

*Trimble
Agriculture
Division*

AgGPS® 170 Field Computer

User Guide



AgGPS® 170 Field Computer

User Guide



Version 3.00
Part Number 38362-00-ENG
Revision E
March 2001

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About this Manual

Welcome to the *AgGPS 170 Field Computer User Guide* version 3.00. This manual describes how to configure and use Trimble's AgGPS® 170 Field Computer as part of the AgGPS Field Management System.

Before using the AgGPS 170 Field Computer, make sure that the:

- appropriate version of this manual is available to anyone who uses the AgGPS 170 software
- AgGPS 170 software is operated in accordance with this manual

In addition, Trimble recommends that anyone who uses the AgGPS 170 Field Computer receives training from approved personnel.

Even if you have used other Global Positioning System (GPS) products before, Trimble recommends that you spend some time reading this manual to learn about the special features of this product. If you are not familiar with GPS:

- Read the booklet *GPS, A Guide to the Next Utility* (available from Trimble).
- Visit our website (www.trimble.com) for an interactive look at Trimble and GPS.

Related Information

Other manuals in this set include:

- Reference Manual

The reference manual contains installation instructions, practice exercises for you to use to become familiar with the AgGPS 170 Field Computer functions, instruction for creating input files, and advice for data transfer and viewing data in the office.

Other sources of related information are:

- Help – the software has built-in, context-sensitive online help that lets you quickly find the information you need.

For more information, see Getting Help, page 122.

- Release notes – the release notes describe new features of the product, information not included in the manuals, and any changes to the manuals.

Technical Assistance

If you have a problem and cannot find the information you need in the product documentation, contact your local dealer.

Your Comments





Your feedback about the supporting documentation helps us to improve it with each revision. To forward your comments, do one of the following:

- Send an e-mail to ReaderFeedback@trimble.com.
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If the reader comment form is not available, send comments and suggestions to the address in the front of this manual. Please mark it *Attention: Technical Publications Group*.

Document Conventions

The document conventions are as follows:

Convention	Definition
<i>Italics</i>	Identifies software menus, menu commands, dialog boxes, and the dialog box fields.
Helvetica Narrow	Represents messages printed on the screen.
Helvetica Bold	Identifies a software command button, or represents information that you must type in a software screen or window.
	Is an example of a hardware key (hard key) that you must press on the AgGPS 170 keypad.
"Select <i>Italics</i> / <i>Italics</i> "	Identifies the sequence of menus, commands, or dialog boxes that you must choose in order to reach a given screen.
	Is an example of a hardware function key that you must press on a personal computer (PC). If you must press more than one of these at the same time, this is represented by a plus sign, for example,  .
	Is an example of a softkey. The operation of softkeys is explained in Softkeys and Softkey Buttons, page 10.

Getting Started

In this chapter:

- Introduction
- Turning on the AgGPS 170 Field Computer
- Training mode
- Working with the front panel
- Working with softkeys
- Working with dialogs
- Working with the lightbar
- Working with the external keypad
- External inputs

Introduction

The AgGPS® 170 Field Computer is a major component of the AgGPS Field Management System. This is a portable and rugged precision agricultural management system designed to meet your site specific or precision agricultural needs for field mapping, field guidance, and data collection.

The system uses the latest satellite navigation technology, Differential Global Positioning System (DGPS), to obtain positions that are typically accurate to less than 1 meter in real time.


It is suitable for use in all weather conditions and in all terrain.

To start the AgGPS Field Management System, do the following:

- Install a GPS receiver and antenna.
- Install the AgGPS 170 Field Computer unit, the lightbar, and the external keypad.
- Make sure you have differential corrections available from either a beacon or a satellite service provider.

For information on installing or connecting equipment, refer to Chapter 2 of the *AgGPS 170 Field Computer Reference Manual*.

Turning on the AgGPS 170 Field Computer

The AgGPS 170 default settings let you install the system, turn it on, and operate it, without having to run complex setup routines. To turn on the AgGPS 170 Field Computer, press .

Note the following important default settings:

- Units – U.S. (imperial units)
If you use metric units, change this setting before using the AgGPS 170 Field Computer to map a field.
- GPS – AgGPS NMEA
Trimble AgGPS receivers output this format. If you have a different GPS receiver, change this setting before using the AgGPS 170 Field Computer to map a field.

You also need to configure the system to suit your specific operational requirements, machinery, and field conditions. This includes swath parameters (swath width and pattern), and control of other equipment (such as the lightbar).

For information on setting swath parameters, see *Setting the Swath Parameters*, page 111. For all other setup options and a list of the system defaults, see Chapter 4, *Setup*.



Training Mode

The AgGPS 170 Field Computer incorporates a Training mode. This lets you use most of the normal system functions in a simulation mode and has been designed as a training or system demonstration tool.


Training mode does not need the signals from a GPS receiver, and can be operated without any other equipment attached to the AgGPS 170 system. All that you need is a 12-volt power supply to power the AgGPS 170 display. However, can also connect the lightbar and external keypad and practice using these items.

For three exercises that use Training mode and demonstrate the AgGPS 170 Field Computer functions, refer to Chapter 3 in the *AgGPS 170 Field Computer Reference Manual*.


Accessing Training Mode

To activate Training mode, hold down the  key as you press the  key. This turns on the AgGPS 170 display.

The words Training Mode flash on the *Plan View Map* for half a second every few seconds to remind you that you are in a simulation mode.

To turn off Training mode, turn the unit off and on again without holding down the  key.



Tip – To turn off the AgGPS 170 display unit, hold down the  key for at least two seconds.

Training location

When the AgGPS 170 Field Computer is turned on for the first time, or when the software is upgraded, the training location is set to 0,0 (latitude, longitude).

For information on manually setting the training location position to meet your own requirements, see Training Location, page 228.

Vehicle Movement

In Training Mode, the position and movement of the vehicle icon is controlled by the arrow keys, rather than by using incoming GPS signals.



Use the arrow keys to drive the vehicle as follows:



- Use ▲ to speed up the vehicle.
- Use ▼ to slow down the vehicle.
- Use ► to turn the vehicle to the right by a few degrees.
- Use ◀ to turn the vehicle to the left by a few degrees.



This takes some practice as the vehicle response is not instantaneous. Press the arrows two or three times to see the response.

Panning the Screen

In GPS mode the zoom control keys and the arrow keys control the position of the map on the screen. The keys are as follows:

- Press ► to move the view to the right
- Press ◄ to move the view to the left
- Press ▲ to move the view up
- Press ▼ to move the view down
- Press  to zoom in
- Press  to zoom out

To zoom out so that the full field is displayed on the AgGPS 170 display, hold down the  key and press .

To zoom out so that everything recorded against the field is displayed on the AgGPS 170 display, hold down the  key and press . (This is useful when you are outside the field.)

For more information on using softkeys, see Working with Softkeys, page 21.

Working with the Front Panel

The front panel is the interface to the AgGPS 170 Field Computer. This consists of a color LCD display that displays information, and keys that provide input controls. Keys in the top row (immediately below the display) control the softkeys on the display. These softkeys vary depending on what part of the program is on display.

Figure 1.1 shows the front panel and display.




Figure 1.1 The AgGPS 170 Field Computer front panel

Table 1.1 lists the items on the front panel.

Table 1.1 The front panel items

Number	Description	See...
1	Menus that appear over the Title Bar	page 8
2	LCD display	page 9
3	Tip bar	page 9
4	Softkeys	page 10
5	Softkey buttons	page 10
6	Next key	page 12
7	Zoom In key	page 12
8	Zoom Out key	page 12
9	Menu key	page 13
10	Using the Menu key as a function key	page 13
11	Data card slot (behind cover)	page 15
12	Enter key	page 16
13	Arrow keys	page 16
14	Power key	page 17
15	Escape key	page 18
16	Storage bar	page 19
17	Scale bar	page 20
18	Title bar	page 20

Menus

The menus are normally hidden to allow maximum use of the available screen space. To access the screen menus, press . The *Field*, *Setup*, *Equipment* and *Help* menus appear, as shown below:

Field

- New Field (Boundary)
- New Field (No Boundary)
- Select Field
- Select Work Order
- Close Field
- Swath Pattern
- Swath Width
- Swath Direction
- Change Grid
- Background Layers
- Pause

Setup

- Features
 - Time and Units
 - Map Display Options
 - Boom to Antenna Offsets
 - Information Screens
 - Sounds and Alarms
 - Guidance
 - Logging
 - Save Configuration
 - Restore Configuration
 - Restore Default Settings

Equipment

- GPS
 - Training Location
 - Lightbar
 - Lightbar Text
 - Approach LED Interval
 - External Keypad
 - Variable Rate Controller
 - Raw Serial Data
 - Barcode-Sensor Input
 - Remote Output

Help

- Help On Current Screen...
 - How To...
 - Technical Support
 - Contents
- Save Samples To Data Card
- Upgrades and Options
- About...

LCD Display

The display is a backlit 320 by 240 pixel, sunlight-readable, 16-color LCD screen. The display features a wide viewing angle with adjustable brightness. This means that you can view it under all lighting conditions.

The screen displays standard Windows-style menus at the top, and custom softkeys at the bottom. The softkey functions change with different screens, and are operated by pressing the associated softkey button.

Tip Bar

The tip bar displays on screen messages relating to the current activity.

For example, in the *Plan View Map* displayed on the LCD display in Figure 1.1, page 6, the tip bar displays the message Press NEXT for Information Screen 1.

In the *Pattern Check Map*, the tip bar displays the message Press ENTER to accept or MENU to make changes.


If you do not need the tips, you can turn the tip bar off to save space on the display. For information on how to do this, see Map Display Options, page 199.

Softkeys and Softkey Buttons


Softkeys are graphical “keys” displayed on the bottom line of the AgGPS 170 display. To activate a softkey, press the softkey button that is immediately below it on the front panel. See Figure 1.2.



Figure 1.2 Softkeys and softkey buttons




For example, to activate the  softkey (1), press the softkey button (2) immediately below it.

Note – This manual regularly refers to the softkeys. When the manual says press Softkey 1, press the associated softkey button below it.




Softkeys relate to particular screens or dialogs and only appear when these screens or dialogs are accessed. For example, the  softkey appears when the *Main Operation* screens are accessed, as it relates to these screens.


Softkey operation

In most cases, the label on the softkey describes the operation that is performed when the softkey is pressed once. For example:

-  selects the next swath
-  sets Point A
-  displays the Features softkeys on the *Plan View Map*

There are three softkeys which turn an operation on when pressed once, and turn the operation off again when pressed a second time. The operations performed by these softkeys are:

-  turns logging on and off
-  starts and stops mapping a field boundary
-  turns automatic panning on and off

With  on, when the vehicle reaches the edge of the screen, the map is moved and redrawn centered on the vehicle.

These three softkeys are displayed as depressed when the function is on and normal when the function is off.





Tip – For more information on softkeys, and a list of the softkey functions used in the AgGPS 170 Field Computer, see *Working with Softkeys*, page 21.


Next

Use the  key to step through:

- data entry fields in dialog screens
- guidance screens

Hold down the  key and press the  key to move back through data entry fields in dialog screens.

Zoom In


Use the  key to:

- reduce the current screen scale by a fixed amount so that you can see the central area more clearly. This has been set to 1.4 times ($\sqrt{2}$) so that zooming in twice halves the scale.

***Note** – The maximum Zoom In scale is 10 ft or 2 m on the scale bar, or about 25 ft or 8 m screen width.*

- move forward in topic history in Help screens.

Zoom Out

Use the  key to:

- increase the current screen scale by a fixed amount so that you can see a larger area. This has been set to 1.4 times ($\sqrt{2}$) so that zooming out twice doubles the scale.
- move back to the previous topic in Help screens.




Menu Key

Use the  key to:



- access the drop-down menus



The menus are similar to standard Windows menus. They are normally hidden to allow maximum use of the available space on the screen.

- act as a function key


The menus appear when you *release* the  key, as long as no other key is also pressed. If another key is pressed when the  key is held down, the  key acts as a function key.

Using the Menu Key as a Function Key



The  key can be used with other keys to carry out specialized tasks. For example, the yellow border around the  key and markings on Softkey 2 and Softkey 3 identify the brightness control feature.



To use the  key as a function key, hold it down as you press the other key. (To repeat the operation, keep holding down the  key.)

Context-sensitive Help



Press the  key and Softkey 1 at the same time to display help on the current screen or dialog.


Brightness control

To increase the display brightness, press  and  at the same time.

To decrease the display brightness, press  and  at the same time.



Zoom To Field

To zoom the display out to the boundary of the current field, in the *Main Operation Screens*, press  and  at the same time.


In an A-B Line field you do not actually *map* a field boundary. Pressing  includes the A-B Line, any logging that has been done, and any swaths that have been selected.

The *Pattern Check Map* zooms to field, and the *Plan View Map* automatically zooms to all when a field is selected or mapped.






Zoom All

In the *Main Operation Screens*, press  and  at the same time to zoom the display out to include:

- all background layers if no field is open
- all items related to the current event if a field is open

While a field is open,  includes the current field boundary, the vehicle, point, line and area features and coverage logging, *not* waypoints or background layers.



Tip – If you accidentally record the wrong positions in a field,  might zoom out so far that you can see only a few small dots. In this case, use the  softkey to locate the field. If using the  and  softkeys cause a pan, the  softkey turns off.

The CompactFlash Data Card

The system stores data on a CompactFlash data card. To record information, a data card must be inserted into the card slot below the control keys on the front panel of the AgGPS 170 display.

Recorded information includes all field boundary maps, coverage logging files, and point features.

Software upgrades are also performed by inserting a data card into the card slot, and turning on the AgGPS 170 Field Computer. The system automatically detects the new software version and gives you the option to upgrade or continue using the current software version.



Warning – When the data card is in use a small orange LED beside the card slot is lit. Do not attempt to remove the data card while it is in use. This can cause serious loss of data or damage to the data card. Always wait at least 3 seconds after the system has stopped writing to the data card before attempting to remove it.

CompactFlash data card sizes

The commonly available sizes of data card and *approximately* how many hours each will last under coverage logging or track logging situations are listed in Table 1.2:

Table 1.2 Data card sizes

Data card space	Coverage logging (hours)	Track logging (hours)
8 Mb	200	70
16 Mb	400	140
24 Mb	600	200

Note – The exact capacity depends on how many farms, fields, and features are on the card, and on the track logging rate. These typical capacities assume approximately 10 farms with 100 average sized fields, which each contain 10 point features, and 1 Hz track logging.

Enter

Use the  key to:


- select menu options
- select help topics
- exit from dialogs and save changes
- show and hide softkeys on the main operation screens
- complete steps in some procedures, for example, mapping a field boundary

Arrow Keys


Use the ▲, ▼, ►, and ◀ keys to:

- navigate within menus, lists, and Help screens
- enter text or numbers into data entry fields in dialogs
- pan the *Plan View Map* when in GPS mode
- control the vehicle speed and direction when in training mode

Navigating within Menus

To choose a specific menu, press  then press ► or ◀.

Press ▲ and ▼ to move up and down the drop-down menus.

To select a highlighted menu option, press .


For information on navigating within Help screens, see page 123.

Data entry




In text and numeric fields in any of the dialogs, use ▲ and ▼ to scroll through characters to enter the data. Use ► and ◀ to move between characters.

Power Key


The power  key turns the AgGPS 170 Field Computer on and off.

To turn on the AgGPS 170 Field Computer, press . A welcome screen appears, followed by some useful navigation tips.

If a new version of the software is detected, an Upgrade Software option message appears.

To activate Training Mode, power on the AgGPS 170 Field Computer while holding down the  key. Training Mode also displays the Setup menus. To display the Setup menus in GPS mode, hold down the  key and press .


Suspend

To turn off the AgGPS 170 Field Computer, press and hold the  key for several seconds, until the display and controls shut down. (This delay reduces the risk of you turning off the power accidentally.) The AgGPS 170 Field Computer closes all events automatically when the power is turned off.

***Note** – When the AgGPS 170 Field Computer is suspended the central processor unit (CPU) still runs. This draws very little current. To completely power down the system, turn it off at the power source (for example, at the ignition switch).*


Air to ground mode switch


The AgGPS 170 software is designed for use in aircraft or farm vehicles. You can only switch between Air and Ground mode when you turn the AgGPS 170 Field Computer on. This changes some of the menu options, the vehicle/aircraft icon, and system defaults.


To turn the AgGPS 170 Field Computer on in air mode, hold down Softkey 1 and press . Repeat the process to switch back to ground mode.

The title bar in the startup screen displays the current mode.

Reset

If the AgGPS 170 Field Computer stops responding, reset it by holding down the  key for about 30 seconds, until the AgGPS 170 Field Computer turns off.

Press  again to turn the system back on.

Note – The  key only turns the AgGPS 170 Field Computer on and off. It does not turn the GPS receiver on and off.

Power failure

The AgGPS 170 Field Computer saves data to the data card regularly during normal operation, and whenever the system is shut down. However, in the event of irregular power failure (such as the terminals falling off the battery) some data could be lost.





Warning – If you lose power in the middle of mapping a field boundary, all mapping points are lost. You need to solve the power problem and remap the field boundary.

When the power is lost, the backlight is turned off, some functions are disabled to conserve power, and warning messages are displayed.

Internal battery

The AgGPS 170 Field Computer has an internal battery, which protects the data in case of external power failure. The battery cannot run the unit, but will sustain the system for brief power outages, and ensure that all data is saved when the unit is turned off.

Escape

Press the  key to exit from dialogs and abandon changes. If you have made changes, a warning message appears when you press . This gives you the option to save or abandon your changes. If no changes have been made, the dialog exits immediately.

Storage Bar

The storage bar displays the amount of space left on the data card.

When starting a new event, it is a good idea to check the storage bar to make sure that you will not run out of storage in the middle of the event. If this is likely, insert a new data card before starting the event.

Warnings


When the storage space remaining on the data card gets low the AgGPS 170 Field Computer provides warnings:

- When fewer than 10 hours of storage are left, you are warned not to start new work without clearing space or replacing the data card. Track logging and variable rate logging are disabled.
- When storage drops below 50 kilobytes, all logging automatically shuts down and you are prevented from saving configurations, screen snaps, or waypoints, or recording input.
- When there is no data card in the slot, the storage bar color changes to red, No Card is displayed, and mapping and logging functions are disabled.

For more information on warnings, see Variable Rate Controller Messages, page 310.

Remedies

If the data card runs out in the middle of an event, do one of the following:

- Delete some fields or event logging on the current card.
- Insert a new data card and press . When a new data card is inserted, the AgGPS 170 software automatically starts a new event using the same field boundary.

Note – *To view the full event in the office, load the events from both data cards. For more information on viewing data files, refer to Chapter 4 of the AgGPS 170 Field Computer Reference Manual.*

Scale Bar

The scale bar helps to estimate distances and approximate areas. It scales automatically according to the size of the current field and the extent to which zoom in or out has occurred.

Title Bar


The title bar shows either the name of the current screen (for example, *Waypoint Guidance*), or the name of the current field and event. When the title bar displays the name of the current field and event, it also displays a three-letter abbreviation for the swath pattern, and the swath width.


For more information on the pattern codes, see Swathing, page 143, or refer to the Help.

On *Main Operation Screens* the title bar can be hidden to increase the available area for display of the graphic information.

For information on how to set up the display, see Map Display Options, page 199.

Working with Softkeys

Softkeys relate to particular screens or dialogs and only appear when these screens or dialogs are accessed. For example, the  softkey appears when the *Main Operation Screens* are accessed, as it relates to these screens.

If the function performed by the operation of the softkey is disabled, the softkey text is light gray. For example, when defining an A-B Line, you need to set Point A before you can set Point B. Therefore until you set Point A, the  softkey is disabled.

To operate a softkey press the associated softkey button below it.

There are five different softkey types available:

- History – a list of previously entered text items
- List selection – a range of predefined options
- Swathing control – for example, Next Swath, Previous Swath
- Feature entry – for example, weed, hazard, stream, pond
- Function keys – for example, Zoom to Field
- Waypoints – for example, Add Waypoint, Waypoint 1

The type of softkey that appears on the screen depends on which screen you are currently in.

History and list selection softkeys appear in dialogs.



Function softkeys are used in conjunction with the  key to carry out specialized tasks. For example, pressing  and Softkey 4 zooms to the current field.

Figure 1.3 shows an example of the softkeys.

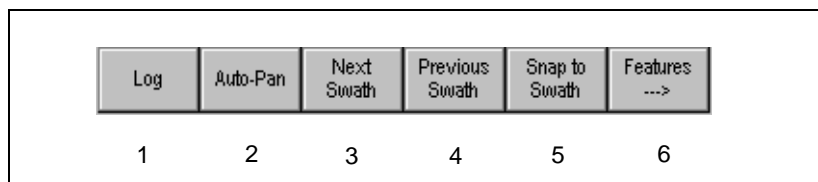


Figure 1.3 Softkeys

Table 1.3 shows the softkeys that appear on the common operation screens.

Table 1.3 Examples of softkey functions

Screen or Dialog	Softkey 1	Softkey 2	Softkey 3	Softkey 4	Softkey 5	Softkey 6
New Field	History	History	History	History	History	History
Map Field (Boundary)	Log	Auto-Pan	Set Point A	Set Point B	Auto-Map	Features -->
Map Field (No Boundary)	Log	Auto-Pan	Set Point A	Set Point B	Set Point C	Features -->
Pattern Check Map		Auto-Pan				
Plan View Map Swathing Features Waypoints (examples)	Log Hazard Add Waypoint	Auto-Pan Weed Waypoint1	Previous Swath Insect	Next Swath Disease	Snap to Swath Rock	Features --> Waypoints --> Swathing --> Mapping --> or
Swath Direction	Log	Use Boundary Use GPS Positions	Set Point A	Set Point B	Next Point	Previous Point
Select Field	Delete Field	Delete All Fields	Delete Events	Delete All Events	Field History	Delete Features

Table 1.4 shows a full list of softkeys and their functions.

Table 1.4 Softkey functions





































Key	Function	Key	Function
	Turns Auto-Map on and off		Turns Auto-Pan on and off
	Selects the next swath		Selects the previous swath
	Selects the closest guidance swath		Turns logging on and off
	Sets Point A		Sets Point B
	Sets Point C		Selects a sampling event
	Selects the next boundary point		Selects the previous boundary point
	Selects the next line or area feature for guidance		Selects the previous line or area feature for guidance
	Starts the pattern on the left of the A-B Line		Starts the pattern on the right of the A-B Line
	Starts pattern based on the first turn		Selects next swath after you log off
	Sets swath direction using boundary points		Sets swath direction using the vehicle
	Deletes the selected field from the data card		Deletes all fields from the data card
	Deletes all events in selected field from the data card		Deletes all events in all fields from the data card.
	Displays information on previous events in the field		Deletes all features in selected field from the data card
	Displays more history softkeys		Changes <i>Plan View Map</i> softkeys
	Changes <i>Plan View Map</i> softkeys		Changes <i>Plan View Map</i> softkeys
	Changes <i>Plan View Map</i> softkeys		Changes <i>Plan View Map</i> softkeys
	Selects options in dialogs		Removes options in dialogs
	Goes to the top of file		Goes to user defined options

Table 1.4 Softkey functions (Continued)


















































Key	Function	Key	Function
	Adds a waypoint		Deletes all waypoints
	Lightbar choice		Lightbar choice
	Selects text for the lightbar		Selects text for the lightbar
	Selects text for the lightbar		Selects text for the lightbar
	Displays long lightbar text items		Displays short lightbar text items
	AgGPS 23 lightbar needle choice		AgGPS 23 lightbar needle choice
	AgGPS 23 lightbar needle choice		
	Information Screen 1 choices		Information Screen 2 choices
	Plan View Map choices		Selects feature type
	Selects feature type		Selects feature type
	Selects swath guidance		Selects AgRemote interface
	Adds a sample point		Deletes the last sample point
	External keypad choices		External keypad choices
			
	Changes raw serial data		Changes raw serial data
	Pause raw serial data		Resume raw serial data
	Changes GPS raw data format		Changes GPS raw data format
	Records input		Stops recording input
	Replays input file		Stops replaying input file
	Zooms to the current field		Zooms to all event items
	Increases display brightness		Decreases display brightness

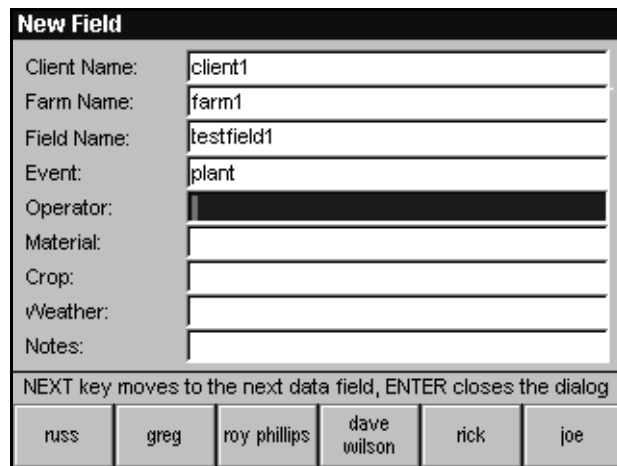
Table 1.4 Softkey functions (Continued)

Key	Function	Key	Function
	Pauses the event		Resumes the event
	Removes the background layer		Provides context-sensitive help
	Restores all default parameters		Clears history from the softkeys

History Softkeys

Some dialogs prompt you to input text information. The history softkeys are the softkeys at the bottom of these screens. They provide a list of previous entries relevant to each data entry field. The most recently used entry is on Softkey 1. If there are more than six previously used entries, Softkey 6 changes to . Press this key to cycle through older entries.

To re-use the softkey data in any text field, press  to go to the field and press the appropriate softkey. An example of history softkeys for the *Operator* field in the *New Field* dialog are shown below:



New Field

Client Name: client1

Farm Name: farm1

Field Name: testfield1

Event: plant

Operator: **[highlighted]**

Material:

Crop:

Weather:

Notes:

NEXT key moves to the next data field, ENTER closes the dialog

russ greg roy phillips dave wilson rick joe

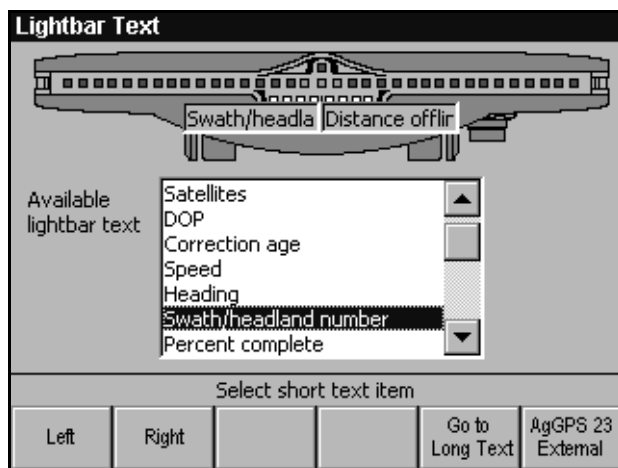
To set the *Operator* to 'greg', press Softkey 2.

When information is entered into a field using the history softkeys the cursor is placed at the end of the text. To add to or change the text, use the arrow keys.

Note – *The history softkeys may not be able to totally display long names.*

List Selection Softkeys

Use the list selection softkeys to select options in the setup dialogs. An example of the list selection softkeys in the *Lightbar Text* dialog are shown below.



To set the lightbar text for the AgGPS 21 internal lightbar, press ▼ to highlight *Swath/headland number*, then press to display the *Swath/headland number* on the left side of the lightbar display. Press ▼ to highlight *Distance offline*, then press to display *Distance offline* on the right side of the lightbar display.

Figure 1.4 shows how the text selected in this example appears on the AgGPS 21 internal lightbar.

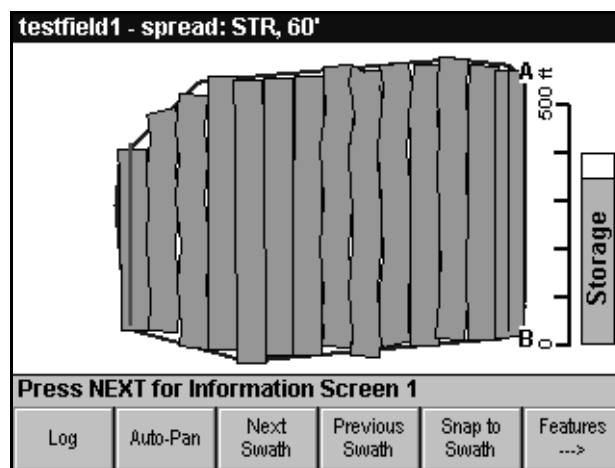




Figure 1.4 Text display on the lightbar



For more information on setting lightbar text, see *Lightbar Text*, page 233.

Swathing Control Softkeys

The swathing softkeys control guidance, and are generally used when planting, spraying, or applying fertilizer to a field. An example of the swathing softkeys on the *Plan View Map* are shown below:



Tip – Press  when you stop spraying at the end of the current swath, then press  to spray the next swath.


Swathing control or feature entry softkeys appear on the main operation screens. Pressing  in swathing mode changes this softkey to , and changes the rest of the softkeys to features. For information on how to specify which features appear on these keys, see Features, page 192.

Feature Softkeys

Features are shown as small graphic icons, lines, or areas that mark important features or obstacles to be recorded in the field. The AgGPS 170 Field Computer has a standard set of features. Additional features can be added.

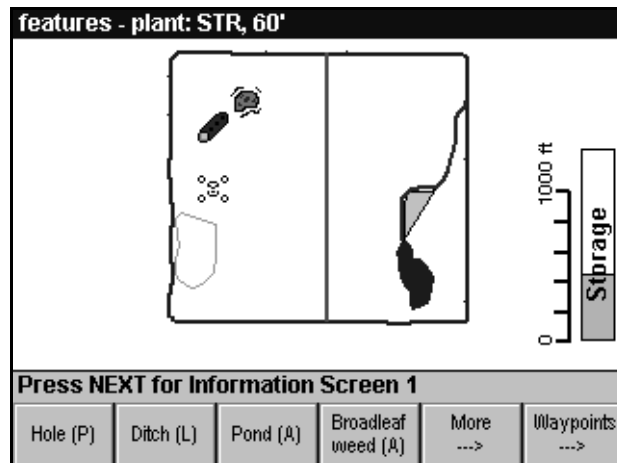
Features can be used to navigate back to at a later stage or to highlight a hazard that must be avoided when spraying this field.

A set of feature softkeys are available on the *Plan View Map*.

To access the feature softkeys, press .


To map a point while driving around a field, press the appropriate softkey. To start mapping an area or line, press the appropriate softkey. To stop mapping the area or line, press the softkey again.

An example of the feature softkeys are shown below:










Tip – For more information on mapping features, see Mapping Features and Waypoints, page 81.

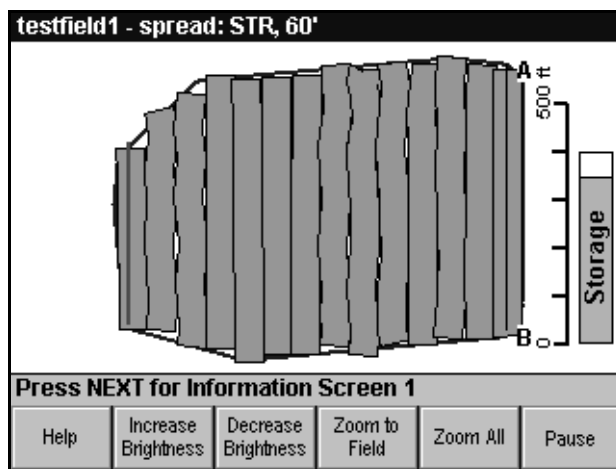
Pressing  displays the waypoint softkeys.

Function Softkeys

The  key can be used in conjunction with other keys as a function key to carry out specialized tasks.

To use the  key and a softkey as a function key, hold down the  key as you press the softkey. (Keep holding down the  key if you want to repeat the operation.)

When you press the  key, the softkey labels change to show the functions as shown below:



Waypoint Softkeys

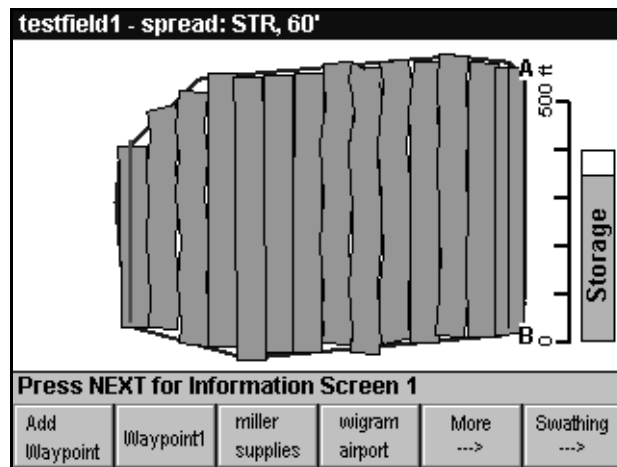
Waypoints are a type of point feature. You can use waypoints to mark the location of a feature such as an airstrip or a refueling tank. When you press a waypoint softkey, swath or feature guidance is paused and guidance is provided to the waypoint and then back to the pause location.

The waypoint softkeys are available on the *Plan View Map*.

To access the waypoint softkeys, press **Features** then **Waypoints**.

To map a waypoint while driving around a field, press **Add Waypoint**. To get guidance to a waypoint, press the appropriate softkey.

An example of waypoint softkeys are shown below.



For more information on waypoints, see Waypoints, page 86.

Working with Dialogs

Dialogs allow you to enter data or to set up options to configure the system to meet your requirements.


Dialogs may contain any of the following items:

- Text input fields
- Numeric input fields
- Lists
- Options
- Check boxes
- Messages or tips

Current data entry field

The current field, check box, or option button is identified by the blue background color or blue text.

Navigating within Dialogs

To step between consecutive input fields, list boxes, sets of option buttons, and check boxes, press  .

To navigate within a list box or step between option button options, use ▲ and ▼ .

Text Input Fields



Use Text fields to enter your own information about the parameter you are setting up. For example, the name of your farm or field or the type of crop you are spraying. Data can be entered into these fields using the arrow keys, and in some cases the softkeys. For information on entering data using the arrow keys, see *Entering Text*, page 33.

Numeric Input Fields

Use numeric input fields to enter the required number for the parameter you are setting up. For example, the lightbar *Inner LED spacing* and *End LED spacing*. Data can be entered into these fields using the arrow keys.

Lists

In some text fields you can only enter specific data. For example, functions such as Log On, Log Off, and Next Swath can be assigned to external keypad inputs.

Lists contain valid data options for the particular data field. To enter data in these fields, highlight the data you want using ▼ and ▲, and press . (If the maximum number of items is already selected, the  softkey is disabled.)

Options

Use these icons to select a single option from a number of alternatives. For example, metric or US units in the *Time and Units* dialog.

Ⓐ – represents the selected option

○ – represents any option that is not selected


Use ▲ and ▼ to choose an option.

Check Boxes

Use these icons to turn a function on or off. For example, display the scale bar on the map display.

☑ – represents a function turned on

☐ – represents a function turned off

Press  to select or clear a check box.

Messages

Context-sensitive error or help messages appear on the tip bar to help you to enter data or make selections in dialogs.

For example, when you enter the GMT to local time offset, a message displays the range limits.

Entering Text

In the setup dialog text and numeric fields, use ▲ and ▼ to enter the data, as follows:

- The ▲ arrow steps through the lower case alphabet, then through a range of special characters depending on the current field (for example, _ , . () \$ % ? !). It then steps through the numbers, and back to ‘a’.
- The ▼ arrow steps through the same character set in reverse.
- The character list in alpha-numeric fields always starts from ‘a’.
- In numeric fields only numeric characters are available.
- In blank numeric fields the numbers always start from 1. When you change numbers in a field, the ▲ and ▼ arrows start stepping from the existing number.
- The ► arrow steps to the next character to the right. Pressing this key twice inserts a space (in fields where spaces are allowed).
- The ◀ arrow steps back one character to the left. This deletes the character in the space to the left.

Note – *The maximum number of characters that you can enter is 50 in the Notes field, and 30 in any other field. You cannot use some special characters in the Client Name, Farm Name, Field Name, and Event Name fields. This is so that data files created by the AgGPS 170 Field Computer can be read in office GIS software.*

Working with the Lightbar

A lightbar is a standard component provided with the AgGPS Field Management System. The lightbar is designed for swath guidance. It may be attached to, or removed from, the system at any time. The lightbar is not activated until the AgGPS 170 Field Computer is turned on. If no GPS signals are received from the GPS receiver, the lightbar text displays NO GPS.

Figure 1.5 shows the following AgGPS 21 internal lightbar features:

- A row of colored LEDs for guidance
- A multi-colored LED to indicate the approach of the start and end of swaths
- An eight-character text display

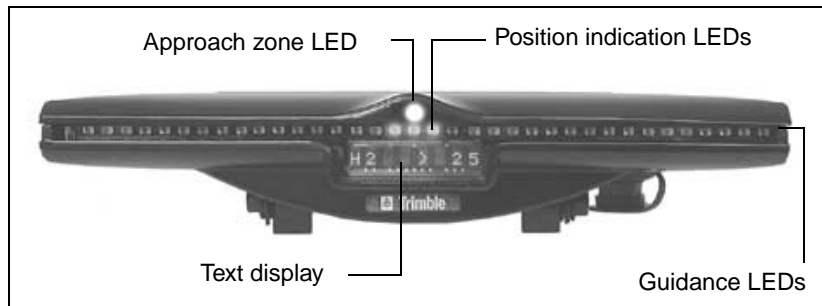


Figure 1.5 AgGPS 21 internal lightbar

Figure 1.6 shows the following AgGPS 23 external lightbar features:

- A row of colored LEDs for guidance
- Three LEDs to indicate the approach of the start and end of swaths
- A sixteen-character text display
- A guidance needle

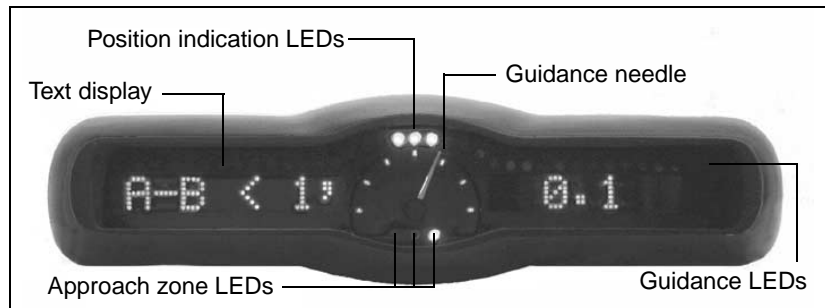


Figure 1.6 AgGPS 23 external lightbar

Guidance LEDs

The lightbar provides guidance along straight or curved swath lines using a row of 35 colored LEDs. Two or three LEDs are illuminated at any time to indicate vehicle position with respect to the current swath.

The lightbar uses a *sliding bar* technique to show offline position changes. When the three green LEDs in the center of the lightbar are illuminated, the vehicle is exactly over the current swath center.

As the vehicle moves away from the center of the swath, the illuminated red LEDs change position on the lightbar to show that you are off-center.

The sensitivity of the lightbar can be set using the *Inner LED spacing* and the *End LED spacing* settings.

Inner LEDs

The ten inner LEDs, either side of the center LED, are designed to be used as a fine guidance control. Three LEDs are illuminated for fine guidance. The *Inner LED spacing* defines the offline distance interval covered by a single LED on the lightbar. This allows fine guidance close to the line.

Outer LEDs

The seven outer LEDs, at each end of the lightbar, are designed to be used as a coarse guidance control. Two LEDs are illuminated for coarse guidance. The *End LED distance* field is set to at least 17 times the spacing between the inner LEDs. The remaining outer LEDs are evenly spaced between the tenth inner LED and the end LED value. This makes the outer LEDs less sensitive to changes in offline distance, and allows course guidance so you are less likely to lose sight of the guidance LEDs when you make wide turns. The outer LED spacings cannot be set to less than the sum of the inner LED spacings.

Turn Indicator LEDs

When the *Use turn indicator LEDs* check box in the *Lightbar* dialog is selected, and provided that you are no more than half a swath width offline, the outer LEDs provide advance warning that you need to turn shortly to stay on line with the current swath.

This could be because:

- you have strayed offline
- there is a turn in the current swath approaching

The warning is displayed approximately twice the look ahead time before the turn. The angle of the turn determines the number of LEDs that are illuminated. As the approaching turn angle increases, more LEDs are illuminated.

For examples of the Turn Indicator LEDs, see Figure 1.7 on page 37.

Displaying turn indicator arrows on the lightbar text

A row of turn arrows can also be displayed on the lightbar text. (For information on setting up the lightbar, see *Lightbar*, page 229 and *Lightbar Text*, page 233.) The extent of the turn angle determines the number of arrows displayed:

- >>>>> means right turn approaching
- <<<<< means left turn approaching

Table 1.5 shows the number of LEDs and text arrows that are displayed for various turn angles.

Table 1.5 LEDs and text arrows

Turn angle (degrees)	Number of LEDs illuminated	Text arrows (right turn)
5 to 10	1	no arrows
10 to 15	2	>
15 to 20	3	>
20 to 30	4	>>
30 to 40	5	>>>
40 to 60	6	>>>> or >>>>>
60 to 80	7	>>>>>>
greater than 80	8	>>>>>>>

Figure 1.7 shows that you are 4 m offline approaching a 10–15 degree turn to the right. (The inner LED spacing is set to 1 m.)



Figure 1.7 AgGPS 21 internal lightbar displaying turn indicator

Figure 1.8 shows that you are 2 m offline approaching a 40–60 degree turn to the right. In this example *Turn indicator arrows* are selected for *Lightbar Text* display. (Inner LED spacing is set to 1 m.)



Figure 1.8 AgGPS 21 internal lightbar text turn arrows

Approach Zone Indicator

The approach zone indicator warns you of the start and end of swath lines, so that you can turn the spray application switch on and off.

The AgGPS 21 internal lightbar has a single tri-color approach-zone LED located above the row of guidance LEDs. The AgGPS 23 external lightbar has three LEDs: red, orange, and green. They are located below the needle.

The approach-zone LED turns red when you are twice the LED interval away from the start of the swath. It turns orange when you are one LED interval away from the start of the swath. When the start of the swath is reached the LED turns green.

As you approach the end of a swath, or the end of a swath segment where the swath crosses the field boundary, the sequence is reversed.

You can configure the approach zone LED interval based on look-ahead distance or time.

Figure 1.9 shows where the color of the approach zone indicator LED changes. (The approach LED interval is set to 60 ft.)

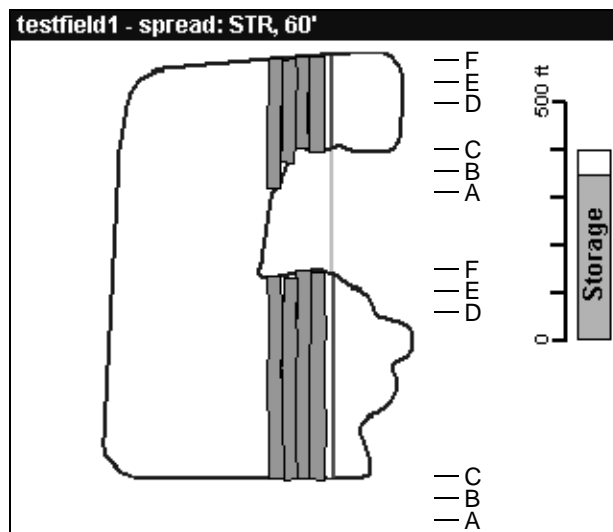


Figure 1.9 Approach zone LED

As you approach the end of the swath, the approach zone indicator LED is not illuminated:

At ...	the LED turns ...
Point A (120 ft before the start of swath)	red
Point B (60 ft before the start of swath)	orange
Point C (at the start of swath)	green
Point D (120 ft before the end of swath)	orange
Point E (60 ft before the end of swath)	red
Point F (at the end of swath)	off

Note – On short swaths, the LED stays green for at least one swath width to ensure that application of materials is not missed. On a swath shorter than a swath width, the LED may go straight from green to red.

AgGPS 23 External Lightbar Needle

If you are using an AgGPS 23 external lightbar, you have three options for what is shown by the needle:

- Heading guidance – Directs you online and heading in same direction as the current swath
- Heading error – Directs you to head in the same direction as the current swath

Figure 1.10 shows the difference between heading guidance and heading error.

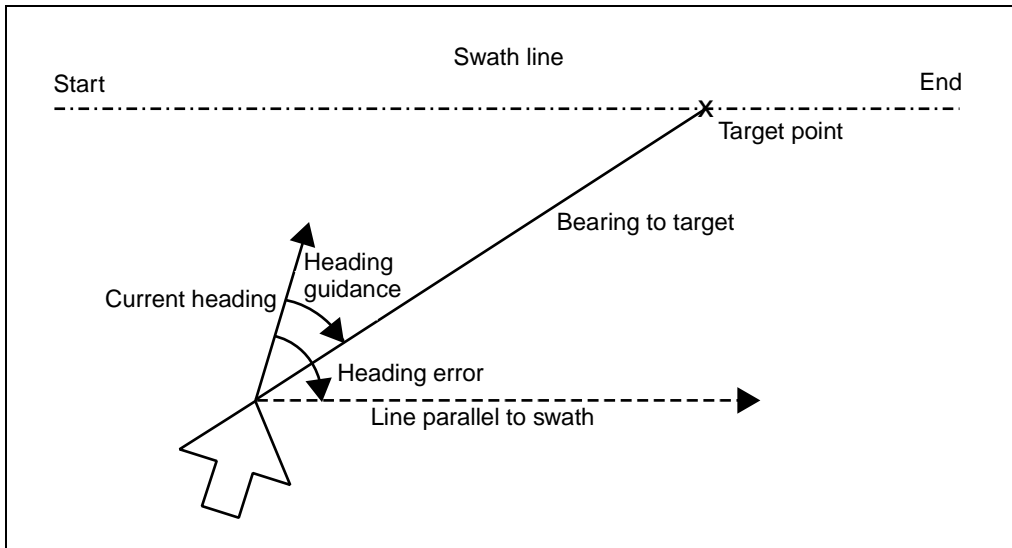


Figure 1.10 Heading guidance and heading error

- Direction to feature – Shows you the direction you have to turn to drive straight towards the closest point feature

Figure 1.11 shows the direction to feature.

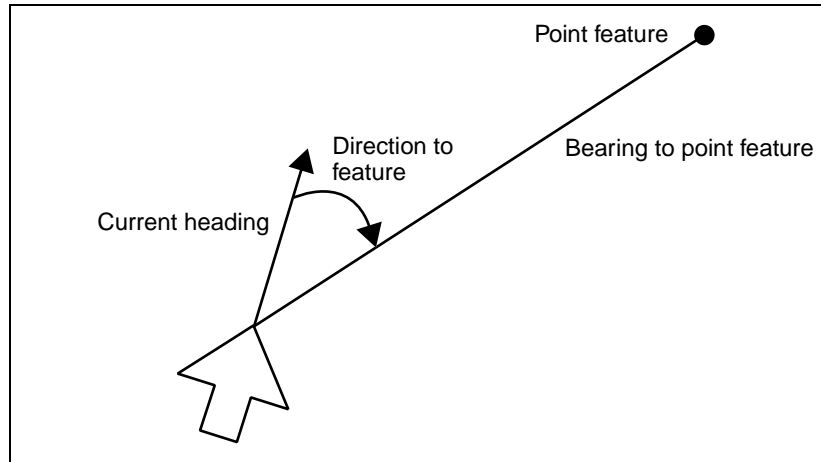


Figure 1.11 Direction to feature

LED Mode

The LED mode provides two guidance methods:

- Chase lights

The current position remains in the center of the lightbar. Illuminated LEDs show where the swath is. If you move offline, steer *towards* the LEDs to correct it. See Figure 1.12.

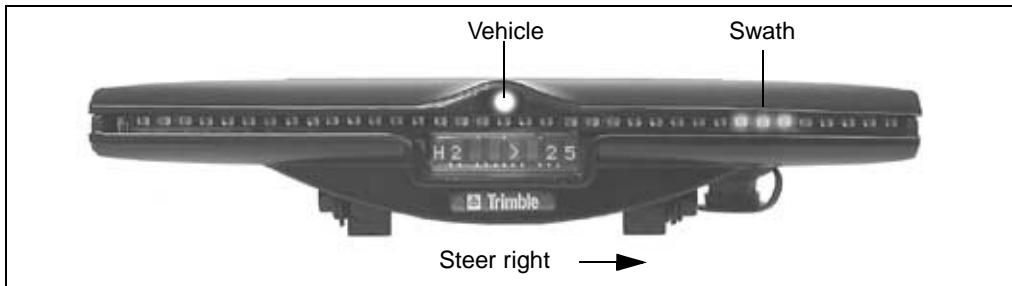


Figure 1.12 Chase lights mode

- Center lights

The swath remains in the center of the lightbar. Illuminated LEDs show where you are in relation to the swath. If you move offline, steer *away* from the LEDs to pull the LEDs back to the center of the lightbar. See Figure 1.13.

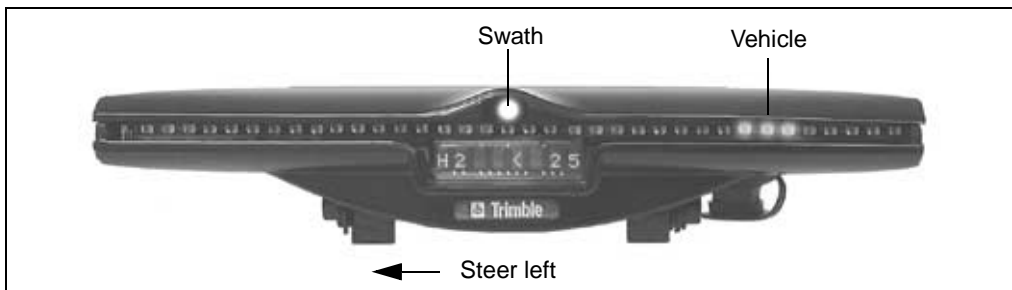


Figure 1.13 Center lights mode

For information on setting LED Mode, see Lightbar, page 229.

Lightbar Text

The AgGPS 21 internal lightbar can display either one long text item (a maximum of 8 characters long), or two short text items side by side (a maximum of 4 characters each) on the LCD display. The AgGPS 23 external lightbar can display either two long text items, four short text items, or a combination of short and long text items.

The short text options are listed in Table 1.6.

Table 1.6 Lightbar short text options

Parameter	Example	Units
Satellites	SV10	
HDOP ¹	1.5, 10.2	
Correction Age	20 s	sec
Speed	11.0	kph or mph
Heading	123°	degrees
Swath/Headland Number	1, H2	
Percent complete ²	57%	%
Storage remaining	45%	%
Direction to start	123°	degrees
Rel. direction to start	123°	degrees
Distance to start	1234	m or ft
Distance to end	1234	m or ft
Line distance to start	1234	m or ft
Line distance to end	1234	m or ft
Distance to feature	1234	m or ft
Direction to feature	123°	degrees
Heading error	34°>	degrees
Distance offline (1 decimal place)	>99 or <9.9	m or ft (not displayed)

¹HDOP now displays 1 decimal place, and the label has been removed.

²Even in sampling events, %_complete refers to application percentage, not the percentage of the field that has been sampled.

The long text options for the lightbar text are listed in Table 1.7.

Table 1.7 Lightbar long text options

Parameter	Example	Units
Boom Latitude	43.72414	degrees
Boom Longitude	172.3536	degrees
Height above MSL	100.50 m	m or ft
Height above Ellipsoid	100.50 m	m or ft
GPS status	FEW SATS NO GPS	
Total time event open	14.25	hr
Field area ¹	400.0	ha
Productive area	360.0	ha
Total area	250.5	ha
Area remaining	150.5	ha
Distance to start	1234	m or ft
Distance to end	1234	m or ft
Line distance to start	1234	m or ft
Line distance to end	1234	m or ft
Distance to feature	1234	m or ft
Distance offline (2 decimal places) ²	<23' >23.1m	ft (0 dec. pl.) m (1 dec. pl.)
Heading error	>>> or <<<	

¹For multiple polygons loaded as area features, the Field area is the sum of the area features.

²For offline distance, a single arrow, < or >, shows the direction of turn.

Note – The selected text is only displayed on the lightbar when the GPS signal is good. If the GPS status is not High Accuracy, the GPS status is displayed on the lightbar.

For information on the meaning of GPS status, see GPS Status, page 108. For information on configuring lightbar text, see Lightbar Text, page 233.

Tip – Because boom latitude and longitude are long text items, only one can be displayed on the AgGPS 21 internal lightbar text at a time. If you want to keep track of latitude and longitude at the same time, use the information screens. For more information, see Information Screens, page 203.

Lightbar messages during field mapping

The selected lightbar text options relating to the field are not displayed until the field is mapped. While the field is being mapped, other messages may be displayed:

- With some No Boundary patterns, SET A, SET B, and sometimes SET C messages are displayed instead of the configured options.
- When a field is being mapped, the lightbar text displays NA for field options (for example, swath number and offline distance).
- Options that are not related to the field (for example, speed and heading) are displayed normally.

Lightbar Communication

The lightbar is connected to COM3 on the AgGPS 170 Field Computer Junction box. The standard connection is the Conxall connector, but if necessary COM3 can be accessed through the adjacent DB9 connector. The RS232 communication protocol is:

- 38400 baud
- 8 bits
- no parity
- 1 stop bit

Working with the External Keypad

The external keypad can control a number of system functions remotely. Figure 1.14 shows the six-button keypad.



Figure 1.14 External keypad

The external keypad has six buttons. Button 2 does not control any function by itself, but is used as a *Shift Key* with the other buttons to provide a second function.

The first four buttons have specific functions. However, you can configure buttons five and six to suit your requirements. For more information about setting up the external keypad functions, see External Keypad, page 238.

Table 1.8 shows the default function of each button or button combination.

Table 1.8 External keypad button functions


















Button	Function
 2	Activates the top symbol on each button. When pressed, SHIFT appears on the lightbar text display. If pressed by mistake, simply press again to deactivate.
 2  1	Sets Point A. Complete this step at the beginning of the first swath.
 1	Sets Point B. Set Point B while driving the first swath to complete the A-B Line. Point B cannot be set without first setting a new Point A.
 3	Press to increase the swath number. In straight line A-B guidance mode, this button is not required if Snap-to-Swath is on. In curve guidance mode, this button steps through the applied swaths.
 2  3	Press to decrease the swath number. In curve guidance mode, this button steps through the applied swaths.
 4	Press to pause parallel swathing. Press again to resume.

Table 1.8 External keypad button functions (Continued)


Button	Function
 	Press to step the display through the <i>Plan View Map</i> and the two <i>Information Screens</i> .
	Reserved for user-specified operation. By default, this button is set to perform the same functions as the AgGPS 170 keypad  key.
 	Reserved for user-specified operation. By default, this button creates a New Field (Boundary).
	Reserved for user-specified operation. By default, this button toggles logging on and off.
 	Reserved for user-specified operation. By default, this button creates a New Field (No Boundary).

Note – The external keypad Enter function cannot be used until the AgGPS 170 Field Computer has completed start-up routines. For example, to upgrade the software you need to use the AgGPS 170 front panel keypad, not the external keypad.

External Keypad Setting Options

Table 1.9 shows the functions that can be assigned to keys 5 and 6.

Table 1.9 External keypad setting options

Parameter	Action
Next Swath	Press to increase the swath number.
Previous Swath	Press to decrease the swath number.
Toggle Log	Press to turn logging on and off.
Toggle Pause	Press to pause parallel swathing. Press again to resume.
Toggle Auto-Map	Press to turn Auto-Map on and off.
Toggle Auto-Pan	Press to turn Auto-Pan on and off.
Toggle Show Coverage	Press to turn coverage polygon layer on and off.
Add Point Feature 1–5	Press to add one of the first 5 Point Features from the <i>Selected Features</i> list in the <i>Features</i> dialog.
Toggle Snap to Swath	Press to turn Snap to Swath on and off.
Short or Long Text	Switch between lightbar text options.
Help	Display help on current screen.
Next Screen	Press to step through the <i>Plan View Map</i> and the two <i>Information Screens</i> .
Enter	The same functions as the AgGPS 170 keypad  key.
New Field (Boundary)	Press to create a new field (boundary).
New Field (No Boundary)	Press to create a new field (no boundary).
Next Guidance Line	Press to select the next guidance line.
Previous Guidance Line	Press to select the previous guidance line.
Toggle ASCII log	Turns on and off the saving of sensor data to an ASCII file.
Set A/B/C Next Swath	Sets the next required point while mapping a field, and selects the next swath after the field is mapped.
Swath Direction	Press to change the swath direction.

Note – The functions that are already available on other keys, such as *Next / Previous Swath* and *Auto-Map*, are only provided to give you flexibility in which keys you find more comfortable to use.

External Inputs

An external switch such as a spray switch can be connected to the AgGPS 170 Field Computer to control logging. For information, refer to Connecting Power and External Devices in Chapter 2 of the *AgGPS 170 Field Computer Reference Manual*.

When an external spray switch is connected, this takes precedence over the other methods of controlling logging except for a variable rate controller:

- The switch input only activates logging if a field is selected or is being mapped.
- Log on (using the softkey, external keypad, or switch input) resumes normal operation if the system was paused.

If the switch is closed, and you select Pause, the spray switch or variable rate controller causes the software to immediately resume. Therefore you should turn off your sprayer or boom switches, before pausing the field.

For more information, see Pause and Resume, page 105.

- Once you have used the external spray switch to control logging in a field, the other methods are disabled to ensure that logging is recorded whenever the external spray switch is on.
- If you want to occasionally spray without logging (for example, cleaning spray tanks while a field is selected) you will need to install an isolating switch in the circuit.
- If you want the AgGPS 170 Field Computer to control logging when you go on and off a prescription, you can connect your spray pump to remote output.

For more information, see Logging, page 134.

Operating the *AgGPS* 170 Field Computer

In this chapter:

- Introduction
- Defining a new field
- Working with existing fields
- Mapping features and waypoints
- Guidance
- Logging
- Warning messages
- Setting the swath parameters
- Getting help

Introduction

Before using the AgGPS 170 Field Computer, you need to define the field where you will work. To do this, enter information to uniquely identify the field, and then map the field (either by mapping the field boundary, or by creating a reference line to work from).

You can also import a field from the \AgGPS170 GIS Fields\ directory on the data card.

Each time a new task is carried out in the field, you need to create a new event log (called an Event). You also need to set up some parameters, such as what swath width and swath pattern, or sampling grid you will use.

To perform these tasks, access the dialogs from the *Field* menu.

Defining a New Field

There are two ways to define a new field:

- New Field (Boundary)

Drive around the perimeter of the field. The AgGPS 170 software maps the field boundary as you go, until you return to the start. This creates a polygon that represents the boundary of the field.

The advantages of this method are that it gives you a headlands swathing pattern option, and it automatically calculates the area of the field.

- New Field (No Boundary)

A simpler method is to define a straight or curved line (called an A-B Line) as your reference. To do this, mark the start point (Point A) and end point (Point B) of the line.

This option allows parallel swathing and racetrack patterns, and is quicker and easier if you do not need to map the entire field boundary, or use the headlands pattern.

Some No Boundary patterns also require Point C to define the field width.

***Note** – You should set up the swath parameters before starting to define the field. For more information, see *Setting the Swath Parameters*, page 111.*

There are three steps involved in defining the field:

1. Naming the field.

The *Client Name*, *Farm Name*, and *Field Name* data fields are used to uniquely identify each field defined and are mandatory.

For more information on naming the field, see *Naming the Field*, page 54.

2. Entering information about the event that you are to perform.

When a field is defined, the first event in that field is created at the same time. When you enter the *Client Name*, *Farm Name*, and *Field Name*, enter the first *Event Name* and any other information for the first event as well.

For more information on entering event data, see *Creating a New Event*, page 72.

***Note** – Client Name, Farm Name, and Field Name uniquely identify the field. These are constant for all events on a single field. The other information such as Crop and Weather can be changed each time a new event is created for that field.*

3. Mapping the field.

Mapping the field defines the field boundary or A-B Line.

For more information on mapping the field, see *Field Boundary Mapping*, page 56 or *Mapping a Straight No Boundary Field*, page 62.

Naming the Field

When you choose *New Field (Boundary)* or *New Field (No Boundary)*, the *New Field* dialog appears, as shown below:

New Field					
Client Name:	client1				
Farm Name:	farm1				
Field Name:	testfield1				
Event:	plant				
Operator:					
Material:					
Crop:					
Weather:					
Notes:					
NEXT key moves to the next data field, ENTER closes the dialog					
russ	greg	roy phillips	dave wilson	rick	joe


To enter the data, use the history softkeys or the arrow keys.


Softkeys

The history softkeys at the bottom of the screen provide a list of previous entries for all data entry fields except *Notes* (which is for specific notes relevant only to the current event). To re-use the softkey data in any data entry field, use the **NEXT** key to select the desired data entry field and press the appropriate softkey. An example of history softkeys for the operator field is shown below.

russ	greg	roy phillips	dave wilson	rick	joe
------	------	--------------	-------------	------	-----

If you use history softkeys to select a *Field Name*, you may need to edit the name because the *Field Name* must be unique within the farm.






A maximum of 50 previous entries can be stored on the history softkeys. If there are more than six previous entries, the first five previous entries are displayed on Softkey 1 to Softkey 5. To access the rest, press  (Softkey 6).

Note – You must fill in the *Client Name*, *Farm Name*, *Field Name*, and *Event data fields*, otherwise you cannot map the field. If you do not want to provide names for these fields, press  to use the system defaults. *Operator*, *Material*, *Crop*, *Weather*, and *Notes* are optional data fields to help you manage your field events.

To name the field:

1. In the *Client Name* field, enter a concise name to uniquely identify the client.

If you have already created one or more clients, select the client name from the history softkeys. To enter a new client name, use the arrow keys.

2. Press  and enter the *Farm Name*, or select the farm name from the history softkeys.
3. Press  and enter the *Field Name*.
4. Press  and enter the *Event Name* and press  again to enter data in any other fields.
5. When you have finished entering the data, press  to begin mapping the field.

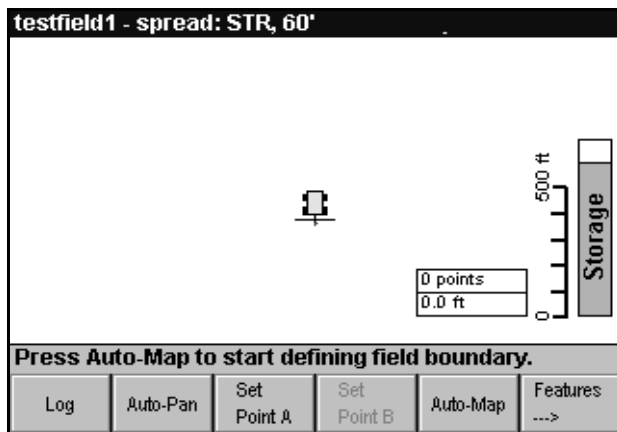


Tip – Trimble recommends that you choose names for your clients, farms, fields, and events that, in the first eight characters, clearly identify them. If you use longer names, they may be abbreviated in the *Select Field* list box and on the softkeys. If the total length of the field and event names is greater than 35 characters, they will be abbreviated to 35 characters when displayed on the title bar.

For information on how to use the arrow keys to enter text, see *Entering Text*, page 33.

Field Boundary Mapping

When you finish naming the field, press **ENTER** to map the field boundary. The *Map Field* screen appears, as shown below:



There are three ways to map the field boundary:

- Record coverage logging while you map the boundary.
- Use Auto-Map to map the field boundary without logging.
- Map individual boundary points.

If there are GIS fields on the data card, the *Select Boundary* dialog appears so that you can load a GIS field boundary instead of mapping a new field. For more information, see *Loading GIS Field Boundaries*, page 258.


Note – Points can only be recorded if you have a good DGPS position with the Horizontal Dilution of Precision (HDOP) less than the warning limit. For more information, see *Warning HDOP and warning correction age*, page 223.

Coverage logging and mapping at the same time

This option is particularly suited to the headlands pattern.

To record application coverage of spray or fertilizer while you are defining the field boundary:

1. When you start applying the spray or fertilizer, press .



This turns  on, sets Point A, and starts the AgGPS 170 Field Computer recording application coverage.

2. When you stop applying the spray or fertilizer, press .


This stops the AgGPS 170 Field Computer from recording application coverage, sets Point B, and stops mapping boundary points.

***Note** – If you do not want logging to set Point A and Point B, you can disable this function. For more information, see *Logging*, page 213.*

If you temporarily stop applying the spray or fertilizer in the corners of the field while you turn around, the AgGPS 170 Field Computer stops auto-mapping until you start logging again.

3. To set the direction for parallel swathing, press  at any point on the appropriate side of the field. Before you reach the end of the side, press . This overrides the A and B points set by logging, establishes an A-B Line, and activates the lightbar. The lightbar provides guidance in the direction of this A-B Line.

Swaths will be parallel to a line between Point A and Point B.

4. Press  to finish mapping the boundary.

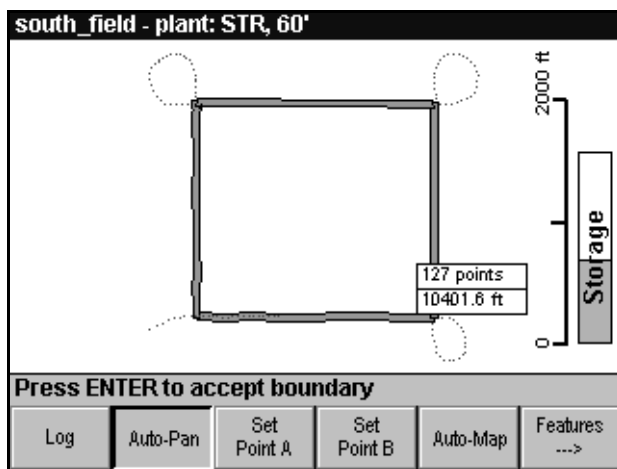
The AgGPS 170 Field Computer joins each section of logging to generate the field boundary.

Note – You do not have to map the last side of the boundary polygon as the AgGPS 170 Field Computer will draw a straight line between the first and last points. However, material is usually applied to the field as you drive the field boundary, so you would usually drive back to the start point before completing the boundary.

An external spray switch can be connected to control the log-on and log-off functions to record application automatically.

For information on how to connect external inputs, refer to Connecting Power and External Devices in Chapter 2 of the *AgGPS 170 Field Computer Reference Manual*.

A field boundary mapped by recording application coverage along four sides of the field is shown below. The dots represent the path travelled while logging was turned off. Auto-Mapping is also turned off while logging is turned off.




Warning – If you press **ESC** without completing the field definition, the AgGPS 170 Field Computer deletes the field event information and field boundary. When you press **ENTER**, the field boundary polygon closes and the data is saved to the data card. In either case, a warning message screen gives you the option to complete the field definition or quit.

Mapping the field boundary using Auto-Map



The AgGPS 170 Field Computer automatically maps the boundary of the field while you drive around it. The swath direction for parallel swaths can also be set while driving the boundary.

To map the field boundary using Auto-Map:

1. Start auto-mapping the boundary by pressing .

1. Drive around the boundary of the field.


The AgGPS 170 Field Computer records points, at one-second intervals, on the boundary of the field. The current length and number of points are displayed on the screen while you map the boundary.

2. To set the direction for parallel swathing, press  at any point on the appropriate side of the field. Before you reach the end of the side press . This establishes an A-B Line and activates the lightbar. The lightbar provides guidance in the direction of this A-B Line.

Swaths will be parallel to a line between Point A and Point B.



Tip – If you do not want to set the swath direction while driving the boundary, you can do it later. If the swath direction is not set by this method then, by default, the swaths are drawn from North to South. For more information on setting the swath direction, see Swath Direction, page 118.


3. Press  when enough points have been added to represent the field boundary. This closes the field boundary polygon.

Manually mapping boundary points

To manually map the field boundary by using the External Keypad:


1. Configure the External Keypad for Next Swath, Previous Swath, Set Point A, and Set Point B.
2. Drive the field boundary.
3. Press the Next Swath button to add boundary points.
4. Press the Previous Swath button to delete a boundary point.
5. Press the Set Point A and Set Point B buttons to define the A-B Line.

***Note** – Pressing the Set Point A button turns Auto-Map on so if you do not want to record points as you drive from Point A to Point B, you must manually turn off Auto-Map after pressing Set Point A.*

6. Press  when enough points have been added to represent the field boundary. This closes the field boundary polygon.

You can also configure the External Keypad to set Point A and Point B, add boundary points, and select the next swath using a single button.

To manually map the field boundary using a single button:

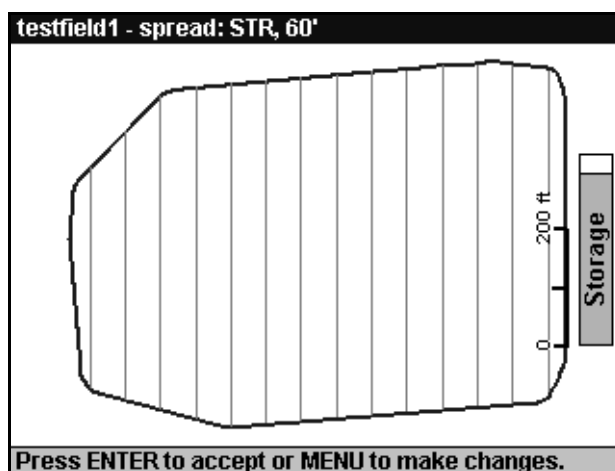
1. Configure the External Keypad for Set A/B/C Next Swath.
2. Drive the field boundary.
3. Press this button to add Point A and the first boundary point.
4. Press again to add Point B and the second boundary point.
5. Press again to add more boundary points.
6. Press  when enough points have been added to represent the field boundary. This closes the field boundary polygon.
7. Pressing this button now selects the next swath.

Note – If you do not want the first two points of your boundary to be Point A and Point B, you need to reset Point A and Point B using the Set Point A and Set Point B buttons or softkeys.

To start logging, see Logging, page 103.

Confirming the pattern

Once field definition is finished, if the pattern is not Curve or Spiral, the *Pattern Check Map* appears, as shown below:



The *Pattern Check Map* displays the field boundary and draws in the swath lines covering the whole field.

The vertical lines shown above are the swath line centers. If you set Point A and Point B while mapping the field, these swaths are parallel to the A-B Line. Otherwise they are drawn North–South.

If the A-B Line is on or near the field boundary the first straight swath is drawn half a swath width in from the boundary. If you define the A-B Line as you map the field boundary and the A-B Line is already offset from the boundary, the first swath is drawn on the A-B Line.

With Curve following and Spiral patterns, the first swath you drive is always the A-B Line.

Press **ENTER** to accept the swath pattern or **MENU** to access the *Swath Pattern*, *Swath Width*, or *Swath Direction* dialogs if you need to make changes. For information, see *Setting the Swath Parameters*, page 111.

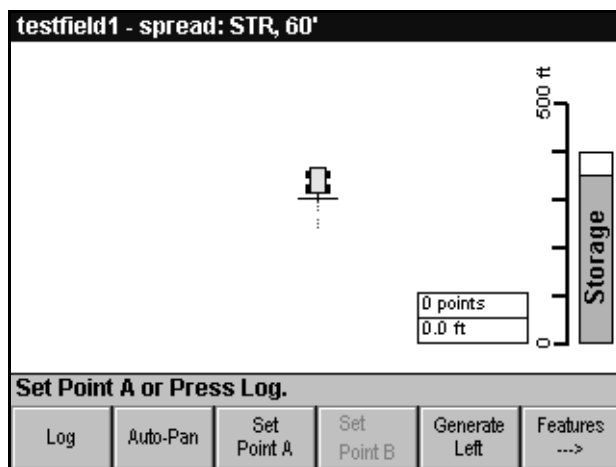
Mapping a Straight No Boundary Field

If the No Boundary pattern is one of the Straight patterns, including the Racetrack and Squeeze patterns, the guidance swaths are all straight lines parallel to the A-B Line.

If the No Boundary pattern is set to Spiral or Curve following, the first guidance swath is a curved line parallel to the A-B Curve. Once this first swath has been driven, the second swath is created parallel to the path driven for this swath, not to the original A-B Curve.

For more information on patterns, see *Swathing*, page 143.

If you press **ENTER** in the *Select Boundary* dialog without selecting a field from the data card, the *Map Field* screen appears, as shown below:



To set the A-B Line for straight swathing:

1. Press **Set Point A**.

This sets Point A.

2. Drive along in the general direction of Point B.

***Note** – The lightbar does not function until two points have been set and the direction of travel is established.*

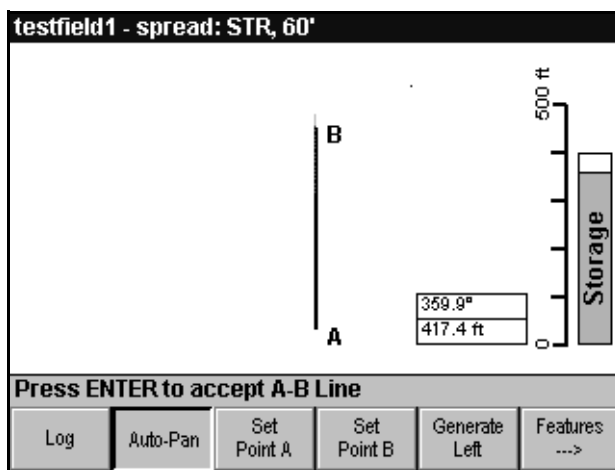
3. At any point along the line you can press .

This step is optional. The purpose is to set Point B, which establishes an A-B Line and activates the lightbar. The lightbar then provides guidance in the direction of this A-B Line.

4. When you reach the very end of the line, press and then press .

This defines your A-B Line.

A defined A-B Line on the *Map Field* screen is shown below:



Resetting A-B Line points

If you press or a second time, Point A is reset.

- Pressing more than once resets Point B and updates the direction of the A-B Line being created, based from the initial Point A added.
- Pressing a second time resets Point A.

Press **ENTER** to complete the A-B Line mapping.

The current length and direction of the A-B Line is displayed on the screen during definition. The direction is useful if you want to achieve a specific A-B direction across a field. The length of the A-B Line is useful for calibrating equipment.

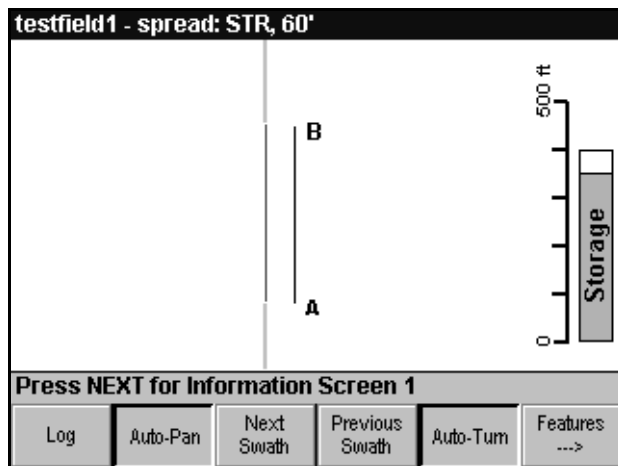


Warning – If you press **ESC** without completing the A-B Line, the AgGPS 170 deletes the field event information you have entered so far. A warning message gives you the option to complete the A-B Line mapping or quit.

If there are prescription files that overlap the field boundary on the data card, the *Select Prescription* dialog appears.

For more information, see Loading Prescription Files, page 270.


When field mapping is complete, the *Plan View Map* appears, as shown below:




Coverage logging and mapping at the same time

To record application coverage of spray or fertilizer while you are defining the A-B Line:

1. As soon as you start applying material, press .

This starts the AgGPS 170 recording application coverage, and sets Point A if you have not already done so. (If you want to use a different Point A, press  at the appropriate point.)

2. When you stop applying material, press .

This stops the AgGPS 170 recording application coverage, and sets Point B if you had not set it. (If you want to use a different Point B, press  at the appropriate point.)

An external spray switch can be connected to the AgGPS 170 to record application logging coverage automatically. For information on how to connect external inputs, refer to Connecting Power and External Devices in Chapter 2 of the *AgGPS 170 Field Computer Reference Manual*.

Mapping a Curve or Spiral No Boundary Field

You can use an A-B Curve or Spiral pattern for guidance in fields with or without boundaries.



You can define the A-B Curve in two ways:

- Use the first application of materials as the first curve
- Define an A-B Curve by setting Point A and Point B

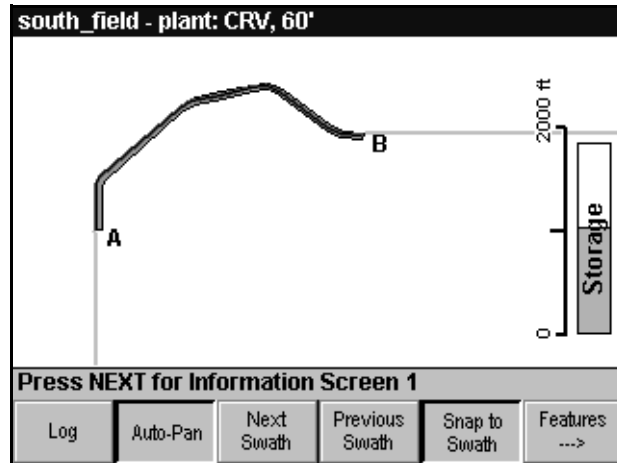
To set the A-B Curve while logging the first application of material to the field:

1. Press .

This sets the start point for the first swath and starts logging.

2. Drive the first curve.
3. At the end of the curve, press  and then press .

This defines your A-B Curve. The *Plan View Map* appears, as shown below:



If you log off and log back on again while mapping the curve, all segments are used to define the A-B Curve.




To set the A-B Curve without logging coverage:

1. Press .
2. Drive the first curve.
3. At the very end of the curve, press and then press .

Key issues

The key issues are:

- Guidance swaths are parallel to the *previous swath*.
- If you set Point A and Point B, the A and B points are used to define the A-B Curve.
- If you set Point A but do not set Point B, the logging is used to define the A-B Curve.

For example, if you press , and , then press  to accept the field definition without setting Point B, the Point A that was set is ignored and the entire piece of logging is used to define the A-B Curve.

- The *Pattern Check Map* is not displayed with Curve or Spiral patterns.



Tip – Curve and Spiral patterns do not provide a pre-generated swath pattern. If you select an existing field or event using either of these patterns, guidance is only provided to the A-B Curve until you do some more logging.

For more information about Curve and Spiral patterns, see Swathing, page 143.



Mapping a No Boundary Field Using a Racetrack Pattern

Crop circle racetrack and Skip racetrack patterns require A and B points to be set. Half-field racetrack, Center racetrack and Squeeze patterns require A, B, and C points to be set. For more information about racetrack patterns, see Swathing, page 143.

The Half-field racetrack pattern can be defined in two ways:

- Use the first application of material down each side of the field to set A, B, and C points.
- Use softkeys to set A, B, and C points.

To set up a Half-field racetrack pattern while logging the first application of material to the field:

1. Press  at the start of the first side of the field.
This sets Point A and starts logging.
2. Drive the first swath.
3. At the end of the swath, press .

This sets Point B and creates an A-B Line.

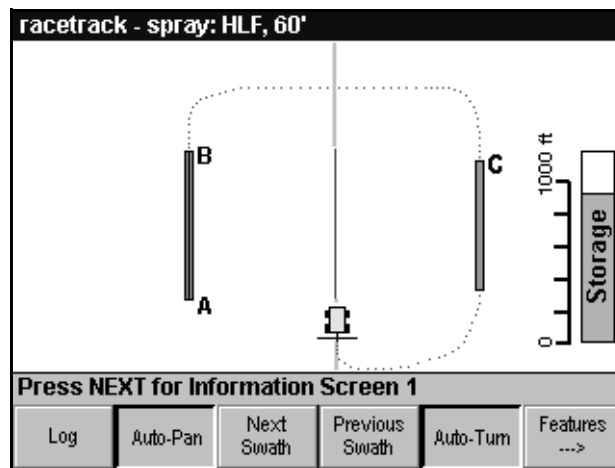
4. The next swath is on the opposite side of the field. At the start of the swath, press .

This sets Point C and creates the pattern.

Note – You cannot set Point C less than half a swath away from the A-B Line.

5. At the end of the swath, press .
6. Make sure that is selected. Turn towards the center of the field. When you turn through 60°, the next swath is created in the center of the field.

A Plan View Map displaying the A-B Line, Point C, and the coverage logging is shown below. The vehicle is about to drive the third swath.



To set the A-B Curve without logging coverage:

1. Press .
2. Drive the first swath.
3. At the very end of the swath, press .
4. Drive to the opposite side of the field and press .

Setting A, B, and C points, and Next Swath

You can configure the external keypad so that you can set A, B, and C points, and also select the next swath, using a single button.

Pressing this button always sets the next required point while you are mapping the field, or changing the swath direction:

- If no point is set, pressing this button sets Point A.
- If Point A is set, pressing this button sets Point B.
- If a Point B is set, and the pattern requires Point C, pressing this button sets Point C.

Once the field is mapped, pressing this button selects the next swath.

This button can be used in conjunction with other methods of setting the A, B, and C points (using softkeys, or logging).

To reset the A or B points, use the softkeys.

For information on setting up the external keypad, refer to External Keypad, page 238.

Working with Existing Fields

Use the *Select Field* dialog to do the following work within existing fields:

- Create a new event
- Add to the logging data collected on an existing event
- Delete logging data or features from existing fields and events
- Delete fields completely

From the *Field* menu, choose *Select Field*. The *Select Field* dialog appears, as shown below:

Select Field - Training mode fields only

Client - Farm - Field:

- client1 - farm1 - default9
- client1 - farm1 - testfield2
- client2 - skyline - back 40**
- client2 - skyline - gulch_75
- frey_bro - brian_fr - johns_40
- rhodes_e - poly_rx - DAP_POLY
- rhodes_e - poly_rx - lime_poly
- sample - dickeyjo - 33ab34
- sample - dickeyjo - 33g12
- sample - dummy - default25
- sample - dummy - default26

Selection radius: 10 miles

Last Event: topo

Material: anhydrous

Notes: order no 3229683

Area: 4.3857 a

Boundary: Yes

Delete Field Delete All Fields Delete Events Delete All Events Field History Delete Features

Note – When in Training mode, the Title Bar displays *Select Field – Training mode fields only*. Only fields created in Training mode are available for selection.





The *Client – Farm – Field* list displays, in alphabetical order, all fields saved on your data card. The closest field is highlighted.

Note – If you use long names for your farm or your fields, they are abbreviated to a maximum of eight characters each when displayed in this list box.


Selection radius

If the list of fields is too long, reduce it by selecting the *Selection radius* check box. This reduces the list to only fields that fall within the specified distance from the current position.

To reduce the number of fields displayed in the list box:

1. Press  to move to the *Selection radius* check box.
2. Press  to select the check box.
3. Press  to move to the distance field, and use the ▼ and ▲ keys to enter a value.
4. Press  again to toggle the list and select a field.



Warning – If you press  or  when the selection radius is checked you will delete all fields or events on the data card, not just the ones that are displayed in the list.

The *Last Event* display box on the right of the screen shows information about the last event performed in the selected field. For fields with boundaries, the field area is displayed in the current units.

Event options

From the *Select Field* dialog you can:


- create a new event in the selected field
- select the last event worked on in the field and add to it
- use *Field History* to select an old event in the field and add to it

Selecting a Field

To select another field to work in:


1. Use ▲ or ▼ to move up or down the list.

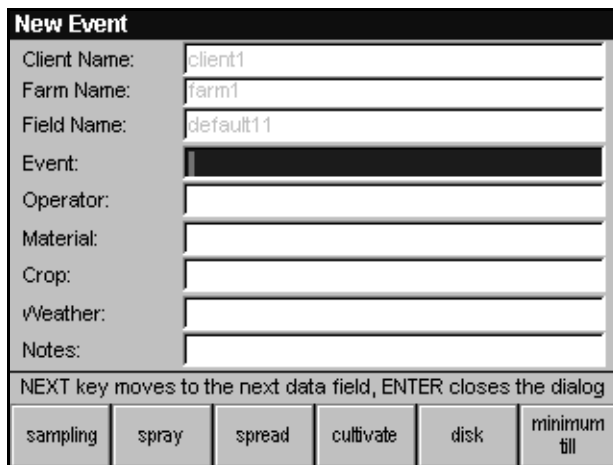
If there are too many fields on the data card to display in the list box, the scroll bar is displayed on the right hand side of the list box. Use the arrow keys to scroll past the last displayed field.

2. Press  for more information on work previously carried out in the selected field.

Creating a New Event

To create a new event in an existing field:

1. Press . If the last event created in this field is already complete, the *New Event* dialog appears, as shown below:



The **New Event** dialog box contains the following fields and controls:

- Client Name:** client1
- Farm Name:** farm1
- Field Name:** default11
- Event:** (empty field with a dark background)
- Operator:** (empty field)
- Material:** (empty field)
- Crop:** (empty field)
- Weather:** (empty field)
- Notes:** (empty field)

Below the fields is a text box: NEXT key moves to the next data field, ENTER closes the dialog

At the bottom are six buttons: sampling, spray, spread, cultivate, disk, and minimum till.

Note – The Client Name, Farm Name, and Field Name text is light grey to indicate that it is common for all events in the field and cannot be changed.

2. Enter the event name and any other data using the softkeys or the arrow keys.

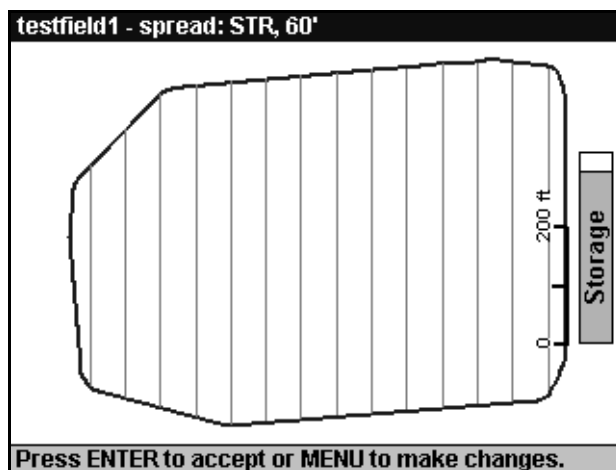
The *Event* name must be unique in each field. You can use the softkeys to enter the name, and then the arrow keys to edit it, if necessary.

Note – The AgGPS 170 software automatically appends a number to events with the same name in a field.

3. When this is complete, press **ENTER** to begin logging.

If either the pattern or swath width differs from the last used swath parameters a message appears, giving you the choice of using the last used or the current swath parameters.

For Boundary fields (apart from Curve and Spiral patterns), the *Pattern Check Map* displays the existing field boundary, swath pattern, and swath width, as shown below:



If the pattern is set to Curve or Spiral, or if the field has no boundary, no *Pattern Check Map* is shown. The *Plan View Map* is displayed immediately. In a sampling event, the *Grid Setup* dialog is displayed.

To start logging, see Logging, page 103.


Recording different field information

In the *Notes* data field you can record up to 50 characters of information about any aspect of the event. If this is not enough, although the data field names have been set for the most commonly recorded data and cannot be changed, you can still use these fields to record any other information, if required.

For example, if you do not want to record information about the weather for a particular event, and have already used the *Notes* field to record customer/client payment terms, you can use the *Weather* field to record the type of spray rig used for the event.

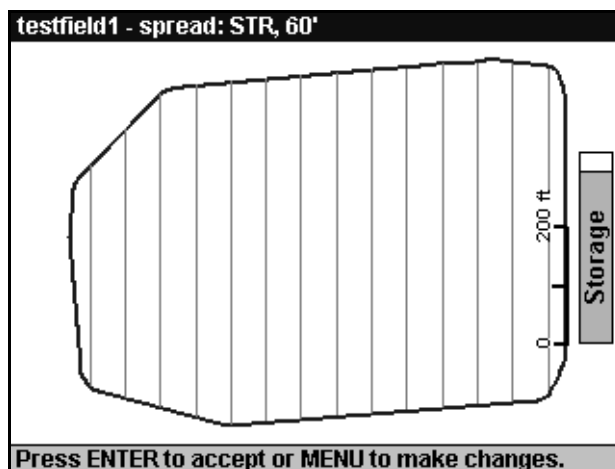
Adding to the Last Event

To add to the last event in an existing field, from the *Field* menu, choose *Select Field*:

1. In the *Client – Farm – Field* list, use the arrow keys to select the existing field to work on.
2. Press . As long as the most recent event in the selected field is incomplete, the boundary and logging information is loaded.

If the pattern, swath width, or access path settings differ from the most recently used swath parameters, a message appears. You can choose the most recently used or the current swath parameters.

For Boundary fields, apart from Curve and Spiral patterns, the *Pattern Check Map* displays the existing field boundary, swath pattern, and swath width, as shown below:



Tip – Curve and Spiral patterns do not provide a pre-generated swath pattern. If you use either of these patterns and select an existing field or event, guidance is provided to the A-B Curve until you do more logging.


For information about starting logging, see Logging, page 103.

Viewing Field History

From the *Select Field* dialog, you can display details of previous events recorded on the storage card for the selected field. This provides a check that:

- the field has not already been sprayed with a particular chemical
- withholding periods for fields treated with a particular chemical are not broken

To view field history, in the *Client – Farm – Field* list:

1. Use the arrow keys to select the existing field to view.
2. Press the  key. The *Field History* dialog appears as shown.

Field History			
mw_farms - kennedys - north_field			
Date	Event	Crop	Material
03-Feb-1999	spray4	soya	roundup
c 03-Feb-1999	spray3	soya	roundup
c 22-Jan-1999	spray2	soya	fungicide
21-Jan-1999	spray1	soya	pesticide
X 03-Dec-1998	minimum ti	soya	fertilizer
X 22-Jan-1998	spread	soya	urea
X 21-Dec-1997	sow	soya	seed
X 03-Feb-1997	cultivate		
X 05-Jan-1997	spray		roundup
Press ENTER to add to event. Press ESC to return to select field.			

Note – Completed events are marked with a *c* in the left column. Deleted events are marked with an *x*. Completed events can be loaded from the *Field History* dialog but deleted events are listed for reference only and cannot be loaded.


The client, farm and field names are listed at the top of the screen and for each event (including any deleted events), the crop, material applied, and the date the event was started is recorded in the list below.

If there is more than one screen full of events, a scroll bar appears. Use the arrow keys to move through events.

Adding to a Previous Event

The *Select Field* dialog only gives you access to the most recent event created in the field. You can reload previous events using the *Field History* or from a work order.

To load an old event:

1. From the *Field History* dialog, use the arrow keys to select the existing event to load.
2. Press .



Tip – When you select an old event from the *Field History* dialog, the current swath parameters are checked against the EventHistory.dbf file. You can select the current values or the values last used with the selected event.

For information on using work orders to load events, see *Selecting Work Orders*, page 275.

Completing Events

When you close a field, or select another field:

1. A message asks whether the event is complete:
 - If the last event is completed, the next time you select the field a new event is automatically created.
 - If the last event is not completed, the next time you select the field the event is loaded.
2. The *Edit Event Attributes* dialog appears.






If the event information has changed, you can change any of the details entered in the *Operator*, *Material*, *Crop*, *Weather*, or *Notes* fields.

Deleting Field or Event Data

To delete logging data or point features from existing events, or to delete fields:

1. From the *Field* menu, choose *Select Field*.
2. Use ▼ and ▲ to select the desired field.
3. Press the appropriate softkey.


The softkeys give you the options shown below.

Use this key ...	To delete the following items from the inserted CompactFlash data card ...
	the currently highlighted field and all associated event logs
	all farms, fields, and associated event logs
	all event log files for the highlighted field (but not the field boundary or event history files)
	all event log files for all fields (but not field boundaries or event history files)
	all point feature files, including target point files and incomplete sample files, associated with the currently highlighted field


Warnings

When field data or event data is deleted it is gone completely from the database and there is no way to retrieve it. To make sure that this data is not accidentally deleted, a warning message appears whenever a delete softkey is pressed:



The message tells you exactly what will be deleted. The example above shows that if the  softkey is pressed, all fields and all events will be deleted.

To confirm the deletion, press .

If you do not want to delete, press .


Note – When you select the *Delete Event* or *Delete All Events* options on this screen, all files in the \Event\ directory are deleted. The event identification data entered in the *New Event* screen (for example, event, operator, and material) is retained in the field history.

To view the field history, press  in the *Select Field* dialog. For more information, see *Viewing Field History*, page 75.

The *Delete Field* and *Delete All Fields* options, delete **all** data including the field history.

Closing Fields



The current field and event automatically close when you:

- power off (using the power key )
- create a new field
- select another field

However, Trimble recommends that you close the field when you complete an event—especially if you have track logging turned on. If you do not do this, GPS positions are still recorded while the vehicle is standing still and as you travel to the next field. These positions are recorded with the data relating to the first field. The track.dbf file can get very large if the event is left open with track logging on for a long time.

For more information about logging, see *Logging*, page 103.

To manually close a field before driving off to the next field or the next farm, from the *Field* menu, choose *Close Field*.

A message asks you to confirm that you really want to close the field (press ) , or press  to keep the field open.

When a field is closed a message asks whether the event is complete. This saves time by automatically creating a new event if a field that has no incomplete events is selected.

Note – *If you need to change the swath parameters: stop the vehicle, log off, and close the field before accessing the swath parameter dialogs. For more information on the effect of changing swath parameters, see *Changing Swath Parameters*, page 176.*

Mapping Features and Waypoints

The AgGPS 170 Field Computer contains tables of point, line, and area features. Use these to record features such as weeds, rocks, tiles, drains, and pests in the field.

One set of features is saved for each feature type. You can record or add to these features during any event, but all events on a field will share the same set of features.



Features are used when working the field, to:

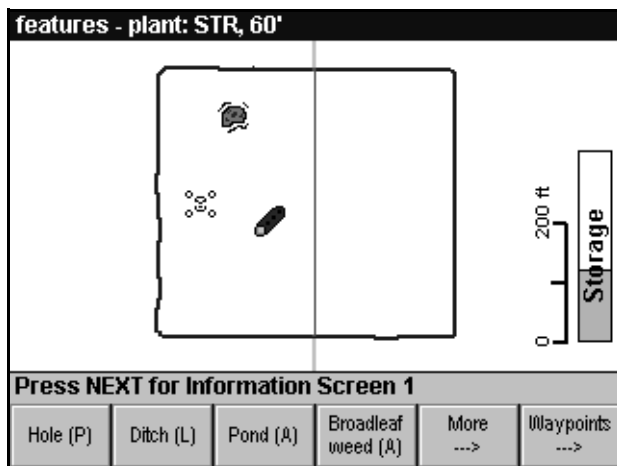
- mark a point to return to at a later stage
- highlight a hazard that must be avoided
- highlight spot treatment for weeds


You can assign up to 52 feature types to the feature softkeys at a time. For information on assigning features to softkeys, see Features, page 192.

The standard feature lists are stored in tables (.bmp and .dbf files) in the AgGPS 170 internal memory. There is one global list of features for all fields. You cannot edit these default feature tables, but you can create new feature tables and store them on the data card to use instead.

If there are feature tables on the data card, the AgGPS 170 Field Computer automatically selects features from these tables. If there are no feature tables on the data card, the AgGPS 170 Field Computer uses the built-in default feature tables.

To access the feature softkeys, press . Softkey 6 changes to , as shown below:



To show whether a feature is a point, line, or area feature, the feature name on the softkeys is followed by (P), (L), or (A). If there are more than five softkeys assigned, Softkey 5 displays .

Point Features


Use point features to record the position of a feature such as a hole or a gate. Point features have position information but no size.

Recording point features in a field

To record a point feature in the field:

1. Press the appropriate point feature softkey at the location where the point feature occurs.

***Note** – To accurately record the position of the feature, make sure that the antenna position or known offset position is directly over the top of the feature when you press the feature softkey.*

2. To access more features, press .

A symbol representing each point feature is drawn on the screen. Point feature information is recorded in the Point_<featurename> files in the \Field\ directory on the data card.

For more information on files, refer to Data Organization in Chapter 4 of the *AgGPS 170 Field Computer Reference Manual*.

Line Features

Use line features to record the position of a feature such as a ditch or a fence. Line features have position and length information.


Recording line features in a field

To record a line feature in the field:

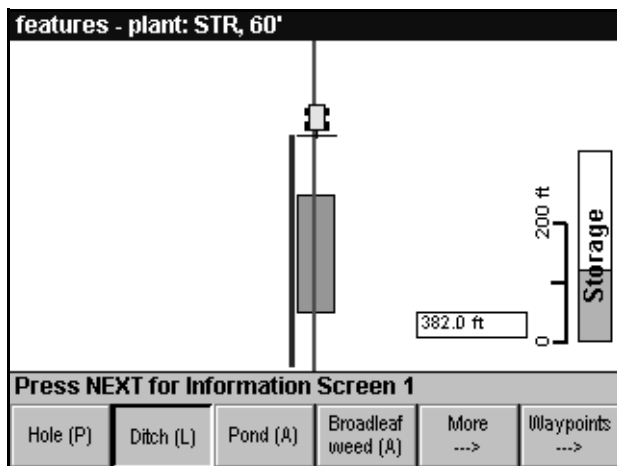
1. Press the feature softkey at the location where the feature starts. The softkey appears depressed.

***Note** – To accurately record the position of the feature, make sure that the antenna position or known offset position is directly over the top of the feature when you press the feature softkey.*

2. Drive along the length of the feature. The line feature and line length is displayed on the screen while you map the feature.
3. Press the feature softkey at the location where the feature ends.

***Note** – If you map a feature at the same time as you map the field, the feature is completed when you press  to accept the field boundary or A-B Line.*

An example of a ditch line feature mapped with a left offset is shown below. For more information on offsets, see Features, page 192.



The feature information is recorded in the Line_<featurename> files in the \Field\ directory on the data card.

Area Features

You can use area features to record features such as a patch of rocks or a pond. Area features have position and area information.


Recording area features in a field

To record an area feature in the field:

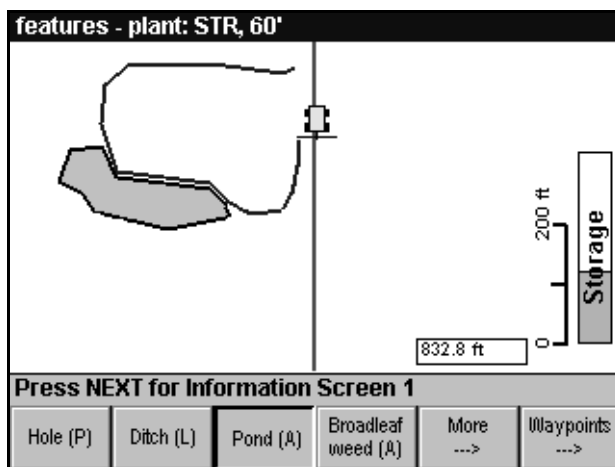
1. Press the feature softkey at the location where the feature starts. The softkey is shown depressed.

***Note** – To accurately record the position of the feature, make sure that the antenna position or known offset position is directly over the top of the feature when you press the feature softkey.*

2. Drive around the perimeter of the feature. As you drive a line is drawn on the screen. The perimeter length is displayed on the screen while you map the feature.
3. Press the feature softkey at the location where the feature ends.

Note – If you map a feature at the same time as you map the field, the feature is completed when you press  to accept the field boundary or A-B Line.

An example of mapping a pond area feature with a left offset is shown below. An area of rocks is already mapped by the edge of the pond.



The feature information is recorded in the Area_<featurename> files in the \Field\ directory on the data card.

Deleting Features from a Field

You cannot delete individual features on the AgGPS 170 Field Computer; you can only delete all of the features associated with a specific field. On an office computer, you can delete all features of one type by deleting the appropriate shapefiles. For more information on how to delete all features in a field, see Deleting Field or Event Data, page 78.

Waypoints

The AgGPS 170 Field Computer provides guidance to waypoints. You can use waypoints to mark the location of a feature such as an airstrip or a refueling tank.

When you press a waypoint softkey, swath or feature guidance is paused. While swath or feature guidance is paused, guidance is provided to the waypoint and then back to the pause location.

Waypoint positions are stored in a Waypoints.txt file in the root directory on the data card and displayed as icons on the *Plan View Map*. The icons used to display waypoints are selected from the PointFeatures.bmp file when the waypoint is defined.

If a Waypoints.txt file exists on the data card, the last 51 waypoint names in the file are displayed on the waypoint softkeys.




Tip – The AgGPS 170 Field Computer loads the Waypoints.txt file the first time it finds one on the data card. If you insert a new card with a different Waypoint.txt file, you need to reboot the AgGPS 170 Field Computer to load the new waypoints.

Defining waypoints

Waypoints cannot be defined while a field is already paused.

There are two ways to define a waypoint:

- Specify waypoint positions in a Waypoints.txt file on an office computer. Refer to Defining Waypoints in Chapter 5 of the *AgGPS 170 Field Computer Reference Manual*.
- Map waypoints on the AgGPS 170 Field Computer using the  softkey.

Note – Any waypoints defined apply to all fields.

Waypoints are accessed from Softkey 6 on the *Plan View Map*.

To access the waypoints softkeys:

- If a field is loaded, press **Features** and then press **Waypoints**.
- If a field is not loaded, just press **Waypoints**.





Tip – If you do not have a field open, the AgGPS 170 puts you into waypoint guidance mode as soon as you press **Waypoints**, even if you do not select a waypoint. To return to swath guidance mode, press **ESC** or from the *Field* menu, select *Close Field*.

To define a new waypoint on the AgGPS 170 Field Computer:

1. Press **Add Waypoint**. The *Add Waypoint* dialog appears, as shown below:

Add Waypoint			
Name	waypoint1		
	Deg.	Min.	Sec.
Latitude	N 0	0	0.408
Longitude	W 0	0	0.001
Symbol	1 ●		
Notes			
<div> <div></div> <div></div> <div></div> <div></div> <div>Delete All Waypoints</div> </div>			

2. A default waypoint name is provided. If you want to define your own waypoint name, use the arrow keys.
3. Press **NEXT** to step between fields.
4. The current latitude and longitude values are entered by default. If the waypoint is at a different location, use the arrow keys to enter the latitude and longitude values.
5. Use the arrow keys to select a waypoint icon.

6. In the *Notes* field, store additional information about the waypoint if required.
7. Press  to save the waypoint.
8. If a field is not loaded, press  to return to swath or feature guidance.



For information on adding waypoints in the office, refer to Defining Waypoints in Chapter 5 of the *AgGPS 170 Field Computer Reference Manual*.

Deleting waypoints


You can delete an individual waypoint in the office by deleting that line from the Waypoints.txt file.

On the AgGPS 170 Field Computer you can delete the entire Waypoints file, but you cannot delete an individual waypoint.

To delete the Waypoints file:

1. Press  to access the *Add Waypoint* dialog.
2. Press .



Tip – You can define new waypoints and navigate to waypoints without selecting a field. However, after doing this you need to press  or select *Close Field* from the *Field* menu before you can select or define another field. When there is no field open, selecting a waypoint does not draw the Pause icon on the screen.

Guidance

When the field and event are defined, use the AgGPS 170 Field Computer display and lightbar for guidance to swaths, target points, line or area features, or waypoints.

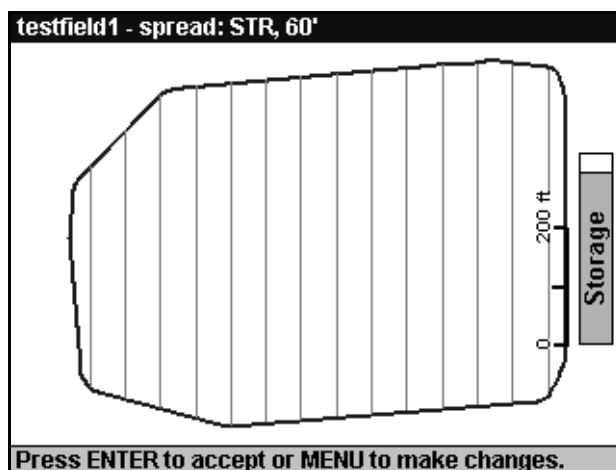
For information on configuring guidance options, see *Guidance*, page 211.

This section explains how to use the:

- Pattern Check Map
- Plan View Map
- Information screens

Confirming Field Pattern

After mapping a new field boundary with Straight, Headlands, Center racetrack or Skip racetrack pattern, or changing the swath parameters, the *Pattern Check Map* appears. It zooms to fit the field on the AgGPS 170 screen, as shown below:



The *Pattern Check Map* lets you confirm that the field has been logged as you expected and that the pattern, direction, and swath spacing are correct. Use the scale bar to check that the field size is approximately correct.

The *Pattern Check Map* example above shows a Boundary field with a straight pattern and a 60 ft swath width.

Shape


The boundary polygon (in blue on the display) should look like the shape of your field. If the shape is not correct you need to remap the boundary.

Pattern

The black lines represent the center of the swaths to be driven. Check that the pattern is correct, and that the swath spacing looks realistic.

The pattern can be changed using the *Field / Pattern* menu command, and swath width and direction can be reset using the *Field / Swath Width* and *Field / Swath Direction* menu commands.

For information on how to set up swathing options, see Setting the Swath Parameters, page 111.

When the swath parameters are acceptable, press  to display the first of the main operation screens—the *Plan View Map*.

Reviewing the Pattern Check Map

If you change any of the swath parameters the *Pattern Check Map* is displayed.

If you make any changes to the swath parameters, the *Pattern Check Map* is displayed again.

To display the *Pattern Check Map* again, reselect the current field and add to the current event.

Main Operation Screens

There are three main operation screens. These are:


- The Plan View Map
- Information Screen One (text only)
- Information Screen Two (text only)

To cycle through the main operation screens, press .


Each screen displays the softkeys at the bottom. These softkeys give you control of your work in the field.

Display options

The main operation screens can display information to help control the field work. The main features are:

- The softkey buttons can be always displayed, or only displayed for 5 seconds when the  key is pressed.
- The title, tip, storage, and scale bars, (which appear on the *Plan View Map*), can be suppressed to maximize space on the screen.

***Note** – These options can be turned on or off in the Setup / Map Display Options dialog. For more information, see Map Display Options, page 199.*

- The menus are always hidden. When you press , they appear. When you make your menu selection, they disappear immediately to maximize space on the screen.

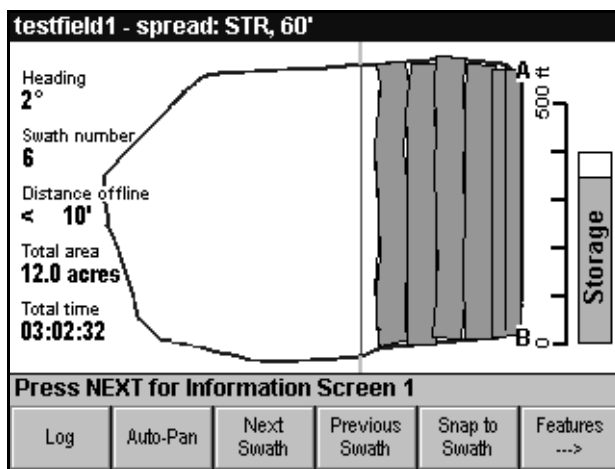
Plan View Map

The *Plan View Map* is the main graphical screen. When it first appears after mapping or selecting a field, it performs a *Zoom All* to make sure that all items are visible.

The *Plan View Map* displays any of the following items:

- Field boundary (a blue line)
- A-B Line (a black line)
- Current swath (a red line). For all patterns except Headlands and Spiral, the swath is extended (a grey line) to the edge of the screen to give lead in guidance to the swath.
- Current position (a yellow icon)
- Logged coverage (green polygons)
- Mapped point, line, or area features
- Waypoint icons
- Scale bar showing approximate distances
- Storage bar showing available space on the data card
- Flashing messages such as Training Mode or NO GPS
- Track logging, RTK GPS, or ASCII logging status information
- Up to five configurable items of text information
- Prescription maps (not displayed below)
- When field boundaries, or line or area features, are being mapped, the length of the line being mapped is displayed.
- A sampling grid
- Target and sample points
- Background layers (not displayed below)

An example of a *Plan View Map* is shown below:



Scale bar

The scale bar helps to estimate distances and approximate areas. It scales automatically according to the size of the current field and the extent to which zooming has occurred.

Data storage

The storage bar shows any storage space remaining on the data card. The lower shaded part of the bar represents the data already logged on the storage card. The upper white part of the bar represents the storage space available on the storage card. When there is no card in the slot, the background color changes to red and No Card is displayed.

Text information

For information on displaying text on the *Plan View Map*, see Information Screens, page 203.

Current position

The current location and direction of travel are displayed relative to the swath lines and field boundary. The vehicle is represented by a yellow icon on the map. The center of the boom at the base of the icon represents the exact boom center position. Figure 2.1 shows the vehicle icon.

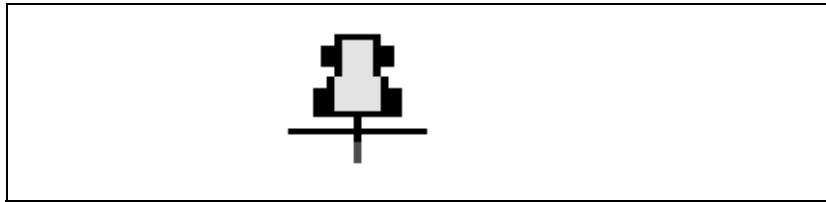


Figure 2.1 Plan View Map – vehicle icon


Orientation





The *Plan View Map* can display the field with North at the top of the screen or display the A-B Line vertical with Point B at the top of the screen. For information on changing the orientation, see Map Display Options, page 199.

Zooming in and out

The *Plan View Map* automatically performs a *Zoom All* to ensure that all items related to the field are visible on the screen when the field is selected or mapped. Zoom In or Zoom Out will zoom by a fixed amount. This has been set to approximately 1.4 times ($\sqrt{2}$) so that zooming in twice halves the scale, and zooming out twice doubles the scale.

Panning

The default for  is “on”. This centers the view around the current position whenever you move off the screen.

In the *Plan View Map*, the arrow keys (, , , and ) pan approximately 25 percent in the selected direction. Using the arrow keys in this way turns auto-pan off to let you view areas away from the current position.







Softkeys

There are three softkey modes available in the main operation screens:

- Swathing mode – see Swathing softkeys, page 95.
- Feature mode – see Feature softkeys, page 96.
- Waypoints mode – see Waypoints softkeys, page 97.

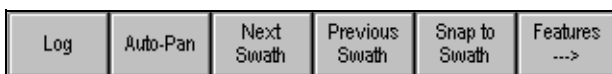
The softkey functions are independent of the main operation screen displayed.

By default, swathing softkeys options are displayed.









- To display feature softkeys, press .
- When displaying features, Softkey 6 changes to .
- When displaying waypoints, Softkey 6 changes to  or  (depending on what you are doing at the time).
- To return to swathing or mapping softkeys, press  or .

Swathing softkeys



The swathing softkeys control guidance and are generally used when carrying out operations such as spraying or applying agri-chemicals to a field. An example of swathing softkeys are shown below.



The swathing softkeys carry out the following tasks:

-  starts recording application coverage. (This can also be done using the external keypad or a spray switch or a variable rate controller.)
-  pans the *Plan View Map* to keep the vehicle displayed on the screen.
-  steps forward through the swaths. If you hold this softkey down, the AgGPS 170 Field Computer skips through the swaths quickly.
-  steps back through the swaths. If you hold this softkey down, the AgGPS 170 Field Computer skips through the swaths quickly.
-  selects the closest swath to the current position. In some patterns  is replaced with .
-  changes the softkeys to feature softkeys.



Tip – For racetrack patterns, where the swath application sequence differs from the swath numbering sequence,  and  step through the swaths in the application sequence order.

For information on setting the swath parameters, see page 111.

For more information on swathing control, see Snap-to-swath, page 171 and Auto-Turn, page 172.

Feature softkeys

You can record features while driving around a field to:

- mark a point to return to at a later stage
- highlight a hazard to avoid
- highlight spot treatment for weeds

Up to 52 feature types can be assigned to the feature softkeys at a time. An example of the feature softkey options are shown below.

Hole (P)	Ditch (L)	Pond (A)	Broadleaf weed (A)	More --->	Waypoints --->
----------	-----------	----------	-----------------------	--------------	-------------------

For information on mapping features, see Mapping Features and Waypoints, page 81.

If you need to add features that were not originally allocated to the softkeys, you can reassign the feature types on the softkeys part way through an event.

For information on assigning features to the features softkeys, see Features, page 192.

You can navigate to features using the *Plan View Map*. Look at the location of the vehicle icon relative to the feature. You can also navigate to features using the *Distance to feature*, and *Direction to feature* text information options displayed on an information screen. These give the distance and direction to the **closest point feature**.

Waypoints softkeys

You can use waypoints to mark the location of a feature such as an airstrip or a refueling tank.

The waypoints softkeys let you create a new waypoint in the field, or select an existing waypoint from the data card. When you select a waypoint, swath or feature guidance is paused, and guidance is provided to the waypoint and then back to the pause location.

The first softkey allows you to add a new waypoint. Up to 51 waypoints are displayed on the waypoints softkeys at a time. If there are more than 51 waypoints saved in the Waypoints.txt file, the last 51 are displayed on the softkeys. An example of the waypoints softkey options is shown.

Add Waypoint	Waypoint1	miller supplies	wigram airport	More --->	Swathing --->
-----------------	-----------	--------------------	-------------------	--------------	------------------





For more information, see Waypoints, page 86.

Guidance to Waypoints

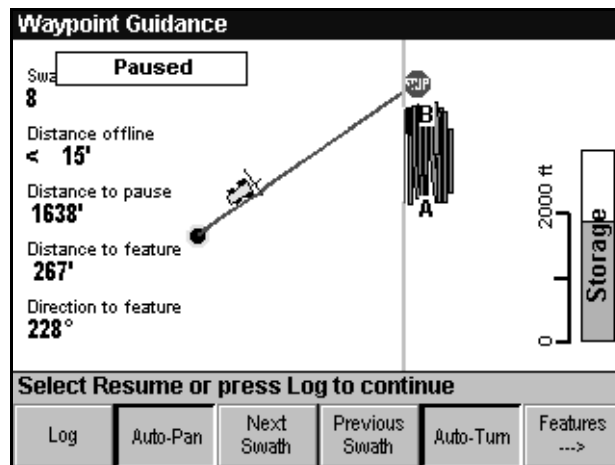
The AgGPS 170 Field Computer provides three kinds of guidance:

- Swath guidance (default)
- Feature guidance
- Guidance to a waypoint

To pause swath guidance and get guidance to a waypoint:

1. If a field is loaded, press **Features** .
- The softkey label changes to **Waypoints** .
2. Press **Waypoints** .
3. If the required waypoint is not displayed on one of the softkeys, press **More** .
4. Select the required waypoint from the softkeys.

A *Plan View Map* displaying the paused icon, the waypoint icon and the guidance line is shown below. *Plan View Map* text has been configured to display the guidance parameters.



When a waypoint is selected:


- The Title Bar displays *Waypoint Guidance*.
- The Pause icon is drawn on the *Plan View Map* at the current position.
- A red line is drawn between the paused location and the selected waypoint.
- The *Plan View Map* zooms out to include the waypoint and the paused location.
- The guidance LEDs on the lightbar provide offline guidance to the line between the paused location and the selected waypoint.
- The lightbar text always displays distance to the waypoint or the paused location:
 - When you are heading towards the waypoint, the distance displayed is the distance to the waypoint.
 - When you are heading towards the paused location, the distance displayed is the distance to the paused location.

The settings in the *Lightbar Text* dialog are ignored.




- On the information screens or Plan View Map:
 - To display the distance or direction to the waypoint, select *Distance to feature* or *Direction to feature*.
 - To display the distance to the paused location, select *Distance to paused location*.
 - *Distance offline* is the distance you are away from the line that links the paused location and the selected waypoint.
 - The distance or direction to start and end options depend on the direction of travel.

Waypoints cannot be selected while a field is already paused.

To return to swath guidance:

1. Press .
2. Press the selected waypoint softkey.

Alternatively do one of the following:

- From the *Field* menu, select *Resume*.
- Hold  and pressing .
- Press .
- Turn on a spray switch.



Tip – To get a better lineup before resuming logging, configure an external keypad button to toggle pause. When you get close to the pause location, toggle pause and use swath guidance to get back online.

For information on defining waypoints, see *Waypoints*, page 86.

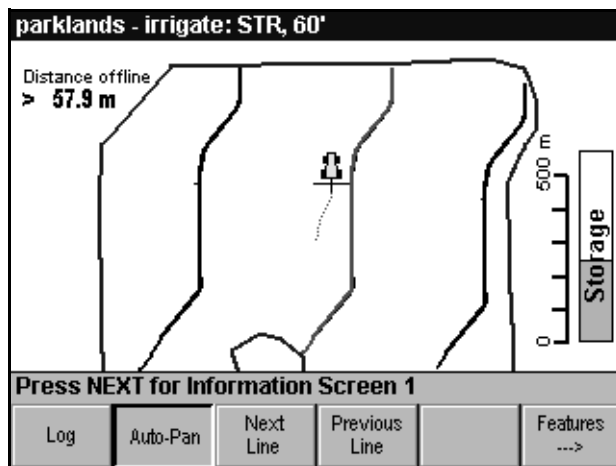
Line and Area Feature Guidance

As well as guidance to swaths, the AgGPS 170 Field Computer can also provide guidance along a specified type of line feature, or around the perimeter of an area feature.

This lets you, for example, do the following:

- map rice levees, and recreate them next year
- get guidance to an irrigation pipe
- get guidance around the perimeter of a crop variety

The use of line guidance and *Distance offline* on the *Plan View Map* to provide guidance to an irrigation pipe is shown below:



For information about setting up features for guidance, see *Guidance*, page 211.

When you select line or area feature guidance:

- The lightbar LEDs give offline guidance to the selected feature type, but the approach LED is disabled.
- The **Next Swath** and **Previous Swath** softkeys change to **Next Line** and **Previous Line**. Use these to step through all instances of the selected feature.
- Snap-to-swath and Auto-turn are turned off.



Tip – Selecting *Area – Field Boundary* in the *Guidance* dialog gives you guidance to an area feature called field boundary, not to the boundary polygon that is created when you map a field boundary.

Guidance when there are no features mapped

If you map a field with line or area guidance selected, or select a field containing no features of the selected feature type, a warning message is displayed. You can either revert to swath guidance, or continue using the selected line or area option.

If you continue, guidance begins when you map the first feature of the selected type. The lightbar displays **MAP LINE** or **MAP AREA** until a feature is mapped.

Line vertex limitations

Very complex lines can affect the AgGPS 170 Field Computer performance. If the line or area feature polyline has a large number of vertices (more than a few hundred), the AgGPS 170 Field Computer can be slow finding the closest segment.

Waypoint guidance

Feature guidance is not available during waypoint guidance. However, waypoint guidance is available during feature guidance. It has priority over feature guidance.

Logging

Logged areas of application or other field management are shown as painted areas (polygons) on the *Plan View Map*. This instantly shows the driver if any sections of the field have been missed. Different colored areas are used to show reduced GPS accuracy.

For information on the definition of the colors, see Swathing, page 143.

Coverage Logging

Coverage logging is an important and useful facility provided by the AgGPS 170 Field Computer. It records position data while you carry out an operation such as planting seed or applying fertilizer to a field.

This produces a set of polygons which display the application material coverage and the GPS status. Whenever the GPS status changes or logging stops or starts, a new coverage polygon is created. The width of the polygon equals the application width.

Coverage logging is useful for identifying any skips or overlaps in the application area, or any problems with the GPS signal status.


Track Logging

Use the track logging option during any field event to record more detailed point information, such as time and elevation, HDOP, number of satellites, heading, distance offline, and distance traveled. The detailed information is useful for detailed analysis of the events or troubleshooting of the system.

For more information about coverage polygons and detailed information, see Logging, page 134.

Controlling Logging


To manually record position information and other data while carrying out an operation such as applying materials or field mapping:

1. At the beginning of the first swath, press .

***Note** – You can control logging from the external keypad or from a remote switch, such as a spray controller switch. For information on controlling the AgGPS 170 Field Computer remotely, see Logging Control, page 140.*


2. Drive along the first swath using the lightbar or the graphics screens for guidance.

For information on lightbar guidance, see Working with the Lightbar, page 34.

3. At the end of the first swath, press .

The spray off point is automatically recorded.

4. Press .

5. At the start of the next swath press  (or turn on the spray).

The lightbar approach indicator LED gives an indication as you approach the start of the swath.

6. Continue until the field is completed.

7. Press .



***Note** – To increase the display update rate and reduce storage used, the AgGPS 170 Field Computer removes superfluous field boundary points and coverage polygons. This data reduction improves the efficiency of storage and information display. For example, minor variations in the field boundaries are smoothed out to within 0.5 m with DGPS and 0.1 m with RTK.*


Pause and Resume



The pause and resume function lets you disable logging and swath guidance during the application of materials, reload or refuel the vehicle, return to the pause point, and resume the application of materials.

Pause

There are four ways to pause swath guidance:

- From the *Field* menu, select *Pause*.
- Hold down , and press the  softkey.
- Press pause on the external keypad.
- Select a waypoint.

The AgGPS 170 Field Computer places a  icon on the *Plan View Map* to identify the point along the last swath where you paused. It also flashes a warning message on the screen, and displays the *Distance to Paused Location* on the lightbar text. Guidance is provided back to the paused location in order to continue the application.

Note – *If you close the field and then reopen it with snap-to-swath turned on, snap-to-swath is suspended as long as the field is paused. The pause icon is displayed, and the swath closest to the pause icon is the current swath. To make any other swath the current swath, use  or .*

When a waypoint is selected, guidance is provided to the waypoint and back to the Paused Location.

For more information on waypoints, see Waypoints, page 86.




When you pause, the LEDs behave as they do when active, indicating error with respect to the active swath. If you drive off-field while paused, the LEDs pull to one side or other. As you drive back to the active swath, the LEDs move toward the center of the lightbar. When close to the active swath, turn down the active swath and bring the lights to center.

If you are using an AgGPS 23 external lightbar, the lightbar needle shows the direction to the Pause point.

Coverage polygons on the *Plan View Map* also help to identify the Pause position.

Resume

There are five ways to resume:

- From the *Field* menu, select *Resume*. This is the only way to resume when a variable rate controller is connected.
- Hold down , and press the  softkey.
- Press  to resume and continue logging.
- Press resume on the external keypad.
- Deselect the waypoint.

Note – *If you pause and resume while logging a Curve or Spiral swath, the sections of coverage logging before and after the pause point are both used to generate the next guidance swath.*

Information Screens

There are two information screens available. Up to five pieces of information can be displayed on each screen, as shown below:

Information Screen 1	
Swath number	28
Distance offline	6' 06"
Speed	26.9 mph
GPS mode	High Accuracy
Distance to pause	Not Available
Press NEXT for Information Screen 2	
Log	Auto-Pan
Next Swath	Previous Swath
Snap to Swath	Features --->

Information Screen 2	
Total area	40.2 acre(s)
Area applied	17.0 acre(s)
Percent complete	42%
Distance to feature	Not Available
Press NEXT for Plan View Map	
Log	Auto-Pan
Next Swath	Previous Swath
Snap to Swath	Features --->



Tip – If fewer than five items of information are selected for display, the lines are blank. This is illustrated in the second example, which displays four items of information.

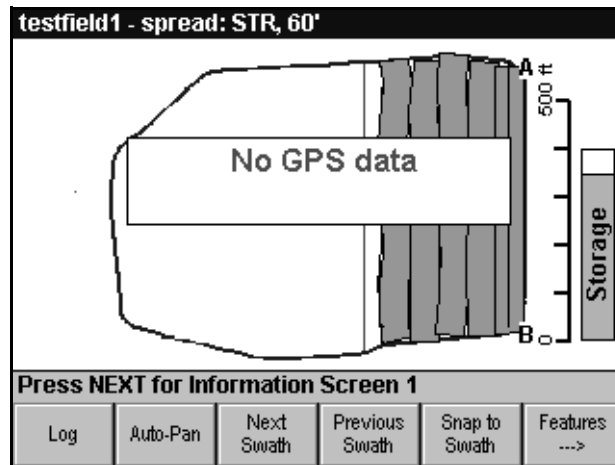
For details on how to set up the information to be displayed on the information screens, see Information Screens, page 203.

To step between the *Plan View Map*, *Information Screen 1*, and *Information Screen 2*, press **NEXT** .

Softkeys are available on the information screens, so that you can use them (for example, to control logging) while monitoring information.

Warning Messages

When a serious error occurs, such as loss of GPS input, a large message flashes on the screen every few seconds, as shown below:



GPS Status

During periods of low accuracy or no GPS position at all, spray coverage is painted in a different color.

If a GPS position is not available:

- On the *Plan View Map*, the vehicle icon remains stationary at the last known GPS position.

- On the information screens, other real-time information fields such as *Speed* and *Heading* display Not Available.
- On the lightbar, guidance is lost and the text displays No GPS.

Table 2.1 lists the GPS Status messages and the equivalent lightbar messages.

Table 2.1 GPS status

Message	What it indicates	Lightbar message
No GPS data	There has been no GPS data coming into serial port 2 for at least 1.5 seconds. This could be caused by a cabling fault, or a problem with the GPS receiver configuration.	NO GPS
Invalid GPS	There is GPS data coming into serial port 2, but the data is in the wrong format or the baud rate is incorrect. The GPS receiver may be correctly calculating positions, but there is a problem with its output configuration. You may have the receiver cable plugged into Port B of the receiver rather than Port A.	INV GPS
No GPS Position (Too Few Satellites)	There are too few GPS satellite signals to calculate a position. Possible causes are: <ul style="list-style-type: none"> • Obstructions between the GPS antenna and the GPS satellites • A very dirty antenna • 2 dimensional (2D) GPS positions from the GPS receiver. (The AgGPS 170 does not allow guidance using 2D GPS positions as accuracy of these can be very poor.) 	FEW SATS
No GPS Corrections	The differential correction age is greater than your specified maximum.	NO CORCT
Low Accuracy	The HDOP > than the user specified warning HDOP or the differential age >than the user specified warning age. If the <i>Use Low Accuracy Positions</i> check box is on, these positions are still used for guidance.	LOW ACC
High Accuracy	Good DGPS or Fixed integer RTK position.	HIGH ACC

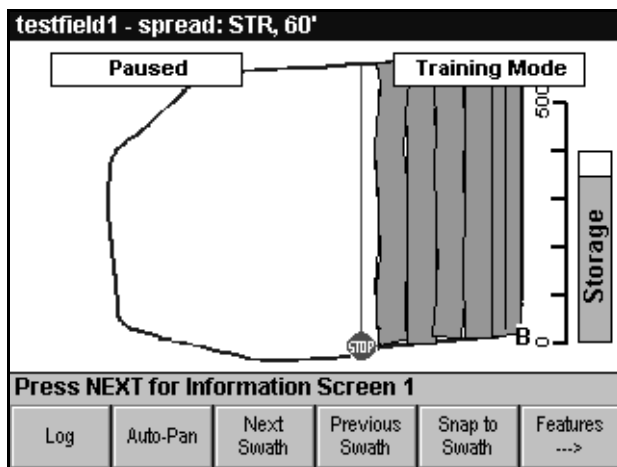
For more information and the implication of GPS Status on the recording of application coverage, see Logging, page 134.

Other Warning Messages

Other warning messages that can flash on the screen are:

- Training Mode
- Paused

The Paused message, with the stop icon that identifies the paused location, and the Training Mode message is shown below:



For information on resolving error messages, see Appendix A, Troubleshooting.

Setting the Swath Parameters

The swath parameters are settings that control the swath pattern, swath width, and swath direction that the AgGPS 170 Field Computer uses to provide guidance. The swath pattern and swath width cannot be changed in the middle of an event while the field is open. If you must change these parameters during an event, close the field first, change the parameters, then reselect the field.

Swath Patterns

There are a number of different ways an operator can drive around a field when applying seed or agri-chemicals. These various ways are referred to as swath patterns.

The options available in the AgGPS 170 Field Computer are:

- Straight
- Headlands
- Spiral
- Curve
- Half-field racetrack
- Crop circle racetrack
- Squeeze
- Skip racetrack
- Center racetrack

Headlands pattern is only available with Boundary fields. Crop circle racetrack, Half-field racetrack, and Squeeze patterns are only available with No Boundary fields.

For more information, see *Swathing*, page 143.

If you create a new field, the AgGPS 170 Field Computer always uses the currently selected swath pattern.

Setting the pattern

The pattern can only be changed if no field is selected, or when the *Pattern Check Map* is displayed. From the *Field* menu, select *Swath Pattern*. The *Swath Pattern* dialog appears, as shown below:

The **Swath Pattern** dialog box is divided into two main sections: **Boundary Field** and **No Boundary Field**.

Boundary Field Section:

- Pattern:** A dropdown menu set to "Skip racetrack".
- Headlands:** A numeric input field set to "2".
- Options:** Two radio buttons. "Use skip count" is unselected, and "Specify racetrack width" is selected.
- Skip:** A numeric input field set to "180" followed by "ft".

No Boundary Field Section:

- Pattern:** A dropdown menu set to "Half-field racetrack".
- Direction:** A dropdown menu set to "Left".
- Options:** Two radio buttons. "Work towards A-B Line" is unselected, and "Work towards Point C" is selected.
- Skip:** A numeric input field set to "180" followed by "ft".

Bottom Section:


A label "Use softkeys to select the pattern" is above a row of six buttons: "Straight", "Headlands", "Spiral", "Curve following", "Center racetrack", and "Skip racetrack".

Note – If you select an old field with a different pattern from the current pattern setting, the AgGPS 170 Field Computer displays a message that gives you the option to press **ENTER** to use the current pattern (press **ESC** to retain the most recently used pattern for this field). A similar message warns you if the number of headlands is different.

To select a pattern:

1. Press **NEXT** to choose between the *Boundary field* patterns and the *No Boundary field* patterns.
2. Use the softkeys to select the pattern.

If there are more than six patterns available, the **More** key will be shown. Press **More** to display more patterns.

3. Configure the pattern parameters:
 - If you select Headlands pattern, move to the *Headlands* field, and use the arrow keys to set the number of headland circuits.
 - If you select a Half-field racetrack pattern, use the arrow keys to choose to work towards the A-B Line or Point C.
 - If you select a No Boundary Straight, Skip racetrack, or Crop circle pattern, move to the *Pattern Direction* field, and use the softkeys to force the pattern to be generated to the left or right of the A-B Line, or to let the AgGPS 170 Field Computer automatically determine the pattern direction based on the direction you turn after completing the A-B Line.
 - If you select a Skip racetrack pattern move to the *Skips* field, and use the arrow keys to specify the number of swaths to skip or the racetrack width.
4. Press  to accept the new pattern.



Tip – You can also change the pattern direction while mapping the field, using Softkey 5.

Note – *If the pattern is set to Half-field racetrack, Crop circle, Center racetrack, or Squeeze and you select an old field mapped with a Straight, Spiral, or Curve pattern, a Point C is automatically generated. Use the swath direction screen to move Point C if necessary.*

Skip racetrack pattern field width

In boundary fields, the Skip racetrack pattern creates as many racetracks as it can fit within the field. If there are any swaths left over, guidance to these swaths uses the straight back-to-back swath pattern, as shown in Figure 2.2, page 114.

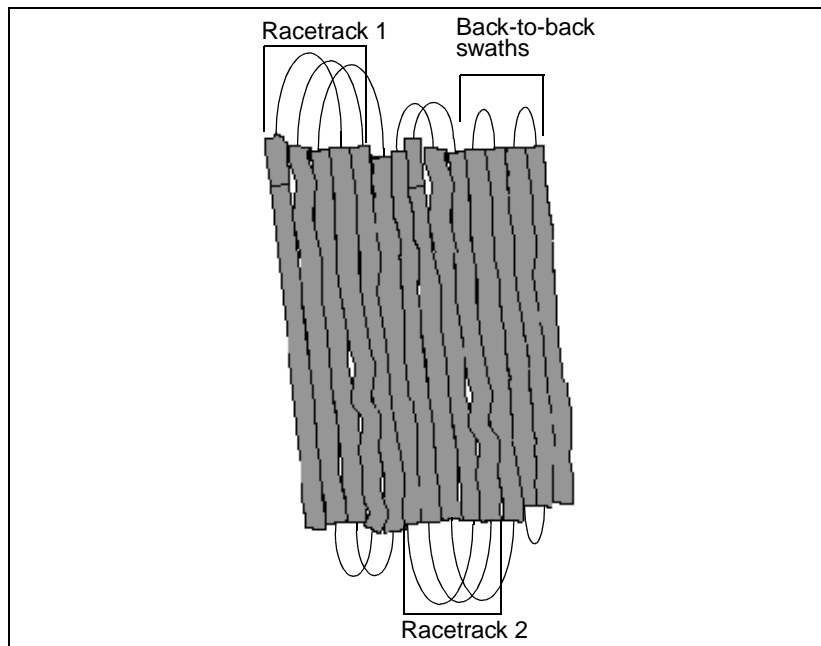


Figure 2.2 Boundary skip racetrack pattern

Specifying Skip racetrack width

The racetrack width is the width of the field covered by the swaths in the racetrack. Each racetrack always has an uneven number of swaths. If you set a racetrack width, the number of skips will depend on the swath width. The last swath in a Skip racetrack is in the center of the racetrack.

If you specify a racetrack width that is not a multiple of the swath width, the AgGPS 170 Field Computer rounds the racetrack width to the closest swath.

Swath Width

The *Swath Width* is the distance between the swath centers, or the distance from the center of one row to the center of an adjacent row. Guidance is provided to the swath centers.

The *Application Width* is the width of material applied to the field. The coverage polygons record the application width. For more information, see Application width, page 139.

Where there is no overlap, the swath width and the application width are the same. If ensuring that there are no gaps in the application of materials is more important than reducing wastage caused by overlaps, set the swath width slightly less than the application width. This introduces a small overlap at each side of the swath.

Use the *Swath Width* dialog to define the distance between swath lines, and the application width.

Setting the swath width

The swath width can only be changed if no field is selected, or from the *Pattern Check Map*. From the *Field* menu, choose *Swath Width*. The *Swath Width* dialog appears, as shown below:

Swath Width

Swath width: 60 ft 0 in

Application width: 60 ft 0 in

☐ Expand boundary by half a swath after mapping field

☒ Generate access paths between groups of swaths

Access path width: 30 ft 0 in

Swaths in:




first group 1

subsequent groups 2

☒ Guide to swaths

☐ Guide to access paths

To set the swath and application widths:

1. Use the arrow keys to set the swath width to match the distance between adjacent swaths.
2. Press , and use ▼ and ▲ to set the minor units, if required.
3. Press , and use ▼ and ▲ to set the application width to the effective material width obtained when applying agri-chemicals (for example, the width of the spray boom).
4. Press .



Expand boundary setting

If you map the field boundary with a boom attached, select the *Expand boundary by half a swath after mapping field* check box to:



- make sure that the boundary is correct on the *Plan View Map*
- improve the accuracy of the calculated field area

If you map the boundary using a four-wheel bike or pickup, you can leave this option clear unless the distance between your vehicle and the fence line is significant enough to affect these results.

To select or clear the *Expand boundary by half a swath after mapping field* option:

1. Press .
2. Press .

By default, this option is selected.

Note – Selecting an old field with a different swath or application width from the current settings displays a message which gives you the option to press  to use the current swath and application width or press  to retain the settings last used for this field.









Access paths

This swath setting option provides an access path after every few crop rows, for spray trucks and other equipment to drive down. This means that you can use the swaths for guidance to plant crops or lay drip tape, and use the access paths for guidance to spray several rows of vegetables at a time.

Access paths are only available with *Straight* patterns.

To change from swath guidance to access path guidance, you need to close the field, change the option, and reselect the field.

To use access paths:

1. Press  until you get to the *Generate access paths between groups of swaths* check box.
2. Press .
3. Press , and use ▼ and ▲ to set the width of the access path between groups of swaths.
4. Press , and use ▼ and ▲ to set the minor units, if required.
5. Press , and set the number of swaths in the first group before the access path.
6. Press , and set the number of swaths in the second and all subsequent groups.
7. Press , and use ▼ and ▲ to set the choose guidance to the swaths or the access paths.
8. Press  to save the settings.

For more information on using access paths, see Access Path Guidance, page 166.

Note – *If the number of swaths in the first group is set to zero, an access path is generated along the A-B Line.*

Swath Direction

The swath direction is the direction of the swaths in a straight line pattern, or the straight swaths in the center of the headlands pattern. With Curve and Spiral patterns, the swaths are always parallel to the last curve. Therefore the *Swath Direction* screen is not available with Curve and Spiral patterns.

In an A-B Line field the swath direction is parallel to the A-B Line. You can only change it by defining a new A-B Line.

In a field mapped with a field boundary, the easiest method of setting the swath direction is to Set A and B points while mapping the boundary. This can be done as you drive the first swath and apply materials to the field.

There are also two ways to set or change the swath direction after the field boundary has been mapped, or an existing field selected:

- Set A and B points in the field using GPS positions.
- Select points on the field boundary to use as A and B points.

The swath direction is then set parallel to a straight line between these A and B points.

For information on the effect of changing the swath direction, see Changing Swath Parameters, page 176.

Setting the swath direction

To set the swath direction while mapping a field boundary:

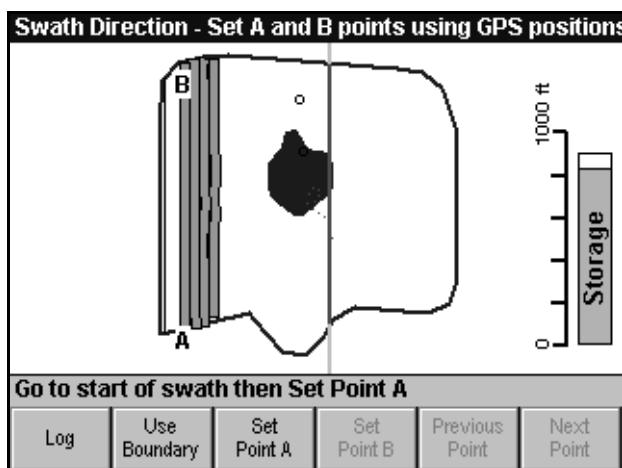
1. Start auto mapping the boundary by pressing **Auto-Map** or **Log**.
2. Drive around the boundary of the field.
3. Press **Set Point A** at any point on the appropriate side of the field.
4. Before you reach the end of the side, press **Set Point B**.

Straight swaths will be parallel to a line between Point A and Point B.

Changing the swath direction

To change the swath direction, you must have a field open, and the pattern must not be Curve or Spiral.

From the *Field* menu, choose *Swath Direction*. The *Swath Direction* screen appears displaying the boundary, the original A-B Line, the current swath and any logging, as shown below:





Note – You can also access the *Swath Direction* screen using the *External Keypad*. For more information on configuring the *External Keypad*, see *External Keypad*, page 238.

You can change the swath direction by setting new A and B points. If the pattern requires Point C, you need to set a new Point C as well.

You can use logging to set your A, B, and C points.

For all patterns:

- If you have not set Point A manually, logging on sets Point A. Press  to reset Point A.
- If you have not set Point B manually, logging off sets Point B. Press  to reset Point B.
- For ABC patterns, the second log on sets Point C.

To set the A-B Line using GPS positions:

1. Go to a point anywhere in the field and press Set Point A or Log.
2. Go to another point anywhere in the field and press Set Point B or Log.
3. Press ENTER.

If the field has a boundary, the *Pattern Check Map* appears so that you can confirm that your swath direction is correct.

4. Press ENTER to return to the *Plan View Map*.

This method is useful if you want to get guidance in existing crop rows, work the field at a different angle to mix crop residues into the soil more evenly, or reduce compaction.

To set the swath direction for an ABC pattern using GPS positions:

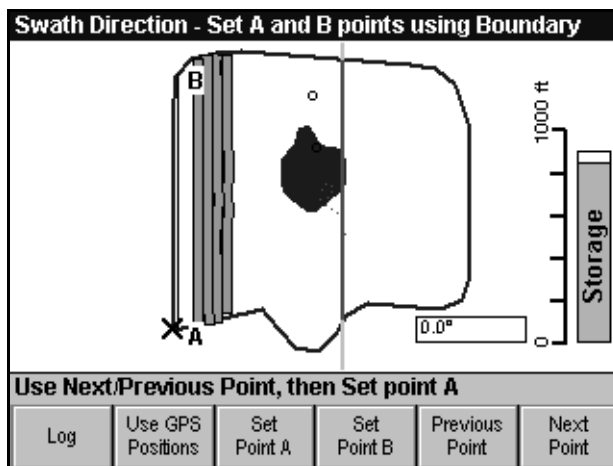
1. Go to a point anywhere in the field, and press Set Point A or Log.
2. Go to another point anywhere in the field, and press Set Point B or Log.
3. Go to another point on the other side of the field, and press Set Point C or Log.
4. Press ENTER.

If you have mapped the field boundary, you can use points on the boundary as A and B points to set the swath direction.

To set the swath direction using points on the field boundary:

1. Press **Use Boundary**.

The title bar, tip bar, and softkey label change and a cross (×) appears, as shown below:



2. Press **Next Point** or **Previous Point** a few times until the × is over the point you want to start your A-B Line from.
3. Press **Set Point A**.
4. Press **Previous Point** or **Next Point** one or more times until the × is over the point at which you want to end your A-B Line.
5. Press **Set Point B**. The new A-B Line is displayed.
6. Press **ENTER**.


The *Pattern Check Map* appears so that you can confirm that your swath direction is correct.

7. Press **ENTER** to return to the *Plan View Map*.

Key issues

The key issues are:

- The *Pattern Check Map* displays any logging.
- The *Swath Direction* screen zooms to the field. You can still use zoom and pan functions to focus on a particular area of the field.
- In the *Swath Direction* screen, a black line segment shows the field boundary segment or A-B Line that is used to set the direction for the parallel lines.
- If the Map Orientation is set to Line Up, the *Plan View Map* is rotated after a new Swath Direction is set.

Note – When you press , the text data field in the bottom right of the screen (shown as 0.0°) in the previous example shows A-B Line direction. This label cannot be manually edited but changes as you set up the swath direction.


Getting Help










The AgGPS 170 Field Computer offers you two types of online help:

- Context-sensitive (subject matter) help for a current screen or dialog
- Help about a topic from the *Help* menu


Help is also available by accessing the Trimble website at www.trimble.com/ag170guide/index.htm.

Navigating within Help Screens



Moving around Help screens is similar to moving around Internet screens. Underlined text represents a link. To go to a related topic, move to the link and press .

Press ...	to ...
	select a Help topic from a menu
	select a Help topic from a hyperlink
	scroll up in a Help screen (two lines at a time)
	scroll down in a Help screen (two lines at a time)
	step to the previous topic
	step to the next topic
	step to the next topic
	go back in topic history
	go forward in topic history
	exit from Help

Help history

To go back to the previous Help screen, press .

If you have viewed several screens of help:


- Press  to go back through those screens.
- Press  to go forward through those screens again.

Most Help screens also have a Contents link to take you back to the Contents screen.


Note – When you enter Help using  and Softkey 1, the history keys only take you back to the first help topic you viewed. However, the Contents link lets you view all help topics.

Context-Sensitive Help

To access Help from a current screen, dialog, or error message:

- Press  and Softkey 1 at the same time.
- From the *Help* menu, select *Help on the current screen*.

Links provide jumps to related Help topics.

To return to the point from which you entered Help, press .

Help Menu

The *Help* menu provides quick access to Help for the AgGPS 170 Field Computer screens and dialogs. It also shows how to carry out basic functions, as well as the standard *About* window. The Help gives you help in the field without this manual.

How To

From the *Help* menu, select *How To*. The first *AgGPS 170 – Help* screen appears, as shown in Figure 2.3 :

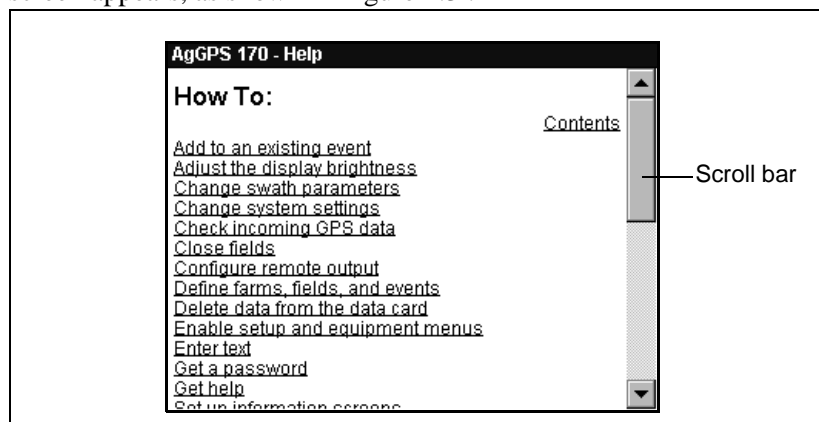


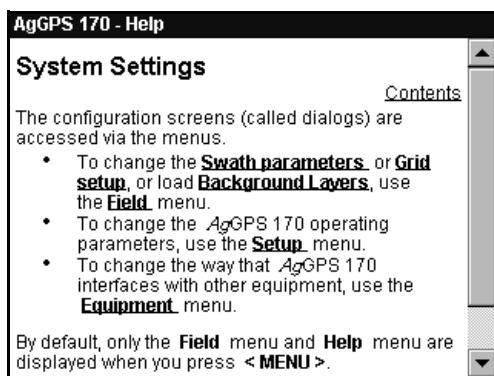
Figure 2.3 How To menu

This screen gives you a list of the common help topics provided in the AgGPS 170 Field Computer, and a link to the Contents topic. The scroll bar indicates that there is more than one screen of Help.

For example, to get help on changing system settings:

1. Press **NEXT** or **▶** several times, until Change system settings is highlighted.
2. Press **ENTER** to display detailed help on this topic.

The second *AgGPS 170 – Help* screen appears, as shown below:



3. Press **▼** to scroll the Help screen.
4. Press **▶** to scroll through the links to other Help topics.
5. To get more help about a topic that is underlined, press **ENTER**.
6. When you have finished using the Help, press **ESC**.

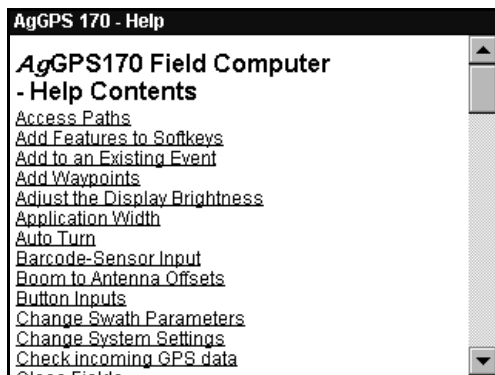
Technical support

The *Technical Support* command lists the Trimble Support phone number, e-mail address, and Web access details for website information.

For more information, see Technical Assistance, page xiv.

Contents

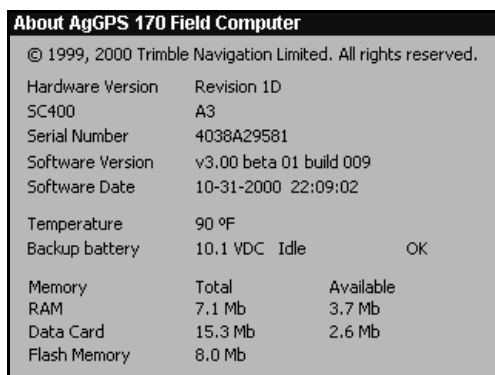
The *Help / Contents* command shows a list of all available Help topics, as shown below:



Help – About

The *Help / About* command displays information about the software and hardware. For example, software and hardware versions, temperature, battery voltage, and the total and available RAM, Flash, and Data Card memory.

An example of the *Help – About* screen is shown below.



Advanced Operation

In this chapter:

- Introduction
- Input and output files
- Mapping fields
- Logging
- Swathing
- Upgrading the software
- Configurations
- Record and replay input files

Introduction

This chapter explains the more advanced features of the AgGPS 170 Field Computer. For information on common tasks, see Chapter 2, *Operating the AgGPS 170 Field Computer*.

Input and Output Files

This section summarizes the files that are used to supply input information to the AgGPS 170 Field Computer, and the files that are written to store data on the data card.

For information on other system files and the contents of the files, refer to Data Organization in Chapter 4 of the *AgGPS 170 Field Computer Reference Manual*.

Input Files

Table 3.1 lists the names and types of files that are used to supply input information to the AgGPS 170 Field Computer, and the directory where these files must be located on the data card.

Table 3.1 **Input files**

Data	Description	Files	Directory on data card
Features	Point, line, and area feature types	PointFeatures.bmp PointFeatures.dbf LineFeatures.dbf AreaFeatures.dbf	AgGPS170
Work Orders	Job data	<workordername>.dbf	AgGPS170 Work Orders
GIS Field Boundaries	Polygons	<fieldname>.shp <fieldname>.dbf <fieldname>.shx	AgGPS170 GIS Fields
Prescription Files	Polygons	<prescriptionname>.shp <prescriptionname>.dbf <prescriptionname>.shx	AgGPS170 Prescriptions
	AgInfo GDX	<prescriptionname>.gdx	

Table 3.1 Input files (Continued)

Data	Description	Files	Directory on data card
Background Layers	Points, lines and areas	<filename>.shp <filename>.shx	AgGPS170 Layers
Field Layers	Points, lines, and areas	<filename>.shp <filename>.dbf <filename>.shx	AgGPS170 Field Layers
History softkeys	Field and event data	AgGPS_Names.txt	The root directory
Waypoints	Waypoint data	Waypoints.txt	The root directory
Data Dictionary	User-defined attributes	<datadictionaryname>.txt	AgGPS170 Data Dictionary

Output Files

Table 3.2 lists the names and types of files containing mapping and logging information, and the directory where the AgGPS 170 Field Computer saves these files on the data card.

Table 3.2 Output files

Data	Description	Files	Location
Field A-B Line	Boundary and/or A-B Line polylines	<fieldname>_ABLine.shp <fieldname>_ABLine.dbf <fieldname>_ABLine.shx	Field
Field boundary	Polygon	<fieldname>_Boundary.shp <fieldname>_Boundary.dbf <fieldname>_Boundary.shx	Field
Event History	Job data	<fieldname>EventHistory.dbf	Field
Point Features	Points with attribute ID Points with attribute ID and latitude, longitude, and height	Point_<featurename>.shp Point_<featurename>.dbf Point_<featurename>.shx PointExt_<featurename>.shp PointExt_<featurename>.dbf PointExt_<featurename>.shx	Field

Table 3.2 Output files (Continued)

Data	Description	Files	Location
Line Features	Lines with attribute ID	Line_<featurename>.shp Line_<featurename>.dbf Line_<featurename>.shx	Field
Area Features	Area polygons with attribute ID	Area_<featurename>.shp Area_<featurename>.dbf Area_<featurename>.shx	Field
Coverage	Series of polygons	<eventname>_Coverage.shp <eventname>_Coverage.dbf <eventname>_Coverage.shx	Event
Track	Series of 2D points with attributes, or	<eventname>_Track2D.shp <eventname>_Track2D.dbf <eventname>_Track2D.shx	Event
	Series of 3D points with attributes	<eventname>_Track3D.shp <eventname>_Track3D.dbf <eventname>_Track3D.shx <eventname>_Track3D.trx	
Variable Rate	Series of points with attributes	<eventname>VariableRate.shp <eventname>VariableRate.dbf <eventname>VariableRate.shx	Event
Configuration	Configuration file	<filename>.cfg	AgGPS170
Sampling	Target points with attributes	Point_Sample target.shp Point_Sample target.dbf Point_Sample target.shx	Field
	Sample points with attributes	Point_Sample.shp Point_Sample.dbf Point_Sample.shx	Field or Event
	Grid definition	SamplingGrid.dbf	Field and Event
	Text	<eventname>_SensorData.txt	Event
Summary	Text	<eventname>_Summary.txt	Event
User-defined Attributes	Text	<eventname>_UserAttributes.txt	Event

Mapping Fields

Mapping is the process of recording positional information to identify a field, or to identify features within the field. Fields can be mapped by driving and recording the field boundary, or by defining a straight or curved reference line (known as an A-B Line).

Defining a Field by Mapping the Boundary

The AgGPS 170 Field Computer saves field boundaries on the data card as ArcView shapefiles. There are two file formats as follows.

The ABLine files are saved as polylines:

- Shape (<fieldname>_ABLine.shp)
- Attribute (<fieldname>_ABLine.dbf)
- Index (<fieldname>_ABLine.shx)

The boundary files are saved as polygons:

- Shape (<fieldname>_boundary.shp)
- Attribute (<fieldname>_boundary.dbf)
- Index (<fieldname>_boundary.shx)

ABLine and Boundary files are saved in the field directory.

For more information on file formats, refer to Chapter 4, Viewing Data in the Office in the *AgGPS 170 Field Computer Reference Manual*.

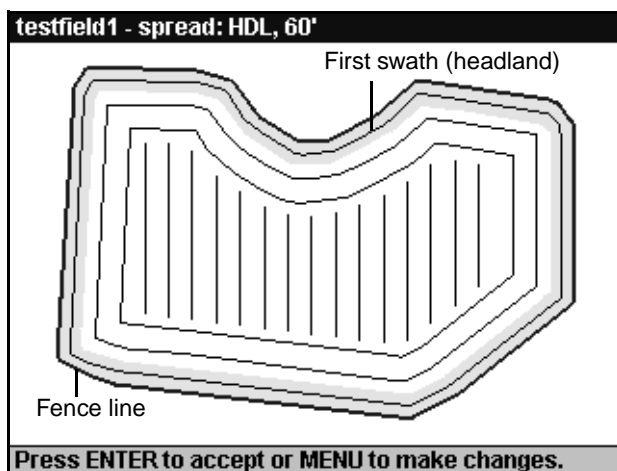
When you use Auto-Map to define the field boundary, the AgGPS 170 Field Computer automatically removes unnecessary points along straight lines to increase processing speed and storage capacity.

Expand the boundary by half a swath width

In the *Swath Width* dialog there is an *Expand boundary by half a swath after mapping field* check box. If you map the field with a spray truck with a boom attached, select this check box to get a more accurate boundary polygon and area calculation.

Trimble recommends that you mount the GPS antenna in the center of the vehicle, preferably on the roof of the cab.

A polygon field mapped with three headlands is shown below:



The shaded area represents the swath width of the first headland.

To map the field boundary by driving the first swath:

1. From the *Field* menu, select *Swath Width*.
2. Select the *Expand boundary by half a swath after mapping field* check box.
3. Map the field as described in *Field Boundary Mapping*, page 56. The field boundary is created half a swath width outside the path you drive.

To map the field boundary by driving along the fence line:

1. From the *Field* menu, select *Swath Width*.
2. Clear the *Expand boundary by half a swath after mapping field* check box.
3. Map the field as described in Field Boundary Mapping, page 56. The path you drive becomes the field boundary.
4. The first swath line is created half a swath width inside the boundary.

Use this option when mapping the field boundary by driving close to the fence line without a spray boom on the vehicle (for example, using a pickup, an ATV, or a motorbike.)

For information on how to set up the swath options, see Swath Width, page 115.

Defining a Field Without Mapping the Boundary

The *New Field (No Boundary)* menu option generates swath lines parallel to a reference line. This reference line is called the A-B Line and is also the first swath line. There is no field boundary.

The *<fieldname>_ABLine.shp* file records the A-B Line. The *<fieldname>_Boundary.shp* file records the field extents.

Logging

Logging is a form of mapping that records the application of materials to a field.

Logging records position and other data on the data card using the Environmental Systems Research Institute (ESRI) Shapefile format. The data can be viewed on your office PC using any software that is capable of reading this file format.

For more information on viewing data files, refer to Chapter 4, Viewing Data in the Office in the *AgGPS 170 Field Computer Reference Manual*.

Three types of application logging are available:

- Coverage logging.
- Variable rate data logging. For more information, see Variable Rate Controller, page 239.
- Track logging (formerly called detailed logging). See Track Logging, page 141.

Coverage Logging

Coverage logging is the default data logging in the AgGPS 170 Field Computer. This produces a set of colored polygons that display the application material coverage and the GPS status. The color of a polygon indicates the GPS status. Whenever the GPS status changes, or logging stops or starts, a new coverage polygon is created. The width of the polygon equals the application width.

Use coverage logging to identify:

- skips or overlaps in the application area
- problems with the GPS signal status during the material application

Coverage polygons and GPS status

The performance of the AgGPS 170 Field Computer depends on the quality of the GPS signal being provided by the GPS receiver. The AgGPS 170 Field Computer indicates GPS quality by doing the following:

- Displaying it on the lightbar text
- Displaying it on one of the information screens
- Flashing warning messages on the screen
- Changing the color of the coverage polygons on the *Plan View Map*

When good GPS positions are available, the *Plan View Map* displays green coverage polygons equal to the application width between log-on and log-off points.

When you have no GPS positions, the width of the coverage polygons is reduced to one-fifth of the application width so that it is more obvious when GPS accuracy is very poor. The coverage polygons are drawn as narrow red polygons.

These changes apply to GPS status values of 9–12.

Because the US government has now turned off selective availability, the accuracy of GPS receivers when differential correction signals are lost is much better. You can now continue working and use guidance without corrections, by selecting *Use low accuracy positions for guidance and logging* from the *GPS* dialog.

The coverage polygons are drawn the full application width when you have no corrections (GPS_Status = 8).



Warning – AgGPS receivers with no corrections are usually accurate to 3 meters for the short term, but 15 meters or more for the longer term.

If there are no GPS positions when spraying starts (log on) a small warning polygon (one-fifth of the application width wide) is added in front of the first good position the system acquires.

If GPS positions are lost before spraying stops (log off) a small warning polygon (one-fifth of the application width wide) is added after the last good position the system received.

Note – *These warning polygons are drawn in **red** to give a clear visible indication of problem areas.*

If GPS positions are lost **and then recovered** before spraying stops (that is, you log off) these two small warning polygons are joined to create a narrow red polygon between the last GPS position and the next GPS position. This polygon appears as a straight line—it indicates that you were logging while the GPS positions were lost, but does not represent the path travelled.

When the accuracy of the DGPS corrections is reduced, coverage polygons are drawn in **yellow**.

When no DGPS corrections are available, coverage polygons are drawn in **dark yellow**.

Table 3.3 lists AgGPS 170 Field Computer messages for GPS status values for a Differential GPS receiver supplying NMEA GGA messages. Column 1 displays the GPS status value stored in the .dbf files.

Table 3.3 DGPS status and coverage polygon colors

	Lightbar text	Information Screen text	Flashing warning message	Polygon color	Accuracy
2	HIGH ACC	High Accuracy	none	Green	submeter
3	HIGH ACC	Military Mode	none	Green	submeter
6	LOW ACC	Low Accuracy	Low GPS accuracy (High HDOP)	Yellow	1–10 m
7	LOW ACC	Low Accuracy	Low GPS accuracy (High correction age)	Yellow	1–10 m
8	NO CORCT	No Corrections	No GPS corrections	Dark yellow	3–15 m
9	FEW SATS	Too Few Sats	No GPS position (Too few satellites)	Red	

Table 3.3 DGPS status and coverage polygon colors (Continued)

	Lightbar text	Information Screen text	Flashing warning message	Polygon color	Accuracy
10	NO COORD	No Coord. Sys.	No GPS position (No coordinate system)	Red	
11	INV GPS	Invalid GPS	Invalid GPS data	Red	
12	NO GPS	No GPS	No GPS data	Red	

Table 3.4 lists additional AgGPS 170 Field Computer messages for GPS status values specific to an RTK GPS receiver.

Table 3.4 RTK GPS status and coverage polygon colors

	Lightbar text	Information Screen text	Flashing warning message	Polygon color	Accuracy
1	HIGH ACC	High Accuracy	none	Green	centimeter
4	LOW ACC	Low Accuracy	Low GPS accuracy (RTK float solution)	Yellow	decimeter
5	LOW ACC	Low Accuracy	Low GPS accuracy (RTK DGPS)	Yellow	submeter
6	LOW ACC	Low Accuracy	Low GPS accuracy (High HDOP)	Yellow	0.1–10 m

The effect of reduced GPS quality on coverage logging is shown in Figure 3.1.

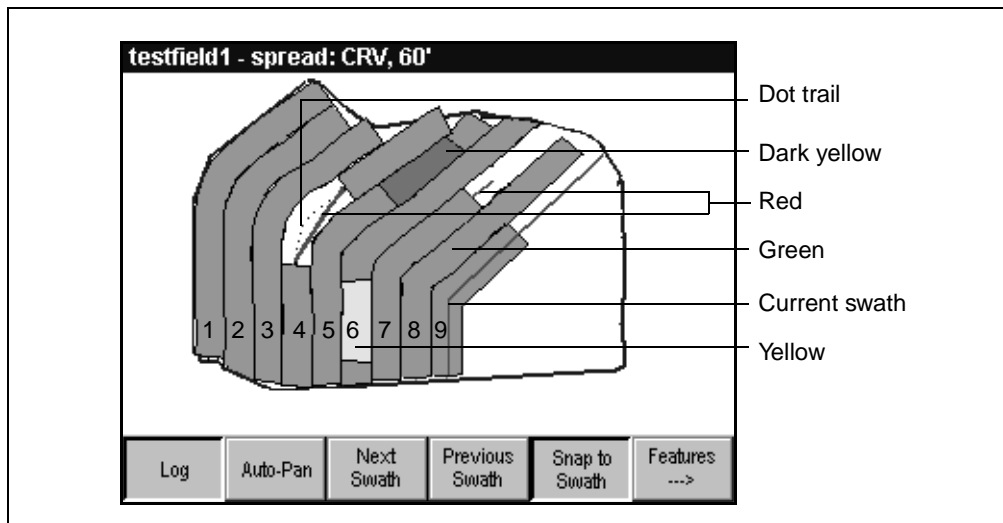


Figure 3.1 Coverage polygon colors

The examples in Figure 3.1 show:

- High Accuracy GPS coverage polygons displayed in green.
- Temporary loss of GPS positions on swath four. A straight red line (one-fifth of the *application width* wide) connects the points where GPS positions were lost and regained. (The dot trail in the diagram has been added to show the actual path traveled—this is not displayed on the AgGPS 170 Field Computer.)
- Temporary loss of GPS corrections displayed in dark yellow on swath five.
- A section of logging with low accuracy positions displayed in yellow on swath six.
- GPS positions were lost near the end of swath seven. A short red line shows that logging was still on when the GPS was lost. When the GPS positions were recovered, logging had stopped.

Application width

The width of the coverage polygons is proportional to the width of the material applied to the field (called the application width). In normal circumstances, this is the same as the swath width. However, to ensure that there are no gaps in the application of materials to the field, small overlaps can sometimes be tolerated.

The AgGPS 170 Field Computer application width is used to create an intentional overlap between adjacent swaths. See Figure 3.2.

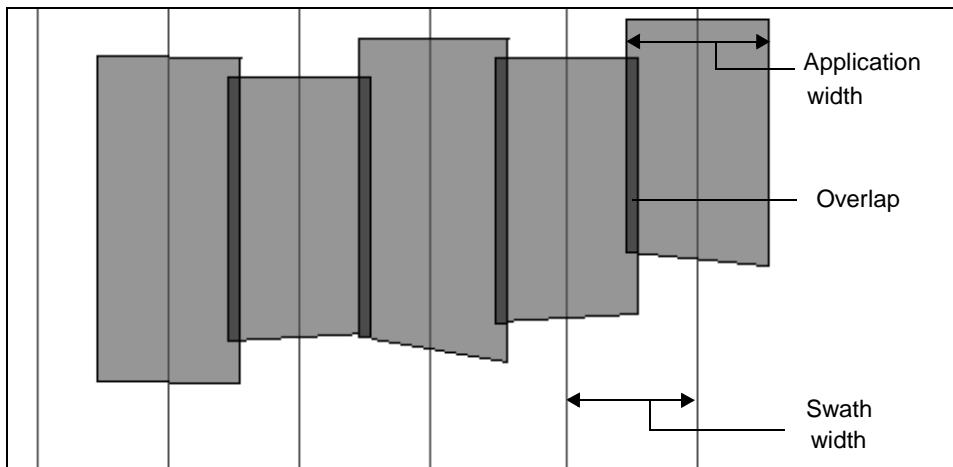


Figure 3.2 Application width and swath width

For example, to allow a 3 ft overlap between adjacent swaths when using a 60 ft boom, use the following settings:


- Application width = 60 ft
- Swath width = 57 ft

As long as the vehicle stays within 3 ft of the swath there are no gaps in the application coverage.

Note – If a variable rate controller sends boom section information back to the AgGPS 170 Field Computer, it is used to determine application width.


Logging Control

To control coverage logging and variable rate application logging with the AgGPS 170 Field Computer, use:

- a variable rate controller
- an external switch
- the  softkey
- the external keypad or button inputs
- remote output


Note – *When track logging is enabled in the GPS dialog, it is active as long as a field is open.*

Variable rate controller

A variable rate controller takes priority over other forms of logging control. When logging data is received from a variable rate controller, the external switch, the external keypad or button inputs, and the  softkey are disabled.

When all boom sections on the variable rate controller are off, the AgGPS 170 Field Computer stops logging.

External switches

An external switch takes priority over the  softkey and the external keypad.

The AgGPS 170 Field Computer has three switches available, which can be used to control up to two boom sections.

If you are not able to individually control sections of your boom, connect your spray switch to Switch 0.

If you have two boom sections:

- Connect your master switch to Switch 0
- Connect your left boom switch to Switch 1
- Connect your right boom switch to Switch 2


The AgGPS 170 Field Computer assumes you have one boom, which is not divided into sections, until you turn Switch 1 or Switch 2 on.



Tip – If you have separate boom sections connected, turn the boom sections on before turning the master switch on. Otherwise, the AgGPS 170 Field Computer assumes that there are no boom sections, and records coverage logging, even though nothing is being sprayed.

For information on connecting switch inputs, refer to Connecting Power and External Devices in Chapter 2 of the *AgGPS 170 Field Computer Reference Manual*.

The softkey and external keypad

When the AgGPS 170 Field Computer is operated without a variable rate controller or an external switch, either the  softkey or the external keypad control logging.

Track Logging

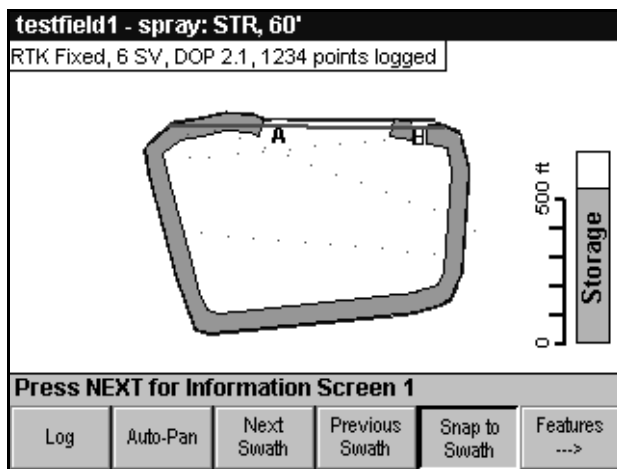
More detailed information can be recorded using track logging. The track logging information is useful for detailed analysis of the events or troubleshooting of the system, and can also be useful in applications like topographic mapping.

You can view this additional information in the office using GIS software such as ArcView or ArcExplorer.

By default, the *Track logging interval* is set to zero, which means that track logging is not recorded. To enable track logging with high accuracy GPS only, from the *GPS* dialog set the *Track logging interval* (in seconds). To record positions even when the GPS accuracy is low, from the *GPS* dialog also select *Use low accuracy positions for guidance and logging*. For a list of the information saved in the track logging file, refer to Track logging data in Chapter 4 of the *AgGPS 170 Field Computer Reference Manual*.

Displaying status messages on the Plan View Map

If track logging is enabled, the *Plan View Map* displays status messages below the title bar, as shown below:



The messages that are displayed on the *Plan View Map* are:

- RTK GPS status (RTK receiver only)
- Number of satellites (RTK receiver only)
- HDOP (RTK receiver only)
- Number of points logged in the track logging files

The GPS status, number of satellites, and HDOP values can also be displayed on the information screens.

Swathing

The swath parameters control the pattern, swath width, and direction that the AgGPS 170 Field Computer uses to provide guidance.

Table 3.5 lists the swath pattern options available in the AgGPS 170 Field Computer.

Table 3.5 Swath patterns

Pattern	Code	B ¹	NB ²	Description
Straight	STR	✓	✓	Swaths are parallel to the A-B Line. See page 145.
Headlands	HDL	✓		The first swaths are circuits (headlands) around the boundary of the field. The rest of the field uses the straight pattern. See page 146.
Spiral	SPR	✓	✓	Curves that are driven continuously in one direction. New swaths are parallel to the last swath. See page 149.
Curve	CRV	✓	✓	Adjacent curves that are driven back and forth. New swaths are parallel to the last swath. See page 150.
Half-field racetrack	HLF		✓	The field is defined by the A-B Line on one side and Point C on the other side of the field. One large racetrack covers the entire field. All swaths are parallel to the A-B Line. See page 152.
Center racetrack	CNT	✓	✓	The field is defined by the A-B Line on one side, and Point C determines the center swath of the racetrack. Swaths are driven in a racetrack pattern. All swaths are parallel to the A-B Line. See page 161.
Skip racetrack	SKP	✓	✓	The field is defined by the A-B Line on one side, and the specified skip value determines how many swaths to skip. Swaths are driven in a racetrack pattern. All swaths are parallel to the A-B Line. See page 159.
Crop circle	CRP		✓	Circular fields are defined by the A-B Line through the center of the field. The field radius defines the field width. One racetrack covers the entire field. All swaths are parallel to the A-B Line. See page 157.
Squeeze	SQZ		✓	The field is defined by the A-B Line on one side and Point C on the other side of the field. Swaths are driven from the outside to the center of the field. All swaths are parallel to the A-B Line. See page 158.

¹These patterns are available in Boundary fields.

²These patterns are available in No Boundary fields.

The Spiral and Curve patterns are similar in concept to using a foam marker system, where guidance is always based on the previous pass.



Tip – For Half-field racetrack, Center racetrack, and Squeeze; set A, B, and C points to define the field. Point C cannot be less than half a swath away from the A-B Line. If you set Point C, too close to the A-B Line, swaths may not be generated between the A-B Line and Point C.

Racetrack Width

The racetrack width is the distance between the center of the first swath and the center of the last swath in the racetrack pattern.

With Skip racetrack patterns, you can specify the number of swaths to skip in the pattern, or the racetrack width.

If you specify a racetrack width which is not an exact multiple of the swath width, the AgGPS 170 uses the closest swath to Point C, and rounds the racetrack width to the distance from the A-B Line.

***Note** – The Point C label displayed on the Plan View Map may not line up exactly with any swath due to rounding of the racetrack width.*

Auto-Turn

The Auto-Turn feature controls the selection of swaths in straight and racetrack patterns. The next swath is not selected until you log off and turn through more than 60 degrees.

For more information, see Snap-to-Swath and Auto-Turn, page 171.

Viewing the pattern and swath width

When you have a field open, the title bar displays the three letter pattern code of the current pattern, and the current swath width. The pattern codes are listed in Table 3.6.

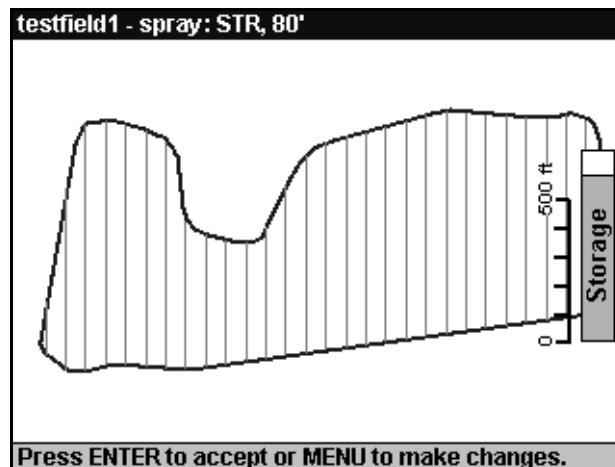
Table 3.6 Pattern codes

Pattern	Code	Pattern	Code
Straight	STR	Center racetrack	CNT
Headlands	HDL	Skip racetrack	SKP
Spiral	SPR	Crop circle	CRP
Curve	CRV	Squeeze	SQZ
Half-field racetrack	HLF		

***Note** – If you are in a sampling event, the pattern code and swath width are not displayed on the title bar.*

Straight Swath Pattern

The straight swath pattern is a series of swath lines that are parallel to the A-B Line, as shown below:



The spacing of the swath lines is set using the swath width dialog.

If an A-B Line is not set when the field is mapped, the AgGPS 170 Field Computer automatically generates North–South swaths and selects the swath closest to one side of the field as the A-B Line.

At any time the A-B Line can be reset using the *Swath Direction* screen.

Headlands Swath Pattern

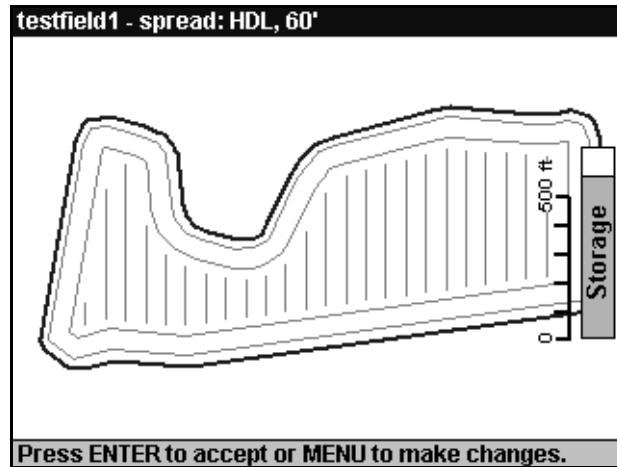
Headlands, turn rows, or end rows are defined as swaths around the field boundary. These are sprayed separately (usually first) and then used as an area for turning. Parallel swath lines are contained within the innermost headland. You can specify the number of headlands before the parallel swaths start.

The AgGPS 170 Field Computer identifies the start and end of the parallel swaths so that the spray can be turned on and off during turns.

If the Headlands pattern is selected, the *Number of Headlands* needs to be set. The number of headlands are usually between one and three, but can be in the range of 1–99.

If the specified number of headlands does not fit in the field, the AgGPS 170 Field Computer creates as many headlands as it can fit in the field, and then fills up the rest of the field with straight swaths if possible.

The example below shows two headlands:



Islands

When mapping an irregularly shaped field with the headlands pattern, be careful to avoid creating “islands”. Islands are created if the total width of the headlands is more than half the distance from one side of the field to the other, in any direction. The effect of creating islands is as follows:

- Parallel swaths are only generated in one island. See Figure 3.3.
- The lightbar cannot provide guidance in the island that has no swath lines.

If islands are created:

1. Complete the section of the field where guidance swaths are provided using the headlands pattern.
2. Change the pattern to parallel for the rest of the field.

3. Use the coverage polygons displayed on the AgGPS 170 display to show you where you have already applied.

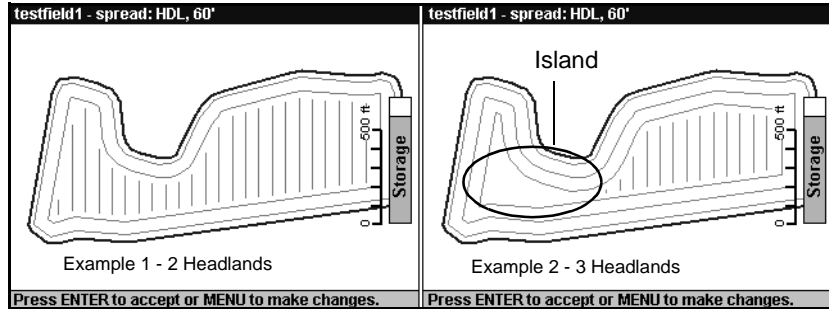


Figure 3.3 Islands

To avoid creating islands, reduce the number of headlands:

- In example 1 the total width of the headlands is less than half the distance from one side of the field to the other, giving a satisfactory parallel swath pattern over the entire field.
- In example 2 the total width of the headlands is more than half the distance from one side of the field to the other, creating two islands and giving parallel swaths over only one island.

Spiral Swath Pattern

Spiral patterns are adjacent parallel curves driven continuously *in one direction*. Guidance is always based on the *last* curve driven, not the initial swath. See Figure 3.4.

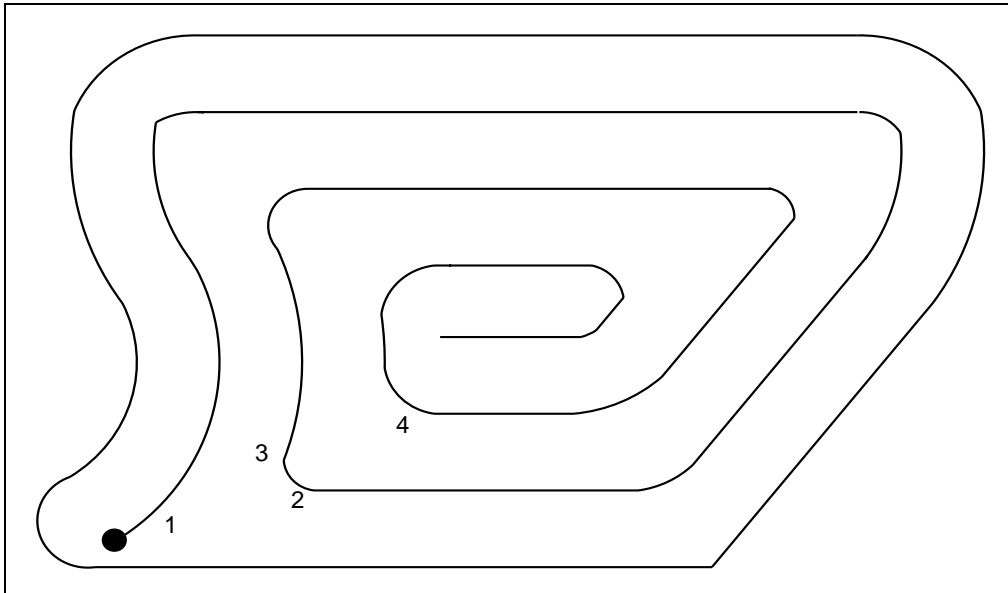


Figure 3.4 Spiral pattern

To use the Spiral pattern:

1. Press at the start of the first swath (Point 1). As you drive the first swath, DGPS positions are recorded.
2. Press at the end of the first swath (Point 2). The next curved swath is generated parallel to the driven swath.
3. Press again and drive the next swath in the same direction from Point 3 to Point 4.
4. Press at Point 4 to generate the next swath.

Whenever you log off, a new swath is generated parallel to the last driven swath. For more information, see Curve and Spiral Guidance, page 164.

Curve Swath Pattern

Curve patterns are adjacent parallel curves that are driven back and forth. Guidance is always based on the *last* curve driven, not the initial swath. See Figure 3.5.

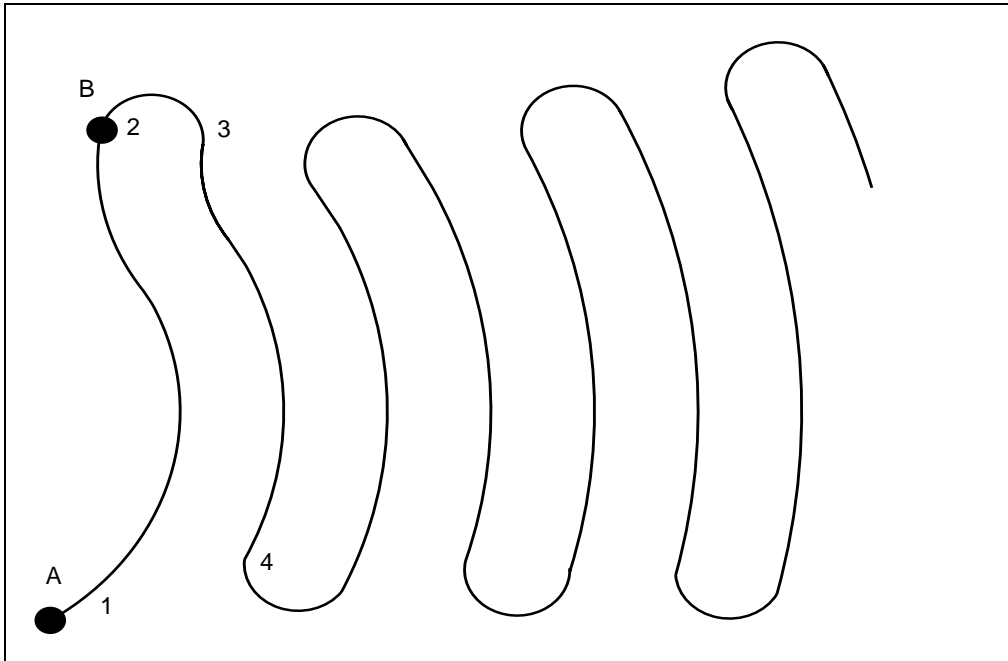


Figure 3.5 Curve pattern

To use the curve pattern:

1. Press at the start of the first swath (Point 1). As you drive the first swath, DGPS positions are recorded.
2. Press at the end of the first swath (Point 2). The next curved swath is generated parallel to the driven swath.
3. Turn and drive the next swath from Point 3 to Point 4.

Whenever you log off, a new swath is generated parallel to the last driven swath. For more information, see Curve and Spiral Guidance, page 164.

Curve swath pattern—center pivot

Use the curve pattern for crops that are irrigated with a center pivot.
See Figure 3.6.

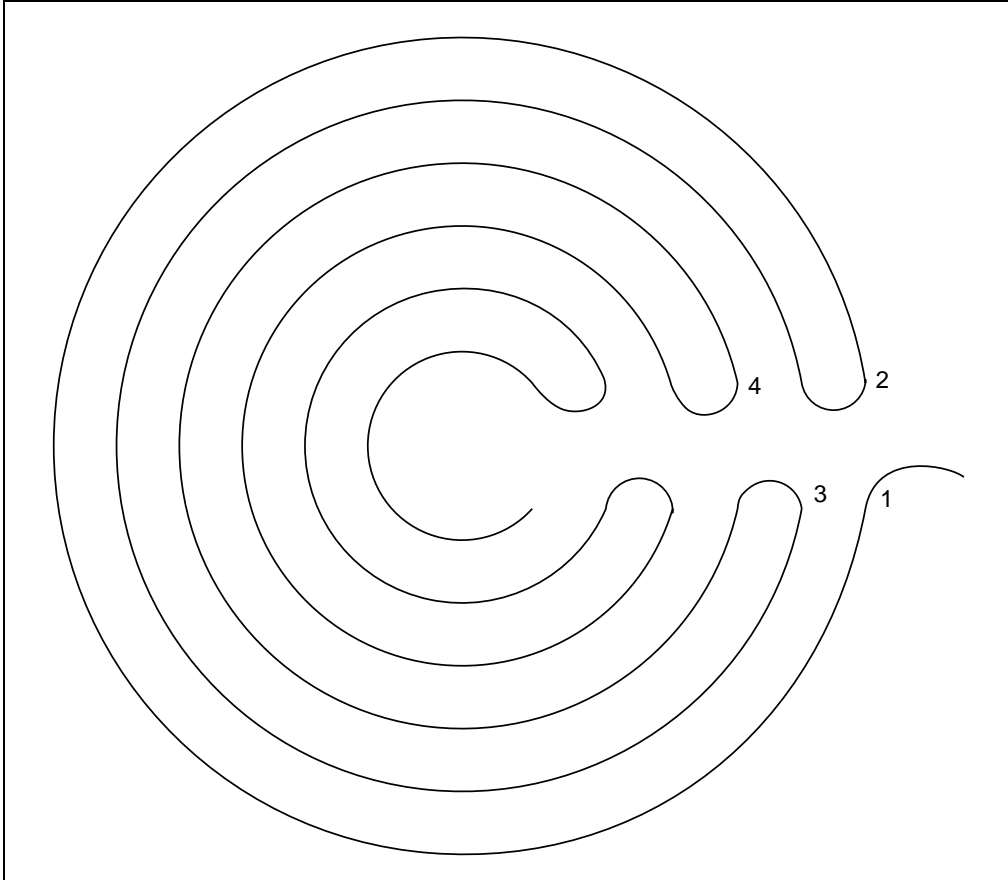


Figure 3.6 Curve pattern—center pivot

To use the center pivot curve pattern:

1. Press at the start of the first swath (Point 1). As you drive the first swath, DGPS positions are recorded.
2. Press at the end of the first swath (Point 2). The next curved swath is generated parallel to the driven swath.
3. Turn and drive the next swath from Point 3 to Point 4.

Whenever you log off, a new swath is generated parallel to the last driven swath.

Half-Field Racetrack Pattern

In a No Boundary field, the Half-field racetrack pattern is defined by the A-B Line on one side of the field and Point C on the other.

The standard Half-field racetrack swath sequence starts from Point C and works towards the A-B Line. You can also start the swath sequence from the A-B Line and work towards Point C.

To start a standard Half-field racetrack pattern in a No Boundary field, from the *Swath Pattern* dialog, select *Work towards A-B Line*. For more information, see Setting the pattern, page 112.

To use the Half-field racetrack pattern:

1. Drive one side of the field. At the start of the first side start spraying, or press to define the field without spraying.
2. At the end of the first side of the field stop spraying, or press .
3. Drive the other side of the field. At the start of the opposite side of the field start spraying, or press .

Figure 3.7 shows the sequence of swaths using the Half-field racetrack pattern. Swaths are numbered from the A-B Line outwards.

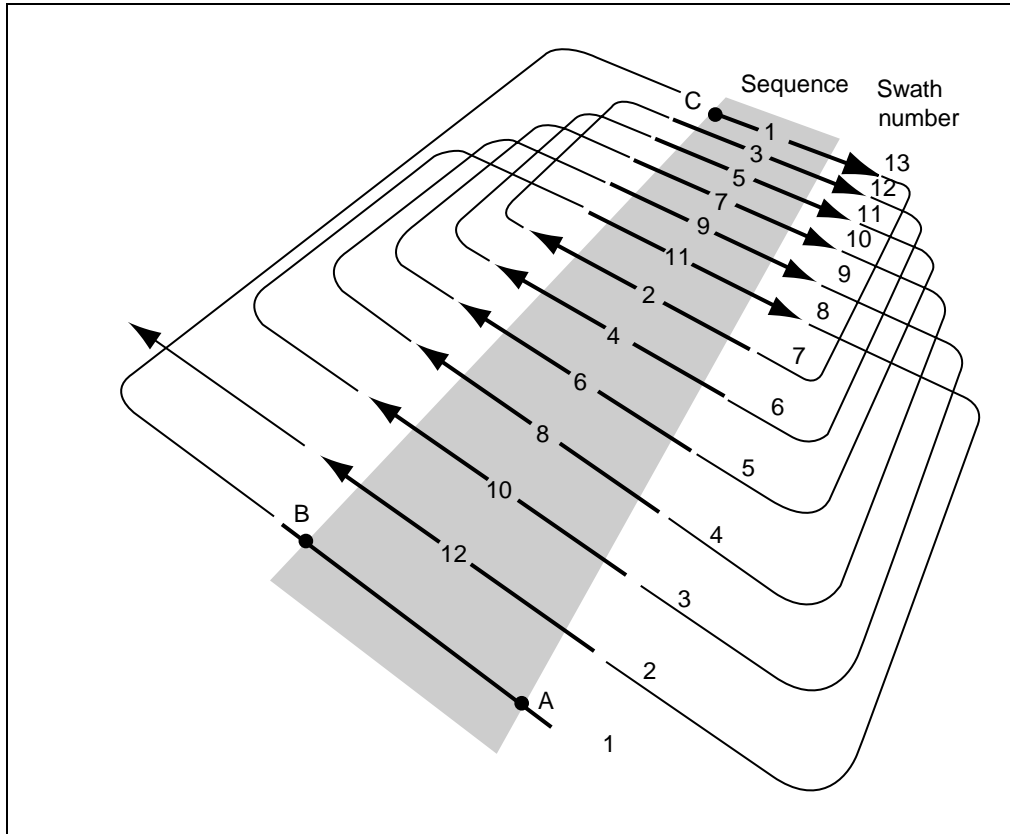



Figure 3.7 Half-field racetrack pattern

The AgGPS 170 Field Computer assumes that you define a No Boundary field while logging the A-B Line and C swath. If you do not want to do this, press or to select the correct swath when you start logging.

Reverse Half-Field Racetrack Pattern

To start a Reverse half-field racetrack, from the *Swath Pattern* dialog, select *Work towards Point C*. For more information, see *Setting the pattern*, page 112.

Figure 3.8 shows the Reverse half-field racetrack swath sequence. After completing the Point C swath, drive right across the field, and drive swath number one next. If you mapped the field without applying materials, press  to select the correct swath to start logging.

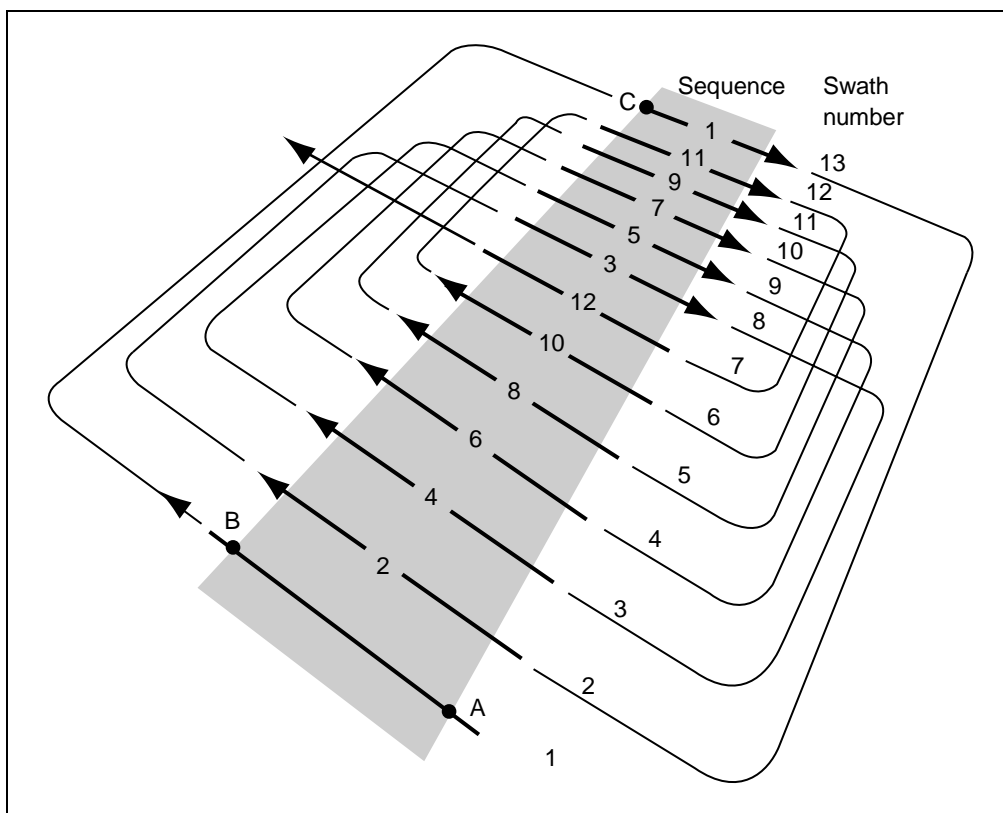


Figure 3.8 Reverse half-field racetrack pattern

If you do not set Point C at the edge of your field, swaths are generated in a back-to-back pattern to complete the field. Figure 3.9 shows an example of a field with an even number of swaths in the Reverse half-field racetrack pattern. Point C is located three swaths from the edge of the field.

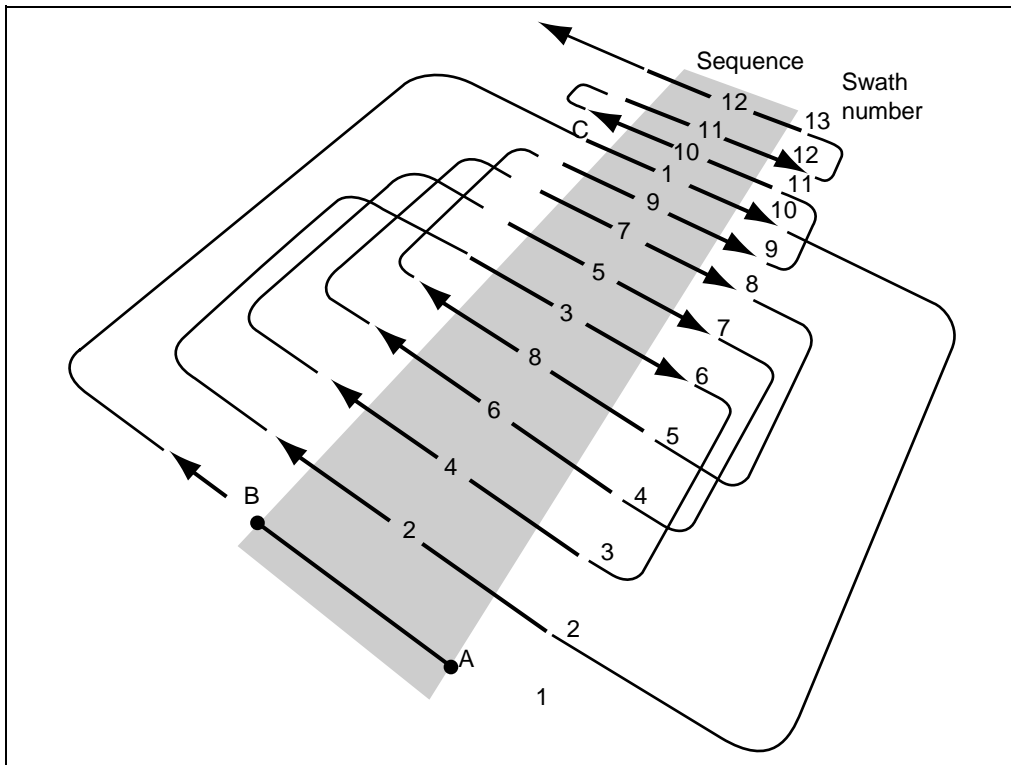


Figure 3.9 Reverse half-field pattern with back-to-back swaths (even)

Figure 3.10 shows an example of a field with an odd number of swaths in the Reverse half-field racetrack pattern. Point C is located four swaths from the edge of the field.

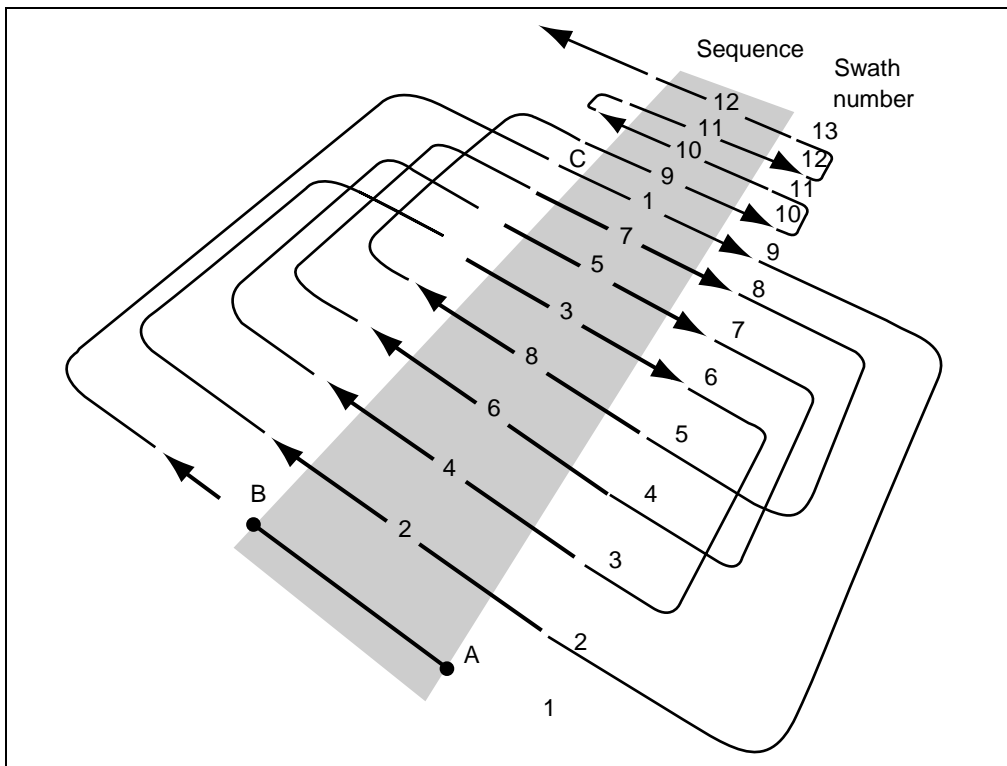


Figure 3.10 Reverse half-field pattern with back-to-back swaths (odd)

Crop Circle Racetrack Pattern

The Crop circle racetrack pattern is defined by the A-B Line through the center of the field. The length of the A-B Line defines the circle diameter and field width.

Figure 3.11 shows an example of a Crop circle racetrack pattern. Consecutive swaths are driven on alternate sides of the field.

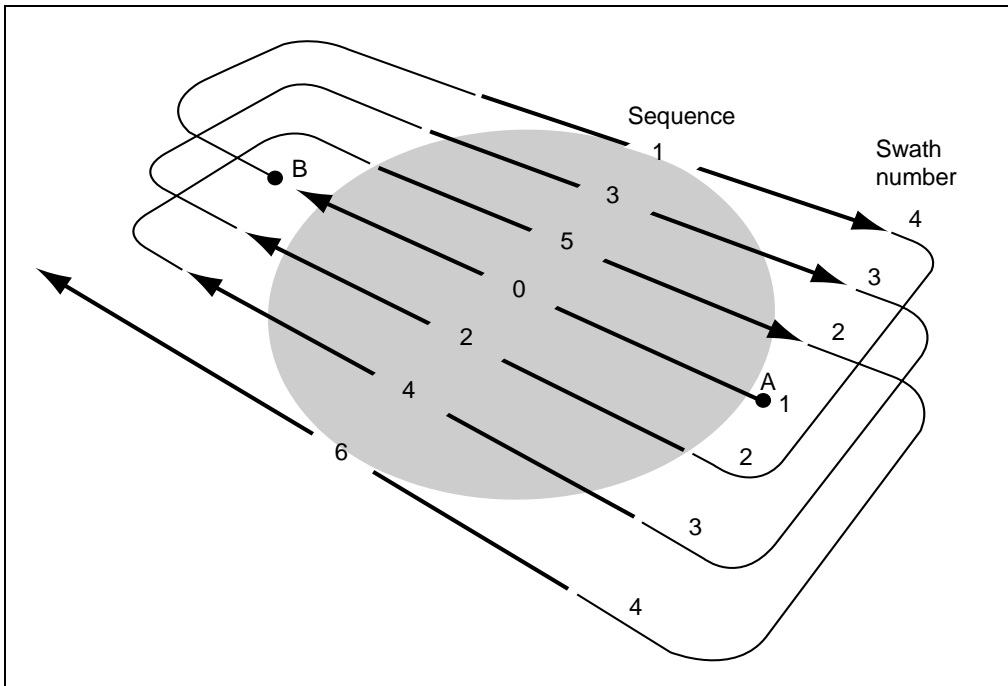


Figure 3.11 Crop circle racetrack pattern

Swaths are numbered from the A-B Line outwards. In the example in Figure 3.11, the A-B Line is the first swath driven, followed by swath number 4 on the right, and then swath number 2 on the left.

Swath number 4 on the left is the last swath driven.

Squeeze Pattern

The Squeeze pattern is defined by the A-B Line on one side of the field, and Point C on the other. Swaths are driven from the outside to the center of the field.

Figure 3.12 shows an example of a Squeeze pattern.

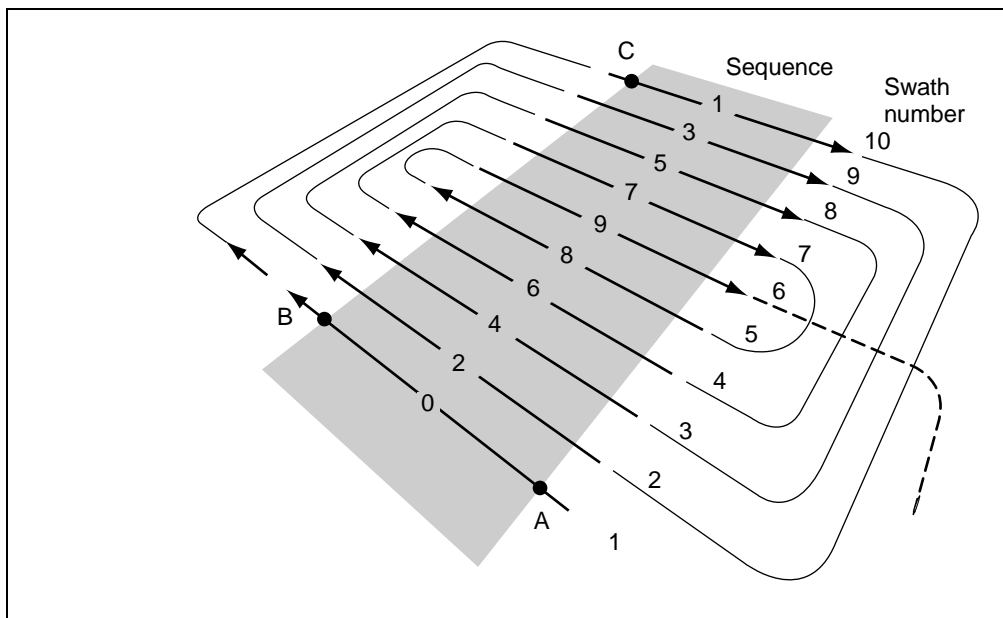


Figure 3.12 Squeeze pattern

Consecutive swaths are driven on alternate sides of the field.

Swaths are numbered from the A-B Line outwards. In the example, the A-B Line is the first swath driven, followed by swath number 10, and then swath number 2.

The last swath is in the center of the field.

Skip Racetrack Pattern

The Skip racetrack pattern is a series of racetrack patterns defined by the A-B Line on one side, and the specified skip value. Swaths are driven in a racetrack pattern across the field from one side to the other.

Figure 3.13 shows an example of a Skip racetrack pattern.

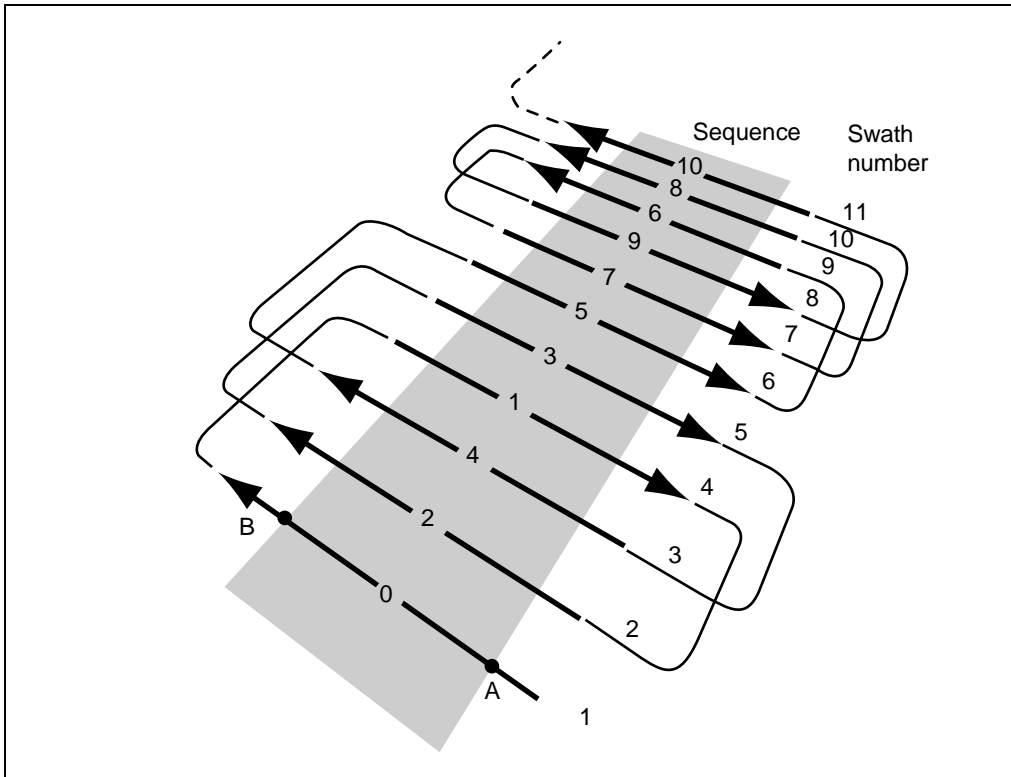


Figure 3.13 Skip racetrack pattern

Consecutive swaths are grouped across the field.

Swaths are numbered from the A-B Line outwards. In the example, the skip value is set to 2. The A-B Line is the first swath driven, followed by swath 4, then swath 2. After swath number 3, the second racetrack starts in the opposite direction.

Skip Racetrack Pattern (Boundary)

In a Boundary field, the series of racetrack patterns repeats until the number of swaths in one complete racetrack does not fit into the rest of the field. The field is completed with back-to-back guidance.

Figure 3.14 shows an example of a Skip racetrack pattern in a boundary field.

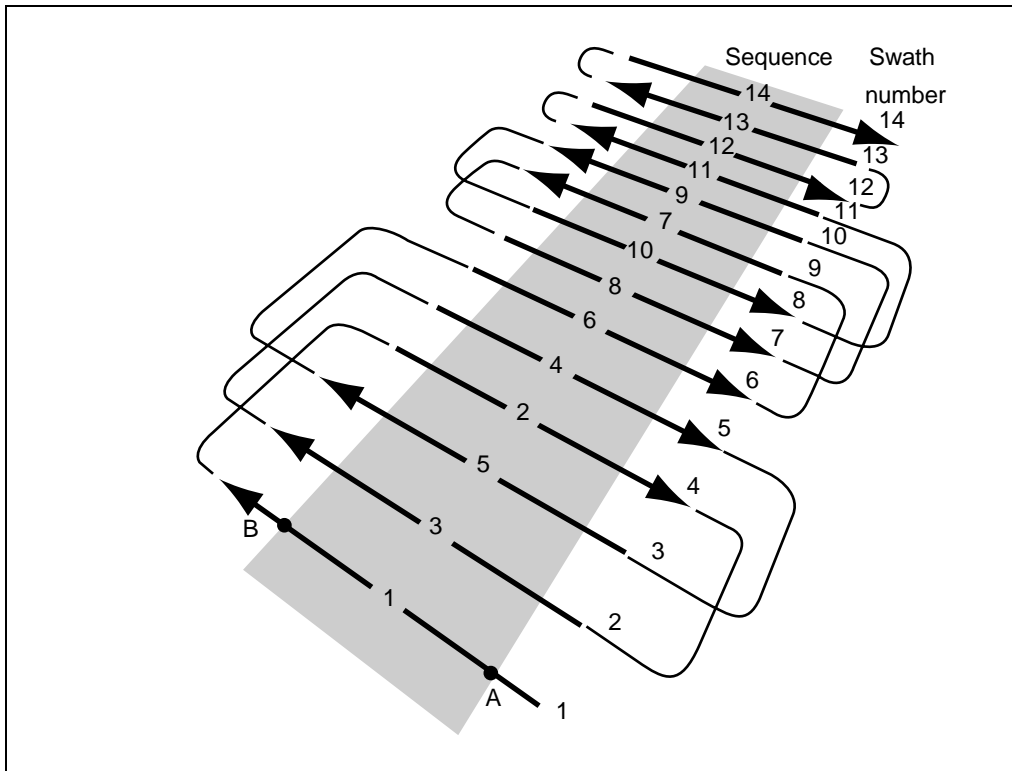


Figure 3.14 Skip racetrack pattern (boundary)

Swaths are numbered from the A-B Line outwards. In the example, the skip value is set to 2. The A-B Line is the first swath driven, followed by swath 4, then swath 2. After swath number 3, the second racetrack starts in the opposite direction. After swath 8, straight back-to-back swaths complete the field.

Center Racetrack Pattern

The Center racetrack pattern is a series of racetrack patterns defined by the A-B Line on one side and Point C. Swaths are driven in a racetrack pattern across the field from one side to the other.

Figure 3.15 shows an example of a Center racetrack pattern.

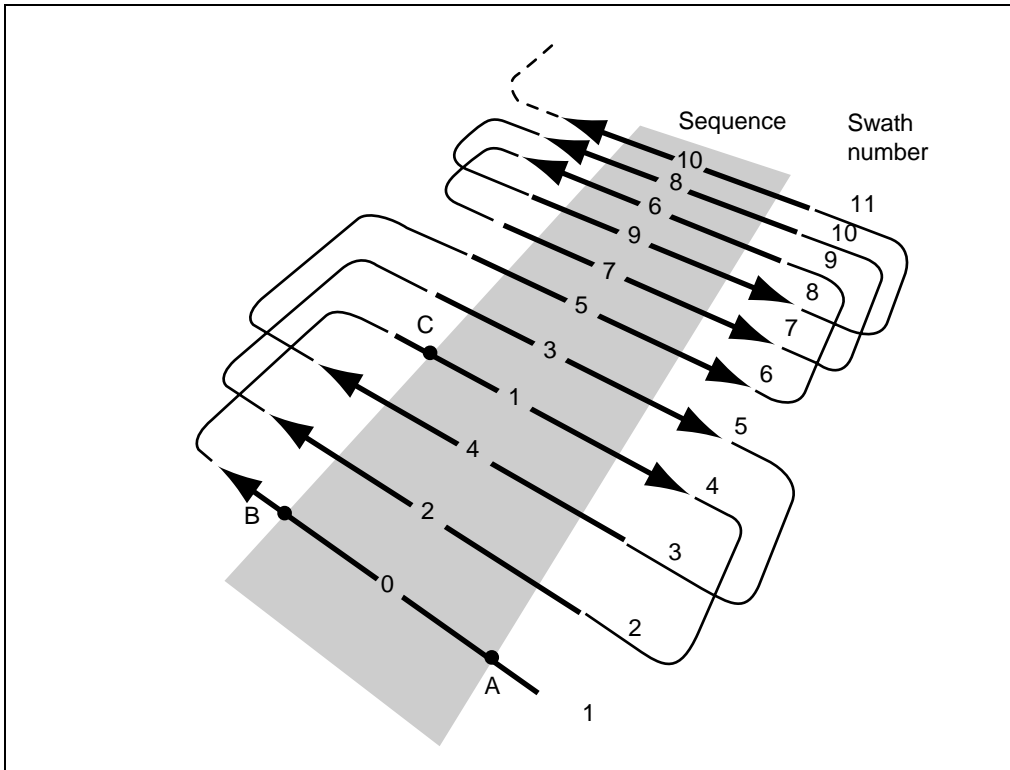


Figure 3.15 Center racetrack pattern

Consecutive swaths are driven in groups across the field.

Swaths are numbered from the A-B Line outwards. In the example, there are two swaths between the A-B Line and Point C. The A-B Line is the first swath driven, followed by swath 4, then swath 2. After swath number 3, the second racetrack starts in the opposite direction.

Center Racetrack Pattern (Boundary)

In a Boundary field, the Center racetrack pattern is defined by the width of the field. This pattern does not use a Point C.

To use the Center racetrack pattern in a Boundary field:

1. Press **Auto-Map** to map the field without logging.
2. Press **ENTER** to complete the field boundary.
3. Start logging from the A-B Line.

Figure 3.16 shows the sequence of swaths using the Center racetrack pattern in a Boundary field with an even number of swaths.

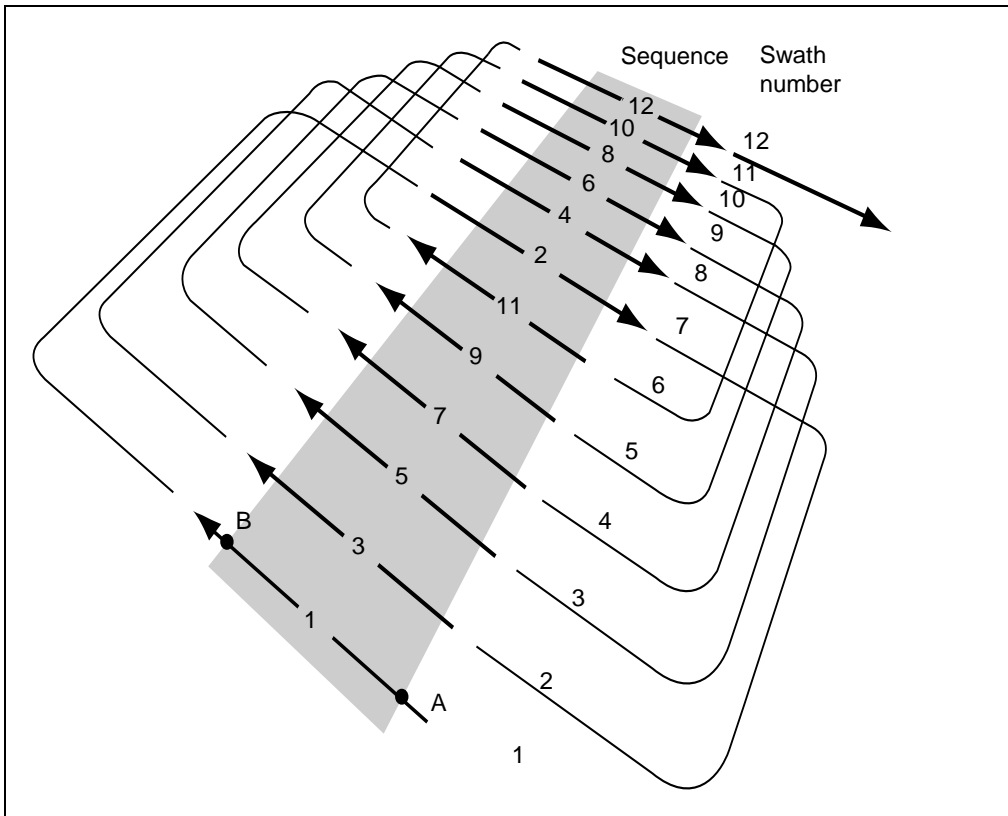


Figure 3.16 Center racetrack pattern (boundary)

Figure 3.17 shows the sequence of swaths using the Center racetrack pattern in a Boundary field with an odd number of swaths.

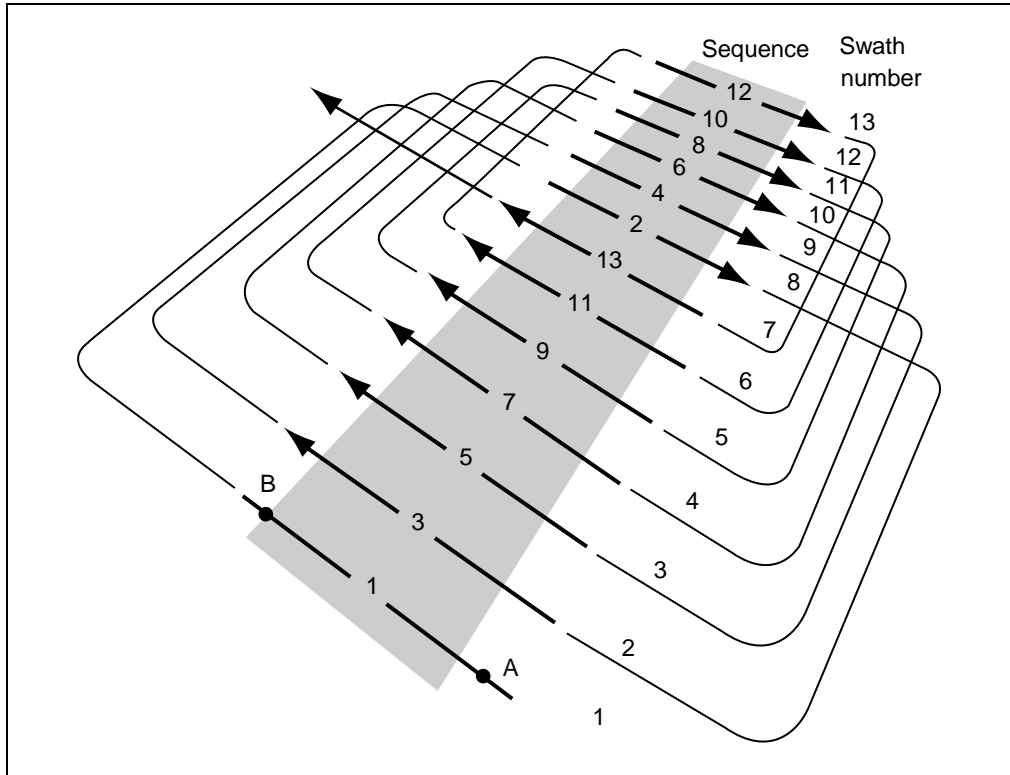


Figure 3.17 Center racetrack pattern (boundary)

Curve and Spiral Guidance

The Curve and Spiral swath patterns provide guidance that is parallel to curved swaths. An A-B Curve is used to define the first swath regardless of whether a field boundary is defined or not. Guidance swaths are then generated parallel to this A-B Curve on either side.

When the field mapping is completed the *Plan View Map* appears. (The *Pattern Check Map* is not displayed). See Figure 3.18.

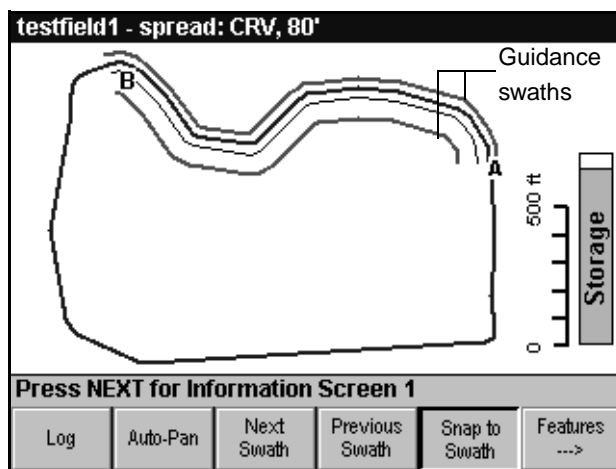


Figure 3.18 Curve swath pattern

One of the two guidance swaths is automatically selected. If you want to select the other guidance swath, press or .

With on, only the guidance swath on the vehicle side of the A-B Curve is displayed. When the vehicle drives across the A-B Curve, the guidance swath on the other side is displayed.



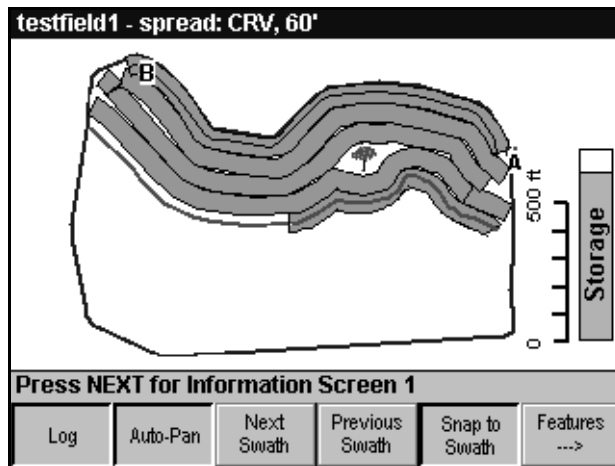
Warning – The Curve and Spiral swath patterns provide guidance to gentle curves around obstructions such as hillsides and rivers. Using these patterns to drive **complicated** curves can have unpredictable results on the generated guidance swaths.

Creating new guidance swaths

DGPS positions recording the location of the swath are stored while driving a swath and logging. When the swath is completed (when you log off), a new guidance swath is generated parallel to the swath just driven. Each successive swath is then parallel to the previous swath.

Note – *If you log off and on again without moving, a new swath is not generated. This is useful if you have to log off to clear blocked nozzled in the middle of a swath.*

As each swath is driven, positions are saved. These positions are used to provide guidance down the next swath, as shown below:






In this case, the operator has driven around a tree on the fourth swath. The guidance swath now being followed is guiding the vehicle around a path parallel to this diversion.

Note – *Very short pieces of logging with sharp turns at the beginning or end can produce strange hooks at the ends of curved guidance swaths.*

Selecting fields using Curve or Spiral pattern

Curve and Spiral patterns do not provide a pre-generated swath pattern. Each new swath is only generated when the last swath is completed.

As long as the event remains open:

- Press  or  to select each of the two guidance swaths in turn.
- Press  to select the closest guidance swath.

Using either of these patterns, if you select an existing event, or create a new event in an existing field, guidance is initially provided to the A-B Curve. As you complete each swath, a new guidance swath is generated.

For more information, see Snap-to-swath, page 171.

Access Path Guidance

This swath setting option provides an access path after every few crop rows for spray trucks and other equipment to drive down.

Access paths are only available with *Straight* patterns.

Using access paths, you can:

1. Map the field and record items, such as irrigation pipes, as line features or point features.
2. Use swath guidance to prepare seed beds and plant your crops.
3. Use access path guidance to drive the vehicle between the groups of rows for spraying.

To change from swath guidance to access path guidance, close the field, change the guidance option in the *Swath Width* dialog, and reselect the field.

The pattern is only generated on one side of the A-B Line in Boundary fields. Therefore you should set the A-B Line on one side of the field. With No Boundary fields, the pattern is generated on both sides of the A-B Line.

For information on defining access paths, see Swath Width, page 115.

Access path field layout

Figure 3.19 shows a typical field layout from left to right. It shows the following:

- One swath covering three rows
- An access path
- Two swaths covering three rows each
- Another access path
- The pattern continues to the other side of the field

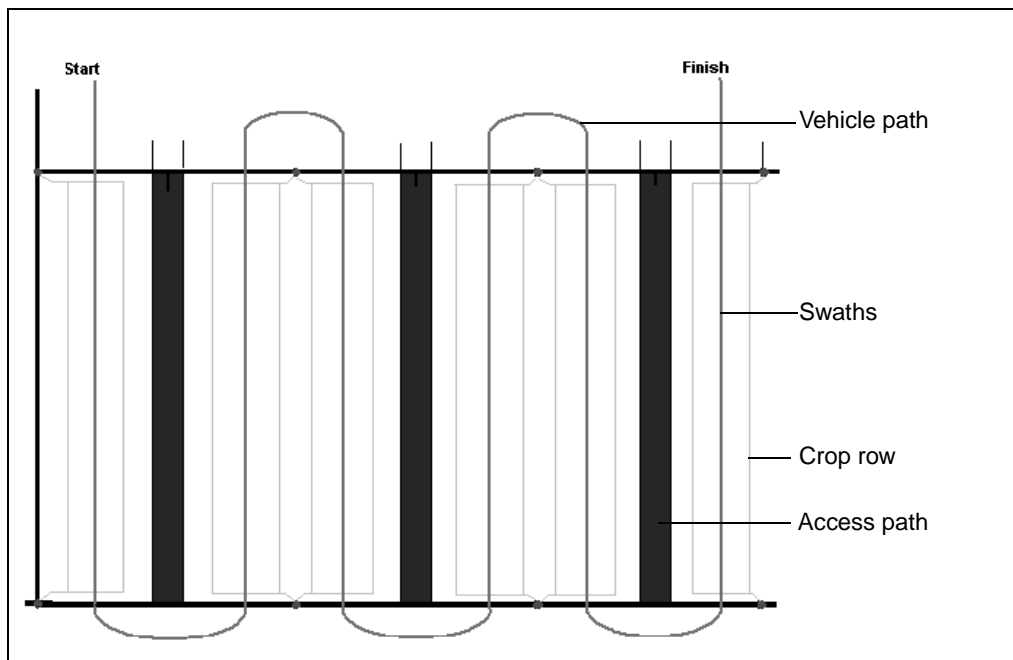
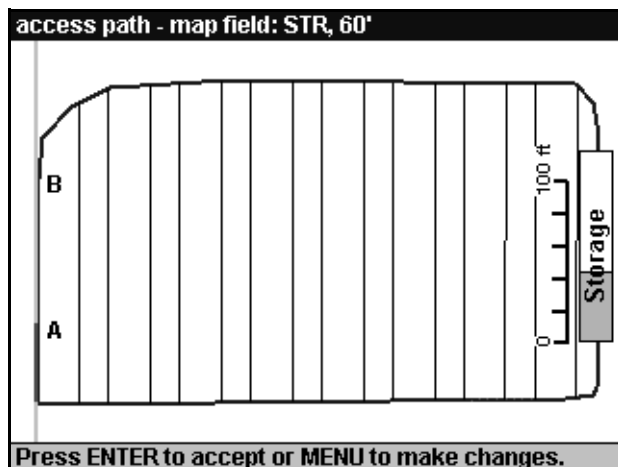
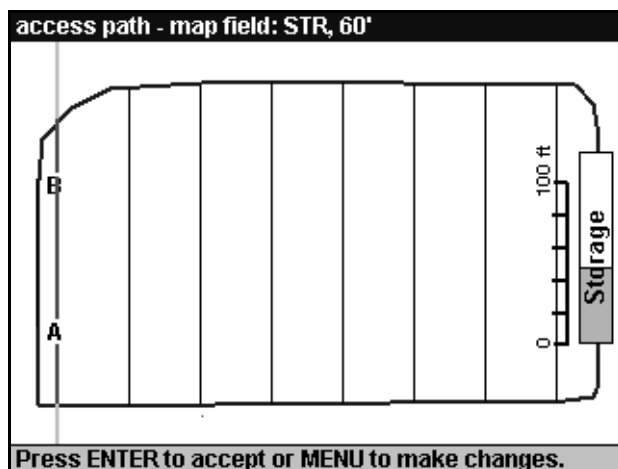


Figure 3.19 Access paths

With *Guide to swaths* set, when you select a field the *Pattern Check Map* displays only the swaths, as shown below:



With *Guide to access path* set, when you select a field the *Pattern Check Map* displays only the access paths, as shown below:

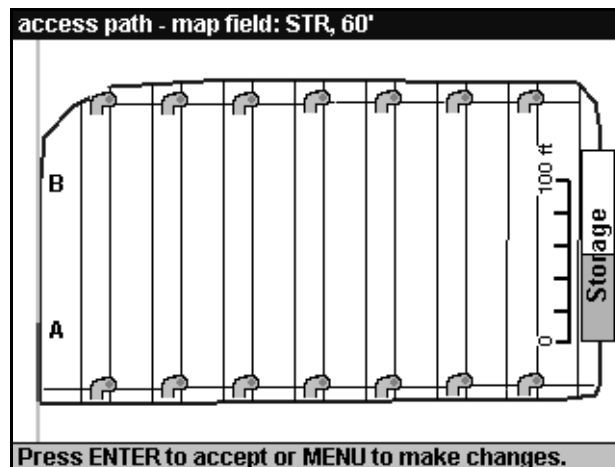


Access paths example

Using access paths, you can:

1. Map the field, recording the permanent buried water main supplies as line features, and riser manifolds as point features. These are displayed on the *Plan View Map*, for all events in the field.
2. Use swath guidance to prepare the seed beds, lay drip tapes, and plant your crops. With high accuracy guidance, you can accurately map the location of the drip tape. Planting and bed preparation can occur without disturbing the drip tape year after year.
3. Use guidance to access paths to drive the vehicle between the groups of rows for spraying.

An example of the *Pattern Check Map* displaying water mains and riser manifolds mapped as features, and guidance swaths is shown below:



Spraying from access paths

Set the application width to include the swaths on either side of the access path when spraying.

Figure 3.20 shows two swaths sprayed from an access path:

- The swath width is 18 ft.
- The access path is 8 ft.

The application width is 44 ft (two swaths plus the access path width).

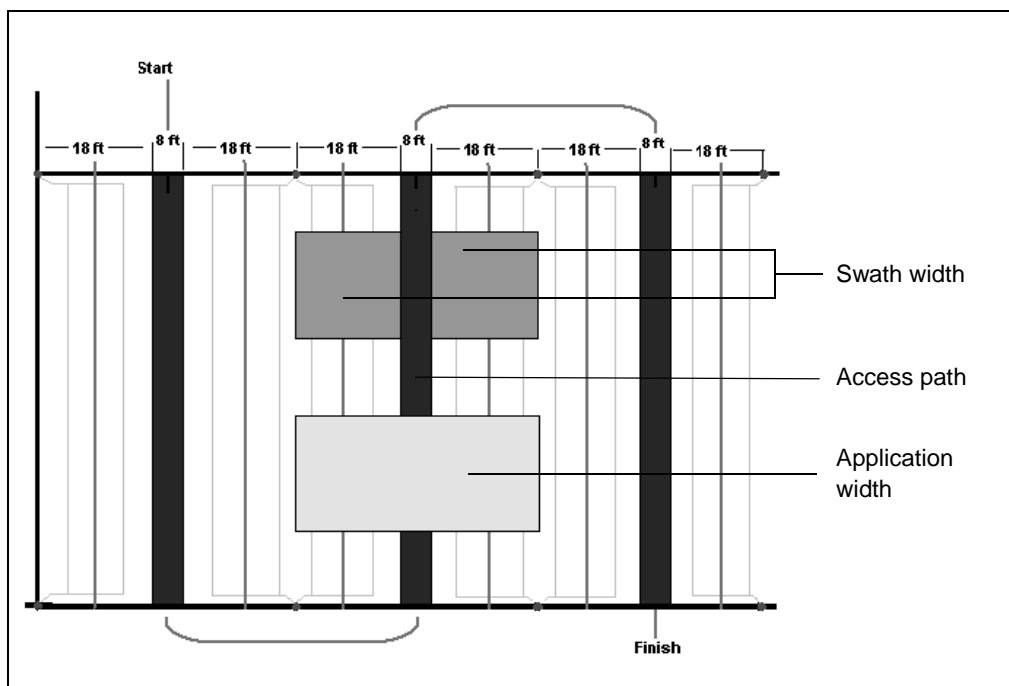




Figure 3.20 Application width




Note – Coverage polygons record the total application width. This includes the width of the access path.

Snap-to-Swath and Auto-Turn



Depending on the swath pattern, Softkey 5 on the *Plan View Map* can be either  or .

Snap-to-swath


Snap-to-swath is used with Straight, Headlands, Curve, and Spiral patterns.



The AgGPS 170 Field Computer automatically snaps to the closest swath when the  softkey is depressed. When you press  or , snap-to-swath is turned off.

With Curve and Spiral patterns:

- Pressing  or  selects each of the two guidance swaths in turn.
- Once you close an event, you cannot get guidance to swaths created by logging from a previous time the event was open.



Snap-to-swath in headlands

If you use Headlands pattern, when you press  the AgGPS 170 Field Computer snaps to the swath (headland or straight swath) which is closest to the current position. The AgGPS 170 Field Computer will snap to swath as follows:



- If the current swath is a headland,  will only snap to other headlands.
- If the current swath is a straight swath,  will only snap to other straight swaths.

This lets you use the headlands area to turn at the end of a row (straight swath) without snapping to the headlands swaths, and thereby losing sight of the straight swaths until you get back over them.

To get guidance to only the straight swaths once you have finished with the headlands:

1. Turn  off.
2. Go within the straight swaths area.
3. Press .

If you need to get guidance to only the headlands again:

1. Turn  off.
2. Go to within the headlands area.
3. Press .

Auto-Turn

Auto-Turn is used with Half-field racetrack, Crop circle racetrack, Squeeze, Skip racetrack and Center racetrack patterns.

If Auto-Turn is selected then each new swath is automatically selected after you:



1. Log off.
2. Turn through more than 60 degrees.

Pattern direction

When you map a field using a Straight, Crop circle racetrack, or Skip racetrack pattern, Softkey 5 displays the current pattern direction setting. To change the pattern direction, press this softkey—it steps through left, right, and auto.

The pattern direction setting determines on which side of the A-B Line the next swath is generated:

- If the pattern direction is set to *Left*, the next swath is on the left of the A-B Line.

Press  to manually select a swath to the left. Press  to manually select a swath to the right.

- If the pattern direction is set to *Right*, the next swath is on the right of the A-B Line.

Press **Next Swath** to manually select a swath to the right. Press **Previous Swath** to manually select a swath to the left.

- If the pattern direction is set to *Auto* with a straight pattern, the next swath is on the same side of the A-B Line as the vehicle.

Press **Next Swath** to manually select a swath away from the A-B Line. Press **Previous Swath** to manually select a swath towards the A-B Line.

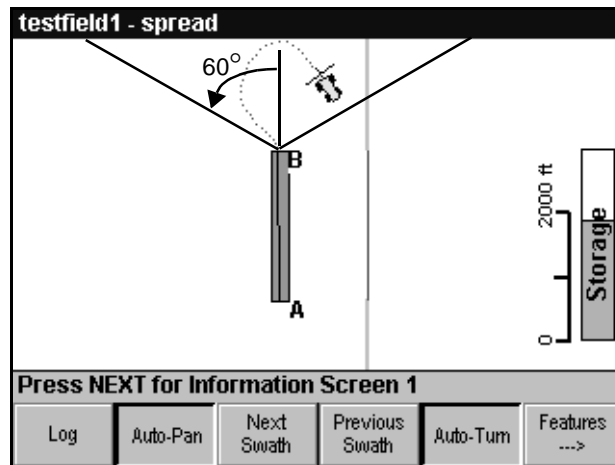
- If the pattern direction is set to *Auto* with any other pattern, the direction of the first turn determines on which side of the A-B Line the swaths are generated.



Tip – When using automatic pattern direction, make sure that you do not turn more than 60 degrees in the wrong direction after setting the A-B Line, or swaths will be generated in the wrong direction.

You can change the pattern direction from the *Swath Direction* screen.

An example of a keyhole turn less than 60 degrees to the left to create the next swath on the right is shown below:





Swath Numbering




The swath number identifies the current swath. This can be displayed on the lightbar text or the information screens. When track logging is enabled, the swath number is recorded in the Track2D or Track3D.dbf file.

No Boundary



The A-B Line is displayed and recorded as swath number 1. The other swaths are numbered ascending away from the A-B Line. The A-B Line is usually at one side of the field, but if it is set across the middle of the field, the swaths on the second side of the A-B Line are recorded in the Track.dbf file as -1, -2, -3

The pattern direction setting when the field is mapped determines the operation of the  and  softkeys with respect to the A-B Line.

With a straight pattern:

- Press  to select the next swath farther away from the A-B Line (increase the swath number).
- Press  to select a swath closer to the A-B Line.
- Press  to step through swaths back to the A-B Line and continue past it.

With a racetrack pattern:

- Swaths are numbered out from the A-B Line, not in the sequence defined by the pattern.
- Press  and  to step through the swaths in the pattern sequence.

For an example of the difference between the swath numbering and the pattern sequence, see Figure 3.7 on page 153.

Boundary – Straight pattern

Swaths are numbered from one side of the field boundary. If an A-B Line is set when the field is mapped, numbering starts from the side of the field nearest to the A-B Line. If an A-B Line is not set when the field is mapped, numbering starts from the side of the field nearest to the current position when the boundary is completed.

The A-B Line is usually at one side of the field and is swath number 1, but if it is set across the middle of the field, it can be any swath number, and is displayed on the Information Screens and on the lightbar, and recorded in the Track.dbf file as this swath number.

There are no negative numbered swaths.

Boundary – Headlands pattern

Headland swaths are numbered H1, H2, H3 . . . inwards from the field boundary. Straight swaths are numbered from one side of the field boundary. If there are three headlands, the first straight swath is swath number 4.

Numbering starts from the side of the field nearest to the A-B Line. If you do not set an A-B Line when you map the field, the A-B Line is automatically set on the side of the field closest to the vehicle when you complete the boundary.

Changing Swath Parameters

It is not necessary to set up the swath parameters (swath pattern, swath width, or swath direction) for every event or every new field unless you want to use different swath parameters. Once the swath parameters have been set, they are used for all subsequent field operations, until they are changed. This also applies to the grid settings for sampling events.



Warning – Changing existing swath parameters can have a significant effect on guidance. It is important to understand this effect before changing swath parameters on an existing field.

Changing the pattern, swath width, or swath direction, can result in guidance that is significantly different from the previous operation in the field.

You cannot change the swath pattern and swath width while an event is open. If you must change either of these parameters, close the event, make the change, and reselect the event.

Effects of changing swath parameters

- Changing swath parameters rennumbers the swaths.
- Changing the swath pattern or swath width can cause guidance overlaps or gaps.
- Changing the pattern from Curve to Straight (or Headlands) creates a new straight A-B Line using existing A and B points.
- If you change the pattern from an A-B pattern to an A-B-C pattern, Point C is automatically generated. Use the *Swath Direction* dialog to change Point C if necessary.

Changing the pattern halfway through an event

The pattern should only be changed *before* starting a new event. Changing the pattern halfway through an event is most likely to create gaps or overlaps in coverage. Figure 3.21 shows a field originally mapped using the headlands pattern, but changed to parallel halfway through the event. Overlaps are created in the headlands area, so you will be guided to cover areas that have already been sprayed.

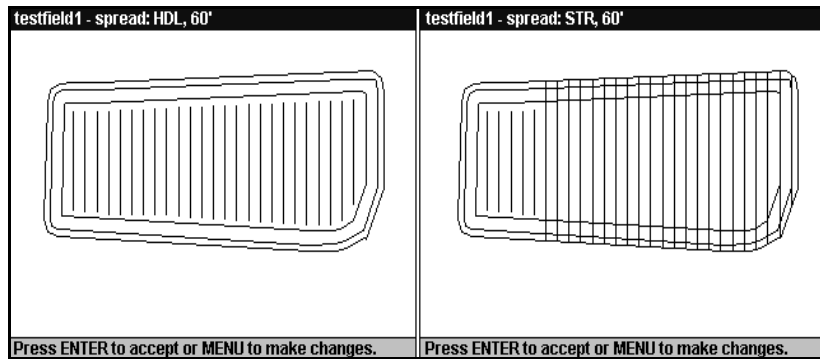


Figure 3.21 Overlaps

Mapping a new field

To map the field using a swath pattern, swath width, or swath direction that is different from the last field mapped, change the appropriate swath parameter *before* starting to map the field.

Working in an existing field

If you select an existing field which was originally mapped with a different swath pattern or swath width from the current parameters, a message appears telling you which parameter has changed.

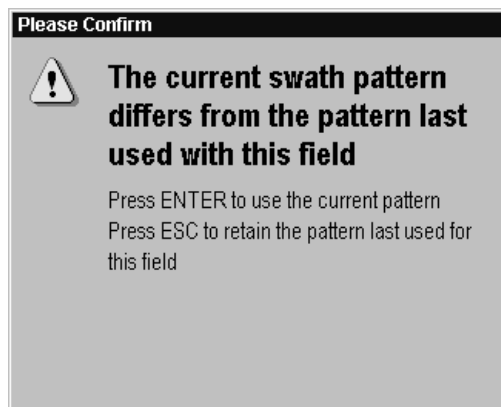
To use the original swath parameters, press . The current swath parameters revert to the settings you had when you mapped the field.


To replace the original swath parameters with the current swath parameters, press .


Changing the swath pattern

Headlands and Spiral swath patterns can only be used if the field boundary was originally mapped using New Field (Boundary).

When you select a field, and the last pattern used for the field differs from the current pattern, a message box appears, as shown below:




To use the original pattern press . The current pattern reverts to the pattern you had when you last worked in this field. The *Pattern Check Map* displays the existing field with the original boundary and pattern.

To use the current pattern, press . The *Pattern Check Map* displays the existing field with the original boundary but with a new pattern.

Changing the swath width

When you select an existing field, and the original swath width is different from the current swath width, a message box appears giving you the option to use the current swath width or the original swath width.

If you press  the *Pattern Check Map* displays the existing field with the original boundary, pattern, and swath width.

If you press **ENTER** the *Pattern Check Map* displays the existing field with the original boundary and pattern but with a new swath width.

The effects of the new swath width are:

- the boundary stays the same
- the center of the first swath or headland moves
- the A-B Line stays in the same place and the rest of the swaths move
- Changing the swath width during an event is likely to cause overlaps or gaps in the coverage. See Figure 3.22.

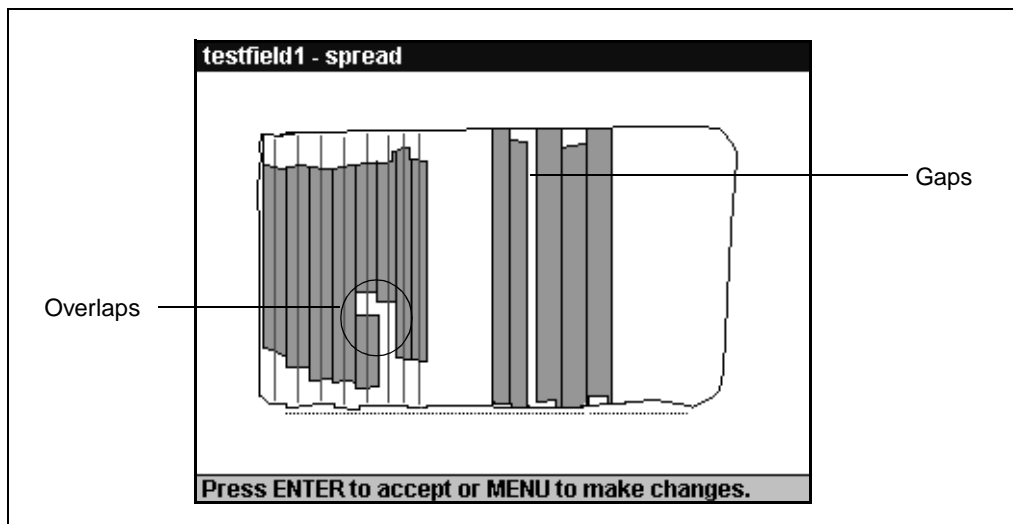


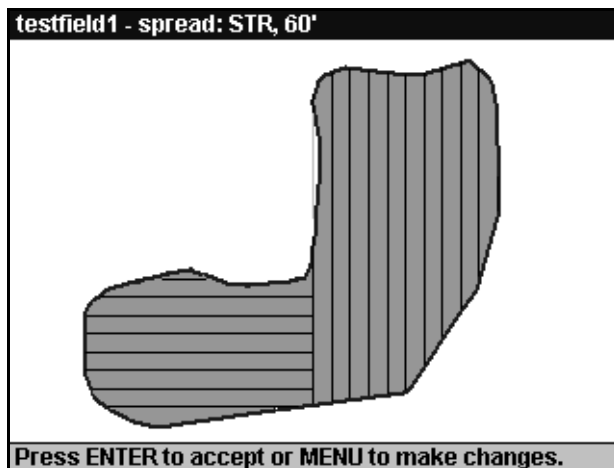
Figure 3.22 Changing swath width during an event

Changing the swath direction

You cannot change the swath direction in a field with a Spiral or Curve pattern, and you cannot set A and B points unless you have a good GPS position.

Changing the swath direction can cause gaps in guidance patterns.

However, changing the swath direction can be very useful, if it is done carefully, especially in L-shaped fields, to allow longer runs throughout the field. An example of how part of the field can be worked, and the swath direction changed for the rest of the field, is shown below:




Upgrading the Software

Software upgrades are performed using the CompactFlash data card. To access new software, download it from the Trimble website (www.trimble.com/support/files/index.htm). If you do not have Internet access, contact your Trimble dealer.

To see the version of the software that is currently installed on the AgGPS 170 Field Computer, from the *Help* menu, select *About*.

Minor fixes are provided free to customers with the latest major version, and do not require a password.

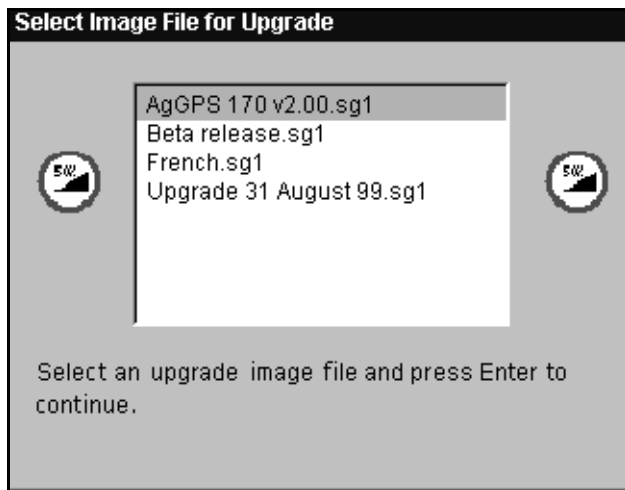
To upgrade the software to a new version:

1. Copy the new firmware from the Trimble website to the data card.
2. Insert the data card containing the new software into the card slot on the AgGPS 170 Field Computer front panel.
3. Press  to turn on the system.

The upgrade image file names can be called *.sg1, not just Upgrade.sg1. This means that files can be named to indicate, for example, their language. If one or more .sg1 files are detected on the data card, they are listed in a dialog. From this list, select the appropriate file.

If you downgrade to an earlier version of firmware, the default settings are restored. If you upgrade from version 2.00 or later, your current configuration settings are preserved.

The AgGPS 170 Field Computer detects the version of software on the card, and displays the *Select Image File for Upgrade* dialog, as shown below:



4. Use the arrow keys to select an upgrade file and press .
 5. The AgGPS 170 Field Computer compares this version to the installed software, and displays a message which lets you upgrade (or downgrade) or continue without upgrading.
 6. Press to continue with installation.
(To continue without upgrading the software, press .)
- If a valid software file is found on the data card, the system upgrades the software.
7. When the upgrade is finished, turn the AgGPS 170 Field Computer off by removing the power altogether, and then restart.



Tip – If the display turns off during the upgrade process, press the power button and the upgrade will continue.

Options

Major software enhancements are not automatically activated when you upgrade the software. Advanced software options can be activated for an additional cost.


If you want to enable advanced options:

1. Contact your Trimble dealer and request the option you require, provide details of payment, and your AgGPS 170 Field Computer serial number. You will be sent a password file over e-mail, or told the password if you do not have e-mail.
2. Copy the password file to the root directory on the data card.

Alternatively:

- a. From the *Help* menu, select *Upgrades and Options*. The *Upgrades and Options* dialog appears, as shown below:

Upgrades and Options	
Serial Number	4038A29581
Software Version	3.00, 19-Nov-2000
Software Support Expiry	None
Password	<div style="background-color: black; width: 100px; height: 1.2em;"></div>
Enter a password, or place a password file on the data card	
<div style="width: 40px; height: 20px;"></div>	<div style="width: 40px; height: 20px;"></div>
<div style="width: 40px; height: 20px;"></div>	<div style="width: 40px; height: 20px;"></div>
<div style="width: 40px; height: 20px;"></div>	<div style="width: 40px; height: 20px;"></div>
<div style="width: 40px; height: 20px;"></div>	<div style="width: 40px; height: 20px;"></div>

- b. In the *Password* field, enter the password provided to you and press .
3. The advanced option is activated.

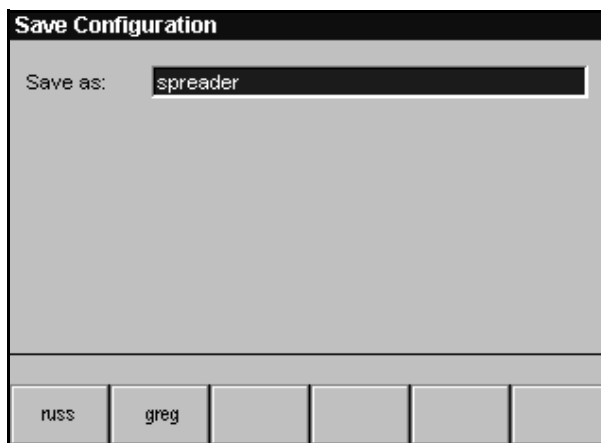
Configurations

This feature lets you quickly save and restore configuration settings for different vehicles or operators. When you save a configuration, all settings in all dialogs are saved.

Save Configurations


To save the current configuration:

1. From the *Setup* menu, choose *Save Configuration*. The *Save Configuration* dialog appears, as shown below:



2. Enter a name for the configuration.

The softkeys show a history of operator names (as in the *New Field* dialog when *Operator* is selected), so that you can quickly enter an operator name if this is how the file is to be identified. Otherwise, use the arrow keys to enter text.

3. Press  to save the configuration.

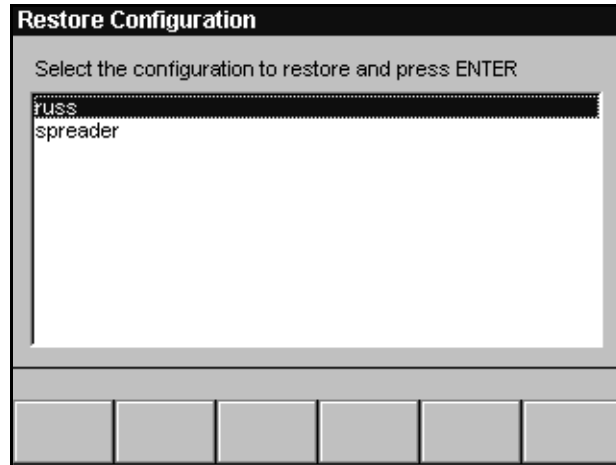
Note – Configuration files are saved on the data card, in the \AgGPS170\ directory, with a .cfg extension. You will not be warned if the specified configuration filename already exists—the existing file is simply overwritten.


Restore Configurations

The configuration can only be restored when there is no field open.

To restore a saved configuration:

1. From the *Setup* menu, choose *Restore Configuration*. The *Restore Configuration* dialog appears, as shown below:



2. Use the arrow keys to select the configuration to be restored.
The filenames are listed without a path or extension, and are sorted alphabetically.
3. Press  to restore the configuration.

If you load an Air Mode configuration file while you are in Ground Mode, or if you load a Ground Mode configuration file while you are in Air Mode, you need to turn the AgGPS 170 Field Computer off and on again so that all the configuration changes take effect. You do **not** need to hold down Softkey 1 to change modes.

If you restore a configuration with background layers selected, but the layers are not present on the data card, an error message is displayed.

Note – Configuration files from different versions of software may not be compatible. If the configuration file cannot be loaded, an error message is displayed.

Record and Replay Input Files

You can record a sequence of inputs or keystrokes to help identify and diagnose problems.

The AgGPS 170 Field Computer records inputs received from:

- NMEA messages from the GPS receiver
- External keypad button presses
- External switch operations
- AgGPS 170 front panel keypad key strokes



Warning – This is a diagnostic and troubleshooting tool only. It is not intended for regular use. Recording input files has a noticeable impact on performance, because the AgGPS 170 Field Computer is constantly writing to the data card.

When a sequence of inputs or keystrokes is recorded, two files are created. These files can be sent to your dealer or to Trimble and used to reproduce the problem on another AgGPS 170 Field Computer.

You can also replay a recording on your AgGPS 170 Field Computer, but you need to ensure that the initial conditions are the same as they were when the recording began, or the results may not be as expected.



Tip – If you change a setting during recording, it will be changed again when you replay the file. For best results, save the configuration before recording the input file and, if you replay the input file, restore the configuration first.

Examples of unexpected results

If your recording begins with no open field, then you should replay from this state as well. Other situations to be aware of:

- The recording saves *keystrokes*, not *values*. If you change the swath width from 50 ft to 60 ft while recording, you should restore the configuration before replaying the input file. Otherwise, the swath width will be changed from 60 ft to 70 ft during the replay.
- In the *New Field* dialog, if you select barley as the crop by pressing Softkey 3, barley moves to Softkey 1. When you replay, the crop on Softkey 3 is selected.
- If your recording includes actions such as logging or adding point features, then if you replay this with the same event, you will log over the existing logging and add duplicate point features at the same location.

So, if you want to replay logging, you should start a new event each time, and if you want to replay adding of point features to an existing field, you should manually save and restore your database files between replays.

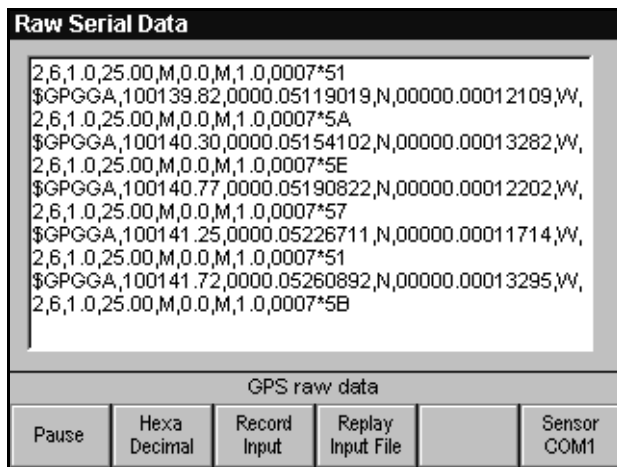
Record and Replay Input Filenames

When you record a sequence of inputs or key strokes, a log file is created in the \AgGPS170 Replay\ directory. The filename cannot be specified. It is constructed automatically from the current date in the format *yyyy-mm-dd_nn.inp*, where *nn* is a sequence number that starts at 01.




When you start recording, the configuration is saved to a separate file in the same directory with the same filename, but with a *.cfg* extension. Although this is automatically created when recording, it is not automatically restored before replaying.

Recording Input Files

From the *Equipment* menu, choose *Raw Serial Data*. The *Raw Serial Data* dialog appears, as shown below:




To record a sequence of events:

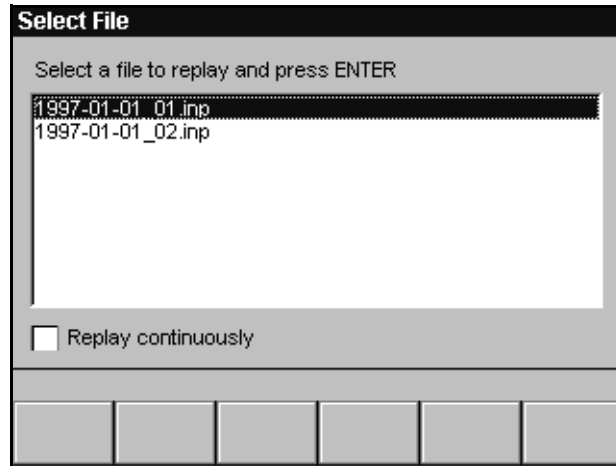
1. Press .
2. When you have completed the sequence of events, from the *Equipment* menu choose *Raw Serial Data*.
3. Press .
4. Press .





Note – Recording is stopped automatically when the storage space remaining on the data card becomes very low. For more information, see *The CompactFlash Data Card*, page 15.

Replaying Input Files



To replay a recorded sequence of events:

1. From the *Equipment* menu, choose *Raw Serial Data*.
2. Press . The *Select File* dialog appears, as shown below:



3. Press  to select the file to replay.
4. Press  and then wait while the AgGPS 170 replays the sequence of events.
5. When the Playback of recorder file completed message appears, press .
6. Press  to return to the previous dialog.

To interrupt the replay of events at any time:

1. From the *Equipment* menu, choose *Raw Serial Data*.
2. Press .
3. Press .

Setup

In this chapter:

- Introduction
- Setup menu
- Equipment menu

Introduction

This chapter describes how to configure the advanced settings of the AgGPS 170 Field Computer to suit your specific requirements. There are two advanced setup menus that contain the features you can change.

The two menus are:

- Setup menu

This menu lets you configure the AgGPS 170 software operating parameters.

- Equipment menu

This lets you configure the way that the AgGPS 170 Field Computer interfaces with other equipment.

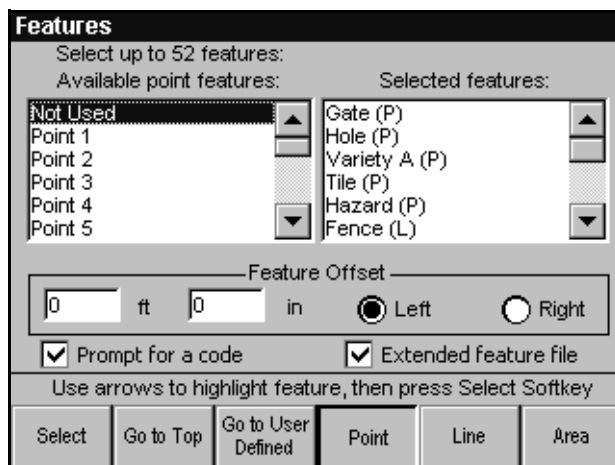
Setup Menu

Use the *Setup* menu to configure the advanced AgGPS 170 software operating parameters.

Features

A maximum of 52 point, line, or area features from predefined lists can be selected for display on the features softkeys at one time. The features appear on the softkeys in the order that they are displayed in the *Selected features* list.

From the *Setup* menu, choose *Features*. The *Features* dialog appears, as shown below:



The *Available point features* list displays the list of point features that can be assigned to softkeys.

To display the list of *Available line features* or *Available area features* instead, press or .

Adding a feature to a softkey

In the *Available point features* list:

1. Use ▼ and ▲ to highlight the desired point feature.
2. Press .

The selected feature appears in the *Selected features* list on the opposite side of the screen.



3. Press or to assign line or area features.
4. Use ▼ and ▲ to highlight the desired feature.
5. Press .
6. Press to save the settings.

The *Selected features* list displays a mixture of point, line, and area features. To show whether a feature is a point, line, or area feature, the feature name is followed by (P), (L), or (A). This also appears on the softkeys on the *Plan View Map*.

Note – Point features 130 (sample target) and 131 (sample) are reserved for sampling events, and cannot be assigned to softkeys.

User-defined features

If you have created your own set of features, you can assign them to the softkeys:

- To go straight to the section of the features file containing your own features, press .
- Use ▼ and ▲ to highlight the desired feature.
- To go back to the top of the file, press .





Tip – Select the features in the order that you want them to appear on the softkeys. The only way to change the order is to delete features and add them back in at the bottom of the list.

For more information, see Mapping Features and Waypoints, page 81.

Deleting features from the selected features list

A maximum of 52 features can be selected for display on the features softkeys at one time. If you already have 52 features displayed in the *Selected features* list and want to add another one, you need to remove one of the existing features first.

To remove features from the *Selected features* list:

1. Press  to move to the *Selected features* list.
2. Use ▼ and ▲ to highlight the desired feature.
3. Press .

(The  softkey changes to  when you are in the *Selected features* list.)





Feature offsets

Features can be mapped at the GPS antenna position or at a predefined left or right offset. This means that you can map a ditch or a fence line by driving along the side of the ditch keeping the end of your spray boom over the positions to be mapped.

While you are mapping a line or an area feature, you cannot change the feature offset—the *Features* dialog is disabled. To change the offset, stop mapping the current feature, change the offset, and map a new feature.

Note – *With large offsets, the Direction to Feature changes rapidly when you are close to the feature, and the Distance to Feature can be either side of the offset.*

To set a feature offset:

1. From the *Selected features* list, press .
2. Use ▼ and ▲ to enter an offset value.
3. Press  and use ▼ and ▲ to enter minor units.
4. Press  and use ▼ and ▲ to select a left or right offset.
5. Press  to save the settings.





Tip – There is only one feature offset setting which applies to all point, line, and area features. If you want to map line features at the end of the boom and point features at the antenna position, remember to reset the offset each time.

Feature codes

When you record a feature in a field, you can record a code in the *<featurename>.dbf* file so that you can identify each feature individually in the office.

To record a code with every feature:

- Press  repeatedly until you reach the *Prompt for a code* check box.
- Press .

When this option is selected, the *Add Feature* dialog appears whenever you finish mapping any feature.

Extended feature files

If the *Extended feature file* check box is selected, **point** features are recorded in PointExt_<featurename>.* shape files. In addition to the standard fields, these files also record latitude, longitude, height and GPS status.

Note – *Extended feature files do not apply to line and area features.*

The latitude and longitude recorded takes into account any feature offset you have specified. However, the height is calculated at the antenna position. If you are mapping a point feature on a slope with a large offset, the height recorded for the feature may be inaccurate.

Time and Units

You can display and enter numeric values in either metric or US units. You can only change units in this dialog when no field event is open.

From the *Setup* menu, choose *Time and Units*. The *Time and Units* dialog appears, as shown below:

To select the required units, press ▼ or ▲ to change the selected option button. The units option uses the measures shown in Table 4.1.

Table 4.1 Measures




	Metric	US
Distance	Meters	Feet
Speed	Kilometers per hour or Knots ¹	Miles per hour or Knots ¹
Area	Hectares	Acres

¹Knots is only used for displaying speeds on the Information Screens or lightbar text. Speed is always recorded in miles per hour or kilometers per hour.

You should always close an event before changing the units because this can change the values saved in the .dbf files. This could affect calculations such as the percent complete.

Speed

To set the speed units to be displayed in knots:

1. Press .
2. Press  or  to change the selected option button.

Time zone offset







The AgGPS 170 Field Computer uses Greenwich Mean Time (GMT) as internal time. This can be offset so that displayed and recorded time data is referenced to your local time zone.

When the unit is first switched on, the offset is calculated based on the current longitude and this offset is used by default.





Warning – The calculated offset can miss the step between time zones where the time zone does not exactly follow the longitude line. It also does not take into account the effects of daylight saving time. If recording accurate time is important, you should check the calculated offset and manually set it if necessary.

To change the GMT to local offset:

1. Press .
2. Press  to clear the *Automatically select time zone* check box.
3. Press  to move to the *GMT to local offset* data entry field.
The range limit tip appears.
4. Use  and  to enter the offset value.
5. Press  to save the settings.

If the manually entered GMT to local offset varies by more than two hours from the calculated value a warning message box is displayed:

- If you press  the AgGPS 170 Field Computer clock is reset using your new value.
- To use the calculated value, press .

Note – *If you want the AgGPS 170 Field Computer to reset the time zone to the calculated value whenever you start a new field, you must leave the Automatically select time zone check box selected. If this check box is selected, the GMT to local offset is unavailable, and cannot be changed.*

Date

The AgGPS 170 Field Computer uses NMEA ZDA messages from the GPS receiver to set the system date. If valid NMEA messages are received but there is no ZDA, a warning message prompts you to enable ZDA messages.

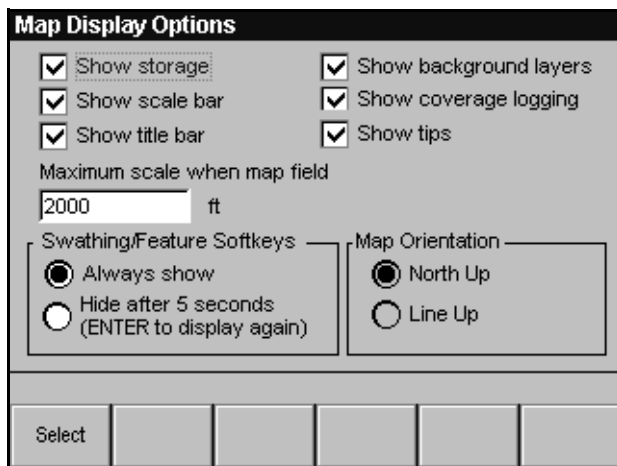
For information on enabling NMEA messages, see your GPS receiver manual.

Map Display Options

The *Main Operation Screens* (*Pattern Check Map*, *Plan View Map*, and the *Information Screens*) display a title bar, a tip bar, and softkeys, as well as the guidance graphics. The *Pattern Check Map* and *Plan View Map* also display status indicators.

By default, these status indicators and softkeys are all displayed permanently. To make the best use of the full screen during logging and guidance operations, they can be hidden.

From the *Setup* menu, choose *Map Display Options*. The *Map Display Options* dialog appears, as shown below:



To hide any of the items, clear the appropriate check box.

Background layers

Individual background layers can be turned on or off in the *Background Layers* dialog, selected from the *Field* menu. To disable the display of all background layers selected in the *Background Layers* dialog and speed up screen drawing time, clear the *Show background layers* check box.

Coverage logging


The coverage polygons are drawn over the top of point, line and area features and the field boundary. To view features recorded while logging, and also speed up screen drawing time, clear the *Show coverage logging* check box.

If this check box is clear when logging is on, the dot-trail turns green and a small block of green is displayed behind the vehicle icon.

Maximum scale when map field

If the vertical height displayed on the AgGPS 170 Field Computer is greater than the maximum scale value when you start mapping a field, the software automatically zooms to the maximum scale. You can then manually zoom to adjust the scale if necessary. If the distance displayed on the AgGPS 170 Field Computer is less than or equal to the maximum scale value, no zoom occurs.

Swathing / Feature softkeys

By default, swathing, feature, or waypoint softkey buttons on the graphics screens are displayed permanently. To display the softkey buttons for five seconds after the  key is pressed and then have them hidden, select the *Hide after 5 seconds* option.



Map orientation

For all patterns except Spiral (provided there is no prescription loaded) the map screens can be rotated so that the vertical axis displays:

- North – South with North at the top
- The direction of the A-B Line with Point B at the top

By default, the map screens are displayed with North at the top.

To set the orientation to follow the A-B Line:

1. Press  until you get to the *Map Orientation* group.
2. Press ▼ or ▲ to select the *Line Up* option.
3. Press  to save the setup.

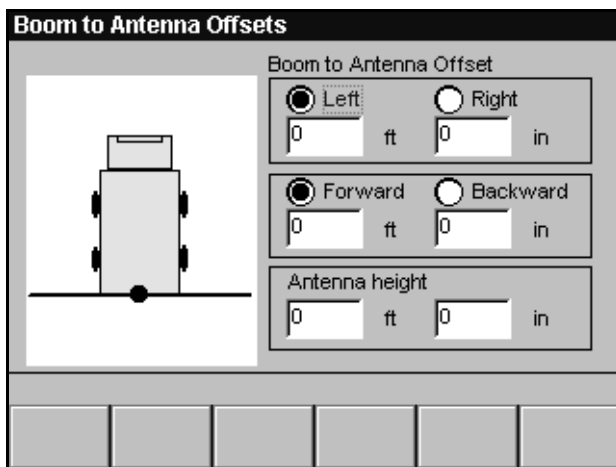


Tip – For Curve patterns, the Line Up orientation is relative to a straight line between Point A and Point B. For Spiral patterns, orientation is always North up. When a prescription file is loaded, the *Line Up* option is unavailable.

Boom to Antenna Offsets

The GPS positions displayed on the lightbar and Information Screens are at the center of the boom. If the GPS antenna is not mounted above the center of the boom, you need to set boom to antenna offsets.

From the *Setup* menu, choose *Boom to Antenna Offsets*. The *Boom to Antenna Offsets* dialog appears, as shown below:



To set the antenna offsets:

1. Press **NEXT** to step between the offset options.
2. Use ▼ and ▲ to change Left to Right, Forward to Backward, or enter an offset distance. A dark blue dot on the simple diagram at the left of the dialog, flashes to show the relative direction of the antenna with respect to the center of the boom.

The antenna height is the height above ground.

3. Press **ENTER** to save the setup.

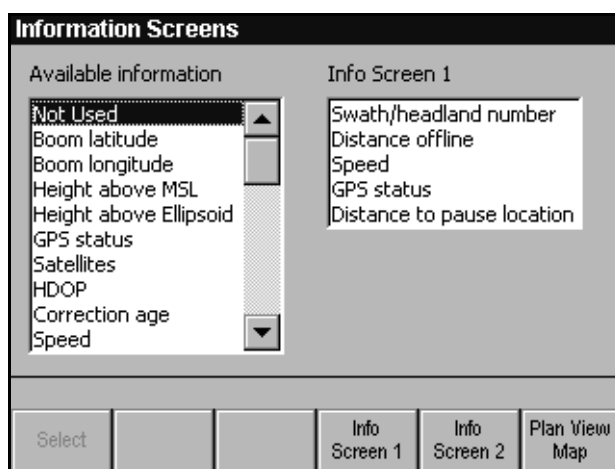


Tip – Trimble recommends that you mount the antenna with a zero left/right offset if possible.

Information Screens

There are two information screens that display up to five pieces of information each. Text information can also be displayed on the Plan View Map.

From the *Setup* menu, choose *Information Screens*. The *Information Screens* dialog appears, as shown below:



The *Available Information* list at the left of the screen displays all of the items that can be selected for display.

The items already selected for display are shown in the list at the right of the screen. By default, this displays the *Information Screen 1* items.

To remove an item from an *Information Screen* or the *Plan View Map*:

1. Press **Info Screen 1**, **Info Screen 2**, or **Plan View Map** to display the appropriate list.
2. Press **NEXT**.
3. Use **▼** or **▲** to highlight the item to be removed.
4. Press **Remove**. (Softkey 1 changes from **Select** to **Remove** when you are in the *Info Screen 1*, *Info Screen 2*, or *Plan View Map* list.)

To add an item to an *Information Screen* or the *Plan View Map*:






1. Press , , or  to display the appropriate list.
2. Use ▼ or ▲ to highlight the item to be added.
3. Press .
4. Press  to save the settings.

Table 4.2 shows the complete list of *Information Screen* options.

Table 4.2 Information screen options

Item	Details
Boom latitude	WGS-84 latitude of the center of the boom.
Boom longitude	WGS-84 longitude of the center of the boom.
Height above MSL	Ground height above mean sea level in ft or m.
Height above Ellipsoid	Ground height above ellipsoid in ft or m.
GPS status	For an explanation of GPS status, see to GPS Status, page 108.
Satellites	Number of satellites.
HDOP	Dilution of precision.
Correction age	Correction age in seconds.
Speed	Speed over ground in MPH, KPH or Knots.
Heading	True north heading.
Swath/headland number	The current swath or headland number. 1 means swath number 1, H2 means headland number 2.
Total time	Total time the event has been open.
Field area ¹	Total area of current field.
Productive area	Field area minus unproductive area defined by area features.
Total area ²	Total area applied in the current field event. This includes any material applied outside the field boundary, and takes into account boom sections being turned on or off when you are using a variable rate controller that provides boom section information to the AgGPS 170 Field Computer.
Percent complete ²	Approximate percentage of field area applied.
Area remaining ²	Only displayed for Boundary fields. Unknown if No Boundary field.
Storage remaining	A percentage of the memory capacity remaining on the data card, given current logging options.

Table 4.2 Information screen options (Continued)

Item	Details
Distance offline	Distance offline in US ft or m.
Direction to start	True north bearing from current position to start of swath.
Rel. direction to start	Difference between current heading and start of swath direction.
Distance to start	Direct distance to start of swath in US ft or m.
Distance to end	Direct distance to end of swath in US ft or m.
Line distance to start	Projected distance along the swath to the start of swath in US ft or m.
Line distance to end	Projected distance along the swath to the end of swath in US ft or m.
Distance to feature	Distance to closest point feature or waypoint, in US ft or m.
Direction to feature	Relative bearing from current heading to closest point feature or waypoint.
Distance to pause location	Direct distance to pause location in US ft or m. This value is also displayed on the lightbar.
Target rate	Target rate at the boom position sent to a variable rate controller.
Applied rate (vol/area)	Active channel applied rate received from a variable rate controller.
Last feature code	The feature code of the last feature recorded.
Total samples	The total number of samples taken during this event.
Total swaths	The total number of swaths in the current field.
Applied rate (vol/min)	Applied rate in units of volume per minute. This value is only available for the AgGPS Aerial Flow Controller, Autocal Flow Controller, or Crophawk Flow Meter.
Total volume	Cumulative applied volume of material. This value is only available for the AgGPS Aerial Flow Controller, Autocal Flow Controller, or Crophawk Flow Meter.
Average rate	Average applied rate. This value is only available for the AgGPS Aerial Flow Controller, Autocal Flow Controller, or Crophawk Flow Meter.

¹For multiple polygons loaded as area features, the Field area is the sum of the area features.

²In sampling events, unless you do logging, Total area, Area remaining, and Percent complete are meaningless.

In order to be updated, most items require GGA NMEA messages less than 2 seconds old from your GPS receiver.

Explanation of terms

Figure 4.1 explains the *distance to* terms.

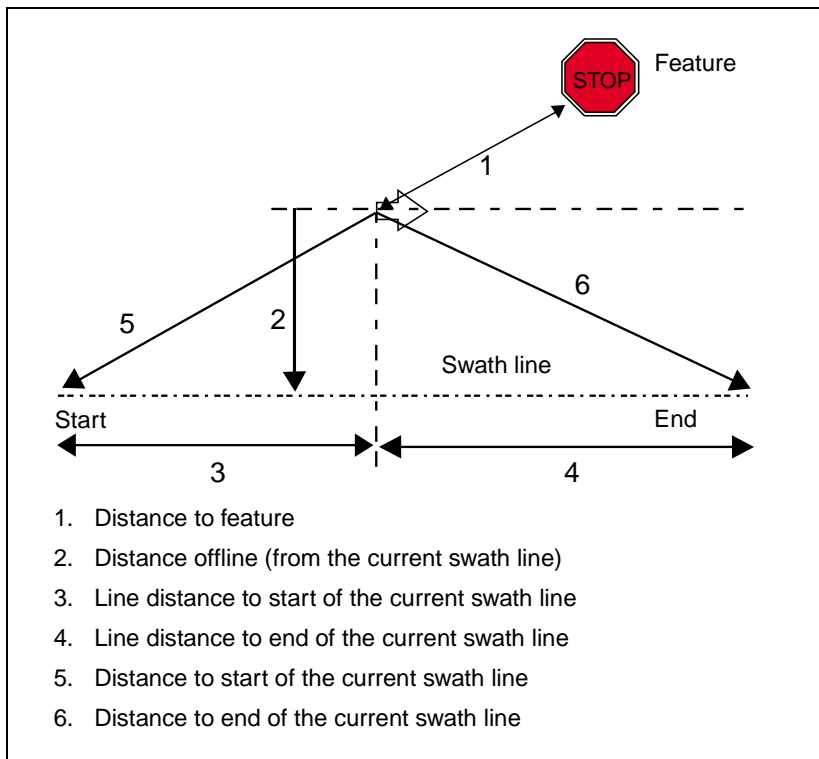


Figure 4.1 Swath distances

Figure 4.2 explains the *direction to* terms.

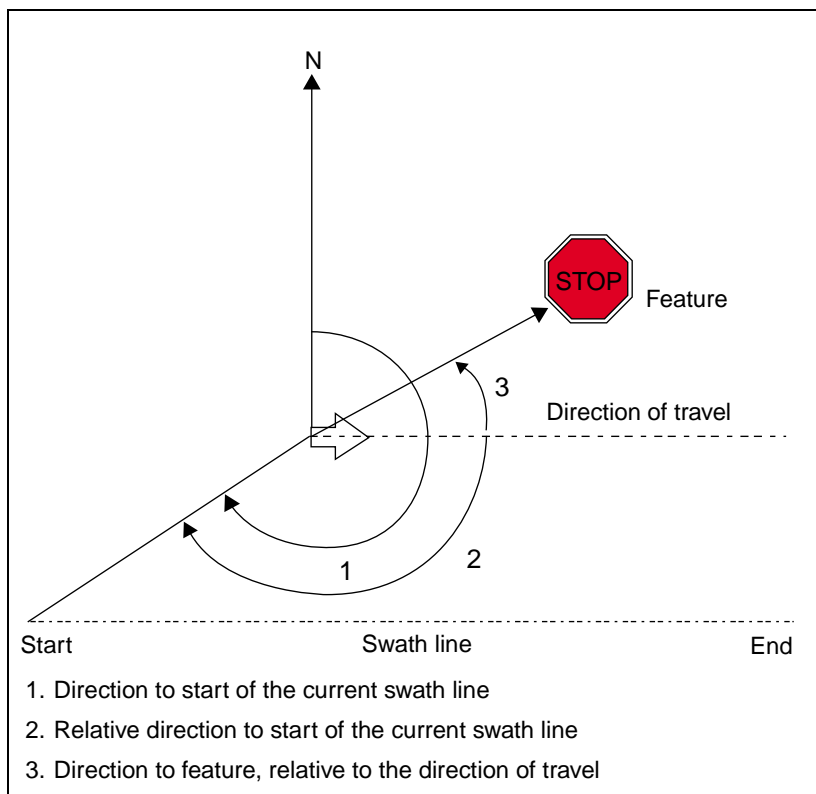


Figure 4.2 Swath directions



Tip – If you have a feature offset, the direction to feature is the relative direction from the offset position to the feature.

External Sounds and Alarms

The AgGPS 170 Field Computer can send alarm messages to an external alarm device.

To configure the alarm outputs, use the *Sounds and Alarms* dialog.

Note – *Internal system alarms and messages, such as GPS status messages, are independent of the external sound and alarms and are not affected by settings in this dialog.*

From the *Setup* menu, choose *Sounds and Alarms*. The *Sounds and Alarms* dialog appears, as shown below:

To enable any of these options:

- Press **NEXT**.
- Press **Select** to select the required check boxes.
- Use the arrow keys to set numeric values.
- Press **ENTER** to save the settings and return to the *Plan View Map*.

Outside the prescription alarm

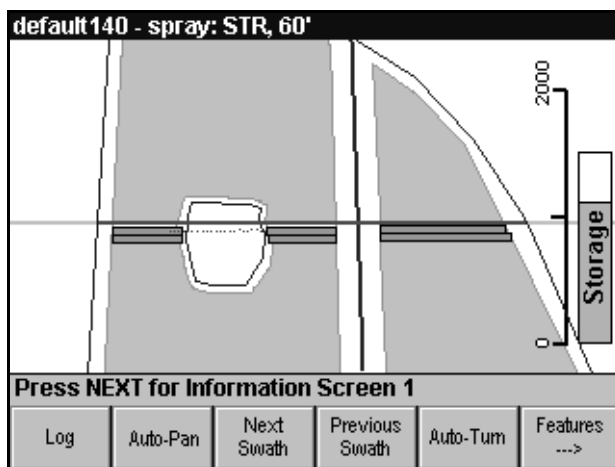
The *Outside the prescription* alarm uses the variable rate controller lead time to predict when you will move outside the area covered by the prescription file.

If the outside the prescription alarm is enabled, an alarm sounds when:

- your variable rate controller is set to *Last rate* or *Default rate* and you go off the prescription.
- you do not have a variable rate controller, and you are logging using a softkey or external switch, when you are outside the prescription.

This alarm uses the prescription grid cells which are accurate to approximately 7.5 ft.

You can create a shapefile containing polygons that define valid spraying areas, and import this shapefile as a prescription. This lets you use the alarm to warn you when you get close to an invalid area. An example of two polygons defining valid spraying areas, imported as a prescription, is shown below:



The left polygon has a hole around a pond, indicating that this area should not be sprayed.

To use this alarm to warn you when you are about to go outside the field boundary:

1. Copy the boundary shapefile to the \AgGPS170 Prescriptions\ directory.
2. Load the boundary file as a prescription.
3. Select a column containing a single positive value as the rate column to ensure the prescription is shown on the map.

***Note** – If you select a column containing different values, the prescription will be displayed with multiple colors.*

Alarm Outputs

The Past end of swath, Too far offline, and Off-prescription alarms only sound while you are logging.

When key beeps are enabled, a beep occurs when a key on the front panel keypad or the external keypad is pressed.

Table 4.3 lists the alarm output sequences for the different types of alarm.

Table 4.3 Alarm output sequences

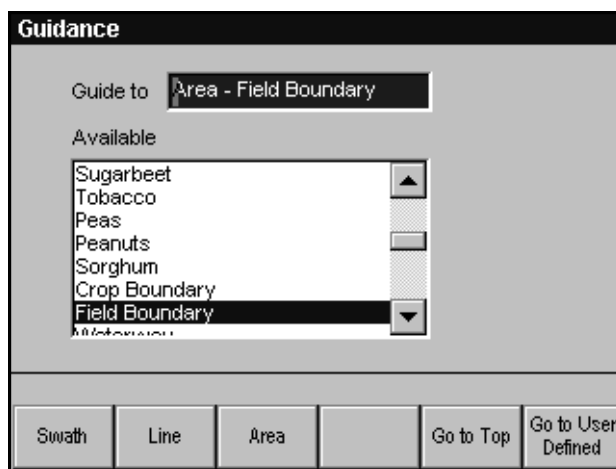
Alarm condition	Alarm sequence
No GPS	short – long
GPS accuracy reduced	long – short – short – short
Past end of swath	long – short – long – short
Too far offline - left	one short beep per second
Too far offline - right	two short beeps per second
Key beep	short
Within limit of point feature	short – short – long – short
Off-prescription	continuous short beeps

Guidance

The AgGPS 170 Field Computer provides guidance to swaths, line features, or the perimeter of area features. Line and area feature guidance is to a single selected line or area type.

You can only get guidance to line and area features mapped by the AgGPS 170 Field Computer, or imported from the \AgGPS170 Field Layers\ directory. You cannot get guidance to global background layers saved in the \AgGPS170 Layers\ directory and selected from the *Background Layers* dialog. For more information, see Loading Background Layers, page 265.

From the *Setup* menu, choose *Guidance*. The *Guidance* dialog appears, as shown below:



To select swath guidance, press .

To select line or area guidance:

1. Press or .
2. Use ▼ and ▲ to select the type of feature for guidance. The selected feature appears in the *Guide to* box. (The above dialog shows guidance to an **area feature** called field boundary, not to the boundary polygon created when you map a field boundary.)

To go straight to the section of the features file containing your own features, press .

Imported field layers with names that do not match standard or user-defined feature names are imported as GIS Line or GIS Area features. You can select these features for guidance by choosing GIS Line or GIS Area in the *Guidance* dialog.

To go back to the top of the file, press .

3. Press to save the settings.

Note – You can also navigate to point features using the *Distance to feature*, and *Direction to feature* text information options displayed on an information screen. These give the distance and direction to the **closest point feature**.

Logging

From the *Setup* menu, choose *Logging*. The *Logging* dialog appears, as shown below:

Logging

☒ Logging sets A/B/C points

☐ Shorten swath when log off early

Shorten swath limit ft

☐ Edit event attributes when closing field



Enable to allow the log key to set A/B/C points

Select

Logging sets A/B/C points

If you log application coverage while you map a field, by default the AgGPS 170 Field Computer sets A, B, and C points when you start and stop logging.

To stop A, B, and C points being automatically set by logging:

1. Press  to clear the *Logging sets A/B/C points* check box.
2. Press  to save the settings.





Shorten Swath

For all patterns except Curve and Spiral, you can set the software to shorten the current swath if you log off before the end of the swath. If you log off when the distance to the end of the swath is greater than the *Shorten swath limit*:

- The current swath is shortened to include only the portion of the swath that was not logged.

- The lightbar approach LED indicates your approach to the start and end of the shortened swath.


To set the software to shorten the current swath if you log off early:

1. Press  to step to the *Shorten swath when log off early* check box.
Press  to select the check box.
2. Press  to step to the *Shorten swath limit* field.
Use ▲ and ▼ to enter the minimum end of swath distance at which shortening will occur.
3. Press  to save the settings.

Swath shortening only occurs:

- as long as the field remains open. If you close and reselect a field, the swaths are regenerated and you have to manually navigate back to the log off point using the coverage logging for guidance.
- if you log off less than half a swath width offline from the current swath.




Tip – If you do not want to log the shortened swath, press  to select the next full length swath.

Edit event attributes

By default, you do not edit event attributes after you start an event.

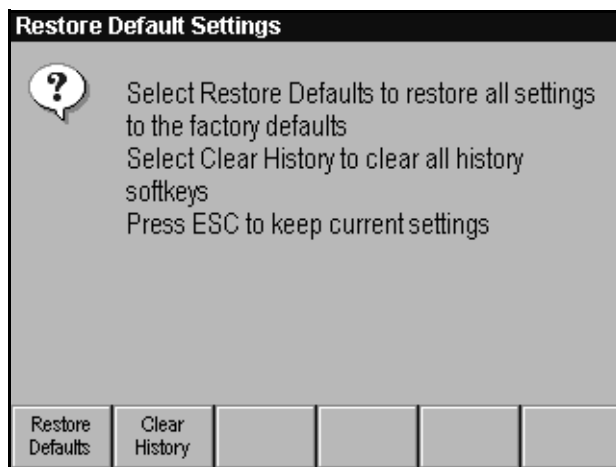
If you want to edit your event attributes when you close a field:

1. Select the *Edit event attributes when closing field* check box.
2. Press  to save the settings.

When this check box is selected, the *Edit Event Attribute* dialog and any data dictionary dialogs appear when you close a field.

Default Settings

To reset parameters, from the *Setup* menu, choose *Restore Default Settings*. The *Restore Default Settings* dialog appears, as shown below:




To restore *all* parameters to the system defaults shown in Table 4.4, press .

Table 4.4 **System default settings**

Dialog	Parameter	Default setting
Select Field	Selection radius Radius value	off 10 miles
Swath Pattern	Boundary No Boundary Headlands Skips Pattern Direction	straight straight 2 2 Auto
Swath Width	Swath Width Application Width Expand boundary by half a swath Access paths	60 ft 60 ft on off

Table 4.4 System default settings (Continued)

Dialog	Parameter	Default setting	
Features	Selected Features	Gate [P], Hole [P], Variety A [P], Tile [P], Hazard [P], Fence [L], Ditch [L], Stream [L], Highway [L], Pond [A], Rocks [A], Clover [A], Alfalfa [A], Weed1 [A], Weed2 [A], Broadleaf weed [A]	
	Prompt for a code	off	
	Feature Offset	0 ft (Left)	
	Extended feature files	on	
Units	Units	US	
	Speed units	m.p.h.	
	Automatically select time zone	on	
Map Display Options	Show storage	on	
	Show scale bar	on	
	Show title bar	on	
	Show background layers	on	
	Show coverage logging	on	
	Show tips	on	
	Maximum scale when mapping	2000 ft	
	Swathing / Feature Softkeys	Always show	
Map Orientation	North Up		
Boom to Antenna Offsets	All offsets (left, right, forward, back)	0	
	Antenna height	0	
Information Screens	Selected Information	Info Screen 1	Swath/Headland number
			Distance offline
			Speed
			GPS status
			Distance to pause location
	Info Screen 2		Field area
			Total area
			Percent complete
			Distance to feature
			Direction to feature
	Plan View Map		Target Rate
			Applied Rate (vol/area)

Table 4.4 System default settings (Continued)

Dialog	Parameter	Default setting
Sounds and Alarms	Key beep	on
	Outside prescription	on
	All other alarms	off
	Point Feature limit	30 ft
	Offline limit	30 ft
Logging	Logging sets A/B/C points	on
	Shorten swath when log off early	off
	Shorten swath limit	60 ft
GPS	Type	AgGPS NMEA
	Warning HDOP	2
	Warning Correction Age	15 sec
	Track logging interval	0
	3D SHP	off
	Use low accuracy positions	off
	Auto Drive	off
Training Location	Latitude	0.00
	Longitude	0.00
Lightbar	Inner LED spacing	2 ft
	End LED distance	56 ft
	BrightnessText	15
	LED	15
	Look Ahead time	3.0 sec
	LED Mode	Chase lights
	Mount upside down	off
	Use turn indicator LEDs	off
Lightbar Text	AgGPS 23 Needle	Heading Guidance
	Left text	swath number
	Right text	distance offline
	Long text	distance offline
Lightbar Approach LED Interval	Text display option	2 text items
	Approach LED Interval option	Time
	Time Interval	1.0 sec
	Distance Interval	30 ft

Table 4.4 System default settings (Continued)

Dialog	Parameter	Default setting
External Keypad	Input 5	Enter
	Shift Input 5	New Field (Boundary)
	Input 6	Toggle Log
	Shift Input 6	New Field (No Boundary)
Variable Rate Controller	Use a variable rate controller	off
	Default Rate	0
	Log Interval	0
	Active Channel	1 for MidTech and Teejet, 0 for all other controllers
	Lead Time	3.0 seconds
	Last/Default/Zero Rate	Last rate
Barcode-Sensor Input	Port	Not Used
	Baud rate	9600
	Parity	none
	Data bits	8
	Stop bits	1
	Hardware handshaking	off
	Prefix	none
	Suffix	carriage return, line feed
	Save as point feature	on
	Save to ASCII file	off
	Log Interval	0
Remote Output	Enable	When inside prescription
	Lead Time	3.0 sec
	Left/right distance limit	2 ft
	Output duration	100 ms
	Snap-to-Swath	off ¹
	Auto-Turn	off

¹Curve pattern turns Snap-to-Swath on.

Note – Auto-Pan defaults to “on” every time you start the software.




Warning – Only reset the system to the factory defaults as a last resort. It resets all defaults so you have to go through the full configuration process again.

History softkeys

Some history softkeys in the *New Field* dialog have default settings as shown in Table 4.5. These are provided to save you time when entering data. The software gradually replaces these softkey defaults one at a time when you enter your own data entries.

Table 4.5 History softkey defaults

History softkeys	Default setting
Client Name	client1 – client6
Farm Name	farm1 – farm6
Event Name	sampling plant spray spread cultivate disk minimum till
Material	lime urea nitrogen fertilizer herbicide insecticide fungicide
Crop	corn wheat barley oats soybeans alfalfa



To clear all history associated with the softkeys including the default history names, press  from the *Restore Default Settings* dialog.

Note – If you have history names specified in an *AgGPS_Names.txt* file saved on the data card, these are reloaded onto the softkeys.

Default field names

The AgGPS 170 Field Computer displays defaults for the *Client Name*, *Farm Name*, *Field Name*, and *Event* fields when you select either of the *New Field* dialogs. Use these defaults if you do not want to provide your own names for each event.

To use AgGPS 170 Field Computer default names:

1. From the *Field* menu, select the *New Field (Boundary)* or *New Field (No Boundary)*.
2. Do one of the following:
 - Press  without entering any data to use all defaults.
 - Press  to accept the default name provided in a field, and use the arrow keys or softkeys to change the information in other fields.

The AgGPS 170 Field Computer automatically names the event, as shown below:

Field	Default
Client Name	The last client name used (from Softkey 1)
Farm Name	The last farm name used (from Softkey 1)
Field Name	The first time you use this feature the field is called <i>default1</i> . Subsequent default field names are <i>default2</i> , <i>default3</i> , and so on.
Event	The last event name used (from Softkey 1 or 2)



Warning – Do not use the word *default* when entering your own field names.

Equipment Menu

Use the *Equipment* menu to configure the AgGPS 170 Field Computer to work with the other equipment installed on your vehicle.

GPS

To select the type of NMEA messages supplied by your GPS receiver, from the *Equipment* menu, choose *GPS*. The *GPS* dialog appears, as shown below:

The *Type* field indicates the data format in which the GPS position data is supplied. External positions can come from any equipment that outputs NMEA GGA and ZDA messages in RS-232 format. This includes the Trimble AgGPS 114, AgGPS 124, and AgGPS 132 receivers. It also includes the Trimble AgGPS 214 high accuracy receiver.

Note – The NMEA GKG option has been removed from version 3.00. GGA messages from AgGPS 214 version 1.70 firmware contain extra RTK status messages. If you are using older firmware in your receiver, you should upgrade to the latest version. Current NMEA GKG settings will be treated as NMEA GGA/ZDA.

Trimble recommends that you do the following:



- Use AgGPS NMEA with Trimble AgGPS receivers. This automatically configures the AgGPS receiver outputs and enables 5 Hz update rate. For more information, refer to Using AgGPS NMEA in Appendix B of the *AgGPS 170 Field Computer Reference Manual*.
- Use NMEA GGA / ZDA for the AgGPS 214 and other receivers.

Configuring the NMEA baud rate

When AgGPS NMEA is selected, the AgGPS 170 Field Computer automatically uses NMEA messages at 38400 baud.

When NMEA GGA/ZDA is selected the baud rate defaults to 38400 baud, but can be changed if required.

To set the baud rate:

1. Use ▼ or ▲ to set the NMEA type to NMEA GGA/ZDA.
2. Press .
3. Use ▼ or ▲ to set the baud rate.
4. Press .

The data format must be 8 data bits, no parity, 1 stop bit.

Using NMEA VTG messages

The AgGPS 170 Field Computer has two methods for calculating speed and heading:

- The NMEA VTG message contains speed and heading values which are fairly accurate as long as the speed is greater than about 1 mph. If VTG is available from the GPS receiver, this is used.
- If VTG messages are not available (or are more than 1.5 seconds old), speed and heading is calculated from the position data in the GGA message.

Using AgGPS NMEA, the AgGPS 170 Field Computer configures an AgGPS receiver to output NMEA GGA, ZDA, and VTG messages in RS-232 format, at 38400 baud, 8 data bits, no parity, and 1 stop bit.

Note – *For an AgGPS receiver running software earlier than version 1.3, the automatic configuration does not set the NMEA output. You need to do this manually from the receiver front panel.*

If you use NMEA GGA/ZDA, you need to set the NMEA outputs manually from the receiver front panel.

For information on GPS Status, see page 108.

When the *Training* option is selected, no GPS input is required. The vehicle is controlled using the arrow keys.

For information on Training mode and controlling the vehicle using the arrow keys, refer to Exercise 1 – Familiarization in Chapter 3 of the *AgGPS 170 Field Computer Reference Manual*.

Warnings

When the AgGPS 170 is switched on, it checks for valid incoming NMEA messages at the default baud rate:

- If valid data is not detected, a message asks you to connect a GPS receiver.
- If valid data is detected but there is no date information, a message asks you to enable NMEA ZDA message output on your GPS receiver.

Warning HDOP and warning correction age


Accurate GPS positions require a low Dilution of Precision (DOP) and recent DGPS correction signals. Consider the following:

- HDOP values above 2 give significantly reduced accuracy.
- Because NMEA GGA messages contain HDOP, the Warning HDOP default value is set to 2.

Set the minimum acceptable limits in this screen.

When the limits are exceeded, a warning (flashing screen) is given and the GPS status displayed and recorded in the track file drops from high accuracy to low accuracy. Low accuracy positions result in a time-out indication on the lightbar, and Not Available is displayed on the screen for position related information items.




If you do not require submeter accuracy, you can continue working with low accuracy positions by selecting *Use low accuracy positions for guidance and logging*. The warning still flashes as soon as the limit is exceeded, but everything else (lightbar guidance, coverage polygons, track logging) works normally.

More advanced GPS configuration can be done by pressing  or done on the GPS front panel keyboard, with TSIP Talker™, or Remote Controller utilities running on a laptop and interfaced to the GPS receiver.



Warning – Settings on the GPS receiver that are more stringent than the AgGPS 170 settings can affect the performance. For example, if the GPS receiver has a HDOP mask of 1 and the AgGPS 170 Field Computer has an HDOP mask of 2, when the HDOP goes above 1, positions will not be output from the receiver to the AgGPS 170 system without a high HDOP warning being displayed.

Auto drive

Auto drive is a demonstration feature, and is only available in Training mode. It simulates guidance up and down the same swath. For good performance, do not use very short swaths. To change swaths, press  or . Use the  softkey, or the external keypad or button inputs, or external spray switches to control logging.

To enable Auto drive, select the *Auto drive* check box.

Track logging

Coverage logging records application or field treatment areas as polygons with GPS quality stored with each polygon. To record more information, such as heights (elevations) for use in contour maps, you need to enable track logging.

AgGPS ViewTrack can replay track files and generate a summary report. You must enable track logging at a 1 second interval for many USDA contracts including the Boll Weevil program.

The AgGPS 170 Field Computer can record track logging data in 2D or 3D shapefile formats:

- 2D shapefiles contain x and y (latitude and longitude) values only, and are supported by most GIS packages.
- 3D shapefiles contain x, y, and z (latitude, longitude, and height) values, and are required if you want to replay track files using ArcView Tracking Analyst.

Track logging is also useful for recording information that could help Trimble Support or your Trimble dealer to identify problems.

You can record track logging *either* by time *or* by distance traveled. If you choose to record track points by distance traveled, you can also manually add track logging points.

Note – *The AgGPS 170 Field Computer never records more than one point per second.*

If the *Track logging interval* is set to zero seconds **and** zero feet or meters, track logging is disabled.

To enable track logging by time:

1. Select the *Track logging interval* time field.
2. Enter a *Track logging interval* (in seconds).



Tip – If you plan to replay your track file, Trimble recommends that you record points at 1 second intervals to make sure that coverage logging is replayed accurately.


To enable track logging by distance:

1. Select the *Track logging interval* distance field.
2. Enter a *Track logging interval* (in ft or m).

To enable 3D logging, select the *3D SHP* check box.



Tip – Many GIS packages do not support 3D shapefiles. Unless you plan you replay your track files in ArcView Tracking Analyst, Trimble recommends that you record your track data in 2D shapefile format.


To manually record track logging points while driving around a field, press  from the *Plan View Map* when you are over the point you want to record.

At each track logging point a number of attributes are recorded. For a list of these attributes, refer to Track logging data in Chapter 4 of the *AgGPS 170 Field Computer Reference Manual*.

AgRemote


If AgGPS NMEA is selected, you can configure your AgGPS 114, AgGPS 124 or AgGPS 132 receiver, or view status information, using the AgRemote interface on the AgGPS 170 Field Computer.

To configure your receiver or view status information:

1. Press . A representation of the AgGPS 132 front panel is displayed on the AgGPS 170 Field Computer, as shown below:



2. Press Softkeys 1 to 5 to activate the buttons on the AgRemote interface.

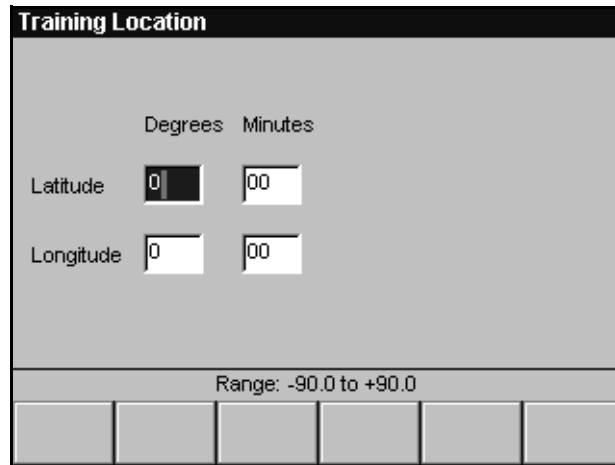
The  button on the AgRemote interface takes you back one level in the screen hierarchy.

Note – On the AgGPS 170 Field Computer, you cannot scroll through differential options by holding down . You can on the AgRemote PC software.

For more information on configuring your receiver, refer to the configuration chapter in your receiver manual.

Training Location

In Training mode the location of the field can be specified. From the *Equipment* menu, choose *Training Location*. The *Training Location* dialog appears, as shown below:



The image shows a dialog box titled "Training Location". It has a light gray background. At the top, there are two labels: "Degrees" and "Minutes". Below these, there are two rows of input fields. The first row is for "Latitude" and the second row is for "Longitude". Each row has a small box for the degrees (containing "0") and a larger box for the minutes (containing "00"). At the bottom of the dialog, there is a label "Range: -90.0 to +90.0" and a row of six small, empty rectangular buttons.

To set the location, enter the desired latitude and longitude using the arrow keys.

Defaults

When Training mode is activated, the default position is set as follows:

- If there is no incoming GPS signal and there is no field selected, the training location position is set to (0, 0).
- If there is no incoming GPS signal but there is a field selected, the training location position is set to the center of the field.
- If there is a non-zero lat/long position, this is the current position.

Lightbar

From the *Equipment* menu, choose *Lightbar*. The *Lightbar* dialog appears, as shown below:

Lightbar

Inner LED spacing: 2 ft 0 in

End LED distance: 34 ft

Brightness: Text 15 LED 15

Look Ahead time: 3.0 sec

LED Mode:

- ☒ Chase lights
- ☐ Center lights

AgGPS23 Needle: Heading Guidance

☐ Mount upside down ☐ Use turn indicator LEDs

Inner LED spacing

Use this field to set the offline distance interval covered by a single LED in the center section of the lightbar.





The *Inner LED spacing* fields refer to the 10 LEDs either side of the center.

End LED distance

Use this field to set the coarse guidance interval for use during turns. The outer seven LEDs are evenly spaced between the tenth inner LED and the end LED value.

The outer LED spacings cannot be set to less than the inner LED spacings. Therefore, the *End LED distance* field will not accept numbers less than 17 times the *Inner LED spacing* field.

Brightness

Use the *Text* field to alter the maximum intensity of the text display on the lightbar. Similarly, use the *LED* field to alter the maximum intensity of the LEDs on the lightbar. For each, select a value between 1 (lowest intensity) and 15. Brightness can be altered up to this value using  +  and  + .

Look ahead time




The look ahead time enables the AgGPS 170 Field Computer to predict a future position, based on the current velocity and heading. This provides smoother guidance. Use this field to set the look ahead time in seconds.

LED mode

To make the illuminated LEDs show where the vehicle is in relation to the swath line, select *Center lights*.

To make the illuminated LEDs show where the swath line is in relation to the vehicle, select *Chase lights*.

AgGPS 23 needle options

If you are using an AgGPS 23 external lightbar, you can choose what the needle shows. You can select either , , or .

Heading guidance directs you online and heading in same direction as the current swath. In contrast, heading error only directs you to head in the same direction as the current swath.

Heading guidance shows you the angle you have to turn to get to a target point on the current swath. The target point is calculated using your current speed and look-ahead time.

For best results with heading guidance, Trimble recommends that you:

- follow the needle in turns, and use the offline LEDs when you are close to the current swath
- manually increment to the next swath as soon as you log off to get heading guidance sooner than you would if you had Snap-to-Swath selected

Heading error shows you the angle you have to turn to travel in the same direction as the swath. For example, if you are travelling in the same direction as the swath but are offline, the heading error is 0 degrees and the needle points straight up. Unless you have previously used heading error, Trimble recommends that you use the heading guidance option.

Figure 4.3 shows the difference between heading guidance and heading error.

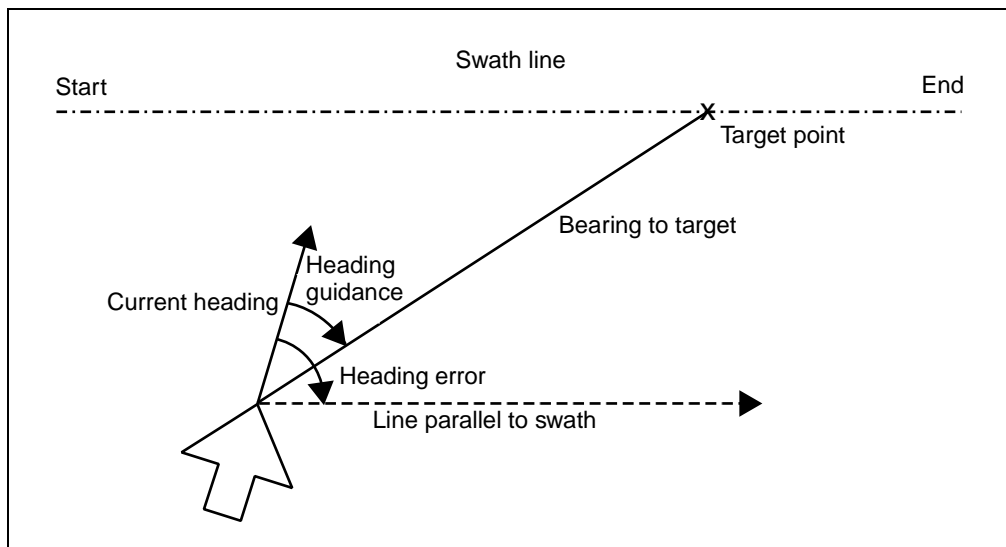


Figure 4.3 Heading guidance and heading error

Direction to feature shows you the direction you have to turn to drive straight towards the closest point feature. Figure 4.4 shows direction to feature.

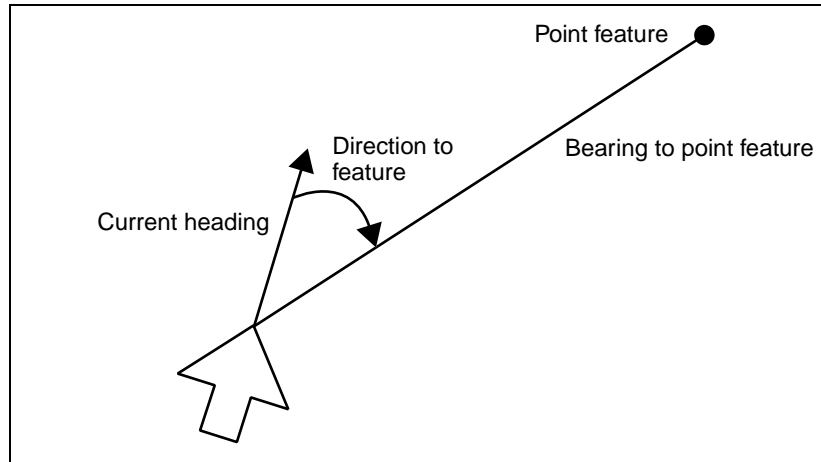


Figure 4.4 Direction to feature

Mounting position

The lightbar is usually positioned on top of the dashboard in front of the driver in an upright position.

The lightbar can also be installed upside down (for example, suspended from the roof of the vehicle), but the text must be inverted. To do this, select the *Mount upside down* check box.

Use turn indicator LEDs

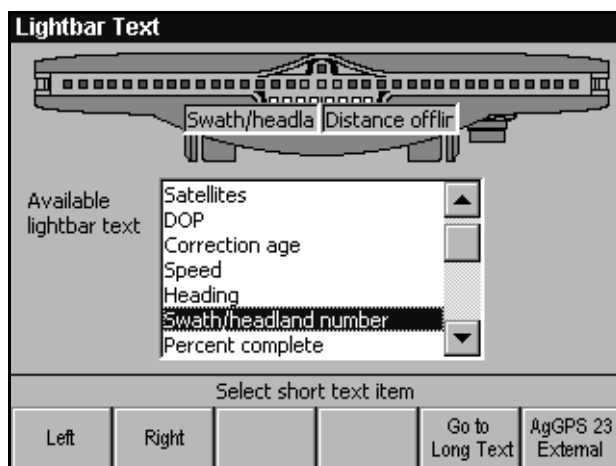
Select this option to provide advance warning of turns by lighting the end LEDs.

For more information on using the lightbar, see *Working with the Lightbar*, page 34.

Lightbar Text

Use the *Lightbar Text* dialog to choose the information to be displayed on the lightbar.

From the *Equipment* menu, choose *Lightbar Text*. The *Lightbar Text* dialog appears, as shown below:



AgGPS 21 internal lightbar text

To select two short text items to be displayed on the AgGPS 21 internal lightbar:

1. Press **AgGPS21 Internal** if this softkey is displayed.
2. Use ▼ and ▲ arrow keys to highlight the desired option in the list of *Available lightbar text*.
3. Press **Left** to place the currently highlighted option in the left box in the lightbar picture.
4. Press **Right** to place the currently highlighted option in the right box in the lightbar picture.
5. To change the option displayed in either text box, select a new option and press **Left** or **Right**.

To select one long text item to be displayed on the AgGPS 21 internal lightbar:

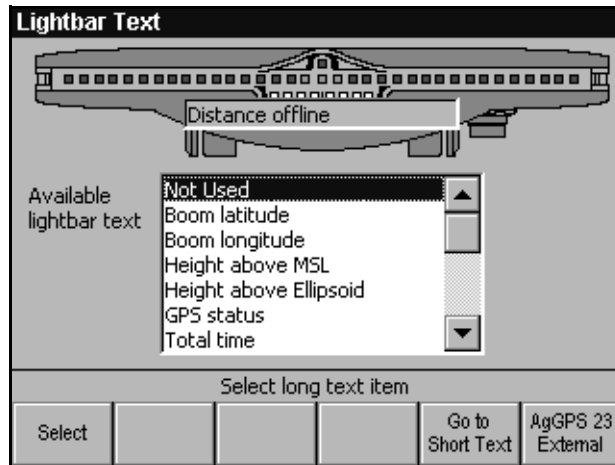
1. Press **Go to Long Text** if this softkey is displayed.

Left changes to **Select**.

Right disappears.

The lightbar display changes to one text box.


The list of options changes to options that will display more than four characters, as shown below:

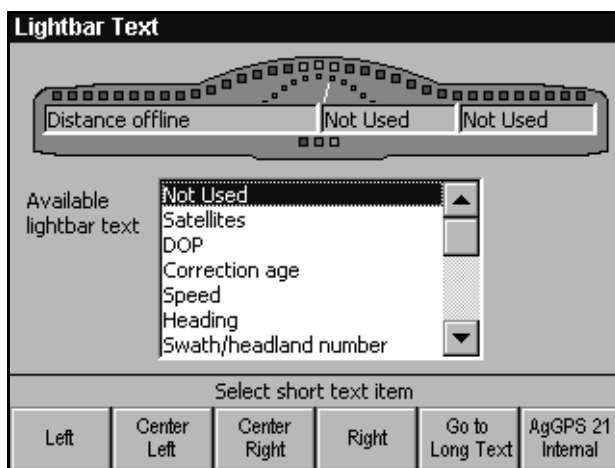


2. Use **▼** and **▲** arrow keys to highlight the desired text option in the list of *Available lightbar text*.
3. Press **Select** to place the currently highlighted text option in the lightbar picture.
4. To change the lightbar text, select a new option and press **Select**.
5. Press **ENTER** to save the changes.


AgGPS 23 external lightbar text

The AgGPS 23 external lightbar can display either two long text items (eight characters), four short text items (four characters), or a combination of short and long text items.


To configure lightbar text for the AgGPS 23 external lightbar, press . The *Lightbar Text* dialog changes, as shown below:




To select short text items to be displayed on the lightbar:

1. Press  if it is displayed.

Note – Any selected short or long text items are displayed until you select another item to replace it.

2. Use ▼ and ▲ arrow keys to highlight the desired option in the list of *Available lightbar text*.
3. Press  to place the currently highlighted parameter in the left position of the lightbar.

Note – If there is currently one long text item selected, the long text box changes to two short text boxes.

4. Press  to place the currently highlighted parameter in the center left position of the lightbar.

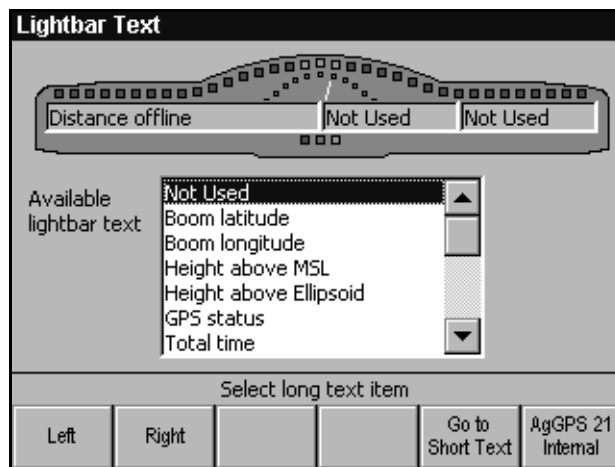
5. Press to place the currently highlighted parameter in the center right position of the lightbar.
6. Press to place the currently highlighted parameter in the right position of the lightbar.
7. To change the parameter displayed in any position, select a new option and press , , , or .

Note – If only one short text item is selected on one side of the lightbar, it is centered.

To select long text items to be displayed on the lightbar:

1. Press if it is displayed.

The list of options changes to options that will display more than four characters, as shown below:



Note – Any selected short or long text items are displayed until you select another item to replace it.

2. Use ▼ and ▲ arrow keys to highlight the desired option in the list of *Available lightbar text*.
3. Press to place the currently highlighted option in the left half of the lightbar.

4. Press **Right** to place the currently highlighted option in the right half of the lightbar.

***Note** – If there are currently two short items selected, the two short text boxes are replaced by a single long text box.*

5. To change the parameter displayed in either position, select a new option and press **Left** or **Right**.

For information on the list of options, see *Lightbar Text*, page 43.

Lightbar Approach LED Interval

You can configure the sensitivity of the approach LED on the lightbar based on either time or distance. Use the *Lightbar Approach LED Interval* dialog to calibrate the approach LED interval.

From the *Equipment* menu, choose *Approach LED Interval*. The *Lightbar Approach LED Interval* dialog appears, as shown below:

Lightbar Approach LED Interval

Approach Led Interval


☒ Time

☐ Distance

Time Interval sec

Distance Interval ft in

To configure the sensitivity of the approach LED:

1. Use the arrow keys to select *Time* or *Distance*.
2. Press  .
3. Use the arrow keys to set the *Time* or *Distance* value.



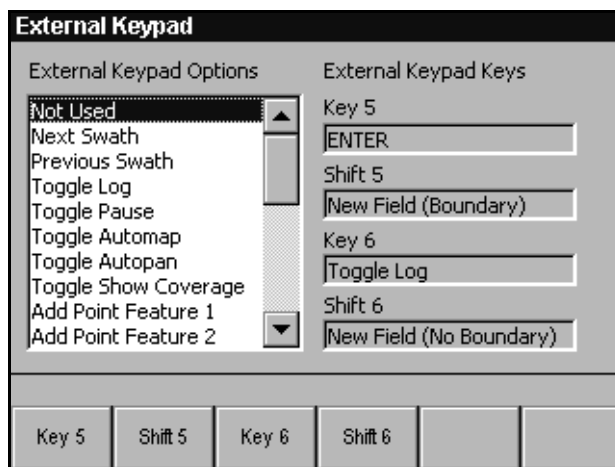
Warning – Unless you drive at a reasonably constant speed, setting the *Approach LED Interval* based on time could lead to unpredictable results. If you slow down as soon as the LED changes color, the look ahead distance is recalculated. This could cause the LED to turn back to the previous color.

External Keypad

If the front panel switches which are used to control the AgGPS 170 Field Computer are difficult to access or out of reach, the external keypad can perform many common functions. Each button (except Button 2—the Shift key) has two functions. Buttons 1 to 4 are predefined.

Note – *A lightbar must be connected before you can operate the external keypad.*

To configure functions on Buttons 5 and 6 on the external keypad, from the *Equipment* menu choose *External Keypad*. The *External Keypad* dialog appears, as shown below:



To configure the external keypad to perform a specific function:

1. Use ▼ and ▲ arrow keys to highlight the desired option in the list of *External Keypad Options*.
2. Press the appropriate softkey to assign the currently highlighted function to the external keypad button.

For more information on the external keypad, see *Working with the External Keypad*, page 46.

Variable Rate Controller

The work order should contain the information required to configure your variable rate controller. If you need to configure your variable rate controller manually, use the *Variable Rate Controller* dialog.

From the *Equipment* menu, choose *Variable Rate Controller*. The *Variable Rate Controller* dialog appears, as shown below:

Variable Rate Controller

☒ Use a variable rate controller

Selected controller **Rawson 6 2/3%**

Default rate **250** Lead time **3.0** sec

Active channel **1** Log interval **0.0** sec

If there is no GPS, or you go off the prescription use

☒ Last rate

☐ Default rate

☐ Zero rate

Choose a controller using the softkeys

Rawson: 2%	Raven	MID-TECH	DICKY- john: L	T Jet 844 SI Units	
---------------	-------	----------	-------------------	-----------------------	--

You can change settings in this dialog while a field is open.

Note – If you have manually configured the controller, and a work order containing any controller information is loaded, a warning message is displayed.

To manually configure your controller:

1. Press **Select** to select the *Use a variable rate controller* check box.
2. Press **NEXT** to step between fields.
3. Select your controller using the softkeys.

In the selected controller field:

- The Rawson softkey steps through the Rawson controller step size options. Press the softkey more than once to step through the options.
- The DICKY-john softkey steps through the Liquid, Granular, or Anhydrous options. To step through the options, keep pressing the softkey.

- The TeeJet softkey steps through the 844 and 855 unit setting options. To move through the options, keep pressing the softkey.
- 4. Use ▼ and ▲ arrow keys to:
 - a. Set the default rate.
 - b. Set the lead time.
 - c. Specify your active channel.

For more information, refer to Specifying the active channel in Chapter 5 of the *AgGPS 170 Field Computer Reference Manual*.
 - d. Set the log interval.
 - e. Select the rate—Last, Default, or Zero— to be used when GPS quality is reduced, or when the vehicle moves outside the area covered by a prescription.

Default rate

The *Default Rate* can be used to apply a constant rate on the field (just varying the output based on the speed of the vehicle).

This can be useful if you:

- do not have a prescription
- drive outside the area covered by the prescription
- lose the GPS signal


For Rawson and New Leader controllers, the default rate must be set to the nominal rate (or Yield).

To use the default rate without a prescription, the controller configuration must be set to manual. When there is no prescription, the AgGPS 170 Field Computer outputs the default rate regardless of whether *Last rate*, *Default rate*, or *Zero rate* is selected.

Last rate

The alternative to using the default rate in these situations is to continue applying the last rate applied before you went outside the area covered by the prescription, or lost GPS signal.

To do this:

1. Press  to step to the *Last rate, Default rate, or Zero rate* options.
2. Use ▼ and ▲ to select *Last rate*.

This option can also be specified from the work order.

Zero rate

The zero rate lets allows you set a non-zero default rate, and still select a zero rate when you are off the prescription.

Raw Serial Data

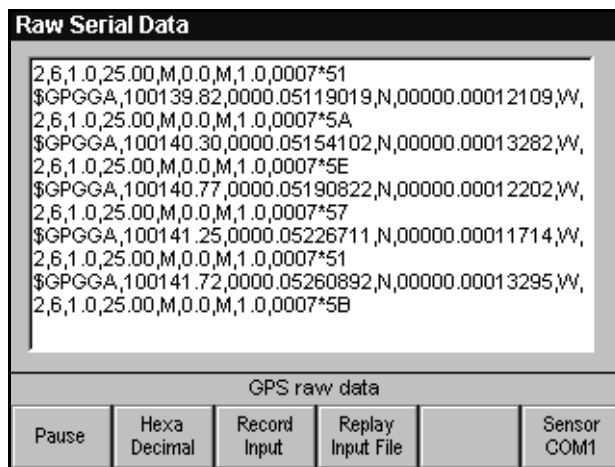
The AgGPS 170 Field Computer system requires an NMEA-0183 (GGA and ZDA) input that carries the GPS information. If the GPS receiver is configured to output VTG messages, these are used for heading and speed calculations.

You should disable all other NMEA messages.

To confirm that the incoming NMEA signal is correct, view the data stream in the *Raw Serial Data* dialog.

If an external sensor (such as a barcode reader) or variable rate controller is connected to COM1 or COM3, you can also use the *Raw Serial Data* dialog to view the incoming data stream.

From the *Equipment* menu, choose *Raw Serial Data*. The *Raw Serial Data* dialog appears, as shown below:



By default, raw NMEA strings are displayed as straight ASCII text:

- To view the data as hexadecimal format, press . (Press to change back to ASCII text.)
- To pause the display of the incoming data, press . (Press to resume the display of incoming data.)
- To view the sensor data, press Softkey 6. The softkey label changes to .
- To view the GPS data again, press the softkey again. The softkey label changes back to .

Note – You should only see NMEA GGA and ZDA, and possibly VTG data. Other NMEA strings (such as RMC) are not used by the AgGPS 170 Field Computer. To improve performance, disable these outputs on your GPS receiver.

Record and replay input files

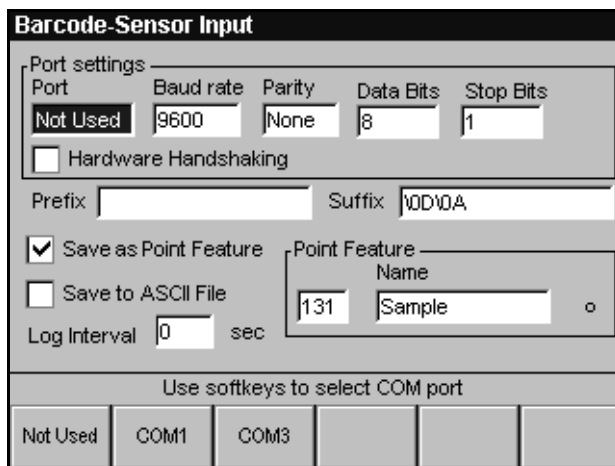
You can use the softkeys on this dialog to record a sequence of inputs or keystrokes to help identify and diagnose problems. For more information, see *Record and Replay Input Files*, page 186.

Barcode–Sensor Input

The AgGPS 170 Field Computer can record RS-232 serial data from a barcode reader, (such as the Symbol LS2104,) or other sensor, (such as a weather sensor,) connected to COM1 or COM3 serial port. In the rest of this section, sensor refers to a barcode reader or any other sensor.

Use the *Barcode–Sensor Input* dialog to configure the port and data parameters, and to select options for saving the sensor data.

From the *Equipment* menu, choose *Barcode–Sensor Input*. The *Barcode–Sensor Input* dialog appears, as shown below:



The **Barcode-Sensor Input** dialog box is shown. It contains the following fields and controls:

- Port settings:**
 - Port:** Not Used
 - Baud rate:** 9600
 - Parity:** None
 - Data Bits:** 8
 - Stop Bits:** 1
 - ☐ Hardware Handshaking
- Prefix:** (empty text field)
- Suffix:** \OD\OA
- ☒ Save as Point Feature
- ☐ Save to ASCII File
- Log Interval:** 0 sec
- Point Feature:**
 - Name:** 131 Sample
- Use softkeys to select COM port:**
 - Not Used
 - COM1
 - COM3
 - (empty)
 - (empty)
 - (empty)

By default the sensor port is set to *Not Used*. Only one sensor can be used at one time. If you allocate COM1 or COM3 to the sensor, the variable rate controller or lightbar is automatically disabled.




Note – *If you assign a sensor to COM3, you must physically disconnect the lightbar to enable the sensor to work.*

When you change the port or any of the port settings, you must turn the AgGPS 170 Field Computer off and back on again, before the changes take effect.

Port settings

You need to specify the serial port that the sensor is connected to, and configure the AgGPS 170 Field Computer serial data format to match the format being received from the sensor.

To configure the AgGPS 170 Field Computer for sensor input:

1. Use a softkey to select the serial port.
2. Press  to step through the data format fields.
3. Use the softkeys to set the data format used by the sensor. For information on the data format used by your sensor, see your sensor manual.
4. If the sensor uses hardware handshaking, press , and then press .

Prefix and suffix

Use the prefix and suffix to determine the sensor data that is decoded and logged. The prefix field is optional, but you must enter a suffix. If you set both values, only data starting and ending with the values specified is saved. Any other data received from the sensor is ignored by the AgGPS 170 Field Computer. The prefix and suffix values are not saved in ASCII text or Features.dbf file.

The prefix and suffix can be in ASCII characters or hexadecimal numbers (of the format \nn where *n* is 00-FF).

By default, the AgGPS 170 Field Computer uses no prefix and sets the suffix to *carriage return, line feed* (ASCII code: \0D\0A). This decodes sensor data values terminated by carriage return, line feed.

For example, if the data stream coming from a GPS receiver is:

- \$GPVTG,0,T,,0.00,N,0.00,N,K*33\0D\0A
\$GPZDA,184830.15,05,11,1996,00,00*66\0D\0A

If you set the prefix to \$GPZDA, and the suffix to \0D\0A, only the ZDA message will be saved, as follows:

- 184830.15,05,11,1996,00,00*66

If you set the prefix to \$GP and the suffix to \0D\0A, the VTG and ZDA messages will both be saved with their message label, as separate entries in the sensor input column in the ASCII file, or as separate point features, as follows:

- VTG,0,T,,0.00,N,0.00,N,K*33
- ZDA,184830.15,05,11,1996,00,00*66

For information on which data is saved to the ASCII file, see Sensor data in Chapter 4 of the *AgGPS 170 Field Computer Reference Manual*.

Saving data to point features or ASCII files


You can save the data to an ASCII <eventname>_SensorData.txt file in the \Event\ directory on the data card. You can also record each sensor value as a point feature saved in Point_<featurename> shapefiles. The feature icon is displayed on the screen. The sensor value, which can be up to 30 characters long, is saved in the code field in the .dbf file. The date and time are also saved.

Note – *Sensor input data is recorded at the feature offset position.*

Sensor data can also be displayed on the *Information Screens*, or viewed on the *Raw Serial Data* screen.

By default, the AgGPS 170 Field Computer uses Point_Sample, but you can select any other type of point feature.

To save the data as point features:

1. Select the *Save as Point Feature* check box.
2. Press .
3. Use the arrow keys to change the point feature type.

To save the data to an ASCII *<eventname>_SensorData.txt* file, select the *Save to ASCII file* check box.

You can also turn the *Save to ASCII file* check box on and off using *Toggle ASCII Log* on the External Keypad. Whenever a COM port is allocated to a sensor, **ASCII Log On** or **ASCII Log Off** is displayed on the *Plan View Map* to show the current logging state.

If neither of these check boxes are selected, sensor data is not logged.



Tip – If you are saving a lot of sensor data, for example every few seconds, Trimble recommends that you only save to an ASCII file. Saving to point features will fill up your data card quickly and slow down the AgGPS 170 Field Computer.


Log interval

The maximum rate that the AgGPS 170 Field Computer saves sensor logging to an ASCII file is 5 Hz, and for point features, 2 Hz. If you save data as both point features and ASCII data, the maximum rate is 2 Hz.

If you set the log interval to zero (this is the default), all sensor data up to the maximum rate is recorded. If you set a log interval other than zero, the last data packet received from the sensor before the log interval expires, is recorded.

If there is no data during the log interval, a **No Data** entry is saved to the ASCII file. Use the arrow keys to set the log interval.

Note – In sampling events, or if you use a barcode reader, the log interval should always be set to zero, so that all samples are recorded.

When you finish configuring sensor settings, press  to save the settings. Shut down the AgGPS 170 Field Computer and restart.

Configuring the Symbol LS2104 barcode scanner

To configure the LS2104 barcode scanner for 9600-8-N-1, no handshaking, Bar Code Number followed by carriage return / line feed, scan the following barcodes in the LS2104 manual (January 2000 Rev B) in the following order:

- SET ALL DEFAULTS (page 4-5)
- DISABLE NO READ (page 4-13)
- SCAN SUFFIX 1 (page 4-50)
1, 0, 1, 3 (page 4-68)
This sets the first part of the suffix to carriage return (\0D)
- SCAN SUFFIX 2 (page 4-50)
1, 0, 1, 0 (page 4-68)
This sets the second part of the suffix to line feed (\0A)
- <DATA><SUFFIX 1><SUFFIX 2> (page 4-52)
This specifies that there is no prefix, and the data is terminated by a suffix in two parts (carriage return, line feed (\0D\0A)).

Remote Output

The AgGPS 170 Field Computer can enable a remote output when you are either inside a prescription or when you pass a point feature. For example, this can be used to:

- start a spray pump when you are inside spray zones
- plant trees when you pass a target point
- activate warning alarms or LEDs

For information on connecting equipment to remote output, refer to Connecting Remote Output in Chapter 2 of the *AgGPS 170 Field Computer Reference Manual*.

To configure remote output, from the *Equipment* menu, select *Remote Output*. The *Remote Output* dialog appears, as shown below:

When inside prescription

By default, the AgGPS 170 Field Computer enables remote output when you are inside a prescription.

The lead time is the time it takes for the equipment connected to the AgGPS 170 remote output to respond to on / off requests.

To set a lead time to compensate for system latency:

1. Press **NEXT**.
2. Using the arrow keys, enter your lead time value.



When the software is paused, remote output is turned off. Remote output is turned on again when you select *Resume* and you are inside the prescription.

By default, if you lose high accuracy GPS, remote output is turned off. If you want to keep using remote output with low accuracy GPS, select the *Use low accuracy positions for guidance and logging* check box in the *GPS* dialog.

Remote output is **always** turned off if you have too few Satellites.

When passing point feature

To configure the AgGPS 170 Field Computer to enable remote output for a specified output duration when you pass a point feature:

1. Use ▼ to select the *When passing point feature* radio button.
2. Press  and enter the *Left/right distance limit*.
3. Press  and enter the *Output duration*.

Note – *The minimum output duration is 50 ms, and the output duration accuracy is +/- 15 ms.*

Remote output is only triggered when passing a point feature if:

- you have high accuracy GPS, even if you have selected the *Use low accuracy positions for guidance and logging* check box
- the software is not paused
- you are within the left/right distance limit

The distance limit is measured either side of the closest point feature, perpendicular to your direction of travel. It uses the feature offset position, not the antenna or boom position.

Figure 4.5, shows the measurement of the left/right distance limit.

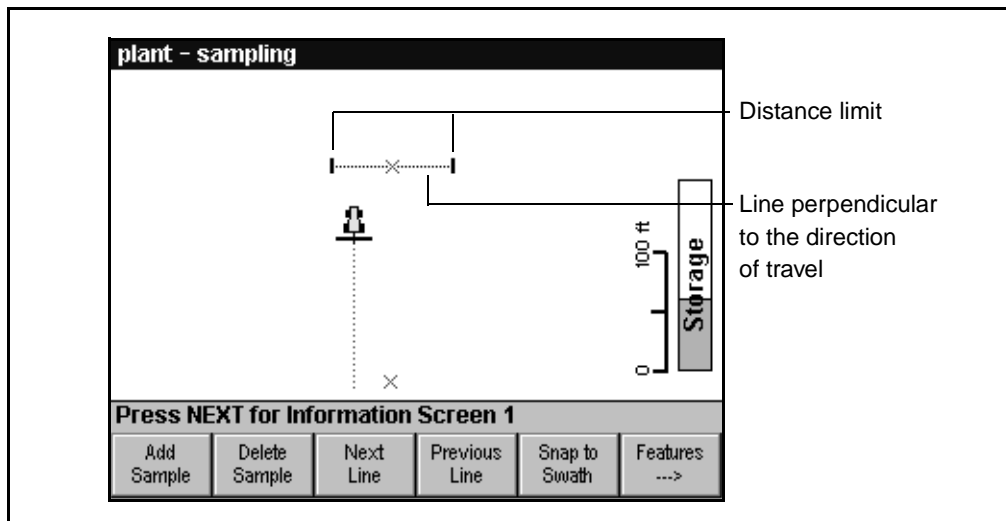


Figure 4.5 Left/right distance limit

In this example:

- the *Left/right distance limit* is set to 50 ft
- there is no feature offset
- the vehicle is travelling due north

Note – If you have configured the AgGPS 170 Field Computer to enable remote output when you pass a point feature, any type of point feature will enable remote output, not just target points.

The Left/right distance limit is also used to ensure that there is only a single output at each target location. After remote output is enabled by passing a point feature, it cannot be enabled again until you have traveled the Left/right distance limit away from the feature.

Note – If you travel the Left/right distance limit past the feature, and then back to the same point feature, remote output is triggered again.

Loading Files

In this chapter:

- Introduction
- Loading the history names
- Loading and using data dictionaries
- Loading GIS field boundaries
- Loading background layers
- Loading prescription files

Introduction

The AgGPS 170 Field Computer can load and use files that you have created in your office software, including GIS packages, and saved to the data card. This chapter explains how to load input files created on an office computer to the AgGPS 170 Field Computer.

Loading the History Names

When the AgGPS 170 Field Computer finds a copy of the AgGPS_Names.txt file in the root directory of the data card, the names are automatically copied from the text file to the history softkeys.

Note – *If you select a data dictionary, your Names.txt file is not read. For more information, see Loading and Using Data Dictionaries, page 255.*

Underscores (_) are not displayed on the softkeys, but are displayed in the field when you press the softkey. Existing history softkeys are retained and placed on the softkeys after the names from the file. When the list of history softkeys is longer than 50, old entries are dropped off the bottom of the list.

Note – *The history softkeys are reset to defaults when a new version of software is loaded. Providing the AgGPS_Names.txt file is still on the data card, the AgGPS 170 Field Computer reloads the softkeys with the entries defined in the file.*

Loading and Using Data Dictionaries

The AgGPS 170 Field Computer can load data dictionary files that specify user-defined event attributes. A data dictionary allows you to record many more attributes for an event, than the standard ones provided in the *New Field* dialog.

Data dictionary files must be:

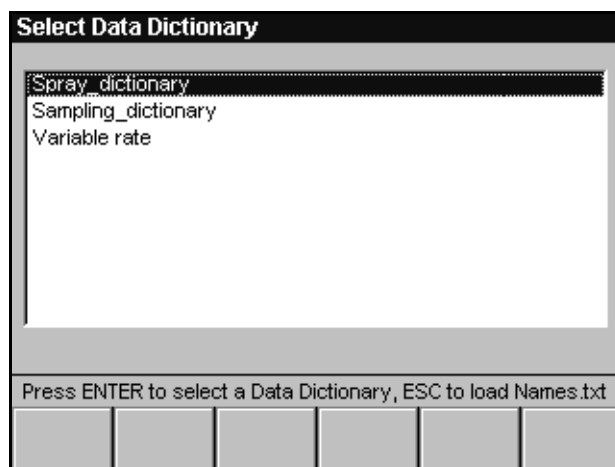
- in text (.txt) format
- saved in the \AgGPS170 Data Dictionary\ directory
- contain data in a format supported by the AgGPS 170 Field Computer

For more information on generating data dictionary files, refer to Chapter 5 in the *AgGPS 170 Field Computer Reference Manual*.

To load a data dictionary for a new field:

1. From the *Field* menu, select *New Field (Boundary)* or *New Field (No Boundary)*.

If there are any .txt files in the \AgGPS170 Data Dictionary\ directory, the *Select Data Dictionary* dialog appears, as shown below:



2. Use the arrow keys to highlight the data dictionary to use with the current event.


3. Press . The data dictionary file is loaded.

***Note** – If the data dictionary cannot be loaded a <datadictionaryname>.err file is written to the \Event\ directory.*

If you press , the AgGPS_Names.txt file is loaded.


4. The *New Field* dialog appears.

Enter the client, farm, field and event names and any other information you want to record in the fields in this dialog.

5. Press . Additional dialogs appear to allow you to enter values for the attributes defined in your data dictionary.

You can enter information by selecting the values specified in the <datadictionaryname>.txt file from the softkeys, or manually entering this information using the arrow keys.

***Note** – Specify names for these additional dialogs when you create your data dictionary. Otherwise the software names them User Defined Event Attributes.*

6. Press  for each dialog to accept the information you have entered.

The information entered in the *New Field* dialog is written to:

- <eventname>_EventHistory.dbf file
- <eventname>_Summary.txt file.

Additional user-defined attribute information is written to:

- <eventname>_Summary.txt
- <eventname>_UserAttributes.txt. This is a copy of the data dictionary you selected. For each attribute, an additional variable called *Cur* is written to the file. *Cur* contains the current value for the attribute.

Note – If there are no files in the \AgGPS170 Data Dictionary\ directory, the AgGPS 170 Field Computer loads any user-defined attributes from the AgGPS_Names.txt file saved in the root directory on the data card.


If you select an existing event which uses a data dictionary, the <eventname>_UserAttributes.txt data dictionary from the \Event\ directory is automatically loaded.

If you select an existing field and create a new event, the *Select Data Dictionary* dialog appears. Follow Step 2 to Step 6 above.

Editing Event Attributes


If you have the *Edit event attributes when closing field* check box in the *Logging* dialog selected, you can update the event attributes when you close the field. For more information, see *Logging*, page 213.



To edit to the event attribute values:

1. From the *Field* menu, select *Close Field*.
2. Press  to confirm closing the field.


The *Edit Event Attributes* dialog appears. This dialog is similar to the standard *New Field* dialog.



Tip – If you do not want to edit **any** event attributes, press . Your data dictionary dialogs will not appear.

3. Change any details in the *Operator*, *Material*, *Crop*, *Weather* or *Notes* fields.
4. Press . Your data dictionary dialogs appear.
5. Change any value for the attributes specified in your data dictionary.
6. Press .



Tip – If you need to go back and edit the attributes on a previous dialog, press .

Loading GIS Field Boundaries

The AgGPS 170 Field Computer can load field boundaries created by a Geographic Information System (GIS).

To load GIS boundaries, files must be:

- saved in the \AgGPS170 GIS Fields\ directory on the data card
- in WGS-84 latitudes, longitudes and heights in decimal degrees

When you define a new field with a field boundary, if there are GIS boundary shapefiles on the data card, you can either import a GIS boundary file or map the field manually. You can also combine multiple GIS boundaries into a single field.

Options:

- Map the field—if you do not select a GIS field boundary from the *Select Boundary* dialog, the *Map Field* screen appears so that you can map the field boundary.
- Create a new field boundary from a single GIS boundary—if you select one file that contains a single polygon, the polygon is used to create the field boundary.
- If you select multiple GIS boundary files, or one file containing multiple polygons, the polygons are used to create area features in a No Boundary field.



Warning – If a polygon has more than one part, for example, holes, only the first part is used and any other parts are ignored. This may mean that if you import a GIS boundary file which contains a polygon made up of multiple parts, only one part of the boundary file will be loaded.

You can also load GIS field boundaries using work orders. For more information, see Introduction, page 274.

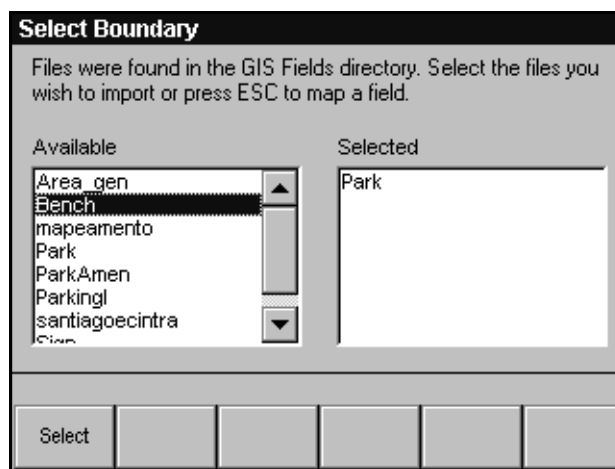


Tip – Set the swath pattern before importing the field.

Loading a Single Polygon

To load GIS fields, the GIS field boundary shapefiles must be in the \AgGPS170 GIS Fields\ directory on the data card:

1. From the *Field* menu, choose *New Field (Boundary)*.
2. Enter the *client*, *farm*, *field*, and *event* data in the *New Field* dialog.
3. Press **ENTER**. As long as there are shapefiles in the GIS fields directory, the *Select Boundary* dialog appears, as shown below:



4. Use ▼ or ▲ to move up or down the list.
5. Press **Select** to choose a GIS field boundary.
6. Press **ENTER**. If the pattern is Straight, Headlands, Center racetrack or Skip racetrack, the *Pattern Check Map* appears.

The AgGPS 170 Field Computer searches the data card for prescription files and allows you to select one if any overlap the boundary. For more information, see Loading Prescription Files, page 270.

You can use any Boundary field pattern with this option.

Loading Files Containing Multiple Polygons

If the GIS field boundary file contains more than one polygon, each polygon must only have one part.

There are two options for importing multiple polygon fields:

- Create a single No Boundary field and convert the polygons to area features.
- Treat each polygon as a separate field, identified by a number added to the end of the field name.

These other fields can be loaded from the *Select Field* dialog, or you can specify the field name with the numbers on the end as separate entries in a work order.

A warning message also gives you options to ignore the GIS boundary specified in the work order and map the field, or to cancel the event.

Creating a single field

Create a single field if:

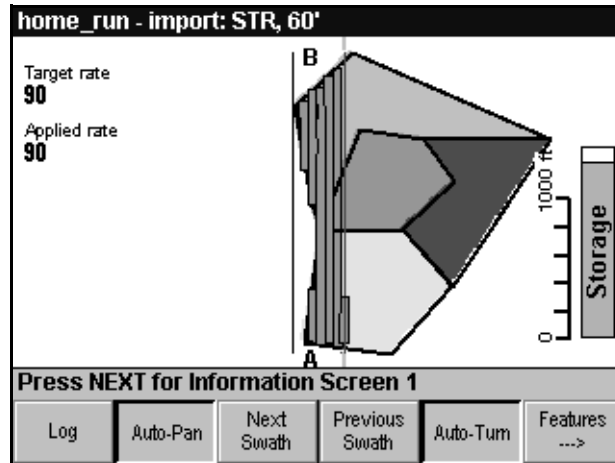
- the polygons are close together, and you want to apply the material to all polygons at once.
- you have just a single prescription covering all the polygons.

All polygons are converted to area features.

If your pattern is set to Half-field racetrack, Center racetrack or Squeeze, Point C is chosen automatically. Use the *Swath Direction* screen to move Point C if required.

When the warning message appears, press .

An example of four polygons imported as area features into a single field, and sprayed using the straight pattern is shown below:



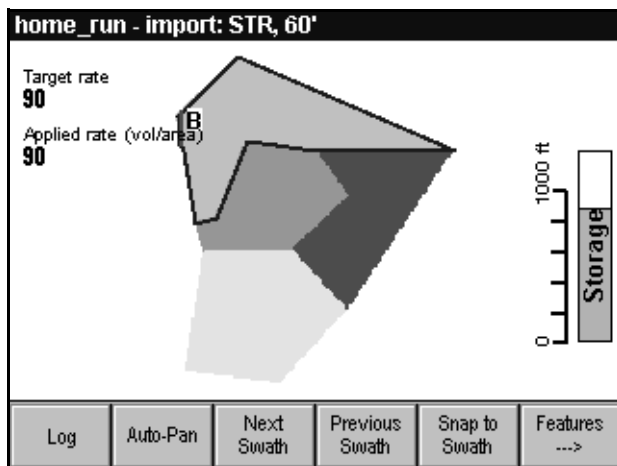
Creating separate fields

This option is useful if you want to apply material to each field separately.

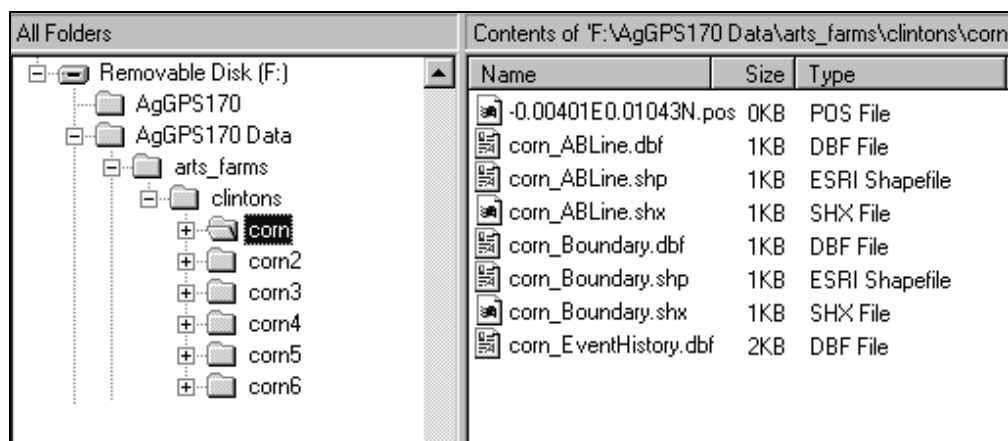
You can use any Boundary field pattern with this option.

When the warning message appears, press Separate Fields.

The GIS boundary from the previous example, imported as separate fields is shown below. The first field is selected.




The files created by importing a GIS field called **corn** containing six polygons is shown below:

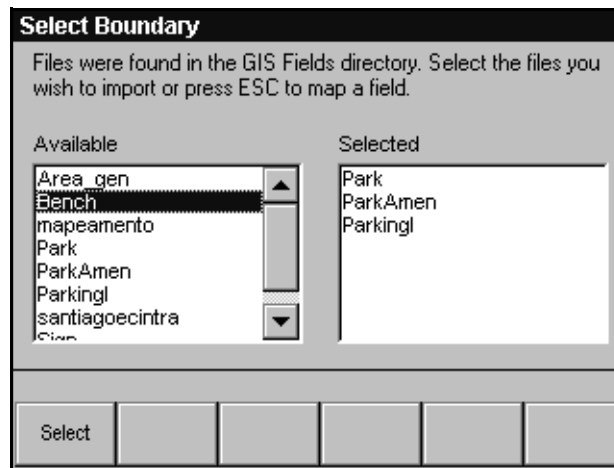



Note – If there are a large number of polygons in the GIS boundary, it can take a long time to create all the field boundaries. They also use up a lot of space on the data card.

Loading Multiple Files

To load GIS fields, the GIS field boundary shapefiles must be in the \AgGPS170 GIS Fields\ directory on the data card:

1. From the *Field* menu, choose *New Field (Boundary)*.
2. Enter the data in the *New Field* dialog.
3. Press . As long as there are shapefiles in the GIS fields directory, the *Select Boundary* dialog appears, as shown below:



4. Use ▼ or ▲ to move up or down the list.
5. Press  to choose the appropriate GIS field boundaries.

When you choose more than one GIS field, the GIS fields are loaded as area features in a No Boundary field. The field area is the sum of the area features.

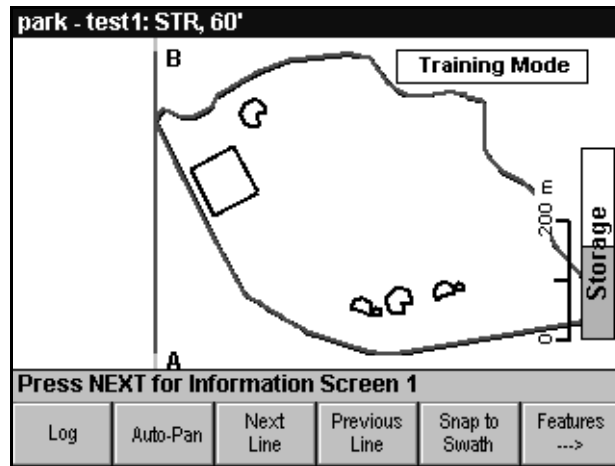
6. Press .



Tip – You need to select shapefiles that are reasonably close together. If the combined field will be greater than 20 km wide or 20 km long, a warning is displayed.

When you load a GIS field boundary, the AgGPS 170 Field Computer searches the data card for prescription files and lets you to select one that overlaps the boundary. For more information, see Loading Prescription Files, page 270.

An example of three GIS boundaries imported as area features is shown below. One GIS boundary has multiple polygons.



Area guidance

The software can provide guidance to GIS polygons which have been converted to area features. To do this, in the *Guidance* dialog, choose Area - GIS Area. For more information, see Guidance, page 211.

Loading Background Layers

The AgGPS 170 software can load GIS point, line, or area shapefiles containing geographic features, (such as roads or rivers), as background layers.

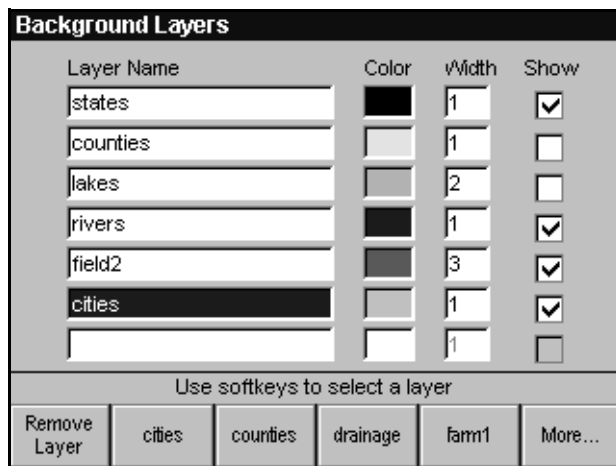
Selected background layers are displayed on the *Plan View Map* whether a field is loaded or not. You can turn each layer on and off independently, and you can also configure the colors and widths.

To display background layers:

- The background layers shapefiles must be saved in the \AgGPS170 Layers\ directory on the data card.
- The background layers files must be in 2D ESRI point, line, or area shapefile format.
- The background layers must contain WGS-84 latitudes and longitudes.

***Note** – If the combined size of the background layers being loaded is greater than 2 MB, a warning message is generated and some layers may not be loaded or displayed. Loading and displaying very large layers may take several minutes.*

From the *Field* menu, select *Background Layers*. The *Background Layers* dialog appears, as shown below:



Layers are displayed in the order that they appear in this dialog, with the top layer drawn on top of all subsequent layers. Up to seven layers may be selected and displayed at one time.

To select background layers:

1. Press **NEXT** to move to the appropriate *Layer Name* field.
2. Select a layer from the softkeys. If there is already a layer in this position, it is replaced with the layer on the softkey.
3. If you have layers that are not initially displayed on the softkeys, press **More** to access them.
4. To select a color, use ▼ and ▲.
5. To select line or point width, use ▼ and ▲.
6. To toggle the *Show* check box, press **Select**.

To remove a background layer from the list, go to the appropriate line and press **Remove Layer**.

Note – Layers are displayed on the softkeys in alphabetical order. If more than 99 layers exist in the \AgGPS170 Layers\ directory, only the first 99 layers are displayed on the softkeys.

Loading Field-Specific Background Layers

When you map a new field or select an existing field, you can also select background layers that will be displayed only while the field is open.

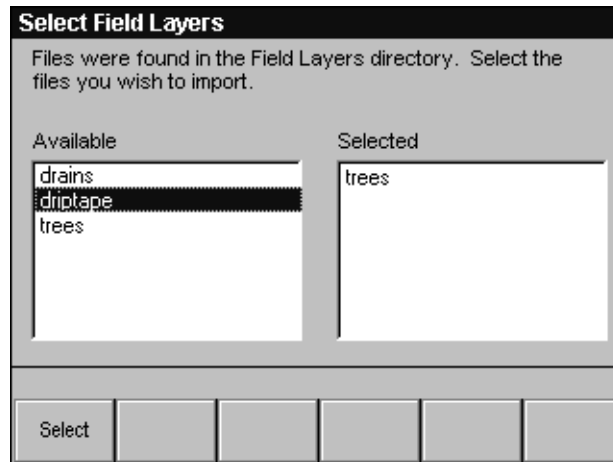
To load field-specific background layers, the point, line, or area shapefiles must:



- be saved in the \AgGPS170 Field Layers\ directory on the data card
- include features that are within the field boundary for a Boundary field
- include features that are within 1 km of the A-B Line for a No Boundary field

***Note** – If you want to display layers that are further away, save the files in the \AgGPS170 Layers\ directory and load them from the Background Layers dialog.*

To load field layers:

1. Map a new field or select an existing field.
2. If any field layers are within the field boundary, or within 1 km of the A-B Line, the *Select Field Layers* dialog appears, as shown below:



3. To move up or down the list, use ▼ or ▲.
4. To choose layers to load, press .
5. To load the field layers, press .


Selected features are displayed on the *Plan View Map* and are available for feature guidance. For more information, see *Guidance*, page 211.

If one of the standard or user-defined feature types matches, or is an initial substring of, the layer filename, then the display attributes defined for that feature type are used when displaying the field layer. If there is no corresponding feature type, the display attributes of GIS Point, GIS Line, or GIS Area are used. Spaces and capitalization in the filenames and feature types are ignored. See Table 5.1.



Table 5.1 Examples of layer file names and feature types

Layer filename	Corresponding feature type
trees	Tree
driptape	Drip Tape
rye grass	Ryegrass
varietyBest	Variety B
variety	Uses GIS Point, Line or Area as there is no feature type called "variety" or substring of "variety".

The AgGPS 170 Field Computer records the field layers that have been selected for each field. When you open an existing field, the previously selected field layers are automatically placed in the *Selected* list of the *Select Field Layers* dialog. You can:

- Press  to display this default set of layers.
- Select additional layers to be displayed, or remove previously displayed layers.

To remove a selected field layer:

1. Press  to move to the *Selected* list.
2. Highlight the desired layer using ▼ and ▲.
3. Press .

Loading Prescription Files

The AgGPS 170 Field Computer can load prescription files created by a Geographic Information System (GIS). Prescription files can be used to:

- provide application rates to a variable rate controller
- provide criteria for zone sampling
- enable remote and alarm output

For more information, refer to Creating Prescription Files in Chapter 5 of the *AgGPS 170 Field Computer Reference Manual*.

When you map a new field or select an existing field, you can also select any shapefile (.shp) or AgInfo GDX (.gdx) prescription file created in AgInfo versions 3.5.44.0 or later, that overlaps it:

- You can only load prescriptions that overlap the field boundary.
- For fields without boundaries, you can only load prescriptions that overlap the A-B Line.
- If you load a shapefile prescription, you need to specify your rate column.
- If you load a prescription, you can manually configure your variable rate controller.

Note – *The maximum size of a prescription is approximately 900 acres.*

To load a prescription, the prescription files must be in the \AgGPS170 Prescriptions\ directory on the data card.

When you map a field, load a GIS field boundary, or load an existing field, the AgGPS 170 Field Computer searches the data card for prescription files that overlap the field boundary or the A-B Line. If there are a lot of prescriptions on the data card, this can take several seconds and a progress bar is displayed.

You can also load prescriptions using work orders. For more information, see Introduction, page 274.

To manually load a prescription file:

1. Map a new field or select an existing field.
2. If any prescription files overlap the field boundary or A-B Line, the *Select Prescription* dialog appears, as shown below:

3. Use ▼ and ▲ to select a prescription file.

Note – If an AgInfo GDX prescription has an incorrect format, it will not be listed in the *Select Prescription* dialog.

4. If you select a shapefile prescription, press **NEXT**, and use ▼ and ▲ to select the correct prescription rate column.



Warning – If you choose the wrong column when using a variable rate controller, the applied rate will be incorrect.

If you select an AgInfo GDX prescription, the *Rate Column* box is not displayed.

5. Press **ENTER** to load the prescription file.
6. The *Variable Rate Controller* dialog appears so that you can configure a controller. For more information, see *Variable Rate Controller*, page 239.

Using Work Orders

In this chapter:

- Introduction
- Deleting work orders
- Selecting work orders
- Confirming the work order details
- Field boundaries
- Loading prescription files
- Closing events
- Data integrity

Introduction

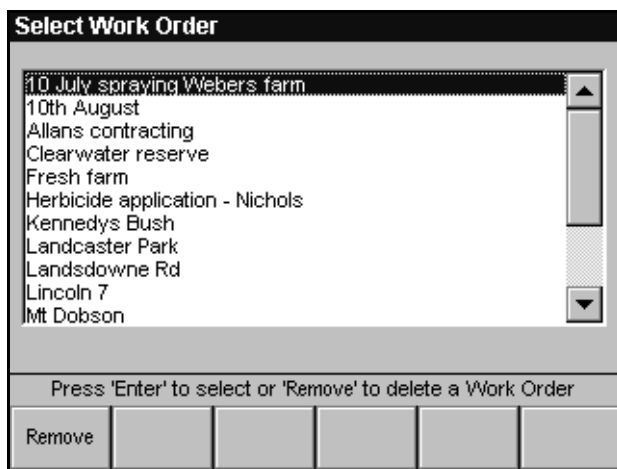
The work order defines the details of the work to be carried out in the field. One work order can contain any number of events (jobs). The data card can contain several work orders.

To use a work order, the work order file must be on the data card in the \AgGPS170 Work Orders\ directory. When all events in the work order are complete, the work order is considered to be complete.



Tip – Work orders do not specify swath parameters. Use the *Field* menu to set up the swath pattern or swath width before you select your work order. For more information see *Setting the Swath Parameters*, page 111.

From the *Field* menu, choose *Select Work Order*. The *Select Work Order* dialog appears, as shown below:



The *Select Work Order* dialog displays all work orders in the \AgGPS170 Work Orders\ directory on the data card. This includes any completed work orders. If there are more than 10 work orders on the data card, the scroll bar is displayed, and the arrow keys scroll past the last displayed work order.

If the list of work orders is too long, you can delete completed work orders from the card.

Deleting Work Orders

To delete a work order from the data card:

1. Use ▼ or ▲ to move down or up the list to select a work order.
2. Press **Remove**.

Note – If you try to delete a work order a warning is displayed.

Selecting Work Orders

To select a work order:

1. Use ▼ or ▲ to move down or up the list.
2. Press **ENTER** to load the selected work order.

If the AgGPS 170 Field Computer detects errors in the work order, a message is displayed and the details are saved in a <filename>_Errors.txt file on the data card.

3. Press **ENTER**.

As long as there is more than one incomplete event in the work order the *Select Event* dialog appears, as shown below:

Select Event from Russ number 7 work order

Client: [dropdown]
 Farm: [dropdown]
 Field: [dropdown]
 Event: [dropdown]
☒ Show completed events

Operator: [dropdown]
 Material: [dropdown]
 Crop: [dropdown]
 Prescription Instructions: [dropdown]

Select a Client from softkeys.

mw_farms ew_farms [] [] [] []

If all events in the work order are complete a message appears. For information on completed events, see Show Completed, page 277.

If the work order contains only one client, farm, or field with incomplete events, it is automatically selected and the cursor moves to the next level. If the work order contains only one incomplete event, this event is automatically selected and the event details screen appears.

To select an event from a work order, use the softkeys:

1. Select a client from the softkeys.



Tip – When you press a softkey in this dialog the cursor automatically steps to the next data entry field. To move back to the previous field to change a selection hold down the **MENU** key and press **NEXT**.

2. Select a farm from the softkeys.
3. Select a field from the softkeys.
4. Select an event from the softkeys.

When the event is selected some details from the work order are displayed in the fields on the right side of the screen to confirm that the correct work order has been selected, as shown below:

Select Event from Fresh farm work order	
Client fresh_farms	Operator andy walker
Farm kennedys	Material roundup 50 ml per liter of lwa
Field long_ace	Crop thistles and
Event spray	Prescription Yes
<input type="checkbox"/> Show completed events	Instructions: Pick up the Roundup from Westlake Supplies Ltd - charge to Sam
Select an Event from softkeys. Press 'More' for more Events.	
burn	spray
dig	cut
spread	More --->

Show Completed




By default, only clients, farms, fields, and events that are still to be completed are displayed on the event softkeys. In this way, when there are no more clients on the softkeys the work order should be completed as well:

- When all events in a field are complete, the field is considered to be complete.
- When all fields in a farm are complete, the farm is considered to be complete.
- When all farms in a client are complete, the client is considered to be complete.

It may be necessary to load an event that has already been completed. This could happen if:

- the data card contains old data about a completed event with the same name in the same field
- the event was closed accidentally
- more work is required in a completed event

To display all clients, farms, fields, or events in the work order:

1. Press  to select the *Show completed events* check box.
2. Press .
3. Press  to return to make your selection.



Warning – When work is carried out on an event, the event data is stored on the current data card. The AgGPS 170 Field Computer uses this data to determine which events are completed. If the work order is moved to another data card, events that were completed on the original data card appear as incomplete on the new data card. Also, if a field is deleted from the data card, the work order function considers that any events in this farm are incomplete.

Confirming the Work Order Details

If the correct work order has been selected, press **ENTER**. If the selected event has already been completed, a message gives you the option of creating a new event called `<eventname>1` (press **ENTER**), or adding to the completed event (press **ESC**).

The *Event Details* screen displays the work order instructions, and information about the selected prescription file and variable rate controller, as shown below:

fresh_farms - kennedys - longacre - spray	
Instructions:	Boundary Name
Pick up the Roundup from Westlake Supplies Ltd - charge to Sam Kennedy. Watch out for Kettles corn field to the north west. If the southerly comes through don't spray within 60 ft of the fenceline.	Prescription Name
	Rate Column Name
	Controller Type
	Default Rate
	Active Channel
	Lag Time (sec)
	Logging interval
	Last / Default
Press ENTER to accept. Press ESC to change the Event	
<div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> </div>	

If the controller is manually configured, the dialog settings are displayed, otherwise the controller settings specified in the work order are displayed.

Work orders may also specify the boundary file to be used for an event. The boundary file is a shapefile containing one or more polygons. For more information, refer to Data Formats in Chapter 4 of the *AgGPS 170 Field Computer Reference Manual*.

Press **ENTER** to start work on the event or **ESC** to select another event.

If there are errors in the work order, such as invalid prescriptions or controller settings, the following occurs:

- An error message is displayed on the screen.
- Depending on the error, the software may continue but some functions may not work.
- Errors are also recorded in a `<workordername>_Errors.txt` file in the `\AgGPS170 Work Orders\` directory.

For more information, see Variable Rate Controller Messages, page 310.

The client, farm, field, and event names are used to uniquely identify client, farm, field, and event directories on the data card.

If there is no *client* or *farm* directory, a new directory is created.

If a boundary file is specified in the *Boundary* column of the work order **and** the field boundary does not already exist, the boundary file is imported.

Note – *If the existing field boundary does not match the specified GIS boundary file for the field, a new field is created.*

If a boundary file is not specified in the work order, the field is mapped before starting the event.

If the event already exists but is incomplete, this event is loaded.

A new event is created if:

- if the event does not exist
- the event is complete
- the event details have changed

Field Boundaries

A work order can be used to specify work to be done in a:

- field that has already been mapped and is on the data card
- new field for which a boundary has been created in an office GIS
- new field for which a boundary is to be mapped as part of the work

Loading Existing Fields

If the field specified in the work order has already been mapped and is stored in the \AgGPS170 Data\ directory on the data card, this field is loaded and used for the work order.

Incomplete Events

If the event specified in the work order already exists and is incomplete this event is loaded and, depending on the pattern, the *Pattern Check Map* or *Plan View Map* displayed.

If the event specified in the work order does not exist, or is already complete, a new event in the field is created. The *New Event* dialog appears. See page 281.

Note – *The event name must be unique within the field. If the event specified in the work order is the same as an already complete event in the field, a new event name is created by adding a number to the existing event name. For example, if the work order specifies an event called spray which has already been completed, a new event called spray1 is created.*

Loading GIS Fields

If the field specified in the work order does not already exist in the \AgGPS170 Data\ directory on the data card, and there is a boundary file specified, the AgGPS 170 Field Computer looks in the \AgGPS170 GIS Fields\ directory for this boundary file.

If there is an incomplete event with the specified name it is loaded, otherwise a new event is created. The *New Event* dialog appears, as shown below:

New Event	
Client Name:	mw_farms
Farm Name:	kennedys
Field Name:	k1
Event:	spray
Operator:	Jim
Material:	Roundup
Crop:	Soya
Weather:	
Notes:	
NEXT key moves to the next data field, ENTER closes the dialog	

For information on loading complex fields, see Loading Files Containing Multiple Polygons, page 260.

Mapping a New Field Boundary

If the field specified in the work order does not already exist in the \AgGPS170 Data\ directory on the data card, and there is no boundary file in the \AgGPS170 GIS Fields\ directory, a message is displayed on the screen to tell you that the field boundary specified does not exist. The *Map Field* screen is displayed.

Loading Prescription Files

If a prescription file which is defined in the work order exists in the \AgGPS170 Prescriptions\ directory, the prescription file is loaded along with field boundary.

Prescriptions are converted into a 15 ft grid, displaying different color background regions to indicate a range of application rates. Because the grid is square, if your prescription contains irregular shaped polygons, there could be up to 7.5 ft error between the edges of the grid cells and the prescription regions.

This grid approximates curves in the field boundary and prescription regions.

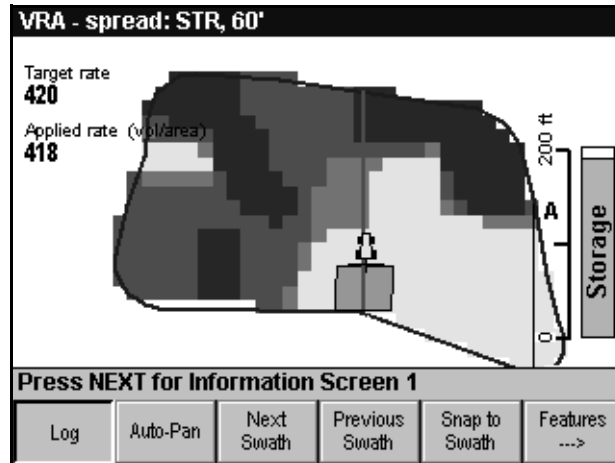
If you use complex contoured prescriptions, loading the prescriptions and converting them into a grid can take some time. The AgGPS 170 software displays progress bars while loading and converting prescriptions.



Tip – If the specified prescription file name does not overlap the field boundary, a message is displayed as there may have been an error made when the work order was created.

If you are using a variable rate controller, the *Plan View Map* displays the Target rate specified in the prescription file and the Applied rate value returned from the controller for the active channel, in the top left corner of the screen.

An example of the *Plan View Map* with a prescription file loaded and target and as applied rates displayed is shown below:



Note – The map screens cannot be rotated when a prescription file is loaded. When a prescription file is loaded, the map is always displayed North Up, and the Line Up option is disabled.

Closing Events

The AgGPS 170 Field Computer keeps a record of which events have been completed, and by default only displays incomplete events for selection from *Select Event* or *Select Field* dialogs.

When you finish spraying and select *Close Field*, a message appears giving you the option to mark the event as completed:

- If you mark the event as completed (press **ENTER**), the next time you select the field the AgGPS 170 software creates a new event.
- If you do not mark the event as completed (press **ESC**), the next time you select the field the AgGPS 170 software loads this event so you can add to it.



Data Integrity

To protect work already carried out in the field, the AgGPS 170 Field Computer checks the work order data against the data on the data card, and provides error or warning messages when there is a conflict.

Event Details Differ

If the crop or material specified for an event in the work order differs from the data already stored in the EventHistory file for the same event, the event cannot be loaded. A new event must be created.

Field Boundary Differs

If the field already exists on the data card but the boundary differs from the GIS field specified in the work order, the existing field cannot be loaded. You can either delete the existing field and load the field specified in the work order (press ) or abort the selection (press )

Sampling

In this chapter:

- Introduction
- Grid sampling procedure
- Taking samples
- Working with existing fields

Introduction

Sampling events provide target points based on a specified grid, and record the actual location of sample points taken in the field.

They can be used for:

- Soil sampling
- Tree planting in orchards
- Aerial photography
- Seismic soundings

When an event is completed, the sample points are used to generate a set of target points that can be used in a later event.

Sampling Types

The AgGPS 170 Field Computer provides two sampling options:

- A grid of target points
- Zone sampling without target points

Grid sampling

When you select grid sampling, the AgGPS 170 Field Computer displays a matrix of target points in a rectangular grid covering the whole field. Target points are only generated within the field boundary.

When you map the field:

- you can define the size of the grid by entering grid area or by entering cell height and width.
- target points can be centered within grid cells, placed at grid intersections, or randomly positioned within the cells.
- you can also choose to have no target points. The AgGPS 170 Field Computer generates a grid with no target points, so that you can choose your own sample point positions within each grid cell.

Zone sampling

Zone sampling lets you record sample points based on elevation, soil type, or other criteria, which can be loaded from a prescription file.

No grid or target points generated by the AgGPS 170 software are displayed with zone sampling. If you have generated sample points in a GIS package, you can load these as target points from the \AgGPS170 Field Layers\ directory. For more information, see Loading Field-Specific Background Layers, page 267.

If you have completed a previous sampling event in the same field, the sample points recorded are loaded as target points.



***Note** – If you have sample points in the \AgGPS170 Field Layers\ directory, Trimble recommends that you do not load these for subsequent sampling events in a field. If you do, you will get two sets of target points.*

If you change a sampling event from grid to zone, the grid and target points in the \Field\ directory are deleted.

For No Boundary fields, only zone-based sampling is possible. The *Grid Setup* dialog is not displayed, and target points are not generated.

Sampling Events

A sampling event is identified by the event name. As long as the event name starts with *sampling* the event is a sampling event.

In the *New Field* dialog, Softkey 1 is labeled . If a sampling event already exists in the field when you select , the AgGPS 170 Field Computer appends a number to the event name. You can also edit the event name using the arrow keys.

Plan View Map

In a grid sampling event, the AgGPS 170 Field Computer displays a grid on the *Plan View Map*. Target points are generated in each cell of the grid inside the field boundary. As samples are taken, they are displayed at the actual sample position and saved in the *Point_Sample* shapefile in the \Field\ directory on the data card.

Grids and target points are only provided in fields that have had the field boundary mapped. You can still carry out sampling in a field without a boundary, and any sample points taken are recorded in the sample shapefiles.

For more information on shapefiles, see *Storing Target and Sample Points*, page 297.

Swath guidance

In sampling events, the values in the *Swath Pattern* and *Swath Width* dialogs are not used:

- The swath pattern is always straight.
- If the target points are centered within the cells of the grid, the swaths bisect the grid lines, and line up with the target points.
- If target points are at grid intersections, are random, or there are no targets, the swaths coincide with the grid lines.
- The swath width is the width of the cells in the grid.
- The swath direction is parallel to the A-B Line.



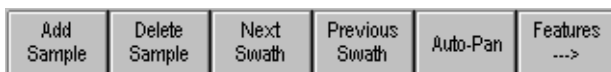
Tip – If you select *Expand boundary by half a swath after mapping field*, the swath width set in the *Swath Width* dialog is used to determine the field boundary, not the cell width.



For information on setting up the grid, see page 291.

Note – Because swath width and pattern are not relevant in sampling events, the values in the EventHistory file are not updated. If the sampling event is the first event in the field, the current dialog settings are recorded. Otherwise the values used in the previous event are recorded against the sampling event.





Softkeys

In sampling events, the *Plan View Map* softkeys are labeled, as shown below:




To step between swaths, use  and .

Line guidance

If you select line or area feature guidance,  and  are replaced with  and . For more information, see Line and Area Feature Guidance, page 100.



Tip – The  softkey is not available in a sampling event. To log application coverage during a sampling event, use an external spray switch.

Grid Sampling Procedure

The procedure for sampling is:

1. Define a field using a *sampling* event name.
2. Map the field setting Point A and Point B to establish the grid origin and orientation.
3. Define the grid size and target point locations.
4. Use the AgGPS 170 Field Computer for guidance to the target points.
5. Record each sample point and sample ID.

If you map a No Boundary field, target points are not generated, but you can still record sample points.

Mapping a New Field

From the *Field* menu, choose *New Field (Boundary)*. The *New Field* dialog appears, as shown below:

New Field	
Client Name:	client1
Farm Name:	farm1
Field Name:	leftfield
Event:	sampling1
Operator:	
Material:	
Crop:	
Weather:	
Notes:	
NEXT key moves to the next data field, ENTER closes the dialog	
sampling	plant
spray	spread
cultivate	More...

To define a sampling event:

1. Select *Client*, *Farm*, and *Field* names from the history softkeys, or enter new names using the arrow keys.
2. In the *Event* field select .

is always on Softkey 1 in the *Event* field. If an event called *sampling* already exists in the current field, a number is automatically appended to create a unique event name.

3. Press to map the field boundary.

You can set the grid direction by defining an A-B Line when you map the field:

- Press to establish the grid origin point.
- Press to set the grid direction.

If you do not define an A-B Line, the grid direction is set to North–South.



When you press to complete the field boundary, the *Grid Setup* dialog appears, as shown below:

The **Grid Setup** dialog box contains the following controls:


- Sampling Type:** Two radio buttons, **Grid** (selected) and **Zone**.
- Target Points:** Four radio buttons: **Centered** (selected), **Random**, **At Intersections**, and **None**.
- Cell Area:** A text input field followed by the unit **acres**.
- Cell Height:** A text input field with the value **200**, followed by **ft** and another text input field with the value **0** followed by **in**.
- Cell Width:** A text input field with the value **300**, followed by **ft** and another text input field with the value **0** followed by **in**.
- Snap to target radius:** A text input field with the value **0**, followed by **ft** and another text input field with the value **0** followed by **in**.

At the bottom of the dialog is a row of six empty rectangular buttons.

To define the grid:

1. Use the arrow keys to select grid or zone sampling.
2. If grid sampling is selected, press  and use the arrow keys to choose a position within each cell for the target points.
3. Press  and use the arrow keys to set the grid cell size.

You can define the grid by entering the cell area or the cell height and width. If you enter the cell area the AgGPS 170 Field Computer calculates and displays the cell height and width, and generates a square grid.

4. Press .

Snap to target radius

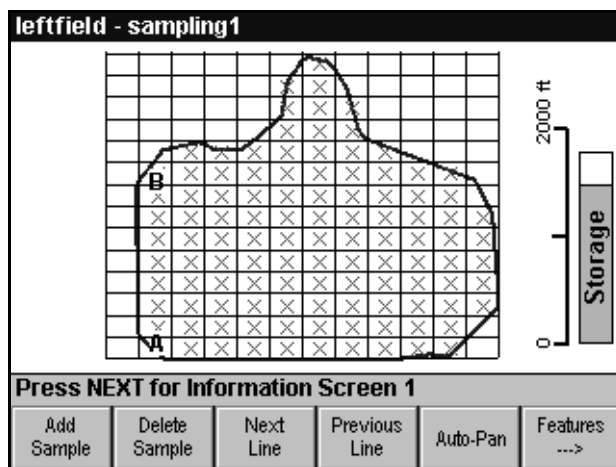
To prevent cumulative position errors after several years of sampling the same field, set a snap to target radius:

- If you record a sample point when your position is closer to the target than the snap to target radius, the sample is recorded at the target location.

***Note** – If you have another point feature closer to your location than the target, the sample is recorded at that point feature location.*

- To record all sample points at the actual sample location, make sure the snap to target radius is set to zero.

Once grid definition is complete, the *Plan View Map* appears. The grid is displayed with a target point icon displayed in each cell within the field, as shown below:



Target points are displayed as a red cross.


Drawing a very large number of points on the *Plan View Map* can be slow. To help performance, and make the *Plan View Map* clear when you zoom out a long way:

- Target points are not displayed if there are more than 2000 points within the current zoom area.
- If the grid is so dense that it appears to be a solid mass of black, only the four outer borders of the grid are displayed.



Tip – Loading point features takes approximately one minute per 1000 points, and more than 2000 point features in a field can cause delays of 3–5 seconds when you pan or zoom. Trimble recommends that you start a new field if you have recorded more than 5000 samples.

Taking Samples

Sample points can be recorded using a barcode reader or manually by pressing the  softkey.

Sample Codes

When a sample is recorded, the Sample ID for the sample, and the date and time, are recorded in the attribute file (Point_Sample.dbf) in the \Field\ directory on the data card.

When a barcode reader is used, the Sample ID is usually a sample bag number. When samples are added manually, the AgGPS 170 Field Computer provides a default ID that you can change.



Tip – When a sampling event is completed, sample files are copied to the \Event\ directory. For more information, refer to Sampling files in Chapter 4 of the *AgGPS 170 Field Computer Reference Manual*.

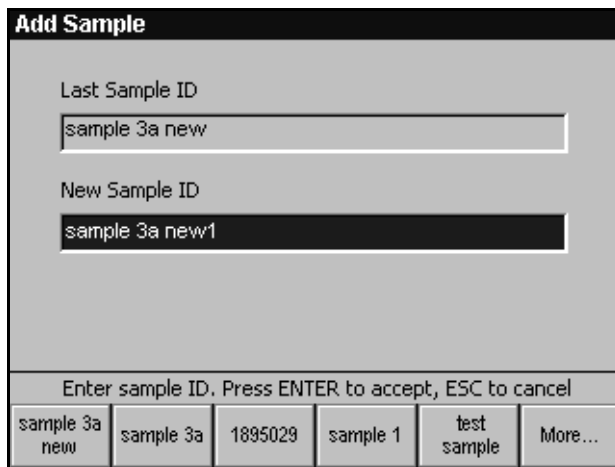
Recording Sample Points Using a Barcode Reader

To record sample points using a barcode reader, scan the barcode of the sample bag when you take each sample. The AgGPS 170 Field Computer automatically adds a sample point each time the barcode is scanned.

For information on how to configure the AgGPS 170 Field Computer to communicate with a barcode reader, see Barcode–Sensor Input, page 244.

Recording Sample Points Manually

To manually record a sample, press . The *Add Sample* dialog appears, as shown below:




The **Add Sample** dialog box contains two input fields. The first field, labeled "Last Sample ID", contains the text "sample 3a new". The second field, labeled "New Sample ID", contains the text "sample 3a new1". Below the input fields is a row of softkeys: "sample 3a new", "sample 3a", "1895029", "sample 1", "test sample", and "More...". Above the softkeys is a line of text: "Enter sample ID. Press ENTER to accept, ESC to cancel".

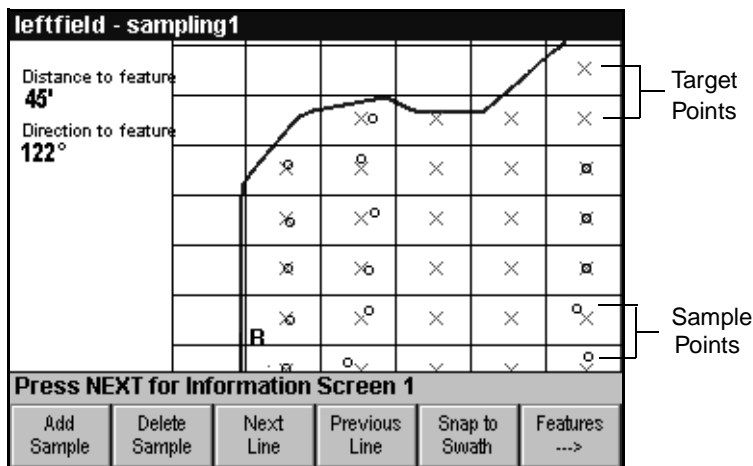
You can use a Sample ID to identify each sample. This could be something like a sample bag number.

The Sample ID of the previous sample is displayed in the *Last Sample ID* field. The AgGPS 170 Field Computer automatically increments the *Last Sample ID* value and uses this as the default *New Sample ID* value. Any IDs that are defined in the AgGPS_Names.txt file, or have already been entered using the arrow keys, are displayed on the softkeys.

To change the *New Sample ID* value, use the arrow keys or press a softkey.

Press  to return to the *Plan View Map*.

When you record a sample, a sample icon is displayed as a black circle, at the sample location on the *Plan View Map*, as shown below:



The sample points in the two columns to the left of the example above were taken with snap to target off (*Snap to target radius* set to zero).

The sample points in the column to the right were taken with snap to target radius set to 10 ft. Apart from the two samples at the bottom, which were more than 10 ft from the target point, these samples have been recorded at the exact target point location.

Deleting Sample Points


You cannot move individual target points or sample points, but if you accidentally record a sample point in the wrong location you can delete it, and add a new sample point at the correct location. Only the most recent sample point can be deleted. To delete an earlier sample point, you need to delete any subsequent sample points first.

To delete the most recently added sample point, press Delete Sample. To prevent you inadvertently deleting a sample point, a message appears.



Tip – If you delete all sample points, the Point_Sample.* shapefiles are also deleted.

Delete Features softkey

Pressing the  softkey in the *Select Field* dialog deletes all point, line, and area features in the selected field. This includes any sample points taken in an incomplete event, and also includes target points created from completed events. Sample points for completed events are stored in the \Event\ directory and are not deleted.

Storing Target and Sample Points

Sample points (and target points from complete events) are stored in point features shapefiles in the \Field\ directory on the data card:

- Point_Sample.dbf
- Point_Sample.shp
- Point_Sample.shx
- Point_Sample target.dbf
- Point_Sample target.shp
- Point_Sample target.shx

For more information, see *Completing Events*, page 299.

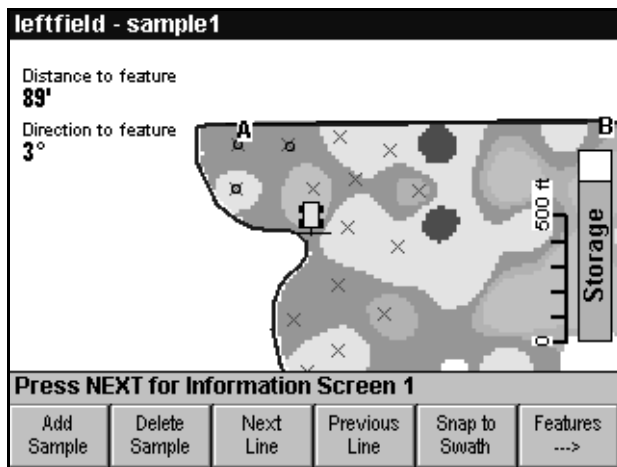
Sample Guidance

You can display *Distance to feature* and *Direction to feature* on the:

- lightbar text
- information screens
- Plan View Map

These options display the distance and direction to the closest feature including target points and sample points. Use any of these options to navigate to target points.

An example of how you can display the distance to feature and direction to feature on the *Plan View Map* to get guidance to the nearest target point is shown below:







The prescription file displays zones of different soil types.

Adjusting the Target Points

When a sampling event is created, the grid origin and orientation are based on the A-B Line.


Use the *Grid Setup* dialog to move or rotate the grid (and therefore the target points), change the cell size, move the target point positions within the grid cells, or change the snap to target radius:

1. From the *Field* menu, choose *Change Grid*. The *Grid Setup* dialog appears.
2. Enter the new grid parameters.
 - a. To change the grid cell size, enter a new *Cell area* or a new *Cell height* and *width*.
 - b. To change the location of the target points within the cells, press **NEXT** and use the arrow keys to select another *Target Points* option.

- c. To change the *Snap to target radius*, press  and use the arrow keys to set the value.
3. Press . The *Swath Direction* screen appears.
4. If you want to change the grid origin or direction, reset the A and B points, and press  to confirm the new A-B Line. For information on resetting the A and B points, see *Changing the swath direction*, page 119.
A new grid and new target points are generated.
5. If you want to keep the grid origin and direction, but change the cell size, target point location, or snap to target radius, press  without resetting Point A and Point B.

Adjusting the Grid after Taking Samples

If you change the grid when one or more samples have been recorded for the event, the sample points will not correspond to target points. When you select *Change Grid* from the *Field* menu, a warning message appears.

If you press , the *Grid Setup* dialog appears. If you change the grid the existing target points are replaced with a new set of target points. The existing sample points are not affected.

Completing Events

Every time you close a field and confirm that the sampling event is complete, a permanent record of the sample points is saved in the \Event\ directory. Target point files are created from the latest sample points, so these can be used as the target points for the next sampling event performed on the field:

- Point_Sample.* files are copied from the \Field\ directory to the \Event\ directory.
- Point_Sample.* files in the \Field\ directory are renamed to Point_Sample target.*.

For more information, refer to Sampling files in Chapter 4 of the *AgGPS 170 Field Computer Reference Manual*.

Working With Existing Fields

You can load incomplete sampling events and continue recording samples, or create new sampling events in existing fields. You can also reload completed sampling events, but if you do, the sample points that have been taken in the event are only displayed as target points.

Loading an Existing Sampling Event

If you select a field that has an incomplete sampling event:

- The incomplete event is reopened.
- Any target points and sample points recorded in the event are loaded and displayed.
- You can add more samples to the event.

Creating a New Sampling Event

If you select a field in which the previous event was completed, the *New Event* dialog appears.

Select for the *Event Name* to create a sampling event. As in the *New Field* dialog, if a sampling event already exists in the selected field, a sequence number is appended to make the name unique.

If this is the first sampling event to be performed on this field, the *Grid Setup* dialog is displayed.

If a sampling event has already been performed on this field, the *Grid Setup* dialog is not opened, and the existing target points are loaded and displayed.

Coverage Events

After you have performed a sampling event on a field, you can return to the same field to perform a coverage event.

The grid, target points, and sample points are only displayed in a sampling event, *not* when you do any other kind of event in the field.



Troubleshooting

In this chapter:

- Troubleshooting techniques
- Common problems and solutions
- Error messages
- Warning messages



Troubleshooting Techniques

The AgGPS 170 Field Computer is designed to work with Trimble AgGPS receivers. Before contacting your dealer, make sure you:

- have the latest receiver firmware
- determine whether there is data coming from the GPS receiver (from the *Equipment* menu, select *Raw Serial Data*)
- check that there is power on the AgGPS 170 Field Computer
- check that all connectors are tight
- note your AgGPS 170 Field Computer serial number and software version from the *Help – About...* dialog.

Screen Snaps

Screen snaps are a useful way to record problem situations when you need help from your dealer or from Trimble.

If the AgGPS 170 displays unusual swath patterns, coverage polygons, or other problems on the screen, you can take a screen snap of the problem. To do this, hold down the  key and press .

A bitmap file is created and saved on the data card. The name of the file indicates the date and time that the screen snap was taken. This file can be viewed in a drawing package such as Microsoft Paint, or zipped and e-mailed to Trimble for assistance.

Program Log Message File

The AgGPS 170 Field Computer carries out a number of tests when it is switched on or off, and regularly does other status checks.

Information about these tests and error messages are saved to a file called ProgramLog.txt in the \AgGPS170\ directory on the data card.

This file can be read with a text editor such as Notepad, and can be very useful when trying to track down problems.

When this file gets very large, the file is renamed ProgramLog.old and a new ProgramLog.txt is created.

Common Problems and Solutions

This section describes possible causes of common problems and provides solutions where appropriate. See Table A.1.

Table A.1 Common problems and solutions





Problem	Possible causes	Solution
Cannot see anything on the AgGPS 170 Field Computer display.	Power has been lost.	Check all battery connections.
	The brightness is turned down.	Press  and  at the same time to increase the display brightness.
	The display is zoomed out too far.	Press  or  .
The vehicle icon does not move around the display.	The AgGPS 170 Field Computer is running in Training Mode.	Turn the power off and restart the system.
	There is no incoming GPS or invalid GPS.	From <i>Equipment / Raw Serial Data</i> , compare the incoming data with NMEA message formats as listed in your GPS Receiver manual. Check GPS Status on your GPS receiver.
No guidance on the lightbar or AgGPS 170 Field Computer display.	The A-B Line or Field Boundary has not been defined.	Map or select a field.
	No valid GPS positions.	Check your GPS receiver.
Guidance on the lightbar is reversed.	The <i>Mount upside down</i> check box setting is incorrect.	From <i>Equipment / Lightbar</i> check the <i>Mount upside down</i> setting.
	The <i>Chase Lights / Center Lights</i> setting is incorrect.	From <i>Equipment / Lightbar</i> check the <i>Chase Lights / Center Lights</i> setting is correct.
Field layer does not appear in <i>Select Field Layers</i> dialog.	The shapefile is not in WGS-84 decimal degrees.	Convert the file to WGS-84 decimal degrees in your GIS package.

Table A.1 Common problems and solutions (Continued)



Problem	Possible causes	Solution
Guidance is sluggish.	Outputs on AgGPS132 Port B are enabled.	Check that all outputs on AgGPS132 Port B are disabled. If you need to use outputs from Port B enable them one at a time and test that the performance is still acceptable.
	Look ahead time is too high.	Reduce look ahead time.
Feature softkeys are blank.	No Features have been set up.	See Features, page 192.
Cannot log on.	If a variable rate controller or an external switch is connected it takes precedence over the External Keypad or the  softkey.	Turn on the variable rate controller master boom switch to start logging.
	There is no CompactFlash card inserted.	Insert a data card.
The software gets noticeably slower over a few weeks, or you get a warning that the software has run out of memory.	The power source to the AgGPS 170 Field Computer must be switched off when the vehicle is switched off.	Power the AgGPS 170 Field Computer using the ignition switch Check the internal battery.
Select Field is slow.	Very large numbers of features in a field can cause the field to take a long time to load.	In future, map fewer features.
The AgGPS 170 software locks up or crashes.	This may be a software error.	Hold  down for about 45 seconds to reset the AgGPS 170 Field Computer. If this happens more than once advise Trimble what you did before the problem occurred.
Software freezes after splash screen during bootup.	If you pull the data card out too soon (within 15 seconds) after powering off, the PCMCIA drivers can stop working.	Try removing the external power for 1 minute. If you get data card errors about lost or invalid clusters, try reformatting the data card.

Table A.1 Common problems and solutions (Continued)











Problem	Possible causes	Solution
Software freezes when you plug in a data card.	If you view files on your office computer using a program like ArcExplorer or Excel, and remove the card without closing the files, the files can be corrupted.	Always close files before removing the data card.
The AgGPS 170 Field Computer doesn't recognize the data card.	The AgGPS 170 Field Computer can occasionally have problems reading data cards which have been accessed using third party PCMCIA card drivers on Windows 95 and NT.	To avoid problems with PCMCIA card drivers, Trimble recommends that you use Windows 98 or Windows 2000 on your office computer.
When you insert a CompactFlash adaptor in an office computer, it warns that it has found new hardware, and asks you if you want to install a new driver for it.	The CompactFlash adaptor is faulty.	Buy a new CompactFlash adaptor.
The display turns off during the upgrade process.	May occasionally occur when upgrading from very early software versions.	Press  and the upgrade will continue.
The coverage logging disappears when power is lost.	Faulty backup battery.	Check the backup battery status in the <i>Help – About...</i> dialog. If the battery is faulty, return the AgGPS 170 Field Computer to Trimble for servicing.
The Plan View Map zooms out a long way.	The prescription file is for the wrong field, and is located a long way away from the current field. <i>Zoom All</i> is trying to include the current field and the loaded prescription.	Try   Load the correct prescription file.

Table A.1 Common problems and solutions (Continued)

Problem	Possible causes	Solution
There are gaps in the track logging file.	Track logging is suspended while swaths are being generated. This may happen if you change the swath direction.	Remain stationary while changing swath direction to avoid losing valuable position data.
Changing the rates on a Rawson Controller gives a comms error	The controller is in Non GPS mode but the AgGPS 170 Field Computer thinks it should be in GPS mode	Reload the work order, and when the message appears, press  to use the controller in Non GPS mode Set the controller to GPS mode
Distance or direction to feature do not work very well.	If you map features more than 4 km from the center of the field, the AgGPS 170 Field Computer may experience problems locating the closest feature.	Close the field and reselect it.
Loops are removed.	Very small loops are intentionally removed from field boundaries and coverage polygons so that minor position variations, that occur when you are moving very slowly or stopped, do not give misleading results.	If you do not want loops removed from the field boundary, map the boundary and loops continuously in one direction without crossing over your previously mapped boundary.
Hooks on the end of swaths.	Sharp turns at the beginning or end of curve swaths.	Avoid sharp turns when logging curved swaths.
History softkey defaults are not read from the AgGPS_Names.txt file.	The AgGPS 170 Field Computer does not read the defaults from the Names.txt file if you load a data dictionary.	Copy the history softkey defaults from your Names.txt file to the start of your data dictionary file.
 and  selects the wrong swath.	If you hold  or  down for more than half a second, the AgGPS 170 Field Computer skips through swaths quickly.	Release  or  within half a second.

Fields displayed in ArcExplorer and ArcView are distorted

ESRI ArcExplorer and ArcView do not apply a longitude scaling factor when displaying latitudes and longitudes. Near the equator this has no effect, but at higher values of latitude, square fields appear rectangular in ArcExplorer and ArcView. The higher the value of latitude, the more obvious this effect becomes.

If more accurate maps are required you need to use a GIS that applies a longitude scaling factor.

The approximate stretching of longitude is:

- 1.5:1 at 50 degrees latitude
- 2:1 at 60 degrees latitude
- 3:1 at 70 degrees latitude

Figure A.1 shows an example of a field at 60 degrees latitude displayed on the AgGPS 170 Field Computer and the same field displayed using ArcExplorer.

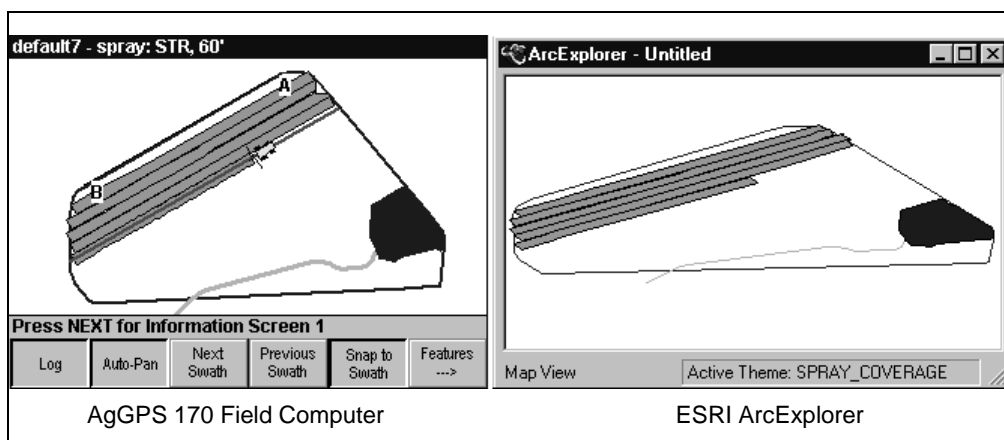


Figure A.1 Stretching effect at 60 degrees latitude

Error Messages

Error messages are generated by the AgGPS 170 Field Computer system to alert you to situations where you need to take some action to ensure that the system continues to operate properly.

Power Supply Messages

The AgGPS 170 Field Computer monitors the state of the power supply and provides error messages to warn you of power supply problems.


Low Battery

The backup battery is only provided to make sure that power loss does not result in data loss. The AgGPS 170 Field Computer cannot run normally on the backup battery. If the power is restored within 10 seconds the message will disappear, and the AgGPS 170 Field Computer will continue to operate normally.


Otherwise the unit will shut down. You should check all power connections.

Abnormal shut down detected

This message appears when you turn the AgGPS 170 Field Computer on, if the system was not shut down properly last time.

The AgGPS 170 Field Computer should always be shut down by pressing the  key before switching off the ignition. Failure to do this will shorten the life of the backup battery.



Warning – The AgGPS 170 Field Computer should always be wired to the power supply through the ignition switch or some other isolating switch. Never wire it direct to the battery, as the  key only suspends the unit, and does not switch the system off completely.

Internal Battery Failure

This message appears when you turn the AgGPS 170 Field Computer on, if the internal battery needs replacing.



Warning – You can continue working provided you have a reliable power supply, but if the message persists, you should contact your Trimble dealer as soon as possible. If you switch the power off without closing the field, or your power supply fails, before the internal battery is replaced, the AgGPS 170 Field Computer will not be able to close files properly, and data will be lost.

GPS Messages

When the AgGPS 170 Field Computer loses GPS signals or if the quality of the signal is unacceptable, some functions are disabled to prevent unsatisfactory performance, and a message is displayed on the screen. In some circumstances this message automatically disappears when normal GPS returns.

GPS receiver configuration failed

This message only occurs when GPS is set to AgGPS NMEA. The AgGPS 170 Field Computer tries to automatically configure the GPS receiver, but gets no response. If you are not using a Trimble AgGPS receiver, choose NMEA GGA / ZDA. For more information, see GPS, page 221 and Appendix B, Configuring the GPS Receiver.

Invalid GPS

Possible causes are an incorrect baud rate, NMEA setting in the *GPS* dialog, or NMEA setting on the receiver, or you have plugged the receiver cable in to Port B rather than Port A.

No GPS

The most probable cause of this message is the receiver is not connected.

Warning Messages

Warning messages are generated by the AgGPS 170 Field Computer to alert you to situations where you need to take some action to ensure that information is not lost.

Most of these messages (apart from GPS status and system messages) are full screen messages, and suggest what action you should take.

GPS Status

When there is a problem with the GPS signal a message is flashed on the screen over the top of the *Plan View Map* approximately once a second. If the problem is serious, logging is disabled. For a list of the messages and possible solutions, see Table 2.1 on page 109.

Variable Rate Controller Messages

The AgGPS 170 Field Computer checks for valid data coming from a variable rate controller, and displays messages if there are errors found.

If the active channel configuration is incorrect one of the following messages may be displayed:

- Active channel “<channelname>” has not been configured on the variable rate controller
- Channel name “<channelname>” is not valid for controller type “<controllername>”.
- Invalid active channel name

Work Order Messages

The AgGPS 170 Field Computer checks for valid data in a work order, and displays messages if there are errors found.

If any of the following messages appear, check the work order or configure the controller manually using the *Variable Rate Controller* dialog:

- Boundary does not overlap prescription
- This prescription has an invalid rate column
- Controller type is invalid or missing
- Active channel missing
- Rawson controller with invalid step size
- Rawson controller with invalid nominal rate

System Messages

The following system messages may appear.

Training Mode




When the system is in Training Mode a message flashes on the top right hand corner of the screen. The list of fields available in the *Select Field* dialog changes. Only the fields mapped in Training Mode are listed.

For more information on Training Mode, see Training Mode, page 3.

Paused

When the field is paused a message flashes on the top left corner of the screen.

Do one of the following to resume:

- From the *Field* menu, select *Resume*
- Press  and 
- Press  to resume and start logging

- Log on using the External Keypad or spray switch

Swath Parameter Messages

If you select an existing field that was last worked on with different swath parameters from the current parameters, the AgGPS 170 Field Computer gives a warning.

Small Fields

Mapping very small fields is not an intended use of the AgGPS 170 Field Computer. If you change the swath width or pattern and then select a very small field using the new swath width or pattern, there may not be enough room to create the new swath pattern.

If you try to map a very small field with the *Expand field by 1/2 swath width* check box selected, there may not be enough room to expand the boundary. One of the following messages may appear:

- The field is very small relative to the current swath width
- No swaths were generated
- Try changing swath width, pattern or direction

This message is displayed instead of the *Pattern Check Map* if the field is so small that no swaths can be generated.

Try clearing the check box, reducing the swath width, or mapping a larger field.

CompactFlash Data Card Messages

The following data card messages are generated by the AgGPS 170 Field Computer.

There is no data card

When there is no data card in the data card slot the storage bar turns red and displays No Card. If you attempt to create or select a field the AgGPS 170 Field Computer displays a warning message.

The data card is nearly full

When there is only approximately 10 hours of storage space left on the data card, this message appears. Trimble recommends that you insert a new data card before starting a new event or mapping a new field. You can continue, but track logging and variable rate logging are disabled, and the next message will appear when space is reduced to approximately 1 hour.

Event logging has been disabled

A message appears warning you that event logging is disabled when there is only about 50 kB of space left on the data card. At this point, coverage logging, adding waypoints, saving configurations, saving screen snaps and record input are all disabled.

Windows CE Operating System Messages

Some warning messages about the data card are created by the Windows CE operating system, and some are created by the application.

The following messages can be produced on the AgGPS 170 Field Computer by the Windows CE operating system, or possibly on the office computer when transferring data from the data card:

- The disk in drive E is not formatted, do you want to format it now
- Unidentified PCcard adaptor
- The volume does not contain a recognized file system

Usually this is caused by removing the card from the AgGPS 170 Field Computer before it has finished saving files.

To fix this, reinsert the data card.

Corrupted CompactFlash Data Cards

Files on the data card can occasionally get corrupted due to:

- the card being removed while data is being written to it
- strong magnetic fields
- a dirty or damaged connector

This may result in Windows CE giving storage card error or warning messages referring to invalid or used clusters.

Sometimes these messages lose focus and sit in the middle of the screen covering the *Plan View Map*. If this happens, try pressing the power key to shut down the AgGPS 170 Field Computer software, and then try to operate the *Error/Warning* dialog. Alternatively you can try turning on the AgGPS 170 Field Computer without the card inserted, and then insert the card once *Plan View Map* is displayed. This usually causes the error message to get focus.


Once the message has focus, then selecting **YES** or **OK** seems to fix around 50% of these errors.

You might also be able to fix the card by inserting the card in your PC, and using Windows Explorer, right-click on the appropriate drive letter, select *Properties*, select the *Tools* tab, and select the *Check Now* option.

If problem remains, try to copy your data off the card and reformat it.

Storage card warning

The system has not finished updating the files in the storage card folder. Please reinsert the storage card now

This error can occur if you remove the card too early. Reinserting the card and pressing  will usually fix this problem.

Insert card Press ENTER

This error may occur if the card is so badly corrupted or damaged that the AgGPS 170 Field Computer does not recognize it at all. If this happens, then the *Select Field* dialog will not show any fields available, and if you try to define a new field an error is given.

You may be able to fix the card by inserting the card in your PC and, using Windows Explorer, right-clicking on the appropriate drive letter, selecting *Properties*, and then in the *Tools* tab, selecting the *Check Now* option. If the problem remains, try to copy your data off the card and then reformat it.

If this error occurs with a new card, then there may be a problem with the AgGPS 170 Field Computer. Contact your dealer and arrange for inspection and/or servicing of the AgGPS 170 Field Computer.

Glossary

This section defines technical terms and abbreviations used in this manual.

2D Shapefile	Standard ESRI point, line or polygon shapefile format.
3D Shapefile	ESRI PointZ, PointM, LineZ, LineM, PolygonZ, PolygonM shapefile format introduced in ArcView version 3.1.
A-B line	A straight or curved line between two specified points which provides a reference line for parallel swathing.
Application width	The width of material application.
Approach zone	An area before the start and end of a line. This area indicates that the start or end of the line is approaching. The approach zone distance can be configured based on look ahead time or distance. For example, if the <i>Approach LED Interval</i> is set to 30 m, the approach zone LED changes color 30 m before the start or end of a swath line.
ArcExplorer and ArcView	Office software from ESRI that lets you view field and event data.
Attribute	A piece of descriptive information about an event. For example, you can have the attributes of application timing, wind speed, temperature, etc. Each event will have its own values for these attributes.

Base station	A base station can be set up with AgGPS 170 Field Computer which includes a GPS receiver, radio transmitter, and modem. This station generates differential corrections and transmits them to the vehicle to improve position calculation accuracy. Contact your Trimble dealer for more information.
CAN	Controller Area Network. A system used for communication between AgGPS 170 Field Computer and other agricultural machinery.
Carrier	A medium (generally water) in which the chemical or granules are suspended before spraying.
Data Card	The plug-in storage card which can be removed to take data into the office for analysis in a GIS.
Dialog	Any screen where you enter text or numbers, or select check boxes or option buttons.
Differential Global Positioning System (DGPS)	A technique involving the use of GPS satellite technology and radio telemetry to calculate a position to less than one meter accuracy.
Event	A single agricultural activity (such as the application of fertilizer or pesticide) in a field.
Farm	A collection of fields.
Features	Points, lines, or areas which can be recorded in a field to identify areas for special attention, such as weeds, rocks, or pests.
Field	A defined polygon, comprising any number of sides, in which agricultural management occurs.
Fix	A packet of related data recorded at some instant of time (that is, data which is logged at an instant of time).

Geographic Information System (GIS)

A computerized system used to input, manage, manipulate, analyze, and display geographic data in digital form.

Global Positioning System (GPS)

A system involving the use of satellite technology to calculate an accurate three-dimensional position. A GPS system consists of a space segment (up to 24 NAVSTAR satellites in 6 different orbits), the control segment (5 monitor stations, 1 master control station and 3 upload stations), and the user segment (GPS receivers)

NAVSTAR satellites carry extremely accurate atomic clocks and broadcast coherent simultaneous signals.

Headlands

Swath circuits or end rows around the boundary of a field.

Lightbar

An array of LEDs to provide information on the current position relative to the guidance line. The lightbar can also display useful information, such as speed, swath number, and GPS mode. Lightbar information is updated five times per second.

Logging

The process of recording coverage polygons showing the areas where a material has been applied to a field.

Log off

The process of stopping the AgGPS 170 Field Computer from logging coverage data.

Log on

The process of activating the AgGPS 170 Field Computer coverage logging facility.

NMEA

A standard established by the National Marine Electronics Association (NMEA), that defines electrical signals, data transmission protocol, timing, and sentence formats for communicating navigation data between marine navigation instruments.

No Corrections (NO CORCT)	The term used to describe DGPS operation when no differential correction information is available. Positions calculated without differential information are accurate to within 10 meters (with differential information, accuracy of less than one meter is possible).
Pattern Check Map	A graphic screen which is used to confirm that the pattern is correct. It displays the field boundary and swath pattern.
Plan View Map	A graphic screen which shows the field boundary, features, swath lines, and coverage polygons in a field.
Polygon	Multi-sided closed-loop figure representing a field boundary.
Position Dilution Of Precision (PDOP)	A measure of the quality of the GPS position. PDOP values below seven are satisfactory (the ideal PDOP value is one, and values from 2 to 4 are good).
Prescription file	A set of files containing information about rates to be sent from the AgGPS 170 Field Computer to a variable rate controller.
Real-time	This term literally means 'to be performed immediately, not at some later time'. Differential corrections for position are obtained in 'real-time' within the AgGPS receiver (there is no need to postprocess position data).
RS232 Serial data	A system used for communications between AgGPS 170 Field Computer, the lightbar, a button box, and other agricultural machinery.
RTCM	Radio Technical Commission for Maritime Services, the body responsible for defining and updating RTCM SC-104.
RTCM SC-104	A standard format for differential GPS corrections; used to transmit corrections from base stations to mobile GPS receivers.

Signal-to-noise ratio (SNR)	A value indicating the quantity of external ‘noise’ interfering with satellite signal strength. SNR values range from 4 (very weak satellite signal) to 40.
Softkeys	Graphic on-screen keys associated with physical front panel keys. The function performed by the softkey varies depending on the current screen.
Swath	The width of material application.
Timeout	On occasions GPS receivers fail to receive satellite signals and are therefore unable to calculate positions—this is referred to as a GPS timeout condition. During timeout, AgGPS 170 Field Computer warns the operator.
Variable rate controller	Control system for varying the rate of application of materials to a field.
WGS-84	World Geodetic System 1984 is an ellipsoidal model of the geoid.
Work order	A database file created in the office, and loaded on to the AgGPS 170 Field Computer, containing details of work to be carried out in the field.
Zoom all	Shows the full field or mapped area, and logging and features at the maximum size that will fit on the screen.
Zoom in	Shows a smaller area of the graphical display in more detail.
Zoom out	Shows a larger area of the graphical display in less detail.
Zoom to field	Shows just the full field or mapped area at the maximum size that will fit on the screen.

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Reader Comment Form

AgGPS 170 Field Computer User Guide
P/N 38362-00-ENG

March 2001
Revision E

We appreciate your comments and suggestions for improving this publication.
Contributors of particularly helpful evaluations will receive a thank-you gift.

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