

ROS (Raven Operating Software) Basic Operation Manual

016-0171-539 Rev. L

8/2019

E33274



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Chapter 1	Important Safety Information.....	1
	Instructions for Wire Routing	2
	Instructions for Hose Routing	3
Chapter 2	Introduction.....	5
	ROS Features	5
	Raven Operating Software Platform	5
	Universal Terminal and Task Controller Capability	6
	Updates	7
Chapter 3	Start Up.....	9
	Power Button and Status	9
	Viper 4+ Built-In Self Test	10
	Understanding Icon Border Colors	10
	Device Shut Down	10
	Initial Start Up Overview	11
	Language and Units	11
	Capturing Screen Shots	11
	Initial Machine Configuration	12
Chapter 4	Navigation Overview.....	13
	Home Screen and Panel Navigation	13
	On-Screen Keyboard	13
	Status Header	14
	Administrator or User Panel	15
	Machine Configuration Panel	16
	Product Configuration Panel	17
	UT Panel	18
	Job Profile Panel	18
	Guidance Views and Widgets	19
	View Selection	19
	Widget Selection and Set Up	20
	Alerts and Alarms	20
Chapter 5	Administrator and User Profiles	21
	Overview	21
	PIN Security and Profile Reporting	21
	Administrator Profile	21
	Managing User Profiles	21
	Creating User Profiles	22
	Editing or Deleting User Profiles	22
	Calibrating the Touch Screen	22
	Demonstration Mode	23
	User Profile Settings Definition	23
	General User Settings	23
	Product Control User Settings	28

Chapter 6	System Manager	29
	System Manager Overview	29
	ROS Information and Updates	30
	ROS Download Example	30
	Installing ROS Updates	31
	Reverting to Previous ROS Versions	32
	Hardware Information and Updates	32
	Installing CANbus or ISOBUS Firmware Updates	33
	Node Recovery Mode	33
	Feature Keys and Activation	34
	Permanent Feature Activation	34
	Temporary Key	35
	Slingshot® Field Hub	35
	Hardware Information	36
	General	36
	Lifetime	36
	Usage	36
	Networking	36
	License	37
Chapter 7	File Manager	39
	File Manager Overview	39
	Using the File Manager	40
	Using Filters and Renaming Files	40
	Selecting Files	41
	Grower, Farm, Field (GFF) Manager	41
	Delete Files	43
	File Export	43
	Export Job Reports and Coverage Information	43
	Export Other Field Operation Files	45
	Export ISO Task Data	46
	Exporting A Wallpaper	47
	USB Import Manager	48
	Import Grower, Farm Field (GFF) Folder Structure	49
	Import CAN Node Updates	50
	Import Jobs	51
	Import a Slingshot Archive	52
	Import Prescription (Rx) Maps	53
	Import Scout Groups	54
	Import Guidance Lines	56
	Import ISO TASKDATA	57
	File Transfer History	57
	File Management Options	57
Chapter 8	Machine Panel and Configurations	59
	Overview	59
	Automatic Machine Configuration Detection	59
	Filter Machine Configurations	60

Machine Configuration	60
Create a New Machine Configuration	60
Edit an Existing Machine Configuration	61
Delete an Existing Machine Configuration	61
Machine Profiles	62
Self-Propelled Machine Profiles	62
Tractor Profiles	65
Pull-Type Implement Profiles	67
Section Groups and Section Settings	69
View Section Groups	70
Section Settings	70
Machine Configuration and Profile Settings Definitions	72
Panel Navigation	72
Machine Configuration Tab	74
General Information Tab	75
Measurements Tab	76
Equipment Tab	77
Section Group Settings Definitions	78
Equipment Setup - General Information Tab	79
Equipment Setup - Measurements Tab	80
Equipment Setup - Sections Tab	81
Chapter 9 Differential GPS (DGPS) Set Up	83
GPS Information and Diagnostics	83
Redetect DGPS Devices	83
GPS Solution Information	83
Enable GPS Reverse Sensing	84
View Current GPS Warnings	85
Select a Generic Differential Type	86
GPS Configuration	87
Reset Receiver Defaults	87
Configure a Differential Type	87
Set the Elevation Mask	88
Set GPS Message Outputs	88
GPS Receiver Information	89
Unlock DGPS Receiver Features	89
Receiver Firmware Updates	90
Updating the Receiver Firmware	91
Raven Receiver Settings Definitions	93
Differential Settings Tab	94
GPS Output Tab	99
GPS Information Tab	100
Authorization Code Entry Tab	101
Chapter 10 Serial Device Set Up.....	103
Serial Device Information	103
Serial Device Detection	103
Light Bar Devices	104

Table of Contents

Light Bar Display Settings	104
Light Bar Port Configuration	104
Weather Station Devices	105
Weather Station Settings	105
GreenSeeker® Devices	106
GreenSeeker Communication Settings	106
Camera Configuration	107
networking Configuration	108
Connect to Wi-Fi	108
Manually Add a Wi-Fi Network	108
Wi-Fi Priority	109
Enabling Wi-Fi Hotspot	110
Chapter 11 CANbus Device Set Up	111
CANbus Overview	111
CANbus Detection and Version Information	111
Node or ECU Version Information	111
Retry CANbus Communication	112
Multi-Channel Node or ECU Configuration	112
Readdressing Control Channels	113
Reset CANbus Nodes	114
Node Features and Activation Status	114
Speed Sensor Set Up	115
Switch Box Options	116
Existing Equipment Switches	116
Raven Switch Pro™ and CAN Switch Box	117
Physical Section Switches	117
Physical Switch Box Setup	118
On-Screen Switch Box Options	118
CANbus Troubleshooting	120
Chapter 12 Product Panel and Configurations	121
Overview	121
Product Configurations	121
Create a New Product Configuration	121
Edit an Existing Product Configuration	122
Assign a Product Configuration (for agX)	122
Delete an Existing Product Configuration	123
Product Channel and Ingredient Set Up	123
Product Reporting Information	123
Mix Ratios and Ingredients	124
Chapter 13 Job Profile Panel and Configurations	127
Overview	127
Job Profiles	127
Job Profile Panel Overview	127
Job Filter and Sort	128

Job Profile Editor	128
Job Profile Setup	128
Create a New Job Profile	128
Edit an Existing Job Profile	129
Delete a Job Profile	129
Starting a Job	130
Start or Resume a Job	130
agX Job	131
Cloud Jobs	133
Modifying Pre-populated Jobs	134
Ending a Job	136
System Shutdown	136
Chapter 14 Guidance Screens and Widgets	137
Overview	137
Ending an Active Job	137
Operation Displays	138
Views	138
Zoom and View Tools	138
Alarms	139
Active Alarms	139
Alarm History	139
Alarm Settings	140
Screen Layout Configurations	140
Create a New Screen Layout	140
Copy an Existing Screen Layout	141
Delete a Screen Layout	141
Edit a Screen Layout	141
Widget Selection and Set Up	142
Add Widgets to a Screen Layout	142
Move Widgets to Modify a Screen Layout	142
Remove a Widget from a Screen Layout	143
Widget Catalog Definitions	143
Operational Widgets	143
Accessory Application Widgets	144
GPS Widgets	144
GPS Summary	145
Guidance Widgets	145
Implement Status and Control Widgets	147
Product Control Widgets	148
ISO Widgets	149
Bin Chaining	149
Manual Chain Setup	150
Bin Chain Job Widgets	151
Bin Chain Errors	153
Chapter 15 AB Guidance Utilities and Nudge Features.....	155
Guidance Patterns Overview	155

Table of Contents

Straight (AB) Line	155
Pivot	155
Fixed Contour	155
Last Pass	156
Last Pass Swathing	156
Setting Guidance Paths	157
To Select a Guidance Pattern	157
Set a Straight (AB) Line	158
Setting Straight Line Guidance Using a Heading	158
Set a Pivot Line	159
Set a Fixed Contour Line	159
Recalibrate AB Guidance Path	159
Reset AB Guidance Path	160
Saving Guidance Paths	160
Loading a Saved Guidance Path	161
Nudge Features and Tools	161
Configuring Nudge Values	161
Activating and Using Nudge	162
Reset Nudge	162
Chapter 16 Scout Groups and Features	163
Important Safety Notes	163
Scout Groups Overview	163
Scouting Widget	163
Scouting Features	163
Scout Group Manager	164
Create a New Scout Group	164
Load a Scout Group	165
Delete a Scouting Feature	165
Copy a Scouting Feature	165
Scout Feature Setup	166
Recording a Field Feature	167
Auto Point Capture	167
Manual Point Capture	167
Creating a Flip area	168
Configuring Flip settings	168
Activating or deactivating Flip	168
Street Maps	168
Street Maps for agX	171
Chapter 17 Tally Registers	173
Tally Register Prompt	173
Appendix A Calculating the Calibration Values.....	175
Speed Cal	175
Radar Speed Sensors	176
Wheel Drive Speed Sensor	176

Boom or Section Width Calibration **178**
Liquid Control Systems **178**
Granular Control Systems **178**

CHAPTER

1

IMPORTANT SAFETY INFORMATION

DANGER

CHEMICAL AND AGRICULTURAL PRODUCT SAFETY

- Thoroughly bleed or rinse the nurse tank hose and all other system lines of chemical or product prior to disassembling the flow meter, fittings and hoses, especially in the case of anhydrous ammonia (NH₃) application systems.
- Follow all label instructions for proper chemical mixing, handling, and container disposal methods.

CAUTION

HYDRAULIC SAFETY

- Wear appropriate protective equipment at all times when working on any hydraulic system.
- Ensure the ROS device is disabled prior to starting maintenance work on the machine or control system components.
- Never attempt to open or work on a hydraulic system with the equipment running. Always take care when opening a system that has been previously pressurized.
- Use caution when disconnecting or purging hydraulic hoses, be aware that the hydraulic fluid may be extremely hot and under high pressure.
- Perform any work on the hydraulic system in accordance with the machine manufacturer's approved maintenance instructions.
- When installing hydraulics or performing diagnostics, maintenance or routine service, ensure that precautions are taken to prevent any foreign material or contaminants from being introduced into the machine's hydraulic system. Objects or materials that are able to bypass the machine's hydraulic filtration system will reduce performance and possibly damage the hydraulic valves.

ELECTRICAL SAFETY

- Disconnect the ROS device and all electrical components of the Raven system before jump-starting the vehicle or welding on any component of the equipment.

NOTICE

Read this manual and the operation and safety instructions included with the equipment and/or controller carefully before installing the ROS device.

- Follow all safety information presented within this manual.
- If you require assistance with any portion of the installation or service of Raven equipment, contact a local Raven dealer for support.

- Follow all safety labels affixed to the system components. Be sure to keep safety labels in good condition and replace any missing or damaged labels. Contact a local Raven dealer to obtain replacements for missing or damaged safety labels.

When operating the machine after installing the ROS device, observe the following safety measures:

- Be alert and aware of surroundings.
- Do not operate the ROS device while under the influence of alcohol or an illegal substance.
- Remain in the operator's position in the machine at all times when the ROS device is engaged in product control functions or while any additional automated features are operating. Disable these functions or features when exiting the operator's position.
- Determine and remain a safe working distance from other individuals. The operator is responsible for disabling the ROS device or any optional features when the safe working distance has been diminished.

INSTRUCTIONS FOR WIRE ROUTING

The word "harness" is used to mean all electrical leads and cables, bundled and unbundled. When installing harness, secure it at least every 30 cm (12in) to the frame. Follow existing harness as much as possible and use these guidelines:

Harness should not contact or be attached to:

- Lines and hoses with high vibration forces or pressure spikes
- Lines and hoses carrying hot fluids beyond harness component specifications

Avoid contact with any sharp edge or abrading surfaces such as, but not limited to:

- Sheared or flame cut edges
- Edges of machined surfaces
- Fastener threads or cap screw heads
- Ends of adjustable hose clamps
- Wire exiting conduit without protection, either ends or side of conduit
- Hose and tube fittings

Routing should not allow harnesses to:

- Hang below the unit
- Have the potential to become damaged due to exposure to the exterior environment. (i.e. tree limbs, debris, attachments)
- Be placed in areas of or in contact with machine components which develop temperatures higher than the temperature rating of harness components
- Wiring should be protected or shielded if it needs to route near hot temperatures beyond harness component specifications

Harnessing should not have sharp bends

Allow sufficient clearance from machine component operational zones such as:

- Drive shafts, universal joints and hitches (i.e. 3-point hitch)
- Pulleys, gears, sprockets
- Deflection and backlash of belts and chains
- Adjustment zones of adjustable brackets

- Changes of position in steering and suspension systems
- Moving linkages, cylinders, articulation joints, attachments
- Ground engaging components

For harness sections that move during machine operation:

- Allow sufficient length for free movement without interference to prevent: pulling, pinching, catching or rubbing, especially in articulation and pivot points
- Clamp harnesses securely to force controlled movement to occur in the desired harness section
- Avoid sharp twisting or flexing of harnesses in short distances
- Connectors and splices should not be located in harness sections that move

Protect harnesses from:

- Foreign objects such as rocks that may fall or be thrown by the unit
- Buildup of dirt, mud, snow, ice, submersion in water and oil
- Tree limbs, brush and debris
- Damage where service personnel or operators might step or use as a grab bar
- Damage when passing through metal structures

IMPORTANT: Avoid directly spraying electrical components and connections with high pressure water. High pressure water sprays can penetrate seals and cause electrical components to corrode or otherwise become damaged. When performing maintenance:

- Inspect all electrical components and connections for damage or corrosion. Repair or replace components, connections, or cable as necessary.
- Ensure connections are clean, dry, and not damaged. Repair or replace components, connections, or cable as necessary.
- Clean components or connections using low pressure water, pressurized air, or an aerosol electrical component cleaning agent.
- Remove visible surface water from components, connections, or seals using pressurized air or an aerosol electrical component cleaning agent. allow components to dry completely before reconnecting cables.

INSTRUCTIONS FOR HOSE ROUTING

The word "hose" is used to mean all flexible fluid carrying components. Follow existing hoses as much as possible and use these guidelines:

Hoses should not contact or be attached to:

- Components with high vibration forces
- Components carrying hot fluids beyond component specifications

Avoid contact with any sharp edge or abrading surfaces such as, but not limited to:

- Sheared or flame cut edges
- Edges of machined surfaces
- Fastener threads or cap screw heads
- Ends of adjustable hose clamps

Routing should not allow hoses to:

- Hang below the unit
- Have the potential to become damaged due to exposure to the exterior environment. (i.e. tree limbs, debris, attachments)
- Be placed in areas of or in contact with machine components which develop temperatures higher than the temperature rating of hose components
- Hoses should be protected or shielded if it needs to route near hot temperatures beyond hose component specifications

Hoses should not have sharp bends

Allow sufficient clearance from machine component operational zones such as:

- Drive shafts, universal joints and hitches (i.e. 3-point hitch)
- Pulleys, gears, sprockets
- Deflection and backlash of belts and chains
- Adjustment zones of adjustable brackets
- Changes of position in steering and suspension systems
- Moving linkages, cylinders, articulation joints, attachments
- Ground engaging components

For hose sections that move during machine operation:

- Allow sufficient length for free movement without interference to prevent: pulling, pinching, catching or rubbing, especially in articulation and pivot points
- Clamp hoses securely to force controlled movement to occur in the desired hose section
- Avoid sharp twisting or flexing of hoses in short distances

Protect hoses from:

- Foreign objects such as rocks that may fall or be thrown by the unit
- Buildup of dirt, mud, snow, ice, submersion in water and oil
- Tree limbs, brush and debris
- Damage where service personnel or operators might step or use as a grab bar
- Damage when passing through metal structures
- High pressure wash

This document provides information regarding the following aspects of the Raven Operating Software (ROS):

- Initial setup and navigation
- File maintenance
- Updates
- Feature activation

ROS FEATURES

The following sections provide an overview of Raven Operating Software (ROS) capabilities and features.

RAVEN OPERATING SOFTWARE PLATFORM

Raven Operating System (ROS) is designed to assist with managing multiple operators, various implements, a constantly growing and changing list of agricultural products, and various field operations throughout the growing season.

- Multiple user profiles allow the system administrator to set up multiple operators. Each user profile may configure various user preferences to ensure that the operator is comfortable using the system.
- Machine configurations allow the system user to configure ROS for multiple tractor and implement types. As the ROS device is moved from implement to implement, the device will detect the machine configuration for the equipment with which the device is currently running to simplify operation preparation.
- Preconfigured product and job profiles allow the system user to set up operation or application details which allow the equipment operator to quickly select preconfigured settings for the product loaded and the job or operation to perform and begin field work without setting up the system.

The system administrator may view and use the above information from the job report to make administrative decisions required with as much information as needed for the specific operation.

NOTE: Please review this manual for details on setting up user or job profiles and equipment or product configurations.

CUSTOMIZABLE 2D AND 3D GUIDANCE SCREENS AND WIDGET DASHBOARD

ROS features widget based screens for field operation and guidance. Select from various widgets to customize the information displayed on the screen during field operations and may customize the widget layout to keep important operation information or operation tools available at a glance. Save each screen profile to quickly recall and view additional information as necessary or as different tasks become more critical for the field operation.

NOTE: Refer to Chapter 14, *Guidance Screens and Widgets*, for additional information about widgets or saving and using screen profiles.

During field operations, ROS provides either a two or three dimensional view of the equipment location within the field area. ROS also utilizes the configured equipment geometry to provide a swath guidance line on the ROS display to assist the operator and keep the equipment on track during the field operation.

NOTE: This guidance path may also be used by automated steering systems such as Raven SmarTrax to automatically steer the equipment onto the displayed swath guidance line, to help reduce operator fatigue and allow the operator to monitor input or application systems.

ON-SCREEN MAPPING AND JOB REPORTING

During field operations, ROS monitors and tracks the vehicle location and records input or application systems. As active sections or the working equipment width covers field area, ROS creates a live map of previous equipment coverage. When the job is complete, ROS compiles the location and any population, rate, or yield information into a report file for transfer to a home or office PC. The reports may be edited and used for customer billing, tracking product input for government purposes, or to help plan future crop inputs and field operations.

Job reports must be transferred to a Slingshot® user account via either a Slingshot Field Hub or a USB flash drive. The Slingshot web service is free and does not require any hardware or monthly subscriptions to utilize the reporting features of the web site. With a Slingshot Field Hub, files may be transferred to the equipment cab from a home or office PC and completed job reports may be transferred from the cabin to the home or office via the wireless network.

Visit the Slingshot web site for more information or to locate a local Slingshot dealer for additional assistance with available Slingshot services.

<https://portal.ravenslingshot.com>

UNIVERSAL TERMINAL AND TASK CONTROLLER CAPABILITY

ROS devices are capable of interfacing with many ISOBUS control systems via the universal terminal capabilities. This feature allows the operator to monitor or control various aspects of the vehicle or implement over an ISOBUS network via the ROS device display without the need for additional displays or control consoles in the vehicle cabin.

TASK CONTROLLER

The ISO Section Control activation key allows AccuBoom to control implement sections that is connected to the task controller. The task controller is required to allow the ROS UT to automatically control sections based upon field position and previous coverage data collected during the application.

NOTE: The task controller unlock is not included with the free UT capabilities. Contact a local Raven dealer for additional information or pricing.

UPDATES

Product software and documentation updates may be made available periodically on the Raven Applied Technology web site:

<https://portal.ravenprecision.com>

At Raven Industries, we strive to make your experience with our products as rewarding as possible. One way to improve this experience is to provide us with feedback on this manual.

Your feedback will help shape the future of our product documentation and the overall service we provide. We appreciate the opportunity to see ourselves as our customers see us and are eager to gather ideas on how we have been helping or how we can do better.

To serve you best, please send an email with the following information to

techwriting@ravenind.com

- ROS (Raven Operating Software) Basic Operation Manual
- 016-0171-539 Rev. L
- Any comments or feedback (include chapter or page numbers if applicable).
- Let us know how long have you been using this or other Raven products.

We will not share your email or any information you provide with anyone else. Your feedback is valued and extremely important to us.

Thank you for your time.

When powered on for the first time, the ROS device will prompt the operator to configure the machine before proceeding. The following procedure is designed to assist the user or equipment owner with the initial set up and configuration of the ROS device and is recommended to avoiding entering profile calibration information more than once.

Please read the following procedure from start to finish before starting the initial setup. Completing the tasks in the order presented in the following section will help ensure the ROS device and connected systems are ready for operation in the shortest time possible.

POWER BUTTON AND STATUS

To power up the ROS device, press the power button once.

Viper 4



Viper 4+



The power status indicator will flash red and then should illuminate green. If the status indicator stays red or does not illuminate, contact a local Raven dealer for additional assistance.

NOTE: Do not connect any USB drives or devices to the ROS device during the power up sequence.

VIPER 4+ BUILT-IN SELF TEST

If the Viper 4+ fails to display a picture on the screen, perform a Viper 4+ self test to diagnose the issue. The built-in self test will help determine if a black screen symptom is caused by a hardware issue or a software issue.

NOTE: This feature is not available on a Viper 4.

To perform a Viper 4+ self test:

1. Remove power from the Viper 4+ by disconnecting the four pin power plug.
2. Press and hold the power button on the side of the Viper 4+.
3. Reconnect the four pin power plug.
4. Release the power button and note the power button color. If the button is:
 - Green - Hardware is working properly. The cause of the black screen is likely a software issue. Reload the software on the Viper 4+.
 - Yellow - Hardware is functioning properly but the firmware may be corrupt. Use the thumb drive with the appropriate firmware to reinstall the firmware.
 - Red - A hardware issue has occurred. Contact a distributor to schedule the Viper 4+ to be returned to the Raven service department for analysis and repair.
 - No Color - If the power button does not display a color, this could indicate that there is no power being applied to the Viper 4+. Check the power and input with the voltmeter and troubleshoot any external power issues. If power is present at the Viper 4+ power plug, contact your distributor to return the Viper 4+ to the Raven service department for analysis and repair.

UNDERSTANDING ICON BORDER COLORS

The function of each icon is indicated by the border around the icon. If the icon has a gold border it is an icon that can be selected and opened to make adjustments. Icons with a gray, or no, border are informational and will not perform an action if pressed.

DEVICE SHUT DOWN

When finished using the ROS device:



1. Close any active jobs by selecting the home icon in the lower, right corner of the display.
2. Touch the administrator or user panel and select the shut down icon.

INITIAL START UP OVERVIEW



LANGUAGE AND UNITS

1. Touch the Done icon to clear the initial machine configuration prompt.
2. Touch the administrator panel at the top of the display and select the User Profile option.
3. Touch the location information tab and set the desired language at the bottom of the tab display.
4. If desired, update the time zone to the local universal coordinated time (UTC).
5. Touch the unit preferences tab and select the desired base and pressure units for display. These units will be used to enter the machine configuration and calibrate control systems.

NOTE: Refer to Chapter 5, *Administrator and User Profiles*, for additional details on setting up user profiles on the ROS device.

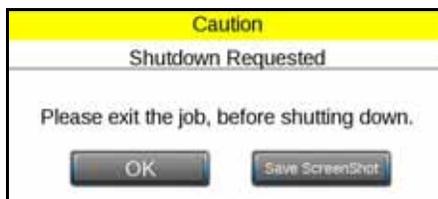
6. Proceed to the *Initial Machine Configuration* section on page 12 to continue the initial set up of the ROS device.

CAPTURING SCREEN SHOTS

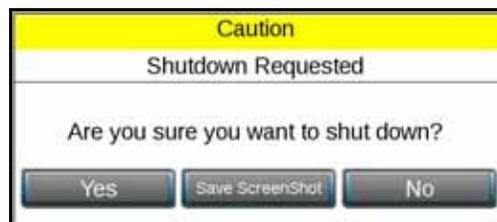
Capturing screen shots is possible while working in and out of jobs.

To capture a screen shot while in a job:

1. Quickly press and release the power button. The screen shot is saved as soon as the power button is pressed. A Shutdown Requested window will open.
2. Press the Save Screen Shot button.



3. To capture a screen shot while not in a job, quickly press and release the power button. A Shutdown Requested window will open.
4. Select Save Screen Shot.



5. After capturing a screen shot, export the data via file maintenance.

INITIAL MACHINE CONFIGURATION



1. Select the Edit icon in the machine configuration panel and touch the add button.
2. Use the on-screen keyboard to enter a name for the machine or equipment configuration. The machine configuration includes the vehicle or tractor and any connected implements, carts, or tanks. Choose a profile name that will assist with identifying profiles with similar components as new profiles are added for future operations.
3. Touch the Tractor Name field and use the on-screen keyboard to enter the name or designation for the vehicle or tractor used with the profile.

FOR EXAMPLE:

When setting up a configuration for a pull-type sprayer, the operator might enter the configuration name as "Liquid Applicator" and the tractor nickname as "Front Wheel Assist."



4. Select Done on the machine configuration tab to return to the machine panel.
5. Locate and select the CAN System icon in the machine panel editor to view CAN system information.
6. Verify that all CANbus nodes are detected and displayed by the ROS device.
7. Readdress any product control nodes connected to the CANbus at this time.
8. Verify any multi-channel nodes are configured correctly for the control channels necessary for the equipment during field operations. Refer to Chapter 11, *CANbus Device Set Up*, for details on readdressing product control nodes and configuring multi-channel control nodes.
9. Finish the machine configuration setup. Refer to Chapter 8, *Machine Panel and Configurations*, for details on setting up and completing machine configurations.
10. If desired, enter product information to set up a product configuration during the initial set up. Refer to the ROS Product Control Calibration and Operation manual for additional assistance with configuring product profiles.
11. If desired, set up Job Profiles for various field operations during the initial set up process if desired. Refer to Chapter 13, *Job Profile Panel and Configurations*.

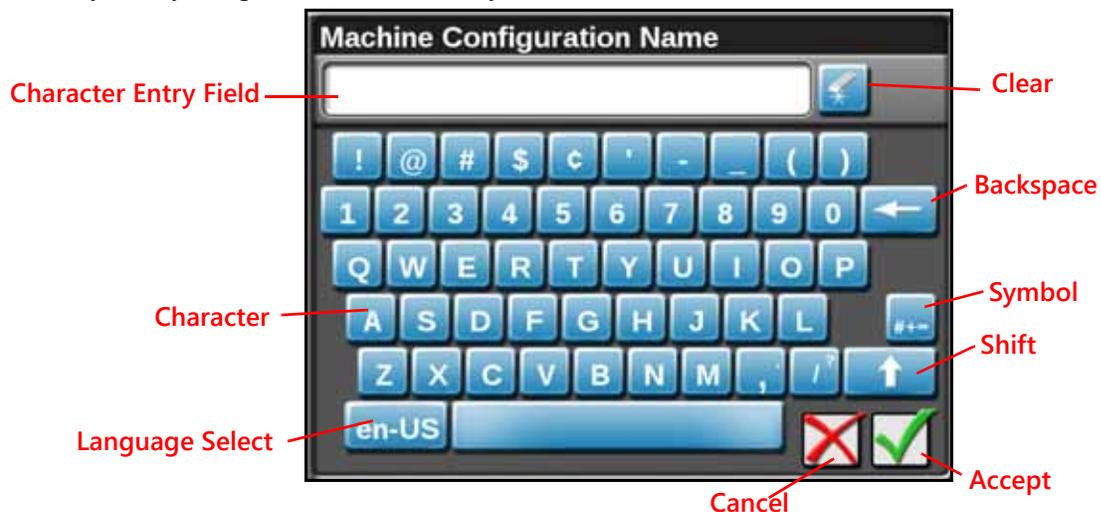
HOME SCREEN AND PANEL NAVIGATION

When the device is powered up, ROS will display the following profile areas or panels:

- *On-Screen Keyboard*
- *Administrator or User Panel*
- *Machine Configuration Panel*
- *Product Configuration Panel*
- *Job Profile Panel*
- UT Panel
- Street Maps Panel
- Camera Panel

ON-SCREEN KEYBOARD

Date entry is easy using the fill, on-screen keyboard.



This keyboard is displayed when entering or modifying profile, product, or job names. The following features may be used on the keyboard:

CHARACTER ENTRY

When the keyboard is touched, the character selected will display above the key. If the character displayed is not the character intended for entry, continue touching the screen while dragging to the correct character to enter. The character will not be entered in the character entry field until the touch is released.

SHIFT/CAPS LOCK

The keyboard displays the character set that will be entered in the character field when any of the keys are selected. To shift the character set to lower case, press the shift key.

NOTE: The keyboard automatically capitalizes the first character entered into the character entry field. To cancel the feature, touch the shift key before entering characters using the keyboard.

Touch the shift key to enter the characters using the upper case character set. Double tapping the shift keys will enable caps lock. Touch the shift key again to disable caps lock.

SYMBOLS

When browsing the web using the field computer, the  will be displayed on the keyboard. Touch  to return to the alphabetic keyboard.

BACKSPACE AND CLEAR

Touch the  key to delete the previously entered character of the  to clear all characters in the character entry field.

ACCEPT/CANCEL

Touch the  key to accept the text or characters displayed in the character entry field. The displayed text or characters will be entered in the selected text field on the previous screen.

Touch the  key to return to the previous screen without entering the keyed text or characters.

LANGUAGE SELECT

Pressing the language select button will change the keyboard language between various languages including Russian, French, and German. Press the button repeatedly until the desired language is reached. Changing the language on the keyboard does not change the language for the rest of the screens. Those will remain the default language.

STATUS HEADER

The status of various features or other system components connected to the field computer is displayed in the upper, right corner of the ROS display.

This area allows the equipment operator to quickly check communication or processes in progress at a glance and, if necessary, take action to address any issues before beginning the days operations.



The following status indicators will be displayed in the status header:



Slingshot®. The status of a Slingshot Field Hub is displayed. A red X will display on this indicator if a Field Hub is not connected or not detected. When a Field Hub is connected to the ROS device, this area will display the current signal strength for wireless communication status.

GPS. This indicator displays the current status of the position solution. This indicator will display:



- Green if the status of GPS is okay
- Yellow if an error or cautionary condition has been encountered
- Red if GPS is non-functional



Software Update Available. One of these status displays will be available if a ROS update or feature unlock file is available. The update will remain available even after the USB flash drive is disconnected from the device to allow the operator to perform the update process at a convenient time during the day and without disrupting field operations.



File Transfer. the status header displays the status of wireless file transfers with a Slingshot® Field Hub. If a file transfer is in progress, the file transfer indicator will display a green "in progress" status.



CANbus Communications. This indicator displays the communication status for a CANbus system. A green indicator will be displayed when communication is detected without errors.



ISOBUS Communications. This status display indicates the status of ISObus communication with ECUs, working sets, implements, etc. This status will only be shown if an ISObus ECU is detected by the ROS device.



Serial Communications. This indicator displays the communication status for serial communication ports. A green indicator will be displayed when all configured communication ports.



Forward/Reverse. The forward/reverse status indicator shows if the machine is traveling forward or reverse according to the ROS device.

ADMINISTRATOR OR USER PANEL

Touch Administrator or User Name at the top of the display to access the Administrator or User Panel and the following utilities:



POWER DOWN

Touch the power down icon to shut down the ROS device. It is recommended to shut down the device using this icon prior to removing power from the ROS device by switching the vehicle ignition off.



LOG OUT

Touch the log out icon to exit the current user profile. Log out of the ROS device when leaving the equipment for short periods or at the end of the shift or when switching operators to secure the management system from unauthorized access or operation of the control system.



NOTE: Demonstration mode features are also available via the logout prompt.

Review Chapter 5, *Administrator and User Profiles*, for additional assistance with user profiles and security features available with ROS.





USER PROFILE

User profiles may be created for each operator to save user preferences such as language and displayed units to maximize each user's comfort level while operating the equipment with ROS. Each user profile may also be assigned a unique Personal Identification Number (PIN) to secure the ROS device from unauthorized access, modifications, or operations from the operator.

In addition to securing the system from unauthorized use, ROS saves active user profile information with each job report. If multiple operators will be using the same machine during a specific field operation, the job report will contain a list of users that completed the specific field operation. The system administrator may also review the specific field areas in which each operator was logged in and operating the equipment.

Refer to Chapter 5, *Administrator and User Profiles*, for more information on setting up and using administrator and user profiles.



SYSTEM MANAGER

Access the system manager utility within the administrator or user panel to perform software updates and CAN node firmware updates. Product software and documentation updates may be made available periodically on the Raven Applied Technology web site:

<https://portal.ravenprecision.com/>

NOTE: Refer to Chapter 6, *System Manager*, for more information on performing system and hardware updates.



FILE MANAGER

Access the file manager to perform file maintenance, access utilities for exporting and transferring job files and other data to and from the ROS device, and to view the transfer history for previous job data.

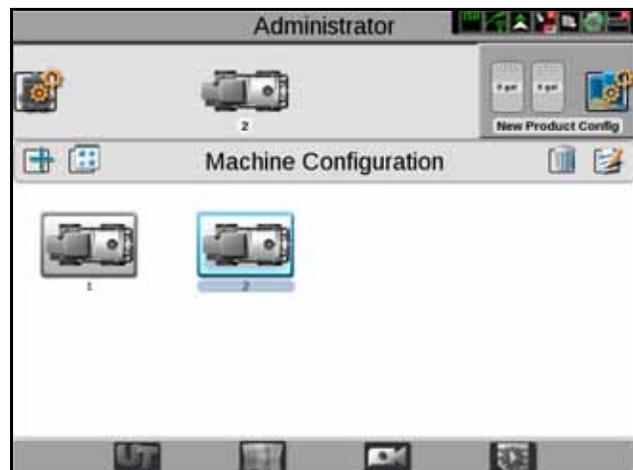
NOTE: Refer to Chapter 7, *File Manager*, for more information on performing file maintenance.

Do not store job and field information on the ROS device for long term reference or archiving. Perform file maintenance regularly and remove files associated with completed jobs or field operations to ensure memory resources are available for new operations as needed. Archive and back up job and field information on a home or office PC to ensure the data is securely archived and backed up.

MACHINE CONFIGURATION PANEL

The Machine Panel contains the following utilities for selecting and configuring the various types of vehicles and equipment with which the ROS device will be operated:

NOTE: On initial start up, ROS will require a machine configuration before other system features may be accessible. Refer to Chapter 3, *Start Up*, for an overview of the initial settings required and the recommended procedure to complete setup of the ROS device.





CAN SYSTEM CONFIGURATION

A machine configuration saves vehicle or tractor calibration information, implement geometry for each configured implement, and CANbus system information. If a configuration is completed for a specific implement, the ROS device will automatically identify and select the matching configuration on start up. The ROS device will also alert the operator if a CAN component in the saved profile is not detected.

Refer to Chapter 8, *Machine Panel and Configurations*, for detailed information on setting up machine configurations for the various implement types available with ROS.



MACHINE CONFIGURATION AND IMPLEMENT GARAGE

In some instances, a machine configuration may match more than one equipment set up such as a tractor used with a plow, swather, hay rake, or a rock picker. If desired, create profiles for each of these implements to allow the ROS device to save geometry and guidance settings for each specific implement. When ROS detects a set up matching these configurations, the device allows the operator to select the saved machine configuration to quickly set up the field computer for the days operations.

ROS also allows a system administrator or operator to access other saved configurations via the machine or implement "garage" to modify or remove profiles to keep the ROS device updated for the equipment currently in the fleet or machine shed.

Refer to Chapter 8, *Machine Panel and Configurations*, for additional information on selecting and modifying machine configurations and using the machine and implement garages.

PRODUCT CONFIGURATION PANEL

The product configuration panel provides the following utilities for setting up control channels for common product applications, tank mixes, or seed varieties which the ROS device will be used to control input or application:



PRODUCT CONFIGURATION

ROS allows the operator or system administrator to set up a profile for common applications, tank mixes, or for upcoming field operations. The product configuration saves control channel and product or mix information for various application or product types and allows the operator to reselect profiles to quickly resume or restart an application or operation for various fields. New product configurations may be created using existing products entered into ROS or via the agX product database pre-loaded on the ROS device.

Refer to the ROS Product Control Calibration and Operation Manual, for more information on setting up various products and product configurations using ROS.



PRODUCT CONFIGURATION SELECTION

Once a product configuration is setup, the product may be selected to quickly set up ROS for operations and resume operation or repeat the same operation in a different field. Simply select the product configuration, verify



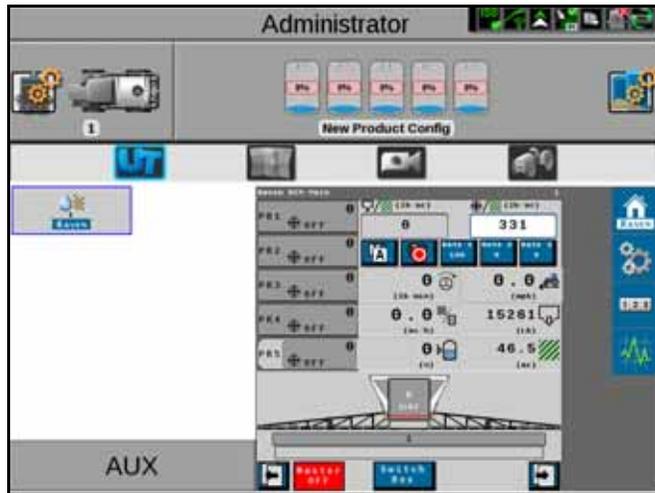
and adjust mix ratios as necessary for accurate job reporting, and get to the field tasks at hand. Simply select the product configuration, verify and adjust the mix ratio's, and start the field tasks at hand.

NOTE: If the product control nodes are readdressed between field operations, the product configuration must be adjusted to properly control the product assigned to each control channel. Check and verify the product configuration before starting any field operations.

UT PANEL

The UT panel provides access to the ISOBUS working set displays and ECU options or features. Use this panel to access features such as the Raven ISO Product Control, Raven ISO AutoBoom, or various third party features connected to the ISOBUS communication network.

NOTE: The UT panel will be available in the lower, left corner of the main panel display only if an ISOBUS compatible ECU is detected by the ROS device.



JOB PROFILE PANEL

The job profile panel provides the operator or system administrator with the following tools to set up, filter, and select profiles for specific field operations or tasks:



JOB PROFILE CONFIGURATION

Configure common or recurring field operations to save job settings such as grower and field data, scouting information, or saved guidance lines for use during upcoming field operations or reuse during future seasons.

Refer to Chapter 13, *Job Profile Panel and Configurations*, for assistance setting up various job profiles.



JOB PROFILE SELECTION

When the equipment arrives at the field, the operator selects the preconfigured job profile and verifies the job settings, enters the target product rate or rates, selects any modifications to the guidance or scout information and selects start to begin a new field application or start operations.

The job profile panel also displays any previous jobs started using a preconfigured profile. To resume a previous job operation, select the specific job file, verify the job settings, and select start. ROS also provides utilities to help sort and filter the items displayed in the job profile panel to help the operator quickly locate and select the correct profile or previous operation.

NOTE: Setting up a job profile is not a requirement and is designed as a Grower function. The default Start Job profile allows a user to quickly start a job and allows the user to assign GFF, saved guidance lines, and scout groups (if applicable).



 CAMERA PANEL

The camera panel allows the user to access cameras connected to the display. Toggle between up to four video sources with one designated as a reverse camera.

Refer to the *Camera Configuration* section on page 107 for addition information.

 STREET MAPS

Street maps provides a view of scouting field boundaries in the area. If desired, the user can filter the scouting field boundaries by grower, farm, and field. The user can also select the scout field boundary directly from the map. Street maps need to be created on the Slingshot web site.

Refer to the *Street Maps* section on page 168 for additional information on Street Maps.



GUIDANCE VIEWS AND WIDGETS

ROS features a customizable guidance display using widget based tools and display utilities. Each equipment operator may select the widgets to be displayed during a job, move each of the widgets around the screen to create the best or most desirable information display, and save the layout for use during future operations or by different operators.

 VIEW SELECTION

The ROS guidance display allows the operator to set up various screen layouts and switch between saved layouts and views at any point during field operations. The following guidance views are available during an active job:



Zoom View Selection Alarms Widget Home Set Up

3D Guidance. Provides a three-dimensional view of the current equipment location in the field.

Field Review. The field review allows the operator to review any part of the active job or the overall coverage map for the current operation.

Web View. If wireless services are available, this view allows the operator to access web based services for up to date information delivered right to the vehicle cabin.

NOTE: Access to web based services may require additional hardware with a wireless service contract. For additional information on these features, contact a local Raven or Slingshot dealer.

Widget. The widget view provides the operator with a view for additional widgets, tools, and other feature controls that may be necessary during various field operations and allows the operator to place as many widgets as necessary without covering guidance or field information.



WIDGET SELECTION AND SET UP

The guidance screen widgets featured in ROS allow the equipment operator to create and save multiple screen configurations for various types of field operations, equipment, or applications. The operator may select as few or as many widgets as desired or necessary to perform tasks in the field. Each customized layout may be saved to allow the operator to quickly switch from one layout to the next with a few screen touches, complete a specific task, and then return to the desired operation screen.

For example, during tillage operations, the operator may only need to see swath information, guidance type, vehicle speed, and perhaps a compass heading. Additional widgets may be added to a new view for monitoring rate control systems, implement automation systems, or to access other features and information during field application.



ALERTS AND ALARMS

To help the equipment operator make the most informed decisions possible, the ROS device provides active alert information as well as alert history. When encountering problems in the field, the operator is able to access this information while troubleshooting to help the operator and support personnel correct potential issues quickly while in the field.

CHAPTER

5

ADMINISTRATOR AND USER PROFILES

OVERVIEW

User profiles save preferences such as language, units, screen brightness, and on-screen coverage map colors without affecting equipment operation for other users. With a customized user profile, equipment operators can quickly start or resume operations over shift or operator changes with their personalized settings.

PIN SECURITY AND PROFILE REPORTING

If desired, a unique Personal Identification Number (PIN) can be created for each user profile to secure the ROS device from unauthorized operation. With PINs enabled, the operator or administrator must provide the assigned PIN to log in to the device and operate control features, start a job, or record field data.

ROS also stores active profile information with completed job reports for review by an equipment owner or manager. A system administrator is also able to review field area covered by each active profile if multiple profiles were active during a single field operation.

This information is potentially useful to identify operator training needs, improve operator performance, or make adjustments for future field operations.

ADMINISTRATOR PROFILE

Using the administrator profile, an equipment owner or manager create new user profiles for each operator on the ROS device.

MANAGING USER PROFILES

NOTE: Only the administrator profile may be used to create, edit, and manage various user profiles. User profiles are only allowed to edit and modify settings for the active profile.

Raven will not be able to recover or reset the administrator PIN if the default (1111) is changed. Be sure to write down the administrator PIN and store it in a safe place if this feature is desired to ensure the ability to create user accounts remains accessible.

CREATING USER PROFILES

To create new User Profiles:



1. Touch the Administrator Panel along the top of the Main Panel Display and select the User Profile button.

NOTE: Verify that “Administrator” is displayed in the upper, left corner of the prompt. New user profiles cannot be created while logged in with a user profile. Log out of ROS and back in using the administrator profile and restart this procedure.

2. Touch the Administrator Options tab at the far right of the general user settings screen.
3. In the Administration Options area at the top of the Administrator Options tab, verify that the enable user logins option is selected.

NOTE: Enable the Require PINs option to prompt the equipment operator for a PIN before accessing ROS control features.

4. In the Users area toward the bottom of the Administrator Options tab, touch the Add button to create a new user profile.
5. Refer to the *User Profile Settings Definition* section on page 23 for details on completing the profile information for the new user profile.

EDITING OR DELETING USER PROFILES

To edit or delete User Profiles:

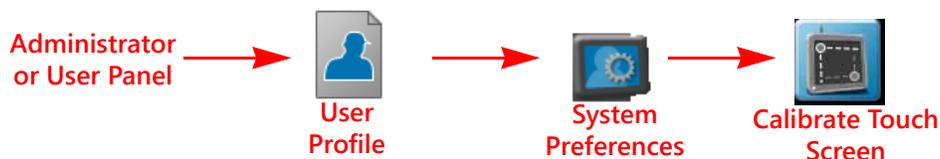


1. Touch the Administrator Panel along the top of the main panel display and select the User Profile button.
2. Touch the Administrator Options tab at the far right of the general user settings screen.
3. Select an existing user profile from the user area at the bottom of the Administrator tab.
4. Touch the Edit button to edit the profile or the delete button to delete the selected profile. Refer to the *User Profile Settings Definition* section on page 23 for details on completing the profile information for user profiles.

CALIBRATING THE TOUCH SCREEN

This process does not apply to the Viper 4+.

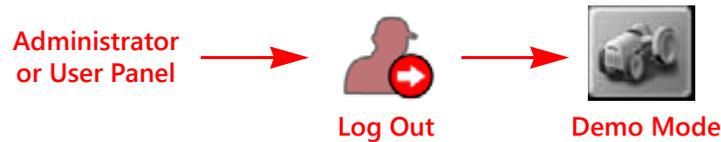
To recalibrate the touch screen:



1. Touch the Administrator or User Panel along the top of the main panel display and select the User Profile button.
2. Touch the System Preferences tab.
3. Touch the Calibrate Touch Screen button at the bottom of the tab to begin the touch screen calibration.
4. Touch the calibration points as each point appears.
5. Touch areas on the screen to test the touch screen calibration. If necessary, repeat the touch screen calibration.

DEMONSTRATION MODE

Set the ROS unit to demonstration mode to allow the unit to be used for display purposes. To switch to the demonstration mode:



1. Touch the Administrator or User Panel along the top of the main panel display and select the Log Out button.
2. Touch the Demo Mode button in the lower, left corner of the display.
3. Select the option to Restart with the Demo Mode Enabled. The ROS device will restart with the demonstration mode features enabled.
4. Perform the above procedure again to toggle the demonstration mode off.

NOTE: There is a Viper 4 Setup Demo on <https://portal.ravenprecision.com/>.

USER PROFILE SETTINGS DEFINITION

Each user profile provides fields for entering contact information, display preferences, and security settings. There are two pages of user profile settings:

- *General User Settings*
- *Product Control User Settings*

NOTE: Audible and pop-up alarms will be triggered based upon the product control user settings. Refer to the *Product Control User Settings* section on page 28 for details on these user settings.

GENERAL USER SETTINGS

NOTE: An administrator profile is available by default with ROS. It is recommended that the administrator profile be used only by an equipment owner or manager.

USER INFORMATION TAB

The user information tab provides fields for entering the operator contact information. To enter or edit user information:



1. Touch the Administrator or User Panel then select the User Profile button.
2. Touch the User Information tab on the General User Settings prompt. The following fields will be available:

User Name. Enter a name for the user or profile that will be used to identify the profile on the field computer and in job reports.

NOTE: The user name in the administrator profile cannot be modified.

First and Last Name. Enter the first and last name of the system administrator or equipment operator in these fields.

Contact Information. Enter the home and mobile phone numbers, fax number, and e-mail address as desired for contacting the equipment operator in the associated fields.

Operator License Information. Enter the operator license and expiration date in these fields.

LOCATION INFORMATION TAB

The location information tab provides fields for company contact information and desired display language. To access location information:



1. Touch the Administrator or User Panel then select the User Profile button.
2. Touch the Location Information tab on the General User Settings prompt. The following fields will be available:

Company Name. Enter the name of the company with which the operator or administrator is employed.

NOTE: The user name in the administrator profile cannot be modified.

Company Address and Location. Enter the company or branch address, city and state, and country of operation.

Time Zone. Select the Coordinated Universal Time (UTC) for the time zone in which the ROS device will be operating.

NOTE: Time zone setting will affect the time shown on Job Reports.

Language. Select one of the available languages desired for operation of the ROS device. Each equipment operator may select a different language for operation and ROS will automatically switch to the desired language on log in.

UNIT PREFERENCES TAB

The Unit Preferences tab provides access to personalized language and display unit preferences. To configure unit preferences:



1. Touch the Administrator or User Panel then select the User Profile button.
2. Touch the Location Information tab on the General User Settings prompt. The following fields will be available:

Base Units. Select the desired unit system:

Unit System	Units
Metric	centimeters (cm), liters (L), hectares (ha), kilometers per hour (km/h)
U.S. (English)	inches (in), gallons (gal), acres (ac), miles per hour (mph)
Turf	inches (in), gallons per 1000 square feet (gal/1000 ft ²), miles per hour (mph)

Pressure Units. Select the desired pressure units:

Abbreviation	Units
PSI	Pounds per square inch
kPa	kilopascal
bar	bar or atmospheric
inHg	Inches of mercury
mmHg	Millimeters of mercury
atm	Atmospheres
hPa	Hectopascal

Date Format. Select the preferred date format.

Time Format. Select the preferred time format.

Automatic Daylight Savings. Enable automatic daylight savings time adjustments if the local time zone jurisdiction observes daylight savings time.

SYSTEM PREFERENCES TAB

The System Preferences tab provides access to settings to customize the ROS device display and operation. To adjust system preferences:



1. Touch the Administrator or User Panel then select the User Profile button.
2. Touch the System Preferences tab on the General User Settings prompt. The following fields will be available:



Mode. set the display mode for day or night operations.

Screen Brightness. Adjust the screen brightness for personal preference and ambient lighting conditions.

LED Brightness. Adjust the LED brightness for personal preference and ambient lighting conditions. This setting will also adjust the brightness of a compatible light bar connected to the ROS device.

Automatic Power Down. Enable the automatic power down option to automatically shut down the ROS device when the vehicle ignition is switched off. This feature may be enabled to help ensure job information is saved and the device is properly powered down.

NOTE: The default setting for the power down feature is enabled. To monitor the vehicle ignition status, the field computer will require the appropriate wiring harness and a connection to the vehicle ignition. Without the appropriate harness, the power down feature will have no affect on operation of the ROS device.

Calibrate Touch Screen. Touch the calibrate touch screen button to begin the touch screen calibration process on the ROS device.

NOTE: The touch screen calibration is not available on the Raven Viper 4+ field computer.

ALARM SETTINGS TAB

To edit Alarm Settings:



NOTE: Audible and pop-up alarms will be triggered based upon the product control user settings. Refer to the *Product Control User Settings* section on page 28 for details on these user settings.

1. Touch the Administrator or User Panel along the top of the Main Panel display and select the User Profile button.
2. Touch the Alarm Settings tab on the General User Settings prompt. The following fields will be available:

NOTE: Refer to the ROS Product Control Calibration and Operation Manual for additional information on setting alarm conditions.

Audible Alarms. Enable this option to receive audible alerts for alarm conditions detected by the ROS device.

Popup Alarms. Enable this option to receive a prompt for alarm conditions detected by the ROS device.

Audible Backup Warning Enabled. Select this check box to enable an Audible Backup Warning alarm.

Alarm Volume. Adjust the alarm volume on the Audio Volume slider.

ADMINISTRATOR OPTIONS TAB

When logged in as a system administrator, the Administrator Options tab provides access to the utilities to manage and edit user profiles. To access the system Administrator Options:



NOTE: The Administrator Options tab will only be available when logged in with the administrator profile.

1. Touch the Administrator Panel along the top of the Main Panel display and select the User Profile button.
2. Touch the Administrator Options tab on the general user settings prompt. The following fields will be available:

Enable User Logins. Select this option to enable the user login feature on the ROS device. When enabled, the system administrator may create and manage multiple users or equipment operator profiles.

Refer to the *Creating User Profiles* section on page 22 for details on creating new user profiles or the *Editing or Deleting User Profiles* section on page 22 for assistance with managing user profiles.

Require PINs. Enable this option to require a personal identification number, or PIN, to access ROS and the control system features. This feature is recommended to help secure the control system from unauthorized access or operation.

Set PIN. The administrator PIN field is displayed below the “Require PINs” option. Enter the desired administrator PIN or personal identification number used to log into the administrator profile.

NOTE: Raven will not be able to recover or reset the administrator PIN if the default (1111) is changed. Be sure to write down the administrator PIN and store it in a safe place to ensure the ability to create user accounts remains accessible.

USER PROFILE SECURITY OPTIONS TAB

The Security Options tab allows the profile user to enter a new personal identification number, or PIN, for secure login. To access the Security Options tab:



NOTE: Secure PIN login must be enabled by the system administrator. Refer to the *Administrator Options Tab* section on page 27 to enable PINs for user login. The system administrator may access and modify any user profile even if PINs are enabled for secure log in. Touch the User panel along the top of the main panel display and select the User Profile button.

1. Touch the Administrator Panel along the top of the Main Panel display and select the User Profile button.
2. Touch the Administrator Options tab on the General User Settings prompt.
3. Touch the Security Options tab on the General User Settings prompt. The following fields will be available:

Set PIN. Enter the desired personal identification number used to log into the profile.



PRODUCT CONTROL USER SETTINGS

During field operations, ROS creates and displays a live coverage reference map for the equipment operator. During rate control operations (e.g. seeding, product application, etc.), the ROS device will display field areas in which the actual monitored rate of product application is at, or within tolerance, of the target rate or where the actual rate is too high or too low.

To access the available product control User Settings:



1. Touch the Administrator or User Panel at the top of the Main Panel display.
2. Select the User Profile button.
3. Swipe or use the page navigation at the bottom of the General User Settings prompt to access the product control user settings. The following fields will be available on the product control user settings display:

RATE THRESHOLDS

ROS allows each user to set the high and low limits tolerated for application before the system provides an alert or alarm condition during field operations.

Max Rate Threshold. Enter the top limit for product application before the ROS device provides alerts for a high rate condition.

Min Rate Threshold. Enter the bottom limit tolerated for product application before the ROS device provides alerts for a low rate condition.

Rate Colors. Touch the High, OK, and Low rate colors to select custom rate colors for the user.

Zero Rate Tolerance. Dry or granular application systems rely upon one or more encoders to monitor the application system and measure the rate of product being applied. In some instances, such as when driving through zero rate zones or with the application system toggled off, the encoders may register a false rate pulse due to excessive bouncing or jarring of the equipment. These false signals will be recorded by the ROS device as an area of product coverage and will be displayed in the job report and may display as over application in zero rate zones.

The zero rate tolerance value is intended to help filter these pulses and eliminate encoder "chatter" when the application system is not engaged or actively spreading product.

Enter the minimum application rate, in pounds per acre [kilograms per hectare], required for the control system to register as field coverage during application control operations. Any rate signals received below this threshold will be ignored and will not count toward the product volume or coverage area applied.

NOTE: On some machines, the main bin will supply a relatively high volume of product and the tolerance may be set relatively high. Other bins that supply micro-nutrients may apply material at a much lower rate and will require a lower zero rate tolerance value.

The following sections provide information on using the System Manager utilities to view software and system hardware information, update system components, and activate codes for additional features.

SYSTEM MANAGER OVERVIEW

The system manager utilities allow the operator to review the software and firmware versions currently installed on various system devices, temporarily activate system features, and check status of a Slingshot Field Hub or request remote support.

To view information on software currently installed or available for use with this device



1. Touch the Administrator or User Panel along the top of the Main Panel display to expand the panel.
2. Select the System Manager utility. The following tabs will be available:

NOTE: To transfer or copy files or settings using ROS, refer to Chapter 7, *File Manager*, for more information on file maintenance operations.

Software Update. The software update tab displays ROS software version information and allows the operator to update software or revert a previous version as needed. Refer to the *ROS Information and Updates* section on page 30 for additional information about using the software update tab.

Hardware Update. Firmware version information is displayed on the hardware update tab. This information may be useful for troubleshooting CAN systems or components. This tab also allows the operator to update the CAN system components as necessary to take advantage of new features available from Raven Industries Applied Technology Division. Refer to the *Hardware Information and Updates* section on page 32 for details on performing firmware updates via the ROS device.

Features Keys. The Features Keys tab displays permanent feature activations available. This tab also displays the time remaining for temporary authorization of ROS features. Temporary time codes entered on this prompt will only be available for a specific time period and will expire at a set time interval. Contact a local Raven dealer for assistance with permanent authorization of available ROS features.

Slingshot Field Hub. Select the Slingshot tab to view Field Hub wireless communication information or to enable a remote support session. For additional information on Slingshot services, refer to the ROS Slingshot Field Hub Calibration and Operation Manual or contact a local Slingshot dealer.

Hardware Information. The hardware information tab contains information about the field computer's internal hardware states, usage statistics, diagnostics tools for CANBus, and network connectivity information.

License. Contains the Raven Operating Software end user license agreement.

ROS INFORMATION AND UPDATES

To view information regarding the ROS version currently installed or for a ROS update available for the ROS device:



1. Touch the Administrator or User Panel to expand the panel.
2. Select the System Manager utility and touch the Software Update tab. The following ROS version information will be available:

Current Version. ROS version used by the device during field or control system operations. This version information may be important if service or support is required.



Version Information

Press the version information button to view additional software and database information.

Install Latest Update. If a newer ROS version is available, the updated version number will display.

Select the install latest update button to install the version displayed onto the device. When the system is restarted, this will be the current version used for operation. If desired, select Delete and the update will not install.

NOTE: Updates can be performed if connected to a Slingshot field hub. Refer to the Slingshot Operation manual for additional information using slingshot to perform updates.

Undo Last Update. In the event that an update to ROS provides undesirable operation, the device will store the last software version installed and allow the operator to revert to the version displayed in this field.



Revert to Previous Version

Factory Reset. The factory reset feature may be used to revert the device to a factory condition.

Only perform this procedure if instructed by a dealer or service technician. All settings and user files will be erased during the factory reset process. Perform file maintenance and copy all critical data to a USB flash drive prior to performing a factory reset.

ROS DOWNLOAD EXAMPLE

NOTE: The following procedure is for example purposes only. Any images provided in this section may not accurately depict the web browser or prompts encountered on various home or office computer systems. Please refer to computer or web browser user help for additional assistance.

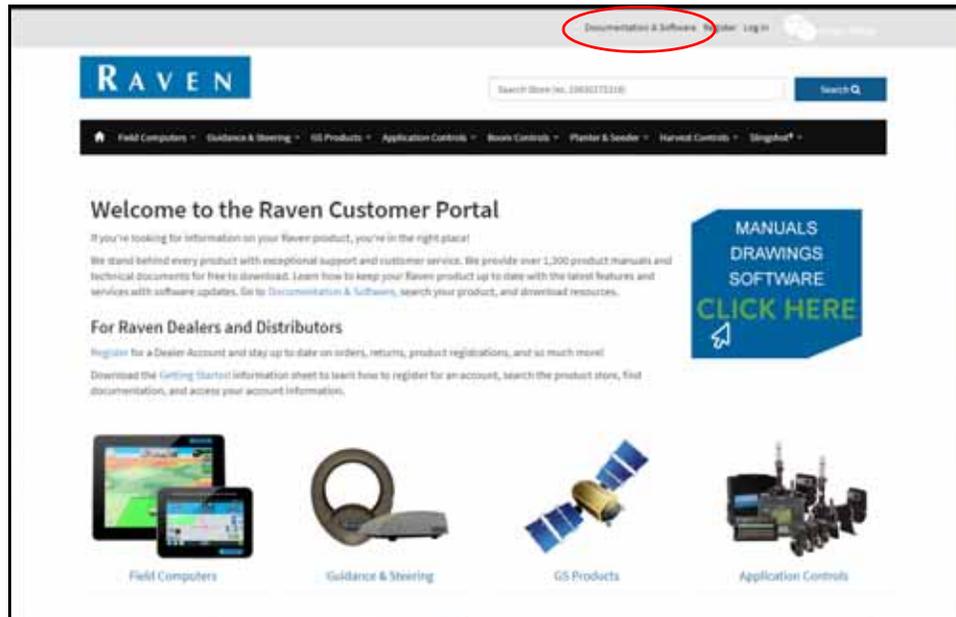
Software updates for the ROS device will be made available periodically from the Raven Help web site:

<https://portal.ravenprecision.com/>

NOTE: CAN node firmware is included with the ROS software download and will automatically download to the ROS device. However, node updates will not be installed until the user installs the update. The node updates in the ROS update will be the latest version of ROS release and may not be the latest version available.

To download CAN Node updates:

1. On a home or office computer, visit <https://portal.ravenprecision.com/>.
2. Select Documentation & Software.



3. Select desired device type (e.g. Field Computers, Guidance & Steering, etc).
4. Select the Software drop-down specific to your machine.



5. Select the desired software update.
6. Select Save As from the drop down.
7. Select Save to save the software to the computer. Select a commonly used download directory or a destination which will be easy to locate after the download completes.

NOTE: It may be necessary to accept security or warning prompts displayed by the browser or computer system to successfully save the software update to the computer.

8. Insert a USB flash drive used with the ROS device into an available USB port on the computer.
9. Copy the software update zip file (*.zip) from the download location to the computer.
10. Extract the files from the .zip file onto the computer.

NOTE: Do not rename the extracted files as this will not allow the software download to the field computer.

11. Transfer the extracted files to the USB flash drive.
12. Remove the USB flash drive from the home or office computer.

INSTALLING ROS UPDATES

To apply a software update to the ROS device:



1. When a update is detected, press Install. The update will install. The Update Available status will be displayed in the upper, right corner of the main panel display and the update file will be copied to the ROS device.
2. Touch the Administrator or User Panel to expand the panel.
3. Select the System Manager utility and touch the Software Update tab.
4. Touch the Install Update button to update the ROS version. The device will install the available update version and automatically restart.



Update Available

NOTE: After the ROS device restarts, it is necessary to redetect GPS. To redetect GPS, perform the steps in the *Serial Device Detection* section on page 103.

REVERTING TO PREVIOUS ROS VERSIONS

To revert to a software version previously installed on the ROS device:



1. Touch the Administrator or User Panel to expand the panel.
2. Select the System Manager.
3. Touch the revert to previous version button to re-install the displayed ROS version. The device will re-install previous version and automatically restart.

HARDWARE INFORMATION AND UPDATES

To view firmware information for the system components currently connected to the ROS device:



1. Touch the Administrator or User Panel to expand the panel.
2. Select the System Manager utility and touch the hardware update tab. The following firmware version information will be available for each node currently detected on the CANbus:

Node. The node name or identification information will be displayed in this column.

Program Number. The program number is used to identify the node on ROS.

NOTE: The program number displayed on the hardware update tab does not reflect the program identified on the physical serial number tag affixed to the node from the factory.

Current Version. The firmware currently installed on the node will be displayed in this column.

Newest Version. If node firmware updates have been transferred to the ROS device, the update version will be displayed in this area.

INSTALLING CANBUS OR ISOBUS FIRMWARE UPDATES

NOTE: The node firmware can be transferred from the USB flash drive onto the ROS device before the firmware updates can be applied to nodes connected to the system using the System Manager utility. Refer to the *Import CAN Node Updates* section on page 50 for assistance copying CAN Node Update files.

To apply a firmware update to a CANbus system component:



1. Insert the USB flash drive with the firmware update files into the ROS device.

NOTE: Review the *ROS Information and Updates* section on page 30 for more information on the folder structure required for performing the update.

2. Use the USB Manager utility within the File Manager to import the CAN node updates. Refer to Chapter 7, *File Manager*, for additional assistance using the USB Manager.
3. Touch the Administrator or User Panel to expand the panel.
4. Select the System Manager utility and touch the Hardware Update tab.
5. Select a specific node to be updated.

NOTE: Note the program number (PGM #) for the node selected. In case of problems with the node update, this number will be required to select the appropriate program number for recovering the node. Refer to the *Node Recovery Mode* section on page 33 or contact a local Raven dealer for additional assistance.

6. Select the appropriate update from the Versions Available list for the selected node.
7. Touch the apply update button to update the firmware on the selected node. The ROS device will install the selected firmware update. Repeat the process to update any other nodes as necessary or required.

NOTE: If a problem is encountered during the firmware update process, refer to the Raven CANbus Installation Manual for information on troubleshooting the node and use the recovery mode to attempt to restore the CANbus node. Refer to the *Node Recovery Mode* section on page 33 for additional information on using the recovery mode with a Raven CANbus system.

NODE RECOVERY MODE

NOTE: The node program number is required to properly recover the node. If the program number is unknown, contact a local Raven dealer or the Raven Technical Support Center for additional assistance with appropriate program numbers for recovering a CANbus node.

To attempt to recover a CANbus node on which a failed update has occurred:



7. Copy the feature package to the USB flash drive used with the ROS device. The feature package must be copied to the following directory on the flash drive:
 "USB Drive Name" > Raven > FeatureUnlocks
8. Connect the USB flash drive to the ROS device. The feature package will automatically install.
9. Restart the ROS device when prompted to make the new feature available for use.



- NOTE:** If a ROS update is available on the USB flash drive, the update must be applied to install the feature package. Refer to the *Installing ROS Updates* section on page 31 for assistance with installing a ROS update.
10. After the device restarts, access the Feature Keys tab and verify the activated features are displayed in the Unlocked Features area.

TEMPORARY KEY

- NOTE:** Any temporary keys will remain active after the activation code is entered. The temporary key timer will continue until the key expires. Once the temporary key expires, the feature will be available using the activation package. Contact a local Raven dealer for additional assistance with temporary keys or feature activation.

In some situations, a temporary authorization code may be obtained to unlock ROS features for a predetermined time. To temporarily authorize features for use with ROS:



- NOTE:** Temporary key operation time remaining begins at the time the temporary code is requested. Even if the temporary code is not entered on the field computer, time will be deducted from the time remaining if the device is used to manage field operations.

1. Touch the Administrator or User Panel to expand the panel.
2. Select the System Manager utility and touch the Feature Keys tab.
3. Note the Identification Number and Job Code Time values displayed on the prompt.
4. Contact the Raven Applied Technology Division Technical Support Center with the values observed from the previous step.
5. Touch Renew Time and enter the temporary service code to add time to the temporary features time remaining.

SLINGSHOT® FIELD HUB

The Slingshot tab provides access to Slingshot Field Hub information and will be used when requesting remote support. For additional information on using the Slingshot Field Hub with the ROS device, refer to the ROS Slingshot Field Hub Calibration and Operation Manual.

HARDWARE INFORMATION

To access information about the ROS device hardware:



1. Touch the Administrator or User Panel to expand the panel.
2. Select the System Manager utility and touch the Hardware Information tab.
3. Touch the General or Lifetime Views to display the following hardware information details for the ROS device:

GENERAL

Provides information on the hardware such as:

Platform. The ROS device type or name.

OEM ID. Displays the OEM ID number.

Hardware Revision. The ROS device hardware version.

Micro-controller Version. The firmware version installed on-board the ROS device.

FPGA Version. Firmware version of the FPGA controller.

LIFETIME

The lifetime statistics provides runtime information for the ROS device. The following information will be available when the lifetime option is selected:

Hardware Lifetime. Provides a tally of operational hours on the ROS device, the number on power cycles, and the number of shutdowns.

Hardware Status. Includes information on the switch power, camera power, camera fault, and FPGA fault.

USAGE

Provides CANBus information such as warning counts, bus off counts, and on error states.

NETWORKING

Provides information on the IP address, gateway, and the interface name.

LICENSE

To review and accept the ROS End User License Agreement (EULA) at any time:



1. Touch the Administrator or User Panel to expand the panel.
2. Select the System Manager utility and touch the license tab.
3. Review the EULA as necessary. Contact the Raven Applied Technology Division Technical Support Center for further information.

NOTE: Acceptance of the EULA is required before operation.

The following sections provide information on using the File Manager utilities to edit grower, farm, field information, export files, ISO files, and manage a connected USB flash drive and other file management options.

FILE MANAGER OVERVIEW

To view job and file information currently stored on the ROS device:

Administrator
or User Panel



File
Manager



File
Manager



USB
Manager



File Transfer
History



File
Management
Options

1. Touch the Administrator or User Panel along the top of the Main Panel display to expand the panel.
2. Select the File Manager utility. The following tabs will be available:

File Manager Tab. The file manager tab allows the operator to rename files and manage grower, farm, field (GFF) folders and assignments right on the ROS device. Manual file transfer is also located under this tab. Refer to the *Using the File Manager* section on page 40 for assistance with using the file manager or the *Grower, Farm, Field (GFF) Manager* section on page 41 for details on managing the GFF for file structure.

USB Import Manager Tab. The USB import manager tab allows the operator to find and transfer files from a connected USB flash drive to the ROS device. Review the *USB Import Manager* section on page 48 for assistance using the USB manager.

File Transfer History Tab. ROS provides a log of files transferred to and from the device via a Slingshot Field Hub. See the ROS Slingshot Field Hub Calibration and Operation Manual for details on the file information available on the history tab.

File Management Options. Additional options may be available on this tab to set up file management features with the ROS device. Refer to the ROS Slingshot Field Hub Calibration and Operation Manual for additional information on available file management options.

USING THE FILE MANAGER

If desired, edit, rename, and remove files right on the ROS device in the vehicle cabin. Refer to the following sections for more assistance with using File Manager features.

NOTE: CAN node update files, or the “canupload” files will be displayed in the file manager. To ensure that the CAN firmware version information is available on the ROS device, it is recommended not to edit the file names for the node firmware update files.

If desired, remove all firmware update files from the ROS device after performing any necessary node updates. Review the *Hardware Information and Updates* section on page 32 for more information on downloading and applying CAN node firmware updates.

USING FILTERS AND RENAMING FILES

To use the file filters or rename files:



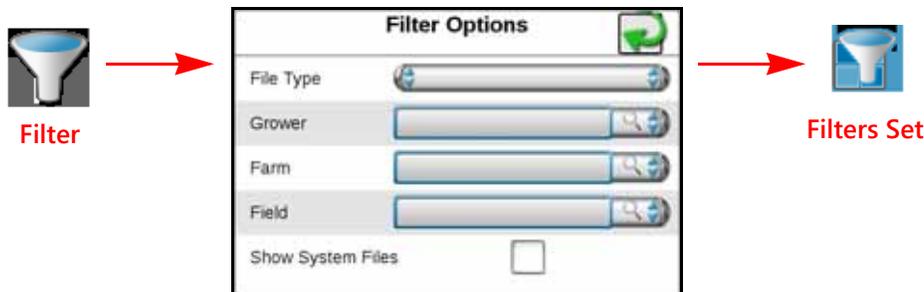
1. Touch the Administrator or User Panel to expand the panel.
2. Select the File Manager utility and touch the File Manager tab. The File Manager tab will display a list of the following file types currently stored on the ROS device:

TABLE 1. ROS File Types

User Files	System Files
Job	CAN node updates
ISO XML	Screen Shots
Prescription (Rx) Maps	Core Dumps
Scout Groups	Log Files
Saved Guidance Lines	Street Maps
AgX Rec	Wallpapers

NOTE: Enable the Show System Files option to view and manage ROS system files while performing file maintenance operations.

3. Touch the Filter icon at the top of the “All Files” list to set filters for file type or grower, farm, or field assignments.



4. To rename a file, touch the file name in the Files list and use the on-screen keyboard to rename the file.

SELECTING FILES

If desired, select a file to modify grower, farm, or field (GFF) assignments. To select files:



1. Press Administrator or User Panel to expand the panel.
2. Select the File Manager utility and touch the File Manager tab. The File Manager tab will display a list of the following file types currently stored on the ROS device.
3. Use the File Manager to filter the "Files" list as desired. Review *Using Filters and Renaming Files* section on page 40 for assistance using file filters.
4. Touch the Select icon displayed to the right of the file name to move individual files to the Selected Files list. To move all files currently displayed in the Files list, touch the Select All button at the top of the "Files" list.



NOTE: If files are filtered, the Select All button will only select files available with the existing filter settings.

5. Touch the clear button to the right of a file name to remove the file from the Selected Files list or touch the clear all button at the top of the list to remove all files at once.
6. Proceed to the *Manage Grower, Farm, Field (GFF) Information* section on page 42 or the *Delete Files* section on page 43 for assistance with performing these file management procedures.



GROWER, FARM, FIELD (GFF) MANAGER

ROS offers a Grower, Farm, Field (GFF) utility to create and manage GFF information right on the ROS device.

NOTE: The GFF Manager is also available via the Job Profile panel by selecting:



Refer to Chapter 13, *Job Profile Panel and Configurations*, for additional assistance with setting up job profiles or starting jobs with ROS.

CREATE GROWER, FARM, FIELD (GFF) STRUCTURE

To create new Grower, Farm, Field (GFF) associations for jobs:



1. Touch the Administrator or User Panel to expand the panel.
2. Select the File Manager utility and touch the File Manager tab.
3. Touch the Edit button at the top of the Selected Files list.
4. Select the Edit button displayed at the top of the GFF display.

5. Touch the Grower panel at the top of the display to expand the Grower panel.
6. To add a new:
 - grower to the GFF structure, select the Add button.
 - farm or field to an existing Grower, select the appropriate grower from the list.
7. Touch the Farm panel below the list of available growers to expand the Farm panel.
8. To add a new:
 - farm to the GFF structure, select the add button.
 - field to an existing grower and farm, select the appropriate farm from the list.
9. Touch the Field panel at the bottom of the GFF display to expand the Field panel.
10. To add a new field, touch the Add button to add a field to the selected grower and farm.



MANAGE GROWER, FARM, FIELD (GFF) INFORMATION

To edit current grower, farm, field associations for all files displayed in the Selected Files list:



NOTE: Review the *Selecting Files* section on page 41 for assistance with selecting files.

1. Touch the Administrator or User Panel to expand the panel.
2. Select the File Manager utility and press the File Manager tab. File Manager will open and display a list of files currently stored on a ROS device.
3. Touch the Edit button at the top of the Selected Files list.
4. Select the Edit button displayed at the top of the GFF display.
5. Use the file browser to select the desired grower, farm, or field entry to edit.
6. With the appropriate entry selected, touch the Edit button. To delete a GFF entry, touch the delete button.



RESET GROWERS, FARMS, FIELDS

To reset grower, farm, field information:

1. Open File Manager.
2. Press the Arrow next to the desired grower, farm, or field in the all files column to move the desired GFF to the Files column.
3. Press the Notepad key above the files column. This will open the grower, farm, field manger screen.
4. Press the Delete icon in the reset grower, farm, field cell. A prompt will open asking "This action will permanently remote all growers, farms, fields and their associations. Do you wish to continue?".
5. Select Yes to reset all growers, farms, fields and their associations. Press No to return to the previous screen.

DELETE FILES

To delete files from the ROS device:



1. Touch the Administrator or User Panel to expand the panel.
2. Select the File Manager utility and touch the File Manager tab. The File Manager tab will display a list of files currently stored on the ROS device.
3. Review the *Selecting Files* section on page 41 to move files to the “Selected Files” list.
4. Touch the Delete button at the top of the “Selected Files” list and accept the displayed prompt to delete the selected files from the ROS device.



Delete

FILE EXPORT

The following sections provide information on using the file export feature to copy or move job information for direct job reporting, for use with other ROS devices, or for upload to a Slingshot user account.

NOTE: Use the following procedures to export files to a USB flash drive if a Slingshot Field Hub, or a wireless network connection, is not available for wireless file transfer.

A Slingshot Field Hub and wireless service contract will be required to send files to the Slingshot web service from the vehicle cabin. Contact a local Slingshot dealer or refer to the ROS Slingshot Field Hub Calibration and Operation Manual for additional assistance with using the Slingshot Field Hub for transferring job files.

EXPORT JOB REPORTS AND COVERAGE INFORMATION

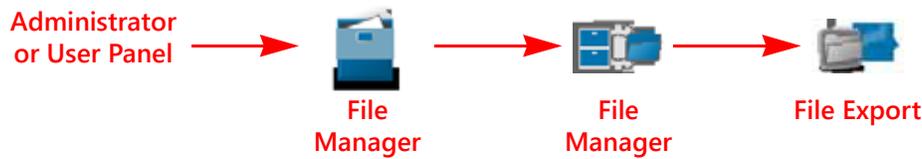
ROS is capable of exporting job reports and coverage information in the following formats:

- Portable document format (.pdf)
- Job data package (.jdp)
- Slingshot archive (.ssa)
- Shape file (.shx, .shp, and .dbf)

The following procedures assist with exporting job and field information to a connected USB flash drive for transferring information to a home or office computer system.

NOTE: A Slingshot Field Hub and wireless service contract will be required to send files to the Slingshot web service from the vehicle cabin. Contact a local Slingshot dealer or refer to the ROS Slingshot Field Hub Calibration and Operation Manual for additional assistance with using the Slingshot Field Hub for transferring job files.

To export job data from the ROS device in the above formats:



1. Touch the Administrator or User Panel along the top of the Main Panel display to expand the panel.
2. Select the File Manager utility and press the file manager tab. The File Manager tab will display a list of files currently stored on the ROS device.
3. If necessary, use the file list type and grower, farm, field (GFF) filters to assist with finding and selecting the desired files for export.
4. Move the files to Export from the left side of the File Manager to the right side. Alternatively, touch the Select All option at the top of the file list to select all files currently displayed and matching the set filter conditions.
5. Select the File Export icon.
6. From the File Export screen, select either Slingshot or the listed USB drive. If more than one USB drive is inserted there may be multiple choices.
7. With at least one file selected, select one of the following export actions:



•Copy - create a duplicate of the selected information on the destination to be selected.



•Move - export the selected information to the destination to be selected and remove the information from the ROS device.

The Export Files prompt will display.

NOTE: Refer to the ROS Slingshot Field Hub Calibration and Operation Manual for more information on using the Slingshot Field Hub with ROS.

Send with Folder Structure (.jdp). Select this option to create a job data package (.jdp) on the USB flash drive with the grower, farm, field (GFF) file structure. The .jdp file may be transferred to a Slingshot viewer or user account to review job information or create job reports, or to another ROS device via the USB flash drive to continue the job.

NOTE: While the GFF file structure is transferred to the USB flash drive using this export option, the GFF assignments will not be inherently associated with the .jdp file if transferred to another ROS device.

To reassociate the .jdp with the GFF information, the GFF structure will need to be imported via the USB manager and then reassign the .jdp to the GFF using the File Manager tab. Review the *USB Import Manager* section on page 48 for assistance with importing the GFF information and the *Using the File Manager* section on page 40 for details on using the file manager to reassign the GFF associations.

Send as Slingshot Archive (.ssa). The Slingshot Archive (.ssa) file type may be used with either a Slingshot user account or to transfer multiple files to another ROS device. Select this file type to transfer multiple files as one package.

The .ssa file allows multiple files to be imported into the Slingshot web portal as a single file.

NOTE: If imported onto another ROS device, files exported as an .ssa will retain GFF associations from the original device. All files exported to the "slingshotArchives" directory on the USB flash drive will be required to retain the GFF associations from the previous device.

- Enable the following "Report Generation" options to export additional report or coverage map files for viewing, creating, or archiving completed job information:

NOTE: Report generation options will not be available when exporting Slingshot Archive (.ssa) file types.

Generate Report (.pdf). Select this option to export a portable document format (.pdf) document directly from the ROS device. A .pdf document is a common file format viewable on any computer system, often with a free software package available on-line from several sources.

Include Shape Files (.shx, .shp, and .dbf). The shapefile format consists of four separate files created for each product channel active during the field operation. Select the "Include Shape Files" option to export a shape format (.shp), a shape index (.shx), an attribute database (.dbf), and a project (.prj) file for each control channel active during the field operation.

The shapefile format requires specialized software to view on a home or office computer system and each of the above file types must have the same file name (different extension) for the shapefile format to function correctly.

- Touch the confirm button in the lower, right corner of the Export to USB prompt to start the export process. When complete, the ROS device will return to the File Export tab.

EXPORT OTHER FIELD OPERATION FILES

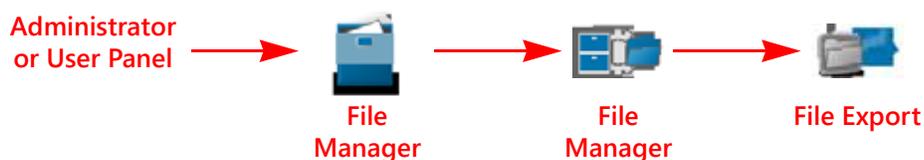
ROS is capable of exporting the following files used during field operations:

- Prescription (Rx) Maps (shapefile format)
- Scout Groups (.sct)
- Guidance Lines (.ab)
- CAN Node Updates
- Screen Shots
- Core Dumps
- Log Files

If desired, files can be exported for archiving or be transferred for use on another ROS device. The following procedures are for exporting field operation files to a connected USB flash drive.

NOTE: A Slingshot Field Hub and wireless service contract will be required to send files to the Slingshot web service from the vehicle cabin. Contact a local Slingshot dealer or refer to the ROS Slingshot Field Hub Calibration and Operation Manual for additional assistance with using the Slingshot Field Hub.

To export the above field operation files from the ROS device:



- Touch the Administrator or User Panel along the top of the Main Panel display to expand the panel.
- Select the File Manager utility and press the File Manager tab. The File Manager tab will display a list of files currently stored on the ROS device.
- Press the File Export tab.
- If necessary, use the file type and grower, farm, field (GFF) filters to assist with finding and selecting the files. Move the files to export from the left side of the file manager to the right side. Alternatively, touch the Select All option at the top of the file list to select all files currently displayed and matching the set filter conditions.
- Select the File Export icon.

6. From the File Export screen, select either Slingshot or the listed USB drive. If more than one USB drive is inserted there may will be multiple choices.
7. With at least one file selected, select one of the following export actions:



- Copy - create a duplicate of the selected information on the destination to be selected.



- Move - export the selected information to the destination to be selected and remove the information from the ROS device.

The Export Files prompt will display.

NOTE: Refer to the ROS Slingshot Field Hub Calibration and Operation Manual for more information on using the Slingshot Field Hub with ROS.

8. Send with Folder Structure

Select this option to export the field operation file types to the USB flash drive with the grower, farm, field (GFF) file structure. The field operation files may be transferred to a Slingshot viewer or user account to review job information, or to another ROS device via the USB flash drive to continue the job.

NOTE: While the GFF file structure is transferred to the USB flash drive using this export option, the GFF assignments will not be inherently associated with the field operation files if transferred to another ROS device.

To reassociate the .jdp with the GFF information, import the GFF structure via the USB manager and then reassign the .jdp to the GFF using the File Manager tab. Review the *Import Grower, Farm Field (GFF) Folder Structure* section on page 49 for assistance with importing the GFF information and the *Grower, Farm, Field (GFF) Manager* section on page 41 for details on using the file manager to reassign the GFF associations.

Send as Slingshot Archive. The Slingshot Archive (.ssa) file type may be used with either a Slingshot user account or to transfer multiple files to another ROS device. Select this file type to transfer multiple files as one package.

NOTE: If imported onto another ROS device, files exported as an .ssa will retain GFF associations from the original device. All files exported to the "slingshotArchives" directory on the USB flash drive will be required to retain the GFF associations from the previous device.

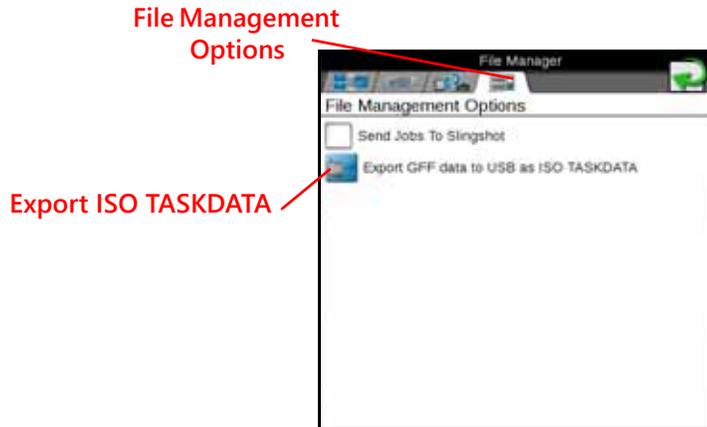
9. Touch the Confirm button on the Export to USB prompt to start the export process. When complete, the ROS device will return to the File Export tab.

EXPORT ISO TASK DATA



1. Touch the Administrator or User Panel along the top of the Main Panel display to expand the panel.

2. Select the File Manager utility and press the File Management Options tab.



3. Select Export GFF data to USB as ISO TASKDATA. The ISO GFF Export window will open.

NOTE: "Send Jobs to Slingshot" is set as the default setting to send jobs via Slingshot when closing the job.

4. Select the desired USB drive from "Select export media." The GFF data will export to the USB device in an ISO XML format.

NOTE: ISO TASKDATA can only be edited on the device the TASKDATA was created on.

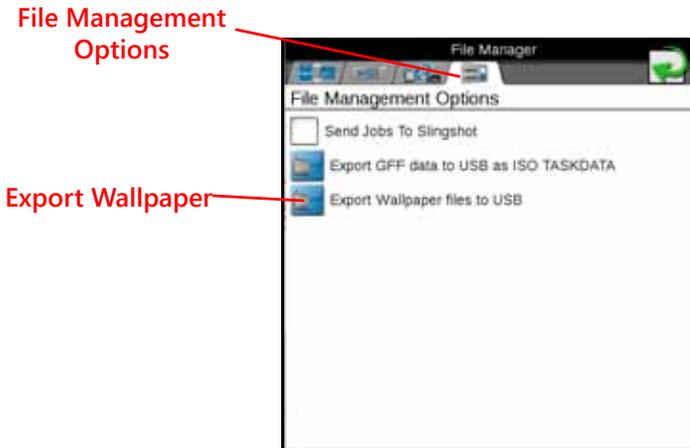


EXPORTING A WALLPAPER



1. Touch the Administrator or User Panel along the top of the Main Panel display to expand the panel.

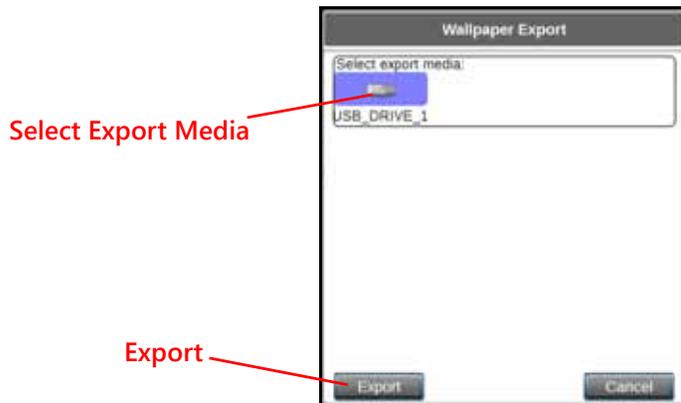
2. Select the File Manager utility and press the File Management Options tab.



3. Select Export Wallpaper files to USB. The Wallpaper Export window will open.

4. Select the desired USB drive from "Select export media."

NOTE: Wallpaper can only be edited on the device the wallpaper was created on.



USB IMPORT MANAGER

The USB Import Manager utilities allow the machine operator to select and import the following file types from a USB flash drive connected to the ROS device:

- Grower, Farm, Field Folder Structure
- CAN Node Updates
- Jobs
- Slingshot Archives
- Prescription (Rx) Maps
- Scout Groups
 - Field Boundary
 - Flags
 - Line
 - Zone
- Guidance Lines

- ISO Task Data
- Street Maps
- agX Rec Package
- Wallpapers

NOTE: The USB manager only displays file types recognized and used with the ROS device. Other file formats or types may not be transferred to the ROS device using the USB Manager.

IMPORT GROWER, FARM FIELD (GFF) FOLDER STRUCTURE

To import grower, farm, field (GFF) folder information from a USB flash drive:



1. Insert a USB flash drive used with the ROS device and containing the folder structure and files to be imported.
2. Touch the Administrator or User Panel along the top of the Main Panel display to expand the panel.
3. Select the File Manager utility and touch the USB manager tab.
4. Touch the USB drop down and select the connected USB flash drive from which to import files.
5. Touch the File Type drop down and select the "GFF Folder Structure" option.

NOTE: Only one file type may be imported at a time. Perform the import procedure multiple times in order to import multiple file types.

6. Touch the next button on the USB manager tab. The USB flash drive and folder structure will display.
7. Use the displayed browser to locate the Grower folder within the GFF folder structure to be imported.

For Example.

"USB Drive Name" > Raven > GFF > "Grower Name"



NOTE: When importing the GFF folder structure, only select to the "Grower" folder level of the GFF folder structure. The ROS device will automatically transfer the folder information contained within the grower folder to complete the GFF structure. If farm or field folders are selected, the GFF folder structure will be incorrect when imported to the ROS device.

8. With the grower file selected, select one of the following import actions:



•Copy - create a duplicate of the selected information on the ROS device.



•Move - import the selected information to the ROS device and remove the information from the USB flash drive.

The Import Files prompt will display.

9. Verify imported files list is correct. If the list requires further configuration, touch the Cancel button to return to the USB Manager tab.

10. Touch the Import button to begin the file transfer process.

IMPORT CAN NODE UPDATES

NOTE: Review the *Installing CANbus or ISOBUS Firmware Updates* section on page 33 for additional information on downloading and applying updates to Raven CANbus hardware.

Any node firmware updates copied or moved to the ROS device will be saved on the device until deleted using the file maintenance feature. Refer to the *Delete Files* section on page 43 for assistance with deleting node update files from the ROS device.

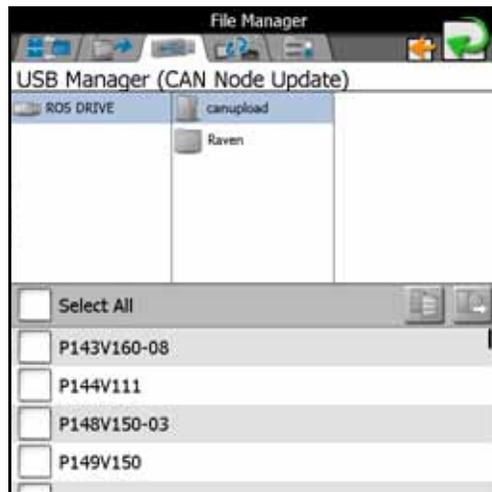
To import CAN node firmware updates from a USB flash drive:



1. Insert a USB flash drive used with the ROS device and containing the CAN node updates.
2. Press the Administrator or User Panel to expand the panel.
3. Select the File Manager utility and touch the USB Manager tab.
4. Touch the USB drop down and select the connected USB flash drive from which to import files.
5. Touch the File Type drop down and select the "Node Update" option.
6. Touch the Next button on the USB manager tab. The USB flash drive and folder structure will display.
7. Use the displayed browser to locate and select the "canupload" or "ISOUpload" folder downloaded from the Raven web site. Node update files currently stored on the USB flash drive will be displayed in the lower portion of the USB manager tab.

For Example.

"USB Drive Name" > canupload



NOTE: Review the *Installing CANbus or ISOBUS Firmware Updates* section on page 33 for additional information on downloading and applying updates to Raven CANbus hardware.

8. Press Select All at the top of the file list to import all node updates from the USB flash drive. Node updates may be removed or deleted after the CANbus hardware update process has been completed. Alternatively, touch the box displayed to the left of the node update file name to import only a specific node update if the file name is known.
9. With at least one CAN node update file selected, select one of the following import actions:



- Copy - create a duplicate of the selected information on the ROS device.

- Move - import the selected information to the ROS device and remove the information from the USB flash drive.

The Import Files prompt will display.

10. Verify the list of files to be imported is correct. If the list requires further configuration, touch the Cancel button to return to the USB Manager tab.
11. Touch the Import button to begin the file transfer process.

IMPORT JOBS

Follow the procedure below to import job files saved or exported as a job data package (.jdp). To import a .jdp file from a USB flash drive:

NOTE: Jobs may also be imported via a Slingshot Archive (.ssa) file type. Refer to the *Import a Slingshot Archive* section on page 52 for assistance importing this file type.



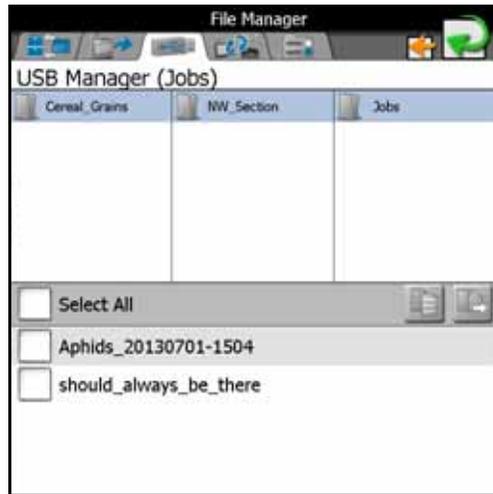
1. Insert the USB flash drive with the job profile.
2. Select the Administrator or User Panel to expand the panel.
3. Select the File Manager utility and touch the USB Manager tab.
4. Touch the USB drop down and select the connected USB flash drive from which to import files.
5. Touch the File Type drop down and select the "Jobs" option.

NOTE: Only one file type may be imported at a time. Perform the import procedure multiple times in order to import multiple file types.

6. Touch the Next button. The USB flash drive and folder structure will display.
7. Use the browser to locate and select the "Jobs" folder which contains the desired .jdp files. Job files currently stored on the USB flash drive will be found within the GFF folder structure and are displayed in the lower portion of the USB manager tab.

For Example.

"USB Drive Name" > Raven > GFF > "Grower Name" > "Farm Name" > "Field Name" > Jobs



8. Touch the box displayed to the left of the listed file names to select specific files to import. Alternatively, touch the Select All option at the top of the file list to select all files currently displayed.
9. With at least one job file selected, select one of the following import actions:



•Copy - create a duplicate of the selected information on the ROS device.



•Move - import the selected information to the ROS device and remove the information from the USB flash drive.

The Import Files prompt will display.

10. Verify the list of files is correct. If the list requires further configuration, touch the Cancel button to return to the USB Manager tab.
11. Touch the Import button to begin the file transfer process.

IMPORT A SLINGSHOT ARCHIVE

To import a Slingshot Archive (.ssa) file from a USB flash drive:



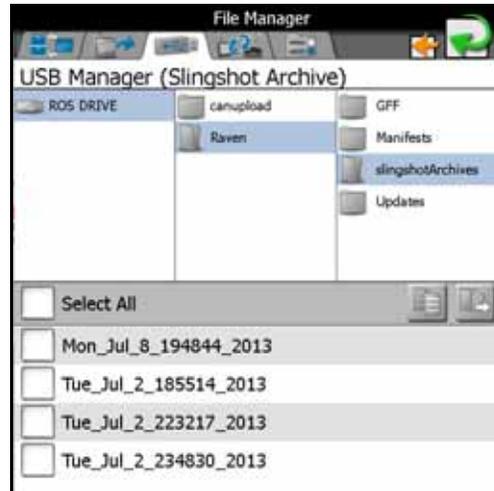
1. Insert the USB flash drive containing the Slingshot Archive file.
2. Touch the Administrator or User Panel along the top of the Main Panel display to expand the panel.
3. Select the File Manager utility and touch the USB Manager tab.
4. Touch the USB drop down and select the connected USB flash drive from which to import files.
5. Touch the File Type drop down and select the "Slingshot Archive" option.

NOTE: Only one file type may be imported at a time. Perform the input procedure multiple times in order to import multiple file types.

6. Touch the Next button. The USB flash drive and folder structure will display.
7. Use the displayed browser to locate and select the "slingshotArchives" folder. Slingshot Archive files currently stored on the USB flash drive will be displayed in the lower portion of the USB manager tab.

For Example.

"USB Drive Name" > Raven > slingshotArchives



8. Touch the box displayed to the left of the listed file names to select specific files to import. Alternatively, touch the Select All option at the top of the file list to select all files currently displayed.
9. With at least one file selected, select one of the following import actions:



•Copy - create a duplicate of the selected information on the ROS device.



•Move - import the selected information to the ROS device and remove the information from the USB flash drive.

The Import Files prompt will display.

10. Verify the list of files to be imported is correct. If the list requires further configuration, touch the Cancel button to return to the USB Manager tab.
11. Touch the Import button to begin the file transfer process.

IMPORT PRESCRIPTION (RX) MAPS

NOTE: Prescription maps may also be imported via a Slingshot Archive (.ssa) file type. Refer to the *Import a Slingshot Archive* section on page 52 for assistance importing this file type. If working in a cloud job, prescription maps loaded locally will automatically share with other field computers in the same cloud job.

Field computers must have VRA capability and the necessary unlock(s) to achieve prescription map sharing.

To import a prescription or Rx map from a USB flash drive:



1. Insert a USB flash drive used with the ROS device and containing the prescription map to be imported.
2. Touch the Administrator or User Panel along the top of the Main Panel display to expand the panel.
3. Select the File Manager utility and touch the USB Manager tab.
4. Touch the USB drop down and select the connected USB flash drive from which to import files.

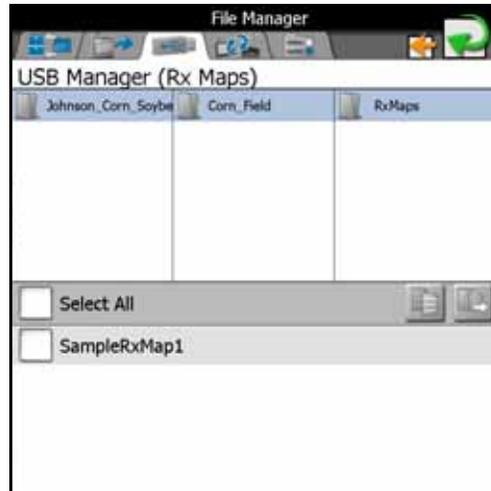
5. Touch the File Type drop down and select the "Rx Maps" option.

NOTE: Only one file type may be imported at a time. Perform the input procedure multiple times in order to import multiple file types.

6. Touch the Next button. The USB flash drive and folder structure will display.

7. Use the browser displayed to locate and select the "RxMaps" folder which contains the map to be imported. Prescription map files currently stored on the USB flash drive will be found within the GFF folder structure and are displayed in the lower portion of the USB manager tab.

For Example. "USB Drive Name" > Raven > GFF > "Grower Name" > "Farm Name" > "Field Name" > RxMaps



8. Touch the box displayed to the left of the listed file names to select specific files to import. Alternatively, touch the Select All option at the top of the file list to select all files currently displayed.

9. With at least one file selected, select one of the following import actions:



•Copy - create a duplicate of the selected information on the ROS device.



•Move - import the selected information to the ROS device and remove the information from the USB flash drive.

The Import Files prompt will display.

10. Verify the list of files to be imported is correct. If the list requires further configuration, touch the Cancel button to return to the USB Manager tab.

11. Touch the Import button to begin the file transfer process.

IMPORT SCOUT GROUPS

NOTE: Scouting information such as field boundaries and no-coverage zones may also be imported via a Slingshot Archive (.ssa) file type. Refer to the *Import a Slingshot Archive* section on page 52 for assistance importing this file type.

To import a scout group from a USB flash drive:



1. Insert a USB flash drive used with the ROS device and containing the scout group files to be imported.
2. Touch the Administrator or User Panel to expand the panel.
3. Select the File Manager utility and touch the USB Manager tab.
4. Touch the USB drop down and select the connected USB flash drive from which to import files.
5. Touch the file type drop down and select the "Scout Group" option.
6. Select the specific feature type in the scout groups category to import individual scout group features (e.g. field boundaries, flags, lines, and zones) independently.

NOTE: Only one file type may be imported at a time. Perform the input procedure multiple times in order to import multiple file types.

7. Touch Next. The USB flash drive and folder structure will display.
8. Use the browser displayed to locate and select the "scoutRoot" folder which contains the scout group to be imported. Scout group files currently stored on the USB flash drive will be found within the GFF folder structure and are displayed in the lower portion of the USB manager tab.

For Example.

"USB Drive Name" > Raven > GFF > "Grower Name" > "Farm Name" > "Field Name" > scoutRoot > "Scout Group Name"



9. Touch the box displayed to the left of the listed file names to select specific files to import. Alternatively, touch the Select All option at the top of the file list to select all files currently displayed.
10. With at least one file selected, select one of the following import actions:



•Copy - create a duplicate of the selected information on the ROS device.



•Move - import the selected information to the ROS device and remove the information from the USB flash drive.

The Import Files prompt will display.

11. Verify the list of files to be imported is correct. If the list requires further configuration, touch the Cancel button to return to the USB Manager tab.
12. Touch the Import button to begin the file transfer process.

NOTE: When importing a Field Boundary or Zone not created on a Viper 4 (ROS) you must assign a Scout Group Name for all features.

IMPORT GUIDANCE LINES

NOTE: Guidance lines may also be imported via a Slingshot Archive (.ssa) file type. Refer to the *Import a Slingshot Archive* section on page 52 for assistance importing this file type.

To import guidance lines from a USB flash drive:



1. Insert a USB flash drive used with the ROS device and containing the prescription map to be imported.
2. Touch the Administrator or User Panel to expand the panel.
3. Select the File Manager utility and touch the USB Manager tab.
4. Touch the USB drop down and select the connected USB flash drive from which to import files.
5. Touch the file type drop down and select the Guidance Lines option.

NOTE: Only one file type may be imported at a time. The import procedure will need to be performed multiple times in order to import multiple file types.

6. Select Next. The USB flash drive and folder structure will display.
7. Use the browser displayed to locate and select the “abLines” folder which contains the line to be imported. Guidance line files currently stored on the USB flash drive will be found within the GFF folder structure and are displayed in the lower portion of the USB manager tab.

For Example. “USB Drive Name” > Raven > GFF > “Grower Name” > “Farm Name” > “Field Name” > “abLines”



8. Touch the box displayed to the left of the listed file names to select specific files to import. Alternatively, touch the Select All option at the top of the file list to select all files currently displayed.
9. With at least one file selected, select one of the following import actions:



•Copy - create a duplicate of the selected information on the ROS device.



•Move - import the selected information to the ROS device and remove the information from the USB flash drive.

The Import Files prompt will display.

10. Verify the list of files to be imported is correct. If the list requires further configuration, touch the Cancel button to return to the USB Manager tab.
11. Touch the Import button to begin the file transfer process.

IMPORT ISO TASKDATA

The import ISO TASKDATA section provides options to import data from Slingshot or a USB stick. This information can be GFF data or field boundaries.

12. Refer to the ROS Slingshot Field Calibration and Operation Manual for additional information on using a Slingshot Field Hub with the ROS device.

FILE TRANSFER HISTORY

If a Slingshot Field Hub is connected with the ROS device for wireless communication, the File Transfer History tab may be used to track and review transfer history via the Field Hub.

Refer to the ROS Slingshot Field Calibration and Operation Manual for additional information on using a Slingshot Field Hub with the ROS device.

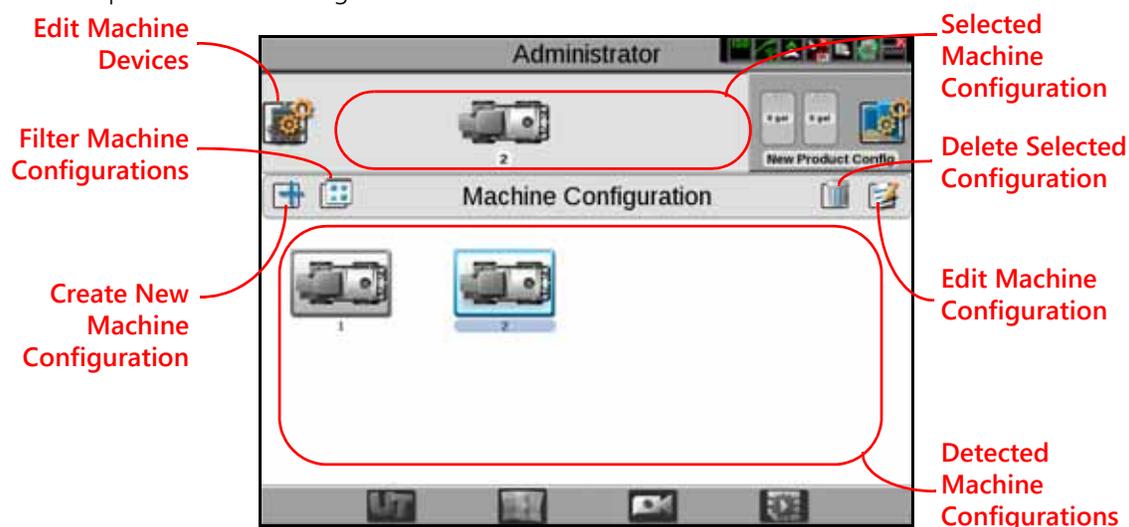
FILE MANAGEMENT OPTIONS

The File Management Options tab is currently only used if a Slingshot Field Hub is connected to the ROS device. If a Field Hub is not installed, it is not recommended to leave the "Send Jobs to Slingshot" option enabled.

Refer to the ROS Slingshot Field Calibration and Operation Manual for additional information on using a Slingshot Field Hub with the ROS device.

OVERVIEW

The Machine Panel displays the selected machine configuration and provides access to the following settings which make up the machine configurations:



- Machine (e.g. self-propelled or tractor) profiles
- Implement profiles (used with tractor profiles)
- Equipment section groups
- Machine device configurations

AUTOMATIC MACHINE CONFIGURATION DETECTION

Machine configurations allow an administrator or equipment owner to set up specific configurations for various implements in a fleet or in the machine shed. With completed machine configurations, ROS will attempt to detect and select the machine configuration to which the device is connected. Specific machine configurations also allow an operator to select various tractor/implement combinations and quickly “reconfigure” ROS for operation on various equipment throughout the season.

If a machine configuration does not exist for the detected system, ROS will select the closest compatible match. Refer to the *Machine Configuration* section on page 60 and the *Machine Profiles* section on page 62 for more information on machine profiles and configurations created using ROS.

NOTE: A compatible match must have the same active nodes, or defined but not currently active, as the previous machine configuration.

This chapter provides information on navigating and using the Machine Panel set up and configure machine profiles for various vehicle types available either in a custom applicator fleet or in a grower machine shed.

FILTER MACHINE CONFIGURATIONS

Use the filter button in the Machine Configuration panel to toggle the panel view.

Toggle the Machine Panel display between all available machine configurations or only machine configurations compatible with the current machine configuration.



Show All



Show Matching

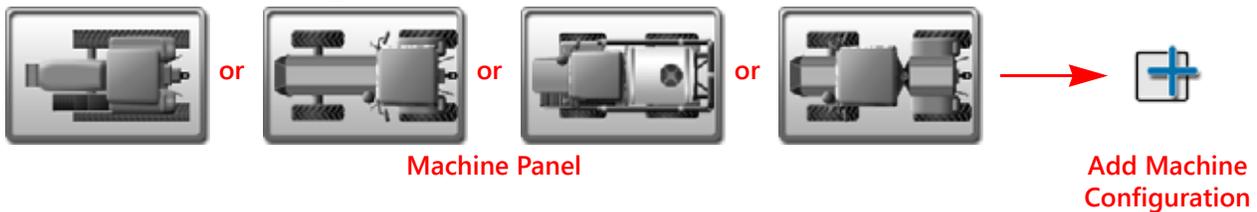
MACHINE CONFIGURATION

Machine configurations matching the detected machine devices will display in the Machine Panel and may be selected by the operator to quickly change the ROS device setup for different configurations used during various field operations.

CREATE A NEW MACHINE CONFIGURATION

NOTE: A new machine configuration may be created without being connected to the specific equipment to be used with the configuration. However, if the configuration is created while the ROS device is connected to a different CANbus system, the created machine configuration will need to be modified or adjusted when ROS first detects the CANbus system to be associated with the machine configuration. Refer to the *Edit an Existing Machine Configuration* section on page 61 for assistance with modifying an existing machine configuration.

To create a new Machine Configuration:

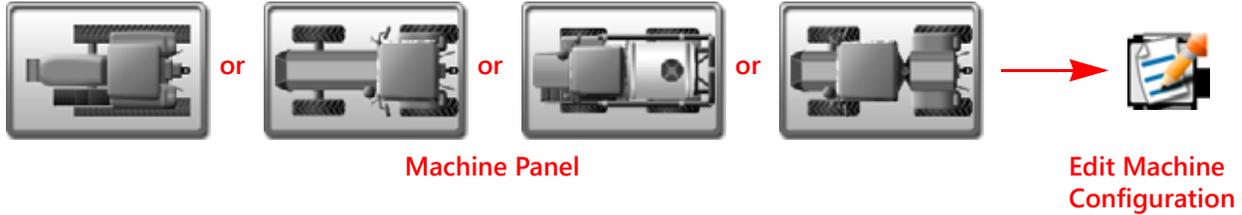


1. Touch the Machine Panel to display the available machine configurations.
2. Touch the Add button to create a new machine configuration.
3. Use the on-screen keyboard to enter the desired machine configuration name and touch the done button. The machine garage will display.
4. Select one of the following options to complete the machine configuration:
 - Touch a tractor or self-propelled sprayer icon to use an existing vehicle profile already set up in ROS. ROS will use the selected machine profile for use with the new machine configuration.
 - Touch the Add button toward the upper, right corner of the display to create a new profile for the machine configuration. Refer to the *Machine Profiles* section on page 62 for information on setting up a new machine profile.

EDIT AN EXISTING MACHINE CONFIGURATION

ROS allows the operator to quickly make changes or adjustments to an existing machine configuration to set up for a different field operation. This process is especially useful for pull-type implements or a machine fleet or to adjust a machine configuration to use an implement normally used with a different tractor than currently detected.

To edit or modify an existing machine configuration:



1. Touch the Machine Panel to display the available machine configurations.
2. If necessary, select the machine configuration.
3. Touch the Edit button.
4. On the displayed prompt, select the:

Machine Garage. to edit the tractor or self-propelled machine profile currently assigned to the machine configuration.



Machine
Garage

Implement Garage. (if available) to edit the implement profile currently assigned to the machine configuration.



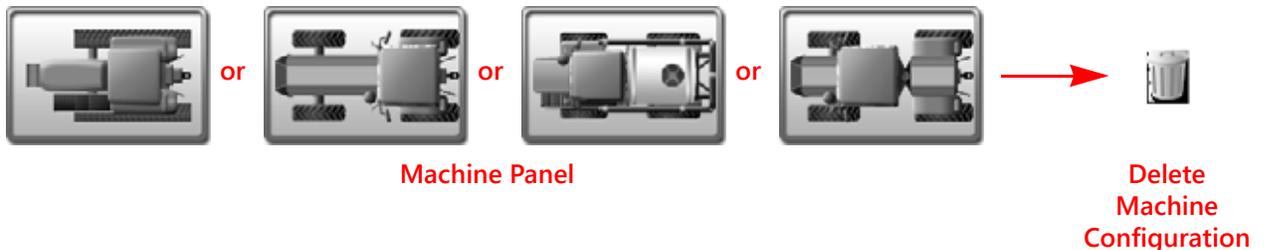
Implement
Garage

5. Use the Delete, Edit, or Add buttons in the selected garage to manage available tractor, self-propelled, or implement profiles. Refer to the *Self-Propelled Machine Profiles* section on page 62 or the *Tractor Profiles* section on page 65 for assistance with creating or editing a machine profile or the *Pull-Type Implement Profiles* section on page 67 for assistance with creating or editing implement profiles.

DELETE AN EXISTING MACHINE CONFIGURATION

NOTE: Deleting a machine configuration does not delete individual machine or implement profiles used within the configuration.

To delete an existing machine configuration:



1. Touch the Machine Panel to display the available machine configurations.
2. Select the desired machine configuration.
3. Touch the Delete button toward the right side of the display.
4. Touch the Yes button on the displayed prompt to permanently delete the machine configuration.

MACHINE PROFILES

Machine profiles save information for various self-propelled implements or tractor and pull-type implements found in a fleet or in the machine shop and that may be used with the ROS device. Profiles may be saved and assigned to multiple machine configurations to allow ROS to function for various field operations throughout the growing or operation seasons.

NOTE: ROS offers a continually expanding database of preset machine profiles. Selecting these profiles will automatically set known factory calibration values for the profile. Due to changes during model year production, check all measurements and verify values shown in ROS prior to using a preset profile during a field operation.

A new machine profile must be created in either the machine garage or while creating a new machine configuration. The following procedure is for creating or completing a new machine profile using either of these methods. For additional assistance with creating a machine configuration or assigning machine profiles to the configuration, refer to the *Machine Configuration* section on page 60.

SELF-PROPELLED MACHINE PROFILES

Profiles for self-propelled agricultural machines such as sprayers, spreaders, harvesters, or swathers are configured with an implement fixed or attached on the vehicle.

NOTE: Self-propelled machine profiles cannot be assigned to a machine configuration with an additional pull-type implement such as a disk or plow, tool bar, pull-type applicator, etc.

CREATE A NEW MACHINE PROFILE

To access the machine garage and create a new self-propelled machine profile:



1. Touch the Machine Panel to view any available machine configurations.
2. Touch Edit.
3. Touch the Machine Garage button to view any machine profiles already configured.
4. Touch Add to create a new machine profile.
5. Select either:
 - the "Self-Propelled" machine type to create a new profile from scratch.
 - an existing self-propelled implement to clone the machine profile settings for the new machine.
6. Use the on-screen keyboard to enter the name for the new machine profile and touch the done button. If a new "Self-Propelled" machine type is selected, proceed to step 7. If using an existing machine profile to create the new profile, skip to step 13.

7. The Machine Profile selection prompt will display if creating a new machine profile from scratch.



8. Use the drop down selections to set the machine profile type, sub-type, manufacturer, and model (if available) of the machine to be created.
9. When the appropriate selections are set, touch the OK button. The equipment selection prompt will display.



10. Review the available OEM equipment options.
11. Depending upon the equipment offered from the manufacturer or the optional features installed on the machine for which the profile is being created, select:
 - no options to enter custom section profiles later in this procedure.
 - a specific option matching, or close to, the OEM equipment currently installed on the machine.
 - multiple, or all, equipment options if the machine offers multiple equipment configurations using the installed equipment.

NOTE: If the configuration is using an ISO product controller, the ISO equipment will be assigned to the configuration later. Refer to the "Equipment Tab" on page 77.

NOTE: Deleted or adjust section groups as necessary later in this procedure for optional features or customized configurations.

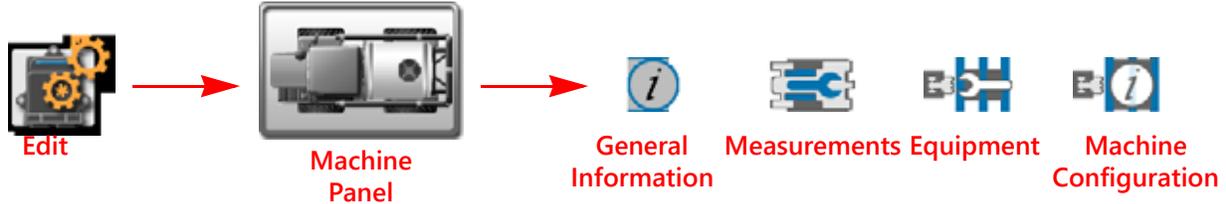
12. Touch the OK button to accept the selected equipment options and proceed with the machine profile configuration.
13. The General Information tab allows the operator to enter or modify machine information. Touch the information fields and use the on-screen keyboard to enter general information about the machine for identification purposes. If a preset machine profile was selected, verify the information displayed and make adjustments if necessary.

14. Press Next.
15. Set or adjust the GPS Offset measurements and Antenna Height. Refer to the *Measurements Tab* section on page 76 for assistance with measuring these values.
16. Enter the Wheel Base measurement. Refer to the *Equipment Tab* section on page 77 for assistance with measuring the machine wheel base.
17. Press Next.
18. Review the section information. If a preset machine profile was selected, the section information for the equipment available from the manufacturer will be set for section groups as appropriate. Touch:
 - the Delete button to remove section groups from the machine profile.
 - the Edit button to modify sections labels, widths, or offset information.
 - the Add button to create a new or customized section group.

Refer to the *Section Groups and Section Settings* section on page 69 for more information on setting up implement section groups.

EDIT THE CURRENT MACHINE PROFILE

To make adjustments to the current machine profile:

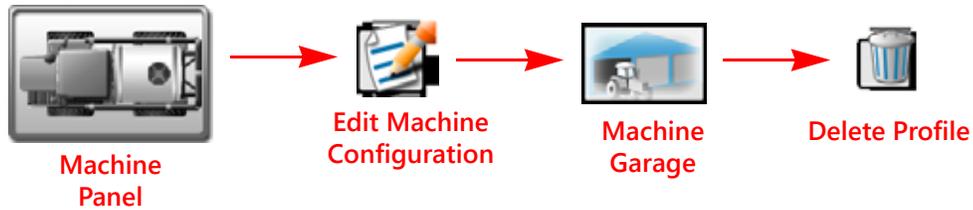


1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Touch the Machine Profile button to access the profile settings.
3. Select the General Information tab and enter identification information for the machine. Refer to the *General Information Tab* section on page 75 for additional information on machine identification or the *Machine Profiles* section on page 62 for assistance with creating or modifying machine profiles.
4. Select the Measurements tab and adjust GPS offset values and the machine wheelbase. Refer to the *Measurements Tab* section on page 76 for assistance with measuring these values on various vehicle types.
5. Select the Equipment tab to view configured section groups. Review the *Section Groups and Section Settings* section on page 69 for additional information on creating, editing, or deleting section groups.
6. Use the page navigation buttons at the bottom of the machine profile tabs, or swipe from left to right, to access the machine configuration Information tab.
7. Use this page to modify the machine configuration information or override the implement width or offset information used for field guidance. Refer to the *Machine Configuration Tab* section on page 74 for more assistance with the machine configuration information.

DELETE AN EXISTING MACHINE PROFILE

NOTE: If a machine profile is deleted, any machine configurations to which the profile was associated will be incomplete until a new machine profile is assigned to the configuration.

To delete an existing machine profile:



1. Touch the Machine Panel to view any available machine configurations.
2. Touch Edit.
3. Touch the Machine Garage button to access the Machine Garage and view any machine profiles already configured.
4. Select the machine to be deleted from the list of machine profiles to be deleted.
5. Select the Delete button to remove the machine profile from the Machine Garage.

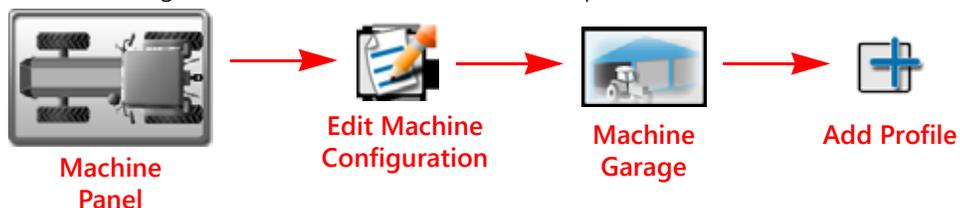
TRACTOR PROFILES

Profiles for tractors such as front wheel assist, articulated, tracked, and traditional tractors will be configured for addition of a pull-type or towed implement using a separate implement profile. Refer to the *Pull-Type Implement Profiles* section on page 67 for more information on pull-type implement profiles.

NOTE: Tractor profiles may be assigned to a machine configuration with one or more pull-type implement profiles such as a tool bar, pull-type applicator, or air-seeder cart and drill, etc.

CREATE A NEW MACHINE PROFILE

To access the Machine Garage and create a new tractor machine profile:



1. Touch the Machine Panel to view any available machine configurations.
2. Press Edit.
3. Touch the Machine Garage button to view any machine profiles already configured.
4. Touch the Add button to create a new machine profile.
5. Select:
 - the "Tractor" machine type to create a new profile from scratch.
 - an existing tractor to clone the machine profile settings for the new machine.
6. Use the on-screen keyboard to enter the name for the new machine profile and touch the Done button. If a new "Tractor" machine type is selected, proceed to step 7. If using an existing machine profile to create the new profile, skip to step 10.

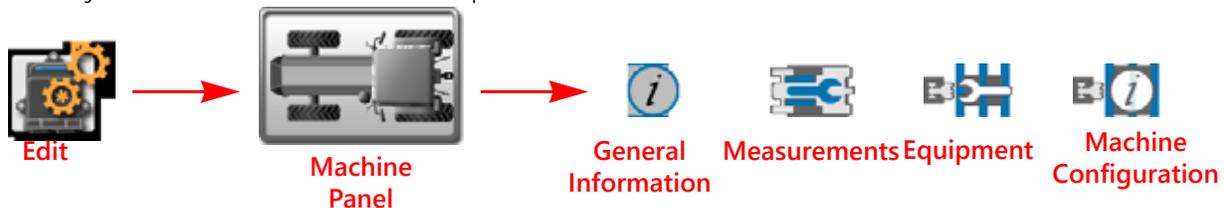
7. The Machine Profile selection prompt will display if creating a machine profile from scratch.



8. Use the drop down selections to set the machine profile Type, Sub-Type, Manufacturer, and Model (if available) of the machine to be created.
9. When the appropriate selections are set, touch the OK button.
10. The General Information tab allows the operator to enter or modify machine information. Touch the information fields and use the on-screen keyboard to enter general information about the machine for identification purposes. If a preset machine profile was selected, verify the information displayed and make adjustments if necessary.
11. Press Next.
12. Set or adjust the GPS offset measurements and antenna height. Refer to the *Measurements Tab* section on page 76 for assistance with measuring these values.
13. Enter the Wheel Base Measurement. Refer to the *Equipment Tab* section on page 77 for assistance with measuring the machine wheel base.
14. Press Done. Refer to the *Pull-Type Implement Profiles* section on page 67 for more information on setting up implement profiles for use with the tractor profile.

EDIT THE CURRENT MACHINE PROFILE

To make adjustments to the current machine profile:



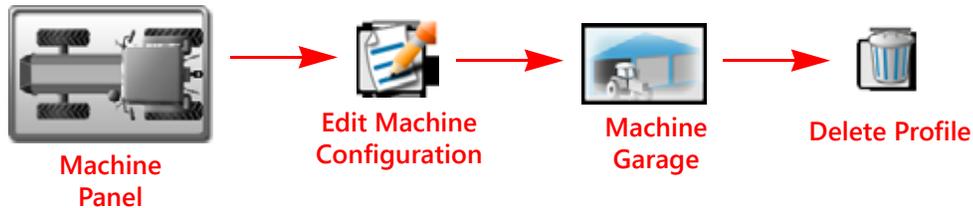
1. Touch the Edit icon to view the machine devices.
2. Touch the Machine Profile button to access the profile settings.
3. Select the General Information tab and enter identification information for the machine. Refer to the *General Information Tab* section on page 75 for additional information on machine identification.
4. Select the Measurements tab and adjust GPS offset values and the machine wheel base. Refer to the *Measurements Tab* section on page 76 for assistance with measuring these values on various vehicle types.
5. Select the Equipment tab to view configured section groups. Review the *Section Groups and Section Settings* section on page 69 for additional information on creating, editing, or deleting section groups.
6. Use the page navigation buttons at the bottom of the machine profile tabs, or swipe from left to right, to access the machine configuration information tab.

- Use this page to modify the machine configuration information or override the implement width or offset information used for field guidance. Refer to the *Machine Configuration Tab* section on page 74 for more assistance with the machine configuration information.

DELETE AN EXISTING MACHINE PROFILE

NOTE: If a tractor profile is deleted, any machine configurations associated with the profile will be incomplete until a new tractor profile is assigned to the configuration.

To delete an existing machine profile:



- Touch the Machine Panel to view available machine configurations.
- Press Edit.
- Touch the Machine Garage button to access the Machine Garage and view any machine profiles already configured.
- From the list of available machine profiles, select the machine.
- Press the Delete button to remove the machine profile from the Machine Garage.

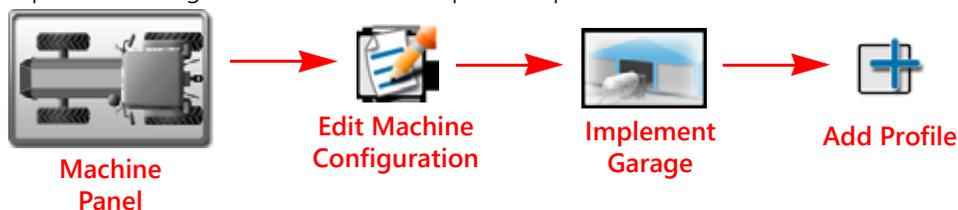
PULL-TYPE IMPLEMENT PROFILES

Profiles for pull-type implements such as plows, disks, pull-type applicators, planters, air-seeder cart, drill, or other tool bars are configured as an addition to a separate tractor profile. Refer to the *Tractor Profiles* section on page 65 section for more information.

NOTE: One or more pull-type implement profiles may be assigned to a machine configuration with a tractor profile for use during field operations.

CREATE A NEW IMPLEMENT PROFILE

To access the Implement Garage and create a new implement profile:



- Touch the Machine Panel to view any available machine configurations.
- Press Edit.
- Touch the Implement Garage button to access the implement garage and view any implement profiles already configured.
- Touch the Add button to create a new implement profile.
- Select:
 - “Two Wheel Cart” type to create a new single axle profile from scratch.
 - “Four Wheel Cart” type to create a new double axle profile from scratch.

- “Pull-Type Toolbar” type to create a new pull-type toolbar from scratch.
 - “Mounted Toolbar” type to create a new mounted toolbar from scratch.
 - an existing implement profile to clone the profile settings for the new implement.
6. Use the on-screen keyboard to enter the name for the new machine profile and touch the Done button. If a new implement type is selected, proceed to step 7. If using an existing implement profile to create the new profile, skip to step 10.
 7. The machine profile selection prompt will display if creating a new machine profile from scratch.

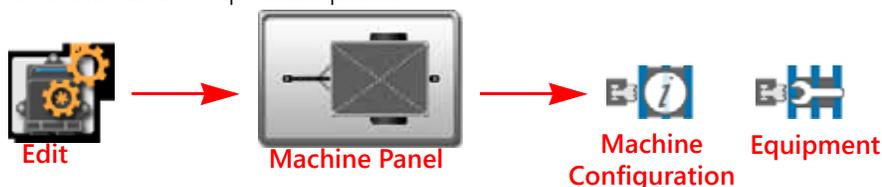


8. Use the drop down selections to set the implement profile type, sub-type, manufacturer, and model (if available) of the implement to be created.
9. When the appropriate selections are set, touch the OK button.
10. The General Information tab allows the operator to enter or modify implement information. Touch the information fields and use the on-screen keyboard to enter general information about the implement for identification purposes. If a preset implement profile was selected, verify the information displayed and make adjustments if necessary.
11. Enter the front and rear (if applicable) tongue and hitch length measurements for the implement. Refer to *General Information Tab* section on page 75 for assistance with measuring these values.
12. Press Next.
13. Review the displayed section information. If a preset implement profile was selected, the section information for the equipment available from the manufacturer will be set for section groups as appropriate. Touch the:
 - Delete button to remove section groups from the implement profile.
 - Edit button to modify sections labels, widths, or offset information.
 - Add button to create a new or customized section group.

Refer to *Section Groups and Section Settings* section on page 69 for more information on setting up implement section groups.

EDIT THE CURRENT IMPLEMENT PROFILE

To make adjustments to the current implement profile:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Touch the Implement Profile button to access the profile settings.

3. Select the General Information tab.
4. Enter identification information for the implement. Refer to the *General Information Tab* section on page 75 for additional information on implement identification.
5. Enter the front and rear (if applicable) tongue lengths and the rear hitch length. Refer to the *General Information Tab* section on page 75 for assistance with measuring these values on various implement types.
6. Select the Equipment tab to view configured section groups. Review the *Section Groups and Section Settings* section on page 69 for additional information on creating, editing, or deleting section groups.
7. Use the page navigation buttons at the bottom of the machine profile tabs, or swipe from left to right, to access the tractor - general Information tab.
8. Use the tractor - general information tab to modify the tractor profile information. Refer to the *Tractor Profiles* section on page 65 for more assistance with the tractor information.
9. Use the page navigation buttons at the bottom of the machine profile tabs, or swipe from left to right, to access the machine configuration tab.
10. Use the machine configuration tab to modify the configuration information or override the implement width or offset information used for field guidance. Refer to the *Machine Configuration Tab* section on page 74 for more assistance with the machine configuration information.

DELETE AN EXISTING IMPLEMENT PROFILE

NOTE: If an implement profile is deleted, any machine configurations associated with the profile may not be complete until a new implement profile is assigned to the configuration.

To delete an existing implement profile:



1. Touch the Machine Panel to view available machine configurations.
2. Touch Edit.
3. Touch the Implement Garage button to view any implement profiles already configured.
4. From the list of available implement profiles, select the implement to be deleted.
5. Select Delete to remove the implement profile from the implement garage.

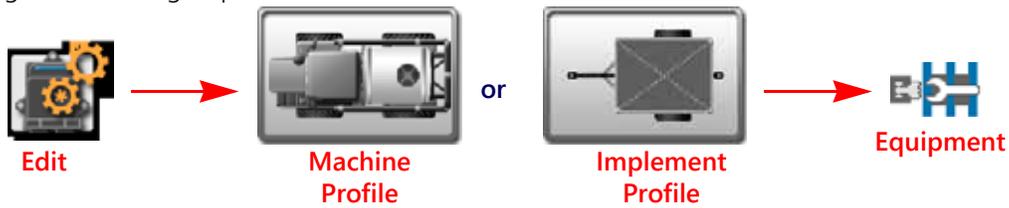
SECTION GROUPS AND SECTION SETTINGS

The section groups feature of ROS provides a flexible method for configuring sections for various implement types. Section groups may be configured for separate “boom systems” or to group various boom sections as necessary. For example, section groups may be used to configure a tiered boom system, setup control sections on a row crop planter, or to separate implement sections on a multi-bin air seeder system with liquid booms.

NOTE: ROS uses the section groups to determine the overall implement or working width when providing swath guidance during field operations. For assistance with modifying the width used for implement guidance, refer to the *Machine Configuration Tab* section on page 74.

VIEW SECTION GROUPS

To view configured section groups:



1. Touch the Edit icon in the machine panel to view the machine devices.
2. Touch the Machine Profile (for self-propelled implements) or Implement Profile (for pull-type implements) button to access the profile settings.
3. Select the Equipment tab.

NOTE: When using an implement profile assigned to a machine configuration, use the page navigation at the bottom of the tab, or swipe across the screen, to access additional implement profiles without backing out to the machine configuration panel.

The Equipment tab displays the name or description, type, and overview of the configured sections and section labels for any configured section groups.

4. To:

Edit Section Settings. Touch the Edit button to access or edit additional section group or individual section settings. Refer to the *Section Settings* section on page 70 for more information on modifying section settings within section groups.



Edit

Delete Section Groups. Touch the Delete button to remove a section group from the machine or implement.



Delete

Create a New Section Group. Touch the Add button in the next available group to add a new section group. Use the on-screen keyboard to enter a group name or description for the new group and refer to the *Section Settings* section on page 70 for assistance with section settings within section groups.



Add

NOTE: The Edit and Delete buttons will only display for configured section groups. If no section groups are configured, the Add button will be displayed in the first group.

SECTION SETTINGS

To set up or modify section settings on an implement:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Touch the Machine Profile (for self-propelled implements) button or the Implement Profile (for pull-type implements) button to access the profile settings.
3. Select the Equipment tab.
4. Touch the:

- Add button to create a new section group and use the on-screen keyboard to enter a group name or description for the new group.
- Edit button to modify group and section settings for an existing section group.

NOTE: If no section groups are configured, the Add button will be displayed in the first group.



5. Touch the General Information tab.
6. Select the Name field and enter the desired name or description of the section group.
7. Touch the Type drop down field and select the type of sections in the group.
8. Enter any applicable information to be shown with the completed job or field report in the lower portion of the General Information tab.
9. Touch the Measurements tab.
10. Configure the overall offset of the implement (e.g. spray boom, spread pattern, knives or shanks, etc.) from the center of the machine or implement pivot point as necessary.
 - a. Select the left/right offset direction and select the offset distance field and use the on-screen keypad to enter the distance from the center of the implement pivot point to the center of the section group. Refer to the *Equipment Setup - Measurements Tab* section on page 80 for additional information on measuring the implement offsets.
 - b. Select the aft offset distance field and use the on-screen keypad to enter the distance from the center of the implement pivot point to the center of the section group. Refer to the *Equipment Setup - Measurements Tab* section on page 80 for additional information on measuring implement offsets.
11. Touch the Sections tab.
12. Touch the Number of Sections field and use the on-screen keypad to enter the number of sections in the group. ROS will update the sections display with the appropriate number of sections.
13. Touch a section indicator to display section settings.
14. Touch the section label field and use the on-screen keyboard to enter the desired label (up to three characters) for the section.
15. Touch the Width field and use the on-screen keypad to enter the section width in inches [centimeters].

NOTE: ROS is capable of calculating section offsets for standard implements automatically. For standard section configurations (e.g. sections aligned end-to-end and centered on the swath midpoint) set the section width for each section and touch the "Calculate Offsets" button.

Section offsets may still be adjusted to customize the section configuration as necessary.

16. Touch the Wired As field and enter the appropriate "boom sense" connection or lead used to sense the section status. Refer to the ROS Device Installation Manual, the Raven CANbus Installation Manual, or contact a local Raven dealer for additional assistance with section connections and cabling.
17. Repeat step 13 through step 16 to set the section settings for each section in the section group. Once the section labels, width, and wired as settings are configured, ROS may be used to automatically calculate and set the section offsets for the group.

To automatically calculate section offsets:

1. Verify that the section width field for each section in the group has been entered correctly.
2. Touch the "Calculate Offsets" button to automatically align sections end-to-end along the swath midpoint. ROS will calculate and set the offset values for a standard section configuration (e.g. similar to sections on a self-propelled sprayer).

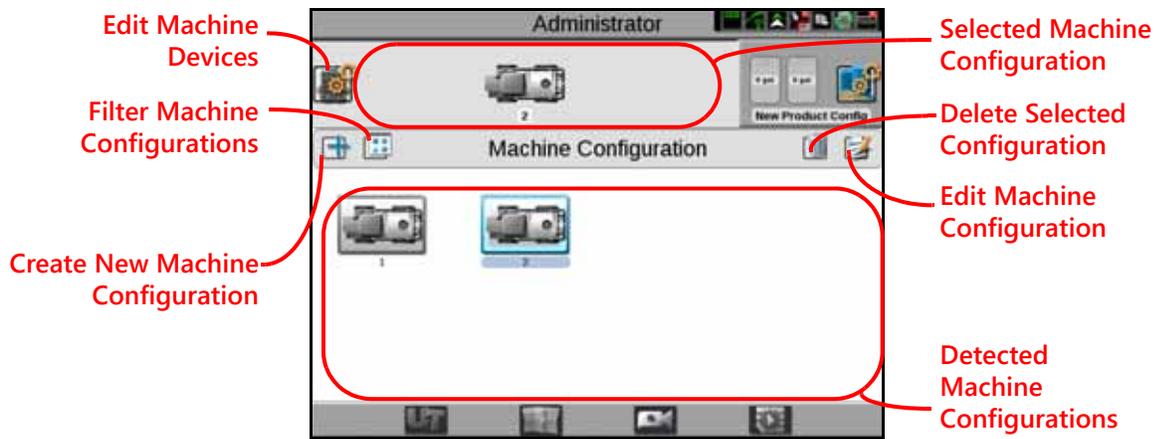
To manually configure or adjust section offsets:

1. Touch the left/right direction setting and select the appropriate offset direction.
2. Touch the left/right field and enter the offset distance.
3. Touch the fore/aft direction setting and select the appropriate offset direction.
4. Touch the fore/aft field and enter the offset distance.

MACHINE CONFIGURATION AND PROFILE SETTINGS DEFINITIONS

The following sections provide detailed information about the settings and options accessible via the Machine panel.

PANEL NAVIGATION



MACHINE CONFIGURATIONS

Touch the machine configuration panel to view additional configurations (if available). The panel must also be expanded to select the following machine configuration options:

Add New Machine Configuration. Touch the Add button to create a new machine configuration.



Add New Machine Configuration

Edit Machine Configuration. Select the Edit button to access the machine and implement garages and edit equipment profiles.



Edit Machine Configuration

Delete Machine Configuration. Touch the Delete button to remove an existing machine configuration from the machine panel. Any machine or implement profiles assigned to the deleted configuration will still be available in the machine or implement garage.



Delete Machine Configuration



MACHINE DEVICES

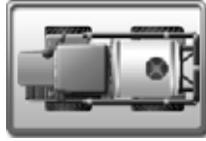
Touch the machine devices button to expand the machine devices panel and access additional GPS, serial, and CANbus device settings.



MACHINE AND IMPLEMENT PROFILES

Machine profiles store information such as the machine geometry and GPS antenna mounting position which will be used to provide guidance during field operations. To complete the machine configuration, machine profiles are paired with either a pull-type implement or a self-propelled, or fixed, implement profile.

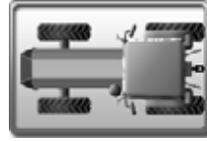
Self-Propelled Machine Configuration



Self-Propelled Machine Profile

or

Tractor and Implement Machine Configuration

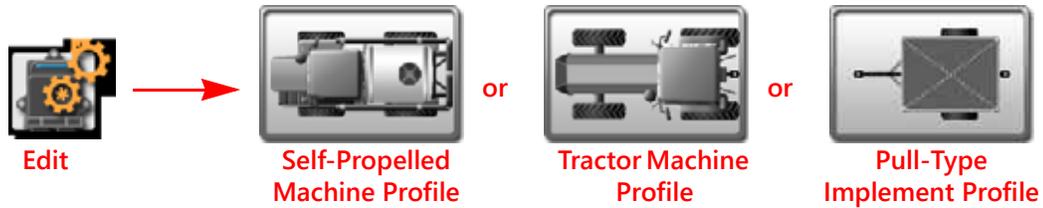


Tractor Machine Profile



Pull-Type Implement Profile

To access the machine or implement profile settings for the current machine configuration, select:



To access the machine or implement garage to access machine or implement profile settings for any configured profile:



The following options are also available in the machine or implement garage:

NOTE: The operator may choose to create a new machine profile when setting up a new machine configuration. Refer to the *Create a New Machine Configuration* section on page 60 for additional assistance with creating machine configurations.

Add New Profile. Touch the Add button in the upper, right corner of the machine or implement garage to create a new profile.



Edit Profile. Select the Edit button in the upper, right corner of the machine or implement garage to edit the selected profile.

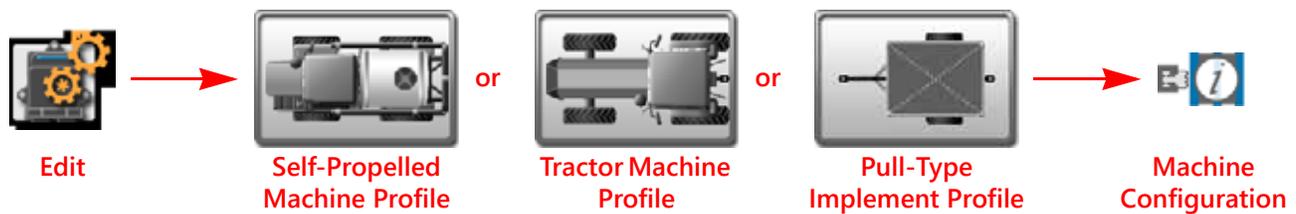


Delete Profile. Touch the Delete button to remove the selected machine or implement profile from the garage.

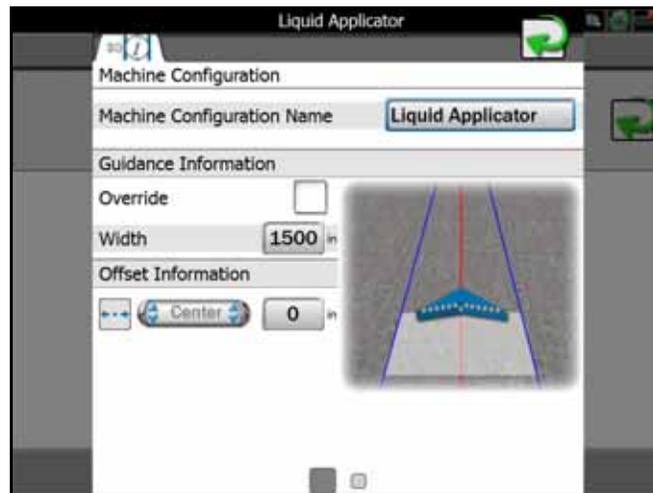


Any machine configurations associated with the profile may be incomplete until another profile is assigned to replace the deleted profile.

MACHINE CONFIGURATION TAB



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Touch any of the profile buttons for the machine or implements currently assigned to the machine configuration.
3. Use the page navigation at the bottom of the prompt, or swipe across the screen, to display the first settings page and display the machine configuration tab.



Machine Configuration Name. Displays the name or description for the current machine configuration.

GUIDANCE INFORMATION

Override Enable. Touch the Override option to enable or disable the guidance override option. Use this option to override the configured implement section width for calculating and displaying guidance paths during field operations.

Width. Enter the desired override width for calculating and displaying guidance paths during field operations.

NOTE: The override width does not modify configured section information. Coverage of active sections will be displayed and mapped as configured for the machine profile.

OFFSET INFORMATION

Left/Right Override Direction. Touch the direction drop down and select the direction in which the guidance path should be overridden.

Left/Right Override Distance. Touch this field and enter the distance for the guidance path override direction.

GENERAL INFORMATION TAB

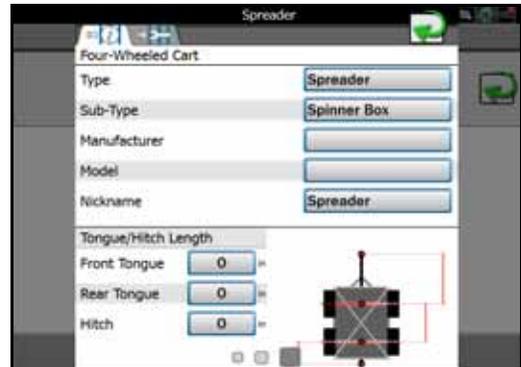


1. Touch the edit icon in the machine panel to view the machine devices.
2. Select a profile button for the machine or implements currently assigned to the machine configuration to view the General Information tab for the selected machine or implement.

NOTE: Use the page navigation at the bottom of the prompt, or swipe across the screen, to access other information for profiles assigned to the selected machine configuration.

Self-Propelled and Tractor

Pull-Type Implements



NOTE: Information may be prepopulated in the following fields if a preset machine or implement profile has been selected during set up. Touch any of the fields described below and use the on-screen keyboard to edit the displayed profile information.

Type. A description of the type of machine or implement used with the selected profile.

Sub-Type. The sub-type field offers an additional line of equipment description to help identify the appropriate equipment with which the profile should be used.

Manufacturer. Name or description of the original equipment manufacturer.

Model. A model number, model year, or other designation to help identify the equipment used with the profile.

Nickname. If desired, a name or description used by operators or fleet administrators to identify the equipment may be entered. This description will be displayed in the machine panel area on the main display.

TONGUE/HITCH LENGTH

NOTE: The tongue and hitch length settings are only applicable to pull-type implements and carts and will not be used with self-propelled or tractor profiles.

Tongue or Front Tongue. Enter the distance in inches [centimeters] from the implement hitch to front axle on a pull-type implement. The tongue distance must be measured parallel with the direction of travel.

NOTE: Only one tongue length measurement will be required for implements with a single “axle.”

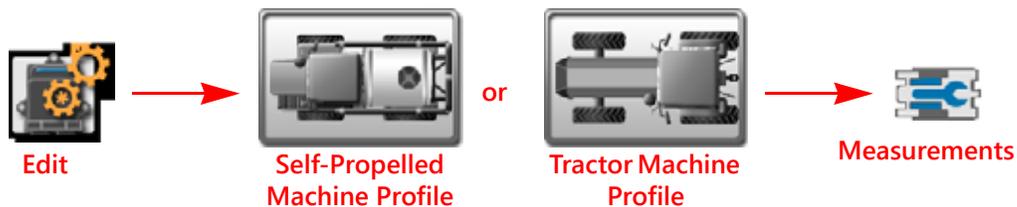
For pull-type implements with an offset working section, set the left or right offset in the section group settings. Refer to the *Equipment Setup - Measurements Tab* section on page 80 for assistance with section group offsets.

Rear Tongue. For implements with a second “axle,” Enter the distance in inches [centimeters] between the front and rear axles. The rear tongue distance must be measured parallel with the direction of travel.

Hitch. The hitch distance should be entered if the implement or cart will be towed between the machine and another implement during field operations. Enter the distance in inches [centimeters] from the implement rear axle to the hitch point on the implement or cart. The hitch distance must be measured parallel with the direction of travel.

MEASUREMENTS TAB

NOTE: Measurements for pull-type implements are entered on the General Information tab. Refer to the *General Information Tab* section on page 75 for details on measurements for these implements.



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Touch a Machine Profile button currently assigned to the machine configuration to view the General Information tab for the selected machine or implement.

NOTE: Use the page navigation at the bottom of the prompt, or swipe across the screen, to access other information for profiles assigned to the selected machine configuration.

3. Touch the Measurements tab to view the Profile Measurements prompt.

GPS MEASUREMENTS

To provide accurate guidance during field operations, calibrate the ROS for the position of the GPS antenna on the machine relative to the center of the pivot point. Refer to the following sections for assistance with measuring and setting the GPS measurements on the ROS device.

NOTE: The pivot point for a conventional tractor or self-propelled sprayer is the center of the rear axle.
 The pivot point for a tracked tractor is the center of the track length between the tracks.
 The pivot point for an articulated tractor is the point of articulation.



Left/Right Offset Direction. Touch the left/right offset direction drop down and select the position of the GPS antenna from the center-line of the machine.

Left/Right Offset Distance. Select the GPS offset distance field and enter the distance from the center-line of the machine to the GPS antenna in inches [centimeters]. The left/right offset distance must be measured perpendicular to the direction of travel.



Fore/Aft Offset Direction. Touch the fore/aft offset direction drop down and select the position of the GPS antenna from the machine pivot point.

Fore/Aft Offset Distance. Select the GPS offset distance field and enter the distance from the pivot point to the GPS antenna in inches [centimeters]. The fore/aft offset distance must be measured parallel with the direction of travel.

GPS Antenna Height. The GPS Height value is the measurement from the ground to the bottom of the GPS antenna. The height value will only be necessary if a tilt corrected DGPS signal is provided to the field computer.

MACHINE AND HITCH MEASUREMENTS

The machine measurement settings provide information about the machine geometry used by ROS to map the vehicle position during field operations and create coverage or as-applied data for field operations.

Hitch Left/Right Offset Direction. Touch the left/right offset direction drop down and select the position of the machine hitch from the center-line of the machine.

Hitch Left/Right Offset Distance. Select the offset distance field and enter the distance from the center-line of the machine to the hitch in inches [centimeters]. Measure the left/right offset distance perpendicular to the direction of travel.

Hitch Fore/Aft Offset Direction. Touch the fore/aft offset direction drop down and select the position of the hitch from the machine pivot point.

Hitch Fore/Aft Offset Distance. Select the offset distance field and enter the distance from the pivot point to the hitch in inches [centimeters]. The fore/aft offset distance must be measured parallel with the direction of travel.

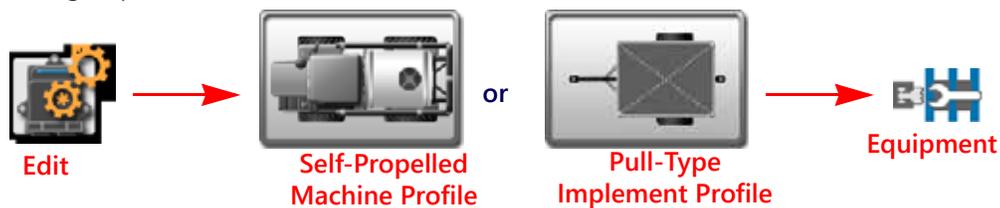
Wheel Base. The wheel base value is used by ROS to map coverage of the implement during field operations. Enter the distance between the front and rear "axle" in inches [centimeters]. The wheel base must be measured parallel with the direction of travel.

Pivot to Front Axle. For articulated vehicles, measure the distance from the pivot point to the front axle.

Pivot to Rear Axle. For articulated vehicles, measure the distance from the pivot point to the rear axle.

EQUIPMENT TAB

The Equipment tab provides an overview of configured section groups and allows the operator to create or manage section groups.



1. Touch the Edit icon in the Machine panel to view the machine devices.
2. Touch any of the machine profile buttons currently assigned to the machine configuration to view the General Information tab for the selected machine or implement.

NOTE: Use the page navigation at the bottom of the prompt, or swipe across the screen, to access other information for profiles assigned to the selected machine configuration.

3. Touch the Equipment tab to display configured section groups for the self-propelled or implement profile.



SECTION GROUP DISPLAY

The following information about configured section groups will display on the Equipment tab:

Section Group Name. The name or description assigned to the section. Refer to the *Equipment Setup - General Information Tab* section on page 79 for more information on entering section group names or descriptions displayed in this area.

Section Group Type. The selected or entered section type for the sections in the group. Refer to the *Equipment Setup - General Information Tab* section on page 79 for more information on entering section types displayed in this area.

Section Labels and Abstract. The bottom of the section group area will display the number of sections and configured section labels for each section currently set for the section group. Refer to the *Equipment Setup - Sections Tab* section on page 81 for more information on setting up section labels.

SECTION GROUP OPTIONS

Edit Section Settings. Touch the Edit button to access or edit additional section group or individual section settings. Refer to the *Section Settings* section on page 70 for more information on modifying section settings within section groups.



Edit

Delete Section Groups. Touch the Delete button to remove a section group from the machine or implement.



Delete

Create a New Section Group. Touch the Add button in the next available group to add a new section group. Use the on-screen keyboard to enter a group name or description for the new group and refer to the *Section Settings* section on page 70 for assistance with section settings within section groups. The Add button can also be used to import a section group from an ISO product controller.



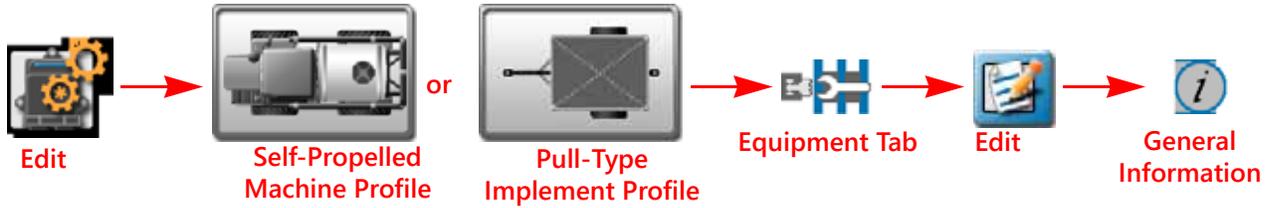
Add

NOTE: The Edit and Delete buttons will only be displayed for configured section groups. If no section groups are configured, the Add button will be displayed in the first group.

SECTION GROUP SETTINGS DEFINITIONS

Review the following sections for additional assistance with entering section group information and setting up section configurations within a section group.

EQUIPMENT SETUP - GENERAL INFORMATION TAB



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Touch the profile buttons for the machine or implements currently assigned to the machine configuration to view the general information tab for the selected machine or implement.

NOTE: Use the page navigation at the bottom of the prompt, or swipe across the screen, to access other information for profiles assigned to the selected machine configuration.

3. Select the Equipment tab to view the currently configured section group information. Refer to the *View Section Groups* section on page 70 for information on the section group display or the *Section Settings* section on page 70 for assistance with creating a new section group.
4. Select the Edit button in the desired section group to edit section group information.
5. Touch the General Information tab to access the following settings for the selected section group:



NOTE: Information may be prepopulated in the following fields if a preset machine or implement profile has been selected during set up. Touch any of the fields described below and use the on-screen keyboard to edit the displayed profile information.

Depending on equipment type, reporting information may not be available.

GENERAL INFORMATION

Name. A name or description of the sections configured in the selected section group.

Type. A description of the type of sections in the selected section group.

REPORTING INFORMATION

The lower portion of general information equipment setup or section groups allows the operator to enter the following information as applicable to the field operation:

NOTE: The following fields are for report notation or display information purposes only and will not set or adjust any values or control system characteristics for an application control system.

Tip Type. Type of spray tips used on a liquid boom system during a field operation.

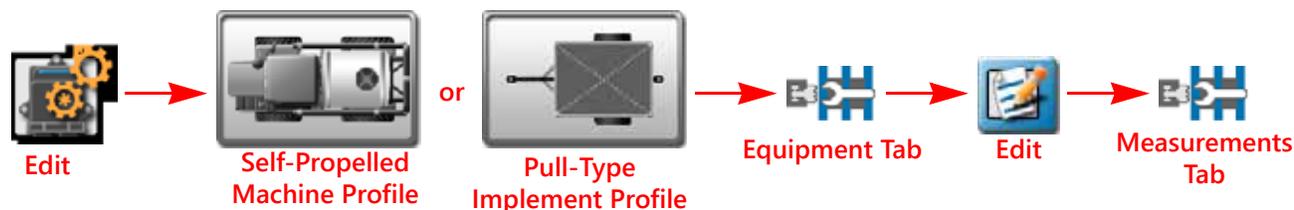
Tip Spacing. Spacing between spray tips on a liquid boom system.

Tip Pressure. This field may be used to note the average or target pressure for the currently installed spray tips.

Tip Size. Enter the tip size information for display or information.

Height. Use this field to note the average or target height in feet [meters] maintained for the current tips or boom configuration.

EQUIPMENT SETUP - MEASUREMENTS TAB



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Touch the profile buttons for the machine or implements currently assigned to the machine configuration to view the General Information tab for the selected machine or implement.

NOTE: Use the page navigation at the bottom of the prompt, or swipe across the screen, to access other information for profiles assigned to the selected machine configuration.

3. Select the Equipment tab to view the currently configured section group information. Refer to *View Section Groups* section on page 70 for information on the section group display or the *Section Settings* section on page 70 for assistance with creating a new section group.
4. Select the Edit button in the desired section group to edit section group information.
5. Touch the Measurements tab to access the following settings for the selected section group:

EQUIPMENT OFFSETS

Use the following settings to configure the location of the section group on the machine or implement:

 **Left/Right Offset Direction.** Touch the left/right offset direction drop down and select the overall offset for the selected section group from the center-line of the machine or implement.

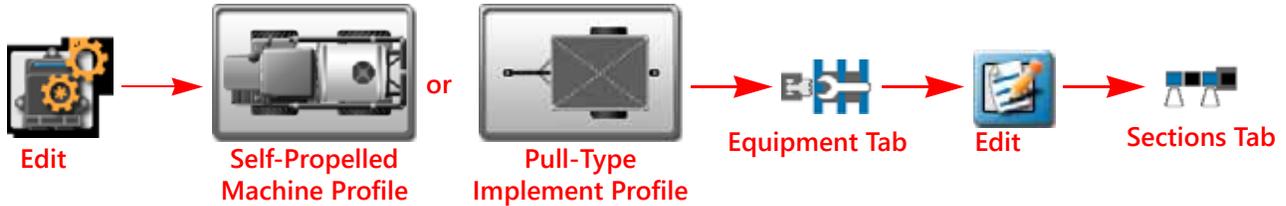
Left/Right Offset Distance. Select the offset distance field and enter the distance from the center-line of the machine or implement to the center of the section group in inches [centimeters]. The left/right offset distance must be measured perpendicular to the direction of travel.

 **Fore/Aft Offset Direction.** Touch the fore/aft offset direction drop down and select the position of the section group from the machine or implement pivot point.

NOTE:The fore equipment offset may not be available when configuring some implement types.

Fore/Aft Offset Distance. Select the offset distance field and enter the distance from the pivot point to the section group in inches [centimeters]. The fore/aft offset distance must be measured parallel with the direction of travel.

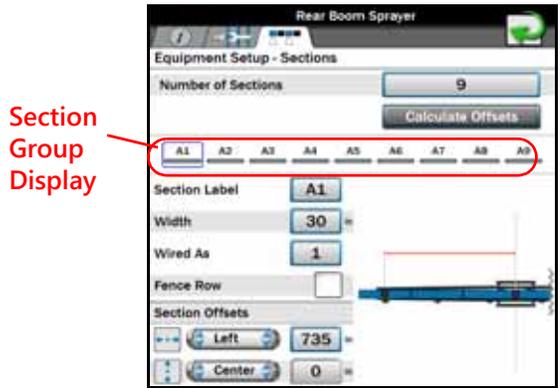
EQUIPMENT SETUP - SECTIONS TAB



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Touch the profile buttons for the machine or implements currently assigned to the machine configuration to view the general information tab for the selected machine or implement.

NOTE: Use the page navigation at the bottom of the prompt, or swipe across the screen, to access other information for profiles assigned to the selected machine configuration.

3. Select the Equipment tab to view the currently configured section group information. Refer to *View Section Groups* section on page 70 for information on the section group display or the *Section Settings* section on page 70 for assistance with creating a new section group.
4. Select the Edit button in the desired section group to edit section group information.
5. Touch the Sections tab to access the following settings for the selected section group:



NOTE: The section group display will not necessarily represent the physical section layout of the implement.

Number of Sections. This field sets the number of sections available within the section group. Edit this number to add or remove sections from the section display area.

Calculate Offsets Feature. ROS is capable of calculating section left/right offsets for standard section configurations (e.g. sections aligned end-to-end and centered on the swath midpoint).

This feature may be used to quickly set up sections for common configurations such as spray booms, tool bars, planters, and seeders.

To use the automated offset calculator:

1. Set and verify width values for all sections in the group. See the *Equipment Setup - Sections Tab* section on page 81 for details on setting the width value for each section.
2. Touch the "Calculate Offsets" button. ROS will automatically set the left/right offsets for a standard section configuration.
3. If necessary, manually adjust the fore/aft or left/right offset direction and distance values to customize the section group configuration.

Section Group Display. This area displays an abstract of the current section group configuration with the number of sections and assigned section labels. Touch a section indicator shown in this area to view settings for each section in the group.

NOTE: The section order displayed in this area will be duplicated for section status indicators during field operations. It is recommended to enter sections from left to right to ensure that the status indicators display a general representation of the section group status.

Section Label. Set the label to be displayed for each section during field operations. The section label may be up to three characters and will be displayed on section status display or on-screen switch box widgets selected for use during active jobs.

Width. Set the width in inches [centimeters] to calibrate ROS for the area covered by each specific section during field operation.

Wired As. Use the “wired as” field to set the physical “boom” sense or valve connection used for each configured section and to reorder sections in the group for accurate display during a field operation.

NOTE: Raven boom sense cables are color coded as follows:

Section Number	Lead Wire Color	Section Number	Lead Wire Color
1.	Black	2.	White/Blue
3.	Brown	4.	Pink
5.	Blue	6.	Yellow/White
7.	Black/White	8.	Green/White
9.	Brown/White	10.	Red/White
11.	Blue/White	12.	White/Yellow
13.	White/Black	14.	White/Green
15.	White/Brown	16.	White/Red

The above section numbers assume that section 1 is located at the far left of the implement and section 16 is at the far right. Some OEM installations may connect these leads differently than indicated above. For additional assistance with switch lead or valve connections, refer to the Raven CANbus Installation Manual or contact a local equipment dealer.

Fence Row. Select the fence row option to designate the configured section as a fence row. The ROS device will not include sections assigned as fence rows in overall guidance width calculation. Guidance width and offset may still be overridden on the Machine Configuration tab. Refer to the *Machine Configuration Tab* section on page 74 for additional assistance.

SECTION OFFSETS



Left/Right Offset Direction. Touch the left/right offset direction drop down and select the direction from the center of the boom or implement to the center of the section.

Left/Right Offset Distance. Select the offset distance field and enter the distance from the center of the boom or implement to the center of the section in inches [centimeters]. The left/right offset distance must be measured perpendicular to the direction of travel.



Fore/Aft Offset Direction. Touch the fore/aft offset direction drop down and select the direction from the center of the boom or implement to the center of the section.

Fore/Aft Offset Distance. Select the offset distance field and enter the distance from the center of the boom or implement to the center of the section in inches [centimeters]. The fore/aft offset distance must be measured parallel with the direction of travel.

Elevation. The current GPS elevation above sea level.

Satellites. Displays the number of satellites currently used in the position solution.

Differential ID. Depending upon the correction source used, this value will display the differential source identification such as the differential satellite PRN, a base station ID, etc. Some correction sources will not populate this field.

Differential Age. This value is the age of the last differential update. The differential age should not rise above a few seconds to ensure accurate position corrections during field operations depending on correction type.

HDOP. Horizontal Dilution of Precision (HDOP) is a value indicating the geometry of the satellites used in the position solution. Lower values indicate better positioning of the used satellites.

GGA Quality. Displays the current differential fix status. This value will display:

- '0' or '1' if no differential corrections are being received, single solution.
- '2' when the DGPS receiver has locked on to a differential source (SBAS or converging with GS/OmniSTAR corrections).
- '4' for RTK fixed mode for fine GPS course correction mode.
- '5' for fixed GS or OmniSTAR XP/HP correction modes or RTK float mode.

UTC Time and Date. Universal coordinated time and date information is displayed in these fields (Greenwich Mean Time).

Messages. Displays what NMEA messages are being received by ROS and the frequency at which they are being received.

ENABLE GPS REVERSE SENSING

The GPS reverse sensing feature may be enabled if the ROS device will be used to map application or field coverage where the vehicle may be traveling in reverse (i.e. backing into corners). To allow the ROS device to automatically detect when the vehicle is traveling in a reverse direction:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the GPS module. The GPS Global Settings prompt will display.

3. Touch the GPS Diagnostics button to the right of the desired GPS receiver. The GPS Solutions Information tab will be displayed.



4. Touch the GPS Reverse Sensing option at the bottom of the GPS Solution Information tab to toggle the reverse sensing feature.

NOTE: The GPS based reverse sensing feature is not available if a Raven SmarTrax steering node with terrain compensation capabilities is detected on the CANbus and the Terrain Compensation feature on the node is activated.

When reverse movement is detected during field operations, the device will maintain the vehicle indicator orientation when the system detects that the machine is moving in reverse.

NOTE: If this feature is disabled, the guidance display will assume all vehicle motion is in the forward direction.

When the reverse sensing feature is enabled, ROS may require the operator to manually override the current direction of travel during field operations. Before beginning field operations, review the *Widget Selection and Set Up* section on page 142 and the *Widget Catalog Definitions* section on page 143 and ensure that the appropriate widgets for this feature are available on the guidance screen(s) as appropriate.

The Forward Override widget is required to manually override the direction of travel during a field operation.

VIEW CURRENT GPS WARNINGS

Information may be available for current GPS warning or alarm conditions as encountered by the ROS device:

NOTE: Warning information displayed by the ROS device only applies to corrections transmitted to the device. If using an external receiver, corrections may be received by the external equipment, but not transmitted to the ROS device. Check cable connections and verify communication settings before troubleshooting the correction source.

To display any current GPS warnings detected by the ROS device:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the GPS module. The GPS global settings prompt will display.
3. Touch the GPS Diagnostics button next to the GPS receiver with the warning. The GPS solution information Page will open.
4. Touch the Current Warning tab.
5. Any active warnings or alarm conditions will be displayed on the current warnings prompt. This tab will also display possible solutions for the current warning or alarm conditions to assist with troubleshooting or correcting the current condition.

SELECT A GENERIC DIFFERENTIAL TYPE

When using a “Generic” source (i.e. GPS from a non-Raven receiver or GPS routed through an optional SmarTrax system, etc.) for a differential solution, the operator must set the type of differential corrections that will be supplied to the ROS device. This setting allows the ROS device to help monitor status of GPS corrections during field operations.



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the GPS module. The GPS Global Settings window will open.
3. Touch the GPS Diagnostics button next to the desired GPS receiver. The GPS Solution Information tab will be displayed.
4. Touch the Differential Source tab.

NOTE: Options on the Generic GPS Differential Source tab will be disabled if the receiver is capable of being configured through the ROS device directly. Refer to the *Configure a Differential Type* section on page 87 for assistance with configuring a compatible receiver via the connected ROS device.

5. Select the type of Differential Corrections used for the position solution. During field operations, the ROS device may provide a warning if position corrections do not meet the requirements for the user selected correction type.

NOTE: This selection does not configure the GPS receiver for position solutions during field operations. Selecting an option other than the correction type used during field operations may cause ROS to indicate GPS status incorrectly.

GPS CONFIGURATION

Compatible Raven receivers, or a receiver integrated into a Raven device, may be configured via the ROS interface.

NOTE: The settings described in the following sections will not be accessible if a compatible receiver is not detected.

RESET RECEIVER DEFAULTS

To reset default setting to a compatible Raven receiver using the ROS device:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the GPS module. The GPS Global Settings tab will open.
3. Press the GPS Configuration button to the right of the desired receiver. The Differential Settings tab will display.
4. Touch the Restore Receiver Defaults button in the upper, right corner.

NOTE: The Restore Receiver Defaults button will not be available if a compatible receiver is not detected.

5. Touch the Yes button on the displayed Caution prompt to restore default settings to the GPS receiver or No to keep the current settings.

CONFIGURE A DIFFERENTIAL TYPE

To configure the type of differential corrections on a compatible receiver using the ROS device:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the GPS module. The GPS Global Settings prompt will be displayed.
3. Touch the GPS Configuration button to the right of desired receiver. The Differential Settings tab will be displayed.
4. Use the radio options along the left of the tab to select the desired differential source.
5. Additional information, settings, and options may be displayed on the right of the Differential Settings tab based upon the selected differential type. Refer to the *Differential Settings Tab* section on page 94 for more information or additional assistance with these options.

SET THE ELEVATION MASK

The elevation mask



1. Touch the Edit icon in the machine panel to view the machine devices.
2. Locate and select the GPS module. The GPS Global Settings prompt will display.
3. Select the GPS Configuration icon to the right of desired receiver. The Differential Settings tab will display.
4. Touch the General Settings tab. The GPS Elevation Mask setting will display.

Use the elevation mask to adjust the minimum elevation above the horizon which the receiver may use in the position solution. This feature is adjusted in degrees above horizontal and may be used to force the system to ignore satellites which are too low on the horizon. The default elevation mask is 5°.

Raising the elevation mask may cause the system to lose differential lock or could increase the occurrence of HDOP issues. Unless instructed to raise the elevation mask by a technician, leave this value at the default value.

SET GPS MESSAGE OUTPUTS

NOTE: Raven receivers use NMEA 0183 protocols. NMEA 0183 is a combined electrical and data specification for communication between marine electronics such as echo sounder, sonars, anemometer, gyrocompass, autopilot, GPS receivers and many other types of instruments. It has been defined by, and is controlled by, the National Marine Electronics Association.

To configure NMEA output messages and message rates using the ROS device:



1. Touch the Edit icon in the machine panel to view the machine devices.
2. Locate and select the GPS module. The GPS Global Settings prompt will be displayed.
3. Touch the GPS Configuration button to the right of desired receiver. The Differential Settings page will be displayed.
4. Touch the GPS Output tab.
5. Use the Ports drop down field to select the desired port to configure.
6. Use the Baud Rate drop down field to adjust the output baud rate.

NOTE: Use the "Enable Default Messages" option to reset the receiver default settings.

If a SmarTrax steering system has been detected, an additional "Set for SmarTrax" check box will be displayed when the port connected to SmarTrax is selected. This check box allows the user to setup the port to support SmarTrax requirements.

7. Use the Message Type sliding bars to adjust the output message rates as necessary for optional equipment.

GPS RECEIVER INFORMATION

To access additional information for a compatible Raven receiver using the ROS device:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the GPS module. The GPS Global Settings prompt will be displayed.
3. Touch the GPS Configuration button to the right of desired receiver. The Differential Settings tab will open.
4. Touch the GPS Information tab. Refer to the *GPS Information Tab* section on page 100 for details on the information displayed on the GPS Information tab.

UNLOCK DGPS RECEIVER FEATURES

NOTE: This process is for the integrated GPS receiver as well as supported Raven external receivers such as the 600S, Phoenix 200, and Phoenix 300.

To purchase authorization codes and features, including GS corrections, visit:

TABLE 1. Unlock and Correction Purchase Information

Feature	Purchase Location
GS Corrections Unlock	Contact a Raven Dealer
Satellite GS Subscription	https://portal.ravenprecision.com/

NOTE: Have the receiver model, serial number, and firmware version available when purchasing feature unlocks. Have the PAC code available when purchasing GS/Terrastar feature unlocks. Review the *GPS Receiver Information* section on page 89 for assistance with finding information about a compatible GPS receiver.

After purchasing the desired authorization codes, return to the ROS device. To activate the purchased features on a compatible receiver:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the GPS module. The GPS Global Settings prompt will be displayed.
3. Touch the GPS Configuration button to the right of desired receiver. The Differential Settings tab will open.
4. Touch the Authorization Code Entry tab.
5. Enter the authorization code acquired for the purchased features into the field.

NOTE: The receiver model information will update on the GPS Information page when a new authorization code has been entered successfully.

RECEIVER FIRMWARE UPDATES

Updates to the integrated device receiver may be made available periodically on the Raven Help web site:

<https://portal.ravenprecision.com/>

The following items will be required to update the integrated receiver:

- ROS device with an integrated receiver serial number starting with "BFN."
- Home or office PC or laptop with Microsoft Windows® operating system and the WinLoad utility.

NOTE: WinLoad is not compatible with 64-bit operating systems.

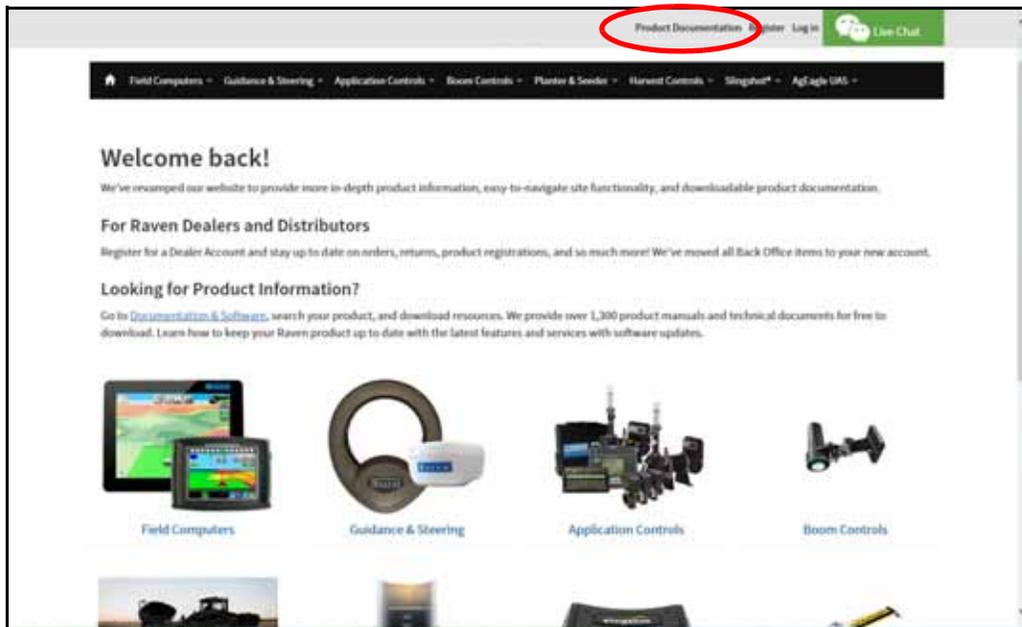
- Serial cable
- USB to serial adapter (optional)
- ROS device cable with "GPS Out" connector
- firmware update .hex file

FIRMWARE DOWNLOAD EXAMPLE

NOTE: The following procedure is intended for example purposes only. Any images provided in this section may not accurately depict the web browser or prompts encountered on various home or office computer systems. Please refer to computer or web browser user help sections for additional assistance.

To download Firmware updates:

1. On a home or office computer, visit <https://portal.ravenprecision.com/>.
2. Select Documentation & Software.



3. Select the desired device (Guidance & Steering, Boom Controls, etc.)
4. Select the Software drop-down specific to your machine.



5. Select the desired software update.

6. Select Save As from the drop down.
7. Select Save to save the software to the home or office computer. Select a commonly used download directory or a destination which will be easy to locate after the download completes.

NOTE: It may be necessary to accept security or warning prompts displayed by the browser or computer system to successfully save the software update to the computer.

UPDATING THE RECEIVER FIRMWARE



CAUTION

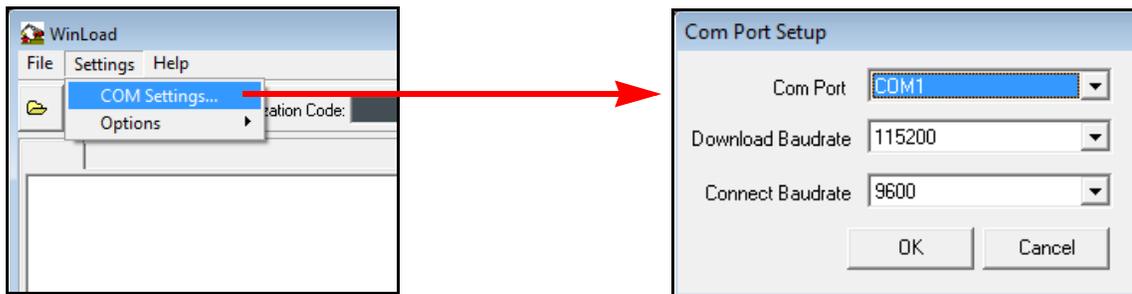
Integrated GPS receivers with serial number BFN1343 or lower are capable of OmniStar corrections. All Viper 4 receivers can be upgraded to GS. Depending on current capabilities, purchasing an upgrade may be necessary.

To apply the firmware update to the ROS device integrated receiver:

1. Shutdown the ROS device. Refer to the *System Shutdown* section on page 136 for assistance with the proper shutdown procedure.
2. Disconnect the antenna cable from the back of the ROS device
3. Connect a serial cable from the PC to the connector labeled "GPS Output" on the ROS device cable. To determine the COM port being used by the PC:
 - a. Click Start.
 - b. Right Click on My Computer.
 - c. Select Properties.
 - d. Select Device Manager.
 - e. Select the Hardware tab.
 - f. Select Device Manager.
 - g. Expand the Ports options. The port being used will be labeled Communications Port. If desired, temporarily unplug the cable to see what COM disappears.

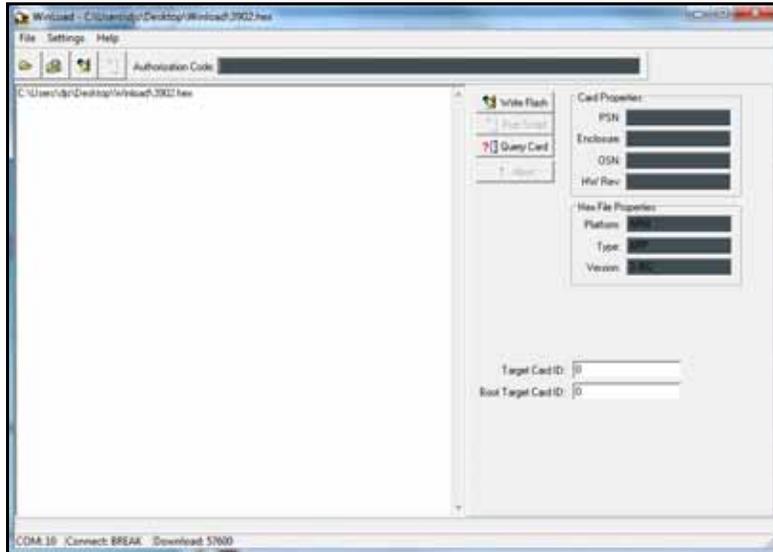
NOTE: A USB to serial adapter may be required if the PC or laptop does not offer a serial port.

4. Extract, or unzip, the receiver update zip file.
5. On the PC or laptop, open the downloaded firmware update folder and locate the WinLoad application.
6. Click on the settings option in the upper, left corner of the WinLoad window and select COM Settings...

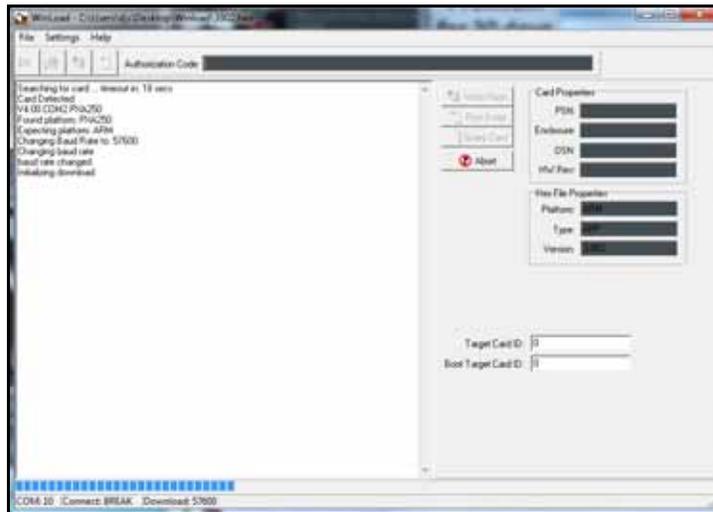


7. In the Com Port Setup prompt, select the com port on the PC or laptop connected to the GPS out connector. Refer to the operating system help for assistance determining which com port is connected to the ROS device cable.
8. Set the Download Baudrate to 115200.

9. Set the Connect Baudrate to 9600 and click OK.
10. Click File in the upper, left corner of the WinLoad window and select File Open....
11. Use the file browser to locate and select the receiver update .hex or .shex file. The file information should now be displayed in the main WinLoad panel.
12. Click the Write Flash button to the right side of the main WinLoad panel. After the timer has counted down a few seconds, press the power button on the ROS device. The Viper 4+ must show "Powered By Raven" before pressing Write flash. The WinLoad program should display information in the main panel to indicate that the update is in progress.



13. Wait for the WinLoad update to complete. The blue loading bar will cycle through multiple times. When the Write Flash button is click-able, the download is complete.



14. Once the update has finished, close the WinLoad application and restart the ROS device.
15. On the home screen, select GPS.



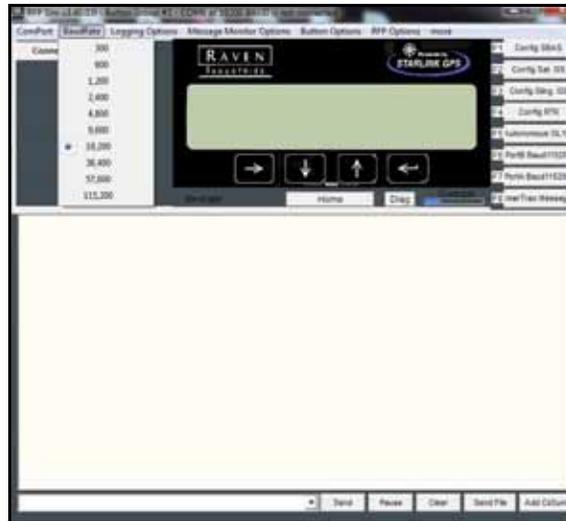
16. Select Configuration behind the GPS source.
17. Press Next.



18. Select Restore Receiver Defaults.
19. Select Yes.
20. Restart the Viper4/Viper 4+.
21. On the PC or laptop, open the RfpSim program for the desired Com Port.

NOTE: RFPsim programs are located at under Guidance and Steering, GPS Receivers at <https://portal.ravenprecision.com>.

22. Select the matching BaudRate using the appropriate COM port.



23. Select Connect.
 24. Confirm that data is streaming.
 25. Type FRESET in the command line.
 26. Press Send.
- NOTE:** Sometimes FRESET may need to be entered multiple times to work.
27. Power cycle the ROS device.
 28. Allow the system to populate the GPS information.
 29. Perform the steps in the *Serial Device Detection* section on page 103 to redetect GPS and serial devices.

NOTE: It will take at least 20 minutes for the almanac to reload after the FRESET.

RAVEN RECEIVER SETTINGS DEFINITIONS

The settings defined in the following sections will be available only for integrated or compatible Raven receivers. If a compatible receiver is not detected by the ROS device, the following settings will not be accessible. Check any cable connections and refer to the *Serial Device Detection* section on page 103 to reinitialize the serial communication ports.

DIFFERENTIAL SETTINGS TAB



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the GPS module. The GPS Global Settings prompt will display.
3. Click the GPS Configuration icon to the right of desired receiver. The Differential Settings tab will open.
4. Select one of the following differential types available along the left side of the differential settings prompt:

NOTE: The settings and options displayed on the right side of the Differential Settings prompt will vary based upon the selected differential type. Refer to the descriptions below for additional information and refer to the definitions section for each specific correction type for additional assistance with settings and options.

GL1DE Only. For areas with limited availability of differential correction sources (e.g. SBAS, OmniSTAR, etc.), the ROS device may offer Autonomous GL1DE as an autonomous GPS correction source. In GL1de only mode, ROS will use GPS satellites to locate the vehicle position within 20 in [50 cm].

NOTE: No additional settings or features are available for the Autonomous GL1DE correction type. Refer to the specific ROS device manual or contact a local Raven dealer for more information on capabilities of a specific ROS device or display.

RTK. The Real-Time Kinematic (RTK) correction type uses a Slingshot® Field Hub, a Continuously Operating Reference Station (CORS) network, or a traditional base station system for a position solution. These systems use a ground reference station to provide highly accurate corrections.

NOTE: The RTK option will be displayed only after an RTK authorization key is entered using the procedure in the *Unlock DGPS Receiver Features* section on page 89. Contact a local Raven dealer to obtain the authorization code or for more information on the Slingshot RTK services.

Refer to the *RTK* section on page 98 for additional information on available settings or options available for the RTK correction type.

GS-Satellite. The GS correction service is a satellite based subscription service providing position solutions using GPS and GLONASS satellite constellations and using a Precise Point Positioning (PPP) technique to remove atmospheric errors to determine a position solution. Contact a local Raven dealer or access the Slingshot store at the web address below for additional subscription information.

<https://portal.ravenprecision.com/>

SBAS. The Satellite Based Augmentation System (SBAS) option utilizes the available Wide Area Augmentation System (WAAS) or European Geostationary Navigation Overlay Service (EGNOS) correction signals. These common correction services are available free for use in several regions and is the default correction source if available on the selected receiver.

Refer to the *SBAS* section on page 95 for additional information on available settings or options available for the SBAS correction type.

OmniSTAR. The OmniSTAR correction source offers a subscription based position service with various accuracy levels to match budget and operation needs. Refer to the OmniSTAR web site for additional subscription or purchasing information.

www.omnistar.com

Refer to the *OmniSTAR* section on page 97 for additional information on available settings or options available when using a compatible receiver with the OmniSTAR correction type.

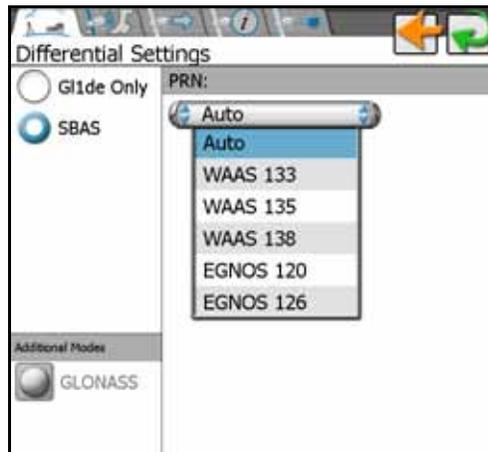
NOTE: ROS devices with internal GPS serial numbers higher than BFN1344xxxx are not compatible with OmniSTAR correction services. See the *GPS Information Tab* section on page 100 section for assistance with verifying the serial number of the receiver. Contact a local Raven dealer for information on correction services available for ROS devices with newer receivers or for additional assistance. All integrated GPS receivers can be upgraded to GS corrections capability.

GLONASS. If the ROS device supported receiver is capable of using the GLONASS satellite constellation, this mode will be displayed in the lower, left corner of the Differential Settings tab. The optional GLONASS (Global Navigation Satellite System) satellite constellation may be unlocked to increase the number of satellites visible at any given time. This feature may help to improve satellite coverage or reduce HDOP issues during field operations.

Refer to the *GLONASS* section on page 98 for additional information on enabling the optional GLONASS constellations for use with the ROS device.

SBAS

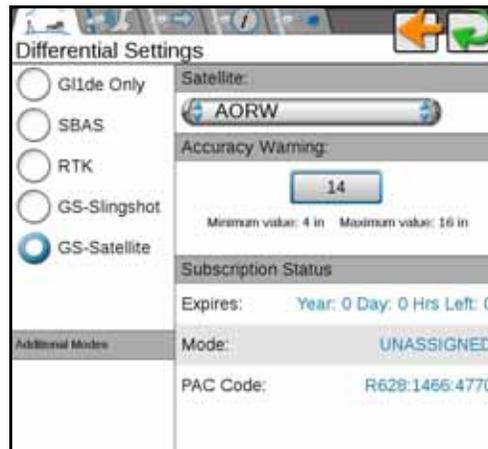
The following information and options will be available when configuring a compatible receiver and using the SBAS correction type:



PRN. Touch the drop down list and select a WAAS or EGNOS satellite Pseudo-Random Number (PRN) to manually select the differential satellite which provides the best coverage for the operation area if desired. Selecting a PRN from the list locks the correction signal to the selected satellite. If the 'auto' option is selected, the receiver will scan and automatically set the PRN throughout an operation.

GS-SATELLITE

Use the following settings and subscription information to manage GS correction services on the ROS device:



Satellite. The satellite identities is used to select the satellite for the region in which the ROS device will be operating. Set this option to AUTO to allow the device to automatically select the satellite.

TABLE 2. Region Identities

ID	Description	ID	Description
98W	North America and Western South America	IOR	Eastern Europe and Africa, Asia, and Western Australia
AORW	Eastern North America and South America	143.5E	Eastern Asia and Australia
AORE	Eastern South America, Western Europe and Africa	POR	Eastern Asia and Australia and Western North America
25E	Europe, Africa, and Western Asia		

NOTE: Visit the Raven web site for additional information and assistance with the satellite region identities.
<https://portal.ravenprecision.com/>

Accuracy Warning. The accuracy warning value sets the allowable horizontal accuracy for field operation. When the receiver determines the position solution meets the set value, the solution will be considered converged and the appropriate status will be display.

NOTE: Higher values will allow the receiver to converge faster, but will allow more horizontal position error. Smaller values will provide more accurate position, but will take longer to converge and are more likely to lose a converged status during field operations.

The following information is displayed in the Subscription Status area of the Differential Settings tab when configured for GS-Satellite corrections:

Expires. A display of the current time remaining before the GS subscription expires. Contact a local Raven dealer or access the Slingshot store at the web address below to extend subscription services.

<https://ravenslingshot.com/store>

NOTE: Be sure to log into the account to which the subscription service will be extended.

Mode. The current activation status of the GS subscription. The mode field must display termed to allow Satellite GS corrections to be used during field operations. Contact a local Raven dealer for assistance with extending GS correction services delivered via satellite.

PAC Code. The PAC Code will be required for registration with the GS correction service.

OMNISTAR

NOTE: ROS devices with internal GPS serial numbers higher than BFN1344xxxx are not compatible with OmniSTAR correction services. See the *GPS Information Tab* section on page 100 section for assistance with verifying the serial number of the receiver. Contact a local Raven dealer for information on correction services available for ROS devices with newer receivers or for additional assistance.

The following information and options will be available when configuring a compatible receiver and using the OmniSTAR correction service:



OmniSTAR Satellite. Select the specific satellite for use with OmniSTAR correction services for the area of operations.

Custom Satellite Enable. This option allows the operator to enable a custom satellite for use with the OmniSTAR subscription. Only enable this feature when instructed by an OmniSTAR technician.

Custom Satellite Frequency. If the custom satellite option is enabled, the custom frequency field displays the current satellite frequency used with OmniSTAR corrections.

Custom Satellite Baud. If the custom satellite option is enabled, the custom rate field displays the current message rate for OmniSTAR corrections.

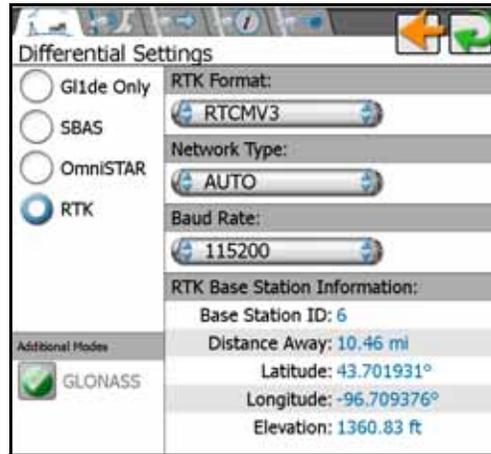
Custom Satellite Signal Strength. If the custom satellite option is enabled, the custom rate field displays the signal strength of the selected satellite.

Subscription Status. The subscription status area displays the OmniSTAR subscription expiration date, type of subscription (e.g. HP, XP, VBS, or G2), and the OmniSTAR ID required for registration with the OmniSTAR correction service.



RTK

The following information and options will be available when configuring a compatible receiver and using the RTK correction type:



RTK Format. Select the format of the correction messages sent from the RTK correction source.

AUTO. AUTO will automatically search and detect compatible RTK correction formats.

Network Type. Select the network from which the RTK corrections will be delivered.

Baud Rate. Select the baud rate at which the correction messages are transmitted from the RTK correction source.

Base Station ID. The base station identification number used for the current position solution. (Ex. Slingshot field hub).

Distance. This value displays the baseline or distance from the vehicle position to the base station antenna.

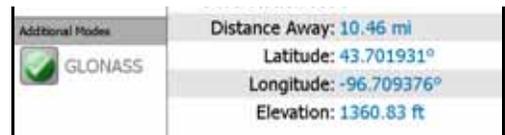
Latitude, Longitude, and Elevation. The bottom portion of the prompt when set for an RTK correction source will display the geographic coordinates and elevation of the current base station.

GLONASS

If the ROS device offers an integrated receiver capable of using the GLONASS satellite constellation, this mode will be displayed in the lower, left corner of the Differential Settings tab.



or

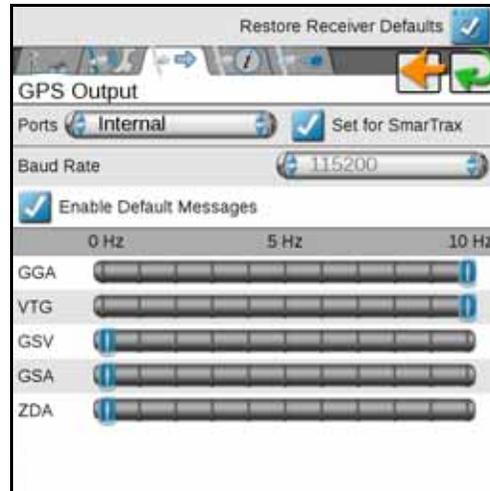


Once unlocked, the optional GLONASS mode will display the following status indicator when this feature is being used in the current position solution.

GPS OUTPUT TAB



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the GPS module. The GPS Global Settings prompt will display.
3. Click the Configuration tab to the right of desired receiver. The differential settings tab will open.
4. Select the GPS Output tab.



Use Defaults. Select Use Defaults to send default port and message settings to the selected receiver. This option may be used to reset defaults on either an integrated device receiver or a compatible Raven receiver connected to the ROS device.

With this option disabled, the following settings and options may be used to manually configure GPS output messages.

Ports Selection. Touch the Ports drop down field and select the port to be configured. Port selection may affect the available message types and configured rates.

Set for SmarTrax. Set for SmarTrax option is available for the ROS device output port. Select this option to automatically configure the device output for use with a Raven SmarTrax steering system.

Message Types and Rates. The available port output message types and rates are displayed in the lower portion of the GPS Output tab. Touch the slider buttons and drag the button to adjust the slider to set the desired message rates. Set the slider to 0 Hz to shut off the corresponding message. Shut off any messages not required for output to other system components to ensure the best possible performance during field operations.

Port Baud Rate. Touch the baud rate drop down field and select the output communication rate for the ROS device. If connected to a Raven 600S, the baud rate will be locked at 115200 output on the connected port (typically Port A).

NOTE: Some systems or components may require specific baud rate settings to receive messages sent from the ROS device. Please refer to the documentation provided with optional or external components for additional information on required communication settings when setting up ROS for use with optional devices.

GPS INFORMATION TAB



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the GPS module. The GPS General Settings prompt will display.
3. Right click on the configuration to the right of desired receiver. The GPS Global Settings page will open.
4. Touch the GPS Information tab.



Model. Displays the GPS receiver model (e.g. Raven Phoenix 200, 600S, or Phoenix 300) or the current active model for the integrated receiver.

Serial Number. The receiver serial number will be displayed in this area. This information may not be available for all receivers.

Firmware Version. The current firmware version installed on the receiver. This information may not be available for all receivers.

Latitude/Longitude. The current geographic coordinates of the ROS device.

Elevation. The current GPS elevation above sea level.

Satellites. Displays the number of satellites currently used in the position solution.

Differential ID. Depending upon the correction source used, this value will display the differential source identification such as the differential satellite PRN, a base station ID, etc.

Differential Age. This value is the age of the last differential update. The differential age should not rise above a few seconds to ensure accurate position corrections during field operations.

HDOP. Horizontal Dilution of Precision (HDOP) is a value used to indicate the geometry of the satellite constellation used in the position solution. High HDOP values indicate that the visible satellite constellation is grouped close together which can negatively impact the accuracy of position and guidance systems.

GGA Quality. Displays the current differential fix status. This value will display:

- '0' or '1' if no differential corrections are being received (single solution). It will display 0 if no GPS fix at all and one if there is a fix but no correction.

- '2' when the DGPS receiver has locked on to a differential source (SBAS, or convergence on GS/OmniSTAR).
- '4' for RTK fixed mode for fine GPS course correction mode.
- '5' for fixed GS or OmniSTAR XP/HP correction modes or RTK float mode.

UTC Time and Date. Universal coordinated time and date information is displayed in these fields.

AUTHORIZATION CODE ENTRY TAB



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the GPS module. The GPS Global Settings prompt will display.
3. Select the Configuration icon to the right of the desired receiver. The Differential Settings tab will open.
4. Touch the Authorization Code Entry tab.



Authorization Code Field. Review the information displayed on the Authorization Code Entry tab before entering the code received from a local Raven dealer to activate or unlock optional features of the selected Raven receiver.

Review the *Unlock DGPS Receiver Features* section on page 89 for assistance with obtaining the authorization code for optional features on the Raven receiver.

The following sections are intended to provide information on connecting external devices such as a differential GPS, or DGPS receiver, light bar, or another serial device to the ROS device. For additional assistance or information on available components, contact a local Raven dealer.

SERIAL DEVICE INFORMATION

The ROS device provides a list of detected serial devices connected to the system. To review the serial devices currently detected by the ROS device:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the serial devices module. The serial devices tab will display the following information for each detected device:

- serial device name
- automatic or user configured communication settings
- current active communication (COM) port
- the input baud rate at which the ROS device is attempting to communicate with the device



Auto Detected Devices



User Setup Devices

NOTE: The COM port displayed on the Serial Devices tab does not reflect the cable connector label to which the device may be connected.

Redetect the serial devices if new devices are connected, or if an existing device connection is changed for any reason.

SERIAL DEVICE DETECTION

To redetect serial devices connected to the system:



1. Touch the Edit icon in the Machine Panel to view the machine devices.

2. Locate and select the serial devices module. The Serial Devices tab will display.
3. Touch the Redetect icon. A prompt will open.
4. Select whether to reset manually or user configured serial device communication settings before resetting and detecting connected serial devices and touch the Yes to restart the communication ports.
5. Allow the ROS device to scan the serial ports for connected devices. When complete, the serial devices tab will display.

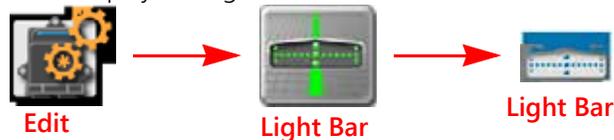
LIGHT BAR DEVICES

ROS may be used to control guidance information displayed on an external light bar. In this configuration, the light bar will only display information provided by the ROS device.

NOTE: Refer to the installation instructions provided with the Raven light bar before connecting the light bar to the ROS device. Once installation is complete, connect the light bar to the 9-pin serial connection labeled "COM2", "COM3" or "Light Bar" on the appropriate cable. Contact a local Raven dealer for additional installation or connection assistance.

LIGHT BAR DISPLAY SETTINGS

To configure or adjust the light bar display settings:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the Light Bar module.
3. Select the Light Bar tab to access the following light bar display settings:

Path Deviation Sensitivity. The path sensitivity may be adjusted for the type of field operation being performed and allows the operator to adjust how the distance from the displayed guidance path will be displayed by the light bar. Select the fine, standard, and coarse presets as desired or touch the indicator values and enter custom values for each indicator.

Bearing Deviation Sensitivity. The bearing sensitivity allows the operator to adjust how the light bar displays the course over ground (COG) deviation from the guidance path or line displayed by the ROS device. Select the fine or standard preset to adjust the light bar display.

Reverse LED Option. When deselected, the light bar indicators will illuminate in the direction toward which the operator should steer to regain the guidance path. If the Reverse option is selected, the operator must steer away from the indicator lights to regain the correct guidance path.

LIGHT BAR PORT CONFIGURATION

To manually configure the light bar communication port settings:



1. Touch the Edit icon in the Machine Panel to view the machine devices.

2. Locate and select the Light Bar module.
3. Select the Port Configuration tab to access the following light bar display settings:

Auto Detect. Enable the auto detect option and restart the serial communication ports to automatically detect a connected light bar device. Review the *Serial Device Detection* section on page 103 to restart serial communication ports.

NOTE: The Port and Baud settings described below will not be available when the ROS device is configured for auto detecting a light bar.

Current Port Display. The current port on which the light bar is detected will be display in the upper, right corner of the Port Configuration tab for reference.

Port. Touch the port drop down menu and select the communication port to which the light bar is connected to manually set the light bar communication port. Touch the Apply button to set the selected port setting.

NOTE: The COM port selections do not necessarily reflect the connector label on the system cabling platform. Contact a local Raven dealer for additional assistance.

Baud. Touch the baud drop down menu and select the output baud rate from the light bar to manually configure the ROS device to detect the device. Touch the Apply button to set the selected baud setting.

NOTE: When connecting a Raven RGL series light bar to the ROS device, it is recommended to set the light bar to a static baud rate. This will ensure that the serial device is detected when the ROS device scans for serial devices on power up.

If it is not possible to set the RGL lightbar to a static baud rate, lock ROS to a static baud rate for the port the RGL is connected to.

WEATHER STATION DEVICES

The ROS device is compatible with the WatchDog Sprayer Station from Spectrum Technologies to record weather data during a field operation. When connected to ROS, the Sprayer Station may be used to display weather conditions throughout the day during field operations. The operator can also take a “snapshot” of weather conditions at any point during the operation and ROS will automatically add the information to the job or application report.

NOTE: A weather station activation code will be required to unlock the weather station interface and features. Contact a local Raven dealer for additional information or assistance.

WEATHER STATION SETTINGS

To set up the weather station:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Select the Weather Station module. The Weather Station Settings tab will display with the following settings:

Enable Logging to Job File. Select this option to allow ROS to automatically log weather data from the weather station for the job report.

Log Time Interval. Set the frequency for logging weather data into the application report. This information will only be available in the shapefile report. Refer to the *File Export* section on page 43 for additional information on exporting the shapefile job report with completed job files.

Enable Wind Speed Warning. Enable a warning alert if the weather station detects a wind speed over the set threshold during an in-field operation.

Wind Speed Threshold. Set the maximum wind speed allowed during field operations. The weather station will display an alarm if the weather station detects wind speeds above the set threshold.

Audible Alarm Interval. If enabled, the ROS device will sound an audible wind speed alert at the selected interval as long as the wind speed threshold is exceeded.

RECORD WEATHER SNAPSHOT

During an active job, touch and hold the Weather Station widget to view detailed weather conditions currently monitored by the station. Touch the Record Snapshot button at the bottom of the Weather Station prompt to record the current conditions into the job report screen.

Refer to the *Ending a Job* section on page 136 for additional assistance with closing job files and editing weather information.

GREENSEEKER® DEVICES

The ROS device is capable of interfacing with the GreenSeeker rate management system to adjust the application based upon the crop conditions detected by the GreenSeeker system. ROS will control the application system based upon the GreenSeeker interface to adjust application rates as necessary during field operations.

NOTE: A GreenSeeker activation code will be required to unlock the GreenSeeker interface and features. Contact a local GreenSeeker or Raven dealer for additional information or assistance.

GREENSEEKER COMMUNICATION SETTINGS

NOTE: Only the GreenSeeker serial device communication settings are configurable via the ROS device. Review the GreenSeeker operation documentation for additional assistance with system calibration or operation.

To set up the GreenSeeker:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the GreenSeeker module. The Port Configuration tab will be displayed with the following settings:

Auto Detect. The auto detect option is recommended to allow the ROS device to automatically detect and connect to the GreenSeeker system upon system start up. Deselect this option only if the automatic detect feature is not properly connecting the GreenSeeker system or if instructed by a Raven technician.

Auto detect must be disabled to access the following manual settings.

Port. Manually select the port on which the GreenSeeker system may be detected.

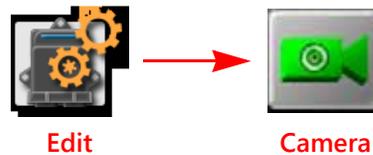
Baud. Select the baud rate for GreenSeeker communication during field operations.

Apply Button. Touch the "Apply" button when making changes to the communication settings to save the displayed settings.

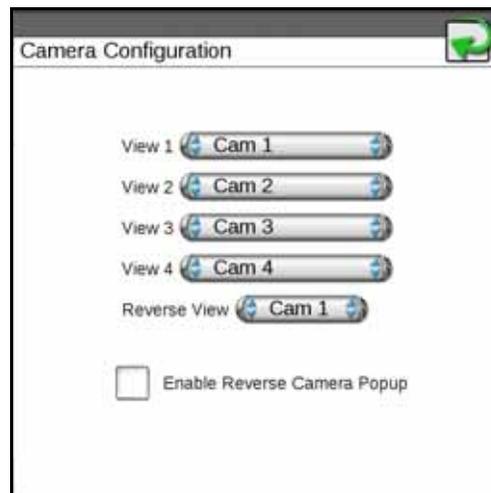
3.

CAMERA CONFIGURATION

The ROS device can support up to four cameras. To configure the camera views:



1. Touch the Edit icon in the Machine Panel.
2. Locate and select the Camera module. The Camera Configuration window will be displayed.
3. Use the View drop down options to configure the camera for each view.
4. Use the Reverse View drop down to set the camera providing a reverse camera view if applicable.
5. Select the Enable Reverse Camera Popup to provide a reverse camera view popup on the ROS device when GPS detects that the machine is moving in reverse.



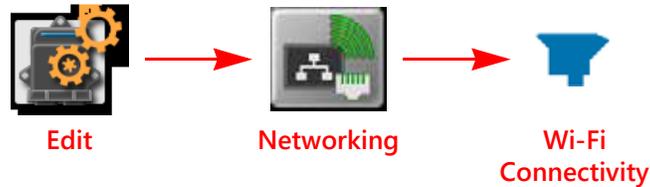
NETWORKING CONFIGURATION

Review the following sections to connect the ROS device to an available Wi-Fi network or allow the ROS device to broadcast a Wi-Fi hotspot if connected to a compatible wireless modem via an ethernet cable.

NOTE: Networking settings are only available when logged in as an Administrator on the ROS device.

CONNECT TO WI-FI

To connect the ROS device to a Wi-Fi network:



NOTE: The ROS device will automatically connect to known networks or hotspots with the strongest signal strength. The administrator may also create a connection priority list to set preferred connections which can be configured to help save plan data on mobile hotspots.

1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the Networking module. The Wi-Fi Connectivity tab will be displayed.
3. Select the check box next to Enable Wi-Fi Connection. A list of available Wi-Fi networks or hotspots will be displayed.

NOTE: Touch the Refresh button to redetect available networks.

4. Touch the desired Wi-Fi network from the list and touch the Connect button.

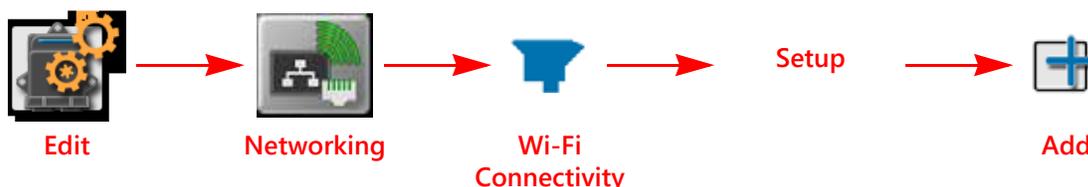
NOTE: Use the Connect Automatically check box to allow the ROS device to connect to the network or hotspot whenever it is available.

5. A Password Required prompt will be displayed if the network requires a password to connect. Enter the Wi-Fi Password and touch the Accept button.
6. The ROS device will attempt to connect to the Wi-Fi network. "Connected" will be displayed on the network or hotspot currently used for wireless communications.
7. Repeat step 4 through step 6 to connect to additional networks or hotspots if desired.

NOTE: Refer to the *Wi-Fi Priority* section on page 109 for assistance with setting up a priority list for preferred wireless networks or hotspot connections. The ROS device will automatically connect to an available network on the priority list instead of the strongest signal connection.

MANUALLY ADD A WI-FI NETWORK

To manually setup a network:



1. Touch the Edit icon in the Machine Panel to view the machine devices.

2. Locate and select the Networking module. The Wi-Fi Connectivity tab will be displayed.
3. Touch the Setup button and then touch the Add button.
4. Use the Create Profile prompt to enter the Network Name, select the Security option, and enter the Password, if necessary.
5. Touch the Accept button to save the displayed settings and return to the Wi-Fi Connectivity tab.

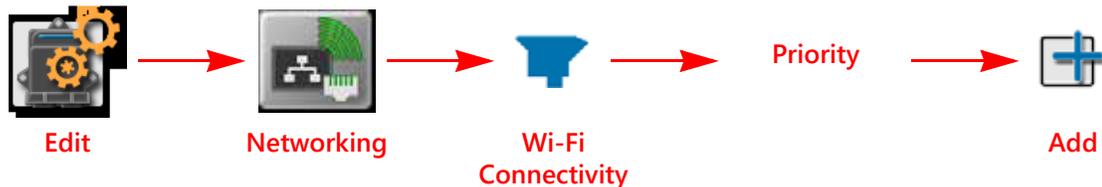
WI-FI PRIORITY

The administrator may set an order for preferred wireless networks and hotspots. This feature allows the ROS device to automatically connect to a home or shop Wi-Fi network when available to help save plan data on a mobile hotspot.

ADD A PRIORITY WI-FI CONNECTION

NOTE: If Wi-Fi priority is set but a priority network is not in range, the Viper will attempt to connect to connect to any Wi-Fi connection in range that has Connect Automatically checked.

To set a Wi-Fi priority list:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the Networking module. The Wi-Fi Connectivity tab will be displayed.
3. Touch the Priority button in the lower, left corner of the displayed tab. The Automatic Connection Order screen will be displayed.
4. Touch the Add button in the upper, right corner of screen and select one of the desired wireless connections.

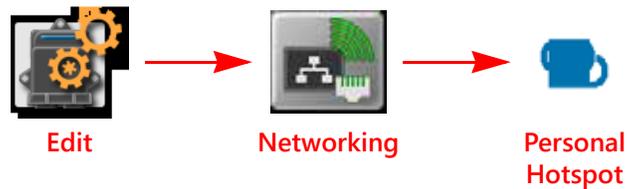
NOTE: The Connect Automatically option must be enabled to add a connection to the Wi-Fi priority connections.

The ROS device will automatically connect to the Wi-Fi network or hotspot highest on the priority list when available. If no priority connections are available, the ROS device will connect to the available network with the strongest signal strength.

5. Repeat step 4 until all of the hotspots are in the correct order.

ENABLING WI-FI HOTSPOT

If the ROS device is connected to a compatible wireless modem via an ethernet cable, the device may be configured to broadcast a Wi-Fi hotspot. To use the ROS device as a Wi-Fi hotspot:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the Networking module.
3. Select the Personal Hotspot tab.
4. Select the Enable Wi-Fi Hotspot option.

NOTE: Enabling this option will disable Wi-Fi connections received by the ROS device. The ROS device cannot broadcast a hotspot while using a wireless connection to send and receive wireless data.

5. If the ROS device is connected to a Wi-Fi network or hotspot, touch the Yes button to disable Wi-Fi connectivity on the device.
6. Enter an SSID name for the hotspot.
7. Enter the password that must be entered on devices connecting to the hotspot.
8. Any devices connected to the hotspot broadcasted by the ROS device will be displayed in the bottom portion of the screen.



CANBUS OVERVIEW

A Controller Area Network, or CAN, system is a high-integrity serial data communications bus that operates at a data rate of 250 kilobits per second for real-time control applications and uses special cables and terminators for operation. The CAN protocol has excellent error detection and confinement capabilities, making it very suitable and reliable for agricultural applications.

CAN systems allow products to be added to a control system at any time. Multiple control channels may be available for use with the ROS device for any combination of liquid, granular, chemical injection or spinner control applications.

	NOTICE
Refer to the Raven CANbus Network Installation Manual for installation information for individual CANbus control components. Be sure each component is properly mounted and cables are connected prior to powering the field computer.	

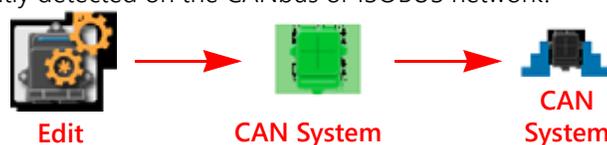
CANBUS DETECTION AND VERSION INFORMATION

The ROS device must be able to communicate with the CANBUS system when monitoring or controlling field operations. On power up, the ROS device should automatically establish communication with the boom/speed node, any AccuBoom, AutoBoom, or SmarTrax nodes (if installed) and multiple product control channels via the CANbus.

NOTE: Product nodes may need to be readdressed before the ROS device will be able to detect each control channel on the CANbus. See the *Readdressing Control Channels* section on page 113 for detailed instructions on readdressing the product nodes. Contact a local Raven dealer for more information on required activation keys for controlling multiple products using the ROS device.

NODE OR ECU VERSION INFORMATION

To view a list of nodes currently detected on the CANbus or ISOBUS network:



1. Touch the Edit icon in the Machine Panel to view the machine devices.

2. Locate and select the CAN System module. The CAN System tab will display a list of the CAN control nodes, available control channels, software version, software revision, and program number of each node detected on the CANbus.



NOTE: If a product node or control channel does not display as anticipated, retry the CANbus initialization. If the node or control channel is still not available, readdress the product control nodes or troubleshoot the node before starting field operations. Contact a local Raven dealer for additional assistance.

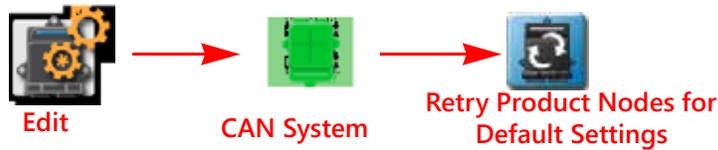
Review the *Hardware Information and Updates* section on page 32 for assistance with installing node updates to nodes connected to the CAN system. Only Raven CANbus nodes may be updated via the ROS device and CANbus communication system. ISOBUS ECUs cannot be updated via the ROS device.

RETRY CANBUS COMMUNICATION

If the ROS device loses communication with a node, restarting the CANbus may reestablish communication with the node.

NOTE: If communication is not restored, or if the node continues to encounter communication issues, refer to the Raven CANbus Installation Manual or contact a local Raven dealer for assistance with troubleshooting the node.

To restart CANbus network communications:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the CAN System module. The CAN System tab will be displayed.
3. Touch the Retry CAN button at the bottom of the CAN System tab to manually restart CANbus communication.
4. Confirm the restart of the CANbus system. ROS will restart the CANbus and return to the CAN system tab.

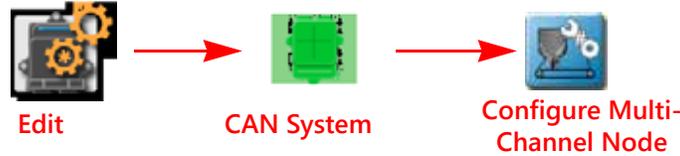
If all nodes are detected, continue field operations as normal. If product control nodes or control channels are not detected, the CANbus may need to be readdressed. Refer to *Readdressing Control Channels* section on page 113 for assistance with readdressing the CANbus system.

MULTI-CHANNEL NODE OR ECU CONFIGURATION

Some Raven CANbus nodes or ISOBUS ECUs may offer multiple channels for product rate control via the CANbus network. The number of channels available via these multi-channel or “multi-product” nodes may be increased or decreased for the equipment on which they will be used. It is recommended to configure nodes for only the number of channels offered by the vehicle or application equipment.

NOTE: Some multi-channel nodes may require a feature unlock or activation code to allow access to additional control channels. Contact a local Raven dealer for more information or to purchase additional node capabilities.

To configure a multi-channel node:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the CAN System module. The CAN System tab will be displayed.
3. Touch the Reset Product Control Node button at the bottom of the CAN system tab. A prompt with the currently set number of channels will be displayed.
4. Touch the Current Channel value and use the on-screen keypad to enter the desired number of channels to be controlled via the multi-channel node.

NOTE: ROS will only allow the operator to enter a value for the maximum number of channels currently available via the multi-channel node. Contact a local Raven dealer for more information or to purchase additional node capabilities.

5. Touch the OK button to accept the displayed value. The ROS device will reconfigure the multi-channel node and restart CANbus communications.

READDRESSING CONTROL CHANNELS

If the ROS device is unable to detect a CANbus node on startup, troubleshoot the CANbus and the node (see the *CANbus Troubleshooting* section on page 120) and then readdress the CANbus:



NOTE: Only nodes offering product control channels will need to be addressed (single or multi-product nodes, motor control, planter or seeder control nodes, etc.). When readdressing multi-channel control nodes, configure the number of channels on the node prior to readdressing the CANbus. Review *Multi-Channel Node or ECU Configuration* section on page 112 for details on configuring multi-channel control nodes.

RAVEN CANBUS NETWORK

1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the CAN System module. The CAN system tab will display.
3. Touch the Readdress CAN button at the bottom of the CAN System tab.
4. Confirm the readdressing operation for nodes offering product control channels.
5. Cycle logic power to the node to be assigned to control channel 1. To cycle power:
 - a. remove the logic power fuse on the cable connected directly to the node,
 - b. disconnect the node harness from the CANbus network (generation 2 systems), or
 - c. remove the node connector with the power and ground (red and white lead wires).
6. Repeat step 5 and cycle logic power for any remaining nodes connected to the CANbus to assign remaining control channels as necessary.
7. When all product control nodes on the CANbus system have been assigned to control channels, touch the "OK" button to finish the readdressing process.

- ROS will restart CANbus communications and return to the CAN system tab. If all nodes are detected, continue field operations as normal. If CAN control nodes are still not detected, refer to the Raven CANbus Installation Manual or contact a local Raven dealer for additional assistance troubleshooting the node.

ISOBUS NETWORK

ECUs with product control capabilities may be re-ordered, or re-addressed, on the UT display using the ISO Product Control module. This feature may be useful to configure the ECU display or resort control channels for display during field operations.

If the ISOBUS needs to be reconfigured:

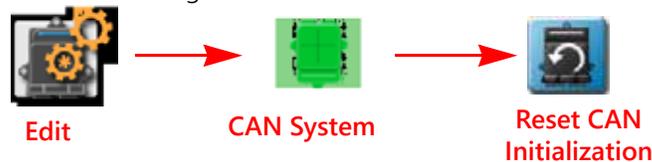


- Touch the Edit icon in the Machine Panel to view the machine devices.
- Locate and select the ISO Product Control module. The Product ID Mapping page will be displayed.
- Select the desired control channel to modify.
- Select the up or down arrows along the right side of the display to move the selected channel up or down in the channel order.
Repeat this process for each control channel to readdress each product control channel available on the ISOBUS system.

RESET CANBUS NODES

NOTE: Resetting nodes to default settings will erase all settings stored on CANbus nodes used for product control and is not recommended unless directed by an authorized Raven service technician.

To reset the CANbus nodes to default settings:

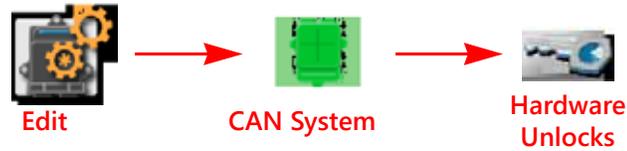


- Touch the Edit icon in the Machine Panel to view the machine devices.
- Locate and select the CAN System module. The CAN system tab will display.
- Touch the Reset CAN button at the bottom of the CAN system tab to reset all CANbus product control nodes to default settings.
- Confirm the CANbus reset. ROS will restore the CANbus settings and return to the CAN System tab.

NODE FEATURES AND ACTIVATION STATUS

NOTE: Refer to the *Feature Keys and Activation* section on page 34 for assistance with ROS features and activation status information.

To view any features activated with the Raven CANbus:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the CAN System module. The CAN System tab will display.
3. Select the Hardware Unlocks tab. Any features unlocked and available for use on the CANbus control system will be displayed on this prompt. Contact a local Raven dealer for additional assistance with available features and obtaining a feature activation code.

SPEED SENSOR SET UP

A speed sensor is required for the ROS device to perform speed based control system operations such as product rate control, planter or seeder control, yield mapping, etc. Several options are available for speed sense and input. Contact a local Raven dealer for additional information.

To configure the ROS device for the speed sensor connected to the system:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the Speed Settings module. The Speed Settings tab will be displayed with the following settings, displays, and options.

Sensor Type. Select the type of sensor currently used for speed signal with the control system.

Speed Cal. The speed calibration value is used to tune and adjust the control system to the connected speed sensor. A calibration value may be entered for each sensor type to allow the operator to quickly switch between speed sources if necessary without recalibrating the speed system during an active job.

The following calibration values are recommended for initial system set up:

Sensor Type Setting	Used with	Recommended Initial Speed Cal	
		English	Metric
Wheel	Wheel Magnets	1000	254
	Speedometer Drive Speed Sensor	612	155
Radar	Raven Radar	598	152
GPS	External Raven DGPS Receiver	785	199
	Internal DGPS Receiver	812	206
	GPS Speed over CANbus ^a	1000	1000

a. A boom/speed node with firmware version 1.6 is required for GPS speed over CANbus.

These values are good starting points and generally yield adequate results, however, the speed cal should be refined for the specific system and equipment. Refer to Appendix A, *Calculating the Calibration Values* for instructions on refining the speed calibration.

NOTE: The GPS speed over CANbus feature is only available with specific Raven speed sense nodes. This feature utilizes NMEA speed over ground data transmitted over the CAN network which eliminates the need for a separate, external speed sensor.

	<p style="text-align: center;">NOTICE</p> <p>When using the GPS speed over CANbus feature, no refining or adjustment is available for the speed cal value. Losing GPS signal for more than a second will also result in loss of the CAN speed signal which may affect product application in progress.</p>
---	---

Current Speed Display. The speed settings tab displays the current vehicle speed monitored by the selected speed sensor.

Test Speed. The test speed feature may be used to simulate a speed signal when testing or troubleshooting the control and monitoring systems and allows the operator to check system function while the vehicle is stopped. To use the test speed feature, touch the self-test speed field and use the on-screen keypad to enter a value approximately equal to normal application speeds.

NOTE: A speed cal value must be set for the selected sensor type to allow the test speed feature to function. The test speed feature will be cleared automatically if the ROS device receives a signal from the actual speed sensor. To keep the test speed feature from disengaging, disconnect the speed sensor from the system during testing.

When utilizing a Test Speed, verify AccuBoom is disabled. AccuBoom requires a live GPS movement input so the Test Speed will not working correctly with it enabled.

Distance Information and Reset. The ROS device monitors and tallies the distance traveled during equipment operation. This display may be used as an odometer or "trip meter" for the distance traveled by the equipment over a season or during a specific field operation.

To reset the ROS device distance tally, touch the recal distance icon in the lower, right corner of the speed settings tab.

SWITCH BOX OPTIONS

Status of implement sections must be provided to the ROS device to accurately adjust rate control systems, map coverage, and create application reports for the product coverage. One of the following switch box options will be required to provide section status during field operations:

EXISTING EQUIPMENT SWITCHES

Implement section status may be wired into the ROS device from existing switch panels on many implements. The switch panel must provide switches with constant 12 V on and 0 V off status to operate properly with the device.

NOTE: Momentary or pulsed switch panels are not compatible with the ROS device for rate or section control systems. Contact a local Raven_dealer for additional assistance and components required to tie into existing implement switch hardware.

RAVEN SWITCH PRO™ AND CAN SWITCH BOX

The Raven Switch Pro or a Raven CAN Switch Box may be installed in vehicles without existing switches. Both Raven switch box options offer a compact design to reduce clutter in the operator cabin while offering simplified operation of implement sections and other features available with the ROS device.

NOTE: Contact a local Raven dealer for additional information on these switch box options and purchasing assistance.

PHYSICAL SECTION SWITCHES

To configure the number of switches necessary to control implement section functions:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the Physical Switch Box module.

NOTE: If the physical switch box has been previously configured, a summary of the switch box assignments will be displayed.

3. Touch the Edit icon.
4. Select the Physical Switch Box tab.
5. Touch the Number of Switches value and use the on-screen keypad to enter the desired number of switches to control implement section functions.
6. If desired, touch the section labels in the lower portion of the Physical Switch Box tab to customize the switch box labels displayed during field operations.

To configure the physical switch box and automatically configure the section mapping or switch assignments:



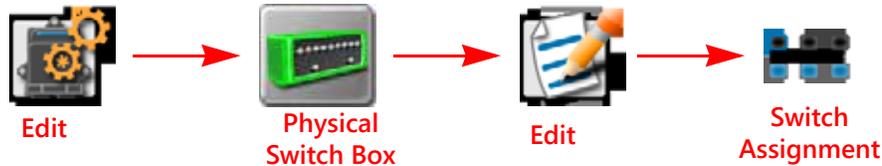
1. Touch the Edit icon in the machine panel to view the machine devices.
2. Locate and select the Physical Switch Box module.

NOTE: If the physical switch box has been previously configured, a summary of the switch box assignments will be displayed.

3. Touch the Edit icon.
4. Select the Physical Switch Box tab.
5. To automatically assign sections to configured switches, touch the Auto-Map Sections button in the lower, right corner of the display. This button will only be available if the number of configured implement sections matches the number of switches.

NOTE: Verify the section assignments before starting an actual field operation with the automatic section assignments.

To manually set up the physical section switch box assignments:



1. Touch the Edit icon in the machine panel to view the machine devices.
2. Locate and select the Physical Switch Box module.

NOTE: If the physical switch box has been previously configured, a summary of the switch box assignments will be displayed.

3. Touch the Edit icon in the upper, right corner of the Summary screen.
4. Touch the Switch Assignments tab.
5. Select a switch function in the upper portion of the Assignments tab.
6. Review all implement sections currently assigned to the switch function in the lower portion of the screen.
7. To change switch assignments, touch the Change Assignment button. Only unassigned sections will be displayed on the section assignment screen for the selected switch. To reassign a section to a different switch function, the section must first be unassigned from the current switch.

PHYSICAL SWITCH BOX SETUP

This section only applies when using a Raven Product Control Node with Boom Sense Unlock with a Master Switch.

The Raven Product Controller node with Boom Sense unlock has the ability to be configured with only a single master switch. This requires a =12V signal for all sections to apply. When this configuration is used, it is necessary to assign all sections to switch 1 on the physical switch box.

ON-SCREEN SWITCH BOX OPTIONS

The on-screen switch box option provides an option to control implement status right on the ROS display. This option may be preferable for equipment without existing switches or when a physical switch box is impractical or undesirable for operations.

NOTE: The on-screen switch box must be configured prior to adding the widget to the Run screen for use during in-field operations.

MASTER SWITCH OPTIONS

To configure ROS master switch options:



NOTE: The master switch module will not be available if a boom speed node or other switch hardware (e.g. Raven Switch Box or SwitchPro) is detected on the CANbus.

1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Select the Master Switch module.
3. Select the option necessary and best suited for implement control:

On-Screen Master Switch. Select this option to allow the operator to use an on-screen master switch widget to toggle the implement status.

With this option selected, the operator will need to add the master switch widget to the guidance display in order to toggle coverage history on or off during field operations.

NOTE: The on-screen master switch is only capable of toggling coverage for a single section or full implement. Review the *Widget Selection and Set Up* section on page 142 for assistance with setting up and adding widgets to the guidance display for field operations. Refer to the *On-Screen Switch Box Options* section on page 118 for information on using an on-screen switch box to control individual sections on an implement.

Remote Master Switch. Select this option if a remote master or proximity switch is connected to the "Remote Switch" connector on the chassis cable. Review the Raven CANbus System Installation Manual for additional information on installing the generation 1 interface or generation 2 chassis cable platforms.

ON-SCREEN SECTION SWITCHES

NOTE: Additional hardware may be required to control individual sections using the on-screen switch box. Contact a local Raven dealer for additional assistance or ordering information.

The on-screen switch box option will not be available if a Raven Switch Pro or CAN Switch Box is detected on the CANbus.

To configure the number of switches necessary to control implement section functions:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Select the On-Screen Switch Box module.

NOTE: If the on-screen switch box has been previously configured, a summary of the switch box assignments will be displayed.

3. Touch the Edit icon.
4. Touch the On-Screen Switch box tab.
5. Select the number of switches value and use the on-screen keypad to enter the desired number of switches to control implement section functions.
6. If desired, touch the section labels in the lower portion of the on-screen switch box tab to customize the switch box labels displayed during field operations.

To configure the on-screen switch box and automatically configure the section mapping or switch assignments:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Locate and select the On-Screen Switch Box module.

NOTE: If the on-screen switch box has been previously configured, a summary of the switch box assignments will display.

3. Touch Edit.
4. Touch the On-Screen Switch Box tab.
5. To automatically assign sections to configured switches, touch the Auto-Map Sections button in the lower, right corner of the display. This button will only be available if the number of configured implement sections matches the number of switches.

NOTE: Verify the section assignments before starting an actual field operation with the automatic section assignments.

To manually set up the on-screen section switch box assignments:



1. Touch the Edit icon in the Machine Panel to view the machine devices.
2. Select the On-Screen Switch Box module.

NOTE: If the on-screen switch box has been previously configured, a summary of the switch box assignments will display.

3. Touch the Edit icon in the upper, right corner of the Summary screen.
4. Touch the Switch Assignments tab.
5. Select a switch function in the upper portion of the Assignments tab.
6. Review all implement sections currently assigned to the on-screen switch function.
7. To change switch assignments, touch the Change Assignment button. Only unassigned sections will be displayed on the section assignment screen for the selected switch. To reassign a section to a different switch function, the section must first be unassigned from the current switch.

CANBUS TROUBLESHOOTING

Although the control algorithm is located within the CAN node, all of the same troubleshooting techniques that are used in a traditional hard-wired or serial control systems still apply to a CAN system and the behavior of the system remains the same. Flow and speed sensors, as well as the control valve and boom valves, are used in the same fashion.

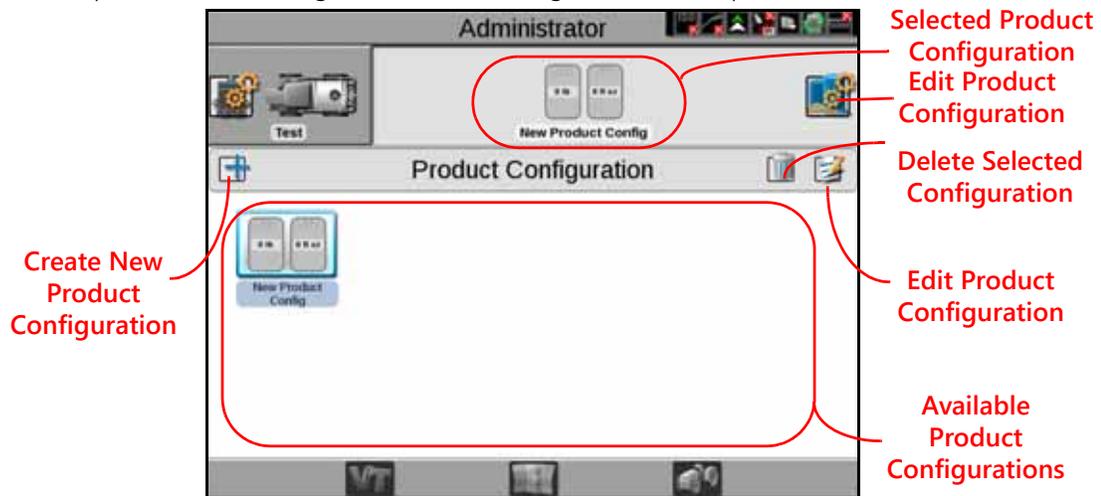
Refer to the Raven CAN Network Installation Manual for additional troubleshooting and CAN system information.

CHAPTER 12

PRODUCT PANEL AND CONFIGURATIONS

OVERVIEW

The product panel allows an operator or system administrator to set up control channel assignments and enter product information for a field operation. A product configuration may be saved for common or recurring field operations to will allow the operator to reselect the product settings from a previous operation to quickly change the Raven OS setup for different configurations used during various field operations.



NOTE: Product configurations will be displayed only for the selected machine configuration.

PRODUCT CONFIGURATIONS

Product configurations save information on products assigned to each control channel and may be used to quickly set up the Raven OS for common or various input or application operations. The product configuration information may be used to enhanced job reporting information and allows improved product information to be saved, changed, and used quickly and easily.

CREATE A NEW PRODUCT CONFIGURATION



1. Touch the Product Configuration panel to display any available product configurations.

2. Touch the Add button to create a new product configuration.
3. Use the on-screen keyboard to enter the desired name or description for the product configuration and touch the Done button. The product setup screen will be displayed.
4. Refer to the *Product Channel and Ingredient Set Up* section on page 123 to configure the product or mix information for each control channel available in the product configuration.

EDIT AN EXISTING PRODUCT CONFIGURATION

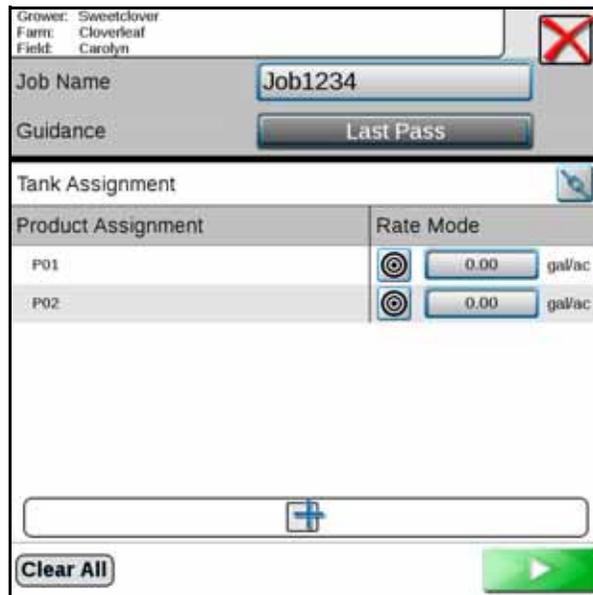
To edit or modify an existing product configuration:



1. Touch the Product Configuration panel to display the available product configurations.
2. If necessary, select the product configuration to be modified.
3. Touch the Edit button to edit the selected product configuration. The product configuration prompt will be displayed.
4. Edit the existing information for each control channel as necessary to modify or adjust the configuration for the field operation needs. Refer to *Product Channel and Ingredient Set Up* section on page 123 for additional information on entering product information for each control channel available in the product configuration.

ASSIGN A PRODUCT CONFIGURATION (FOR AGX)

1. Select the desired agX field.



2. Select the Guidance type.
3. Enter the desired rate for each product node.
4. Press the Start button.

DELETE AN EXISTING PRODUCT CONFIGURATION

NOTE: Deleting a product configuration does not delete product information assigned to the configuration.

To delete an existing product configuration:



1. Touch the Product Configuration panel to display the available product configurations.
2. Select the product configuration to be removed.
3. Touch Delete.
4. Touch the “Yes” button on the displayed prompt to permanently delete the product configuration.

PRODUCT CHANNEL AND INGREDIENT SET UP

The following sections are intended to assist with setting up and entering product information for each control channel in a product configuration. The product channel information may be used to enhance the job reporting features and provide detailed input or application information for reference during the growing season or for archival record keeping.

PRODUCT REPORTING INFORMATION

To set up control channel information:



1. Touch the Product Configuration panel and select a product configuration to modify or create a new configuration.

NOTE: Refer to the *Create a New Product Configuration* section on page 121 or the *Edit an Existing Product Configuration* section on page 122 to create or edit a product configuration.

2. Touch the Edit button in the Product Configuration panel to edit the selected product configuration.
3. Select a channel indicator shown along the left side of the prompt to select the control channel on which to add product information.
4. Touch the Mix Name field to create or edit the tank mix or granular blend name. To select a previously configured mix, touch the Mix Name drop down and select a previous mix to assign the mix to the selected control channel.

NOTE: Selecting a previous mix or blend will automatically enter any information entered previously for the remaining fields. Verify the mix or blend information before proceeding to the next control channel.

Editing the mix name will not create a new mix with the existing mix or blend information.

5. If desired, press the unit to toggle between units (gal, pt, fl oz).

NOTE: If needed, there is a mix calculator available to assist with determining the appropriate mix. Press the Rate Calculator button and enter the desired values.



Rate Calculator

6. Once the Mix Name is entered, the Raven OS will set the "Display As" label for the mix. If desired, touch the Display As field and edit the label (up to 4 characters) to be displayed during field operations on user selected widgets.

7. Press the Tank Manager button.



Tank Manager

8. Touch the Current Volume or Current weight field and set the current tank volume or bin weight available for the mix or blend. This value is the total amount of product (carrier and all ingredients) in the tank or bin.

NOTE: To refill a tank or bin to the full capacity of the product tank or bin, touch the Refill button. To refill all tanks or bins to full capacity, touch the Refill All button at the top of the prompt.



Refill



Refill All

MIX RATIOS AND INGREDIENTS

When configuring a control channel for liquid control, the Product Configuration prompt will display a Carrier and Carrier Volume field. The Raven Operating System (ROS) uses the carrier volume or rate field to calculate the ratio of carrier and mixed ingredients during the field application.

To enter carrier information for a tank mix:



1. Touch the Product Configuration panel and select a product configuration to modify or create a new configuration.

NOTE: Refer to the *Create a New Product Configuration* section on page 121 or the *Edit an Existing Product Configuration* section on page 122 to create or edit a product configuration.

2. Touch the Edit button in the Product Configuration panel to edit the selected product configuration. If the control channel is configured for liquid product control the Carrier and Carrier Volume fields will be displayed. Touch the Carrier drop down selection and select the existing carrier product or select the Add button to create a new carrier.

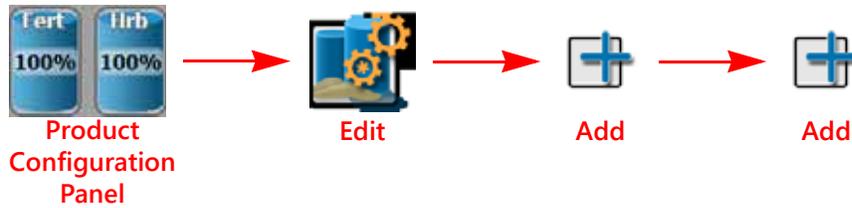
3. For liquid products, touch the Carrier Volume field and enter the volume of carrier used in the mix. This field is used to set the ratio of product and does not have to reflect the actual volume of carrier in the tank.

For Example. If a chemical supplier used 1500 gallons of water mixed with 500 gallons of a liquid fertilizer for the nurse tank mixture, the Carrier Volume may be entered as 1500 and the ingredient volume may be entered as 500. The Raven OS will calculate the ratio for each tank load for the field application.

ADD INGREDIENTS

The lower portion of the Product Configuration prompt allows mix or blend ingredients to be added to the Product Configuration. This information is used to calculate the ratios of product applied during field operations with the mix or blend assigned to the control channel.

To select ingredients and enter product information:



1. Touch the Product Configuration panel and select a product configuration to modify or create a new configuration.

NOTE: Refer to the *Create a New Product Configuration* section on page 121 or the *Edit an Existing Product Configuration* section on page 122 to create or edit a product configuration.

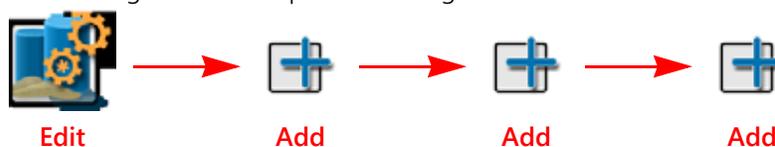
2. Touch the Edit button in the Product Configuration panel to edit the selected product configuration. Touch the Add button to add a product to the ingredient list. The Favorite Products list will be displayed. The Favorite Products prompt displays products that have been used for previous product configurations.
3. Select the desired product from the recently used list if available and touch the Done button to add the product to the ingredients list. To add an ingredient from the product database, touch the Add button at the bottom of the Favorite Products prompt. The Reference Products prompt will be displayed. The Reference Products database contains thousands of preconfigured agricultural products and information that may be added to the ingredient list.
4. Use the filter options at the top of the Reference Products prompt to help locate and select the desired product for the ingredients list and touch the Done button to add the selected product to the ingredients list.

NOTE: The selected product will also be added to the Favorite Products list.

To create a new product or ingredient not available in the product database, touch the Add button at the bottom of the Reference Products prompt. Proceed with the procedure described in the *Create a New Ingredient* section on page 125 for additional assistance with creating a new product for field operations.

CREATE A NEW INGREDIENT

To create a custom product or ingredient for a product configuration:



1. Touch the Edit button in the Product Configuration panel.

NOTE: Refer to the *Create a New Product Configuration* section on page 121 or the *Edit an Existing Product Configuration* section on page 122 to create or edit a product configuration.

2. Select the Add button at the bottom of the Product Configuration prompt to display the Favorite Products list.
3. Touch the Add button again to view the Reference Products database.
4. Touch the Add button once more to access the Product Details prompt.
5. Select the Type drop down list and select the type of product to be added.

NOTE: Use the Type filter option available to the right of the Type drop down to filter the product database information. This feature may be useful when adding a new product based off of a previous product line already in the database.

6. Touch the Manufacturer field or select the drop down option to enter or select a manufacturer.

NOTE: Use the Manufacturer filter option to the right of the Manufacturer drop down list to filter the product database information. This feature may be useful when adding a new product from a manufacturer already in the database.

7. Touch the Name field or select the drop down option to enter or select a product name or description already in the product database.

NOTE: Use the product Name filter option to the right of the Name drop down list to filter the product database information. This feature may be useful when adding a new product based upon a product or product line already in the database.

8. Touch the Liquid/Dry drop down and select the type of product to be configured.

9. Touch the Units drop down and select the preferred application rate units.

10. Touch the Registration field and enter any registration information as available or necessary for reporting to governmental or environmental agencies.

11. Enter any additional product notes in the Notes area.

CHAPTER

13

JOB PROFILE PANEL AND CONFIGURATIONS

OVERVIEW

The Job Profile panel contains configured job profiles and any jobs, completed or in progress, and currently stored on the ROS device. Job profiles allow field information such as guidance lines or scouting features to be preconfigured for various fields and assigned to the grower, farm, field (GFF) folder structure.

Jobs previously started on the ROS device are also available in the Job Profile panel until removed. To resume the field operation, select the job file with the previous coverage map to be amended and begin field operation.

NOTE: Perform file maintenance regularly to keep device resources available for active field operations. Transfer completed job files to a home or office PC, or a Slingshot account, for backup and archiving.

JOB PROFILES

Job profiles allow the operator to select a profile with preset grower, farm, field (GFF) assignments, preferred guidance type, and field scouting information, all with one touch instead of multiple procedures to load each of these options.

Job profiles may be used to provide as much, or as little, of the above information as needed or desired for a grower or custom applicator operation. This function is not required.

JOB PROFILE PANEL OVERVIEW

Touch the Job Profile area toward the bottom of the main panel display to expand the Job Profile panel. The Job Profile panel displays job profiles and previous job files in progress and stored on the ROS device.



JOB FILTER AND SORT

Filter and sort features are available in the upper, left corner of the Job Profile panel. Touch the Filter button to select options to filter or sort jobs and job profiles displayed in the Job Profile panel. Use these features to quickly locate files for a job in progress or the appropriate job profile, recommendations, or cloud job features for a new field operation.

Job filtering also allows the operator to view only work assigned to a specific grower, farm, or field, type of job file, or to a specific operator.

NOTE: The Only My Work filter option is only used with AgSync cloud jobs.

Applied filter options will be displayed each time the Job Profile panel is selected. If a job profile or previous application is not displayed, clear the filter options or check that the set filtering options do not exclude the desired selection.

JOB PROFILE EDITOR

The edit feature available in the upper, right corner of the Job Profile panel allows the operator or system administrator to create or manage job profiles for future field operations using the ROS device.

JOB PROFILE SETUP

Job profiles save common field preferences such as guidance type and lines, scouting information, and grower, farm, field (GFF) associations and allow a machine operator to load these settings quickly at the start of a field operation.

NOTE: Job profiles are not required to start a job.

CREATE A NEW JOB PROFILE

To configure a job profile for future field operations:



1. Touch the Job Profile Panel.
2. Touch Edit.
3. Touch the Add button. The Job Profile Settings screen will display.
4. Proceed with the following sections to complete the job profile set up as desired for use when starting future field operations.

JOB PROFILE NAME

1. Select the profile name field and use the on-screen keyboard to enter the name or description of the profile.
2. Enter a name or description that will help identify the specific field for which the profile is configured.

FIELD INFORMATION

1. Touch the edit button in the field information area and use the selection fields to assign the job profile. Refer to the *Grower, Farm, Field (GFF) Manager* section on page 41 for details on creating or editing GFF assignments to help sort and manage field and job information.

GENERAL SETTINGS

1. Touch the guidance drop down field and select the preferred guidance type or line to use during field operations with the selected profile. A guidance line must be available on the ROS device to select a guidance line for the profile. Refer to the Chapter 15, *AB Guidance Utilities and Nudge Features*, for assistance with setting or saving a guidance path.
2. Touch the scout drop down field and select an available scout group to use with the profile. A scout group must be available on the ROS device to select a scout group for the profile. Refer to Chapter 16, *Scout Groups and Features*, for additional information on creating scout groups and features for use during field operations.

EDIT AN EXISTING JOB PROFILE

To modify an existing job profile:



1. Touch the Job Profile Panel.
2. Touch the Edit button.
3. On the Job Profile screen, select the Edit button for the job profile to be modified.

DELETE A JOB PROFILE

To remove a job profile from the Job Profile panel:



1. Touch the Job Profile panel.
2. Touch the Edit button.
3. On the Job Profile screen, select the Delete button for the desired file.
4. Confirm that the delete process to permanently remove the job profile.

STARTING A JOB

	<p style="text-align: center;">CAUTION</p> <p>To avoid loss of job information, it is recommended to close any active job operation before shutting down the ROS device or removing power from the display. Refer to the <i>Power Down</i> section on page 15 for additional information on the proper procedure to shutdown the ROS device.</p>
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START OR RESUME A JOB

To start a new job or field operation:



1. Touch the Job Profile panel at the bottom of the Main Panel display.
2. Select one of the following options for starting a job:

Start Job. Touch the Start Job option to begin a default field operation with or without assigning Grower, Farm, Field data or profiles to the job. This option may be desired to quickly start a job or if additional data collection or record keeping will not be necessary. GFF, scout guidance lines, and scout groups can be loaded if applicable.

Start agX Job. agX files are created on a computer before heading out the field. These files are called "recommendations". Recommendations contain information such as field boundaries, application rates, and prescription maps. The process to start an agX job varies from a typical application.

Start a Pre-Populated Job. Pre-Populated Jobs are created in Slingshot and sent to the field computer via the Slingshot link. Information such as Grower, Farm, Field, prescription maps, and mix ratios are preconfigured in the pre-populated job. Pre-populated job icons appear similar to other jobs but have a small check box on the icon.

Start a Cloud Job. Cloud jobs are similar to pre-populated jobs but can have multiple machines operating within the same job. When in a cloud job the pre-populated job information and coverage from other machines in the same Slingshot® account will be visible on the Viper 4. Cloud job icons look similar to other jobs but have a cloud on the job icon.

Job Profile. Select a configured Job Profile to begin a field operation using a previously configured job profile. Refer to the *Job Profile Setup* section on page 128 for assistance with creating or editing job profiles.

Resume Previous Job. Select a previous job to add to the previous coverage history.

3. Verify the GFF assignments displayed in the upper, left corner of the prompt. This information will be set with the job profile if already configured. If necessary, touch the Edit button at the top of the Job Setup prompt to reassign the job to GFF structure or create new GFF entries as necessary. Refer to the *Grower, Farm, Field (GFF) Manager* section on page 41 for additional information on creating GFF entries for assignment to the new job. Editing GFF is not available for agX or pre-populated jobs or cloud jobs unless you are the originator.
4. If desired, touch the Job Name field and use the on-screen keyboard to enter a new name or description for the field operation being started.

5. Enter a name or description that may be used to identify the job if it is necessary to resume the field operation at a later date or to help with archiving field data back at the home or office.
6. To change the job profile in the Job Setup prompt, touching the Job Profile drop down and select the desired profile. If a different profile is selected, restart this procedure to verify settings as required before starting the field operation.
7. Verify the guidance type or path for the field operation. If a guidance line is saved on the ROS device, touch the Guidance drop down field and select the saved line to load for the field operation.
8. Verify the scout group for the field operation. Scout groups may contain a field boundary, recorded zone map features, and other scouted field map features as saved. Touch the Scout drop down field and select the saved scout group to load for the field operation. Scout groups are not available for agX or pre-populated jobs or cloud jobs unless you are the originator and are starting a job for the first time.
9. Verify any application control or monitoring features for active control channels to be used during the field operation being initiated. Refer to the ROS operation manual for the optional system for more information and additional assistance with configuring the optional control, management, or monitoring system to be used during the field operation being initiated.

NOTE: If the same product has been assigned to multiple nodes, the ROS device will automatically combine the same products into a chain.

FOR EXAMPLE:

Check application control system calibration, verify product information.

The ROS Product Control Calibration and Operation Manual will provide additional information for these features and capabilities of a liquid or granular application system.

Other optional input, application control, or operation monitoring systems may offer additional control settings or specific features for use with the ROS system. Review the operation manuals provided with these systems for additional assistance with feature specific job options.



10. Touch start to open the operation screen.

AGX JOB

agX recommendations are created on a computer and sent to the ROS device via Slingshot or transferred via a thumb drive. The data, saved as a .RDP file contains information such as field boundaries, prescription maps, and chemical information.



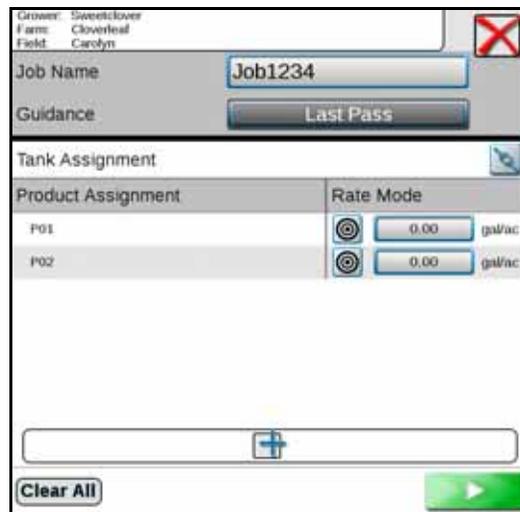
STARTING AN AGX JOB

After transferring the .RDP file to the field computer:

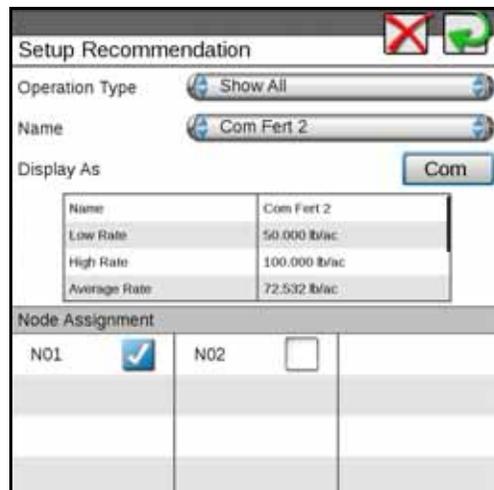
1. Select the desired agX field boundary.



2. Press the Add button.



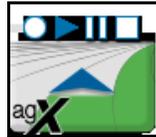
3. Select the desired recommendation from the Name drop down.



4. Select the Node Assignment for the recommendation.
5. Press the back arrow to go the previous screen.
6. Either press the Start button to start the job or press the Add button to add additional recommendations.

RESUME AGX JOB

To resume an agX job that was started previously, select the desired agX job. The agX jobs that have already been started have play, pause, and stop buttons along the top of the button.



CLOUD JOBS

Before starting a cloud job it is important that there is an active Slingshot connection and that Cloud Jobs are enabled in File Manager. To enable cloud jobs in File Manager:

1. Select Administrator or User Panel along the top of the Main Panel display to expand the panel.
2. Select File Manager.
3. Select the File Management Options Tab.
4. Select the Enable Cloud Jobs check box.

STARTING A CLOUD JOB

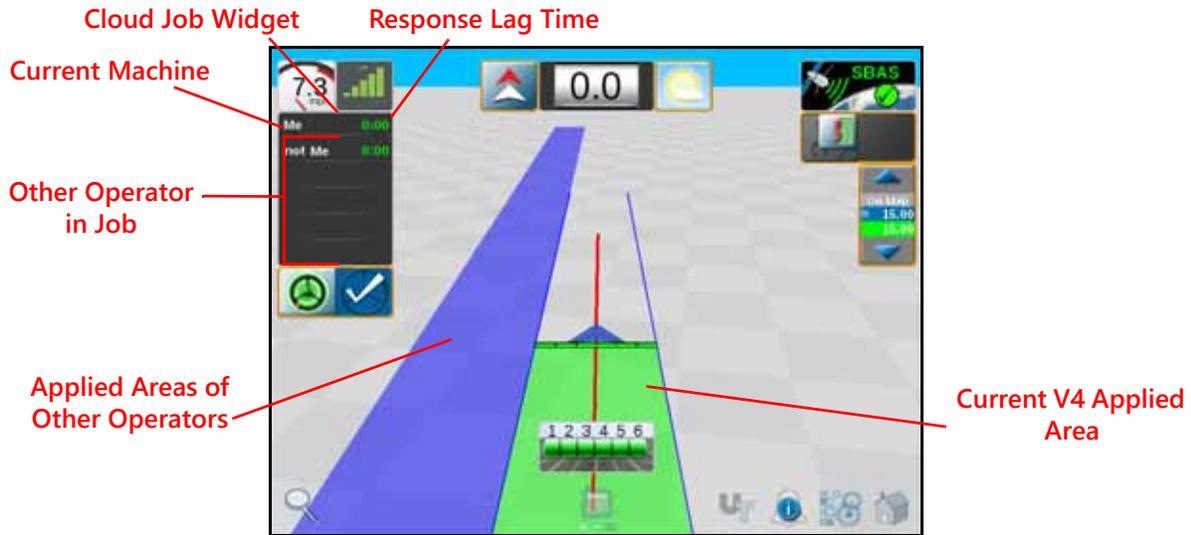
1. Select the desired cloud job.
1. If joining a cloud job, confirm that the auto-assigned products from the cloud job are correctly assigned to the control channels on the machine.

The screenshot shows the Job Profile Panel for Job WO1. At the top, it displays 'Grower: Raven', 'Farm: Raven', and 'Field: Raven'. Below this is the 'Job Name' field containing 'WO1'. There are buttons for 'Guidance', 'Last Pass', 'Scout', and 'None'. The main section is titled 'Tank Assignment' and contains a table with columns for 'Current', 'Mix', and 'Rate Mode'. The first row shows '2,4-' in the 'Current' column, '2,4-D' in the 'Mix' column, and '15.00 gal/ac' in the 'Rate Mode' column. Below this are rows for P02 through P08, each with a '0.0 lb/ac' rate. At the bottom, there are radio buttons for 'Product View' (selected) and 'Node View', along with a green play button. Red annotations point to various elements: 'GFF' points to the top status bar; 'Editable Mix Name' points to the '2,4-' text; 'Product Reorder' points to the up/down arrows; 'Information' points to the 'i' icon; and 'Editable Rate Field' points to the '15.00' value.

2. Press Start

NOTE: If there is an issue with Slingshot or Enable Cloud Jobs is not selected, a Cloud Job Warning error window will open. Exit the job, verify Enable Cloud Jobs in selected and Slingshot is connected.

- Start a job as normal. On this screen you will be able to see the areas you applied and other the areas other operators have applied (in blue). A list of the other operators in the same job will be visible in the Cloud Job widget. The number to the right of the operator name indicates the time (in seconds) since that field computer last communicated. If there isn't a number behind the name it indicates that the operator is no longer active in the job.



MODIFYING PRE-POPULATED JOBS

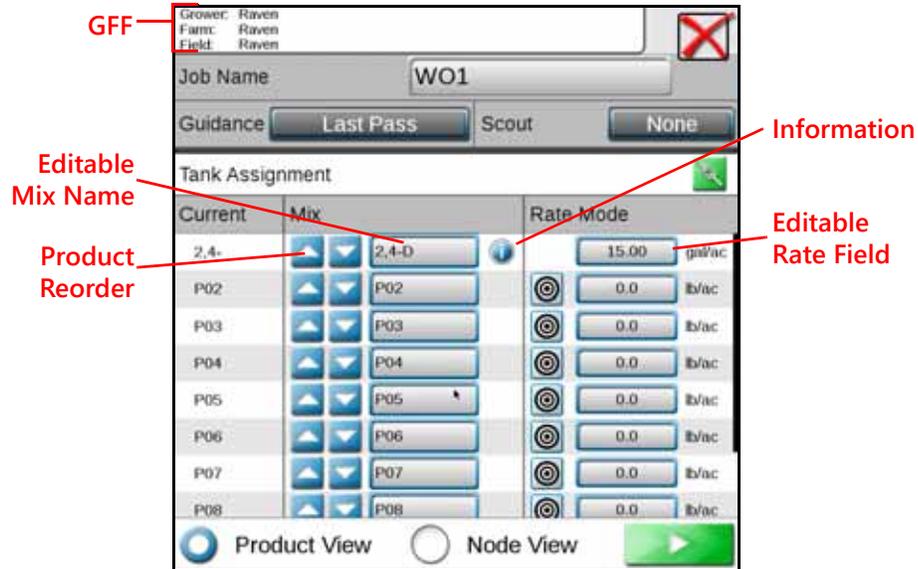
Pre-populated jobs are created in Slingshot and imported to the field computer via Slingshot. Pre-populated jobs contain information such as Grower, Farm, Field, prescription maps, and mix ratios. Pre-populated jobs have a small checklist icon on the job icon.



ROS will not allow the user to assign a pre-populated job product to an incompatible control channel. For example, if the pre-populated job requires granular and the control channel is configured for liquid.

After pressing the pre-populated job a pre-populated job confirmation screen will open:

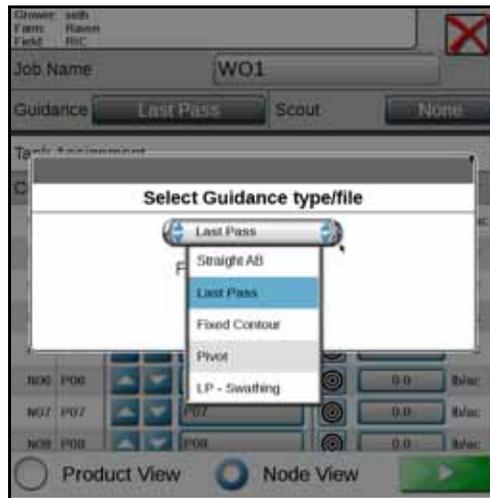
1. If needed, use the product reorder arrows to move the mix(es) up or down to the desired node location.



NOTE: Select the Node View radio button to view the node name and the current mix.

Pre-populated job products will have the information button visible behind the Editable Mix Name. Products without the Information button are extra nodes on the bus and not associated with the pre-populated job.

2. If desired, press in the Editable Mix Name field and rename the mix. The edited name will only be visible to the current operator and is not saved in the pre-populated job.
3. Press the information icon beside the mix to view the mix information.
4. Press the button in the Guidance cell to select the desired Guidance type.



5. Press the button in the Scout cell to select (if applicable) a Scout group.
6. After completing the pre-populated job configuration, press Start to start the pre-populated job.

ENDING A JOB

To close or end a job currently in progress:



1. Touch the Home button. The Application Report tab will display.
2. Touch any information fields and enter any desired or necessary job data or notes regarding the field operation.
3. Touch the Weather Report tab.
4. Select Include Weather Report option at the top of the prompt to include weather information in the job report for the field operation.
5. Touch any information fields and enter any desired or necessary weather information or notes regarding weather during the field operation.

NOTE: Weather information may be collected automatically during the field operation if a weather station is connected to the ROS device. Refer to the *Weather Station Devices* section on page 105 for additional information about using a weather station.

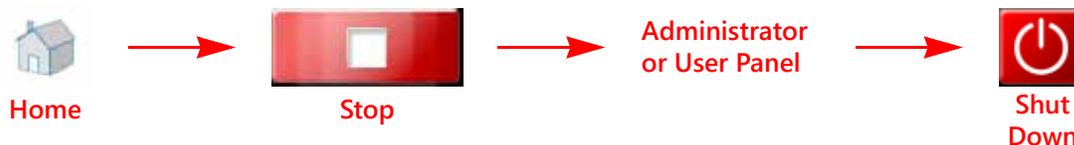
6. Select the Job Complete option if the field operation is finished.

NOTE: The job will still be displayed in the Job Profile panel, but will display a check mark to indicate the job has been completed and does not need to be restarted to complete any operations.

7. If a Slingshot Field Hub is connected with the ROS device, select the "Send to Slingshot" option to transfer the job to the Slingshot web service via the wireless network. Refer to the ROS Slingshot Field Hub Calibration and Operation Manual for assistance with Slingshot Field Hub set up and operation.
8. Select the Stop button in the lower, right corner of the prompt to close the job and return to the main panel display.

SYSTEM SHUTDOWN

To shutdown the system while in a job:

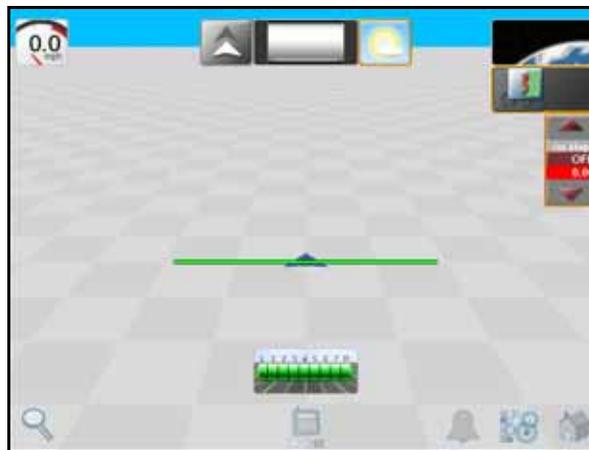


1. Touch the home icon in the lower, right corner of the display.
2. Touch the Stop icon.
3. Touch the Administrator or User panel at the top of the Main Panel display.
4. Select the Shutdown button to properly power off the ROS device before removing power or shutting off the machine ignition.

OVERVIEW

ROS features a customizable guidance display using widget based tools and display utilities.

**Default 3D
Guidance View**



ROS allows each equipment operator to select which widgets will be displayed during operation, move each of the widgets to a desired portion of the screen, and save multiple screen configurations for use during future operations and other operators.

ROS also allows an Administrator to create a custom wallpaper and copy it to multiple Viper 4's so all machines can have the same guidance screens the administrator deems appropriate for operation. The administrator created screens are locked and cannot be modified by the users.

The following sections are intended to assist with using the operation and guidance utilities, selecting widgets, and saving screen layouts used during field operations.

ENDING AN ACTIVE JOB

Refer to the *Ending a Job* section on page 136 for assistance with closing or ending an active field operation.

OPERATION DISPLAYS

VIEWS

To select a view during an operation:



1. Touch Select View.
2. Select one of the following views to switch the display to the selected view.

3D Guidance. Select this view to use a three dimensional view of the current machine position in the field area.

Field Review. The field review mode allows the operator to move the display to any portion of the field area to review coverage or operation data for the current operation.

NOTE: Touch a completed field boundary in the field review mode to display the boundary area.

Widget View. The widget view provides the operator with a view for additional widgets, tools, and other feature controls necessary during various field operations and allows the operator to place as many widgets as necessary without covering guidance or field information.

Web View. If wireless service is available, this view allows the operator to access the Internet and web based services to provide up to date information to the vehicle cabin.

NOTE: Access to web based services may require additional hardware with a wireless service contract. For additional information on these features, contact a local Raven or Slingshot dealer.

ZOOM AND VIEW TOOLS

The following tools are available on the 3D Guidance and Field Review modes:



Touch the zoom icon in the lower, left corner of the display and use the sliding bar to adjust the zoom level desired for monitoring the field operation on the ROS display.

NOTE: While using the 3D Guidance mode, the zoom slider will also adjust the view angle for down-field or overhead view of the vehicle location.



In the field review mode, select the coverage extents icon along the bottom of the display to automatically set the zoom to display the extents of the coverage area, scout map, or prescription map completed or loaded into the job.

NOTE: Touch a completed field boundary in the field review mode to display the area within the Scout Group.



VEHICLE LOCK

In the field review mode, select the vehicle lock icon along the bottom of the display to keep the field review display centered on the current vehicle position during field operations.

ALARMS

To help the equipment operator make the most informed decisions possible, the ROS device provides active alert information as well as alert history. When encountering problems in the field, the operator is able to access this information while troubleshooting to help the operator and support personnel correct potential issues quickly while in the field.

NOTE: Additional alarm settings may be available for various add on systems or features. Please refer to the system or feature documentation for assistance with configuring alarms or defining alarm conditions. Alarms from ISO ECU's are handled by the UT which has it's own pop up and audible indicator. Alarms for ISO ECU's will not show on the Raven alarm widget or in the Raven alarm history. Alarm settings do not apply to the ISO ECU alarms.



ACTIVE ALARMS

If an alert or alarm condition is detected during a field operation, ROS will display an alert or alarm notice on the Alarm icon along the bottom of the display.

To view additional information on active alarm conditions:



1. Touch the Alarms icon.
2. Select the Active Alarms tab. If an alarm condition is currently detected during the field operation, ROS will display the following alarm details:

Alarm Severity. The alarm severity may be used as an indication of the impact which the detected condition may have on the operation. A critical error may cause significant application issues or indicate a severe problem with the system while a notice may be an indication of a minor issue during which the system is able to function normally.

Regardless of the severity of the alarm, it is recommended to check the alert or alarm details and address the condition as necessary for the current field operation.

	#1 - Critical
	#2 - Alert
	#3 - Notice

Alarm Information. ROS will provide a short description of the alert or alarm condition to assist the operator with diagnosing or correcting the cause for the alarm.

Category. The category of the alarm may be helpful when addressing specific alarms to either identify systems or components which may be encountering or causing the error.

ALARM HISTORY

Even after the alarm condition has been addressed or corrected, ROS provides a log of alert conditions throughout the field operation.

To access the alarm history during an active operation:

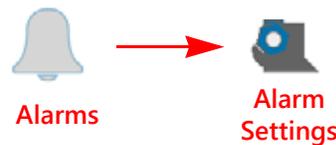


1. Touch the Alarms icon.
2. Select the Alarm History tab. ROS will display a list of previously detected alarm conditions. Refer to the *Active Alarms* section on page 139 for details on the severity, alarm information, and category information displayed.

ALARM SETTINGS

To access global alarm settings during an active field operation:

NOTE: Additional alarm settings may be available for various add on systems or features. Please refer to the system or feature documentation for assistance with configuring alarms or defining alarm conditions.



1. Touch the Alarms icon.
2. Select the Alarm Settings tab. The following global alarm settings will be accessible:

Audible Alarms. Enable the audible alarms option to receive an audible tone for alarm conditions detected during the active field operation.

Popup Alarms. Enable the popup alarms option to display an alert prompt on the ROS display for alarm conditions detected during the active field operation.

Audible Backup Alarm Enabled. Enable the audible backup alarm to receive an audible notification when GPS detects the machine is backing up.

SCREEN LAYOUT CONFIGURATIONS

CREATE A NEW SCREEN LAYOUT

To create a new screen layout:



1. Touch the Screen Configuration icon.
2. Swipe or use the page navigation at the bottom of the manage screen layouts prompt to select the view or mode in which to add the new screen configuration.
3. Select the Add button and use the on-screen keyboard to enter a name or description for the new configuration.

- The new configuration will be displayed on the view or mode layouts prompt. Touch the new layout button and refer to the *Widget Selection and Set Up* section on page 142 for assistance with editing widgets on the new screen layout.

COPY AN EXISTING SCREEN LAYOUT

To create a new screen configuration using an existing layout:



- Touch the Screen Configuration icon.
- Swipe or use the page navigation at the bottom of the Manage Screen Layouts prompt to select the view or mode with the screen layout to be copied.
- Select the Copy button and use the on-screen keyboard to enter a name or description for the new configuration.
- The new configuration will be displayed on the view or mode layouts prompt. Touch the new layout button and select the edit button. Refer to the *Widget Selection and Set Up* section on page 142 for assistance with editing widgets on the new screen layout.

DELETE A SCREEN LAYOUT

To remove an existing screen configuration from the manage screen layouts prompt:



- Touch the Screen Configuration icon.
- Swipe or use the page navigation at the bottom of the manage screen layouts prompt to select the view or mode with the screen layout to be deleted.
- Select the icon for the existing layout to be removed.
- Touch the Delete button. The configuration will be displayed with a "deleted" icon over the layout button.
- To undo the delete function, touch the screen layout to remove the "deleted" status. To proceed and remove the configuration, touch the done button in the upper, right corner of the prompt.

NOTE: Default screen layouts (Ex. Default, Service, or any custom OEM layouts) cannot be deleted.

EDIT A SCREEN LAYOUT

To add, remove, or modify widgets on a screen configuration:



1. Touch the Screen Configuration icon.
2. Swipe or use the page navigation at the bottom of the Manage Screen Layouts prompt to select the view or mode with the screen layout to be modified.
3. Select the Edit button to enter the widget editing mode. Refer to *Widget Selection and Set Up* section on page 142 for more information on adding, modifying, or removing widgets on a screen layout.

NOTE: Job and guidance operations will continue in the background while in the widget editing mode, however, job and guidance information will not be displayed. If significant layout changes will be made, pause field operations while editing the screen layout or widget selection.

Default screen layouts (Ex. Default, Service, or any custom OEM layouts) cannot be edited.

WIDGET SELECTION AND SET UP

ADD WIDGETS TO A SCREEN LAYOUT

To use the widget editing mode to add widgets to a screen layout:



1. Touch the Screen Configuration icon.
2. Swipe or use the page navigation at the bottom of the manage screen layouts prompt to select the view or mode with the screen layout to be modified.
3. Select the Edit button to enter the Widget Editing mode.
4. Touch the Add widgets icon along the bottom of the display. The Widget Selection prompt will display.
5. Swipe or use the page navigation at the bottom of the widgets prompt to browse the available widgets.
6. To add a widget to the screen, touch and hold the desired widget for approximately two seconds. The widget edit mode screen will be displayed.
7. Touch the exit widget mode button along the bottom of the display to return to the manage screen layout prompt or refer to the *Move Widgets to Modify a Screen Layout* section on page 142 for assistance with modifying the widget layout.

MOVE WIDGETS TO MODIFY A SCREEN LAYOUT

To move widgets or customize a screen layout:



1. Touch the Screen Configuration icon.
2. Swipe or use the page navigation at the bottom of the manage screen layouts prompt to select the view or mode with the screen layout to be modified.
3. Select the Edit button to enter the widget editing mode.

4. In the Widget editing mode, touch and hold on the Widget. The Widget will be highlighted.

NOTE: Refer to the *Add Widgets to a Screen Layout* section on page 142 to select and add widgets to a screen layout.

5. Drag the Widget to the desired display location and release.

6. Touch Exit Widget Editing Mode to return to the manage screen layout prompt or refer to the *Move Widgets to Modify a Screen Layout* section on page 142 for assistance with modifying the widget layout.

REMOVE A WIDGET FROM A SCREEN LAYOUT

To remove a widget from a screen layout:



1. Touch the Screen Configuration icon.
2. Swipe or use the page navigation at the bottom of the manage screen layouts prompt to select the view or mode with the screen layout to be modified.
3. Select the Edit button to enter the Widget Editing mode.
4. In Widget Editing mode, tap the widget to be removed.
5. Touch the Delete icon in the upper, left corner of the widget to remove the widget from the screen layout.
6. Touch the Exit Widget mode button along the bottom of the display to return to the manage screen layout prompt.

WIDGET CATALOG DEFINITIONS

ROS features user selectable widgets which allows the ROS device to be configured to display the information necessary for various field operations or customized for operator preferences. Some widgets may be required to perform specific tasks with ROS while others may be used for status or information display if desired.

Several widgets will require installation of additional hardware or components to enable use of the widget during a field operation. The following sections are intended to assist with selecting and using various ROS widgets available for use with standard system installations. Please refer to the ROS documentation for each optional system or feature for additional information on using widgets with these systems.

OPERATIONAL WIDGETS

DAY/NIGHT TOGGLE

The day/night widget allows the operator to toggle between a day and night display mode during a field operation. Tap the widget to toggle the display mode. Touch and hold the widget to view screen and LED brightness settings for the current mode.



Refer to the *System Preferences Tab* section on page 25 for additional information on the brightness settings available.

ACCESSORY APPLICATION WIDGETS

CAMERA INTERFACE

If a camera system is connected to the ROS device, select the Camera Interface widget to view camera feeds for the connected devices. Tap on the camera feeds along the bottom of the widget to select the desired feed to view during a field operation.

Touch and hold on the widget during a field operation to access camera feed settings. Select a Reverse Cam to set the camera feed to view when ROS detects reverse vehicle travel. There will be a camera interface widget available for the cameras configured on the machine (up to four) but only one camera widget can be placed on the screen at a time.



SCOUTING

The scouting widget is used to record or manage scout groups during field operations. Use the Scouting widget to record features such as field boundaries, zone maps, or field markers for future reference.



Refer to the Chapter 16, *Scout Groups and Features*, for additional assistance with using ROS to record scout group features.

WEATHER STATION

If a WatchDog Sprayer Station is connected to the ROS device, the system may be used to automatically log weather data during a field operation or to capture a “snapshot” of current conditions for the operation.



During a field operation, touch and hold the Weather Station widget to view current weather conditions. Use the Record Snapshot button to copy the current weather conditions to the job report. Refer to the *Ending a Job* section on page 136 for assistance with editing a job report.

CLOUD JOB

When running in a cloud job, the Cloud Job widget will be visible. This widget shows the names of the other profiles in the same job and the response time for those profiles. If there isn't a number after the profile name, the operator is no longer active in that job.



GPS WIDGETS

FORWARD OVERRIDE

The Forward Override widget may be necessary if the reverse sensing feature is enabled. Refer to the *Enable GPS Reverse Sensing* section on page 84 for more information about the Reverse Sensing feature. If ROS detects reverse vehicle travel, tap the forward override widget to manually override ROS to a forward direction of travel.



GPS STATUS

The GPS Status widget may be used as a status indicator for signal reception used for the current position solution. This widget will display the selected and current correction type and status for NMEA messages received by ROS during field operations.



Touch and hold the widget to access a GPS Health prompt with additional details on GPS reception. Refer to the *Raven Receiver Settings Definitions* section on page 93 for definitions of the information displayed on the GPS Health prompt.

GPS SUMMARY

The GPS Status widget provides an indicator for signal reception used for the current position solution and the current speed detected by the GPS receiver. This widget will display the selected and current correction type and status for NMEA messages received by ROS during field operations.



Touch and hold the widget to access a GPS Health prompt with additional details on GPS reception. Refer to the *Raven Receiver Settings Definitions* section on page 93 for definitions of the information displayed on the GPS Health prompt.

HEADING AND SPEED WIDGET

The Heading and Speed widget displays the current GPS heading and vehicle speed as detected by the receiver. Touch and hold this widget to access the GPS Health prompt with additional details on GPS reception. Refer to the *Raven Receiver Settings Definitions* section on page 93 for definitions of the information displayed on the GPS Health prompt.



NOTE: The GPS filter mode allows the operator to filter the course over ground information provided for position information during field operations. Higher filter settings may be desirable in some regions to help smooth rapid course variations reported by the GPS receiver and provide smoother course information on job reports.

The default filter setting is Low (this is the recommended setting). Raise the filter mode setting to increase the filtering capabilities if GPS corrections in your region normally create erratic or fluctuations in GPS course over ground information, or create other issues during field operations or on job reports.

VEHICLE SPEED

The Vehicle Speed widget displays the current vehicle speed as reported by a speed sense node on the CANbus. The speed displayed using this widget is the speed to which a rate control system will be using for speed compensated rate control systems.



COMPASS

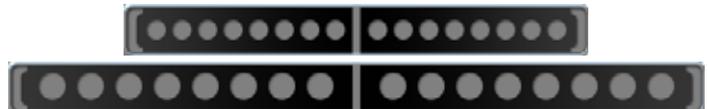
The Compass widget displays the current GPS heading as detected by the receiver. Tap the Compass widget to toggle the compass display.



GUIDANCE WIDGETS

LIGHT BAR

On-screen Light Bar widgets provide the operator with a heads-up display of the machine position during swath guidance. Select the size of the light bar widget desired to provide a representation of the distance and direction to the displayed guidance path.



The Light Bar widgets may be used in conjunction with an external light bar mounted on the vehicle. Refer to the *Light Bar Devices* section on page 104 for assistance with light bar settings.

DISTANCE FROM GUIDANCE LINE

The Distance from Guidance Line widget will be used with a guidance line set using the AB utilities and will display the distance and direction from the current vehicle position to the displayed guidance path.



Refer to the *Setting Guidance Paths* section on page 157 for assistance with setting an AB line with the AB Utilities widget.

NUDGE ARROW

The Nudge Arrow widget offers the same display information as the Nudge Status widget, but provides access to nudge controls directly on the current display view or mode. Select this option to allow the operator to manually adjust the guidance line directly from the guidance display during field operations.



Tap the arrow buttons displayed on the Nudge Arrow widget to nudge the displayed guidance line by the active nudge value. Touch and hold the widget to access the Nudge and Swath prompt. Refer to the *Nudge Features and Tools* section on page 161 for additional assistance using the nudge features.

NUDGE STATUS

The Nudge Status widget displays the current nudge applied to the displayed guidance line. Touch and hold the Nudge Status widget to access the Nudge and Swath prompt. Refer to the *Nudge Features and Tools* section on page 161 for additional assistance with using the nudge features.



AB UTILITIES

The AB Utilities widget will be necessary to select guidance modes, set AB paths, or to save or load an AB guidance path. Tapping the AB utilities widget will set A and B points for a guidance path (if a guidance path is not set) or access the AB guidance line tools and will provide access the Nudge and Swath prompt. Refer to the *Setting Guidance Paths* section on page 157 for additional assistance with using the AB guidance mode features.



SWATH INFO

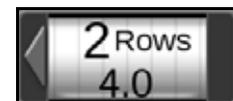
Select the Swath Info widget to display the guidance path number when using an AB guidance mode (e.g. Straight AB, Pivot, or Fixed Contour) for field guidance. This widget will display "LST" when using the Last Pass guidance mode.



Refer to Chapter 15, *AB Guidance Utilities and Nudge Features*, for additional information on using guidance modes and setting AB guidance paths.

ROW WIDTH DISTANCE FROM GUIDANCE LINE WIDGET

Row Width Distance from Guidance Line widget displays how many rows off from the desired row the machine is. After placing the widget on the guidance screen, press and hold the widget until the Row Width box appears, then enter the row width. The arrow on the widget indicates the direction the machine is off from the desired row. The row value is approximate and rounds up or down depending on how close the machine is to the row.



3D MAP

Add the 3D Map or 3D Map Wide widgets to the widget only view to display a picture in picture display of the application area while viewing the widget only view.

NOTE: Only one of the 3D map widgets may be added to the widget only view at any time.



SMARTRAX

Add the SmarTrax widget to easily access view SmarTrax status or access SmarTrax Settings.



IMPLEMENT STATUS AND CONTROL WIDGETS

MASTER SWITCH

The boom/implement Master Switch widget provides an option for an on-screen master switch to toggle all configured sections on or off. Select this option if a machine switch panel or another switch option is available for toggling boom section status.



NOTE: A Raven CAN switch box or Switch Pro will override the on-screen master switch (only available if a boom speed node is not installed) widget. It is not recommended to select this widget if another master switch will be used to control section status on the implement.

Refer to the *Master Switch Options* section on page 118 for additional assistance with enabling the on-screen master switch feature.

SECTION STATUS

The Section Status widget is available in various widths and allows the operator to select the best option for displaying configured sections.



Product-Based Section Status. Select the Product-Based widget to display status for sections assigned to specific products only. Touch and Hold the widget to select the desired product or to view all sections. Refer to the ROS Product Control Calibration and Operation Manual for assistance with assigning sections to available control channels.

ON-SCREEN SWITCH BOX

Select the On-Screen Switch box widget to control sections directly on the ROS device during field operations. The on-screen switch box widget will only be available if the on-screen switch box feature has been configured and if a Raven CAN switch box or Switch Pro is not detected on the CANbus.



Tap the on-screen section switch to select the switch state for the selected section. Toggle the master switch to control all sections at the same time.

ACCUBOOM

The AccuBoom widget shows AccuBoom status and also provides quick access to additional AccuBoom information.



BOOM CAPACITY

Having the Boom Capacity widget on the run screen provides visibility to the percentage of the boom capacity currently used. This is for information purposes only.



PRODUCT CONTROL WIDGETS

FIELD AREA

Select the Field Area widget to display a tally of area covered during the current field operation. Touch and hold the field area widget to select the desired product map to display the area coverage tally.



Select the product on applied map option to display the area for a product control channel selected in one of the product list widgets. Refer to the ROS Product Control Calibration and Operation Manual for assistance with product control settings and using product control widgets.

AUTOBOOM

Select the AutoBoom widget to access settings that automate boom height adjustment. Using the existing machine hydraulics, the AutoBoom parallel hydraulic system keeps the machine's hydraulic system open, using only the hydraulic fluid needed to balance the hydraulic cylinders to allow the booms to raise or lower effortlessly.



SLINGSHOT

The Slingshot field hub provides wireless access to transfer GFF data or to import software updates for field computers.



TALLY REGISTERS

Select the Tally Registers widget to provide a display of total volume, field volume, total area, field area during field operations.



Tap the Tally Registers widget to toggle the available register information for display during the operation. Touch and hold the tally registers widget to access the Tally Registers prompt. Refer to Chapter 17, *Tally Registers*, for assistance with tally register information.

NOTE: Some ISO ECU's may not report tally register values.

FAN SPEED

This will display the fan speed in revolutions per minute. Information on this widget is used for information purposes only.



RX OPTIONS

Having the RX options on the operating screen provides quick access to view the current prescription information and RX look ahead settings for prescription rate map zones.



LIQUID PRESSURE

The Liquid Pressure widget will display the approximate pressure of the liquid in the system. This is for informational purposes only.



PUMP

The Pump widget shows the pump number and the operation status of each pump.



PRODUCT LEVELS

The Product Levels widget shows the calculated product level based on the starting level and application rate. These levels are for informational purposes only.



LIQUID PUMP RPM

Shows the RPM of the pump based the pump speed. This information if for references purposes only.



INDIVIDUAL PRODUCT CONTROL

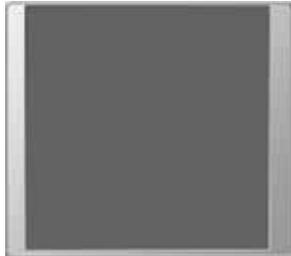
Displays the target and actual application rate for the selected product. This widget allows the user to select the Data Type, Implement, Function or Feature, Data Element, and the product Name. This widget will show status on/off status, volume, and allow the user to increase or decrease flow rate.



ISO WIDGETS

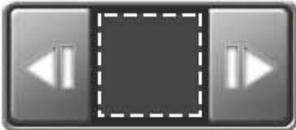
ISO

The ISO widget shows the status of ISO devices on the machine.



INTERACTIVE UT

To scroll through various ISO applications, place the ISO Working Set Selector widget on the run screen. This allows the user to have a scroll through all of the items running on the ISObus system. Scroll left or right through the selector to view the available systems on the ISObus system. Press the center of the button to show all available ISO working sets. From the list of available working sets, select a working set to make it active.



ASSIGNABLE UT

The assignable item widget allows the user to create a configurable widget for any ECU that makes data points available to monitor a desired Data Type, Function or Feature, or Data Element on the desired Implement.:



BIN CHAINING

The Bin Chain widget provides options to reset the chain to the first link, cleanout, or open the settings page.

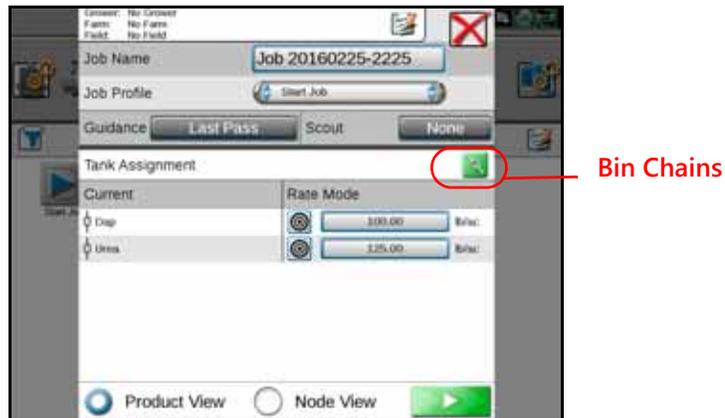


MANUAL CHAIN SETUP

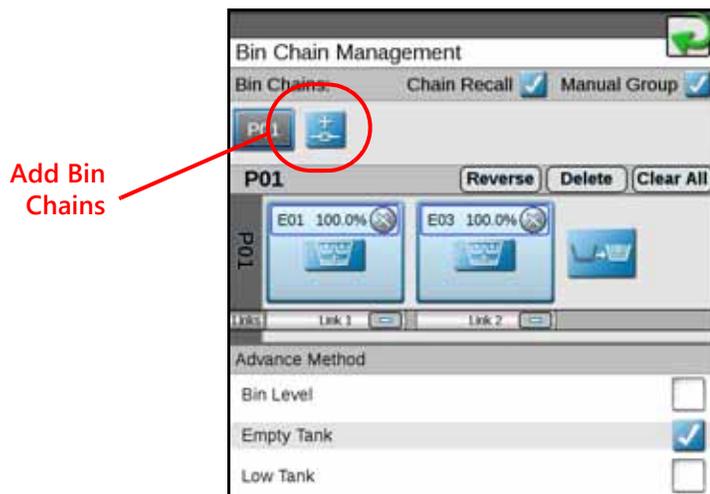
To manually configure Bin Chaining:

1. Press the Bin Chain icon. The Bin Chain Management prompt will display.

NOTE: If the Bin Chain icon is green, ROS has automatically chained the products with the same Product Mix name. If the icon is gray, there are no chained products or a manual chain may be configured.



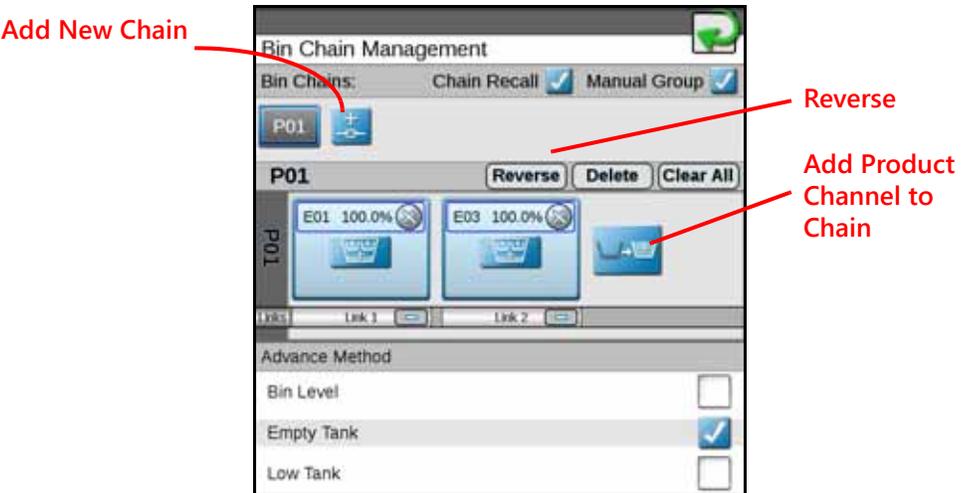
2. Check the Manual Group box.
3. Press and hold Add Bin Chains to add nodes. The primary product window will open.



4. Configure the Primary Product, Bin Chain Name, and Rate Information.



5. Press the Add Node in the selected chain field to add other bins to the product.



- 6. Select the advanced method for bin switching. This can either be done when the Bin Level sensor alarm is triggered, when there is an empty tank, or a low tank alarm is triggered.
- 7. Repeat step 3 through step 6 for each empty chain. A minimum of four products/nodes is required to have multiple chains.
- 8. After completing a bin chain it is possible to reverse the bin chain order by pressing Reverse. This changes the order of the links (instead of 1 - 3 the order would become 3 -1).

BIN CHAIN JOB WIDGETS

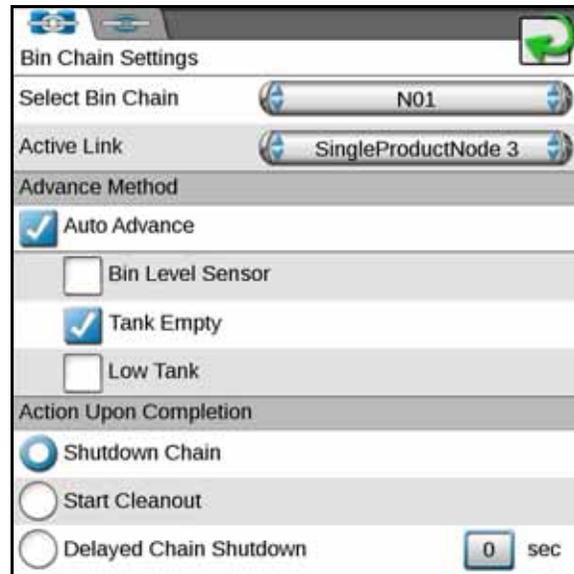


To reset the chain to the first link, press the left half of the Bin Chain button.

To activate or deactivate cleanout, press the right half of the Bin Chain button. Cleanout is only available after the chain has completed with the advance method detected for all links in the chain.

To open the Settings page, long press the bin chain button. There are two tabs. The first tab (Bin Chain Settings) allows the user to adjust the settings as desired. The second tab (Bin Link Order) allows the user to rearrange bin chain order.

To adjust settings on the Bin Chain Settings Page:



Select Bin Chain. Change the product.

Active Link. Select the desired node.

Advance Method. Select Auto Advance and refine the settings based on preferences.

NOTE: Select only one of the auto advance options.

- Bin Level Sensor - Advances to next node in the chain when the bin level sensor low level triggers.
- Tank Empty - Advances to the next node in the chain when the tank is empty.
- Low Tank - Advance to the next node in the chain when the low tank sensor triggers.

Activation Upon Completion.

- Shutdown Chain - Will turn all nodes in the chain off when the last bin is complete. The chain will go into cleanout ready mode.
- Start Cleanout - Will turn all of the nodes to auto with each having a fraction of the target rate for each bin. For example, a two bin chain will apply 50% out of each bin.
- Delayed Chain Shutdown - Will leave the last node running for the set time (in seconds) and then turn all nodes off or advance to the next link.

NOTE: If the machine was reloaded after chain configuration is complete, reset the chain to the first bin in the chain.

To reorder products on the Bin Link Order tab:

1. Press the up or down arrow next to the desired link.

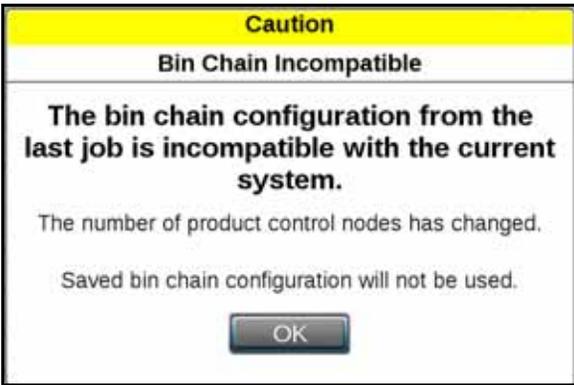


2. Once complete, press the back arrow to save the settings. If desired, press Reverse to reset the order to the previously ran job.

BIN CHAIN ERRORS

There are a few possible errors that only occur when using bin chain recall:

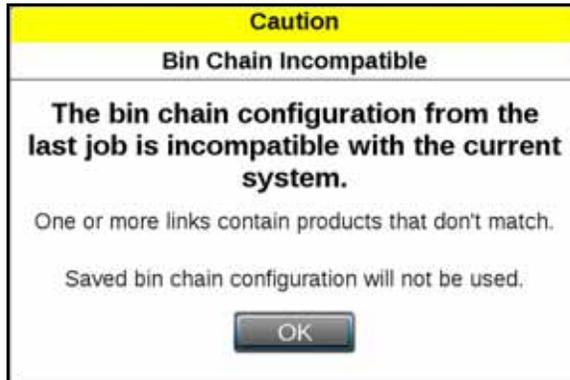
The Number of Product Nodes has Changed. This error condition will appear if one of the previously used nodes on the selected chain was disconnected or removed. To correct this issue either ensure all the correct nodes are connected or configure a new chain without the missing node.



One or More Links Contain Products that are a Different Type. This error occurs when different products types (liquid and granular) are contained in the same chain. To correct this issue either remove the different product type or create a new chain without the different product.



One or More Links Contain Products that Don't Match. This error condition occurs if there is a product configuration and the nodes within the chain have different product assignments.



CHAPTER

15

AB GUIDANCE UTILITIES AND NUDGE FEATURES

The following sections provide information on using ROS guidance utilities to set and manage AB guidance paths during field operations.

GUIDANCE PATTERNS OVERVIEW



STRAIGHT (AB) LINE

The Straight (A-B) Line pattern is well suited for operations within rectangular fields and straight swaths.

The straight line, or parallel, pattern is created by drawing a straight line through two user defined points (A and B). After A and B points are set, ROS uses the programmed equipment width and the original path to calculate parallel guidance paths for the rest of the coverage area.

As long as the straight (A-B) line pattern is active and the original path is available, ROS will display the nearest path regardless of previous application history or coverage mapping. See the *Setting Guidance Paths* section on page 157 for assistance with setting and using the AB utilities with the straight line pattern.



PIVOT

The Pivot pattern is designed to provide guidance within a field with a center pivot, or circle, irrigation system.

The pivot pattern is created using two user defined points on the circumference, or swath furthest from the irrigation hub, of the field area. The pivot pattern does not require the entire circumference of the field to be driven before beginning guidance; however, best results are generally achieved by driving further along the initial swath when creating a pivot guidance pattern.

As long as the pivot pattern is active and the original path is available, ROS uses the programmed equipment width to calculate concentric circular paths stepping toward the center of the field area regardless of the previous application history or coverage mapping. See the *Setting Guidance Paths* section on page 157 for assistance with using the AB utilities with the Pivot guidance pattern.



FIXED CONTOUR

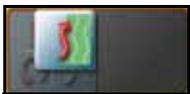
The Fixed Contour pattern is ideal for creating and saving swaths which follow irregular field boundaries, waterways, well heads, etc., or where the ability to skip swaths in an irregular pattern is necessary.

The fixed contour pattern is created by setting the first, or “A,” point and driving the first full swath before setting the second, or “B,” point. ROS will then connect points recorded along the first swath and displays the fixed contour path.

As long as the fixed contour pattern is active and the original path is available, ROS will use the initial swath and programmed equipment width to calculate contours for the rest of the coverage area nearest path regardless of previous application history or coverage mapping.

NOTE: Curvature of the fixed contour guidance path should not be too aggressive. Overly aggressive curves may produce undesirable results. Always be aware of sharp turns when using the fixed contour pattern if an assisted steering system such as Raven SmarTrax system is engaged. Contact a local Raven dealer for more information about Raven assisted steering systems.

See the *Setting Guidance Paths* section on page 157 for assistance with using the AB utilities with the fixed contour guidance pattern.



LAST PASS

FEATURES AND USES

Last Pass is best used for applying around the headlands of a field, in U shaped areas, and circular patterns. Last Pass creates a guidance path based on previous coverage in a field. Every two seconds, last pass searches for a piece of coverage (previously applied area) in order to maintain the guidance path.

ENHANCEMENT

Depending on the shape or location in the field, last pass could cause the guidance path to “bounce” between two pieces of coverage. When using auto-steering, the machine would attempt to stay on the now “bouncing” guidance line, causing the machine to hard weave from side to side. This typically occurred in situations where two areas of previous coverage were close together, such as valleys and the very last pass of a field. Last Pass has been enhanced to now cause the current pass to tether to an anchor point along the previous pass. It looks approximately 40 meters ahead and behind the anchor point to maintain the tether, keeping the current pass from jumping to another nearby piece of coverage.

WHEN NOT TO USE LAST PASS

Do not use Last Pass while making swaths back and forth across a field. It can often cause what is referred to as “line straightening” or “line smoothing.” Line straightening / smoothing occurs when the guidance path gradually loses the contour from the previous pass, resulting in gaps in coverage. Use Last Pass - Swathing for these situations.



LAST PASS SWATHING

FEATURES AND USES

Last Pass Swathing is used when making passes back and forth across a field. After turning roughly 30 to 45 degrees, it assumes the machine is turning around for the next swath in the field. A dynamic fixed contour line is created after a turn, which enables the guidance path and the machine to hold tighter to the previous coverage. The line is also extended out approximately 40 meters at the beginning and end to help with leading in and out of the headlands. These line extensions also help auto-steering by allowing the machine to acquire the line earlier.

The line will not disappear as long as the center of the machine is within 1/2 of a swath width. After 1/2 of a swath width, it will search for another piece of good coverage. The refresh button can be used to clear the line and cause guidance to search for another good piece of coverage. For example, use the refresh button when switching from making north/south passes to making east/west passes. Driving 1/2 of a swath width away from the current line will also work in this situation.

NOTE: Using the refresh button or driving 1/2 of a swath width away from the line will not create the line extensions. The line extensions will not display until the following pass.

WHEN NOT TO USE LAST PASS SWATHING

Do not use Last Pass while making swaths back and forth across a field. It can often cause what is referred to as "line straightening" or "line smoothing." Line straightening / smoothing occurs when the guidance path gradually loses the contour from the previous pass, resulting in gaps in coverage.



SETTING GUIDANCE PATHS

The AB Utilities widget will be required to set and manage AB guidance paths during field operations. Refer to the *Add Widgets to a Screen Layout* section on page 142 to add the AB utilities widget to a screen layout before performing the following procedures.

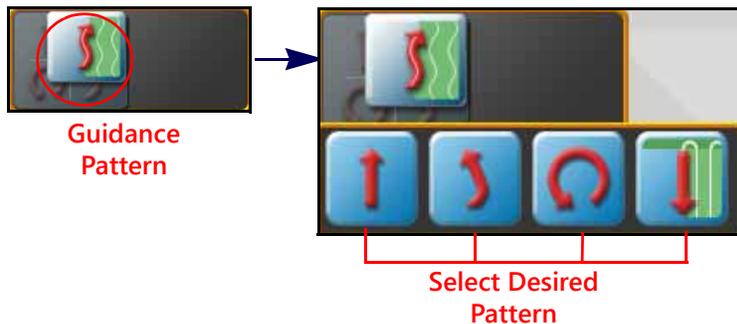


NOTE: The AB Utilities widget may also be used to access nudge features and tools. Refer to the *Nudge Features and Tools* section on page 161 for assistance with using AB guidance nudge during field operations.

TO SELECT A GUIDANCE PATTERN

NOTE: The Last Pass modes is enabled and set by default when starting a job without selecting a saved guidance path. Refer to the *Starting a Job* section on page 130 for assistance with configuring job settings or the *Starting a Job* section on page 130 for assistance with setting up a job profile.

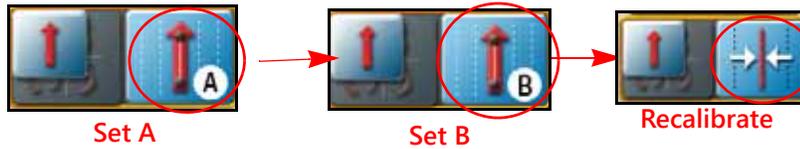
To select a guidance pattern:



1. Touch the Guidance Pattern button.
2. Select the desired pattern.

SET A STRAIGHT (AB) LINE

To set a new straight AB line guidance path:



1. Touch the Set A button on the AB Utilities widget.
2. Begin driving the first swath. While ROS may allow the second point to be set before driving the full swath, best results are generally achieved by driving further along the initial swath before setting the B point.
3. Touch the Set B button.
4. If needed, press the Recalibrate button to move the guidance line to the current position.

SETTING STRAIGHT LINE GUIDANCE USING A HEADING

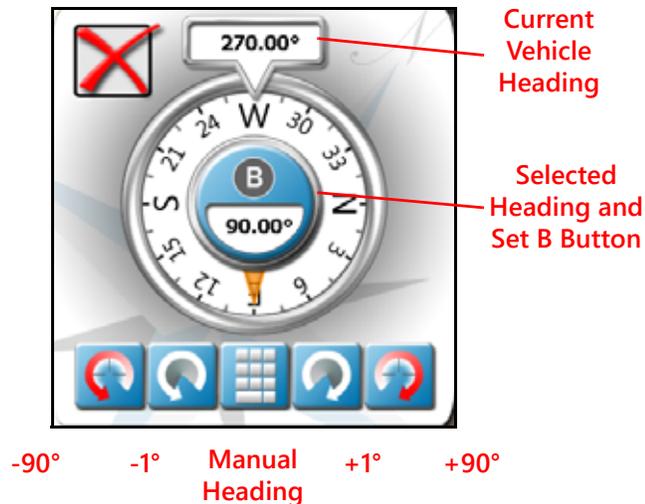
To set a new straight AB line guidance path using a compass heading:



1. Touch the Set A button on the AB utilities widget.
2. Press the Pattern Type button.
3. Select the Straight A-B by heading button.

NOTE: There is no minimum distance between A and B points when setting an AB line using a heading.

4. Touch the Set B by Heading button to display the Set B by Heading prompt.



5. Use the course setting options along the bottom of the prompt to adjust the value displayed as the selected heading.
6. Touch the Set B button in the middle of the compass display to set the guidance path using the selected heading.

SET A PIVOT LINE

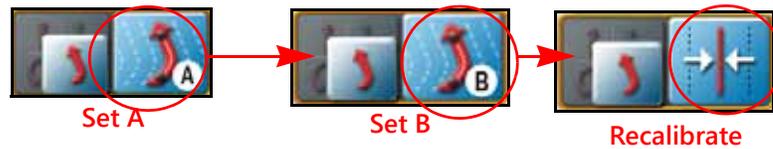
To set a new pivot guidance path:



1. Touch the Set A button on the AB Utilities widget.
2. Begin driving the first swath. While ROS may allow the second point to be set before driving the full swath, best results are generally achieved by driving further along the initial swath before setting the B point.
3. Touch the Set B button.
4. If needed, press the Recalibrate button to move the guidance line to the current position.

SET A FIXED CONTOUR LINE

To set a new fixed contour guidance path:



1. Touch the Set A button on the AB Utilities widget.
2. Begin driving the first swath. When creating a fixed contour path, ROS will require that the full swath length be driven to plot points along the swath.
3. At the end of the swath, touch the Set B button.
4. If needed, press the Recalibrate button to move to the current position.

RECALIBRATE AB GUIDANCE PATH

The Recalibrate Guidance Path feature is intended to be used to reset an existing guidance path to the current vehicle position to correct for issues such as GPS drift. This feature may also be useful to adjust an AB guidance path for use with an implement with a different width than the implement used to record the path.

	<p style="text-align: center;">CAUTION</p> <p>Please use caution when recalibrating a guidance path loaded from previous field operations. Contour paths may not provide anticipated results and cause the equipment to swing or cover areas unintended for coverage or into nearby obstacles.</p>
--	---

To clear the current AB guidance path:



1. Tap the AB Utilities widget to display the swath tools prompt.

2. Touch the More button to access the Nudge and Swath prompt.

NOTE: The nudge features are also available on the Nudge and Swath prompt. Refer to the *Nudge Features and Tools* section on page 161 for assistance with using AB guidance nudge during field operations.

3. Select the Recal button. The AB path will reset to the center of the configured vehicle swath.

RESET AB GUIDANCE PATH

Multiple AB paths may be used during a field operation as desired for field guidance. Before a new AB guidance path may be created during a field operation, the existing AB path must be cleared.

To clear the current AB guidance path:



1. Tap the AB Utilities widget.
2. Touch the Reset button.

SAVING GUIDANCE PATHS

Saving an AB guidance path allows the line to be assigned to a job profile or selected when setting up for a field operation.

NOTE: Only the active AB guidance paths will be saved. Last pass paths will not be stored by ROS.

To save the displayed guidance path:



1. Tap the AB Utilities widget to display the swath tools prompt.
2. Touch the More button to access the nudge and swath prompt.

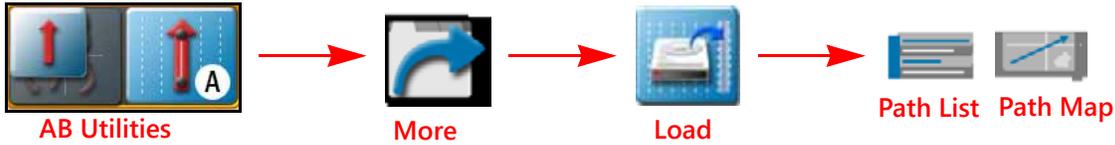
NOTE: The nudge features are also available on the Nudge and Swath prompt. Refer to the *Nudge Features and Tools* section on page 161 for assistance with using AB guidance nudge during field operations.

3. Select the Save button.
4. Touch the Name field to the right side of the Save Guidance Line screen and use the on-screen keyboard to create a new guidance path or select an existing guidance path to replace.

NOTE: If the guidance line is saved in a cloud job, the line will be available to be loaded by other field computers that join the cloud job.

LOADING A SAVED GUIDANCE PATH

To load a guidance path into the current field operation:



1. Tap the AB utilities widget to display the Swath Tools prompt.
2. Touch the More button to access the Nudge and Swath prompt.

NOTE: The nudge features are also available on the Nudge and Swath prompt. Refer to the *Nudge Features and Tools* section on page 161 for assistance with using AB guidance nudge during field operations.

3. Select the Load button.
4. Select either the path list or path map tab to locate and select the desired guidance path to be loaded.
5. Select the path from the list or on the map and touch the Done button to load the selected path into the job for the current field operation.

NUDGE FEATURES AND TOOLS

The nudge feature allows an operator to make small or incremental adjustments to a guidance path during field operations. This feature is designed to allow the equipment operator adjust the guidance path to keep the implement running between rows or inside tramlines.

ROS offers two nudge feature widgets to match how frequently the nudge feature may be used, or what nudge information is needed, during various field operations.



Refer to the *Add Widgets to a Screen Layout* section on page 142 to add a widget to a screen layout before performing the following procedures.

NOTE: The nudge widgets also provide to access to some AB guidance tools. Refer to the *Recalibrate AB Guidance Path* section on page 159, the *Saving Guidance Paths* section on page 160, or the *Loading a Saved Guidance Path* section on page 161 for assistance with using these AB guidance tools during field operations.

CONFIGURING NUDGE VALUES

To configure nudge distance setting for use during field operations:



1. Touch and hold the Nudge widget to access the Nudge and Swath prompt.

2. Tap the Unit Toggle button to the right of the Nudge 1 or Nudge 2 to select the desired measurement for the nudge distance.
3. Touch the Nudge 1 or Nudge 2 value and use the on-screen keypad to set the nudge distance.

ACTIVATING AND USING NUDGE

To activate a nudge distance and adjust an AB guidance path during a field operation:



1. Touch and hold the Nudge widget to access the nudge and swath prompt.
2. Tap the Nudge 1 or Nudge 2 button along the left side of the prompt to select the active nudge distance.
3. Touch the Nudge Left or Right button to adjust the displayed guidance path by the active nudge distance.

NOTE: If using the nudge arrow widget, tap the left or right arrows on the widget to adjust the displayed guidance line by the active nudge distance right from the guidance view or mode.

4. The Status area on the on-screen widget will display the nudge distance and direction applied the guidance path currently displayed.

RESET NUDGE

To remove any nudge distance applied to the current AB guidance path:



1. Touch and hold the Nudge widget to access the Nudge and Swath prompt.
2. Select the Reset Nudge button to remove all nudge adjustments currently applied to the displayed guidance path.

CHAPTER 16

SCOUT GROUPS AND FEATURES

IMPORTANT SAFETY NOTES

CAUTION

When operating with an automatic section control system or feature with the ROS device:

- Always toggle the master switch to the off position and keep by-standers clear of all equipment when using the scout group manager during a field operation.
ROS may activate sections or control system's hardware immediately if a scouting feature is added or removed from the selected scout group.
- Use caution when loading or copying scout groups or features during an active job with an automatic section control system or feature in use with the ROS device.
Toggle the vehicle or implement master switch off when loading section groups to avoid activating sections in areas not intended for application or coverage.

SCOUT GROUPS OVERVIEW

ROS saves features such as field and zone boundaries, scouting lines, or flags as components of a scout group. Each job may utilize multiple scout groups or features may be copied from one scout group to another to complete various phases of a field operation.

The following sections are intended to assist with using ROS to perform scouting functions such as recording field boundaries, zone maps, or marking various field areas for future reference.

SCOUTING WIDGET

The scouting widget is required to record scouting features during field operations. Refer to the *Add Widgets to a Screen Layout* section on page 142 to add the scouting widget to a screen layout before performing the following procedures.



SCOUTING FEATURES

The following features may be recorded and stored with scout groups on a ROS device:

Field Boundaries. Boundaries allow the operator to mark the field perimeter or outline the field area.

If an optional section control system is enabled for field operations, the field boundary will also create a basic zone map for the field. Refer to the calibration and operation documentation for the optional section control system or contact a local Raven dealer for additional assistance with setting up or using section control features with ROS.

NOTE: To review the field boundaries, go to the field review mode and touch anywhere in the field boundary to view the field boundary acres.

Spray and Plant Zones. Zone map features may be used to assign areas of a field to zones designated for coverage or no-coverage.

If the optional automatic section control system is enabled, ROS will reference the zone map for section control features during the field operation. Refer to the calibration and operation documentation for the optional section control system or contact a local Raven dealer for additional assistance with setting up or using section control features with ROS.

Scout Zone. Scout zones may be used to mark field areas for future reference or that may require attention. For example, use a scout zone to mark an area that has rocks, flooded areas, or a particularly heavy weed or insect infestation. When recalled in a future job, the operator will be able to find the area using the recorded scout zone. Scout zones will not provide any section control options, but may be useful for reference or to relocate specific areas within a field.

Scout Line. A scout line may be recorded to mark a swath or dividing line within a field area. Similar to scout zones, a recorded scout line will not provide any section control or guidance options but may be used for reference or to relocate areas within a field.

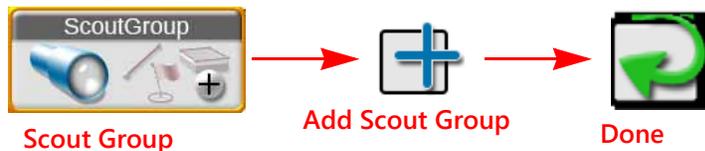
Flags. Flags may be used to mark a spot in a field and may be used for reference or to relocate a spot within a field.

SCOUT GROUP MANAGER

Refer to the following sections to manage scout groups and group features during field operations.

CREATE A NEW SCOUT GROUP

To create a new group for scouting features:



1. Tap the Scout Group widget on the Guidance View or Mode.
2. Touch the Add Scout Group button.

NOTE: It may be beneficial to identify the scout group with the application or field id.

3. Tap the Done button to return to the Guidance View or Mode.

NOTE: Scout groups may be deleted using the File Maintenance features without an active job in progress on the ROS device. Refer to Chapter 7, *File Manager*, for assistance with using the file manager utilities.

LOAD A SCOUT GROUP

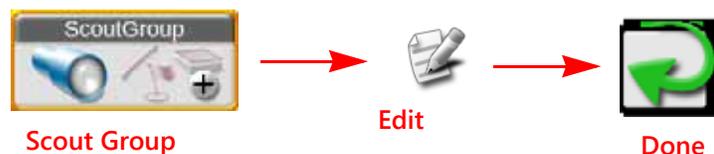
To select and load a scout group, and all recorded features within the scout group, into an active job:



NOTE: Scout groups may be deleted using the File Maintenance features without an active job in progress on the ROS device. Refer to Chapter 7, *File Manager*, for assistance with using the file manager utilities.

1. Tap the Scout Group widget on the Guidance View or Mode.
2. Touch the Active Group drop down field and select the Scout Group to load.
3. Tap the Done to return to the Guidance View or Mode.

DELETE A SCOUTING FEATURE



To delete individual scouting features, press the Edit icon to open the Scout Group manager. To delete specific scouting features:

1. Tap the Scout Group widget on the Guidance View or Mode.
2. Set the scout group that contains the specific scout feature from the active groups list.
3. Press the Edit icon to open the Scout Group manager.
4. Press the Delete icon.
5. Tap Done in the upper, right corner of the Scout Group manager prompt to return to the main Scout Group manager.

Deleting scouting groups is performed through the File Manager. For information on deleting files, refer to the *Delete Files* section on page 43.

COPY A SCOUTING FEATURE

Features available on the ROS device may be copied into the current field operation by copying recorded feature(s) into the current scout group. To copy a scouting feature(s) into the current scout group:



1. Tap the Scout Group widget on the Guidance View or Mode.
2. Press the Edit icon.
3. Select the source to be copied from the Select Source Group drop down.

NOTE: The feature will remain in the source scout group.

4. Use the check boxes to select the features to copy.
5. Click Copy.
6. Tap Done to return to the Main Scout Group page.
7. Tap done in the upper right corner to return to the guidance view or mode.

SCOUT FEATURE SETUP

To configure ROS to record a field feature boundary, line, or place flags to mark various positions in a field during an operation:



Scout Group

1. Tap the Scout Group widget on the Guidance View or Mode.
2. Select an existing group or add a new group.
3. Tap the Scout Feature Type drop down field and select the desired feature. Review the *Scouting Features* section on page 163 for more information on the features available for use with ROS.
4. Touch the Name drop down field to select a feature name previously recorded using the ROS device. Selecting a name used previously for a new feature will not affect the previous feature.
If needed, modify the name to assist with feature selection during future field operations.
5. Touch the color indicator and select the desired color for the feature to be recorded or location to be marked.
6. Select the desired point recording mode. Select:

Auto Point Capture. to allow ROS to automatically record the vehicle path while recording the feature boundary.

Manual Point Capture. to manually select points for the feature or area. Refer to the *Manual Point Capture* section on page 167 for assistance with using the Scouting widget to manually capture points during a field operation.

7. Select the left, center, or right position for recording points on the feature boundary. ROS will record points at the left, center, or right of the configured equipment width.
8. Enable the override shift distance option to enter a custom left or right offset distance if desired.
9. When creating a spray/plant zone for automatic section control features, select the following options to configure section control features:

NOTE: Refer to the ROS documentation for the optional section control feature for additional information on using automatic section control features with zone mapping features.

Spray. Select this option to allow ROS to use an optional section control system to enable application sections to cover or apply product to the designated area.

No-Spray. Select this option to designate the area within the completed boundary as a non-application area. ROS will use any optional automated section control features to shut off application sections in these areas.

Plant. Select this option to allow ROS to use an optional section control system to enable seeding or row crop planting sections to input crops in the designated area.

No-Plant. Select this option to designate the area within the completed boundary as a non-input area. ROS will use any optional automated section control features to shut off input sections in these areas.

10. Select ready to start recording in the lower, right corner of the prompt to finish set up and to begin recording the boundary or plotting points for future reference. Refer to the *Recording a Field Feature* section on page 167 for assistance with starting to record a zone boundary or plotting points for scout features.

RECORDING A FIELD FEATURE

NOTE: Refer to the *Scout Feature Setup* section on page 166 for assistance with setting up ROS to record a feature or plot points in a field during operation.

AUTO POINT CAPTURE

To begin recording a field feature using the automatic point capture mode:



1. Touch the Start Recording button shown on the scouting widget to begin recording the field feature. ROS will automatically capture points along the path driven by the equipment.
2. Touch the Pause Recording button at any time to momentarily stop recording the current equipment path for the feature being recorded. Touch Resume Recording to resume recording the field feature boundary.
3. Select the save and end recording button to stop recording the field feature and save the current boundary to the scout group.

NOTE: If the feature provides any features for automatic section control systems enabled for the field operation, ROS will begin controlling sections after the feature is saved to the scout group. Refer to the calibration and operation documentation for the optional section control feature for additional information on setting up and using the section control system.

MANUAL POINT CAPTURE

To begin recording a field feature using the automatic point capture mode:



1. Touch the Start Recording button shown on the Scouting Widget to begin recording the field feature.
2. Touch the Add point button on the Scouting widget to plot the first point.
3. Continue driving the field feature boundary touching add point button as necessary to record the outline of the field feature.
4. Select the Save and End Recording button to stop recording the field feature and save the current boundary to the scout group.

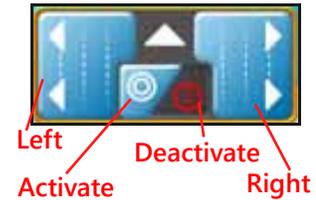
NOTE: If the feature provides any features for automatic section control systems enabled for the field operation, ROS will begin controlling sections after the feature is saved to the scout group. Refer to the calibration and operation documentation for the optional section control feature for additional information on setting up and using the section control system.

CREATING A FLIP AREA

A flip area is primarily used for planting and tilling to create a boundary around the edge of the field or another obstacle that creates a zone that will not be planted. This allows the user to plant the entire field and, when done with everything in the field except for the flip area, go back and plant that area last.

CONFIGURING FLIP SETTINGS

1. Long press the flip widget on the run screen. The Flip Options window will open.
2. Select either the Number of Swaths or Distance in: radial button.
3. If Distance in: was selected, select the desired unit of measurement from the drop down.
4. Enter the desired Amount (this will either be number or swaths or the desired distance).



ACTIVATING OR DEACTIVATING FLIP

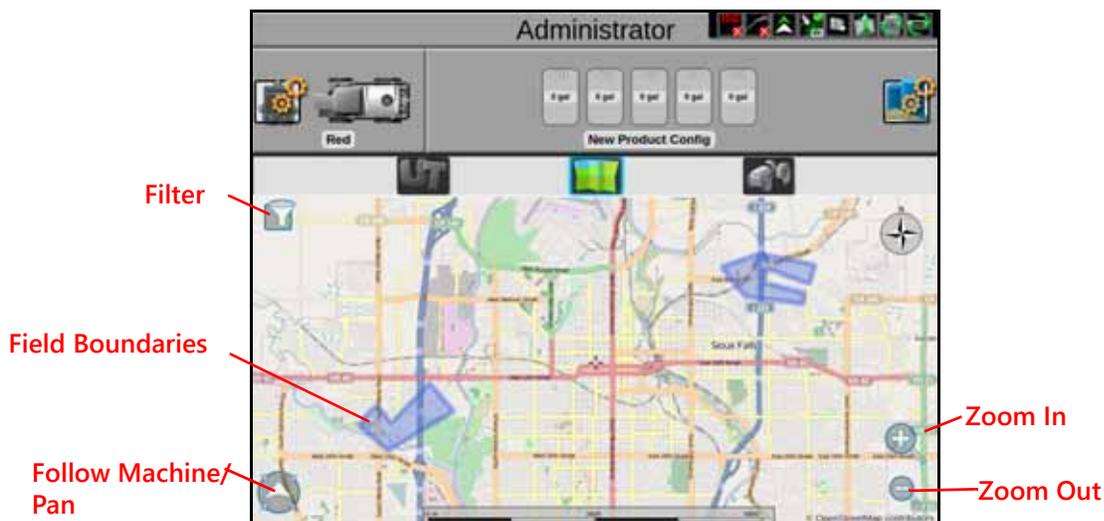
While running in a job:

1. Press the left or right arrow to begin recording a Flip zone offset to that side.
2. Press the arrow again to complete the Flip zone.
3. Set to Activate to prevent applying in Flip zones.
4. Set to Deactivate to allow applying in Flip zones.

STREET MAPS

Street maps provides an aerial map view of an area along with available field boundaries in the area. To open

street maps, press . A window will open showing the street view as well as field boundaries (shown in blue) in the area.



DOWNLOADING MAPS

Before using street maps, a map must be downloaded from the Slingshot portal. The downloaded map will only show the area selected by the user (in mile radius) and does not automatically update based on location. Since street maps is offline, it will only show areas imported to the field computer. To download Street Maps:

1. Select the Manage drop-down from the top of the page then select Street Maps.
2. Select a location on the map. This will create a center point for map creation. At any time, if desired, select a different center point.
3. Use the Size slider bar to increase or decrease the map size. The map size (Tile size) is measured in miles square. For example, a map that is ten miles wide by ten miles long will be 100 square miles.
4. The latitude and longitude of the center point will display after choosing the center point.

NOTE: If you know the coordinates of the center point location, you can enter the coordinates into the latitude and longitude and the Street Maps will create the center point for you.

5. Enter a name for the map.

NOTE: Having "Street Map" or "Map" as part of the name will make it easier to identify the file as a Street Map when in "File Manager."

6. Select Create. The map name will display on the left side of the screen. If desired, select the map name to view the download status. The display status "Processing" indicate the map is getting ready for download. "Ready to Download" indicates the map is ready to download.
7. Select Ready to Download to download the map.
8. Select Save.
9. Navigate to the desired save location on the computer or on the USB.

FILTERING

If desired, press the filter in the top left corner of the map to filter visible field boundaries by grower, farm, field, or job type. The field boundaries can also be filtered by most recent, name, etc.

ZOOM

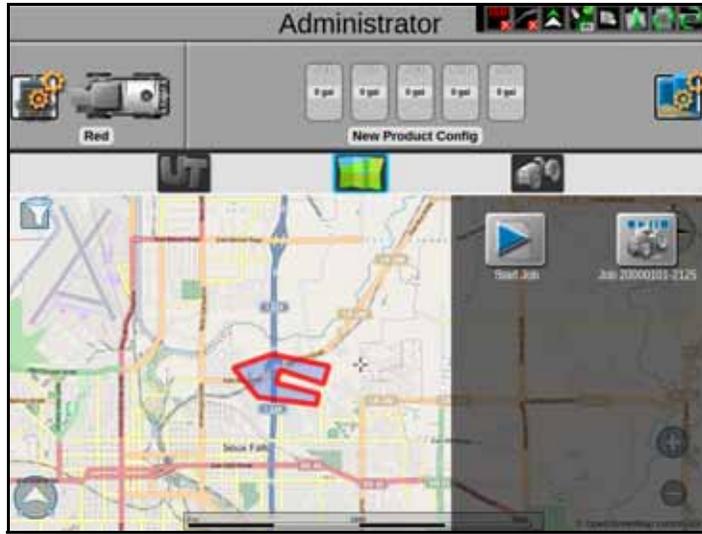
Use the magnifying glass icons to zoom in or out on the map.

FOLLOW

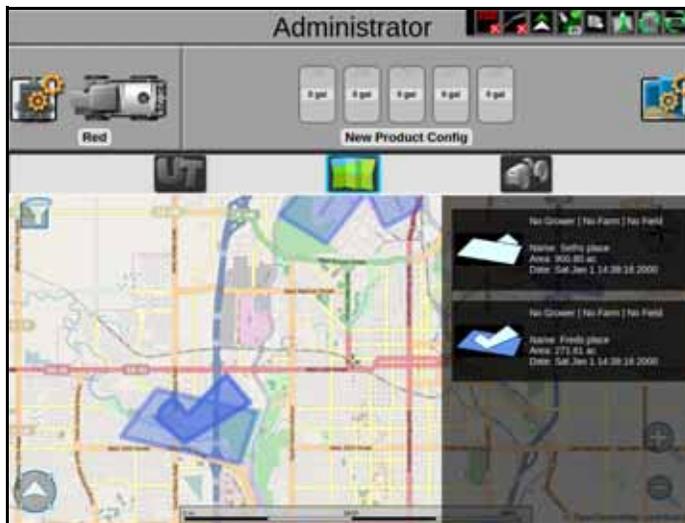
Press the arrow icon in the lower left corner of the screen to either have the map follow the machine or be able to pan and navigate around the map.

SELECTING A JOB

On the map, field boundaries will be visible as blue shapes on the screen. Pressing the desired job will highlight the field boundary and open a window with a list of available jobs for that field boundary. Select the desired job to start an existing job or press Start Job to start a new job.

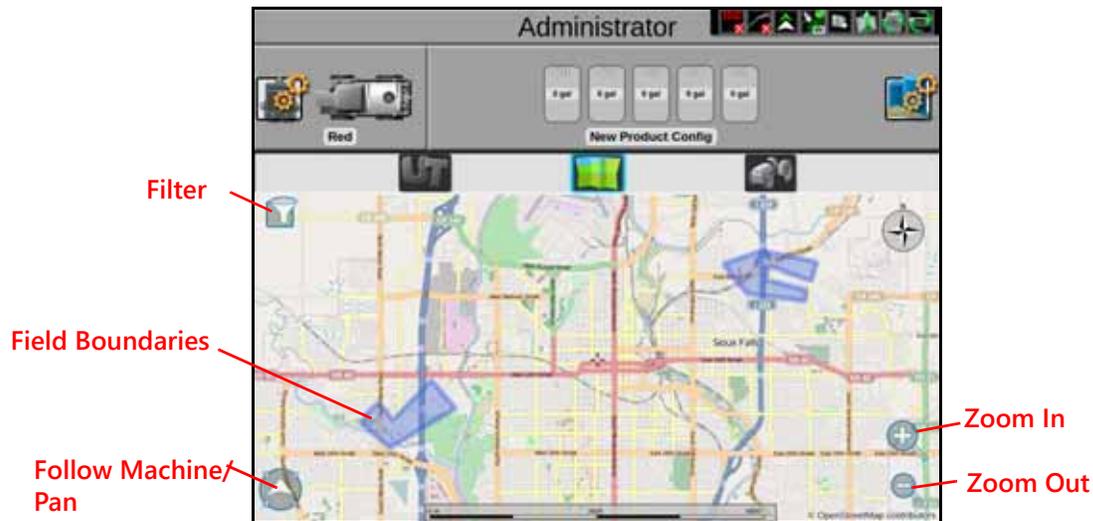


If there are multiple field boundaries in the area that have overlapping boundaries, select the desired area. A window will open that shows the available field boundaries in the selected area. Select the desired field boundary then select the desired job.



STREET MAPS FOR AGX

Street maps provide an aerial map view of an area along with available field boundaries in the area. To open street maps, press . A window will open showing the street view as well as field boundaries (shown in blue) in the area.



DOWNLOADING MAPS

Before using street maps, a map must be downloaded from the Slingshot portal.

<https://portal.ravenslingshot.com>

The downloaded map will only show the area selected by the user (in mile radius) and does not automatically update based on location. Since street maps is offline, it will only show areas imported to the field computer.

FILTERING

If desired, press the filter in the top left corner of the map to filter visible field boundaries by grower, farm, field, or job type. The field boundaries can also be filtered by most recent, name, etc.

ZOOM

Use the magnifying glass icons to zoom in or out on the map.

FOLLOW

Press the arrow icon in the lower left corner of the screen to either have the map follow the machine or be able to pan and navigate around the map.

SELECTING A JOB

On the map, field boundaries will be visible as blue shapes on the screen. Pressing the desired field boundary will highlight the field boundary and open a window with a list of available jobs for that field boundary. Select the desired job to start an existing job or press Start Job to start a new job. For agX, select a new agX job image since there isn't a start button.



If there are multiple field boundaries in the area that have overlapping boundaries, select the desired area. A window will open that shows the available field boundaries in the selected area. Select the desired field boundary then select the desired job.



TALLY REGISTER PROMPT

ROS provides a tally of the volume and area values to track totals over a period of time such as a field application or over the course of a season.

NOTE: Tally registers are a running total and do not automatically reset. The user must reset the tally registers.

To view the register:



Tally Registers

NOTE: Volume and area tallies are only available during an active job on ROS.

1. Touch and hold the Tally Registers widget. The Tally Registers prompt will display.
2. Use the following table to reset tallies displayed on the register as necessary or desired over the course of an operation or season.

TABLE 1. Reset Tallies on the Register

To Reset:	Touch and Hold
One register value	The desired value displayed in the register
A tally for all control channels	 Tally Reset
All tallies for a specific control channel	 Channel Reset
The full register	 Register Reset

3. To configure tank or bin levels or capacities during the field operation, touch and hold the Product Levels button. Refer to the ROS Product Control Calibration and Operation Manual for additional assistance with setting or configuring product values for field operations.
4. Tap the widget to toggle through the tally registers. Long press to change the product widget tally.



Product Levels Prompt

A

SPEED CAL

Raven industries recommends the following values for the initial speed cal:

Sensor Type Setting	Used with	Recommended Initial Speed Cal	
		English	Metric
Wheel	Wheel Magnets	1000	254
	Speedometer Drive Speed Sensor	612	155
Radar	Raven Radar	598	152
GPS	External Raven DGPS Receiver	785	199
	Internal DGPS Receiver	812	206
	GPS Speed over CANbus	1000	1000

These values are usually a good starting point and will generally yield adequate results; however, the speed cal should still be refined for each vehicle.

NOTE: The GPS speed over CANbus feature is only available with specific Raven speed sense nodes. This feature utilizes NMEA speed over ground data transmitted over the CAN network which eliminates the need for a separate, external speed sensor.

	NOTICE
<p>When using the GPS speed over CANbus feature, no refining or adjustment is necessary or recommended to the speed cal value. Losing GPS signal for more than a second will also result in loss of the CAN speed signal which may affect product application in progress.</p>	

Refer to the following procedures to adjust or tune the speed calibration value, or speed cal, for the specific speed sensor used with the ROS device.

RADAR SPEED SENSORS

To tune or adjust the ROS device for the speed sensor connected to the system:



1. Make sure any section switches are turned OFF before powering the ROS device on.
2. Touch the Edit icon in the machine panel to view the machine devices.
3. Locate and select the Speed Settings module.
4. Touch the Recal Distance button to reset the distance display to a "0" value.
5. Drive 1 mile [1 kilometer]. The field computer will measure the distance driven using the current speed cal value.

NOTE: Accelerate and decelerate slowly. To achieve the most accurate calibration, do not use the vehicle odometer or ROS distance display to measure the actual distance driven. Use section lines or highway markers to determine the actual distance.

6. At the end of the driven distance, view the distance display again and record the value. The ROS distance should read a value of approximately 5280 [1000]. If the display reads between 5260-5300 [990-1010], the default value of 598 [152] is accurate for the speed cal value.
7. If the distance displayed is not between 5260-5300 [990-1010], recalculate the speed cal with the formula:

$$ADJ = \frac{CSC \times 5280 [1000]}{D}$$

where ADJ = Adjusted Speed Cal, CSC = Current Speed Cal (speed cal number used to drive the test distance), and D = the ROS Distance display at the end of the driven distance. Round to the nearest whole number.

For Example. Assume that the ROS Distance reads 5000 [980] after a known 1 mile distance has been driven using an initial speed cal value of 598 [152].

English	Metric
$ADJ = \frac{598 \times 5280}{5000} = 631.48$	$ADJ = \frac{[152] \times [1000]}{[980]} = [155]$

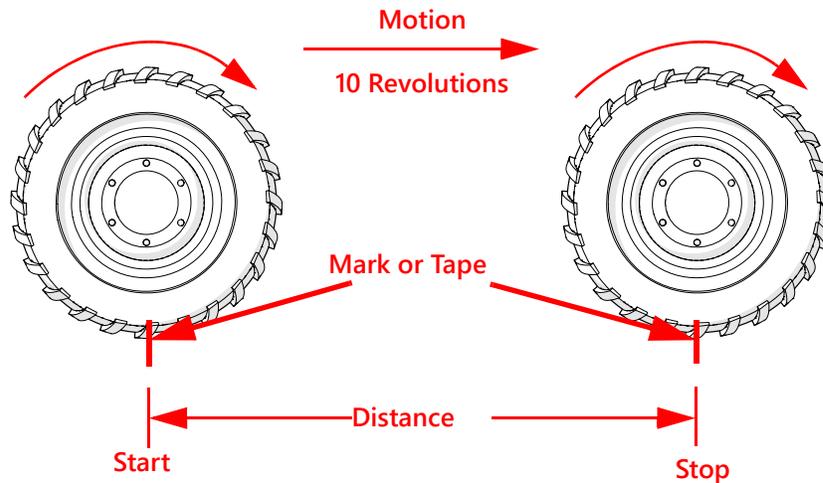
The Adjusted Speed Cal value is 631 [155].

8. Touch the speed cal value for the radar speed sensor and use the on-screen keypad to enter the adjusted speed cal.
9. Verify the new speed cal derived in step 7 by repeating step 4 through step 6.

WHEEL DRIVE SPEED SENSOR

1. Mark the tire on which the speed sensor is installed using chalk or a piece of tape as shown below.
2. Mark the corresponding spot on the ground.
3. Count 10 full revolutions of the wheel while traveling in a straight path. The mark must stop with the chalk or tape in the same orientation that it began at the starting point.

FIGURE 1. Calculating the Speed Cal with a Wheel Magnet Speed Sensor System



4. Mark the stopping point and measure the distance between the starting and stopping marks on the ground in inches [dm]. Round to the nearest whole number.

NOTE: This measurement is critical to the performance of the ROS device. Measure Carefully. Be sure tire is properly inflated before measuring. If possible, measurements should be made in the type of soil in which the vehicle will be operating. Tire circumference will vary when measured in soft or hard packed soil. For best results, measure several times and average the results.

5. Enter this measurement as the adjusted speed cal.

Adjusting for Additional Magnets. Typically, four magnets are used with the wheel drive speed sensor. However, to ensure accurate speed readings for large tires and very low speed applications, additional wheel magnets may be necessary. Any even number of magnets may be used as long as they are of alternating color and equally spaced. After calculating the speed cal, this number must be adjusted according to the number of magnets installed using the following formula:

$$\frac{4}{NM} \times D = ADJ$$

where ADJ = Adjusted Speed Cal, NM = Number of Magnets used and D = the Distance Measured.

For Example. The distance measured between starting and stopping marks is 1200 and six magnets are installed.

$$\frac{4}{6} \times 1200 = 800$$

The Adjusted Speed Cal is 800.

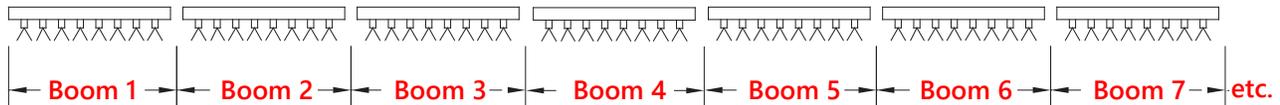
BOOM OR SECTION WIDTH CALIBRATION

Use the following formulas to help calculate the boom or implement section widths for either broadcast or band applications.

LIQUID CONTROL SYSTEMS

For liquid sprayers, the boom cal value is the width of the individual boom sections.

Calculate the width of each section by measuring the spacing between spray tips in inches [cm] and then multiplying by the number of tips in each boom section



For Example. 20 tips in a section with spacing of 40 inches would yield:

$$20 \times 40 = 800 = SW$$

or a Section Width of 800 inches (approximately 67 feet). Enter 800 as the width for this section.

BAND SPRAYING ADJUSTMENT

To calculate the adjusted applied rate for band spraying applications, use the following formula:

$$\frac{BR \times BW}{S} = AR$$

Where BR = the Broadcast Rate, BW = the band width, S = the spacing between the tips, and AR = the Adjusted Rate for band spraying.

For Example. If the Broadcast Rate is 20 GPA [200 L/ha], the band width is 14 inches [40 cm], and the tip spacing is 40 inches [100 cm]:

English	Metric
$\frac{20 \times 14}{40} = 7$	$\frac{[200] \times [40]}{[100]} = [80]$

Therefore, the adjusted rate is 7 gallons per acre or 80 liters per hectare.

GRANULAR CONTROL SYSTEMS

To calibrate section widths in inches [cm] for the granular application types:

- For single section control systems, enter the total spread width as the boom 1 cal.
- For dual section control systems, enter the left side spread pattern as boom 1 cal and the right side spread pattern as boom 2 cal.
- For spinner control, enter the total spread width as boom 1, enter spinner spread width as boom 2 for spinner control. Boom 1 is associated with all products, boom 2 is the spinner control.

A

Alarms 139

B

Boom or Section Width Calibration 178

C

Camera Configuration 107, 108
CANbus Detection 111
CANbus Detection and Version Information 111
CANbus Troubleshooting 120
Configure Differential Type 87
Creating a Flip Area 168

D

Demonstration Mode 23

E

Ending a Job 136
Export ISO Task Data 46

F

Feature Keys and Activation 34
File Export 43
File Manager 16, 39

G

GPS General Settings 87
GPS Message Outputs 87
GPS Solution Information 83
Greenseeker Devices 106
Grower, Farm, Field (GFF) Manager 41
Guidance Patterns Overview 155

H

Hardware Information 36
Hardware Information and Updates 32
Hardware Updates 32
Home Screen and Panel Navigation 13

I

Import Scout Groups 54
Important Safety Notes 163

Initial Start Up Overview 11

J

Job Profile 18
Job Profile Delete 129
Job Profile Edit 129
Job Profile Panel 127
Job Profile Panel Overview 127
Job Profile Setup 128

K

Keyboard 13

L

License 37
Light Bar Devices 104
Log Out 15

M

Machine Configuration 16, 60
Machine Configuration and Profile Settings
Definitions 72
Machine Profiles 62
Manage User Profiles 21

N

Node Features 111, 114
Node Features and Activation Status 114
Nudge Features and Tools 161

O

Operation Displays 138
Overview 21, 59, 121, 127, 137

P

Power Button 9
Power Button and Status 9
Power Down 15
Product Channel and Ingredient Set Up 123
Product Configuration 17
Product Configurations 121
Pull-Type Implement Profiles 67

R

Raven Receiver Settings Definitions 93
Receiver Firmware Updates 90
Recording a Field Feature 167
Redetecting DGPS Devices 83
ROS Features 5
ROS Information and Updates 30
ROS Updates 30

Widget Catalog Definitions 143
Widget Selection 20
Widget Selection and Setup 142
Wi-Fi 108
Wi-Fi Configuration 34

S

Scout Feature Setup 166
Scout Group Manager 164
Scout Groups Overview 163
Screen Layout Configurations 140
Screen Shots 11
Section Group Settings and Definitions 78
Section Groups and Section Settings 69
Self Test 10
Serial Device Detection 103
Serial Device Information 103
Setting Guidance Paths 157
Slingshot 35
Slingshot Field Hub 35
Speed Cal 175
Speed Sensor 115
Starting a Job 130
Street Maps 168
Street Maps for agX 171
Switch Box Options 116
System Manager 16, 29
System Manager Overview 29

T

Tally Register Prompt 173
Touch Screen Calibration 22
Tractor Profiles 65

U

Updates 7
USB Import Manager 48
User Profile 16
User Profile Settings Definition 23
User Profiles 21
UT Panel 18

V

Viper 4+ Built-In Self Test 10

W

Wallpaper 47
Weather Station Devices 105

LIMITED WARRANTY

WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

HOW LONG IS THE COVERAGE PERIOD?

Raven Applied Technology products are covered by this warranty for 12 months from the date of retail sale. In no case will the Limited Warranty period exceed 24 months from the date the product was issued by Raven Industries Applied Technology Division. This warranty coverage applies only to the original owner and is non-transferable.

HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries.

WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the warranty claim, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

WHAT IS NOT COVERED BY THIS WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.

EXTENDED WARRANTY

WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

DO I NEED TO REGISTER MY PRODUCT TO QUALIFY FOR THE EXTENDED WARRANTY?

Yes. Products/systems must be registered within 30 days of retail sale to receive coverage under the Extended Warranty. If the component does not have a serial tag, the kit it came in must be registered instead.

WHERE CAN I REGISTER MY PRODUCT FOR THE EXTENDED WARRANTY?

To register, go online to www.ravenhelp.com and select Product Registration.

HOW LONG IS THE EXTENDED WARRANTY COVERAGE PERIOD?

Raven Applied Technology products that have been registered online are covered for an additional 12 months beyond the Limited Warranty for a total coverage period of 24 months from the date of retail sale. In no case will the Extended Warranty period exceed 36 months from the date the product was issued by Raven Industries Applied Technology division. This Extended Warranty coverage applies only to the original owner and is non-transferable.

HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries. In addition, the words "Extended Warranty" must appear on the box and all documentation if the failure is between 12 and 24 months from the retail sale.

WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the product's registration for the Extended Warranty and the claim itself, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

WHAT IS NOT COVERED BY THE EXTENDED WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. Cables, hoses, software enhancements, and remanufactured items are not covered by this Extended Warranty. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.