark when you make the change and the two separate areas can later be analyzed for yield differences.

> **Note:** You don't have to use the colored flags in any particular order, you can use the same color to mark an area of a particular type. Flags are numbered consecutively irrespective of their color.

Marking a Single Point

You can use marks to record a single point, such as a rock patch. Simply drop a mark and record what it is on a note pad to input into the Field Notes software later
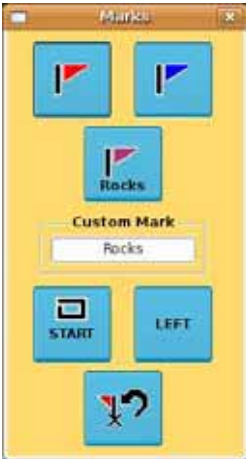
Step	Button (when applicable)
1. Touch the **Marks** button. The Marks screen appears.	
Figure 5-11: The Marks screen	
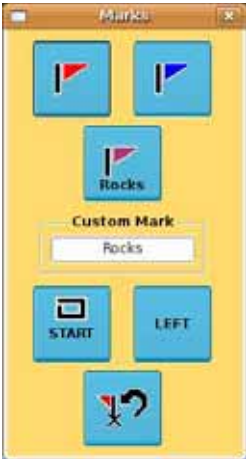
Step	Button (when applicable)
2. Select the a mark color from the Marks screen. The current location is saved and identified by the color and by a number. The system numbers marks in the order you drop them. This makes later identification easier.	
3. Annotate all marks and any other pertinent information about the job on a note pad.	
4. After finishing the job, transfer the information to a PC using the Field Notes software.	

Creating Custom Flags

You can create custom marks to supplement those that come standard with Sts. You can give your custom markers meaningful names.

Step	Button (when applicable)
1. Touch the **Marks** button. The Marks pop-up window appears.	

Step	Button (when applicable)
 Figure 5-12: The Marks window	
2. Touch the editable **Custom Mark** field next to the purple custom flag. The virtual keyboard appears.	
3. Touch **Clear** to clear the custom mark field then touch type the name of the custom marker. Touch **Apply**. The name you gave the marker shows in the purple button. **Note:** You can only name the purple custom flag directly in Sts. You can annotate the other flags in Field Notes	
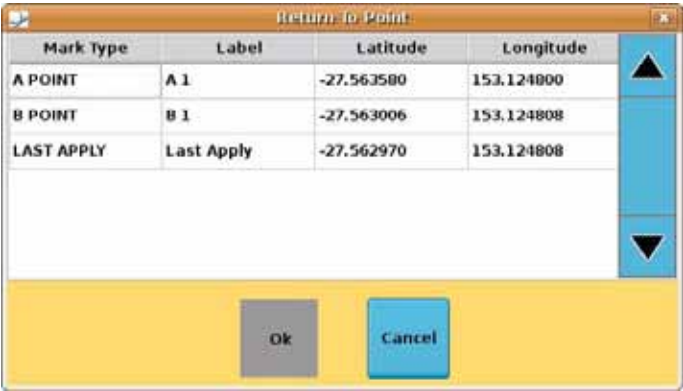
Step	Button (when applicable)
4. Touch the custom flag button to place your custom marker. It shows in the field with the name you gave it.	
5. Note all marks and any other pertinent information about the job in a note pad.	
6. After finishing the job, transfer the information to a PC using the Field Notes software	
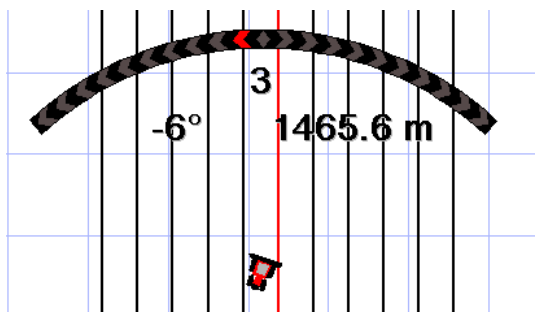
Returning to a Previously Recorded (or Marked) Point

Step	Button (when applicable)
1. While in Straight Guidance mode, touch the **Marks** button. Touch the **Return to Point** button. The Return To Point list appears.	

Step	Button (when applicable)
  Figure 5-13: The Return To Point list Note that you can return to A and B points (scroll to see A), marks (flags, including custom flags) and to the end of the last application (Last Apply mark type in the list).	
2. Select the point to which you want to return (scroll if necessary) and touch OK. The system returns you to the map screen.	

Step	Button (when applicable)
 Figure 5-14: The map screen when returning to a point Beneath the lightbar's heading arch the system displays: • the return point ID, which will be, depending on your selection at Step 2: • mark number - 3 in the example • the custom mark name, e.g. "Custom 6" • "Last Apply" • A or B point with number, for example B2 • the bearing to the point (-6° in the example) • the distance to the point	

Step	Button (when applicable)
3. Steer the course to the return point you have selected - the display will show 0° and the distance will count down. Use the lightbar for guidance as required. **Note:** When you have returned to a point, the lightbar arch and on-screen return point data disappear. Although the return point remains in the list, and you can select it, nothing will appear on the map screen to guide you to that point if you do select it - because you are at it. If you move away again, however, you can return to the point again. There is only ever one Last Apply return point - and it is always the end of the last time you turn Apply off.	

Chapter 6: GPS Differential Correction Types

T his chapter provides an overview of the differential correction types used by Outback Sts and details on using e-Dif, including selecting e-Dif and entering a subscription code. There is information on initialization on power up and on updating e-Dif when a job has been interrupted.

Outback Sts supports correction types SBAS (Space Based Augmentation System) and e-Dif.

For North American distribution, SBAS (WAAS) are the factory installed options. WAAS is free and is available throughout most of North America.

For European distribution, SBAS (EGNOS) are the factory installed options. EGNOS, like WAAS, is also free and is available throughout most of Europe.

If you are in a location which does not have access to SBAS corrections like WAAS or EGNOS, e-Dif is a factory installed option. You will not need any additional hardware to use e-Dif.

Note: Sts's e-Dif application comes with a pre-activated one-time primary subscription, which can be used 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 meters (3-6.5 feet) per hour making pass to pass accuracy for broad-acre applications acceptable. However, absolute positional accuracy errors may approach ±10 meters (±33 feet).

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 in order 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

Touch the Setup button on the GPS Status screen to access the Setup screen. Touch the e-Dif button to set it as the GPS application.
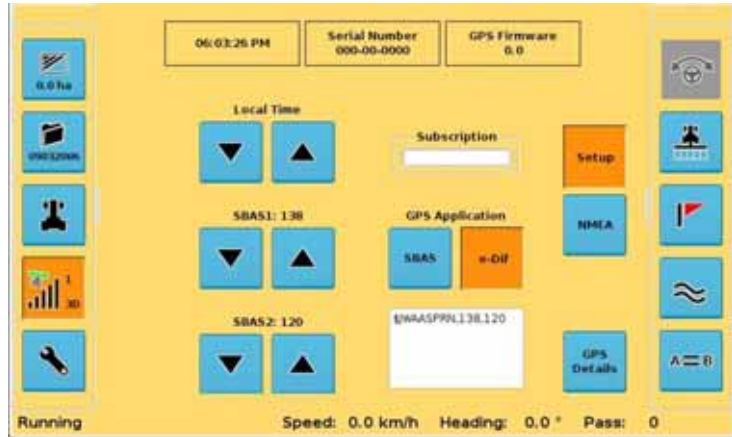
Figure 6-1. The GPS Status, Setup screen - Selecting e-Dif

Entering an e-Dif Subscription Code

Touch the subscription field on the Setup screen and use the alphanumeric keypad to enter the subscription code. Touch OK to store the code in the system.

Initialization Outback Sts on Power Up

After the power is turned on to Sts, the system must track GPS satellites for about ten 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, the e-Dif Status field displays the following:

- "No Fix" = No GPS

- "2d Fix" = has a 2 dimensional position

- "3d Fix" = has a 3 dimensional position

- "2D Fix" = has a 2 dimensional differential position

- "3D Fix" = has a 3 dimensional differential position

Note: the GPS screen tab will indicate these statuses showing 2d, 3d, 2D or 3D (or nothing, indicating no fix/no GPS).

The Status shows as "3D Diff Fix" meaning all the other statuses have been passed through.

Figure 6-2: Status Field on the GPS Details screen.

When Sts has finished tracking, the Status changes to "Ready".

Chapter 7: Communicating with Third-Party Applications

Available Applications

Changing Default Settings

The DGPS signals of the Outback Sts can be shared with third-party mobile applications.

Available Applications

Any application designed to receive DGPS signals from an external receiver over an RS232 Serial Interface using either NMEA 0183 or RTCM messages will work with the Outback Guidance System. NMEA 2000 messages are also available over the CAN bus. Various connecting cables and kits are available for specific applications such as yield monitors, rate controllers, laptops, PDAs, etc.

For successful communication, both Sts and the external application must be configured to communicate in the same way. Many applications can use the default communication protocol, however, some applications may require alteration from the default settings.

Changing Default Settings

You can change the default communication settings by
touching the NMEA button on the GPS screen. The NMEA
Setup screen appears. After making any changes, touch
the Save button.
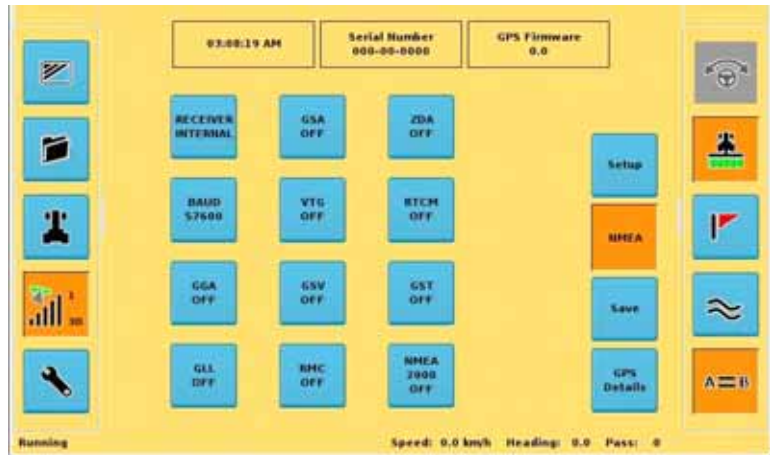
The following options are available: (Default options are in bold)

- NMEA PORT 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.)

Note: If you select a higher output rate (5 HZ or 10 HZ), you must also select a faster NMEA PORT BAUD (57600 or 19200) in order to facilitate proper communication.

Chapter 8: Appendices

Appendix A: Setting Up Field Notes Files

To transfer files created using the Field Notes™ PC utility to Sts, you need to create a Field Notes PC utility folder on a USB drive.

Creating a Field Notes Folder on the USB Drive

1. Insert a USB drive into the computer's USB port. The USB drive main folder displays. Take note of the letter assigned to the USB drive as indicated in the Address field.
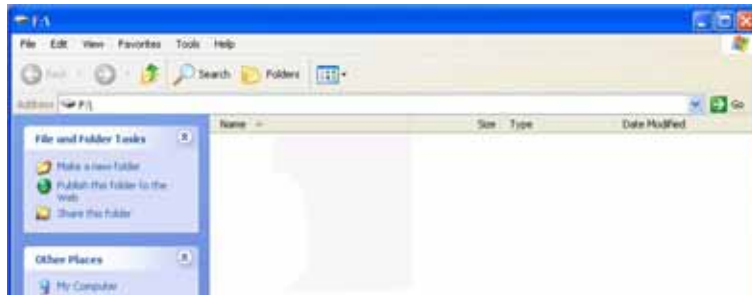
2. Right click in the white area of the main folder to bring up the drop down menu.

3. Select New > Folder to create a new folder.
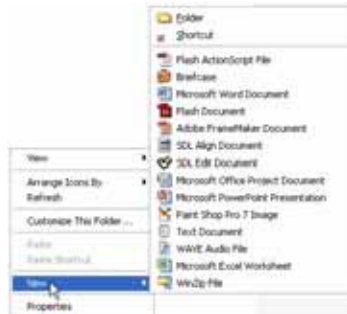
4. Rename the new folder "sts_data" and press Enter.
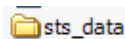
5. Close the main USB flash drive folder.

6. Right click on the "Safely Remove Hardware" icon at the bottom right corner of the in the task bar to bring up the **Safely Remove Hardware** screen.

Note: Click on the expand arrow if the "Safely Remove Hardware" icon does not show.

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7. Click on the Safely Remove Hardware button.

8. Select the USB drive that is used.

9. Click the Stop button to turn off the USB drive. The **Stop a Hardware device** window appears.
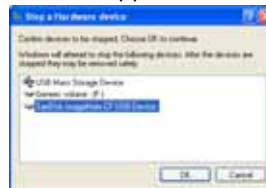
10. Select the USB drive from the list.

11. Click the OK button. The **Safe to Remove Hardware** message appears in the lower right corner indicating that the USB drive can be safely removed from the computer.

Moving Files from the PC to the USB drive after editing in Field Notes

1. Open the Field Notes file transfer location on the PC.
2. Select the desired job (*.LOG) or template (*.TEM) file.
3. Move or copy the file to the sts_data folder on the USB drive.

Importing Job Data from the USB Drive to Sts

1. Connect the USB drive to the USB port on the side of Sts.
2. Touch the Import button on the Job screen. The Import Data pop-up window appears.
3. Select the data files to import. Only job data contained in the sts_data folder on the USB drive will appear in the Import data pop-up window.

Note: Job files have a *.LOG extension and template files have a *.TEM extension.

4. Touch the Import button on the Import Data pop-up window. A confirmation message appears.
5. Select Yes to continue: the job is imported.

Appendix B: Optional Floor Switch & Cable

Attaching the Floor Switch (if purchased)

You can use the floor switch (if purchased) as a remote to pause or restart the Sts mapping/data logging function, - it's the same as using the Apply control button. See "Apply On/Off" on page 24

Note: Your floor switch comes with its own main cable. This cable is supplied with an eDriveTC unit, or you can purchase it seperately. To install the cable see See "Installing the Main Cable and GPS Cable" on page 14.

1. Remove the 2-pin cap from the run/hold portion of the main cable and connect the floor switch.

Optional Floor Switch

Connectors

Main Cable (for floor switch option)
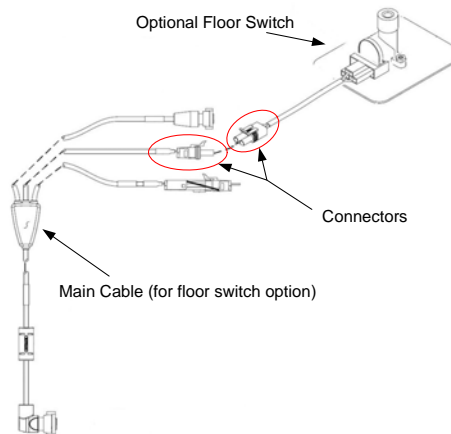
Figure 8-1. Floor switch, cable and connectors

2. Install the floor switch in an easily accessible position.

Appendix C: Basic Troubleshooting

Note: 'See' references in the chart, for example, 'See section 1' (in chart Section 2) refer to the explanatory sections following the chart.
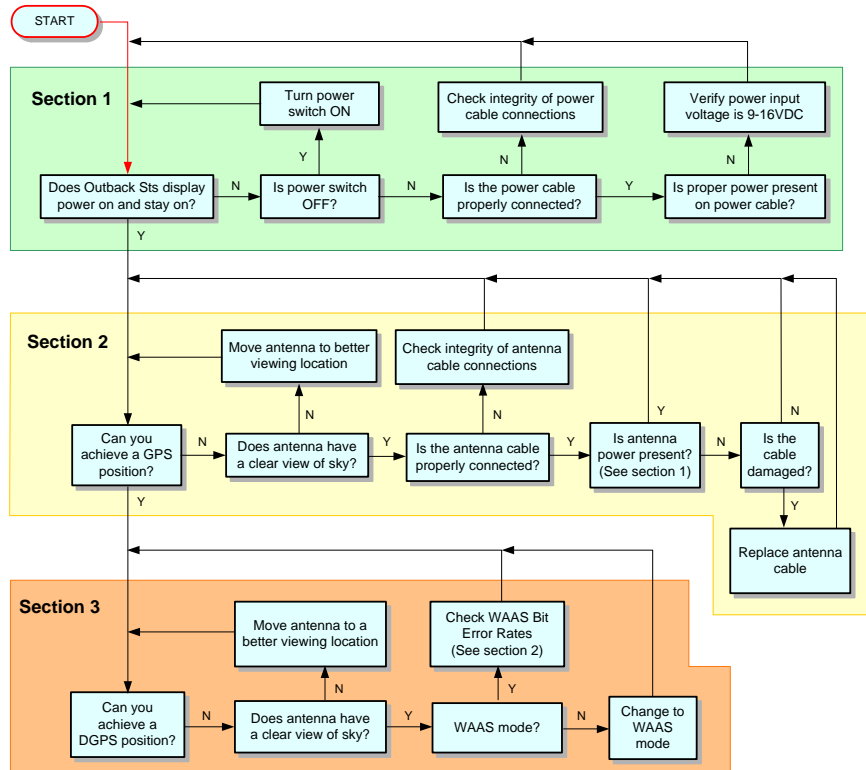
Figure 8-2. Troubleshooting process

1. Check Power by Testing Antenna Voltage

The Sts antenna is an "Active" antenna that requires power to operate. This power is supplied to the antenna by way of the coaxial cable connecting it to Sts.

Testing the antenna voltage can:

- Ensure the Sts receiver is supplying power to the antenna; and

- Verify the antenna cable is not damaged.

Procedure

1. Turn Sts off.
2. Disconnect the coaxial cable from the Sts antenna.
3. Turn Sts on.
4. Using a voltmeter set to VDC, measure the voltage output across the coaxial cable. It should measure +5 VDC between the center conductor and exterior connector shell. If the measurement is +5 VDC across the coaxial cable, then neither the cable nor receiver are damaged. If the measurement is not +5 VDC across the coaxial cable, proceed to step 5.
5. Turn Sts off.
6. Disconnect the coaxial cable from Sts.
7. Turn Sts on.
8. Using a voltmeter set to VDC, measure the voltage output across the antenna output on the console. the measurement should be +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 coaxial cable, then the cable is damaged. Replace the coaxial cable and return to step 1.
9. If the measurement is not +5 VDC from Sts, contact Outback Customer Service to return the console for servicing.

2. Check the Differential Signal in SBAS by Verifying the Bit Error Rate (BER)

The Bit-Error-Rate (or BER) can be checked in the BER field on the GPS screen
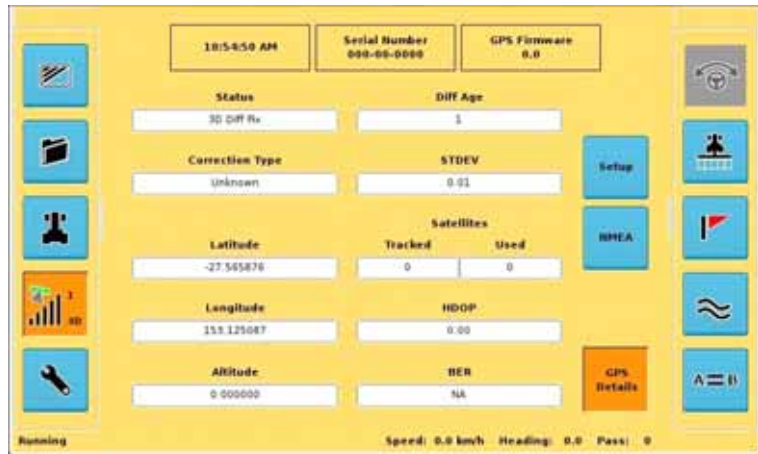
The BER is a check of the quality of the SBAS correction signal reception. Sts uses a scale of 0 to 500 to indicate the signal quality. BER values of less than 20 are ideal. If not, ensure the antenna has a clear view of the sky in order for it to properly find and track the correction satellites.

When using SBAS for the correction type, Sts can track one or two correction satellites. Both of these sources will have a different BER and will be displayed with a hyphen separating the two values.

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

Appendix D: Frequently Asked Questions

About GPS Guidance

Q: What is GPS?

A: GPS stands for Global Positioning System. It's a satellite-based signal operated by the 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. For more information, go to http://gps.faa.gov/GPSbasics/index.htm.

Q: What is DGPS?

A: The D stands for Differential Correction. It just means that a second signal is used to correct inherent errors in the GPS signal making it even more precise. Sts can utilize SBAS or e-Dif corrections.

Q: What is WAAS?

A: WAAS stands for Wide Area Augmentation System. It is a satellite based correction signal operated by the U.S. Federal Aviation Administration and is free to those who use it. The service works throughout most of North America from Mexico north to the 55th parallel in Canada. WAAS is not available currently anywhere else in the world, though other SBAS systems like EGNOS (Europe) and MSAS (Japan) are equivalent and can also be used. For more information about WAAS contact the FAA at http://gps.faa.gov/

Q: What is e-Dif?

A: e-Dif is a Hemisphere GPS patented technology 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. The differential corrections are modeled over time and applied to the GPS data in order to maintain a very consistent relative position. The operator can use e-Dif over long time periods with minimal drift in accuracy or return to the starting location at any time to update the differential corrections.

Q: How accurate is Outback Sts 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 lapsed time from one pass to the next may increase the chance for additional error.

Q: What about Foam Markers and Disk Markers?

A: The answer is … use them if they help. The best guidance is whatever works for the operator. The more visual indications to guide from the better. One thing is certain, 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. We recommend combining the use of Differential GPS giving the driver every possible advantage he could have.

Q: How does weather affect the GPS signal?

A: Weather normally does not affect the GPS signal. This includes rain, sleet, snow, thunderstorms and wind. Lightning isn't a problem unless it's a close strike. A direct lightning strike will damage Sts. Snow and ice accumulation on the antenna can also cause a problem.

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 Sts

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

A: The Steering Guide calculates the nose heading for the driver to steer in order to correctly follow the intended path. Current Position only reports the distance left or right of the intended path. The operator drives using the Steering Guide and checks results using Current Position.

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

A: Yes. Sts accommodates both NMEA 0183 serial and NMEA 2000 CAN communication protocols. Contact the factory at any time to get the latest compatibility list.

Q: How long does it take Outback Sts to attain a usable signal?

A: It normally takes 1 - 3 minutes. The GPS signal is acquired first, and "3d" appears on the GPS tab. Next, the DGPS correction is acquired, and "3D" appears on the GPS tab. For e-Dif, it takes 10 minutes to generate corrections. The vehicle can be moving during this acquisition process.

Q: Does Outback Sts have memory?

A: Sts records all movement as long as guidance is on. When either the Apply button or the (optional) Run/Hold floor switch is used to pause the job, no data is recorded. Sts can record up to 30 hours of data for a single job. When the job is finished, the job data is automatically saved. Historical data for each job is collected and stored on the system. Data can also be imported, exported, or erased all together on the Job screen.

Q: How do I erase memory?

A: To erase the memory in Sts, touch the job screen tab, then the Jobs button in the Jobs Setup screen. The Manage Jobs screen appears. Select the job to delete and touch the Delete button. To delete all the recorded job, touch the Delete All button. The Delete All Jobs screen will confirm that all job data should be deleted. Press the Yes button to continue, or press the No button to cancel.

Q: What's Straight Guidance?

A: In straight guidance mode, Sts generates perfectly straight, parallel lines. Sts locks on the closest line based on the first A-B pass and the entered swath width. It then records in memory the actual movement over those lines while guiding. A new A-B line can be generated at any time with Sts. Straight guidance can also be used to create circular (pivot) rows.

Q: What's Contour Guidance?

A: In contour guidance mode, all movement is recorded as the machine moves around, unless the system is paused using the Apply button or the (optional) Run/Hold Floor Switch. During the initial pass, no guidance is given. When you make a second pass and subsequent passes, Sts 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 Sts is in contour guidance mode, it follows any pass recorded in the current job, be it a straight, circular or contour pass.

Q: How do I perform headlands?

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

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

A: When doing straight passes, the initial pass is defined by marking two points in the field. Sts will generate a line through the two points defining the first pass. Since passes can be worked in any order, the A-B line can be defined along the edge of the field, down the middle of the field, or at any point in between. There are two ways to define the A-B line: by marking Point A at the beginning of the initial pass and marking Point B at the end, or by marking Point A at the beginning of the initial pass and entering a desired heading.

Q: Can Outback Sts store a waypoint?

A: A waypoint can be stored so the operator can guide back to that point. It's used primarily when a job is paused. For example, when stopping for a refill the operator would pause the job, save the point and return back to that point to resume. Sts automatically records multiple points that can be used as waypoints including the last point any data was recorded. You can also drop a flag to mark a waypoint and Sts can guide to it.

Q: How is the console mounted?

A: The console is mounted using a vacuum cup against the windscreen or other, non-porous (metal) surface.

Q: Does bright sunlight affect the display?

A: The available Day and Night display modes makes the display screen easily viewable with any ambient light situation. Also, the brightness option in the System screen can be used to further adjust the display.

Q: How is the antenna mounted?

A: It's mounted 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 Outback Sts account for implement lag in turns?

A: Sts does not account for implement lag. We assume turning lag will be about the same on each pass. As long as tractor spacing is right, implement spacing will follow. This also goes for 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 Outback Sts?

A: A standard DC power supply between 9 and 16 volts is required. Current is 1.5 Ampere at 12 VDC. Sts won't be damaged by reverse polarity (positive to negative), but it will not operate.

Appendix E: Sales and Service Information

Contacting the Factory

U.S:	Canada:
Outback Guidance	Outback Canada
Hemisphere GPS	Hemisphere GPS, Inc.
2207 Iowa Street	326 Saulteaux Crescent
Hiawatha, KS 66434	Winnipeg, MB R3J 3T2
USA	CANADA

ONLINE: http://www.outbackguidance.com

PHONE: Monday Through Friday 8AM-5PM U.S. Central Time

- **U.S:** 1-800-247-3808 (Customer Service & Ordering)

- **Canada:** 1-866-888-4472 (Customer Service & Ordering)

- **From all other countries:** 01-785-742-2976

E-MAIL: 24 hours / 7 days a week, all inquiries will receive a response from one of our Customer Support Representatives within one business day.

- **Sales:** outbacksales@outbackguidance.com

- **Customer Service:** outbackcs@outbackguidance.com

- **Website Feedback:** outbackweb@outbackguidance.com

FAX: 24 hours / 7 days a week, all inquiries will receive a response from one of our Customer Support Representatives within one business day.

- **Canada:** 1-204-888-0991

- **U.S:** 1-785-742-4584

U.S. REGIONAL SALES OFFICES:

- Outback South - Hewitt, TX 1-866-857-4448

- Outback North Central - Fargo, ND 1-888-825-6031

Outback Sts Extended Service Plan (ESP) Summary

U.S. and Canada Only

Item	Standard Term	Extended Term
Price	Free	$399
Term	1 Year ESP	3 Year ESP (Standard +2 Years)
Exchange Service	Yes	Yes
Software Revision Updates	No Charge	No Charge
Software Revision Installation	Provided by Customer or OGCTM	Provided by Customer or OGCTM
Damage During Shipments	Covered	Covered
Damage After Customer Receipt	Not Covered	Not Covered
Shipping, Outback to Customer	Outback Paid (Next Day Air & Saturday* Delivery)	Outback Paid (Next Day Air & Saturday* Delivery)
Shipping, Customer to Outback	Outback Paid (Ground Service)	Outback Paid (Ground Service)

* Saturday delivery may not be available in all service areas.

Limited Outback Sts Extended Service Plan

The Sts ESP (U.S. and Canada only) applies only to the non-software portions of the electronic components of the product, including the console, antenna, and related cables. Coverage for the mechanical portions of Sts is described in the warranty notice. The limited plan term

is one-year standard, or three-years extended if purchased at the time of the original order, beginning on the date of invoice to the original purchaser.

Damage caused by shipping the product(s) to the original purchaser is covered under this limited plan. Otherwise, this limited plan does not cover damage due to external causes, including accident, abuse, misuse, problems with electrical power, servicing not authorized by Hemisphere GPS, usage not in accordance with product instructions, failure to perform required preventive maintenance and problems caused by use of parts and components not supplied by Hemisphere GPS.

This limited plan does not cover any items that are in one or more of the following categories: software (except for Hemisphere GPS authorized revision updates), external devices (except as specifically noted), accessories or parts added to as Sts system after the system is shipped from Hemisphere GPS, accessories or parts that are not installed in the Hemisphere GPS factory.

Hemisphere GPS will provide, on an exchange basis and subject to the Hemisphere GPS Exchange Policy in effect on the date of the exchange, replacement parts (up to and including a complete Sts system) for the Sts product(s) covered under this limited plan when parts require replacement. To request service, call Hemisphere GPS (U.S. 800-247-3808, Canada 866-888-4472) or go to www.outbackguidance.com for information, within the plan period. If replacement is required, Hemisphere GPS will issue a Return Material Authorization Number and will ship by UPS Next Day Air & Saturday Delivery the replacement part(s) within 1 business day. Ship by UPS Ground Service collect, the original product(s) back to Hemisphere GPS in this packaging. For Canadian customers, Saturday delivery is not available and the shipping carrier is Purolator.

In any instance in which Hemisphere GPS issues a Return Material Authorization Number, Hemisphere GPS must receive the original part(s) prior to the expiration of the plan period in order for the replacement(s) to be covered by the limited plan. Failure to return original part(s), for which replacement(s) have been sent, within 30 days of initial shipment, will result in the issuance of an invoice for the cost of the sent part(s). Failure to pay the invoice, or return the part(s), will result in cancellation of this limited plan.

Hemisphere GPS owns all parts removed from repaired products. Hemisphere GPS uses new and reconditioned parts made by various manufacturers in performing service repairs and building replacement products. If Hemisphere GPS repairs or replaces a product, its plan term is the remainder of the limited plan term.

These provisions apply to the Limited Sts Extended Service Plan only. Hemisphere GPS reserves the right to make improvements in design or changes in specifications at any time, without incurring any obligation to owners of units previously sold. No one is authorized to alter, modify or enlarge this Limited Sts Extended Service Plan nor the exclusions, limitations, and reservations.

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End User License Agreement

HEMISPHERE GPS
END USER LICENSE AGREEMENT

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