Outback GUIDANCE

Outback STX

User Guide

Part No. 875-0352-000 Rev C1

AgJunction

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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6501346	7373231	8000381	8271194	8649930	
6539303	7388539	8018376	8307535	8676620	
6549091	7400294	8085196	8311696	8718874	
6711501	7400956	8102325	8334804	8768558	
6744404	7429952	8138970	8489291	8781685	
6865465	7437230	8140223	8521372	RE41358	
6876920	7460942	8174437	8548649		
7142956	7689354	8184050	8583315		
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Other U.S. and foreign patents pending.

Dealer Support

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

Phone: (800) 247-3808
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Contents

Chapter 1: Getting Started

Thank you for your purchase of Outback STX™. This chapter provides an overview of Outback STX and the following:

- Parts included in your kit
- Basic connection diagram
- Information on installing Outback STX
- Information on powering up and powering down Outback STX
- Information on starting Outback STX

Read this chapter thoroughly before beginning the installation.

Overview

The Outback STX Guidance System combines RTK capability in an autosteer-ready, value-based terminal. Your STX system is compatible with eDriveXC™ and eDriveXD™ —Outback's advanced autosteer systems with the optional eTurns™ automated turn solution (eDriveXC-only). STX is RTK-capable when used in conjunction with an Outback MAX™ rover radio and Outback RTK base stations.

Note: When referring to both eDriveXC and eDriveXD, this manual uses the term eDriveXC/XD. When referring to functionality specific to either eDriveXC or eDriveXD, this manual uses that term. For example, eTurns is an eDriveXC-only feature.

STX features a high-resolution touchscreen, multi-language support, and clear, easy-to-read job data and system status information in real time. STX provides the following features:

- Integrated receiver offering scalability from L1 GPS to L1/L2 GNSS
- GLONASS ready (unlock required—contact Outback Guidance Customer Service for more information)
- Support for various differential correction types (SBAS, RTK, and L-band), with RTK correctors through a combination of the Outback MAX rover and any one of Outback's portable or fixed base stations, such as A321™, A221™, and BaselineX™.
- Support for Hemisphere's patented Extended Differential (e-Dif®) software that enables STX to perform with differential-like accuracy for extended periods of time without the use of a differential service. See "e-Dif" on page 165 for information on setting up and using e-Dif.

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

For more information on the differential corrections available for your STX system, contact Outback Guidance Customer Service (see just inside the front cover before the Contents section for contact information).

Parts Included in Your Kit

Unpack your STX terminal kit and identify the parts as shown in Table 1-1.

Table 1-1: Parts list

Part Number	Qty	Description	Photograph
802-1079-000#	1	Terminal, Outback STX	
604-0013-000#	1	RAM ball mounting hardware • Round base • Square base • Double socket arm mount • U-bolt and related nuts	
051-0364-000#	1	Cable, power, ECU, 4.5 m Connects ECU to cable 051-0351-000#	
051-0351-000#	1	Cable, circular (female) 10 - power, CAN Connects terminal to power, run/hold foot switch, and ECU cable 051-0364-000#	

Table 1-1: Parts list *(continued)*

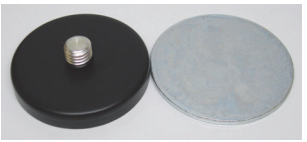
Part Number	Qty	Description	Photograph
051-0353-000#	1	Cable, circular (female) 14 - power, ethernet, rover Connects terminal to rover radio *This optional part is purchased separately as part of the STX RTK kit.*	
804-3044-000#	1	Antenna, A50, wide band, N-type	
720-0033-00A	1	Antenna mounting kit • Base, magnet, round, 3.2" OD, 5/8-tap, black • Disk, 3 x 3/8" x 3/16, zinc • Screw, hex, 5/8"-11, 7/8" long, set screw steel, cup end, zinc plated • Insulation tape • Adhesive foam pad	
050-0033-002#	1	Antenna cable, N-type male 90° to TNC male 90°, 26 ft Connects terminal antenna port to antenna 804-3044-000#	
750-1079-000	1	USB drive, 2 GB	
720-0035	1	Run/hold foot switch *This optional part is purchased separately.*	

Table 1-1: Parts list *(continued)*

Part Number	Qty	Description	Photograph
051-0393-000#	1	Cable, GSI/AC110 Connects terminal to GSI device and AC110 rate control cable 054-0131-000# *This optional part is purchased separately.*	

STX Terminal Overview

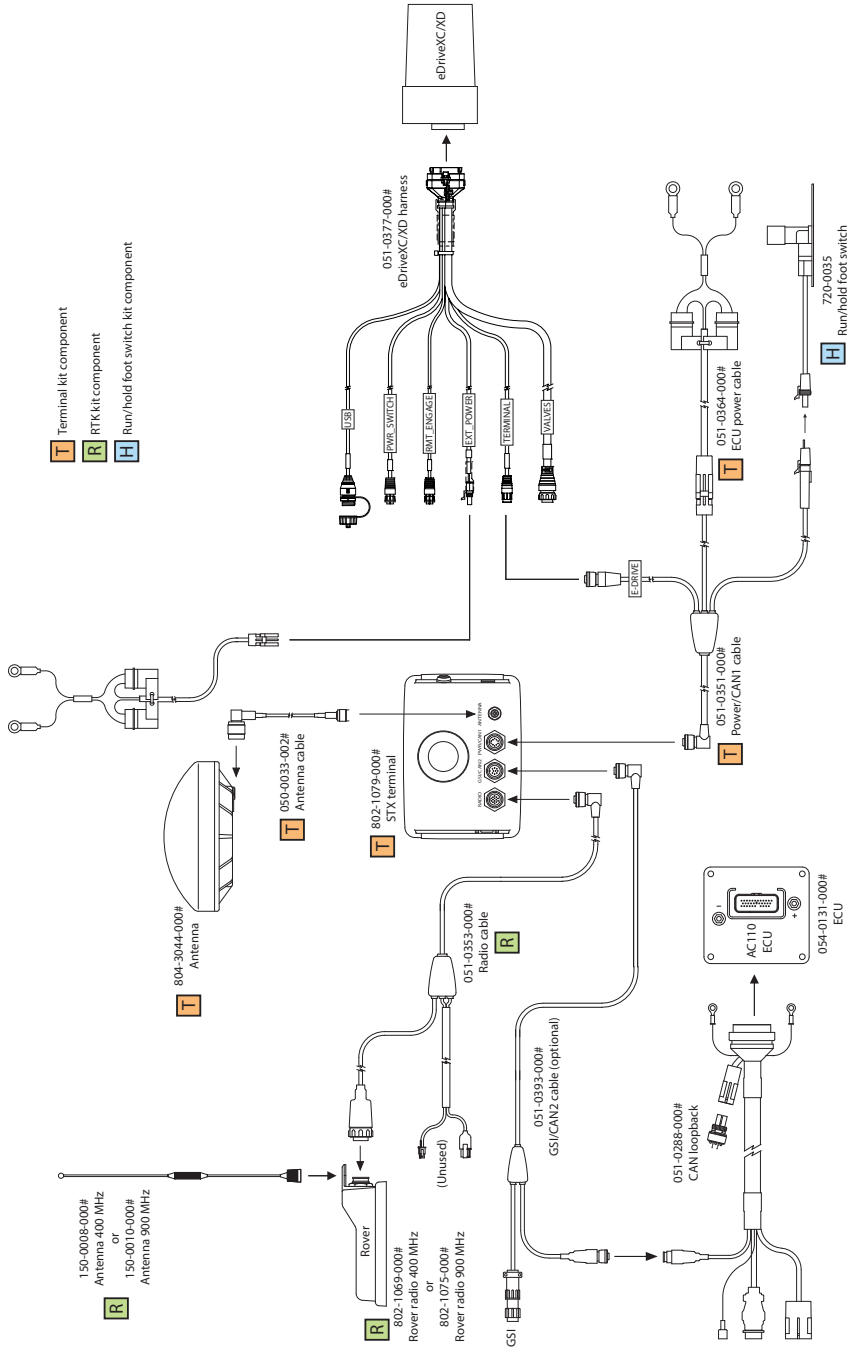
Figure 1-1 shows the front, side, and rear views of the STX terminal and Table 1-2 on page 6 describes the features shown in Figure 1-1 For specific cable/port connections, refer to “Connection Diagram” on page 7.

Figure 1-1: STX terminal (front, side, and rear views)

Table 1-2: STX terminal feature descriptions

Item	Description
1	Power button (also functions as a screen capture button—see “Capturing Screen Images” on page 34)
2	USB port
3	Display touchscreen
4	Serial port
5	Model/serial number
6	Mounting holes
7	RADIO port 14-pin, connects to optional rover radio (only for use with STX RTK kit) The cable for this port is color coded blue to match the port.
8	GSI/CAN2 port 9-pin, connects to GSI device and AC110 The cable for this port is color coded yellow to match the port.
9	PWR/CAN1 port 10-pin, connects to power source, autosteer ECU, and optional run/hold foot switch The cable for this port is color coded red to match the port.
10	ANTENNA port TNC, connects to antenna

Connection Diagram



Installing STX

Note: Proper installation is critical for safe and optimal STX operation.

The following steps represent the typical installation order; however, you may install components in your preferred order.

1. Mount the antenna.
2. Install any optional parts (eDriveXC/XD, run/hold foot switch, rover radio) then route the appropriate cables into the cab for connection to the terminal.
3. Install the terminal mounting hardware (RAM ball mount) to both the cab and the terminal.
4. Connect the appropriate cables to the terminal.
5. Connect the terminal to the mounting hardware (RAM ball mount).

Note: If there are separate installation instructions for any parts (such as for installing eDriveXC/XD) those instructions are included with their part/kit.

Mounting the Antenna

You should install the GPS antenna on the vehicle's left/right centerline and front/back pivot point. If you cannot install the antenna at the exact centerline and/or pivot point, see Chapter 3, "Autosteering" for instructions on entering offset values.

Note: Do not place the antenna within two feet of a transmitting radio antenna (such as for a 2-way or business band radio).

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

5. Place the magnetic mounted antenna on the plate and on the vehicle's centerline and pivot point (similar to photo at right).

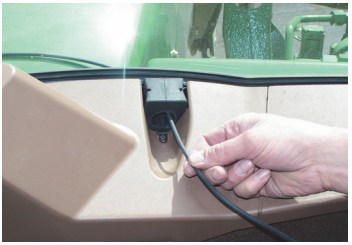
Routing the Antenna Cable

When routing the antenna cable:

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

To route the antenna cable:

1. Securely attach one end of the antenna cable (050-0033-002#) to the GPS antenna.
2. Route the cable through a cab opening where rubber protection exists that will protect the cable (see photo at right).
3. Attach the other end of the cable to the terminal (see Figure 1-1 on page 5 and "Connection Diagram" on page 7).



Installing Optional Parts

For information on installing such optional parts as eDriveXC/XD or AC110, refer to the installation instructions included with your kit. For information on installing the run/hold foot switch or rover radio, see the sections that follow.

Installing the Run/Hold Foot Switch

You can use the run/hold foot switch as a remote to pause or restart STX's mapping/data logging function. Using Figure 1-1 on page 5 and "Connection Diagram" on page 7 install the run/hold foot switch as follows:

1. Connect one end of run/hold foot switch cable 051-0281-000# to power cable 051-0351-000#.
2. Remove the cap from the run/hold connector on power cable and connect to run/hold foot switch 770-0035.
3. Connect the other end of the foot switch cable to the run/hold foot switch.
4. Install the run/hold foot switch in an easily accessible position.

Installing the Rover Radio

You should mount the rover radio on top of the vehicle cab to ensure line-of-sight to the RTK base station. The bottom of the rover radio includes a built-in magnet for easy placement on the included mounting plate.

1. Clean and dry the vehicle surface where you will attach the rover radio mounting plate.
2. Remove the paper backing from the adhesive strips on the back of the mounting plate (see photo at right).
3. Position the mounting plate and press down hard for proper adhesion.
4. Place the rover radio on the plate.
5. Screw the rover radio antenna onto the rover radio antenna mount until snug.

Routing the Power Cable

1. Connect the red and black leads of power cable 051-0364-000# to a reliable 12 VDC power source—red lead to positive and black lead to negative (red lead shown at right).
2. Route power cable 051-0364-000# into the cab to connect to the power connector on power cable 051-0351-000#.
3. Coil excess cable in a protected location and secure the installation with tie straps.

Connecting the Cables to the STX Terminal

Using Figure 1-1 on page 5, “Connection Diagram” on page 7, and the photo at right as guides, connect the appropriate cables to the STX terminal. The cables and the ports on the terminal are color coded to make connections easier.

Blue Yellow Red

Mounting the STX Terminal

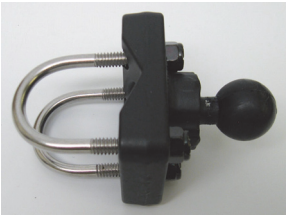
Before you mount the terminal select an appropriate mounting location. The terminal should be located within easy reach and visibility of the driver; normally, this is in the front, right corner of the cab. Additionally, make sure you allow enough room for any optional equipment, such as the lightbar and/or switchbox.

⚠WARNING: *Do not mount the terminal in a location where it interferes with seeing other information, controls, or the field. Looking at the screen for too long while operating the vehicle can cause a crash.*

To mount the STX terminal:

1. If necessary, loosen the knob on the arm mount and remove the ball mounts from the RAM ball mount assembly.
2. Attach the round base to the back of the terminal using the screws provided (shown at right).

3. Attach the bar mount base to your selected location using the included U-bolt hardware (shown at right).
4. Place one end of the arm mount over the ball of the bar mount base then tighten the knob enough to keep the arm mount attached.



5. Position the terminal so the round base fits in the open end of the arm mount and tighten the knob securely (similar to shown at right).
6. Adjust the terminal to the desired viewing angle.

Powering up STX

Depending on the components of your system you may have to power up more than one component. For example, if your STX system includes eDriveXC/XD you must power up both the STX terminal and the eDriveXC/XD ECU.

1. Power up the STX terminal.

   The STX terminal power button is located at the top of the left side of the terminal (circled at right).

   Press and hold the power button for approximately three seconds until the screen illuminates and the AgJunction logo appears.

2. Power up any optional components.

   Note: Refer to the installation guide specific to your vehicle make and model for information on installing eDriveXC/XD. Refer to your AC110 documentation for detailed instructions on installing AC110.

   - eDriveXC/XD

     Turn the eDriveXC/XD power switch to the On (middle) position—the long thin LED on the switch illuminates red when On. eDriveXC/XD will establish communication with the STX terminal and wait for the DGPS signal to be acquired.

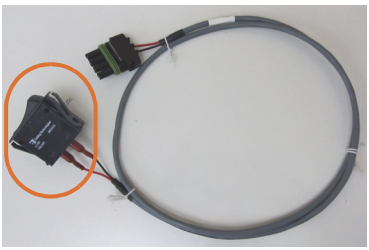
     

     The green power (inner) LED indicates power when illuminated (circled at right).

   - AC110

     Turn the AC110 power switch to the ON position.

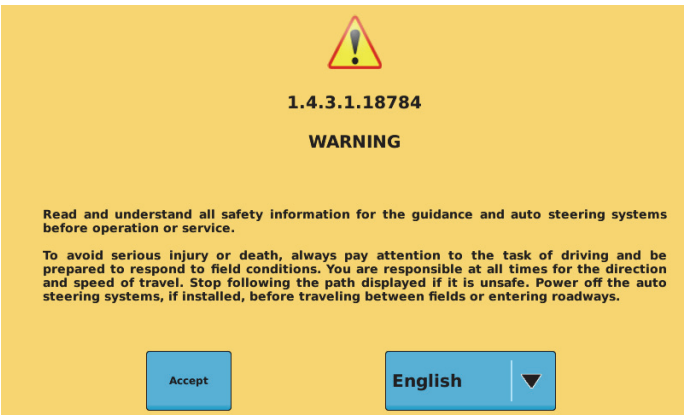
- eDriveESi

  Power is supplied to eDriveESi by eDriveXC/XD.

Starting STX

To start STX:

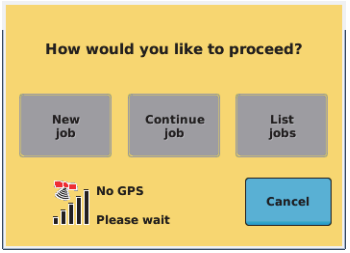
1. Power up STX. If you have any additional components connected to STX power them up as well. Upon powerup STX completes a self test and the screen below appears.



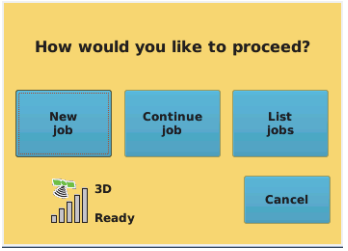
2. (Optional) Your system should be preset to the language you requested when purchasing the system; if it is not, you can change the language from the screen shown above by pressing the language button then pressing the preferred language.

   You can also change the language after you start STX—see “Setting the Language” on page 25 for more information.

3. Press **Accept**. The window below appears (left figure shows no GPS, right figure shows GPS).



No GPS signal



GPS signal acquired

Upon startup STX starts acquiring a DGPS signal (as long as the antenna has a clear view of the sky)—this may take several minutes, during which time the vehicle can be moving and you can perform certain functions.

- Upon achieving a GPS position, the satellite icon turns from red to orange and "3d" appears indicating a 3-dimensional solution.
- Upon acquiring a DGPS position, the satellite icon turns green and "3D" appears indicating a differentially corrected 3-dimensional solution.
- Upon acquiring an RTK position (with optional RTK equipment) "RTK" appears.

Note: STX must have a GPS position to begin a job and provide guidance.

The first time you start STX the Continue job and List jobs buttons are unavailable (gray)—as are all Job buttons until you have a GPS position.

Press the buttons as follows:

- **New job** - STX automatically assigns a job name (number) and this number appears on the Job screen button and on the Setup (Job) screen (see "Setup Screen" on page 203).
- **Continue job** - STX automatically loads the most recently closed job and displays the map screen.
- **List job**s - STX displays a jobs window, from which you can load a previous job (see "Closing a Job" on page 85).
- **Cancel** - Starts STX with no job.

Note: See "STX Display" on page 16 for more information on navigating the display using buttons, screens, and tabs.

Powering down STX

Depending on the components of your system you may have to power down more than one component. For example, if your STX system includes eDriveXC/XD you must power down both the STX terminal and the eDriveXC/XD ECU. Refer to "Powering up STX" on page 12 for photos of the power buttons/switches of the STX terminal and eDriveXC/XD ECU.

1. Power down the STX terminal by pressing (and releasing) the terminal power button. STX will go through its power down sequence.

   Note: If you have a USB drive plugged into the terminal with a "Screenshots" folder at the root level of the drive, pressing and releasing the terminal power button captures an image of the terminal screen and saves it to the USB drive (see "Capturing Screen Images" on page 34).

2. Power down any additional components:
   - eDriveXC/XD - turn the eDriveXC/XD ECU power switch to the OFF position
   - AC110 - turn the AC110 power switch to the OFF position
   - eDriveESi - this will power down when you power down eDriveXC/XD

Chapter 2: Display Overview and Basic Configuration

STX Display

Viewing GPS Signal Information

Map Screen Elements

Status Bar

Configuring STX

Exporting Log Files

Capturing Screen Images

STX Display

The STX display consists of screen buttons, screen tabs, and control buttons. Figure 2-1 shows (top) the Setup (GPS) screen and (bottom) the map screen in Machine mode and Top Down view.

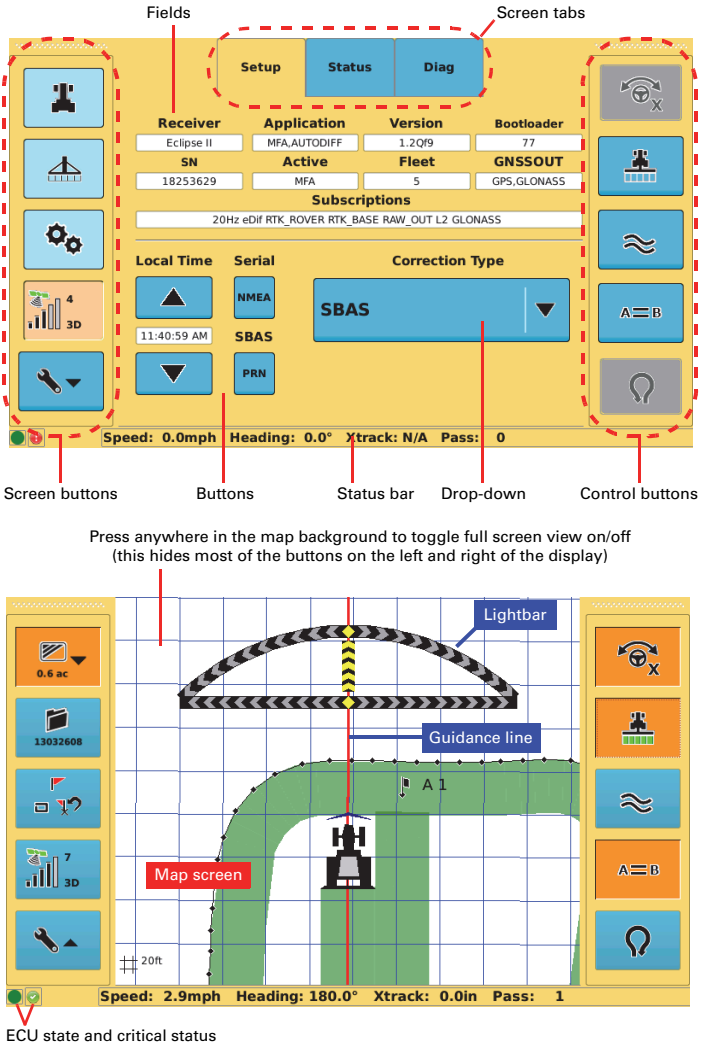


Figure 2-1: STX display

You navigate the display using **screen buttons** and **screen tabs**. Press a screen button to access a single screen or a set of screens. For example, the top figure in Figure 2-1 shows the result of pressing the GPS screen button—three tabs are displayed, the Setup screen is visible (Setup tab is yellow), and the two blue tabs provide access to the Status and Diag screens.

Use **fields** to edit settings and **buttons** to adjust settings or activate functionality. You can use a button that is blue and edit a field with a thin outline around it; however, if a button is gray or a field has no thin outline around it, you cannot use/edit it (see "Editing Field Data" on page 21). Use **control buttons** to perform such tasks as engaging automated steering and setting guidelines. An orange screen/control button or tab is active. You can swap the location of the screen buttons and control buttons (see the Controls button in Table A-2 on page 171).

The status bar shows the eDriveXC/XD ECU state and critical status and the current vehicle's speed, heading, crosstrack (Xtrack) error, and pass number. See "Status Bar" on page 24 for more information.

Table 2-1 describes the STX screen buttons and provides links to more detailed information elsewhere within this manual.

Table 2-1: Screen buttons and screens

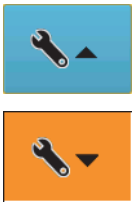
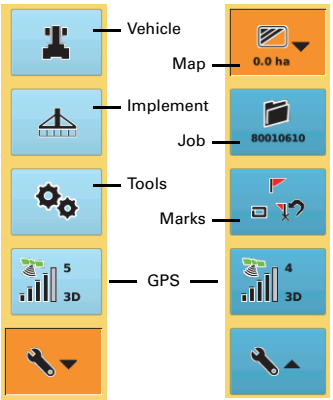
Screen Button	Description
	Setup screen button - provides access to other screen buttons: **When the Setup screen button is blue with an up arrow** press it to display (from top to bottom) the Vehicle, Implement, and Tools screen buttons—after you press the blue Setup screen button it changes to orange with a down arrow **When the Setup screen button is orange with a down arrow** press it to display (from top to bottom) the Map, Job, and Marks screen buttons—after you press the orange Setup screen button it changes to blue with an up arrow 
	GPS screen button - provides access to the following screens (depending on your installed components and valid subscriptions): • Setup - view read-only system information and set such items as message output rates, correction type, and time • Status - view read-only GPS information • Diag - view read-only diagnostic information • Config (e-Dif-only screen) - view e-Dif point data, save points, and update the e-Dif solution • e-Dif (e-Dif-only screen) - view read-only e-Dif information • Radio (RTK-only screen) - view/set radio information • RTK (RTK-only screen) - view RTK information • Omni (OmniSTAR-only screen) - view read-only OmniSTAR information See "GPS Screens" on page 176 for more information on the fields/buttons on the GPS screens.

Table 2-1: Screen buttons and screens *(continued)*

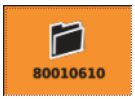
Screen Button	Description
	Vehicle screen button - provides access to the following Vehicle screens: • Main - add, edit (name and color), load, import, export, and delete vehicles • Steer - enter eDriveXC/XD settings and calibrate eDriveXC/XD • Details - view read-only eDriveXC/XD related information • Status - view read-only eDriveXC/XD status information • ESi - view read-only ESi status information and update ESi firmware See “Working with Vehicles” on page 54.
	Implement screen button - provides access to the following Implement screens: • Main - add, edit, load, import, export, and delete implements • Setup - set implement width, overlap, and offset information • Rate / Section Control - configure rate control and/or section control • eTurn Calibrate - calibrate your implement for eTurns (this screen appears only if you enter a valid eTurns subscription) • eTurn Setup - set up eTurns for your implement (this screen appears only if you enter a valid eTurns subscription) See “Working with Implements” on page 64 and Chapter 7, “Rate Control and Section Control.”
	Tools screen button - provides access to the following Tools screens: • System - view read-only system information, export data, update the ECU, and set the language • Display - settings for your display, such as screen brightness and units of measure • Rate Section - view current rate control parameters, clear volume, and perform a section test • Codes - view current subscriptions and enter new subscription codes
	Job screen button - provides access to the following Job screens: • Setup - create new jobs, continue a previous job, use templates, and import or export job data • Notes - record job specific data such as the farm, field, and operator ID, and view system-generated current job number for quick reference See “Jobs Overview” on page 80. This button displays the current (active or open) job number.

Table 2-1: Screen buttons and screens *(continued)*

Screen Button	Description
	Map screen button - displays the map screen and toggles between sets of map-related buttons. • Map screen - moving graphical representation of the field operation • Map-related buttons - use to zoom in and out on the map screen, toggle between Machine mode and Field mode, and toggle between Top Down view and 3D view See “Map Screen Overview” on page 96 for more information on the Map screen button other map features.This button displays the applied/recorded area in either acres or hectares (7.1 acres in button at left).
	Mark/Boundary/Return to Point screen button - display the Marks window to drop and manage marks (flags), set boundaries, and return to a previous point. See Chapter 8, “Advanced Features.”

Control Buttons

Control buttons enable you to perform such tasks as engaging automated steering, displaying the lightbar, and activating Contour guidance. This user guide makes a distinction between control buttons (that appear along the left or right side of the display) and buttons that appear on each screen. If you have to press a control button the text will specifically say “control button.”

Table 2-2 describes each control button.

Table 2-2: Control buttons

Control Button	Description
  	Steering button • If eDriveXC/XD is connected, X appears on the button The color of the Steering button indicates the following: • Gray - Not all auto steering criteria are met. • Blue - All auto steering criteria are met. Press the button when blue to engage auto steering (the button turns orange). • Orange - 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, auto steer disengages. If you press the Steering button during autosteering (button is orange), auto steering is disengaged and the button turns blue.
Pre-Engage enabled 	STX (with eDriveXC/XD) supports pre-engage, enabling you to activate the Steering button before all engage requirements are met. When you activate pre-engage but are not ready for autosteering, a ‘P’ appears on the Steering button. See “Pre-Engage” on page 52.

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

Control Button	Description
	Apply Select to have STX log application or coverage data for the current job. Press this button (or press the run/hold foot switch) to stop or hold logging job data. Blue indicates no data logging; orange indicates data logging.
   	Contour Guidance Activate Contour (free-form) guidance mode, where guidance is relative to any previous pass. Contour mode differs from Straight (A=B, A + Direction) and Pivot guidance modes, where Straight and Pivot guidance modes follow predefined guidelines and Contour guidance mode follows previously defined guidelines. Blue indicates Contour guidance mode is inactive; orange indicates it is active. This button also enables and disables Contour Lock. When using Contour guidance, STX constantly searches for the nearest swath from which to provide guidance. If passes of different contour definitions occur close enough together and Contour Lock is not enabled, STX might display guidance for a pass of a different contour definition from the one you are on. Contour Lock enables you to stop the STX's search for the closest swath. See "Contour Guidance" on page 122.
  	Straight Guidance / Pivot Guidance / AB Contour Guidance Display the Straight Guidance window, where you can create linear, pivot (circular), or AB contour parallel guidance passes, or return to point guidance. Blue indicates Straight guidance mode is inactive; orange indicates it is active. This button changes to the Pivot Guidance button when in Pivot guidance mode and to the AB Contour button when in AB Contour guidance mode. See "Straight Guidance" on page 107, "Pivot Guidance" on page 117, and "AB Contour Guidance" on page 124.
	eTurns eTurns is a subscription-only eDriveXC feature that enables the vehicle to automatically execute a turn at the end of a swath (you determine which swath to turn onto). See "eTurns" on page 156. *Note: You must have eDriveXC installed and have a valid eTurns subscription to use eTurns. Contact your local dealer or Outback Guidance Customer Service to obtain an eTurns subscription.*

Editing Field Data

If a field has a line around it you press the field to display a window to edit the current value. For example, if you press the Enter code field the Enter code window appears (see below). Use the buttons in the window to enter a value and press Apply to accept the value and close the window. If a button is gray or a field has no outline around it, it is not available (you cannot use the button or edit the field's value).

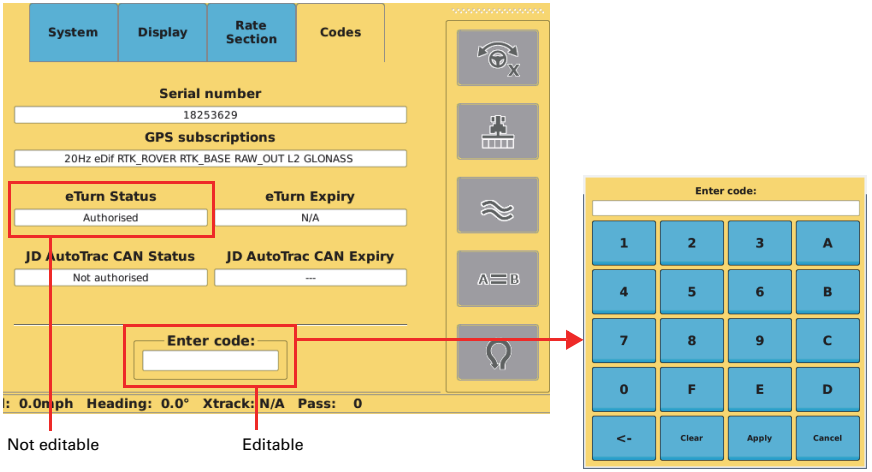


Figure 2-2: Editing field data

Viewing GPS Signal Information

The GPS screen button displays GPS signal information (Figure) for quick reference. If the button is orange the button is active (you are displaying the set of GPS screens). Table 2-3 describes what is displayed on the button.

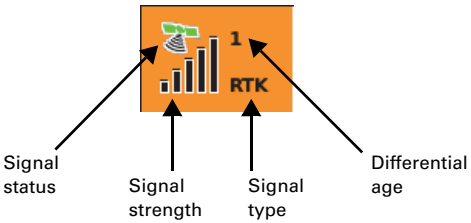


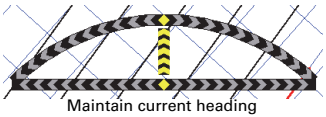
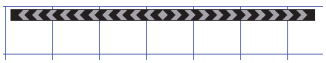
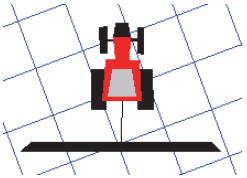
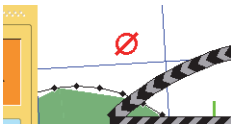
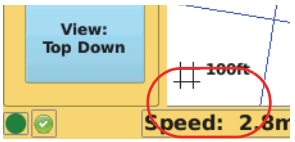
Table 2-3: GPS screen button information

Button Element	Description
Signal Status	Satellite icon color indicates the following: • Red = no fix on a GPS signal • Orange = tracking satellites • Green = receiving a DGPS signal
Signal Strength	Vertical bars indicate the quality of the GPS signal related to the standard deviation of the solution: • SBAS, 3 to 4 bars are typical • RTK, 4 bars are typical
Signal (Correction) Type	STX is receiving the following signals: • No signal type (blank) = not receiving a GPS signal • 3d = 3 dimensional signal • 3D = 3 dimensional differential signal (DGPS) • RTK = real time kinematic corrections
Differential (Diff) Age	Age of the corrections used in the DGPS correction: • SBAS, typically 6 to 10 seconds • RTK, optimal operating values are < 5 seconds • e-Dif, between 0 and 2700 seconds • OmniSTAR, typically 10 to 25 seconds

Map Screen Elements

Table 2-4 describes the elements of the STX map screen.

Table 2-4: STX map screen elements

Screen Item	Description
 Turn right per green heading arrows  Maintain current heading  Only crosstrack bar visible	Onscreen lightbar Shows the vehicle's position relative to the guidance line. • Top arc shows heading • Bottom bar shows crosstrack (distance away from the guidance line) • When the steering guide indicators are centered (indicated by vertical yellow arrows), the vehicle is aligned with (heading correct) and on (crosstrack 0) the current pass. To make accurate steering corrections, steer either left or right as indicated by the lighted heading arrows. You can display the full lightbar (top two figures at left) or display just the crosstrack bar (bottom figure at left). See "Display Settings" on page 26.
	Zoom buttons • Press the zoom in (plus) button to zoom in on the field (vehicle appears larger) • Press the zoom out (minus) button to zoom out on the field (vehicle appears smaller) Press either button as many times as necessary to obtain your preferred zoom level.
	Vehicle and implement indicators Representation of selected vehicle and selected implement. The width of actual implement is indicated by width of implement indicator (for example, a wider implement will appear wider onscreen than a narrower implement). See "Working with Vehicles" on page 54 and "Vehicle Screens" on page 190 and "Working with Implements" on page 64 and "Implement Screens" on page 198.
	Headland alert indicator Indicator that appears in the upper left of the map screen when the headland alert indicator is set to ON (see HL Alert button in Table A-2 on page 171) and the implement crosses into a previously applied area.
	Zoom distance (lower left corner of screen) This is the distance between the grid lines (value increases or decreases as you zoom in or out).

Status Bar

The Status bar is always visible along the lower middle of the STX display (Figure 2-3.

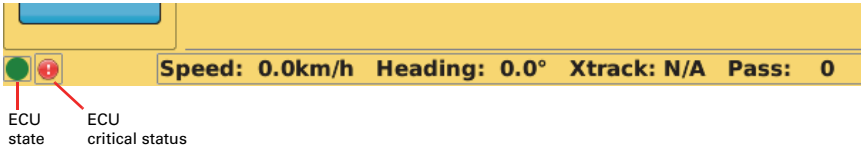


Figure 2-3: Status bar

The Status bar shows the following eDriveXC/XD ECU and commonly-used vehicle information.

- ECU state (current state of ECU when connected)

   Orange = startup

   Red = shutdown

   Light green = connecting

   Green = guidance

   Purple = calibration

   Blue = service

- ECU critical status

   Green with check mark = OK

   Red with exclamation point = errors (see “Status Screen” on page 195 for information on ECU errors.

- Speed - rate at which the vehicle is traveling.
- Heading - direction of travel in degrees.
- Xtrack (crosstrack) error - perpendicular distance from your current driving position to your guidance line. For example, if you are driving an A=B and you veer to the right and are off your line by 6 inches, your crosstrack error is 6 inches.
- Pass number - once the A=B line is set, all passes are numbered. Pass 1 is one side of the original A=B line; Pass -1 is to the other side.

Configuring STX

STX has several screens/tabs on which you accept default values/options or select alternative values/ options to configure STX before you start a job. For information on all buttons and fields on all screens see Appendix A, “STX Screens Reference.”

System Settings

Use the System (Tools) screen to view hardware and software information, change the system language, export log data, and update the ECU software.

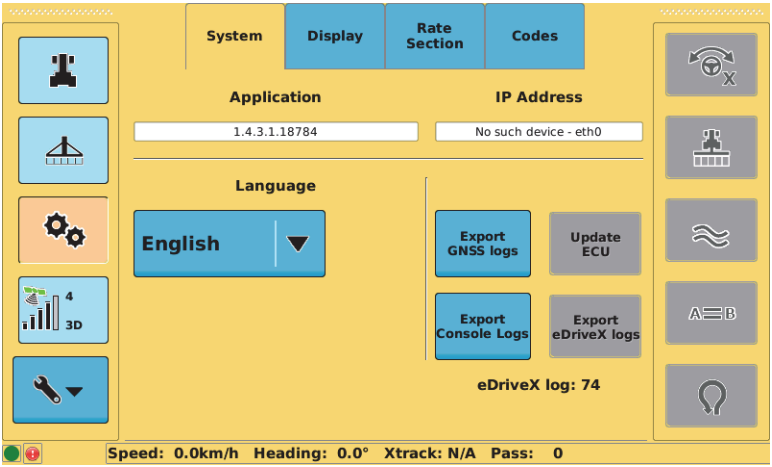


Figure 2-4: System (Tools) screen

The following section describes how to set the language. For information on all buttons and fields on the System screen see “System Screen” on page 170. For detailed information on exporting log files see “Exporting Log Files” on page 30.

Setting the Language

Your STX terminal should be set to the language you requested when you ordered the unit. Use the following procedure if you need to change the language.

To set the language:

1. Press the **Tools** screen button, and, if the System screen is not displayed, press the **System** tab. The System screen appears (Figure 2-4 above).

2. Press the **Language** field and select a language from the drop-down list.

Display Settings

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

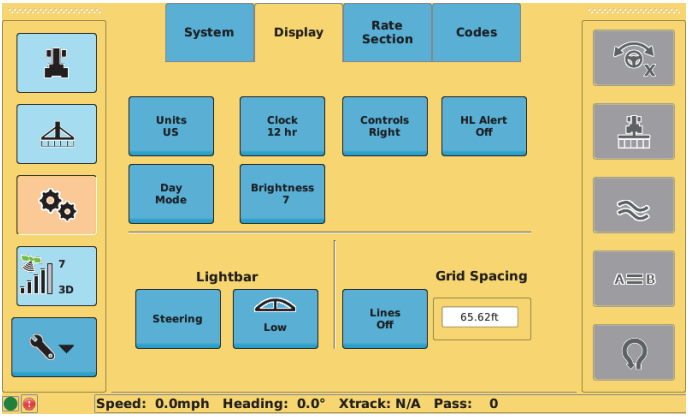


Figure 2-5: Display (Tools) screen

To configure the display settings other than the lightbar and grid spacing:

1. Press the **Tools** screen button then the **Display** tab.
2. For each of the settings shown below press a button to toggle/cycle through available options.

Display

- The Units, Clock, Controls, HL Alert, and Mode buttons each have two possible values. Press the button to toggle between the values.

  Units: US or Metric
  Clock: 12 hr or 24 hr
  Controls: Right or Left
  HL Alert: Off or On
  Mode: Day or Night

- The Brightness field can be set to an integer level from 1 (dimmest) to 10 (brightest). Press the button to cycle through the levels. When you reach 10 pressing the button again starts over at 1.

For the information on configuring the lightbar see “Configuring the Onscreen Lightbar” on page 100 and for information on grid spacing see “Map Screen Line Display Options” on page 107.

GPS Settings

The Setup (GPS) screen has various settings that relate to the type of GPS differential correction the system uses. The fields at the top of the screen are read-only and provide useful diagnostic information.

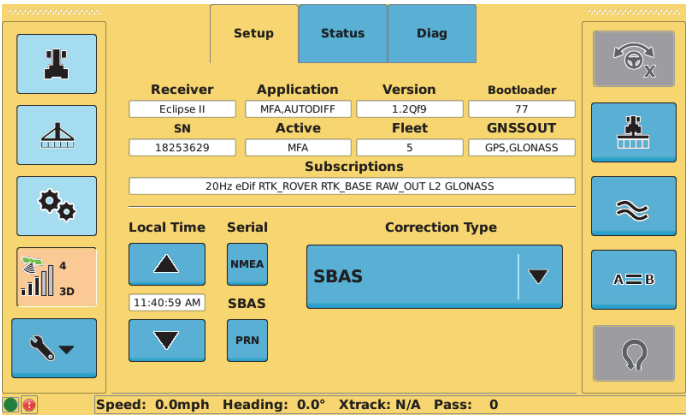
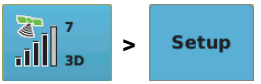


Figure 2-6: Setup (GPS) screen

Configuring GPS Settings

To configure GPS settings:

1. Press the **GPS** screen button then the **Setup** tab.

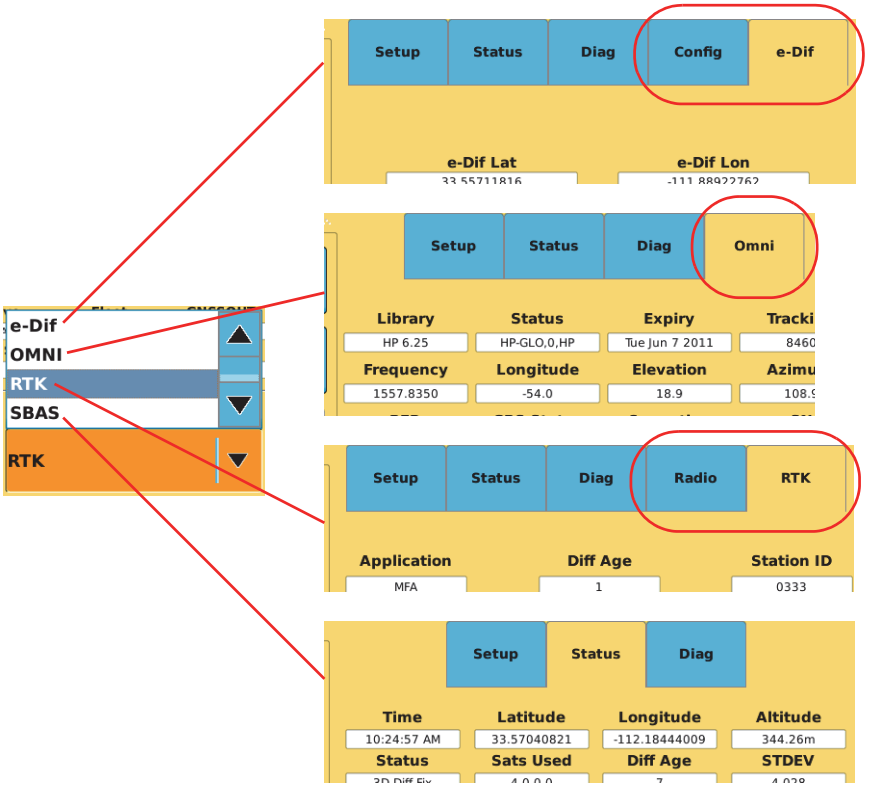


2. Change the settings as follows:
   - For the Local Time, press the up/down arrows to increase/decrease the time in half-hour increments.
   - For Serial and SBAS, press each button to display a window where you select the preferred values.
   - For the Correction Type, press a button to select that correction type—see “Correction Type Overview” on the next page.

For information on all buttons and fields on the Setup screen see “Setup Screen” on page 176.

Correction Type Overview

When you press the GPS screen button the Setup, Status, and Diag tabs are always available; however, the option you select from the Correction Type drop-down determines what tabs appear to the right of the Diag tab (there are no additional tabs for SBAS). For example, if you select OMNI as the correction type, the Omni tab appears.



Vehicle and Implement Settings

See Chapter 4, “Working with Vehicles and Implements” and “Vehicle Screens” on page 190, and “Implement Screens” on page 198 for information on vehicle and implement settings.

Steering Settings

STX uses the settings on the Steer screen when you have eDriveXC/XD connected.

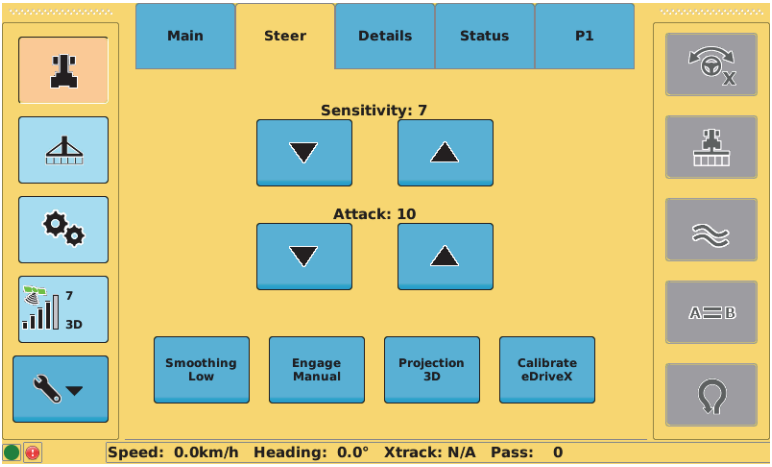
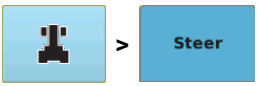


Figure 2-7: Steer (Vehicle) screen - autosteering connected

To configure steering settings:

1. Press the **Vehicle** screen button then the **Steer** tab.



2. Change the settings as follows:
   - Sensitivity and Attack - press the up/down buttons to increase/decrease values (see “Steering Options” on page 50).
   - Smoothing - press the button to cycle through values (see “Steering Smoothing” on page 51).
   - Engage - press the button to toggle between Manual and Pre-Engage (see “Pre-Engage” on page 52).
   - Projection - press the button to toggle between 2D and 3D (see “Setting 2D or 3D Projection” on page 52).
   - For Calibrate eDriveX, press the button to display the calibration screen (see “Vehicle Calibration Considerations” on page 46).

For information on configuring all these settings when adding a vehicle see “Vehicle Setup and Calibration” on page 55.

Exporting Log Files

While the system is powered on, session data is recorded (logged). Use the Export logs buttons on the System (Tools) screen to collect data for troubleshooting purposes when contacting Outback Guidance Customer Service.

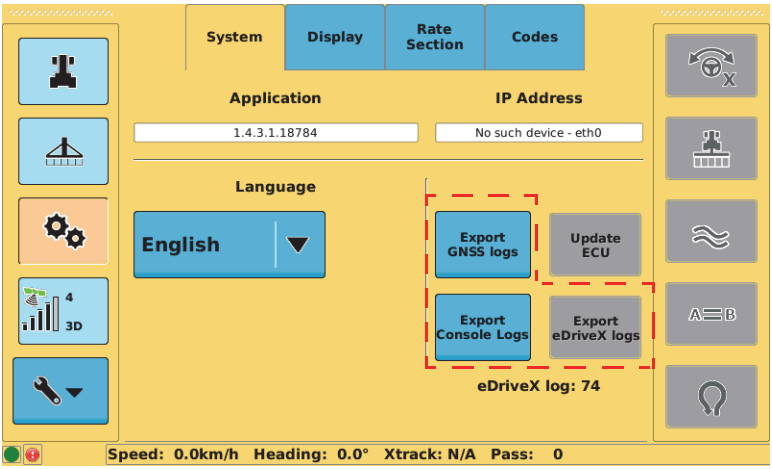


Figure 2-8: Export logs buttons—System (Tools) screen

You can export the following log types:

- GNSS logs (receiver log files)
- Console logs (terminal log files)
- eDriveXC/XD logs (eDriveXC/XD autosteering ECU log files)

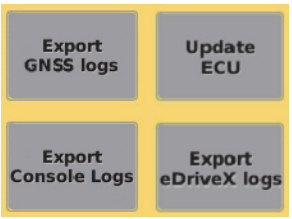
Exporting GNSS Logs

You can export GNSS logs to a USB drive inserted in the STX terminal. When you export logs STX creates a folder name based on the current UTC date and time and stores the logs in this folder. For example, if you export GNSS logs on Saturday, March 9, 2013 at 16:11:49 UTC, the folder is named "Sat_Mar_9_16_11_49_2013."

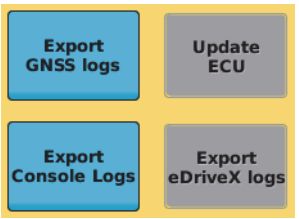
To export GNSS logs:

1. Press the **Tools** screen button, and, if the System screen is not displayed, press the **System** tab. The System screen appears (see Figure 2-8 on page 30).

2. Insert a USB drive into the USB port on the STX terminal. The Export GNSS logs and Export Console Logs buttons change from gray to blue.



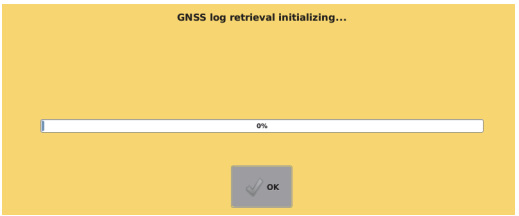
Before inserting USB drive in terminal



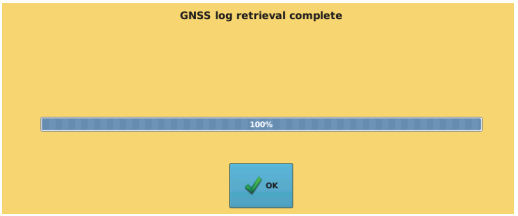
After inserting USB drive in terminal

Note: You can insert the USB drive in the terminal before displaying the System screen. The steps here are in this order to illustrate how the Export GNSS logs and Export Console Logs buttons change color upon inserting a USB drive in the STX terminal.

3. Press **Export GNSS Logs**. The following status screen appears.



When the process is complete a 'complete' message appears and the OK button is blue.



4. Press **OK** to close the status screen and return to the System screen.

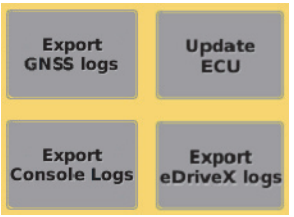
Exporting Console Logs

You can export console (STX terminal) logs to a USB drive inserted in the STX terminal. When you export logs STX creates a folder name based on the current UTC date and time and stores the logs in this folder. For example, if you export console logs on Wednesday, August 26, 2015 at 23:19:28 UTC, the folder is named "stx_Wed_Aug_26_23_19_28_2015".

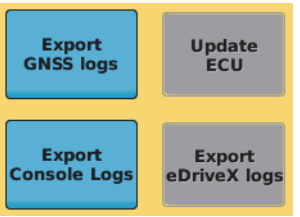
To export console logs:

1. Press the **Tools** screen button, and, if the System screen is not displayed, press the **System** tab. The System screen appears (see Figure 2-8 on page 30).

2. Insert a USB drive into the USB port on the STX terminal. The Export GNSS logs and Export Console Logs buttons change from gray to blue.



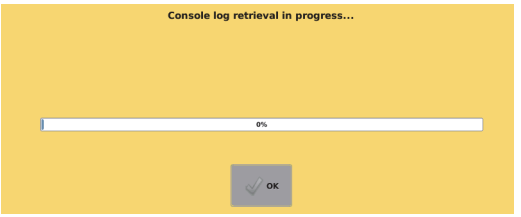
Before inserting USB drive in terminal

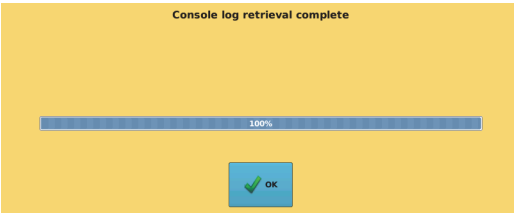


After inserting USB drive in terminal

Note: You can insert the USB drive in the terminal before displaying the System screen. The steps here are in this order to illustrate how the Export GNSS logs and Export Console Logs buttons change color upon inserting a USB drive in the STX terminal.

3. Press **Export Console Logs**. The first status screen below appears and when the process is complete a 'complete' message appears and the OK button is blue.





4. Press **OK** to close the status screen and return to the System screen.

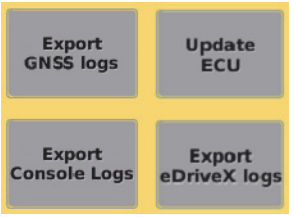
Exporting eDriveXC/XD Logs

You can export eDriveXC/XD logs to a USB drive inserted in the eDriveXC/XD ECU. The exported log number is displayed below the export logs buttons on the System screen (see at right). When you export a log, eDriveXC/XD creates a 'logs' folder with a subfolder based on the MAC address of the ECU (for example, 00d0c9bb25b4) and stores the log files in this subfolder.

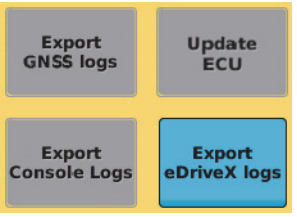
To export eDriveXC/XD logs:

1. Press the **Tools** screen button, and if the System screen is not displayed, press the **System** tab. The System screen appears (see Figure 2-8 on page 30).

2. Insert a USB drive into the USB port on the eDriveXC/XD ECU. The Export eDriveX logs button changes from gray to blue.



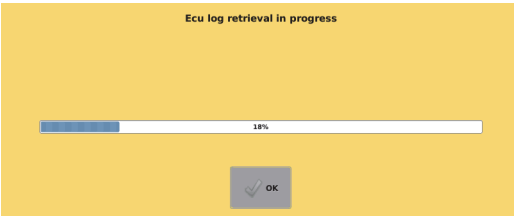
Before inserting USB drive in eDriveXC/XD ECU

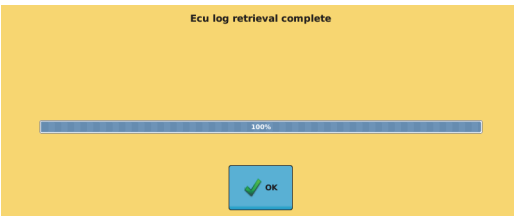


After inserting USB drive in eDriveXC/XD ECU

Note: You can insert the USB drive in the eDriveXC/XD ECU before displaying the System screen. The steps here are in this order to illustrate how the Export eDriveX logs button changes color upon inserting a USB drive in the eDriveXC/XD ECU.

3. Press **Export eDriveX logs**. The first status screen below appears and when the process is complete a 'complete' message appears and the OK button is blue.





4. Press **OK** to close the status screen and return to the System screen.

Updating eDriveXC/XD ECU Firmware

Refer to the separate update instructions included with your release to update autosteering ECU firmware.

Capturing Screen Images

If you notice something on the touchscreen that you either do not understand or want to save for later review you can take a screen capture of the entire display. Insert a USB drive (with a "Screenshots" folder at the root level of the drive) into the terminal then press the power button to save the display image as a .png file in the Screenshots folder on the USB drive.

Caution: *With a USB drive (with "Screenshots" folder) inserted in the terminal, press and release the terminal power button to capture a screen image. If no "Screenshots" folder exits on a USB drive inserted in the terminal, pressing and releasing the terminal power button powers down the terminal. See "Powering down STX" on page 14 for more information.*

Chapter 3: Autosteering

Performing a Steering Test
Antenna Pivot
Antenna Offset
Vehicle Calibration Considerations
Steering Options

This chapter applies only if you have automated steering (eDriveXC/XD) installed and connected to your STX system. Before you add a vehicle, review the information in this chapter. The following bullets provide a summary of the required steps to properly set up automated steering for your system:

- Performing a steering test
- Steering options
- Antenna pivot
- Antenna offset
- Vehicle calibration

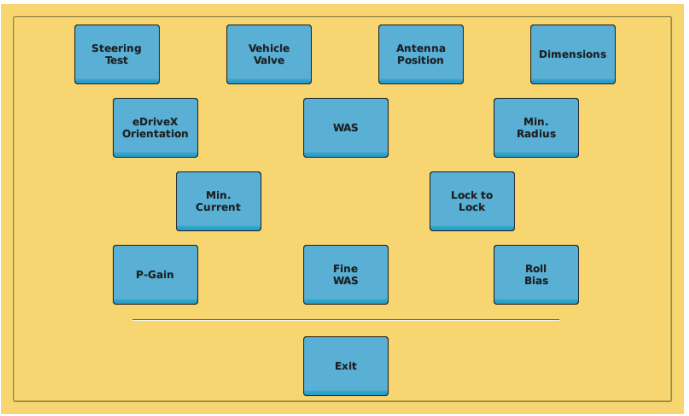
Performing a Steering Test

Perform a steering test to check the connectivity of the system. Test the steering with:

- Vehicle moving at no more than 4 kph (2.5 mph)
- eDriveXC/XD power switch in the 'AUTO' position

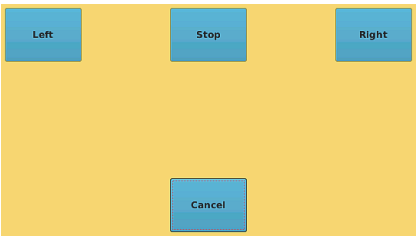
To perform a steering test with eDriveXC/XD connected:

1. Press the **Vehicle** screen button, press the **Steer** tab, then press **Calibrate eDriveX**. The calibration screen appears.



The calibration screen may display different buttons depending on your selected vehicle and valve types but the calibration process is similar.

2. Press **Steering Test**. The steering test screen appears.



3. Start driving your vehicle, maintaining your speed between 0.0 and 4 kph (0.0 and 2.5 mph).

   If you drive above 4 kph the Left, Stop, and Right buttons become inactive (gray).

4. Press **Left** and verify the vehicle steers to the left. Press **Stop** as soon as the direction is confirmed.

   Press **Right** and verify the vehicle steers to the right. Press **Stop** as soon as the direction is confirmed.

5. Press **Cancel** to return to the calibration screen.

If the system passed the steering test, continue with the next section ("Antenna Pivot"). If the system did not pass the steering test, see the table below and re-check your installation.

Problem	Solution
Wheels move in wrong direction (left instead of right or right instead of left)	Swap the two cables connected to the solenoids of the eDriveXC/XD hydraulic block.
Wheels do not move	Check for problems with each of the following system components: • Hydraulics • Wheel angle sensor • Electronics • eDriveXC/XD harness

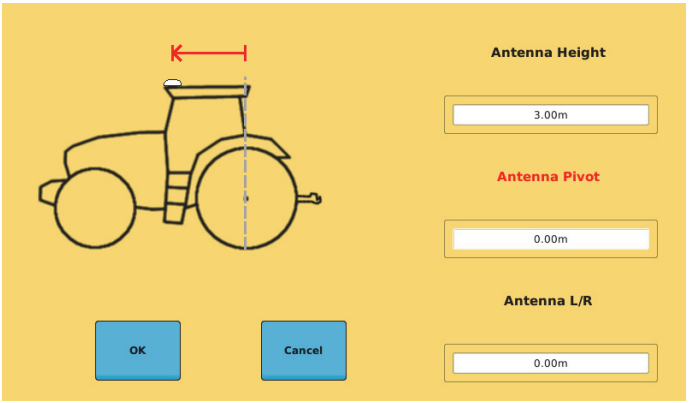
If you are still unable to perform a successful steering test after troubleshooting, contact your local dealer or Outback Guidance Customer Service.

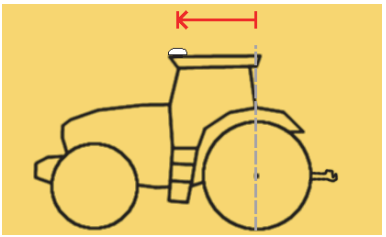
Antenna Pivot

Antenna pivot is the perpendicular distance of the antenna's center in front of or behind the vehicle's pivot point. The vehicle's pivot point depends on the vehicle type, such as a standard tractor or sprayer. You typically enter this value when setting up your vehicle—see "Vehicle Setup and Calibration" on page 55.

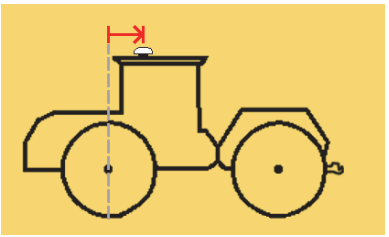
Note: Measure the antenna pivot as accurately as practical, as this measurement has some impact on the accuracy of vehicle guidance and is the reference point from which the implement offset is calculated. Unlike the antenna left/right offset, there is really no field method to verify or improve the antenna pivot measurement.

The top figure below shows the antenna position screen (with Antenna Pivot selected) for a standard tractor and the figures following show how antenna pivot is measured for the remaining tractor types.

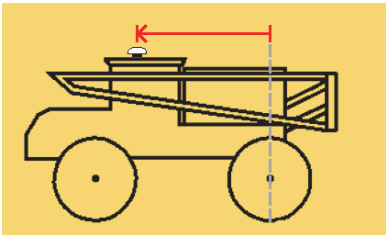




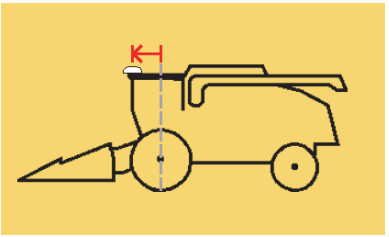
Standard tractor



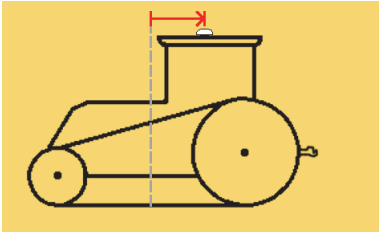
Articulated tractor



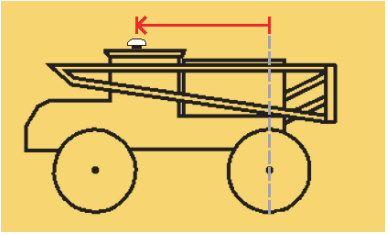
Sprayer



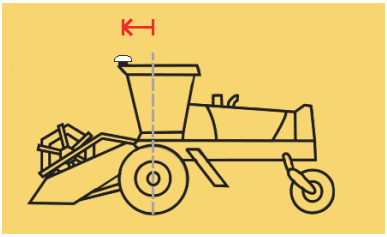
Combine



Tracked tractor



Spreader



Swather

Antenna Offset

Antenna offset is the lateral (perpendicular) distance between the center of the GPS antenna and the centerline of the vehicle.

To achieve optimum steering accuracy you must determine the antenna offset in the field. However, you need to have completed the calibration procedure before you can conduct the field tests, and to complete vehicle calibration, you need to enter the antenna offset values on the vehicle dimensions screen (see step 8, page 42). Because you do not have an accurate antenna offset when working through calibration, you have two options:

- Leave the antenna offset as 0.00 and enter the measured offset later
- Enter an estimated 'provisional' offset value (suggested if you have a noticeable antenna offset that you can measure or estimate)

When you have completed the vehicle calibration and determined the actual antenna offset, you can revisit vehicle calibration and add the actual value; however, see "Completing Vehicle Calibration Steps in Sequence" on page 47 and "Changing a Completed Calibration Step" on page 48 for important information on changing calibration values.

To enter a provisional antenna offset:

1. Measure the perpendicular distance of the center of the antenna from the centerline of the vehicle.
2. Enter the value as the antenna offset on the vehicle dimensions screen (step 8, page 42).

The following page provides general information on antenna offsets and "Determining Antenna Offset Overview" on page 40 describes two methods for determining the antenna offset.

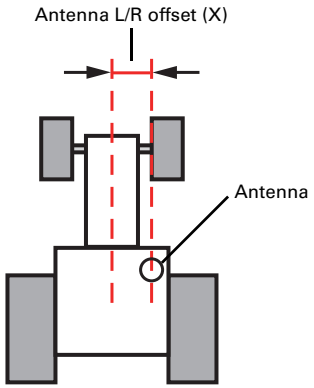


Figure 3-1: Antenna offset (distance= X, direction = right)

When ‘calibrating an antenna offset’ you are actually compensating for a physical antenna offset. To compensate for a physical antenna offset:

- Measure the effect of the uncompensated antenna offset
- Calculate the offset adjustment required
- Enter the calculated adjustment to compensate for the physical antenna offset

An offset—for which you will compensate—comprises a measured distance (the amount of the offset) and a direction (left or right of vehicle centerline). In Figure 3-1 on the previous page, the offset distance (or amount) is X, the direction is right.

Because it is difficult to measure the antenna offset on the vehicle, you must determine the antenna offset in the field to ensure maximum steering accuracy. However, you need to have completed the calibration before you can conduct the field tests, and to complete vehicle calibration, you need to enter the antenna offset. This initial—or provisional—setting enables you to complete vehicle calibration so you can conduct the field test for an exact antenna offset.

Note: If the center of your antenna is exactly on the centerline of the vehicle, you have no antenna offset and no compensation is required. When you carry out the procedures for determining the offset, the result will be a measured offset of zero and no further action will be required.

⚠WARNING: *Calibration is required if the system shows an offset while driving up and down on a guidance line without an implement after calibrating the roll bias.*

Determining Antenna Offset Overview

There are two ways to determine the antenna offset:

- **Track** method (preferred): This method measures the track difference, in at least three places, during two passes (one in each direction) on the same A=B line. The method requires a surface where the vehicle clearly leaves tracks.

  Note: ‘Track’ in this context means wheel or track marks on the ground. The track method for determining antenna offset is suitable for wheel and track vehicles.

- **Marker** method: This method measures the offset using at least three flags (or other marks) to mark the center of the vehicle (hitch pin point) during two runs (one in each direction) on the same A=B line. If using the mark method, use at least three measurement points on the A=B line.

Whichever method you use, the antenna offset (the physical offset on the vehicle and the compensating offset value you enter in the system) is half the measured difference in the track of the vehicle over the two runs.

Determining Antenna Offset - Track Method

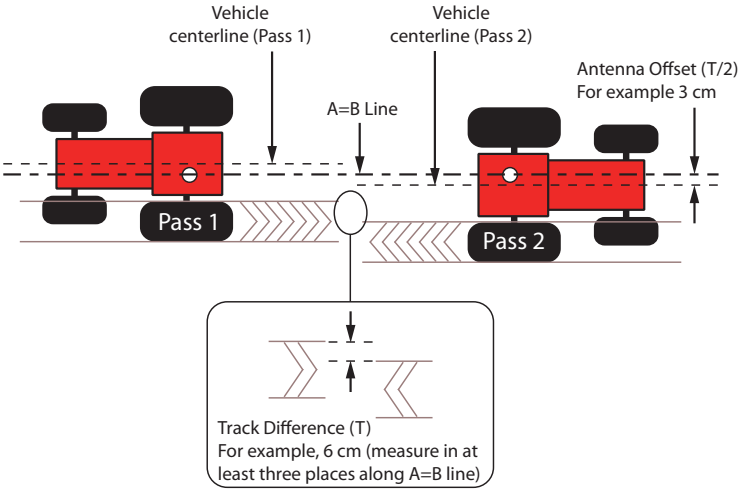


Figure 3-2: Determining antenna offset (example 6/2 = 3 cm left)

To determine the antenna offset (track method):

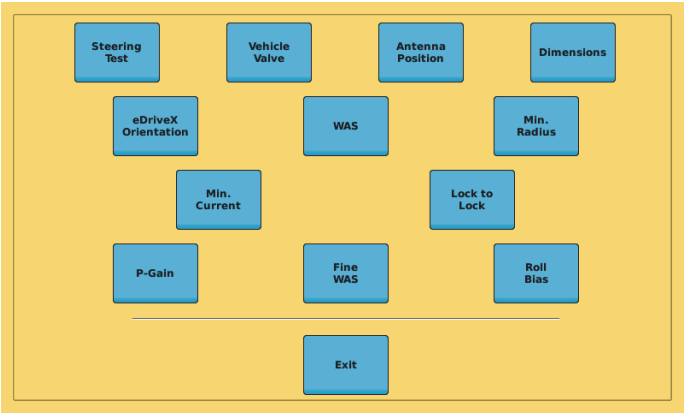
1. Set up a straight A=B line (see "Setting an A=B Line" on page 109).
2. Maintaining a speed of 5 kph (3 mph) engage steering and let the system steer you along the guideline for at least 100 m. See Pass 1 in Figure 3-2.
3. Perform a keyhole turn, re-engage the steering, and let the system steer you down the same guideline. See Pass 2 in Figure 3-2.
4. In three different places along the A=B line, measure the distance between the corresponding track marks (inside edges, outside edges or centers, whichever are easiest to see and measure, see Figure 3-2). If there is variation, calculate the average difference. In Figure 3-2 the track difference is 6 cm, measured at the outside edges of the track marks at one point on the A=B line.

   Note: Take your measurements where the vehicle was travelling with a crosstrack of between 0-1, that is, not just after re-acquiring the A=B line after your turn (sometimes referred to as 'allowing settling time').

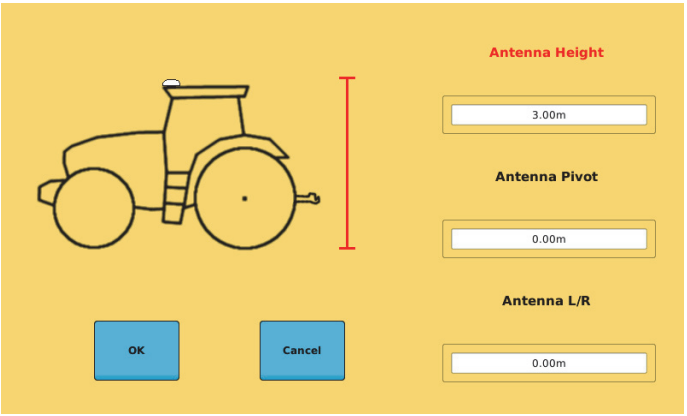
   Halve the measurement (3 cm). This is the amount of the physical antenna offset—the offset you need to compensate for and need to enter as the antenna offset (in meters, 0.03 m) at step 9.
5. Determine the direction of the offset—this is the left or right direction of the antenna's centerline relative to the vehicle centerline when viewed in the direction of travel.

6. Press the **Vehicle** screen button, press the **Steer** tab, then press **Calibrate eDriveX**. The calibration screen appears.

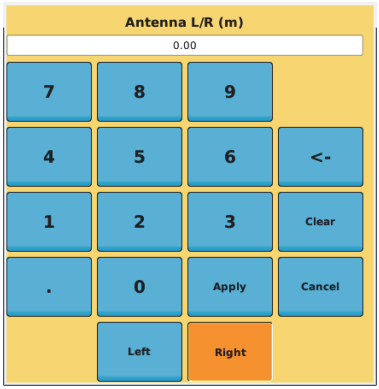
Note: The screens below and in step 8 show a standard tractor vehicle type. The calibration screen may display different buttons depending on your selected vehicle type but the process is the same.



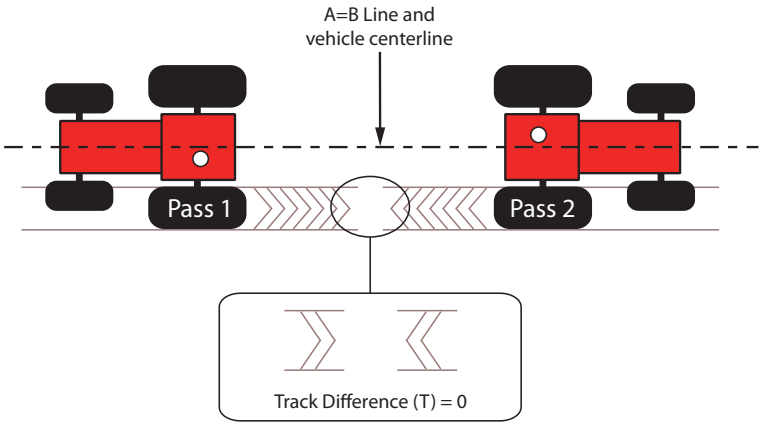
7. After you select the vehicle and valve types (using the Vehicle Valve button) the Antenna Position button is blue (available) and all subsequent buttons are gray.
8. Press **Antenna Position**. The following screen appears.



9. Enter the antenna offset:
   a. Press the **Antenna L/R** field. The Antenna L/R window appears.
   b. Press **Left** or **Right** for the offset direction (see step 5).
   c. Enter an offset value then press **Apply** to confirm the value and close the window.



10. Test the completed calibration by letting the system control up and down on a new A=B line—the tracks should match. If they do not match, repeat the procedure for determining the antenna offset.



Determining Antenna Offset - Marker Method

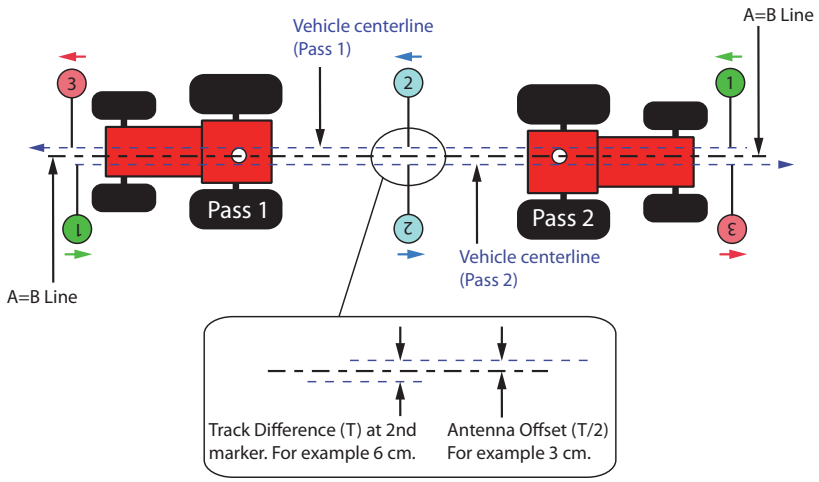


Figure 3-3: Determining the antenna offset (example 6/2 = 3 cm left)

To determine the antenna offset (marker method):

1. Set up a straight A=B line (see "Setting an A=B Line" on page 109).
2. Maintaining a speed of 5 kph (3 mph) engage steering and let the system steer you along the guideline for at least 100 m. When the crosstrack has stabilized (0-1), place at least three marks along the A=B line and on the centerline of the vehicle (the hitch pin point). See Pass 1 in Figure 3-3.
3. Perform a keyhole turn, re-engage the steering, and let the system steer you down the same wayline. When the crosstrack is stabilized (0-1), place more marks close to those placed on the first pass. See Pass 2 in Figure 3-3.

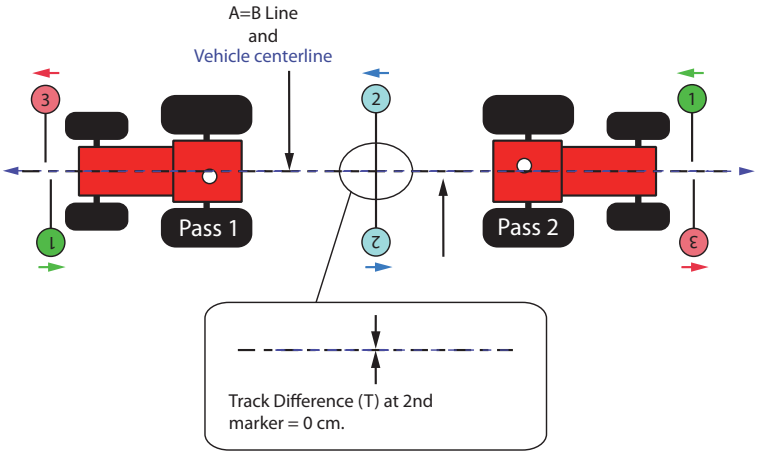
   Note: Place your marks while the vehicle is travelling with a crosstrack of between 0-1, that is, not just after re-acquiring the A=B line after your turn (sometimes referred to as 'allowing settling time').

4. Measure the distance between corresponding markers. In Figure 3-3 the centerline difference is 6 cm.

   Halve the measurement (3 cm). This is the amount of the physical offset of the antenna—the offset you need to compensate for and need to enter as the antenna offset (in meters, 0.03 m).

5. Determine the direction of the offset—this is the left or right direction of the antenna's centerline relative to the vehicle centerline when viewed in the direction of travel.
6. Complete steps 6 through 9 of "Determining Antenna Offset - Track Method" on page 41.

7. Test the completed calibration by letting the system control up and down on a new A=B line and placing marks as before. The centerlines should match. If they do not match, repeat the procedure for determining the antenna offset.



Vehicle Calibration Considerations

STX guides you through the vehicle calibration process using step-by-step instructions. With eDriveXC/XD installed and powered up, a successful steering test completed, and the prerequisites met (see the next section "Before Calibrating a Vehicle") you are ready to calibrate a vehicle.

Before Calibrating a Vehicle

Before calibrating a vehicle ensure that:

- GPS antenna/sensor is located in its final position and initialized.
- You use the GPS source the vehicle will use in operations. For example, if you plan to use RTK in the field you must use RTK during calibration.
- All the items at the top of the Status screen are green (see "Status Screen" on page 178).
- eDriveXC/XD power switch is in the 'AUTO' position.

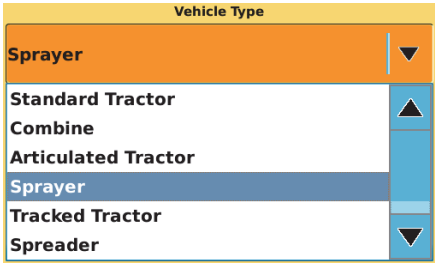
Calibration Steps and Different Vehicle Types

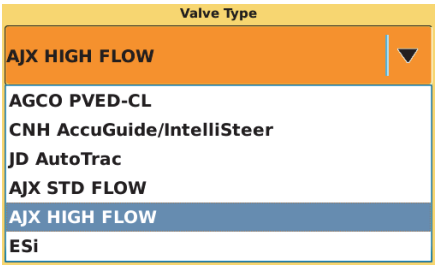
The calibration steps you complete are based on the vehicle/valve type combination you select when setting up your vehicle.

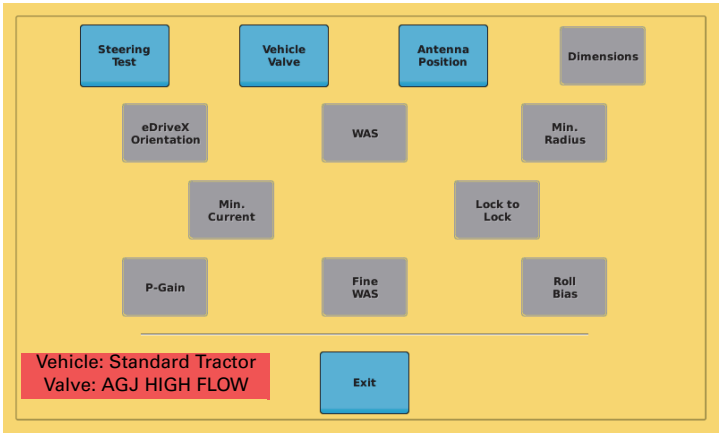
See the following topics for more information:

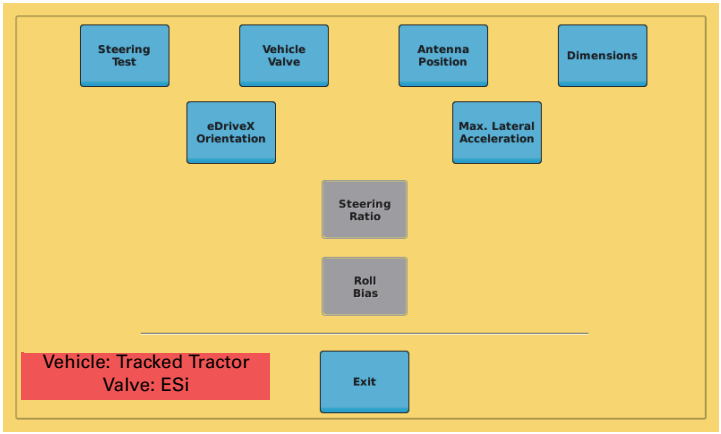
- "Antenna Pivot" on page 37 for the vehicle types you can select in STX
- "Vehicle Setup and Calibration" on page 55 for information on selecting a vehicle type and valve type

After selecting a vehicle/valve type combination, entering your vehicle's dimensions, and selecting the ECU orientation, you calibrate your vehicle. The buttons (required steps) on the calibration screen depend on the vehicle/valve type combination you selected, as shown in the examples at the top of the next page.





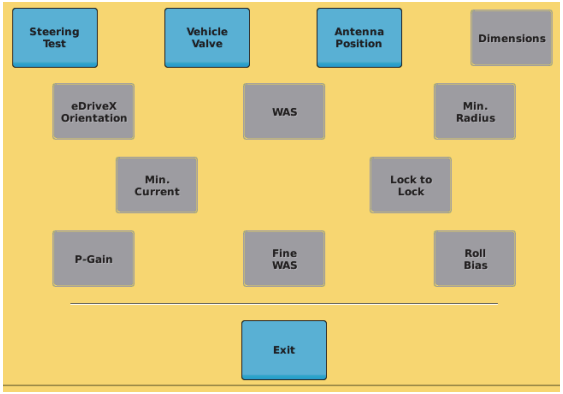




Completing Vehicle Calibration Steps in Sequence

Because you must complete the calibration steps in sequence, some step buttons are inactive (gray) until you can perform that step.

For example, if you just completed the WAS step, you must complete the Min. Radius step before completing the steps that follow it.



Changing a Completed Calibration Step

If you need to change a step you have already completed, you must re-do all the subsequent steps that were also completed.

For example, you have completed all the calibration steps for a wheeled hydraulic steering vehicle. You then need to change the eDriveXC/XD ECU orientation. After you make this change only the next step (WAS) is available for you to change (all other steps are inactive).

Note: Once you have completed the roll and pitch bias calibration, you can make changes to previous steps (from WAS through roll and pitch bias) without having to revisit the subsequent steps. However, if you make changes to vehicle setup steps previous to WAS calibration, such as antenna position or vehicle dimensions, you must complete all subsequent steps.

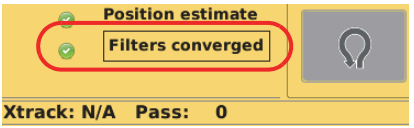
About Engine Speed During Calibration

Some calibration steps should be carried out at full hydraulic pressure. Because some hydraulic systems need higher engine speeds than others to achieve full hydraulic pressure, it is recommend that you execute those calibration steps with a minimum engine speed of 1500 rev/min. This is indicated as a requirement where it applies.

Converging Filters

Filters are an important part of the data processing that enables precision guidance and autosteering. To be effective, filters need to be converged. Filters may be either converged (for immediate use) or converged with convergence data stored (for immediate and subsequent reuse). Certain driving routines will result in convergence but you need to meet more conditions for convergence data to be stored.

On the Status (Vehicle) screen, a check mark next to 'Filters converged' indicates filters have been converged; however, it does not indicate that the convergence data is stored (although it may be - see "Filter Self-Convergence" on page 49).



Note - vehicle/valve combination: Convergence data, if stored, is stored for each vehicle/valve type combination. If you change the vehicle/valve type combination to a combination for which there is no stored convergence data, you will need to repeat the appropriate convergence and convergence data storage requirements.

Initial Convergence or Re-convergence

Initial filter convergence (and re-convergence if required) is achieved through a driving pattern. The driving sequences executed manually or automatically during the calibration process are normally enough for filters to converge. If the calibration driving sequences are enough, the convergence status will show as checked. You will then have to meet the requirements for convergence data storage (see "Manual Driving Sequence" on the next page).

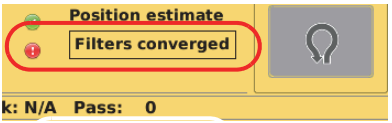
If the driving sequences within the calibration process do not result in filter convergence, or a full calibration in not required, execute the 'manual' sequence

described in the next section (see also the additional storage driving requirements in the same section and “Re-Converging Filters” on page 50).

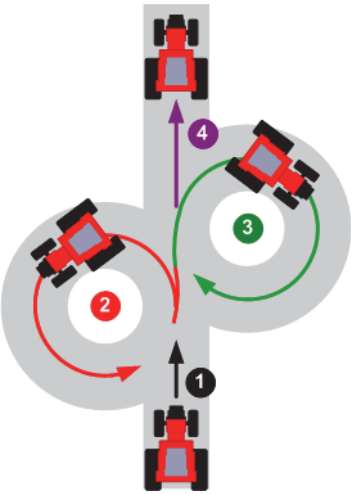
Note - antenna position: Filter convergence includes a calculation of the antenna position. If there is a difference of more than 1 m between the calculated antenna position and the entered antenna fore/aft (‘pivot’) dimension, the filters will converge but the filter data will not be stored. To avoid this situation, ensure you have accurately entered the antenna pivot dimension when adding a new vehicle (see “Antenna Pivot” on page 37 and “Adding a Vehicle” on page 54).

Manual Driving Sequence

The procedure below describes how to manually converge filters. You will need to perform this procedure if the Filters converged status indicator is a red exclamation point (see at right).



Using the figure at right as a guide and driving the vehicle at a slow speed (typically 5-7 kph), complete the following steps to manually converge filters:



1. Drive straight for 10 m. If filters do not converge, go to step 2.
2. Drive a tight full circle to the left.
3. Drive a tight full circle to the right. If filters do not converge, go to step 4.
4. Drive straight for 10 m.

To store the newly acquired convergence data you must drive at least three minutes (recommended minimum) under autosteering and bring the vehicle to a stop (the point at which the data is stored). This can be cumulative—you do not have to immediately drive under autosteer for three minutes and stop. Provided you have three minutes of autosteering (for which filters must be converged) and come to a halt before you power off eDriveXC/XD, the convergence data will be stored (but see *Note* on antenna position at top of this page).

Filter Self-Convergence

On system startup, the filters converged status always indicates filters are not converged: this is normal. After you drive forward for at least 10 seconds, the status should become checked indicating the use of stored convergence data. If the status does not change, it indicates convergence data is not stored. Refer to “Re-Converging Filters” on the next page.

Re-Converging Filters

Filters will need to be re-converged—and the new convergence data stored—if:

- Filter convergence data was never stored.
- Antenna calibrated (entered) dimension is changed by more than 0.1 m.
- Vehicle/valve type combination is changed to one that has not been used before (meaning there is no convergence data for the combination - see *Note: vehicle/valve combination*, page 48).

If re-convergence is required, establish the reason and, accordingly, reset the antenna data, complete the calibration process, and/or complete the driving requirements for convergence and convergence data storage as detailed in the preceding sections.

Steering Options

Steering adjustment options include:

- Sensitivity—how aggressively the vehicle steers on the guidance line when in close proximity
- Attack—how aggressively the vehicle steers onto the guidance line when approaching it from a distance
- Smoothing—amount of smoothing of contours

Steering Sensitivity

Note: See "Vehicle Setup and Calibration" on page 55 to set steering sensitivity.

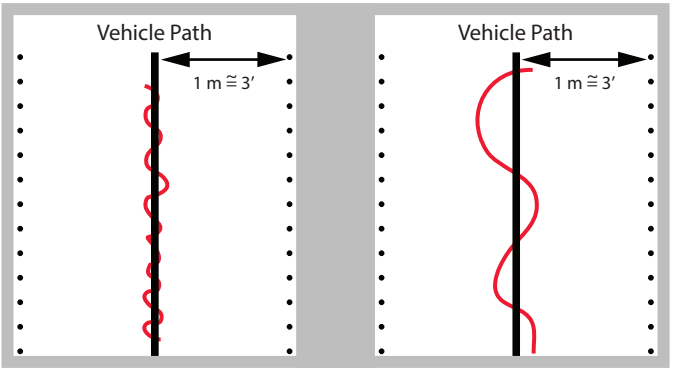
Steering sensitivity determines how aggressively the vehicle steers onto the guidance line when approaching it from close proximity. Depending on preference and needs, you can adjust sensitivity to between 1 and 20. The default setting 7 is a good value to start with on most vehicles. Use Table 3-1 as a guide to setting the sensitivity.

Table 3-1: Sensitivity settings

Setting	Performance
Low value	Smooth steering adjustments, eventual lack of crosstrack accuracy (in this sense, crosstrack is the real-time, constantly changing horizontal offset of the vehicle to the desired position on the guidance line).
Medium value	Good compromise between smooth steering and crosstrack accuracy.
High value	Aggressive steering adjustments with the wheels being very active (or twitchy). Highest crosstrack accuracy.

Adjust the sensitivity setting during vehicle calibration to maintain the GPS guideline accurately without rapidly overshooting or responding too slowly.

- If steering corrections are too rapid, causing the machine to jerk erratically back and forth across the line, sensitivity is set too high (below left).
- If the machine slowly weaves down the guideline, sensitivity is set too low (below right).



The best sensitivity setting for optimized machine control depends on such parameters as vehicle type, implement, working speed, and field conditions.

Steering Attack

Note: See "Vehicle Setup and Calibration" on page 55 to set steering attack.

Steering attack determines how aggressively the vehicle steers onto the guidance line when approaching it from a distance. Depending on preference and needs, you can set attack to between 1 and 10. The default setting 10 (maximum) is a good value to start with on most vehicles. Use Table 3-2 as a guide to setting the attack.

Table 3-2: Attack settings

Setting	Performance
Low value	Very slow line acquisition (the vehicle will not overshoot the guidance line during approach).
Medium value	Good compromise between fast line acquisition and some overshoot.
High value	Fast line acquisition with the potential to overshoot the guidance line until the system catches up.

Steering Smoothing

Note: See "Vehicle Setup and Calibration" on page 55 to set steering smoothing.

Steering smoothing determines the amount of smoothing of contours. The smoothing applied to the current contour is based on the smoothing setting that was active during the preceding pass.

Depending on preference and needs, smoothing can be adjusted to None (default), Low, Medium, or High. For example, it might be necessary to adjust the smoothing setting if a vehicle/implement combination does not allow turning within a tight radius. In addition, a very sharp curvature might not be desired during high-speed operation.

Performance for the steering smoothing settings are as follows:

- None (default) - System tries to follow every contour, even if the contour has a very tight curvature, but may disengage when following a very tight turn.
- Low - System applies minimum smoothing.
- Medium - System applies medium smoothing.
- High - System generates optimized control paths for high-speed operation, where the minimum curvature for each turn is large. It is not suitable for tight-turn operations as unwanted coverage gaps may occur.

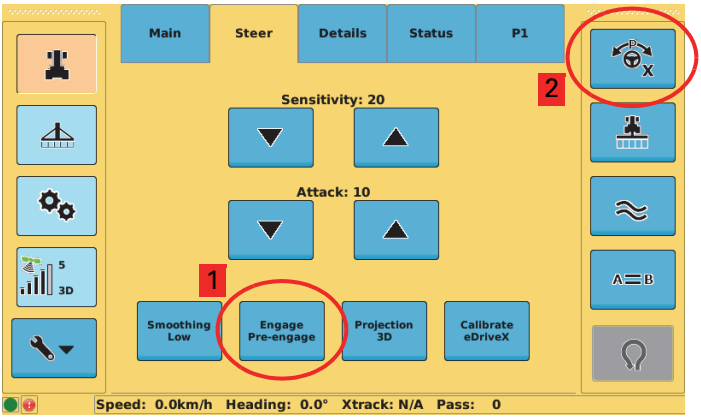
Pre-Engage

Note: See "Vehicle Setup and Calibration" on page 55 to set up and use pre-engage.

Pre-engage enables you to activate the Steering button before all engage requirements are met. Once the requirements are met, STX automatically engages on a guideline.

Pre-engage is a two-step process:

1. Enable the pre-engage feature (make it available)—if the Engage button shows Manual then press the button to switch to Pre-Engage.
2. Activate pre-engage—press the Steering button and when all the engage requirements are met STX automatically engages on a guideline.



Setting 2D or 3D Projection

Note: See "Vehicle Setup and Calibration" on page 55 to set 2D/3D projection.

The projection mode relates to the effect of the earth's curvature on guidance accuracy. The default is 2D. Select 3D as the A=B projection mode for wide field operations or interoperability with third party guidance systems that also use 3D guidance line projection.

Chapter 4: Working with Vehicles and Implements

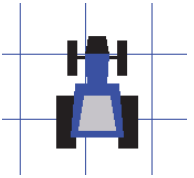
Working with Vehicles

Working with Implements

Working with Vehicles

A vehicle in STX refers to a machine you drive in the field, such as a sprayer, planter, or tractor. You can add as many vehicles to STX as you want and select the one you need for your job. The first time you power up STX there is one vehicle: the default vehicle. After adding a vehicle (or vehicles), upon powerup STX loads the vehicle that was loaded prior to the terminal being powered down.

The map screen always displays a vehicle as shown at right (you can change the color), whether it is the default vehicle or a vehicle that you add.



You can add, edit, load, import, export, and delete vehicles.

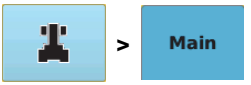
Adding a Vehicle

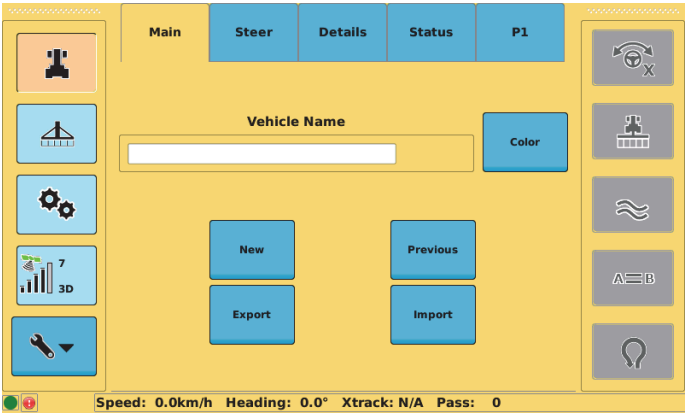
When you add a vehicle it remains in memory, even if you move the terminal to another vehicle. For example, if you add a vehicle, move the terminal to another vehicle for use, and reinstall the terminal in the original vehicle, your original vehicle in STX will still be there.

The procedure below for adding a vehicle creates a vehicle with a name and color you determine. After creating a vehicle, set up and calibrate the vehicle to differentiate it from the default vehicle (see “Vehicle Setup and Calibration” on the next page).

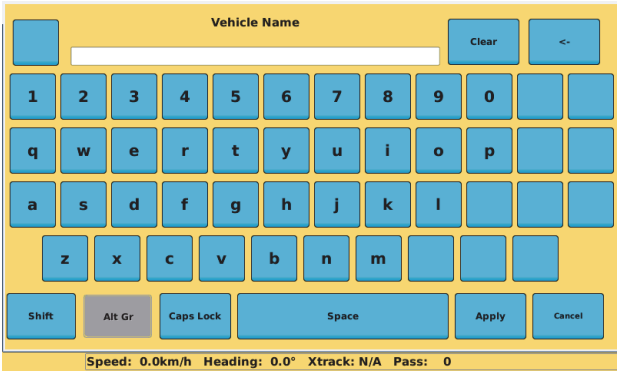
To add a vehicle:

1. Press the **Vehicle** screen button then the **Main** tab. The Main screen appears.

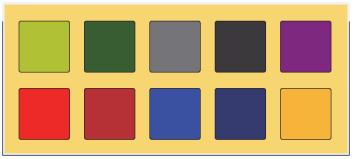




2. Press **New**. The Vehicle Name screen appears.



3. Press **Clear** to delete the current vehicle name (if one is displayed), enter a name, then press **Apply**. The screen closes and the name you entered appears in the Vehicle Name field on the Main screen.
4. Press **Color**. The Color window appears.
5. Press a color. The window closes and the new color appears on the vehicle when you view the map screen.

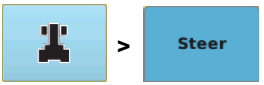


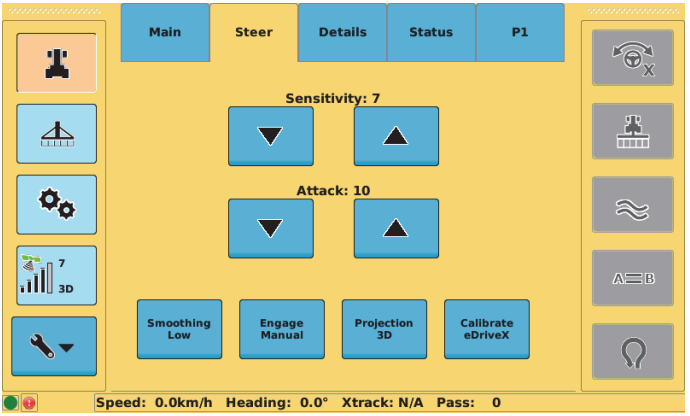
Vehicle Setup and Calibration

When you select the vehicle type (step 9 in procedure following) STX populates the vehicle profile with default values. Before you begin, review Chapter 3, “Autosteering.”

To set up and calibrate a vehicle with eDriveXC/XD:

1. Press the **Vehicle** screen button then the **Steer** tab. The Steer screen appears.





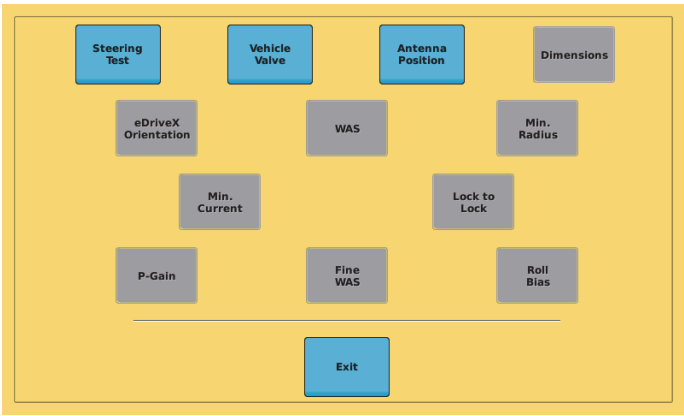
2. Set the sensitivity: Press the **Sensitivity** up/down arrows to increase/decrease the sensitivity of eDriveXC/XD (sensitivity prevents over-reaction in difficult-to-control machines). See “Steering Sensitivity” on page 50 for more information.
3. Set the attack level: Press the **Attack** up/down arrows to increase/decrease the attack level of eDriveXC/XD (attack is how aggressive a vehicle will try to acquire the line). See “Steering Attack” on page 51 for more information.
4. Set the smoothing level: Press **Smoothing** to cycle through smoothing settings (None, Low, Medium, and High). Steering smoothing determines the amount of smoothing of contours. The smoothing applied to the current contour is based on the smoothing setting that was active during the preceding pass. See “Steering Smoothing” on page 51 for more information.
5. Set engage to manual or pre-engage: Press **Engage** to toggle between Manual and Pre-Engage.

   When set to Pre-Engage:

   - If you are not ready for autosteering, a ‘P’ appears on the Steering button (shown at right).
   - If you are ready for autosteering, the Steering button appears as normal.

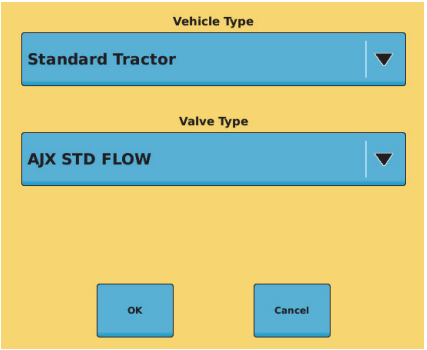
   To turn pre-engage off press **Engage** again to set it to Manual. See “Pre-Engage” on page 52 for more information on this setting.
6. Set the projection mode: Press **Projection** to toggle between 2D mode and 3D mode. See “Setting 2D or 3D Projection” on page 52 for more information on this setting.
7. Press **Calibrate eDriveX**. The calibration screen appears.



8. Perform a steering test: Press **Steering Test** then follow the instructions under “Performing a Steering Test” on page 36. When finished, return to this page and proceed to step 9 (next step).

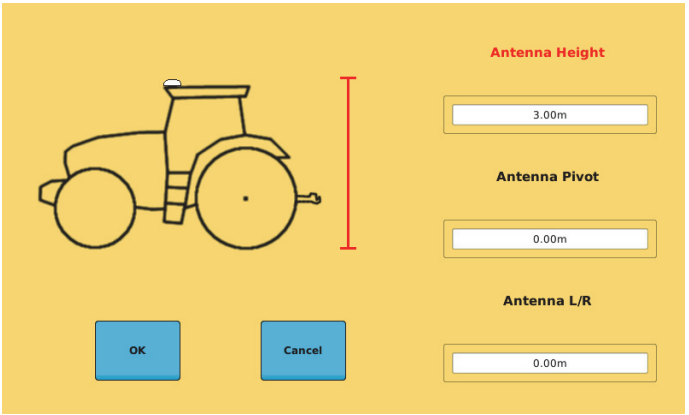
Note: The remaining buttons on the calibration screen require you to select/enter values or perform certain tasks based on the information displayed on the screen.

9. Select the vehicle and valve types:
   a. Press **Vehicle Valve**. The vehicle valve screen appears.
   b. Press the **Vehicle Type** field and select a type from the drop-down.
   c. Press the **Valve Type** field and select a type from the drop-down.
   d. Press **OK**.



*Note: After you change the vehicle or valve type, STX may prompt you to restart the ECU (eDriveXC/XD) for the changes to take effect. Press **OK** to acknowledge the message then reboot the ECU.*

10. Enter the antenna position: Press **Antenna Position** to display the antenna position screen.

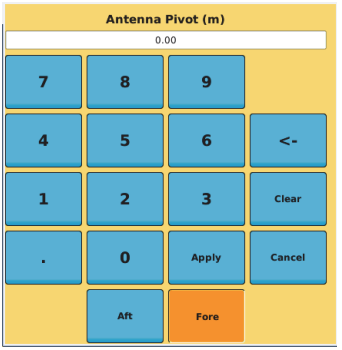


Complete the following then press **OK**.

Note: For the three antenna fields, press the field once to activate it (field label turns red) and visually illustrate its measurement on the vehicle on the screen then press again to display the related data entry window.

- Antenna Height: Press **Antenna Height** (twice, if field label initially not red), enter a value, then press **Apply**.

- Antenna Pivot: Press **Antenna Pivot** (twice, if field label initially not red), press **Fore** (antenna in front of vehicle pivot point) or **Aft** (antenna behind vehicle pivot point), enter a value, then press **Apply**.

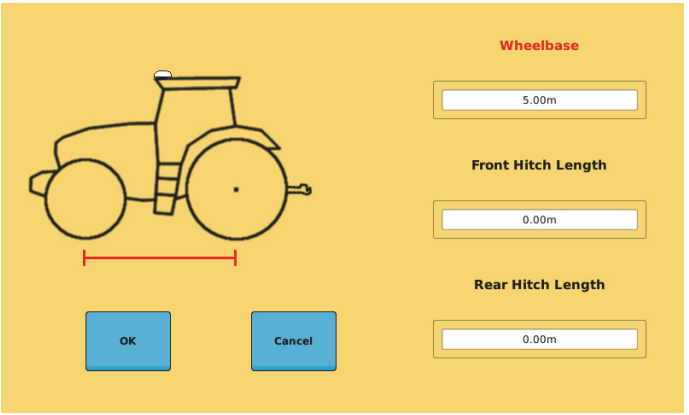
  

  See “Antenna Pivot” on page 37 for more information on this setting.

- Antenna L/R: Press **Antenna L/R** (twice, if field label initially not red), press **Left** (antenna left of vehicle centerline) or **Right** (antenna right of vehicle centerline), enter a value, then press **Apply**.

  You can leave Antenna L/R as 0.00 when first working through this step of vehicle setup—see “Antenna Offset” on page 39 for more information.

11. Enter vehicle dimensions: Press **Dimensions** to display the dimensions screen.

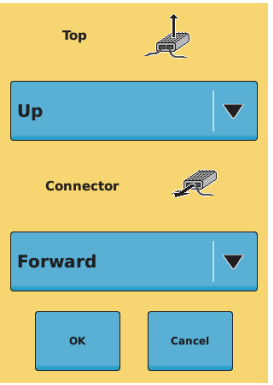


Complete the following then press **OK**.

Note: For the three dimension fields, press the field once to activate it (field label turns red) and visually illustrate its measurement on the vehicle on the screen then press again to display the related data entry window.

- Wheelbase: Press **Wheelbase**, enter a value (for the distance between the centers of the vehicle’s two axles), then press **Apply**.
- Front Hitch Length: Press **Front Hitch Length**, enter a value, then press **Apply**.
- Rear Hitch Length: Press **Rear Hitch Length**, enter a value, then press **Apply**.

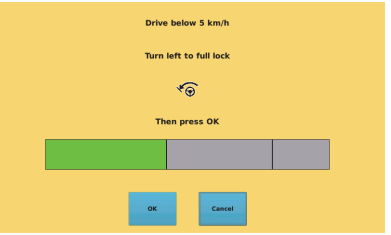
12. Set the orientation of the eDriveXC/XD ECU:
    a. Press **eDriveX Orientation**. The eDriveXC/XD orientation screen appears. You set the orientation of the top of the eDriveXC/XD ECU (the face with the cooling fins) and of the two connectors. The connector orientation options are dependent on the orientation of the eDriveXC/XD ECU's top so you set the top position first.
    b. Press the **Top** drop-down and select an option, press the **Connector** drop-down and select an option, then press **OK**.



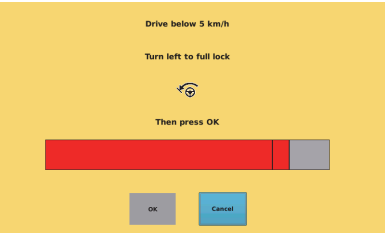
13. Press **WAS** then follow the onscreen instructions. When you have completed the WAS calibration step, the terminal beeps (as it does after each successful calibration step) and the next button becomes blue—press this blue button then follow the onscreen instructions. You will repeat this process for the remaining gray calibration buttons (in order) to complete the eDriveXC/XD calibration.

Note: The screens that appear for certain calibration steps have a status bar that indicates if you have met the conditions for that step. For example, if the step instructs you to drive less than a certain speed, the bar shows red if you are driving too slow or too fast and shows green if you are driving within the correct range. Pay attention to color on the bar to help guide you through the calibration process.

When instructed to center the steering aim at a specific landmark to ensure you are driving the vehicle in a straight line.



Green - within range



Red - outside range

Editing a Vehicle

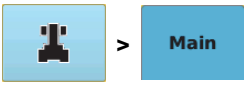
You can edit only the current vehicle. To edit an existing vehicle, first load the vehicle (see "Loading a Vehicle"following) then edit any of the settings on the Main screen and all but the eDriveXC/XD calibration settings on the Steer screen.

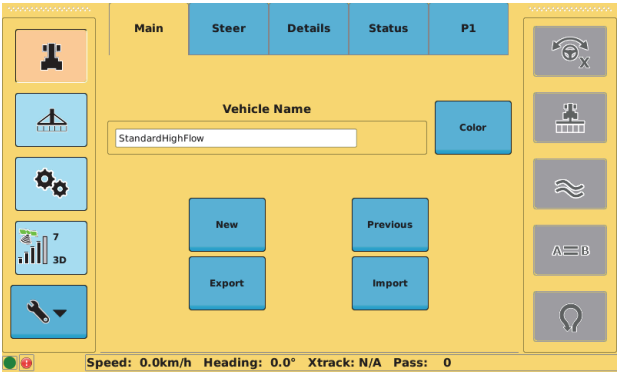
Loading a Vehicle

Each vehicle you create in STX is saved to memory creating a list of vehicles. You can then load the appropriate vehicle from this list. When you load a vehicle that vehicle's settings, such as color and calibration parameters, are loaded as well. For example, if you load a previous tractor named Stnd1 that is blue, the tractor on the map screen is blue.

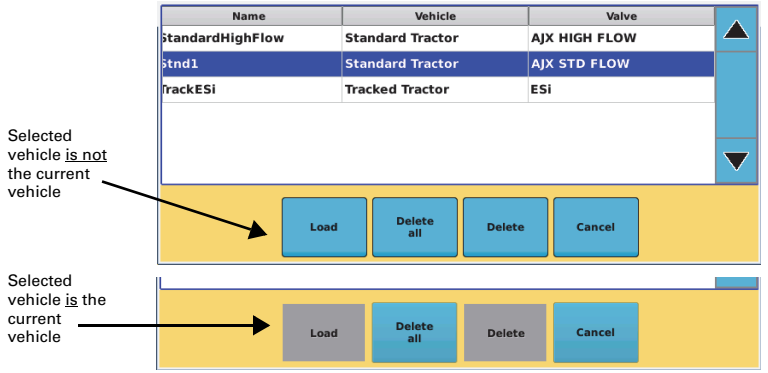
To load a vehicle:

1. Press the **Vehicle** screen button then the **Main** tab. The Main screen appears.





2. Press **Previous**. In the window that appears select the vehicle you want to load. If you select the current vehicle the Load and Delete buttons are unavailable; otherwise, all four buttons are available.



3. Press **Load**. The window closes and the name of the loaded vehicle appears in the Vehicle Name field on the Main screen.

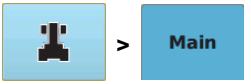
Note: You may be required to reboot eDriveXC/XD after loading a vehicle.

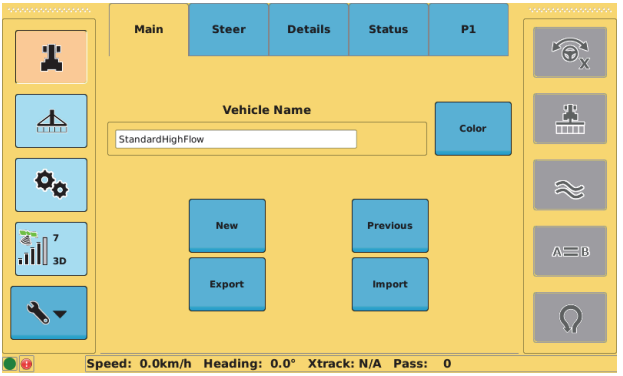
Exporting a Vehicle

You must have a USB drive plugged into the terminal to export a vehicle; otherwise, the functionality is disabled (Export button is unavailable/gray). When you export a vehicle to a USB drive STX creates a 'vehicles' folder on the USB drive (if one does not already exist) and copies the VEHICLE file to that folder. For example, if you have a vehicle profile named 'TestVehicle1' and export that vehicle to a USB drive it will appear as follows: *TestVehicle1.vehicle*

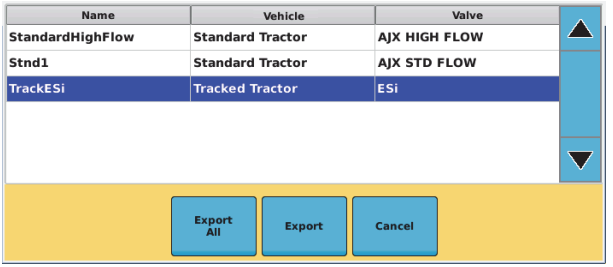
To export a vehicle:

1. Insert a USB drive in the STX terminal.
2. Press the **Vehicle** screen button then the **Main** tab. The Main screen appears.





3. Press **Export**. A window appears with a list of vehicles.



4. To export one vehicle, select the vehicle then press **Export**.

   or

   To export all vehicles, press **Export all**.

   Note: If the USB drive already contains a vehicle of the same name you are exporting, STX prompts you to confirm/cancel exporting that vehicle. Confirming the export overwrites the vehicle on the USB drive.

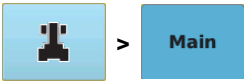
Importing a Vehicle

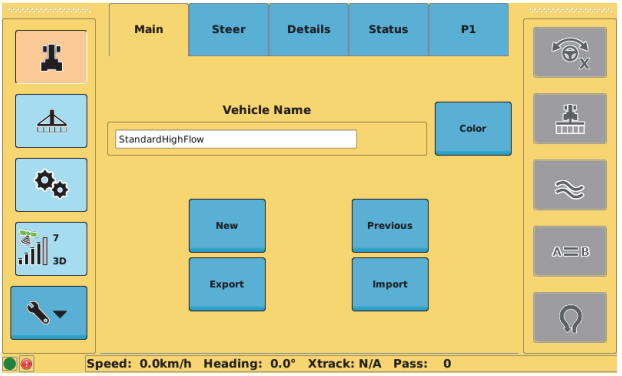
Once you import a vehicle it will appear in the vehicles window when you press Previous (see “Loading a Vehicle” on page 60 and “Deleting a Vehicle” on page 63) or Export (see “Exporting a Vehicle” on page 61).

You must have a USB drive plugged into the terminal to import a vehicle; otherwise, the functionality is disabled and the Import button is unavailable (gray). The USB drive must contain a 'vehicles' folder and all vehicle files must be in this folder. For example, if your USB drive is drive M on your PC, your vehicle files should be in the following folder: *M:\vehicles*

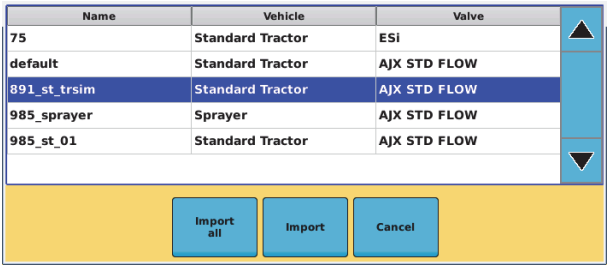
To import a vehicle:

1. Insert a USB drive in the STX terminal.
2. Press the **Vehicle** screen button then the **Main** tab. The Main screen appears.





3. Press **Import**. A window appears with a list of vehicles.



If you do not select a vehicle to import the Import button is gray (unavailable).

4. To import one vehicle, select the vehicle then press **Import**.

   or

   To import all vehicles, press **Import all**.

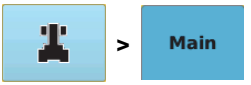
> *Note: If STX already contains a vehicle of the same name you are importing, STX prompts you to confirm/cancel importing that vehicle. Confirming the import overwrites the vehicle on your terminal.*

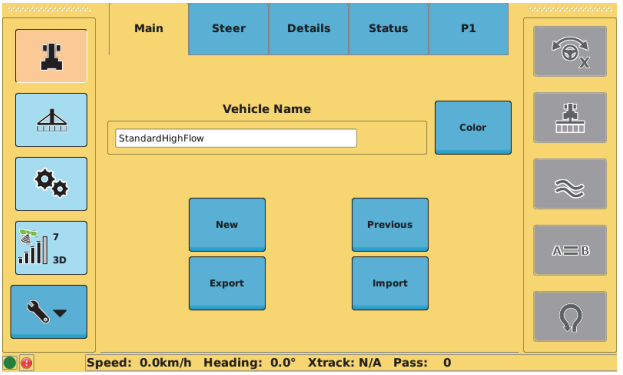
Deleting a Vehicle

Caution: *Deleting a vehicle permanently removes the vehicle and its calibrations—you cannot retrieve a deleted vehicle.*

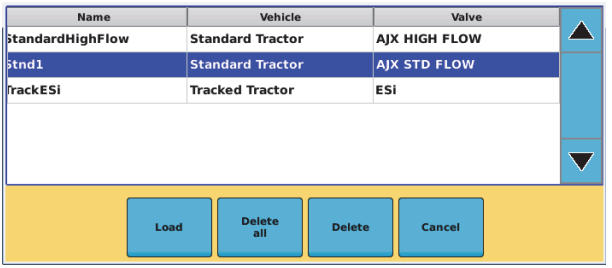
To delete a vehicle:

1. Press the **Vehicle** screen button then the **Main** tab. The Main screen appears.





2. Press **Previous**. A window appears with a list of vehicles.



3. To delete a vehicle: Select the vehicle then press **Delete**. In the confirmation message that appears, press **Yes**. Press **Cancel** to close the window and return to the Main vehicle screen.

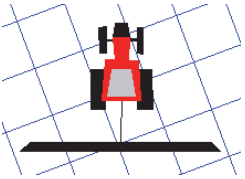
   or

   To delete all vehicles (including the current vehicle): Press **Delete all**. In the confirmation message that appears, press **Yes**.

Working with Implements

An implement in STX refers to machinery attached to your vehicle, such as a sprayer, planter, or tillage equipment. You can add as many implements to STX as you want and select the one you need for your job. STX stores certain information—such as implement geometry and eTurns setup—with each implement.

The selected implement appears on the map screen with the selected vehicle (implement and vehicle shown at right). The distance between the implement and the vehicle is determined by the fore/aft offset. The implement may also appear left or right of the vehicle; this distance is determined by the swath offset. See “Implement Offsets” below for more information.



You can perform the following implement tasks:

- Add, set up, edit, and delete implements
- Load a previous (existing) implement
- Import and export implements

Note: If eDriveXC is connected to STX and you entered a valid eTurns subscription, the eTurn Calibrate screen is available (tab is blue) when you press the Implement screen button. The eTurn Setup screen is available (tab is blue) after you calibrate eTurns. With eDriveXC connected but without a valid eTurns subscription, these tabs are gray and the screens are unavailable. See “eTurns” on page 156 for information on eTurns functionality.

Implement Offsets

In STX you can set two offsets for your implement:

- Swath (left or right) offset
- Fore/Aft (front or back) offset

See the sections that follow for an overview of each type of offset and instructions on how to set the implement offsets.

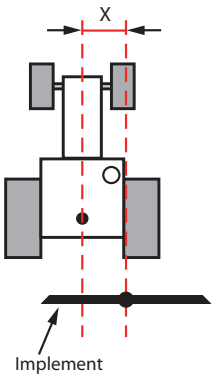
Swath Offset

The swath offset is the lateral (perpendicular) distance between the center of the implement and the centerline of the vehicle. When ‘calibrating a swath offset’ you are actually compensating for a physical implement offset. And to compensate for physical implement offset you:

- Measure the effect of the uncompensated implement offset
- Calculate the offset adjustment required
- Enter the calculated adjustment to compensate for the physical implement offset

Calibration is required if the vehicle successfully repeats its passes while driving up and down on a straight A=B line without an implement, but still shows an offset (skip or overlap) during field work with an implement attached. In this case it is likely that the implement is not centered in relation to the centerline of the vehicle. To compensate for this you need to complete a swath offset calibration for each implement that is used with STX.

The swath offset—for which you will compensate—comprises a measured distance (the amount of the offset) and a direction (left or right of vehicle centerline). In the figure at right, the offset distance (or amount) is X, the direction is right.



Because it is difficult to measure the swath offset on the vehicle/implement combination, you must determine the offset in the field to ensure maximum field work accuracy.

Note: The calibration compensates only for a static swath offset that is caused by the physical dimensions of the implement. It does not prevent offsets that are caused by dynamic movements of the implement, like drift on a slope, for example.

There are two ways to determine the swath offset. The following section describes the preferred method, which includes a brief description of the alternative method. See also “Setting the Swath Offset - Alternative Method” on page 69.

Setting the Swath Offset - Preferred Method

This method for determining the swath offset is the preferred method because it eliminates the possibility of errors caused by an incorrect vehicle width (see “Adding a Vehicle” on page 54).

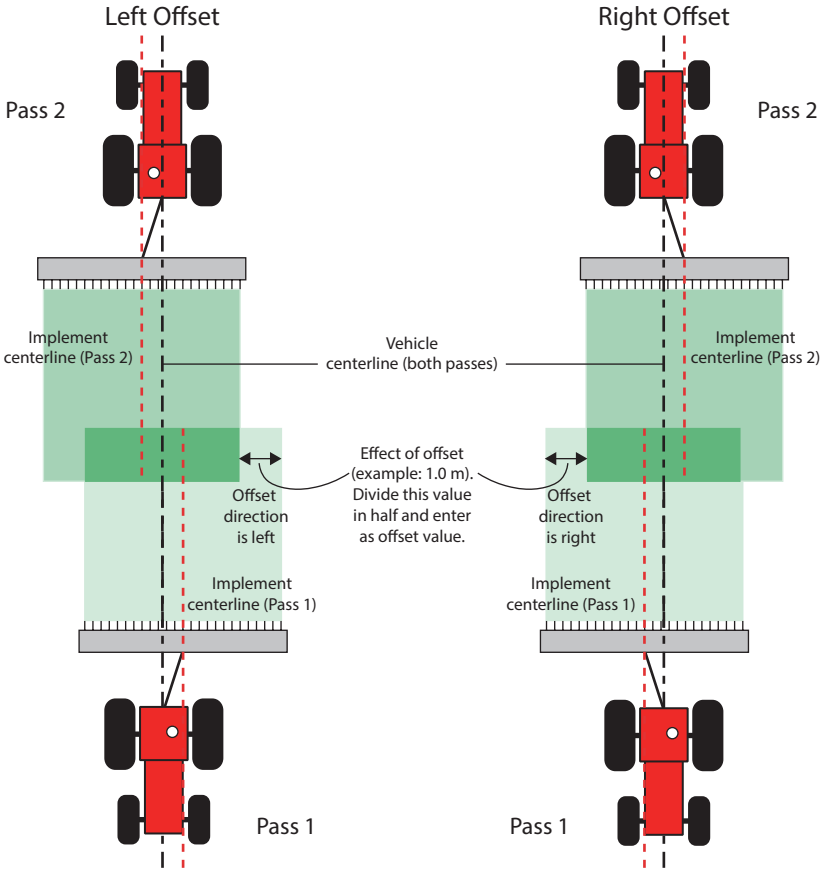
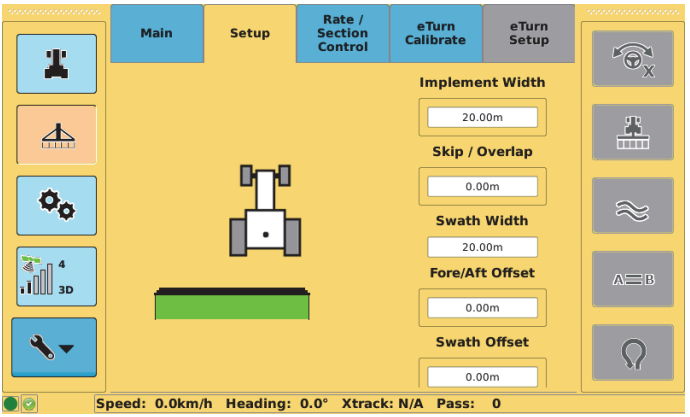


Figure 4-1: Determining the effect of swath offset

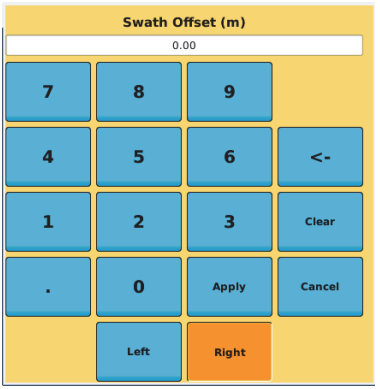
To determine the swath offset:

1. Set up a straight A=B line (see “Setting an A=B Line” on page 109).
2. Maintaining a speed of 5 kph (3 mph) engage steering and, with good crosstrack and with the implement straight, let the system steer you along the wayline for at least 100 m. Ensure the implement is in sufficient contact with the ground to leave a visible swath. See Pass 1 in Figure 4-1.
3. Perform a keyhole turn, re-engage the steering, and let the system steer you down the same wayline, again with good crosstrack and with the implement straight. See Pass 2 in Figure 4-1.
4. Measure the effect of the uncompensated implement offset shown in Figure 4-1 (1.00 m in example)—it is the width of the first swath not covered by the second swath.

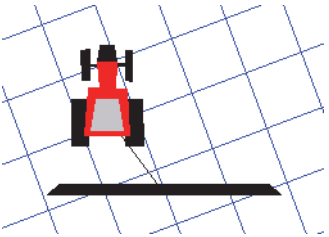
5. Divide the measurement by two. This is the amount of the physical offset of the implement—the offset you need to compensate for and need to enter as the Swath Offset on the Setup screen (step 7 below)—so 0.5 m in Figure 4-1 (and see step 8 below).
6. Determine the direction of the offset—this is the left or right direction of the implement's centerline relative to the vehicle centerline when viewed in the direction of travel. See Figure 4-1 for examples of both a left and right offset.
7. Press the **Implement** screen button then the **Setup** tab. The Setup screen appears.



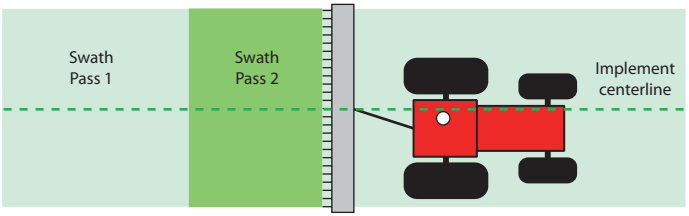
8. Enter the left or right implement offset:
   a. Press the **Swath Offset** field. The Swath Offset window appears.
   b. Press **Right** or **Left** (the direction of the offset you determined in step 6).
   c. Enter an offset value then press **Apply**. The Swath Offset window closes and the new value appears in the Swath Offset field on the Setup screen.



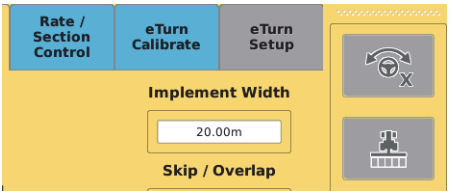
9. Display the map screen. The new implement position is indicated on the map (right swath offset shown at right).
10. Test the completed calibration by letting the system control up and



down on a new A=B line. The second swath should overlay the first exactly. If it does not, repeat the calibration.



If test results still show skips or overlaps after calibrating both the antenna and swath offsets, make sure the Implement Width value is correct.



Setting the Swath Offset - Alternative Method

With this method, instead of driving two passes on the same wayline—one in each direction—you drive three passes on adjacent waylines. Depending on the direction of your swath offset (left or right), you will get a skip or an overlap on the second pass and the opposite on the third pass.

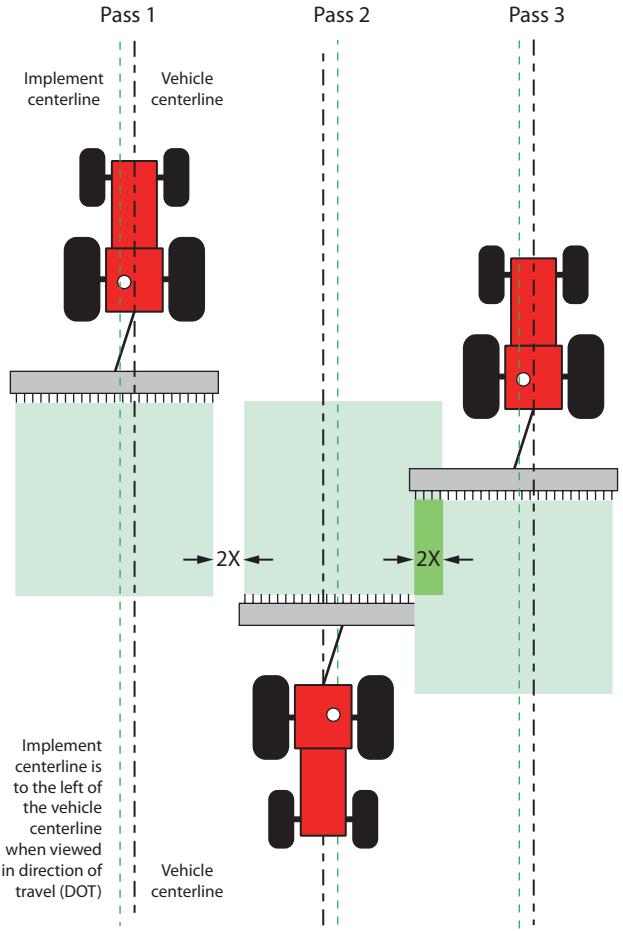


Figure 4-2: Three-Pass method for determining swath offset

The amount of skip and overlap will be the same. Whichever you measure (2X) divide it in half and enter the result as the swath offset (X) along with the direction of the offset, which is left in the example (start at step 7 of the previous section “Setting the Swath Offset - Preferred Method”).

Note: If the offset was to the right, Pass 2 would produce overlap, Pass 3 would produce skip.

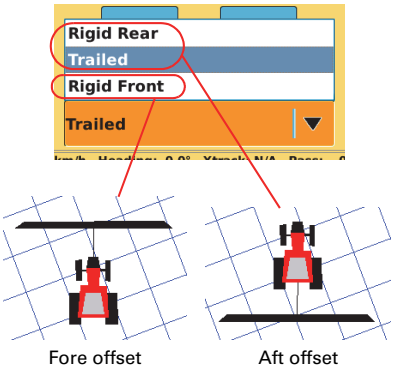
Fore/Aft Implement Offset Overview

The fore/aft implement offset is the perpendicular distance between the vehicle's pivot point and the application line (for example, spray impact point or seed drop point) of the implement. The front/back implement offset affects the section control ‘on/off’ points and the variable rate control ‘change’ points as the implement passes over preset boundaries, previously worked areas, or prescription map areas.

Setting the Fore/Aft Implement Offset

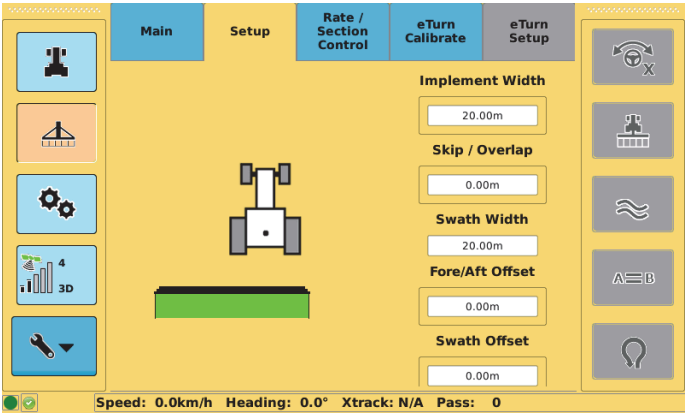
If the application line of the implement is behind the vehicle pivot point (you selected Rigid Rear or Trailed as the mount type), measure the distance from the antenna pivot point to the application line and enter this value as the aft offset—the implement will trail behind the vehicle on the map screen.

If the application line of the implement is in front of the vehicle pivot point (you selected Rigid Front as the mount type), measure the distance from the antenna pivot point to the application line and enter this value as the fore offset—the implement will be in front of the vehicle on the map screen.

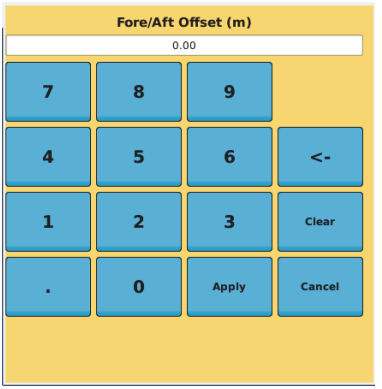


To set the fore/aft implement offset:

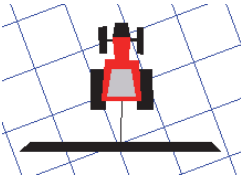
1. Verify you set the correct mount type for your implement (see step 3, page 72 of “Adding an Implement”).
2. Press the **Implement** screen button then the **Setup** tab. The Setup screen appears.



3. Enter the fore/aft offset:
   a. Press the **Fore/Aft Offset** field. The Fore/Aft Offset window appears.
   b. Enter an offset value then press **Apply**. The value is entered and the window closes.



4. Display the map screen. The new implement position is indicated on the map (aft offset shown at right).



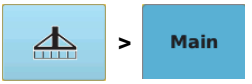
Note: Based on the location of the application line of the implement, you may need to set a combination of swath and fore/aft offsets on the implement.

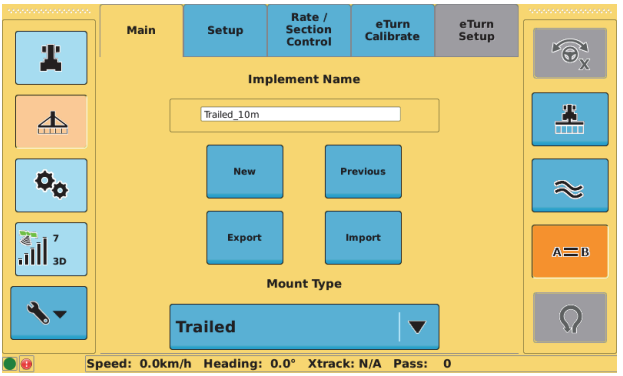
Adding an Implement

When you add an implement it remains in memory, even if you move the terminal to another vehicle.

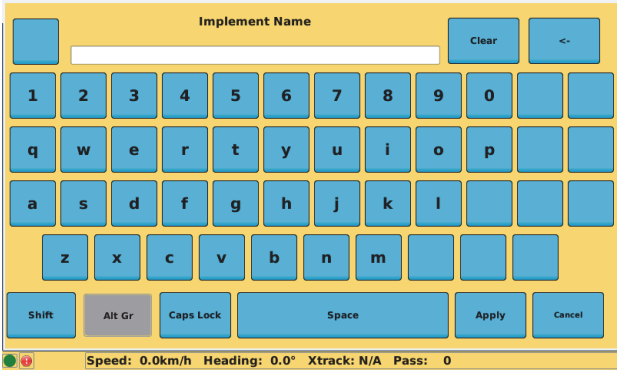
To add an implement:

1. Press the **Implement** screen button then the **Main** tab. The Main screen appears.

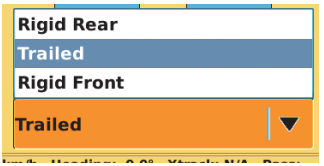




2. Press **New** and in the Implement Name window enter a name and press **Apply**. The window closes and the name you entered appears in the Implement Name field on the Main screen.



3. Press the **Mount Type** button then select an option from the list (at right).

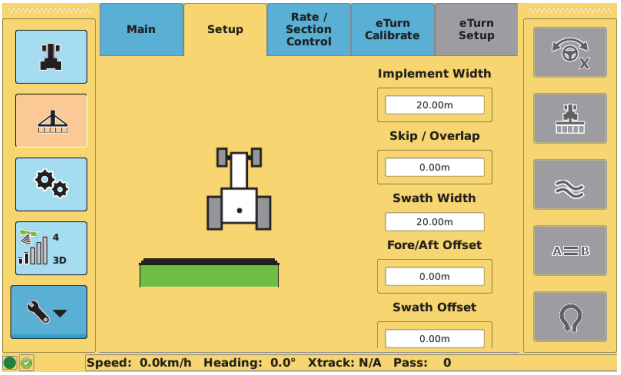


Setting Up an Implement

Before you begin review “Implement Offsets” on page 64 and “Implement Screens” on page 198.

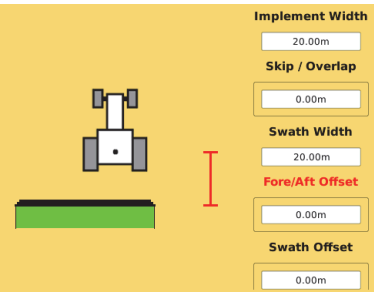
To set up an implement:

1. Press the **Implement** screen button then the **Setup** tab. The Setup screen appears.



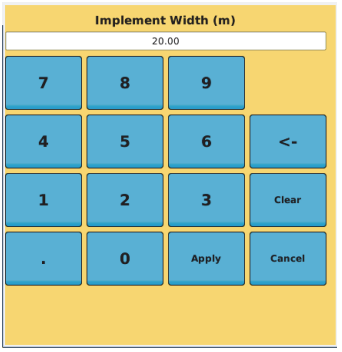
Note: If you have eDriveXC connected and an eTurns subscription see “eTurns” on page 156 for information on using the eTurn Calibrate and eTurn Setup screens to calibrate and set up eTurns, respectively.

For the Implement Width, Skip / Overlap, Fore/Aft Offset, and Swath Offset fields, press the field once to activate it (field label turns red) and visually illustrate its location and measurement relative to the vehicle on the screen (see at right) then press again to display the related data entry window.



2. For the Implement Width, Fore/Aft Offset, and Swath Offset fields:
   a. Press the field (twice, if field label initially not red) to display a data entry window (Implement Width window shown at right).
   b. Enter a value and press **Apply**.

   STX computes the Swath Width value by taking the Implement Width and adding the Skip value or subtracting the Overlap value.



3. For the Skip / Overlap field:
   a. Press the field (twice, if field label initially not red) to display the Skip / Overlap window.
   b. Press **Skip** or **Overlap**.
   c. Enter a value and press **Apply**.

Editing an Implement

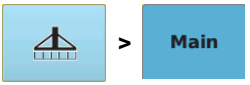
You can edit only the current implement. To edit an existing implement, first load the implement (see "Loading an Implement"following) then edit any of the settings on the Main and Setup screens.

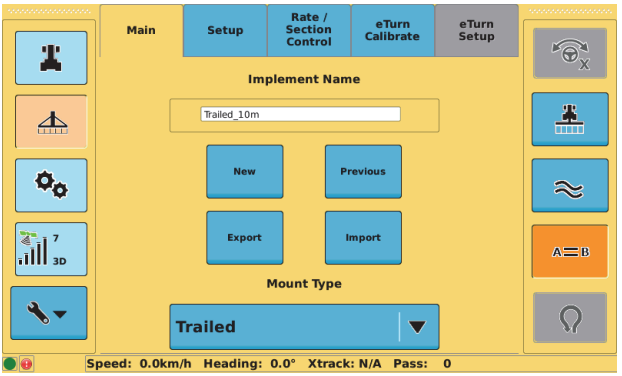
Loading an Implement

Each implement you create in STX is saved to memory creating a list of implements. You can then load the appropriate implement from this list.

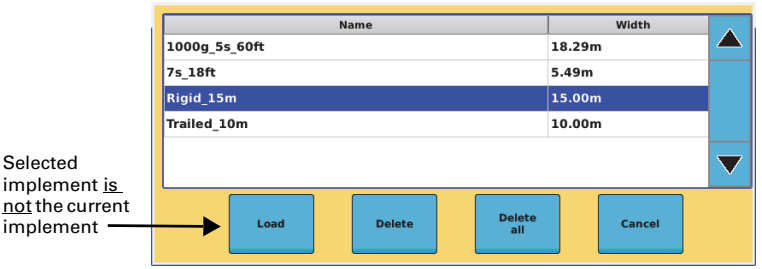
To load an implement:

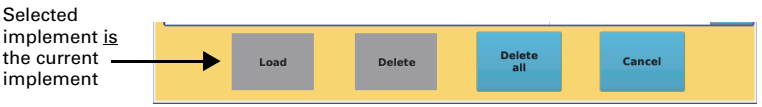
1. Press the **Implement** screen button then the **Main** tab. The Main screen appears.





2. Press **Previous**. An implements window appears with a list of implements.
3. Select the implement you want to load. If you select the current implement the Load and Delete buttons are unavailable (bottom figure below); otherwise, all four buttons are available (top figure below).





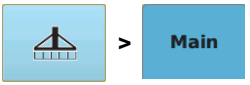
4. Press **Load**. The window closes and the name of the loaded implement appears in the Implement Name field on the Main screen.

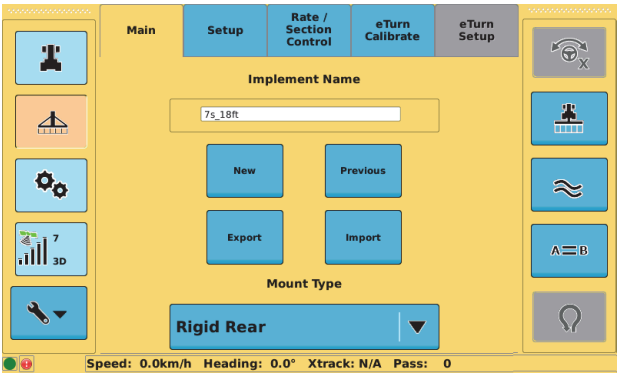
Exporting an Implement

Exporting an implement enables you to send the implement setup information to other STX terminals. You must have a USB drive plugged into the terminal to export an implement; otherwise, the functionality is disabled and the Export button is unavailable (gray). When you export an implement to a USB drive STX creates an 'implements' folder on the USB drive (if one does not already exist) and copies the IMPL file to that folder. For example, if you have an implement named 'TestImplement1' and export that implement to a USB drive it will appear as follows: *TestImplement1.impl*

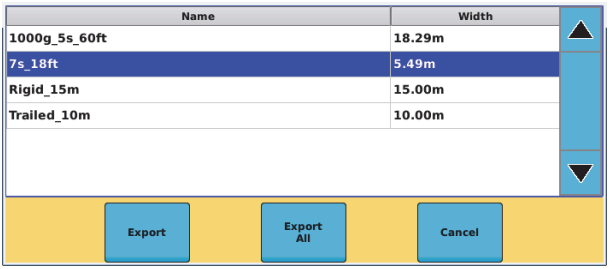
To export an implement:

1. Press the **Implement** screen button then the **Main** tab. The Main screen appears.





2. Press **Export**. An implements window appears with a list of implements.



3. To export one implement, select the implement then press **Export**.

   or

   To export all implements, press **Export All**.

> *Note: If the USB drive already contains an implement of the same name you are exporting, STX prompts you to confirm/cancel exporting that implement. Confirming the export overwrites the implement on the USB drive.*

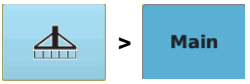
Importing an Implement

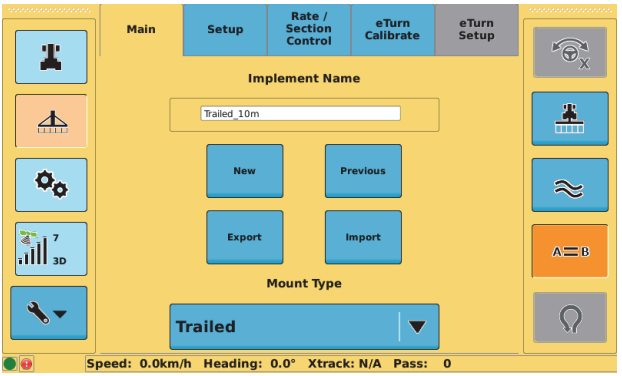
Importing implements enables you to import setup information for implements already set up in another STX terminal.

You must have a USB drive plugged into the terminal to import an implement; otherwise, the functionality is disabled and the Import button is unavailable (gray). The USB drive must contain an 'implements' folder and all implement files must be in this folder. For example, if your USB drive is drive M on your PC, your implement files should be in the following folder: *M:\implements*

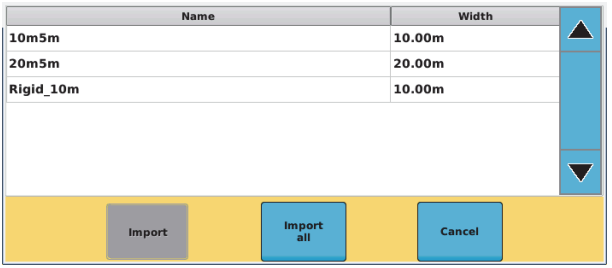
To import an implement:

1. Press the **Implement** screen button then the **Main** tab. The Main screen appears.





2. Press **Import**. An implements window appears with a list of implements.



3. To import one implement, select the implement then press **Import**.

   or

   To import all implements, press **Import all**.

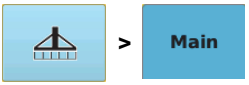
> *Note: If STX already contains an implement of the same name you are importing, STX prompts you to confirm/cancel importing that implement. Confirming the import overwrites the implement on your terminal.*

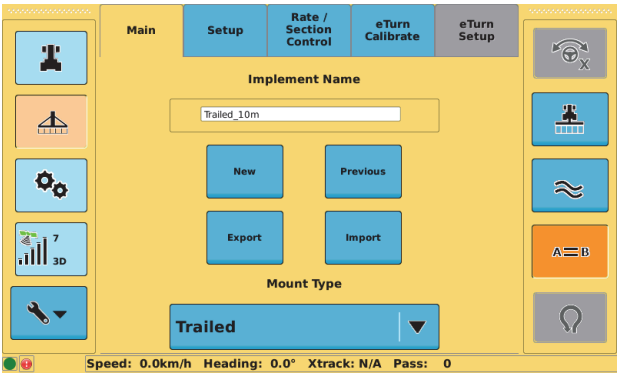
Deleting an Implement

Caution: *Deleting an implement permanently removes the implement—you cannot retrieve a deleted implement.*

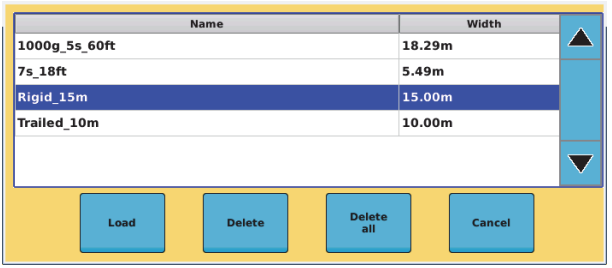
To delete an implement:

1. Press the **Implement** screen button then the **Main** tab. The Main screen appears.





2. Press **Previous**. An implements window appears with a list of implements.



3. To delete an implement: Select the implement then press **Delete**. In the confirmation message that appears, press **Yes**. Press **Cancel** to close the window and return to the Main implement screen.

   or

   To delete all implements, press **Delete all**. In the confirmation message that appears, press **Yes**.

Chapter 5: Jobs

This chapter provides an overview of jobs in STX and instructions on working with jobs and job templates.

Jobs Overview

This section describes what a job is, how STX numbers jobs, and what needs to occur before you start a job.

What is a Job?

A job is a field task you perform, such as spraying, tilling, or harvesting and is required for guidance and autosteering.

You can work with jobs in two ways:

- Using the Getting Started window after powering on STX (see "Working with Jobs at Startup" on page 81)
- Using the Job screen button to display the Setup and Notes screens (see "Working with Jobs Using the Job Screens" on page 82)

You can create job templates from existing jobs and use these templates to create similar new jobs.

Job Numbering

When you start a new job STX automatically assigns it a job number. The job number is based on the current date and the order of the job number. For example, STX names the first job you start on April 2, 2013 as 13040201.log, where:

- 13 = year (2013)
- 04 = month (April, fourth month)
- 02 = day
- 01 = first new job on this date

If you start more than one new job on this date, STX uses the same year, month, and day and orders the last two digits. For example, if you start three new jobs on April 2, 2013, STX autonumbers them as follows:

- 13040201.log
- 13040202.log
- 13040203.log

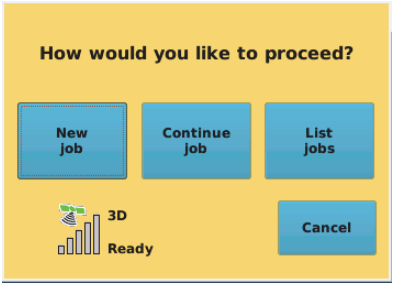
Before You Start a Job

Before you start a job verify you have a GPS position. On the GPS screen button, verify the satellite indicator is green (see "Viewing GPS Signal Information" on page 22).

If the satellite indicator is green the New and Continue buttons on the Setup (Job) screen are enabled and you can start, continue, or load a job; otherwise, the New and Continue buttons on the Setup (Job) screen are disabled and you cannot start, continue, or load a job (see the screenshot in "Working with Jobs at Startup" on the next page).

Working with Jobs at Startup

After you start STX and press Accept on the warning screen, STX displays the Getting Started window.



If this is the first time you are starting STX the *Continue job* and *List jobs* buttons are unavailable (gray—as are all Job buttons until you have a GPS position). If you are restarting STX and you have previously worked with a job then all four buttons are blue.

Press the buttons as follows:

- **New job** - STX automatically assigns a job name (number) and this number appears on the Job screen button and on the Setup (Job) screen. See “Starting a New Job” on page 83.
- **Continue job** - STX automatically loads the most recently closed job and displays the map screen. “Closing a Job” on page 85.
- **List job**s - STX displays a jobs window, from which you can load a previous job (see “Closing a Job” on page 85). “Closing a Job” on page 85.
- **Cancel** - STX starts with no job.

Working with Jobs Using the Job Screens

After you make a selection in the Getting Started window (see previous page) and are using STX, you work with jobs via the two Job screens (Setup and Notes, Figure 5-1 below). In addition to providing the same job functionality as the Getting Started window, the Job screens also enable you to perform such job tasks as importing/exporting, closing, and deleting jobs. See the sections starting on the next page for more information.

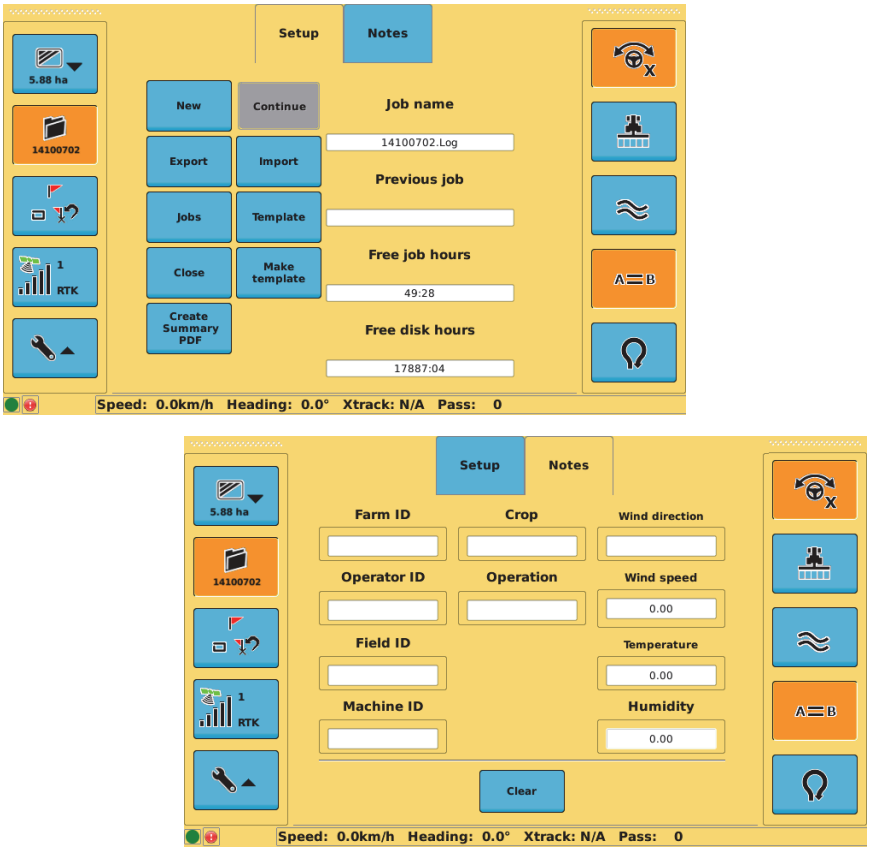


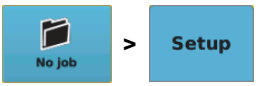
Figure 5-1: Setup and Notes screens (Job)

Starting a New Job

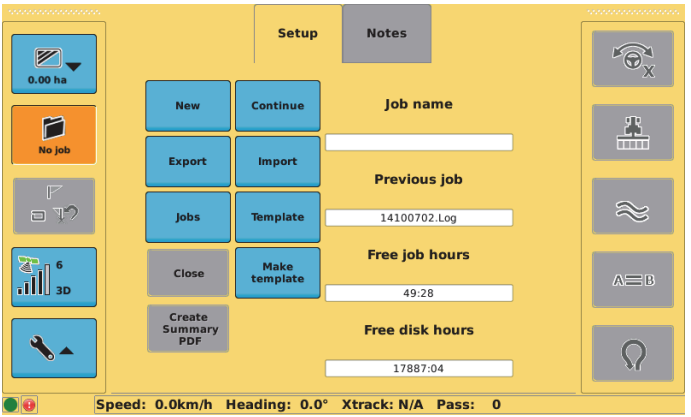
See “Before You Start a Job” on page 80 for information on what you need to do before staring a job. When you start a job STX automatically creates a job number for the job (see “Job Numbering” on page 80). When you start a new job STX automatically closes the current job.

To start a new job:

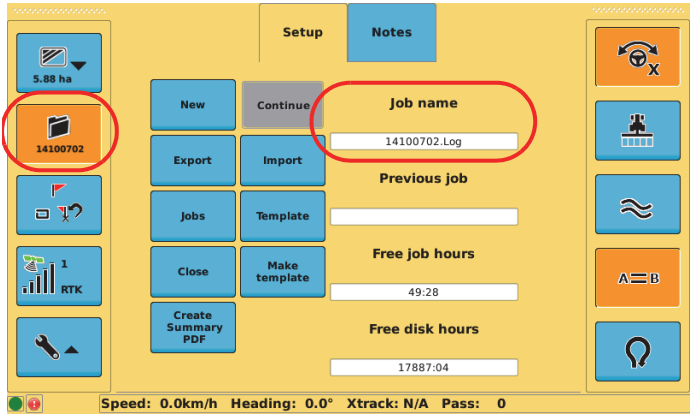
1. Press the **Job** screen button then the **Setup** tab. The Setup screen appears.



If this is the first time starting a job, the Previous job field will be empty; otherwise this field shows the most recently closed job. See “Closing a Job” on page 85 for information on loading the previous job.



2. Press **New**. STX starts a new job and the job number appears in the Job name field and on the Job screen button.



Entering Job Notes

You can add notes to an open job using the Notes screen (top screen in Figure 5-2). Notes are not required; however, you may find it useful to enter information for some or all fields. Any information you enter is saved with the current (open) job, so the next time you load that job the Notes information is loaded as well. If no job is open the Notes screen is unavailable with a gray tab (bottom figure in Figure 5-2).

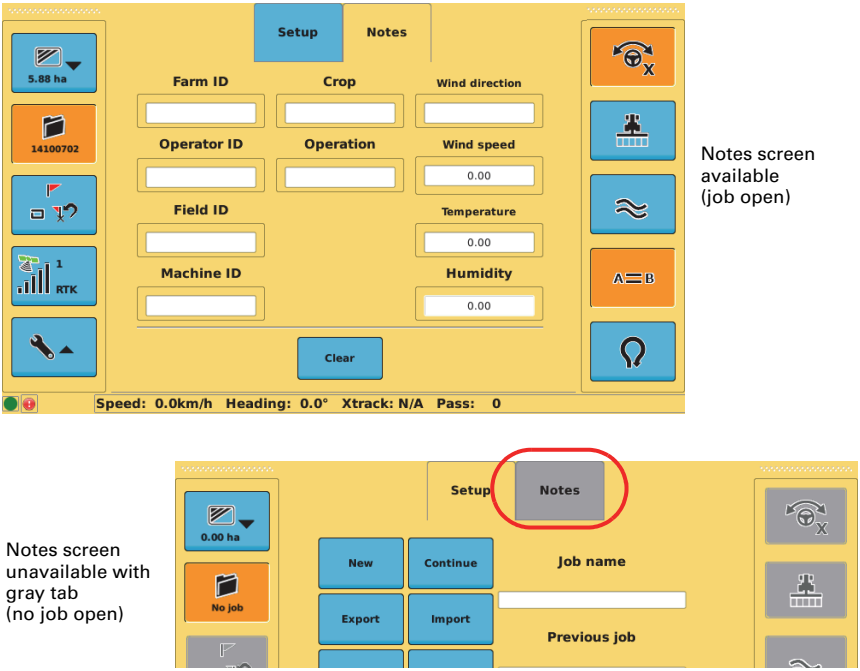
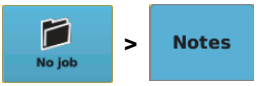


Figure 5-2: Notes (Job) screen

To enter job notes:



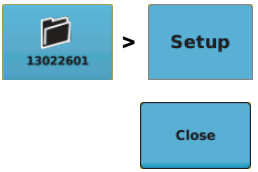
1. Press the **Job** screen button then the **Notes** tab. The Notes screen appears.
2. Enter field information:
   a. Press the field for which you want to add information.
   b. In the window that appears enter the desired information.
   c. Press **Apply**. The window closes and the field on the Notes screen displays the value you entered.
   d. Repeat steps a through c for other fields on this screen.

Closing a Job

In addition to closing a job manually (described here), the current job is closed automatically when you start a new job.

To close a job:

1. Press the **Job** screen button then the **Setup** tab. The Setup screen appears (see Figure 5-1 on page 82).
2. Press **Close**.



Loading a Job

There are two ways to load a job:

- Load a job from a list of previous jobs
- Continue (load) the most recently closed job to quickly continue the most recent job without having to search for that job from a list of jobs

You can load a previous job if another job is already open—loading the job automatically closes the currently open job. However, no jobs can be open if you want to continue with the most recent job—the Continue button is gray (unavailable) if a job is already open and blue (available) if no job is open. Although loading a job from a list of jobs closes the current job, you cannot continue that closed job—you can only continue a job that you closed with the Close button (see "Closing a Job" above).

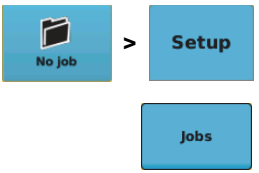
When you load a job:

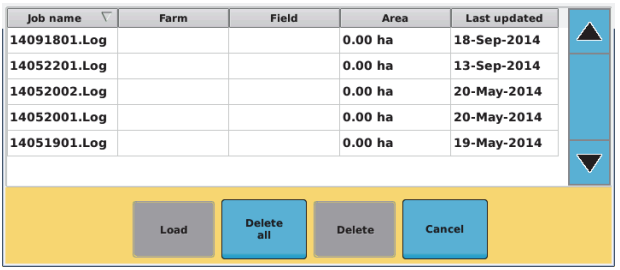
- The job number appears in the Job name field and on the Job screen button
- Information associated with the job (such as swath lines, marks, and sprayed areas) appears on the map screen

To load a previous job from the list of existing jobs:

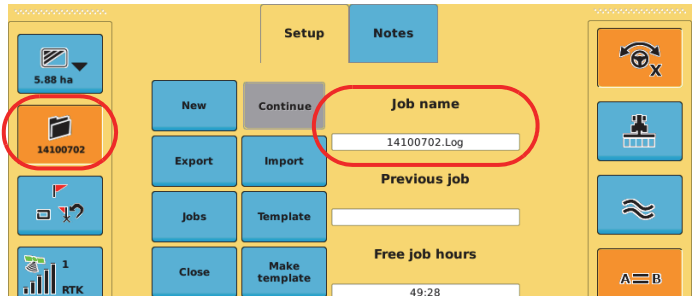
> *Note: If at startup you pressed New job in the Getting Started window, continue at step 3 on the next page.*

1. Press the **Job** screen button then the **Setup** tab. The Setup screen appears (see Figure 5-1 on page 82).
2. Press **Jobs**. A window appears with jobs sorted from newest (top) to oldest (bottom).





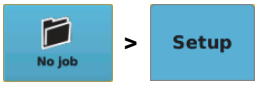
3. Select the job you want to load and press **Load**. STX loads the job and the job number appears in the Job name field and on the Job screen button.

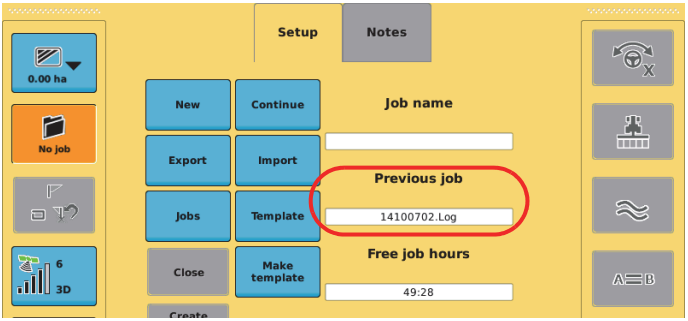


To continue the most recently closed job:

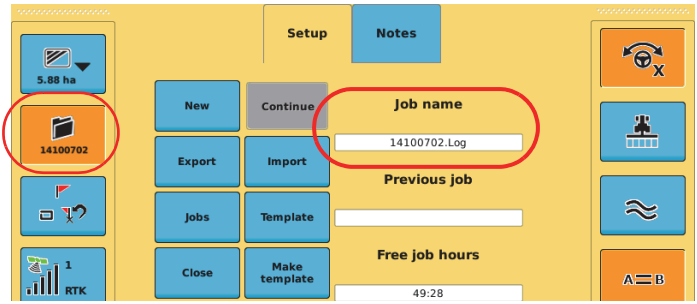
1. Press the **Job** screen button then the **Setup** tab. The Setup screen appears.

   The Previous job field shows the most recently closed job (the job you closed with the Close button).





2. Press **Continue**. STX continues (loads) the most recent job and the job number appears in the Job name field and on the Job screen button.



Exporting a Job

You can export two types of job files: job log files and job template files (see “Working with Job Templates” on page 92 for more information on job templates).

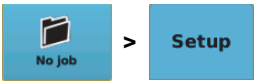
You must have a USB drive plugged into the USB port on the terminal to export a job; otherwise, the functionality is disabled and the Export button is gray (not available).

When you export a job to a USB drive STX creates an 'S3jobs' folder on the drive and copies the text file (.Log for job logs) and/or template (.tem for job templates) to that folder. For example, if you export job number 13041101 to a USB drive it will appear as follows: *13041101.Log*

You cannot export the current job—that is, you cannot export a job unless it has been closed. For example, you have three jobs and one of the jobs is open (current). When you display the jobs window the current job does not appear in the jobs list.

To export a job:

1. Insert a USB drive in the terminal.
2. Press the **Job** screen button then the **Setup** tab. The Setup screen appears (see Figure 5-1 on page 82).



3. Press **Export**. A window appears showing all the jobs and templates you can export.

4. To export a job or template, select the job or template then press **Export**.

or

To export all jobs and templates, press **Export All**.

Importing a Job

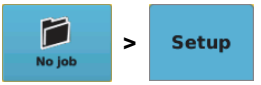
You can import two types of job files: job log files and job template files (see “Working with Job Templates” on page 92 for more information on job templates).

You must have a USB drive plugged into the USB port on the terminal to import a job; otherwise, the functionality is disabled and the Import button is gray (not available).

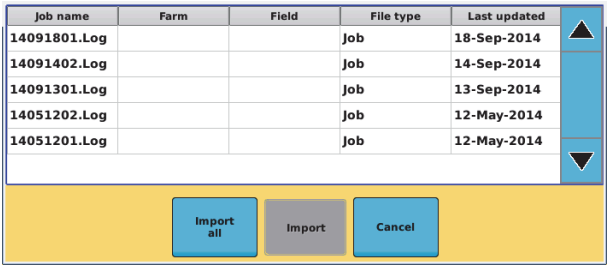
The USB drive must contain an 'S3Jobs' folder at the root level of the drive and all job files must be in this folder. For example, if your USB drive is drive M on your PC, your job files should be in the M:\S3Jobs folder.

To import a job:

1. Insert a USB drive in the terminal.
2. Press the **Job** screen button then the **Setup** tab. The Setup screen appears (see Figure 5-1 on page 82).



3. Press **Import**. A window appears showing all the jobs and templates you can import.



4. To import a job or template, select the job or template then press **Import**.

or

To import all jobs and templates, press **Import All**.

Creating a Job Summary Report

A job summary report (Figure 5-3) is a PDF file that displays job-related data (top of report) and a map of the sprayed area with any points or marks (bottom of report). You can create a job summary report only for the currently loaded job.

Job summary reports are saved only to a USB drive, so you must insert a USB drive in the terminal to enable this functionality.

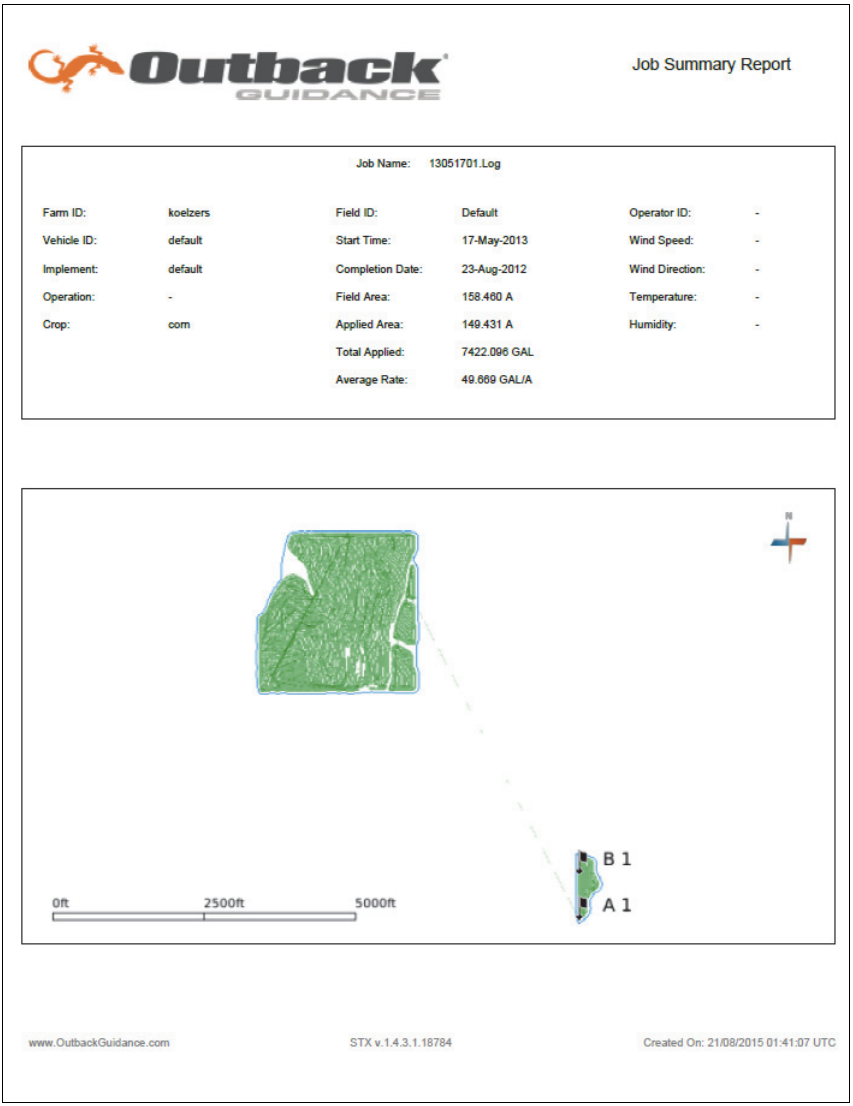


Figure 5-3: Job Summary report

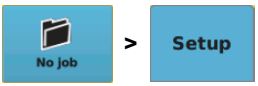
Table 5-1 indicates the source of the data at the top of the report—whether the data is directly from fields on the screen or recorded/calculated values.

Table 5-1: Job Summary report data

Field	Data Source (and description if recorded/calculated value)
Farm ID	Setup (Job) screen: Farm ID field
Vehicle ID	Main (Vehicle) screen: Vehicle Name field
Implement	Main (Implement) screen: Implement Name field
Operation	Notes (Job) screen: Operation field
Crop	Notes (Job) screen: Crop field
Field ID	Notes (Job) screen: Field ID field
*Start Time	Date you started the job
Completion Date	Date you last performed any of the following: Set an A or B point Set a mark Applied product (green swath on map)
*Field Area	Area within all defined perimeters/boundaries
*Applied Area	Field area on which you have applied product (this value is displayed on the Map screen button)—indicated by green swath area on the map
*Total Applied	Total volume of product deposited on field
*Average Rate	Average application rate (calculated by dividing the Total Applied by the Applied Area)
Operator ID	Notes (Job) screen: Operator ID field
Wind Speed	Notes (Job) screen: Wind speed field
Wind Direction	Notes (Job) screen: Wind direction field
Temperature	Notes (Job) screen: Temperature field
Humidity	Notes (Job) screen: Humidity field
**indicates recorded or calculated values*	

To create a job summary report:

1. Insert a USB drive in the terminal.
2. Press the **Job** screen button then the **Setup** tab. The Setup screen appears (see Figure 5-1 on page 82).



3. Press **Create Summary PDF**. STX creates the summary report and saves it to the USB drive.

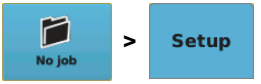
Deleting a Job

Caution: *Deleting a job permanently removes the job—you cannot retrieve a deleted job.*

You cannot delete the current job—that is, you cannot delete a job unless it has been closed. For example, you have three jobs and one of the jobs is open (current). When you display the jobs window (where you load or delete jobs), the current job does not appear in the jobs list.

To delete a job:

1. Press the **Job** screen button then the **Setup** tab. The Setup screen appears (see Figure 5-1 on page 82).



2. Press **Jobs**. A window appears showing all the jobs you can delete. If you have an open (current) job, this job does not appear in the list.

3. To delete a job: Select the job then press **Delete**. In the confirmation message that appears press **Yes**. Press **Cancel** to close the window and return to the Setup screen.

   or

   To delete all jobs: Press **Delete All**. In the confirmation message that appears press **Yes**.

Working with Job Templates

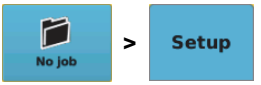
A job template enables you to reuse certain parameters of a job log file. For example, if you have a job log file with a specific client, farm, or wayline (A=B, pivot, or boundary) and you want to reuse that information for a different field or for another job in the same field, you can save the original job log file as a template. When you then start a new job from a template you will already have the client and farm information entered. Items that are stored in a template are boundaries (include and exclude), A=B lines, pivots, guidance around a boundary, marks/flags, and client, farm, and field names.

Creating a Job Template

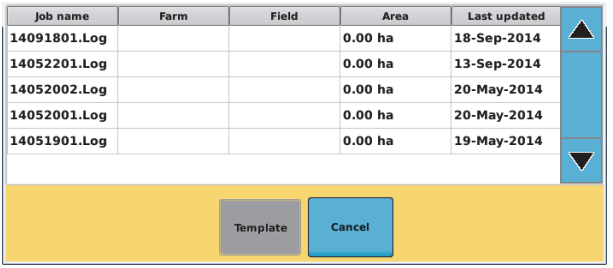
You can create a job template from any existing job except the current job—that is, you cannot create a job template from a job unless that job is closed. For example, you have three jobs and one of the jobs is open (current). When you display the list of job templates list window the current job does not appear in the jobs list.

To create a job template:

1. Press the **Job** screen button then the **Setup** tab. The Setup screen appears.



2. Press **Make template**. A jobs window appears, showing all the jobs you can use to create a template.



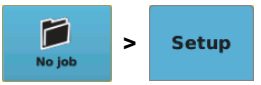
3. Select the job you want to use to create the template and press **Template**. STX creates the template and the jobs list window closes.

Using a Job Template

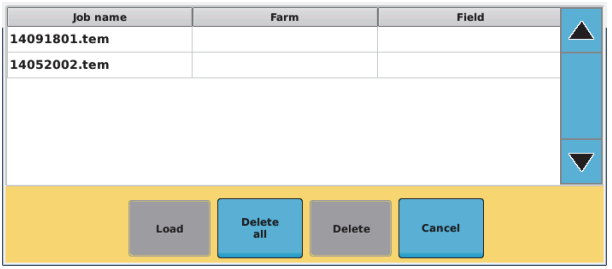
Using a template starts a new job based on the job template you select.

To use a job template:

1. Press the **Job** screen button then the **Setup** tab. The Setup screen appears.



2. Press **Template**. A job templates window appears, showing all the templates you can use to create a new job.



3. Select the template you want to use for the new job then press **Load**. STX creates a new job based on the selected template and the window closes.

Exporting and Importing Job Templates

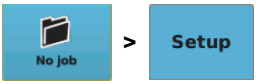
You export and import job templates using the same window you use to export and import jobs. See “Closing a Job” on page 85 and “Importing a Job” on page 87 for more information.

Deleting a Job Template

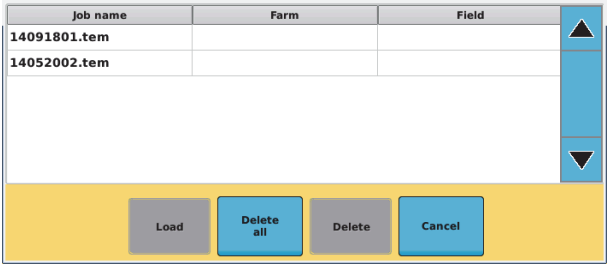
Caution: *Deleting a job template permanently removes the job template—you cannot retrieve a deleted job template.*

To delete a job template:

1. Press the **Job** screen button then the **Setup** tab. The Setup screen appears.



2. Press **Template**. A job templates window appears, showing all the templates you can delete.



3. To delete a job template: Select the job template then press **Delete**. In the confirmation message that appears press **Yes**.

   or

   To delete all job templates, press **Delete All**. In the confirmation message appears press **Yes**.

Chapter 6: Guidance Operations

This chapter discusses map screen basics and the types of guidance STX provides. Some of the guidance procedures outlined in this chapter include steps for both manual and automated steering.

Map Screen Overview

After you perform such tasks as creating a vehicle and implement, selecting your differential source, and starting a job, you can perform field guidance operations. However, you should first have a good understanding of how the map screen functions.

This overview describes how to display the map screen, the different ways to view your field and vehicle, displaying the map screen in full-screen view, zooming in an out on the field, and understanding the onscreen lightbar.

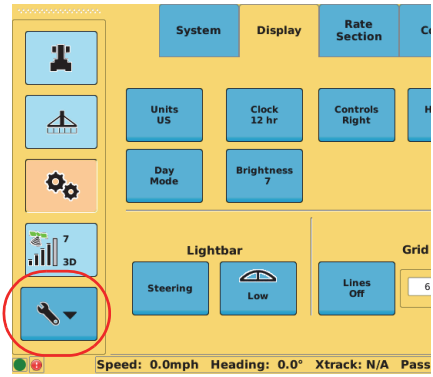
Displaying the Map Screen

You will most likely spend most of your time in the field with the map screen displayed. Review the information on the Setup screen button in Table 2-1 on page 17.

To display the map screen:

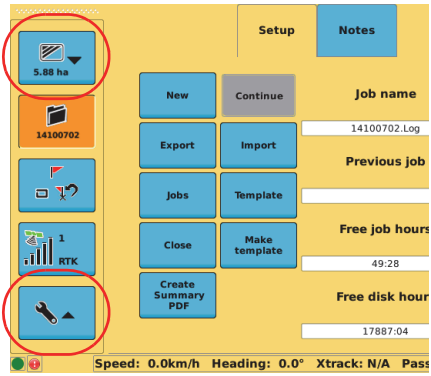
- *If the Setup screen button is blue with a down arrow*, you are viewing one of the Vehicle, Implement, or Tools screens or the GPS screen. Press the **Setup** screen button to switch to display the map screen.

  For example, the figure at right shows the Display (Tools) screen—the Setup screen button is blue with a down arrow.



- *If the Setup screen button is blue with an up arrow and the map screen is not displayed* (such as when viewing a Job screen), press the **Map** screen button (blue with a down arrow).

  For example, the figure at right shows the Setup (Job) screen—the Setup screen button is blue with an up arrow.



Map Modes and Views

Map modes and views work together to provide you with different ways to view your vehicle and field. There are two map modes (Machine and Field) and two map views (Top Down and 3D). The map mode determines whether the vehicle appears stationary and the map moves or the map appears stationary and the vehicle moves, while the map view refers to the angle at which you view the map (see Table 6-1)

Table 6-1: Map views and perspectives

Map Option		Description
Map Mode	Machine	Use Machine mode to “follow” the vehicle while work is in progress. In this mode the map moves while the vehicle appears stationary. The vehicle is always pointing ‘up’ toward the top of the screen and the field adjusts.
	Field	In this mode, the vehicle appears to move while the map appears stationary. You can pan to a specific area on the map by pressing the screen and dragging the area into view. The field is oriented with North at the top of the screen and the vehicle points in its actual direction. For example, if the vehicle is driving southwest, it will point toward the bottom left of the screen.
Map View	Top Down	Provides a bird’s eye view of the job
	3D	Provides a three-dimensional view down the field in the direction of travel

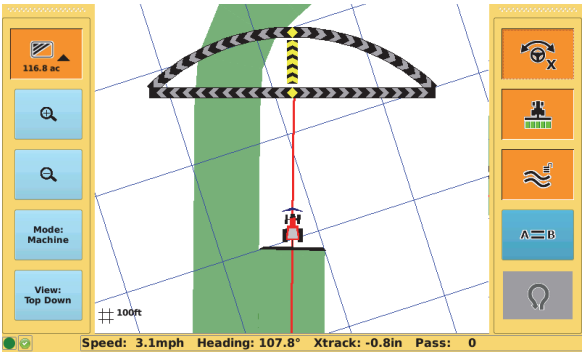
When first using STX select different mode/view combinations to become familiar with how they appear, while noting the combinations in Table 6-2.

Table 6-2: Mode/view combinations

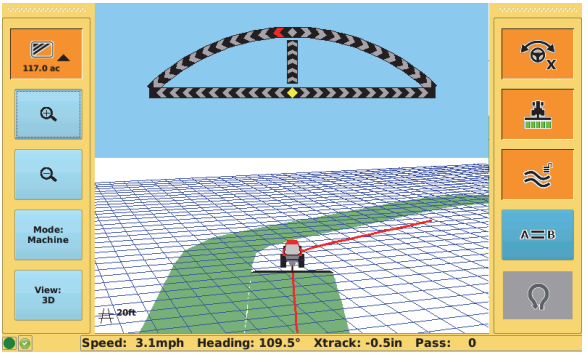
Mode	Top Down View	3D View
Machine	Valid	Valid
Field	Valid	Invalid If you are in Field / Top Down and you select 3D, the map mode automatically changes to Machine. If you are in Machine / 3D and you select Field, the view automatically changes to Top Down.

Both map modes display the vehicle's position on the field and the direction of travel.

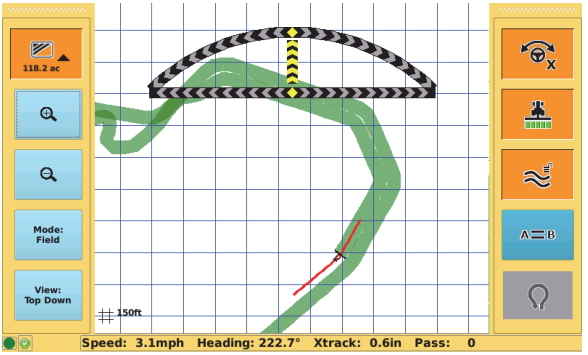
The figures below illustrate different mode/view combinations.



Machine / Top Down



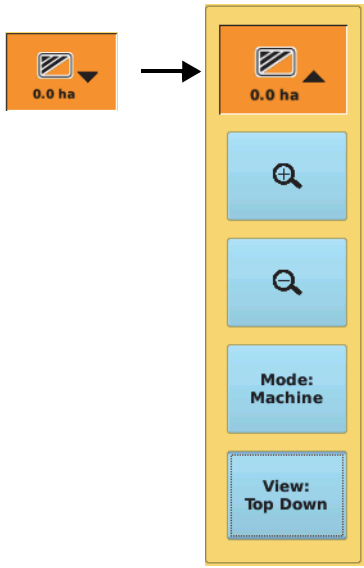
Machine / 3D



Field / Top Down

To set the map mode/view:

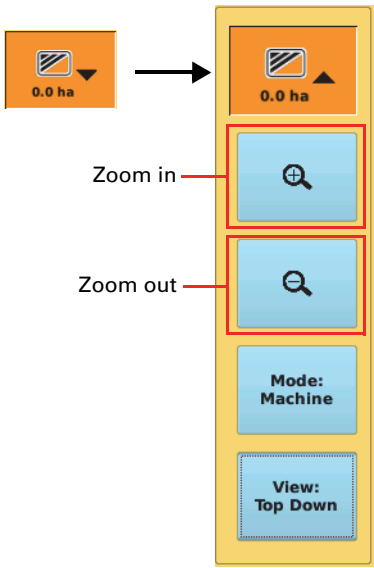
1. Display the map screen (see "Displaying the Map Screen" on page 96).
2. Press the orange **Map** screen button (with the down arrow). The map-related buttons appear below the Map screen button.
3. Press **Mode** and/or **View** to select your preferred mode and view.



Zooming In and Out on the Map Screen

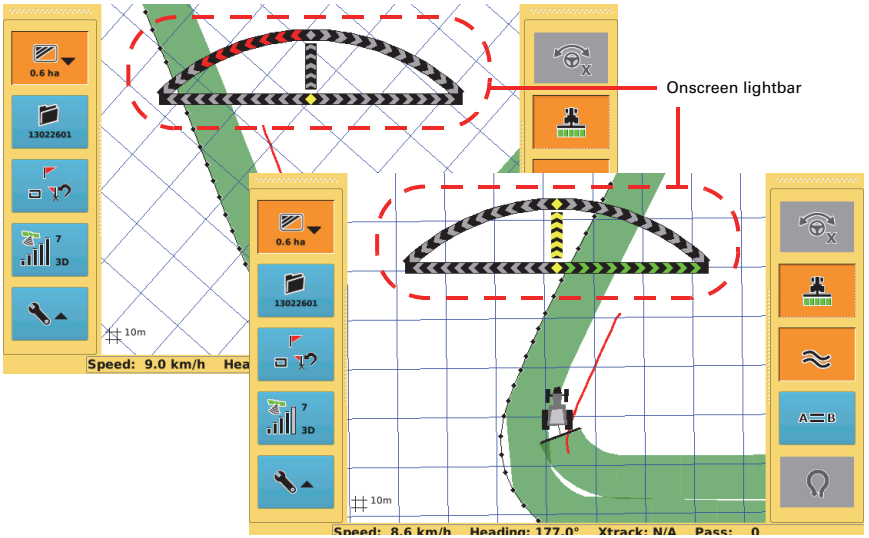
You can zoom out on the map screen to display more of your field and guidelines or zoom in to provide more detail on certain areas of your field.

1. Display the map screen (see "Displaying the Map Screen" on page 96).
2. Press the orange **Map** screen button (with the down arrow). The map-related buttons appear below the Map screen button.
3. Press the zoom buttons to zoom in or out.



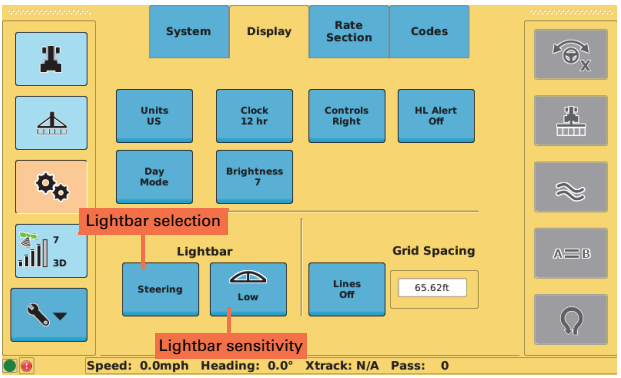
Configuring the Onscreen Lightbar

The onscreen lightbar shows the vehicle's position relative to the guidance line. The arch shows heading and the horizontal bar shows crosstrack (in dotted outlines in the figure below).

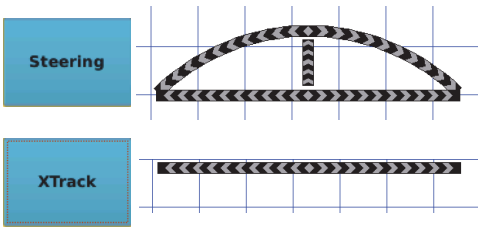


When the lightbar indicators are centered (indicated by a yellow column of arrows in the middle of the lightbar), the vehicle is aligned with (heading correct) and on (crosstrack 0) the current pass. To make accurate steering corrections, steer either left or right as indicated by the lighted arrows.

You use the lightbar buttons on the Display (Setup) screen to configure the lightbar.



Press the lightbar selection button to cycle through the following display settings: Steering (show the full lightbar), XTrack (show just the crosstrack section—lower horizontal bar), and Off (hide the lightbar).



Press the lightbar sensitivity button to cycle through the following crosstrack sensitivity options: Low, Medium, and High.

Low sensitivity

Medium sensitivity

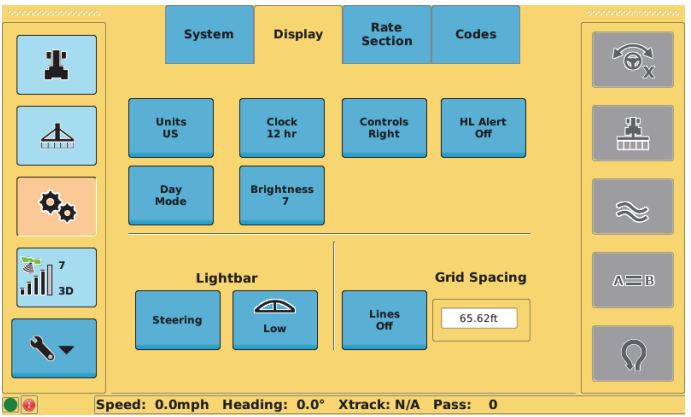
High sensitivity

Crosstrack sensitivity refers to the relationship between how far you are off your guideline and how this distance is represented by arrows on the lightbar. For any distance you are off your guideline the High (sensitivity) setting displays more arrows on the lightbar than the Low setting and the Medium setting is between the High and Low settings (see example at right).

Note: You may want to practice driving your vehicle at different sensitivity settings and observing the lightbar arrows to determine your preferred setting. The lightbar sensitivity button is unavailable if the lightbar selection button is set to Off.

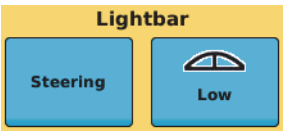
To configure the lightbar:

1. Press the **Tools** screen button then the **Display** tab. The Display screen appears.



2. Press the lightbar selection button repeatedly until the button displays your preferred option (Steering, XTrack, or Off).

   Setting this option to Off disables the lightbar sensitivity button (turns gray).



3. If you set the lightbar selection button to Steering or XTrack, press the lightbar sensitivity button repeatedly until the button displays your preferred option (Low, Medium or High).

Field Guidance Basics

Field guidance in STX refers to working with guidance lines—lines you follow while driving your vehicle.

Setting Guidance Lines

STX supports the following types of guidance:

- Straight guidance
  - A=B line—an imaginary straight line that passes through two points that you set (Point A and Point B) to define the first pass
  - A + Direction line - where you define a beginning point (Point A) and enter a heading angle (the direction)
- Pivot (circular) guidance
- Contour (free-form) guidance
- AB contour guidance (where you create a reference guideline along a contour guideline)

Adjusting Guidance Lines

You can adjust guidance lines while stationary or on-the-go without interrupting normal guidance operation. This feature is especially useful to correct for DGPS drift over time.

- **Snap**: You can "snap" a guidance line to the vehicle's current location parallel to the original guidance line. This feature is best used to insert a required gap between consecutive parallel swaths (for example, a conservation barrier strip). The original definition of lat/long/heading of the guidance line is not changed and displaying a previous A=B or pivot displays the original lines.

  Applies to: Straight guidance; pivot guidance; AB Contour guidance (AB contour that has been merged or an AB contour with just a detour)

- **Shift**: You can shift a guidance line left or right in small increments rather than re-establishing a new guidance line.

  If your guidance lines are not exactly where you want them, you can shift them to the left or right—for Straight guidance lines this applies to the red guidance line and black swath lines on both sides of the guidance line. The original definition of lat/long/heading of the guidance line is not changed and displaying a previous A=B or pivot displays the original lines.

  Applies to: Straight guidance; pivot guidance; AB Contour guidance (AB contour that has been merged or an AB contour with just a detour)

- **Update B Point**: If you need to correct the B point, you can adjust the A=B line by moving the existing B point to a new position on the map. 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. When you update a B point, 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.

  Applies to: Straight guidance

- **New A=B / Previous A=B:** You can set a new A=B line at any point during the job and you can use previously defined A=B or pivot lines for guidance. All A=B and pivot lines previously defined for a job are available for that job.

  Applies to: Straight guidance

- **Detour Contour and Merged Contour:** In AB Contour mode you can steer around an obstacle (such as a tree line or water area) and create a detour guideline around the obstacle. You then decide whether to end your guideline after steering around the obstacle or merge into the original AB contour after driving around the obstacle.

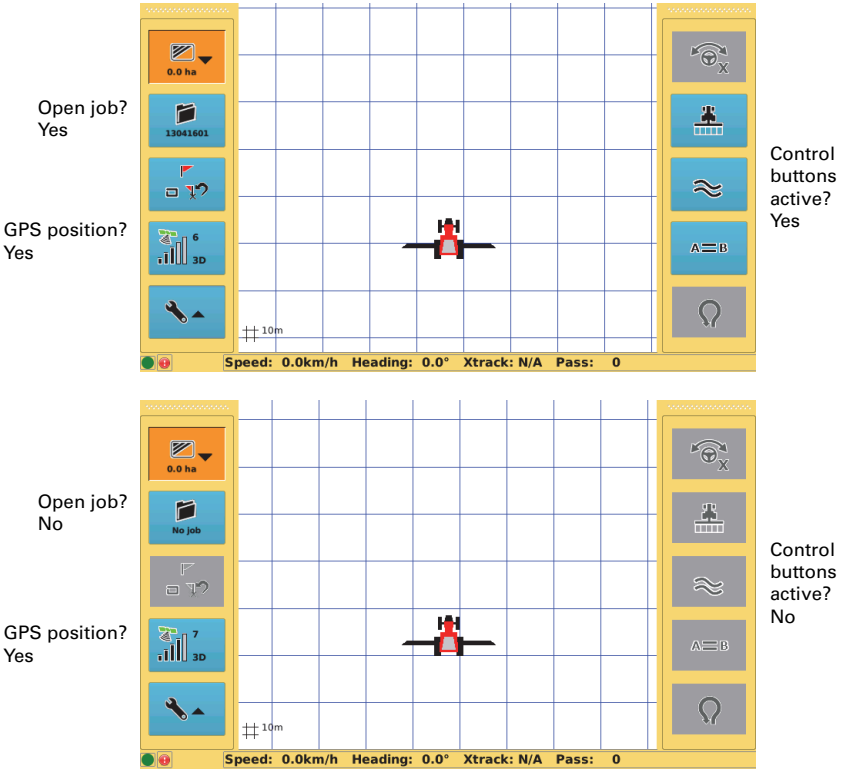
  Applies to: AB Contour guidance

Note: All guidance line adjustments are removed when you close a job and the original guidelines are restored when you continue the job.

Before You Set Guidance Lines

Before you can set a guidance line you must have a GPS position and have an active (open) job. On the GPS screen button verify the satellite indicator is green and verify a job number appears on the Job screen button—the control buttons used to work with guidance line are then enabled (top figure on next page). If you have no GPS position or no job open, the same control buttons are gray (bottom figure on next page). See "Viewing GPS Signal Information" on page 22 and Chapter 5, "Jobs".

Note: The Apply, Contour, and A=B control buttons are always available if you have a GPS position and an open job. The Steering control button is available but will appear gray until you meet certain criteria (see the Steering button description in Table 2-2 on page 19). The eTurns control button is available only if you have eDriveXC installed and have entered a valid eTurns subscription.



Guidance and Automated Steering

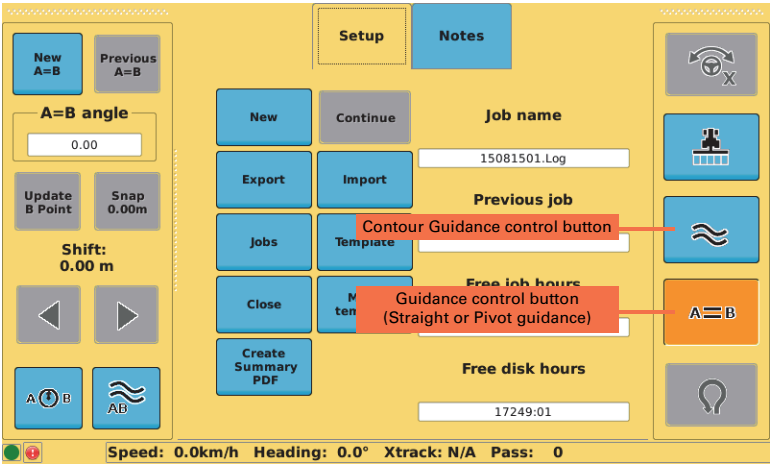
If using automated steering, you cannot create any new guidance lines or recall previous guidance lines while engaged on a guideline. You must disengage automated steering before setting any new or previous guidance lines.

You cannot automatically engage any guideline. If you are already on a guideline, you can manually disengage the guideline by pressing the Steering button, or you can steer off of the guideline, at which point the automatic steering disengages. You then must manually press the Steering button to reengage the steering on a guideline (unless you enable Pre-Engage—see “Pre-Engage” on page 52). You can switch to any guidance mode at any time as long as you are not engaged on a guideline. The guidance mode buttons are dimmed and not available while engaged on a guideline.

Note: This chapter provides alternative steps depending on whether you have automated steering (eDriveXC/XD) installed. If no automated steering is installed you will manually perform steps that automated steering performs for you.

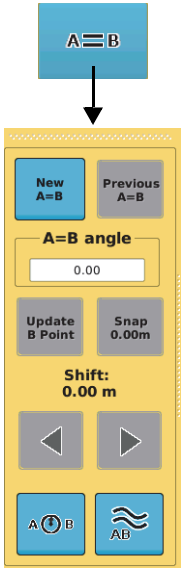
Working with Guidance

You start working with guidance in STX using the two control buttons noted below.

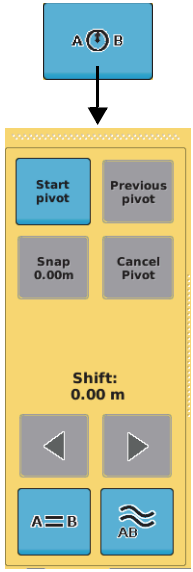


Pressing the Contour Guidance control button activates Contour Guidance mode. See “Contour Guidance” on page 122 for more information.

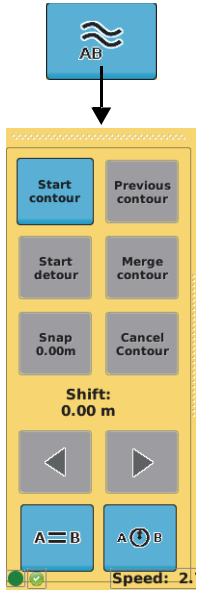
Pressing the Guidance control button displays the Guidance window, providing access to Straight Guidance mode, Pivot Guidance mode, and AB Contour Guidance mode. The mode indicated on the Guidance control button determines what buttons initially appear in the Guidance window (see top of next page).



Straight Guidance window



Pivot Guidance window



AB Contour Guidance window

Depending on what guidance window appears the two buttons at the bottom of the window provide access to the other two guidance modes. For example, in the middle figure above (Pivot Guidance window), press the A=B button (left button) to display the Straight Guidance window or press the AB Contour button (right button) to display the AB Contour Guidance window.

Each guidance window provides buttons that enable you to:

- Start guidance
- Cancel guidance (for Straight Guidance the Cancel A=B button appears after you press New A=B)
- Access previous guidance lines
- Adjust guidance lines (such as Snap for all three guidance modes or Update B Point for Straight Guidance mode)

For more information on using guidance in STX see the following sections:

- “Straight Guidance” on page 107
- “Pivot Guidance” on page 117
- “AB Contour Guidance” on page 124

Straight Guidance

The following steps illustrate how you work with in Straight guidance mode in STX with and without automated steering.

Manual Steering

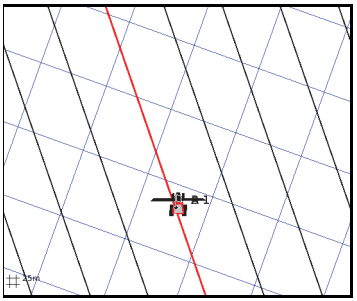
1. Create straight line (A=B line or A + Direction line).
2. STX starts Straight guidance.
3. Steer along guidance line using screen and lightbar.

Automated Steering

1. Create straight line (A=B line or A + Direction line).
2. STX starts Straight guidance.
3. Engage automated steering.
4. STX automatically steers you along guidance line.

Map Screen Line Display Options

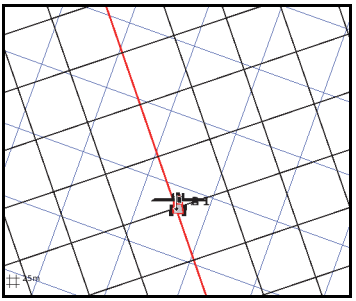
Guidance lines provide a regular pattern over an area by which you can drive your passes. You can set how Straight guidance lines appear on the map screen. There are three display options: A=B, Grid, and Off (Figure 6-1):

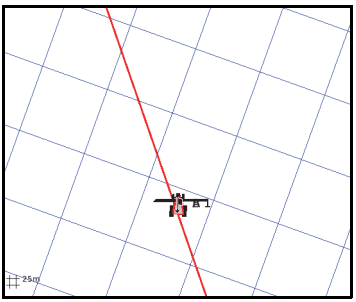


A=B (figure at left)
Display the A=B line and guidance lines parallel to and on both sides of the A=B line. The guidance lines are spaced a swath width apart (see step 2 of "Setting Up an Implement" on page 72 for information on how STX calculates the swath width.

Grid (figure at right)
Display the A=B line, guidance lines parallel to and on both sides of A=B line, and perpendicular grid lines. The guidance lines are spaced a swath width apart (see step 2 of "Setting Up an Implement" on page 72 for information on how STX calculates the swath width.

The distance between grid lines is based on the value in the Grid Spacing field (see procedure following). Grid lines are useful if you need to guide from point to point on a grid in successive order for such tasks as soil sampling, tree planting, or staking out regular areas.



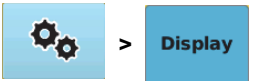


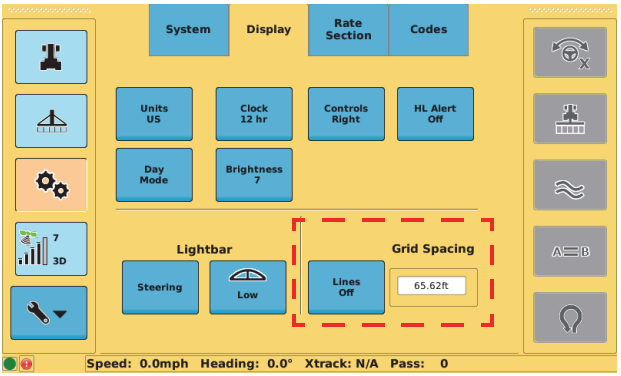
Off (figure at left)
Display the A=B line without any additional guidance lines

Figure 6-1: Grid lines: A=B, Grid, and Off

To set map screen line display options:

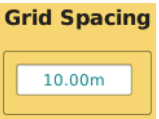
1. Press the **Tools** screen button then the **Display** tab. The Display screen appears.

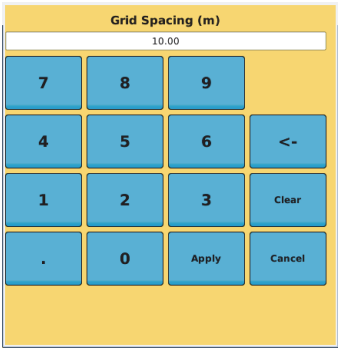




2. Press **Lines** to cycle through the settings (A=B, Grid, Off) until you display the preferred setting.

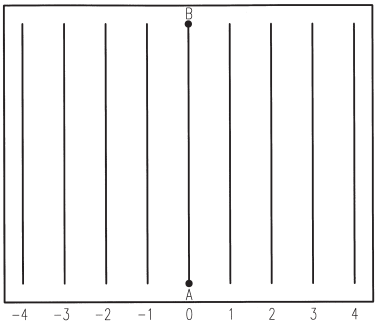
3. If you selected Grid, press the **Grid Spacing** field. The Grid Spacing window appears.





4. Enter a value and press **Apply**.

Setting Straight Lines



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 Point A and Point B, or by marking a Point A and entering the required heading.

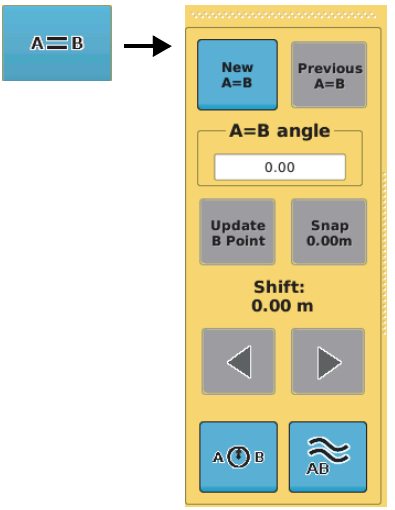
This section describes how to:

- Set an A=B line
- Set an A + Direction line
- Return to a previously recorded point
- Define a new additional A=B line
- Use a previously defined A=B line

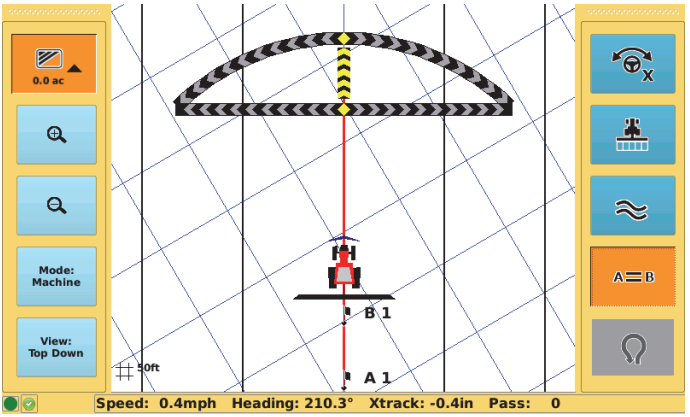
Setting an A=B Line

Before setting an A=B line enter the implement width and, if necessary, a skip or overlap value as required to create a swath width different from the implement width (see “Setting Up an Implement” on page 72).

1. Position the vehicle at the beginning of the first pass then display the map screen.
2. Press the **Straight Guidance** control button. The Straight Guidance window appears.
3. Press **New A=B**. Set A Point appears on the button.
4. Press **Set A Point**. A1 appears on the map at the location of the vehicle and Set B Point appears on the button.
5. If you want to log data, press the **Apply** control button.
6. Start driving the first pass then press **Set B Point**. The Straight Guidance window closes and the map screen shows the following:
   - B1 at the point where you pressed Set B Point
   - Red (closest) guidance line through Points A and B



- Black guidance lines on both sides of and parallel to the red guidance line



Automated steering installed: STX automatically begins Straight guidance and, after you press the Steering button on the map screen to engage steering, steers your vehicle along the A=B line. The Steering button must be in a state of "ready to engage" before you press it to engage automated steering.

No automated steering installed: Drive the first pass using the lightbar (onscreen or external) to help you drive along the guidance line.

7. At the end of the current pass turn around and steer your vehicle toward the next line you want. This may be the black guidance line adjacent to the original red guidance line or the next black guidance line after that (if you are skipping rows). As you get close to your preferred black guidance line, STX changes the line from black to red and you will steer along this line.

   Automated steering installed: Press the Steering button to engage steering. STX automatically steers your vehicle along the A=B line.

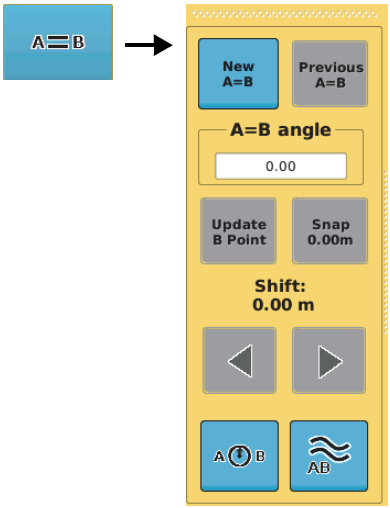
   No automated steering installed: Drive the pass using the lightbar (onscreen or external) to help you drive along the guidance line.

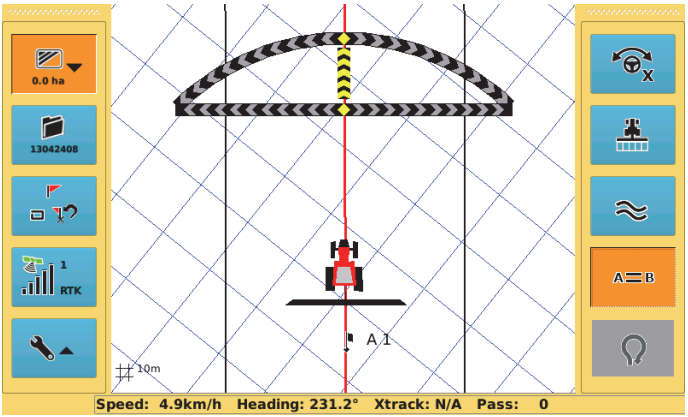
   Note: If you are using eTurns to have STX automatically turn your vehicle for you and start the next pass see "eTurns" on page 156.

Setting an A + Direction Line

Before setting an A + Direction line enter the implement width and, if necessary, a skip or overlap value as required to create a swath width different from the implement width (see "Setting Up an Implement" on page 72).

1. Position the vehicle at the beginning of the first pass then display the map screen.
2. Press the **Straight Guidance** control button. The Straight Guidance window appears.
3. Press **New A=B**. Set A Point appears on the button.
4. Press **Set A Point**. A1 appears on the map at the location of the vehicle and Set B Point appears on the button.
5. Press the **A=B angle** field, and in the A=B angle window enter an angle and press **Apply**. The A=B angle window closes and the map screen shows the following:
   - Red (closest) guidance line through Point A at the angle you entered
   - Black guidance lines on both sides of and parallel to the red guidance line





Automated steering installed: STX automatically begins Straight guidance and, after you press the Steering button on the map screen to engage steering, steers your vehicle along the A + Direction line. The Steering button must be in a state of "ready to engage" before you press it to engage automated steering.

No automated steering installed: Drive the first pass using the lightbar (onscreen or external) to help you drive along the guidance line.

6. At the end of the current pass turn around and steer your vehicle toward the next line you want. This may be the black guidance line adjacent to the original red guidance line or the next black guidance line (if you are skipping rows). As you get close to the next guidance line, STX changes the line from black to red and this becomes your new guidance line.

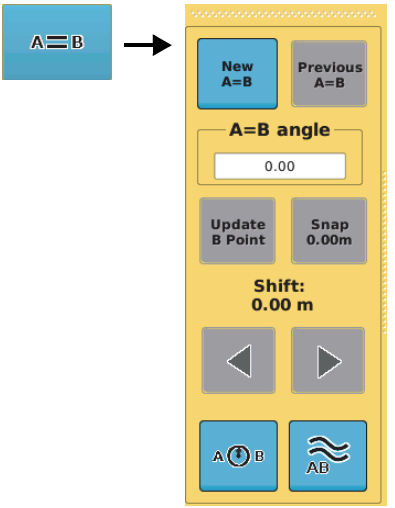
Automated steering installed: Press the Steering button to engage steering. STX automatically steers your vehicle along the A + Direction line.

No automated steering installed: Drive the pass using the lightbar (onscreen or external) to help you drive along the guidance line.

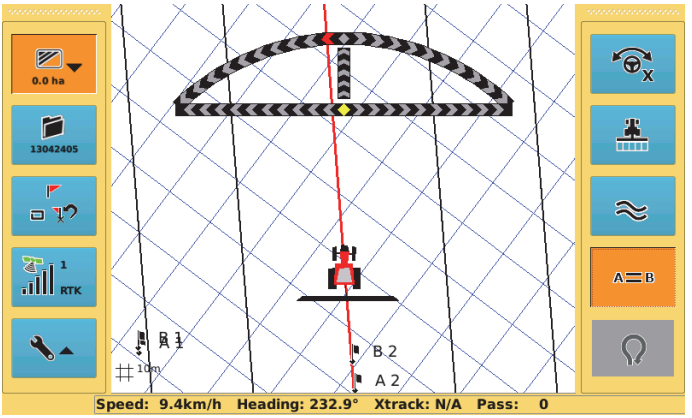
Note: If you are using eTurns to have STX automatically turn your vehicle for you and start the next pass see "eTurns" on page 156.

Defining a New Additional A=B Line

You can set a new A=B line at any point during the job.



1. Press the **Straight Guidance** control button. The Straight Guidance window appears.
2. Press **New A=B**. Set A Point appears on the button.
3. Press **Set A Point**. A2 appears on the map at the location of the vehicle and Set B Point appears on the button.
4. If you want to log data, press the **Apply** control button.
5. Drive the first pass.
6. At the end of the pass, press **Set B Point**. The Straight Guidance window closes and the map screen shows the following:
   - B2 at the point where you pressed Set B Point
   - Red (closest) guidance line through Points A and B
   - Black guidance lines on both sides of and parallel to the red guidance line



Automated steering installed: STX automatically begins Straight guidance and, after you press the Steering button on the map screen to engage steering, steers your vehicle along the A=B line. The Steering button must be in a state of "ready to engage" before you press it to engage automated steering.

No automated steering installed: Drive the first pass using the lightbar (onscreen or external) to help you drive along the guidance line.

7. At the end of the current pass turn around and steer your vehicle toward the next line you want. This may be the black guidance line adjacent to the original red guidance line or the next black guidance line (if you are skipping rows). As you get close to the next guidance line, STX changes the line from black to red and this becomes your new guidance line.

   Automated steering installed: Press the Steering button to engage steering. STX automatically steers your vehicle along the A=B line.

   No automated steering installed: Drive the pass using the lightbar (onscreen or external) to help you drive along the guidance line.

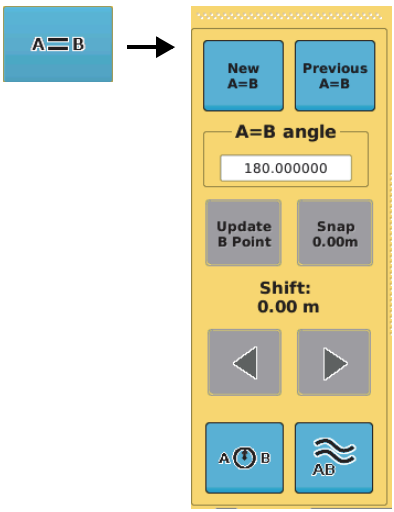
   Note: If you are using eTurns to have STX automatically turn your vehicle for you and start the next pass see "eTurns" on page 156.

Using a Previously Defined A=B Line

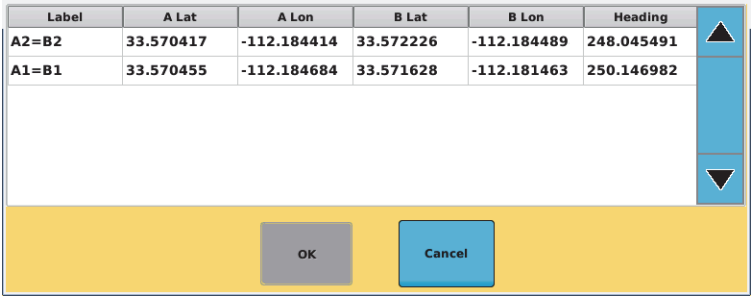
STX stores all straight paths you create per job. If necessary, you can use a previously defined A=B line for the current job for guidance.

To use a previously defined A=B line:

1. Position the vehicle at the beginning of the first pass then display the map screen.
2. Press the **Straight Guidance** control button. The Straight Guidance window appears.



3. Press **Previous A=B**. A window appears showing all previous A=B lines for the current job.



4. Select an A=B line then press **OK**. The Straight Guidance window closes and guidance lines for the selected A=B line appear on the map screen.

   STX populates the map with the guidance lines it generated when you first defined this A=B line, with the closest guidance line in red.

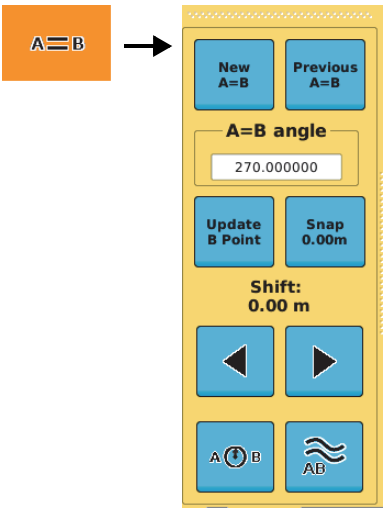
Updating the B Point

You can use your current location as the new B Point based on the following:

- You must be travelling on the A=B line in the direction A to B. The Update B Point button is not available if you are travelling on the A=B line in the direction B to A.
- You must be within a half swath width of the original A=B line. Once your vehicle moves more than 1/2 swath width from the original guideline (Pass 0) and the original guideline shifts right or left, the Update B Point button is no longer available (dimmed).
- You can move the B point as often as necessary.

To update Point B:

1. If the Guidance window is not visible while in Straight guidance mode, press the **Straight Guidance** control button. The Straight Guidance window appears.
2. Press **Update B Point** (shown below) to move the B point to its new location. The new B point appears on the map screen at your current location and the Straight Guidance window closes.

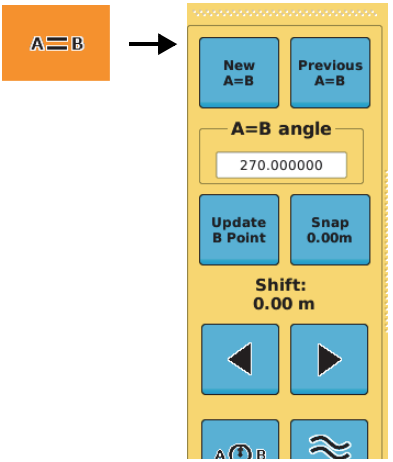


Shifting an A=B Line

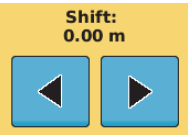
You can use the shift function to have STX move the guideline position by the specified distance (in increments of 0.01 m or 0.1 ft). Shifting the A=B line does not change the original A=B line (the lat/lon/heading specification remains unchanged).

To shift an A=B line:

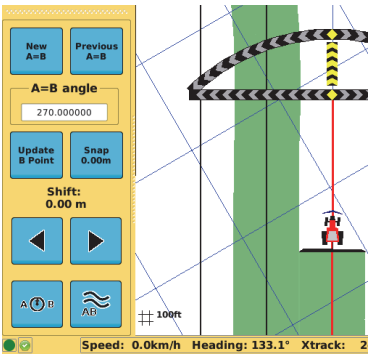
1. While in Straight guidance mode, press the **Straight Guidance** control button. The Straight Guidance window appears (upper section of window shown at right).



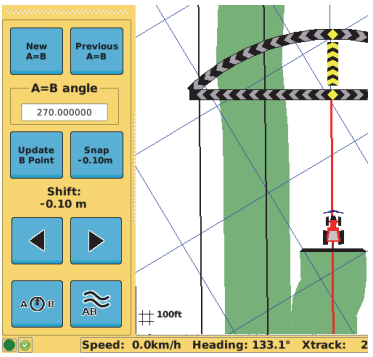
2. Press the appropriate **Shift** button to shift the guidance line to the left or right, relative to the direction of travel. As you press either button the shift value above the buttons changes (the value on the Snap button changes by the same amount) and the guidance line on the map screen shifts by this value.



   The figures below show a vehicle before shifting the guidance line (left figure below) and after shifting the guidance line (right figure below) to the right (pressing the right arrow button).



Before shift



After shift

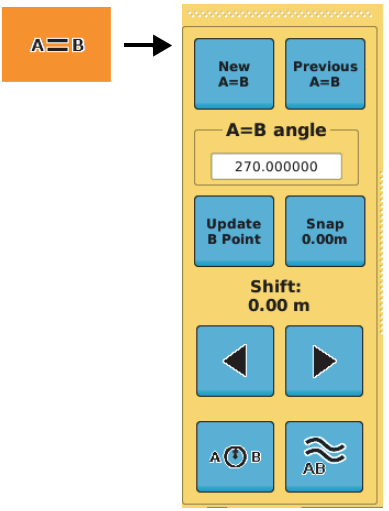
3. Press the **Straight Guidance** control button to close the Straight Guidance window.
4. Steer onto the shifted guidance line.

Snapping the A=B Line to the Current Location

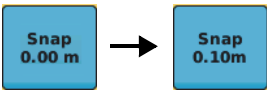
You can use the snap function to have STX move the A=B line to the vehicle's current position.

To snap an A=B line:

1. While in Straight guidance mode, press the **Straight Guidance** control button. The Straight Guidance window appears.

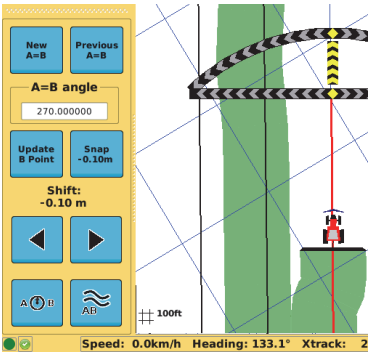


2. Press **Snap**. The nearest A=B guideline is snapped (moved) to the vehicle's current position and the distance moved appears on the Snap button.



   The figure at right shows a vehicle after driving to the right of the original guidance line then snapping the guidance line to the vehicle's position.

3. Press the **Straight Guidance** control button to close the Straight Guidance window.



If you snap the nearest guidance line for the A=B line you selected, to your current position, the set 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 previous 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 (you will have unsnapped from the guideline).

Pivot Guidance

Note: You must have a GPS position and an active job to use Pivot guidance.

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

Turning Apply on or 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 in red and its pass number is shown below the map screen.

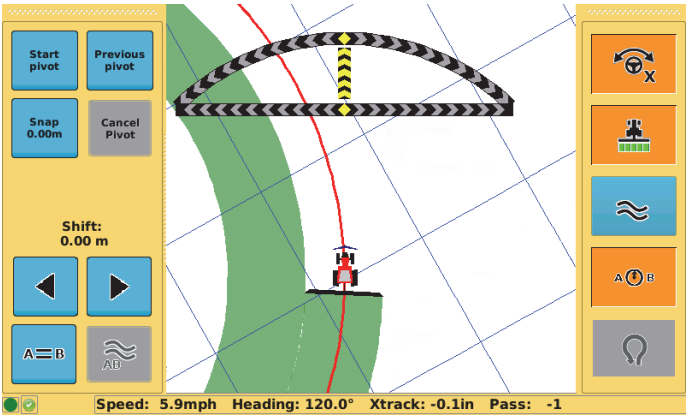
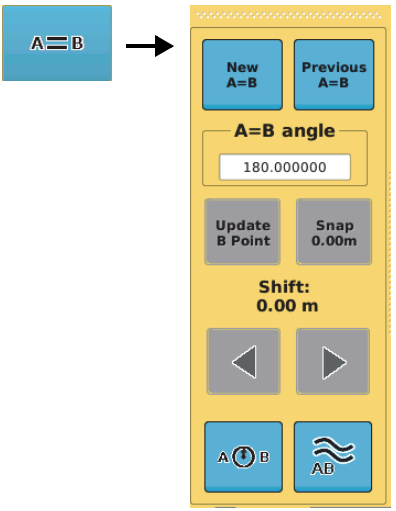


Figure 6-2: Pivot guidance on second pass

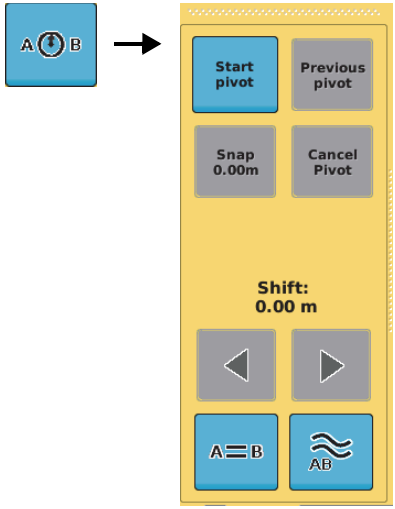
Setting the Pivot Circle

To set the pivot circle:

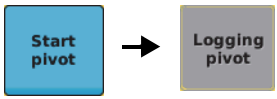
1. Position the vehicle at the beginning of the first pass then press the **Straight Guidance** control button. The Straight Guidance window appears.



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



3. Press **Start pivot**. STX starts logging pivot data and the Start pivot button label changes to Logging pivot (gray).



4. Start driving the circle.

   When you have driven enough of the circle for STX to complete it, the Logging pivot button changes to End pivot.

5. When you are satisfied you have driven enough of the circle to get an accurate pivot press **End Pivot**.

   You do not get an array of guidance lines (circles) with Pivot guidance as with Straight guidance. However, STX displays a new, current guidance circle (Pass +1 or Pass -1) when you approach its position inside or outside of the original pivot circle.

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

   Automated steering installed: STX automatically begins Pivot guidance and, after you press the Steering button on the map screen to engage steering, steers your vehicle along the pivot line. The Steering button must be in a state of "ready to engage" (blue) before you press it to engage automated steering.

   No automated steering installed: Turn the steering wheel in the direction indicated by the pivot line to remain centered on the pivot line and drive the first circle using the onscreen lightbar to help you drive along the guidance line.

6. When you have finished one circle move to either the right or left of the original circle and steer your vehicle to the next guidance line.

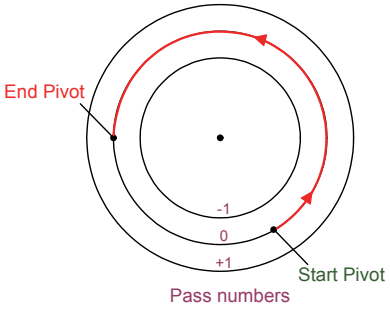
   Automated steering installed: Press the Steering button to engage steering. STX automatically steers your vehicle along the circle.

   No automated steering installed: Drive the circle using the onscreen lightbar to help you drive along the guidance line.

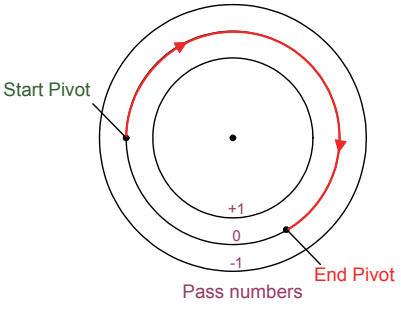
Numbering Passes

After you establish the pivot log, STX numbers all passes. Pass +1 is always to the right of the original circle and Pass -1 to the left, where (see figures below):

- If you drive the circle counterclockwise Pass +1 is on the outside.
- If you drive the circle clockwise, Pass +1 is on the inside of the original circle.
- You can work passes in either order.



Counterclockwise Pivot guidance



Clockwise Pivot guidance

Using a Previously Defined Pivot

You can access a previously defined pivot line while in Straight guidance or Pivot guidance modes. This functionality (and the Previous pivot button noted in the steps that follow) is available only if the current job has at least one previous pivot defined.

To use a previously defined pivot:

1. If in Straight guidance mode, press the **Straight Guidance** control button, then in the Straight Guidance window press the **Pivot Guidance** button. The Pivot Guidance window appears.

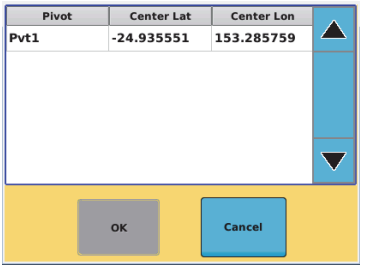
   If in Pivot guidance mode, press the **Pivot Guidance** control button. The Pivot Guidance window appears.

2. Press **Previous pivot**. The Pivots window appears.

3. Select the pivot you want to use guidance lines for and press **OK**.

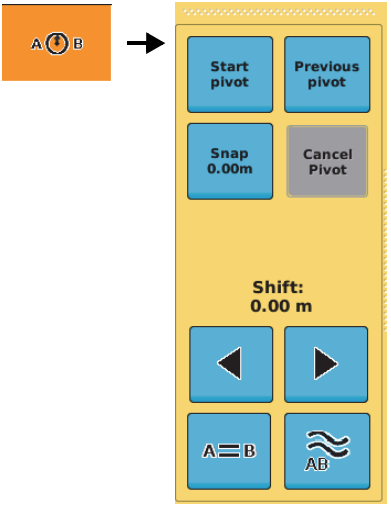
   STX populates the map with the pivot point showing and a guidance line nearest to your vehicle's current position. The pass number is based on the pivot point you selected. Whichever defined pivot point you select, your current position will be on or near a pass based on that pivot. The pass number for that pivot is displayed; if you switch between pivot points, the pass number updates for the current pivot point.

Shifting a Pivot Line

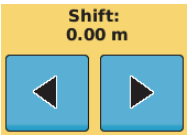
You can use the shift function to have STX move the pivot line by the specified distance (in increments of 0.01 m or 0.1 ft) and the current pass number.

To shift a pivot line:

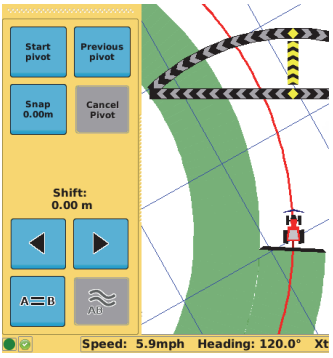
1. While in Pivot guidance mode, press the **Pivot Guidance** control button. The Pivot Guidance window appears.



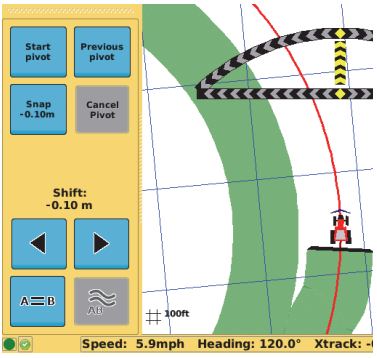
2. Press the appropriate **Shift** button to shift the pivot line in or out. As you press a button the shift value above the buttons changes and the guidance line on the map screen shifts by this value.



The figures below show a vehicle before shifting the pivot line (left figure) and after shifting the pivot line (right figure).



Before shift



After shift

3. Start driving the circle (see steps 5 - 7 of “Setting the Pivot Circle” on page 117).

Snapping a Pivot Line to the Current Location

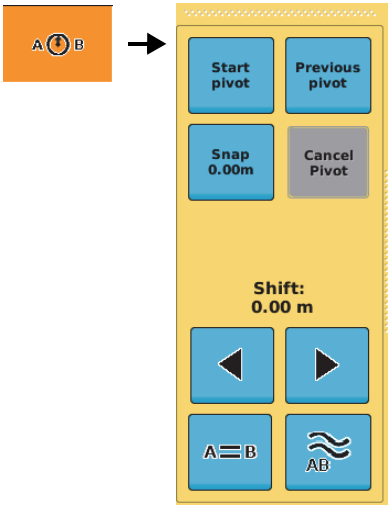
In Pivot guidance mode you can snap (move) the guidance line to the vehicle's current location parallel to the original guidance line. While in Pivot guidance mode, the Pivot Guidance button is displayed instead of the Straight Guidance control button.

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. See the previous section ("Numbering Passes").

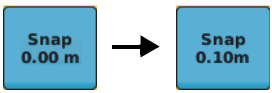
When you snap a pivot line, its originally calculated position does not change. Thus, if after snapping you use the Previous Pivot function, all pivot lines revert to their original positions.

To snap a pivot guidance line to the current location:

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

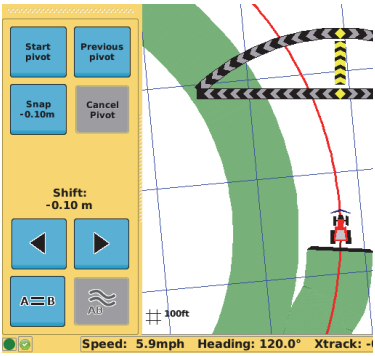


3. Press **Snap**. The nearest pivot guideline is snapped (moved) to the vehicle's current position and the distance moved appears on the Snap button.



   The figure at right shows a vehicle after driving to the right of the original pivot line then snapping the pivot line to the vehicle's position.

4. Start driving the circle (see steps 5 - 7 of "Setting the Pivot Circle" on page 117).



Contour Guidance

Use Contour guidance mode to follow any previous applied paths/areas (straight, pivot, or free form). Contour mode differs from Straight and Pivot guidance modes:

- Straight and Pivot guidance modes follow predefined guidelines
- Contour guidance mode follows previously defined paths

At any time during Contour guidance you can switch to Straight or Pivot guidance by pressing the A=B button and following the procedures detailed in “Straight Guidance” on page 107 and “Pivot Guidance” on page 117.

Note: Apply must be active (Apply button orange) to record a contour. If Apply is not On, STX cannot know that you completed the defining pass for the contour and are driving back to start a new pass based on that definition.

When operating in Contour mode, a red guideline appears on the map screen for additional guidance support (see below).

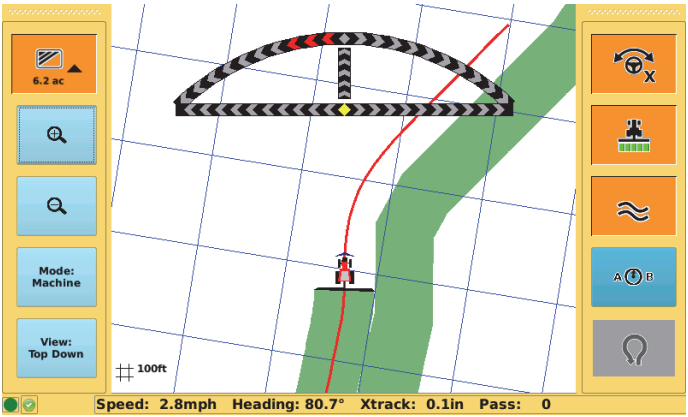


Figure 6-3: Map screen showing red Contour guidance line

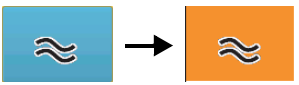
Creating an Initial Contour Pass

In Contour guidance mode STX is either logging an initial pass or guiding from a previous applied pass. You generally use Contour guidance mode for working with borders, turn areas, or following the contours created by obstacles.

After selecting Contour guidance, proceed by making the initial pass during which the onscreen lightbar is not active and cannot be used. Later, when attempting to follow a previous pass, you must steer your vehicle within an implement’s width of the guidance line, at which point the Steering button becomes enabled (ready to engage) and the lightbar provides guidance. You can then press the Steering button and STX engages on the guidance line.

To create an initial contour pass:

1. Press the **Contour Guidance** control button before beginning the initial pass. The button turns orange.



2. Drive to where you want to start logging your contour and press **Apply** to turn logging on. The button turns orange.

3. Make the initial pass (the onscreen lightbar is not active during the initial pass).
4. At the end of the initial pass, turn around and begin the next pass. When you are within half a swath of the previous contour, STX provides a guidance line parallel to that previous contour. The lightbar becomes active to provide guidance.

Guiding on Subsequent Passes

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

If using eDriveXC/XD and the angle of attack is within limits, you can engage STX automated steering. See “Steering Attack” on page 51 for more information on steering attack.

Making a New First Pass

Occasionally a situation arises during a job when you need to make a pass that follows a different path than the previous passes. Drive the new path with Apply ON, as required, and subsequent passes are guided from this newly defined pass.

Contour Lock

When using Contour guidance, STX constantly searches for the nearest swath from which to provide guidance. If passes of different contour definitions occur close enough together and Contour Lock is not enabled, STX might display guidance for a pass of a different contour definition from the one you are on. Contour Lock enables you to stop the STX’s search for the closest swath. In the Contour Lock mode, guidance:

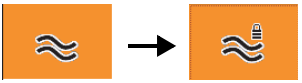
- Remains locked on its current swath until you manually unlock it
- Automatically unlocks if you drive offline by the lesser of 2 m or 10% of the swath width, then begins searching for the closest swath again

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

Note: STX, when searching for the closest path and not in Contour Lock mode, will pick up a different path only 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.

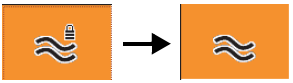
To use Contour Lock:

1. In Contour guidance mode, when you are on or approaching the required guidance contour, press the **Contour Guidance** control button. This puts you in Contour Lock mode (Contour Lock engaged) and a locked padlock appears on the Contour Lock control button (Contour Lock active). STX stops searching for, and providing guidance on, passes for other defined contours.



   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. STX resumes its contour search and Contour Lock becomes active again when you are within 2 meters of any guidance line.

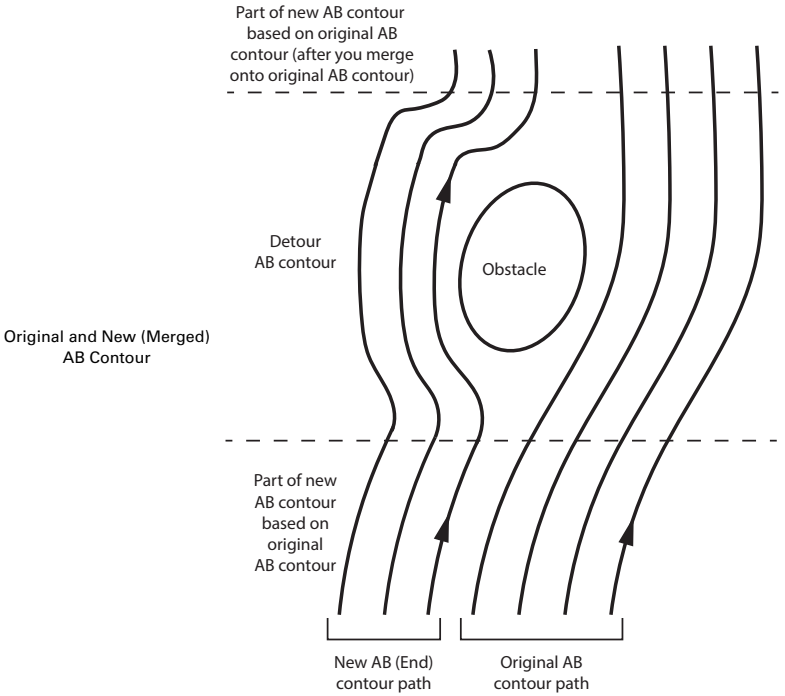
2. To disengage Contour Lock mode, press the **Contour Guidance** control button. The padlock disappears. Contour Lock can be active (padlock locked) or inactive (padlock unlocked) when you disengage it.

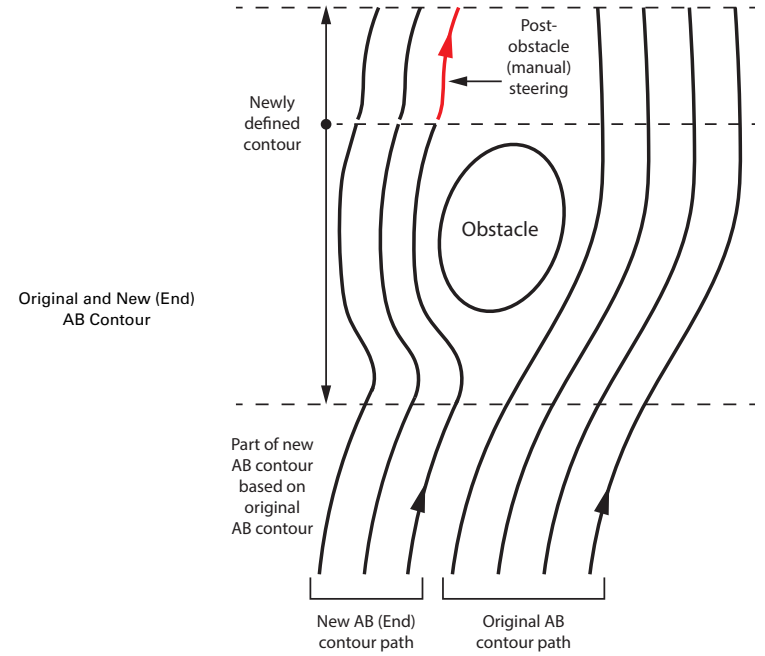


AB Contour Guidance

AB Contour guidance enables you to create a reference guideline along a contour path. For example, if your field requires a curved path around an obstacle, you can create an AB contour for the initial passes and create another AB contour to drive around an obstacle. The second AB contour can be in one of two forms:

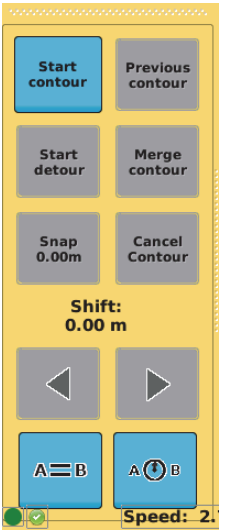
- A merged AB contour where STX combines your original AB contour (before your detour), your detour, and the continuation of the original AB contour (where you merge back onto the original contour—top figure on next page
- A new AB contour where STX combines your original AB contour (before your detour) and your detour—bottom figure on next page


Part of new AB contour based on original AB contour (after you merge onto original AB contour)
Detour AB contour
Obstacle
Original and New (Merged) AB Contour
Part of new AB contour based on original AB contour
New AB (End) contour path
Original AB contour path


Post-obstacle (manual) steering
Newly defined contour
Obstacle
Original and New (End) AB Contour
Part of new AB contour based on original AB contour
New AB (End) contour path
Original AB contour path

To start an AB contour:

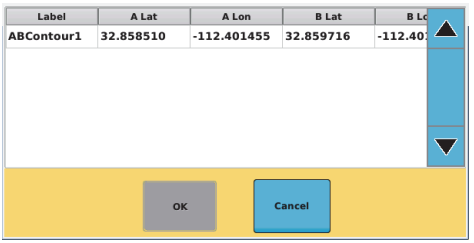
1. Position the vehicle at the beginning of the pass then display the AB Contour Guidance window (at right).
2. Press **Start contour**. The End contour button (gray) replaces the Start contour button, and, after you drive for a short distance a blue line guideline appears within the AB contour path and the End contour button becomes available (blue).
3. When you are finished driving your AB contour press **End contour**. Red guidelines extend from both ends of the AB contour to provide guidance.
4. Turn around and steer your vehicle to the next guidance line. As you get closer to the guidance line the Steering button changes to 'ready to engage'...press the Steering button to engage on the AB contour.
5. At the end of each pass repeat step 4.



Note: You can press Cancel Contour at any time before pressing End contour to cancel the AB contour.

To drive a previous AB contour:

1. Position the vehicle at the beginning of the pass then display the AB Contour Guidance window.
2. Press **Previous contour**. The AB Contours window appears (see at right).
3. Select an AB contour then press **OK**. The selected AB contour is applied to the map screen.



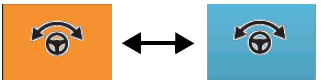
To create a detour:

1. While driving along an AB contour and approaching an obstacle display the AB Contour Guidance window.
2. Press **Start detour** (this disengages autosteering and the End detour button replaces the Start detour button) and drive off the AB contour to avoid the obstacle.
3. After you pass the obstacle you can do one of the following:
   - Press **End detour** to create a new AB contour.
   - Drive toward the original AB contour, engage autosteering, wait for the Merge contour button to become available, then press **Merge contour** to create new merged AB contour.

Shuttle Shift and Re-engaging on a Line

For vehicles with shuttle shift functionality, you can shift between forward and reverse gears without using the clutch, enabling you to shift direction more quickly and easily. If you are engaged on an A=B line, pivot line, or contour line, you can automatically re-engage on your guidance line when switching from forward to reverse and vice versa. An example of using shuttle shift is to line up in a headland when turning around. The following scenario describes how shuttle shift works.

1. While engaged on a line, slow down and come to a stop. As you come to a stop STX disengages autosteering (the Steering button starts flashing between ‘engaged’ (orange) and ‘ready to engage' (blue) states).

   You have approximately five seconds to automatically re-engage autosteering (by driving forward or in reverse); this is when the Steering button is flashing.
2. Start driving in reverse. The Steering button briefly flashes then STX automatically re-engages on the line (Steering button turns solid orange).
3. When you are ready to go in a forward direction again, slow down and come to a stop. As you come to a stop STX disengages autosteering (the Steering button starts flashing between 'engaged' and 'ready to engage' states).
4. Start driving forward. The Steering button briefly flashes then STX automatically re-engages on the line (Steering button turns solid orange).

Chapter 7: Rate Control and Section Control

Rate Control and Section Control Overview

Note: Rate control and section control are optional features. Contact Outback Guidance Customer Service for information on rate control and section control systems compatible with STX.

Outback AC110 provides single product (liquid or anhydrous) constant rate control with straightforward calibration and automatic section control for up to ten sections with onscreen section display and section override functionality.

After you install AC110 you must configure your implement for rate control, or section control, or both (depending on what equipment you have installed and the functionality you need). For example, if you need section control but no rate control, you need only configure section control settings in STX.

Rate/Section Control Display Overview

Although you can always display the Rate/Section Control screen, rate and/or section control functionality is enabled only with AC110 connected to STX.

Rate/Section Control tab is always visible (even without AC110 connected), but is only functional with

With AC110 connected, rate/ section control buttons and indicators appear when you display the map screen

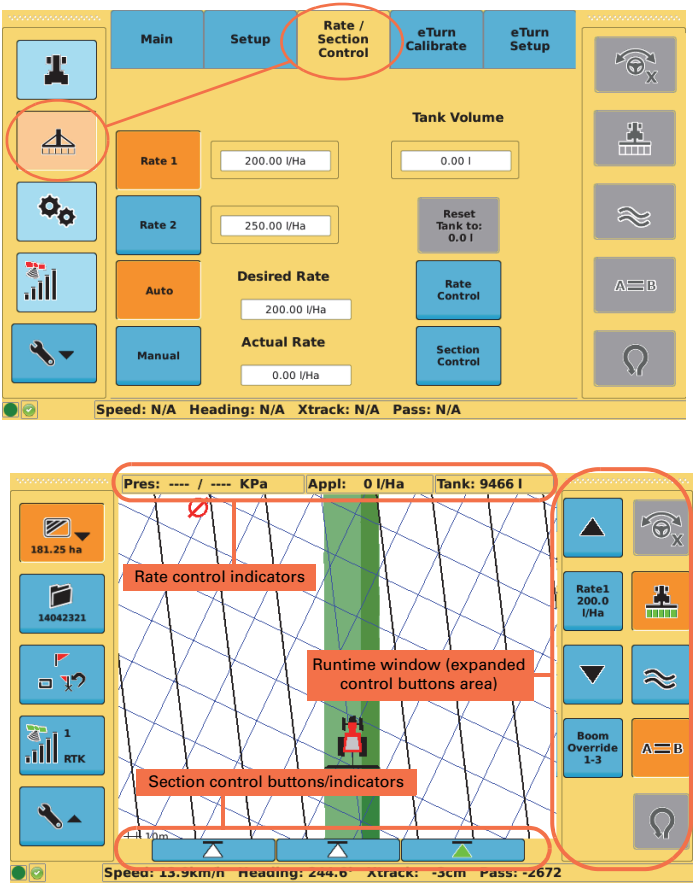


Figure 7-1: Rate and section control display overview

Navigating Rate and Section Control Screens

When you first press the Rate / Section Control tab under Implements you see the product details screen.

- From the product details screen you can access the rate control screen and the section control screen
- From the rate control screen you can access the section control screen, the product details screen, and the calibration values screen
- From the section control screen you can access the rate control screen and the product details screen

When you display any of these screens the tab at the top of each screen (to the right of the Setup tab) will always show Rate / Section Control.

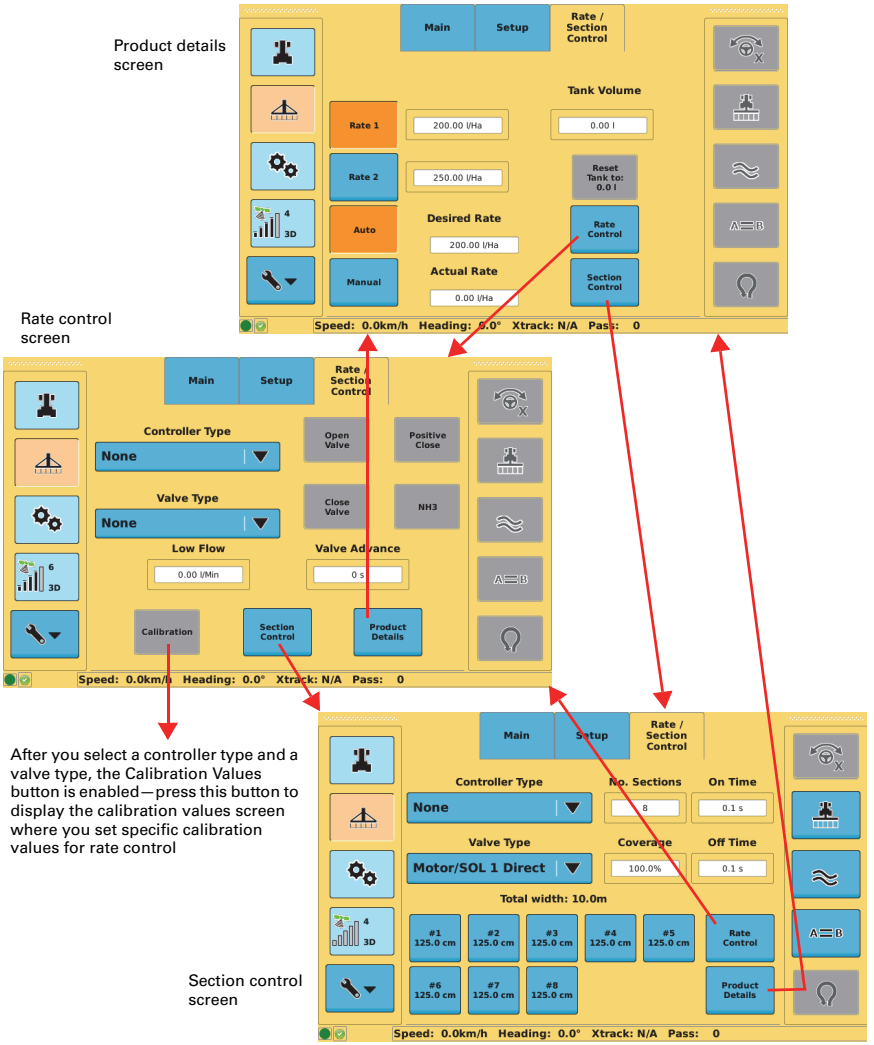


Figure 7-2: Navigating the rate and section control screens

Rate Control

Rate control functionality in STX requires you to do the following:

1. Configure your implement for rate control
2. Calibrate the rate control valve
3. Set rate control parameters, such as flow rate and tank volume
4. Use rate control in your field

Configuring Your Implement for Rate Control

Note: This section describes how to configure an existing implement for rate control. You can also configure your implement for rate control when first adding the implement to STX (you just have to complete some implement setup steps first before configuring the implement for rate control). Keep in mind that you must configure each implement that you will use for rate control.

Review "Rate Control and Section Control Overview" on page 130 before configuring your implement for rate control.

Use the rate control screen (below) to configure your implement for rate control. Table 7-1 (starting at the top page 133) describes each button/field on the screen.

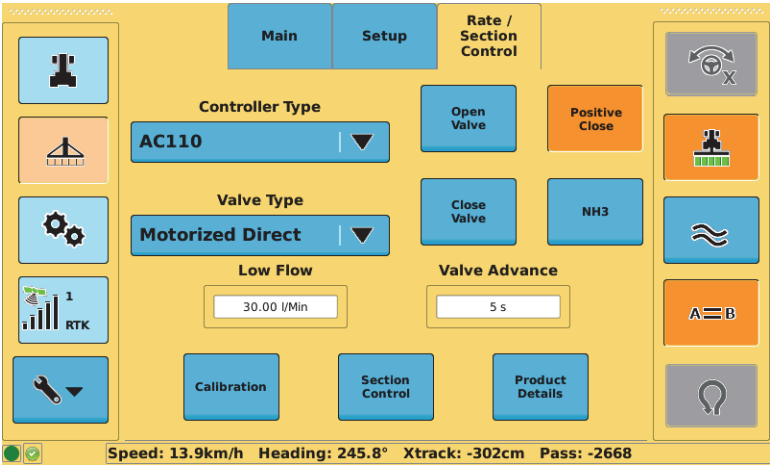
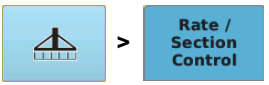


Figure 7-3: Rate control screen

To display the rate control screen:

1. Press the **Implement** screen button then press the **Rate / Section Control** tab at the top of the screen. The Rate/Section Control product details screen appears (see Figure 7-5 on page 137).



2. Press **Rate Control**. The rate control screen appears (Figure 7-3 above—when you first display this screen no values will be selected or entered).

Table 7-1: Rate control screen field/button descriptions

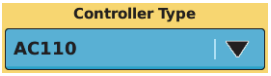
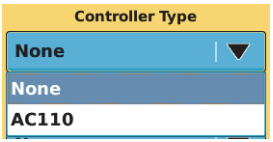
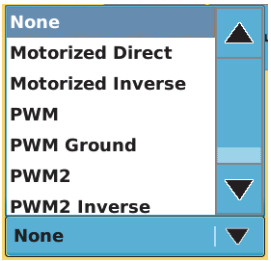
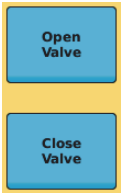
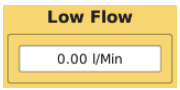
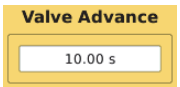
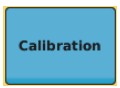
Field/Button	Description
 Expanded drop-down list 	Press the drop-down and select an item from the list. • Setting the Controller Type to something other than 'None' displays the rate control indicators and buttons on the map screen and enables all rate control functionality. • Setting the Controller Type to 'None' disables rate control functionality. Select this option if you are not using rate control.
 Expanded drop-down list 	Press the drop-down and select an item from the list. **Motorized Direct** Two-wire electric motor opens and closes the flow control valve to subsequently increase or decrease the application flow rate, respectively. **Motorized Inverse** Two-wire electric motor opens and closes the flow control valve to inversely decrease or increase the application flow rate, respectively. **PWM** Electrohydraulic solenoid valve proportionally increases application flow rate with increased duty cycle (voltage). **PWM GROUND** Electrohydraulic solenoid valve proportionally decreases application flow rate with increased duty cycle (voltage). **PWM2** Similar to PWM but with a slower algorithm; use when rate control is too unstable when using PWM. **PWM2 Inverse** Similar to PWM Ground but with a slower algorithm; use when rate control is too unstable when using PWM Ground. *Note: You must recalibrate your rate control after changing the valve type.*
	Useful in manually opening (press Open Valve) and closing (press Close Valve) the regulating valve to identify if you selected an incorrect rate Valve Type or if a cable is not connected.
	Press to toggle between enabled (orange) and disabled (blue), where enabled is for installations where the rate control valve is also used to stop and start product application (such as when no boom On/Off or section valves are present).

Table 7-1: Rate control screen field/button descriptions *(continued)*

Field/Button	Description
	Press to toggle between enabled (orange) and disabled (blue). • Enable for NH3 (anhydrous ammonia) control. Rate is in lbs nitrogen/acre (US) or kgs nitrogen/hectare (metric). Tank volume is in lbs or kgs of NH3. • Disable to set any other liquid as the application liquid.
	Without a Low Flow value the tips on your sprayer may shut off when flow drops below a certain rate (such as due to a drop in vehicle speed when traveling through a rough spot in the field). The Low Flow value you enter is the flow rate above which STX will continue to spray (apply product) and not close the regulating value completely and will maintain a minimum flow independent of speed and number of sections closed. See “Determining the Low Flow Value for Your Implement” on page 138 for instructions on setting this value. If a low flow condition occurs while spraying the Applied field at the top of the map screen turns red and several seconds later STX beeps repeatedly until you resolve the low flow situation.  Take corrective action (such as increasing vehicle speed if that is the cause) to increase flow rate.
	**Applies to PWM and motorized valves** For PWM and motorized valves you can enter a value to increase the valve position when coming out of headlands. For example, if spray comes on and briefly turns off when coming out of a headland (due to the boom having to recharge) you can enter a Valve Advance value to compensate for this. The range of Valve Advance values is 0 - 20 for PWM and Servo/motorized valves, where: • For PWM, 0 – 20 equals 0 – 30% increase from valve’s current position • For motorized, 0 – 20 equals 0 - 2000 ms When you are no longer applying product (Apply button displays Off): • For PWM, the system increases the valve’s position by the % you entered • For motorized, the system opens the valve the specified number of ms before it normally opens
	Press to display the calibration screen where you calibrate rate control—see “Calibrating Rate Control” on page 135.

Calibrating Rate Control

Note: Before calibrating for rate control make sure you have properly configured your implement for rate control. See the previous section "Configuring Your Implement for Rate Control" for more information.

You can perform calibration with the vehicle parked or moving. Perform the following before calibrating the flow:

- Make sure the tank is clean then fill with several hundred gallons of water
- Unfold the booms and move the vehicle to a safe location
- Make sure the vehicle is running at the operating RPM used for spraying

You calibrate your system via the calibration values screen (Figure 7-4).

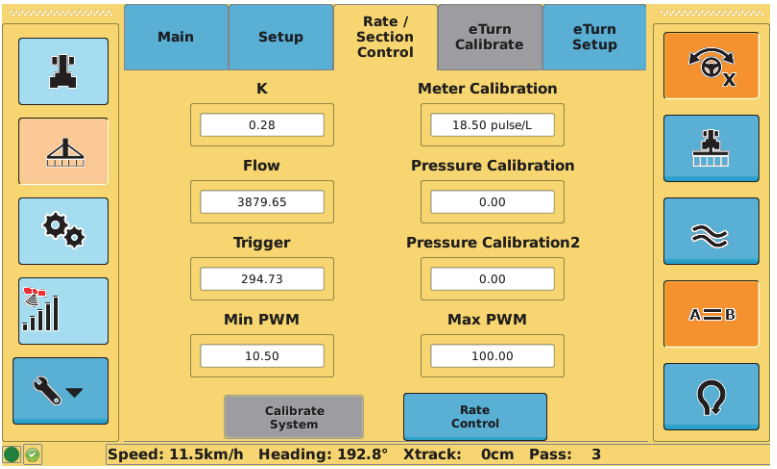


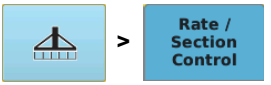
Figure 7-4: Calibration values screen

Note: The K, Flow, Trigger, Min PWM, and Max PWM values are set during the calibration process. Outback recommends that you contact Outback Customer Service or your local dealer before changing any of these values.

The Calibrate System button at the lower left of the screen is disabled until you enter a Meter Calibration value.

To calibrate rate control:

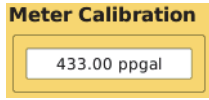
1. Press the **Implement** screen button then press the **Rate / Section Control** tab at the top of the screen. The Rate/Section Control product details screen appears (see Figure 7-2 on page 131).



2. Press **Rate Control**. The rate control screen appears (see Figure 7-3 on page 132).

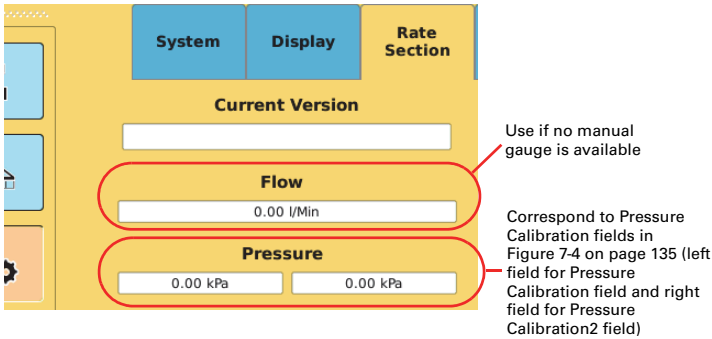
3. Press **Calibration**. The calibration values screen appears (Figure 7-4 on the previous page).

4. For the Meter Calibration field:
   a. Locate the meter calibration tag or stamp on the flow meter and the corresponding calibration value.
      – For Raven systems, divide the calibration number by 10 and enter this number.
      Example: If 169 is the calibration value, enter 16.9.
      – For TeeJet meters, enter the number as is.
      Many TeeJet meters list the calibration value in pulses/liter. It may be easier to change the units of measure in STX to metric, enter the meter calibration, then change units back to U.S.
   b. Press the **Meter Calibration** field.
   c. In the window that appears enter a value then press **Apply**. The Calibrate System button is now enabled.



Note: Step 5 below applies only if your system supports pressure sensors. If your kit does not support pressure sensors the two Pressure fields in step 5b will be zero and the two pressure indicators at the top of the map screen (see the first row of Table 7-3 on page 144) will not show any values.

5. For the two Pressure Calibration fields:
   a. Enter a calibration value of 100 as a starting point (press the field, and in the window that appears enter a value then press **Apply**).
   b. Display the Rate Section (Tools) screen, then:
      – Observe the pressure readings (the left pressure reading corresponds to the Pressure Calibration field and the right pressure reading corresponds to the Pressure Calibration2 field) and compare to that of a manual gauge.
      – If no manual gauge is available, use the flow rate (see Flow field below) to calculate a pressure based on your spray tip orifice size.

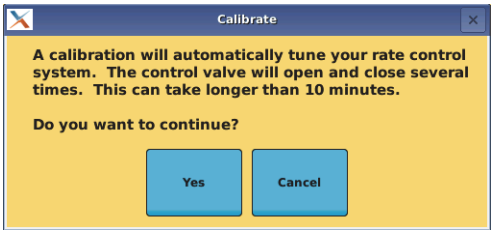


   c. Return to the calibration values screen and adjust the Pressure Calibration and Pressure Calibration2 values up or down to make them match.

6. Perform the calibration.

Note: The Calibrate System button is disabled (gray) until you enter a Meter Calibration value in step 4.

a. Press **Calibrate System** to start the system calibration process—the Calibrate System button turns orange and a Calibrate message appears.



b. Press **Yes**. The calibration process starts and may take up to 10 minutes. A progress message (with elapsed calibration time) appears during calibration.

To cancel the calibration press **Cancel** in the message window.

c. Once calibration is complete a message window appears—press **Ok** to close the message.

Setting Up Rate Control

Use the Rate/Section Control product details screen (Figure 7-5) to set rate (flow) control parameters.

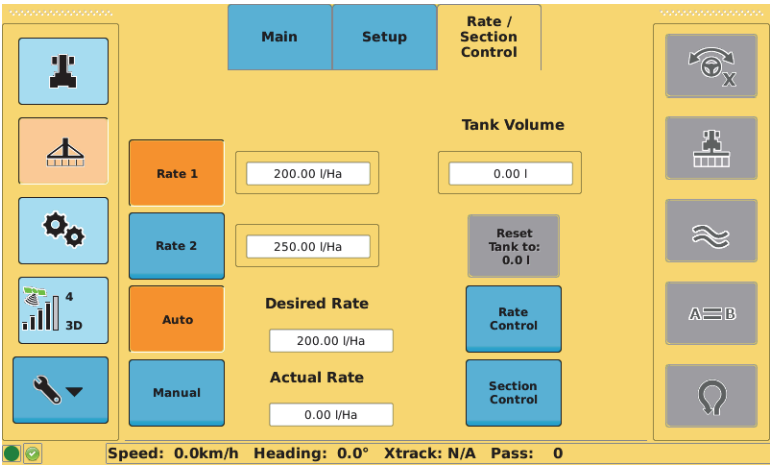


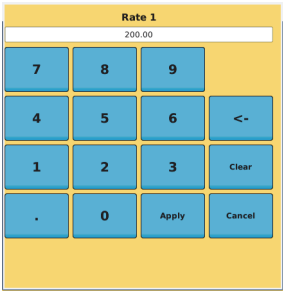
Figure 7-5: Product details screen (rate/section control)

Note: Before setting up rate control review "Rate / Section Control Product Details Screen" on page 201 for information on each button/field on the product details screen.

To set up rate (flow) control:

1. Press the **Implement** screen button then the **Rate / Section Control** tab. The Rate/Section Control product details screen appears (see Figure 7-5).

2. Enter flow rates for Rate 1 and Rate 2.
   a. Press the **Rate 1** field. The Rate 1 data entry window appears (shown at right).
   b. Enter a flow rate and press **Apply**. The data entry window closes and the rate appears in the Rate 1 field.
   c. Repeat steps a and b for Rate 2.

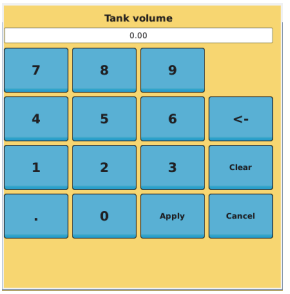


3. Select the rate you want to use—press either the **Rate 1** button or the **Rate 2** button (an orange button indicates the selected rate).

   Note: You can toggle between Rate1 and Rate2 by pressing the Rate button in the Runtime (expanded Control buttons) window. See Table 7-3 on page 144 for more information.

4. Enter the tank volume.
   a. Press the **Tank Volume** field. The Tank volume date entry window appears.
   b. Enter the tank volume and press **Apply**. The data entry window closes and the entered volume appears in the Tank Volume field.

   Note: You will need to adjust this value after each load—see next step.



5. To quickly reset the volume to full when refilling the tank press **Reset Tank to**. The Tank Volume field now displays the original tank volume.

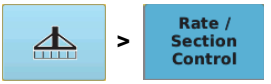
Determining the Low Flow Value for Your Implement

Note: You must have a job open to enable the Rate Bump buttons in step 1 of the following procedure.

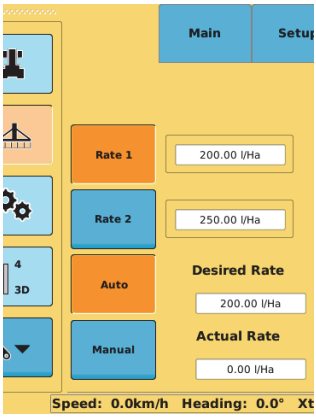
To determine the Low Flow value for your implement:

1. Identify the flow rate at which the spray tips begin to shut off.
   a. Put the system in manual mode

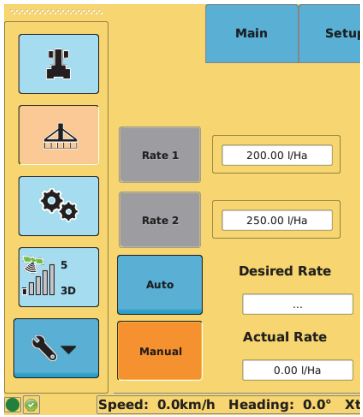
   Press the **Implement** screen button then the **Rate / Section Control** tab to display the Rate/Section Control product details screen.



Press **Manual**. Rate 1 and Rate 2 are disabled and the Desired Rate field is empty (you cannot set a desired rate in manual mode).



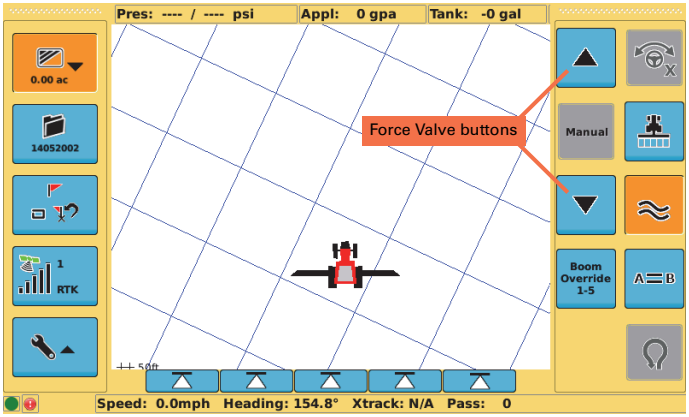
Before pressing Manual



After pressing Manual

b. Adjust the rate

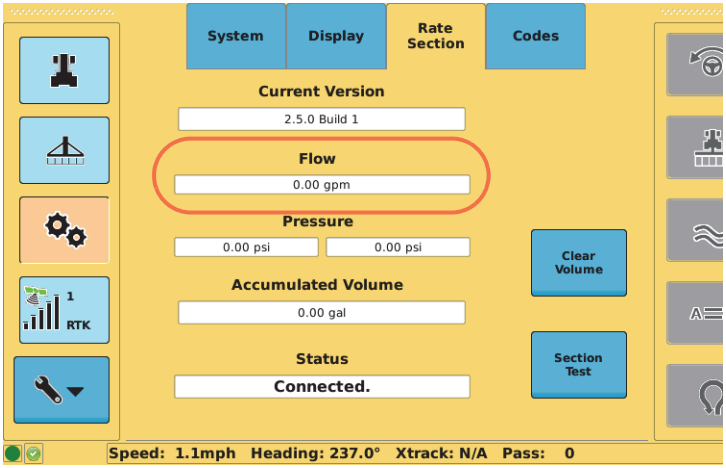
Display the map screen (see "Displaying the Map Screen" on page 96)—this automatically expands the Control Buttons window to display rate and section control buttons—then press the **Force Valve** down arrow to decrease the rate until the tips shut off (see "Using Rate Control and Section Control" on page 144 for more information).



c. Identify what the flow value is on Rate Section (Tools) screen

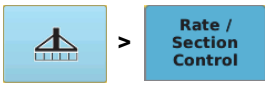
Press the **Tools** screen button then press the **Rate Section** tab at the top of the screen. The Rate Section screen appears.

Observe the value in the Flow field.

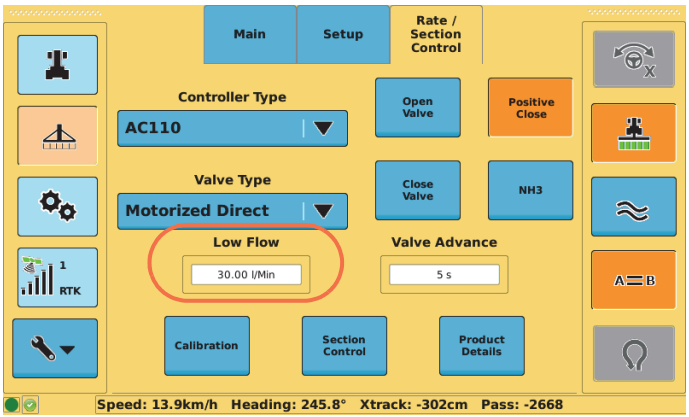


2. Enter a LowFlow Setting value that is slightly higher than the value from the previous step.

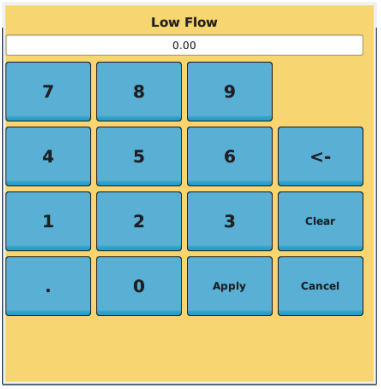
   a. Press the **Implement** screen button then press the **Rate / Section Control** tab at the top of the screen. The Rate/Section Control product details screen appears.



   Press **Rate Control** to display the rate control screen then press the **Low Flow** field.



b. In the Low Flow window enter a value then press **Apply**.



Section Control

You must enter specific section control settings (see next section) before using STX for section control (see “Using Rate Control and Section Control” on page 144).

Configuring Your Implement for Section Control

Note: This section describes how to configure an existing implement for section control. You can also configure your implement for section control when first adding the implement to STX (you just have to complete some implement setup steps first before configuring the implement for section control). Keep in mind that you must configure each implement that you will use for section control.

Review “Rate Control and Section Control Overview” on page 130 before configuring your implement for section control.

Use the section control screen (below) and Table 7-2 on page 142 to configure your implement for section control.

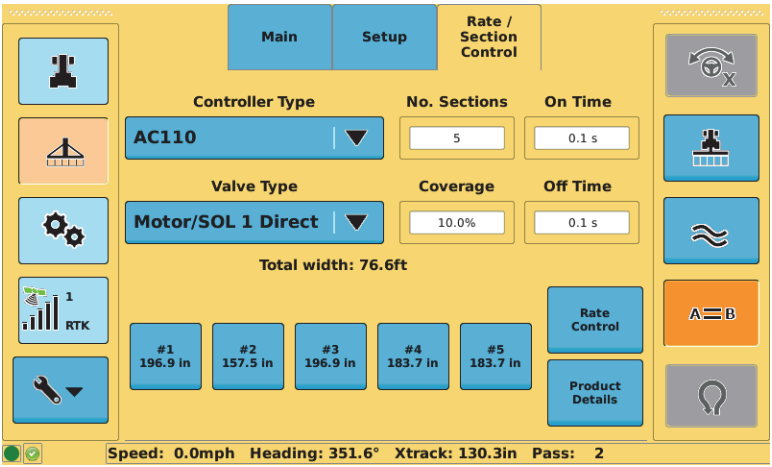


Figure 7-6: Section control screen

To display the section control screen:

1. Press the **Implement** screen button then press the **Rate / Section Control** tab at the top of the screen. The Rate/Section Control product details screen appears (see Figure 7-5 on page 137).

2. Press **Section Control**. The section control screen appears (see Figure 7-3 on previous page—when you first display this screen no values will be selected or entered).

Table 7-2: Section control screen field/button descriptions

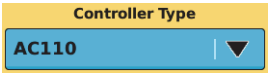
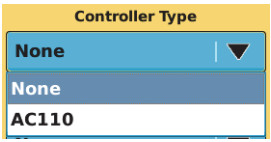
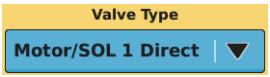
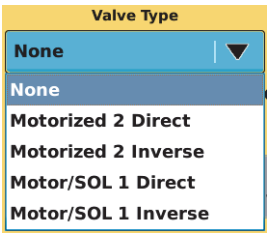
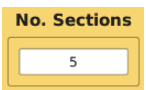
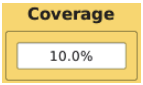
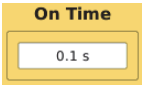
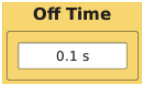
Field/Button	Description
 Expanded drop-down list 	Press the drop-down and select an item from the list. • Setting the Controller Type to AC110 displays the section control indicators on the map screen and enables the Boom Override button. • Setting the Controller Type to 'None' disables section functionality. Select this option if you are not using section control.
 Expanded drop-down list 	Press the drop-down and select an item from the list. **Motorized 2 Direct** Electric motorized valve that is: 1. Driven open with a positive voltage signal. 2. Driven closed by a negative voltage signal across two signal wires. **Motorized 2 Inverse** Electric motorized valve that is: 1. Driven open with a negative voltage signal. 2. Driven closed by a positive voltage signal across two signal wires. **Motor/SOL 1 Direct** Electric motor or solenoid valve that is: 1. Driven open with a single positive voltage signal. 2. Returned to a closed position by a spring or other automatic means. **Motor/SOL 1 Inverse** Electric motor or solenoid valve that is: 1. Driven closed with a single positive voltage signal. 2. Returned to an opened position by a spring or other automatic means.
	Press to display the Number of Sections data entry window where you set the number of sections. STX supports a maximum of ten sections. The number you enter determines the number of section buttons that appear at the bottom of the section control screen.

Table 7-2: Section control screen field/button descriptions *(continued)*

Field/Button	Description
	Press to display the Coverage data entry window where you enter the percentage of the boom section that must enter or exit a previously applied area before AC110 will turn it off or on.
	Press to display the On Time data entry window. Enter the number of seconds needed to open the boom valves and build pressure ahead of an unapplied area. Increase the number to turn on sooner.
	Press to display the Off Time data entry window. Enter the number of seconds needed to close the boom valves ahead of a previously applied area. Increase the number to turn off sooner.
	Press any section button to display a data entry window where you enter the section width for that section. Because you can only set each section width individually, each change you make affects the total implement width (Implement Width field on the Implement Setup screen). *Note: When AC110 is connected and powered on, the Implement Width field on the (Implement) Setup screen is read-only. When AC110 is powered off, the Implement Width field is editable. This enables STX to store the settings for rate and section control while enabling you to change the implement width for other uses.*

Using Rate Control and Section Control

When using rate/section control you can:

- Increase or decrease the selected rate incrementally
- Override individual sections
- Toggle all sections between an Auto state and override state
- Turn off all sections at any time

After you set up rate/section control you work with rate/section control via the map screen (Figure 7-7) and the rate/section control indicators and buttons.

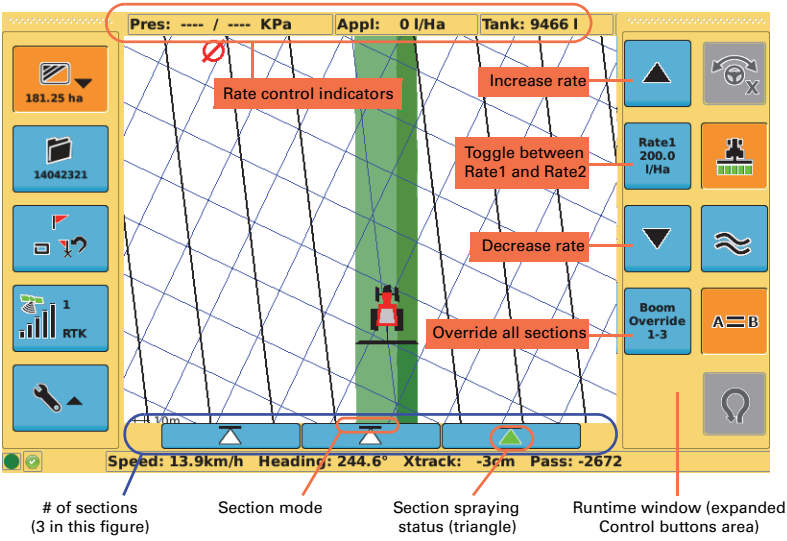


Figure 7-7: Map screen showing rate/section control

Before you begin using rate/section control, review the screen item descriptions in the following table.

Table 7-3: Map screen item descriptions for rate/section control

Screen Item	Description
Pres: ---- / ---- KPa Appl: 0 l/Ha Tank: 9466 l	Indicators along top of map screen • Pres: liquid rate control pressure (see "Calibrating Rate Control" on page 135 for information on calibrating these two values). • Appl: Actual application rate calculated from the flow meter (under a low flow condition or if the actual rate is off by 10% from the target rate this field appears red)—see Table 7-1 on page 133 and "Determining the Low Flow Value for Your Implement" on page 138 for more information. • Tank: Volume remaining in tank that decreases as you spray (see "Setting Up Rate Control" on page 137 on how to initially set the tank volume).

Table 7-3: Map screen item descriptions for rate/section control *(continued)*

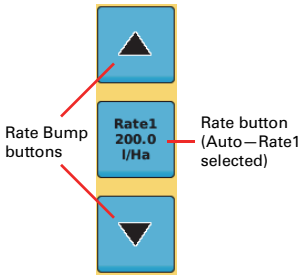
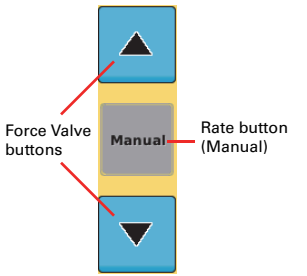
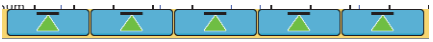
Screen Item	Description
	The functionality of the Rate button and the two arrow buttons differ depending on whether you select Auto or Manual mode on the product details screen. See Figure 7-2 on page 131 and "Rate / Section Control Product Details Screen" on page 201 for more information on the Rate buttons on the product details screen. If you select Auto mode on the product details screen: • When you first display the map screen the rate indicated on the Rate button correlates to the Rate button (Rate 1 or Rate 2) you pressed on the product details screen. The Rate button shown at left enables you to select either rate to apply quickly (toggle between Rate1 and Rate2). • Use the Rate Bump buttons to increase/decrease the target rate in 1 gallon or 10 liter increments. • When you press either Rate Bump button to change the rate the rate displayed on the Rate button increments/decrements. • If the actual rate is off by 10% from the target rate the Applied field at the top of the map screen turns red and several seconds later STX beeps repeatedly until you resolve the low flow situation. Take corrective action (such as increasing vehicle speed if that is the cause) to increase flow rate. 
	If you select Manual mode on the product details screen: • The Rate button displays "Manual" (for display only—pressing this button has no effect). • Press the Up arrow to force the control valve open. • Press the Down arrow to force the control valve closed.
	Press the Boom Override button to toggle all sections between Auto mode (Boom Override button blue) and manual override (orange—all section valves forced open).

Table 7-3: Map screen item descriptions for rate/section control *(continued)*

Screen Item	Description
 Auto mode No spraying  Auto mode Spraying  Manual OFF No spraying  Override ON Spraying  Override ON No spraying	Each section is represented by a horizontal bar and a triangle. For example, if you configured STX for five sections, five sections appear along the bottom of the map screen. The horizontal bar above each triangle represents the section mode and the triangle represents spraying or no spraying. See the examples at left for the different combinations. The horizontal bar can be: Black (Auto mode) Green (override mode—manually forced ON) Red (manually forced OFF) Each triangle can be: White (section OFF - no spraying) Green (section ON - spraying) Repeatedly pressing the sections along the bottom of the map screen cycles through different options, as illustrated in the following five-section example. • After setting up rate/section control the sections appear along the bottom of the map screen (sections are in Auto mode with no spraying)  • Press **Apply** to start spraying in all sections  • Press the far left and far right sections once each to manually force them OFF (no spraying)  • Press the far left and right sections again to override them (spraying ON, even if in already applied areas)  • Press the far left and right sections once more to return to Auto mode spraying  • Press **Boom Override** to override all sections (spraying ON, even if in already sprayed areas) 

Rate and Section Control Diagnostics

Regardless of whether you have AC110 connected or not the Rate Section screen under Tools (Figure 7-8 below) is always available. You use this screen to:

- View read-only rate control information
- Clear volume
- Perform a section test

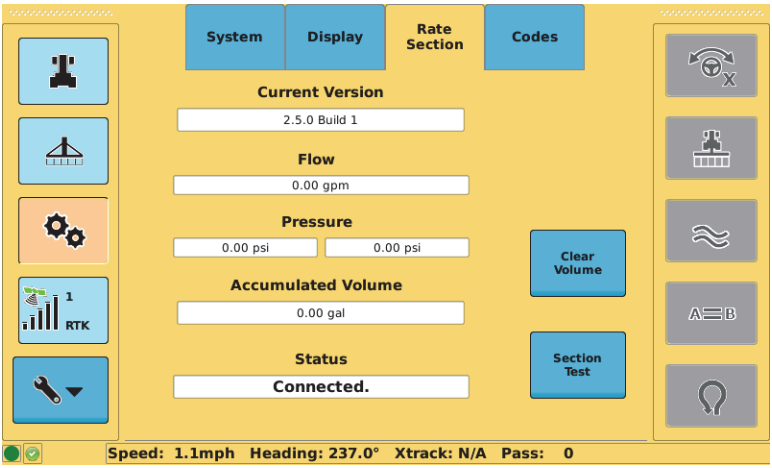


Figure 7-8: Rate Section (Tools) screen

Table A-4 on page 175 describes the fields/buttons on the Rate Section screen. Use this table as a reference for the tasks following the Note below.

Note: The Clear Volume button is not enabled until AC110 is connected and you select a Controller Type on the rate control screen—see "Configuring Your Implement for Rate Control" on page 132. The Section Test button is not enabled until AC110 is connected and you select a Controller Type on the section control screen—see "Configuring Your Implement for Section Control" on page 141.

To clear the Accumulated Volume field:

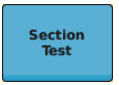
1. Press the **Tools** screen button then press the **Rate Section** tab at the top of the screen. The Rate Section screen appears (see Figure 7-8).

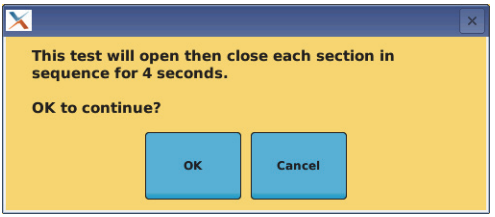
2. Press **Clear Volume**. The Accumulated Volume field resets to zero.

To perform a section test:

1. Press the **Tools** screen button then press the **Rate Section** tab at the top of the screen. The Rate Section screen appears (see Figure 7-8 on the previous page).

2. Press **Section Test**. The following message appears.





3. Press **OK**.

Chapter 8: Advanced Features

Boundaries
Using Marks
Returning to an Existing Point
eTurns
e-Dif

This chapter describes how to set a boundary within a field, use marks (flags) to create sub-areas within a field, and use the optional eTurns functionality.

Boundaries

STX enables you to record a field boundary and save it as a template for future operations. This way, boundary information remains consistent from job to job, season after season.

About Boundaries

Normally, you complete the first operational pass to set and record the boundary of the field.

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

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

You can also pause then resume a boundary. For example, if you run out of spray while creating the boundary you can go back, refill your tank, then come back and complete the boundary.

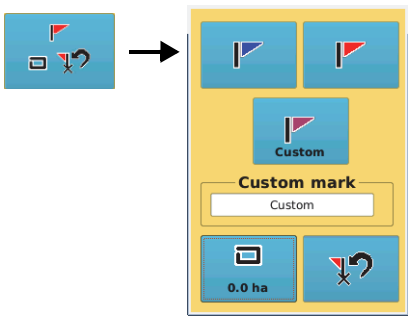
Setting a Boundary

To set a boundary:

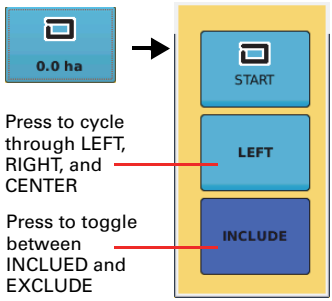
1. Drive to the starting position of the field.

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

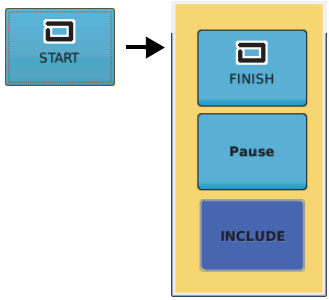
2. Press the **Mark** screen button. The Mark window appears.



3. Press the **Boundary** button. The Boundary window appears.
4. Press the middle button to cycle through the following options to specify where the boundary is marked relative to the vehicle/implement:
   - LEFT - boundary calculations start from left edge of the swath width
   - CENTER - boundary calculations start from center of the swath width
   - RIGHT - boundary calculations start from right edge of the swath width

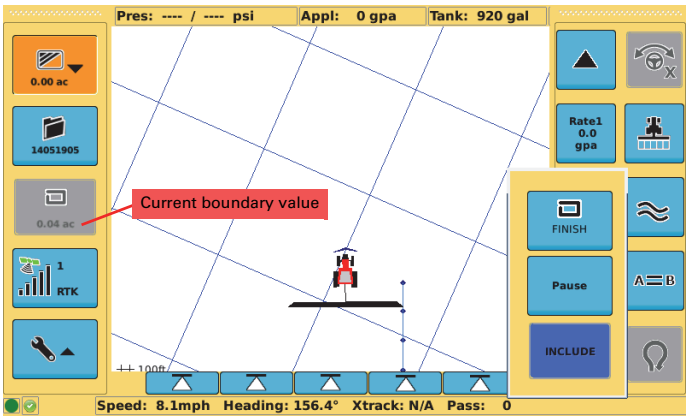


5. Press the bottom button to toggle between the following:
   - INCLUDE - calculate the total area
   - EXCLUDE - subtract the defined area from the total area calculation
6. Press **START**. The Boundary window now displays FINISH and Pause buttons.

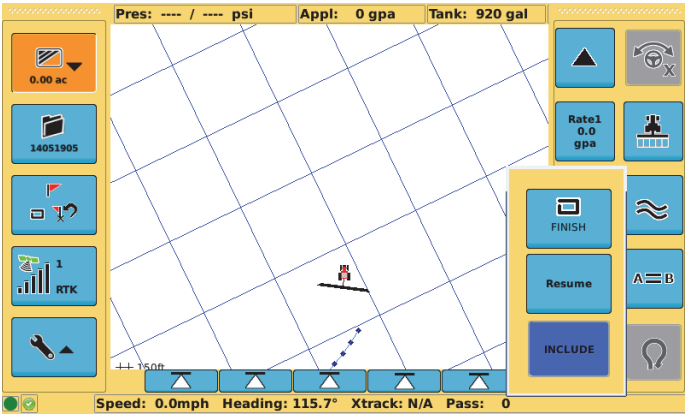


Note: You can perform actual work while creating the boundary (Apply On) or drive around the field with Apply Off. STX creates the boundary from the current swath edge or center, regardless of whether Apply is On or Off.

7. Drive the boundary you want to define as accurately as possible. As you drive a black, studded line on the map screen shows the boundary as STX defines it and the current boundary value shows on the FINISH button.

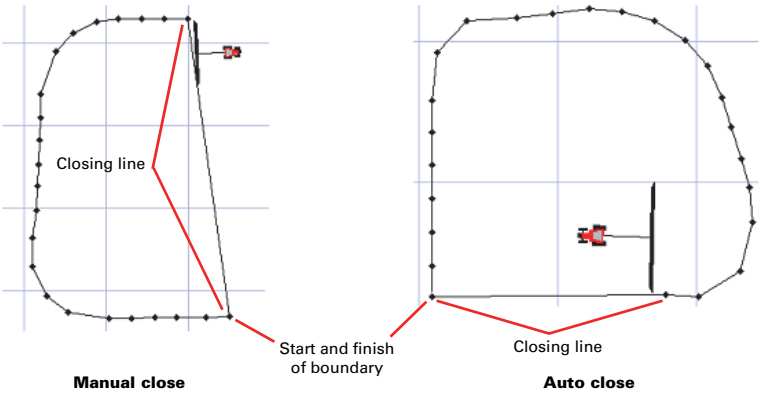


8. (Optional) Press **Pause** to pause boundary creation. The Resume button replaces the Pause button. The figure below shows the boundary paused and the vehicle moving away from the boundary.



When you are ready, return to this point (where you paused) and press **Resume** to continue creating the boundary. The Pause button replaces the Resume button.

9. When you are ready to close the boundary press **FINISH**. Alternatively, drive to within half a machine width of the boundary start point to have STX automatically close (finish) the boundary for you. The closing line runs from your current position to the start position.



Note: You should close the boundary as close to the starting point as possible (auto close).

Using Marks

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

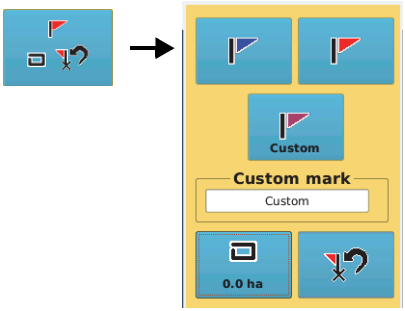
Note: You do not have to use the different color flags in any particular order; you can use the same color to mark an area of a particular type. Flags are numbered consecutively regardless of their color.

Marking a Single Point

You can use marks to record a single point, such as a rock patch. If necessary, you can add a name to a mark (create a custom mark). It is good practice to record pertinent information about the mark on a note pad.

To mark a single point:

1. Drive to the point where you want to place a mark.
2. Press the **Mark** screen button. The Mark window appears.



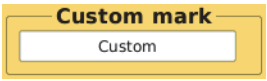
3. Press either of the two mark buttons along the top of the Mark window. STX places a mark (flag) of the color you selected at the vehicle's current position.

   or

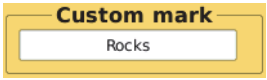
   To place a custom mark (using the mark color on the Custom button):

   a. Press the **Custom mark** field.

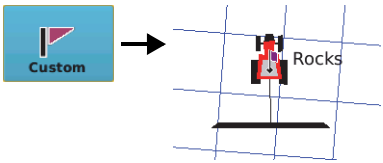
   b. On the data entry screen that appears enter a name for the custom mark then press **Apply**. The screen closes and the new name appears in the Custom mark field.



   For example, if you want to mark a rock pile you can name the Custom mark as Rocks.



   c. Press the **Custom** button. STX places the custom mark at the vehicle's current location. In the "Rocks" example, your flag would appear as shown at right.



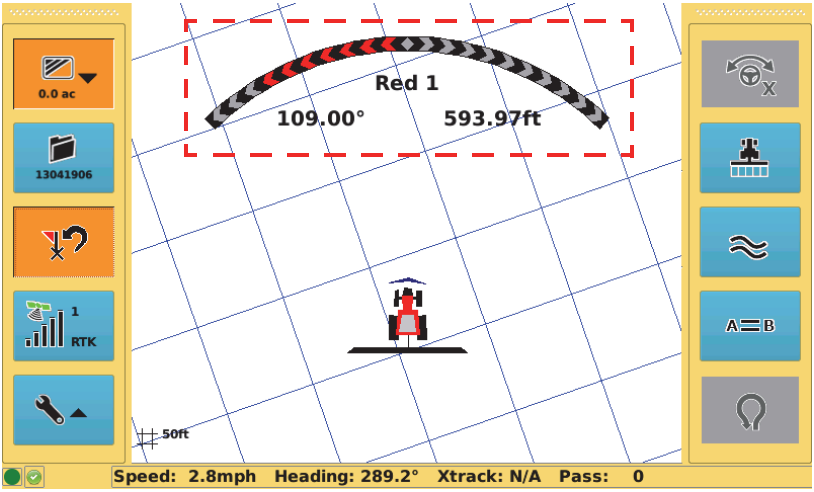
Returning to an Existing Point

STX can provide guidance to an existing point in the current job—the last apply point, any A or B point, or any dropped mark.

Note: There is only ever one Last Apply return point—it is always the end of the last time you turn Apply Off.

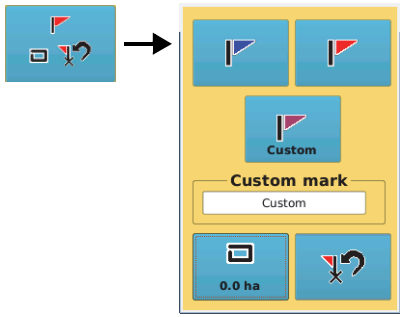
This feature does not automatically take you to a point; however, it does provide guidance to a point. When returning to a point the onscreen lightbar changes to display just the arch (heading indicator) and the following guidance information (see example):

- Return point ID (see the Label column in the figure in step 2 on the following page)—this is a unique identifier for each return point
  - Mark number (Red 1 in example,) - consecutively numbered identifiers for the three default mark colors (for example, if you drop three red marks, STX names them Red 1, Red 2, Red 3)
  - Custom mark name (such as “Rocks” or “Tree”)
  - Last Apply
  - A or B point with number (such as B2 for point B in the second A=B line you create for a job)
- Bearing to the point (109° in example)
- Distance to the point (593.97 ft in example)

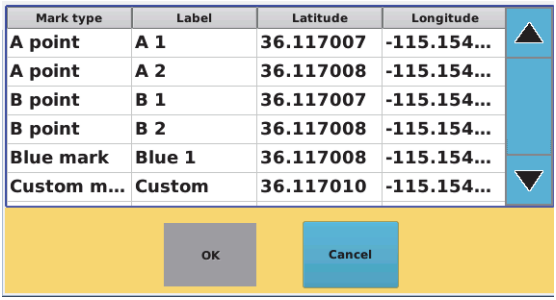


To return to a point:

1. Press the **Mark** screen button. The Mark window appears.



2. Press **Return to Point**. The Return To Point window appears.



3. Select a return point and press **OK**. The Return to Point window closes and the map screen displays the onscreen lightbar arch and additional guidance information (see figure at bottom of previous page).

eTurns

Note: eTurns is a subscription-only eDriveXC feature—you must have eDriveXC installed on your system and have a valid eTurns subscription to use eTurns. Contact your local dealer or Outback Guidance Customer Service to obtain an eTurns subscription. To enter your eTurns authorization code see "Codes Screen" on page 175. If you do not have a valid eTurns subscription and you press the eTurns button a message appears stating eTurns is not authorized on your system.

eTurns enables the vehicle to automatically execute a turn at the end of a swath (you determine which swath to turn onto).

The key points about eTurns are:

- eDriveXC must be connected and you must have a valid eTurns subscription
- eTurns are applicable only to straight line A=B operations (A=B lines and A + Direction lines)
- The eTurns button (bottom right of screen) is not active until you have calibrated eTurns (see "Calibrating eTurns" on page 157) and are engaged on a straight line (A=B or A + Direction)
- eTurns calibration is required for each implement
- You can operate with a fixed turn configuration or change the configuration in real time for individual turns
- eTurns guides the vehicle's turning path, not the implement's turning path
- The headland prompt, if used, is based on the vehicle position, not the implement's position

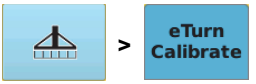
Note: It is recommended that you calibrate your autosteering system before you calibrate eTurns (see "Steering Options" on page 50). eTurns calibration is required for each implement (unless implements are identical - see Warning in the next section).

Calibrating eTurns

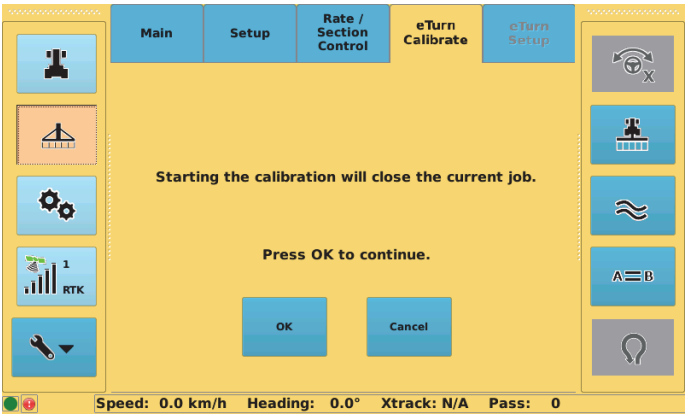
⚠WARNING: *Because there is potential for damage to machinery if you use a larger implement with the calibration data recorded for a smaller implement, you need to recalibrate eTurns for different implements. When making the left and right turns during eTurns calibration, make the minimum radius turns possible for the current implement.*

To calibrate eTurns:

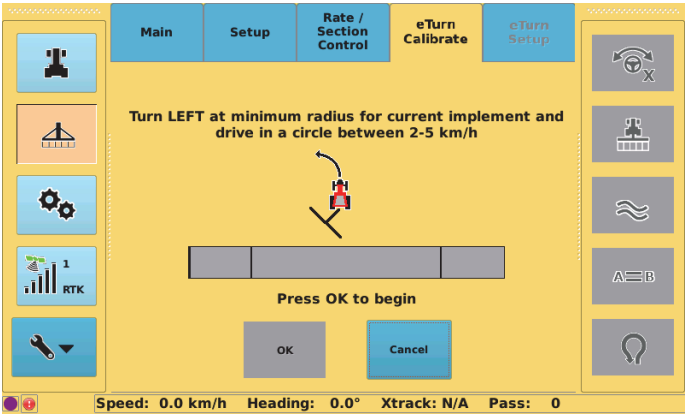
1. Create or load the desired vehicle and implement (see “Working with Vehicles” on page 54 and “Working with Implements” on page 64).
2. Press the **Implement** screen button then the **eTurn Calibrate** tab.



If you have an active (open) job, the first figure below appears. Press **OK** to display the “turn left” calibration screen (second figure below).

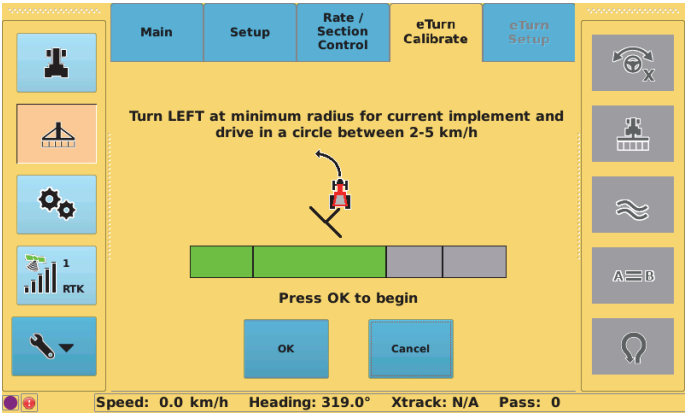


If you have no open job, the “turn left” calibration screen appears immediately after pressing the eTurn Calibrate tab.

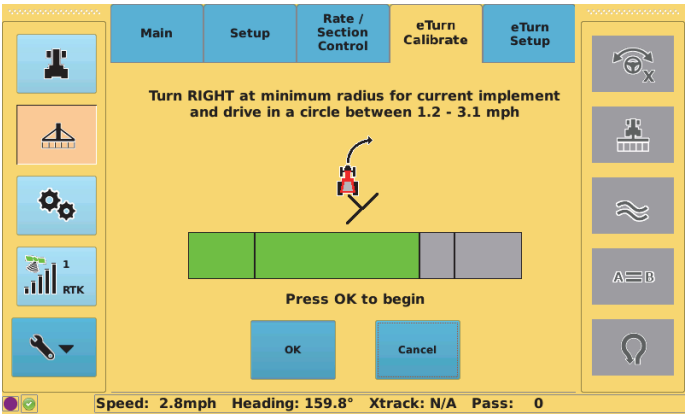


Note: The 'left' and 'right' calibration screens that follow have a speed bar that indicates if you are driving within the required speed range. Use the speed bar to ensure you stay within the speed range. When instructed to center the steering, aim at a specific landmark to ensure you are driving the vehicle in a straight line.

3. Perform the left calibration:
   a. Maintaining the recommended speed, steer to the left at the minimum radius for the current implement (tightest possible or practical turn for the current implement). When you are driving within the required speed range, the OK button becomes available.

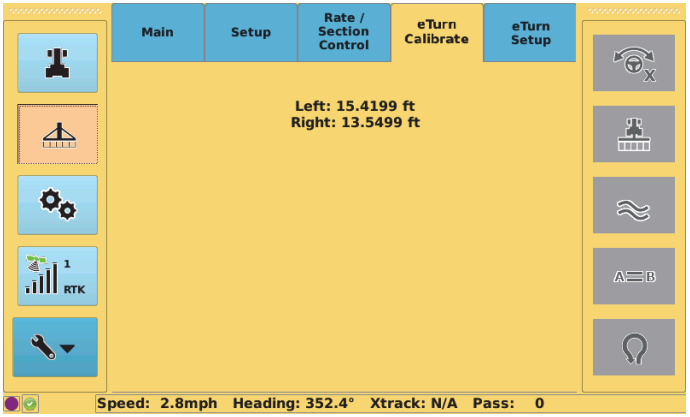


   b. Press **OK**. STX indicates that calibration is in progress and the OK button becomes unavailable (gray).
   c. When the left calibration step is complete the OK button becomes available. Press **OK**. The right calibration screen appears.
4. Perform the right calibration.
   a. Maintaining the recommended speed, steer to the right at the minimum radius for the current implement (tightest possible or practical turn for the current implement). When you are driving within the required speed range, the OK button becomes available.



b. Press **OK**. STX indicates that calibration is in progress and the OK button becomes unavailable (gray).

c. When the right calibration step is complete, the calibration complete screen appears and you can perform eTurns setup (the tab is blue).



Setting Up and Making eTurns

After you have completed eTurns calibration, you initially configure eTurns using the eTurn Setup screen.

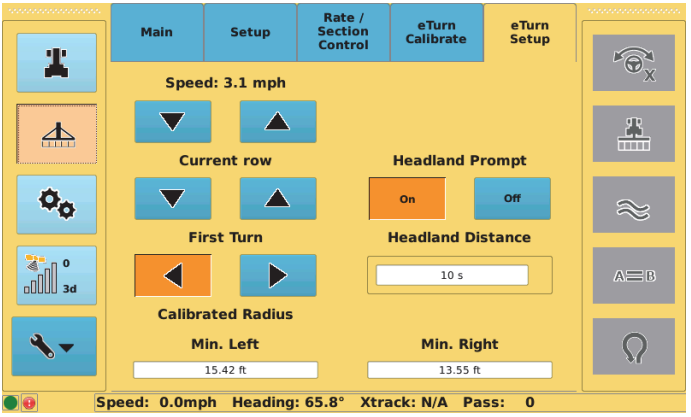
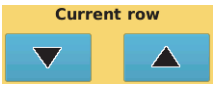
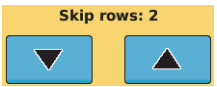
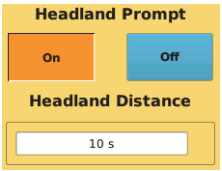


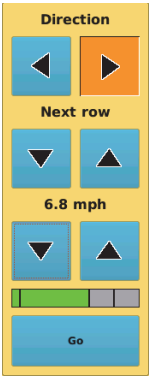
Figure 8-1: eTurn Setup screen

Table 8-1 describes each of the eTurns setup parameters.

Table 8-1: eTurns setup parameters

Parameter	Description
	Speed Speed at which you want your vehicle to execute the eTurn. The Speed and the Headland Distance combine to determine the linear distance from the headland that the prompt appears. If, during an eTurn, you exceed the speed you set (here or on the eTurns Control panel), automated steering (so the eTurn also) will disengage.
 	Next pass Order in which rows are worked (or 'steered to' - also known as the 'swath pattern'). Pressing the up arrow or down arrow changes the text that is displayed above the arrows as follows: • Current row - automatically turn back onto the current row • Next row - automatically turn onto the adjacent row • Skip rows: # - skip the number of adjacent rows specified (for example, for Skip Rows: 1, the vehicle will automatically turn on the pattern 1, 3, 5, 7 etc.)
	First Turn Direction to turn (left or right)
	Headland Prompt and Headland Distance When Headland Prompt is set to On, during operation the eTurns window automatically appears (as if you pressed the eTurns control button) as you approach the headland (previously applied area). The value (in seconds) you set in the Headland Distance field determines when the eTurns window appears. Thus, how far in distance you are from the headland that the eTurns window appears is based on this value and your current speed (the faster your speed, the farther away from the headland the window appears; the slower your speed, the closer to the headland the window appears). When Headland Prompt is set to Off, the Headland Distance field is disabled.

After setting up eTurns and after you are engaged on an A=B line or A + Direction line, press the eTurns control button to make an eTurn—the eTurns window (at right) appears along the left of the display, showing the first turn, next pass, and eTurn speed parameters and the speed bar.



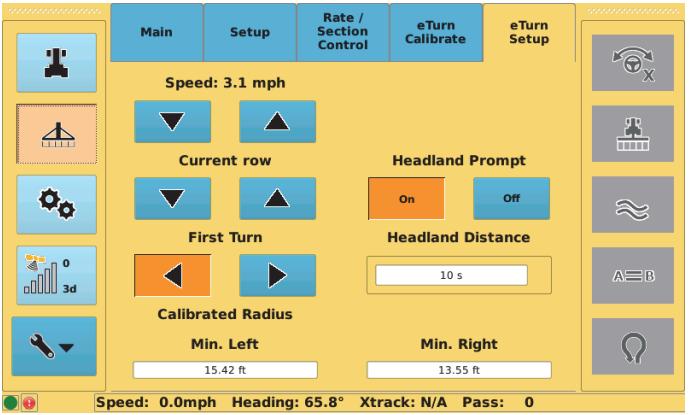
You can accept the parameters you set on the eTurn Setup screen or change them here (except for Headland Prompt and Headland Distance). You may need to vary your current speed: if the speed bar is red you are driving too fast or too slow. When the speed bar is green, the Go button becomes active and you can make your eTurn.

When you make adjustments to your eTurn in the eTurns window, the map screen shows the predicted eTurn path in blue. When you make the eTurn, the map screen shows the actual eTurn path in red (see the top figure in step 5 on page 163 for an example).

To set up eTurns:

1. Press the **Implement** screen button:
   - If the eTurn Setup tab is not blue, calibrate eTurns (see "Calibrating eTurns" on page 157) then press the eTurn Setup tab.
   - If the eTurn Setup tab is blue, press the tab.

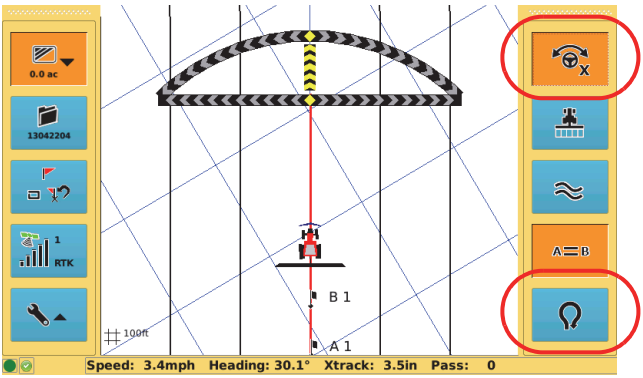
   The eTurn Setup screen appears.



2. Make your selections:
   a. Press the **Speed** down arrow (decrease speed) or up arrow (increase speed) to set your maximum eTurn speed.
   b. Press the **Next pass** (Current row in figure above) down arrow or up arrow. The down arrow decreases pass numbers and the up arrow increases pass numbers.
   c. Press the **First Turn** left arrow (eTurn to left) or right arrow (eTurn to right).
   d. Press the preferred **Headland Prompt** button (On or Off).
   e. If you set Headland Prompt to On, press **Headland Distance**, and in the data entry window enter a value then press **Apply**.

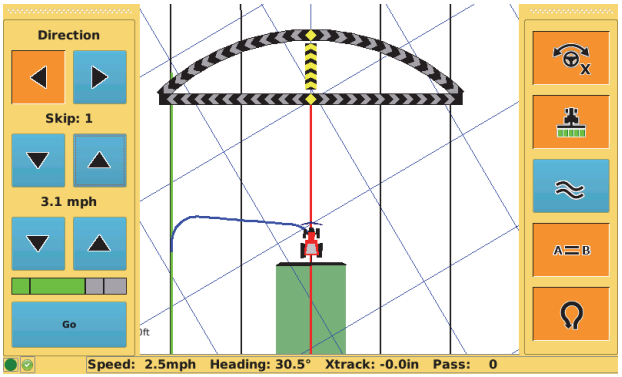
To make an eTurn:

1. In an active job, set a straight line (A=B or A + Direction).
2. When eDriveXC is ready to engage press the **Steering** button (blue). STX engages on the guideline, the Steering button turns from blue to orange, and the eTurns control button turns from gray to blue.

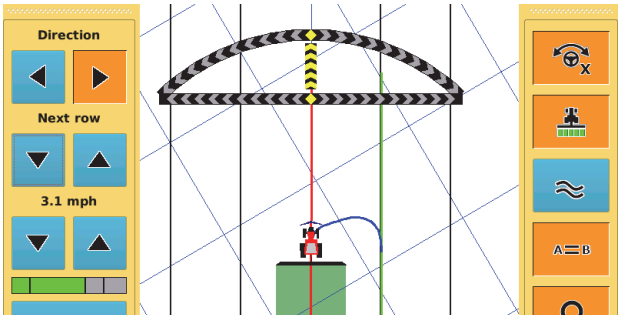


3. Press the **eTurns** control button. The eTurns window appears.
4. Adjust the parameters (if necessary). As you make any changes to the first turn (direction), next pass, or eTurn speed parameters, STX shows the changes on the map screen (predicted eTurn path in blue).

Make eTurn to the left, skip one row

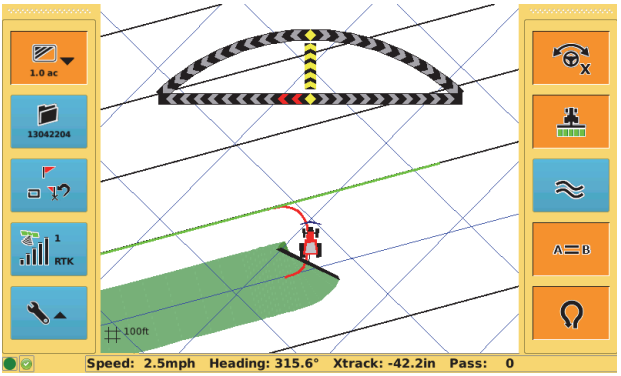


Make eTurn to the right, next row (do not skip rows)

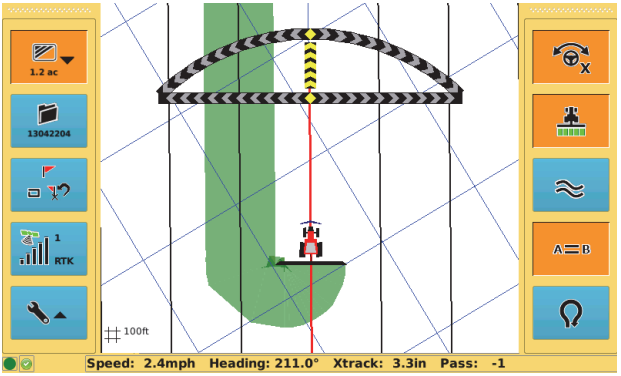


5. Make sure the speed bar is green (you are not driving too fast or too slow) then press **Go**. STX starts making the eTurn (actual eTurn path in red).

eTurn in progress, eTurns control button orange



eTurn complete, eTurns control button blue



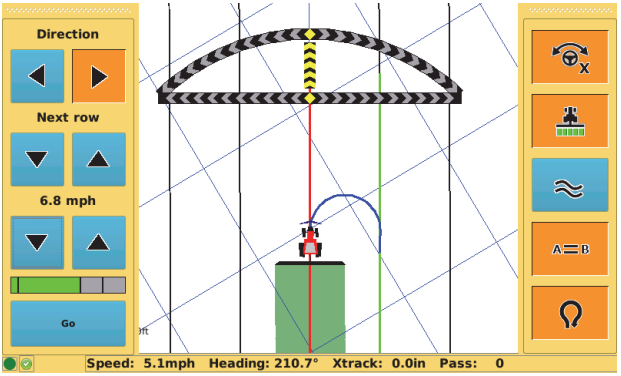
If you set the Headland Prompt to On and you have an applied area around your field, from this point on you do not need to press the eTurns control button to display the eTurns window—this will occur automatically.

eTurns and Speed

The predicted and actual turn eTurn paths are determined by the speed at which you set the eTurn to be made (and the curvature calibration for the tractor/implement combination). Figure 8-2 shows how speed determines the eTurn path.

Note: If you exceed the set speed during the eTurn (beyond a small buffer value), automated steering disengages. This applies to the speed you set on the eTurn Setup screen or the speed you set (override) in the eTurns window.

Slower speed, sharper turn



Faster speed, wider turn

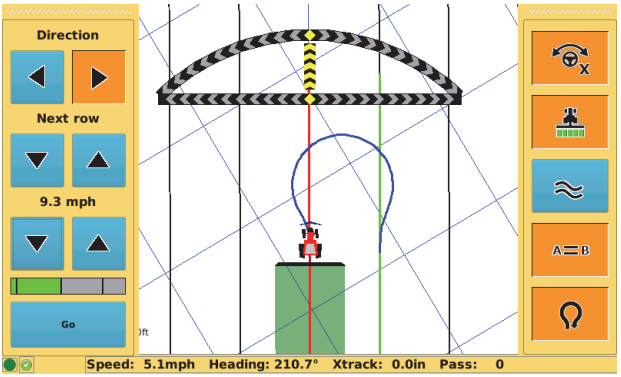


Figure 8-2: eTurns and speed

e-Dif

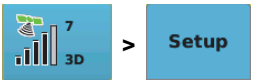
Extended Differential (e-Dif) software enables STX to perform with differential-like accuracy for extended periods of time without the use of a differential service. e-Dif models the effects of ionosphere, troposphere, and timing errors for extended periods by computing its own set of pseudo-corrections. e-Dif may be used anywhere geographically and is especially useful where SBAS networks have not yet been installed, such as South America, Africa, Australia, and Asia.

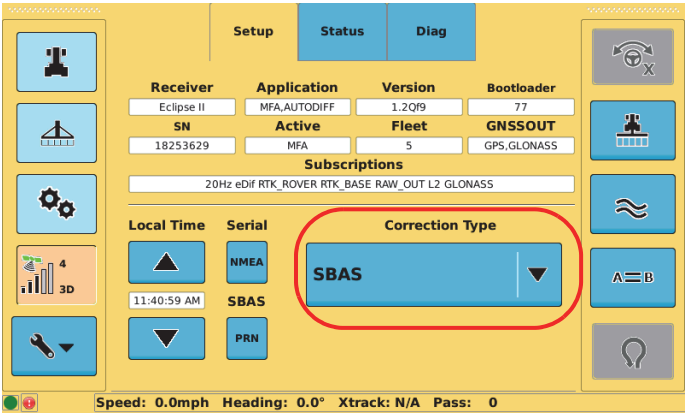
Note: e-Dif should be used only for relative guidance applications and is not recommended for data recording and subsequent comparative analysis. Relative positional accuracy will typically drift at a rate of 1-2 m (3-6.5 ft) per hour making pass-to-pass accuracy for broad-acre applications acceptable. However, absolute positional accuracy errors may approach ±10 m (±33 ft).

Selecting e-Dif as the Differential Correction Type

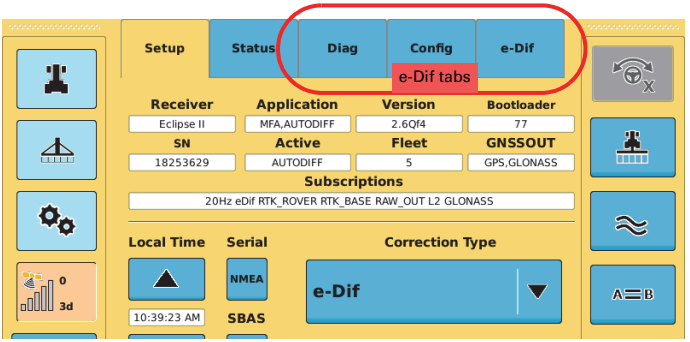
To select e-Dif as the differential correction type:

1. Press the **GPS** screen button then the **Setup** tab. The Setup screen appears.





2. Press the **Correction Type** drop-down and select **e-Dif**. The e-Dif related tabs appear and an audible beep sounds.

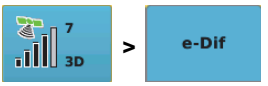


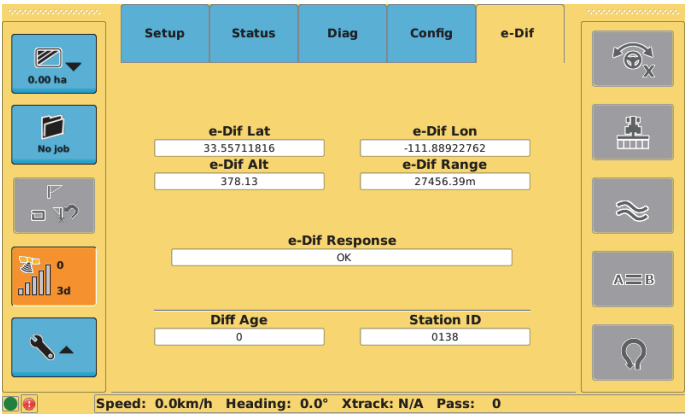
Initialization of e-Dif on Powerup

After powerup STX must track GPS satellites for approximately 10 minutes before it can generate differential corrections. The vehicle must be stationary during this time and the antenna should have a clear view of the sky. When STX has finished tracking, the e-Dif Response field displays “OK.”

To view e-Dif status information and verify e-Dif is working correctly:

1. Press the **GPS** screen button then the **e-Dif** tab. The e-Dif screen appears.





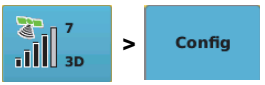
2. Confirm the e-Dif Response field displays “OK.”

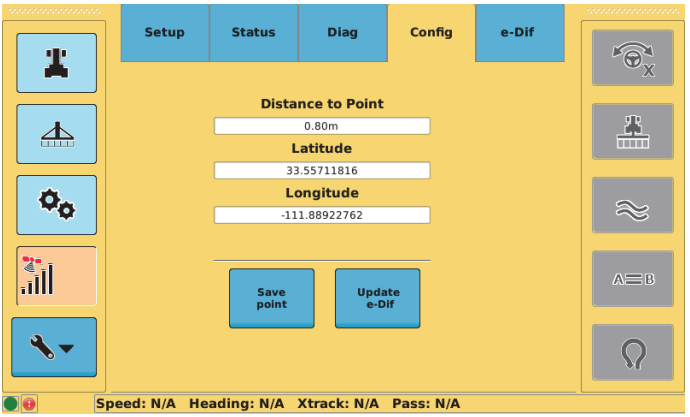
   If “OK” does not appear, verify your hardware/cable connections. If you need further assistance, contact your dealer or Outback Guidance Customer Service.

Updating e-Dif

If a job is interrupted or suspended, for hours or days for example, you need to be able to restart the job at the point (exact location) at which it was suspended. You record (and physically mark as a backup) the point at which the job is suspended. When you are ready to resume the job, use STX guidance to return to that point (which you can confirm with a physical mark). Once at that point, update the e-Dif correction and restart where you left off.

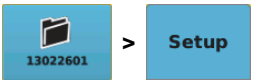
1. At the point at which the job is suspended (where you stop your vehicle and turn Apply Off):
   a. Press the **GPS** screen button then the **Config** tab. The Config screen appears.

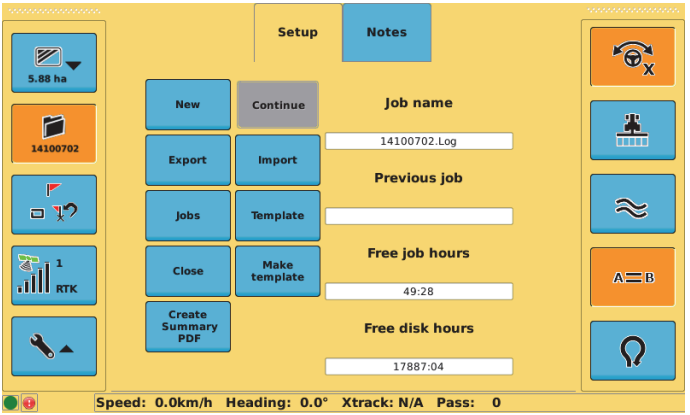




   b. Press **Save point**. STX records the vehicle's exact location and populates the Latitude and Longitude fields with this location.
   c. Place a physical marker at the exact location (recommended).

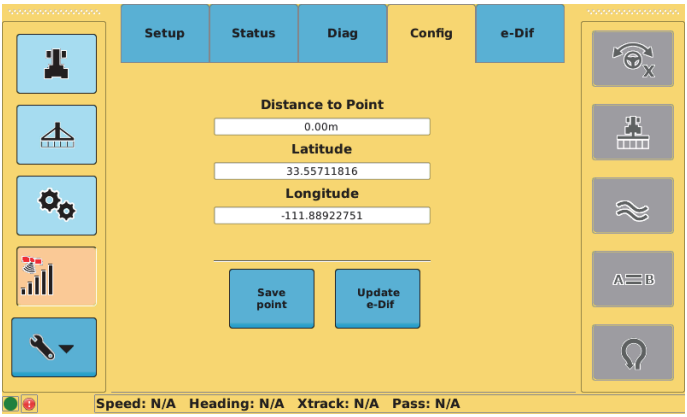
2. Press the **Job** screen button then the **Setup** tab. The Setup screen appears.





3. Press **Close** to save the current job.
4. When you are ready, load the job (see “Closing a Job” on page 85).
5. Select the Last Apply point (see “Returning to an Existing Point” on page 154).

   STX guides you back to the point where it last logged any job data. Because it is important to return to the exact physical location, you should use STX guidance and your physical marker to return to that exact location.
6. When you reach the return point, stop the vehicle and confirm STX is not logging data.
7. Press the **GPS** screen button then the **Config** tab to display the Config screen. Confirm you have reached the exact location using the Distance to Point field.



8. Press **Update e-Dif**. STX resets the e-Dif correction.
9. Resume guidance by pressing either the **Straight Guidance** control button or the **Contour Guidance** control button.

Appendix: STX Screens Reference

Tools Screens
GPS Screens
Vehicle Screens
Implement Screens
Job Screens
Map Screen

This appendix provides descriptions of each STX screen/tab (including the buttons and field on the tabs). Your screens/tabs may vary depending on the application being used or optional system components (such as eDriveXC/XD or AC110) installed.

Tools Screens

The Tools screen button provides access to the System, Display, Rate Section, and Codes screens.

System Screen

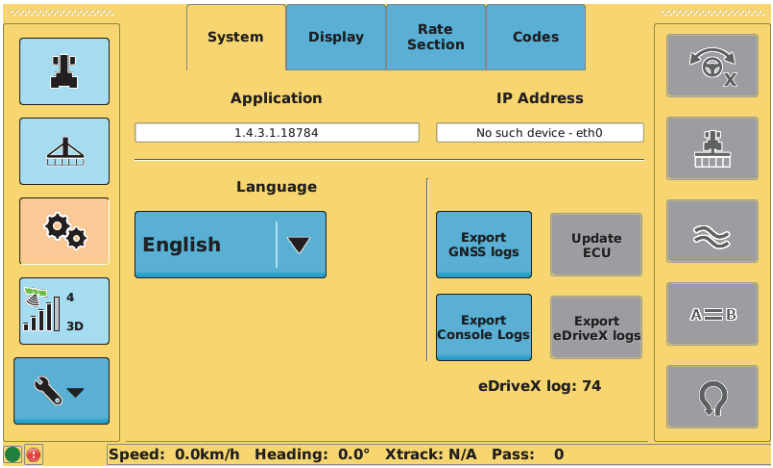


Table A-1: System (Tools) screen button/field descriptions

Button/Field	Function/Description
Application 1.4.3.1.18784	Current version of STX application software.
IP Address No such device - eth0	*This field is for future use only.*
English	Language currently in use on STX. See “Setting the Language” on page 25 for more information.
Export GNSS logs	Export GNSS logs to a USB drive inserted in the STX terminal. STX creates a folder name based on the current UTC date and time. See “Exporting GNSS Logs” on page 30 for more information.
Update ECU	Update the ECU firmware from a USB drive. See “Updating eDriveXC/XD ECU Firmware” on page 34 for more information.

Table A-1: System (Tools) screen button/field descriptions *(continued)*

Button/Field	Function/Description
Export Console Logs	Export console logs to a USB drive inserted in the STX terminal. STX creates a folder name based on the current UTC date and time. See “Exporting Console Logs” on page 32 for more information.
Export eDriveX logs	Export eDriveXC/XD logs to a USB drive inserted in the eDriveXC/XD ECU. A "logs" folder is created with a subfolder based on the MAC address of the ECU (for example, 00d0c9bb25b4). See “Exporting eDriveXC/XD Logs” on page 33 for more information.
eDriveX log: 220	Number of the current eDriveXC/XD log (the file to which data is being logged). This is the log you can export to a USB drive.

Display Screen

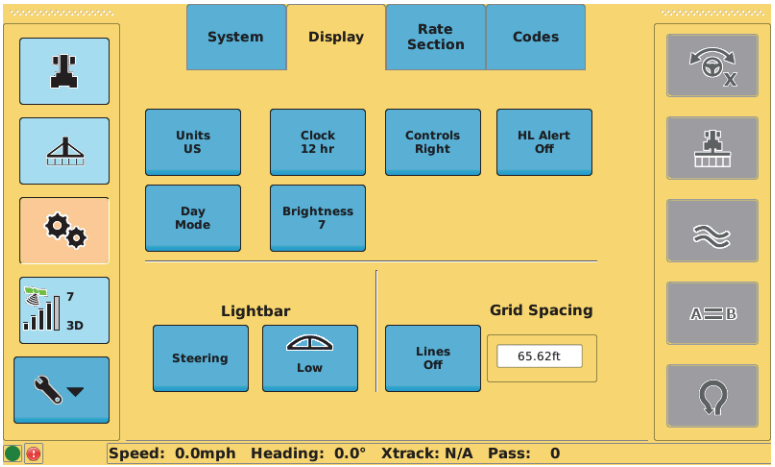


Table A-2: Display (Tools) screen button/field descriptions

Button/Field	Function/Description
Units Metric	Toggle between US or Metric, setting the unit of measurement in which STX displays and records all measurements.
Clock 12 hr	Set the clock to either a 12-hour or 24-hour format.
Controls Right	Display the control buttons (Steering, Apply, etc.) on either the left or right side of the screen—the screen buttons (Vehicle, Implement, Tools, etc.) appear on the opposite side.

Table A-2: Display (Tools) screen button/field descriptions *(continued)*

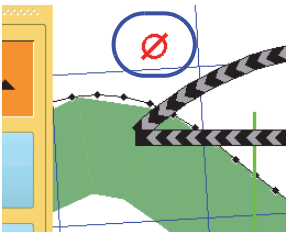
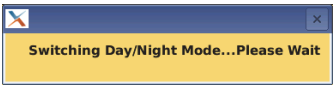
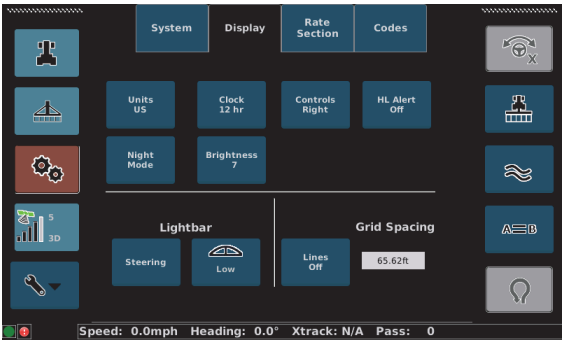
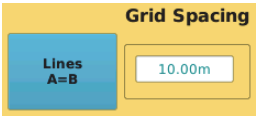
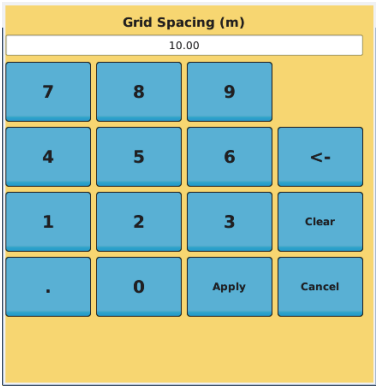
Button/Field	Function/Description
	Toggle headland alert on/off A headland alert occurs when the implement enters a headland—a previously applied area. The alert is both an audible tone and an indicator (red circle with a line through it) that appears in the upper left of the screen. 
	Toggle between daytime (Day) or nighttime (Night) mode—Night mode shown below. When you switch modes a 'switching mode' message appears briefly.   Rebooting the terminal resets the terminal to Day mode.
	Cycle through the display brightness from 1 (dim) to 10 (bright).
	• Lightbar selection (left) button - cycle between Steering, XTrack (crosstrack), and Off • Lightbar sensitivity (right) button: – Cycle through High, Medium, and Low sensitivity when the lightbar selection button is Steering or XTrack – Unavailable (gray) when the lightbar selection button is Off

Table A-2: Display (Tools) screen button/field descriptions *(continued)*

Button/Field	Function/Description
	• Lines button - cycle through A=B, Grid, and Off. • Grid Spacing field (available only when you set Lines to Grid) - display the Grid Spacing data entry window where you enter the grid spacing and press Apply. 

Rate Section Screen

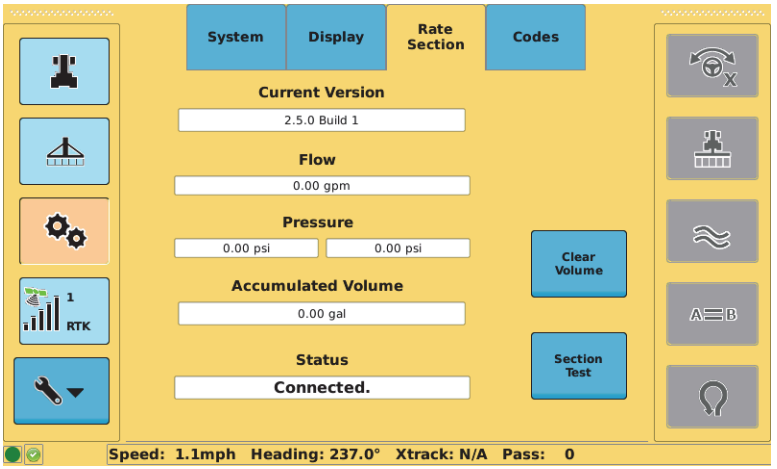
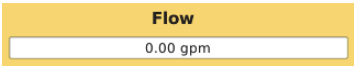
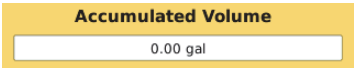
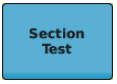


Table A-3: Rate Section (Tools) screen button/field descriptions

Button/Field	Function/Description
	AC110 software version currently installed.

Table A-3: Rate Section (Tools) screen button/field descriptions *(continued)*

Button/Field	Function/Description
	Current flow rate.
	Liquid rate control pressure. See “Calibrating Rate Control” on page 135 for more information on how these values relate to calibrating your rate control.
	Total product applied until you clear (reset to zero) it by pressing Clear Volume (see later in this table). For example, you may want to record all product volume applied for a season or for a job.
	AC110 connection status (Connected or Disconnected).
	Press to clear the Accumulated Volume field. See “Rate and Section Control Diagnostics” on page 147 for more information.
	Press to perform a section test. See “Rate and Section Control Diagnostics” on page 147 for more information.

Codes Screen

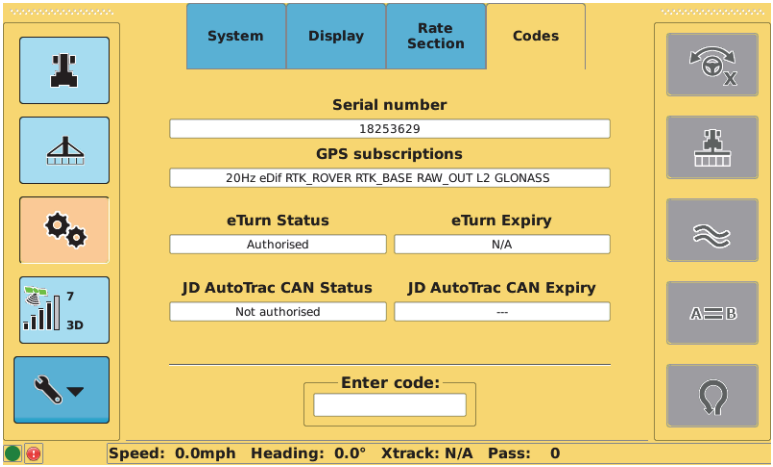


Table A-4: Codes (Tools) screen button/field descriptions

Button/Field	Function/Description
Serial number 18253629	Serial number of the STX terminalS
GPS subscriptions 20Hz eDif RTK_ROVER RTK_BASE RAW_OUT L2 GLONASS	Current GPS/GNSS subscriptions
eTurn Status Authorised eTurn Expiry N/A	eTurns subscription status (Authorized or Not Authorized) and expiration date.
JD AutoTrac CAN Status Not authorised JD AutoTrac CAN Expiry ---	JD AutoTrac connection status (Connected or Not Connected) and subscription expiration date.
Enter code:	Press to display the Enter code data entry window where you enter a subscription code for both subscriptions and feature licenses.

GPS Screens

The GPS screen buttons provide access to the various screens depending on the correction type you select (see Table A-5).

Table A-5: GPS screens depending on selected correction type

Correction Type	GPS Screens							
	Setup	Status	Diag	Config	e-Dif	Radio	RTK	Omni
SBAS	X	X	X					
e-Dif	X	X	X	X	X			
RTK	X	X	X			X	X	
OMNI	X	X	X					X

Setup Screen

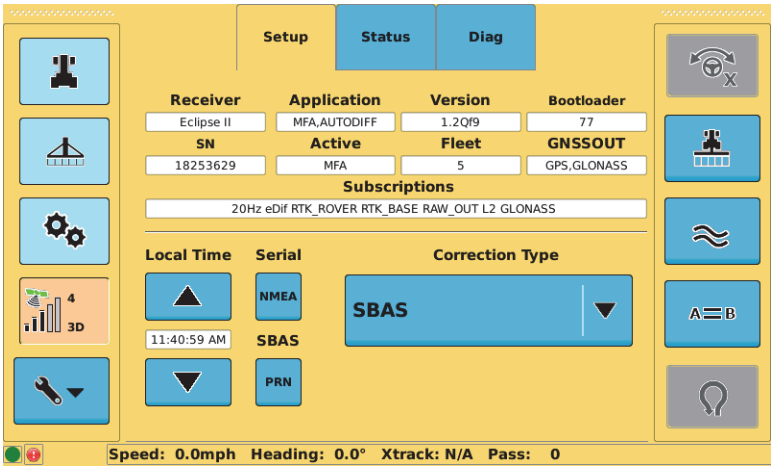


Table A-6: Setup (GPS) screen button/field descriptions

Button/Field	Function/Description
Receiver Eclipse II	GNSS receiver type.
Application MFA,AUTODIFF	GNSS applications loaded on the terminal.
Version 1.2Qf9	Receiver application version.
Bootloader 77	Version of software that enables you to update the receiver firmware.

Table A-6: Setup (GPS) screen button/field descriptions *(continued)*

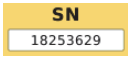
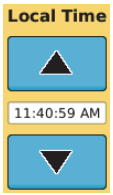
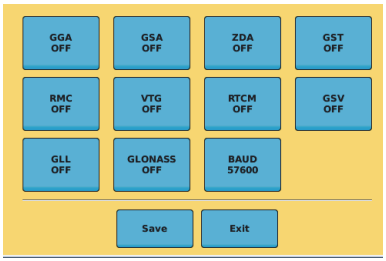
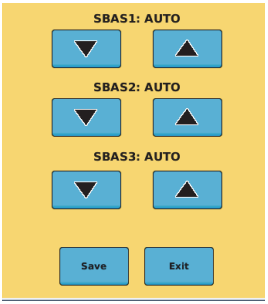
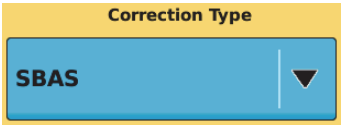
Button/Field	Function/Description
	Serial number of the terminal.
	Active application (of the applications displayed in the Application field).
	For troubleshooting purposes only, as directed by Outback Guidance Customer Service.
	Available receiver output.
	Currently subscribed applications.
	Increase the time (up arrow) or decrease the time (down arrow) in half-hour increments. The time field between the buttons shows the current time and is read-solely.
	Display the NMEA window where you press the buttons to cycle through available options to set the baud rate and output for available NMEA messages, and turn GLONASS on/off. For example, press the GGA button to cycle through OFF, 0.2 Hz, 1 Hz, 5 Hz, and 10 Hz.  • Press **Save** to save settings for the current session and after rebooting STX. • Press **Exit** to change settings only for the current session; changes will revert to their previous values after rebooting STX. You can share Outback DGPS signals with third-party mobile applications. Any application designed to receive DGPS signals from an external receiver over an RS-232 serial interface using either NMEA 0183 or RTCM will work with STX. Various cables and kits are available for specific applications such as yield monitors, rate controllers, and laptop PCs. For successful communication both STX and the external application must be configured to communicate similarly. Many applications can use the default settings, while some applications may require different settings. If you select a higher output rate (5 Hz or 10 Hz), you must also select a faster baud rate (19200 or 57600) for proper communication. *Note: NMEA message rates vary based on your subscription.*

Table A-6: Setup (GPS) screen button/field descriptions *(continued)*

Button/Field	Function/Description
	Display the SBAS PRN window, where you select the SBAS satellites (AUTO or specific PRNs) used in STX's position calculation. The default value for each SBAS setting is Auto (STX automatically selects from the available satellites). If you change any of these settings and then set any of them back to Auto, all three are automatically set back to Auto (you cannot have a mix of manual and auto settings). 
	Press to select a correction type—your selection determines what GPS screens are available in addition to Setup, Status, and Diag. See "Correction Type Overview" on page 28.

Status Screen

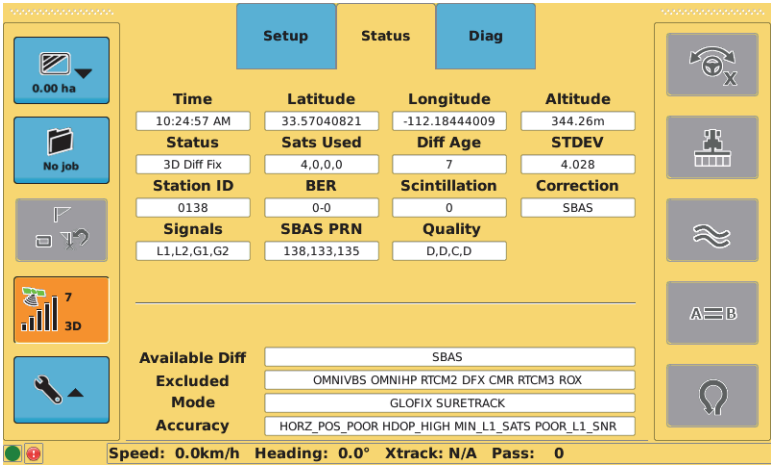


Table A-7: Status (GPS) screen button/field descriptions

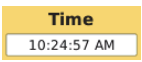
Button/Field	Function/Description
	Current time.
	Vehicle's current latitude.

Table A-7: Status (GPS) screen button/field descriptions *(continued)*

Button/Field	Function/Description
Longitude -112.18444009	Vehicle's current longitude.
Altitude 344.26m	Vehicle's current altitude.
Status 3D Diff Fix	Status of the GPS receiver to receive GPS differential corrections. Possible values are: • For SBAS and RTK (No Fix, 2d Fix, 3d Fix, 2D Diff Fix, 3D Diff Fix, RTK Acquire, RTK Fix, Download PGM, Warming up...) • For OmniSTAR (Unknown, None, AUT, DIF, FLT, FIX)
Sats Used 4,0,0,0	Number of GNSS satellites used to calculate the position.
Diff Age 7	Age of corrections (how many seconds since last correction was received) used in DGPS calculation. A value > 120 sec requires acquisition of new RTK lock; for SBAS, the value is typically 6-10 sec).
STDEV 4.028	Pseudo-estimate of the DGPS solution accuracy determined as the RMS value of the positional residual errors. STDEV is valid only if six or more satellites are used in the solution calculation. Typical values for SBAS correction are 0.5 ft – 1.5 ft (0.15 m – 0.45 m). Typical values for RTK corrections are < 0.1 ft (3 cm).
Station ID 0138	ID of correction station.
BER 0-0	Relative strength of the correction satellites. For WAAS, two numbers are shown separated by a hyphen. The number can be from 0 to 500, (0 is the best, 500 is the worst). If BER > 20 verify the antenna has a clear view of the sky to properly find/track correction satellites. STX tracks multiple correction satellites, each satellite has a different BER, and the value in the BER field represents each value separated by a hyphen. For example, a BER of 8-500 means STX has a very good signal on one satellite (BER=8) and is not receiving corrections from the other satellite (BER=500, the lowest reception value). Only one satellite must have a low BER value (< 20) to provide differential corrections.
Scintillation 0	Ionospheric scintillation, values are: • 0 (little or no scintillation - does not adversely affect RTK solution). • 1-100 (scintillation detected - adversely affects RTK solution).
Correction SBAS	Type of differential correction being used: • SBAS (SBAS) • RTK (ROX, CMR, or RTCM v3) • e-Dif (e-Dif) • OMNI (OmniSTAR VBS, XP, HP, or G2)
Signals L1,L2,G1,G2	GNSS signals being used: • GPS - L1, L2 • GLONASS - G1, G2

Table A-7: Status (GPS) screen button/field descriptions *(continued)*

Button/Field	Function/Description
SBAS PRN 138,133,135	Satellites used by SBAS.
Quality D,D,C,D	Quality of GNSS signals.
Available Diff SBAS	Differential corrections the receiver is getting.
Excluded OMNIVBS OMNIHP RTCM2 EDIF DFX CMR RTCM3 ROX	Differential corrections the receiver is not using (excluded from the differential solution).
Mode GLOFIX SURETRACK	Current operating modes that control various GPS tracking parameters.
Accuracy HORZ_POS_POOR HDOP_HIGH MIN_L1_SATS POOR_L1_SNR	RTK accuracy status.

Diag Screen

The fields on the Diag screen are the same regardless of the selected correction type on the Setup screen (see “Setup Screen” on page 176). The Diag screen is mainly used for troubleshooting purposes or when providing information to Outback Guidance Customer Service.

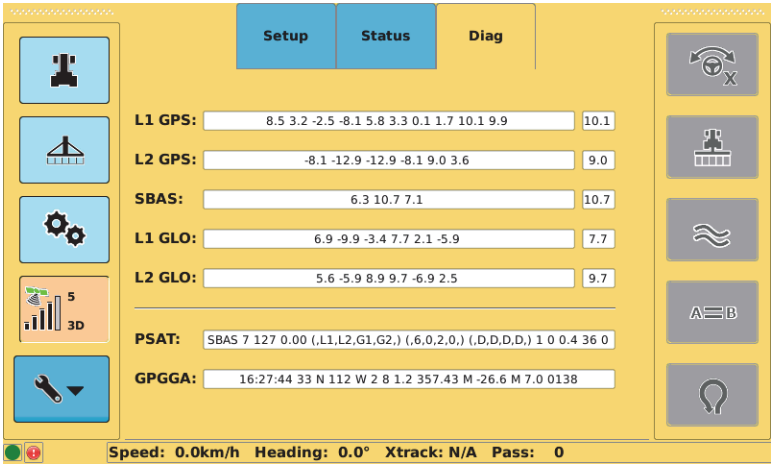


Table A-8: Diag (GPS) screen button/field descriptions

Button/Field	Function/Description
L1 GPS: 11.3 10.0 16.7 14.1 10.5 12.2 8.5 -2.9 12.5 17.8 21.7 — 21.7 **L2 GPS:** 12.7 5.2 18.7 13.8 10.5 13.6 5.0 0.9 -9.9 23.2 32.2 — 32.2	SNR values of L1 and L2 GPS signals. The values in the boxes on the right are the maximum values of the SNR values.
SBAS: 12.5 14.8 12.8 — 14.8	SNR values of SBAS signals. The value in the box on the right is the maximum value of the SNR values.
L1 GLO: 12.7 8.9 10.0 12.8 18.5 13.7 — 18.5 **L2 GLO:** 12.2 16.6 16.5 13.7 21.9 17.1 — 21.9	SNR values of L1 and L2 GLONASS signals. The values in the boxes on the right are the maximum values of the SNR values.
PSAT: SBAS 7 103 0.00 (,L1,L2,G1,G2,) (,7,0,0,0,) (,A,A,B,A,) 0 0 0.6 68 0 **GPGGA:** 18:36:22 39 N 95 W 2 7 1.3 352.86 M -29.5 M 7.0 0133	Information transmitted in PSAT,RTKSTAT and GPGGA messages.

Config Screen

The Config screen is displayed only when you select e-Dif as the correction type (see Table A-5 on page 176).

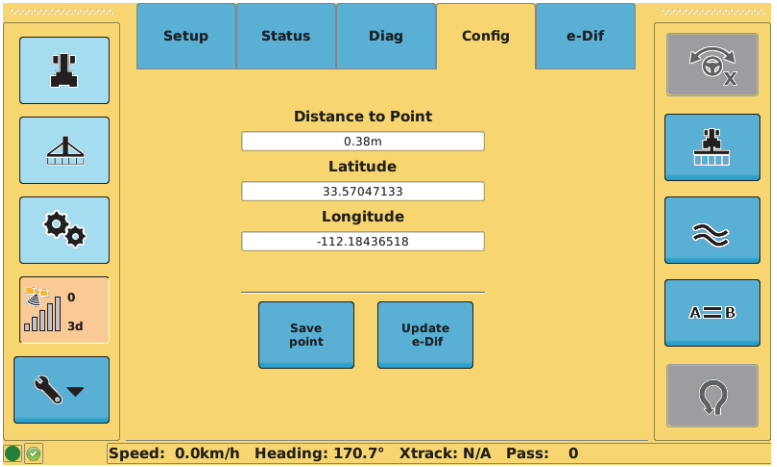


Table A-9: Config (GPS) screen button/field descriptions

Button/Field	Function/Description
Distance to Point 0.38m	Distance from the vehicle's current position to the last point that e-Dif was saved.
Latitude 33.57047133	Latitude of the point where e-Dif was last saved.
Longitude -112.18436518	Longitude of the point where e-Dif was last saved.
Save point	Save the current location as a reference point.
Update e-Dif	Update the e-Dif solution with the current location.

e-Dif Screen

The e-Dif screen is displayed only when you select e-Dif as the correction type (see Table A-5 on page 176).

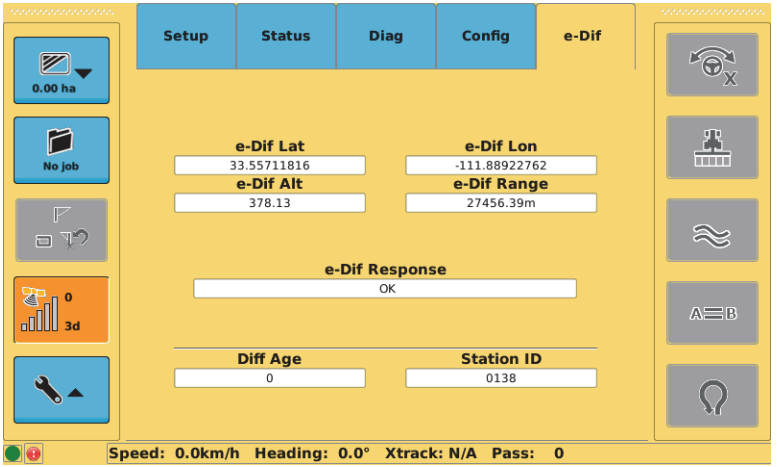
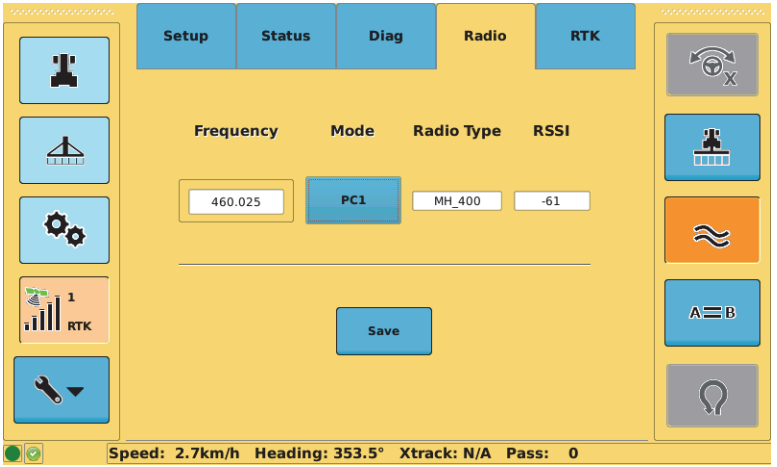


Table A-10: e-Dif (GPS) screen button/field descriptions

Button/Field	Function/Description
e-Dif Lat 33.55711816	Latitude of the reference point in decimal degrees.
e-Dif Lon -111.88922762	Longitude of the reference point in decimal degrees.
e-Dif Alt 378.13	Ellipsoidal height of the reference point.
e-Dif Range 27452.87m	Distance from saved e-Dif point.
e-Dif Response OK	e-Dif status; possible values are: • OK • FAILED Not Enough Stable Satellite Tracks
Diff Age 0	Counter that starts counting up when an e-Dif solution is first computed.
Station ID 0138	ID of correction station.

Radio Screen

The Radio screen is displayed only when you select RTK as the correction type (see Table A-5 on page 176).

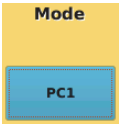


Radio screen above is for 400 MHz radio option; fields at right appear on screen for 900 MHz radio option.

Table A-11: Radio (GPS) screen button/field descriptions

Button/Field	Function/Description
	Radio frequency (applies to 400 MHz radio only).
	Radio channel (applies to 900 MHz radio only).

Table A-11: Radio (GPS) screen button/field descriptions *(continued)*

Button/Field	Function/Description
	Radio mode (press to cycle through available options). **For 400 MHz radio:** • PC1—Most commonly-used mode for RTK applications, providing the best sensitivity while ensuring enough throughput to support the largest possible RTK message. • PC2—Not commonly used, providing better throughput but much poorer sensitivity than PC1 mode (Outback Guidance recommends using this mode only for compatibility reasons). • PC3—Similar to PC1, but with forward error correction (FEC) is turned off (allowing for improved throughput, but poorer sensitivity). • PC4—Similar to PC2, but with forward error correction (FEC) is turned off (allowing for improved throughput, but poorer sensitivity) (Outback Guidance recommends using this mode only for compatibility reasons). • AgJunction—Similar to PC3 mode except the link rate is 16000 bps instead of 9600 bps, allowing for a payload throughput of approximately 14000 bps while still maintaining excellent sensitivity (this mode supports setting up network repeaters and retransmissions). **For 900 MHz radio:** • SLOW—Compatible with Outback BaseLineX, providing the best radio sensitivity, but with very limited throughput. • SLOW2—Similar to SLOW, but with FEC turned off (allowing for significant throughput improvement and enables additional retransmissions of the RTK messages but with reduced sensitivity). • FAST—Differs from SLOW and SLOW2 mode by virtue of its link rate (FAST link rate is 115200 bps; SLOW/SLOW2 link rate is 19200 bps), where a faster link rate allows significantly improved data throughput that helps mitigate in-band interference. • Note: FAST is recommended for GLONASS. You can use SLOW with GLONASS, but the low data rate means there can be no retransmissions, which is why it is not recommended. • FAST+R—FAST mode that supports repeaters. This cuts the available bandwidth and number of retransmissions in half.
	Radio type in the rover receiver.
	Received signal strength indicator—actual power in the received radio signal (in dBm).
	Save any changes on this screen (Frequency/Channel and/or Mode).

RTK Screen

The RTK screen is displayed only when you select RTK as the correction type (see Table A-5 on page 176).

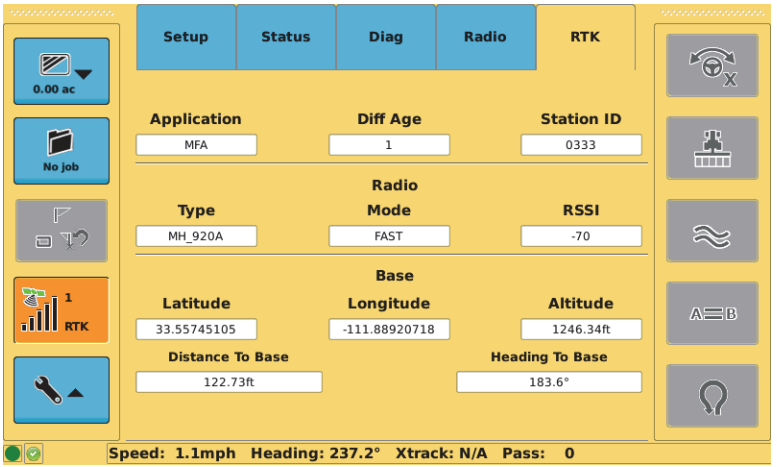


Table A-12: RTK (GPS) screen button/field descriptions

Button/Field	Function/Description
Application MFA	Active (current) application.
Diff Age 1	Age of the corrections used in the DGPS calculation.
Station ID 0333	ID of correction station.
Radio Type: MH_920A Mode: FAST RSSI: -70	• Type - radio type in the rover receiver. • Mode - current radio mode. • RSSI - received signal strength indicator (actual power in the received radio signal in dBm).

Table A-12: RTK (GPS) screen button/field descriptions *(continued)*

Button/Field	Function/Description
	• Latitude - base station latitude, in decimal degrees. • Longitude - base station longitude, in decimal degrees. • Altitude - base station altitude, in feet or meters. • Distance To Base - distance between base and rover radio. • Heading To Base - direction from rover to base, in degrees.

Omni Screen

The Omni screen is displayed only when you select OMNI (OmniSTAR) as the correction type (see Table A-5 on page 176).

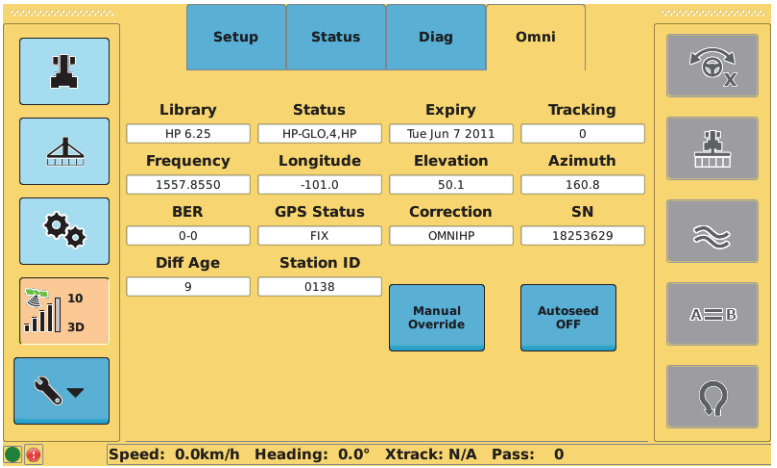


Table A-13: Omni (GPS) screen button/field descriptions

Button/Field	Function/Description
	Version of service.

Table A-13: Omni (GPS) screen button/field descriptions *(continued)*

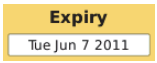
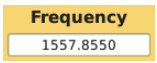
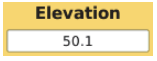
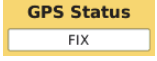
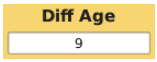
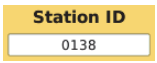
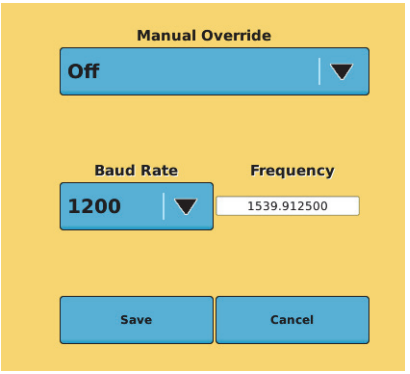
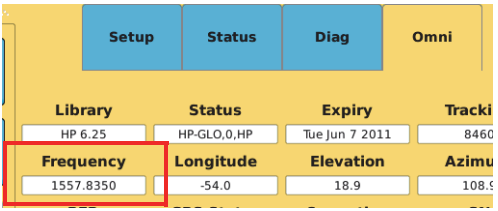
Button/Field	Function/Description
	Current OmniSTAR status level.
	Subscription expiration date.
	OmniSTAR tracking status.
	Frequency of OmniSTAR satellite.
	Satellite location (longitude) that covers the area in which you will be working.
	Elevation of OmniSTAR satellite.
	Azimuth of OmniSTAR satellite.
	Bit error rate - relative strength of the correction satellite. The number can be from 0 to 500, with 0 being the best and 500 being the worst. If BER > 20 verify the antenna has a clear view of the sky to properly find and track correction satellites. For OmniSTAR the numbers before and after the hyphen will be the same.
	Current status level (possible values are FIX, FLT, DIF, AUT).
	Differential correction in use: VBS, XP, HP, or G2.
	GNSS serial number.
	Age of the corrections used in the DGPS calculation.
	ID of correction station.

Table A-13: Omni (GPS) screen button/field descriptions *(continued)*

Button/Field	Function/Description
Manual Override	Enables you to define the OmniSTAR frequency to be used. 1. Press **Manual Override**. The manual override screen appears. 2. Press the **Manual Override** drop-down and select On. 3. (Optional) Press the **Baud Rate** drop-down and select a different baud rate. 4. Press the **Frequency** field, enter a value in the window that appears, then press Apply.  5. Press **Save**. You are returned to the Omni screen and the new frequency appears in the Frequency field. 
Autoseed OFF	Set to On to have STX automatically use the last known position to reduce HP/XP convergence time. Default is Off. **⚠WARNING:** *When Autoseed is On, there is a potential for position shifts if the vehicle is moved after shutting the unit off. The vehicle must remain in the same position with a clear view of the sky between the times of powering the unit off and powering the unit back on. If this is not possible, it is recommended that Autoseed be turned Off.*

Vehicle Screens

The Vehicle screen button provides access to the following screens:

- Main
- Steer
- Details
- Status
- ESi (if ESi valve type, shown below) or P1 (if Plus+1 valve type)

Main Screen

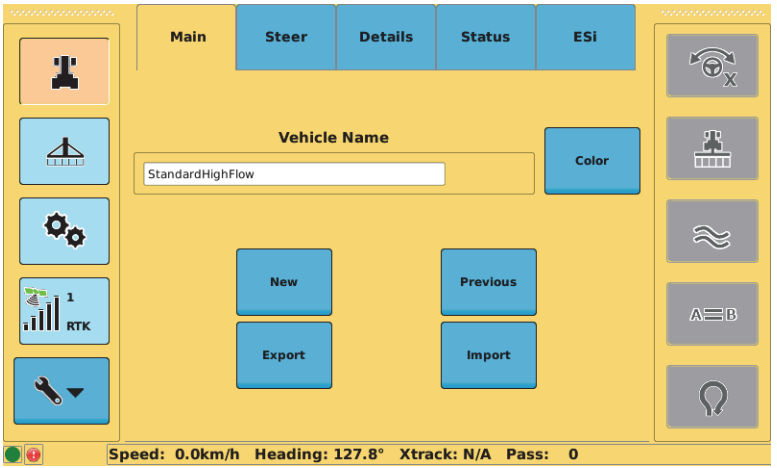


Table A-14: Main (Vehicle) screen button/field descriptions

Button/Field	Function/Description
Vehicle Name StandardHighFlow	Display the Vehicle Name screen where you edit the current vehicle name.
Color	Display the color selection window where you select a color for the current vehicle.
New	Display the Vehicle Name screen where you enter a name for a new vehicle.
Previous	Display a vehicle list window where you load a vehicle, delete a vehicle, or delete all vehicles. *Note: You cannot delete the 'default' vehicle or the current vehicle.*

Table A-14: Main (Vehicle) screen button/field descriptions *(continued)*

Button/Field	Function/Description
	Display a vehicle list window where you can export one or all vehicles to a USB drive. *Note: Vehicle files are exported to a 'vehicles' folder on the USB drive. STX automatically creates this folder (if it does not already exist) during the export process.*
	Display a vehicle list window where you can import one or all vehicles from a USB drive. *Note: Vehicle files must be in 'vehicles' folder on the USB drive.*

Steer Screen

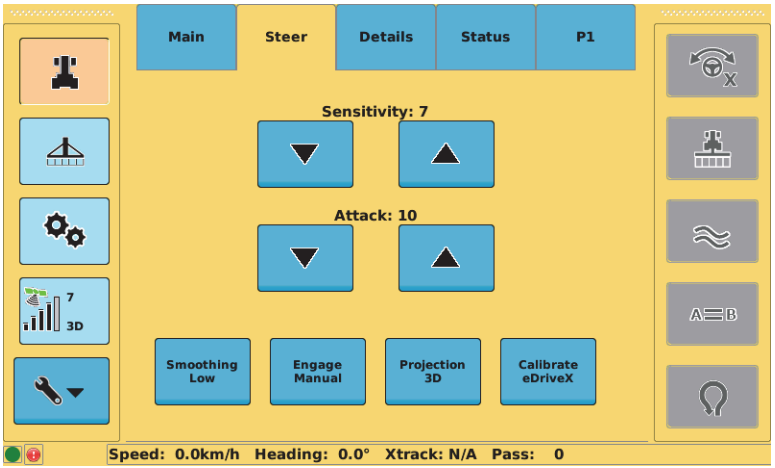


Table A-15: Steer (Vehicle) screen button/field descriptions

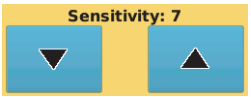
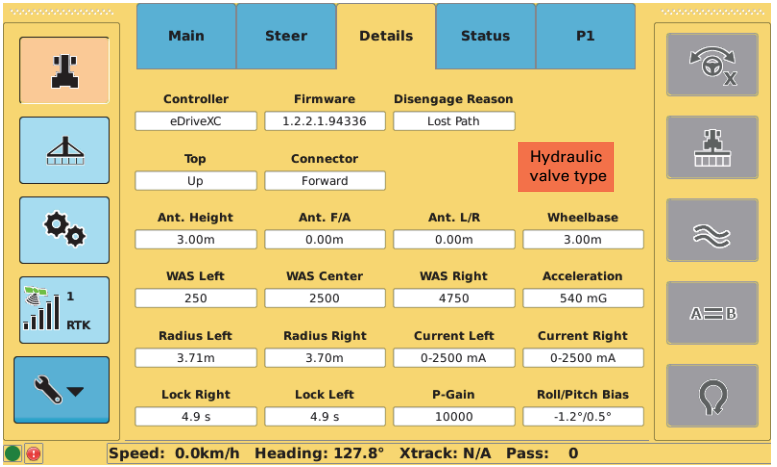
Button/Field	Function/Description
	Adjust the sensitivity of eDriveXC/XD to prevent over-reaction in difficult-to-control machines—press the up arrow button to increase sensitivity and press the down arrow button to decrease sensitivity. The valid range is 1 to 10 (1 is lowest, 10 is highest). Default is 10.
	Adjust the attack of eDriveXC/XD to determine how aggressively the vehicle steers onto the guidance line when approaching it from a distance
	Cycle through smoothing settings (None, Low, Medium, and High). Steering smoothing determines the amount of smoothing of contours. The smoothing applied to the current contour is based on the smoothing setting that was active during the preceding pass.

Table A-15: Steer (Vehicle) screen button/field descriptions *(continued)*

Button/Field	Function/Description
	Toggle between Manual and Pre-Engage. When set to Manual you must press the Steering control button at the appropriate time to engage on a line. Setting to Pre-Engage enables you to activate the Steering button before all engage requirements are met when starting from a stopped position—once the requirements are met STX automatically engages on a guideline.
	Toggle between 2D and 3D projection. The projection mode relates to the effect of the earth's curvature on guidance accuracy. Select 3D as the A=B projection mode for wide field operations or interoperability with third party guidance systems that also use 3D guidance line projection.
	Start the eDriveXC/XD calibration process.

Details Screen

The Details screen provides read-only autosteering information for the currently loaded vehicle. Except for Controller, Firmware, and Disengage Reason this screen displays information you enter or STX calculates when calibrating your vehicle. Most of the items on this screen appear regardless of the vehicle/valve combination selected; however, some items are determined by your vehicle/valve types as shown in the two figures below.



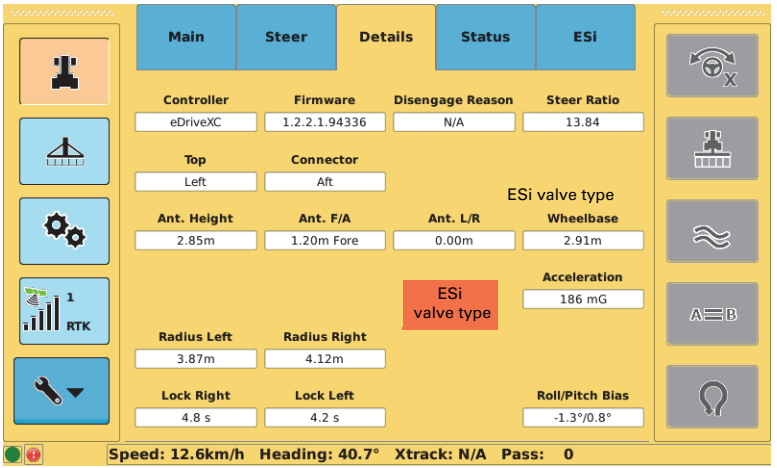


Table A-16: Details (Vehicle) screen button/field descriptions

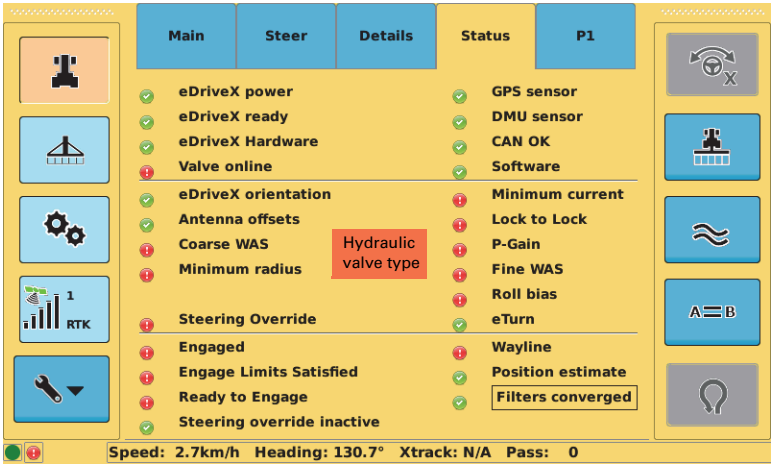
Button/Field	Function/Description
Controller eDriveXC	Controller connected to STX—will show None or the connected autosteering component (eDriveXC/XD).
Firmware 1.2.2.1.94336	Current autosteering firmware version.

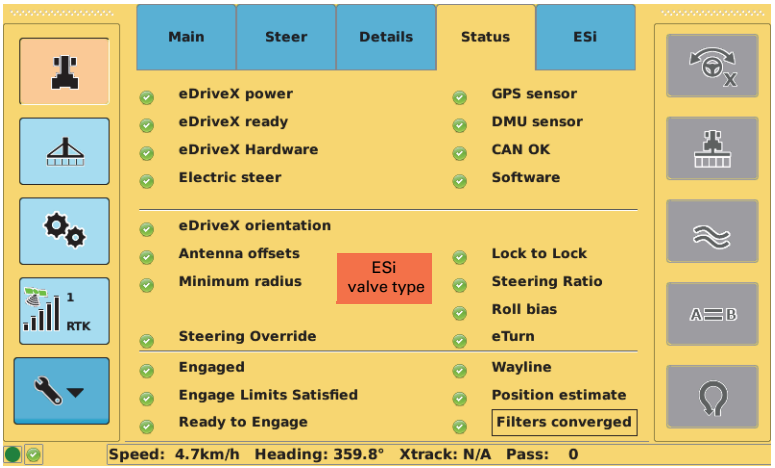
Table A-16: Details (Vehicle) screen button/field descriptions *(continued)*

Button/Field	Function/Description
Disengage Reason Lost Path	Previous disengage reason. Contact your dealer or Outback Guidance Customer Service if you are unable to resolve a disengage issue.
Top Up	ECU top orientation.
Steer Ratio 13.84	Ratio of wheel turn to vehicle turn
Connector Forward	ECU connector orientation.
Ant. Height 3.00m	Height of the antenna above ground.
Ant. F/A 0.00m	Antenna distance from fore/aft centerline.
Ant. L/R 0.00m	Antenna distance from left/right centerline.
Wheelbase 3.00m	Wheelbase of current vehicle.
WAS Left 250 WAS Center 2500 WAS Right 4750	Wheel angle sensor counts at left lock, center, and right lock.
Acceleration 186 mG	Maximum lateral acceleration - eTurns will be limited to the calibrated maximum g-force.
Radius Left 3.87m Radius Right 4.12m	eTurns minimum radius (left/right) - turning circle of the vehicle with the implement attached.
Current Left 0-2500 mA Current Right 0-2500 mA	Minimum and maximum currents left and right for steering valve.
Lock Right 4.8 s Lock Left 4.2 s	Time it takes for the machine to go from full lock left to full lock right (Lock Right) and from full lock right to full lock left (Lock Left).
P-Gain 1	Scaling factor applied to the current to optimize wheel response (Current only, not Lock-to-Lock).
Roll/Pitch Bias -1.3°/0.8°	Mounting bias of the autosteering ECU.

Status Screen

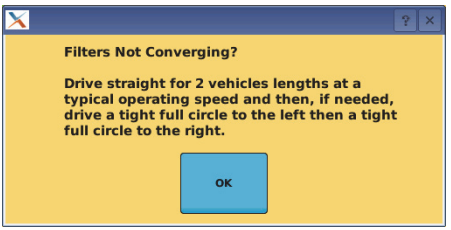
The Status screen shows the hardware, calibration, and run time status of eDriveXC/XD. All items (except for "Engaged") must be green (OK) before you can engage on a guideline. The items on the Status screen are determined by your vehicle/valve type—hydraulic and ESi valve type examples are shown below.





Each item's status will show as good (green/checked, see above) or an alert (red/exclamation point, see at right) that indicates an error or limitation.

If a status item has a box around it (such as Filters converged shown above) and that status item has an alert status, press the field to display instructions on how to resolve the error then press OK to close the instructions window.



ESi Screen

The ESi screen provides read-only ESi status information. This screen is available (visible) only if you have ESi connected and powered on.

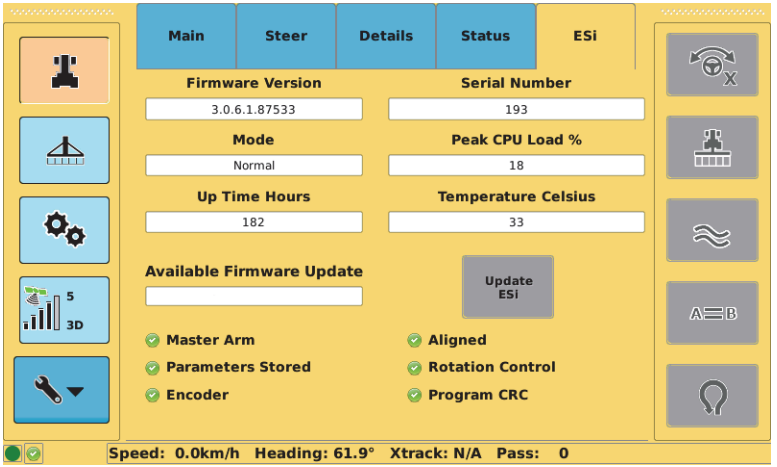
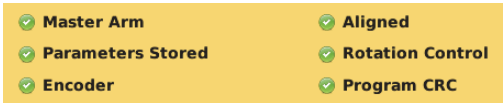


Table A-17: ESi (Vehicle) screen button/field descriptions

Button/Field	Function/Description
Firmware Version 3.0.6.1.87533	ESi firmware version.
Serial Number 193	ESi serial number.
Mode Normal	Mode of operation; displays ‘Normal’ when ESi is functioning properly. If a value other than 'Normal' appears, contact Outback Guidance Customer Service or your local dealer.
Peak CPU Load % 18	ESi CPU peak load %.
Up Time Hours 182	Total cumulative time the ESi has been powered.
Temperature Celsius 33	ESi motor temperature.
Available Firmware Update Update ESi	Use the Update ESi button to update your ESi firmware to the version listed in the Available Firmware Update field. Refer to the separate update instructions included with your release to update ESi firmware.

Table A-17: ESi (Vehicle) screen button/field descriptions *(continued)*

Button/Field	Function/Description
	All items will have a green check when the system is operating properly. If an item has a red exclamation point, an error is indicated—contact Outback Guidance Customer Service or your local dealer. *Note: The Aligned (Hardware) item will have a red exclamation point under any of the following conditions until you turn the wheel slightly: ESi is first powered on, eDriveXC/XD is rebooted, or valve type is changed to ESi.*

P1 Screen

The P1 screen provides read-only Plus+1 status information. This screen is available (visible) only if you have Plus+1 connected and powered on.

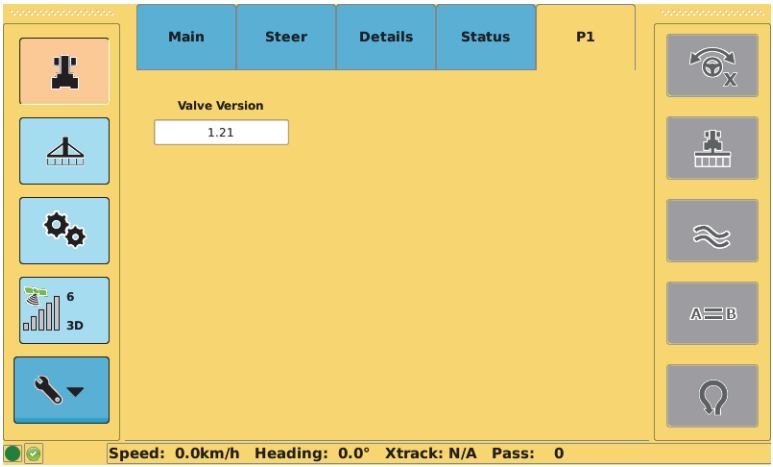


Table A-18: P1 (Vehicle) screen button/field descriptions

Button/Field	Function/Description
	Plus+1 steering controller firmware version.

Implement Screens

The following sections provide information on all the fields and buttons on the Implement screens:

- Main screen
- Setup screen
- Rate / Section Control
- eTurn Calibrate screen (appears only if eDriveXC connected and system authorized for eTurns)
- eTurn Setup screen (appears only if eDriveXC connected and system authorized for eTurns)

Main Screen

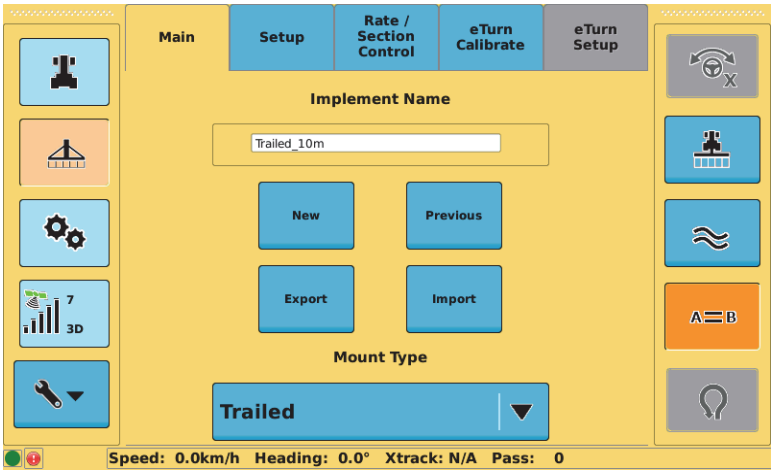


Table A-19: Main (Implement) screen button/field descriptions

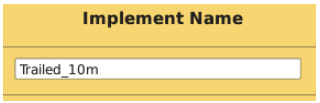
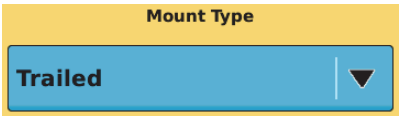
Button/Field	Function/Description
	Display the Implement Name screen where you edit the current implement name.
	Display a implement list window where you load an implement, delete an implement, or delete all implements. *Note: You cannot delete the 'default' implement or the current implement.*
	Display the Implement Name screen where you enter a name for a new implement.

Table A-19: Main (Implement) screen button/field descriptions *(continued)*

Button/Field	Function/Description
	Display an implement list window where you can export one or all implements to a USB drive. *Note: Implement files are exported to a 'implements' folder on the USB drive. STX automatically creates this folder (if it does not already exist) during the export process.*
	Display an implement list window where you can import one or all implements from a USB drive. *Note: Implement files must be in 'implements' folder on the USB drive.*
	Press to display a drop-down of the following options: • Rigid Rear • Trailed • Rigid Front

Setup Screen

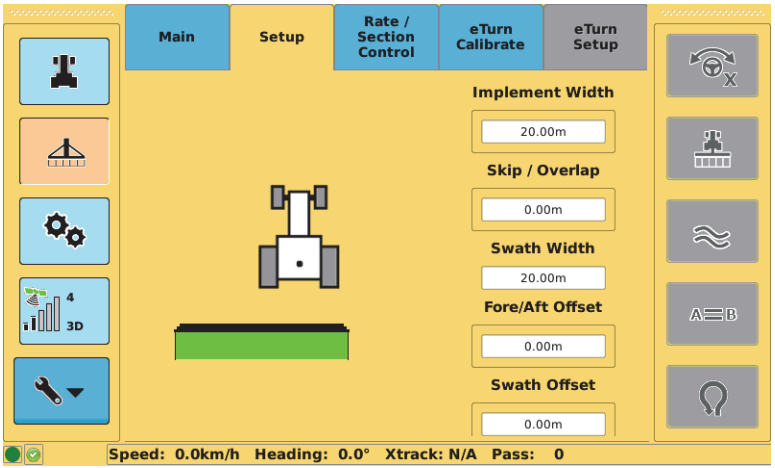


Table A-20: Setup (Implement) screen button/field descriptions

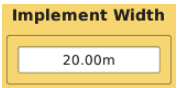
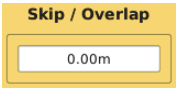
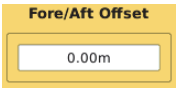
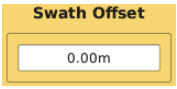
Button/Field	Function/Description
	Press once for a visual representation of the implement width (see figure above this table). Press a second time to display the Implement Width window, where you enter the width of the implement.

Table A-20: Setup (Implement) screen button/field descriptions *(continued)*

Button/Field	Function/Description
	Press once for a visual representation of a skip and an overlap. Press a second time to display the Skip / Overlap window, where you set the skip or overlap value to drive a pattern where rows intentionally skip or overlap. When you enter a skip or overlap the map screen shows this as an area between swaths in the green coverage lines, where a skip is shown as the white area between swaths and an overlap is the dark green overlap of one swath on another.
	Press once for a visual representation of the swath width, an STX-generated value that is the sum of the Implement Width and the Skip/Overlap. The Skip value is added to the Implement Width, while the Overlap value is subtracted from the Implement Width. Examples: • If the Implement Width is 20 ft and the Skip is 2 ft, the Swath Width is 22 ft. • If the Implement Width is 20 ft and the Overlap is 2 ft, the Swath Width is 18 ft.
	Press once for a visual representation of a fore/aft offset. Press a second time to display the Fore/Aft Offset window, where you set a fore or aft offset of the antenna from any implement. If the implement is in front of the vehicle, such as on a harvester, enter the distance between the implement and the antenna as a fore offset. If the implement is located behind the vehicle, such as a drawn planter, enter the distance as an aft offset.
	Press once for a visual representation of a swath offset. Press a second time to display the Swath Offset window, where you set a right or left swath offset. A swath offset corrects for an antenna that is not installed on the vehicle or implement centerline. The offset is equal to the distance between the GPS antenna centerline and the vehicle or implement centerline and corrects for this distance from the centerline.

Rate / Section Control Product Details Screen

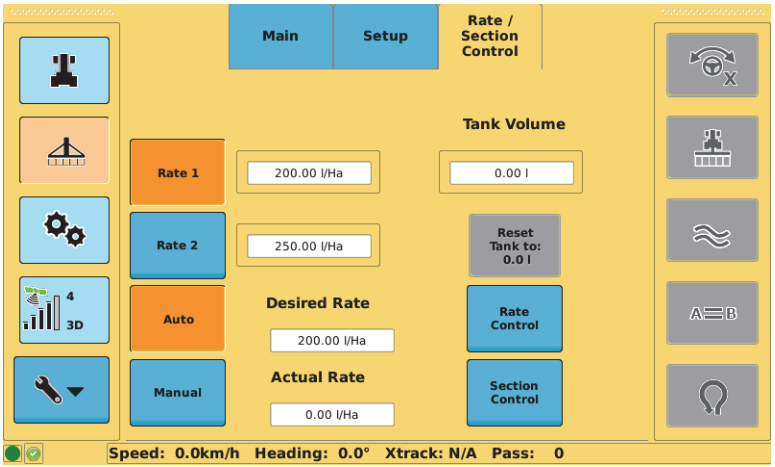
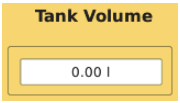


Table A-21: Product details screen button/field descriptions

Button/Field	Function/Description
	Press either field to the right of the Rate buttons to enter a predefined value for that rate. The rate button that is orange is the selected rate (Rate 1 at left)—the other rate is automatically blue (not the selected rate). To select the other rate press the blue (non-selected) rate button. *Note: If necessary, you can change the rate on the fly during application using the Rate button on the Runtime window (expanded Control buttons window)—see "Using Rate Control and Section Control" on page 144.*
	Press to toggle between enabled (orange) and disabled (blue). When enabled (orange), STX automatically controls the predefined rate you select.
	Press to toggle between enabled (orange) and disabled (blue). When enabled (orange), the regulating valve can be opened or closed only using the Force Valve buttons (up/down arrows) on the Runtime window—this is useful if the flow meter quits working and you want to keep applying.
	Desired Rate: Target rate—this is the selected rate (based on the selected Rate button) plus or minus any manual rate bumps. Actual Rate: Flow rate calculated from the flow meter.

Table A-21: Product details screen button/field descriptions *(continued)*

Button/Field	Function/Description
	Press to display the Tank Level data entry window, where you enter the volume of product in the tank. You will need to adjust this value after each load. While spraying, STX subtracts from this value what has been applied and this current volume appears in the Tank Volume field.
	Press to reset the tank volume to the original level you entered for the Tank Volume field (see previous row in this table). This enables you to reset the tank level to full with one button push when refilling the tank; otherwise, you have to re-enter data values for a full tank in the Tank Volume data entry window.
	Display the rate control screen.
	Display the section control screen.

Job Screens

The following sections provide information on all the fields and buttons on the two Job screens:

- Setup screen
- Notes screen

Setup Screen

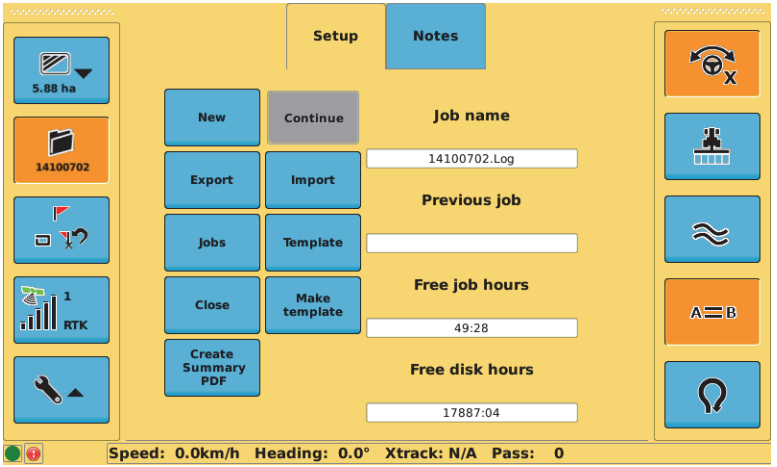


Table A-22: Setup (Job) screen button/field descriptions

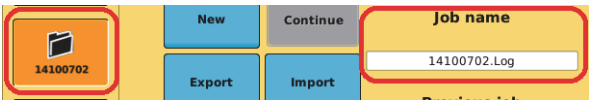
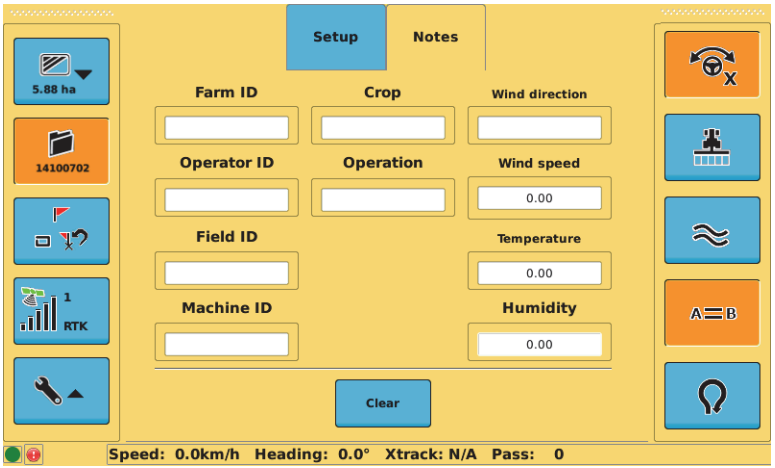
Button/Field	Function/Description
New	Begin a new job. The number in the Job name field and on the bottom of the Job screen button changes. 
Continue	Continue the most recent job. The most recently closed job (and all its data) is activated. The Continue button is available (blue) only when there is no open (active) job; otherwise, the Continue button is unavailable (gray).
Export	Display a job list window where you can export one or all jobs to a USB drive. *Note: Job files are exported to an 'S3jobs' folder on the USB drive. STX automatically creates this folder (if it does not already exist) during the export process.*
Import	Display a job list window where you can import one or all jobs from a USB drive. *Note: Job files must be in 'the S3jobs' folder on the USB drive.*

Table A-22: Setup (Job) screen button/field descriptions *(continued)*

Button/Field	Function/Description
Jobs	Display a job list window where you load a job, delete a job, or delete all jobs. *Note: You cannot delete the current job.*
Template	Load templates to or delete templates from STX.
Close	Close and save the current job.
Make template	Create a template from a selected job, saving job data to provide an outline for future jobs.

Notes Screen

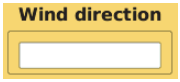
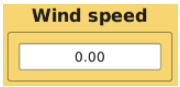
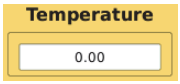
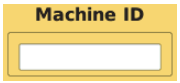
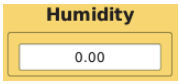
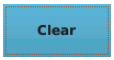


For each of the fields in Table A-23 press the field to display a data entry window, enter a value, then press Apply. Any notes you enter apply only to the current job.

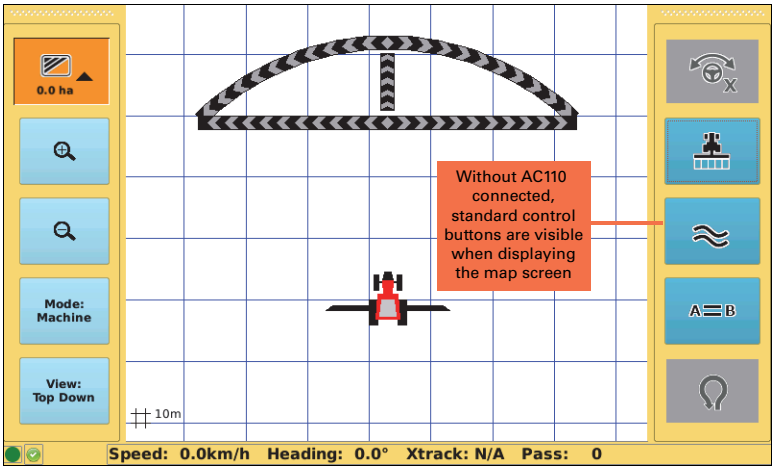
Table A-23: Notes (Job) screen button/field descriptions

Button/Field	Function/Description
Farm ID	Set name or number of the farm where the job is performed.
Crop	Set the type of crop being worked.

Table A-23: Notes (Job) screen button/field descriptions *(continued)*

Button/Field	Function/Description
	Set the direction of the wind during the job.
	Set the name or ID # of the machine operator.
	Set the type of operation performed (planting, tilling, etc.).
	Set the wind speed during the job.
	Set name or number of the field where the job is performed.
	Set the outside temperature.
	Set the name or ID# of the machine.
	Set the humidity during the job.
	Clear all fields.

Map Screen



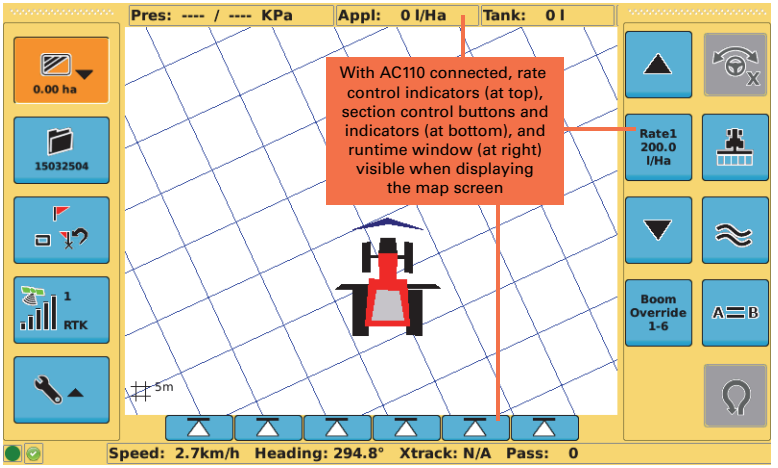


Table A-24: Map screen button descriptions

Button/Field	Function/Description
 Zoom in  Zoom out	Zoom in and zoom out of the view. See “Zooming In and Out on the Map Screen” on page 99 for more information.

Table A-24: Map screen button descriptions *(continued)*

Button/Field	Function/Description
	Press to toggle between the following modes: • Machine (can use with Top Down view or 3D view) • Field (can use Top Down view only)
	Press to toggle between the following views: • Top Down (can use with Machine or Field mode) • 3D (can use Machine mode only) See “Map Modes and Views” on page 97 for more information.
Rate and section control buttons, indicators, and related control buttons	See Chapter 7, “Rate Control and Section Control” for more information.

Index

D

E

F

K

L

M

N

O

P

R

S

T

U

V

W

Z

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