

Calibration & Operation Manual



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Calibration Reference Sheet

Record the settings and calibration values used when programming the field computer and keep this sheet for future reference or when contacting a service technician.

Circle the setting selected on the field computer for the following options:

Units	US (Acres)	SI (Hectares)	Turf (1000 Square Feet)	
Speed Sensor	SP1 (Wheel Speed)	SP2 (Radar)	Speed Cal	

Write down the selected settings for each configured control channel in the spaces provided:

	Control Channel 1	Control Channel 2	Control Channel 3	Control Channel 4	Control Channel 5
Control Type					
Valve Type					

	Control Channel 6	Control Channel 7	Control Channel 8	Control Channel 9	Control Channel 10
Control Type					
Valve Type					

Write down the calculated calibration values in the spaces provided.

Section Widths (Boom Cal)	Meter Cal	Rate Cal	Valve Cal	Cal Weight	Volume in Tank/Bin
1.	1.	1.	1.	1.	1.
2.	2.	2.	2.	2.	2.
3.	3.	3.	3.	3.	3.
4.	4.	4.	4.	4.	4.
5.	5.	5.	5.	5.	5.
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					

Unit Definitions and Conversions

Unit of Measure Definitions

Abbreviation	Definition	Abbreviation	Definition
GPM	Gallons per Minute	PPK	Pounds per 1,000 square feet
L/min	Liters per Minute	mm	Millimeters
dL/min	Deciliters per Minute	cm	Centimeters
PSI	Pounds per Square Inch	dm	Decimeters
kPa	Kilopascal	m	Meter
GPA	Gallons per Acre	MPH	Miles per Hour
L/ha	Liters per Hectare	km	Kilometers
mL/ha	Milliliters per Hectare	km/h	Kilometers per Hour
GPK	Gallons per 1,000 Square Feet	US	Volume per Acre
PPM	Pounds per minute	SI	Volume per Hectare
kg/min	Kilograms per minute	TU	Volume per 1,000 Square Feet
PPA	Pounds per Acre	[]	Metric Values
kg/ha	Kilograms per Hectare	{ }	Turf Unit Values

Unit of Measure Conversions

To convert the METER CAL value into the selected unit of measure, divide the original number printed on the Flow Meter label by the desired conversion value.

Fluid Ounces Conversion Formula	Liters Conversion Formula	Pounds Conversion Formula
$\frac{\text{Original METER CAL Number}}{128}$	$\frac{\text{Original METER CAL Number}}{3.785}$	$\frac{\text{Original METER CAL Number}}{\text{Weight of One Gallon of Product}}$

Liquid

- 1 U.S. gallon = 128 fluid ounces
- 1 U.S. gallon = 3.785 liters
- 1 U.S. gallon = 0.83267 imperial gallons
- 1 U.S. gallon = 8.34 pounds (water)

Length

- 1 millimeter (mm) = 0.039 inches
- 1 centimeter (cm) = 0.393 inches
- 1 meter (m) = 3.281 feet
- 1 kilometer (km) = 0.621 miles
- 1 inch = 25.4 mm or 2.54 cm
- 1 mile = 1.609 km

Area

- 1 square meter = 10.764 square feet
- 1 hectare = 2.471 acres or 10,000 square meters
- 1 acre = 0.405 hectares or 43,560 square feet
- 1 square mile = 640 acres or 258.9 hectares

Pressure

- 1 psi = 6.89 kPa
- 1 kPa = 0.145 psi

Weight

- 1 Pound = 16 Ounces
- 1 Pound = 0.45 Kilograms

CHAPTER

1

Important Safety Information

Safety Information

NOTICE

Read this manual and the operation and safety instructions included with the implement and/or controller carefully before installing the Viper Pro field computer.

- 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. To obtain replacements for missing or damaged safety labels, contact a local Raven dealer.

When operating the machine after installing the Viper Pro field computer, observe the following safety measures:

- Be alert and aware of surroundings.
- Do not operate the field computer while under the influence of alcohol or an illegal substance.
- Remain in the operator's position in the machine at all times when the field computer is engaged in product control or feature operation. The machine operator is responsible for disabling or turning off automatic control features before leaving the operator's position.
- Determine and remain a safe working distance from other individuals. The operator is responsible for disabling or turning off automatic control features when the safe working distance has been diminished.
- Ensure the field computer is disabled prior to starting any maintenance work on the machine or parts of the field computer.
- Follow all label instructions for proper chemical mixing, handling and container disposal methods.



DANGER

Thoroughly bleed the nurse tank hose and all other system lines prior to disassembling the flow meter, fittings and hoses, especially in the case of anhydrous ammonia.



Hydraulic Safety

- Raven Industries recommends that appropriate protective equipment be worn at all times when working on any hydraulic system.
- Never attempt to open or work on a hydraulic system with the equipment running. Care should always be taken when opening a system that has been previously pressurized.
- When disconnecting the hydraulic hoses or purging is required, be aware that the hydraulic fluid may be extremely hot and under high pressure. Caution must be exercised.
- Any work performed on a hydraulic system must be done 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

- Always verify that the power leads are connected to the correct polarity as marked. Reversing the power leads could cause severe damage to the equipment.
- Ensure that the power cable is the last cable to be connected.
- Disconnect the Viper Pro field computer before jump-starting the vehicle.
- Disconnect the Viper Pro field computer and any other Raven systems before welding any component of the machine.

CHAPTER

2

Introduction

Congratulations on the purchase of the Seed Hawk® Viper Pro™ precision application management system!

The Seed Hawk Viper Pro is a multi-purpose precision tool offering the latest technology in precision agriculture with features including product application control, field mapping, and application reports, as well as in-field guidance via a connected DGPS (Differential Global Positioning System) receiver.

FIGURE 1. Seed Hawk® Viper Pro™ Field Computer



Viper Pro Features

The following sections offer a brief introduction to the capabilities of the Viper Pro field computer and some of the optional features available for use with the Viper Pro precision application management system.

Speed Compensated Product Control and Datalogging

The Viper Pro is capable of controlling up to five products through product control nodes connected to a CANbus system. Viper Pro automatically adjusts the application rate of each product according to the speed of the vehicle, width and status of programmed sections, and a programmed target rate.

A real-time, as-applied map is displayed on-screen while application and scouting information is logged and saved by the Viper Pro. This “job” information can then be transferred to a home or office PC or the Slingshot web site and used to create printed reports and coverage maps.

Variable Rate Application (VRA)

Viper Pro can provide automatic variable-rate control for liquid, granular, anhydrous ammonia, or injection products. Viper Pro will also datalog and store as-applied data or scouting information. This as-applied information can be used to compare the field prescription to the actual application and provide valuable documentation of the application. The Viper Pro system will store the application report and datalogged information on the field computer until transferred to a USB flash drive or uploaded to the Slingshot web site for creating or printing application reports or archiving application information on a home or office PC. See Chapter 11, *File Maintenance and Editing Reports*, or Appendix B, *Understanding Viper Pro Files*, for detailed information. The Viper Pro field computer creates application reports in both the common shapefile format which can be used with many application management software packages and a bitmap (.bmp) file which can be viewed on any computer without specialized software tools.

Single product VRA (Variable Rate Application) comes standard with the Viper Pro system. SCT systems come standard with the multi-product VRA upgrade (P/N 077-0171-152) and can variable rate up to five products simultaneously. Contact a local Seed Hawk dealer to add multi-product VRA capabilities to a Base system.

On-Screen Guidance

The Viper Pro system provides on-screen 3-D guidance in the form of a course direction indicator (CDI) as well as an on-screen light bar. The guidance feature offers straight (A-B) line, last pass, fixed contour and pivot swath patterns to match the field and application. In addition, GPS information may be sent to an optional Raven external light bar. See Chapter 6, *Viper Pro Guidance*, for more detailed operation.

AgX™ Compatibility

The SST® AgX platform provides a standardized data structure and agricultural chemical database that enables efficient record keeping and seamless communication between AgX compliant devices and software.

AgX recommendations can be transferred onto the Viper Pro field computer for pre-populated job and product information. The Viper Pro also creates AgX compliant reports for transfer back onto a home or office PC for detailed application reporting.

Note: *Currently, the SST Summit software package is required to provide AgX recommendations for the Raven Viper Pro field computer. Viper Pro software version 3.4 or higher is required to utilize the AgX features with the field computer.*

An AgX activation key is required to use AgX recommendations on the Viper Pro field computer. Application of multiple products using the AgX feature will require a multiple product VRA key.

Optional Features

In addition to the product application control capabilities of the field computer, several optional Raven components and systems are available for use with the Viper Pro system.

Note: *Refer to Chapter 8, Sectional Control Technology™ (SCT), for more information on using this feature with the Viper Pro field computer.*

The Viper Pro is also capable of integrating into many Raven CANbus control systems or with Raven standard serial interface control consoles and virtually any new or existing DGPS receiver.

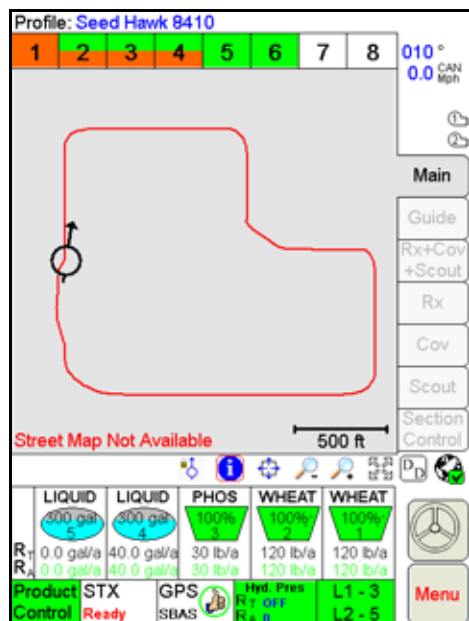
Contact a local Raven dealer for more information about these and other optional features and components available for use with the Viper Pro.

The Viper Pro Interface

The following sections offer an overview of the user interface features of the Viper Pro field computer.

Active Matrix Transflective Touch Screen

Active Matrix Transflective touch screen technology offers clear visibility across a range of lighting conditions and even in direct sunlight while the touch screen functionality places menus and options literally at the operator's finger tips.



CAUTION

Do not use sharp objects, such as ball point pens, pocket knives, screwdrivers, etc. on the Viper Pro display.


Front Panel

The front panel of the Viper Pro provides easy access to the power button and the USB connection. The following is a description of the front panel features of the Viper Pro:

FIGURE 2. Viper Pro Front Panel





Press the power button to start up the Viper Pro field computer. The field computer takes approximately two minutes to power up.

	<div data-bbox="867 884 1062 932">NOTICE</div> <p>Failure to close a job before turning the field computer power off may result in a loss of information for that job. Make sure to properly close any open jobs before shutting down the computer.</p>
--	--

A USB port is conveniently located on the front of the Viper Pro field computer. Insert a USB flash drive into this port to transfer compatible Viper Pro files.

Note: The USB flash drive must be formatted with the Viper Pro file structure. See Chapter 11, *File Maintenance and Editing Reports*, for setting up the required file structure on a USB flash drive.

	<div data-bbox="813 1346 1117 1402"> CAUTION</div> <p>Damage to the field computer may occur if the USB ports are used to charge mobile devices such as cellular phones, tablets, or mp3 devices. The USB ports should only be used for performing file transfer and maintenance.</p>
---	---

File Transfer

The Viper Pro features internal memory to store files for current job and field information. The internal memory should not be used for long term storage and files should be periodically transferred to a home or office PC for archiving and printing job reports. The Viper Pro is compatible with USB flash drives with between 256 MB and 4 GB of storage and should be used to manually transfer files to and from the field computer. USB flash drives may be purchased directly from Raven Industries (4 GB USB Flash Drive P/N 524-0002-065) as well as many retail locations.

FIGURE 3. USB Flash Drive



Note: *Install the USB flash drive only when transferring files. Do not start the Viper Pro or leave the USB flash drive in the Viper Pro during normal operations.*

A Slingshot® Field Hub may be connected to transfer files wirelessly from the home or office PC to the Viper Pro. Contact a local Slingshot dealer for purchasing and more information.

Rear Panel

The following is a brief introduction to the ports and connectors available on the back of the Viper Pro field computer.

The rear panel offers additional USB ports as well as an ethernet port for wireless capabilities using an optional Slingshot Field Hub.

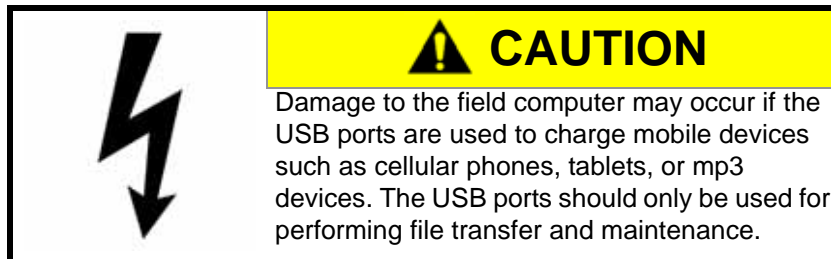
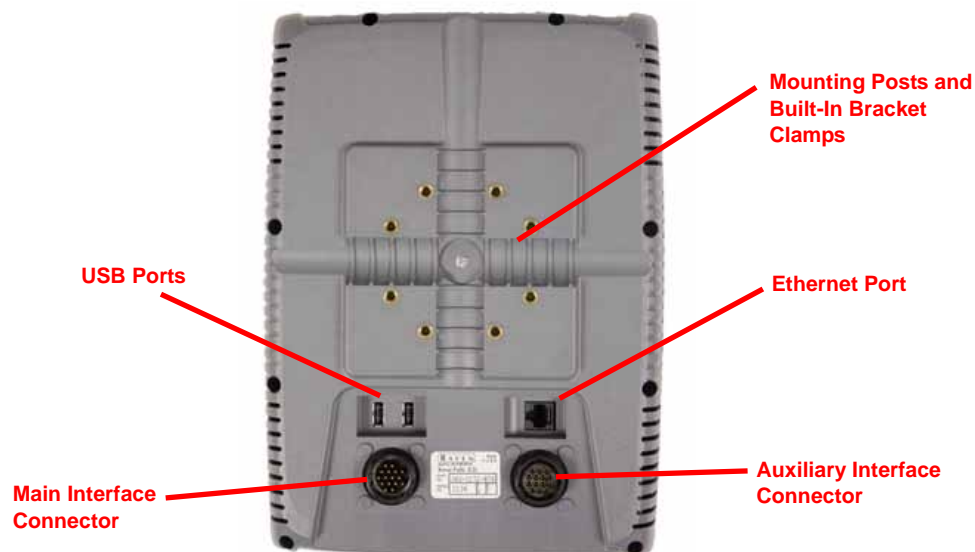


FIGURE 4. Viper Pro Rear Panel



The main and auxiliary interface connectors are also located on the back of the Viper Pro.

The field computer part and serial numbers, and revision letter, are printed on the tag located on the back of the field computer. Please have this information available when contacting customer support.

Viper Pro Care and Use

Refer to the following guidelines for proper care and use of the Viper Pro field computer.

CAUTION

- Do not apply any type of liquid or glass cleaner directly to the surface of the touch screen. Harsh chemicals may damage the touch screen. Clean the touch screen and field computer exterior as needed with a soft cloth dampened with glass cleaner. Apply the cleaner to the cloth and then wipe the screen gently.
- Do not use any type of pointed or sharp instrument on the touch screen. Only a fingertip or approved stylus should be used when interfacing with the field computer.
- Do not expose the Viper Pro field computer to precipitation, condensation, or other liquids. Store the computer in a dry environment when not in use.
- Mount the field computer securely and route cables to avoid tripping hazards and to keep the wires from pinching or breaking.
- When temperatures are expected to be 32° F [-0° C] or lower, remove the field computer from the vehicle and store it in a climate controlled environment.
- Damage to the field computer may occur if the USB ports are used to charge mobile devices such as cellular phones, tablets, or mp3 devices. The USB ports should only be used for performing file transfer and maintenance.

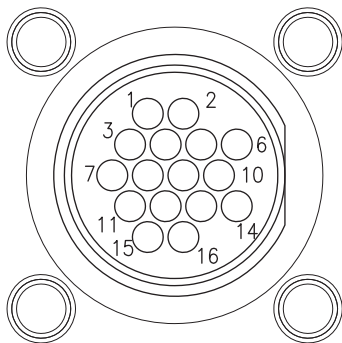
Technical Specifications

		U.S.	Metric
Dimensions	Height	12.04 in.	[30.58 cm]
	Width	8.95 in.	[22.73 cm]
	Depth	2.98 in.	[7.57 cm]
	Diagonal	10.4 in.	[26.42 cm]
Weight		4.7 lbs.	2.13 kg
Environmental	Operating Temperature	32° F to 158° F	0° C to 70° C
	Storage Temperature	-4° F to 185° F	-20° C to 85° C
Power	Operating Voltage	9 VDC to 28 VDC Reverse Polarity Protected	
Ports	USB	3 (1 on front, 2 on back)	
	Ethernet	1 (Back)	
	Amp	2 (Back)	
Mounting	Clamp ^a (Provided)	1.020 in. dia.	2.59 cm dia.
	Thumb Screws (Provided)	1/4"-20 x 1" Long	

a. Designed to secure the field computer to a 1" dia. [2.54 cm] monitor bar or post.

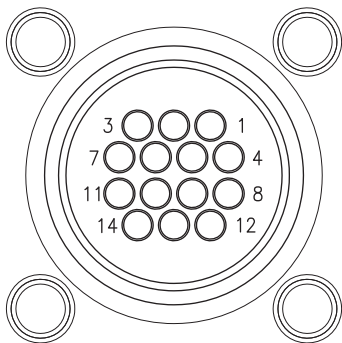
Amp Connector Pin Definitions

Main Amp Connection



Main Amp Connector	
1.	Battery Negative
2.	Ext. Switch
3.	CAN Hi
4.	CAN Lo
5.	DGPS Receive
6.	DGPS Transmit
7.	DGPS CTS
8.	DGPS RTS
9.	Console Transmit
10.	Console Receive
11.	RS232 Ground
12.	Console CTS
13.	Console RTS
14.	+ 12 V Ignition
15.	+ 12 V Switched
16.	Battery Positive

Auxiliary Amp Connection



Auxiliary Amp Connector	
1.	Auxiliary DSR
2.	Ext. Switch
3.	CAN Hi
4.	CAN Lo
5.	Auxiliary DCD
6.	Not Used
7.	Auxiliary Receive
8.	Auxiliary Transmit
9.	Auxiliary CTS
10.	DTR
11.	Auxiliary RTS
12.	RS232 Ground
13.	Not Used
14.	Radar Out

Updates

Updates for Raven manuals as well as software updates for Raven consoles are available at the Raven Applied Technology Division web site:

www.ravenhelp.com

CHAPTER

3

Installation, Start Up, and Registration

Overview of the Installation Process

The following sections are intended as an overview of the Viper Pro installation process. These instructions cover basic installation of the Viper Pro field computer and supplied components and cabling.

Note: *For instructions on installing additional hardware with the Viper Pro, refer to instructions provided with the additional or optional component(s). For additional system diagrams, see Appendix A, System Diagrams.*

Basic installation of the Viper Pro system is as follows:

1. Review kit contents
2. Mounting the Viper Pro field computer
3. Mounting the DGPS receiver and antenna
4. Route and connect sectional control console cable
5. Route and connect sectional control vehicle power/CAN cable
6. Connect any optional CAN or GPS components

Kit Contents

The following components will be installed on the tractor to be used with the Seed Hawk® air cart system. Before proceeding with the installation of the Viper Pro system, review this list.

TABLE 1. Seed Hawk Viper Pro Tractor Mounted Components

Qty.	Part/Description	Part Number
1	Manual, Seed Hawk® Viper Pro	016-3001-003
1	Quick Reference Guide, Seed Hawk® Viper Pro	016-0171-291
1	Console, Seed Hawk® Viper Pro	063-0173-053
1	Switch Box, Seed Hawk®	063-0173-036
1	Kit, Mounting Bracket	117-0171-181
1	Cable, Sectional Control Console	115-0171-926
1	Cable, Sectional Control Vehicle Power/CAN	115-3001-076 (SCT) or 115-3001-056 (Base)

Mounting the Field Computer

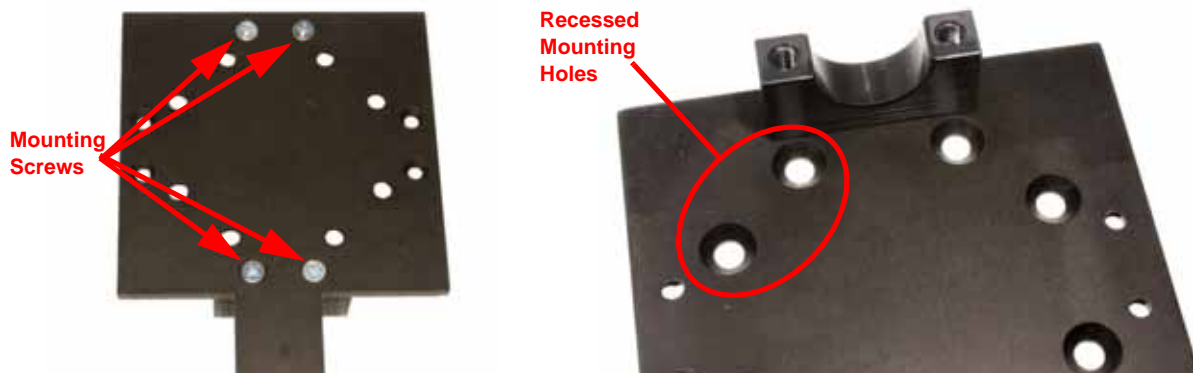
Refer to the following sections for detailed instructions on mounting the Seed Hawk Viper Pro field computer and Switch Box and connecting the required cables.

Mounting the Switch Box

Note: The following instructions illustrate mounting the switch box below the Viper Pro field computer. The mounting bracket (P/N 107-0171-847) also may be used to mount the switch box above the computer. Before tightening the mounting bracket, verify the bracket is in the desired orientation and ensure the field computer and switch box will be clear of any moving elements within the machine cab.

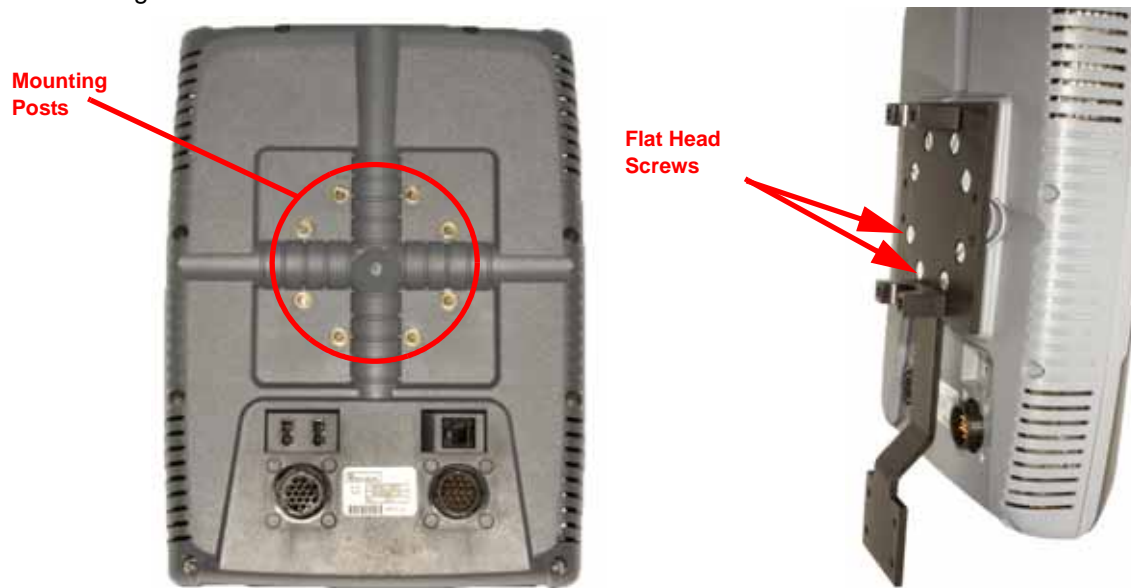
To assemble the mounting bracket:

1. First, mount two of the provided clamps to the mounting bracket using four flat head phillips screws.



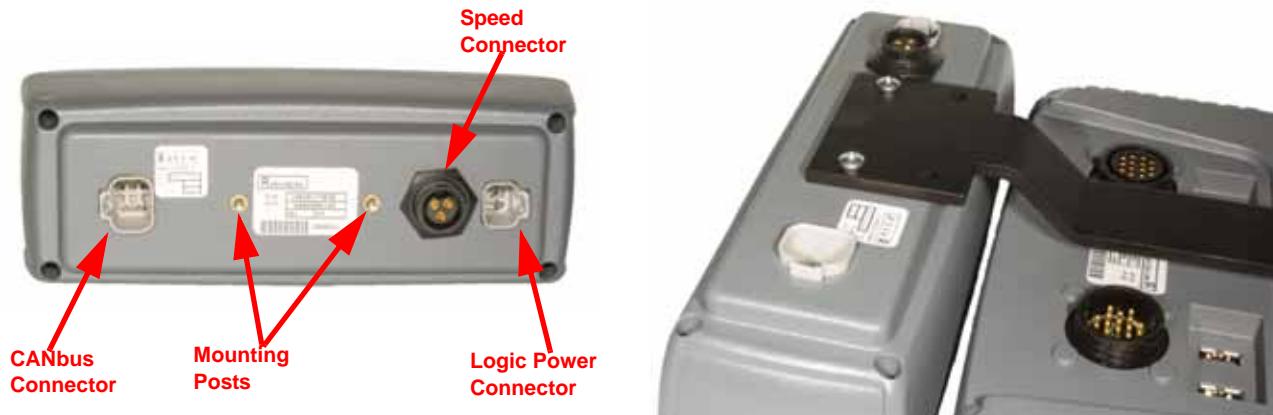
Attach the clamp to the mounting bracket so that the recessed mounting holes and the clamp are on the same side.

2. Match up mounting posts on the back of the Viper Pro field computer with the recessed holes in the mounting bracket.



When assembled, the smaller flange of the mounting bracket should be centered with the console and slightly behind the upper flange.

3. Use the eight flat head screws to fasten the mounting bracket to the Viper Pro field computer.
4. Match up the two mounting posts on the back of the switch box with the smaller flange of the mounting bracket.



5. Use two phillips head screws to mount the switch box to the mounting bracket.
6. The remaining clamps and four hex bolts will be used to secure the Viper Pro field computer and switch box to the selected mounting post within the vehicle cab.



Mounting the Viper Pro and Switch Box in the Cab

1. Select a location to mount the Viper Pro field computer. Refer to the following requirements when selecting a mounting location for the Viper Pro field computer:
 - The Viper Pro is not weatherproof. Mount the field computer inside of the machine cabin or drivers compartment within easy reach of the driver or operator.
 - Secure the field computer to an existing post or display bar using the provided bracket.
 - If necessary, securely fasten the mounting bracket (P/N 107-0171-415) to a suitable, flat surface. Once mounted, the bracket must provide a stable base for the field computer and should not impede normal machine operation.
 - The Viper Pro should be mounted in a location where it will not be jarred during normal equipment operation. Keep the field computer clear of moving elements within the machine's cab.
 - Keep cable routing in mind when selecting a mounting location to avoid tripping hazards or damage to the cable during normal operation.
2. Use the remaining clamps and four hex bolts to secure the Viper Pro and switch box to the selected mounting post within the vehicle cab.

3. Connect the main interface cable (P/N 115-0172-001) to the back of the computer and switch box.
4. Connect the 2-pin Deutsch connector to the logic power connector on the switch box.
5. Connect the 4-pin Deutsch connector to the CANbus connector on the switch box.
6. Begin routing main interface cable to avoid tripping hazards as well as to protect the cable from kinking or breaking during normal machine operation. Connect to chassis cable (P/N 115-0171-915, 115-0171-936, 115-0171-937 or 115-0171-938).

DGPS Receiver Connection



NOTICE

Carefully read and follow all installation instructions included with the DGPS receiver and antenna and any optional DGPS components before connecting the Viper Pro field computer or related cabling.

Signal from a DGPS receiver must be routed into the Viper Pro via the serial connector labeled 'DGPS' on the main interface cable (P/N 115-3001-011). For information on configuring the Viper Pro to receive signal from the connected DGPS Receiver, refer to the *Serial Communication Port Setup* section on page 163.

CANbus Installation

CAN systems allow product nodes to be added to expand the number of control channels on the system at any time. Five product control nodes can be connected to the Viper Pro control system for any combination of liquid, granular, chemical injection, or spinner control applications.

Review the Raven CANbus Installation Manual for details on building a CANbus network or adding a control channel to an existing product control system.

Power Connection

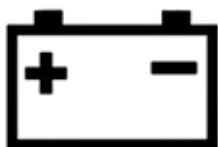


CAUTION

The power leads should be connected after all other installation instructions have been completed. Reversing the power leads may cause damage to the field computer.

Ensure that the Viper Pro has been properly mounted and all component cabling has been connected before connecting the main power cable (P/N 115-3001-076 or 115-3001-056) to power.

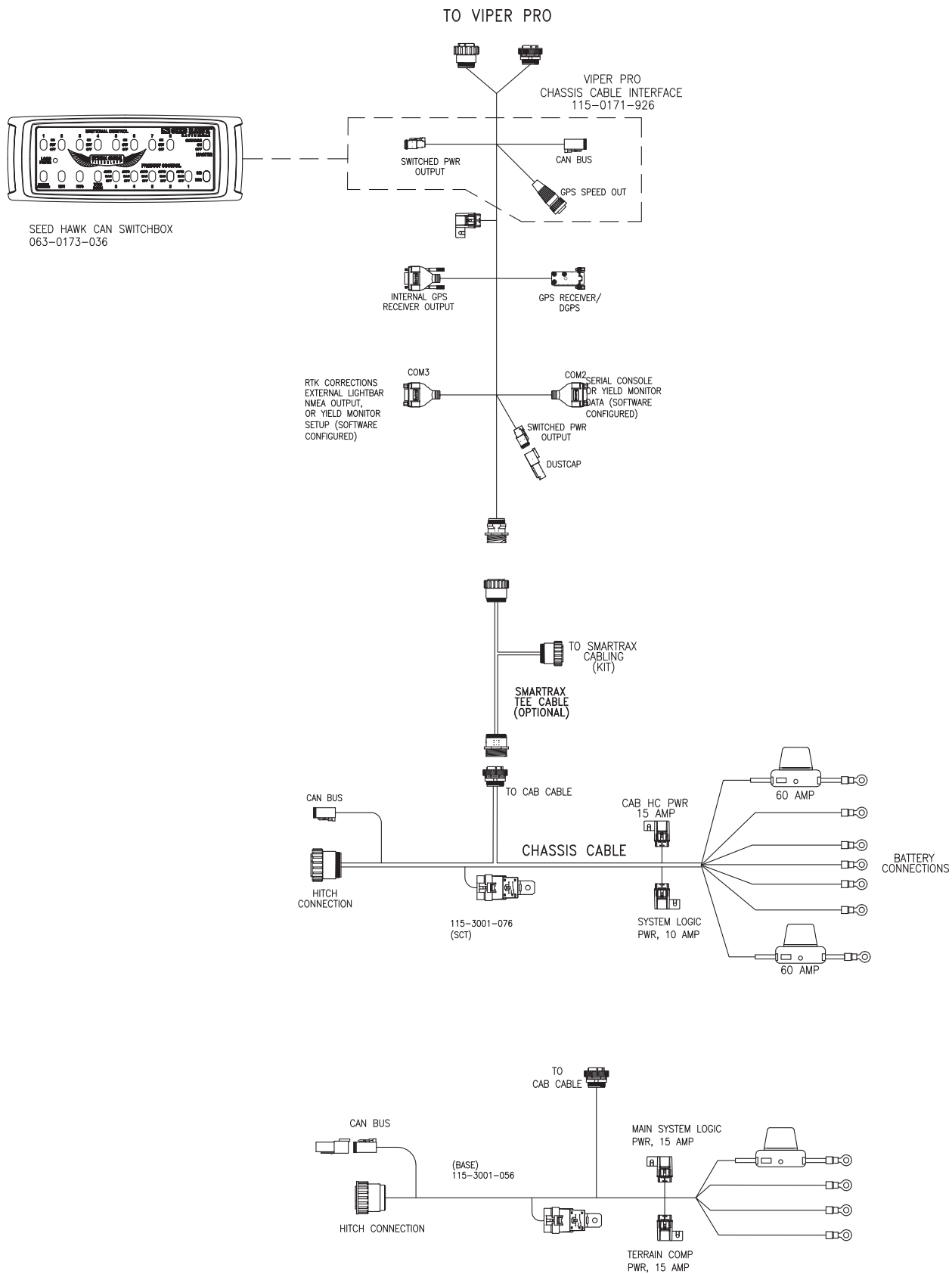
1. Route the red and white leads to the vehicle's battery.
2. Connect red lead wire to the positive battery terminal.
3. Connect the white wire to ground.



CAUTION

Even when the Viper Pro is powered off, the field computer will draw a small current from the battery. If the machine will not be in use for an extended period of time, remove power from the Viper Pro by disconnecting the main interface cable from the rear panel of the field computer.

FIGURE 1. Seed Hawk System Connection Diagram (D/N 054-3030-002)



Start Up

Note: Before connecting or using any additional or optional components with the Viper Pro precision application management system, be sure to follow any installation instructions and verify proper installation.

Before powering up the Viper Pro, check that the field computer is properly mounted and all power and cable connections have been installed properly as instructed in the previous sections.

Once installation of the Viper Pro precision application management system has been completed and verified, the field computer may be powered up.

To start up the Viper Pro:

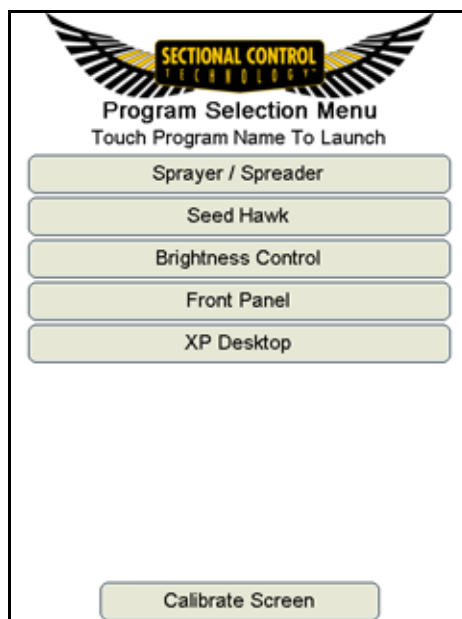
1. Press the power button on the Viper Pro. The field computer will take approximately 2 minutes to power up.

Note: Pressing the power button when the following prompt is displayed on-screen will launch the touch screen calibration wizard without displaying the Program Selection Menu.



This prompt is displayed for approximately five seconds and may be ignored to display the Program Selection Menu as normal.

- The Program Selection Menu will display if the Viper Pro was powered off at this screen the last time the field computer was on.



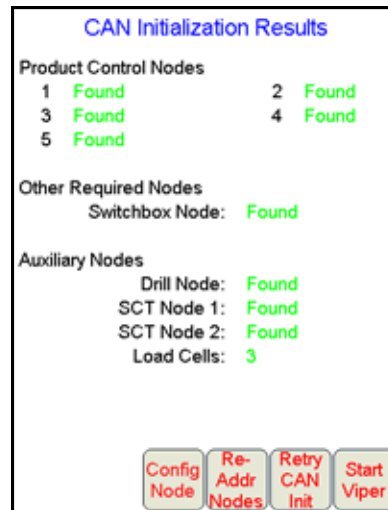
Note: To skip the Program Selection Menu next time the Viper Pro is powered up, shutdown the field computer from the Viper Pro application. Within the Viper Pro application, touch the Menu button in the lower, right corner of the screen and select Exit, Shutdown Viper.

Pressing and holding the Power button to shutdown the Viper Pro is not recommended. This procedure should only be used in situations when normal shutdown is not possible.

Select the:

- **Sprayer/Spreader** to launch the Viper Pro precision application management system in a liquid or granular applicator mode. Refer to the Raven *Viper Pro Installation and Operation Manual* for more information on operation of the field computer in this mode.
 - **OmniSeed** to launch the Viper Pro precision application management system in an air seeder mode.
 - **Brightness Control** option to adjust the screen brightness.
 - **Front Panel** option to configure Raven DGPS Receivers directly with the Viper Pro using the Front Panel Program. See Appendix D, *Using the Front Panel Program with the Viper Pro System*, for detailed instructions on setting up and using the Front Panel Program.
 - **XP Desktop** option to view the Windows® desktop on the Viper Pro field computer.
 - **Install Viper Pro** option to install the Viper Pro application. This option is only displayed if a flash drive containing the Viper Pro startup directory is inserted into the Viper Pro.
 - **Update CAN Nodes** option to begin the CAN update program. Refer to Appendix C, *Updating CAN Nodes via the Viper Pro*, for more information.
 - **Calibrate Screen** button at the bottom of the screen to begin the touch screen calibration wizard.
- Select the **Seed Hawk** option to launch the Viper Pro precision application management system.

- If the Viper Pro is set as the CAN Controller, the Viper Pro will attempt to establish communication with the CANbus system. The CAN Initialization Results screen displays the results of CANbus detection.



- If the status of the CAN nodes is displayed properly, touch the **Start Viper** button to finish the start up sequence.

Note: Refer to Chapter 4, *Initial Set Up and Navigation*, for more information on the CAN Initialization Results screen, or information on setting up or troubleshooting the CANbus or CAN nodes.

If the field computer is enabled to receive web notifications via the Slingshot server, a prompt or dialogue may be displayed after the Start Viper button is selected and the Main screen is displayed. Refer to the Wireless File Transfer section on page 207 for more information.

- The Viper Pro main screen will display. For a description of the features and information displayed on the main screen, see Chapter 4, *Initial Set Up and Navigation*.

Touch Screen Calibration Wizard

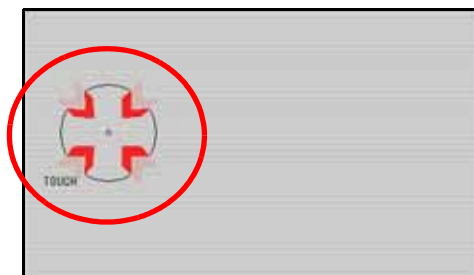
When the operator touches an area of the screen, the Viper Pro displays an arrow in the area where the selection has been made. If this arrow does not appear in the correct location, the touch screen may require recalibration.

There are two ways to access the Touch Screen Calibration Wizard:

- Press the power button while the start up prompt is displayed.
- Select the **Calibrate Screen** option at the bottom of the Program Selection Menu screen.

To complete the Touch Screen Calibration Wizard:

- Touch and hold in the center of the first of four calibration points.



- When prompted, release the point. The next calibration point will be displayed.

3. Touch and hold the center of each remaining calibration point as they are displayed.
4. Once all points have been calibrated, touch in various areas of the screen to verify that the arrow appears in the correct location.



Note: This screen will only be displayed for 1 minute. A count down of time remaining is displayed on the **Cancel** button. If the calibration is not accepted before 1 minute lapses, the calibration will be discarded and Viper Pro will continue to start up with the previous touch screen calibration.

5. Touch the **Accept** button to apply the recalibration and continue the Viper Pro start up sequence. Touching the **Cancel** button discards the recalibration and the Viper Pro will start up with the previous touch screen calibration.

Registering the Viper Pro

The Viper Pro must be registered if an optional feature activation key such as the multi-product VRA, AgX prepopulated jobs, or a weather station will be activated. Activation keys are specific to each Viper Pro. Once activated, a purchased key may not be transferred to another field computer.

Viper Pro Features

The following feature activation keys are available for the Viper Pro system:

- Multi-Product VRA (P/N 077-0171-152)
- Weather Module (P/N 077-0180-030)
- AgX Prepopulated Jobs (P/N 077-0180-059)

Multi-Product VRA

The Multi-Product VRA feature is only required for automatic variable rate control of more than one product on the Viper Pro. This feature allows the Viper Pro to automatically control product rates in reference to a prescription map or maps.

Weather Module

The Viper Pro is capable of reading information from an external weather station and recording this information into the application report. See Appendix F, *Weather Station*, or contact a local Raven dealer for more information.

AgX Prepopulated Jobs

AgX recommendations can be transferred onto the Viper Pro field computer for pre-populated job and product information for product control and application. The Viper Pro also creates AgX compliant reports for transfer back onto a home or office PC for detailed application reporting.

Note: Currently, the SST Summit software package is required to provide AgX recommendations for the Raven Viper Pro field computer. Viper Pro software version 3.4 or higher is required to utilize the AgX features with the field computer.

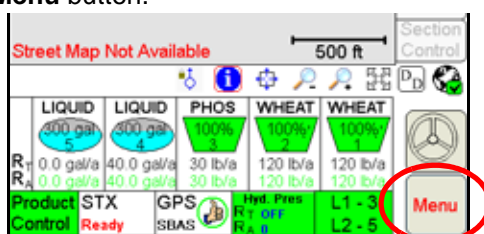
An AgX activation key is required to use AgX recommendations on the Viper Pro field computer. Application of multiple products using the AgX feature will require a multiple product VRA key.

Activation Key Request

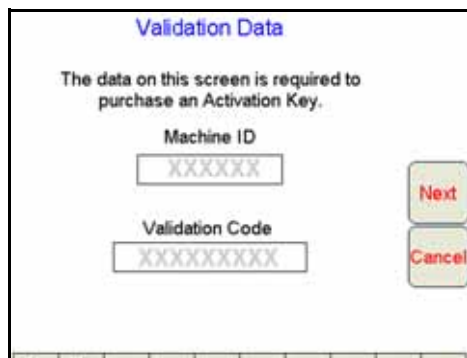
Note: To enter the activation key, start the Viper Pro in Sprayer/Spreader mode, enter the activation code and then restart the field computer in the OmniSeed control mode.

To register and activate a special feature on the Viper Pro:

1. On the main screen, touch the **Menu** button.

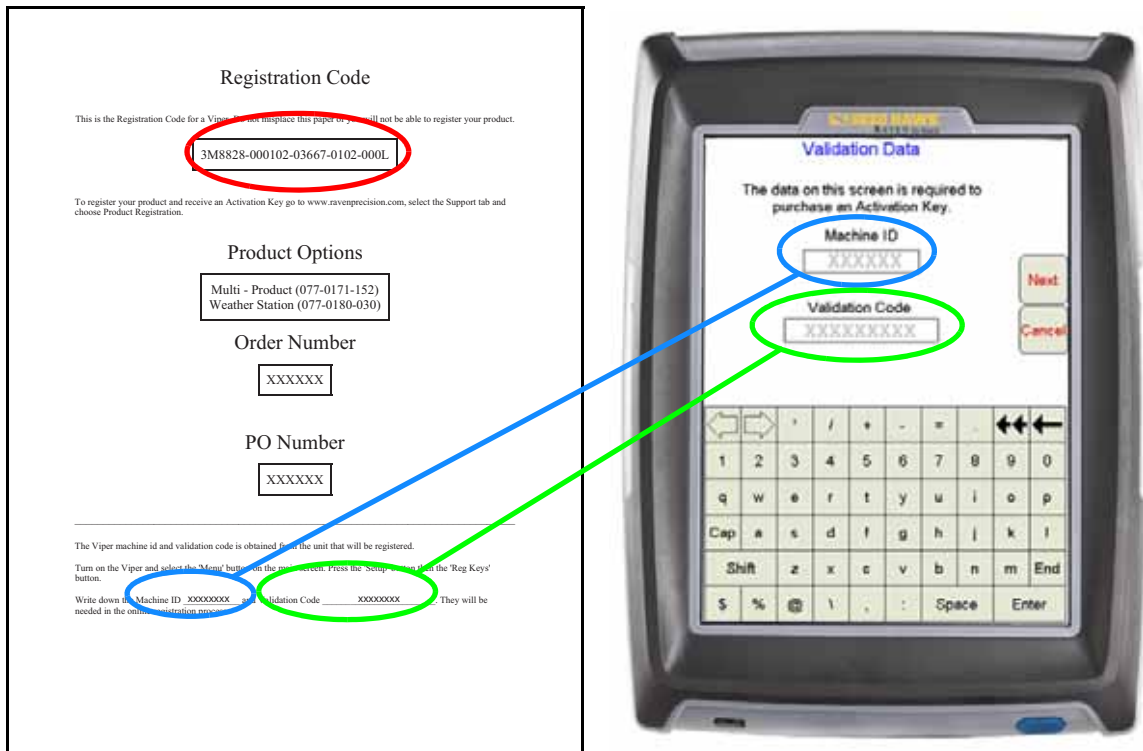


Select **Setup** then **Reg. Keys** to display the Validation Data screen.



- Write down the **Machine ID** and **Validation Code** from the Viper Pro field computer on the Registration Code sheet; an example is shown below.

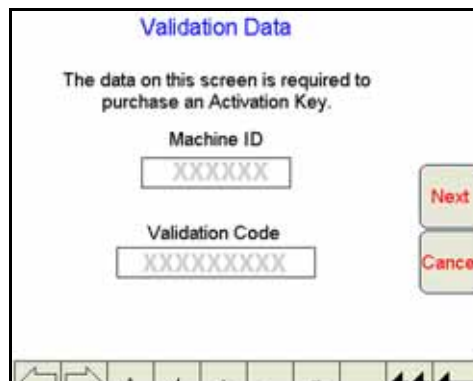
FIGURE 2. Machine ID and Validation Code



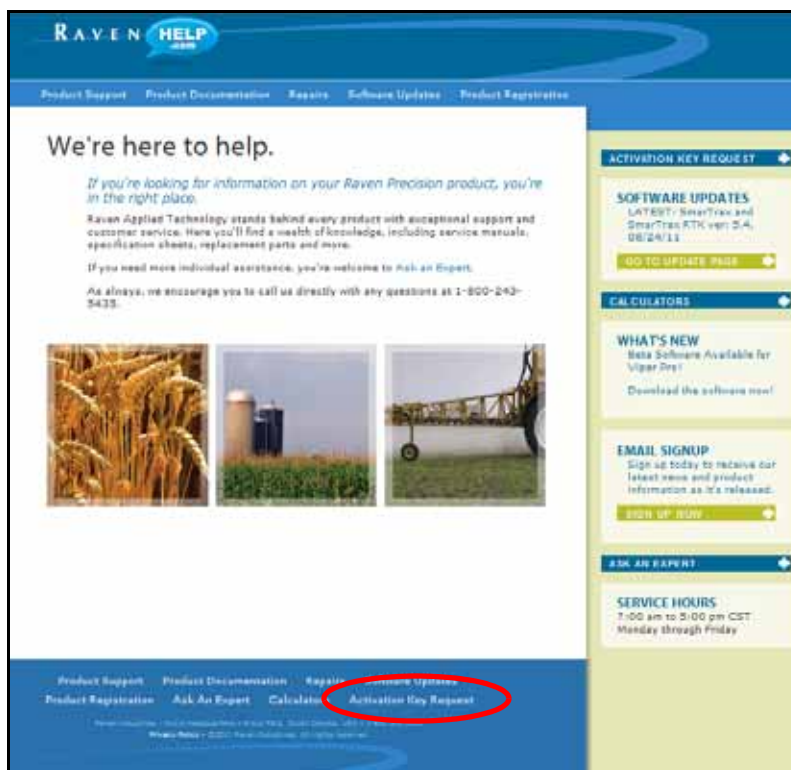
Please note that the registration code appears on this sheet as well. This number will be necessary for future use.

Note: The above values are for example purposes only. If additional features (such as multi-product VRA or weather module) have not been purchased, the registration code sheet will not be supplied. Write down the machine ID and validation code from the Viper Pro system on a blank piece of paper for future use.

- Touch the **Next** button. The Key 1 screen displays. This is the screen on which the activation key code will be entered. Do not navigate away from this screen.



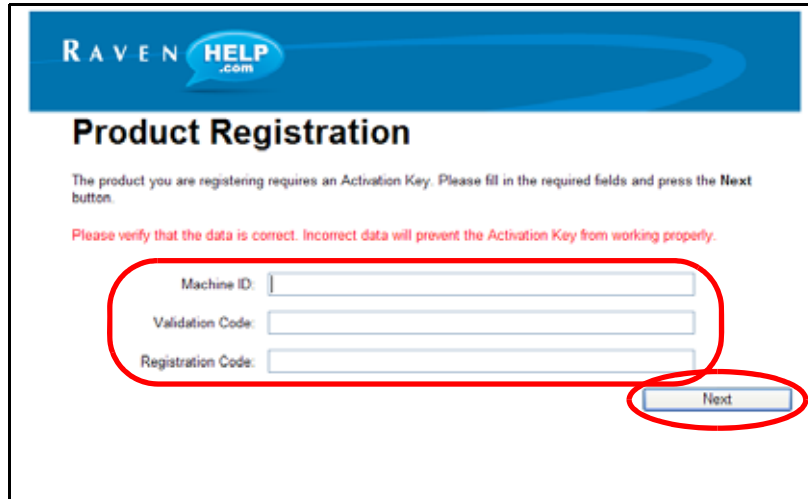
- On a home or office computer, go to the Raven Applied Technology Division web site at:
www.ravenhelp.com
and click on the “Activation Key Request” link.



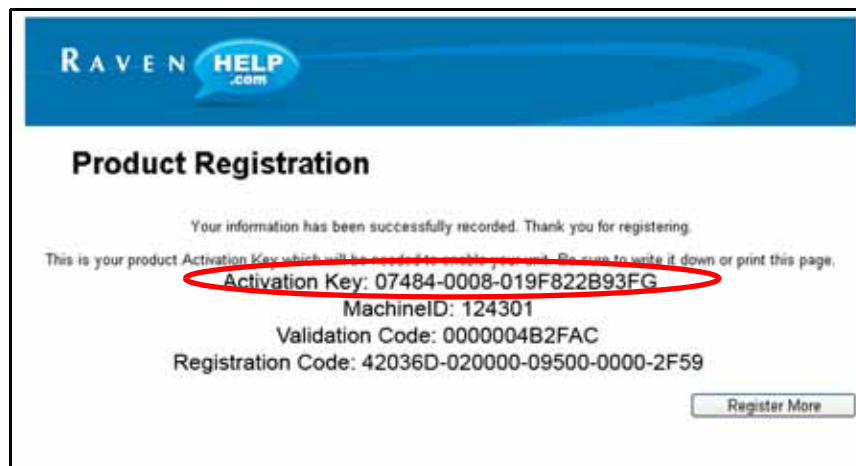
- Fill in the requested information and then click **Next**.

The screenshot shows the 'Product Registration' form on the Raven Help website. The form is titled 'Product Registration' and includes a thank you message from Raven Industries. It asks the user to complete the form to register their purchase, noting that some products require a special key. The form fields are: First Name, Last Name, Company, Address 1, Address 2, City, State/Prov/Terr, Zip/Postal Code, Country (a dropdown menu with '(Click here to choose)' selected), Telephone, E-mail Address, and Select Product (a dropdown menu with '(Click here to choose)' selected). A red rectangle highlights the entire form area. A 'Next' button is located at the bottom right of the form.

6. The Registration Code screen displays.



7. Fill in the machine ID, validation code, and registration code from the registration code sheet. Click the Next button.
8. If the registration was processed successfully, a prompt similar to the following will be displayed.



9. Locate the product Activation Key.

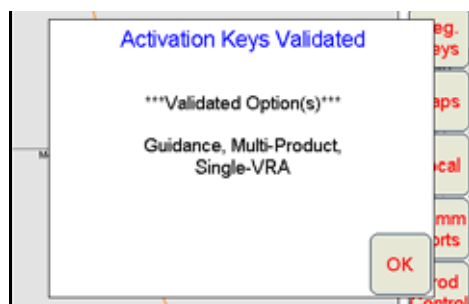
Note: Print and save this page for future use.

10. Back on the 'Key 1' screen on the Viper Pro, use the on-screen keyboard to enter the activation key received from the Raven web site (see step 8).



Note: If the Viper Pro has been registered previously, touch the Menu button on the main screen and select **Setup**, then **Reg. Keys** and **Next** to display the 'Key 1' screen to enter an activation key.

11. Touch **OK**. The activation key is saved to the Viper Pro field computer and the appropriate activation keys are validated.



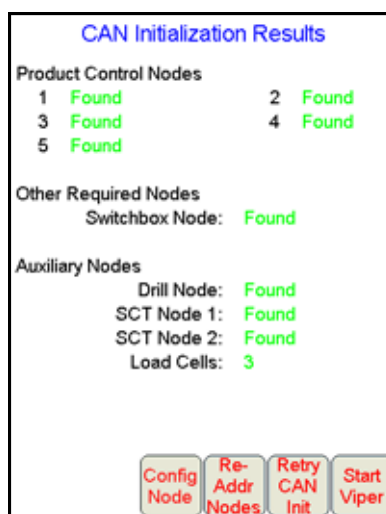
CHAPTER 4

Initial Set Up and Navigation

Detecting CANbus Nodes

The Viper Pro must be able to communicate with the CANbus system to make sure product is being applied correctly. Viper Pro should automatically establish communication with the switch box node, drill node, seed blockage node, scale nodes (if present), product 1, 2, and 3 nodes, and drill node.

FIGURE 1. CAN Initialization Results Screen



Seed Hawk® Viper Pro systems with Sectional Control Technology (SCT™) will also detect up to two SCT nodes depending upon the number of bins in the air cart. Base systems will not have any SCT nodes on the CANbus. Up to two additional product control nodes (Product 4 and 5 nodes) may be installed to control optional products during seeding operations.

Note: If the Viper Pro establishes communication with a node, it displays as 'Found' on the CAN Initialization Results screen. Nodes not detected during startup will not be displayed on this screen.

If a product node is not found by the Viper Pro field computer, troubleshoot the system to determine why Viper cannot communicate with the node. See Chapter 12, Troubleshooting the Viper Pro System, for more information about communication failures.

CAN Initialization Results

1. Power up the Viper Pro field computer.
2. The CAN Initialization Results screen displays. If the CAN system found all of the connected nodes, touch **Start Viper**. If not, touch **Retry CAN Init**.

Note: *If the product nodes are not found and this is a new installation, skip to the Re-Addressing Product Nodes section on page 30 and follow the instructions for addressing the product nodes.*

3. If product nodes which had been 'Found' during previous Viper Pro applications, but are still not displayed after step 2, troubleshoot the CANbus system to determine why the node is not communicating with the CAN system (i.e. No logic power, ground issues, faulty CAN connection, etc.).

CAN Node Off-line Errors

The most likely causes for losing CAN communication between the field computer and any one of the nodes are:

1. Corroded and/or open connections in the circuit.
2. Field computer and/or CAN node logic power and grounds connected to a "dirty" power source (dirty power is defined as any circuit with a variable load that exceeds 1 ampere). This is especially true of circuits loaded by electrical coils.
3. Field computer and nodes connected to different power and/or ground sources (e.g. battery, alternator or power bus). This can result in components operating at different voltage planes. Connect the field computer and nodes to the same power source via separate leads to eliminate potential issues.
4. Supply voltage below required minimums due to weak alternator or battery outputs. Check the machine battery and alternator and repair or replace as necessary.

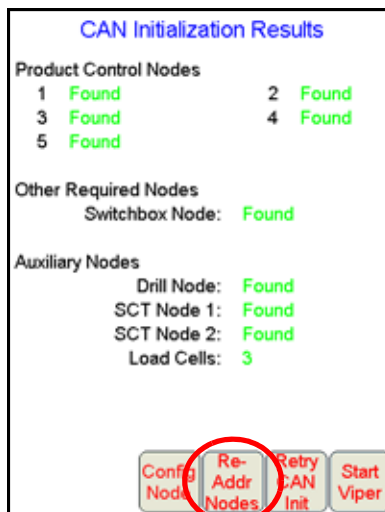
Re-Addressing Product Nodes

Note: *With the Seed Hawk Viper Pro, the only nodes that may need to be re-addressed are SCT nodes (if applicable), the air cart node, and any single product control nodes.*

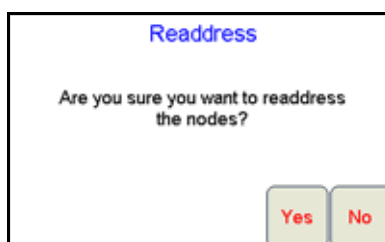
If the Seed Hawk Viper Pro is not able to detect a CAN single product control node or the SCT Node(s) during the start up sequence, troubleshoot the CANbus and the node, and then re-address the CANbus:

Note: *It is recommended to retry the CANbus initialization prior to readdressing the system if no new nodes have been connected to the CANbus.*

1. Touch **Re-Addr Nodes** from the CAN Initialization Results screen.



2. The Readdress screen displays.



3. Touch **Yes**. The Re-Address CAN Nodes screen displays.
4. Cycle power to the air cart node.

Note: To power cycle a node, temporarily disconnect the logic power connector from the node, wait a few seconds and reconnect.

5. Touch the **Next** button on the Viper Pro to re-address any single product nodes on the CANbus. If no single product nodes are connected, touch the **Finish** button. The Viper Pro will prompt the operator to re-address any SCT nodes on the CANbus.

Note: If the Seed Hawk system will be used with a Raven AccuFlow™ system, the anhydrous system must be assigned to product channel 4 on the Viper Pro to ensure valve shut off is performed correctly using the switch box inputs.

6. If SCT nodes are connected to the CANbus, cycle power to the SCT node to be setup as SCT Node 1.
7. Touch the **Next** button to re-address SCT Node 2 if necessary.
8. Touch the **Finish** button to finish re-addressing nodes on the CANbus. The Viper Pro will re-initialize the CANbus system using the new node addresses and display the CAN Initialization Results screen.
9. Touch **Start Viper** when all the product nodes in the system display as 'Found'.

Initial Set Up

The first time the Viper Pro is powered up, the field computer will require the operator to input information about the machine and the type of applications, products and setup any additional features connected to the system. The following sections are provided to assist the operator in setting the required calibration information prior to starting an actual application with the Viper Pro system.

During initial set up of the field computer, the following settings will be configured:

• <i>Language</i>	• <i>Time Zone</i>	• <i>Display Units</i>	• <i>Product Control Type</i>
• <i>Speed Sensor Type and Cal</i>	• <i>Application and Control Valve Type(s)</i>	• <i>Rate Cal(s)</i>	• <i>Meter Cal(s)</i>
• <i>Valve Cal(s)</i>	• <i>Fan Cal</i>	• <i>Section Setup</i>	<i>Profiles</i>

The above settings are the standard settings which the Viper Pro requires to monitor and control product application. Depending upon additional features installed with the field computer or application types which the Viper Pro may be used to control, additional settings may be required. Refer to Chapter 7, *Advanced Settings and Features* for additional information on product control settings and features. Refer to Chapter 8, *Sectional Control Technology™ (SCT)*, for additional information on the SCT system.

Language

To select the language displayed on the Viper Pro field computer:

1. Touch **Menu**, **Setup**, **Local** and **Lang**. The Language Setup screen will be displayed.
2. Touch the desired language for display on the field computer and select **OK** to return to the main screen.

Time Zone

1. Touch **Menu**, **Setup**, **Local**, and **Time Zone**. The Time Zone Setup screen displays.
2. Touch the desired time zone from the list. Use the **Up** or **Down** arrows if necessary to display additional time zones.
3. Select the **Auto Adjust for Daylight Savings** option to allow Viper to automatically adjust for daylight savings.
4. Touch **OK** to save the displayed selections and return to the main screen.

Display Units

Select the desired unit system for use with the Viper Pro:

1. Touch **Menu**, **Setup**, **Local** and **Units**. The Display Units screen will be displayed.
2. Select **English** (units displayed in feet, miles, ounces, etc.), **Metric** (units displayed in meters, kilometers, liters, etc.), or **Turf** (English measurement system in units per 1000 square feet) for unit displays on the Viper Pro.
3. Touch **OK** to save the displayed settings.
4. Proceed to the *Product Control Type* section on page 33 to continue setting up the Viper Pro.

Product Control Type

To properly configure the field computer for field operations, select the type of system which the Viper Pro will be used to monitor or control:

1. Touch **Menu, Setup, Prod. Control**. The Select Controller screen will be displayed.
2. Select the appropriate controller setting from the list of available options.
 - a. If the Viper Pro field computer will be used to control a CANbus control system, verify that the CAN option is selected.

Note: *If the Viper Pro is set up as the CAN controller, the switch box node, and at least one product control node must be programmed to allow the Viper Pro to control application of a product during a field application.*

- b. If the Viper Pro will be connected to a separate Raven rate control console via a serial cable, select the specific rate controller from the list of controller model options.
 - c. If the Viper Pro will be used to provide guidance for a towed implement without rate control capabilities, select the 'Manual' option.
3. Touch **OK** to accept the displayed selection and return to the Main screen.

Speed Sensor Type and Cal

To automatically adjust the rate of applied products for vehicle speed, the field computer must be properly calibrated for the sensor type providing speed information.

1. Touch within the **Product Control** area at the bottom of the main screen.
2. Touch within the **Miscellaneous** area on the CAN Controller Status screen.
3. Select **Radar** or **Wheel** for the type of speed sensor connected to the Viper Pro.

Use the **Wheel** option if a magnetic type, such as a wheel or drive shaft magnet, system is used with the Viper Pro. Set the speed sensor setting to the **Radar** option if a radar or GPS unit is sending speed information to the Viper Pro.




4. Touch the **Speed Cal** value and use the on-screen keypad to enter the new value.

Raven recommends the following speed calibration values for initial system setup.

Sensor Type	Used with	US	Metric
Radar/GPS	External Raven GPS Receiver	785	199
	GPS Speed over CANbus	1000	1000
	Raven Radar	598	152
Wheel	Wheel Magnets	1000	254
	Speedometer Drive Speed Sensor	612	155

These values are good starting points and generally yield adequate results, however, the speed cal should be refined for each specific vehicle and speed sense system. See Appendix A, *Calculating the Calibration Values*, for instructions on refining the speed cal value.

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

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.

*If another source will be used to detect vehicle speed, touch the **Calibration Assistance** button and follow the on-screen instructions. Refer to Appendix A, *Calculating the Calibration Values* for additional information about the calibration assistance procedure. The procedure outlined in Using the Calibration Assistance section on page 227, should also be performed to refine or verify the initial value used with a speed sensor not listed in the above table.*

5. Touch **OK** to save the currently displayed settings and return to the CAN Controller Status screen.

Application and Control Valve Type(s)

The application and control valve type settings configure the Viper Pro for the type of product applied with the control system and how the products will be applied.

1. Touch within the **Product Control** area at the bottom of the main screen.
2. Make sure that **Node 1** is selected on the CAN Controller Status screen

3. Touch within the **Application** area at the bottom of the CAN Controller status screen.
4. Select the type of control valve installed on the machine and which is controlled with the product assigned to channel or node 1.

The following valves are commonly used:

Valve Type	Description
Standard	Select this type when using a standard valve. This is a butterfly-type valve used in liquid applications. The valve stops adjusting rate and remains at the current position when the control signal is removed. This valve type setting is also used when controlling a CAN Motor Control node.
Fast	Same as the Standard valve, but can change setting at a higher rate.
Fast Close	Same as the Standard valve, but can change setting at a higher rate and closes completely when the master switch is in the 'off' position.
PWM	This valve uses pulse width modulation to control the speed of a hydraulic motor. Typically used to drive a liquid pump.
PWM Close	PWM valve that closes completely when the master boom switch is in the 'off' position. Typically used to control a hydraulic motor to a spreader apron.

Note: When operating a Seed Hawk hydraulic drive system, set the valve type to PWM close.

- The first three nodes in a Seed Hawk system are automatically set to **Gran 4** (Air Cart System).

**Status Screen Example
(Products 1-3)**

Node 1 Settings

Valve Type ☒ Standard ☐ Fast
☐ Fast Close ☐ PWM
☐ PWM Close

Application
☒ Gran4

**Status Screen Example
(Products 4-5)**

Node 4 Settings

Valve Type ☐ Standard ☐ Fast
☐ Fast Close ☐ PWM
☒ PWM Close

Application ☒ Liquid ☐ Gran 1
☐ Gran 2 ☐ Gran 3
☐ Spinner

Note: Control channels 4 or 5 for liquid or anhydrous ammonia products may be set for **Liquid, Gran 1** (single bed, single encoder), **Gran 2** (dual bed, single encoder) or **Gran 3** (dual bed, dual encoder).

Depending upon the product node connected to the system, options for spinner or injection control may also be available. If the control system detects an injection node, the application types will be limited to liquid injection or granular injection. Refer to the Raven Viper Pro Installation and Operation Manual for more information about spinner control operations.

- Repeat the above process for remaining product nodes or control channels as necessary.
- Touch **OK** to save the currently displayed settings and return to the CAN Controller Status screen.

Rate Cal(s)

- Touch within the **Product Control** area at the bottom of the main screen.
- Make sure that **Node 1** is selected on the CAN Controller Status screen and touch within the second data display, or Product Control Settings area, on the CAN Controller Status screen.

CAN Controller Status

Section Cals		Miscellaneous	
0	100 0 100	Speed Sensor	Radar
0	100 0 100	Speed Cal	1000
0	100	Self Test	0.00
0	100	Packing Press	63
0	100	Speed	0.0
0	100	Units	US
Fan Calibration			
Node 1			
Off Rate %	30	Bin Level Alarm	On Gate AlarmOff
Low Tank	0.0	Bin Press Alarm	Off Smoothing On
Low Limit	0.0	Decimal Shift	On
		Zero Shutoff	Off
Area/Hour	0.0	Cal Weight	2.00
Vol/Min	0.0	Valve Cal	43
Rate Cal	2.0	Pre Set Pw	0
Rate +/-	0.0	Pw Freq	60
Meter Cal	84.0	Valve Delay	0.0
RPM	0.0	PWM	0
		Appl Delay	0.0
		Bin Level % Cal	
Pressure 1	----	Min Pw	1
Pressure 2	----	Max Pw	253
		Application Gran 4	
		PWM Close Valve	
Tally Reg.		CAN Profile	
		OK	

3. Touch the Rate Cal value displayed on the screen and use the on-screen keypad to enter the desired target rate for a product application.

Note: *During the initial set up of the field computer, enter a typical rate for seeding operations. The rate cal will need to be adjusted for different seeding operations on each product control channel prior to starting an actual seeding operation. Contact a local planter or seed supply dealer for assistance.*

4. Repeat the above process for any remaining product nodes or control channels as necessary.
5. Touch **OK** to save the entered value or proceed to the *Bin Level Sensor Calibration* section to continue with the initial set up process.

Bin Level Sensor Calibration

The Seed Hawk® air cart features ultrasonic bin level sensors which automatically detect the level of product remaining in each bin. The bin sensor for each of the products must be calibrated to accurately gauge the amount of product in the bin.

Note: *The air cart bins must be empty to calibrate the bin level sensors.*

1. Touch within the **Product Control** area at the bottom of the main screen.
2. Make sure that **Node 1** is selected on the CAN Controller Status screen and touch within the second data display area, or the Product Control Settings area, on the CAN Controller Status screen.
3. Touch the **Calibrate** button displayed below the current bin level value and follow the on-screen instructions.
4. Repeat the above process for any remaining nodes or product control channels as necessary.
5. Touch **OK** to save the entered value or proceed to the *Meter Cal(s)* section on page 42 to continue with the initial set up process.

Optional Bin Pressure Sensor

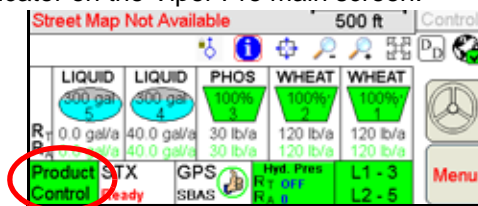
An optional bin pressure sensor may be installed to monitor the air cart bin pressures during operation. The Seed Hawk system monitors the bin pressure while seeding to help ensure that product in each bin is metering properly. The field computer is capable of displaying an on-screen alert if any of the bin pressure sensors detect pressure in the bin falls below a set threshold.

Note: *The bin pressure alarm must be activated to display an alert when the bin pressure drops below the set threshold. Refer to the Feature Settings Area for Products 1-3 section on page 127 for more information on enabling the bin pressure alarm.*

If bin pressure sensors are not used, make sure that the bin pressure alarm is disabled.

To calibrate the bin pressure sensor:

1. Turn off any active fans on the air seeder.
2. Touch the Product Control indicator on the Viper Pro main screen.



The CAN Controller Status screen will display.

CAN Controller Status

Section Cals				Miscellaneous	
1	600	4	120	4	120
1	600	5	120	5	120
1	600	1	120		
1	120	2	120		
2	120	3	120		
3	120				
Fan Calibration				Speed Sensor Wheel	
Product 1 ▼				Speed Cal 100	
Off Rate % 30				Self Test 0.00	
Low Tank 0.0				Speed 2.5	
Low Limit 0.0				Units US	
Area/Hour 0.0				Bin Level Alarm On Smoothing On	
Vol/Min 0.0				Decimal Shift On	
Rate Cal 100.0				Zero Shutoff On	
Rate +/- 4.0				Cal Weight 2.00 Pre Set Pw 0	
Meter Cal 60.0				Valve Cal 43 Pw Freq 122	
RPM 0.0				Valve Delay 0.0	
Pressure 1 100				PWM 0	
Pressure 2 ---				Appl Delay 0.0	
				Bin Level % Cal	
Application Gran 4					
PWM Close Valve					
Tally Reg.				CAN Profile	
				OK	

3. Select the desired product bin to calibrate the corresponding sensor. If multiple bin pressure sensors are installed on a multi-bin air cart, the following steps will need to be repeated to calibrate each sensor individually.
4. Touch the Fan Calibration area to access the Fan Calibration screen.

Fan Calibration

	Cal	Low Limit	High Limit	Cur. Val.	Alarm	Home Disp.
RPM1	2	0	0	0	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
RPM2	2	0	0	0	<input type="checkbox"/> On	<input type="checkbox"/> On
RPM3	0	0	0	0	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
RPM4	0	0	0	0	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
AIR1	---	0.0	0.0	---	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
AIR2	---	0.0	0.0	---	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
AIR3	---	0.0	0.0	---	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
AIR4	---	0.0	0.0	---	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
AIR5	---	0.0	0.1	---	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
AUX1	---	0	0	---	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On

☒ Air/Liquid ☐ Hydraulic

1	2	3	4	5	←←←←←
6	7	8	9	0	- .

Cancel OK

The system offers five bin pressure monitoring channels for use with seeder control systems.

Note: The AUX channel may be used as a sixth bin pressure channel if necessary. Select the type of sensor (Air/Liquid) for bin pressure monitoring and set the values as described below.

Cal. Proceed to the *Bin Pressure Sensor Calibration* section on page 41 to complete the bin pressure sensor calibration.

Low Limit. Enter a value for the low limit to activate an alarm if the bin pressure (AIR) falls below the set value.

High Limit. Enter a value for the high limit to activate an alarm if the bin pressure (AIR) rises above the set value.

Current Value (Cur. Val.). The current bin pressure is displayed in this area for any configured pressure transducers.

Alarm. Enable the alarm option to provide an audible alarm if the bin pressure is outside of the range set by the high or low RPM limits. If this selection is not enabled the Viper Pro will not provide an alarm.

Home Display. Select up to four items displayed on the Fan Calibration screen for display on the Viper Pro main screen during field operations. This option allows the operator to monitor selected components of the seeding system without returning to the Fan Calibration screen.

Note: *If fewer than four items are selected for display on the main screen, the Viper Pro will randomly select additional items for the home display.*

Bin Pressure Sensor Calibration

The Viper Pro field computer is capable of monitoring pressures in PSI [kPa] with the Seed Hawk system. To ensure that the field computer properly monitors the air cart bins, each pressure transducer should be recalibrated at least once a day to ensure the sensor is monitoring pressure in the bins correctly.

Note: The air cart bin pressures are dependent upon ambient conditions. Changing weather patterns or large variations in air temperature may cause the bin pressure sensor to display false errors during seeding operations.

If the system begins to display false bin pressure alarms during an operation, especially if weather patterns or temperature varies significantly from the previous calibration, recalibrate the bin pressure sensor.

To calibrate a bin pressure sensor:

1. Touch the Cal field for the bin pressure sensor to be calibrated.
2. Use the on-screen keypad to enter a value of '0' for the sensor calibration.
3. Touch the **AIR** button to the left of the appropriate bin pressure sensor to set the entered value.

	Cal	Low Limit	High Limit	Cur. Val.	Alarm	Home Disp.
RPM1	2	0	0	0	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
RPM2	2	0	0	0	<input type="checkbox"/> On	<input type="checkbox"/> On
RPM3	0	0	0	0	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
RPM4	0	0	0	0	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
AIR1	---	0.0	0.0	---	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
AIR2	---	0.0	0.0	---	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
AIR3	---	0.0	0.0	---	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
AIR4	---	0.0	0.0	---	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
AIR5	---	0.0	0.1	---	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On
AUX1	---	0	0	---	<input checked="" type="checkbox"/> On	<input type="checkbox"/> On

☒ Air/Liquid ☐ Hydraulic

1	2	3	4	5	←←←
6	7	8	9	0	.

Cancel OK

Note: If the Viper Pro detects a fan speed when the pressure calibration is set, the new value will not be saved by the field computer. Be sure any fans monitored by the Seed Hawk system are toggled off before calibrating the bin pressure sensor.

4. Touch **OK** to return to the CAN Controller Status screen.

Meter Cal(s)

Note: *The meter cal is required when the corresponding product node or control channel will be controlling seed application rates or application of a liquid product. When operating the Viper Pro with a dry or granular product applicator, a spreader constant and product density value will be required to control application. Refer to the Raven Viper Pro Installation and Operation Manual for more information on controlling dry or granular product applications.*

1. Touch within the **Product Control** area at the bottom of the main screen.
2. Make sure that **Node 1** is selected on the CAN Controller Status screen and touch within the second data display area, or the Product Control Settings area, on the CAN Controller Status screen.
3. Touch the meter cal value displayed on the screen and use the on-screen keypad to enter the number of counts detected by the sensor per revolution of the metering roller (products 1-3). The meter cal value for liquid products (products 4-5) will be found on the flow meter connected to the selected product node or control channel.

Note: *When operating with a Seed Hawk hydraulic drive system, use a meter cal value of 60.31. For systems with a high or low rate kit installed with a dual sprocket setup, multiply the normal meter cal value by the number of teeth on the meter shaft and then divide by the number of teeth on the sprocket connected directly to the hydraulic motor to determine the appropriate meter cal value.*

4. Repeat the above process for any remaining nodes or product control channels as necessary.
5. Touch **OK** to save the entered value or proceed to the *Cal Weight* section on page 42 to continue with the initial set up process.

Cal Weight

The cal weight value sets the weight of product applied per revolution of the metering roller. The Viper Pro may be used to help calculate the cal weight value by using the cal weight calibration assistance feature while performing a catch test.


Note: *Make sure the metering roller is full of product before beginning the calibration. If the roller is not full, the test results will be inaccurate.*

The cal weight calibration assistance may also be performed using the remote tank console. Refer to Chapter 9, Remote Calibration Console, to perform the cal weight calibration assistance process using the remote tank console.

Priming the Metering Rollers

1. Set the Seed Hawk switch box as follows:
 - a. Section 1 switch on.
 - b. Section 2 through 8 switches off.
 - c. Master switch off.
 - d. Product 1 switch in manual.
 - e. Product 2-5 switches off.
2. Verify that the weight box is in place and that no product will be spilled on the ground.

3. Toggle the master switch on.



WARNING

The metering rollers will begin turning during the priming procedure. Keep away from moving components and alert anyone around the air cart when performing the priming process.

4. Use the INC/DEC switch to adjust the roller speed while priming the roller.
5. When the roller is primed, toggle the master switch off.
6. Empty the weight box and proceed to the *Catch Test and Cal Weight Calculation* section below to calibrate product 1. To prime remaining product nodes or control channels, toggle the product 1 switch to off, toggle the desired product switch to manual and repeat the above process.

Catch Test and Cal Weight Calculation


1. Set the Seed Hawk switch box as follows:
 - a. Section 1 switch on.
 - b. Section 2 through 8 switches off.
 - c. Master switch off.
 - d. Product 1-5 switches off.
2. Touch within the **Product Control** area at the bottom of the main screen.
3. Make sure that **Node 1** is selected on the CAN Controller Status screen and touch within the second data display area, or the Product Control Settings area, on the CAN Controller Status screen.
4. Touch the **Calibration Assistance** button below the cal weight value. The Cal Weight Calibration screen will display.

Note: *The application type must be set for Gran 4 in order to use the cal weight calibration assistance feature. See the Application and Control Valve Type(s) section on page 35 for more information on selecting the application type.*

5. Verify that the weight box is in place and that no product will be spilled on the ground.

Note: *Make sure the metering roller is full of product before touching **Begin Calibration**. If the roller is not full, the test results will be inaccurate. Perform the Priming the Metering Rollers section on page 42 to ensure the rollers are properly primed.*

6. Touch the **Begin Calibration** button.
7. Toggle the product 1 switch to manual.
8. Toggle the master switch on.



WARNING

The metering rollers will begin turning during the calibration procedure. Keep away from moving components and alert anyone around the air cart when performing the calibration process.

9. Dispense product until a sufficient weight of product is in the weight box or the weight box is full.
10. Toggle the master switch off.
11. Touch the **End Calibration** button.

12. Weigh the product dispensed (minus the weight box) and enter the weight in the cal weight calibration assistant.
13. Touch the **Calculate** button. Viper Pro will calculate the cal weight value and enter the value on the Node Settings screen.
14. Toggle the product 1 switch off. To perform a catch test for additional product nodes or control channels, toggle the appropriate product switch to manual and repeat the above process as necessary.
15. Touch **OK** to save the entered value or proceed to the optional *Valve Cal(s)* section if applicable to continue with the initial set up process.

Valve Cal(s)

Note: *The Viper Pro automatically enters the recommended valve cal value for the valve type selected during the procedure in the Application and Control Valve Type(s) section on page 35.*

1. Touch within the **Product Control** area at the bottom of the main screen.
2. Make sure that **Node 1** is selected on the CAN Controller Status screen and touch within the second data display area, or the Product Control Settings area, on the CAN Controller Status screen.
3. Touch the **Next** button to view additional settings for the selected product node or control channel.
4. Touch the displayed valve cal value and use the keypad to enter the calibration value for the installed control valve.

Note: *Raven recommends the following initial valve cal values:*

Valve Type	Calibration Value
Standard Valve	2123
Fast or Fast Close Valve (C-F or C-FC)	743
PWM or PWM Close Valve (C-P or C-PC)	43
(Injection Pump) Motor Control Node (select Standard Valve type)	123

These values are good starting points and will generally yield adequate results, however, the valve cal should be refined for the individual control valves installed on the specific machine. Refer to Appendix A, Calculating the Calibration Values, for more information on calculating the valve cal.

For ground drive carts use the standard valve cal as the initial valve cal value. For hydraulic drive carts, enter the PWM close valve value as the initial value. These values are good starting points and will generally yield adequate results, however, the valve cal should be refined for the individual control valves installed on the specific machine. Refer to the *Valve Cal* section on page 237 for more information about adjusting the valve cal.

Note: *When operating a hydraulic drive system at extremely low seed application rates, the valve cal may need to be adjusted to slow the PWM close valve and keep the seed rate from fluctuating at these low rates.*

5. Repeat the above process for any remaining nodes or product control channels as necessary.
6. Touch **OK** to save the entered value or proceed to the optional *Valve Cal 2 (Optional)* section if applicable to continue with the initial set up process.

Valve Cal 2 (Optional)

The valve cal 2 value may be used to fine tune control valve response and reduce application rate oscillations when using a Fast Close, PWM or PWM Close control valve.

Fast Close Valves. When using a fast close valve to control product application, valve cal 2 is utilized to enable a high resolution rate control for lower application rates. Enter a non-zero value for the time, in milliseconds, which the valve will be fully opened before switching into high resolution control. For example, a value of 200 will give the valve a 200 millisecond “burst” at a full 12V to open the control valve from the closed position before resuming product rate control. A zero value will disable this feature.

Note: *When used with a Fast Close valve, the valve cal 2 feature requires product node software version 1.40 or higher for operation.*

PWM or PWM Close Valves. The valve cal 2 feature is not used with all systems or application equipment. Refer to the OEM operation manual for instructions on using the valve cal 2 feature with PWM or PWM Close control valves.

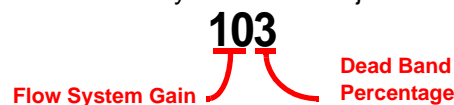
Dual Loop Control Cals

The following calibration values will replace the valve cal and valve cal 2 values if the dual loop control feature is enabled. See the *Dual Loop Control* section on page 134 for details on the dual loop control mode. Refer to the *Node Feature Settings Screen (Page 2)* section on page 128 for information on enabling the dual loop control feature.

Flow Cal

Note: *It is recommended to set the Sgain value prior to making any adjustments to the flow cal value.*

The flow cal value has two components which may be used to adjust the response of the application system.



Flow System Gain. The first digit(s) of the flow cal correspond to a flow system gain between 1 and 99. The higher the flow system gain, the more aggressive the system will respond to changes in flow rate.

Note: *When entering a flow gain value from 1 to 9, it is not necessary to enter a zero in front of the value.*

If the system adjusts to rate control changes too slowly, increase the flow gain digit(s) to increase the system response rate. If the system overshoots or oscillates around the desired flow rate, decrease the flow gain digit(s) to help stabilize the system.

Dead Band Digit. The last, or right most, digit in the flow cal value is the dead band digit. The dead band digit is the allowable difference between the target rate and the actual application rate. The values range from 1 to 9, where 1 equals 1% difference and 9 equals 9% of the difference.

Pr SGain (Pressure System Gain)

The default setting for the Sgain value is 100. To adjust the system aggressiveness, enter a value between 1 and 999 as necessary.

Note: *It is recommended to increase or decrease the current value in increments of 10 or less when making adjustments to the Sgain setting. If the new value does not produce significant or notable changes in the system response, increments of 20 may be used.*

Increase the Sgain value if the observed product pressure increases too slowly or if the system takes a long time to reach a set standby pressure or rate input change. If the system is consistently over shooting a set standby pressure or oscillating around a target rate, decrease the Sgain value until the system stabilizes.

Fan Cal

The Seed Hawk Viper Pro must be calibrated to monitor the fans used to provide air flow for product bins on the air cart.

To configure the air cart fans from the Viper Pro main screen:

1. Touch within the **Product Control** area at the bottom of the main screen.
2. Touch the Fan Calibration area on the CAN Controller Status screen to display the Fan Calibration screen.

Cal. Enter the number of pulses detected by the fan sensor per revolution of the fan. Typically, this value will be 2.

Low Limit. Enter a value for the low limit to activate an alarm if the fan speed (RPM) falls below the set value.

Note: *If the fan alarm is enabled when operating with ground drive systems, the master clutch will not activate unless the fan RPM is above the low limit to prevent plugging seed tubes if the fan is not providing enough air flow to move product.*

High Limit. Enter a value for the high limit to activate an alarm if the fan speed (RPM) rises above the set value.

Alarm. Enable the alarm option to provide an alarm if the fan speed is out of the range set by the high or low RPM limits. If this selection is not enabled the Viper Pro will not provide an alarm if the fan speed is out of range.

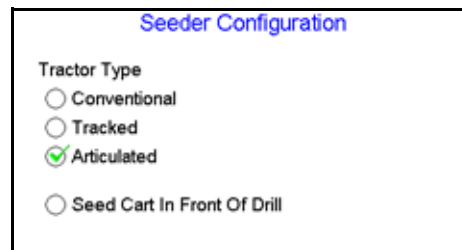
Note: *If the fan speed is below the low limit when operating with ground drive systems, the master clutch will not enable.*

Section Setup

The Seed Hawk Viper Pro must be configured for the specific vehicle and drill being used for seeding applications. To ensure the best possible results, the Section Setup Wizard should be completed if any part of the seeding system (i.e. tractor or drill) is changed.

Note: *If multiple tractors or drills may be used, be sure to save each profile with detailed profile names to help identify specific profiles at a later date.*

1. Select **Menu**, **Setup**, and **Sect**. The Seeder Configuration screen displays.



2. Select the tractor type that best describes the vehicle used to pull the seeder during actual seeding operation. Select one of the following tractor types:
 - Conventional - Standard wheeled tractor with front wheel steering.
 - Tracked - Tractor with a set of continuous tracks instead of wheels.
 - Articulated - Tractor steered by articulating at a pivoting joint.
3. If the seed or air cart is pulled in front of the drill, select the **Seed Cart in Front of Drill** option and select either a Two Wheel or Four Wheel Cart.
4. Touch the **Next** button in the lower right corner to advance to the selected tractor type setup screen.

Tractor Setup

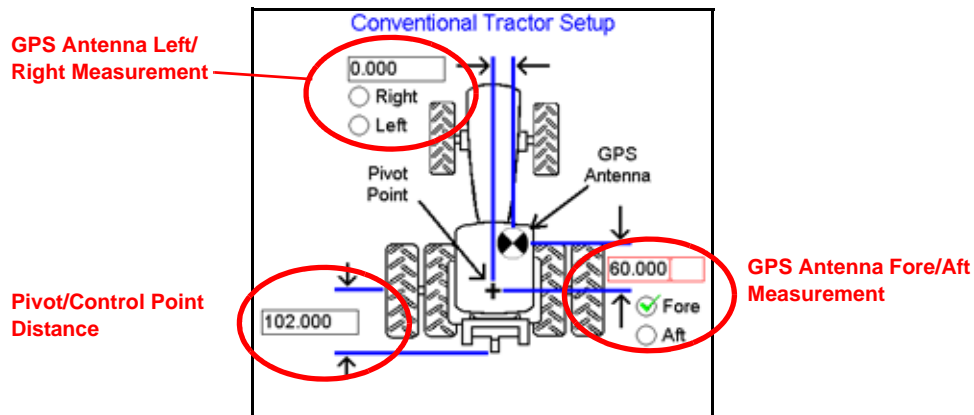
The tractor setup screens configure the relative locations of the GPS antenna, the control point or hitch, and the pivot point. These points may be different for the specific tractor type selected. See the *Conventional Tractor Setup* section on page 48, *Tracked Tractor* section on page 49, or *Articulated Tractor* section on page 49 for detailed instructions on locating and measuring these points.

Note: All measurements should be taken with respect to the pivot point of the vehicle. If required, set the fore/aft or left/right selections with respect to the pivot point and facing toward the front of the vehicle.

Be sure to enter each measurement in the units displayed above the on-screen keypad. See the *Display Units* section on page 32 for assistance to change the units of measure.

Conventional Tractor Setup

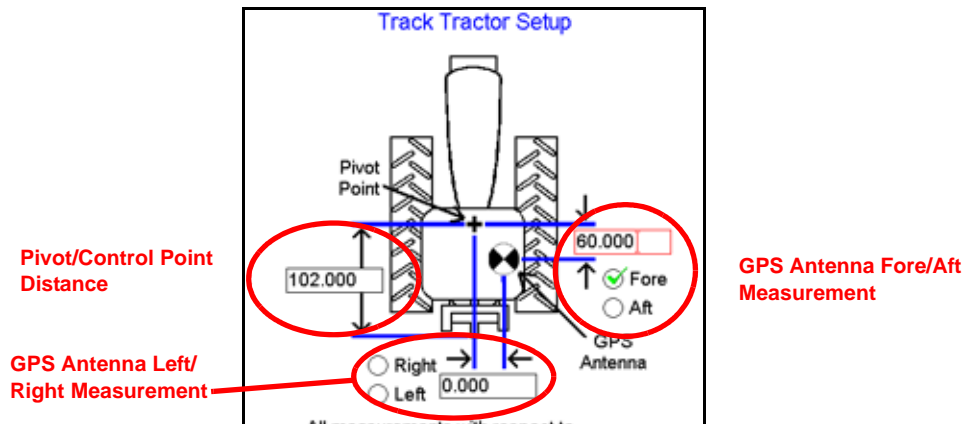
Note: The pivot point of a conventional tractor is the center of the rear axle.



1. Enter the left/right offset of the GPS antenna from the pivot point. The left/right offset must be measured parallel to the vehicle rear axle.
2. To determine the offset direction, at the pivot point and facing toward the front of the vehicle, is the antenna to the left or to the right? Select the direction of the left/right offset.
3. Enter the fore/aft offset of the GPS antenna from the pivot point. The fore/aft offset must be measured perpendicular to the vehicle rear axle.
4. To determine the offset direction, at the pivot point and facing toward the front of the vehicle, is the antenna in front (fore) or behind (aft) of the pivot position? Select the direction of the fore/aft offset.
5. Measure the distance from the pivot point (center of the rear axle) to the control point or hitch.
6. Touch the **Next** button and continue to the *Cart Setup* section on page 50 or the *Drill Setup* section on page 51.

Tracked Tractor

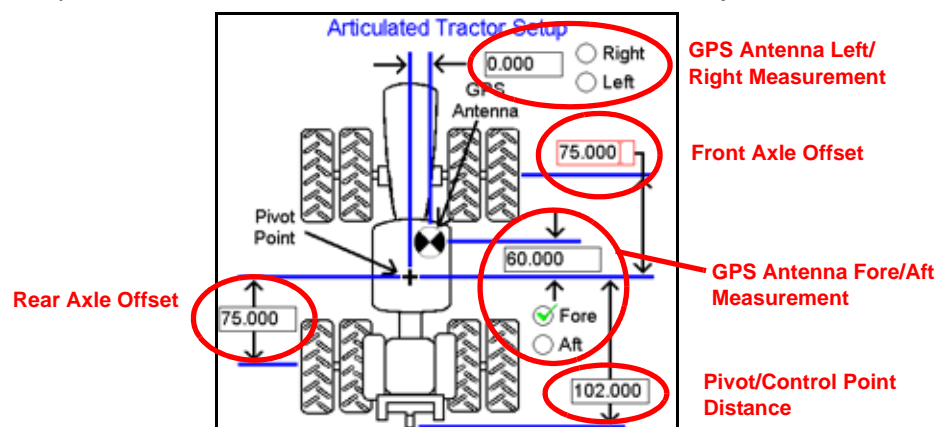
Note: The pivot point of a tracked tractor is in the center of the track length on the center-line of the vehicle.



1. Enter the left/right offset of the GPS antenna from the pivot point. The left/right offset must be measured perpendicular to the direction of forward travel.
2. To determine the offset direction, at the pivot point and facing toward the front of the vehicle, is the antenna to the left or to the right? Select the direction of the left/right offset.
3. Enter the fore/aft offset of the GPS antenna from the pivot point. The fore/aft offset must be measured parallel to the direction of forward travel.
4. To determine the offset direction, at the pivot point and facing toward the front of the vehicle, is the antenna in front (fore) or behind (aft) of the pivot position? Select the direction of the fore/aft offset.
5. Measure the distance from the pivot point (center of track length) to the control point or hitch.
6. Touch the **Next** button and continue to the *Cart Setup* section on page 50 or the *Drill Setup* section on page 51.

Articulated Tractor

Note: The pivot point of an articulated tractor is center of the articulation joint.



1. Enter the left/right offset of the GPS antenna from the pivot point. The left/right offset must be measured perpendicular to the direction of forward travel.
2. To determine the offset direction, at the pivot point and facing toward the front of the vehicle, is the antenna to the left or to the right? Select the direction of the left/right offset.
3. Enter the fore/aft offset of the GPS antenna from the pivot point. The fore/aft offset must be measured parallel to the direction of forward travel.

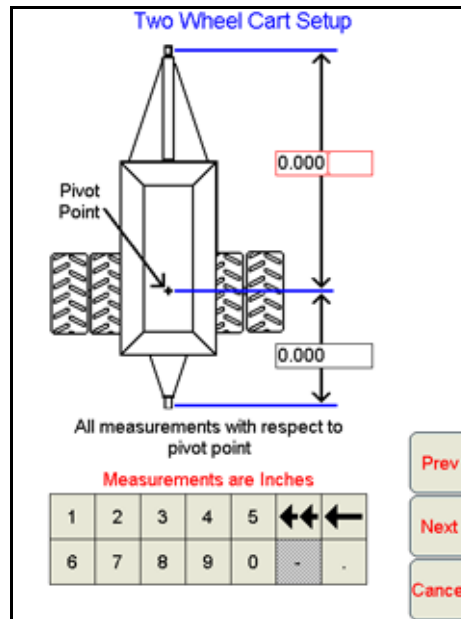
4. To determine the offset direction, at the pivot point and facing toward the front of the vehicle, is the antenna in front (fore) or behind (aft) of the pivot position? Select the direction of the fore/aft offset.
5. Measure the distance from the pivot point to the center of the front axle.
6. Measure the distance from the pivot point to the center of the rear axle.
7. Measure the distance from the pivot point (center of track length) to the control point or hitch.
8. Touch the **Next** button and continue to the *Cart Setup* section on page 50 or the *Drill Setup* section on page 51.

Cart Setup

Note: The Two Wheel or Four Wheel Cart Setup screens will only display if the **Seed Cart in Front of Drill** option was selected on the Seeder Configuration screen. Touch the **Prev** button to return to previous screens and select this option if necessary. Refer to the Two Wheel Cart Setup section on page 50 or the Four Wheel Cart Setup section on page 51 for additional assistance.

Two Wheel Cart Setup

Note: A two wheel cart has a single pivot point at the center of the cart axle.



1. Enter the length from the cart hitch to the cart pivot point. The hitch length must be measured perpendicular to the cart axle.
2. Measure the distance from the pivot point to the cart control point or hitch.
3. Touch the **Next** button and continue to the *Drill Setup* section on page 51.

Four Wheel Cart Setup

Note: A four wheel cart has two pivot points at the center of each cart axle.

Four Wheel Cart Setup

Pivot Point

0.000

0.000

0.000

All measurements with respect to pivot point

Measurements are Inches

1	2	3	4	5	←←←←
6	7	8	9	0	.

Prev

Next

Cancel

1. Enter the length from the cart hitch to the pivot point on the first cart axle. The hitch length must be measured perpendicular to the cart axle.
2. Measure the distance from the first pivot point to the rear cart axle.
3. Measure the distance to the cart control point or hitch.
4. Touch the **Next** button and continue to the *Drill Setup* section on page 51.

Drill Setup

The Drill Setup screen configures the Viper Pro for the specific drill used with the Seed Hawk system.

Note: The pivot point of the drill is located between the implement wheels.

Drill Setup

Pivot Point

384.000

720.000 Width

75.000

Fore

Aft

Number of Sections 8

Make all sections equal width

Prev

1. Enter the total width of the drill as specified by the manufacturer.
2. Measure the distance from the implement hitch to the drill pivot point (center of the implement axle).
3. Measure the fore/aft offset of the drill pivot point (center of implement axle) to the rear most row of openers. The fore/aft offset must be measured parallel with the direction of forward travel.

4. Select the direction of the opener offset from the implement pivot point.
To determine the offset direction, at the drill pivot point and facing toward the front of the vehicle, are the openers in front (fore) or behind (aft) of the drill pivot position? Select the direction of the fore/aft offset.
5. Enter the number of sections on the drill.

Note: When operating a Base system, the number of configured sections must be set to 1, 2, or 5 sections.

6. If the sections on the drill are equal width, select the **Make all Sections Equal Width** option to divide the implement width equally between the number of sections.
7. Touch the **Next** button to proceed to the Section Width Setup screen.

Base Systems

The following procedure contains information for configuring section widths for Seed Hawk Base systems. See the *SCT™ Systems* section on page 53 for information on the Section Width Setup screen for systems with the SCT system installed.

1. Base systems will control products 1 through 3 across the implement width. To ensure proper rate control of these products, enter the implement width as the section 1 width value.

Note: In a Base system, the first section must always set to the full drill width and is assigned to products 1 through 3 applied from the air cart. The section 1 switch on the Seed Hawk switch box toggles all of the air cart bins simultaneously for the entire drill width.

2. Optional liquid products may be controlled in up to four sections. To configure the remaining section widths, divide the total implement width by the number of remaining sections.

Note: To change the number of configured sections, touch the **Prev** button to go back to the Drill Setup screen. See Chapter 8, *Sectional Control Technology™ (SCT)* for more information on SCT and Base systems.

3. Touch the **OK** button to accept the programmed settings and return to the Viper Pro main screen.

SCT™ Systems

The following procedure contains information for configuring section widths for Seed Hawk SCT systems. See the *Base Systems* section on page 52 for information on the Section Width Setup screen for the Seed Hawk Base systems.

1. Enter the width of each section configured on the previous screen starting with section 1 on the far left of the implement.

Section Width Setup

Please enter the width of each section of the implement. Section 1 is on the left as viewed from the drivers seat.

Section	Width	Section	Width
1	90.000	5	90.000
2	90.000	6	90.000
3	90.000	7	90.000
4	90.000	8	90.000

Measurements are Inches

1	2	3	4	5	←←←
6	7	8	9	0	- .

Prev

Cancel

OK

To determine the width of a section, multiply the number of shanks in the section by the row spacing. The number of shanks in a section may be determined by counting the supply lines on each tower of the drill.

Note: To change the number of configured sections, touch the **Prev** button to go back to the Drill Setup screen.

2. Touch the **OK** button to accept the programmed settings and return to the Viper Pro main screen.

Note: If a seed blockage node is connected to the Seed Hawk Viper Pro, touch the **Next** button displayed on this screen to set up the sensor loops. Refer to Chapter 10, Seed Blockage Sensors, for more information on setting up the seed blockage feature with the Seed Hawk system.

Profiles

Once the initial set up is complete for the machine settings, it is recommended to save a machine profile. The profile stores many of the settings previously set during the initial set up procedure as well as any communication port settings, customized section configurations and guidance feature settings.

If the Viper Pro will be used with different machines or application equipment, profiles allow the operator to quickly re-configure the field computer for the specific application and equipment type.

Note: Profiles do not store any information contained in the CAN nodes.

Saving Profile Information

1. Select **Menu**, then **Setup**, **Local**, **Profile**, and **Save Profile**. The Save Profile screen opens.

The screenshot shows a screen titled "Save Profile". Below the title is the label "Profile Name". There is a text input field containing the text "Seed Hawk". At the bottom right of the screen are two buttons: "Cancel" and "OK".

2. Using the screen keyboard, enter a name for the profile.
3. Touch **OK**. A confirmation screen displays.

Note: Before saving a profile, make sure that all settings are correct.

4. Touch **OK**. Viper saves the profile information to the system.

Loading a Saved Profile

1. Select **Menu**, then **Setup**, **Local**, **Profile**, and **Load Profile**. The Select Profile screen displays.
2. Select a profile from the list.

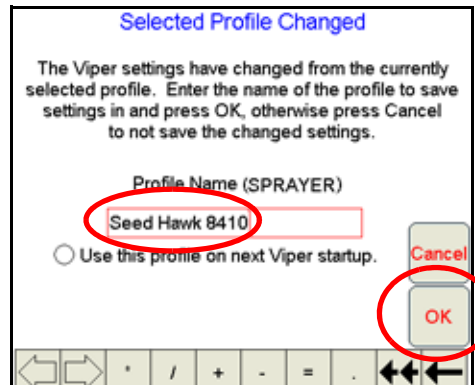
The screenshot shows a screen titled "Select Profile". Below the title is a file explorer view showing the path "D:\viper\data\settings\". There are two files listed: "SCT Ready.ini" and "Seed Hawk 8410.ini", both with a date of "07Apr20 00:01". At the bottom right of the screen are two buttons: "Cancel" and "OK".

3. Touch **OK**. A confirmation screen displays.
4. Touch **OK**. Viper restarts with the new profile loaded.

Profile Changes

If any of the settings saved within a profile are changed during operation of the field computer, the Viper Pro will prompt the operator to save the current profile settings before the field computer is powered down.

To save the current set up in a new profile, type in a new profile name and touch **OK**.

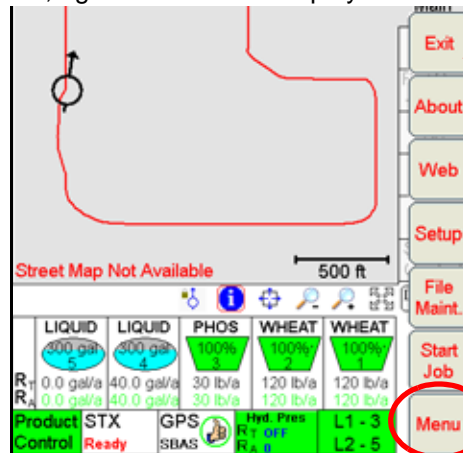


Note: Enable the 'Use this profile on next Viper startup' option to load and use the new profile the next time the field computer is powered on.

Powering Down the Viper Pro

It is always recommended to shutdown the Viper Pro prior to removing power from the field computer. To properly power down the field computer:

1. Touch the **Menu** button in the lower, right corner of the display.




2. Select the **Exit** button. The Exit Viper prompt will display on the field computer.



3. Select **Exit to Menu** to view the Program Selection Menu, **Shutdown Viper** to power down the field computer, or **Cancel** to resume the Viper Pro program.

Note: Refer to the Start Up section on page 20 for details on the Program Selection Menu options.

If a Job is in progress when the exit button is selected, the Viper Pro will display a warning alerting the operator. Raven recommends closing any open jobs before exiting the Viper Pro application to avoid losing job information.

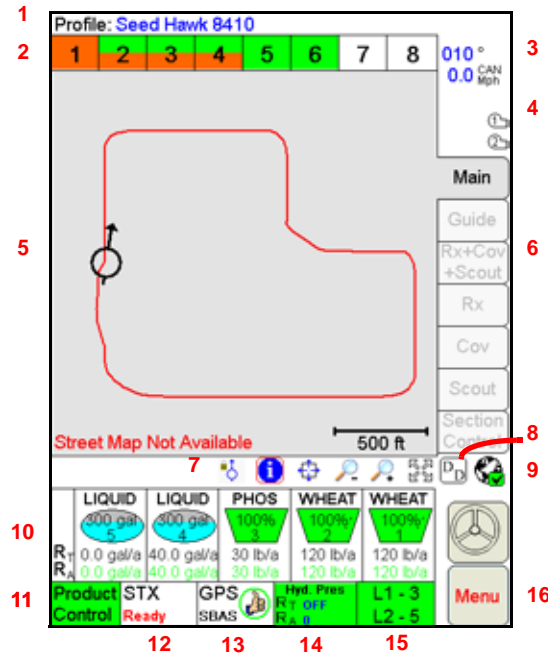
	CAUTION
	Pressing and holding the Power button to shutdown the Viper Pro may result in a loss of field application data and is not recommended. Holding the power button to shut off the field computer should only be used in situations when the standard power down procedure is not possible.

Navigating the Viper Pro Interface

The following sections provide an overview to navigation of the Viper Pro user interface and may be used to familiarize operators to various information displays on the Viper Pro touchscreen and for help navigating through settings screens and menus. Detailed information about the individual settings may be found in Chapter 7, *Advanced Settings and Features*.

Main and Job Screen Displays

The following information can be found on the Viper Pro screen:



1. Active Profile or Product Selection	2. Section Status	3. Vehicle Heading and Speed	4. Fan RPM and Pressure
5. Map Area	6. Tabs	7. Map Tools	8. Display Data
9. Wireless Communication Status	10. Product Rates Area	11. Product Control Status Display	12. SmarTrax Status Indicator (if present)
13. GPS Status Display	14. Packing Pressure	15. Seed Blockage Sensor Status (optional)	16. Menu

Active Profile and Product Selection

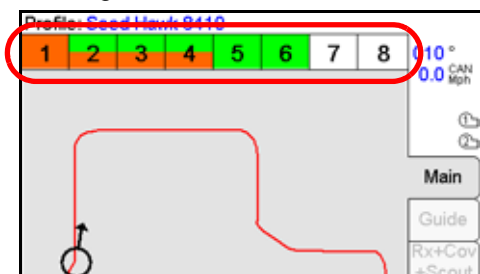
The active profile is displayed above the map area on the Main tab. Before starting a job, be sure that the correct profile is selected.

During an active job, the map area displays coverage or as-applied information based upon the product node or control channel selected in this area.

Note: The Viper Pro may also display an on-screen light bar at the top of the screen during an active job. Refer to the Light Bar Guidance section on page 168 to enable the on-screen light bar feature.

Section Status Indicators

The Section Status area displays the configured sections and their current status.



Note: For more information on configuring the sections and vehicle, see Section Setup section on page 47. Touch within the Section status area to configure the section control settings and Seed Hawk switch box. Refer to Chapter 8, Sectional Control Technology™ (SCT), for detailed configuration instructions.

The status indicators display the current status of the meter gates and openers for each section during an active job.

	SCT Position (Section Enabled/ Not Active)				Section On		Section Switch Off	
Gates	1	2	3	4	5	6	7	8
Openers	1	2	3	4	5	6	7	8

Section Off. Any section switches toggled to the off position will display a white background for that section (sections 7 and 8 above). This indicates that, for this section, all meter gates are closed and the openers are up.

Section On. A green section display indicates that the section switch is either in the on position or in the 'ACCU' position for automatic section control and that the section is currently controlled on. A green section display (sections 5 and 6 above) indicates that the section switch is in either the on or SCT position and that the meter gates are open and the openers are in the ground.

Note: Sectional Control will not automatically control meter gates and openers unless the section switch is in the SCT position. See Chapter 8, Sectional Control Technology™ (SCT) for more information on the status indicators with the SCT and Base systems.

Meter Gates. The upper half of each section indicator displays the status of the meter gates for that section. If any one of the meter gates for product 1, 2, or 3 is open for that section, this area will appear green. If the section switch is in the SCT position, and the SCT system is enabled, the meter gates indicator displays red for any sections for which all gates are closed.

Openers. The lower half of the section status display shows the current status of the openers. When the opener is in the ground, the lower half will display green. If the section switch is in the SCT position, and the SCT system is enabled, the openers indicator will display red if the openers for that section are out of the ground, or in the process of lowering or lifting.

Vehicle Heading and Speed

The Viper Pro displays the current GPS course over ground, in compass degrees, and the reported speed from a ground speed sensor or GPS receiver.

Note: A heading of 000° indicates magnetic north.

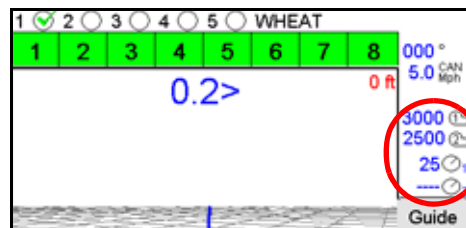
The Viper Pro speed display indicates both the detected vehicle speed as well as the source and use of the displayed speed.

- If 'CAN' is displayed in the speed area, the Viper Pro is registering speed from the Raven CANbus control system. The Viper Pro is also using the displayed speed value for speed compensated product rate control.
- If 'GPS' is displayed in the speed area, the Viper Pro is monitoring speed from a GPS receiver (e.g. an Invicta or Phoenix series receiver). 'GPS' will be displayed when the Viper Pro is connected to an optional Raven serial control console. In this instance, the speed displayed on the Viper Pro is for reference only and is not used to adjust product rate. Verify that the speed reading on the serial controller is accurate.

Review the *Speed Sensor Type and Cal* section on page 33 if the speed reported by the Viper Pro does not approximate the actual vehicle speed.

Bin Pressure and Fan RPM Display

The monitored fan RPM is displayed on the Main screen.



Review the *Bin Pressure Sensor Calibration* section on page 41 or *Fan Cal* section on page 46 for information on calibrating and setting options for the bin pressure or fan RPM display. Up to four displays may be shown in this area on the Viper Pro main screen for monitoring during field operations.

Map Area and Tab Views

The map area displays the current GPS location of the vehicle. This area may be used both in the field during product application and when driving between fields to help identify target application areas for the operator.

The tabs displayed along the right side of the screen can be used to access different features of the application currently in progress or display specific application or field feature information.

Note: Refer to the *Tabs* section on page 86 for detailed information on the tab displays and additional features available from each tab view. Some tab views require additional features or system components to enable operator access. Refer to Chapter 5, *Using the Seed Hawk® Viper Pro System*, for details on starting jobs and enabling features during the job set up process. For assistance with adding additional features to the Viper Pro, contact a local Raven dealer.

Main Tab. The Main tab is only available when the field computer is not providing guidance or logging application or field data in an active job. The Main tab displays the current vehicle location with respect to previously saved field boundaries or on a street map (if available) to help navigate between fields.

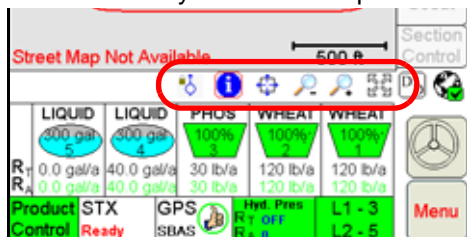
Note: Refer to the *Street Maps* section on page 152 for assistance loading street maps on the Viper Pro field computer.

The Main tab view also displays the active profile at the top of the screen.

Guidance and Coverage Tabs. During an active job, the operator may select the tabs along the right side of the screen to review guidance or application and field information logged during the current job in the map area. Refer to Chapter 5, *Using the Seed Hawk® Viper Pro System*, for more details about the information displayed using the tab views.

Map Tools

Several screen navigation tools are located directly below the Maps area on the Viper Pro main screen.




A red box appears around an active screen tool. To use a tool, simply touch the desired tool icon and touch the area of the Map to perform the selected action.

The screen tools available in this area will vary slightly depending upon which tab is active on the display.

Note: Refer to the *Screen Icons* section on page 115 for information on additional screen tools available on the *Guide* tab during active guidance applications.

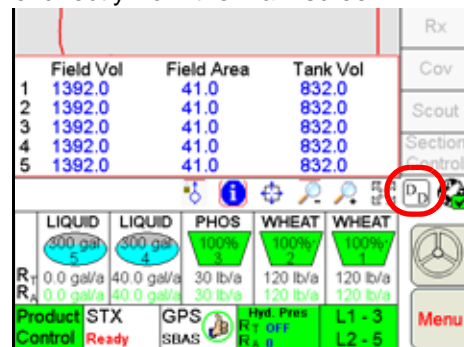
Icon	Description
	<p>When the Vehicle Lock tool is active, the field computer will automatically pan the display to show the current vehicle position as the vehicle indicator moves off of the screen.</p> <p>To activate the vehicle lock, touch the lock icon until a red box is displayed on the icon.</p>
	<p>The Information tool is available on the Main tab or on the Scout tab during an active job.</p> <p>Use the Information tool to view information on field specific features such as area contained within a boundary, field name, etc. To use the Information tool:</p> <ol style="list-style-type: none"> 1. Touch the Information icon until a red box displays on the icon. 2. On the Main tab, touch within a field boundary displayed in the map area to view job and field information. From the information window displayed, the operator may delete, view, or resume the previous job or begin a new job using the displayed field boundary. Refer to the <i>Using an Existing Field Boundary</i> section on page 83 for additional information. 3. On the Scout tab, touch within a field boundary (line displayed in black) to display field area. Note: If the field boundary has been used to create an application zone (line displayed in blue), the area information is no longer associated with the boundary.
	<p>The Prescription (Rx) tool is available on the Rx and Cov tabs if a prescription map has been loaded for the job in progress. The Prescription (Rx) tool may be used to view rate zone or applied coverage information. To use the Prescription (Rx) tool:</p> <ol style="list-style-type: none"> 1. Touch the Prescription (Rx) icon until a red box displays on the icon. 2. Touch the map area. The field computer displays rate information for the selected area.
	<p>The Pan icon may be used to manually pan the map area display. To use the pan tool:</p> <ol style="list-style-type: none"> 1. Touch the Pan icon until a red box displays on the icon. 2. Touch the map area. The selected area will become the center of the map view. Touch near the sides or corners of the map area repeatedly to pan to areas outside of the immediate field area display.
 	<p>The Zoom tools allow the operator to adjust the viewable area of the map display. Note: although map detail may be affected by zooming in or out on the display, the control system is not affected by the level of detail shown in the map area.</p> <p>To use the Zoom tools:</p> <ol style="list-style-type: none"> 1. Touch the Zoom In or Zoom Out icon until a red box displays on the desired icon. 2. Touch the map area. The field computer will increase or decrease the viewable area. Repeated zooming allows the operator to continue to adjust the map display.

Icon	Description
	<p>The Map Extents tool quickly adjusts the map zoom to display all map features or field information. Use this tool to avoid using the zoom and pan tools to return to a complete field map or to display all field boundary areas currently stored on the Viper Pro regardless of current GPS location.</p> <p>Note: To return to the current GPS position, select the Vehicle Lock icon.</p>

Display Data

Note: *Display Data is only accessible if the Viper Pro is set as the CAN controller.*

Touch the Display Data icon to access an overview of the tally register or current active alarm information for each product node or control channel directly from the main screen.



The field volume, field area, tank volume, total volume, total area, and area per hour tallies are displayed within the display prompt. Touch the display data prompt to cycle through the available data displays including weather information if the optional hardware is installed. To hide the data prompt, touch the Display Data icon again.

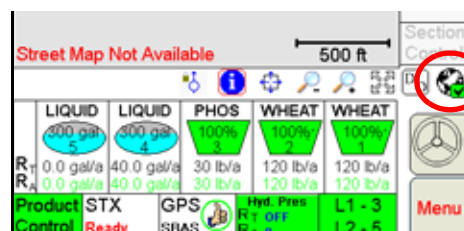
Note: *The data tallies displayed are also available by touching within the Product Control area and selecting the **Tally Registers** button at the bottom of the CAN Controller Status screen.*

The display data prompt is for display purposes only and the tallied information cannot be modified from this view. To modify the data displayed, refer to the Tally Registers section on page 95. See Appendix F, Weather Station, for information on displaying weather data in this area using the optional weather station.

Information for any active alarm conditions is also displayed in this area. If an alarm condition is detected, the Display Data icon will change to a red alarm icon. Touch the alarm icon to display information such as the control channel and alarm type currently active.

Wireless Communication Status

The status of wireless communications is displayed on the Viper Pro main screen in the tool bar below the map.



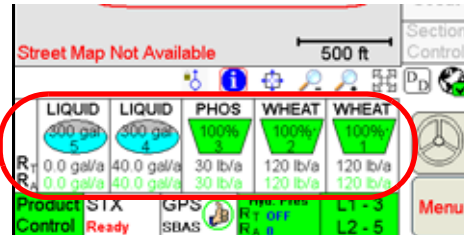
Wireless
Communication
Status Icon

Note: For more information on using the wireless communication features with the Viper Pro, see Appendix G, Wireless Communications and Remote Service.

For instructions on installing and setting up the Slingshot Field Hub, refer to the Field Hub Installation Guide provided with the wireless device.

Product Rates Area

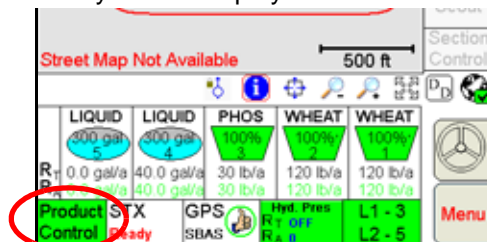
The current target (R_T) and actual (R_A) application rate is displayed for each product node or control channel in the product rates area. The product rates area also displays a bin or tank level for each product currently detected on the CANbus.



Note: Only products detected on the CANbus will appear in the application rates area. Refer to the Bin Level Sensor Calibration section on page 38 to calibrate the air cart bin level sensors. See the Tank Volume section on page 139 for more information on setting the tank or bin levels for additional products.

Product Control Status Display

The Product Control Status of the CAN system is displayed in this area.



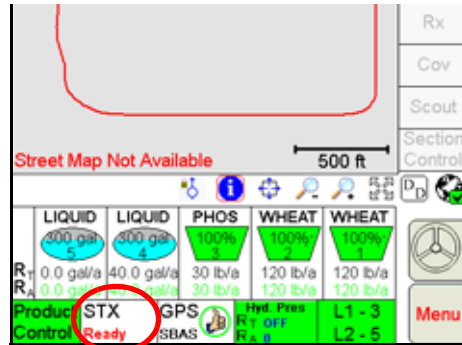
The status indicator displays red if communication with the CANbus system is not available. The status area will display in yellow symbol if the Viper Pro detects a problem with the CANbus system such as an alarm condition. The status indicator will display in green during normal operation.

Touch the Product Control Status or indicator to view the CAN Controller Status screen and access the Node Setup screens when connected to a Raven CANbus system.

Note: See the Controller Status Screen section on page 65 for an overview of the settings and information areas displayed on the CAN Controller Status screen. Review Chapter 7, Advanced Settings and Features, for more information on the Product Control status and using the CAN Controller Status screens on the Viper Pro field computer.

SmarTrax Status Area and Steering Indicator

If an optional SmarTrax system is installed with the Viper Pro, the status of the system will be displayed in this area.

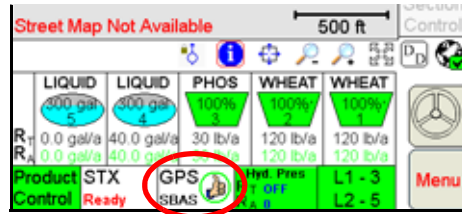


If the SmarTrax system is engaged, the steering indicator will display a green steering wheel with the 'A' as shown above. When the SmarTrax system is disengaged, the steering wheel will be grey and no A will appear.

Note: Refer to the SmarTrax Calibration and Operation Manual for additional information.

GPS Status Display

The current status of DGPS reception, as well as the current source for differential corrections is displayed in this area on the main screen.



Note: This indicator is not necessarily the status of the GPS Receiver or the availability of DGPS reception.

The DGPS Status Indicator displays a green “thumbs-up” if all required messages are being received and updated normally. The indicator changes to a red “X” if GPS information is unavailable or the field computer is not receiving GPS information from the receiver. A yellow “caution” symbol is displayed if the GPS differential data has not been updated in the last 15 seconds, if the HDOP (Horizontal Dilution of Precision) exceeds 2.0, or when any other system “cautionary conditions” are met. Touch the GPS Status Indicator to view the GPS Status screen.

Note: Touch the DGPS status indicator to display the GPS Status screen. Refer to the GPS Status Screens section on page 144 for details on using the GPS Status screen.

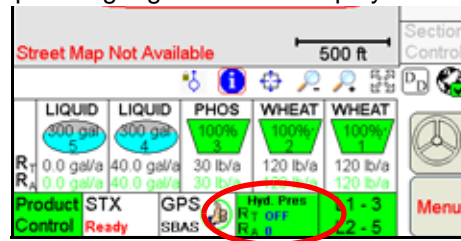
When connected to a compatible GPS receiver, the Viper Pro will display the source of GPS corrections currently received. An audible tone will sound anytime the correction source changes. The Viper Pro will display the following on the Main screen:

- SBAS - This mode displays with any Satellite Based Augmentation System such as WAAS, CDGPS, OmniSTAR VBS, etc.
- OmXP - This mode is displayed with the OmniSTAR XP service selected for differential corrections.
- OmHP - This mode is displayed with the OmniSTAR HP service selected for differential corrections.

- **FLT (Float)** - This mode indicates that the receiver is not able to provide a full RTK position lock due to the distance from the base station, visibility of the sky, time of day or interference around the base station location. In the float mode, the receiver is still providing a course RTK correction signal, but accuracy of the receiver may not be at a sub-inch level.
- **RTK** - This mode indicates that the receiver has a full RTK position fix and is providing sub-inch corrections.

Packing Pressure

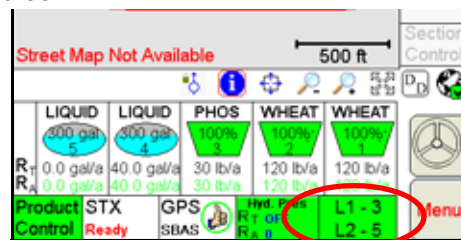
The current pressure applied to the packer gauge wheels is displayed in the Packing Pressure area.



The packing pressure value displays the packing pressure in PSI (English) or kPa (Metric) based on the display units selected during set up of the field computer. Toggle the Packing Pressure switch on the Seed Hawk switch box to increase or decrease the packing pressure.

Seed Blockage Sensors

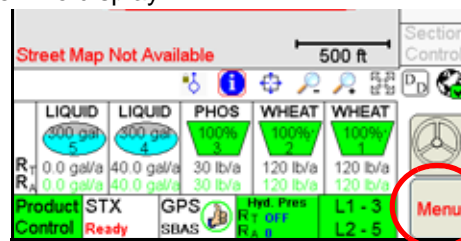
If an optional seed blockage sensor system is connected to the field computer, the status of the air system will be displayed at the bottom of the screen.



Refer to Chapter 10, *Seed Blockage Sensors*, for details on set up and operation of the seed blockage system with the Seed Hawk Viper Pro.

Menu

Various configuration and feature settings for the Viper Pro control system are accessible via the 'Menu' button in the lower, right corner of the Viper Pro display.



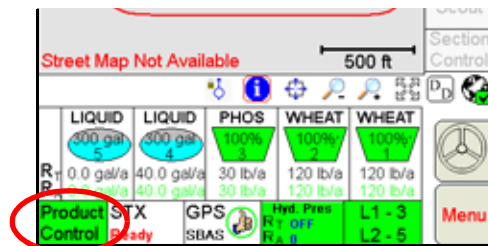
Access the menu to:

Note: Refer to Menu section on page 146 for details on the settings, features and options accessible through the main screen menu button.

- Exit or Restart the Viper Pro application or shutdown the field computer
- View field computer software and hardware version information
- Access the internet (if a wireless access device is connected and properly configured)
- Setup the following control and feature items:
 - Registration or authorization keys for optional Viper Pro features
 - Map settings such as prescription (Rx) map colors, loading street maps (if available) and adjusting coverage and scout map displays
 - Display Language and Units, time zone settings and machine profiles
 - Communication port settings
 - Product control settings
 - Light bar settings
 - Boom configuration and settings
- File maintenance processes
- Begin or resume jobs or machine guidance

Controller Status Screen

Touch the Product Control Status indicator at the bottom of the main screen to view the Controller Status screen.



The Controller Status screen displays information from the product rate controller or a CANbus control system.

Controller Status

When connected to a separate product rate control console, the Viper Pro Controller Status screen displays boom section and product rate information provided by the rate controller. Refer to the *Raven Viper Pro Installation and Operation Manual* for more information about using the Viper Pro field computer with an external rate control console.

CAN Controller Status

While operating in Seed Hawk and controlling seeding operations over a CAN network, the current control settings for each product node or control channel are displayed on the CAN Controller Status screen.

The following information areas display on the CAN Controller Status screen:

CAN Controller Status

Section Cals				Miscellaneous	
1	90	5	90	Speed Sensor	Wheel
2	90	6	90	Speed Cal	68
3	90	7	90	Self Test	0.00
4	90	8	90	Packing Press	0
Fan Calibration				Speed	0.0
Product 1				Units	US
Off Rate % 30				Bin Level Alarm	On
Low Tank 0.0				Bin Press Alarm	On
Low Limit 0.0				Decimal Shift	Off
Area/Hour 0.0				Zero Shutoff	On
Vol/Min 0.0				Cal Weight 5.0	Pre Set Pw 0
Rate Cal 120.0				Valve Cal 2188	Pw Freq 40
Rate +/- 6.0				Valve Delay 0.0	
Meter Cal 80.0				PWM 255	
Min Pw 1				Bin Level % Cal	
Max Pw 253					
Pressure 1 100				Application Gran4	
Pressure 2 85				Standard Valve	

Tally Reg. CAN Profile Current Alarms OK

- The **Section Cals Area** displays an overview of the current boom section widths and mapped display characters. Review the *Initial Set Up* section on page 32 for details on configuring the boom or implement. Refer to *Section Assignments* section on page 122 for more information on assigning products to specific sections.
- The **Miscellaneous Settings Area** displays an overview of current selections for the display units, speed sensor and current vehicle speed, etc. Information about the CANbus nodes is also accessible by touching within this area. Refer to the *Miscellaneous Settings Area* section on page 123 for more information.
- The **Fan RPM** displays the current fan speeds for fans 1 and 2 supplying air flow for the products in the air cart bins. Refer to the *Fan Cal* section on page 46 for details on calibrating the air cart fans.
- Use the **Node/Channel** selection to view the current settings for a specific product node or control channel. When modifying settings, be sure to select the appropriate product node or control channel before changing any settings.
- The **Feature Settings Area** displays an overview of the currently programmed alarm settings and features for the selected product node or control channel. Refer to the *Feature Settings Area for Products 1-3* section on page 127 or the *Feature Settings Area for Products 4-5* section on page 130 for more information on available features accessible through the feature settings area.
- The **Product Control Settings Area** displays the current calibration and application settings for the selected product node or control channel. Refer to the *Product Control Settings Area for Products 1-3* section on page 135 or the *Product Control Settings Area for Products 4-5* section on page 138 for more information on the settings required for controlling rate of product application.
- The pressure registered by an optional transducer is displayed in the **Pressures Area**. Touch within the pressures area to calibrate the pressure transducer. Refer to the *Dual Pressure Area* section on page 143 for more information.
- The **Application Area** displays the selected application type and control valve selection for the selected product node or control channel. Refer to the *Application and Control Valve Type(s)* section on page 35 for more information on the control valve and application type settings.

- Touch the **Tally Registers** button to view or reset application volume and area tallies for each node or channel or the Viper Pro odometer.

Note: *The tally registers information may also be displayed by selecting the 'Display Data' icon on the main screen.*

- A **CAN Profile** may be used to copy or back up the settings for nodes on the CANbus. Use a CAN profile to quickly reset or restore settings for various seed types or products controlled with the Viper Pro field computer.
- The **Current Alarms** button is displayed only when an alarm condition is detected by the Viper Pro during an active job. Refer to the *Alarms* section on page 98 for detailed information on alarm conditions.

CHAPTER

5

Using the Seed Hawk[®] Viper Pro System

Overview of Job Files and Features

The Viper Pro uses jobs and job files to automatically log data in the field during operations using the application management system. During an active job, the Viper Pro collects the following information:

- Target rate (min and max) for each enabled product
- Coverage area and area within a field boundary
- Volume of product applied
- Prescription map information (if applicable)

The job file also collects GPS location information to display the above information in an as-applied or coverage map of the field or areas where coverage or product application has been completed. When application or coverage has been completed for a field, the as-applied map may be transferred to a home or office computer to archive the job data or to create customer application reports.

Note: *A DGPS receiver is not required to control product rates as long as a wheel or radar speed sensor is connected to the Viper Pro. An as-applied or coverage map will not be created and an application report will not be available when operating without DGPS information being input into the Viper Pro.*

A DGPS receiver is required to allow the Viper Pro to control product rate based upon GPS speed, log as-applied or coverage map information or to provide swath guidance. Refer to the GPS Status Screens section on page 144 for details on connecting a DGPS receiver to the Viper Pro.

Job files allow application and field data for multiple operations or fields to be saved on the field computer at any given time without erasing or modifying existing job information and also provides the ability to transfer data to another Viper Pro field computer to begin operations using data previously created or collected or to complete an operation previously started with a different Viper Pro.

Note: *To ensure memory resources are available, Raven recommends performing file maintenance periodically to remove unused job files from the memory on the field computer. Refer to Chapter 11, File Maintenance and Editing Reports for more information.*

Prior to starting a job, be sure that the Viper Pro has been configured for the machine, product control hardware and products to be applied. During an active job, the Viper Pro uses the programmed settings and calibration values to monitor or control product rate(s), calculate area and volume applied and to provide swath guidance in the field.

Note: *Refer to Chapter 4, Initial Set Up and Navigation, to configure the Viper Pro product control system and verify the required product control settings are correctly entered.*

Overview of Job Types

The Viper Pro is compatible with the following job types for operation as a stand alone system or as a part of a full crop data software package.

Standard Jobs

The operator can use the Viper Pro to create the job scouting and application information in the field and during application of products or covering field area during various operations. A standard job does not require additional software to set up or begin using guidance, product control or scouting features of the Viper Pro.

Prescription maps may be uploaded to the Viper Pro via a Slingshot user account or USB flash drive and loaded for standard jobs for variable rate control.

AgX™ Pre-populated Jobs

Jobs may also be pre-populated using AgX standards to create recommendations for product application rates. Pre-populated jobs require a software program installed on a home or office PC with the ability to create AgX compliant product application data package recommendations. These packages must contain a prescription map and field boundary shape file as well as a recommendation file.

Note: *The SST Summit software is required to utilize the AgX pre-populated job files and recommendations on the Viper Pro. Contact a local Raven dealer for more information or to acquire an activation code for the AgX features on the Viper Pro field computer.*

Overview of Job Features

The following features may be enabled or disabled for any operation with the Viper Pro field computer:

- Product Application
- Swath Guidance
- Section Control (SCT)

The following sections offer a brief description of these features used with the Viper Pro field computer.

Product Application

The product application feature allows the Viper Pro to:

- Control a Raven CANbus system
- Log application data such as coverage and rate information
- Control product application according to a prescription map for variable rate control

CANbus Rate Control. The Viper Pro field computer is capable of controlling product application directly via a Raven CANbus using Raven product nodes. Each node provides a single control channel for controlling the application of a single product. So, if the Viper Pro is connected to a CANbus with a single product node, the Viper Pro will monitor or control for one product during an active job. Up to five product nodes may be connected to the Viper Pro to control any combination of liquid, granular, injection or spinner channels as necessary. In this configuration, the Viper Pro is directly controlling the product control valves and other hardware.

Note: *A multi-product variable rate key must be purchased and authorized in order to provide multi-product VRA within a job. Contact a local Raven dealer to acquire the activation key and refer to the Registering the Viper Pro section on page 23 for assistance entering the activation code on the Viper Pro field computer.*

Swath Guidance

When the swath guidance feature is enabled, the Viper Pro may provide on-screen guidance paths based upon the programmed machine or equipment width. The swath guidance path displayed on the Viper Pro provides a quick reference to the vehicle location in relation to previous coverage and may be used with an automated steering system such as the Raven SmarTrax systems to automatically steer the vehicle using the displayed guidance path.

The Viper Pro is capable of providing guidance for several crop or field patterns to suit field conditions and application types.

Section Control

The Seed Hawk Section Control (SCT) feature allows the Viper Pro to automatically turn the sections on or off by referencing the coverage map. While Viper Pro creates the coverage map, the SCT system references previously applied areas and the vehicle location to automatically turn sections off in turn as the implement crosses over previously applied areas. As sections re-enter un-applied area, SCT turns the section back on.

SCT initially creates a 5 MB file with a .bct extension that contains detailed information about the section coverage for a specific job. Viper Pro saves this file in the Coverage folder on the internal storage memory. If the field exceeds the size of the original file, Viper will automatically increase the file size to cover the entire field area.

See Chapter 8, *Sectional Control Technology™ (SCT)*, for more information on using the SCT feature with the Viper Pro field computer.

Liquid Section Control

The liquid section control feature allows the Viper Pro to automatically turn liquid product sections on or off by referencing the coverage map. While Viper Pro creates the coverage map, the system references previously applied areas and the vehicle location to automatically turn liquid sections off in turn as the implement crosses over previously applied areas. As sections re-enter un-applied area, the Viper Pro turns the liquid section back on.

See Chapter 8, *OmniSeed Section Control*, for more information on using the section control feature with the Viper Pro field computer.

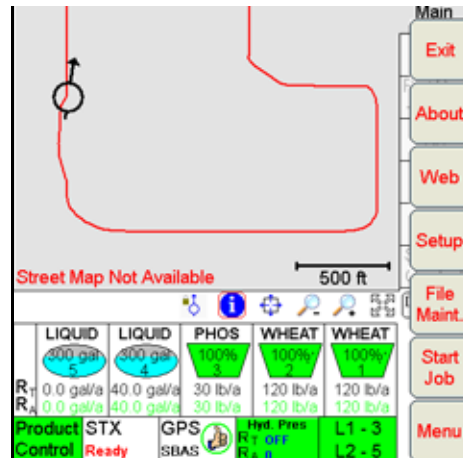


Starting a New AgX Job

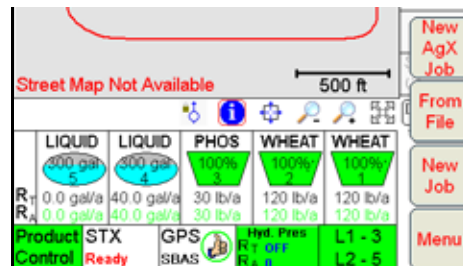
Note: Make sure all nodes connected to the CANbus are recognized and programmed correctly. Refer to Chapter 4, Initial Set Up and Navigation if nodes do not appear to be recognized by the field computer.

To begin a job using AgX recommendations and pre-populated job and product information:

1. Select **Menu**, then **Start Job**.



2. Select **New AgX Job**.



Note: If AgX recommendations have not been transferred to the field computer, or if the AgX activation code has not been entered and validated, the Viper Pro will display a prompt. Contact a local Raven dealer to acquire an AgX activation code or refer to AgX File Maintenance section on page 214 for assistance transferring recommendations from a USB flash drive to the Viper Pro.

3. The Select Field screen will be displayed.

Select Field

☒ Order by Nearest ☐ Show All

Growers: Farms: Fields:

Grower: Farm: Field: Field Size:

Next Cancel

Select the **Grower**, **Farm** and **Field** to use for the job.

Note: Select the **Order by Nearest** option at the top of the screen to display pre-populated jobs closest to the current vehicle location at the top of each list.

To view a complete list of recommendations stored on the Viper Pro, select the **Show All** option. A list of recommendations currently stored on the field computer will be displayed.

4. Once a field has been selected, a field boundary for the selected field will be displayed in the map preview display. Use the zoom and vehicle lock icons below the preview to adjust the map display if necessary.

Select Field

☒ Order by Nearest ☐ Show All

Growers: Farms: Fields:

Grower: John Grower Farm: Lincoln Co. Turner Co. Field: 254th 40 Acre West Sect.

Field Size: 37.9 acres

Next Cancel

- When the correct recommendation is selected, touch the **Next** button to display the Assign Recommendation to Channel screen.

Assign Recommendation to Channel

Chain Profile

Select Channel to Configure

1 2 3 4 5

Recommendations Operation

Fert Rec

Preview

Booms Default Rate Conv. Factor Prev Next Cancel

This screen displays the available control channels and any recommendations available for the selected field.

For instructions on completing the job set up process, continue to the *Assign Recommendations to Product Channels* section on page 74.

Assign Recommendations to Product Channels

Selecting Control Channels

The channel indicators display the currently selected channel and which channels are enabled or disabled for the job. The channel indicators will display as follows:

- Green - Currently selected channel. Touching any channel indicator once selects the channel and enables the channel for the job. Touch the green channel indicator again to disable the selected channel for the job.
- Dark - Channel is enabled.
- Light - Channel is disabled.

- Touch the channel to which a recommendation will be applied.

Assign Recommendation to Channel

Chain Profile

Select Channel to Configure

1 2 3 4 5

Recommendations Operation

Fert Rec

Assigning Recommendations

Note: While recommendations are not required, product control channels selected on this screen should have a recommendation assigned before the job is started. A single recommendation may be assigned to multiple channels if more than one channel will apply the same product.

A target rate may be entered for channels used to control pump, fan, or spinner speeds as necessary after the job is started. Do not select control channels for these functions during the job setup process.

2. Touch the recommendation for the product to be applied using the selected control channel. A red box will display around the selected recommendation and the preview information will be displayed.
3. Select other channels and assign recommendations as the job requires.

Note: A recommendation assigned to a different product channel will display a green check mark to the right of the recommendation name. The red box and preview information will only display if the recommendation is assigned to the selected channel.

4. Confirm the section assignments, default rate and conversion factor settings are correct for each product channel before touching the **Next** button to continue the job set up. Refer to the following sections for details on these settings.

Note: Recommendations may be assigned to any product during the job setup. During the job, Viper Pro will display any “skipped” control channels and the operator may control application of a product using these channels if necessary. “Skipped” channels will not have a product name associated with the control channel and the application report will need to be adjusted for these skipped products.

It is recommended to assign recommendations to any control channels to be used during an active job in sequential order to avoid “skipped” channels whenever possible.

Booms

Sections assigned to the selected channel can be changed by touching the **Booms** button at the bottom of the screen.



Confirm the boom or section selections are correctly set up for the equipment being used.

Note: The boom or section selections are also accessible before setting up a job through the Product Control area on the Viper Pro Main screen. Refer to the Section Setup section on page 47 for more information.

Default Rate

Touch the **Default Rate** button to enter a standard rate of application for the channel when no prescription information is available. The default rate only affects areas where prescription rate information has not been entered.

Note: Zero rate zones will not be affected by the default rate setting.

Conversion Factor

Rate Conversions may be used to calibrate a prescription map recommendation for the application or a different product.

For Example:

Enter a value of '2' to double the prescription rates on the selected prescription map or a value of "0.8" to apply 80% of the prescribed rate.

The Rate Conversions may also be used to convert a prescription map from liters or ounces to gallons, or gallons to ounces or liters. Touch the **Common Factors** button to view some common rate conversion values.

Note: *The Rate Conversion value must be greater than zero. In most applications, the conversion factor will be left at the default setting of 1.0.*

Machine Control Settings

1. Touch the **Next** button on the Assign Recommendations to Channel screen to proceed with the job set up process and display the Machine Control Settings screen.

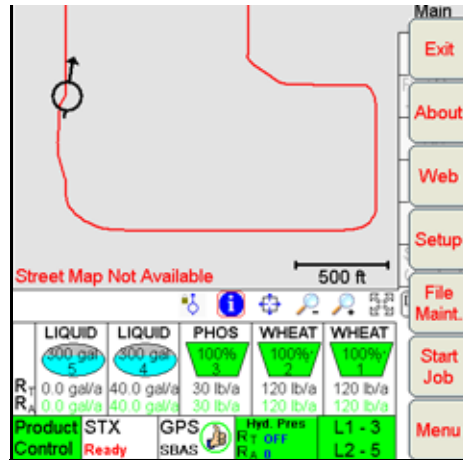
2. The Viper Pro will automatically enter the current date and time as a default job name. To simplify working with job files, or if job files will be accessed at a later date to finish product application, it is recommended to rename the job. Use the on-screen keyboard to enter a job name.
3. Select the guidance pattern best suited to the field area and application. Refer to the *Swath Guidance Patterns* section on page 108 for details on the available patterns and using guidance during a job.
4. Select one of the following Section Control mapping modes for the job:
 - **Standard Section Control** - This method requires no action or additional setup by the operator. The operator simply begins to apply product to the field and the Viper Pro monitors the coverage map and will turn sections off if the implement enters into a previously applied area.
 - **Create Section Control No-Apply Map** - This method allows the operator to define apply/no-apply zones within the field. This method is typically used if no previous map has been created and the operator wants to define the field boundaries and other boundaries such as waterways, well heads, etc.
 - **Load Section Control No-Apply Map** - This method allows the operator to load a previously created zone map. Select the desired map from the list of available Section Control maps currently stored on the Viper Pro.
 - **Map From Field Boundary** - This method allows the Viper Pro to generate a no-apply boundary map from the current field boundary.

Note: *See Chapter 8, Sectional Control Technology™ (SCT), for details on setting up the Section Control feature.*

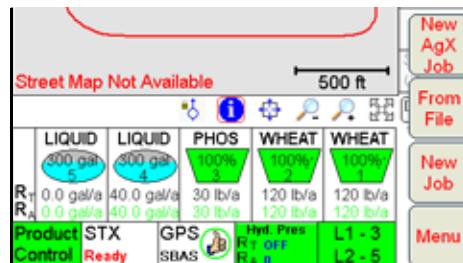
Starting a Standard Job

To begin a standard job and use the Viper Pro to enter all product and job information:

1. Select **Menu**, then **Start Job**.



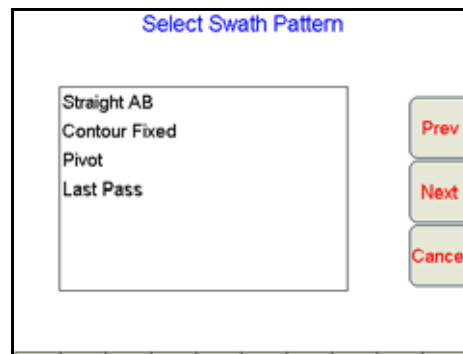
2. Select **New Job**.



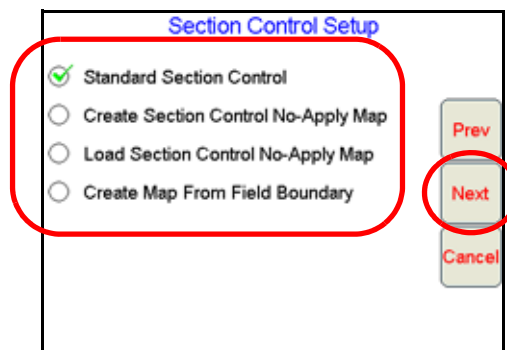
3. The New Job screen displays.

4. The Viper Pro will automatically enter the current date and time as a default job name.
To simplify working with job files, or if job files will be accessed at a later date to finish product application, it is recommended to rename the job. Use the on-screen keyboard to enter a job name.
5. Select the desired job feature options from the list. If no additional features will be used with the job, touch the **OK** button to open the selected job file. To setup additional features, select the features to be used and touch the **Next** button.

6. If Swath Guidance was selected, select the guidance pattern best suited to the field area and application. Refer to the *Swath Guidance Patterns* section on page 108 for details on the available patterns and using guidance during a job.



7. Touch **Next**. If Section Control was selected on the New Job screen, select one of the Section Control mapping modes for the job.



- **Standard Section Control** - This method requires no action or additional setup by the operator. The operator simply begins to apply product to the field and the Viper Pro monitors the application and turns sections off as they enter into a previously applied area.
- **Create Section Control No-Apply Map** - This method allows the operator to define apply/no-apply zones within the field. This method is typically used if no previous map has been created and the operator wants to define the field boundaries and other boundaries such as waterways, well heads, etc.
- **Load Section Control No-Apply Map** - This method allows the operator to load a previously created map. A list of all maps stored on the Viper Pro internal storage will be displayed and the operator may select the desired map.
- **Create Map From Field Boundary** - This method allows the operator to select an existing field boundary and generate a no-apply map from the field boundary map. The operator is given a list of all scout files available and allowed to select the desired map. The boundary must be one previously created by the Viper.

Note: See Chapter 8, *Sectional Control Technology™ (SCT)*, for details on setting up the SCT feature.

8. Touch **Next**. If Product Application was selected, the Product Selection screen displays.

The screenshot shows the 'Product Selection' screen. At the top, it asks 'How many products will you be applying?' with a sub-note '(A value from 1 to 5 is required)'. Below this is a numeric input field containing the number '5'. Underneath the input field is a checked checkbox labeled 'Enable Product Chaining'. To the right of these elements are four buttons: 'Prev', 'Next', 'Cancel', and 'OK'. At the bottom of the screen is a standard numeric keypad.

CAN nodes are controlled in a sequential manner and each single product node provides one product control channel. The operator may only enable the number of control channels currently available on the machine when setting up a new job. It is recommended to select the maximum number of product control channels available on the machine each time a new job is started to allow the most flexibility during product application.

For Example:

If product will be applied from a single tank, but the tank contains a mixture of three products, the operator must enable one control channel to control rate for the mixture.

To only apply products associated with control nodes 4 and 5, the operator must select 5 on the Product Selection screen during job setup. If only product nodes 1 and 2 in a 5 product CANbus system will be used during a job, it is still recommended to select 5 products to allow the operator to enable or disable remaining product nodes during the job as necessary without beginning a new job. This also allows the job to be re-opened at a later date to apply additional products using other product nodes.

9. Enter the number of products which will be applied during the job application.

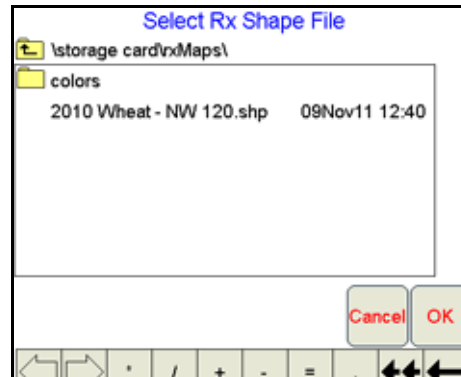
Product Setup

1. Touch **Next**. The Product #1 Setup screen displays.
2. Using the screen keyboard, enter a product name in the **Product Name** field.

The screenshot shows the 'Product #1 Setup' screen. At the top, it says 'Product #1 Setup'. Below this is a 'Product Name' field with a dropdown arrow, containing the text 'WHEAT'. Underneath is a radio button labeled 'VRC' followed by the text 'Using Default Colors' and a 'Select' button. Below that is a 'Prescription File and Rate Field' with a text input containing '.shp' and a 'Browse' button. To the right of these fields are three buttons: 'Prev', 'Next', and 'Cancel'. At the bottom is a numeric keypad.

3. To apply a prescription map to the job, enable the **VRC** option.

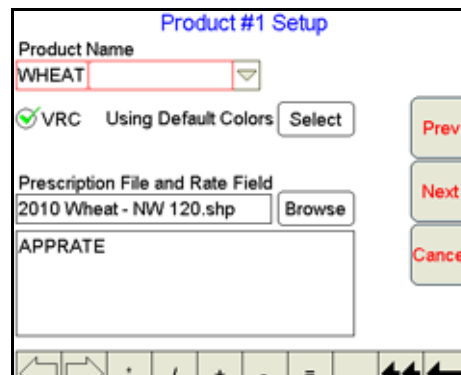
4. Touch **Browse** to display a list of folders or prescription maps stored in the Viper Pro file structure.



Note: If an AgX recommendation is available on the Viper Pro, the AgX prescription map files can be loaded into a standard job by accessing the AgXRec folder on the above screen.

Prescription map files within the AgXRec folder will have several data fields associated with the file. Be certain to select the appropriate prescription rates field to ensure that product rates are applied as expected. Contact the prescription map creator for help if necessary to assist with the rate field selection if necessary.

5. Select the appropriate prescription map from the list and touch **OK**.



6. Select the appropriate rate information field for rate conversion and touch **Next**.

Note: Depending upon how the selected map was created, there could be more than one rate field in the prescription map file. Be sure to select the appropriate rate field for the product to ensure correct application for each product.

7. Repeat step 2 through step 6 as necessary to set up additional products.
8. If prescription maps have been assigned to products, proceed to the *Prescription Rate Conversions and Default Rates* section below for details on using these values with product application using a prescription map. If all products enabled will be applied using a “straight” or single rate, touch **OK** to complete the job set up and begin product application.

Prescription Rate Conversions and Default Rates

- When product setup is complete for each enabled product, the Rate Conversion screen will be displayed if any prescription maps have been assigned to products.

Rate Conversions

Enter a Rate conversion factor for each product. Rx Map Rates are multiplied by this factor before being sent to the Spray Controller.

PROD1 1.0

Common Factors

1	2	3	4	5	←←←
6	7	8	9	0	.-

Prev
Next
Cancel

Rate Conversions may be used to calibrate prescription maps for the application. Enter a value of '2' to double the prescription rates on the selected prescription map or a value of "0.8" to apply 80% of the prescribed rate.

The Rate Conversions may also be used to convert a prescription map from liters or ounces to gallons, or gallons to ounces or liters. Touch the **Common Factors** button to view some common rate conversion values.

Note: The Rate Conversion value must be greater than zero. In most applications, the conversion factor will be left at the default setting of 1.0.

- Enter a conversion factor for each product that will be applied according to a prescription map and touch **Next**. Viper displays the Rx Map Default Value screen.
- Enter a standard rate of application for the channel when no prescription information is available. The default rate only affects areas where prescription rate information has not been entered.

Note: Zero rate zones will not be affected by the default rate setting.

- When the default rates values are set for each product, touch **OK** to complete the job set up process and begin product application.



Existing Jobs

Jobs previously created on the Viper Pro may be reopened to complete report information or to resume a field operation. The following options are available when opening an existing job file:

- View the existing job
- Add to the existing job

Viewing an Existing Job

When viewing an existing job, application information may not be added. Use this feature to view job information without editing or modifying any application data.

1. Touch **Menu**, then **Start Job, From File**, and **View Only**. The Select Existing Job File screen opens.
2. Select a job from the list and touch **OK**. Viper opens the job.
3. Touch **Menu**, **Close Job** to close the job.

Note: *If the field computer is enabled to receive web notifications via the Slingshot server, a prompt or dialogue may be displayed after the Close Job button is selected. Refer to the Wireless File Transfer section on page 207 for more information.*

Adding to an Existing Job

Previously closed jobs may be reopened and the application or coverage map may be modified by adding to the application. This feature is useful if a job has been closed because of a change in weather conditions, lack of materials, etc.

Note: *When re-opening an existing job, Viper will automatically pause the application. To add to the job, un-pause the job before starting product application to allow the Viper to modify the job information.*

The original data is used when adding to the job file. Make sure that all files created in or used by the existing job are still available on the Viper Pro field computer and verify that the original machine configuration is the same as when the job was initially started. These parameters include number of booms, boom widths, boom offsets, etc.

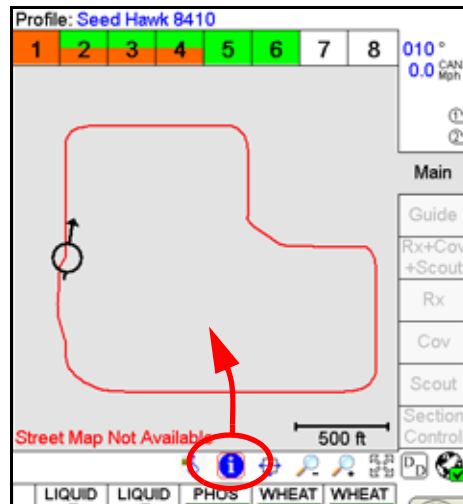
Note: *The original swath pattern will be used to provide guidance when the existing job is restarted. Due to shifts in satellite geometry between active job sessions, the operator should perform a swath recalibration to update the guidance information and swath position for the actual machine location.*

1. Select **Menu**, then **Start Job, From File**, and **Add to Job**. The Select Existing Job File screen displays.
2. Select the existing job to open from the list and touch **OK**. Viper loads the job information.
3. Touch **Menu**, and **Cont. Job** to add to the job.

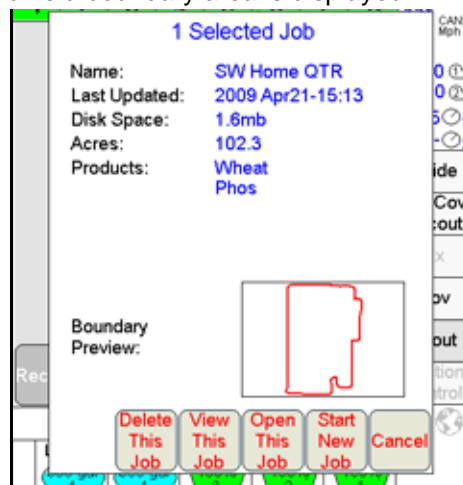
Note: *If the field computer is enabled to receive web notifications via the Slingshot server, a prompt or dialogue may be displayed after the Close Job button is selected. Refer to the Wireless File Transfer section on page 207 for more information.*

Using an Existing Field Boundary

1. On the Main tab, select the Information icon displayed below the Map area and touch within the field boundary displayed on the screen.



2. A preview of the selected job and field boundary area is displayed.



3. Select the desired action to perform using the displayed field boundary.
 - a. Touch 'Delete This Job' to delete the job shown in the preview area. The as-applied or coverage information associated with the selected boundary will be deleted. The field computer will prompt the operator to save or discard the associated field boundary.
 - b. Touch 'View This Job' to view the coverage or as-applied data logged during the previous job associated with the selected field boundary.
 - c. Touch 'Open This Job' to open the selected job and resume product application using the previous coverage information.
 - d. Touch the 'Start New Job' button to begin a new job using the displayed in the preview. The Viper Pro will begin the job set up process for a new job. Refer to the *Starting a Standard Job* section on page 77 for information on completing the job set up process. When the new job is ready to begin, Viper will prompt the operator to select whether the previous job coverage information should be saved or deleted.
 - e. Touch 'Cancel' to exit the job preview screen and return to the main screen.

Pausing and Resuming Jobs

While a job is in progress, the Viper Pro is continuously logging GPS location and other equipment status information. This may not be desired at all times during an operation such as refilling tanks or bins or if the machine will not be moving for a brief period. To help reduce the file size of completed jobs and to help minimize the time required to perform file maintenance, jobs may be paused to keep the Viper Pro from logging data not necessary for the job report.

Pause a Job

To pause an active job, touch **Menu**, then select **Pause Job**. The field computer will stop logging information for the job report and “Job Paused” will begin flashing at the top of the Viper Pro display.

Note: The Viper Pro will continue to display the current vehicle position, but GPS location data will not be logged.

If the field computer is enabled to receive web notifications via the Slingshot server, a prompt or dialogue may be displayed after the Close Job button is selected. Refer to the Wireless File Transfer section on page 207 for more information.

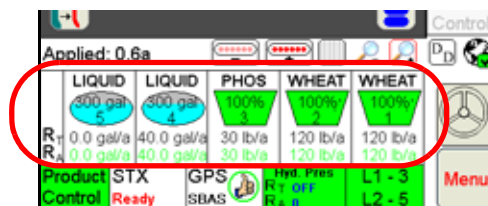
Resume a Paused Job

To resume logging data for the job report, touch **Menu**, then select **Cont Job**. The field computer will resume logging of GPS and application data for the job report.

Note: If the field computer is enabled to receive web notifications via the Slingshot server, a prompt or dialogue may be displayed after the Close Job button is selected. Refer to the Wireless File Transfer section on page 207 for more information.

Application Rates Area

Use the Application Rates area to quickly check the status of each configured product node or control channel during product application.



Note: The “Application Rates” heading will be hidden if multiple product nodes or control channels are enabled to allow all information to be displayed on the main screen.

The Application Rate area displays the target rate (R_T) and actual rate (R_A) and the bin or tank level for each product currently detected on the CANbus.

Note: Only products detected on the CANbus will appear in the Application Rates area.

Bin Level

The level of product remaining in each air cart bin is displayed as a percentage of the total bin height. If the bin displays “Ready” for the bin level, the ultrasonic sensor may need to be calibrated.

Tank Level

The estimated level of product remaining in a liquid tank is displayed for products controlled by product nodes 4 or 5.

Touch within the Application Rates area to display the Application Control screen.

	Inc/Dec Switch	Target Rate	Rate +/-	Active Product
Prod1	✓	20.0	4.0	
Prod2	✓	80.0	50.0	
Prod3	✓	67.0	50.0	
Prod4	✓	50.0	66.0	
Prod5	✓	2.0	0.0	

1	2	3	4	5	←←←	Cancel
6	7	8	9	0	- .	

OK

Use the on-screen keypad on the Application Control screen to enter a target rate and rate bump (-/+) value for each product.

Note: If the product switch is in the off position, the product name, target rate, and rate bump (-/+) will display in grey (product 5 shown above). To modify settings for the product, toggle the product switch to the Man (manual) or Auto (automatic) position.

Rate Bump (-/+)

The rate bump feature allows the operator to raise or lower the target rate using the INC/DEC switch on the Seed Hawk switch box.

To use the rate bump feature:

1. Enter a value in the “Rate +/-” field for the desired products. This is the value by which the target rate will be adjusted each time the INC/DEC switch is toggled.
2. Select the “Inc/Dec Switch” option for the products to be affected by the INC/DEC switch.
3. Touch the **OK** button to accept the programmed values and settings and return to the main screen.
4. Set the product switches to Auto.
5. Toggle the INC/DEC switch to increase or decrease the target rate of the selected products

Note: For products set to Manual control mode, hold the INC/DEC switch to manually raise or lower the target rate.

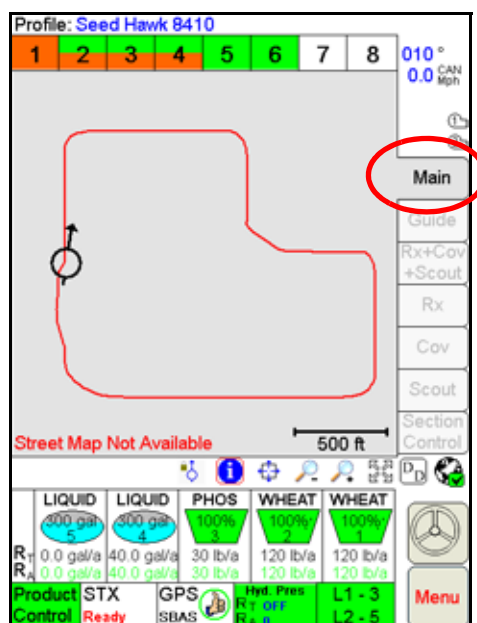
Tabs

The tabs displayed along the right side of the screen allow the vehicle operator to select the information displayed in the map area. The tabs may be used during field operations to toggle coverage, scouting or guidance information at any time and can be used to help the vehicle operator manage the various operations and systems during an application.

Note: When a job is not currently in progress on the Viper Pro field computer, the main tab will display all accessible information. The other tabs will be available only when a job is in progress. Some tabs may not be available unless an optional feature or hardware has been purchased and installed.

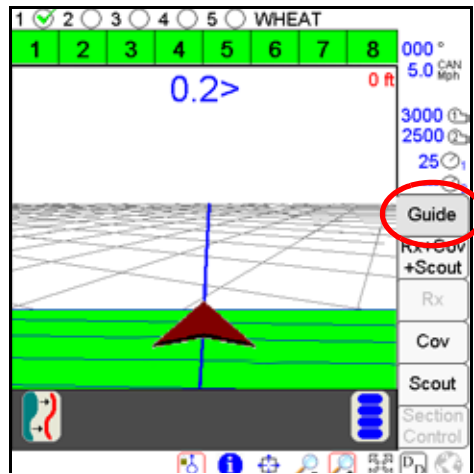
Main Tab

The main tab is only available when a job is not in progress on the Viper Pro. This tab displays county street maps (if available) to help the operator locate fields or areas for product application and any saved field boundary features currently stored on the Viper Pro internal memory.



Guide Tab

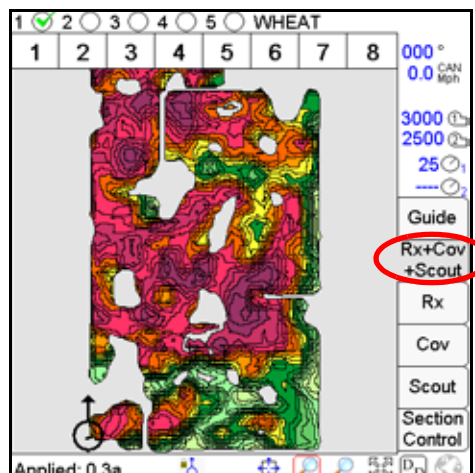
If the swath guidance feature is enabled during the job setup process, touch the Guide tab during the job to access the swath guidance tools and features or to toggle between the available guidance patterns.



Note: Refer to Chapter 6, *Viper Pro Guidance*, for detailed information on using the guidance features on the Viper Pro field computer.

Rx+Cov+Scout Tab

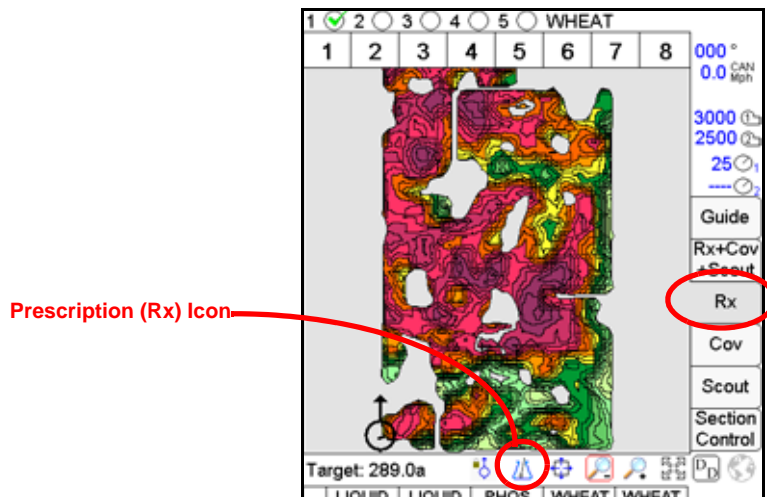
Access the Rx+Cov+Scout tab to view scouting, coverage and any prescription map information in the same map view. This view will allow the machine operator to compare the as-applied or coverage map with scouting or prescription map data to ensure that the operation is progressing as expected. The Rx+Cov+Scout tab will display the coverage map over the top of a prescription map as a reference for the current application.



Note: Review the Rx, Cov or Scout tab sections below for details on the individual tab displays. Scouting information created using the Scout tab will be displayed on the Rx+Cov+Scout tab. To create or edit scout map features, access the Scout tab.

Rx Tab

The Rx tab is only accessible if a prescription map is loaded for at least one product during the job setup process. The Rx tab displays the target, or the total, area of the prescription map.



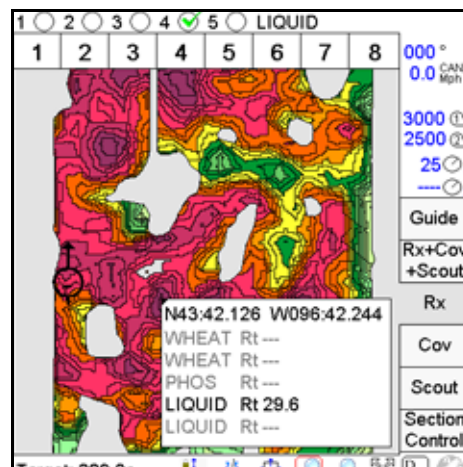
Accessing Prescription Map Information

Additional information contained within the prescription map is accessible through the Rx tab. The operator may access the following information using the tools available on the Rx tab:

- Latitude
- Longitude
- Product associated with the prescription map
- Prescription application rates

To display the above information:

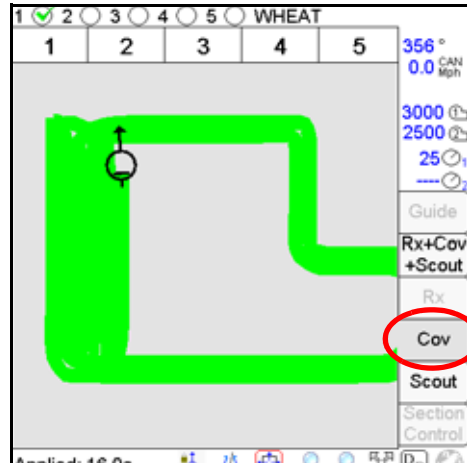
1. Load a job with a valid prescription map.
2. Touch the **Rx** tab and select the appropriate product node or control channel above the map display.
3. Select the **Prescription icon** from the map tools display below the map area.
4. Touch an area or zone on the map. The Viper Pro displays prescription rate information for the selected map area.



Note: For more information on prescription maps, see the Prescription (Rx) Maps section on page 157.

Cov Tab

The Cov tab displays the area covered by active boom sections which create the coverage map for each product. The coverage map displays covered area in green (default) if the actual application rate matches the target or prescription rate. Any areas where the actual application rate does not meet the expected target range will be highlighted in the colors assigned for the rate high and rate low values.



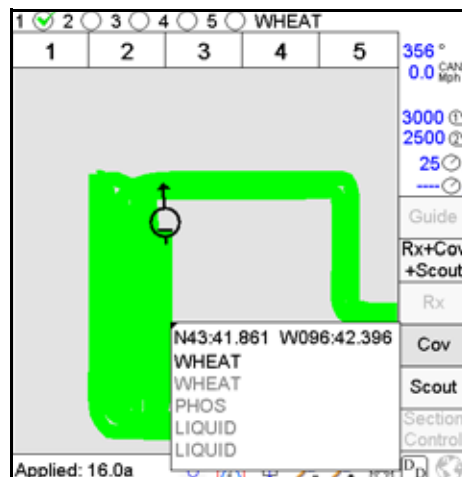
Accessing Coverage Map Information

Additional coverage or as-applied information is accessible through the Cov tab. The operator may access the following information using the tools available on the Cov tab:

- Latitude
- Longitude
- Products associated with the coverage map

To view information regarding the currently displayed coverage map:

1. Load a job with valid coverage information or begin applying products in a new job.
2. Touch the **Cov** tab and select the appropriate product node or control channel above the map display.
3. Select the **Prescription** icon from the map tools located below the map area.
4. Touch a field area or zone on the map. Viper Pro displays product coverage information for the selected area.



Note: See the Coverage Maps section on page 155 for more information about using coverage maps.

Scout Tab

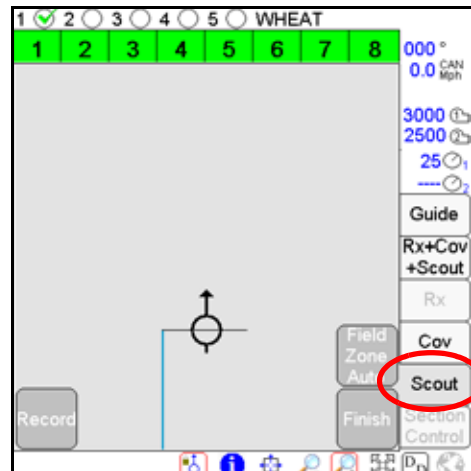
The Scout tab allows the vehicle operator to create a map of field features or locate areas of interest during an active job. The scout map features may be recorded during a field operation or a scout map may be created prior to an operation, stored on the Viper Pro and then reloaded for a new job.

Note: *GPS drift may cause issues with pre-recorded scout maps. Prior to beginning any applications using a previously recorded scout map, check that the scout map location is accurate enough for the field operation(s) being performed.*

Contact a local Raven dealer for more information about available GPS correction sources and services which may help avoid issues with GPS drift and scout maps.

Field features may include, but are not limited to:

- Field boundaries
- Weed or insect infestations
- Tile lines or waterways
- Rocks
- Trees
- Section Control apply/no-apply zones

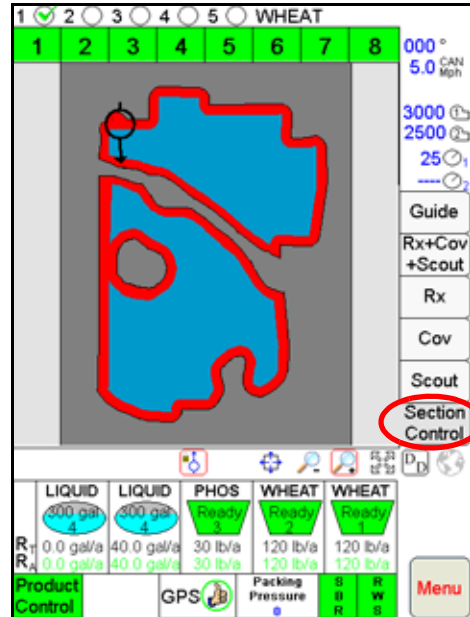


Access the Scout tab to record a zone, path or point to mark a field feature during an active job. Refer to the *Scout Tab* section on page 90 to customize the scout map display on the Viper Pro. Refer to the *Marking a Field Feature* section on page 91 for details on the available features and zones.

Section Control Tab

The Sectional Control tab is not available for Standard SCT applications. The Sectional Control tab displays the current SCT Apply Zone map.

See Chapter 8, *Sectional Control Technology™ (SCT)*, for more information about using the SCT feature.



Marking a Field Feature

Recording field features, zones and boundaries for the scout map feature are all similar operations accomplished by accessing the Scout tab during an active job. Each scout map may contain several field features and zones to help the operator or land owner locate areas of interest at a later time or to avoid applying chemicals in waterways or near well heads.

Note: Refer to the Scout Tab section on page 90 for details on creating custom features for the scout map.

If no scout map features are configured prior to starting a job, the scout map may not be used to map any field features other than a field boundary or Section Control zones (apply or no-apply).

While several zones may be created within a field, the scout map may only contain one field boundary. When a field boundary is completed, the Viper Pro will calculate the area contained within the completed field boundary. Field features, zones and areas may be mapped using the following types of paths or points:

Single Point. Select the single point feature to plot a single location on the scout map. The Viper Pro automatically plots the point at the selected location.

Note: The point will be plotted at the vehicle location where the OK button is selected on the Record Field Feature screen.

Group of Points. Select this option to allow the operator to quickly plot multiple points of the same type during an active job.

For example, select the 'Group of Points' option and a custom entry for "Rocks." During the job application, the operator can access the Scout tab and touch the "Rocks Point" button displayed in the map area to plot a point at the current vehicle location. The Viper Pro scout map may then be used to help re-locate the rocks at a later date for removal.

Line. The line option may be used to plot a path through a field such as drainage tile or a wash out.

Zone. A zone creates a closed path or shape on the scout map. Specific zones may be used by the optional SCT system to automatically control sections based upon a completed SCT apply or no-apply zone map and field boundary. See Chapter 8, *Sectional Control Technology™ (SCT)*, for more information about using the SCT feature with the Viper Pro field computer.

How to Mark a Field Boundary

Note: Other zones, lines, or points may be recorded using a similar process as the one explained below.

Recording of zone boundaries will be paused automatically if the openers are raised.

Within an active job:

1. Select the **Scout** tab.
2. Touch the **Record** button, then **Zone**.

Record Field Feature

Field Boundary
Spray Zone/Boundary
Spray
No-Spray
Rocks
Thistles
Grasshoppers

☐ Manual Point Entry
☒ Auto Point Entry
☐ Manual Point Entry: Rubber banded zone

45.0 Offset from center of swath (feet)

☒ Left ☐ Right

1 2 3 4 5 6 7 8 9 0 .

Import Field
Cancel
OK

3. Select **Field Boundary** from the available features.
4. Select the preferred method for recording or plotting points along the boundary path.

Manual Point Entry. The operator enters feature or boundary points manually. The Viper Pro will automatically connect each point with a straight line to create a field or zone boundary.

Auto Point Entry. The Viper Pro automatically records points along the driven path to create the boundary in real-time. The field computer will also automatically close the field boundary when the vehicle comes within one boom or implement width of the starting point. The operator may also close the boundary manually if desired.

Note: Before closing a boundary manually, check the current vehicle position in relation to the point where recording of the boundary was started.

The Viper Pro will create a straight line from the boundary starting point to the current vehicle location. The field area within the marked boundary will be included in the zone while area outside of this boundary will not be included.

Manual Point Entry: Rubber Banded Zone. This method allows the operator to set boundary points as the machine drives along the boundary. When the operator closes the boundary, the Viper Pro will automatically connect and smooth the boundary line when completing the boundary path.

5. Enter the offset in feet [meters] from the center of the swath, or guidance, width.

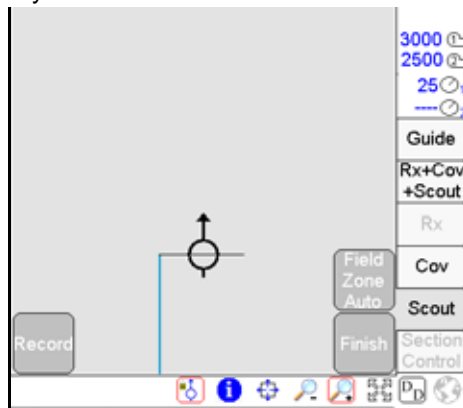
Note: Entering a value 1-1/2 to 2-1/2 times the swath width will record the field boundary so that the headlands passes of the field area may be completed last.

6. Select the direction of the offset:

- a. Selecting the **Left** offset places the reference point for the boundary to the left of the swath center point by the entered distance.
- b. Selecting the **Right** offset places the reference point to the right of the swath center point by the entered distance.

Note: To record the field feature boundary at the center of the swath width, enter a value of zero and select either the left or right option.

7. Touch **OK**. The Viper Pro will begin plotting points or recording manually input points for the boundary based upon the selected Point Entry mode.



Note: Refer to Chapter 8, Sectional Control Technology™ (SCT), for detailed SCT setup and operation and for detailed information on creating apply/no-apply zones.

8. Drive the perimeter of the field while keeping the selected reference point at or near the field boundary.

9. To close the field boundary, select one of the following options:

- Continue driving the field boundary until the Viper Pro automatically closes the boundary. Viper Pro will automatically close the boundary if the vehicle returns to a position within one boom or implement width of the boundary start point.
- Touch the **Finish** button in the map area and select the 'Field Zone Auto' button to manually close the field boundary. Viper automatically connects the boundary line from the current position to the boundary starting point.

Importing a Field Boundary

If a boundary has been recorded previously and is in the shapefile format (.shp), the boundary may be imported into the current job.

Note: Shapefiles must contain only one polygon. For help using the File Maintenance feature, see Chapter 11, File Maintenance and Editing Reports.

How to Import a Field Boundary

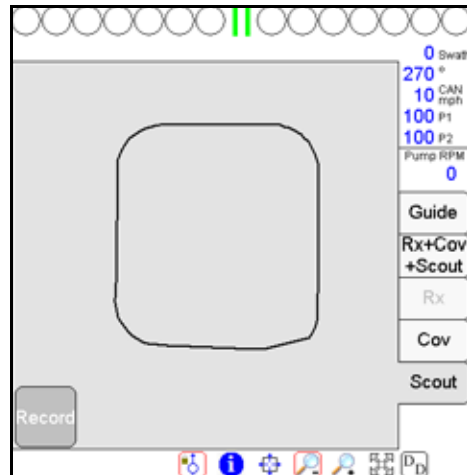
1. Select the **Scout** tab.
2. Touch **Record**, then **Zone**. The Record Field Feature screen displays.

The 'Record Field Feature' screen displays a list of features: Field Boundary, Spray Zone/Boundary, Spray, No-Spray, Rocks, Thistles, and Grasshoppers. Below the list are three radio buttons: Manual Point Entry, Auto Point Entry (selected), and Manual Point Entry: Rubber banded zone. A text field shows '45.0' with the label 'Offset from center of swath (feet)'. Below this are two radio buttons: Left (selected) and Right. At the bottom is a numeric keypad with digits 1-9, 0, a decimal point, and a backspace key. On the right side, there are three buttons: 'Import Field' (circled in red), 'Cancel', and 'OK'.

3. Select 'Field Boundary' and then touch the **Import Field** button. The Select Field Shape File screen displays.

The 'Select Field Shape File' screen shows a file browser view of the directory 'D:\viper\data\scout\'. It lists three files: JB125.shp (04Nov11 12:40), KLM 21.shp (04Nov11 12:25), and TC 041.shp (04Nov11 12:41). The file 'TC 041.shp' is highlighted with a red box. At the bottom right are 'Cancel' and 'OK' buttons. At the very bottom is a navigation bar with icons for back, forward, search, and other functions.

4. Select a file from the list and touch **OK**. The Viper Pro will import a compatible shapefile into the job in progress.



Tally Registers

The tally registers feature of the Viper Pro may be used to track area and volume totals over the course of a field application or over the course of an application season.

To view or reset current tally totals from the Viper Pro main screen:

1. Touch the **Product Control** area at the bottom of the main screen.
2. Touch the **Tally Registers** button at the bottom of the CAN Controller Status screen.

CAN Controller Status			
Section Cals		Miscellaneous	
0	100	0	100
0	100	0	100
0	100	0	100
0	100	0	100
0	100	0	100
0	100	0	100
0	100	0	100
Fan Calibration		Units US	
Node 1			
Off Rate %	30	Bin Level Alarm	On Gate AlarmOff
Low Tank	0.0	Bin Press Alarm	Off SmoothingOn
Low Limit	0.0	Decimal Shift	On
		Zero Shutoff	Off
Area/Hour	0.0	Cal Weight	2.00
Vol/Min	0.0	Valve Cal	43
Rate Cal	2.0	Pre Set Pw	0
Rate +/-	0.0	Pw Freq	60
Meter Cal	84.0	Valve Delay	0.0
RPM	0.0	PWM	0
		Appl Delay	0.0
		Bin Level %	Cal
Pressure 1	----	Min Pw	1
Pressure 2	----	Max Pw	253
		Application	Gran 4
			PWM Close Valve
Tally Reg.		CAN Profile	
		OK	

The Tally Registers screen displays the following for each product node or control channel:

- Total Volume (Ttl Vol)
- Field Volume (Fld Vol)
- Tank Volume (Tnk Vol)
- Total Area (Ttl Area)
- Field Area (Fld Area)

This screen also displays the overall distance traveled by the vehicle as calculated by the Viper Pro using the speed sensor and programmed speed cal.

The screenshot shows the 'Tally Registers' screen. At the top, there are five red circular 'Reset' buttons. Below them is a table with five columns: 'Node', 'Ttl Vol', 'Field Volume', 'Tnk Vol', 'Ttl Area', and 'Fld Area'. The table contains data for five nodes. Below the table, there is a 'Distance' section showing '33 Miles' and '4851 Feet', with a red circular 'Reset' button next to it. At the bottom right, there are two buttons: 'Next' and 'OK'.

Node	Ttl Vol	Field Volume	Tnk Vol	Ttl Area	Fld Area
1	14247.8	14247.8	0.0	778.8	778.8
2	10581.1	10581.1	0.0	156.1	156.1
3	10836.6	10836.6	0.0	156.1	156.1
4	8214.9	8214.9	0.0	157.1	157.1
5	0.0	0.0	0.0	0.0	0.0

Distance 33 Miles
4851 Feet

Next
OK

Touch the **Next** button on the Tally Registers screen to view the Odometer screen. Continue touching the **Next** button to view the Tally Registers for each product control node in the Viper Pro CANbus system.

Resetting the Tally Registers

Selecting the **Reset** button for any group of totals on the Tally Registers screen will reset the selected tally for all nodes at the same time.

For example, touching the reset button above the field volume tally with three product nodes in the system, the field volume for all three nodes will be reset to zero. Touch the tank volume reset button to reset the tank or bin volumes to the preset volume value.

Note: Review the Feature Settings Area for Products 1-3 section on page 127, the Feature Settings Area for Products 4-5 section on page 130 or the following Setting or Resetting Distance and Individual Nodes section for information on setting the tank volume.

Setting or Resetting Distance and Individual Nodes

To reset an individual node, or the Viper Pro odometer from the main screen:

1. Touch the **Product Control** area at the bottom of the main screen.
2. Touch the **Tally Registers** button at the bottom of the CAN Controller Status screen.
3. Touch the **Next** button on the Tally Registers screen to display the Viper Pro Odometer screen.

4. Using the on-screen keyboard, enter the desired distance values in the appropriate fields. Touch the **Set** button to save the entered values. To reset the Odometer, touch the **Reset** button. The Viper Pro odometer is reset to zero.
5. Touch **Next**. The Node 1 screen displays.

6. To set tally data for any of the displayed totals:
 - a. Touch the desired field to modify.
 - b. Enter the desired value and touch the **Set** button next to the entered value.
7. To reset the data in the fields, touch the **Reset** button to the right of the value to reset.
8. Repeat step 6 or step 7 for each node.
9. Touch **OK**. Viper Pro saves the changes.

Note: Field volume, field area, and tank volume can be reset while in a job. Total volume and total area can only be reset while a job is not in progress.

Alarms

If the Viper Pro is configured as the CANbus controller, the field computer will display a specific warning prompt for any configured alarm conditions encountered. Any new warning conditions encountered by the field computer will be displayed automatically when the condition is detected and will contain information to assist the machine operator with addressing the alarm condition.

Touch the Display Data icon to access an overview of the tally register or current active alarm information for each product node or control channel directly from the main screen.

In addition to the warning boxes, the Product Control area on the main screen will display a yellow 'warning' indicator instead of the green 'thumbs up' symbol and a **Current Alarms** button will be displayed at the bottom of the CAN Controller Status screen if an alarm condition is active.

CAN Controller Status			
Section Cals		Miscellaneous	
1 90	5 90	Speed Sensor	Wheel
2 90	6 90	Speed Cal	68
3 90	7 90	Self Test	0.00
4 90	8 90	Packing Press	0
Fan Calibration		Speed	0.0
		Units	US
Product 1 <input type="button" value="v"/>			
Off Rate %	30	Bin Level Alarm	On Gate AlarmOn
Low Tank	0.0	Bin Press Alarm	On Smoothing On
Low Limit	0.0	Decimal Shift	Off
		Zero Shutoff	On
Area/Hour	0.0	Cal Weight	5.0
Vol/Min	0.0	Valve Cal	2188
Rate Cal	120.0	Pre Set Pw	0
Rate +/-	6.0	Pw Freq	40
Meter Cal	80.0	Valve Delay	0.0
		PWM	255
		Min Pw	1
		Max Pw	253
Pressure 1	100	Bin Level % Cal	
Pressure 2	85	Application	Gran4
		Standard Valve	
<input type="button" value="Tally Reg."/> <input type="button" value="CAN Profile"/> <input type="button" value="Current Alarms"/> <input type="button" value="OK"/>			

Note: Off rate and low limit alarms will automatically clear once the condition has corrected itself. All other alarms will need to be cleared by touching the **OK** button on the warning prompt.

Addressing Alarm Conditions

To view any current alarms detected on the CANbus system from the Viper Pro main screen:

1. Touch the **Product Control** area at the bottom of the screen.
2. Select the **Current Alarms** button at the bottom of the CAN Controller Status screen. The Current CAN Node Alarms screen displays:

New CAN Node Alarms	
Node 1:	Off Rate
<input type="button" value="OK"/>	

3. To acknowledge the warning, but keep the warning information accessible, touch the **OK** button. To clear the warning condition from the Viper Pro, touch the **Clear Alarms** button.

Note: *Touching the Clear Alarms button will clear the current alarm prompts from the Viper Pro display. However, the alarm condition may still be present in the application system and the condition may need to be corrected.*

The following table discusses the alarms and the conditions that will set off an alarm for products 1 through 3.

Alarm	Condition
Off Rate	This alarm activates when the actual application rate differs from the specified percentage rate for more than five seconds. This alarm activates only when the system is in Auto mode. The alarm automatically clears when the target rate and actual rate are within the specified range or when the product mode is switched to either Manual or Off.
Low Tank	This alarm activates when the tank volume has dropped below the specified limit. The alarm may be cleared by either entering a value that is above the low tank value or by entering a zero in the Low Tank field.
Vac/Bin	For an injection application, the Vac alarm is active. This alarm activates when the vacuum sensor detects a vacuum in the tank. Troubleshoot the system to determine the cause of the alarm and clear it. For a granular application, the Bin alarm is active. This alarm activates when the bin level sensor detects that the granular level in the bin drops below the sensor.
Fan Limit	This alarm is activated when one or both of the fans on the air cart has exceeded the high rpm fan limit.
Zero Pressure	The zero pressure alarm is displayed if one or more air cart bins has lost pressure. Be sure that the bin covers are in place and secure to repressurize the bins.
Zero Speed	This alarm activates when the speed of the vehicle drops below 0.7 MPH [1.1 km/h] and the Zero Speed Shutoff function is enabled. Cycle the master switch to clear the alarm and resume product control.
Seed Gate Position	If the position of one or more of the seed gates does not correspond to the section switch or product switch on the Seed Hawk switch box, the Viper Pro will display a warning. Make sure that the seed gates are able to open and close properly. Note: An SCT node must be on the CANbus for the Viper Pro to detect or display this alarm condition.
Ultrasonic Failure	This alarm is activated If no signal is received from the ultrasonic sensor in one or more air cart bins.
Low Fan Limit	This alarm will activate if one or both fans drop below the desired low fan RPM limit. Note: If the fan alarm is enabled, the seed gates and master clutch will not activate unless the fan RPM is above the low limit to prevent plugging seed tubes if the fan is not providing enough air flow to move product.
Insuff. Meter Rev.	This alarm activates during the cal weight calculation if the meter does not register at least one full revolution.
HC Power Disc.	The HC Power Disc. alarm is displayed if high current voltage falls below 9 Volts.

The following table discusses the alarms and the conditions that will set off an alarm for products 4 or 5.

Alarm	Condition
Off Rate	This alarm activates when the actual application rate differs from the specified percentage rate for more than five seconds. This alarm activates only when the system is in Auto mode. The alarm automatically clears when the target rate and actual rate are within the specified range or when the product mode is switched to either Manual or Off.
Low Limit	This alarm activates when the volume per minute has dropped below the specified limit. This alarm activates only when the system is in Auto Mode. The alarm automatically clears when the volume per minute rises above the specified limit or when the product mode is switched to either Manual or Off.
Low Tank	This alarm activates when the tank volume has dropped below the specified limit. The alarm may be cleared by either entering a value that is above the low tank value or by entering a zero in the Low Tank field.
Flow/Shaft	For an injection application, the Flow alarm is active. This alarm activates to indicate a loss of product flow. For a granular application, the Shaft alarm is active. This alarm activates when the shaft sensor in a granular application does not detect shaft rotation. Troubleshoot the system to determine the cause of the alarm and clear it.
Vac/Bin	For an injection application, the Vac alarm is active. This alarm activates when the vacuum sensor detects a vacuum in the tank. Troubleshoot the system to determine the cause of the alarm and clear it. For a granular application, the Bin alarm is active. This alarm activates when the bin level sensor detects that the granular level in the bin drops below the sensor.
Dual Flow	This alarm activates for an injection application system when the flow switch monitor and the actual flow readings are out of the specified tolerance. This alarm also activates when Gran 3 is selected as the application type and the rates sensed by the dual encoders are out of the specified tolerance.
Zero Speed	This alarm activates when the speed of the vehicle drops below 0.7 MPH [1.1 km/h] and the Zero Speed Shutoff function is enabled. Cycle the master switch to clear the alarm and resume product control.

Creating Application Reports

When a field operation is completed, the operator may have the Viper Pro create a job report with the coverage map and application or coverage data collected within the open job. The job report may then be transferred to a home or office computer for viewing and archiving or printed as a visual report for a customer.

Information such as field, product(s) and weather information contained in the application report may be entered during the job on the Viper Pro or on a home or office PC. The Viper Pro creates reports in both shapefile and bitmap (.bmp) formats. The shapefile report will require a shapefile editing program to enter report information while the bitmap report may be edited using a simple image editing tool such as Microsoft® Paint.

Note: The job information is also provided in the .jdp (job data package) used with Slingshot web services for creating application reports.

Refer to the following sections to enter report information in an job file before creating the job report. Report information must be entered while the job is open or in progress and may be entered at any time while the job is open. If a job is closed prior to entering report information, the job file must be re-opened to edit or complete report information.

Note: To re-open a job file and add report information, be sure to select the **Add to Job** option when opening the job file.

An application report consists of:

- Customer Information
- Weather Information
- Product Information
- Field Information
- Applicator Information
- Report Notes
- Field Conditions
- Vehicle Information

To Enter Report Information

1. With the job file open, touch the **Menu** button in the lower, right corner of the display and select **Report**.
2. The Customer Information screen will display

Customer Information

3. Use the Customer Information screen to enter the date of the application and the customer name, address, and any identification information associated with the customer file.

The Viper Pro will store customer information entered on the field computer. For future jobs, the operator may select the customer name from the drop down list and Viper Pro will automatically enter the associated customer data.

4. Verify the customer information and touch **Next** to display the Field Information screen.

Field Information

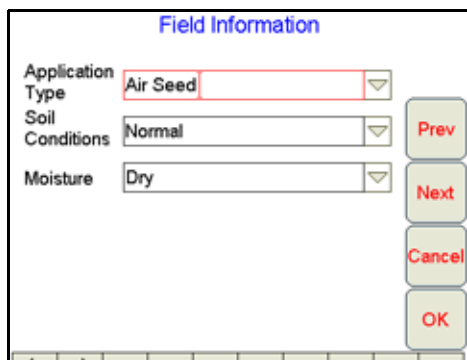
5. Use the Field Information screen to enter field information and the crop type if applicable.

The Viper Pro will store field and crop information entered on the field computer. Select a field name or crop type entered during a previous operation and the field computer will automatically enter the information from the previous job.

6. Verify the field and crop information and, if necessary, edit the displayed report information before touching the **Next** button to display the next Field Information screen.

Field Conditions

7. Use the second Field Information screen to enter application type, soil condition, and moisture information for an operation.



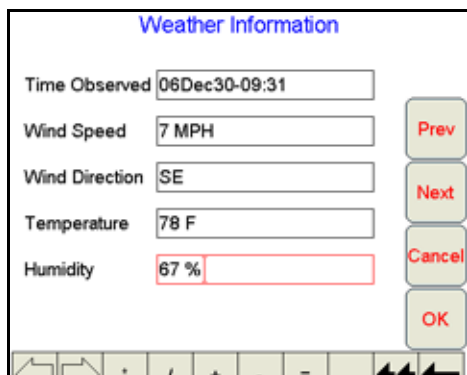
The 'Field Information' screen displays three dropdown menus for data entry. The 'Application Type' menu is set to 'Air Seed', the 'Soil Conditions' menu is set to 'Normal', and the 'Moisture' menu is set to 'Dry'. To the right of these menus are four buttons: 'Prev', 'Next', 'Cancel', and 'OK'. The 'Next' button is highlighted in red. At the bottom of the screen is a navigation bar with several icons.

Conditions entered for previous jobs may be selected from the drop down lists if applicable. The Viper Pro will automatically store any field information entered on the field computer.

8. Touch the **Next** button to display the Weather Information screen.

Weather Information

9. Use the Weather Information screen to enter observed weather conditions during an operation. The Viper Pro offers fields for the operator to enter wind speed, wind direction, temperature, and humidity levels.



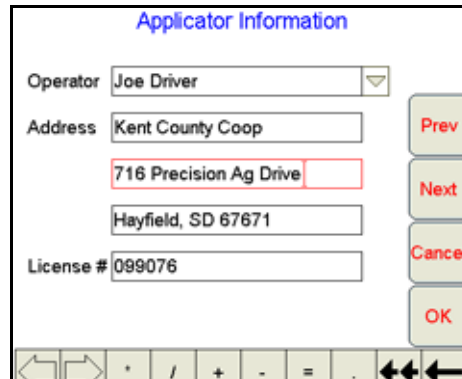
The 'Weather Information' screen displays five input fields for weather data. The 'Time Observed' field contains '06Dec30-09:31'. The 'Wind Speed' field contains '7 MPH'. The 'Wind Direction' field contains 'SE'. The 'Temperature' field contains '78 F'. The 'Humidity' field contains '67 %'. To the right of these fields are four buttons: 'Prev', 'Next', 'Cancel', and 'OK'. The 'Next' button is highlighted in red. At the bottom of the screen is a navigation bar with several icons.

Note: If an optional Watchdog Weather Station is installed, the Viper Pro can log weather data into the job report automatically. See Appendix F, Weather Station, for more information.

10. Touch the **Next** button to display the Applicator Information screen.

Applicator Information

11. Use the Applicator Information screen to enter the operator or custom applicator address and license number.

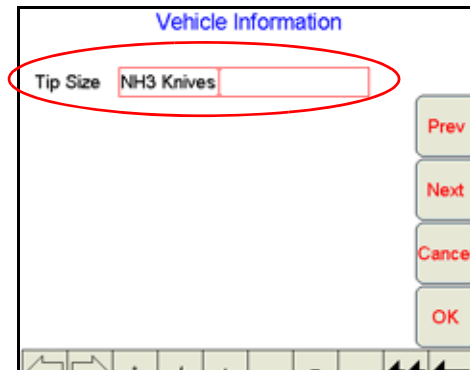


The Viper Pro will store any applicator information entered on the field computer. Select the operator name from the drop down list to automatically enter the applicator information for future jobs.

12. Touch the **Next** button to display the Vehicle Information screen.

Vehicle Information

13. Use the Vehicle Information screen to enter the tip size for a liquid application if applicable.



14. Touch the **Next** button to display the next report information screen.

Product Information

Note: The Product Information screen(s) will not be available if the Product Application option is not selected during the job setup process. Skip to the Report Notes Information section on page 105 to finish entering report notes.

15. The Product Information screen allows the operator enter chemical product information such as the manufacturer, EPA number, and targeted pests as applicable.

The Viper Pro will store any chemical information entered on the field computer. If the operator selects the product for a future job, the manufacturer and EPA number will be automatically entered on this screen.

Product Mix. Select the product mix option at the top of the Product Information screen to provide additional ingredient information on the next report information screen.

NH3 Tank Number. For anhydrous ammonia applications, the anhydrous tank number may be entered to display the tank number on the job report.

Single Color Coverage Map. If desired, the Viper Pro can create a report showing coverage only. A single color report will not display high and low rate areas on the coverage map (default).

16. Verify the product information has been entered correctly and touch the **Next** button to continue entering report information. If the product mix option is selected, proceed to the *Ingredient Information* section below, otherwise, skip to the *Report Notes Information* section on page 105 to finish entering report information.

Ingredient Information

Note: The Ingredient Information screen is only displayed if the Product Mix option is selected on the Product Information screen. Skip to the Report Notes Information section on page 105 to finish entering report information if product mix is not selected.

17. Use the Ingredient Information screen(s) to enter the ingredients of a mixed product solution. Enter the manufacturer, EPA number, target pests, and mixture rate for the mixture as necessary.

The operator may enter up to five ingredients for a mixed product.

18. After the last ingredient in the chemical mixture is entered, touch the **OK** button. The following screen will be displayed.

19. Select the **View** button to review the entered product mixture information.

Note: Refer to the *Single Color Coverage Map* section on page 104 for information on the “1 Color Coverage Map” option.

20. Verify that the correct mixture information has been entered and touch the **Next** button to display the Report Notes Information screen.

Report Notes Information

21. Use the Report Notes screen to enter any additional notes for the job report.

22. Use the **Prev** and **Next** buttons as necessary to review and modify the job report information before touching **OK** to accept the displayed information and return to the Viper Pro main screen.



CHAPTER

6

Viper Pro Guidance

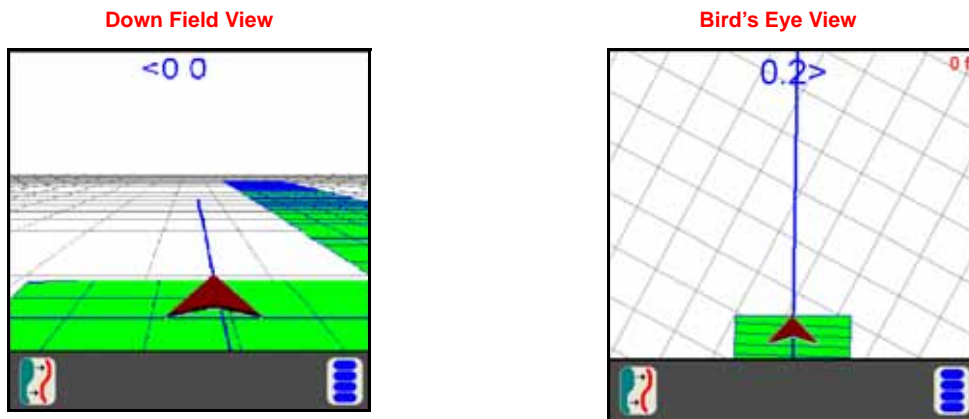
Note: A DGPS receiver capable of outputting GPS messages at 10 Hz is required to use the guidance capabilities of the Seed Hawk® Viper Pro. Contact a local Raven dealer for additional assistance with compatible receiver options.

Non-Raven DGPS receivers may also be used with the Viper Pro. To avoid issues with connection and compatibility, contact the receiver manufacturer or a local dealer for additional information and receiver capabilities before purchasing.

Guidance Views

The Viper Pro provides two viewing options for guidance control, the '**Down Field View**' and the '**Bird's Eye View**.'

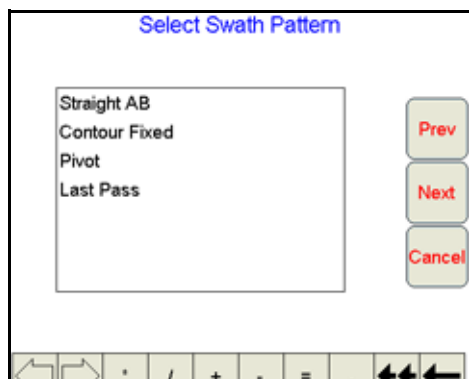
The '**Down Field View**' shows a three dimensional display of the field much like the view from the vehicle cab. The '**Bird's Eye View**' shows the operation area and the vehicle as viewed from a distance above.



All guidance features can be used in either the '**Down Field View**' or the '**Bird's Eye View**.'

Swath Guidance Patterns

If 'Swath Guidance' is enabled during the start job process, the operator must select a swath pattern to use during the job.



The following swath patterns are available.

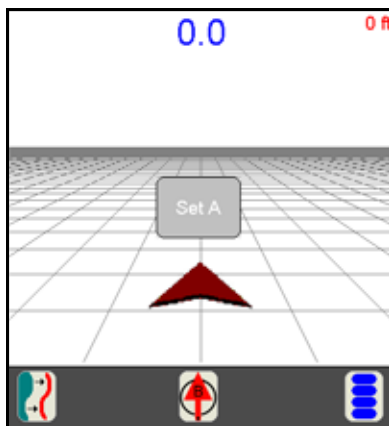
Pattern	Description
Straight A-B	A straight A-B line pattern for parallel guidance.
Pivot	A 360 degree (or circle) pattern.
Last Pass	Guidance based on the last nearest pass driven.
Fixed Contour	Allows the operator to set an irregular A-B Line for swath guidance.

Setting the Straight (A-B) Line Pattern

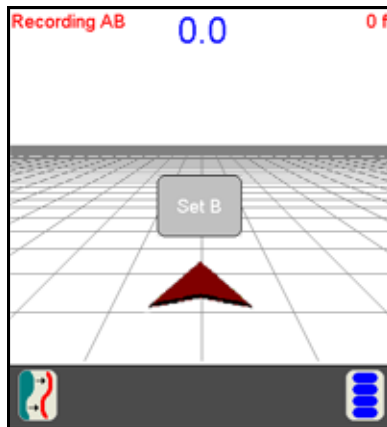
If Swath Guidance is enabled, the Viper Pro will automatically display the 'Guide' tab when a job is opened.

To begin swath guidance with the straight (A-B) line pattern:

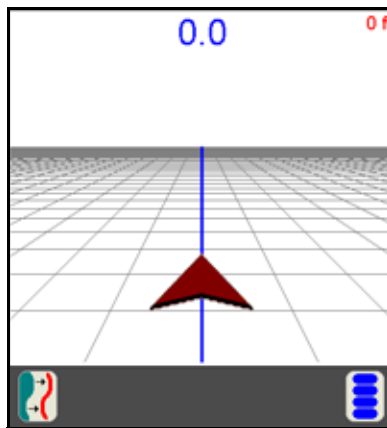
1. Touch the **Set A** button to set the first point on the path at the current vehicle location.



2. Drive to the end of the swath and touch the **Set B** button on the screen.



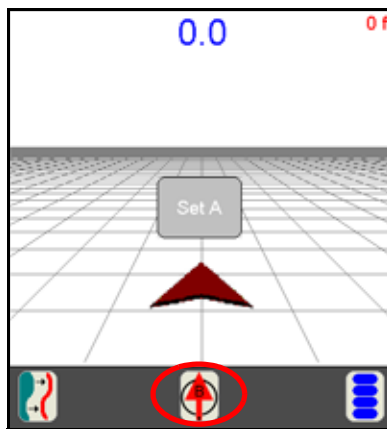
Once the B point is set, Viper will create a straight guidance line displayed in blue.



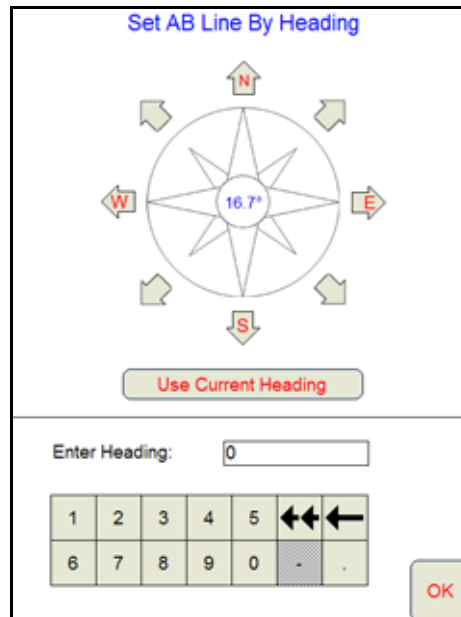
Set A-B Line by Heading

An A-B Line can also be created by using the Set B by Heading feature. To set an A-B path using a compass heading:

1. Touch the 'Set B by Heading' icon along the bottom of the Guidance display.



The A point is set when the 'Set B by Heading' icon is selected. The Set A-B Line By Heading screen will display.



2. Select one of the following to enter the heading for the A-B Line:
 - a. Touch one of the compass heading arrows to set the heading along a compass heading.
 - b. Touch the Use Current Heading button to use the current vehicle heading shown in the center of the compass display.
 - c. Use the on-screen keypad to enter any heading between 0 and 360°.

Setting the Fixed Contour Pattern

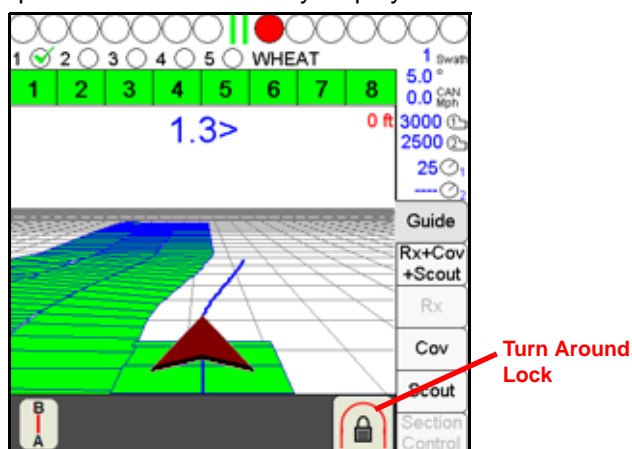
The fixed contour pattern allows the operator to set an irregular A-B Line pattern. To begin swath guidance with the fixed contour pattern:

1. Touch the '**Set A**' button to begin recording an irregular A-B line path. Viper Pro will begin plotting the vehicle position as the machine moves along the desired path.
2. Drive the desired path to the end of the swath.
3. At the end of the swath, touch the '**Set B**' button on the screen. Viper will connect the points plotted along the contour and display the driven path with a blue line. Guidance for subsequent swaths will be based on the original contour and the swath number will be displayed in the upper right corner of the screen.

Note: *Curvature of the Fixed Contour guidance path should not be too aggressive. Overly aggressive curves may produce undesirable results.*

Setting the Last Pass Pattern

If Swath Guidance is enabled, the Viper Pro will automatically display the 'Guide' tab when a job is opened.



The last pass pattern provides guidance based upon the nearest covered area so the operator does not need to set points or record a swath path. To begin Last Pass guidance, begin applying product. Once the first swath path is completed, Viper will detect the nearest area previously covered and use the programmed overall width to determine the next guidance path.

Note: Last Pass Guidance is based on the nearest covered area so the booms must be on in order to utilize this guidance pattern.

Turn Around Lock

The Last Pass pattern uses the nearest, previously applied area, or last pass, to determine the guidance for the next swath. If headlands areas are present and the Last Pass mode is active, the Viper Pro may display a guidance line along the headlands area instead of the next swath.



Lock Enabled



Lock Disabled

Touch the icon to toggle the turn around lock feature on to provide guidance back along the last swath and ignore the headlands area. Touch the icon again to toggle the turn around lock feature off to allow guidance along the headlands area.

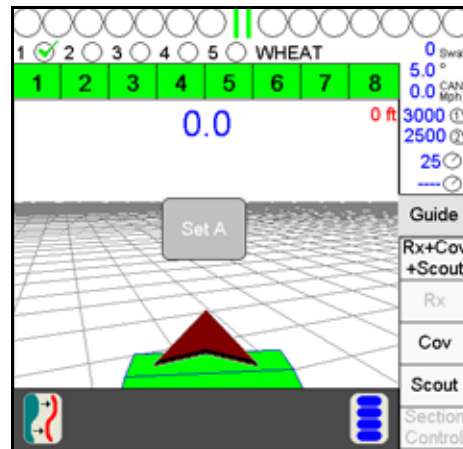
Note: If an optional SmarTrax system is installed with the Viper Pro, a reverse sense icon may display in the map area during operation. Refer to the SmarTrax Operation Manual for more information about operating the SmarTrax system on the Viper Pro field computer.



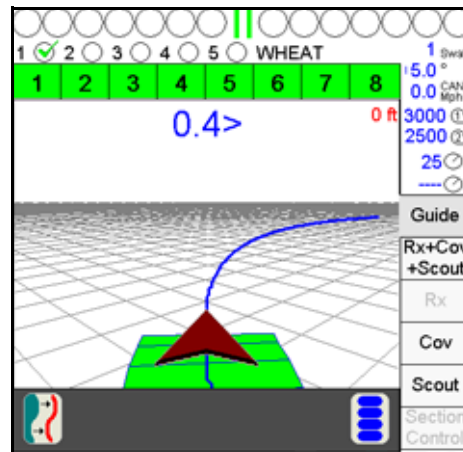
Setting the Pivot Pattern

If Swath Guidance is enabled, the Viper Pro will automatically display the 'Guide' tab when a job is opened. To begin swath guidance with the pivot pattern:

1. Start with the machine located at a point on the outside of the center pivot area and touch the '**Set A**' button on the screen.



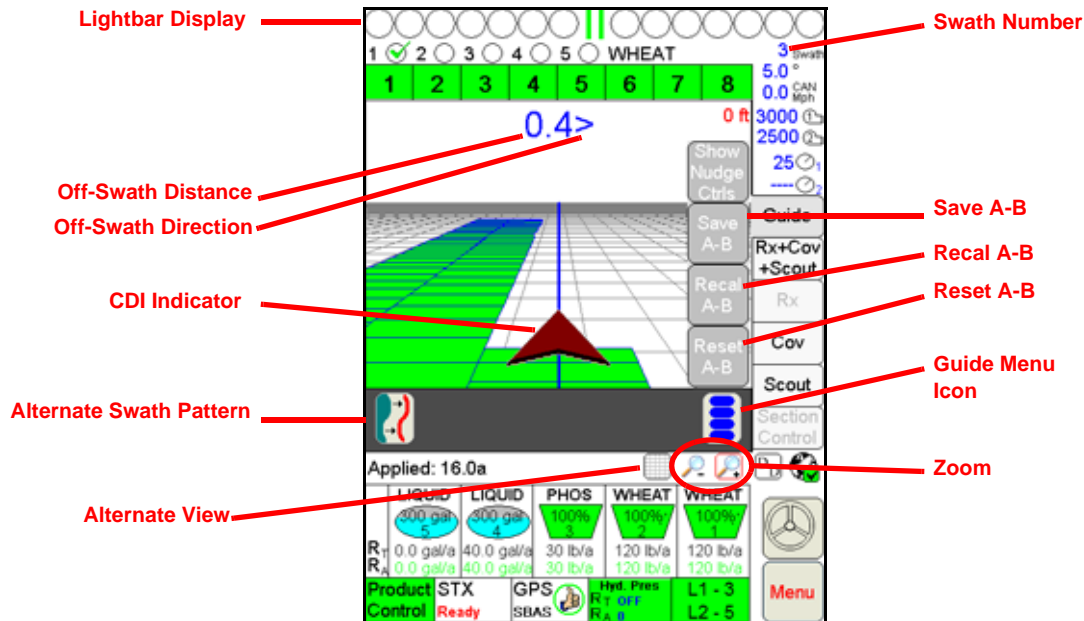
2. Drive along the outside of the pivot pattern area and touch the '**Set B**' button on the screen. Viper will create a circular guidance path using the 'A' and 'B' points selected and display guidance paths toward the inside of the circle.



Note: Currently, this pattern does not require that a complete pivot pass be driven to create a guidance path, however, the best results are usually obtained by driving further along the initial pivot swath before setting the 'B' point.

Using the Guide Tab

Viper Pro will automatically display the Guide tab when a job is opened. The map area displays a Course Direction Indicator in the form of an arrow with the arrow pointing in the direction of travel of the vehicle. The operator may access additional guidance information and features by selecting the displayed areas or on-screen buttons.



The following features display on the Guide tab:

• Light bar Display	• Guide Menu Icon	• Course Direction Indicator
• Off-Swath Distance	• Bright Button	• Save A-B
• Off-Swath Direction	• Dim Button	• Recal A-B
• Swath Number	• Alternate View Button	• Reset A-B
• Alternate Guidance Pattern Button	• Zoom Level	

Light Bar Display

If previously set up, the on-screen light bar will display along the top of the screen during an active job regardless of which tab is currently displayed and allows the operator to use the Guidance feature at all times during product application.

Off-Swath Distance

The Off-Swath Distance displays the actual distance the vehicle is away from the swath pattern.

Off-Swath Direction

The Off-Swath Direction indicator displays the direction from the displayed path to the vehicle. A right arrow indicates that the vehicle is to the right of the displayed path. A left arrow indicates that the vehicle is to the left of the guidance path.

Swath Number

The Swath Number displays the number of passes completed by the vehicle.

Alternate Swath Pattern Button

The Alternate Swath Pattern Button displays the alternate guidance pattern available for the current job.

Alternate View Button

The Alternate View button allows the operator to toggle back and forth from 'Down Field View' to 'Bird's Eye View.' The button shows the alternate view that will be displayed when the button is selected.

Bright Button

The Bright button displays only if the Guidance system is configured to use an external light bar.

Touch the Bright button to increase the brightness of the external light bar. Viper will display the current intensity level of the light bar display each time the button is selected.

Dim Button

The Dim button displays only if the Guidance system is configured to use an external light bar.

Touch the Dim button to decrease the brightness of the external light bar. Viper will display the current intensity level of the light bar display each time the button is selected.

Guidance Menu Icon

The Guidance Menu icon displays if additional options are available for the guidance pattern currently in use. Touch this icon to access special features, save, or modify the current guidance path.

Note: *The Guidance Menu icon will not display if no additional options are available for the active guidance pattern.*

Zoom Level

Select the Zoom In or Zoom Out icons to change the Guidance display for personal preferences or review the coverage map.

Vehicle Indicator

The Vehicle Icon provides an indication of where the vehicle is positioned with respect to the overall field. The tip of the arrow represents the antenna position of the vehicle and where it is in reference to the swath line, field, etc.

Save A-B Button

The Save A-B button allows the operator to save an A-B line once the line has been set using the Set A and Set B buttons or if the A-B line has been re-calibrated or reset.

ReCal A-B Button






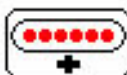

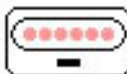



When using the Straight (A-B) Line guidance pattern, touch the Guidance Menu icon to access the Recal A-B button. Touch the Recal A-B button to recalibrate the displayed A-B line to the current machine location.

Reset A-B Button

When using the Straight (A-B) Line guidance pattern, touch the Guidance Menu icon to access the Reset A-B button. Select the Reset A-B button to clear the current A-B guidance points and set new points without closing the current job.

Screen Icons

The following screen icons appear on the Guidance screen.

Icon Name	Description	Icon Name	Description
	Guidance Menu Icon: Touch this icon to view the available options for the current guidance path.		Zoom Out: Touch the icon to zoom the current display area out.
	Straight A-B Pattern: Touch this icon to switch to the Straight A-B pattern.		Zoom In: Touch this icon to zoom the current display area in.
	Last Pass Pattern: Touch this icon to switch to the Last Pass pattern.		Increase Brightness: Touch this icon to increase the brightness of an external light bar.
	Pivot Pattern: Touch this icon to switch to the Pivot pattern.		Decrease Brightness: Touch this icon to decrease the brightness of an external light bar.
	Vehicle Icon: The tip of the arrow indicates the antenna position and current vehicle location in reference to the swath path, field area, etc.		Bird's Eye View: Touch this icon to switch to the 'Bird's Eye View' or view looking down on the current machine location.
			Down Field View: Touch this icon to switch to the 'Down Field View' or a view from the vehicle cab.

A-B Lines

The straight A-B and fixed contour guidance patterns allow the operator to set a swath guidance based upon the first pass driven. This A-B line can be saved for later use.

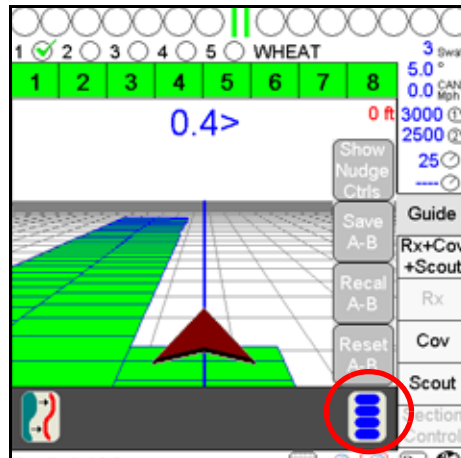
Note: Multiple A-B lines may be saved per job. When saving lines, use unique names to help distinguish each line from other saved A-B lines.

Saving an A-B Line

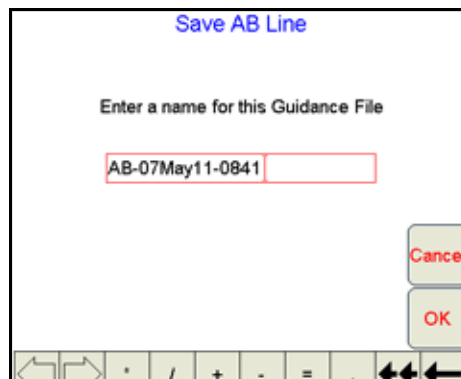
During the job setup, select Straight A-B or Fixed Contour as the swath pattern.

Once the job is started:

1. Touch **Set A** to start the first swath path.
2. Drive to the end of the first swath.
3. Touch **Set B**. The first swath path is now set.
4. Touch the Guide Menu icon in the guidance screen. The A-B feature buttons will display.



5. Touch the **Save A-B** button. The Save A-B Line screen will display.



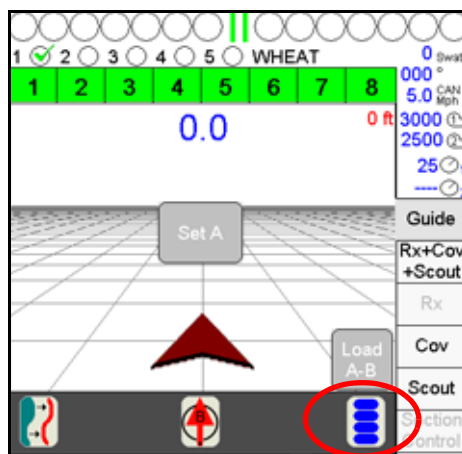
6. Using the on-screen keyboard, enter a name for the A-B line in the box. If no name is entered, the date and time are used for the A-B line.
7. Touch **OK**. The A-B line will be saved and Viper will display the guidance screen.

Note: When saving lines, use unique names to help distinguish each line from other saved A-B lines. Avoid using dates and times as this will make selecting a previously stored A-B line more difficult.

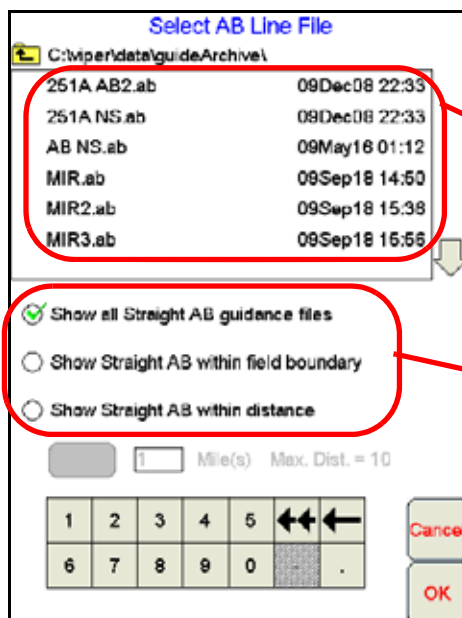
Loading an A-B Line

During the job setup, select straight A-B or fixed contour for the swath pattern. Once the job is started:

1. Touch the **Guide Menu** icon in the guidance screen.



2. Touch the **Load A-B** button. The Select A-B Line File screen will display.



If several A-B lines are saved on the Viper Pro, the following filtering options may be used to help locate a specific guidance path:

Show all guidance files. This option shows all currently saved paths of the same type selected when the job was created.

Show within field boundary. If a field boundary has been created or loaded into the current job, select this option to view only saved A-B paths within the current boundary.

Show within distance. Select the distance filter option to locate an A-B line within a set distance of the current GPS position. The operator may select the distance to use as a filter up to a maximum of 10 miles [16 km] (straight A-B) or 2 miles [3.2 km] (fixed contour). The distance filter is not limited when the pivot pattern is used.

3. Select the desired A-B line from the list provided.
4. Touch **OK**. The A-B line will be loaded and Viper will display to the guidance screen.

Nudge Feature

The Nudge Feature allows the operator to adjust the calculated guidance path to match field conditions. The default Nudge values for a new Profile are 1 inch [1 cm] and 10 inches [10 cm]. The operator may modify these values for specific machines and implement configurations. The Nudge settings can also be adjusted within a job to modify this feature's characteristics for a particular application.

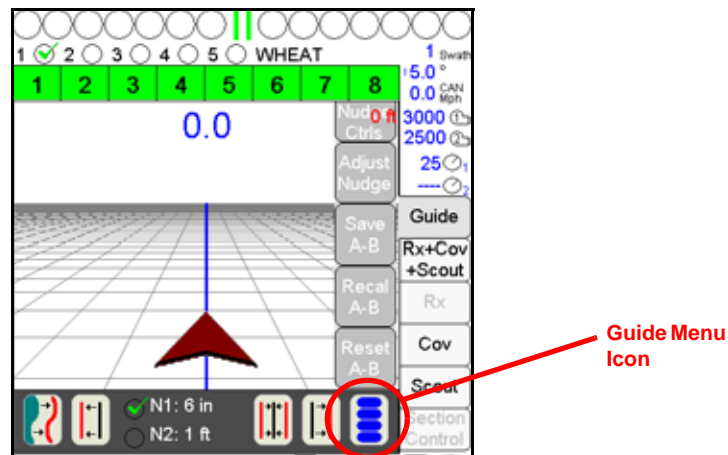
Configuring Nudge Settings

A Profile's Nudge settings can be adjusted to match particular requirements of a job.

Note: *The in-job nudge settings will only be accessible with an A-B type guidance path (i.e. Straight Line, Fixed Contour, Pivot).*

To configure the nudge settings in a job:

1. Touch the Guide Menu icon on the Guidance screen.



2. Select Adjust Nudge to display the Nudge Settings screen.

Nudge Settings

Nudge 1 (N1): ☒ inches ☐ feet

Nudge 2 (N2): ☒ inches ☐ feet

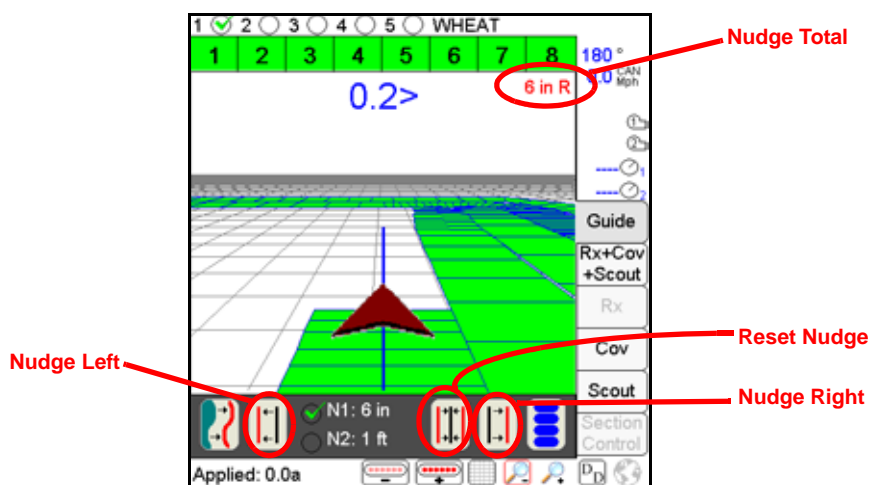
☐ Save these settings as default for future jobs.

Cancel
OK

3. Use the on-screen keyboard to enter the nudge value for the Nudge 1 and 2 values.
4. Select the 'inches' or 'feet' option to set the units for the entered nudge value.
5. Select the 'Save these settings as default for future jobs' option to save these nudge values with the Profile. If this option is selected, the nudge values will be available at the start of each job started on the Viper Pro. If this option is not selected, nudge values must be programmed for each job.

Using the Nudge Feature

In order to nudge a guidance pattern, the user must first start a "Swath Guidance" enabled job and set A and B points. Switching to "Last Pass" will cause the nudge controls to be hidden on the Guidance screen.



If the Nudge buttons are not available on the Guidance screen, touch the Menu button on the Guidance screen and select Show Nudge Ctrl's. The user will then be able to nudge the swath as desired from the "Guide" tab on the Viper Pro main screen as shown above.

Two nudge values can be applied by selecting either "N1" or "N2" and then touching the nudge left or right button. The Guidance screen also displays the current total amount a swath pattern has been nudged. When the Reset Nudge button is selected, the accumulated nudge distance is applied in the opposite direction, effectively removing any nudge adjustment from the current guidance pattern.

CHAPTER

7

Advanced Settings and Features

Overview

This chapter contains descriptions of advanced settings and features available when controlling a CANbus product control system with the Viper Pro field computer.

The following settings and features are not required for operation of the Viper Pro system and are intended to assist with various operations using the Viper Pro field computer.

Advanced Product Control Settings and Features

Additional settings and features may be configured to help the operator monitor and control application of products during an actual job. This section provides details on the settings available through the CAN Controller Status screen when the Viper Pro is configured as the CANbus controller.

The following settings and features are accessible through the CAN Controller Status screen:

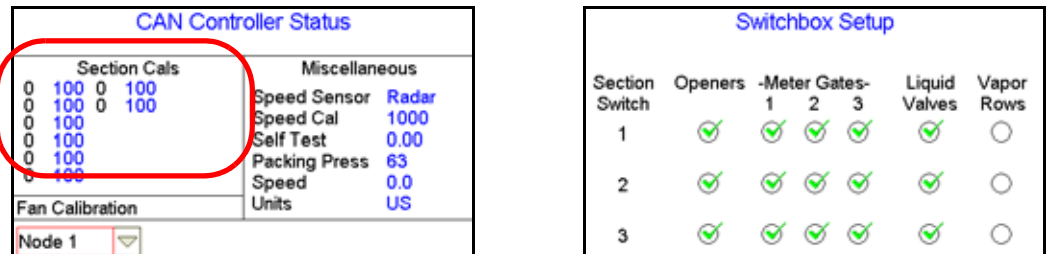
- Boom or implement section assignments
- Miscellaneous settings and node version information
- Feature and alarm settings
- Product control settings
- Pressure display and calibration
- Application and control valve type selection

Section Assignments

The Switchbox Setup screen is used to assign individual functions to the section switches on the Switch Box. Place a check mark in the corresponding function column to assign that function to the section switch. This screen may also be accessed from the main screen by touching the sections indicators above the map area and then touching the **Next** button.

Note: Changes may not be made to the switch box setup options while a job is in progress. To make changes to the options on this screen, close the active job file before accessing the Switchbox Setup screen.

1. Touch within the **Product Control** area on the main screen and then touch the **Section Cals** area on the CAN Controller Status screen.



The Switchbox Setup screen may be used to assign individual switch box functions to section switches on the Switch Box. Place a check mark in the corresponding function column to assign that function to the section switch.

Note: The Switchbox Setup screen may also be accessed from the main screen by touching the section indicators at the top of the map area and then touching the **Next** button. Refer to Chapter 8, Sectional Control Technology™ (SCT) for more information on the Switchbox Setup screen and using the SCT feature with the Seed Hawk® Viper Pro.

Changes may not be made to the switch box setup options while a job is in progress. To make changes to the options on this screen, close the active job file before accessing the Switchbox Setup screen.

Fan and Pressure Cal

The Fan RPM area displays the current RPM of the air cart fans. Touch within the Fan RPM area to display the Fan Calibration screen and calibrate the fans.

CAN Controller Status

Section Cals				Miscellaneous	
0	100	0	100	Speed Sensor	Radar
0	100	0	100	Speed Cal	1000
0	100			Self Test	0.00
0	100			Packing Press	63
0	100			Speed	0.0
0	100			Units	US

Fan Calibration

Node 1 ▼

Off Rate % 30 Bin Level Alarm On Gate Alarm Off
 Low Tank 0.0 Bin Press Alarm Off Smoothing On
 Low Limit 0.0 Decimal Shift On
 Zero Shutoff Off

Area/Hour 0.0 Cal Weight 2.00 Pre Set Pw 0
 Vol/Min 0.0 Valve Cal 43 Pw Freq 60
 Rate Cal 2.0 Valve Delay 0.0
 Rate +/- 0.0 PWM 0
 Meter Cal 84.0 Appl Delay 0.0
 RPM 0.0 Min Pw 1 Bin Level % Cal
 Max Pw 253

Pressure 1 --- Application Gran 4
 Pressure 2 --- PWM Close Valve

Tally Reg. CAN Profile OK

Fan Calibration

	Cal	Low Limit	High Limit	Cur. Val.	Alarm	Home Disp.
RPM1	2	0	0	0	✓ On	○ On
RPM2	2	0	0	0	○ On	○ On
RPM3	0	0	0	0	✓ On	○ On
RPM4	0	0	0	0	✓ On	○ On
AIR1	---	0.0	0.0	---	✓ On	○ On
AIR2	---	0.0	0.0	---	✓ On	○ On
AIR3	---	0.0	0.0	---	✓ On	○ On
AIR4	---	0.0	0.0	---	✓ On	○ On
AIR5	---	0.0	0.1	---	✓ On	○ On
AUX1	---	0	0	---	✓ On	○ On

✓ Air/Liquid ○ Hydraulic

1 2 3 4 5 ← ← ←
 6 7 8 9 0 - -

Cancel OK

Note: Refer to the Optional Bin Pressure Sensor section on page 38 or the Fan Cal section on page 46 for more information on configuring the bin pressure or fan speed calibrations.

Miscellaneous Settings Area

The information displayed in the Miscellaneous area is an overview of the settings and current system status.

CAN Controller Status

Section Cals				Miscellaneous	
0	100	0	100	Speed Sensor	Radar
0	100	0	100	Speed Cal	1000
0	100			Self Test	0.00
0	100			Packing Press	63
0	100			Speed	0.0
0	100			Units	US

Fan Calibration

Node 1 ▼

Bin Level Alarm On Gate Alarm Off

The Miscellaneous area displays an overview of several current system settings for the system.

Note: Touching within the Miscellaneous area will display the Miscellaneous Settings screen.

The following information displays are for reference and monitoring purposes only:

Fan/Pump RPM Display. The fan or pump RPM is a display only. This read out displays the fan RPM if a fan sensor is being used with a granular application or a pump RPM if a pump sensor is equipped for a liquid application.

Speed Display. Speed is a display only. The speed shown in this area is the current ground speed of the vehicle or the entered self test speed. See the *Using the Calibration Assistance* section on page 227 for information on entering and using the self test speed feature.

Miscellaneous Settings Screen

Touch within the Miscellaneous area on the CAN Controller Status screen to display the Miscellaneous Settings screen.

Speed Sensor and Cal. This is the type of speed sensor from which the field computer is receiving speed signal and the calibration value entered for the selected sensor. Review the *Speed Sensor Type and Cal* section on page 33 for details on the sensor type setting or the speed cal value. Refer to the *Speed Cal* section on page 227 for information on using the Calibration Assistance feature to refine the current speed cal value.

Speed Source. Set the speed source to 'Switch Box' if the speed source is connected to the switch box. Set the speed source to 'Air Cart' if the speed sensor is connected to the air cart node.

Self Test Speed. The self test speed allows the field computer to control product application functions while the vehicle remains stationary. This feature allows the operator to test or troubleshoot the CAN and product control systems. For best results, enter a value approximately equal to normal application speeds.

Note: A speed cal must be entered to allow the test speed feature to function.

The test speed will reset to zero if the field computer receives a pulse from the actual speed sensor. To keep the test speed from disengaging, disconnect the speed sensor from the system.

Audible Alarm. When the audible alarm setting is enabled, the Viper Pro will sound a five second alarm tone if an alert condition or alarm setting is detected on the CANbus (i.e. low tank or bin, zero speed, off rate percent etc.).

The following alarms conditions may be enabled and will sound a tone if the audible alarm feature is enabled:

• Dual Flow % (Percent)	• Flow/Shaft Alarm
• Off Rate % (Percent)	• Vacuum/Bin Alarm
• Low Tank	• Zero Speed Shutoff
• Low Limit	

Note: Audible Alarms are enabled by default. Refer to the Feature Settings Area for Products 1-3 section on page 127 for additional information about the above alarm settings.

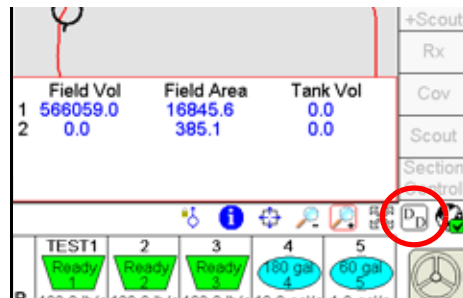
Remote Master. Select the Remote Master option to use a proximity switch to toggle coverage mapping off or on when the drill openers are raised and lowered during seeding operations.

Pause if Opener Raised. Enable this feature to automatically pause recording of field or zone feature boundaries during a seeding operation when the drill openers are raised. This feature may be useful if the drill will not be following the feature boundary, such as when turning and backing into corners or when refilling the seed bins.

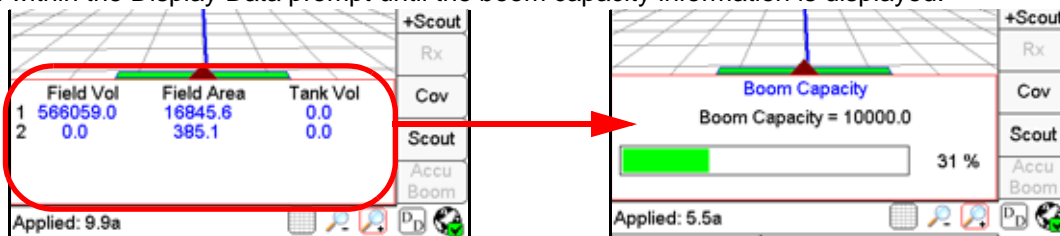
Boom Capacity. Enable the boom capacity feature on the Miscellaneous Settings screen to allow the field computer to monitor the overall volume per minute for all products being applied.

To display the current boom capacity used during a field operation:

1. Touch the Display Data button on the main screen.



2. Touch within the Display Data prompt until the boom capacity information is displayed.



The current percentage of the entered maximum boom capacity is displayed. If the actual rate of application reaches 90% or more of the maximum boom capacity, the Viper Pro will display the Boom Capacity Display Data prompt to alert the operator to the application condition.

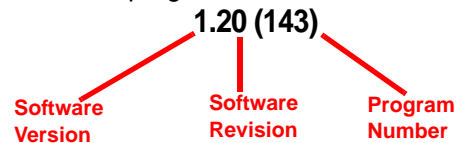
Maximum Capacity. Touch the maximum capacity value and use the key pad at the bottom of the Miscellaneous Settings screen to enter the maximum boom capacity for the application equipment. Consult the equipment documentation or contact a local equipment dealer or the equipment manufacturer for more information on the maximum application capacity for the specific machine model.

Default Capacity Button. Touch the Default button on the Miscellaneous Settings screen to reset the Maximum volume per minute value to 10,000.

Load Cell. Touch the **Load Cell** button if a Digi-Star load cell will be used for calibration of product remaining in a bin. Refer to the Digi-Star load cell documentation for additional information on using a load cell with the Viper Pro.

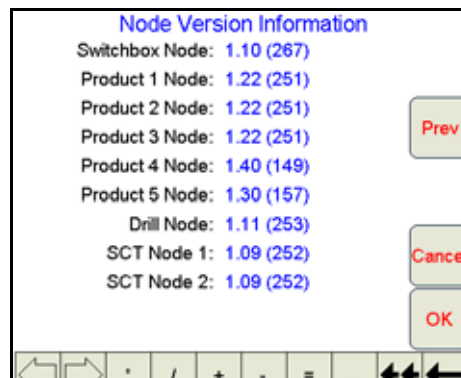
Node Version Information Screen

Version information is available on the Viper Pro field computer. The Node Version Information screen displays the software version, software revision, and program number of each node currently detected on the CANbus.



To access the Node Version Information screen from the main screen:

1. Touch in the **Product Control** area on the main screen.
2. Touch within the **Miscellaneous** area on the CAN Controller Status screen.
3. Touch the **Next** button. The Node Version Information screen displays.



4. Touch **OK** or **Cancel** to return to the CAN Controller Status screen or **Prev** to go back to the Miscellaneous Settings screen.

Feature Settings Area for Products 1-3

The information displayed in the Feature Settings area is an overview of the alarm and feature settings for the selected product control node.

For product nodes or control channels 1 through 3, the following settings will be displayed in the Feature Settings area:

• Off Rate %	• Bin Level Alarm	• Zero Speed Shutoff
• Low Tank	• Bin Pressure Alarm	• Gate Alarm
• Low Limit	• Decimal Shift	• Display Smoothing

Note: The following sections offer descriptions of the various options and settings used with products 1 through 3. For descriptions of the settings used with products 4 and 5, see the Feature Settings Area for Products 4-5 section on page 130.

To modify the feature or alarm settings for the above features, touch within the feature settings area on the CAN Controller Status screen.

Status Screen Example
(Products 1-3)

The screenshot shows the 'CAN Controller Status' screen. At the top, there are two sections: 'Section Cals' and 'Miscellaneous'. Below these, there is a 'Feature Calibration' section. A red circle highlights the 'Node 1' dropdown menu and the feature settings for Node 1. The settings are as follows:

Node	Off Rate %	Low Tank	Low Limit	Bin Level Alarm	Bin Press Alarm	Decimal Shift	Zero Shutoff	Gate Alarm	Smoothing
Node 1	30	0.0	0.0	On	Off	On	Off	Off	On

Below the highlighted section, there are various other settings including 'Area/Hour', 'Vol/Min', 'Rate Cal', 'Rate +/-', 'Meter Cal', 'RPM', 'Pressure 1', 'Pressure 2', 'Cal Weight', 'Valve Cal', 'Min Pw', 'Max Pw', 'Pre Set Pw', 'Pw Freq', 'Valve Delay', 'PVM', 'Appl Delay', 'Bin Level % Cal', and 'Application'. At the bottom, there are buttons for 'Tally Reg.', 'CAN Profile', and 'OK'.

Note: Before changing any of the feature or alarm settings, be sure to select the correct product node or control channel by touching the corresponding radio button displayed at the top of the feature settings area.

Node Feature Settings Screen (Page 1)

Touch within the Feature Settings area to view the first screen of settings for the selected product node or control channel.

The screenshot shows the 'Node 1 Settings' screen. It has a title bar at the top. Below it, there are three rows of settings, each with a label and a text input field. The first row is 'Off Rate %' with the value '30'. The second row is 'Low Limit' with the value '0.00'. The third row is 'Low Tank' with the value '0.00'. To the right of these input fields are three buttons stacked vertically: 'Next', 'Cancel', and 'OK'.

Note: Touch the **Next** button to access additional alarm and feature settings for the selected product node or control channel.

Off Rate %. The off rate percent value sets the allowable difference between the target and actual product application rates. If a non-zero value is entered for this setting and the difference between target and actual rate exceeds the set value for longer than five seconds, the Viper Pro will display an off rate alarm. Enter a value of zero to disable the off rate alarm.

Low Limit. This setting is not used with Seed Hawk air cart ground drive systems. The low limit default setting is zero and should not be altered.

Low Tank. This setting is not used with Seed Hawk air cart ground drive systems. The low tank default setting is zero and should not be altered.

Node Feature Settings Screen (Page 2)

From the CAN Controller Status screen, touch within the Features Settings area to display the first Node Settings screen and select the **Next** button to access the following alarm and feature settings.

The screenshot shows the 'Node 1 Settings' screen for page 2. It has a title bar at the top. Below it, there are six rows of settings, each with a radio button or checkmark and a label. The first row is 'Zero Speed Shutoff' with an unchecked radio button. The second row is 'Bin Level Alarm' with a checked radio button. The third row is 'Bin Pressure Alarm' with an unchecked radio button. The fourth row is 'Gate Alarm' with an unchecked radio button. The fifth row is 'Decimal Shift' with a checked radio button. The sixth row is 'Display Smoothing' with a checked radio button. To the right of these settings are three buttons stacked vertically: 'Prev', 'Cancel', and 'OK'.

Note: The following sections offer descriptions of the various options and settings used with products 1 through 3. For descriptions of the settings used with products 4 and 5, see the Feature Settings Area for Products 4-5 section on page 130.

Zero Speed Shutoff. Enable the zero speed shutoff feature to allow the field computer to automatically shut off product application if the vehicle speed is slower than 0.7 mph [1.1 km/h]. If the zero speed shutoff feature is engaged during a job, the Viper Pro will also display a zero speed alert.

Note: *For products 1 through 3, the zero speed shutoff function is recommended as this will stop seed application if the speed detected by the speed sensor falls below 0.7 mph.*

The zero speed shutoff feature only affects products set to automatic control. Products controlled manually will continue to be applied even if the zero speed shutoff feature is engaged.

To restart product application after the zero speed shutoff feature has engaged, cycle the master switch 'Off' and then back 'On.' The zero speed shutoff feature will reactivate if the vehicle does not achieve a speed greater than 0.7 MPH [1.1 km/h] and maintain that speed for more than 10 seconds.

Note: *The Sectional override may be enabled to begin product application from a complete stop. Refer to the Enabling Sectional Control Override section on page 174 for more information.*

Bin Level Alarm. Enable the bin level alarm to provide an alarm if the bin level falls to 5% or lower.

Bin Pressure Alarm. Enable the bin pressure alarm to allow Viper Pro to display an alert if the air cart bin pressure falls below the mechanical set point of the pressure switch.

Gate Alarm. Enable the gate alarm to provide an alert during an application if the meter gates are not in the appropriate positions for product application.

Decimal Shift. Enable the decimal shift feature to increase the system accuracy for low application rates. In the standard mode, the Viper Pro displays values to one decimal place. With the Decimal Shift feature enabled, values will be displayed to two decimal places.

Note: *Verify all calibration values after the Decimal Shift feature is either enabled or disabled. Change settings as necessary.*

Display Smoothing. Enable the display smoothing feature to allow the field computer to smooth the rate displayed during product applications. With this feature enabled, the actual rate (R_A) in the rates area will display the target rate (R_T) as long as the actual monitored application rate remains within $\pm 10\%$ of the target rate. The actual rate shown on the main screen will display the actual monitored rate if the application system does not reach the target rate dead band ($\pm 10\%$) within 10 seconds.

Disable the display smoothing feature to monitor the actual application rate at all times.

Note: *The display smoothing feature is only active for products in Automatic control mode.*

Feature Settings Area for Products 4-5

The information displayed in the Feature Settings area is an overview of the alarm and feature settings for the selected product control node. For product nodes or control channels 1 through 3, the following settings will be displayed in the Feature Settings area:

• Dual Flow %/FER Cal	• Vacuum/Bin Alarm	• Low PSI Alarm
• Off Rate %	• Decimal Shift	• Max PSI Alarm
• Low Tank	• Zero Speed Shutoff	• Standby Pressure Enable
• Low Limit	• Display Smoothing	• Dual Loop Control
• Flow/Shaft Alarm	• Agitator	• Smart Control
	• Ratio Rate	

Note: *The following sections offer descriptions of the various options and settings used with products 4 and 5. For descriptions of the settings used with products 1 through 3, see the Feature Settings Area for Products 1-3 section on page 127.*

If the Seed Hawk system will be used with a Raven AccuFlow™ system, the anhydrous system must be assigned to product channel 4 on the Viper Pro to ensure valve shut off is performed correctly using the switch box inputs.

To modify the feature or alarm settings for the above features, touch within the feature settings area on the CAN Controller Status screen.

Status Screen Example
(Products 4-5)

Section Cals		Miscellaneous	
1	90	5	90
2	90	6	90
3	90	7	90
4	90	8	90
Fan Calibration		Speed Sensor Wheel	
		Speed Cal 68	
		Self Test 0.00	
		Pump RPM 0	
		Speed 0.0	
		Units US	
Product 4			
Dual Flow % 50		Flow/Shaft Alarm On	
Off Rate % 30		Vac/Bin Alarm On Smoothing On	
Low Tank 0.0		Decimal Shift Off Agitator On	
Low Limit 0.0		Zero Shutoff On Ratio Rate Off	
Tank Vol 300.0		Spreader 0 Pre Set Pw 0	
Area/Hour 0.0		Valve Cal 743 Pw Freq 122	
Vol/Min 0.0		Valve Cal 20 Valve Delay 0.0	
Rate Cal 40.0		Pump Cal 0 PWM 0	
Rate +/- 2.0		Min Pw 1	
Meter Cal 700.0		Max Pw 253	
Pressure 1 100		Application Liquid	
Pressure 2 ---		PWM Close Valve	
Tally Reg.		CAN Profile	
		OK	

Note: Before changing any of the feature or alarm settings, be sure to select the correct product node or control channel by touching the corresponding radio button displayed at the top of the feature settings area.

Node Feature Settings Screen (Page 1)

Touch within the Feature Settings area to view the first screen of settings for the selected product node or control channel.

Node 4 Settings	
Dual Flow %	50
Off Rate %	30
Low Limit	0.00
Low Tank	0.00
Next	
Cancel	
OK	

Note: Touch the **Next** button to access additional alarm and feature settings for the selected product node or control channel.

Dual Flow %/FER Cal. The dual flow percent feature is only used when controlling a chemical injection or Granular 3 application.

Note: The default value for the dual flow percent in either a chemical injection or dual bed system is 50.

For applications using a CAN motor control node to control an injected chemical, the dual flow percent value sets the tolerance for error allowed between the flow switch and pump encoder before a flow alarm will be activated. Enter a value between 0 and 100 for the allowable tolerance between the switch and encoder. For example, set this value to 100 to disable the dual flow alarm or 0 to display an error any time the flow switch and pump encoder do not match. The flow switch alarm activates when out of tolerance conditions have been met for at least five seconds.

Note: *The dual flow percent is replaced with a FER Cal value when operating a Raven Sidekick Pro™. Refer to the Sidekick Pro Installation and Operation Manual for more information about operation with the Viper Pro field computer.*

When controlling a dual bed system in Gran 3 mode, the dual flow percent sets the tolerance between the belt encoder readings before the dual flow alarm is activated. This alarm may be used to indicate that the belts are moving at different rates or one belt is not moving. Enter a value 100 to disable the dual flow percent alarm or 0 to display an error any time the belt encoders do not match. The dual flow alarm activates when out of tolerance conditions have been met for at least five seconds.

Off Rate %. The off rate percent value sets the allowable difference between the target and actual product application rates. If a non-zero value is entered for this setting and the difference between target and actual rate exceeds the set value for longer than five seconds, the Viper Pro will display an off rate alarm. Enter a value of zero to disable the off rate alarm.

Low Limit. The low limit value sets the lowest volume per minute acceptable during application of a product. If the flow rate drops below the low limit value, the field computer will stop closing the control valve and display a flow alarm.

The field computer automatically adjusts the low limit value for active boom or implement sections. For example, if a low limit of 4 is entered but only half of the total boom width is currently applying product, the Viper Pro will only display a flow alarm if the volume per minute drops below 2.

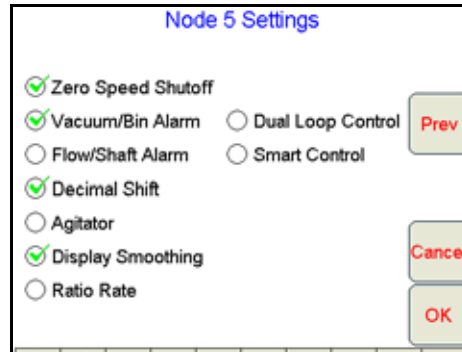
Low Tank. The low tank value displays an alert when the volume remaining in a tank or bin is reduced to the entered value. When the calculated volume remaining in the tank or bin is reduced to the entered value, the Viper Pro will display an alert.

Note: *To utilize the low tank alarm feature, an initial tank or bin volume must be entered for the corresponding product node or control channel. Refer to Tank Volume section on page 139 for details on setting the initial tank or bin volume.*

The alarm condition is cleared either when all sections are turned off or if a new low tank value less than or equal to the current calculated tank volume is entered. Enter a value of zero to disable the low tank alarm.

Node Feature Settings Screen (Page 2)

From the CAN Controller Status screen, touch within the Features Settings area to display the first Node Settings screen and select the **Next** button to access the following alarm and feature settings.



Note: The following sections offer descriptions of the various options and settings used with products 4 and 5. For descriptions of the settings used with products 1 through 3, see the Feature Settings Area for Products 1-3 section on page 127.

Zero Speed Shutoff. Enable the zero speed shutoff feature to allow the field computer to automatically shut off product application if the vehicle speed is slower than 0.7 mph [1.1 km/h]. If the zero speed shutoff feature is engaged during a job, the Viper Pro will also display a zero speed alert.

Note: The zero speed shutoff feature only affects products set to automatic control. Products controlled manually will continue to be applied even if the zero speed shutoff feature is engaged.

To restart product application after the zero speed shutoff feature has engaged, cycle the master switch 'Off' and then back 'On.' The zero speed shutoff feature will reactivate if the vehicle does not achieve a speed greater than 0.7 MPH [1.1 km/h] and maintain that speed for more than 10 seconds.

Note: If an optional SCT system is connected, the SCT override may be enabled to begin product application from a complete stop. Refer to the Enabling Sectional Control Override section on page 174 for more information.

Vacuum/Bin Alarm. The vacuum/bin alarm must be disabled for nodes or channels configured for standard (non-injection) liquid product application control.

Enable the vacuum alarm feature if an injection pump is controlled via a CAN product control or motor control node. When activated, the vacuum alarm displays an alert if the injection pump cannot draw product from the supply tank.

Enable the bin alarm for granular applications if an optional bin level sensor is installed. With this feature enabled, the Viper Pro will display an alert when the sensor detects the product level in the bin falls below the sensor level.

Note: Contact a local Raven dealer for information on injection systems or bin level sensors.

Flow/Shaft Alarm. Enable the flow/shaft alarm to display an alert if the field computer does not detect a signal from the pump shaft encoder or flow switch. This alarm may be used to help troubleshoot flow errors with a CAN motor control node.

Note: This feature is currently not used with the Raven Sidekick Pro injection system.

Decimal Shift. Enable the decimal shift feature to increase the system accuracy for low application rates. In the standard mode, the Viper Pro displays values to one decimal place. With the decimal shift feature enabled, values will be displayed to two decimal places.

Note: *Verify all calibration values after the decimal shift feature is either enabled or disabled. Change settings as necessary.*

Agitator. The Viper Pro may be used to enable or disable an agitator to continuously mix a chemical suspension. Contact a local Raven dealer for required hardware.

Display Smoothing. Enable the display smoothing feature to allow the field computer to smooth the rate displayed during product applications. With this feature enabled, the actual rate (R_A) in the rates area will display the target rate (R_T) as long as the actual monitored application rate remains within $\pm 10\%$ of the target rate. The actual rate shown on the main screen will display the actual monitored rate if the application system does not reach the target rate dead band ($\pm 10\%$) within 10 seconds.

Disable the display smoothing feature to monitor the actual application rate at all times.

Note: *The display smoothing feature is only active for products in automatic control mode.*

Ratio Rate. The ratio rate feature should only be enabled for chemical injection applications. Enabled the ratio rate feature to allow an injected chemical to be applied in ratio to the amount of the carrier. See the *Ratio Rate* section on page 142 to enter the ratio of injected chemical to carrier product.

Standby Pressure. The standby pressure feature may be enabled in either the standard or dual loop control modes. When enabled in the standard control mode, the Sgain value is not displayed on the screen, but is still used to set the response of the system to the application system pressures.

Note: *Refer to the Standby Pressure section on page 142 for information about setting the standby pressure value.*

Dual Loop Control. The dual loop control feature is designed for use with low application rates and requires a pressure transducer with a liquid application system controlled with a PWM valve. The dual loop feature uses both the flow meter, to monitor liquid product flow, and a pressure transducer, to monitor liquid product pressure, while controlling a pump to enhance the control response during operation at low application rates. The default setting for this feature is disabled.

Note: *If the dual loop control feature is enabled, the valve cal and valve cal 2 values programmed during the initial field computer configuration will be replaced with the flow cal and pressure Sgain values.*

Smart Control. The smart control feature may be enabled for control channels using a PWM or PWM Close valve. This feature allows the control system to estimate the required PWM duty cycle for changes in vehicle speed or target rate, or when the hydraulic valve is toggled on. When this feature is enabled, control response will be much more aggressive.

Note: *Smart control will be tuned during the PWM calibration. Refer to the PWM Control Valve Tuning section on page 239 for additional information on performing calibration or adjustments for PWM type control valves.*

Low PSI Alarm. When controlling a Raven Sidekick Pro™ direct injection system, the 'Low PSI Alarm' feature will be displayed on the Node Settings screen. When enabled, this alarm indicates that the injection pressure is below the carrier line pressure. Check the injection plumbing for leaks and correct hand valve positions. Refer to the *Sidekick Pro Installation and Operation Manual* for more information.

Max PSI Alarm. When controlling a Raven Sidekick Pro™ direct injection system, the 'Max PSI Alarm' feature will be displayed on the Node Settings screen. When enabled, this alarm indicates that the injection pressure is greater than the rated 150 PSI [1034.21 kPa]. Check the injection plumbing for blockages or reduce the carrier product pressure. Refer to the *Sidekick Pro Installation and Operation Manual* for more information.

Product Control Settings Area for Products 1-3

The Product Control Settings area displays an overview of the following calibration settings and values used by the control system to monitor or adjust the rate of product application:

• Area/Hour (Display only)	• Meter Cal	• Pre Set PW
• Vol/Min (Display only)	• Valve Cal	• PW Freq
• Rate Cal	• Min PW	• Valve Delay
• Rate Bump (+/-)	• Max PW	• PWM (Display only)

Note: The following sections offer descriptions of the various options and settings used with products 1 through 3. For descriptions of the settings used with products 4 and 5, see the Product Control Settings Area for Products 4-5 section on page 138.

The following data displays are shown in the Product Control Settings area for reference and monitoring purposes only:

Area/Hour. Displays the current area per hour covered during product application. This value is calculated using the programmed section set up and the vehicle speed.

Vol/Min. Displays the current volume per minute monitored by the selected product node or control channel during active application. This value is calculated using the flow of product monitored by the flow meter.

PWM. Displays the current duty cycle of the PWM valve controlling product application (if applicable).

To modify product control settings, touch within the product control settings area on the CAN Controller Status screen.

Status Screen Example
(Products 1-3)

The screenshot shows the 'CAN Controller Status' screen with the following sections:

- Section Cals:** A list of calibration values for sections 0 through 6, all showing 100.
- Miscellaneous:** Includes Speed Sensor (Radar), Speed Cal (1000), Self Test (0.00), Packing Press (63), Speed (0.0), and Units (US).
- Fan Calibration:** A section for fan-related settings.
- Node 1:** A dropdown menu currently set to 'Node 1'.
- Off Rate %:** 30
- Low Tank:** 0.0
- Low Limit:** 0.0
- Area/Hour:** 0.0
- Vol/Min:** 0.0
- Rate Cal:** 2.0
- Rate +/-:** 0.0
- Meter Cal:** 84.0
- RPM:** 0.0
- Pressure 1:** ---
- Pressure 2:** ---
- Bin Level Alarm:** On
- Bin Press Alarm:** Off
- Decimal Shift:** On
- Zero Shutoff:** Off
- Cal Weight:** 2.00
- Valve Cal:** 43
- Min Pw:** 1
- Max Pw:** 253
- Pre Set Pw:** 0
- Pw Freq:** 60
- Valve Delay:** 0.0
- PWM:** 0 (highlighted by a red arrow)
- Appl Delay:** 0.0
- Bin Level % Cal:** ---
- Application:** Gran 4
- PWM Close Valve:** ---

At the bottom, there are buttons for 'Tally Reg.', 'CAN Profile', and 'OK'.

Note: Before changing any of the product control settings, be sure to select the correct product node or control channel by touching the corresponding radio button displayed at the top of the feature settings area.

Node Control Settings Screen (Page 1)

Touch within the Product Control Settings area to view the first screen of settings for the selected product node or control channel

The screenshot shows the 'Node 1 Settings' screen. It has a title bar at the top. Below it, there are five rows of settings, each with a label, a value, and a button or input field. The settings are: 'Bin Sensor Cal' with value '112.6' and a 'Calibrate' button; 'Rate Cal' with value '120.00' and a text input field; 'Rate +/-' with value '6.00' and a text input field; 'Meter Cal' with value '80.00' and a text input field; and 'Cal Weight' with value '5.00' and a text input field. To the right of these settings are three buttons: 'Next', 'Cancel', and 'OK'. At the bottom of the screen is a 'Calibration Assistance' button.

Note: Touch the **Next** button to access additional product control settings for the selected product node or control channel.

Bin Sensor. The Seed Hawk® air cart features ultrasonic bin level sensors which automatically detect the level of product remaining in each bin. The bin sensor for each of the first three products must be calibrated to accurately gauge the amount of product in the bin.

To calibrate the bin sensor, touch the 'Calibrate' button below the current bin level value and follow the on-screen instructions.

Note: The air cart bins must be empty to calibrate the bin level sensors.

Rate Cal. The rate cal value is the target rate to which the system will adjust while applying the corresponding product. Review the *Rate Cal(s)* section on page 36 for more information about the rate cal setting.

Rate Bump (+/-). The rate bump feature allows the equipment operator to quickly adjust the rate of product application during a job. Enter the value by which the target rate will be increased or decreased when the rate bump buttons are selected on the Application Control prompt.

See the *Application Rates Area* section on page 84 for more information about the Application Rates Area on the main screen and using the rate bump feature during a field application.

Meter Cal. Enter the number of counts the metering roller sensor will detect per revolution of the metering roller.

Note: When operating with a hydraulic drive system, enter a meter cal of 60.31 for the meter cal value.

Cal Weight. The cal weight value sets the weight of product applied per revolution of the metering roller. The Viper Pro may be used to help calculate the cal weight value by using the cal weight calibration assistance feature while performing a catch test.

Refer to *Cal Weight* section on page 42 for more information on using the Cal Weight Calibration Assistance.

Node Control Settings Screen (Page 2)

Touch within the Product Control Settings area and then select the **Next** button on the first Node Settings screen to access the following settings.

Valve Cal. The valve cal value is used by the field computer to make adjustments to a product or hydraulic control valve connected to the CANbus system. Refer to the *Valve Cal(s)* section on page 44 for information on the recommend initial valve cal and valve cal 2 values. Instructions for refining the product or hydraulic control valve using the valve cal values may be found in Appendix A, *Calculating the Calibration Values*.

Note: *When operating a hydraulic drive system at extremely low seed application rates, the valve cal may need to be adjusted to slow the PWM close valve and keep the seed rate from fluctuating at these low rates. Refer to the Valve Cal section on page 237 for more information about adjusting the valve cal.*

Min PW. Use the Min PW (Pulse Width) feature to set the minimum desired RPM or hydraulic output (zero point or shutoff point) for a Pulse Width Modulated (PWM) control valve.

Note: *Min PW is not used with ground drive carts.*

Max PW. Use the Max PW (Pulse Width) feature to set the maximum desired RPM or hydraulic output (zero point or shutoff point) for a Pulse Width Modulated (PWM) control valve.

Note: *Refer to PWM Calibration Assistance section on page 239 for details on using the calibration assistance to calculate the Min and Max PW values.*

Max PW is not used with ground drive carts.

Node Control Settings Screen (Page 3)

Pre Set PW. Use the pre-set PW (Pulse Width) setting to set an initial target pulse width value when using a valve that is programmed in PWM Close mode. Enter a value between 1 (slow pulsed width) to 255 (full-scale pulsed width). Viper uses this value to send an initial pulse width to the valve when the booms or nodes are turned on. When a value is entered in this field, the PWM output will not exceed this value when any sections with a non-zero boom cal are off.

When the pre-set PW value is set to zero, the initial pulse width will be equal to the previous state.

Note: *When operating with hydraulic drive systems, the Pre Set PW value may need to be adjusted for low seed rate operations if the system initially applies too high of a seed rate when turning on sections.*

Pre Set PW is not used with ground drive carts.

PW Freq. Enter the coil frequency of the PWM valve in this field. When operating with hydraulic drive systems, the default value is 60 Hz.

Note: *PW Freq is not used with ground drive carts.*

Valve Delay. Set the valve delay to include a time delay between when the booms are turned on and when the product nodes start to control the flow rate. Viper Pro activates this delay if the time between turning the boom on and off is less than 30 seconds.

Note: *A value of zero must be entered if a Fast Close or PWM Close valve is used as the control valve or when the Valve Type is programmed as a standard valve with an injection system.*

Application Delay. Not applicable when operating in Gran 4 or Gran 5 modes.

Product Control Settings Area for Products 4-5

The Product Control Settings area displays an overview of the following calibration settings and values used by the control system to monitor or adjust the rate of product application:

• Tank Volume	• Spreader (Constant)	• Standby Pressure
• Area/Hour (Display only)	• Valve Cal	• Pre Set PW
• Vol/Min (Display only)	• Valve Cal 2	• PW Freq
• Rate Cal	• Valve Advance	• Ratio Rate
• Rate Bump (+/-)	• Fan/Pump Cal	• Valve Delay
• Meter Cal/Density	• Min PW	• PWM (Display only)
	• Max PW	• Max PSI (not applicable for granular applications)

Note: *The following sections offer descriptions of the various options and settings used with products 4 and 5. For descriptions of the settings used with products 1 through 3, see the Product Control Settings Area for Products 1-3 section on page 135.*

If the Seed Hawk system will be used with a Raven AccuFlow™ system, the anhydrous system must be assigned to product channel 4 on the Viper Pro to ensure valve shut off is performed correctly using the switch box inputs.

The following data displays are shown in the Product Control Settings area for reference and monitoring purposes only:

Area/Hour. Displays the current area per hour covered during product application. This value is calculated using the programmed section set up and the vehicle speed.

Vol/Min. Displays the current volume per minute monitored by the selected product node or control channel during active application. This value is calculated using the flow of product monitored by the flow meter.

PWM. Displays the current duty cycle of the PWM valve controlling product application (if applicable).

To modify product control settings for the above features, touch within the product control settings area on the CAN Controller Status screen.

Status Screen Example
(Products 4-5)

CAN Controller Status			
Section Cals		Miscellaneous	
1	90	5	90
2	90	6	90
3	90	7	90
4	90	8	90
Fan Calibration		Speed Sensor Wheel	
Product 4		Speed Cal 68	
Dual Flow % 50		Self Test 0.00	
Off Rate % 30		Pump RPM 0	
Low Tank 0.0		Speed 0.0	
Low Limit 0.0		Units US	
Tank Vol 300.0		Flow/Shaft Alarm On	
Area/Hour 0.0		Vac/Bin Alarm On Smoothing On	
Vol/Min 0.0		Decimal Shift Off Agitator On	
Rate Cal 40.0		Zero Shutoff On Ratio Rate Off	
Rate +/- 2.0		Pre Set Pw 0	
Meter Cal 700.0		Pw Freq 122	
Pressure 1 100		Valve Cal 743	
Pressure 2 ---		Valve Cal 20	
		Valve Delay 0.0	
		Pump Cal 0	
		PWM 0	
		Min Pw 1	
		Max Pw 253	
		Application Liquid	
		PWM Close Valve	
Tally Reg.		CAN Profile	
		OK	

Note: The selected product control node appears with a check mark in the corresponding radio button at the top of the Feature Settings Area. To switch the selected node, touch the radio button for the desired product node.

Node Control Settings Screen (Page 1)

Touch within the Product Control Settings area to view the first screen of settings for the selected product node or control channel.

Node 4 Settings	
Tank Volume	300.00
Rate Cal	40.00
Rate +/-	2.00
Meter Cal	700.00
Spreader	0
Next	
Cancel	
OK	

Note: Touch the **Next** button to access additional product control settings for the selected product node or control channel.

Tank Volume. Enter the initial volume of product in a tank or bin. As product is applied using the corresponding node or control channel, the Viper Pro will calculate the volume remaining in the tank or bin and display the value on the CAN Controller Status screen, the Tally Registers screen and in the Display Data prompt.

A tank volume is required when using the low tank alarm value. Refer to the *Low Tank* section on page 128 for more information on the low tank alarm.

When refilling a tank or bin during an application, the tank volume may be quickly reset using the Tally Registers screen. Refer to the *Tally Registers* section on page 95 for information on resetting the tank volumes to a preset value.

Rate Cal. The rate cal value is the target rate to which the system will adjust while applying the corresponding product. Review the *Rate Cal(s)* section on page 36 for more information about the rate cal setting.

Note: Refer to Appendix A, *Calculating the Calibration Values*, to verify the flow rate limits for the flow meter installed in the system. Contact a local Raven or sprayer supply dealer for additional information or assistance.

Rate Bump (+/-). The rate bump feature allows the equipment operator to quickly adjust the rate of product application during a job. Enter the value by which the target rate will be increased or decreased when the rate bump buttons are selected on the Application Control prompt.

See the *Application Rates Area* section on page 84 for more information about the Application Rates Area on the main screen and using the rate bump feature during a field application.

Meter Cal or Density. Depending upon the selected application type, either the meter cal or product density setting will be displayed. See the *Application and Control Valve Type(s)* section on page 35 for configuring the type of product application or the *Meter Cal or Product Density* section on page 242 for more information on calibrating the meter cal or density values.

- For liquid product applications, the meter cal must be entered to calibrate the Viper Pro to the specific flow meter used to measure the flow of product going to the booms. The meter cal value is typically found on the flow meter.
- When controlling spinner or fan speed, the meter cal is the number of pulses detected per rotation of the spinner or fan multiplied by 10.

Note: A meter cal value is required to control spinner or fan speed. A fan cal value will only be used to monitor fan speeds.

- For dry or granular products, enter the density or weight of 1 cubic foot of product. This value is the density of a dry or granular product entered for rate control. Refer to the *Meter Cal or Product Density* section on page 242. Refer to the *Raven Viper Pro Installation and Operation Manual* for more information on setting and adjusting the product density during a granular product application.

Spreader. The current spreader constant value used by the Viper Pro control system. Refer to the *Raven Viper Pro Installation and Operation Manual* for details on adjusting the spreader constant for the gate height or belt travel measurements and adjustments.

Note: Enter a value of zero for the spreader constant when applying liquid products.

Node Control Settings Screen (Page 2)

Touch within the Product Control Settings area and then select the **Next** button on the first Node Settings screen to access the following settings.

The screenshot displays the 'Node 4 Settings' screen with the following fields and controls:

Field	Value
Valve Cal	43
Valve Cal 2	0
Valve Adv	0
Pump Cal	0
Min Pw	40
Max Pw	253

Navigation buttons on the right: Prev, Next, Cancel, OK.

Bottom buttons: PWM Manual Cal, PWM Auto Cal.

Valve Cal and Valve Cal 2. The valve cal value is used by the field computer to make adjustments to a product or hydraulic control valve connected to the CANbus system. Refer to the *Valve Cal(s)* section on page 44 for information on the recommend initial valve cal and valve cal 2 values. Instructions for refining the product or hydraulic control valve using the valve cal values may be found in Appendix A, *Calculating the Calibration Values*.

Note: *If the dual loop control feature is enabled, the valve cal and valve cal 2 values will be replaced by the “flow cal” and “pr sgain” (pressure system gain) values. Refer to the Dual Loop Control Cals section on page 45 for details on setting and using these calibration values for field operations.*

Flow Cal and Pr Sgain (Dual Loop Control Mode Only). The dual loop control feature uses a flow meter and a pressure transducer to enhance the control response during operation at low application rates. The flow cal and pr sgain (pressure system gain) values are used by the field computer to make appropriate adjustments to the control valve and product pump via the CANbus system. Refer to the *Dual Loop Control Cals* section on page 45 for more information on setting up the flow cal and gain values.

Valve Adv. (Advance - Standard, Fast, or Fast Close Valves). While in the automatic rate control mode, the value entered in the valve advance field sets the time (in seconds) which the field computer will allow the control valve to remain open after boom sections are toggled off. The valve advance feature is best used in conjunction with the valve delay value to build up boom pressure for low rate product applications or with valves with “flow back” features.

Enter a value between 1 and 9 seconds to enable the valve advance feature or a value of 0 to disable this feature if a Fast Close, PWM, or PWM Close control valve is used for product control.

Note: *For best results, approach headlands areas at a consistent speed while turning boom sections off.*

The Valve Advance feature should only be used with Standard or Fast valves and the assigned product control node must have software version 1.50 or higher. This setting must remain at zero for products using a Fast Close, PWM, or PWM Close control valve.

Fan/Pump Cal. The fan/pump cal value is only used to monitor product pump speed during standard liquid applications or to monitor fan or spinner speed during granular applications.

Enter the number of pulses detected per one revolution of the fan, spinner or pump shaft.

Note: *The fan/pump cal value is only used to monitor the RPM of a fan, spinner or product pump. Refer to the Fan Cal section on page 46 for details on calibrating the air cart fan sensors on the Seed Hawk Viper Pro.*

Min PW. Use the Min PW (Pulse Width) feature to set the minimum desired RPM or hydraulic output (zero point or shutoff point) for a Pulse Width Modulated (PWM) control valve.

Note: *Refer to PWM Calibration Assistance section on page 239 for details on using the calibration assistance to calculate the Min and Max PW values.*

Max PW. Use the Max PW (Pulse Width) feature to set the maximum desired RPM or hydraulic output (zero point or shutoff point) for a Pulse Width Modulated (PWM) control valve.

Note: *Refer to PWM Calibration Assistance section on page 239 for details on using the calibration assistance to calculate the Min and Max PW values.*

Node Control Settings Screen (Page 3)

Standby Pressure. When controlling a liquid product with a PWM valve selected (not PWM close), the standby pressure value sets the pressure which the system will maintain in the product lines when the master or all boom sections are toggled off.

Note: *The standby pressure setting is only accessible when controlling products in liquid control modes with a boom pressure transducer detected by the field computer. Refer to the Standby Pressure section on page 134 for details. If the system pressure does not reach the set standby pressure, or if the observed pressure oscillates, when the master switch is toggled off, the Sgain value will need to be adjusted. See the Sgain (Pressure System Gain - Dual Loop Control Mode) section on page 238 to adjust the Sgain value.*

Pre Set PW. Use the pre-set PW (Pulse Width) setting to set an initial target pulse width value when using a valve that is programmed in PWM Close mode. Enter a value between 1 (slow pulsed width) to 255 (full-scale pulsed width). Viper uses this value to send an initial pulse width to the valve when the booms or nodes are turned on. When a value is entered in this field, the PWM output will not exceed this value when any sections with a non-zero boom cal are off.

When the pre-set PW value is set to zero, the initial pulse width will be equal to the previous state.

PW Freq. Enter the coil frequency of the PWM valve in this field. The default value is 122 Hz.

Ratio Rate. Enter a ratio rate value when using a product in an injection system that uses a hand-held spray gun. The product is injected as a ratio to the amount of carrier product applied. For example, to apply 12.0 oz. [0.35 L] of product with every gallon of carrier product, enter 12.0 [0.35] in this field. This function works in manual rate control mode only.

This value must be set to zero (0) in a non-chemical injection application.

Valve Delay. Set the valve delay to include a time delay between when the sections are turned on and when the product nodes start to control the flow rate. Viper Pro activates this delay if the time between turning the section on and off is less than 30 seconds.

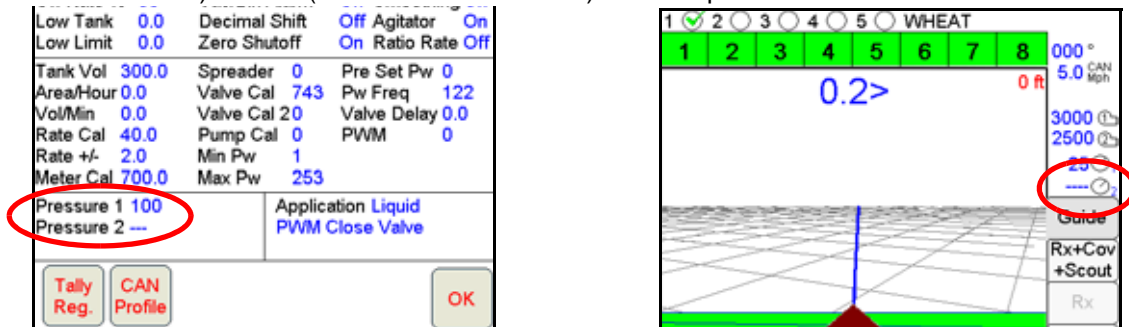
Note: *A value of zero must be entered if a Fast Close or PWM Close valve is used as the control valve or when the Valve Type is programmed as a standard valve with an injection system.*

Appl (Application) Delay. The application delay is used with the product chaining feature when advancing to the next bin in the product chain. Enter the time, in seconds, necessary for the product to travel from the bin to the boom or spinner. The field computer will use the application delay for each product control channel to ensure that product application is not interrupted and that the correct target rate is maintained when switching to the next bin in the product chain.

Dual Pressure Area

Note: The pressure displays calibrated in this area are designed for monitoring product pressures via a product control node. Refer to the *Optional Bin Pressure Sensor* section on page 38 to calibrate bin pressure sensors used with seeding systems.

Liquid product pressures monitored by the Viper Pro, via electronic pressure transducers, are displayed as P1 (Pressure Transducer 1) and P2 (Pressure Transducer 2) on the Viper Pro main screen.



Note: Refer to the *Optional Bin Pressure Sensor* section on page 38 to calibrate bin pressure sensors and select bin pressures or fan speeds for display on the Viper Pro main screen.

Viper Pro displays:

- All dashes if the node does not detect a pressure transducer.
- CAL if it detects a pressure transducer but the transducer is not calibrated.

Note: Pressure readings are provided as display only and do not affect product control. Refer to the *Pressure Transducer* section on page 246 for details on calibrating any pressure transducers connected to the CAN control system.

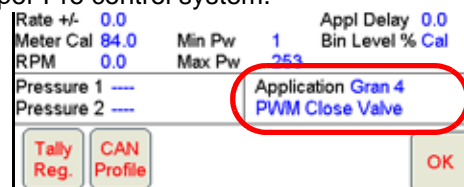
Low Limit Pr (Pressure)

The low limit pressure feature requires a pressure transducer to monitor product pressure during application and will allow the operator to set the lowest pressure tolerable during field operations. If the application system reaches the low limit pressure, the field computer will display an alert and application system will maintain the flow rate to keep the boom pressure consistent and to maintain the spray pattern.

The low limit pressure feature will result in higher than desired application rates. If the low limit pressure feature will be used during field operations, be sure to enter a value that will not interfere with normal field application.

Application Area

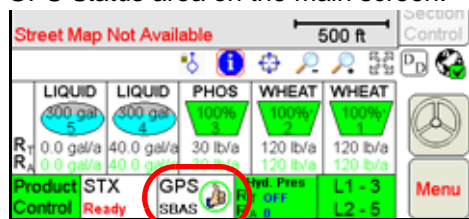
The application area on the CAN Controller Status screen displays the current application type and control valve type configured on for the Viper Pro control system.



Refer to the *Application and Control Valve Type(s)* section on page 35 for information on these settings.

GPS Status Screens

The GPS Status area provides a quick reference for DGPS signals transmitted to the Viper Pro from the connected DGPS receiver. To view additional information and access features for the DGPS information on the Viper Pro field computer, touch the GPS Status area on the main screen.



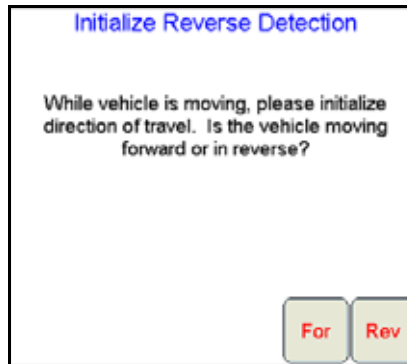
The GPS Status screen displays information provided by the DGPS receiver. This screen may also display information to help address issues with DGPS reception.



Reverse Sense. The reverse sense feature enables the field computer to detect when the vehicle is backing up. With the reverse sensing feature turned off, the Viper Pro will always display any vehicle motion in the forward direction.

Note: *The reverse sense button will not be displayed if an optional SmarTrax system is connected to the CANbus system. Refer to the SmarTrax operation manual for information on reverse sense with these systems.*

Touch the **Rev Sense** button to display the Reverse Sense screen. Review the on-screen feature description and select the desired mode of operation. When the Rev Sense feature is enabled, the field computer will prompt the operator for the direction of travel each time the field computer is powered up.



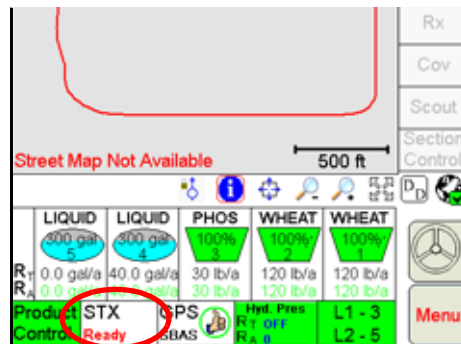
While travelling at least 2 mph [3.2 km/h], select the current direction of travel to calibrate the Viper Pro for automatic reverse detection. This feature may be helpful when backing into corners with the SCT feature enabled. Touch the **For**(ward) or **Rev**(erse) button to manually select the direction of travel.

Course Over Ground (COG) Filter. The course over ground filter may be used to smooth the reported GPS course displayed in the map area on the Viper Pro field computer. Touch the **COG Filter** button to display the Course Over Ground Filter Selection screen. Review the feature description on the display and select the appropriate filtering level.

View Data. Select the **View Data** button to view “raw” GPS data coming from the DGPS receiver into the Viper Pro field computer via the ‘GPS Receiver/DGPS’ port on the main interface or chassis interface cable.

SmartTrax Settings Screens

If an optional SmartTrax system is detected on the CANbus, the status of the system will be displayed on the main screen.

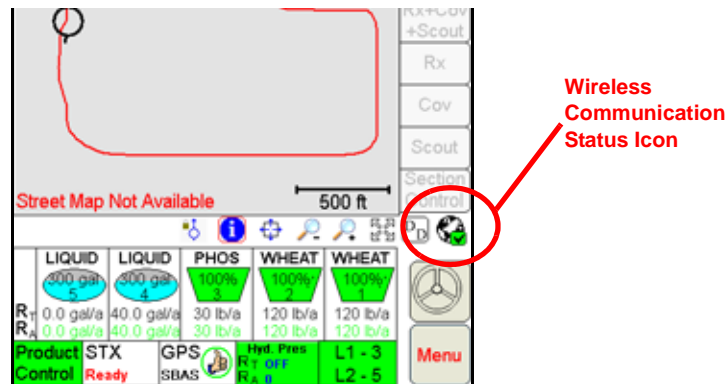


If the SmartTrax system is engaged, the steering status display above the Menu button will show a green steering wheel with the 'A' as shown in the image above. When the SmartTrax system is disengaged, the steering wheel will be grey and no A will appear.

Note: Refer to the *SmartTrax Calibration and Operation Manual* for detailed calibration and operation information.

Wireless Communication Status

The status of wireless communications is displayed along the right side of the main screen below the map area.



Note: For more information on using the wireless communication features with the Viper Pro, see Appendix G, *Wireless Communications and Remote Service*.

For instructions on installing and setting up the Slingshot Field Hub, refer to the *Field Hub Installation Guide* provided with the wireless device.

Menu

The Viper Pro menu contains additional settings and features for working with the control system, managing field application data or interfacing the field computer with optional hardware features. Review the following sections for information about each menu option and the settings, features and available options for operating the Viper Pro field computer.

Exit Button

From the Viper Pro main screen, touch **Menu** and select the **Exit** option to display the Exit Viper prompt. Select the following options to:

Note: If a Job is in progress when the exit button is selected, the Viper Pro will display a warning alerting the operator. Exit the Viper Pro application without closing the job, touch **Yes**. Raven recommends closing any open jobs before exiting the Viper Pro application to avoid losing job information.

Pressing and holding the Power button to shutdown the Viper Pro is not recommended. This procedure should only be used in situations when normal shutdown is not possible.

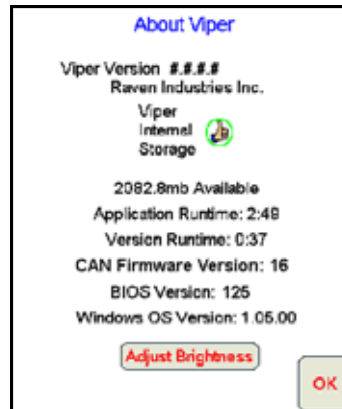
Exit to Menu. Close the Viper Pro application management system and view the Program Selection Menu screen. Review the *Start Up* section on page 20 for details on the Program Selection Menu options.

Shutdown Viper. Close the Viper Pro application management system and power down the field computer. It is always recommended to shutdown the Viper Pro prior to removing power from the field computer.

Cancel. Select this option to return to the Viper Pro application management system.

About Button

From the Viper Pro main screen, touch **Menu** and select the **About** button to view the current software and build version installed on the Viper Pro. The About Viper screen also displays the space remaining on the Viper Pro internal memory.



The following memory indicators may be shown when the internal memory is running low.

	<p>Memory Low</p> <p>Less than 30 MB of space remaining</p>
	<p>Memory Critical</p> <p>Less than 25 MB of space remaining</p>

The Viper Pro automatically checks remaining internal storage space and will display an alert if the internal storage space is almost full. This warning can be cleared by touching the **OK** button.

Runtimes. The application runtime is the overall time that the Viper Pro application management system has been in operation on the field computer. The version runtime displays the run time of the currently installed software version.

CAN Firmware Version. This value displays the current version of firmware used for CAN communication.

BIOS Version. The BIOS version currently used by the Viper Pro field computer.

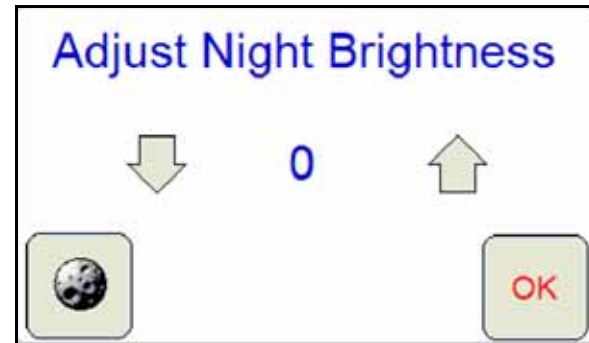
Windows™ OS Version. This value is the image version of the Windows operating system installed on the field computer.

Adjust Brightness

Touch the Adjust Brightness button at the bottom of the About Viper prompt to display the Adjust Brightness settings.



Mode Selection Button -
Day Mode Enabled



Mode Selection Button -
Night Mode Enabled

The Adjust Brightness settings prompt displays the following:

Day/Night Mode Selection Button. The mode selection button also displays the current mode enabled. Touch this button until the desired mode is displayed.

Increase/Decrease Arrows. Touch the arrows pointing up and down to either increase or decrease the display brightness. Touch and hold for five seconds to change the brightness value in increments of 5.

Brightness Value. The current display brightness setting is displayed in the center of the window. In Day mode, this value may be set between 50 and 100. In Night mode, the brightness value may be set between 0 and 100.

OK. Touch the OK button to accept the current mode and brightness value and return to the Viper Pro main screen.

Note: The Viper Pro will always default back to the day mode when powered up or restarted.

Web Button

If the Slingshot Field Hub, or similar hardware, is connected to the ethernet port on the back of the Viper Pro, touch **Menu**, and select the **Web** button to access the world wide web on the Viper Pro touch screen.



Note: The Field Hub will need a registered user account on the Slingshot web page.

On-Screen Keyboard. Place the cursor in a text or value field on a web site or in the web address field and touch the keyboard icon to display an on-screen keyboard for use with the web application on the Viper Pro.

Favorites. Touch the favorites icon to access or edit saved favorites for quick web browsing.

Home. Touch the home icon to return to the initial web page in the Viper Pro web browser.

Back. Select the back button when available to return to the previous web page.

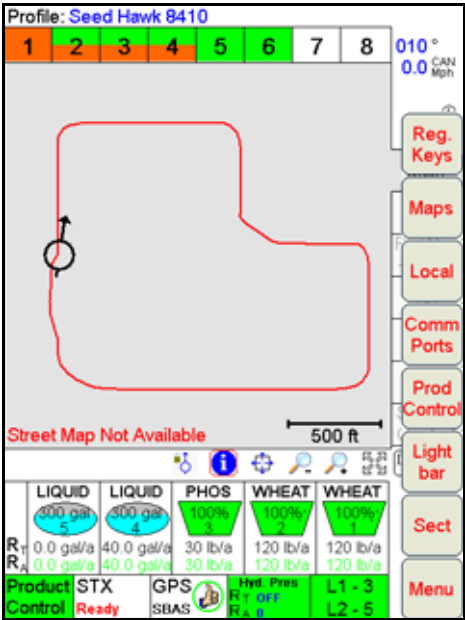
Forward. Select the forward button when available to advance to the next available web page. This button is normally only available if the back button has been used previously.

Add. Select the add button to add the current web site displayed on the screen to the web favorites.

Close. Touch the close button to close the web browser and return to the Viper Pro application management system.

Setup Button

Touch **Menu** and select the **Setup** button to access the following menu items:



• Registration Keys	• Maps	• Local
• Communication Ports	• Product Control	• Light Bar
• Sect (Sections)		

Note: See the Setup Menus section on page 151 for a description of the features accessible through the Setup Menu.

File Maintenance

From the Viper Pro main screen, touch **Menu** and select **File Maintenance** to display the available file maintenance options available for use on the field computer.

This feature allows the operator to transfer files to or from the Viper Pro field computer using either a USB flash drive or to set up automatic file transfer options when using a Slingshot Field Hub.

Note: Do not use the Automatic File Maintenance feature to create reports for a Slingshot account.

The Automatic File Maintenance feature does not export the types to a USB flash drive necessary for creating Slingshot reports and will remove job data from the Viper Pro. Job data transferred using the Automatic File Maintenance feature cannot be reinstalled onto the field computer for export to Slingshot. Refer to the USB File Transfer and Advanced File Maintenance section on page 208 for instructions on outputting the necessary file types.

Refer to Chapter 11, File Maintenance and Editing Reports, for a detailed description of the File Maintenance feature. For information on creating application reports and entering report information on the Viper Pro field computer, see Creating Application Reports section on page 100.

Start Job

To create an as-applied or coverage map, and create an application report, the machine operator must start a job. The job file automatically logs coverage information for reference at a later date and creates coverage reports for viewing on a home or office PC.

Refer to Chapter 5, *Using the Seed Hawk® Viper Pro System*, for detailed information about using the Viper Pro during field applications.

Setup Menus

The Setup menu contains several advanced settings, features and options to configure the Viper Pro field computer for communication with optional equipment on the machine, to customize the map displays or to configure the Viper Pro for the specific vehicle or equipment.

Touch **Menu** and select the **Setup** button to access the following menu items:

- Registration Keys
- Maps
- Local
- Communication Ports
- Product Control
- Light Bar
- Boom

Refer to the following sections for detailed information about the settings and features accessible through the Setup menu.

Note: *The following Setup menu features are not available during an active job. Be sure to configure any necessary settings prior to starting a job.*

Registration Keys

From the Viper Pro main screen, touch **Menu** and select **Setup, Reg. Keys** to display the Validation Data screen.

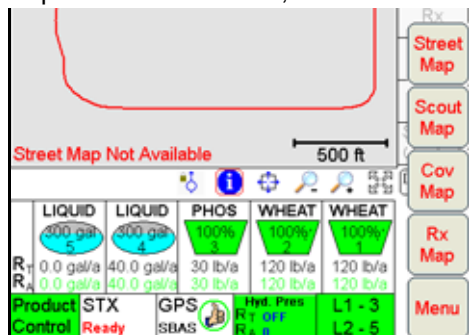
The Viper Pro offers a number of optional features which may be purchased individually and added at any time. See Chapter 3, *Installation, Start Up, and Registration*, for instructions on registering and activating features on the field computer.

Note: *Contact a local Raven or Seed Hawk dealer for additional information or to purchase an optional feature not currently enabled on the Viper Pro system.*

Maps

Coverage, scout and prescription (Rx) map displays may be customized to suit the equipment operator or application through the map option in the setup menu.

To set map display options from the Viper Pro main screen, touch **Menu** and select **Setup** and **Maps**.



The following actions may be performed through the Maps setup menu:

- load and delete streetmaps
- customize scout map displays
- customize coverage map displays
- customize prescription (Rx) map displays

Street Maps

The street maps feature allows the operator to view a county map on the Main tab map area display. The current vehicle location will be displayed on the street map to assist with locating or identifying specific field or application areas.

Note: *Street maps are only displayed on the Main tab.*

Maps are available free of charge for counties within the United States in a compressed, or "zipped," format. A program to extract, or "unzip," these files (i.e. WinZip™) will be required to prepare the files for use with the Viper Pro.

Note: *If the computer does not already have the ability to unzip a file, a trial version of WinZip™ software tool is available at:*

www.winzip.com

A free version of an unzip program is also available from the following web site:

www.freebyte.com/fbzip/

To Download Street Maps

1. Create a folder on the computer in which to store the download files.
2. Access the Tiger web page at:

http://arcdata.esri.com/data/tiger2000/tiger_download.cfm



3. Select the desired state in the map. The “Download Census 2000 TIGER/Line® Shapefiles” page displays.
4. From the **Select by Layer** drop-down list, select the **Line Features-Roads** option.
5. Click **Submit Selection**. The Available Counties page displays.
6. Check the option for the desired county to download and click the **Proceed to Download** button at the bottom of the list. The Data File Ready page will be displayed.
7. Click **Download File**. The File Download screen displays.
8. Click **Save**. The Save As screen displays.
9. Select the folder created in step 1 and click **Save**. The file is saved to the selected folder.
10. To download additional street maps, repeat step 5 through 9.

Note: Before loading the compressed map files to the Viper Pro, extract the map files to the folder created in step 1.

To Load Street Maps to the Viper Pro

1. Rename the three files to the name of the county. For example, rename the “tgr46087lka.shp” file for Dallas county to “Dallas.shp.”

Note: To rename a file, right-click on the file and select **Rename**. Type in the new file name. Be sure to keep the same file extension or the file will not work with the Viper Pro system.

2. Copy the files to the streetmaps folder within the Viper directory of a USB flash drive.

Note: The streetmaps folder should be located in: X:\viper\misc\streetmaps, where X is the root drive letter of the USB device. Do not copy the files into sub-folders. Viper will not be able to locate files within sub-folders.

3. From the Viper Pro main screen, select **Menu**, then **File Maint.**, and then select the option labeled **Advanced File Maintenance**.
4. On the Advanced File Maintenance screen, select:
 - a. **Street Map**, then **Copy** or **Move**.
 - b. To move files from the USB drive to the Viper Pro, select the **External --> Viper** option, and **Copy All** or **Copy Selected**.
 - c. Viper will upload streetmaps files to the internal memory.
5. Touch **OK** to exit the File Maintenance feature.
6. Select **Menu**, then **Setup**, **Maps**, **Street Map**, **Install Streets**, and **OK**. Viper loads the map files for viewing on the Main tab of the Viper Pro.

To Delete Street Maps

Street maps not used frequently may be removed to clear up internal memory for job data and other information. To delete a street map from the Viper Pro:

1. Select **Menu**, then **Setup, Maps, Street Map, Delete Streets**, and **OK**. Viper deletes the .sct files from the field computer.
2. Delete the associated map files from the internal storage using the Advanced File Maintenance feature if the files are no longer needed.

Scout Maps

The scout map feature may be used to locate areas of interest during field applications. For example, if the operator locates an area of rocks, weeds or insects during an application, he or she may place a marker on the scout map to help relocate the area for spot spraying or other field work.

Scout maps are also used to create apply or no-apply areas for the optional SCT, automatic section control, systems. Four preset features and up to twelve (12) user defined areas may be used to map field features.

Note: Scout map features must be defined prior to starting a job on the Viper Pro field computer.

Field features may include, but are not limited to:

- weed or insect infestations
- tile lines or waterways
- rocks
- trees

Note: Scout map features may be recorded at any time during an active job.

To Configure the Scout Map Features and Mapping Colors

1. From the Viper Pro main screen, touch the **Menu** button, then select **Setup, Maps**, and **Scout Map**. The Enter Feature Names and Colors screen is displayed.

Enter Feature Names and Colors.	
Field Boundary	Color
Spray Zone/Boundary	Color
Spray	Color
No-Spray	Color
Rocks	Color
Thistles	Color
Grasshoppers	Color
	Color

Next
Cancel
OK

2. Using the on-screen keyboard, enter the name of the feature in an available field.

- Touch the corresponding **Color** button. The Feature Colors screen displays.



- Select a color for the feature and touch **OK**. Viper assigns the color to the feature and returns to the Enter Feature Names and Colors screen.
- To setup more field features, repeat step 2 through 4.
- Touch **OK** to finish configuring features and return to the main screen.

To Record Field Features

For a step-by-step procedure for recording field features, review the *How to Mark a Field Boundary* section on page 92.

Coverage Maps

During an active job, the Viper Pro creates an as-applied or coverage map containing real-time product rate information for each active product. The equipment operator may reference the coverage map to view areas of a field application in which:

- product application is on or off,
- product rates are within an acceptable range of the target application rate, or
- product rates are above or below the acceptable range of the target application rate.

The equipment operator may access the coverage map for each product individually during an application to make adjustments to the application system or to help identify and correct issues with the application system.

Note: *The as-applied or coverage map information may be displayed on the 'Guide,' 'Rx+Cov+Scout,' or the 'Cov' tabs during job applications.*

When creating reports for completed jobs, coverage map data is included with the report to provide an overall field or coverage view.

Customizing the Coverage Map Displays

1. To customize the coverage map display from the Viper Pro main screen, touch **Menu** and then select **Setup**, **Maps**, and **Cov Map**. The Coverage Maps Colors screen displays.

2. Touch within the maximum rate OK field and use the on-screen keyboard to enter the maximum percentage of the target application rate acceptable for the application.

Note: Enter a value at or above 100% for the maximum range. The default setting is 120%.

3. Touch within the minimum rate OK field and use the on-screen keyboard to enter the minimum percentage of the target application rate acceptable for the application.

Note: Enter a value at or below 100% for the minimum range. The default setting is 80%.

The range between the maximum and minimum rate OK values sets the allowable range for the coverage map display in the maps area during an active application.

While creating the coverage map, Viper Pro will display areas where application rates do not meet the acceptable minimum or maximum range by “painting” the coverage area in a different color. To customize the coverage map display colors:

1. Touch the color **Select** button next to the rate too high, rate OK or rate too low field.
2. Select the desired color to display on the coverage map for the selected range and touch **OK** to accept the change.
3. Touch the remaining color **Select** buttons as necessary to customize the remaining ranges.
4. Touch **OK** to accept the coverage map display changes or touch **Next** to configure a zero rate tolerance for specific product nodes or control channels.

Note: Proceed to the next section for details on the zero rate tolerance setting.

Zero Rate Tolerance

The zero rate tolerance values set the minimum number of pulses detected by an encoder before the Viper Pro will record coverage for the product.

For Example:

While monitoring product rates in rough field areas, an encoder may register false rate pulses due to excess “bouncing” or “jarring” of equipment. These false signals will be recorded by the Viper Pro as an area of product application. If these pulses are received in zero rate zones, the coverage map will display an over application and false data will be included on the application report at the end of the job.

The zero rate tolerance feature may be used to eliminate encoder “chatter” due to these false rate pulses. Each product may be set up with a different rate tolerance value to ensure each product is displayed accurately on the coverage map and application report. 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.

Setting the Zero Rate Tolerance.

1. To set the zero rate tolerance for each node from the Viper Pro main screen, touch **Menu**, then **Setup**, **Maps**, and **Cov Map**.
2. Select the **Next** button on the Coverage Map Colors screen to display the Zero Rate Tolerance screen.

3. Touch the desired product field and use the on-screen keyboard to enter the minimum rate allowed before the field computer will record coverage.

Prescription (Rx) Maps

Prescription (Rx) maps may be loaded onto the Viper Pro field computer for automatic variable rate applications based upon rate zones referenced within the prescription map shapefile. The Viper Pro is capable of controlling up to five products in reference to individual maps for each product or a single map containing the prescription rate information for each product in the .dbf file of the shapefile format.

The following table is an example of the .dbf file for a single map that contains multiple product information.

Nitrogen	Potassium	Phosphorus	Lime
100.0	20.0	15.0	750.0
125.0	17.0	33.0	200.0
85.0	45.0	21.0	600.0
50.0	0.0	18.0	925.0

Note: In order to control multiple products according to a prescription map, a multi-product activation key must be entered on the Viper Pro. Contact a local Raven dealer to obtain a multi-product VRA activation key and refer to the Registering the Viper Pro section on page 23 for information on entering activation keys on the Viper Pro field computer.

If the prescription map contains zero rate zones, the product node or control channel must have either a PWM close or fast close valve controlling the corresponding product. Refer to the Application and Control Valve Type(s) section on page 35 for information on setting the valve type on the Viper Pro.

If the system contains a fast valve, the valve must be plumbed into the main product line. Do not plumb the valve into a bypass line.

Prescription maps used with the Viper Pro must be in the shapefile format and must be created using GIS (Geographic Information System) software capable of creating shapefiles. These shapefiles must be in the polygon shape format that complies with the ESRI (Environmental Systems Research Institute) shapefile specifications. Shapefiles must also be in the WGS84 datum.

For best results, prescription maps used with the Viper Pro should contain as few rate zones as possible. Maps with too many zones may affect performance of the field computer during the application. Raven recommends that the smallest zone(s) contained within the prescription map should be no smaller than the width of the boom or implement applying product.

For Example:

If the machine swath width is 90 feet [27.4 m], zones on the prescription map should be no less than 90 feet [27.4 m] wide.

To load a prescription map shapefile onto the Viper Pro, the .shp, .shx and .dbf files must be copied into the RxMaps folder on the USB flash drive used with the Viper Pro. Refer to the *Uploading Prescription Maps from a USB Flash Drive* section on page 208 for detailed instructions.

Prescription (Rx) Map Look-Ahead

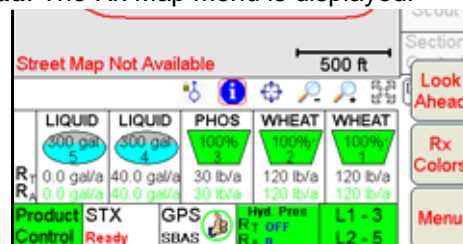
The prescription map look-ahead value is the number of seconds (determined by vehicle speed) which the field computer is allowed to scan in front of the current vehicle position to find rate changes on a prescription map. This feature may be used to help compensate for the time it takes a valve to fully adjust to a different rate.

For Example:

If the control valve takes four seconds to adjust to a rate change, set a prescription look-ahead value of 2 seconds to allow the field computer to begin adjusting the valve prior to the vehicle entering the new rate zone.

Note: The prescription Look-Ahead value only affects products controlled in reference to a prescription map.

1. To access the prescription map look ahead value from the Viper Pro main screen, touch **Menu**, then **Setup**, **Maps**, **Rx Map**, and **Look Ahead**. The Rx Map menu is displayed.



2. Touch within the look-ahead seconds field and use the on-screen keyboard to set the desired look ahead value.
3. Touch **OK** to save the new look-ahead setting and return to the Viper Pro main screen.

Prescription (Rx) Map Colors

The rate zone colors displayed on a prescription map may be customized for different applications or to suit the equipment operator's preferences.

The screenshot shows the 'Rx Map Colors' screen. It has two columns: 'Rate Range' and 'Color'. The 'Rate Range' column has five input fields: 'Minimum', '5', '7.5', '12.5' (highlighted with a red box), and 'Next Page'. The 'Color' column has five 'Select' buttons corresponding to each rate range. On the right side, there are four buttons: 'Prev', 'Next', 'Cancel', and 'OK'. At the bottom left, it says 'Page 1 of 3' and there is a navigation bar with various icons.

Note: If no color template is selected by the operator, the Viper Pro will use the default colors.

Adding a Prescription (Rx) Map Color Template

1. To add or create a prescription map color template from the Viper Pro main screen, touch **Menu**, then **Setup**, **Maps**, **Rx Maps**, and **Rx Colors**. The Rx Map Colors prompt will display.

The screenshot shows the 'Rx Map Colors' screen with the prompt 'Select an Rx Map Color Template Operation'. At the bottom, there are four buttons: 'Add', 'Edit', 'Delete', and 'Cancel'. The right side of the screen shows a partial view of the 'Main' menu with options like 'Main', 'de', 'Cov', 'out', 'x', 'wv', and 'out'.

2. Select **Add**. The Rx Map Colors screen displays.
3. Using the on-screen keyboard, enter a name for the color template.

The screenshot shows the 'Rx Map Colors' screen with the prompt 'Enter a name for this template (up to 15 characters)'. There is a text input field containing the word 'Lime'. On the right side, there are three buttons: 'Next', 'Cancel', and 'OK'. At the bottom, there is a navigation bar with various icons.

4. Touch **Next**. The Rate Range and Color Selection screen will display.

5. In the top field, enter the maximum rate for the lowest rate range displayed on a prescription (Rx) map. Any rate zone within the range between the minimum prescription rate and the value entered in this field will be displayed as the color selected in the following step.
6. Touch the **Select** button corresponding to the first rate range. The Rx Map Colors screen displays.

7. Select the desired rate range display color and select **OK**.
8. To add more ranges for prescription rate zone displays, repeat step 4 through 7. Rate ranges entered for each field must be higher than the previous range to complete the template creation.

Note: Make sure to enter a value for each range and select a display color. Ranges may be assigned with the same colors to create wider rate ranges for the prescription map display. The last range value entered will be the minimum rate for the highest rate range.

9. When a rate range and display color have been entered for each field, touch **OK**. The Viper Pro will display a confirmation prompt.
10. Touch **OK**. The prescription map color template will be saved.

Editing a Rx Color Template

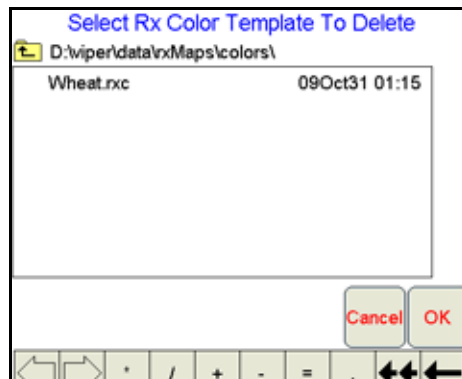
1. Touch **Menu**, then **Setup**, **Maps**, **Rx Maps**, and **Rx Colors**. The Select Rx Map Colors Template prompt will display.
2. Select **Edit**. The Select Existing Rx Color Template screen displays.



3. Select an existing template from the list to edit and touch **OK**.
4. Use the on-screen keyboard to rename the prescription map color template. If the template is not renamed, any changes to the template will be saved over the existing prescription map template.
5. Touch **Next**. The Rx Map Colors screen displays.
6. Refer to the *Adding a Prescription (Rx) Map Color Template* section on page 159 for details on entering rate ranges and assigning rate zone colors.
7. Touch **OK**, when all necessary changes have been made to the prescription map template to save the template and return to the Viper Pro main screen.

Deleting a Rx Color Template

1. Touch **Menu**, then **Setup**, **Maps**, **Rx Maps**, and **Rx Colors**. The Rx Map Colors prompt will display.
2. Select **Delete**. The Select Rx Color Template to Delete screen displays.



3. From the list of existing templates stored on the Viper Pro, select the desired template to delete and touch **OK**.
4. The Viper Pro will display a prompt to confirm that the template file will be deleted. Touch **Yes** to delete the selected template.
5. Touch **OK** to return to the Viper Pro main screen.

Local Settings

The Local settings allow the operator to set up preferences for:

- Language
- Profile Configuration
- Units Configuration
- Time Zone Configuration

Refer to the *Initial Set Up* section on page 32 for detailed information on setting up these settings and saving a machine profile. Refer to the following section for more information on the automatic power down feature.

Power Option

The automatic power down feature allows the Viper Pro to automatically close any active job file and power down the console when the vehicle ignition is switched off. This feature may be enabled to help ensure that job information is saved and the field computer 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 Viper Pro field computer.*

1. Touch **Menu, Setup, Local and Power Option** to display the Automatic Power Down screen.
Select the 'Enable automatic power down' option to allow the field computer to shutdown when the ignition is switched off.
Disable this feature to keep the field computer powered on until the operator powers down the console manually. Review the *Powering Down the Viper Pro* section on page 55 for proper shut down procedures.
2. If enabled when the ignition is switched off, the field computer will display an alert to the operator and allow the operator to cancel the automatic power down. Cancel the power down to keep the field computer powered on after the ignition is switched off.

Serial Communication Port Setup

The Viper Pro features three serial communication ports which may be configured to provide communication between the field computer and various external devices. The serial ports are labeled as follows:

- GPS Comm Port
- Console Comm Port
- Auxiliary Comm Port

GPS Comm Port Setup

To use the guidance capabilities of the Viper Pro field computer, a DGPS receiver must be connected to the 9-pin serial connector labeled 'DGPS' on the main interface or chassis interface cable. The GPS Comm Port Setup screen is used to configure the Viper Pro field computer to receive GPS messages from the connected receiver.

1. To configure the GPS communication port from the Viper Pro main screen, touch **Menu**, and select **Setup, Comm Ports**. The GPS Comm Port Setup screen will display.

GPS Comm Port Setup

Baud	Data Bits	Parity
<input type="radio"/> 4800	<input checked="" type="radio"/> 8	<input type="radio"/> Odd
<input type="radio"/> 9600	<input type="radio"/> 7	<input type="radio"/> Even
<input checked="" type="radio"/> 19200	<input checked="" type="radio"/> 1	<input checked="" type="radio"/> None
<input type="radio"/> 38400	<input type="radio"/> 2	
<input type="radio"/> 57600		
<input type="radio"/> 115200		

Stop Bits: ☒ 1 ☐ 2

Preset Selection:

- ☒ Generic GPS
- ☐ Raven GPS

Buttons: Auto Baud, View Data, Next, Cancel, OK

Communication settings must match the receiver settings exactly for proper communication between the Viper Pro and the connected DGPS receiver. The following presets are available to help configure the GPS Comm Port Setup screen:

- Generic GPS - for RPR 410, Phoenix 300 and non-Raven receivers or with an optional guidance or steering component (e.g. TM-1 Tilt Module, SmarTrax, etc.) connected between the receiver and field computer
 - Raven GPS - for all other Raven receivers
2. Select the appropriate preset to begin configuration of the GPS communication port.

Note: Touch the **View Data** button to display the actual NMEA strings received by the field computer. NMEA strings will not be displayed if the GPS Comm Port Setup does not match the communication settings of the connected DGPS receiver.

3. Refer to the following sections for details on completing the GPS Comm Port Setup for the available preset settings.

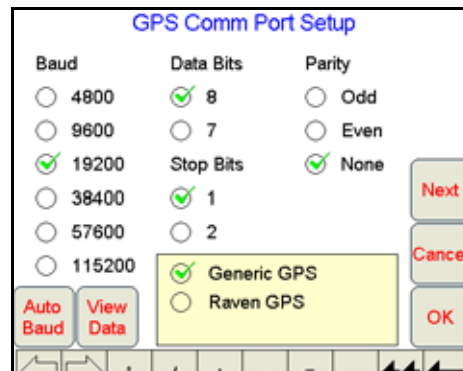
Generic (Non-Raven) GPS Setup

Select the Generic GPS option to configure the Viper Pro to communicate with the following receivers:

- Raven RPR 410
- Raven Phoenix 300
- a non-Raven DGPS receiver
- if an optional guidance or steering component (e.g. TM-1 Tilt Module, SmarTrax, etc.) is connected between the receiver and field computer

Note: The DGPS receiver must be powered up and connected to the 'GPS Receiver/DGPS' connector on the Viper Pro main interface or chassis interface cable. The receiver must also output the GGA, VTG, and either the RMC or ZDA NMEA messages to communicate properly with the Viper Pro.

1. To configure the Generic GPS preset from the Viper Pro main screen, touch **Menu**, then **Setup**, and **Comm Ports**. The GPS Comm Port Setup screen displays.
2. Select the **Generic GPS** option.



3. Touch the **Auto Baud** button to allow the Viper Pro to attempt to establish communication with the DGPS receiver automatically.
 - a. If the field computer is able to receive messages from the connected receiver, touch **OK** to finish the GPS Comm Port Setup.
 - b. If no communication is established, the Viper Pro will display a 'Not Found' message. Touch **OK** and re-check the receiver and cables and repeat step 3. If the Viper Pro is still unable to communicate with the receiver, refer to Chapter 12, *Troubleshooting the Viper Pro System*, or contact the receiver manufacturer for additional assistance.
 - c. If an optional SmarTrax, automated steering system, will be used with the Viper Pro, for SmarTrax software versions:
 - 3.2 and lower, set the baud rate to 38400.
 - higher than 3.2, set the baud rate to 115200.

Raven GPS Setup

1. To automatically configure the GPS Comm Port Setup for a Raven DGPS receiver, touch **Menu**, then **Setup** and **Comm Ports**. The GPS Comm Port Setup screen displays.

The screenshot shows the 'GPS Comm Port Setup' screen. It has four columns: Baud, Data Bits, Parity, and Stop Bits. Under Baud, 19200 is selected with a green checkmark. Under Data Bits, 8 is selected with a green checkmark. Under Parity, None is selected with a green checkmark. Under Stop Bits, 1 is selected with a green checkmark. At the bottom, there are two radio button options: 'Generic GPS' and 'Raven GPS'. 'Raven GPS' is selected and highlighted with a red circle. There are also buttons for 'Auto Baud', 'View Data', 'Next', 'Cancel', and 'OK'.

2. Select the Raven GPS preset to automatically configure the communication ports for the following receivers:

- RPR 100S
- RPR 100G
- Invicta 110
- Invicta 115
- Invicta 210
- Invicta 310
- Phoenix 50
- Phoenix 200
- Phoenix 250

Note: Make sure that the Raven receiver is properly connected and powered up before configuring it with the Viper Pro system. Viper will automatically configure the GPS comm port to the following settings:

- Baud = 19200
- Data Bits = 8 bits
- Stop Bit = 1
- Parity = None

3. Touch the **View Data** button to confirm that the Viper Pro is receiving GPS messages or touch **OK** to return to the Viper Pro main screen.

Note: If the Viper Pro is unable to receive GPS messages from the Raven receiver, refer to Chapter 12, *Troubleshooting the Viper Pro System*, or contact a local Raven dealer for assistance.

Console Comm Port Setup

The Viper Pro may be configured to log product rate data received from a separate rate control console connected to the field computer via the 9-pin serial connector labeled 'Console' on the main interface or chassis interface cable. The Console Comm Port Setup screen is used to configure the Viper Pro field computer to receive rate messages from the connected console.

1. To configure the Viper Pro to receive rate information from a separate rate control console through from the Viper Pro main screen, touch **Menu**, and select **Setup, Comm Ports**.
2. Touch **Next** on the GPS Comm Port Setup screen to display the Console Comm Port Setup screen.

Console CommPort Setup

Baud	Data Bits	Parity	
<input type="radio"/> 1200	<input checked="" type="radio"/> 8	<input type="radio"/> Odd	<div>Prev</div> <div>Next</div> <div>Cancel</div> <div>OK</div>
<input type="radio"/> 4800	<input type="radio"/> 7	<input type="radio"/> Even	
<input checked="" type="radio"/> 9600	Stop Bits	<input checked="" type="radio"/> None	
<input type="radio"/> 19200	<input type="radio"/> 1		
<input type="radio"/> 38400	<input checked="" type="radio"/> 2		

Note: The Console Comm Port Setup screen will not be displayed unless a serial controller is set as the product controller. Refer to the Product Control Type section on page 33 for information on selecting a product controller.

If the Viper is connected to a CANbus system, skip to the Auxiliary Comm Port Setup section on page 167.

1. Select the following communication settings to communicate with a separate Raven control console:
 - Baud = 9600
 - Data Bits = 8
 - Parity = None
 - Stop Bits = 2
2. Touch **View Data** to view the communication strings received through the Console connection.

Note: If no data appears on the View Data screen, touch **Cancel** and re-check the serial control console and connections. Verify that the console is set up properly to communicate with the Viper Pro and then repeat step 2.

If the Viper Pro still does not display console data messages, refer to Chapter 12, Troubleshooting the Viper Pro System, or contact a local Raven dealer for assistance.

3. Touch **OK** to save the displayed communication settings and return to the Viper Pro main screen.

Auxiliary Comm Port Setup

The Auxiliary Comm Port or 'Aux' connector on the optional auxiliary interface cable may be used to connect optional serial equipment as necessary. Access the Auxiliary Comm Port Setup screen to configure the Viper Pro for communication through the auxiliary port.

Note: *The Viper Pro will automatically configure the auxiliary comm port settings for an external Raven light bar or the Spectrum Technologies® WatchDog Sprayer Station. Refer to the Light Bar Guidance section on page 168 or Appendix F, Weather Station, to configure the Viper Pro for these components.*

1. To configure the auxiliary comm port settings from the Viper Pro main screen, touch **Menu**, and select **Setup, Comm Ports**.
2. Touch **Next** until the Auxiliary Comm Port Setup screen is displayed.
3. Adjust the baud rate, data bits, stop bits and parity as described in the instructions provided with the device.

The default values for the Auxiliary Comm Port are:

- Baud Rate - 19200
- Data Bits - 8
- Stop Bits - 1
- Parity - None

Weather Module Setup

The Weather Module Setup screen is only accessible if the optional activation key has been entered on the Viper Pro.

1. To access the Weather Module Setup screen from the Viper Pro main screen, touch **Menu**, and select **Setup, Comm Ports**.
2. Touch **Next** until the Weather Module Setup screen is displayed.

Note: *For information on entering activation keys on the Viper Pro, refer to the Registering the Viper Pro section on page 23. Refer to Appendix F, Weather Station, for details on setting up the weather module.*

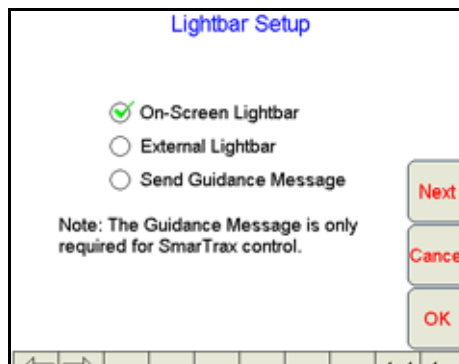
Light Bar Guidance

Light bar guidance features of the Viper Pro may be used to display guidance information on the Viper Pro touch screen or to send guidance information to an external Raven light bar connected to the auxiliary comm port connector on the auxiliary interface cable. The Light Bar Setup screen offers the ability to quickly configure the Viper Pro for either, or both, of these light bar guidance options.

The Viper Pro may also forward guidance information to an optional Raven SmarTrax automated steering system connected to the guidance system.

Note: To use the light bar features of the field computer, a receiver capable of sending DGPS messages at a minimum of 5 Hz must be connected to the Viper Pro.

1. To configure the light bar guidance features from the Viper Pro, touch **Menu**, then **Setup**, **Lightbar**. The Light Bar Setup screen displays.



2. Enable the desired light bar options:

On-Screen Lightbar. Enable this option to display a light bar at the top of the Viper Pro touch screen while guidance is enabled during an active job. The on-screen light bar will be displayed regardless of which tab is active during the job.

External Lightbar. Enable this option to allow the Viper Pro to display guidance information on an external Raven light bar.

Send Guidance Message. Enable this option to send guidance messages from the Viper Pro to an optional Raven SmarTrax automated steering system.

Configuring the Light Bar Display

When the on-screen or external light bar options are enabled, the Viper Pro field computer may be used to configure the light bar display. These settings can help the operator set the accuracy of the light bar for different operations or display preferences.

1. To configure the light bar guidance features from the Viper Pro, touch **Menu**, then **Setup**, and **Lightbar**.
2. Touch the **Next** button. Review the on-screen description of the LED values and enter the desired distances from the swath required to illuminate the light bar.

3. Standard light bar operation will illuminate the light bar in the direction of the guidance path from the current vehicle position. In this mode, the operator will need to steer toward the lights to get back onto the guidance path. To reverse the light bar display, select the **Reverse LEDs** option. This mode will require the operator to steer away from the illuminated lights. Select the option that best suited for the operator.

Section Setup Wizard

The applicator boom or implement section configuration is required to set up the Viper Pro system to monitor or control product application. Refer to the *Section Setup* section on page 47 for a detailed description of the boom or implement setup procedure.

CHAPTER

8

Sectional Control Technology™ (SCT)

The Seed Hawk Sectional Control Technology (SCT) system provides automatic section control and allows the Viper Pro system to automatically control sections in reference to coverage or apply/no-apply zone maps. In addition, field boundaries recorded with the SCT feature enabled will automatically set up a no-apply boundary around the target area to help eliminate seeding or product application outside of targeted areas.

Depending upon desired operation, the SCT system is capable of automatically closing meter gates or control valves for specific products and lift soil openers as the section crosses over previously seeded or applied areas. As the section returns to an un-applied area, the SCT system opens the meter gates and lowers the soil openers so that seed and product are being applied at target rates where it is needed.

This chapter contains information about setting up and using the SCT and Base systems with the Seed Hawk Viper Pro field computer. Contact a local Seed Hawk dealer for more information.

System Overview

The Seed Hawk system may be operated in two different modes:

- Base systems
- SCT systems

Base

As the entry level sectional control system, Base systems are not capable of controlling air cart products or soil openers by sections. The Base system applies products from the air cart product bins as a single product across the drill width while the operator manually operates the soil openers via the tractor hydraulic system.

The Base system is capable of controlling up to two additional liquid products in up to four sections across the seed drill. The Base system controls these products in reference to the current coverage map or a sectional control apply/no-apply map created on the Viper Pro.

Sectional Control Technology (SCT) Systems

Seed Hawk Sectional Control Technology and the Viper Pro come together to maximize crop input efficiency by applying multiple products in a single pass while reducing input costs. The SCT and Viper Pro system provides automatic section control of up to five products, minimizing seed and chemical input overlaps and automatic section control of soil openers to reduce soil disturbance to keep moisture in the ground and reduce the effects of erosion. The Seed Hawk Viper Pro with Sectional Control Technology controls all of this so that the operator can focus on driving and keeping swaths straight, reducing skips and overlaps as well as reducing operator fatigue even while operating the largest drill widths.

Note: *With the Seed Hawk system, the first three products are locked to the air cart product bins. Up to two SCT Control Nodes are required for three bin full SCT system operation. Contact a local Seed Hawk dealer for more information on components required for specific air carts and/or drills.*

Base Setup

This section contains instructions for setting up the Seed Hawk Viper Pro and Base system. For instructions on the setup of an SCT system, see the *Sectional Control Technology™ (SCT)* section on page 177.

If the drill sections have not already been configured in Base mode, be sure to follow the *Section Setup Wizard* section on page 169 to configure the tractor and drill sections. The drill must be configured to 1, 2, or 5 sections.

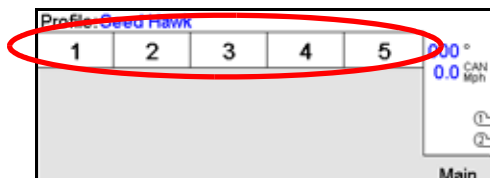
In a Base system, the first section must always set to the full drill width and is assigned to products 1 through 3 applied from the air cart. The section 1 switch on the Seed Hawk switch box toggles all of the air cart bins simultaneously for the entire drill width.

Note: *The Base system is not capable of sectional control of the seed sections or individual products applied from air cart bins.*

Any additional sections configured on the Drill and Section Width Setup screens are assigned to optional liquid products (products 4 and 5). The Base system controls these liquid products as a single product but is capable of controlling one or four sections of liquid application across the drill width.

Section Control Setup Screen

Touch within the Section Status area on the main screen to begin setting up the Base system.



The Section Control Setup screen will be displayed.

 A screenshot of the 'Section Control Setup' screen. The title 'Section Control Setup' is at the top in blue. Below the title, there are two columns of settings. The first column is 'Turn-On' Look-Ahead Sec' and the second is 'Turn-Off' Look-Ahead Sec'. The settings are: Meter Gate1 (5.0), Meter Gate2 (5.0), Meter Gate3 (5.0), Openers (1.0), Liquid Valves (1.0), Sectional Control Override Sec (10), and Turn-Off % Coverage (99). At the bottom, there is a numeric keypad with buttons 1 through 0, a decimal point, and a negative sign. To the right of the keypad are three buttons: 'Next', 'Cancel', and 'OK'.

Note: For Base systems, the look-ahead settings for the soil openers and air cart meter gates are disabled as these functions are manually controlled by the operator. In Base operation, the Section Control Setup screen settings apply strictly to any optional liquid product control nodes.

Turn-On/Turn Off Look-Ahead

Depending upon the type of valve used to control products, control valves may take several seconds to adjust when opening or closing. To help compensate for the valve response time and lag due to filling or emptying product supply lines, the Look-Ahead values allow the Viper Pro to begin adjusting control valves for apply/no-apply zones and previously applied areas.

Note: The look-ahead times should always be entered as positive values.

Turn-On Look-Ahead. Enter the number of seconds ahead of the vehicle (based on vehicle speed) which the Viper Pro will scan for zone boundaries and changes when turning product application on.

Turn-Off Look-Ahead. Enter the number of seconds ahead of the vehicle (based on vehicle speed) which the Viper Pro will scan for zone boundaries and changes when turning product application off.

Note: The Section Control Aggressiveness factor uses the turn-on and turn-off look-ahead values to adapt the responsiveness of the liquid control valves for different driving styles and field conditions or layout. To set the section control aggressiveness factor, touch the Next button on the Section Control Setup screen until the Section Control Aggressiveness screen is displayed.

Sectional Control Override Sec

The Sectional Control Override feature allows the operator to momentarily apply product to a previously applied area while in a job. The override feature is useful to ensure product application in small unapplied areas near irregular headlands and previously applied areas. Enter the number of seconds to override automatic sectional control and apply product after the master switch is toggled to the 'OVERRIDE' position.

Note: The time set as the override seconds does not start until the master switch returns to the on position. Hold the master switch in the override position to sustain the override countdown if desired.

Turn-Off % Coverage

This value controls the percentage of the section width that must be inside a previously applied area in order for the section to turn off. The default value is 80%. This would require that 80% of a section be in a previously applied area before SCT would turn off that section.

Note: If the value is set to 0%, the section will not turn off automatically.

Configuring SCT™ Control

1. Press the **Section Status** area in the main Viper screen. The Section Control Setup screen displays.
2. Using the screen keyboard, enter a value, in seconds, in the '**Turn-On' Look-Ahead** field.
3. Using the screen keyboard, enter a value, in seconds, in the '**Turn-Off' Look-Ahead** field.
4. Using the screen keyboard, enter a value, in percentage, in the '**Turn-Off'% Coverage** field.
5. Using the screen keyboard, enter a value, if desired, in seconds, in the **Sectional Control Override Sec** field.

Enabling Sectional Control Override

1. While in a job, press the Section Status area on the main screen. The Section Control Setup screen displays.
2. Using the on-screen keypad, enter a value, in seconds, in the Sectional Control Override Sec field.

The screenshot shows the 'Section Control Setup' screen with the following fields and values:

	Turn-On' Look-Ahead Sec	Turn-Off' Look-Ahead Sec
Meter Gate1	5.0	5.0
Meter Gate2	5.0	5.0
Meter Gate3	5.0	5.0
Openers	1.0	1.0
Liquid Valves	1.0	1.0
Sectional Control Override Sec	10	
Turn-Off % Coverage	99	

At the bottom, there is a numeric keypad with digits 1-9, 0, a decimal point, and a negative sign. To the right of the keypad are three buttons: 'Next', 'Cancel', and 'OK'.

- During application, toggle the master switch on the Seed Hawk switch box to the 'OVERRIDE' position.

Note: The override feature affects all enabled products. The time set as the override seconds does not start until the master switch returns to the on position. Hold the master switch in the override position to sustain the override countdown if desired.

- Each product enabled will resume application at the target rate for the programmed override countdown before the SCT system will resume normal application control.

Base Switch Box Setup

Touch the **Next** button on the Section Control Setup screen to display the Switchbox Setup screen. This screen is used to configure the function of each section switch on the Seed Hawk switch box.

The screenshot shows the 'Switchbox Setup' screen with a table of configurations for 5 section switches. The columns are: Section Switch, Openers, -Meter Gates- (with sub-columns 1, 2, 3), and Liquid Valves. Section 1 has all four options checked. Sections 2 through 5 have only the Liquid Valves option checked. At the bottom are four buttons: Prev, Next, Cancel, and OK.

Section Switch	Openers	-Meter Gates-	Liquid Valves
		1 2 3	
1	✓	✓ ✓ ✓	
2			✓
3			✓
4			✓
5			✓

Buttons: Prev, Next, Cancel, OK

Note: Settings on the Switchbox Setup screen are locked during job applications. Be sure the Switchbox Setup screen is properly configured for applications before starting or resuming job applications.

In Base mode, the drill must be configured in either one, two, or five sections.

Openers

Note: In Base mode, the soil openers are controlled manually across the entire drill width.

While operating in Base mode, the openers option must be selected to allow the Viper Pro to create an as-applied map products dispensed from the air cart.

Meter Gates

In Base mode, each of the air cart product bins are controlled as a single product and the products will be applied across the entire implement width. In this mode, the meter gates options on the Switchbox Setup screen only selects the products for which the Viper Pro will create an as-applied map. Meter gates settings should only be disabled for product bins which are not used during an application.

For Example:

If only the Meter Gate 1 option is enabled, the Viper Pro will only create an as-applied map for that product. As-applied maps will not be created for products dispensed from bins 2 and 3.

Liquid Valves

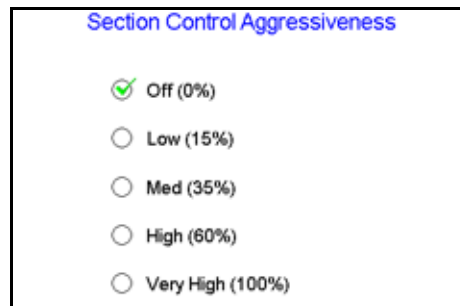
Depending upon the number of sections configured on the Drill Setup screen (see the *Drill Setup* section on page 51), liquid products may be applied in a single section or four sections across the implement width. To allow the Base system to automatically control liquid product application by sections, be sure the liquid valves settings are selected for each section and the section switches on the Seed Hawk switch box are set to the SCT position.

Section Control Aggressiveness Factor

The look-ahead values set the amount of time ahead of the vehicle (based on vehicle speed) which the Viper Pro will scan for zone boundaries or un-applied areas when turning sections on or off. By default, SCT overrides any additional zone boundaries detected until the look-ahead time has passed. For example, if the turn-on look-ahead value is set to 5 seconds and system detects an un-applied area 5 seconds ahead of a section, the system toggles that section on and will ignore subsequent commands to turn that section off for the next 5 seconds until the section has entered the un-applied area.

For sections at the end of larger sections or where sharp turns or aggressive maneuvering is necessary, this override may cause unexpected skips in coverage. The aggressiveness factor uses the user defined look-ahead values to adjust SCT response for these driving styles and/or field areas requiring aggressive maneuvering when crossing apply zones.

The section control aggressiveness factor adds a percentage of the current turn-on or turn-off look-ahead setting to the time which SCT overrides subsequent zone boundaries.



Section Control Aggressiveness

- ☒ Off (0%)
- ☐ Low (15%)
- ☐ Med (35%)
- ☐ High (60%)
- ☐ Very High (100%)

To set the SCT aggressiveness:

1. Press the Section Status Area on the main screen.
2. From the Section Control Setup screen, press **Next** until the Section Control Aggressiveness screen is displayed.
3. Select the desired aggressiveness setting to match the operator driving style or requirements.
4. Touch **OK** to accept the aggressiveness factor setting and return to the main screen.

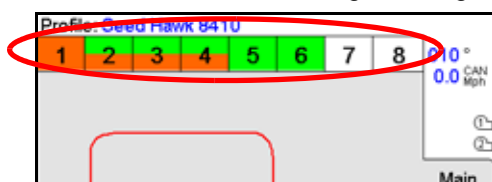
Sectional Control Technology™ (SCT)

This section contains instructions for setting up the Seed Hawk Viper Pro and SCT system. For instructions on the setup of an Base system, see the *Base Setup* section on page 172.

If the drill sections have not already been configured for SCT mode, be sure to follow the *Section Setup Wizard* section on page 169 to configure the tractor and drill sections. The SCT system is capable of automatic section control for eight drill sections. The soil openers for each of these sections may be controlled automatically by the SCT system to minimize soil disturbance and help reduce moisture loss and erosion.

Section Control Setup Screen

Touch within the Section Status area on the main screen to begin setting up the SCT system.



The Section Control Setup screen will be displayed.

Section Control Setup

	Turn-On' Look-Ahead Sec	Turn-Off' Look-Ahead Sec
Meter Gate1	5.0	5.0
Meter Gate2	5.0	5.0
Meter Gate3	5.0	5.0
Openers	2.0	0.0
Liquid Valves	1.0	1.0
Sectional Control Override Sec	10	
Turn-Off % Coverage	99	

Next
Cancel
OK

1	2	3	4	5	←←←
6	7	8	9	0	- .

Turn-On/Turn-Off Look-Ahead

Each air seeder setup will be different and respond differently to various control functions during product application. Depending upon the hydraulic system, soil openers may take several seconds to lift or lower into position. More time is required to prime the seed supply lines from the air cart to the openers. To help compensate for these lag times and ensure that product is ready where and when it is needed, the look-ahead settings allow the Seed Hawk Viper Pro to begin adjusting meter gates, opener position, or liquid control valves based on the current speed and location of the seeder.

Note: *The look-ahead times should always be entered as positive values.*

The Section Control Aggressiveness factor uses the turn-on and turn-off look-ahead values to adapt the responsiveness of the liquid control valves for different driving styles and field conditions or layout.

Turn On Look-Ahead Seconds. The turn on look-ahead setting allows the Viper Pro to lower soil openers and open meter gates or liquid control valves before the section reaches an un-applied area.

- Set the meter gate turn-on look-ahead times to compensate for the time it takes seed to get from the air cart meter gates to the openers. This will ensure seed is going into the ground as sections enter un-applied areas rather than priming the product lines.
- Set the openers turn-on look-ahead to the time it takes the hydraulic system to lower the openers into the ground. The Viper Pro will begin adjusting the openers for each section to ensure the openers are in the proper position at the start of each swath.
- The liquid valves turn-on look-ahead time allows the control valve to open and reach the target rate at the same time as the section enters the un-applied area.

Turn Off Look-Ahead Seconds. The turn off look-ahead is the time ahead (based on current speed) which the Viper Pro will close meter gates or liquid control valves and begin lifting openers.

- Set the meter gate turn-off look-ahead value for the time it takes product to empty from the supply lines when the section is toggled off. This allows the supply lines to purge product before the section crosses into a previously applied area and avoid over seeding or application.
- Enter the openers turn-off look-ahead for the time it takes the hydraulic system to lift the openers out of the ground. This allows the Viper Pro to begin lifting the openers before crossing into a previously covered area and disturbing seeded areas.
- Set the liquid valves turn-off look-ahead time to allow the Viper Pro to close liquid control valves and shut off liquid products before a previously covered area.

Sectional Control Override Sec

The Sectional Control Override feature allows the operator to momentarily override the SCT control status on for previously applied areas or no-apply zones while in a job. The override feature is useful to ensure product application in small unapplied areas near irregular headlands and previously applied areas. Enter the number of seconds to override automatic sectional control and apply product after the master switch is toggled to the 'OVERRIDE' position.

Note: *The time set as the override seconds does not start until the master switch returns to the on position. Hold the master switch in the override position to prolong the override countdown if desired.*

Turn-Off % Coverage

This value controls the percentage of the section width that must be inside a previously applied area or no-apply area in order for the section to turn off. The default value is 80%. This would require that 80% of a section be in a previously applied area before SCT would turn off that section.

Note: If the value is set to 0%, the section will not turn off automatically.

Configuring SCT™ Control

1. Press the **Section Status** area in the main Viper screen. The Section Control Setup screen displays.
2. Using the on-screen keypad, enter the desired time, in seconds, for the meter gates, openers, and liquid valve **'Turn-On' Look-Ahead** fields.
3. Using the on-screen keypad, enter the desired time, in seconds, for the meter gates, openers, and liquid valve **'Turn-Off' Look-Ahead** fields.
4. Using the on-screen keypad, enter the percentage of acceptable overlap in the **'Turn-Off'% Coverage** field.
5. Using the on-screen keypad, enter the time, in seconds, in the **Sectional Control Override Sec** field which the SCT system should override product application.

Enabling Sectional Control Override

1. While in a job, press the Section Status area on the main screen. The Section Control Setup screen displays.
2. Using the on-screen keypad, enter a value, in seconds, in the Sectional Control Override Sec field.

The screenshot shows the 'Section Control Setup' screen with the following fields and values:

	Turn-On' Look-Ahead Sec	Turn-Off' Look-Ahead Sec
Meter Gate1	5.0	5.0
Meter Gate2	5.0	5.0
Meter Gate3	5.0	5.0
Openers	2.0	0.0
Liquid Valves	1.0	1.0
Sectional Control Override Sec	10	
Turn-Off % Coverage	99	

At the bottom, there is a numeric keypad with digits 1-9, 0, and a decimal point. The number 99 is entered. To the right of the keypad are three buttons: 'Next' (green), 'Cancel' (red), and 'OK' (green).

3. During application, toggle the master switch on the Seed Hawk switch box to the 'OVERRIDE' position.

Note: The time set as the override seconds does not start until the master switch returns to the on position. Hold the master switch in the override position to sustain the override countdown if desired.

The override feature affects all enabled products.

4. Each product enabled will resume application at the target rate for the programmed override countdown before the SCT system will resume normal application control.

SCT Switch Box Setup

Touch the **Next** button on the Section Control Setup screen to display the Switchbox Setup screen. This screen is used to configure the function of each section switch on the Seed Hawk switch box.

The screenshot shows the 'Switchbox Setup' screen with a table of configuration options for 8 section switches. Each row represents a section switch, and each column represents a function. Checkmarks indicate enabled functions, and empty circles indicate disabled functions.

Section Switch	Openers	-Meter Gates-			Liquid Valves	Vapor Rows
		1	2	3		
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

At the bottom right, there are three buttons: 'Prev' (red text), 'Cancel' (red text), and 'OK' (red text).

Note: Settings on the Switchbox Setup screen are locked during job applications. Be sure the Switchbox Setup screen is properly configured for applications before starting or resuming job applications.

Openers

Enable the openers option to allow the operator to control the section openers via the Seed Hawk switch box. If the openers are enabled for all sections and the section switches are set to the 'SCT' position on the switch box, the Viper Pro will automatically raise or lower all sections based on the current coverage map or apply/no-apply zones.

Meter Gates

Enable the meter gates options to assign the product bins to each section. With the meter gate enabled, the section switch may be used to manually toggle the product application for that section on or off. If the section switch is left in the 'SCT' position, Viper Pro will automatically control product application based on previously applied areas or a apply/no-apply zone map.

Note: If a bin will not be used during application, disable the corresponding meter gates or toggle the product switch to off to keep Viper from sending alarm messages during the application.

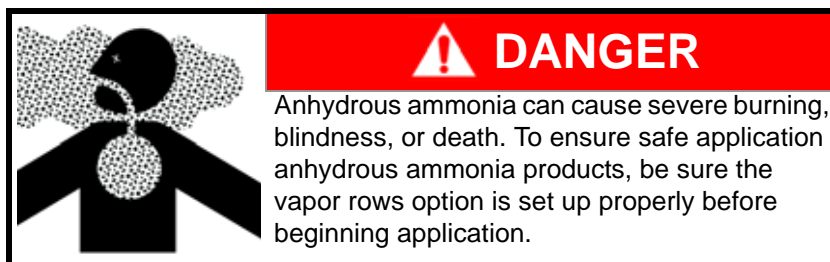
Liquid Valves

Enable the liquid valves options to control liquid fertilizer application using the Seed Hawk switch box. With these options selected, the operator can manually control liquid products by toggling the section switch on or off. If the section switch is in the 'SCT' position, the Viper Pro will automatically control liquid product valves according to apply/no-apply or coverage maps.

Vapor Rows

The vapor rows option is only displayed if an optional single product control node is connected to the CANbus and should only be used if an anhydrous ammonia (NH₃) application system which utilizes vapor tubes will be used during seeding operations.

Verify the sections to which the anhydrous ammonia vapor tubes are connected and enable the vapor rows option for only those sections. During application of anhydrous ammonia, the Seed Hawk Viper Pro will keep the openers for sections with vapor rows in the ground as long as any sections for products 4 or 5 are enabled. To allow the SCT system to automatically control the openers for other sections, select the vapor row options for only the sections with vapor rows connected.

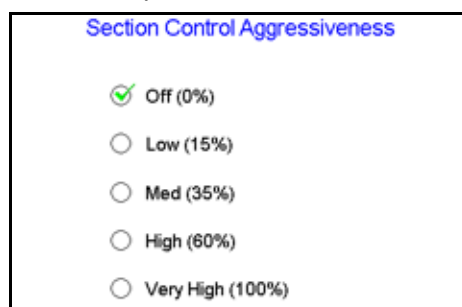


Section Control Aggressiveness Factor

The look-ahead values set the amount of time ahead of the vehicle (based on vehicle speed) which the Viper Pro will scan for zone boundaries or un-applied areas when turning sections on or off. By default, SCT overrides any additional zone boundaries detected until the look-ahead time has passed. For example, if the turn-on look-ahead value is set to 5 seconds and SCT detects an un-applied area 5 seconds ahead of a section, the system toggles that section on and will ignore subsequent commands to turn that section off for the next 5 seconds until the section has entered the un-applied area.

For sections at the end of larger sections or where sharp turns or aggressive maneuvering is necessary, this override may cause unexpected skips in coverage. The aggressiveness factor uses the user defined look-ahead values to adjust SCT response for these driving styles and/or field areas requiring aggressive maneuvering when crossing apply zones.

The section control aggressiveness factor adds a percentage of the current turn-on or turn-off look-ahead setting to the time which SCT overrides subsequent zone boundaries.



To set the SCT aggressiveness:

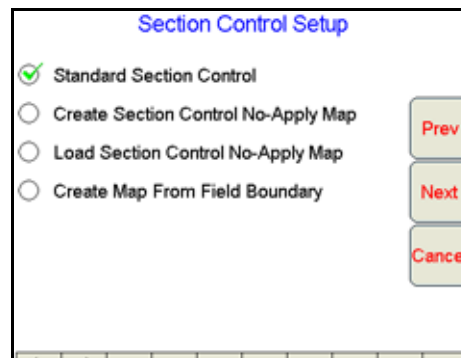
1. Press the Section Status Area on the main screen.
2. From the Section Control Setup screen, press **Next** until the Section Control Aggressiveness screen is displayed.
3. Select the desired aggressiveness setting to match the operator driving style or requirements.
4. Touch **OK** to accept the aggressiveness factor setting and return to the main screen.

Section Control Apply/No-Apply Mapping

Automatic section control may be set up to operate based on a variety of different map features that define apply and no-apply zones. The Section Control Setup screen allows the operator to select the desired method of operation for the SCT system.

The following methods are available for setting up or creating an SCT apply/no-apply map:

- Standard Section Control
- Create Section Control No-Apply Map
- Load Section Control No-Apply Map
- Create Map from Field Boundary

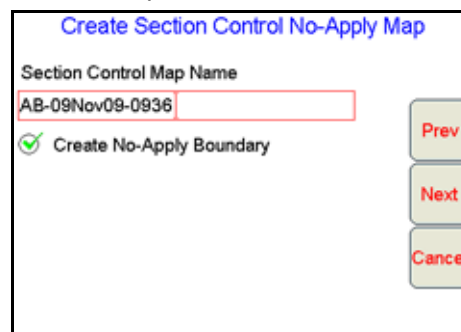


Standard Section Control Method

The standard method uses the Viper Pro coverage or as-applied map to determine section control. The Seed Hawk SCT system will automatically turn off sections if they enter into a previously applied area. An Rx map may be used to further control SCT operation in this mode. If the standard SCT mode is selected, no additional setup is required.

Create Section Control No-Apply Map Method

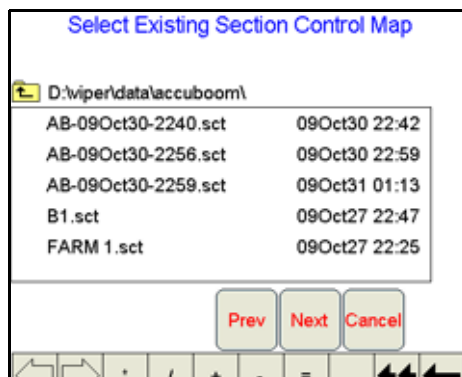
This method allows the operator to define apply and no-apply zones during the job. The apply/no-apply zones may be created using the scouting features of the Viper Pro field computer. If this method is selected, the Viper Pro prompts the operator to name the zone map that will be created.



Select the **Create No-Apply Boundary** option to create a no-apply area of three implement widths around the completed field boundary. The SCT system will function the same as in standard mode until all apply/no-apply areas have been defined and the section control map is created. Creating apply/no-apply maps will be explained later in this section.

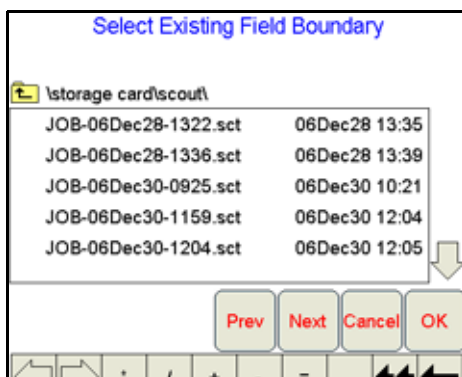
Load Section Control No-Apply Map Method

Select this method to load a map previously created and saved on the Viper Pro. Press the **Next** button to view a list of maps available in the Viper Pro memory. To proceed, select the desired section control map and press the **Next** button.



Create Map From Field Boundary Method

This method allows the operator to select an existing field boundary to use in creating a no-apply field boundary. When the Next button is pressed, a new screen is displayed showing the names of the fields stored on the Viper internal memory.



The operator selects the desired field boundary to create a no-apply boundary for the field. A no-apply zone for three implement widths around the extents of the largest zone will be created based on the field boundary file.

Note: The file selected must have a completed boundary. If the file selected does not have a completed boundary, a prompt will be displayed indicating that the boundary is not complete. Select another option or another field that contains a completed boundary.

Changing Apply/No-Apply Default Colors

The Viper Pro assigns the default colors to apply and no-apply zones. The default colors used to identify apply and no-apply zones on the Viper Pro display may be modified

1. Select **Menu**.
2. Select **Setup, Maps, and Scout Maps**.

Note: *The apply and no-apply labels will be grayed out and cannot be changed, but the color can be changed by the operator.*

3. Press **Color** next to the apply or no-apply feature name. The Feature Colors screen displays.
4. Press the desired color to assign to the apply or no-apply zone and press **OK**. Viper assigns the color to the zone and returns to the Enter Features Name and Color screen.
5. For other zones, repeat step 3 through 4.
6. Press **OK** when to finish modifying the colors for the apply and no-apply zones. Viper saves the information and returns to the Main Screen.

Note: *Select colors for the apply and no-apply zones that are different from the coverage map colors, as the coverage map will be painted over the Section Control map in the Section Control tab.*

Sectional Control Apply/No-Apply Maps

A section control apply/no-apply map may be created on the Seed Hawk Viper Pro before an actual job or product application using the scouting function or the map may be created during the application. The first step in creating a section control apply/no-apply map is to define the apply and no-apply zones within a field. These zones are created in the same method as boundary fields.

Note: *The apply and no-apply selections will only be available while creating a map.*

How to Create an Apply/No-Apply Map

1. Start a new job.
2. Press the **Scout** tab.
3. Select **Record**, then **Zone**. The Record Field Feature screen displays.

4. Select **Apply** or **No-Apply**.

Note: Only one zone type can be created at a time.

5. Select an offset shift for the boundary that is in relationship to one-half the implement width.
6. Press **OK**. Viper draws the boundary line on the Scout map as the machine drive travels along the zone boundary.
7. To close the boundary, press **Finish**.

Note: Apply/no-apply zones do not have the auto close feature. Touch the Finish button and select the Zone to finish at the end of the boundary.

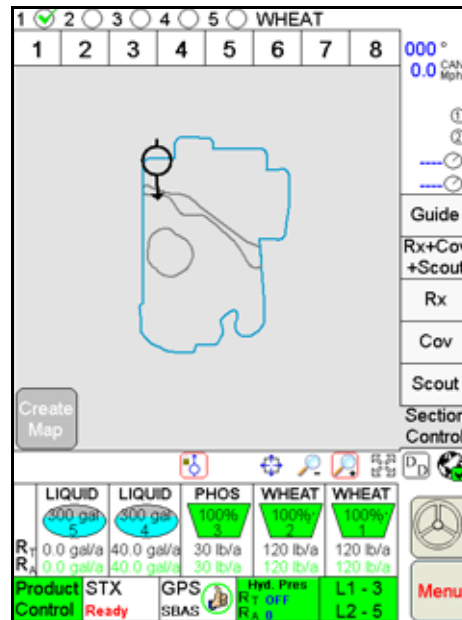
8. To define additional apply/no-apply zones, repeat step 3 through 7 for each apply or no-apply boundary to define.

Once a zone is created, it can be viewed on the Scout tab and on the Section Control tab. The Section Control tab will show all finished zones as well as allow the operator to create the finished SCT apply/no-apply map when all zones have been defined.

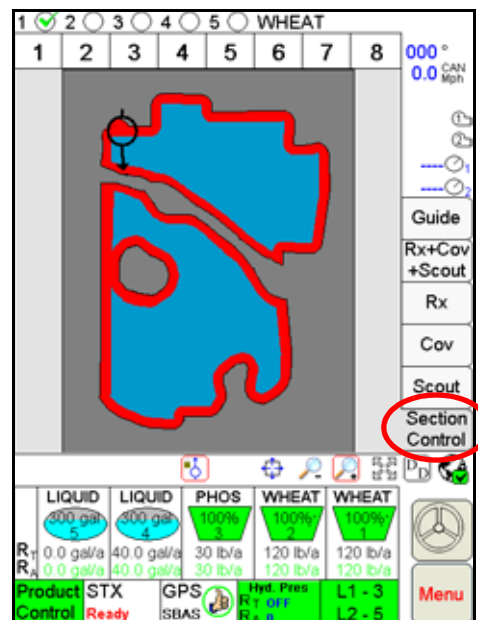
Note: Any area not defined will default to an apply zone. However, if the create boundary selection has been checked, it is important to create the outer boundary of the field as an apply zone.

If an existing field boundary has been selected for use in a SCT enabled job, the selected field boundary will be displayed in the Map area. The operator may still define additional zones if necessary for the job.

Once all the apply and no-apply zones are created, select the Section Control tab and press the **Create Map** button.



The apply and no-apply zones previously created will be converted to an SCT apply/no-apply zone map. The previously created apply and no-apply zones will be removed from the Scout tab and will appear as an SCT apply/no-apply map. This map is now available by selecting the Section Control tab. The zones will be colored according to their type and the default colors previously selected for apply and no-apply zones.




Note: The Create Map button will only appear when at least one zone has been defined and when there are no zones in the process of being defined.

CHAPTER 9

Remote Calibration Console

Overview and Connection

The optional Seed Hawk tank calibration kit (P/N 117-0171-302) allows the operator to perform all the necessary calibration operations from the air cart making calibration of the Seed Hawk system quick and convenient. The remote tank console allows the operator to prime metering rollers and perform the catch test while watching the air cart operation which can help the operator make correct system adjustments prior to starting a seeding operation in a field.



WARNING

The metering rollers will turn during the calibration procedure. Keep away from moving components when performing a catch test using the remote tank console.

Be aware of bystanders and alert anyone around the air cart when performing the calibration process.

Note: When performing calibration with the remote tank console, power up the Seed Hawk Viper Pro and select the **Display Program List** option when prompted. The Seed Hawk Viper Pro should remain on the Program Menu Selection screen while using the remote tank console. To display the Program Menu Selection screen from the Viper Pro main screen, touch **Menu**, **Exit** and then select the **Exit to Menu** option.

The tank calibration kit requires a hydraulic drive system to connect the remote tank console.

Kit Contents

TABLE 1. Seed Hawk RemoteTank Calibration Kit (P/N 117-0171-302)

Part/Description	Part Number
Console, Remote Tank	063-3001-004
Cable, Remote Tank Calibrator	115-3001-039

Console Connection

Note: *The remote tank console and cable should only be connected when using the console to calibrate the Seed Hawk system. Remove the remote tank console and console cable and replace the dust cap when storing or operating the Seed Hawk air cart.*

To connect the remote tank console:

1. Carefully insert the round 4-pin connector on the calibrator cable to the 4-pin port on the back of the tank console. Be sure to line up the keyway on both the port and connector before securing the connector.
2. Carefully insert the round 8-pin connector on the calibrator cable to the 8-pin port on the back of the tank console. Be sure to line up the keyway on both the port and connector before securing the connector.
3. Locate the 6-pin Deutsch connector labeled 'Remote Cal' on the air cart control cable. The 'Remote Cal' connector should be located on the left side of the cart near the metering rollers.
4. Remove the dust cap from the 'Remote Cal' connector and insert the 6-pin Deutsch connector on the calibrator cable.

Console Power

Press the blue power button to power up the remote tank console.



If the console does not power up, check that all connections are secure and that the Seed Hawk Viper Pro is powered on.

Note: *The current program and software version numbers will be displayed while the console initializes during power up. Have these numbers available when contacting technical support.*

To shutdown the remote tank console, press and hold the blue power button for approximately 3 seconds.

Updates

Updating the console is recommended if any communication issues are encountered with the Remote Tank Console during OmniSeed system operation. Updates for the OmniSeed Remote Tank Console may be made available periodically on the Raven Applied Technology Division web site:

www.ravenhelp.com

The tank console update procedure is available in the Raven ATD public knowledge base located at the web site above. For additional assistance, please contact a local Raven dealer or the Raven Technical Support Group.

Remote Tank Console Operation

The remote tank console allows the operator to prime metering rollers, adjust valve response, perform a catch test and enter the cal weight all while observing operation of the air cart to ensure proper operation of the Seed Hawk system.

Priming


To accurately calibrate the Seed Hawk system for operation, the metering rollers must be primed and the meter RPM set prior to performing a catch test. The operator may prime the metering rollers using the remote tank console. To prime the metering rollers:

Note: Place the weight box below the appropriate bin to avoid dumping product on the ground. The metering rollers will not stop automatically. Do not leave the remote tank console until the process is complete and the metering rollers have stopped rotating.

1. With the remote tank console powered up, use the **Next** and **Prev** keys to select the desired bin and press the **Enter** key.



2. Press the **Begin** key to start the bin calibration.
3. Press the **Enter** key again to select the 'Prime Meter Roller' option and press the **Start** key.



WARNING

The metering rollers will begin turning during the priming procedure. Keep away from moving components and alert anyone around the air cart when performing the priming process.

4. Allow the metering roller to rotate until a consistent amount of product is dispensed and then press the **Stop** key.



If necessary, use the **INC** or **DEC** keys to increase or decrease the PWM Output, or speed, of the metering roller during the priming process.

Note: The PWM Output, or metering roller speed, will also be used for the catch test procedure, however, the output may not be adjusted during the calibration. Be sure to set the PWM Output during the priming process to ensure the best results.

5. A catch test may now be performed with the primed bin. To return to the Bin Calibration screen, press the **Back** key. To return to the Bin Selection screen, press **Back**, **Prev**, and **Exit**.

Catch Test and Cal Weight

To perform a catch test and determine the cal weight for seeding operations, perform the following procedures:

Note: Place the weight box below the appropriate bin to avoid dumping product on the ground. The metering rollers will not stop automatically. Do not leave the remote tank console until the process is complete and the metering rollers have stopped rotating.

Catch Test

1. With the remote tank console powered up, use the **Next** and **Prev** keys to select the desired bin and press the **Enter** key.



2. Press the **Begin** key to start the bin calibration.
3. Press the **Next** key to select the 'Start Calibration' option and then select the **Enter** key.
4. Press the **Start** key.

	WARNING
The metering rollers will begin turning during the calibration procedure. Keep away from moving components and alert anyone around the air cart when performing the calibration process.	

5. Continue dispensing product until a sufficient weight is in the weight box or the weight box is full.
6. Press the **End** key to complete the calibration.

Note: Press the **Stop** key during the calibration process to pause the calibration and stop the metering rollers if necessary. While paused, press **Start** key to resume the catch test. It is recommended to run the catch test without pausing the calibration to get the most accurate results.

Press the **Cancel** key to stop the calibration process and return to the calibration screen without entering a cal weight.

7. Weigh the product dispensed (minus the weight box) and proceed to the *Cal Weight* section to complete the calibration process.

Cal Weight

The Metered Weight Page will display automatically at the end of the catch test procedure. This screen displays the number of metering roller revolutions detected during the catch test and allows the operator to enter the weight of product dispensed to calibrate the Seed Hawk system. To enter the cal weight value:

1. Use the **Left** and **Right** keys to move the cursor below the bin cal weight value to the first digit of the measured cal weight and press the **Enter** key.



2. Press the **INC** or **DEC** keys to set the appropriate value for the selected digit and press the **Enter** key to set the value.



3. Repeat the above procedure to set the remaining cal weight digits up to two decimal places.
4. To program the cal weight value, press the **Right** key to move the cursor past the last decimal place in the cal weight value and press the **Send** key.



The remote tank console will send the entered cal weight value to the appropriate control node and will return to the bin calibration screen.

5. Press the **Exit** key to return to the bin selection screen.

Using the Remote Tank Console to Adjust Settings

The following settings may be entered using the remote tank console. Settings will be stored in the appropriate nodes on the Seed Hawk system and will be registered by the Viper Pro when starting the Seed Hawk application for seeding operations.

To adjust settings for a specific bin or product:

1. With the remote tank console powered up, use the **Next** and **Prev** keys to select the desired bin and press the **Enter** key.
2. Press the **Setup** key to display the current settings for the selected bin.
3. The following settings will be available on the first settings screen:



Note: Use the **Next** or **Prev** keys to move the cursor between the screen options. Pressing the **Prev** key on the decimal shift option will return to the bin calibration screen. Press the **Next** key on the cal weight option to advance to the second settings screen.

Decimal Shift. Press the **Toggle** key on the decimal shift option to turn the decimal shift feature on or off.

Enable the decimal shift feature to increase the system accuracy for low application rates. In the standard mode, the remote tank console and Viper Pro field computer will display values to one decimal place. With the Decimal Shift feature enabled, values will be displayed to two decimal places.

Note: When the Seed Hawk Viper Pro is initialized, all of the calibration values will need to be verified after the Decimal Shift feature is either enabled or disabled. Change settings as necessary.

Meter Cal. Press the **Enter** key on the meter cal option to edit the current meter cal value. The meter cal value is the number of counts the metering roller sensor will detect per revolution of the metering roller.

Use the **INC** or **DEC** keys to adjust the meter cal value and press the **Enter** key to set the meter cal value.

Note: It is recommended to enter a meter cal of 60.31 when using the Seed Hawk Viper Pro console for the hydraulic drive system.

Cal Weight. Press the **Enter** key on the cal weight option and use the **INC** or **DEC** keys to adjust the set cal weight value. The cal weight value to set the cal weight sets the weight of product applied per revolution of the metering roller.

Refer to *Catch Test and Cal Weight* section on page 190 for details on using the remote tank console to calculate the cal weight value.

4. Press the **Next** key on the cal weight option to advance to the next settings screen.



Note: The second settings screen is only accessible if the valve type for the selected product bin is set to PWM or PWM close. Refer to the *Application and Control Valve Type(s)* section on page 35 for detailed information on valve type selections.

The following settings are displayed on the second settings screen:

Note: Use the **Next** or **Prev** keys to move the cursor between the screen options. Pressing the **Prev** key on the PWM frequency option will return to the previous settings screen. Press the **Next** key on the min PW option to exit the settings menu and return to the bin calibration screen.

PW Freq. Press the **Enter** key and use the **INC** or **DEC** keys to set the coil frequency of the PWM valve. The default value for hydraulic drive systems is 60 Hz.

Min PW. Press the **Enter** key and use the **INC** or **DEC** keys to set the minimum desired RPM or hydraulic output (zero point or shutoff point) for a Pulse Width Modulated (PWM) control valve.

Max PW. Press the **Enter** key and use the **INC** or **DEC** keys to set the maximum desired RPM or hydraulic output (zero point or shutoff point) for a Pulse Width Modulated (PWM) control valve.

Note: Refer to PWM Calibration Assistance section on page 239 for details on using the calibration assistance to calculate the Min and Max PW values.

Troubleshooting

Issue	Possible Cause	Solution
Remote tank console will not power on	• Seed Hawk Viper Pro not powered on	• Power on the Seed Hawk Viper Pro and access the Program Selection Menu screen.
	• Power not provided to remote tank console	<ul style="list-style-type: none"> • Check and reconnect 6-pin Deutsch connector. • Check and reconnect 4-pin round connector on the back of the remote tank console. • Check and reconnect air cart cable to chassis connection.
Meter rollers do not turn when priming or calibrating.	• Hydraulics to air cart are not powered on.	<ul style="list-style-type: none"> • Turn hydraulics to air cart on and check pressure. • Verify there is no debris or blockages in the hydraulic circuit.

Error Messages

Issue	Possible Cause	Solution
Check air cart node or CAN communication	• Power/ground issue with air cart node(s).	<ul style="list-style-type: none"> • Check the power and ground connections on air cart nodes. • Check CANbus system connections and reconnect nodes.
No nodes have been found. Verify power to node and CAN connection	• Nodes not powered or faulty logic power connection	• Check CANbus system connections and reconnect nodes.
	• CAN nodes not connected to controller.	• Verify hitch connections and check CANbus system connections.
Can not calibrate, note enough meter revolutions. Press any key	• Valve PWM output insufficient for system measurement	<ul style="list-style-type: none"> • Increase PWM output during priming procedure. • Verify PWM or PWM close valve type is selected for the selected product(s). • Be sure the min and max PW values are programmed correctly. Refer to the <i>PWM Calibration Assistance</i> section on page 239 for more information.

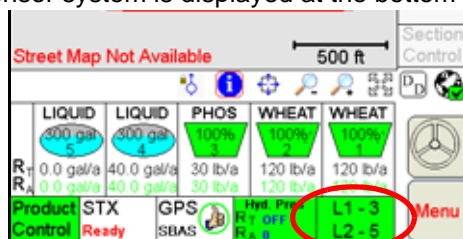
CHAPTER 10

Seed Blockage Sensors

System Overview

With the optional seed blockage sensor system, the Seed Hawk Viper Pro can be used to monitor seed or product flow during seeding operations. If an obstruction is detected, the field computer will display information from the sensors to help the operator quickly locate the obstruction.

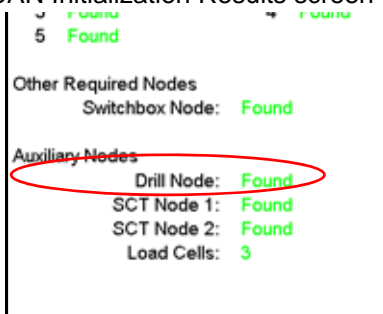
The status of the seed blockage sensor system is displayed at the bottom of the Seed Hawk Viper Pro display.



The field computer may be connected to two separate sensor loops with up to 120 sensors per loop to monitor seed flow at a single distribution tower or individual openers across the drill depending upon the level of system monitoring desired.

Seed Blockage Node Detection

If the seed blockage system is installed and correctly connected to the Seed Hawk Viper Pro, the seed blockage node should display on the CAN Initialization Results screen when the field computer is powered on.



If the seed blockage node is not displayed on this screen during start up, check the node connections and touch the **Retry CAN Init** button before starting the Seed Hawk Viper Pro application. If the node is still not detected, contact a local Seed Hawk dealer for assistance.

Configuring Blockage Sensor Loops

To properly monitor the seed delivery system, the Viper Pro must be configured for the number of seed blockage sensors installed in each section of the drill.

1. Review the *Section Setup* section on page 47 to configure the air seeder and drill and touch the **Next** button on the Section Width Setup screen to display the Blockage Loop 1 Sensor Setup screen.

Section	Number Sensors
1	1
2	0
3	0
4	0
5	0
6	0
7	0
8	0

Navigation buttons: Prev, Next, Cancel, OK

On-screen keypad:

1	2	3	4	5	←	←	←
6	7	8	9	0	-	.	

2. Touch the **Number Sensors** field and use the on-screen keypad to enter the number of sensors in loop 1 for each configured section of the drill.

Note: Only enter values for the number of configured sections on the drill. Leave the value at zero for any unused sections.

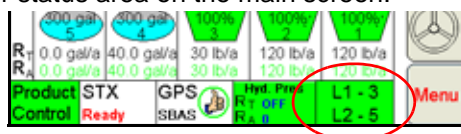
3. Touch the **Next** button and repeat the above process to configure sensor loop 2 if applicable.
4. Touch the **OK** button to complete the section calibration and save the entered settings.

Seed Monitor Setup

Each seed sensor loop may be configured individually to allow the Seed Hawk system to accurately monitor the status of separate delivery systems (e.g. seed or product tubes) and alert the operator to obstructions in either delivery system.

To setup the seed monitoring system:

1. Touch the seed blockage sensor status area on the main screen.



The Seed Monitor Setup screen will be displayed.

Enable Sensor Loop 1

Loop 1 Sensor Count

Enable Sensor Loop 2

Loop 2 Sensor Count

Enable Audible Alarm Feature

Seed Monitor Setup

Loop 1

☐ Sensitivity 4

↓

↑

Blocked

Dirty

Sensor Count - 0

Loop 2

☐ Sensitivity 4

↓

↑

Blocked

Dirty

Sensor Count - 0

Audible Blockage Alarm ☐

1	2	3	4	5	←	←	←
6	7	8	9	0	-	.	

OK

Loop 1 Status

Loop 1 Dirty or Blocked Sensors

Loop 2 Status

Loop 2 Dirty or Blocked Sensors

2. The Seed Monitor Setup screen displays the following information for sensors in Loop 1 and Loop 2.

Enable Sensor Loops. Touch the radio button in front of the sensitivity field to enable sensor loops


Sensitivity. Use the sensitivity value to set the approximate number of seeds per second which each sensor in the loop should detect when the system is operating normally. If a sensor does not detect the set value for seeding rates, the system will display a blockage or obstruction and indicate which sensor is detecting the error. The default sensitivity value is 15.


To adjust the sensitivity, either:

- Touch the current sensitivity value and use the keypad at the bottom of the screen to enter a new sensitivity value, or
- Use the up or down arrows to the right of the sensitivity value to increase or decrease the sensitivity value in smaller increments.

Status. The status indicator displays the status of seed or product flow in the seed tubes. The seed blockage status will display:

 Green when the system is operating normally.

 Yellow when a product blockage or dirty sensor is detected in the system. Check the indicated sensor locations in the *Blocked* display and clear any obstructions as necessary during operation.

 Red if a communication issue is detected with the seed blockage sensors. Check sensor assemblies and cables for disconnected or damaged parts and replace parts as necessary.

Note: *The seed blockage sensor status area on the main screen will provide the same status displays for each sensor loop as described above to allow the operator to monitor the seed blockage system throughout the seeding operation.*

Sensor Count. Check that the programmed sensor count for loop 1 and loop 2 matches the number of sensors installed on the drill. To adjust the number of sensors, refer to the *Configuring Blockage Sensor Loops* section on page 196.

Blocked. When a blockage is detected in loop 1 or loop 2, the sensor number(s) which detect an obstruction or blockage will be displayed in this area. Check these sensor locations for obstructions in the line to clear the blockage condition.

Note: *To help locate blockages during operation more quickly, it is recommended to number the sensors. Refer to the seed blockage sensor installation instructions for details on numbering the sensors.*

Dirty. Sensors may need to be cleaned periodically during seeding operations to ensure that the system is accurately detecting the flow of seed or product through seed tubes. Check and clean the indicated sensor(s) to ensure optimal system performance.

When monitoring particularly dirty seed types or products, it may be necessary to clean each sensor in the loop when the system indicates a sensor or sensors in the loop are dirty.

Audible Blockage Alarm. Enable this option to receive an audible warning or alert when the blockage status changes from a normal condition.

Setting the Sensitivity

Refer to the following table to set and adjust the sensitivity setting for each loop for a specific seeding operation.

Sensitivity	Seeds per Second	Sensitivity (cont.)	Seeds per Second (cont.)
0 ^a	Loop off	70	148
1 ^b	1 seed every 30 seconds	80	281
5 ^b	1 seed every 20 seconds	90	539
10 ^b	1 seed every 10 seconds	100	1043
		110	2019
15	1	120	4400
20	7	121	4800
30	17	122	5300
40	27	123	5800
50	44	124	6400
60	80	125	7000

- a. A sensitivity setting of zero will disable the sensor loop and blockage alarms.
- b. A sensitivity value less than 15 will allow the sensor loop to scan for longer than 1 second periods to count seeds down to one seed per 30 seconds.

The best obstruction and blockage detection is achieved when the sensitivity is set as high as possible without encountering a constant alert condition. To set the sensitivity for a specific seeding operation:

1. Ensure that the system is clear of obstructions.
2. Select and enter a sensitivity value from the table above and begin seeding. Ensure that the system continues to display a normal operating condition at the initial setting.

Note: *If the seed blockage sensors consistently display a blockage alert, select a lower initial sensitivity value before proceeding.*

3. Increase the sensitivity until the seed blockage system indicates a blockage.
4. Decrease the sensitivity by 3 to 5 units at a time until the field computer no longer indicates blockage conditions.

Note: *Do not decrease the sensitivity value below the initial value. Check the indicated sensor locations and clear any obstructions and repeat the above procedure if the sensitivity value is decreased below the initial setting.*

Overview

File Maintenance can be defined as the process of archiving specific files from the Viper Pro and deleting files that are no longer needed. It is recommended that the user perform this maintenance at the end of each day. If this is not possible, maintenance should be performed at least once a week.

To view existing jobs, or add to field applications at a later date, all files associated with those jobs must be transferred back to the Viper Pro field computer. Be sure to backup or save files for any jobs that may need to be resumed at a later date. All files associated with the job file to be resumed must be transferred back to the field computer to resume the job.

File maintenance ensures that the Viper Pro system can perform at optimal efficiency by removing files that are no longer needed. Maintenance also safeguards valuable information from being lost in the event that a file is damaged or corrupted, since files will be archived on a personal computer or laptop for future reference.

File Maintenance

All Viper Pro job files are stored in memory located inside the Viper Pro. The storage location for these files is of a fixed size and will hold a large, but limited, number of files. Do not allow the storage memory to become too full. If the storage memory becomes too full, a Storage Memory warning displays. File maintenance should be conducted on a regular basis to ensure sufficient storage space is available for future jobs and to back up completed job information. Once the report files are saved on a home or office computer, delete the covMaps, jobs, and vnav files from the Viper Pro internal memory by using the Automatic File Maintenance or USB File Transfer features.

Files can be loaded onto the Viper Pro or downloaded from the Viper Pro using an external USB flash drive. Insert the USB flash drive into the USB connector located in the lower left hand corner of the Viper Pro.

Note: *Do not leave the USB flash drive in the front USB connector while operating the machine. Insert the USB flash drive into the front USB connector only to perform file maintenance.*

If a Slingshot Field Hub is connected to the Viper Pro, files may also be transferred wirelessly to the Slingshot web site. A user account will be required to access files transferred to the Slingshot web site on a home or office PC. Refer to Appendix G, *Wireless Communications and Remote Service*, for more information on using the wireless file transfer features.

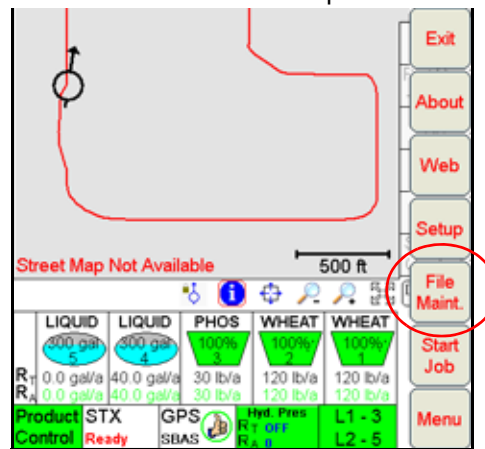
Note: *Do not use the Automatic File Maintenance feature to create reports for a Slingshot account.*

The Automatic File Maintenance feature does not export the types to a USB flash drive necessary for creating Slingshot reports and will remove job data from the Viper Pro. Job data transferred using the Automatic File Maintenance feature cannot be reinstalled onto the field computer for export to Slingshot. Refer to the USB File Transfer and Advanced File Maintenance section on page 208 for instructions on outputting the necessary file types.

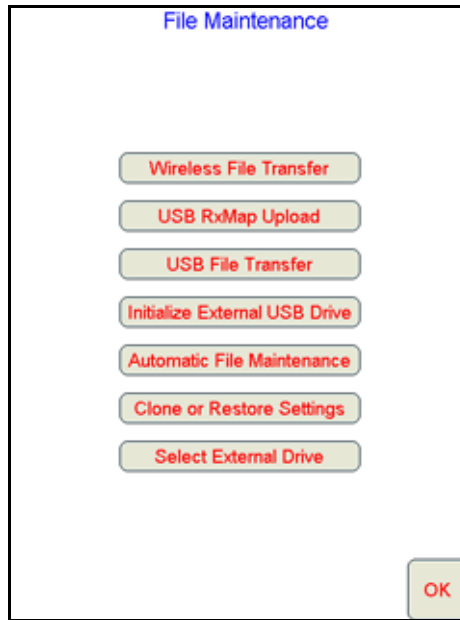
Preparing a USB Flash Drive for File Maintenance

The USB flash drive must be prepared with the necessary file folders to simplify file maintenance. To populate the thumb drive with the necessary file folders, do the following:

1. Start Viper Pro.
2. Insert a clean formatted USB flash drive into the front USB port and touch **Menu** then **File Maint.**



The following screen will display.



3. Select **Initialize External Storage**. The following screen will display.

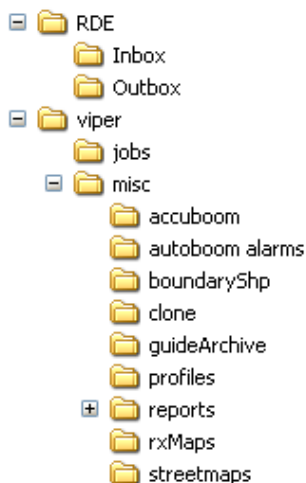


4. Touch **OK**. The necessary file folders will be loaded onto the thumb drive.
5. Touch **OK** to return to the File Maintenance main menu.

The USB flash drive will now be populated with the necessary file folders needed by the Viper Pro.

Flash Drive File Structure

The USB flash drive will be populated with the following file folder structure.



Note: If the USB flash drive was initialized with an older version of software, an Rbin folder may also be available. This folder would contain any Rbin files from the Viper Pro. This file is not used with newer software versions and may be deleted if desired. Verify that the Rbin folder is empty before deleting the folder.

RDE Folder

The RDE Inbox folder contains AgX job and recommendation files for transfer between the Viper Pro and a home or office PC.

Note: Do not remove, rename or overwrite any job files stored in the RDE folder or sub-folders. Modifying these files will cause errors with the AgX job features on the Viper Pro field computer.

The RDE Outbox folder will contain any .jdp (job data package) files for upload to the Slingshot web service.

Viper Folder

The viper folder contains the job and miscellaneous folders which contain files used by the Viper Pro

Jobs Folder

The jobs folder will initially be empty. This folder will contain job related information downloaded from the Viper Pro. These files contain all information associated with a specific job and may be archived on a home or office PC for future use.

Misc Folder Sub-folders

The misc folder contains job reports and files which are not job specific. Several sub-folders are contained in the misc folder to help organize this information. The following information is contained in the sub-folders.

AccuBoom Sub-folder. The AccuBoom sub-folder can be used to upload or download no-apply zone templates that have been set up for specific fields. Once these templates are transferred to the Viper Pro, they can be used when starting a new job in the selected field.

AutoBoom Alarms Sub-folder. Not used with a seeder control system.

BoundaryShp. The boundaryShp folder contains any shapefiles for field boundaries created using GIS software and transferred to the Viper Pro field computer.

Note: *Field Boundaries created using the Viper Pro are saved as a part of the job file.*

Clone. The clone sub-folder will only appear on the USB drive if a clone of the Viper Pro has been created. Clones may be used as “restore points” to quickly and easily reset the Viper Pro field computer to a previous set up. A clone will contain the following files contained within the Viper Pro file structure:

- Coverage Maps
- Prescription Maps
- Streetmaps
- Scout Maps
- A-B Lines
- Job files
- Report files
- Section Configuration
- SCT Configuration
- Comm Port settings

Refer to *Clone or Restore Settings* section on page 213 for instructions on creating or restoring clone files.

GuideArchive Sub-folder. The guide Archive sub-folder can be used to transfer A-B guidance lines from one machine to another.

Profiles Sub-folder. The profiles sub-folder stores previously configured machine profiles for different machine configurations.

Reports Sub-folder. The reports sub-folder contains specific job reports which the field computer generates during file maintenance. The Viper Pro creates application reports in both a shapefile format and bitmap (.bmp) files.

Shapefile reports for a job will have a .shp, .shx, .prj and .dbf file for each product applied in the job and may require specialized software to view the reports.

Bitmap reports are generated for each product applied during the job and may be viewed or printed on any computer without special software tools.

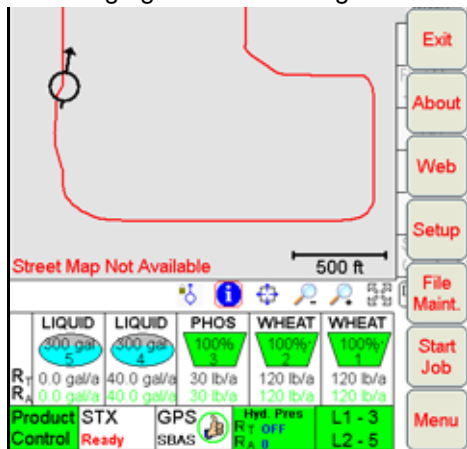
RxMaps Sub-folder. The ‘rxMaps’ sub-folder is used to transfer prescription maps to the Viper Pro. These prescription maps must be in the proper shapefile format used by the Viper Pro.

Streetmaps Sub-folder. The streetmaps sub-folder can be used to load streetmap shapefiles onto the Viper Pro. The streetmaps must be in the proper shapefile format used by the Viper Pro.

Note: *Once the streetmap files are loaded into the Viper, the streetmap must still be loaded into the Viper Pro system memory.*

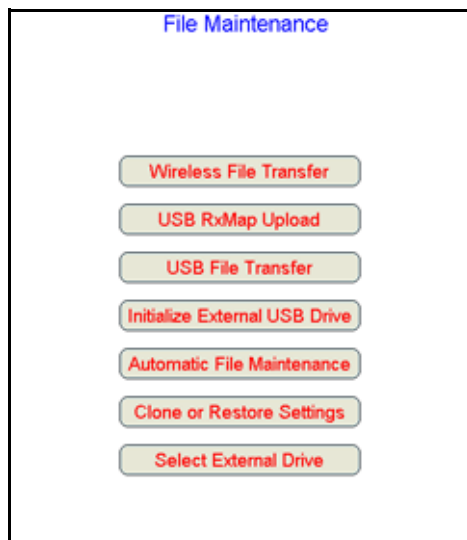
Performing File Maintenance

Viper Pro provides flexible options for managing and maintaining files stored on the Viper Pro field computer.



To access the File Maintenance feature:

1. Touch **Menu** on the Viper Pro main screen.
2. Select **File Maint.** The following file maintenance options will be displayed.



Wireless File Transfer

The Wireless File Transfer button is displayed only if a Slingshot Field Hub is connected and communicating with the Viper Pro field computer. Select this option to setup the desired method for initiating file transfer via a wireless connection.

Note: *A wireless signal is required to transfer files from the Viper Pro field computer. If signal is weak or not available, files may not be transferred as expected.*

Files may also be transferred to a USB flash drive and then uploaded to the Slingshot web site from a home or office PC. Refer to the Uploading Job Reports from a USB to the Slingshot Web Site section on page 216 for more information.

Automatic

If the “Automatic File Upload at End of Job” option is selected, the Viper Pro will attempt to transfer application files automatically each time a job file is closed.

Prompt

If the “Prompt Before Upload at End of Job” option is enabled, the operator will be prompted to before the Viper Pro attempts to transfer files.

Disable

Select the “Disable Wireless File Transfer” to disable sending files from the Viper Pro.

Note: *If wireless file transfer is disabled, all of the job files will remain in the field computer internal memory. Periodic file maintenance will be required to remove these files to keep memory available for new job files.*

Do not use the Automatic File Maintenance feature to create reports for a Slingshot account. *The Automatic File Maintenance feature does not export the types to a USB flash drive necessary for creating Slingshot reports and will remove job data from the Viper Pro. Job data transferred using the Automatic File Maintenance feature cannot be reinstalled onto the field computer for export to Slingshot. Refer to the USB File Transfer and Advanced File Maintenance section on page 208 for instructions on outputting the necessary file types.*

Real Time Data Reporting

This feature is not supported at this time.

Job Notifications

If the field computer is registered with a Raven Slingshot account capable of receiving job notifications, the field computer may be enabled to send notifications of job events to a third party (e.g. office data management server) via the Slingshot server. These notifications may provide customized data management services or transfer between the Raven field computer and the office.

The following job events will trigger notifications to be sent from the field computer:

• Power Up	• Power Down
• Job Start	• Job End
• Pause Job	• Continue Job

Web Notifications

If the field computer is registered with a Raven Slingshot account capable of sending web notifications, the field computer may be enabled to receive web notifications from a third party (e.g. office data management server) via the Slingshot server.

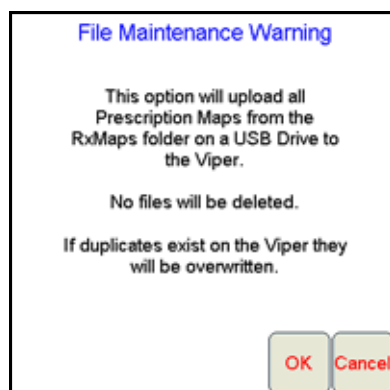
Note: Any web notification dialogues or prompts displayed by the field computer are managed by the third party. Contact the third party system administrator if any assistance is required.

Uploading Prescription Maps from a USB Flash Drive

Prescription maps may be uploaded from the USB flash drive by selecting the USB RxMap Upload button on the File Maintenance screen.

To upload prescription maps:

1. Touch **Menu** on the main screen.
2. Select **File Maint.** from the list of menu options.
3. Select **USB RxMap Upload** from the list of file maintenance options. The following warning screen will display.



4. Touch **OK** to upload the prescription maps from the USB flash drive to the Viper Pro internal storage or **Cancel** to abort the upload process.

USB File Transfer and Advanced File Maintenance

The USB File Transfer feature allows the machine operator to select specific files to copy, move or delete from a connected USB drive or internal memory.

Note: Completed job files transferred to a USB flash drive may be uploaded to the Slingshot web site using a free user account. The web site may be used to edit and archive completed job files or to export a shapefile format of the job information for use in third party software systems. Refer to the Uploading Reports to the Slingshot Web Site section on page 215 for information on uploading files from a USB flash drive.

If a Slingshot Field Hub is connected to the Viper Pro field computer, files may be transferred to the Slingshot web site via the wireless connection. Refer to the Wireless File Transfer section on page 207 for details.

To perform advanced file maintenance:

1. Touch **Menu** on the main screen.
2. Select **File Maint.** from the list of menu options.
3. Select **USB File Transfer** from the list of file maintenance options. The Advanced File Maintenance screen will display.

Advanced File Maintenance		
Select file type to work with		
<input type="radio"/> Job	<input type="radio"/> Guidance	<input type="radio"/> AccuBoom
<input type="radio"/> Report	<input type="radio"/> RxMap	<input type="radio"/> Profile
<input type="radio"/> Street Map	<input type="radio"/> Boundary	<input type="radio"/> All Types

Note: Touch the **Reset** button at the bottom of the Advanced File Maintenance screen to clear all selections and begin the advanced file maintenance setup again. Select the **Cancel** button to return to the File Maintenance screen.

Selecting a File Type to Work With

4. Select the type of file on which to perform file maintenance or transfer via a connected USB drive.

Advanced File Maintenance		
Select file type to work with		
<input checked="" type="radio"/> Job	<input type="radio"/> Guidance	<input type="radio"/> AccuBoom
<input type="radio"/> Report	<input type="radio"/> RxMap	<input type="radio"/> Profile
<input type="radio"/> Street Map	<input type="radio"/> Boundary	<input type="radio"/> All Types

Note: To transfer a job file to another Viper Pro field computer, select the “Job” option and select “Copy” in the next step. To export files to a USB drive for use with the Slingshot web site, select the “Job” option and select “Export” in the next step.

To export a shapefile or bitmap report, select the “Report” option and then select “Copy” in the next step.

Selecting an Operation to Perform

5. Once the type of file is selected, the Select Operation to Perform selection displays. Select:
 - Copy - Makes a copy of the selected file on the destination storage location. Copied file is retained on the source storage location.
 - Delete - Deletes the selected files from the source storage location.
 - Move - Move the file from the source storage location to the destination storage location. The selected file on the source storage location is deleted.
 - Export - Select the export option to transfer a job data package .zip file to the connected USB flash drive. The file will be transferred to the RDE Outbox folder and may then be transferred to the Slingshot web site via a home or office PC.

Advanced File Maintenance		
Select file type to work with		
<input checked="" type="radio"/> Job	<input type="radio"/> Guidance	<input type="radio"/> AccuBoom
<input type="radio"/> Report	<input type="radio"/> RxMap	<input type="radio"/> Profile
<input type="radio"/> Street Map	<input type="radio"/> Boundary	<input type="radio"/> All Types
Select Operation to Perform		
<input type="radio"/> Copy	<input type="radio"/> Delete	<input type="radio"/> Move
<input type="radio"/> Export		

Note: The Export operation will only be available with job files.

Selecting Source/Destination

6. Select the source location of the files on which the selected operation will be performed. For the Copy and Move operations, the destination is also listed.

Advanced File Maintenance		
Select file type to work with		
<input checked="" type="radio"/> Job	<input type="radio"/> Guidance	<input type="radio"/> AccuBoom
<input type="radio"/> Report	<input type="radio"/> RxMap	<input type="radio"/> Profile
<input type="radio"/> Street Map	<input type="radio"/> Boundary	<input type="radio"/> All Types
Select Operation to Perform		
<input checked="" type="radio"/> Copy	<input type="radio"/> Delete	<input type="radio"/> Move
<input type="radio"/> Export		
Select Source/Destination		
<input checked="" type="radio"/> Viper --> USB Drive	<input type="radio"/> USB Drive --> Viper	

Advanced File Maintenance		
Select file type to work with		
<input checked="" type="radio"/> Job	<input type="radio"/> Guidance	<input type="radio"/> AccuBoom
<input type="radio"/> Report	<input type="radio"/> RxMap	<input type="radio"/> Profile
<input type="radio"/> Street Map	<input type="radio"/> Boundary	<input type="radio"/> All Types
Select Operation to Perform		
<input type="radio"/> Copy	<input checked="" type="radio"/> Delete	<input type="radio"/> Move
<input type="radio"/> Export		
Select Source/Destination		
<input checked="" type="radio"/> From Viper	<input type="radio"/> From USB Drive	

Selecting Associated File Actions

7. Some file types may be associated with a job file on the Viper Pro. If job files will be deleted, the operator must choose what action to perform on files associated with the job file being deleted.

Advanced File Maintenance		
Select file type to work with		
<input checked="" type="radio"/> Job	<input type="radio"/> Guidance	<input type="radio"/> AccuBoom
<input type="radio"/> Report	<input type="radio"/> RxMap	<input type="radio"/> Profile
<input type="radio"/> Street Map	<input type="radio"/> Boundary	<input type="radio"/> All Types
Select Operation to Perform		
<input type="radio"/> Copy	<input checked="" type="radio"/> Delete	<input type="radio"/> Move
<input type="radio"/> Export		
Select Source/Destination		
<input checked="" type="radio"/> From Viper	<input type="radio"/> From USB Drive	
Select Associated File Actions		
<input type="radio"/> Delete AccuBoom File	<input type="radio"/> Delete RxMap Files	
<input type="radio"/> Prompt	<input type="radio"/> Select All	

Note: Deleting job files is the only condition which associated file actions must be selected.

Selecting File Selection Method

8. Next, select the method to select specific files.

- By Age - Select the “by Age” option to set an age for files which the action will be performed upon. The operation will be automatically selected and copied, moved, or deleted.
- All - Select the “All” option to perform the selected operation on all files of the selected type.
- Selected - Set the “Selected” option to manually select the files to copy, move, or delete.

Advanced File Maintenance

Select file type to work with

☒ Job ☐ Guidance ☐ AccuBoom

☐ Report ☐ RxMap ☐ Profile

☐ Street Map ☐ Boundary ☐ All Types

Select Operation to Perform

☐ Copy ☒ Delete ☐ Move ☐ Export

Select Source/Destination

☒ From Viper ☐ From USB Drive

Select Associated File Actions

☐ Delete AccuBoom File ☐ Delete RxMap Files

☐ Prompt ☐ Select All

Selection Method

☒ Delete by Age ☐ Delete Selected

☐ Delete All

Next Reset Cancel

9. Finally, touch the **Next** button to begin the file maintenance operation.

If the “Selected” option is selected in step 8, a list of available files will be listed.

Select the Job to Delete

C:\viper\data\jobs\

JOB-09Oct01-1702.job	09Oct01 17:04
JOB-09Oct02-1620.job	09Oct02 16:59
JOB-09Oct06-0812.job	09Oct06 08:14
JOB-09Oct06-0814.job	09Oct06 09:43
JOB-09Oct09-1215.job	09Oct09 12:15

1255.15MB Available on Viper

735.53MB Available on Ext.

Delete Cancel

Operation Button

Select a file from the list and touch the operation button to perform the operation on the selected file. Touch the **Cancel** button to return to the Advanced File Maintenance screen.

Initialize External USB Flash Drive

Select the Initialize External USB Drive option and follow the on-screen instructions to setup the required file structure on a connected USB flash drive.

Automatic File Maintenance

Note: *Do not use the Automatic File Maintenance feature to create reports for a Slingshot account.*

The Automatic File Maintenance feature does not export the types to a USB flash drive necessary for creating Slingshot reports and will remove job data from the Viper Pro. Job data transferred using the Automatic File Maintenance feature cannot be reinstalled onto the field computer for export to Slingshot. Refer to the USB File Transfer and Advanced File Maintenance section on page 208 for instructions on outputting the necessary file types.

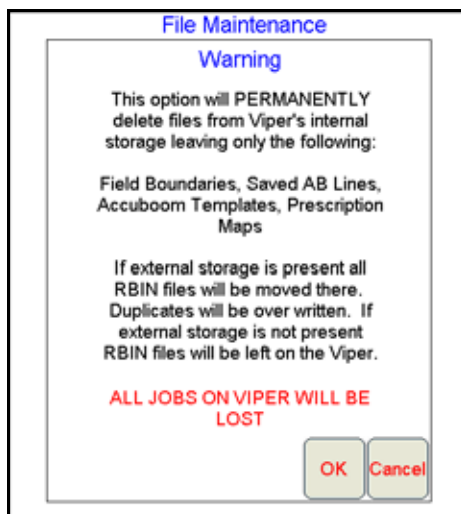
The automatic file maintenance feature will automatically perform the following steps:

1. Move all report files to the USB drive.
2. Delete all existing job files from Viper Pro internal storage.

Note: *All field boundaries, saved A-B lines, SCT templates, street and prescription maps will be maintained on the internal storage.*

To perform automatic File Maintenance:

1. Touch **Menu** on the main screen.
2. Select **File Maint.** from the list of menu options.
3. Select **Automatic File Maintenance** from the list of file maintenance options. The following warning screen will display.

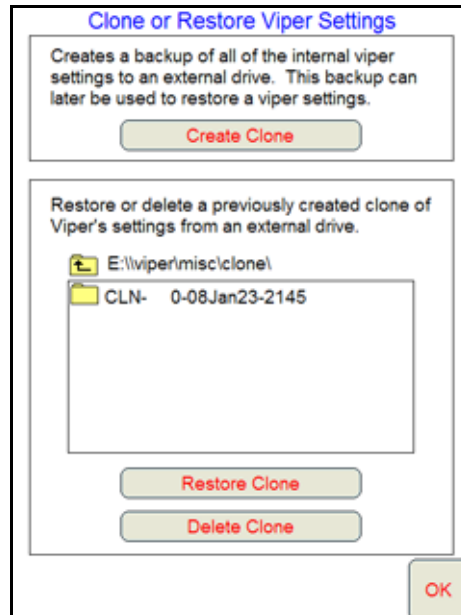


Touch **OK** to download the report files from the Viper Pro internal storage and delete associated job files from the Viper Pro or **Cancel** to abort the downloading of report files.

Clone or Restore Settings

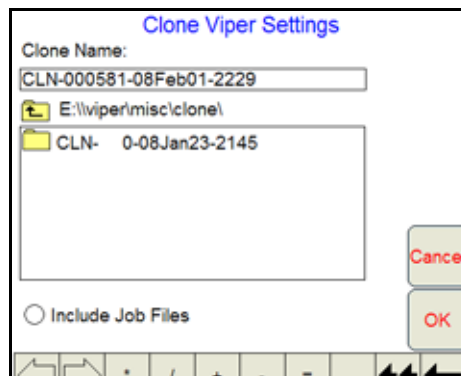
The Clone or Restore Settings feature can be used to save all settings and files from the Viper Pro field computer to external memory. These clones can then be reloaded to restore settings to the same Viper Pro or transferred to another Viper Pro.

Touch the **Clone or Restore Settings** button to view the following display.



If a clone has previously been created, select the file name from the list and touch Restore Clone to restore the selected clone on the Viper Pro. To delete a clone, select the file name and touch Delete Clone to remove the selected clone.

Touch the Create Clone button to save the Viper Pro settings to the selected file. The following screen will be displayed.



Enter a name for the clone in the Clone Name field along the top of the screen. Select the “Include Job Files” option to include the current job files located on the Viper Pro internal memory with the clone. Once finished, touch the OK button to create the clone.

AgX File Maintenance

Note: The AgX File Maintenance button will not be displayed unless an AgX activation key has previously been entered on the Viper Pro. Contact a local Raven dealer for more information or to acquire an activation key.

Select the AgX File Maintenance option to transfer AgX recommendations to the Viper Pro from a connected USB flash drive or to delete recommendations currently stored on the Viper Pro field computer.

To perform AgX File Maintenance:

1. Touch **Menu** on the main screen.
2. Select **File Maint.** from the list of menu options.
3. Select **AgX File Maintenance** from the list of file maintenance options. The following warning screen will display.



4. Touch a recommendation name and the 'Delete' button to remove the selected recommendation from the Viper Pro field computer. To delete all recommendations from the Viper Pro, touch the 'Delete All' button.
5. To transfer recommendations from the USB flash drive connected to the Viper Pro, select the 'Upload Recommendations' button. The Viper Pro will look for AgX recommendations located in the RDE Inbox folder.

Note: Do not remove, rename or overwrite any files stored in the RDE Inbox folder on the USB flash drive prior to transferring files to the Viper Pro. Modifying these files will cause errors with the AgX job features on the Viper Pro field computer.

Once the files have been transferred to the field computer, the files may be deleted from the USB flash drive using a home or office PC.

Select External Drive

If more than one USB flash drive is connected to the Viper Pro at one time, the 'Select External Drive' button will be displayed on the File Maintenance screen. Touch this button to select an external drive.

Uploading Reports to the Slingshot Web Site

Completed job reports may be uploaded to the Raven Slingshot web site using a free Slingshot user account. The Slingshot web site offers tools for creating, editing and archiving job files from the Viper Pro and may also be used to export a job report in the shapefile format.

Note: *Do not use the Automatic File Maintenance feature to create reports for a Slingshot account.*

The Automatic File Maintenance feature does not export the types to a USB flash drive necessary for creating Slingshot reports and will remove job data from the Viper Pro. Job data transferred using the Automatic File Maintenance feature cannot be reinstalled onto the field computer for export to Slingshot. Refer to the USB File Transfer and Advanced File Maintenance section on page 208 for instructions on outputting the necessary file types.

File Transfer Methods

Files may be uploaded to the Slingshot web site using either of the following methods:

- Wirelessly using the Slingshot Field Hub.
- Via a computer connected to the Raven Slingshot web site.

Note: *Both transfer methods require a free user account to access the Slingshot web site.*

Job files transferred to the Raven Slingshot web site cannot be transferred back to the Viper Pro field computer to resume data logging or mapping as-applied information previously in progress. Do not delete job files from the field computer until the job has been completed.

Using the Slingshot Field Hub

If a Slingshot Field Hub is connected to the Viper Pro, completed job files may be transferred to the Raven Slingshot web site wirelessly. Refer to the *Wireless File Transfer* section on page 207 for details on setting up file transfer options.

Using a Computer

The USB File Transfer and Automatic File Maintenance features may be used to transfer completed job data packages to a USB flash drive connected to the Viper Pro field computer. Data packages may then be transferred to the Slingshot web site using a home or office computer with an internet connection to create a job report.

Refer to the *USB File Transfer and Advanced File Maintenance* section on page 208 or *Automatic File Maintenance* section on page 212 for details on transferring the information on performing these file maintenance procedures.

Note: *To create the required job data package (.jdp) file required for upload to the Raven Slingshot site, a job or report file must be exported to the USB flash drive. Refer to the USB File Transfer and Advanced File Maintenance section on page 208 for more information about using the Export action on Viper Pro job files.*

User Account Sign-up

To set up a free user account:

1. Access the Raven Slingshot web site:

www.ravenslingshot.com

Note: To request a form for multiple user accounts, send an email request to:

info@ravenslingshot.com

2. Select the desired language in the upper, left corner of the site.
3. Click on the 'Make Contact' tab to the right side of the site.
4. Fill in the required information and be sure to select the 'New Slingshot User Acct.' option for the request type.
5. Select 'Submit Query' to submit the user account information. Login information will be sent to the user email address provided in the form within 24 hours of the request.

Uploading Job Reports from a USB to the Slingshot Web Site

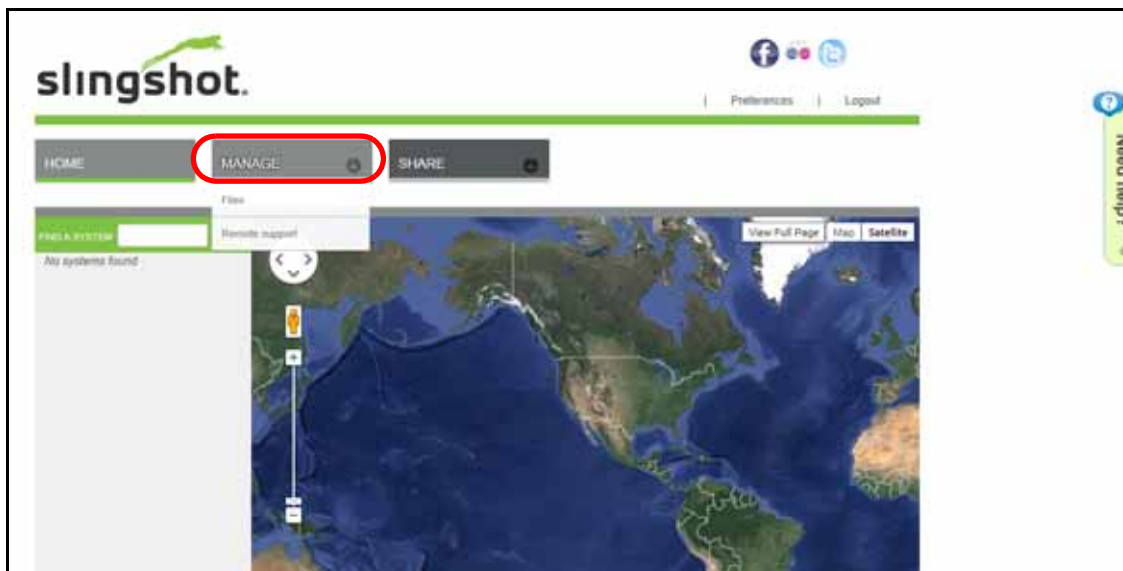
Note: Do not use the Automatic File Maintenance feature to create reports for a Slingshot account.

The Automatic File Maintenance feature does not export the types to a USB flash drive necessary for creating Slingshot reports and will remove job data from the Viper Pro. Job data transferred using the Automatic File Maintenance feature cannot be reinstalled onto the field computer for export to Slingshot. Refer to the USB File Transfer and Advanced File Maintenance section on page 208 for instructions on outputting the necessary file types.

1. Insert the USB flash drive into a home or office PC and login to the Raven Slingshot web site at:

www.ravenslingshot.com

2. Select the desired language in the upper, left corner of the site.
3. Click on 'Log In' in the upper, right corner of the site.
4. Enter the account user name and password and select 'Sign On.'
5. Select the 'Manage' tab at the top of the screen and click 'Files.'



6. Select the "Import File" button along the top of the File Manager display and select "My Library" to browse the local computer for files to upload to the Slingshot web site.
7. Locate the job data package (.jdp.zip) file located on the connected flash drive. The Viper Pro automatically stores transfers the files to the "X:\RDE\Outbox" directory when performing USB or automatic file maintenance where "X" is the drive letter assigned by the computer to the connected flash drive.
8. Allow the Raven Slingshot site to process the file.

Note: *Review the help information on the Slingshot web site for information on performing available file operations as available.*

9. When finished working with job and report files, select the 'logout' option in the upper, right corner of the screen.



CHAPTER

12

Troubleshooting the Viper Pro System

This chapter contains information on troubleshooting the Viper Pro system. Please read through all sections in this chapter before contacting technical support, as many common questions are answered here.

Viper Pro Troubleshooting Information

This section contains information about possible issues and solutions for the Viper Pro system.

General Issues

Issue	Possible Cause	Solution
Viper does not power up.	<ul style="list-style-type: none"> • No power to unit • Blown fuse • Poor ground 	<ul style="list-style-type: none"> • Check for +12VDC on pin 16 of the Viper power cable. • Check for continuity in 10 amp fuse in Viper power cable. • Make sure that pin 1 is connected to the battery ground.
CAN nodes not detected.	<ul style="list-style-type: none"> • No power to CAN nodes • Weak or dirty power to the CAN nodes • Water in CAN nodes • Corrosion in CAN connections • Broken cable to node • Low power voltage 	<ul style="list-style-type: none"> • Verify that there is 12 volt power and ground to the CAN node's logic power • Verify that the 12 volt power to the CAN node is coming from the switch relay that is connected to the battery • Do not direct any pressure or wash stream directly at the CAN node(s) to prevent water and moisture from building up in the nodes. • Disconnect and clean the CAN connections. • Repair or replace cable. • Verify at least +10VDC at node.
Touch screen does not respond to touch	<ul style="list-style-type: none"> • Area touched does not include a selectable function • System is busy processing a previous request 	<ul style="list-style-type: none"> • Touch an area of the screen that contains a selectable function. • Wait for system to finish processing previous requests.

Issue	Possible Cause	Solution
Red DGPS Status indicator on the Main Screen	<ul style="list-style-type: none"> • GPS cable disconnected • No power to the GPS receiver • Incorrect port setting 	<ul style="list-style-type: none"> • Check the cable between the GPS receiver and the Viper Pro. • Check power to the GPS receiver. • Make sure that the port settings on the Viper Pro and the GPS receiver are the same.
Red 'X' in product control area on the main screen	<ul style="list-style-type: none"> • Node connection issue on CAN system 	<ul style="list-style-type: none"> • See the <i>CAN Troubleshooting</i> section on page 226.

Setup Issues

Issue	Possible Cause	Solution
Previous settings have been lost	<ul style="list-style-type: none"> • Settings data deleted from memory • Poor CAN connections 	<ul style="list-style-type: none"> • Review Chapter 11, <i>File Maintenance and Editing Reports</i> and Appendix B, <i>Understanding Viper Pro Files</i> for data information. • See the <i>CAN Troubleshooting</i> section on page 226.
Profile displays as default	<ul style="list-style-type: none"> • No profile loaded into Viper 	<ul style="list-style-type: none"> • Create a profile and load it into Viper. Refer to the <i>Profiles</i> section on page 54 for additional assistance with creating profiles.
Streetmaps will not load	<ul style="list-style-type: none"> • The streetmaps files are not located in the streetmaps folder • Streetmaps are located in a sub-folder in the Streetmaps folder • Streetmaps are not in the correct format • Too many streetmaps files in the Streetmaps folder 	<ul style="list-style-type: none"> • Move the streetmaps files to the Streetmaps folder on the disk. • Move the streetmaps to the Streetmaps root folder. • Save the streetmap files in the shapefile format. • Limit the number of county streetmap files in the Streetmap folder.

Job Issues

Issue	Possible Cause	Solution
Section numbers are gray	<ul style="list-style-type: none"> • Section switches are turned off • Section control SCT enabled but machine not moving • CAN is disconnected 	<ul style="list-style-type: none"> • Turn section and master switch on. • Move the machine out of the applied zone. • See the <i>CAN Troubleshooting</i> section on page 226 section.
Section number does not turn green when turned on	<ul style="list-style-type: none"> • The section is not set up properly • Nodes not completely programmed • The section is disconnected 	<ul style="list-style-type: none"> • Check the section setup from the Setup menu. • Check node calibration and ensure all calibration is completed. • Check the connection and wiring to the section.
Section control SCT system will not turn on	<ul style="list-style-type: none"> • Section switches are in the 'Off' position 	<ul style="list-style-type: none"> • Section switches must be in the 'ACCUSCT' position.
INC/DEC function switch does not work	<ul style="list-style-type: none"> • INC/DEC not enabled for appropriate product(s) • Product application is turned off 	<ul style="list-style-type: none"> • Assign INC/DEC switch function to the appropriate product(s). • Switch product application to either auto or manual mode.
Dates and time are incorrect	<ul style="list-style-type: none"> • No GPS • No GPS RMC or ZDA • Incorrect time zone selected 	<ul style="list-style-type: none"> • Make sure that the GPS receiver is operating properly and that there is a green 'thumbs-up' icon displayed in the GPS section of the main screen. • Check the GPS receiver to make sure the RMC or ZDA string is selected. • Verify the time zone selected in the Menu/Setup/Local/Time Zone section.
Product applied in zero rate zones	<ul style="list-style-type: none"> • Base system • Wrong valve type on vehicle • Incorrect valve setting 	<ul style="list-style-type: none"> • Base system cannot turn off granular products independently. • Must use either a Fast Close or PWM Close valve (not available for ground drive air carts). • Check valve or PWM setting.

Rx Map Issues

Issue	Possible Cause	Solution
Only one prescription map loads	<ul style="list-style-type: none"> • A multi-product VRA registration is not available 	<ul style="list-style-type: none"> • Purchase a multi-product registration from a local Raven dealer.
The prescription map does not display properly	<ul style="list-style-type: none"> • Wrong datum type 	<ul style="list-style-type: none"> • Use WGS-84 decimal degrees when creating an Rx map.

Coverage Map Issues

Issue	Possible Cause	Solution
Gaps displayed in coverage map	<ul style="list-style-type: none"> • Section widths not set correctly • Guidance and total section width not the same 	<ul style="list-style-type: none"> • Check section widths and center values. • Set guidance width and section width to the same value.
Product coverage displayed in zero rate zones	<ul style="list-style-type: none"> • Vibration chatter in encoder • Valve or motor is not set to close completely 	<ul style="list-style-type: none"> • Make sure that the encoder is firmly mounted. Increase value in "Zero Rate Tolerance." • Adjust valve or motor to close or stop completely with no rate applied.
Cannot achieve target rate	<ul style="list-style-type: none"> • Driving too fast for vehicle • Calibration numbers incorrect • Speed calibration incorrect 	<ul style="list-style-type: none"> • Speed may exceed capabilities of vehicle to deliver product. Slow down the vehicle or configure the vehicle to supply a higher amount of product. • Check and adjust meter calibration, density, and other calibration numbers. • Check and adjust speed calibration setting.

Error Messages

The following table provides issues and solutions about error messages displayed on the Viper system.

General Error Messages

Issue	Possible Cause	Solution
The Activation key is not valid	<ul style="list-style-type: none"> Incorrect Activation key entered 	<ul style="list-style-type: none"> Re-enter the Activation key. If this still does not work, contact a local Raven representative.
Scout file error	<ul style="list-style-type: none"> Scout file for one of the jobs is missing File is an older version and not compatible with the current software release 	<ul style="list-style-type: none"> Touch OK to bypass. Touch OK to bypass.
JobMap error	<ul style="list-style-type: none"> Scout file for job is missing 	<ul style="list-style-type: none"> Touch OK to bypass and create a scout file for the current job.

Setup Error Messages

Issue	Possible Cause	Solution
Sections must be specified in left-to-right order	<ul style="list-style-type: none"> Sections are not configured sequentially in a left-to-right order 	<ul style="list-style-type: none"> Configure the sections in a left-to-right order. See <i>Section Setup Wizard</i> section on page 169 for more information on configuring sections.
There is a gap or overlap between sections	<ul style="list-style-type: none"> Improper values entered into either section widths and/or the left/right values for individual section sections. 	<ul style="list-style-type: none"> Check the section setup values entered for Left/Right, and check the sections set up for this product. Set up section sequentially from left-to-right. Left/Right value is measured from center of section.
	<ul style="list-style-type: none"> Section select functions not properly configured. 	<ul style="list-style-type: none"> Section select must specify individual sections for individual products if a gap or overlap is detected.
Missing Scout File	<ul style="list-style-type: none"> Scout files have been deleted from the scout folder but other folders contain files associated with the job. 	<ul style="list-style-type: none"> Delete all files with the same name from all the other folders on the flash drive if the specified job name is not necessary for the job in progress. Use the File Maintenance function to delete the remaining files. Make sure to keep a backup on a home or office PC if the job will be needed at a later date.
Rx Colors error. "You must enter a name for this template"	<ul style="list-style-type: none"> The custom RxMap Colors was selected but no name was given to the template 	<ul style="list-style-type: none"> Enter a name for the custom Rx Color template.
RxColor error. "You must pick a color for entry Minimum"	<ul style="list-style-type: none"> There is no color selected for the range 	<ul style="list-style-type: none"> Touch Select and select a color for the minimum level.
Could not grow buffer	<ul style="list-style-type: none"> Streetmaps that are being installed are too large for the Viper system memory 	<ul style="list-style-type: none"> Limit streetmaps to four counties or less, depending upon the file size. More densely populated counties have a larger file size than sparsely populated counties.

Job Error Messages

Issue	Possible Cause	Solution
Open New Job error	<ul style="list-style-type: none"> For non-VRC (Variable Rate Control) jobs, DGPS coverage must be available before starting the job 	<ul style="list-style-type: none"> Check for GPS signal.
No GPS Coverage Warning: You must have GPS coverage if you start a non-VRC job.	<ul style="list-style-type: none"> Displays when starting a job without a GPS signal 	<ul style="list-style-type: none"> Check for GPS Signal.
Missing Product Information: No Product Name Entered	<ul style="list-style-type: none"> No product name entered 	<ul style="list-style-type: none"> Enter a least one character for a product name.
Job is opened in View mode only.	<ul style="list-style-type: none"> Existing job was started in View mode only. No changes can be saved. 	<ul style="list-style-type: none"> Close the job and restart in 'Add to Job' mode.
You must set up the section information in the Setup menu	<ul style="list-style-type: none"> When starting a job, this message displays if the sections have not been setup 	<ul style="list-style-type: none"> Configure the section information in the Setup menu.
You have not set up all of the products for this job	<ul style="list-style-type: none"> Information for all of the products has not been entered during the job setup process. 	<ul style="list-style-type: none"> Make sure that all products have an assigned product name.
You must select at least 1 section for this product	<ul style="list-style-type: none"> Every product in the system must have at least one section assigned to it. 	<ul style="list-style-type: none"> Using the Section Select option, check at least one section for the product.
The Section Settings for this job do not match your current section setup. Cannot add to this job.	<ul style="list-style-type: none"> When adding to an existing job, all section settings must match exactly the section configuration when the job was originally started. 	<ul style="list-style-type: none"> Re-configure the section setup to match the configuration when the job was originally started.

Variable Rate Control (VRC) Error Messages

Issue	Possible Cause	Solution
Browse Rx Files	<ul style="list-style-type: none"> VRC must be selected in order to enter prescription information 	<ul style="list-style-type: none"> Select VRC in the Product Setup screen.
VRC must be selected in order to enter prescription information	<ul style="list-style-type: none"> VRC was not selected during the product setup 	<ul style="list-style-type: none"> Select VRC in the Product Setup screen.
No VRC Products	<ul style="list-style-type: none"> There are no more selections to make 	<ul style="list-style-type: none"> Touch OK to start the job.

Issue	Possible Cause	Solution
No Rx file chosen for this product	<ul style="list-style-type: none"> • VRC was selected for the product during the product setup, but no Rx map was loaded 	<ul style="list-style-type: none"> • Un-select the VRC selection or load an Rx map for the product.
No Rx rate field chosen for product	<ul style="list-style-type: none"> • VRC was selected and an Rx map was loaded, but a selection was not made in the Rate field 	<ul style="list-style-type: none"> • Select the appropriate item from the Rate field.
When VRC is checked, a Prescription File and Rate Field must be supplied	<ul style="list-style-type: none"> • VRC was selected during the product setup, but a prescription map and rate field have not been selected 	<ul style="list-style-type: none"> • Touch Browse to select the appropriate prescription file. Select the appropriate rate item in the Rate field.
Color templates are available only when VRC is selected	<ul style="list-style-type: none"> • Color template selected without selecting VRC 	<ul style="list-style-type: none"> • A color template must be selected after VRC is selected and the prescription map is loaded.

GPS Error Messages

Issue	Possible Cause	Solution
No GPS Coverage warning	<ul style="list-style-type: none"> • DGPS must be available to start a VRC (Variable Rate Control) or guidance job 	<ul style="list-style-type: none"> • Make sure that the GPS data is being received by the Viper system.
Warning: You do not have optimum GPS coverage. Some features may be disabled.	<ul style="list-style-type: none"> • GPS reception does not have differential correction. Therefore, some features, such as guidance, will not be available when starting a job in this condition 	<ul style="list-style-type: none"> • Enable the differential correction function in the GPS receiver. Contact the receiver manufacturer for additional information.
No Differential	<ul style="list-style-type: none"> • Differential GPS has not been detected by Viper 	<ul style="list-style-type: none"> • Check the GPS receiver to make sure that it has the differential correction function. Contact the manufacturer for additional information.
No GPS	<ul style="list-style-type: none"> • Viper does not detect a GPS signal 	<ul style="list-style-type: none"> • Make sure that the GPS receiver is turned on and receiving a signal. • Make sure that the port setting for Viper and the GPS receiver match. • Make sure that the required NMEA messages are turned on in the GPS receiver.

CAN Troubleshooting

Although the control algorithm is located within the CAN node, all of the same troubleshooting techniques used in a traditional hard-wired system still apply to a CAN system. CAN allows for modularization of the control system, but the behavior of the system remains the same. Flow and speed sensors, as well as the control valve and section valves, are used in the same fashion.

Below are some common causes for communication failures:

Issue	Possible Cause	Solution
CANbus cannot read the product node	<ul style="list-style-type: none">• The node is not connected to the CANbus	<ul style="list-style-type: none">• Connect the node and re-initialize the Viper Pro to read the product node.
CANbus ends not terminated	<ul style="list-style-type: none">• Terminate CANbus ends	<ul style="list-style-type: none">• Make sure that both ends of the CANbus system are properly terminated. See Chapter 3, <i>Installation, Start Up, and Registration</i>, for more information. <p>Note: The first terminator is built into the Seed Hawk[®] switch box mounted in the cab.</p>

APPENDIX

A

Calculating the Calibration Values

Speed Cal

Raven Industries recommends the following values for the initial speed cal:

Sensor Type	Used with	English	Metric
Radar/GPS	External Raven GPS Receiver	785	199
	GPS Speed over CANbus	1000	1000
	Raven Radar	598	152
Wheel	Wheel Magnets	1000	254
	Speedometer Drive Speed Sensor	612	155

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

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.

Using the Calibration Assistance

1. Make sure any section switches are turned OFF before powering the field computer on.
2. Touch within the **Product Control** area on the main screen.

- Touch within the **Miscellaneous Settings** area on the CAN Controller Status screen. The Miscellaneous Settings screen will display.

Miscellaneous Settings

Speed Sensor ☒ Radar ☐ Wheel

Speed Source ☐ Air Cart ☒ Switch Box

Speed Cal **Calibration Assistance**

Self Test

Audible Alarm ☐ Off ☒ On

Remote Master ☐

Pause if openers raised ☒

Boom Capacity ☒ Off ☐ On

Max Capacity **Default**

Load Cell

1 2 3 4 5 ← ← ←

6 7 8 9 0 - .

Next
Cancel
OK

- Touch the **Calibration Assistance** button on the Miscellaneous Settings screen. The Speed Calibration screen will appear.

Speed Calibration

To begin the calibration procedure:

1. Mark off a known distance to drive.
2. Enter the marked off test distance.
3. Drive to the starting point.

Test Distance: Feet

Next
Cancel

- Mark off the physical distance to be driven for the test.
- Enter a measured test distance, in feet [meters], in the **Test Distance** box.

Note: A distance of at least 500 feet [152 meters] should be used for this test. A shorter distance may give less accurate results.

- Touch **Next**.
- Begin driving the machine toward the test distance starting point at normal speed. When the beginning of the test distance is reached, touch the **Begin Cal Run** button. **Calibrating** will begin flashing on-screen.

Speed Calibration

To calibrate the speed:

1. Press the Begin Cal Run button.
2. Drive to the second marked point, increasing and decreasing speed gradually.
3. Press the End Cal Run button.

Begin Cal Run

End Cal Run

Prev
Cancel

9. Drive the test distance.

Speed Calibration

To calibrate the speed:

1. Press the Begin Cal Run button.

Begin Cal Run

2. Drive to the second marked point, increasing and decreasing speed gradually.

Prev

3. Press the End Cal Run button.

End Cal Run

**** Calibrating ****

Cancel

10. At the end of the measured test distance, touch the **End Cal Run** button. The new speed cal value will be calculated automatically.

Speed Calibration

To calibrate the speed:

Speed Calibration Complete

The speed calibration procedure has ended:

Test Distance: 500
Actual Distance: 410

Current Speed Cal: 1000
New Speed Cal: 1216

Apply the new Speed Cal?

Yes **No**

rev
ancel
0
p

11. Touch **Yes** and the new speed cal will be applied.

Note: Touch **No** to discard the calculated speed cal and continue using the existing value.

Verification of the Speed Cal Value

The following procedure may be used to verify the speed cal currently entered on the field computer.

1. Make sure any section switches are turned OFF before powering the field computer ON.
2. Touch the **Product Control** area at the bottom of the main screen to display the CAN Controller Status screen.
3. Touch the **Tally Registers** button at the bottom of the screen.

Meter Cal 6.0	Min Pw 40
	Max Pw 253
Pressure 1 1806.00	Application Liquid
Pressure 2 ---	Standard Valve

Tally Reg. **CAN Profile** **Current Alarms** **OK**

4. Touch the **Reset** button next to the Distance display on the Tally Registers screen.

Tally Registers					
	Reset	Reset	Reset	Reset	Reset
Node	Ttl Vol	Field Volume	Tnk Vol	Ttl Area	Fld Area
1	14247.8	14247.8	0.0	778.8	778.8
2	10581.1	10581.1	0.0	156.1	156.1
3	10836.6	10836.6	0.0	156.1	156.1
4	8214.9	8214.9	0.0	157.1	157.1
5	0.0	0.0	0.0	0.0	0.0
Distance 33 Miles 4851 Feet					
Reset					

5. Drive a known distance:
 - a. Re-run the same test distance driven during the **Calibration Assistance** procedure.
 - b. Drive a test distance of 1 mile [1 km].

Note: *Accelerate and decelerate slowly. To achieve the most accurate calibration, do **not** use the vehicle odometer or the field computer distance display to measure the actual distance driven.*

6. Record the distance from the field computer Tally Registers screen.
If the distance display on the Tally Registers screen matches the measured test distance, the calculated speed cal is correct. If the distance display does not match, repeat the *Using the Calibration Assistance* section on page 227 to recalculate the speed cal automatically or use the *Speed Cal Formulas* section on page 230 to manually calculate the speed cal value.

Note: *If a test distance of one mile [1 km] is used, the distance value displayed on the Tally Registers screen should be 5280 feet [1000]. If the value displayed in the Feet [Meters] field is between 5260 [980] and 5300 [1020], the current speed cal value is correct.*

Speed Cal Formulas

Perform the following calculation to determine the speed calibration

$$\frac{OSC \times 5280}{D} = CSC$$

where OSC = the Old Speed Cal value, D = the Viper Pro odometer reading, and CSC = the Corrected Speed Cal.

For Example:

Using the default Speed Cal of 598 [152], and a Viper Pro odometer reading of 5000 feet [980 meters]:
in English Units:

$$\frac{598 \times 5280}{5000} = 631$$

the Corrected Speed Cal is 631.

in Metric units:

$$\frac{152 \times 1000}{980} = 155$$

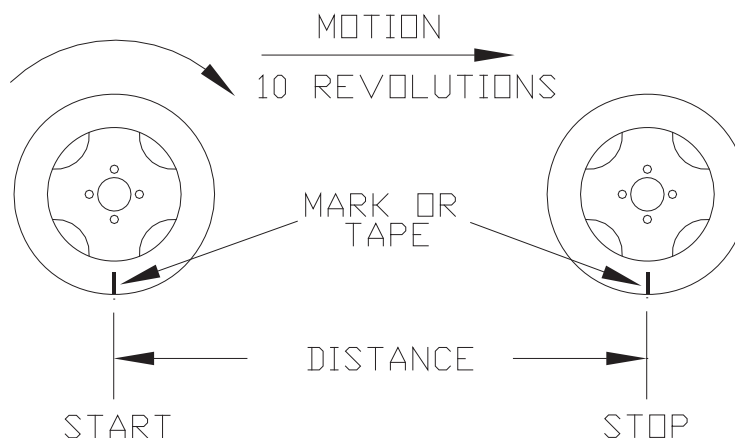
Therefore, the Corrected Speed Cal is 155.

7. Enter the corrected speed cal of 631 [155].
8. Confirm that the new Speed Cal is correct by repeating the procedure in the *Verification of the Speed Cal Value* section on page 229.

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 Viper Pro. **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 new 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 Cal or Section Width Calibration

Use the following formulas to calculate the section width(s) of a boom or implement. The section width is used by application control systems to adjust product rates for active sections during application.

Calculate the boom section width with the formula:

$$T \times S = SW$$

where T = the number of Tips in each boom section, S = the spacing between tips, and SW = the Section Width.

For Example:

20 tips in a section with spacing of 40 inches [101.6 cm] would yield:

$$BSW = 20 \times 40[101.6] = 800[2032]$$

or a Section Width of 800 inches [2032 cm] (approximately 67 feet [20.32 m]). Enter 800 [2032] as the boom width for this section.

Band Spraying Adjustment

The standard application rate must be adjusted when utilizing a system set up to apply product in bands across the boom width. Refer to *Band Spraying Rate Adjustment* section on page 245 for assistance calculating the rate adjustment required for the sprayer configuration.

Boom or Section Mapping

The boom mapping feature allows the operator configure the field computer for the actual boom sense wire connections or customize the character representing each boom or implement section.

Map Sections to Wiring

Viper Section	Wired As	Display Character	Switch Number
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5

Mapping the Booms

1. From the Viper Pro main screen, touch **Menu**, and **Setup, Boom**.
2. Touch **Next** until the Boom Setup Summary screen is displayed.
3. Select the **Map Booms** button. The Map Booms to Wiring Setup screen will display.

Map Sections to Wiring

Viper Section	Wired As	Display Character	Switch Number
1	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>
2	<input type="text" value="2"/>	<input type="text" value="2"/>	<input type="text" value="2"/>
3	<input type="text" value="3"/>	<input type="text" value="3"/>	<input type="text" value="3"/>
4	<input type="text" value="4"/>	<input type="text" value="4"/>	<input type="text" value="4"/>
5	<input type="text" value="5"/>	<input type="text" value="5"/>	<input type="text" value="5"/>

The 'Viper Boom' column displays the number of the boom sense sections configured for the current configuration. These numbers correspond to the section values displayed from left-to-right on the Viper Pro main screen.

Note: Touch the **Next** button if necessary to display 'Wired As' and 'Display Character' settings for sections 6 through 10.

4. Use the 'Wired As' column to set the actual boom sense wired connection for each configured section.

Note: Raven boom sense wires are color coded as follows:

Section Number	Lead Wire Color
1.	Black
2.	Brown
3.	Blue
4.	Black/White
5.	Brown/White
6.	Blue/White
7.	White/Black
8.	White/Brown

Section Number	Lead Wire Color
9.	White/Blue
10.	Pink
11.	Yellow/White
12.	Green/White
13.	Red/White
14.	White/Yellow
15.	White/Green
16.	White/Red

*Viper will not allow 'Wired As' sections to be skipped. For example, if the value entered as the **Number of Boom Sections** setting is set to 3, 'Wired As' must be 1, 2, and 3 in any order. These three sections cannot be 'Wired As' 1, 2, and 4. To skip a boom section, a boom must be configured with '0' width.*

17. Use the 'Display Character' column to customize the "Booms" display on the Viper Pro main screen. For example, the display character for section 1 may be set to L to signify that section 1 is the left fence row.

Note: Use only the characters 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, D, E, L, R, and * to label the booms. It is recommended to use * for skipped booms.

The following table is an example of a possible boom mapping configuration.

TABLE 1. Boom Mapping Example

Logical	Wired As	Display Character
1	1	L
2	2	1
3	3	2
4	4	3
5	5	4
6	6	5
7	9	R
8	8	*
9	7	*

18. The “Switch Number” column to assign section control to a specific switch on a connected CAN switch box. Multiple sections may be assigned to the same switch to allow the operator to control multiple sections.

Map Sections to Wiring

Viper Section	Wired As	Display Character	Switch Number
1	<input style="border: 1px solid red;" type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>
2	<input type="text" value="2"/>	<input type="text" value="2"/>	<input type="text" value="2"/>
3	<input type="text" value="3"/>	<input type="text" value="3"/>	<input type="text" value="3"/>
4	<input type="text" value="4"/>	<input type="text" value="4"/>	<input type="text" value="4"/>
5	<input type="text" value="5"/>	<input type="text" value="5"/>	<input type="text" value="5"/>

19. Touch **OK** to return to the Boom Setup Summary screen. Touch **OK** to save the displayed section settings and return to the Viper Pro main screen or proceed to the

Advanced Section Setup

The standard boom setup covered in the *Section Setup* section on page 47 is sufficient for a standard boom configuration with the sections end-to-end with no overlap or skips.

The advanced section settings allow the operator to customize boom or implement sections individually to reflect specialized configurations with overlaps, skips or offset sections.

1. Select **Menu**, then **Setup**, and **Boom**.
2. Touch **Next** until the Boom Setup Summary screen is displayed.

Boom Setup Summary
Touch a Boom Section or Summary Entry for Advanced Settings

GPS Antenna

1 2 3 4 5

Boom System Center
Overall Width: 1060.0 Left/Right: 0.0 Fore/Aft: -120.0

Boom	Width	Left	Right	Fore	Aft	Wired	As	Display Character
1	140.0	-460.0	-120.0	1	1			
2	240.0	-270.0	-120.0	2	2			
3	320.0	10.0	-120.0	3	3			
4	240.0	290.0	-120.0	4	4			
5	120.0	470.0	-120.0	5	5			

Prev
Map Booms
Cancel
OK

3. Touch a boom section displayed in the section configuration overview or select the section summary entry at the bottom of the screen to access additional section settings. The Boom Section Settings screen for the selected section will display.

Boom Section 3 Settings

Section Width: 320

Enter the location of the midpoint of this boom section with respect to the GPS antenna.

Left and Aft are indicated by negative values (use the minus sign).

Left/Right: 10.000

Fore/Aft: -180

More Info

Measurements Are Inches

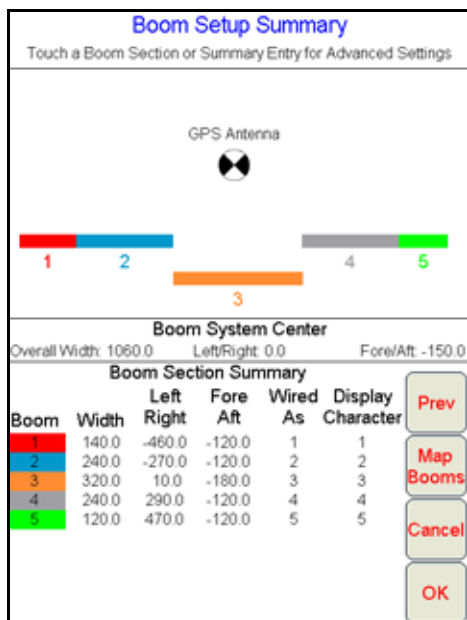
Prev
Next
Cancel
OK

4. The **Section Width** for the section is displayed at the top of the screen. Touch the displayed value and use the on-screen keypad to enter a new section width value if necessary.
5. Touch the **Left/Right** offset value and use the on-screen keypad to enter the distance of the section midpoint from the GPS antenna. If the section is offset to the left of the GPS antenna, enter a negative value for the Left/Right offset value.

Note: The left/right offset must be measured parallel to the boom or implement width. Select the **More Info** button to display an overview of the offset measurements and directions.

Appendix A

6. Touch the **Fore/Aft** offset value and use the on-screen keypad to enter the distance of the section midpoint from the GPS antenna. If the section is behind the GPS antenna, enter a negative value for the Fore/Aft offset value.
7. Touch **Next** to advance to the next boom or implement section to the right or **Prev** to go back to the previous section to the left.
8. Once the width and offset values are entered correctly for each boom or implement section, touch the **OK** button to return to the Boom Setup Summary screen.



9. Verify that the section configuration overview represents the actual application equipment or implement configuration.
10. Touch **OK** to save the section settings and return to the Viper Pro main screen.

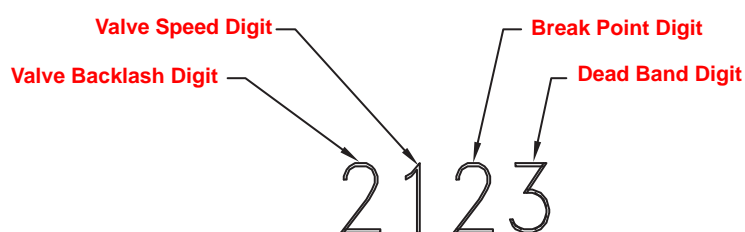
Valve Cal

To ensure that the proper amount of product is being applied, the valve cal must be programmed for the type of control valve(s) connected to the control system. The field computer uses the valve calibration number to adjust the response time of the control valve motor to changes in the vehicle speed.

The following control valve calibration numbers are recommended for the valves listed:

Control Valve Type	Valve Cal
Standard (C-SD)	2123
Fast (C-F) or Fast Close (C-FC)	743
PWM (C-P) or PWM Close (C-PC)	43

Each digit in the calibration number corresponds to a specific function of the valve. The following functions apply to the digits in the valve calibration number:



Valve Backlash Digit

This value controls the time of the first correction pulse after detecting a change in correction direction. The values range from 1 to 9, where 1 is for a short pulse and 9 is for a long pulse.

Note: The backlash digit is not used with a fast, fast close, PWM, PWM close or standard motor control valve.

Valve Speed Digit

This value controls the response time of the control valve motor. If the valve speed setting is too fast, the valve will over correct and the system can start to oscillate. The following valves have specific values:

- Standard Control Valve: This valve has a range of values from 1 to 9, with 1 being slow and 9 being fast.
- Fast and Fast Close Control Valve: These valves have a range of values from 0 to 9, with 0 for fast and 9 for slow.

Note: The speed digit is not used with a PWM or PWM close valve.

Brake Point Digit

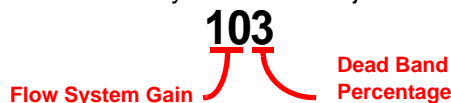
The Brake Point digit sets the percent away from the target rate at which the control valve starts to turn at a slower rate so that it does not overshoot the target rate. The values range from 0 to 9, where 0 is a 5% rate, 1 is a 10% rate and 9 is a 90% rate.

Dead Band Digit

The Dead Band digit is the allowable difference between the target rate and the actual application rate. The values range from 1 to 9, where 1 equals 1% difference and 9 equals 9% of the difference.

Flow Cal (Dual Loop Control Mode)

The flow cal value has two components which may be used to adjust the response of the application system.



Note: *It is recommended to set the Sgain value prior to making any adjustments to the flow cal value.*

Flow System Gain. The first digit(s) of the flow cal correspond to a flow system gain between 1 and 99. The higher the flow system gain, the more aggressive the system will respond to changes in flow rate.

Note: *When entering a flow gain value from 1 to 9, it is not necessary to enter a zero in front of the value.*

If the system adjusts to rate control changes too slowly, increase the flow gain digit(s) to increase the system response rate. If the system overshoots or oscillates around the desired flow rate, decrease the flow gain digit(s) to help stabilize the system.

Dead Band Digit. The last, or right most, digit in the flow cal value is the dead band digit. The dead band digit is the allowable difference between the target rate and the actual application rate. The values range from 1 to 9, where 1 equals 1% difference and 9 equals 9% of the difference.

Sgain (Pressure System Gain - Dual Loop Control Mode)

The default setting for the Sgain value is 100. To adjust the system aggressiveness, enter a value between 1 and 999 as necessary.

Note: *It is recommended to increase or decrease the current value in increments of 10 or less when making adjustments to the Sgain setting. If the new value does not produce significant or notable changes in the system response, increments of 20 may be used.*

Increase the Sgain value if the observed product pressure increases too slowly or if the system takes a long time to reach a set standby pressure or rate input change. If the system is consistently over shooting a set standby pressure or oscillating around a target rate, decrease the Sgain value until the system stabilizes.

PWM Control Valve Tuning

The Viper Pro field computer provides three methods for fine tuning a PWM or PWM close valve used for controlling product application:

PWM Manual Calibration

The operator may enter the known values for the following PWM valve calibration settings within the Product Control Settings area:


• Min PW (Minimum Pulse Width)	• Standby Pressure	• PW Freq (Pulse Width Frequency)
• (Max PW) Maximum Pulse Width	• Pre Set PW (Preset Pulse Width)	

Note: *The PWM valve will not be operated during manual calibration. It is recommended to verify that any changes to these settings will have the desired affect before controlling product application.*

Refer to the Node Control Settings Screen (Page 2) section on page 140 for more information on the min pw, max pw values and the Node Control Settings Screen (Page 3) section on page 142 for details on the standby pressure, preset pw and pw freq values.

PWM Calibration Assistance

The calibration assistant allows the operator to manually increase or decrease the PWM output using on-screen controls and set the PWM minimum, maximum, frequency and preset values based upon observed operation.



WARNING

The PWM valve output will increase and decrease as the up and down arrows are selected. Keep any bystanders away from areas where product may be expelled and moving components when performing the calibration process.

Note: *It is recommended to perform the calibration process with water in liquid tanks or while performing a catch test with a dry or granular application system.*

To use the calibration assistant mode, toggle the vehicle master switch and at least one section to the on position. To stop the PWM output at any time during the calibration process, toggle the vehicle master switch to the off position.

Note: *Refer to the Node Control Settings Screen (Page 2) section on page 140 for more information on the min pw, max pw values and the Node Control Settings Screen (Page 3) section on page 142 for details on the standby pressure, preset pw and pw freq values configured using the calibration assistant.*

1. Touch within the Product Control Settings area on the CAN Controller Status screen. The first Node 1 Settings screen will display.

2. Touch **Next**.

Node 5 Settings

Valve Cal 43

Fan Cal 0

Min Pw 40

Max Pw 253

PWM Manual Cal PWM Auto Cal

Prev Next Cancel OK

Note: The PWM Manual Cal and Auto Cal buttons will be displayed only if a PWM or PWM Close is the selected valve type. See the Application and Control Valve Type(s) section on page 35 for more information on the valve type selection.

3. Touch the **PWM Manual Cal** button. The Min PWM Calibration screen will be displayed.

Liquid

Min PWM Calibration

Setting the Minimum PWM:

1. Press the UP/DOWN arrows until the minimum desired pressure is reached.
2. Press the Set Min PWM button to set the minimum PWM setting.

Current Conditions: Node 1

Pressure 1 18

Pressure 2 ---

Vol/Min 0.0

Current Min PWM: 22

Set Min PWM

Next Cancel OK

Granular

Min PWM Calibration

Setting the Minimum PWM:

1. Turn the Spreader switch on.
2. Press the DOWN arrow until the belt stops, or press the UP arrow until the belt just begins to move.
3. Press the Set Min PWM button to set the minimum PWM setting.

Current Conditions: Node 1

Actual Rate 0.0

Vol/Min 0.0

Current Min PWM: 25

Set Min PWM

Next Cancel OK

The field computer will display the current monitored conditions at the node and the current minimum PWM value set on the field computer. The field computer will also display the following information based on the type of application system:

- For a liquid application system, the pressures at the transducer locations will be displayed.
- For a dry or granular system, the field computer will display the product rate and volume per minute and the currently set minimum PWM value.

4. Use the up or down arrows at the bottom of the screen to adjust the displayed Current Min PWM value. Adjust the minimum value so that:
 - a. either the minimum desired boom pressure is achieved or the required pressure to achieve spray pattern is observed at the spray tips when controlling a liquid application.

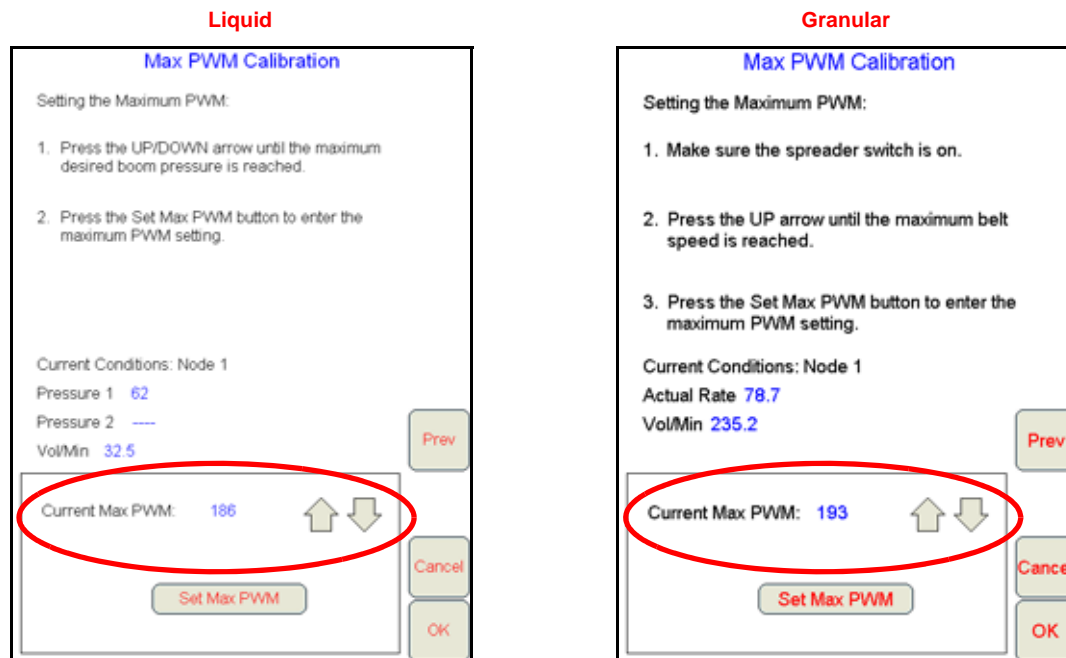
Note: If an electronic pressure transducer is not installed, a manual gauge must be used to calibrate the Min and Max PW.

- b. either the belt just begins to move or just stops moving when controlling a granular application.

5. Touch the **Set Min PWM** button to enter the minimum PWM setting.

Note: *It is recommended to reduce the PWM minimum value by 10 to allow a small dead band during actual field applications.*

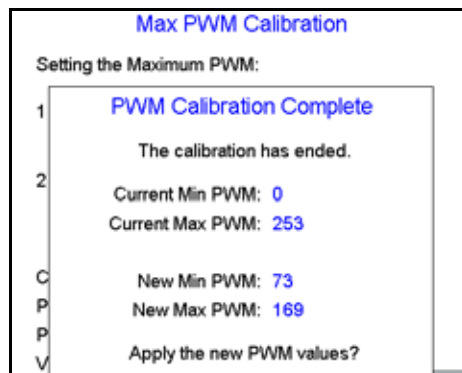
6. Touch the **Next** button. The Max PWM Calibration screen will display.



7. The Max PWM Calibration screen will display the current maximum PWM value as well as the current conditions monitored by the node as displayed on the previous screen.
8. Use the up or down arrows at the bottom of the screen to adjust the displayed Current Max PWM value. Adjust the maximum value so that:
 - a. the maximum desired boom pressure is achieved at the spray tips when controlling a liquid application.


Note: *If an electronic pressure transducer is not installed, a manual gauge must be used to calibrate the Min and Max PW.*

- b. the maximum desired belt speed is achieved when controlling a granular application.
9. Press the **Set Max PWM** button to enter the maximum PWM setting.
 10. Press **OK** to complete the PWM calibration procedure. A screen will display showing the current PWM settings and the new PWM minimum and maximum values.
 11. Press **Yes** to use the new calibration settings or **No** to keep the previous settings.



PWM Automatic Calibration

The automatic calibration mode will allow the field computer to automatically adjust the PWM output and attempt to determine the minimum, maximum and preset values.

	<p>WARNING</p> <p>The PWM valve output will increase and decrease during the calibration process. Keep away from areas where product may be expelled and moving components and alert anyone around the equipment when performing the calibration process.</p>
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To use the automatic assistant mode, toggle the vehicle master switch and at least one section to the on position. Touch the 'Stop Cal' button at any time during the calibration to stop PWM output.

Note: *If calibrating the PWM smart control feature, the product must be set as a granular application with a PWM type control valve.*

The automatic calibration process may take up to two minutes to complete. Maintain sufficient engine RPM and set the remote hydraulic flow to allow for at least 1 GPM [3.8 L/m] flow for each motor on the control system. The field computer will display a prompt when the calibration process is complete. If the system fails to calibrate properly, touch the 'OK' button and select 'Start Cal' again to restart the calibration process.


Meter Cal or Product Density

For liquid applications, the meter cal value is typically found on the flow meter. Enter the value found on the flow meter to ensure the field computer is properly registering the product flow during product application.

For granular products, enter the product density or weight of 1 cubic foot [1 cubic meter] of product as the density value. The density of the product must be entered to calibrate the field computer to the weight of product being applied.

Flow Meter Service and Maintenance

Periodic maintenance of the flow meter may help to extend the effective service life of the flow meter or internal components. If the flow meter does not register the applied product volume properly, the following steps will be necessary to service the flow meter:

	<p>WARNING</p> <p>Exposure to agricultural chemicals may be harmful or fatal. Thoroughly bleed and flush the application system lines prior to disassembling fittings, hoses and the flow meter.</p> <p>If the flow meter is used for applying anhydrous ammonia, bleed the nurse tank hose and flush the system with water before maintaining the flow meter.</p>
---	---

The following procedure should be performed more frequently if the flow meter is used with harsh chemicals or in anhydrous ammonia.

1. Remove the flow meter from the application system and flush with clean water.
2. If necessary, dismantle the flow meter housing.
3. Remove the turbine hub and turbine from the flow meter.
4. Clean the turbine hub and turbine and remove any metal filings or other foreign materials such as wettable powders.
5. Check the turbine blades for wear or damage. Refer to the flow meter replacement parts sheet provided with the flow meter and replace the turbine as necessary.
6. While holding the turbine hub, spin the turbine. The turbine should spin freely with very little drag within the turbine hub. Refer to the flow meter replacement parts sheet provided with the flow meter and replace the turbine hub/turbine assembly as necessary.
7. Reassemble the flow meter.
8. Using a low pressure jet of air (5 PSI [34 kPa]), verify that the turbine still spins freely after reassembly. If the turbine drags or does not move, loosen the hex stud on the bottom of the turbine hub 1/16 turn until the turbine spins freely.
9. If the flow meter continues to provide inaccurate product volumes, refer to the *Testing the Flow Meter/Encoder Cable* section on page 249.

Flow Meter Recalibration

The calibration value for the specific flow meter is printed on the tag attached to the flow meter and will typically provide accurate metering of product application. The following procedure may be used to check the meter calibration or recalibrate the flow meter.

Note: *Performing routine maintenance is recommended to help extend the service life and accuracy of the flow meter. Review the Flow Meter Service and Maintenance section on page 242 to service the flow meter as necessary.*

Before calibrating the flow meter:

1. It is recommended to perform the flow meter calibration with clean water only. Clean out the supply tank and flush the product lines with clean water. Refill the tank with clean water.
2. On the field computer, verify any active jobs are closed.
3. Toggle all boom section switches and the master section switch to the off position.
4. Disconnect one of the section product lines near the spray tips.
5. Set up a calibrated catch container (i.e. 5 gallon [19 L] bucket and place the disconnected end of the product line in the container.

To recalibrate the flow meter:

1. On the field computer Home screen, touch the Tools Menu icon.
2. Select the Product Control icon from the System menu.
3. On the Product Control Configuration screen, touch the Calibration Settings button.
4. Select the Meter Cal value and use the on-screen keypad to enter a value of 10 [38].
5. Touch the Accept icon until the Product Control Configuration screen is displayed.
6. Touch the Volume/Area Settings button.
7. Touch the Total Volume button and use the on-screen keypad to enter a value of 0.
8. Touch the Accept icon to return to the Volume/Area Settings screen.
9. While monitoring the Total Volume on the screen and the container, toggle the master switch and the appropriate section switch to the on position.

10. Dispense exactly 10 gallons [38 L] through the flow meter as measured by the calibrated catch container.

Important: Do not rely on graduation markings/numbers molded into the applicator tank.

11. Toggle the section or master switch off.
12. Read the value displayed on the field computer Total Volume button. This value should be within $\pm 3\%$ of the meter cal value printed on the flow meter tag.
13. To confirm accuracy, reset the Total Volume to 0 and repeat the above process several times. Always 'zero out' the Total Volume display before toggling the section switch on.

Note: The above process is usually sufficient to check the flow meter calibration. For best results, set the Meter Cal value to 100 [378] and repeat the above procedure to dispense exactly 100 gallons [378 L] through the flow meter.

To verify the flow meter calibration:

1. Fill the applicator tank with a predetermined volume of liquid (i.e. 250 gallons [946 L]).

Important: Do not rely on graduation markings/numbers molded into the applicator tank.

1. On the field computer Home screen, touch the Tools Menu icon.
2. Select the Product Control icon from the System menu.
3. On the Product Control Configuration screen, touch the Volume/Area Settings button.
4. Use the on-screen keypad to enter a value of 0 and touch the Accept icon.
5. Empty the applicator tank under normal operating conditions.
6. Return to the Total Volume displayed on the field computer and read the new value. The total volume value should match the known volume ($\pm 3\%$) used to fill the applicator tank.
7. If the total volume value displayed differs from the known volume by greater than 3%, use the following formula

$$\frac{MC \times V_m}{V_k} = CMC$$

Where MC = the Meter Cal value used during the test, V_m = the Volume measured by the field computer, V_k = the known Volume in the applicator tank and CMC = the Corrected Meter Cal.

For Example:

A set meter cal of 720 [190] is used to dispense 250 gallons [946 L] through the flow meter. At the end of the test, the field computer reads a measured volume of 260 gallons [984 L]:

$$\frac{720 \times 260}{250} = 749$$

or

$$\frac{[190] \times [984]}{[946]} = [198]$$

Therefore, the corrected meter cal is 749 [198].

8. Enter the corrected meter cal value before resuming application.

Rate Cal

The product rate cal value is entered in gallons per acre [L/ha] for liquid application systems or in pounds per acre [kg/ha] for granular applications.

Liquid Applications and Spray Nozzles

Enter the desired target volume per minute of liquid product for the application. Refer to *Unit of Measure Conversions* section on page x or contact a local sprayer or chemical supply dealer for more assistance.

The spray nozzles may also need to be adjusted for the target application rate. The following information must be known in order to determine the correct spray nozzles to use with a liquid applicator.

- Nominal Application Pressure _____ PSI [kpa]
- Target Application Rate _____ GPA [lit/ha]
- Target Speed _____ MPH [km/h]
- Nozzle Spacing _____ inches [cm]

From this information, calculate the volume per minute per nozzle as follows:

$$NVPM = \frac{Rate \times Speed \times NS}{5,940[60,000]}$$

where NVPM = Nozzle Volume per Minute (in gallons/acre [L/ha]), Rate = Target Application Rate, Speed = Target Speed of Application and NS = Nozzle Spacing.

For Example:

Application Pressure = 30 PSI, Target Application Rate = 20 GPA, Target Speed = 5.2 MPH and Nozzle Spacing = 20 inches

$$NVPM = \frac{20 \times 5.2 \times 20}{5,940} = 0.35$$

Using the calculated Nozzle Volume per Minute of 0.35 at an Application Pressure of 30, select a tip that is capable of these application specifications. Contact a local sprayer supply dealer for available nozzles or spray tips.

Band Spraying Rate 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 bandwidth, S = the spacing between the tips, and AR = the Adjusted Rate for band spraying.

For Example:

If the Broadcast Rate is 20 GPA [187 L/ha], the band width is 14 inches [35 cm], and the tip spacing is 40 inches [101 cm]:

$$AR = \frac{20[187] \times 14[35]}{40[101]} = 7[65]$$

Therefore, the adjusted rate is 7 GPA [65 L/ha].

Verifying Flow Rate Limits

The target rate for an application must be within the range of that specified for the Raven flow meter installed.

Flow Meter Model	Flow Range	Average Meter Cal Value
RFM 5	0.05 - 5 GPM [0.2 - 18.9 lit/min]	5500
RFM 15	0.3 - 15 GPM [1.1 - 56.8 lit/min]	1750
RFM 60P	1 - 60 GPM [3.8 - 210 lit/min]	720
RFM 100	3 - 100 GPM [11.4 - 380 lit/min]	700
RFM 200/ 200 Poly	15 - 200 GPM [56.8 - 760 lit/min]	164
RFM 400	25 - 400 GPM [94.6 - 1515 lit/min]	80

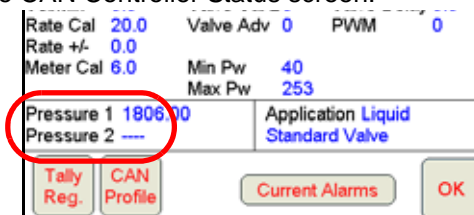
Pressure Transducer

Calibrating the Pressure Transducer

1. Read the pressure on an analog gauge connected in line with the pressure transducer.

Note: If no pressure gauge is installed in line with the pressure transducer, bleed or relieve any pressure applied to the transducer and enter a value of '0' for the pressure value in the procedure below.

2. Touch the Pressure area on the CAN Controller Status screen.



Note: Each product node or control channel has two pressure settings. Use the **Next** or **Prev** buttons to display the correct pressure transducer to calibrate before proceeding.

3. Touch the **Pressure** value and use the on-screen keyboard to enter the pressure gauge reading
4. Touch **Set** to calibrate the pressure transducer.
5. Touch **OK** to return to the CAN Controller Status screen.

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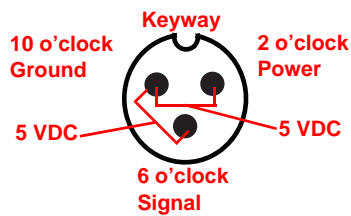
B

Testing Extension Cables

Speed Sensor Extension Cable

Verify that the system is in the Wheel Speed Sensor mode while testing the cable. Disconnect the extension cable from the speed sensor assembly cable. Hold the extension cable connector so that the keyway is pointing in the 12 o'clock position as shown below.

FIGURE 1. Speed Sensor Extension Cable Pin Diagram

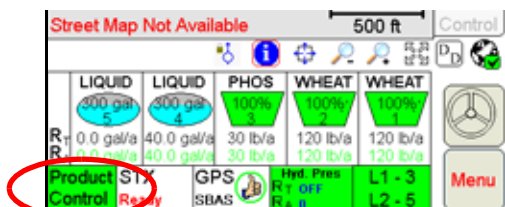


Note: If a radar type speed sensor is used, the voltage between the 10 o'clock and 2 o'clock positions may read 12 VDC.

If a +5V DC voltage reading is not present, disconnect the flow meter cable and re-test the speed sensor cable. If the voltage reads +5V DC when the flow meter cable is disconnected, test the flow meter cable per Testing the Flow Meter/Encoder Cable section on page 249.

Testing the Speed Sensor Cable

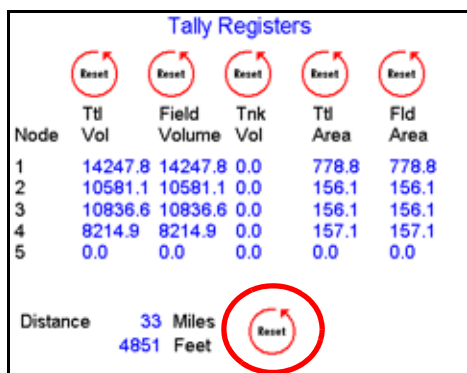
1. Press **Product Control**.



2. Press the **Miscellaneous** box. Enter 1000 as the Speed Cal and touch **OK**.



3. Press **OK** to return to the CAN Controller Status screen.
4. Press **Tally Registers**.
5. Press the **Reset** button next to the **Distance** box.



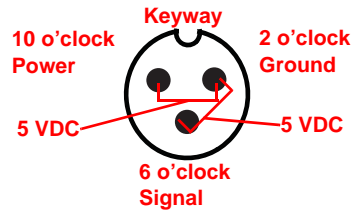
6. With a small jumper wire (or paper clip), short between 10 o'clock and 6 o'clock sockets with a 'short-no-short' motion. Each time contact is made, the Distance total should increase by increments of 1 or more.
7. If the Distance total does not increase, remove the section of cable and repeat the test at the connector that is the next closest to the node. If the distance total now increments during the short-no-short test, replace the defective cable as required.
8. If no pulses are registered, perform the above voltage checks.
9. If all of the cables test 'good', replace the Speed Sensor.

Note: After testing is complete, re-enter the correct Speed Cal and Speed Sensor type before starting application.

Flow Meter/Encoder Extension Cables

Before starting this test, disconnect the flow meter cable from the flow meter. Hold the flow meter cable so that the keyway is pointing in the 12 o'clock position as shown below.

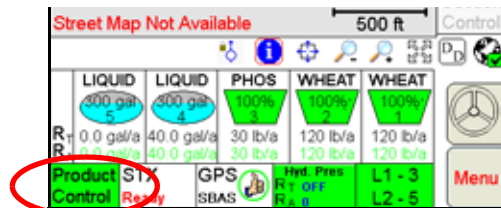
FIGURE 2. Flow Meter Extension Cable Pin Diagram



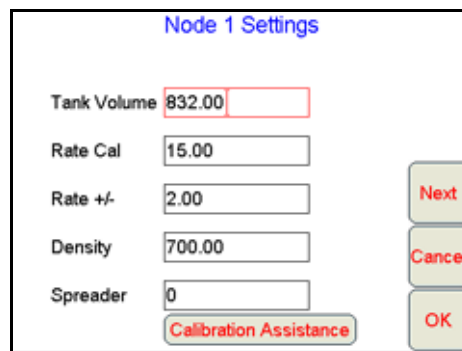
Note: In a non-CAN system if a +5 voltage reading is not present, disconnect the Speed Sensor cable. If the voltage reading is restored, test the Speed Sensor cable as described in Flow Meter/Encoder Extension Cables section on page 249.

Testing the Flow Meter/Encoder Cable

1. Press **Product Control**.



2. Touch the **Product Control Settings** area.
3. Touch within the Product Control Settings area to display the node settings screen for the selected control channel.
4. Enter the number '1' in the **Meter Cal** field and touch **OK**.



5. Touch the **Tally Registers** button at the bottom of the screen.

6. Note the 'Ttl Vol' (total volume) column and the registered values for each control channel.

Tally Registers

Node	Ttl Vol	Field Volume	Tnk Vol	Ttl Area	Fid Area
1	14247.8	14247.8	0.0	778.8	778.8
2	10581.1	10581.1	0.0	156.1	156.1
3	10836.6	10836.6	0.0	156.1	156.1
4	8214.9	8214.9	0.0	157.1	157.1
5	0.0	0.0	0.0	0.0	0.0

Distance 33 Miles
 4851 Feet

7. Toggle the section switches and the master switch on.
8. With a small jumper wire (or paper clip), short between the 2 o'clock and 6 o'clock sockets with a 'short-no-short' motion. Each time contact is made, the total volume should increase by increments of 1 or more.
9. If the total volume does not increase, remove the section of cable and repeat the test at the connector that is the next closest to the node. Replace the defective cable as required.
10. Verify the pin connection and voltage from the previous chart.
11. If all of the cables test 'good', replace the flow meter.

Note: After testing is complete, re-enter the correct meter cal before starting application.

Updating CAN Nodes via the Viper Pro

Viper Pro field computers with software version 3.0 or higher and CAN firmware version 16 or higher are capable of programming nodes on the CANbus directly through the Viper Pro using a USB flash drive with the CAN Update program.

Note: Before trying to update a CAN Node, make sure the node is communicating properly over the CANbus. If the node is not communicating properly, the Viper Pro will be unable to update the node. It is recommended to keep the machine engine running during the update process to ensure proper voltage is supplied to the CANbus nodes.



NOTICE

Updating a CAN node erases the current settings in the node. To retain settings and calibration data, be sure to write down all settings stored by the node(s) being updated.

The CAN Update program and node updates are available on the Raven web site:

www.ravenhelp.com

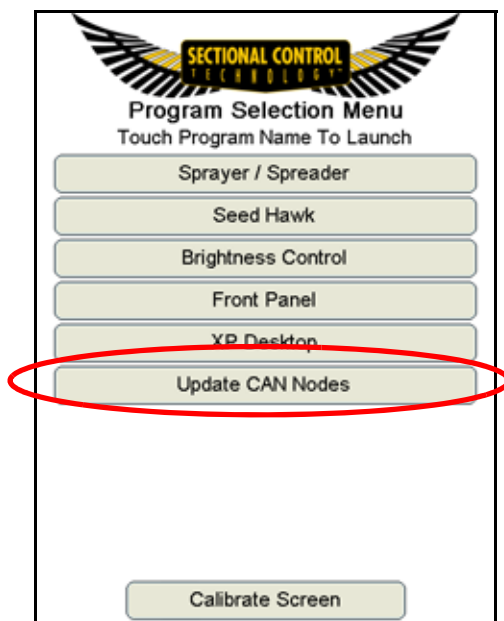
To Update CAN Nodes

1. Start the Viper Pro and access the Program Selection Menu screen.

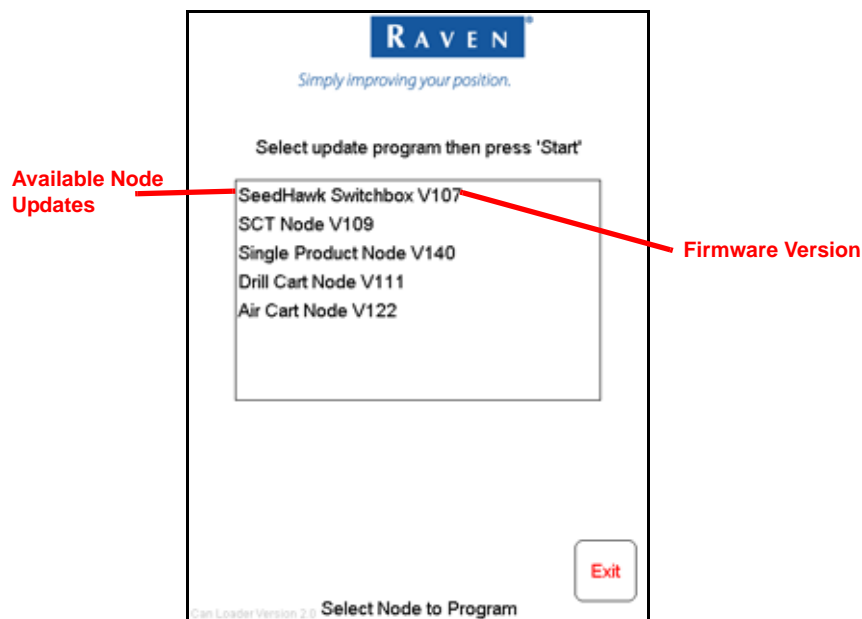
Note: If the field computer is already powered up, touch the **Menu** button and select **Exit**. Select the **Exit to Menu** option on the Exit Viper screen.

2. Insert the USB flash drive with the CAN Update program and required .hex files into an available USB port on the Viper Pro field computer.

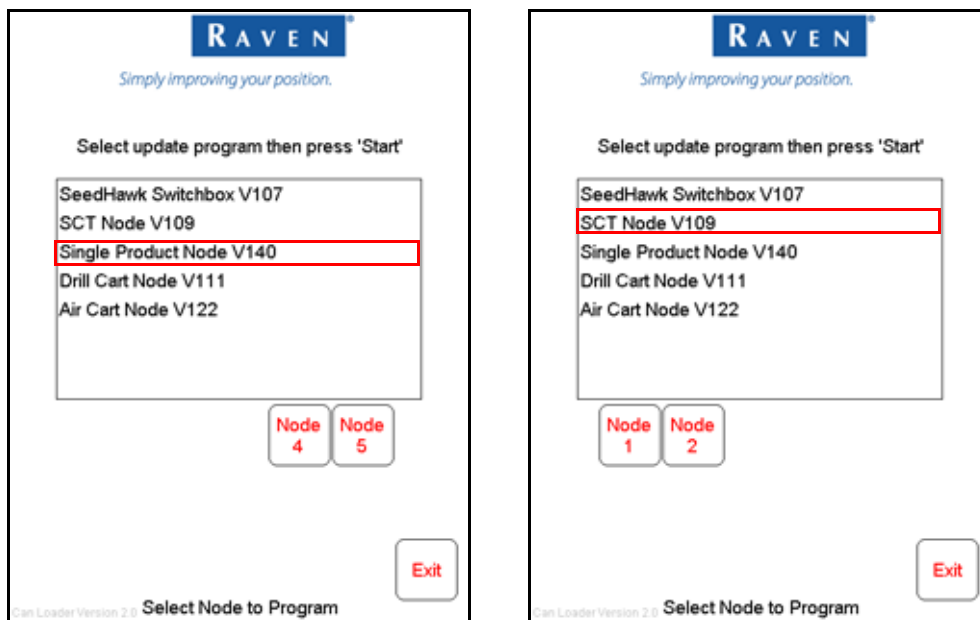
3. On the Program Selection Menu screen, select the option labeled **“Update CAN Nodes”** to begin the CAN Update Program.



4. The Update CAN Nodes screen displays a list of available node updates. This screen also displays the firmware version to which each node will be updated if the update is applied.



5. Touch the node update to apply.



Up to two SCT and single product nodes may be used in some applications. If more than one node is on the system, the node selection buttons will be displayed below the update list.

Up to five single product nodes may be used in some applications. If more than one node is on the system, the node selection buttons will be displayed below the update list.

6. To start the node update:
 - a. If a non-product node (i.e. Seed Hawk Switch Box, Drill Cart) is selected, touch the **Start** button in the lower right corner of the screen to begin the update.
 - b. For single product control nodes, select the **Node** button corresponding to the product node to update.
 - c. For SCT nodes, select SCT node 1 or node 2 to update the corresponding SCT node.

Note: If the Viper Pro cannot communicate with the selected node, the CAN Update Program will display an error. Troubleshoot the node and retry the update.

7. The Viper Pro begins communicating with the selected update. If communication is successful, the Viper Pro will begin the update by erasing the node's memory.

Note: The Viper Pro may take several minutes to prepare and apply the software update to the node.

8. When the update is completed, Viper Pro will display a Programming Complete prompt. Touch the **OK** button to continue.

Note: If errors are encountered during the node update re-apply the node update.

9. To update other nodes via the Viper Pro CANbus repeat step 5 through 8.

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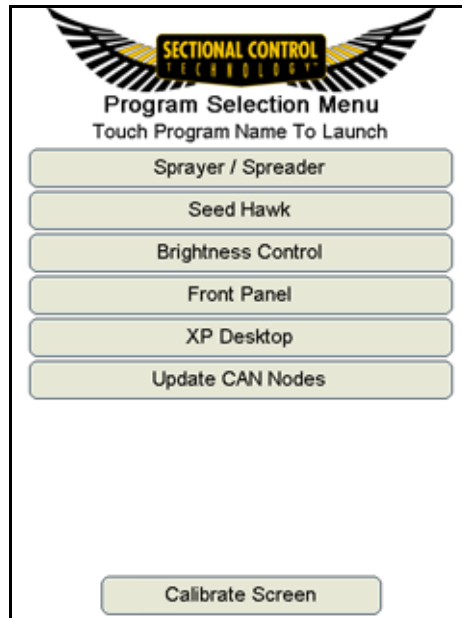
D

Using the Front Panel Program with the Viper Pro System

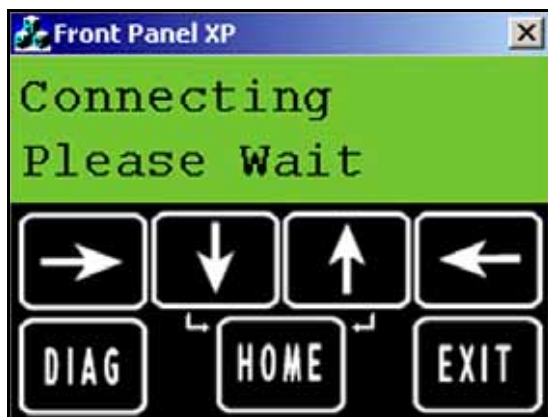
The Front Panel Program may be used to configure Raven DGPS receivers only (e.g. Invicta 110, 115, or Phoenix 200™).

Initializing the Front Panel Program

1. Press **Front Panel** from the Program Selection Menu.



2. After communication with receiver is established, the field computer may be used to navigate through the receiver menus by utilizing the buttons provided on the Viper Pro touch screen.



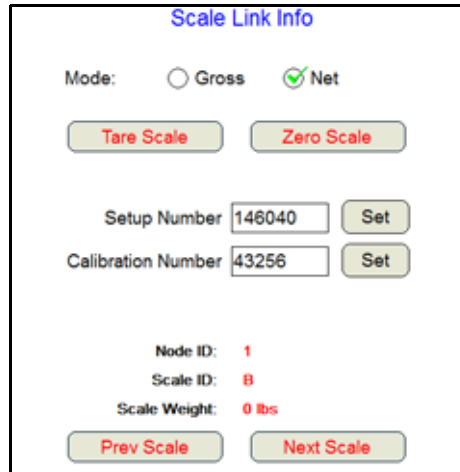
Note: Refer to the Operation Manual or Quick Start Guide for the specific Raven receiver used with the Viper Pro field computer. These documents may also be found on the Raven Applied Technology Division web site:

www.ravenhelp.com/

The Viper Pro is capable of interfacing with Digi-Star load cell systems to monitor the weight of product remaining in a bin during field operations.

To configure the Digi-Star load cell system:

1. Touch the **Product Control** area at the bottom of the Viper Pro main display screen.
2. Touch within the **Miscellaneous Settings** area to access the Miscellaneous Settings screen.
3. Touch the **Load Cell** button to display the Scale Link Info screen.



4. Touch the **Prev** or **Next** buttons to cycle through the load cells connected to the system.

The Scale Link Info screen displays the following information for the weigh scale system:

Mode. Select the mode for the load cell display.

When configured correctly, the:

- Gross mode will display the total weight (bin and product weight) currently on the load cell.
- Net mode will display the weight of the bin contents (product without bin).

Review the *Tare Scale* section and *Zero Scale* section below for details on setting the scale tare and zero.

Tare Scale. Touch the **Tare Scale** button to reset the current weight on the load cell (e.g. empty bin) to zero. It is recommended to check and set the tare as necessary prior to starting field operations each day to help ensure the most accurate operation.

Zero Scale. Touch the **Zero Scale** button to reset the current weight on the load cell to zero. It is recommended to zero the scale before any weight is placed on the load cell.

Setup Number. Refer to the Digi-Star load cell system documentation for information on the setup number.

Calibration Number. Refer to the Digi-Star load cell system documentation for information on the calibration number.

Node ID. Displays the Digi-Star scale link node identification number.

Scale ID. Displays the Digi-Star scale identification tag.

Scale Weight. The weight on the load cell, in the selected mode will be displayed in this area.

The Viper Pro is capable of reading information from an external weather station and recording this information into the application report files. The information being recorded to the report includes:

- Temperature
- Relative Humidity
- Dew Point
- Barometric Pressure
- Wind Speed
- Wind Direction
- Wind Gust

The Viper Pro can only read information from one specific model of weather station. This unit is the WatchDog[®] Sprayer Station Model 3349SS (P/N 117-0171-138) manufactured by Spectrum[®] Technologies, Inc. This system may be ordered through any Raven dealer.

For more information on this system contact Spectrum Technologies at (800) 248-8873.

Weather Station Activation Key

In order to use the weather station with the Viper Pro system, the weather module activation key (P/N 077-0180-030) must be purchased from a Raven dealer. Once the key has been purchased and registered on-line, the activation key must be entered into the Viper Pro. See Chapter 3, *Installation, Start Up, and Registration*, for help with registering and entering this information.

Connecting the Weather Station

If the Viper Pro is connected to a CAN control system, the weather station must be connected to the 'COM 2/ Console' connector on the Viper Pro main interface or chassis interface cable.

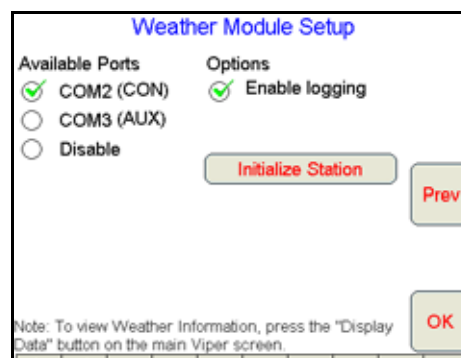
If the Viper Pro is connected to an external Raven serial controller, the weather station must be connected to 'COM 3/Light bar' on the Viper Pro auxiliary interface or chassis interface cable.

If the Viper Pro is using the Viper Pro combination cable (P/N 115-0171-744), connect the weather station to the 'Console' connector if using a CAN control system, or to the AUX connector if using an external Raven serial controller.

Comm Port Configuration

Once the system is properly powered and cabled, and the activation key has been entered into the Viper Pro, the Viper communications port must be configured for the weather station.

1. Press **Menu / Setup / Comm Ports**.
2. Press the **Next** button until the Weather Module Setup page is displayed.

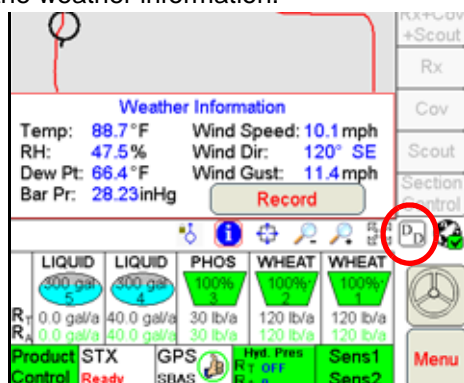


3. Select which comm port the station is connected to.

Note: To record weather information into the report file, ensure the **Enable Logging** is checked. If weather data is not needed, leave this option un-checked to help conserve memory on the field computer.

4. **Initialize Station** must be selected one time to configure the weather station for use with the Viper Pro.
5. Touch **OK** to complete the set-up.

To view weather information, touch the **Display Data** button on the lower right hand side of the Viper, and then touch in the data area to toggle to the weather information.



Note: If the Wind Direction heading displayed in the Weather Information does not appear as expected, re-initialize the Weather Station as described in the Comm Port Configuration section on page 260.

Press the **Record** button to log the current weather conditions into the application report. The record button will only display when in a job. The record button may be selected as many times as desired during the job, but only the information from the last button selection before the job is closed will be recorded into the application report.

APPENDIX

G

Wireless Communications and Remote Service

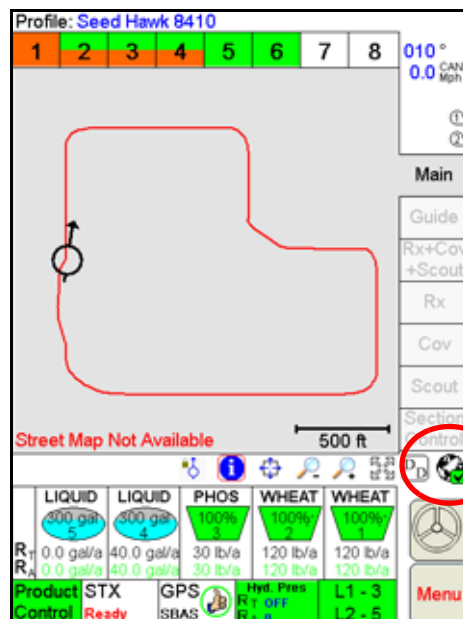
The Viper Pro field computer, with a Slingshot® Field Hub, allows the operator to wirelessly transfer application data back to the home or office and transfer prescription data from the office to the field without the hassle of driving back and forth between locations. This feature also adds the ability to allow service technicians and support specialists to remotely control the Viper Pro field computer, help is now just a touch away.

Via the Field Hub wireless router, the Viper Pro can also be used to keep up-to-date with the latest weather forecasts or crop prices from internet web sites while still managing product application.





Note: For instructions on installing and setting up the Slingshot Field Hub, refer to the Field Hub Quick Reference Guide provided with the wireless device.

Wireless Communication Status



The status of wireless communications is displayed on the Viper Pro main screen in the tool bar below the map.





The following icons may be displayed in the wireless status area:

	No Device Connected - No supported wireless device is connected to the ethernet port on the Viper Pro. This icon is also displayed if wireless communication is unavailable or has been lost.
	Communication OK - The status of wireless communication is good and no errors or alarms are present.
	Communication Error - An error has occurred with wireless communication or during a file transfer.
	Communication Lost or Unavailable - This icon will be displayed if the registration process has not been successfully completed.

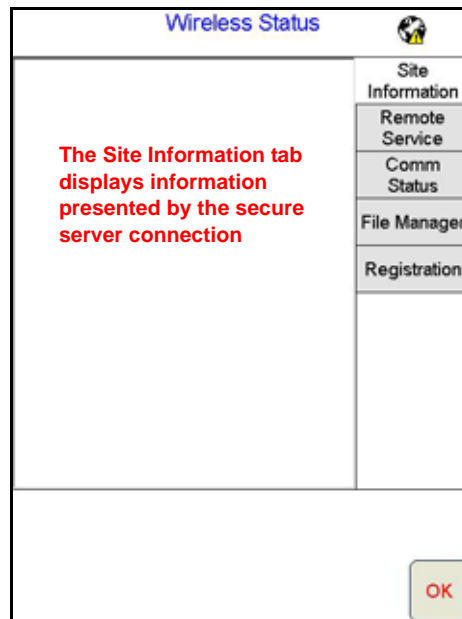
The wireless status symbols also display the file transfer status for any files to or from the Viper Pro field computer.

	Sync In Progress - The blue arrow symbol is displayed on the wireless status icon while the Viper Pro and the Slingshot [®] site are synchronizing.
	Files Received - The envelope symbol is displayed on the wireless status icon when files have been received by the field computer. When this symbol is displayed, touch the icon to display the File Manager tab.

Note: When the  or  symbols are displayed, touching the Communication Status icon will display the Connection Status tab on the Wireless Status screen. Touching the status icon at any other time will display the Site Information tab.

Wireless Status Screen

Touch the wireless status symbol displayed on the Viper Pro main screen to display the Wireless Status screen.



The Wireless Status screen displays information based on the tab selected on the right side of the screen. For details on the information displayed on each tab, refer to the following sections.

Site Information Tab

Displays information from the Slingshot® site.

Remote Service Tab

The Remote Service feature allows a service technician to view and control a Viper Pro field computer in the field from his or her service location and assist the machine operator diagnose or troubleshoot the system.

Note: *The service technician will be able to determine whether a remote service session is necessary to assist with any issues encountered with the Viper Pro field computer. Contact a local Raven dealer or technical service provider before starting the remote service feature.*

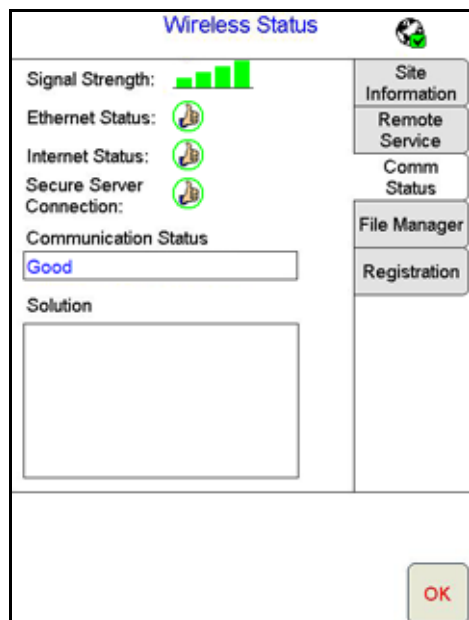
To begin a remote service session:

Note: *The remote service feature must be enabled when the field computer is registered for Slingshot services. Contact a local Slingshot dealer for additional assistance.*

1. Touch the Wireless Status icon on the Viper Pro main screen and select the Remote Service tab.
2. Touch the “Enable Remote Service” button. Have the code displayed on the screen available when contacting a local Raven dealer for support.
3. Read the code to the technician to allow them to view and control the Viper Pro system.

Comm. Status Tab

The connection status tab displays the following information:



- **Current Alarms** - Any current communication errors or alerts are displayed in this area.
- **Signal Strength** - Displays bars to represent the current strength of wireless signal. Four bars represent a strong signal.
- **Ethernet Status** - Displays the status of the connection via the ethernet port on the back of the Viper Pro.
- **Internet Status** - View the status of communication with the world wide web in this area.
- **Secure Server Connection** - The connection status with the secure server is displayed in this area.

Note: *If any error conditions are encountered, the Communication Status screen will display possible solutions.*

File Manager Tab

Access the File Manager tab to view a history of files recently transferred to or from the Viper Pro field computer.



Use the up or down arrows to scroll through the history of files sent from, or received by, the Viper Pro.

Touch a file from one of the lists to view file information such as the file type and size as well as the date and time the file was sent or received.

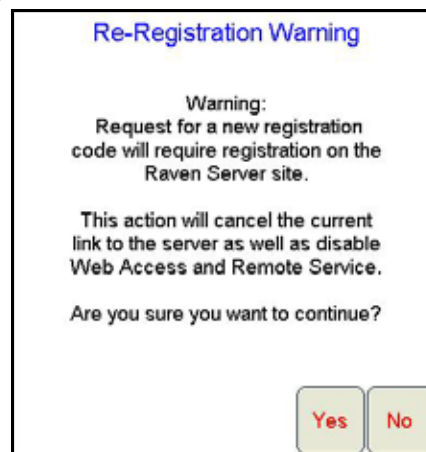
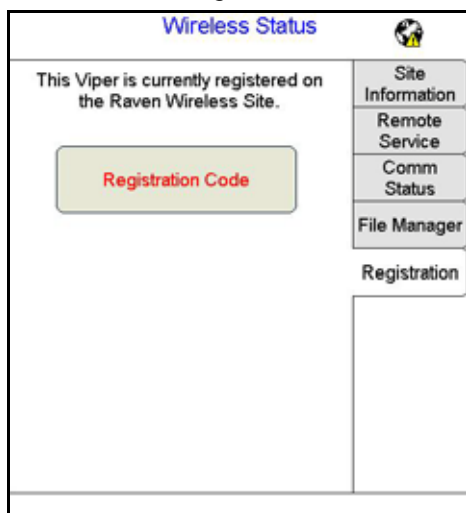
Note: *Do not use the Automatic File Maintenance feature to create reports for a Slingshot account.*

The Automatic File Maintenance feature does not export the types to a USB flash drive necessary for creating Slingshot reports and will remove job data from the Viper Pro. Job data transferred using the Automatic File Maintenance feature cannot be reinstalled onto the field computer for export to Slingshot. Refer to the USB File Transfer and Advanced File Maintenance section on page 208 for instructions on outputting the necessary file types.

Registration Tab

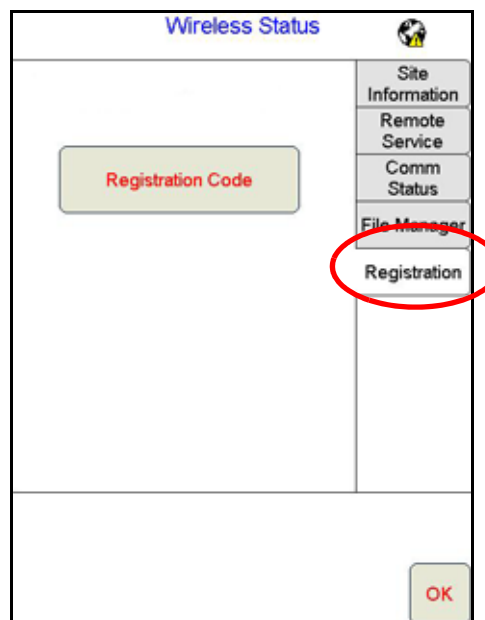
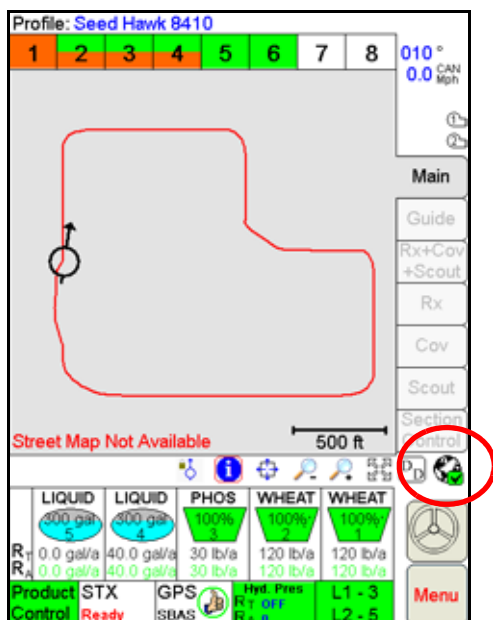
The Registration tab is used to register the Field Hub with the Slingshot® web service and activate the various features of wireless communication on the Viper Pro field computer.

Note: If the Field Hub has been registered previously, the Viper Pro will display the registration status above the “Registration Code” button. Touching the “Registration Code” button will display the Re-Registration Warning prompt below. To re-register the Field Hub, touch the “Yes” button and proceed with the registration instructions to re-register the Field Hub.



To register:

1. Touch the Wireless Status icon on the Viper Pro main screen and select the Registration tab.



-
2. Touch the "Registration Code" button to get a four digit registration code from the Slingshot® site.



3. With the registration code, login to the Slingshot® site.

www.ravenslingshot.com

Note: Be sure to enable the Remote Service and Web Access features if desired (recommended). These features may be enabled later by accessing the Slingshot® site.

To test wireless access:

1. Wait for the Viper Pro to automatically search for available files for transfer. This process may take up to five minutes.
2. If the Remote Service feature was enabled during registration, select the Remote Service tab and touch the "Enable Remote Service" button.
3. If a remote service session is enabled successfully, touch the button now labeled "Disable Remote Service."
4. Exit the Wireless Status screen by touching the **OK** button in the lower, right corner of the screen.
5. If the Web Access feature was enabled during registration, touch **Menu > Web** to open the Viper Pro internet browser and test the web access feature.

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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.



Seed Hawk®
Viper Pro™ Software Version 3.10
Calibration & Operation Manual
(P/N 016-3001-003 Rev C 6/14 E23275)

R A V E N On Board



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