Raven Cart Automation<sup>™</sup> Provisioning and Operation Manual



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# Chapter 1:

# **Important Safety Information**

#### NOTICE

Follow the operation and safety instructions included with the implement and/or controller and read this manual carefully before installing, servicing, or operating this Raven system.

- Park the machine where the ground is level, clean, and dry.
- Bleed pressure from the hydraulic system and leave the machine turned off for the duration of the installation or maintenance process.

Follow the operation and safety instructions included with the implement and/or controller. Before installing or operating this Raven system, review and understand the information presented on this site.

- Failure to follow safety instructions may lead to equipment damage, personal injury, or death.
- Review equipment operation with your local dealer and follow all safety information presented on this site.
- Contact a local Raven dealer for assistance with any portion of the installation, service, or operation of Raven equipment.
- Follow all safety labels affixed to system components. Be sure to keep safety labels in good condition and replace any missing or damaged labels. Contact a local Raven dealer to obtain replacements for safety labels.

Observe the following safety measures when operating the implement after installing this Raven system:

• Do not operate this Raven system or any agricultural equipment while under the influence of alcohol or an illegal substance.

- Be alert and aware of surroundings while operating this Raven system.
  - Determine and remain a safe working distance from obstacles and bystanders. The operator is responsible for disabling the system when a safe working distance has diminished.
  - Do not operate the implement on any public road with this Raven system enabled.
  - Maintain control of the vehicle at all times during operation. For example,
    - Remain in the operator seat while the system is enabled and disable automated Raven controls before exiting the operator seat.
    - Maintain control of safety devices such as E-Stops at all times during operation.
  - Disable this Raven system prior to starting any maintenance work on the implement or components of this Raven system.
- Do not attempt to modify or lengthen any of the system control cables. Extension cables are available from a local Raven dealer.

## Field Computers, Displays, and Control Consoles

- If the display will not be used for an extended period, it is best to remove the display from the machine and store it in a climate controlled environment. This may help to extend the service life of electronic components.
- To prevent theft, secure the display and GNSS antenna when leaving the machine unattended.

## Autonomous Equipment

- Improper use of autonomous equipment, or faulty route planning, may cause property damage, personal injury, or death.
  - Instruct personnel working in the operational area and vicinity of the autonomous tractor of safety procedures and use of the tractor Lockout Switch.
  - As an autonomous vehicle, the machine may move without an operator in the seat. Maintain a safe distance from the machine while the OMNiDRIVE<sup>™</sup> system is enabled for autonomous operation.
  - Do not ride in the autonomous vehicle during autonomous operation. The vehicle may change direction, speed, or stop without warning.
- The OMNiDRIVE<sup>™</sup> system is a supervised autonomous system. It is the site supervisor or operator's responsibility to monitor the condition of the autonomous vehicle.
  - Daily inspections are required to ensure that the tractor and grain cart are in operational condition.
    - The OMNiDRIVE<sup>™</sup> system does not monitor mechanical systems on either the tractor or grain cart.
    - During autonomous operation, no one will be in the tractor to observe the tractor or grain cart. It is recommended to check the operational condition of the tractor and grain cart periodically over the course of daily autonomous operation.
  - Monitor field conditions and the operational area. Suspend autonomous operations when safe conditions or hazards exist for autonomous operations.
  - By accepting a planned route, you are accepting all responsibility for the operation of the autonomous equipment and the route which was planned.
    - Ensure there are no obstacles in the path of the equipment prior to movement.

## Hydraulic Safety

When installing or servicing a hydraulic system or hydraulic components, be aware that hydraulic fluid may be extremely hot and under high pressure. Caution must be exercised.

• Always wear appropriate personal protective equipment when installing or servicing hydraulic systems.

- Never attempt to open or work on a hydraulic system with the implement running.
- Always take care when servicing or opening a system that has been pressurized.
- The implement or machine must remain stationary and switched off with booms or implement sections unfolded and supported during installation or maintenance.
- Any work performed on the hydraulic system must be done in accordance with the machine manufacturer's approved maintenance instructions.
- Before installing hydraulic components, ensure there are no issues with the machine hydraulic system (e.g. pump issues, faulty hydraulic motors, fine metal deposits in the hydraulic lines, etc.).
- Take precautions to prevent foreign material or contaminants from being introduced into the implement hydraulic system. Contaminants that are able to bypass the hydraulic filtration system will reduce performance and may damage hydraulic components.
  - Verify that the hydraulic system is using fresh oil and the filters have been changed.
- Stand clear of the implement when starting the system for the first time after installing or servicing hydraulic components in case a hose has not been properly connected or tightened.

#### 

### **Electrical Safety**

- Always verify that power leads are connected to the correct polarity as marked. Reversing the power leads could cause severe damage to the Raven system or other components.
- To prevent personal injury or fire, replace defective or blown fuses with only fuses of the same type and amperage.
- Do not connect the system power cable to the vehicle ignition or battery until all system components are mounted and all electrical connections are completed.
- Always start the machine before initializing this Raven system to prevent power surges or peak voltage.
- To avoid tripping and entanglement hazards, route cables and harnesses away from walkways, steps, grab bars, and other areas used by the operator or service personnel when operating or servicing the equipment.

 Provided power leads may be shortened by properly trained individuals only. No other modifications to cabling are allowed e.g. increasing power lead lengths, or modifying any other aspect of cabling in the system. If power leads are shortened they must be terminated with provided spare ring terminals or with installer supplied ring terminals listed by the ring terminal manufacture as being compatible with the wire gauge being used.

## Machine Safety Systems

- Use all provided safety systems on the machine when operating the machine with the Raven system.
- Seat belts and restraints must be used when an operator is in the cab.
- Do not disable any machine-provided safety systems, including but not limited to audible alarms, alarm lights, etc.

## **Touch Screen**

- Only touch the touch-screen with your finger or by using a special touch-screen stylus or pen. Operating the touch-screen with sharp objects may cause permanent damage to the screen.
- Only clean the screen using a damp cloth. Never use caustic or other aggressive substances.

# **Recommendations and Best Practices**

## **Point of Reference**

Instructions provided generally assume you are standing behind the machine facing toward the cab. More specific orientation may be provided as necessary to complete procedures.

## **Preparing for Install**

- Ensure there are no issues with the machine hydraulic system (e.g., pump issues, faulty hydraulic motors, fine metal deposits in the hydraulic hoses, etc.).
- Verify that the machine hydraulic system is using fresh oil and that the filters have been recently changed.
- Ensure there are no issues with the steering system (e.g., worn bushings, faulty tie rod ends, improperly adjusted steering components, etc.)

## **Aerials and Signal Interference**

Due to the relatively low broadcast power from satellites, all GNSS receivers and aerials tend to be susceptible to sources of signal noise and interference as compared to terrestrial signals (i.e. radio or cellular).

**Note:** Poor GNSS signal reception may cause other systems which rely on GNSS solutions (e.g. auto-steer systems, rate control systems, etc.) to disengage or may cause undesired operation or results.

The following recommendations are intended to provide an optimal environment for GNSS systems and provide the best up-time results, even as sources of interference may spike throughout the day.

- Mount GNSS antennas with a clear, unobstructed view of the sky.
  - A minimum clearance of 1 m [39 in] is recommended around the GNSS antenna to help avoid common issues with signal interference. Do not mount cellular, radio, or other GNSS antennas within this area.
  - Mount the GNSS antenna to the tallest point of the machine. Avoid mounting the antenna in a location where obstructions (e.g. bins/hoppers, cab roof lines, equipment frame or structural elements, etc.) may rise into the antenna view.

**Note:** The antenna view typically starts 5° to 10° above horizontal from the base of the antenna and extends over the skyward face of the receiver/antenna.

- GNSS is a line-of-sight system. A clear path must exist between the satellite and the GNSS antenna.
  - Obstructions such as buildings, tree branches and limbs, as well as components of the vehicle such as a fiberglass or metal roof, and etc. may cause signal multipath or completely block the GNSS receiver.
- Electrical and magnetic fields can interfere with GNSS or L-Band signals.
  - Avoid mounting GNSS receivers or antennas near components such as radio or cellular antennas, electrical motors, generators, alternators, strobe lights, radio transmitters, radio or cellular antennas, etc.
  - Over-head power lines, microwave dishes, radar, other active antennas, etc. can interfere with GNSS signal.
- Mount the Field Hub cellular and diversity antennas at least 1 m [39 in] apart. Avoid mounting other cellular, radio, or GNSS aerials within this area.

## **Harness Routing**

The word "harness" is used to describe any electrical cables and leads, both bundled and unbundled. Use the following guidelines and recommendations when connecting and routing harnesses while installing or maintaining this Raven system:

- Leave protective caps/covers over harness connectors until needed to avoid dirt and moisture from contaminating electrical circuits.
- Secure the harness to the frame or solid structural members at least every 12 in [30 cm].

- Follow existing harness runs already routed on the implement as much as possible. Proper harness routing should:
  - Secure harnessing and prevent the harness from hanging below the implement.
  - Provide sufficient clearance from moving components and operational zones around shafts; universal joints and suspension components; pulleys, gears, belts, and chains; moving linkages, cylinders, articulation joints, etc.
  - Protect harnessing from field debris and surrounding hazards (e.g. tree limbs, fence posts, crop stubble, dirt clumps or rocks that may fall or be thrown by the implement).
  - Protect harnessing from sharp bends, twisting, or flexing over short distances and normal implement operation.
  - Connectors and splices should not be located at bending points or in harness sections that move.
  - Ensure sufficient length for free movement of the implement during normal operation and prevent pulling, pinching, catching, or rubbing, especially in articulation and pivot points. Clamp harnessing securely to force controlled movement of the harness.
  - Avoid abrasive surfaces and sharp edges such as sheared or flame cut corners, fastener threads or cap screw heads, hose clamp ends, etc.
- Do not connect, affix, or allow harnessing to come into contact with components with high vibration forces, hot surfaces, or components carrying hot fluids beyond the temperature rating of harness components.
  - Harnessing should be protected or shielded if routing requires the hose to be exposed to conditions beyond harnessing component specifications.
- Avoid routing harnesses in areas where damage may occur due to build up of material (e.g. dirt, mud, snow, ice, etc.).
- Avoid routing harnesses in areas where the operator or service personnel might step or use as a grab bar.

**Note:** Avoid applying direct spray or pressure washing of electrical components and connections. High pressure streams and sprays can penetrate seals, cause corrosion, or otherwise damage electrical components. When performing maintenance:

• Inspect electrical components and connectors for corrosion, damaged pins or housings, etc. Repair or replace components or harnessing as necessary.

- Ensure connectors are kept clean and dry. Apply dielectric grease to the sealing surfaces of all connections exposed to moisture, dirt, debris, and other contaminates. Repair or replace harnessing as necessary.
- Clean electrical components with pressurized air, aerosol electrical cleaning agent, or low pressure rinse.
- Remove visible surface water from electrical components and connections using pressurized air or an aerosol cleaning agent. Allow components to dry thoroughly before reconnecting cables.

# **Chapter 2:**

# **Field Provisioning Overview**

The field provisioning procedures configures the components of the Raven Cart Automation<sup>™</sup> system to the tractor and combine for proper machine-to-machine communication.

Complete the following task to provision the components of the Raven Cart Automation<sup>™</sup> system.

## **Raven Cart Automation™ Tractor**

- Raven Cart Automation<sup>™</sup> Setup-Tractor
  - CNH Guidance Calibrations (Must be completed by a CNH dealer)
    - Wheel Angle Sensor Cal
    - Steering Valve Cal
    - Roll Calibration (If not already completed)
  - "Setup the AFS Vector Pro Output to the RS Lite" on page 40
  - "Setup the Tractor RCU" on page 56
  - "Setup the Tractor Vehicle Navigation" on page 60
  - "Raven Cart Automation™ Tractor Calibration" on page 72

## **Raven Cart Automation™ Combine**

- Provision the GPS Receiver
- "Setup the Combine RCU" on page 128
- "Setup the Combine Vehicle Navigation" on page 134
- "Raven Cart Automation™ Combine Calibration" on page 142

# Raven Cart Automation<sup>™</sup> Tractor Provisioning Overview

The following procedures are required to complete the tractor provisioning.

CVT Transmission	PST Transmission
UCM Unlock	UCM Unlock
UCM Update	UCM Update
Set up GPS	DEC Update
Raven Cart Automation™ Tractor Cal- ibration	Update APM Field Sensitivity
Set the Transmission Aggressiveness	Update APM Engine Speed Minimum and Max- imum
	Set up GPS
	Raven Cart Automation™ Tractor Calibration
	Set the Constant Engine Speed to Off

# Unlock Propulsion and Steering on the Universal Control Module (UCM)

The UCM will be required to be unlocked for both CVT and PST tractors.

#### **Required Tools:**

• Laptop with CNH EST Tool

# Locate the Universal Control Module (UCM) Serial Number

- 1. Locate the UCM serial number in the Pro 1200 display.
- 2. Navigate to by pressing the Menu>System>CAN Status>UCM>Drop down lists S/N and current software version.
- 3. Send the serial number information to the CNH contact requesting Class 3 steering and speed unlocks.
- 4. Turn the machine on.
- 5. Plug the laptop into the machine's primary port.
- 6. Open EST and press the **Detect Vehicle** button.

BRAND SELECTION					
<u>CASE II</u>	B NEW HOLLARD AGRICULTURE	STEVR	flexicoil		
		B NEW HOLLAND CONTINUETON	Mîller	KOBELCO	
	DETECT VEHICLE		CANCEL		

7. Verify that the correct machine is selected and press **OK**.



8. Verify that the correct Vehicle Pin is displayed.

**Note:** If the Vehicle Pin is not populated you should be able to move onto the next step.

		-
The Service I ool detected the following: UEHICLE PIN: Is this correct?	JJAMG340PLRK04227	7
☞ Always enter a new Vehicle PIN everytim	CANCEL NO	YES

9. A window will open asking if you are authorized to make changes to this vehicle. Select **Yes**.

	ITROLLER STA	CAN Diagnostic Connector - Primay         PIN:         JJAING348PLBX84227	
CONTROLLER ACM Armrest Centrol Hodule	Electroni	HARNWARE HERSINN SOFTWORE HERSING COMMUNICATION STATU	15
BCM Body Control Nodule DEC priveiine Electronic Gontrol EEU Engine Costrol Unit GDSP AFS Pro 1200 Display IEM Instrument Gontrol Nodule IM Immobilizer Nodule PEM Process / Connectivity Nodule UEM Universal Control Nodule	0	OP LIN     Confirm the vehicle (equipment owner has concented to diagnostic databeng     manovad from the vehicle (equipment and if fracessary vehumad to CNA for the     OP LIN     OP     OP LIN     OP     OP	
		YES NO	
		View EST Privacy Statement	

10. A window will open asking if you want EST to automatically retrieve vehicle status report information. Select **No**.

**Note:** Yes, can be selected but it will add more time to the updating process.

00470	CLED CTATLE . CAN Demodel Comment	DIN	LIGHC349PL BK04252	-
CONTR	ULLER STREUS - CAN Pagnotic Connector - Pr	may FIR	· Johng Hernnetzer	
CONTROLLER	HARDVARE VERSION	SOFTWARE VERSION	COMMUNICATION STATUS	
ACH Armest Control Hodule	1.0.0.0	01.05.00.00	ON LINE	
BCM Body Control Module	1.0.0.2	1.10.0.0	ON LINE	
DEC Driveline Electronic Control	0.0.1	001.007.000.080	DH LINE	
ECU Engine Control Unit		00 00 00 D	ON LINE	
GUSP HES Pro 1200 Display	Electronic Service Tool		× UN LINE	
Ith Imaghilizer Module	A service of the serv		OFF LTHE	
PCN Pracess / Connectivity Module	O De upper the EST to a	utomatically esteined unbiring tota	ON LINE	
UCH Universal Control Module	report information?	utomatically retrieve venicle statt	ON LINE	
		1	1	
		yes No	2.	

11. Confirm that the EST is connected to the primary port and press **OK**.

CONTROLLEN ACH Armerst Control Hoduly BCH Body Control Hoduly DEC Driveline Electroni CEU Engine Control Unit GOSP AFS Pro 1200 Displ. ICH Instrument Control IN Imsolilizer Module PCH Process / Connectivy UCH Universal Control I	Table Vence Corrector CGAN Diagnostic Connector - Tus 4 CGAN Diagnostic Connector - CAb CGAN Diagnostic Connector - Office Diagnostic Connector - Store CGAN Diagnostic Connector - Storering	Programmed Component Suppose BCF Body Centrel Medule CFF Body Centrel Medule CFF Body Centrel Medule CFF BFF Pre 1296 Bisplay CFF BFF Pre 1296 Bisplay CFF BFF Pre 1296 Bisplay CFF BFF Pre 1296 Bisplay CFF Briverest Contrel Medule FFF Berlevent Contrel Medule SFF Body Centrel Medule SFF Body Centrel Medule SFF Body Centrel Medule SFF Body Centrel Medule SFF Pre 1296 Bisplay CFF Pre 1296 Bisplay CFF Precess / Contrel Medule SFF Pre 2008 Centrel SFF Pre 2008 Centrel SFF Pre 2008 Centrel SFF Pre 2008 Centrel SFF Precess / Centrel Medule SFF Briverest Centrel Medule SFF Briverest Centrel Medule SFF Precess / Centrel Medule	
		Communication Adapter Required	
		See Cable Help	

- 12. Press the **Configuration Button** in the top row.
- 13. Navigate to the Unlock Features Interface option.
- 14. Once highlighted in blue press the **Configure Selected Item** button.

	CONFIGURATION + CAN Diagnostic Connector + Primary	PIN: JJAMG340PLRK04227	
CONFIGURATION ITEM SELECTION			
Engine Hours Configuration Engine Restart Counter Reset / Tosing Status and Information	/ Unlock Inducement	^	
General Configuration Innobilizer FOS Maintenance			
Machine Statistical Data Log Replacement of Catalyst - Rese	et ECJ Data		
Beneficience of the Court from			
Replacement of the Crank Case Replacement of the Nox Downstr Replacement of the Nox Hostrea	Pressure Sensor - Reset ECU Data rean Sensor - Reset ECU Data m Sensor - Reset FCU Data		
Replacement of the Grank Case Replacement of the Nox Downstr Replacement of the Nox Upstree Replacement of the Rail Press Replacement of the Rail Press	Pressure Sensor - Reset ECU Data rean Sensor - Reset ECU Data an Sensor - Reset ECU Data are Motoring Unit - Reset ECU Data are Relief Ualve (PRM) - Reset ECU Data		
Replacement of the Grank Case Replacement of the Nox Downstr Replacement of the Nox Upstree Replacement of the Rail Preson Replacement of the Rail Press Replacement of the SCR Dosing Retrieve Uphicia Status Report Technick	Pressure Security (First ECU Data and Security First ECU Data are Motoring Unit - Reset ECU Data are Motoring Unit - Reset ECU Data Module - Reset ECU Data		
Replacement of the Crank Case Replacement of the Nox Dowstr Replacement of the Nox Doystre Replacement of the Rail Pressu Replacement of the ScR Dosing Retrieve Vehicle Status Report Transmission Calibration Reset Unlock Feature Interface Vehicle Pairing To Immobilize	Pressure Security Point ECU Data sons Sensor - Reset ECU Data we Motoring Unit - Reset ECU Data me Motoring Unit - Reset ECU Data Module - Reset ECU Data	_	
Rejlacement of the Grank Case Replacement of the Nox Downstr Replacement of the Nox Upstree Replacement of the Nail Press Replacement of the SCR Dosing Retrieve Uchicle Status Report Trinnmission Calibration Resot Uchicle Paring To Immebilizer Uchicle Speed Registration	Pressure See Bear Print ECU Data see Service - Reset ECU Data we Motoring Unit - Reset ECU Data we Motoring Unit - Reset ECU Data Module - Reset ECU Data		
Rejlacement of the Grank Case Replacement of the Nox Downstr Replacement of the Nox Upstree Replacement of the Nail Press Replacement of the SCR Dosing Retrieve Uchicle Status Report Trunnission Calibration Rost Uchicle Streing To Immedilized Uchicle Speed Registration View Uchicle Information	Pressure Seense - Perst ECU Data we many the Perst ECU Data we Mature Merit ECU Data we Mature Haif Ulau (PHM) - Rest ECU Data Module - Reset ECU Data to to to to to to to to to to	v	
Rejlacement of the Grank Case Replacement of the Nox Downstr Replacement of the Nox Upstree Replacement of the Nail Press Replacement of the SCR Dosing Retrieve Vehicle Status Report Trunnission Gilibratian Rost Uchicle Speed Registration View Vehicle Isformation	Provingene Seeme Re- Province ECU Data We Servinger - Revert ECU Data we Metorzing Unit - Revert ECU Data me Heling Unit - Revert ECU Data Module - Reset ECU Data to Unit	v	
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Replacement of the Grank Case Replacement of the Nox Downstr Replacement of the Nox Upstree Replacement of the Rail Press Replacement of the SGR Dosing Retrieve Vehicle Status Report Truncations in Calibratian Resol Incode Status Report Uncode Status Report Uncode Status Report Vehicle Speed Registration View Vehicle Information	Then Safeton - Recet EGU Pack an Sensor - Recet EGU Pack are Motoring Unit - Reset EGU Data are Motoring Unit - Reset EGU Data Rodule - Neuet EGU Pack Rodule - Neuet EGU Pack - Unit	v	
Rejlacement of the Grank Case Rejlacement of the Nox Downstr Replacement of the Nax I Press Replacement of the Sail Press Replacement of the Sail Press Replacement of the Soft Dowling Transmission Calibratism Resol Union Fourteen Calibratism Resol Union Fourteen Calibratism Resol Union Fourteen Calibratism Resol Union Fourteen Calibratism View Unicie Informatism	Ton Saresor - Rest EGD Rock Data an Sensor - Reset EGD Data are Metoring Unit - Reset EGD Data are Metoring Unit - Reset EGD Data Rodule - Neset KGD Bata Todule - Neset KGD Bata		

15. Enter the activation key that was received from the CNH contact and enter it into the **Enter Activation Code** box.

	STATUS. FEADY TO	D SEND			 
	UCM SERIAL NUMBER:	Г	2828188337		
NEGURATIONITEM SE Engine Hours Cor Engine Restart (	ENTER ACTIVATION CODE	Γ	1F473390ERFCBR768E16431CER1C14CE		
Engine Status Ar Semeral Configur (mmobilizer FOB Machine Statist) Realacement of (	RETRIEVE PARAMETERS		SEND ACTIVATION CODE		
Replacement of t Replacement of t Replacement of t	REQUEST ACTIVATION	PARAMETER DESC	TIPTION	CURRENT VALUES	
Replacement of Replacement of Retrieve Vehicle		ISObus Class3 ISObus Class3 ISObus Class3	Inte Speed Control Option Steering Control Option	Disabled Disabled Disabled	
Indok Feature Jehicle Pairing Jehicle Speed Re					
JIW VENICIE IN					

- 16. Check all three boxes by each unlock option.
- 17. Press the **Send Activation Code** button.

	STATUS READY TO	D SEND				-	 _
	UCM SERIAL NUMBER:	Γ	21	28100337			
Engine Hours Cor	ENTER ACTIVATION CODE:	Γ	1F47339888FCB8768E164310	CEA1C14C6			
Engine Restart ( Engine Status Ar General Configu Immobilizer FOB Machine Statist; Replacement of (	RETRIEVE PARAMETERS		SEND ACTIVATION CODE				
Replacement of t Replacement of t	REQUEST ACTIVATION	PARAMETER DESC	RIPTION		CURRENT VALUES	_	
Replacement of t Replacement of t	Ø	ISObus Class3 ISObus Class3	Base Speed Control Option		Disabled Disabled		
Transmission Cal Unlock Frature	Ø	ISObus Class3	Steering Control Option		Disabled	1	
Vehicle Speed Re View Vehicle Inf							

- 18. A window will open and complete with instructions that need to be completed.
- 19. Turn the machine off.
- 20. After all of the controllers are powered down turn the machine to On.

#### 21. Select Ok.

STATUS SENDING C	OMPLETE			
UCM SERIAL NUMBER:		282818833	7	
ENTER ACTIVATION CODE:		1F473390BAFCBA76AE16431CEA1C14C	6	
RETRIEVE PARAMETERS	1	SEND ACTIVATION CODE		
REQUEST ACTIVATION	Eectroni	Service Tool	CJERENT VALJES	
	15 15 15	Rease turn the vehicle's key switch OFF and then back ON.	Disabled Disabled Disabled	
		OK	1	
	STATUS SENDING CI UCM SERIAL NUMBER: ENTER ACTIVATION CODE: RETRIEVE PARAMETERS REQUERT ACTIVATION	STATUS SENDING COMPLETE UCM SERIAL NUMBER: ENTER ACTIVATION CODE:	STATUS SERIONS COMPLETE UCM SERIAL NUMBER: ENTER ACTIVATION CODE:  RETRIEVE PARAMETERS ESCHORE Sarvice Tool  REQUEDT ACTIVATION IS IS Votenthis a completed, disk on the OK button.  OK	STATUS SERUNS COMPLETE UCM SERIAL RUMBER: 2828188337 ENTER ACTIVATION CODE: 1P47339884FC887568E16431CEA1C1426 RETRIEVE PARAMETERS Extensic Service Tool Ex

- 22. The current values for the unlock options should have changed from Disabled to Enabled.
- 23. Press Exit.

	STATUS: RETRIEV	ING COMPLETE		 
	UCM SERIAL NUMBER	2028100337		
NFIGURATION ITEM SE Ingine Hours Cor Ingine Restart ( Ingine Status Ar	ENTER ACTIVATION CODE:	[		
eneral Configui mnobilizer FOB lachine Statisti leplacement of (	RETRIEVE PARAMETERS	SEND ACTIVATION CODE		
eplacement of ( eplacement of ( eplacement of ( eplacement of (	REQUEST ACTIVATION	PARAMETER DESCRIPTION	CURRENT VALUES	
eplacement of ( eplacement of ) etrieve Vehicle rangeission Ca		ISObus Class3 Base ISObus Class3 Speed Control Option ISObus Class3 Steering Control Option	Enabled Enabled Enabled	
nlock Feature chicle Pairing chicle Speed Re iew Vehicle Inf				

# Update the Universal Control Module (UCM)

The UCM will be required to be updated for both CVT and PST tractors.

#### **Required Tools:**

- Laptop with CNH EST Tool
- UCM Software
- 1. Turn the machine on.
- 2. Plug the laptop into the machine's primary port.
- 3. Open EST and press the **Detect Vehicle** button.

BRAND SELECTION					
<u>CASE II</u>	B HEW HOLLARD AGRICULTURE	STEYR	flexicoil		
		B HEW HOLLAND CONTINUETON	Mîler	KOBELCO	
	DETECT VEHICLE	1	CANCEL	_	

4. Verify that the correct machine is selected and press **OK**.



5. Verify that the correct Vehicle PIN is displayed.

**Note:** If the Vehicle PIN is not populated you should be able to move onto the next step.

The Parcine Tool data and the following		
UENTICLE PIN Is this correct?	а JJAMG340PLRK	84227
✓ Always enter a new Vehicle PIN ever	CANCEL NE	YES

6. A window will open asking if you are authorized to make changes to this vehicle. Select **Yes**.

	ITROLLER STA	US - CAN Diagnostic Connector - Princey PIN: JJANG342	3PL#K04227
CENTROLLER ACM - Ararest Control Module BCM - Body Control Module DEG - Driveline Electronic Control ECU - Engine Control Unit CESP AFS Pro 1200 Display IGM - Instrument Control Module IM - Innobilizer Module PCM - Process / Connectivity Module UCM - Universal Control Module	Electroni	HORDWAINE UERSTON Service Tool I confirm the vehicle / equipment owner has concented to diagnostic data being removed from the vehicle / equipment and if necessary vetured to DNH for the purposes of manating the product within its design specification as described in the EST license terms, which have been explained to the owner of the vehicle / equipment.	AT 10M STATUS ON LINE ON LINE ON LINE ON LINE ON LINE ON LINE ON LINE ON LINE
		YES NO	
RETRIEV	VERSION INFO	RMATION FOR THE SELECTED CONTROLLER	

7. A window will open asking if you want EST to automatically retrieve vehicle status report information. Select **No**.

**Note:** Yes, can be selected but it will add more time to the updating process.

00470	CLED CTATLE . CAN Describe Comments	DIN	LIGHC349PL BK04252	-
CONTR	ULLER STREUS - CAN Pagnotic Connector - Pr	may FIR	· Johng Hernnetzer	
CONTROLLER	HARDVARE VERSION	SOFTWARE VERSION	COMMUNICATION STATUS	
ACH Armest Control Hodule	1.0.0.0	01.05.00.00	ON LINE	
BCM Body Control Module	1.0.0.2	1.10.0.0	ON LINE	
DEC Driveline Electronic Control	0.0.1	001.007.000.080	DH LINE	
ECU Engine Control Unit		00 00 00 D	ON LINE	
GUSP HES Pro 1200 Display	Electronic Service Tool		× UN LINE	
Ith Imaghilizer Module	A service of the serv		OFF LTHE	
PCN Pracess / Connectivity Module	C De upumpet the EST to a	utomatically esteined unbiring tota	ON LINE	
UCH Universal Control Module	report information?	utomatically retrieve venicle statt	ON LINE	
		1	1	
		yes No	2.	

8. Confirm that the EST is connected to the primary port and press **OK**.

CONTROLLER       CON Diagnostic Connector - Cab CON Diagnostic Connector - Cab CON Diagnostic Connector - Cab CON Diagnostic Connector - Cab CON Diagnostic Connector - ISOUUS CON Diagnostic Connector - ISOUUS CON Diagnostic Connector - Steering       PCM Structure I Bails DCD Priveline Electronic CON Diagnostic Connector - Steering         CON Figure 1 (0) Control (0) Connector - Steering       PCM Structure 1 (0) Control (0) Connector - Steering         CON Diagnostic Connector - Steering       PCM Structure 1 (0) Control (0) Connector - Steering         CON Diagnostic Connector - Steering       PCM Structure 1 (0) Control (0) Connector - Steering         CON Diagnostic Connector - Steering       PCM Structure 1 (0) Control (0) Co		Select Vehicle Connector	Programming Components Supported	
Communication Adapter Required Real Cable Help CABLE AND ADAPTER HELP	CONTROLLER IGI Grovest Control Hodul Driveline Electron CU Engine Control Unit CU Engine Control Unit DSF AFS Pro 1200 Displ III Innobilizer Hodule CM Process / Connection Universal Control I	COM Diagnostic Connector - Bus 4 COM Diagnostic Connector - Cab CAM Diagnostic Connector - CMSS COM Diagnostic Connector - ISOUUS COM Diagnostic Connector - ISOUUS COM Diagnostic Connector - Sterring CAM Diagnostic Connector - Sterring	BCH       formerat Control Fadula         DEC       Dely Control Fadula         DEC       Dely Evention Fadula         EQ       Dely Evention Fadula         EQ       Dely Evention Fadula         EVENT       Dely Evention Fadula         EVENT       Dely Evention Fadula         EVENT       Dely Evention Fadula         EVENT       Events         EVENT       Events	
See Cable Help Calle AND ADAPTER HELP			Communication Adapter Required	
CABLE AND ADAPTER HELP			See Cable Help	
			CABLE AND ADAPTER HELP	

- 9. Press the **Programming Button** in the top row.
- 10. Press the Set Up Controllers for Downloading button.

	6 월 11 7 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		
	PROGRAMMING - CAN Diagnostic Connector - Primary	PIN: JJANG348PLRK84227	
	SET UP CONTROLLERS FOR DOWNLOADING		
nholler Selection	UU		
CONTROLLER			
ACH Armrest Control Hod	te		
BCM Body Control Hodule			
DEC Driveline Electroni	Control		
* ECU Engine Control Unit		View Envirole: Information	
GDSP AFS Pro 1200 Displa			
Iten Instrument control	agrie		
In Innotitizer Moule	4.10		
ULE UIE Hedete ENCINEER			
Controller is in programming mode and is av	able to be programmed.		
X Costroller is in normal mode and is available	i be programmed.		
wnłoadFile Selection		1	
		Biowae	
Vew Download File Internation			

- 11. Follow the on screen instructions.
- 12. Turn off the vehicle and let the Pro 1200 display shut down completely.
- 13. Once all the controllers are completely shut down, turn key switch to on but do not start the engine.

#### 14. Select Ok.

PRDSPAJ SET U	MMNG - CAN Disgnostic Connector - Pimary PIN: JJaMG340PLRK04227 P CONTROLLERS FOR 60WHL0ADING	
CONTROLLER           BCH         Anarcest Control Module           BCH         Body Control Module           DEC         Driveline Electronic Control           ECU         Engine Control Vnit           GDSF         AFS Pro 1200 Display           ICH         Instrument Control Module           IM         Inmobilizer Module           UCH         Universal Control Module           US         UJS           US         UJS           Controles in programming mode and is available to be programmed.           Controles in normal mode and is available to be programmed.	Electronic Service Tool X 1. Please set the pack brake (if installici), then turn the visities a set sworth off. 3. Turn he vehicle key source off. 3. Turn he vehicle key source Ork. "Note" if attending to cabire a Case IH. New Holland, Steyr, or Fleac-Cail Color Dipliping, then you must wait until the display screen shows "BOOD Service Tool Capture" before proceeding to the next step. 4. Cluk, OK after all controllers are provered up, or Cluk. CANCEL to abot.	
Download File Selection	Cancel Browse	
Many Department File Information		

- 15. Look for vertical arrows next to the UCM to confirm that the controller is in the programing mode.
- 16. The Pro1200 screen will display the following message once it enters programming mode.



17. Select UCM and confirm that it is highlighted in blue.

	3 IIIE		
i i	PROGEMMMINS - CAN Diagnostic Connector - Primary	PIN: JJAMG340PLRK04227	
	SET UP CONTROLLERS FOR DOWNLOADING		
oller Selection			
NTROLLER			
ACN Armrest Control Module			
BCN Body Control Module			
DEC Driveline Electronic Con	rol	1	
ECU Engine control Unit		View Controler Information	
1CN Instrument Control Modul			
IM Innobilizer Module			
UCN Universal Control Hodule			
VIS VIS Update ENGINEERING O	4L V		
Control or is a supervised and in weight to the	New York Control of Co		
Controller to in programming mode and is available to	be programmed.		
Controller is in normal mode and is available to be pla	gamed		
in ad File Salection			
Ioau ne selecion			
		Browse	
View Download File Information			

#### 18. Select Browse.

P H G			
	PPDGRAMMING - CAN Diagnostic Connector - Primary SET UP CONTROLLERS FOR 00 WINLOADING	PIN: JJAM6340PLRK04227	
ntroler Selection			
CONTROLLER			
\$ ACH Armes	t Control Module		
T BCM Body C	Control Module		
T DEC Drivel	ine Electronic Control	W SERVICE ST	
COSP OF P	o 1288 Disolau	Vew Contoller Information	
1 ICM Instru	ment Control Module		
IN Incohi	lizer Nodule		
1 UCN Univer	sal Control Module		
t uis uis up	date ENGINEERING ONLY		
W Contractor to service	and a set of the second set of		
Controller is in progra	mming mode and is available to be programmed. mode and is available to be programmed.		
winkad File Selection			
		Bowse	
. Wetw D	ownbad File Information		

19. Select the UCM software.

20. Select **Open** for the selected software.

💌 🗟 🕘 🗾 💏 👪 🗄			
	CHODSE PROGRAM FILE NAME	×	
	+ -> 🛧 🧧 == Harvest	& Search UCM Software ,0	
Controller Selection	Organice - New folder	BE • 🖬 🜒 🔄	
CONTROLLER	This PC Name	Status Date modified	
ACM Arnrest Control Module     BCM Body Control Module	3D Objects     15_12_8_09_old.htt1     Besktop     91770786_1577_UCM_CCH_CVT	0 0/21/2022 703 PM	
↓ DEC Driveline Electronic Con     × ECU Engine Control Unit	Documents	T I	
GDSP AFS Pro 1200 Display ICH Instrument Control Hodu	Downloads Music		
IM Imnobilizer Module C UCH Universal Control Module	Fictures		
Controller is in programming mode and is available t	Videos CNHi(C:)		
K Controllor is in normal mode and is available to be p	with the second		
Download File Selection	→ (\cnh1\hun();)		
[	File name: 91770786_1577_UCM_CCH_CVT_	15_1 ~ Program Files (".hx1;".hx1.enc) ~	
View Download File Information		Qpen Cancel	
	1 (		
SEGIN DOWNLOAD		DOWNDOAD STATUS	

#### 21. Select Ok.

	NATION		- a ×
Ho information	was Found about the selected download file.		
- Controler Selector			
CONTROLLS			
T ACH /			
C BCM F			
X ECU E			
GDSP F			
THE T			
¢ UCH 1			
T UIS U			
Controller is			
💥 Controller in			
Download File Seld			
-ial\Deskto			
		-	
×		1	
_	[ <del>]</del>		
	CIK .		
	File information executing a file is selected.	CAN 1	Comm Link Up 02:35:15 PM
E 🔎 Type h		~ _	■ @ \$# #Z9/2(21 □

#### 22. Select Program Download.

PROGRANMING - CAN Dia	gnostic Connecto - Primary	PIN: JJANG340PLRK04227	
SET UP CONTROLLERS	FDR DOWNLOADING		
ontroller Selection			
CONTROLLER			
CH Armrest Control Module			
BCM Body Control Module			
F DEC Driveline Electronic Control			
COCR AES Due 1988 Diselou		View Controller Information	
tosr Ars rro 1200 Display			
IM Impobilizer Hodele			
1 ICM Hoiversal Control Nomile			
VIS UIS Update ENGINEERING ONLY			
Controller is in programming node and is available to be programmed. Controller is in nomal mode and is available to be programmed.			
ownload File Selection			
ial Deskton Rauen Hannest Assist MCM Software 91228286 15	77_UCH_CCH_CUT_15_12_03_00.hx1	Browne	
ViewDownload File Information			

23. A window will open confirming to replace the program file. Select **Ok**.

PROGRA	NMING - CAN Diagnostic Connector Primary PIN: JJAHC346PLRK04227	
SET U	IP CONTROLLERS FOR DOWNLOADING	
ntroller Selection		
CONTROLLER		
I ACH Armrest Control Module		
1 BCH Body Control Hodule	Electronic Service Tool X	
DEC Driveline Electronic Control		
X ECU Engine Control Unit	Nou have requested to replace the program currently on the	
GDSP AFS Pro 1200 Display	tontroller with the selected program file.	
1 ICH Instrument Control Module		
IM Innobilizer Nodule	Click on 'OK' to continue.	
UCH Universal Control Hodule	Olds an Council to NOT contract the support on the	
I UIS VIS Update ENCINEERING ONLY	controller,	
E Controller is in programming mode and is available to be programmed.		
Controller is in normal mode and is available to be programmed.	OK Cancel	
whiload File Selection		
is 15Decktors Record Harmont Accist 50(20 Software	01220/265 1522 004 005 001 15 19 03 00 byt	
int beauty deven dervest heatst worr autoure		
View Download File Information		
28 V		
No. Charles and Shire	DOWNLOAD STATUS	

24. A window will open when the programming is completed. Select **Ok**.

#### 25. Turn the vehicle off.

**Note:** If the vehicle does not shift out of park return to the "Controller Test" page.

PROGRAM SET UP	ING - CAN Diagnostic Connector - Primay PIN: JJAHG346PLRK64227 CONTROLLERS FOR DOWNLOADING	
CONTROLLER CONTROLLER CACH Armrest Control Hodule DEC Driveline Flectromic Control ECU Engine Control Unit GDSF AFS Pro 1200 Display CICH Instrument Control Hodule IN Inmobilizer Hodule 20 UIS Update ENCINEERING ONLY Controlmin in roomal mode and in available to be programmed. X Controlmin in roomal mode and in available to be programmed.	Electronic Service Tool     PROGRAMMING COMPLETED SUCCESSFULLY     The program file which was selected has been successfully     downloaded to the selected controller.     Press perform a try poly and then dear all faults before     completing this diagnostic activity.     OK	
overload File Selection file 1: Decktop:/Reven:Viervest Assist/UCH Software/3 View Download File Information PROGRAM DD/WALCAD	1778786_1577_UCH_CCH_CUT_15_12_03_00.loc1 Browse	

# Update the Driveline Electronic Control (DEC)

The DEC will be required to be updated for PST tractors.

#### Required Tools:

- Laptop with CNH EST Tool
- DEC Software
- 1. Turn the machine on.
- 2. Plug the laptop into the machine's primary port.
- 3. Open EST and press the **Detect Vehicle** button.

BRAND SELECTION					
CASE III	Rew HOLLARD	STEYR	flexicoil		
	CASE	B HEW HOLLAND CONTINUEDON	Mîler	KOBELCO	
	DETECT VEHICLE		CANCEL		
4. Verify that the correct machine is selected and press **OK**.

 DETECT VEHICLE	CLEAR DETECTION		CLEAR FILTER	_
THACTORS           0460         APWS100/APVC           0481         APWS100/APVC           0480         APS Connect Stell           0481         APS Connect Stell           0495         Stellyse Tractor (P           0419         Stellyse Tractor (P           0428         APS Connect Mag           0439         APS Connect Mag           0449         APS Connect Mag           0440         APS Connect Mag	P01 4WD Tractor EVT P01 4WD Tractor EVT por Tractor Wth EVT Transmission [Stage V1]P1.N.JEE2sono prestructor Wth EVT Transmission [Stage V1]P1.N.JEE2sono prestructor Wth EVT Transmission [Stage V1]P1.N.JEE2sono prestructor (wth Full Power Shift) [Tar 40 / The 2]P1.N.JEE2 wth EVT Transmission] [Tar 40 / The 2]P1.N.JEE2 Wth ZEF30001 - ZHF102993] [Tar 40 / The 2] HJ.ZEF30001 - ZHF102993] [Tar 40 / The 2]P1.N.JEE2 [Tar 2]P1.N.JEE0105071 - JEE0105700 wr [P1.N.JEE010570] - JEE0105700 wr [P1.N.JEE010570] - JEE0105700 print Tractor Model 250, 200, 310, 340, 300 [with EVT Transmission] Thractor Model 250, 200, 310, 340, 30	or 500001 and Above) 500001 and Above) 500001 and Above) 500001 and Above) 500001 and Above) 500001 and Above) 500001 etc.25xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Neoso() 25xxxx)	
0392 Magnum Tiactor 0290 Magnum Tiactor 0291 Magnum Tiactor 0222 Magnum Tiactor 0149 Magnum Tiactor	Models 250, 280, 310, 340) (with Full Power Shift) (Tier 4B - TM Models 250, 280, 310, 340, 380) (with CVT Transmission) (Tier 4 Transf 7) (Tier 250, 283, 10, 340) (with Full Power Shift) (Tier 3 Models 235, 260, 290, 315, 340, 370) (with CVT Transmission) ( Models 235, 260, 290, 315, 340) (with Full Power Shift) (Tier 4A	RE Europo Dray (F.1.H. JAMOss234F9sos) 44 / Ter 20) (F.1.H. ZDRF00001 and Above) (F.1.H. JAMOss234FDosso) 2854, 3154(F1.H. ZDFF00001 and Above)(F1.H. JAMOss234FDosso) (Tirel 44. / Tire 324(F1.H. ZZFF00001) - ZEF000001) / Ter 261 (F1.H. ZAF000010 - ZEF000000)	IN. CHVM0xxxxxZM0xxxx)	

5. Verify that the correct Vehicle PIN is displayed.

**Note:** If the Vehicle PIN is not populated you should be able to move onto the next step.

The Service Tool detected the following		_
UEHICLE PIN:	JJAMG340PLRK04	227
Always enter a new Vehicle PIN everytim	CANCEL NO	YES

6. A window will open asking if you are authorized to make changes to this vehicle. Select **Yes**.

	NTROLLER STATUS - CAN Diagnostic Connector - Prinay PIN: JJRNG34	BPLEN84227
CENTROLLER ACM Armrest-Centrol Hodule BCM Body Control Hodule	L HORDWORE HERSTONE SOFTWORE HERSTONE COMMUNIC	ATION STATUS ON LINE ON LINE
DEC Driveline Electronic Control EEU Engine Control Unit GRSP AFS Pro 1200 Display IEM Instrument Control Hodule III Immobilizer Hodule PEM Process / Connectivity Hodule UEM Universal Control Hodule	I confirm the vehicle / equipment owner has consented to diagnostic data being removed from two vehicle / equipment and rindensary vehicuted to 2014 for the upposed of matricing the product vehicle / equipment.	0H LINE 0H LINE 0H LINE 0H LINE 0F LINE 0H LINE 0N LINE
	YES NO	
	View EST Privacy Statement	

7. A window will open asking if you want EST to automatically retrieve vehicle status report information. Select **No**.

Note: Yes, can be selected but it will add more time to the updating process.

CONTROLLER     HARDWARE UERSION     SOFTWARE UERSION     CONHUNICATION STATUS       ACM     Armwest Control Hodule     1.0.0.0     01.05.00.00     DN LINE       BCH     Boly Control Hodule     1.0.0.0     01.05.00.00     DN LINE       BCH     Boly Control Hodule     0.0.0.1     001.007.000.000     DN LINE       BCH     Boly Control Hodule     0.0.0.1     001.007.000.000     DN LINE       BCH     Boly Control Hodule     0.0.0.1     001.007.000.000     DN LINE       BCH     BCH     BCH     001.001.000.000     DN LINE       IM     Invest Control Nodule     001.000.000     001.000.000     DN LINE       IM     Investal Control Nodule     001.000.000     001.000.000     001.000.000       IDN     UNIVERSAL Control Nodule     001.000.000     001.000.000     001.000.000       IDN     UNIVERSAL Control Nodule     001.000.000     001.000.000     001.000.000       IDN     UNIVERSAL Control Nodule     001.000.000     000.000     001.000.000 <th>COM</th> <th>TRICLLER STATUS · CAN Diagnostic Connector · P</th> <th>mary PIN</th> <th>: JJANG340PLRK04227</th> <th></th>	COM	TRICLLER STATUS · CAN Diagnostic Connector · P	mary PIN	: JJANG340PLRK04227	
ACH     Arcwest     Control. Hodule     1.0.0     0H	CONTROLLER	HARDVARE VERSION	SOFTWIRE VERSION	COMMUNICATION STATUS	
BEM Boly Control. Module     1.0.0.2     1.18.0.0     0H LINE       DE privetine Electronic Control     0.0.0.1     0H.000.000     0H LINE       EC3 Engine Control Unit     0H.100     0H LINE       EC4 Figure Control Unit     0H LINE     0H LINE       EC5 Figure Control Unit     0H LINE     0H LINE       EC6 Instrument Control. Module     0H LINE     0H LINE       IM Instrument Control. Module     0H LINE     0H LINE       PCN Process / Connectivity Module     0FF LINE     0H LINE       UCM Universal Control Module     0H LINE     0H LINE	ACH Armest Control Hodule	1.0.0.0	81.85.80.80	ON LINE	
DEC     Driveline Electronic Control     0.0.0.1     004.107.000.000     004.106       COSP     AFS Pro 1200 Display     004.106     004.106       DISP     AFS Pro 1200 Display     004.106     004.106       ITM Instrument Control Module     006.0.1     004.106     004.106       PCN     Prscess / Connectivity Module     007.106     004.106       DCN     Universal Control Module     006.0.1     004.106       DEV     De you want the EST to automatically ritime vehicle status     004.106       DCN     Universal Control Module     004.106	BCH Body Control Module	1.0.0.2	1.10.0.0	OPS LINE	
EGU     Engline     ON LINE       EGU     Engline     ON LINE       EGN     Instrument Exontrol Module     ON LINE       EIN     Inmobilizer Hodule     OF FLINE       PCN     Pracess / Connectivity Hodule     OF FLINE       UCN     Universal Control Module     OF LINE       UCN     Universal Control Module     OF LINE	DEC Driveline Electronic Control	0.0.0.1	881.887.888.888	OH LINC	
CDSP     AFS Pro 1200 Display     OH LINE       UN Instrument bontal     Bectonic Service Bool     WH LINE       UN Instrument bontal     OFF LINE       PCM     Pracess / Connectivity Module     OFF LINE       UCH     Universal Control Module     OH LINE       Winiversal Control Module     IN LINE     OH LINE	ECU Engine Control Unit			ON LINE	
IDM     Instrument Control Module     0H     INE       IN     Inmobilizer Module     0F     0F     INE       PDN     Pracess / Connectivity Module     0F     0H     0H       UCH     Universal Control Module     0H     0H     0H	GDSP AFS Pro 1200 Display	Electronic Sensora Fool		ON LINE	
IM     Immobilizer: Hodule     OFF     IME       POR     Process / Sonnectivity Module     ON     IME       UEM     Universal Control Module     ON     IME	ICM Instrument Control Module	Calcours Service 1997		UNLINE	
PDM Pricess / Connectivity Module UCM Universal Control Module De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status ON LINE De you want the EST to automatically intrine vehicle status De you want the EST to automatically intrine vehicle status De you want the EST to automatically intrine vehicle status De you want the EST to automatically intrine vehicle status De you want the EST to automatically intrine vehicle status De you want the EST to automatically intrine vehicle status De you want the EST to automatically intrine vehicle status De you want the EST to automatically intrine vehicle status De you want the EST to automatically intrine vehicle status De you want the EST to automatically intrine vehicle status De you want the EST to automatically intrine vehicle status D	IM Innobilizer Module	1.620		OFF LINE	
UCH Universal Control Hodule Internation: ON LINE	PCM Process / Connectivity Module	Do you want the EST to a	utomatically retrieve vehicle state	US ON LINE	
			yrs No		
		5			

8. Confirm that the EST is connected to the primary port and press **OK**.

COMMONITIER       Commonitie Commention - Bus 4 COM Diagnostie Commention - Bus 4 Diagnostie Commentie Commentie - Bus 4 Diagnostie Commentie - Bus 4 Diagno		Select Velscle Connector	Programming Components Supported	
Communication Adapter Required. See Cable Help Cable Set ADAPTER HELP	COMTROLLER ACI downest Control Module DEM Body Control Module DEC Driveline Electron CU Engine Control Unit DDSP AFS Pro 1200 Displ ICM Instrument Control Immobilizer Module PCM Process / Connectiv Universal Control f	COM Diagnostic Connector - But 4 COM Diagnostic Connector - CAb COM Diagnostic Connector - OKES COM Diagnostic Connector - 10088 CAM Diagnostic Connector - 10088 CAM Diagnostic Connector - Steering CAM Diagnostic Connector - Steering	BCH       #represet Constrol Module         DEC       Deliveline Electronic Control         ECD       Engine Control Module         ECD       Hastrienet Control Module         ICD       Histrienet Control Module         ICD       Histrienet Control Module         ICD       Histrienet Control Module         ICD       Howersal Control Module         ICD       Encomporent Support         BCR       Arrorest Control Module         DEC       Encomporent Support         BCR       Berge Control Module         DCD       Engine Control Module         ECD       Fregine Control Module         ECD       Weinicle Cont	
tee Cable Help CABLE AND ADAPTER HELP			Communication Adapter Required	
CARLE AND ADAPTER HELP			See Cable Help	
			CABLE AND ADAPTER HELP	

- 9. Press the **Programming Button** in the top row.
- 10. Press the Set Up Controllers for Downloading button.

		× 3* 2 7	
	PROGRAMMING - CAN Diagnostic Connector - Prin	ay PIN: JJAMG348PLRK84227	
	SET OF CONTROLLERS FOR DOWNLOADING		
ntroller Selection			
CONTROLLER			
ACH Armrest	t Control Hodule		
BCH Body Co	ontrol Module		
DEC Driveli	ine Electronic Control		
🗶 ECU Engine	Control Unit	Mary Tradicity Information	
GDSP AFS Pro	o 1200 Display	view Cristoles Intolligion	
ICM Instru	ment Control Nodule		
IN Innobi	lizer Module		
UCM Univers	sal Control Nodule		
UIS UIS Up	date ENGINEERING ONLY		
E Costroller is in program	mning mode and is available to be programmed.		
X Costroller is in normal	mode and is available to be programmed.		
unloadFile Selector			
		Browne	
Mall The	contrast The Incomentation		
9409-040	services receivable		

- 11. Follow the on screen instructions.
- 12. Turn off the vehicle and let the Pro 1200 display shut down completely.
- 13. Once all the controllers are completely shut down, turn key switch to on but do not start the engine.

14. Select Ok.

PROGRAM	MMNG - CAN Disgnostic Connector - Primary P1N: JJaMG340PLRK04227 P CONTROLLERS FOR DOWINLOADINS	
CONTROLLER ROH Arnrest Control Hodule BCH Body Control Hodule DEC Driveline Electronic Control ECU Engine Control Unit DOST AFS Pro 1200 Display ICH Instrument Control Hodule IN Immobilizer Hodule UCH Universal Control Hodule US UIS Update ENGINEERING ONLY © Contoles in programming mode and is available to be programmed. * Controles in normal mode and is available to be programmed.	Electronic Service Tool   I freise set the park tracke (if installed), then turn the  vertice's key switch OFF.  Wild if least 20 seconds to ensure that all controllers have being powered daws.  I turn the vertice key switch OFF.  Wild if least 20 seconds to ensure that all controllers have being powered daws.  Introller Information  Vertice'' If attending those control if asse th, New Holland, Steyr, or Fleat-Call Color  Diplegy, then you musu what until the display screen shows  Bodions proceeding to the next step.  4. Click OK after all controllers are provered up, or Click.  CANCEL to abod.	
Downlad File Selection	Cancel Browse	

- 15. Look for vertical arrows next to the DEC to confirm that the controller is in the programing mode.
- 16. Select DEC and confirm that it is highlighted in blue.

PROSEAMMINS - CAN Diagnostic Connec	Clor-Finary PIN: JJANG348PL/RK84227	
SET UP CONTROLLERS FOR DOWNL	CADING	
miler Selection		
NTROLLER		
BCH Body Control Module		
ECU Engine Control Unit	View Controller Information	
ICH Instrument Control Module		
US Universal Control Module		
Controller is in programming mode and is available to be programmed.		
Controller is in normal mode and is available to be programmed.		
rload File Selection	1	
	Browse	

#### 17. Select Browse.

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	PROGRAMMING · CAN Diagnostic Connector - Primary	PIN: JJAM6348PLRK84227	
	SET UP CONTROLLERS FOR DOWNLOADING		
ntroler Selection			
CONTROLLER			
ACH Armest Control Module			
DEC Driveline Electronic Control			
× ECU Engine Control Unit			
GDSP AFS Pro 1200 Display		Vew Contoller Information	
‡ ICM Instrument Control Module			
IN Innobilizer Nodule			
‡ UCM Universal Control Module			
‡ VIS UIS Update ENGINEERING ONLY			
Controller is in programming mode and is available to be progra Controller is in normal mode and is available to be programmed	mned.		
white Telection			
		Bowne	
View Download File Information			

- 18. Select the DEC software.
- 19. Select **Open** for the selected software.

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	CHODSE PROGRAM FILE NAME			×	7	
	🔶 👍 – 🛧 🧧 🗉 Harvest > UOV	Software ~ 친	Search UCM Softw	a, env		
Controller Selection	Organize - New folder		82	• 🖬 🛛		
CONTROLLER	This PC Name	· ·	Status	Date modified		
F ACH Arnrest Control Hodule	3D Objects 13_12_8	99_old.htt1	0	6/27/2022 7/05 PM		
BCH Body Control Module     the DEC Divelop Electrony Control	Desktop 9177078	1577_UCM_CCH_CVT_15_12_0	1_ O	1/1/2022 3:00 PM		
× ECU Engine Control Unit	Documents				14	
GDSP AFS Pro 1280 Display	🕹 Downloads				2	
I ICH Instrument Control Hodu	Music					
IM Innobilizer Module	Pictures					
¢ UIS VIS Update ENGINEERING	Videos					
E Controller is in representation mode and is available.	4 CNHi (C:)					
Controller is in programming mode and is ordinated	- \\cnh1\root (M:)					
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Vew Download File Information			Open	Cancel		
	1					
			DOMAL DAD CT	THE		

#### 20. Select **Ok**.

o <u>l Yeev Co</u>			
w w has found about the selected download file	*		
introler Selector			
CONTROLLE			
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GDSP 6			
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#### 21. Select Program Download.

🔀 Bectronic Service Tool - Case IH - 0350 - AFS Connect Magrum Tractor (Models 250, 280, 310, 340, 380) (with CVT Transmission) (Trei 48 / Trei 28) (P.I.N. JIAM) - CI X Elle Tool View Communications Options Utilities Window Help

	PRUGRAMMING - CAN Disgnostic Connecto - Primary	PIN: JJANG340PLRK04227	
	SET UP CONTROLLERS FOR DOWNLOADING		
ntroller Selection			
CONTROLLER			
1 ACM Armrest Control Module			
\$ BCH Body Control Module			
DEC Driveline Electronic Control			
× CCU Engine Control Unit		View Controller Information	
GDSP AFS Pro 1200 Display			
F ICH Instrument Control Module			
IM IMNODILIZER MODULE			
+ UCM Universal Control Module			
+ VIS VIS OPDALE ENGINEERING ONL	r		
T Controller is in programming node and is available to be	programmed		
E Controller is in normal mode and is available to be progra	mmed		
wnload File Selection			
ial Darkton Paugo Hammart Arrist IC	4 Saftuana 91228286 1522 UCH CCH CHT 15 12 82	RA hut Browne	
Tar weskup Gaven Garvest Hastac do	1 autours (11/10/00_11/1_00[_000_001_13_18_65		
View Download File Information			

22. A window will open confirming to replace the program file. Select **Ok**.

<u> 7 xa xa 😫 🛤 🖓 ·</u>		
PROGRAM	MING - CAN Disprovid Connector - Primary PIN: JJANG346PLRK04227 CONTROLLERS FOR DOW/NLOADING	
CONTROLLER  CONTROLLER  CONTROLLER  CONTROLLER  CONTROLLER  CONTROLLER  CONTROLLER  CONTROL CONTROL Module  CONTROLLER  CONTR	Electronic Service Tool X	
ovribad File Selection is a Norsk togen Norven to Base in that GH Software https://www.com/software.com/software/https://www.com/softwa 	1 77787986_1577_BCR_OCH_CUT_15_12_H3_H8. hx1 Diowse Diww.L04D STATUS	

- 23. A window will open when the programming is completed. Select **Ok**.
- 24. Turn the vehicle off.

PROGRAM	MING - CAN Diagnostic Connector - Primary PIN: JJANG340PLRK94227	
SET II	P CONTROLLERS FOR DOWNLOADING	
oniore selection		
CONTROLLER		
ACH Armest Control Module	Electronic Service Trul	
DEC Driveline Electronic Control		
× ECU Engine Control Unit	BOOGRAMMING COMPLETED SUCCESSED UV	
GDSP RFS Pro 1200 Display	Ontoter information	
© ICH Instrument Control Module	The program file which was selected has been successfully	
IN Inmobilizer Module	adventigibled to the selected controller.	
CONTRACTOR Universal Control Module	Please perform a key cycle and then clear all faults before	
‡ UIS UIS Update ENGINEERING ONLY	completing this diagnostic activity.	
Controller is in programming mode and in available to be programmed.	Terminal Activity of the Second	
X Controller is in normal mode and is available to be programmed.	OX	
iowniond File Selection		
ial\Desktop\Raven\Harvest Assist\UCM Software\	91770706_1577_UCH_CCH_CUT_15_12_03_00.hct Biowse	
View Download File Information		

### **Update the APM Field Sensitivity Setting**

The APM field sensitivity setting will be required to be updated for PST tractors.

- 1. Locate the APM Field Sensitivity setting in the Pro 1200.
- 2. Navigate to the field sensitivity settings by pressing the Menu>Tractor Settings>Transmission.
- 3. Set the APM Field Sensitivity to 50%.

**Note:** The APM sensitivity toggles in the background at propulsion engagement automatically and does not require a user change.

Menter .	11	actor   Trans	SITISSION		
					•
PM Field Sensitivity		Start Up F	orward Gear	?	Hydraulie Lini
◀ 50%		-	2	+	
0	100	1		13	0Ö0 HMC2
APM Road Sensitivity		Speed Ma	tch Lowest Gea	r	
<ul> <li>50%</li> </ul>			4	+	
0	100	1		13	Engine
APM Road Lowest Gear		Start Up R	everse Gear		The
- 7	+		2	+	
1	12	1		4	Transmission
Reverse Shuttle Gear		Use Last R	everse Gear		A
-	+				Steering
and a state of the second	4				In the second second

## Update the APM Engine Speed Minimum and Maximum

The APM engine speed minimum and maximum will be required to be updated for PST tractors.

- 1. Locate the APM Engine Speed settings in the Pro 1200.
- 2. Navigate to the engine speed settings by pressing the Menu>Tractor Settings.
- 3. Set the APM Engine Speed Min to 850 RPM.
- 4. Set the APM Engine Speed Max to 2200 RPM.



### Set the Constant Engine Speed to Off

The Constant Engine Speed needs to be turned off for PST tractors.

- 1. Locate the constant engine speed button on the armrest.
- 2. Turn both 1 and 2 constant engine speed buttons to off.

**Note:** The LED lights on the buttons will be turned off when the constant engine speed has been turned off.



# Set the Tractor Transmission Aggressiveness

The transmission aggressiveness only needs to be set for tractors with a CVT transmission.

1. Set the transmission aggressiveness to 3. Press the button on the armrest until 3 led lights are displayed.



## **Setup the AFS Vector Pro Output to the RS** Lite

1. Navigate to the GNSS and Guidance setup screen under the UT tab.



2. Add a new configuration and name it appropriately.

Menu	GN	SS & Guid	lance	GNSS	icle: Patriot 3250	
ehicle Receiver FS VectorPro: NMKL21120151U			No	t Installed	Installed	GNS
GNSS Position Output						
Configuration ?						-
Default	-					Vehic
Default		Precision	7			
Add New			8	+		
Port Selection		Port		Baud Rate		Calibra
		ore			-	

3. Turn off the ISO Can messages.

4. Set the port selection to ISO CAN BUS #2 and NMEA ISO Bus to OFF.



5. Select Receiver Serial Port #1.

Contraction of the local division of the loc	GNS	S & Guida	nce   GNSS		×
			Ve	hicle: Patriot 3250	<b>N</b>
Vehicle Receiver FS VectorPro: NMKL2112	201510		Not installed	Installed	GNSS
361					A
Terrain Compensatio	on 🥐	Precision ?			AccuGuide
Terrain Compensatio	on ?	Precision 3	8 +		AccuGuide
Terrain Compensation	2 חו	Precision 2 Port	8 + Baud Rate		AccuOuide
Terrain Compensation	n ?	Precision ? Port OFF	8 + Baud Rate	 	AccuGuide
Terrain Compensation	n? rt 🔺	Precision ? Port OFF	8 + Baud Rate		AccuOuide
Terrain Compensation OFF Port Selection Receiver Serial Port Receiver Serial Port Receiver Serial Port	n ? rt ▲ #1 #2	Precision ? Port OFF	8 + Baud Rate	Ŧ	AccuOuide
Port Selection Receiver Serial Port	n ?	Precision ? Port OFF	8 + Baud Rate	F	AccuCuele

6. Turn Terrain Compensation Off and turn the Port On. Set the Baud Rate to 115200.

**Note:** If the Baud Rate appears to be stuck at 38400, leave the setting at 115200 and reboot the system. After reboot verify the baud rate is set to 115200.

7. Set Precision to 8.

8. Set Port to ON.



9. Scroll down until the **GGA** and **GSA** setup buttons are visible.

Menu GNSS &	Guidance   GNSS	Patriot 3250
ehicle Receiver FS VectorPro: NMKL21120151U	Not installed Ins	stalled
<b>GGA</b>		
+ GSA		ON Accoluide
+ GST		ON Vehicle Measurement
F RMC	OFF	Celibration
+ VTG		
704		AFS Acculture

- 10. Set the following settings:
  - **GGA** 10Hz
  - **GSA** .1Hz

11. Scroll down until the **GST** and **RMC** setup button are visible.



- 12. Set the following settings:
  - **GST** 1Hz
  - RMC Off
  - Scroll down the VTG and ZDA setup are visible.

🏾 🌺 😤 📲 🏭 💿 10:53	📲 🗛 📲 📕	
Menu GNSS & C	Guidance   GNSS	×
	Vehicle: Patriot 3250	2
Vehicle Receiver AFS VectorPro: NMKL21120151U	Not Installed Installed	CHES
ату 🗖	ON	Accultuite
Rate		Vaticate Notaccements
ZDA	ON	Calibration
Rate 1Hz		
Work Stats Map UT Vel	n 95 Camera 🛆 🖽 🧠	Ģ

- 13. Set the following settings:
  - VTG .1Hz
  - **ZDA** 1Hz

### **Turn off Guidance**

- 1. Press the AccuGuide tab.
- 2. Set the AccuGuide Guidance to Off.

**Note:** Guidance will need to be turned on again if a user wants to return to factory guidance. Refer to "Return the Tractor to Factory Guidance" on page 186 for more information.



# **Configure RTK Corrections into the AFS** Vector Pro from the Raven Field Hub

**Note:** This procedure is only necessary if receiving RTK corrections for the tractor from the Slingshot® Field Hub. Both vehicles should be using the same RTK/RTX network.

Make sure that the Field Hub is set up to the correct field base station and on CMR+ protocol. Make sure that the serial port of the Field Hub is connected to the RTK In port on the (P/N 115-2612-001) cable.

Details	
Feature*	
Correction Streaming	~
Assigned Base*	
3789503 – RIC Farm Base	~
Auto Base	
Protocol*	
CMR+	~
Update	

### **Setup the Field Hub Correction Profile**

1. Push the **GNSS Icon** on the home page.



2. Push the Gear Icon.



3. Push the **RTK Setup Tab**.



4. Add a new configuration or edit the current configuration.

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Engine Power	Menu GNSS & Guidance   GNSS	×
<b>15</b> %	Vehicle: Magnum 380 CVT	
Slip 0 %	Vehicle Receiver	GNSS
	Status: On Configuration: Raven Field Hub Base Station:     All	AccurGuide
	ON Raven Field Hub	Vehicle
Cross Track Error	RTK External Device Raven Field Hub	Measurements
Fuel Economy	Status: No Base Detected Add New Data Parity	Calibration
Average Workin	Receiver Serial Port #2  None	AFS AccuTum
Fuel Rate 3.4 gal/h	1 2 3 4 5 6 7 🔒 📾 🦽	5. 28 28 28 C

5. Setup the following RTK settings.



- **RTK** On
- Configuration Raven Field Hub
- Correction Source RTK External Device
- Port Setting Receiver Serial Port #1
- Data Parity None

⊕ (i) <b>↑</b>	🎇 🐔 🗰	9:24 🖣	ය ශ	<b>↓</b> ‼ 🦷	And
Engine Power	Menu	GNSS & Guida	ance   GNSS	_	×
W 7 %			Vehicle:	Magnum 380 CVT	<b>N</b>
<sup>slip</sup> 0 %	Vehicle Receiver AFS VectorPro: NMKL19520012L		Not Installed	Installed	GNSS
	Port Setting	Data P	arity		A
B1 B2	Receiver Serial Port #2	None		•	AccuGuide
	Baud Rate	Stop Bi	its		3
Cross Track Error	115200	▼ Null		-	Vehicie Measurements
in	Protocol				
Fuel Economy	CMR				Calibration
Average Workin 0.0 ac/h	RTK Fill 👔				AFS Accultum
Fuel Rate	1 2 3 4	5	6 7	<u>*</u> 🗟 % 2	• 21• 21• 21 🤅

- Baud Rate 115200
- Stop Bits Null
- Protocol CMR
- RTK Fill On
- 6. Return to the GNSS page and make sure that the CGR is receiving RTK.

# Verify / Update the Tractor to the Correct Datum

**Note:** All tractors and combines being used for Raven Cart Automation<sup>™</sup> need to be referencing the same datum. NAD83 (NSRS2011) is the default datum for RTX in North America. If you are going to run Raven Cart Automation<sup>™</sup> in a different region, you will need to look up the default RTX datum and switch to that datum in the field computer.

1. Select the **Satellite** icon in the top left of the display.



2. Select the GNSS tab on the right side of the screen.



3. Scroll down until the Vehicle Geodetic Datum Setup bar and select it.

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Engine Power	GNS	S & Guidance   Gł	NSS		×
W 7 %			Vehicle Magnu	m 380 CVT	<b>N</b>
0 %	Vehicle Receiver AFS VectorPro: NARG, 10520012L	Not ins	stalled ins	talled	CHESS
N	SBAS System: Auto PRN: Auto				A
	Accuracy Setup			Ì	<b>X</b>
Cross Track Error	GNSS Position Output				
Fuel Economy O.O gal/ac	Emulated Radar Output				Catherine
0.0 ac/h	Vehicle Geodetic Datum Setup				APEAnsTon
D/X 1.7 with	1 2 2 4	s • 1	1 ₽	159 av 24 2	9 20 X 🗘

- 4. After the Vehicle Geodetic Datum Setup is selected a drop down labeled Vehicle Datum Configuration should be visible.
- 5. Verify the machine is on **NAD83 (NSRS2011)** Datum. If not selected press the drop down and select NAD83 (NSRS2011) Datum.

6. If using RTK and RTK or AFS3/PLM3 verify that the streaming source is the same.



• Base Station, Datum, Satellite

### **Update the Tractor RCU**

- 1. Navigate to the Slingshot® object pool.
- 2. Select the gear icon icon the right side of the screen.

0 🕑 🧭	o 🔝
Slingshot Name	
RTK Source	
Remote Diagnostics	
	<b>_</b>

- 3. Select the **System Information** tab.
- 4. Select **RS1<sup>™</sup> Information** from the drop-down menu.
- 5. Press the ECU Updates Prompt.



6. Select the desired software version and press **Download and Install**.

**Note:** If no update is needed the screen will display that **All ECUs are at the correct** *software version*.

Sel T	ect So o Down	oftware load	<b>^</b>
Software Version	Statu	s	
23.4.0.13	OTA		
23.3.0.73	ΟΤΑ		
23.3.0.69	OTA		
23.3.0.68	OTA		
23.3.0.67	OTA		
Current S	oftware Version oftware Version	23.3.0.67	
Downlo and Instal	ad	Check For Server Updates	
	RAVE	∝ 🗸	-

- 7. The Data Usage Warning window will open confirming to download the update.
- 8. Press the Check Mark.



9. A Notice window will open to notify to not turn off power during the update process.

10. Press the Check Mark.



### **Setup the Tractor RCU**

- 1. Press the Raven Cart Automation<sup>™</sup> tab at the bottom of the screen.
- 2. Select the **RCU** tab.
- 3. Select Grain Cart.

**Note:** Press the arrows in the External Vehicle RCU window to see the other vehicles in the area that are on the same channel.



4. Press the **Gears** button

5. Set the Radio Channel. The default channel is 9. Refer to "Scan for the Optimal Tractor RCU Channel" on the next page on how to search for the optimal channel.

Note: All machines must be set to the same radio channel. Up to six machines are supported.

Radio control Unit - Setup           System Settings         ?	
Radio Channel 9	
	*
System Reboot Reset Defaults	

6. Press the **Diagnostic** button to verify the software version.

Radio Control Unit - Diagnostics		
System Informati	.on	RAVEN
Hardware/Software		20
Hardware Part Number	0640171457	
Hardware Serial Number	1110	
Hardware Revision	A	
Software Part Number	0770171632	
Software Version Number	22.4.0.27	
Bootloader Version Number	1.0.0.4	
		-

## Scan for the Optimal Tractor RCU Channel

It is recommended to perform a scan for the optimal RCU channel with the lowest interference levels.

Note: The default channel is 9.

- 1. Open the RCU object pool.
- 2. Press the **Diagnostic** button



- 3. Press the **RCU Test** tab.
- 4. Select **Channel Scan** from the drop down.

5. Press the **Play** button.



- 6. Run the channel scan for 2 to 5 minutes and select the recommended channel.
  - The black bars are an average of background noise.
  - The red lines are spikes (large spikes can drop messages ultimately causing kick outs).



7. Set the RCU to the recommended channel.

# Setup the Tractor Vehicle Navigation

- 1. Press the Raven Cart Automation<sup>™</sup> tab at the bottom of the screen.
- 2. Select the Vehicle Navigation tab.
- 3. Press the Green Check Mark to accept the Operator Liability Notice.

**Note:** The system will not work if this step is not completed.



4. Select the correct tractor information.



5. Make sure to use model year 2020 and greater model numbers.

**Note:** If the machine model is selected the dimensions for vehicle navigation will be pre-populated. Verify that all dimensions are correct.

Machine Selection		<b>6</b>
Select your machin from the menu.	e	
Machine Type		
Front Steered Tract	or 🏚	
Machine Make		
Case IH	<b></b>	
Machine Model		
Magnum 180/200/220/240	MY20+	

- 6. Set the Navigation System:
  - Automation Level Drive Assist
  - Guidance Mode Follower Mode

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	Universal Terminal		
25.0	Harvest Assist	Navigation System	-
P 6.70 F1 2.50	RAVEN Revention	Please select the desired automation level below and press the "Next" button to continue. Automation Level	<b>()</b>
	RS1 Hoto-appendic lignmen Ramme brit	Drive Assist	<b>A</b>
Engine Power	(( ))) RATE System RAVEN	Follower Mode	*
51ip 0 %	005a Non-secolie System NEW HOLLMAD		
Fuel Rate 0.0 gal/h			-
Average Workin 7.9 ac/h	1 2 M	ap 4 Cam GPS SL 🕂 🎘 🕸 🖽	es =>%. 🕵

7. Verify that **CNH UCM** is set as the Steering Partner.

8. Press the **Next** button.



- 9. Set the Antenna Fore / Aft dimensions.
- 10. Press the **Next** button.



11. Set the Antenna Center Offset dimension.

12. Press the **Next** button.



- 13. Set the Antenna Height dimension.
- 14. Press the **Next** button.

Setup Antenna Height	0
Please enter the distance from the GPS antenna to the ground.	℀
142.5 (in)	

15. Set the Wheel Base dimension.

16. Press the **Next** button.



17. Set the Differential Source and Fallback Mode based on the GPS source being used.

<b>Differential Source</b>	FallBack Mode
RTK	Float
L-Band	Float

18. Press the **Next** button.

**Note:** The RTK correction source is not working correctly if the GPS status does not display green. It may take several minutes to converge the RTK correction type.


- 19. Wait for the GPS Status to change to **Converged**.
- 20. Press the **Next** button.



- 21. Perform the Terrain Compensation Calibration.
- 22. Press the **Next** button.



23. Press the **Calibrate** button and follow the on screen instructions.



- 24. Drive forward between 1.6 6.4 km/h [1 4 mph]
- 25. Turn the steering wheel all the way to the left steering lock.

26. Press the Left button to set the left WAS value.

**Note:** Do not turn the steering wheel until the WAS page advances to the Center WAS setting.



- 27. Drive forward between 1.6 6.4 km/h [1 4 mph] with the machine wheels pointing straight ahead.
- 28. Press the **Center** button to set the center WAS value.

**Note:** Do not turn the steering wheel until the WAS page advances to the Right WAS setting.



- 29. Drive forward between 1.6 6.4 km/h [1 4 mph].
- 30. Turn the steering wheel all the way to the right steering lock.

31. Press the **Right** button to set the right WAS value.



32. Review the WAS calibration information.

**Note:** Do not turn the steering wheel until the following Calibration Complete page is displayed.

33. Press the **Next** arrow.



### **Calibrate the Machine Steering System**

The steering control calibration process allows the system to learn the hydraulic capabilities of the machine for optimal steering performance in the field.

**Note:** During calibration, the machine will make several hard left and right turns. Adjust the vehicle speed and location as necessary.

KO	The machine will steer automatically. Be sure the area around the vehicle is clear of people and obstacles before engaging the auto-steer system. To disengage auto-steering at any time, turn the steering wheel or select the on-screen Stop button	
	or select the off selectristop button.	

- 1. Do not use the quick calibration to calibrate the steering system.
- 2. Press the **Next** button.

Use Quick Calibration	0
Quick Calibration uses default gains deemed acceptable by Raven, rather than calibrating.	<u> </u>
Use the steering control calibration on the next page for a calibration specific to your machine.	
	్
Use Quick	

3. Begin driving forward at a speed between 1.6 and 6.4 km/h [1 and 4 mph].

4. Press the resume switch or use the on-screen arrow to begin calibration.



5. The following information is displayed during the calibration process:



6. Allow the auto-steer calibration to complete. Once complete, select the **Next** page button to proceed.

7. Review the steering effort information shown on the page. Select the **Next** page button to proceed.

Steering Control Calibration Complete	0
Steering control calibration has been successfully completed.	
L R Minimum %: 1.0 1.0 Maximum %: 100.0 100.0 System Gain: 29.0 29.0	 ★
View PWM Table	

8. Review the information presented on the Calibration Wizard Summary page.



# Raven Cart Automation<sup>™</sup> Tractor Calibration

- 1. Press the Raven Cart Automation<sup>™</sup> tab at the bottom of the screen.
- 2. Press the **Raven Cart Automation**<sup>™</sup> tab.



3. Press the gears icon icon the right side of the page.

**Note:** On new installations a pop up window will open asking to configure the system.

4. Verify that **Tractor** is set as the machine type.



5. Press Grain Cart Dimensions button.

6. Enter the Grain Cart Length.

**Note:** This dimension is the length of the interior opening of the grain cart. The tarp end caps should not be included in this measurement.



7. Set the Sync Point.

#### NOTICE

Important! For any configuration change, including but not limited to changing the auger extension, changing a header, tire configuration, or changing a grain cart, operator must review and consider whether a sync point reset is needed.

**Note:** Setting the sync point does not have to be completed during the calibration. The sync point can be set during crop harvesting to align the tractor's tires between the crop rows to avoid stubble damage.

- Requirements to save a Sync Point
  - Combine in radio range
  - Combine has RTK GPS Mode
  - Tractor has RTK GPS Mode
  - Combine and Tractor have a Heading within 5 degrees of each other
  - Grain Cart is inside the Sync Window

Note: Required sync point minimum distance between vehicles is 1 m [3.3 ft].

8. Position the combine auger in the center of the grain cart.

Sip       Veries       Sync       Points         Image: Sip       Veries       Image: Sip       Image: Sip       Image: Sip         Sip       Sip       Image: Sip       Image: Sip       Image: Sip       Image: Sip         N       N       N       N       N       N       N	*
Arrow       When the combine auger is positioned in the center of the grain cart, press the Save Sync Points button.         Image: Slip       When the combine auger is positioned in the center of the grain cart, press the Save Sync Point -14.8         Slip       Slip         Image: Slip       Manage: Slip         Image: Slip       Manage: Slip         Image: N N       N         Image: N N       N	
Slip         Slip         Main and Andrew         Current Sync Point         -14.8         36.7           Slip         Slip         Slip         Slip         (fit)         -20.3         -7.5           N         N         (fit)         ncu         (fit)         -20.3         -7.5	
Saved         Saved         -20.3         -7.5           N         N         (1)         ncu         (11)         (11)	
Save Sync Points	
Cross Track Error	-

9. Press the **Save Sync Points** button. The X and Y fields will be updated to indicate that the sync point has been saved.

# Raven Cart Automation<sup>™</sup> Combine Provisioning Overview

# **Provision the Trimble 372 Receiver**

**Note:** The following settings are made through the AFS<sup>®</sup> Pro700 or Trimble AgRemote<sup>™</sup> software. The screenshots appearance will vary depending on which application is used.

1. From the AFS Pro700 main menu select **Toolbox**.



2. The Display Setup Screen will open.

		Display Setup
DGPS	Month	Day
	6	22
0.0 mph	Year	Day/Night
	2010	pm 🚺
	Hour	Minute
	2	7
	Language	Interface Level
	Deutsch	Advanced
	Backlight	Current Vehicle
	1 100	Generic Tractor
Back Disp	Oper Layout Impl	Vehicle Config.

3. Select

4. Select GPS.

	5	Display Setup
XX DGPS	Month	Day
Sneed (GPS)	6	22
0.0 mph	Year	Day/Night
	2010	pm V
	Hour	Minute
	2	7
	Language	Interface Level
A Standard	Deutsch	Advanced
	Backlight	Current Vehicle
	1 1(	Generic Tractor
Back Gain	GPS Marks Man	ual Product Contnr

5. Select the **DGPS Type** drop-down box.

No. CO	GPS Setup		
Speed (GPS) 0.0 mph	GPS Location	Connection Type RS232-B	
	Logging Interval	DGPS Alarm	
	DGPS Type WAAS/EGNOS	Forward Offset	
		Right Offset 0.0 in	
		Height Offset 0.0 in	
Back Gain	GPS Marks Manual	Product Contnr	

6. Select RTK.

		GPS Setup	
DGPS	GPS Location	Connection Type	
	Custom	RS232-B	
0.0 mph	DGPS Туре 🛛 🗙		
	Autonomous		
	HP/XP		
Sec. All	RTK		
VBS			
	WAAS/EGNOS		
A STATE OF STATE OF STATE	KTK Source		
	AgGPS Radio		
Back Gain	GPS Marks Manua	l Product Contnr	

7. Verify that the Chanel ID field displays **No Radio** and that the RTK/RTX Source is set to **AgGPS Radio**.



8. Press the **Back** button on the GPS Setup screen.

DGPS			
Speed (GPS) 0.0 mph	Toolbox	Diagnostics	Data Management
	Run	Performance	Calibration
	VT		Work Condition
		2:25 pm - Jun 14, 20	110

9. Select **Diagnostics**.

	9		Version
	Part #	Software	Version
Speed (GPS) 0.0 mph	84274970	Framework	V25.2.0.0
		BSP	V2.3.0.0
	84263593	Generic Tractor	V25.1.0.0
	87696989	Planter	V25.1.0.0
	▼ <sup>84299939</sup>	Precision Farming	V25.3.0.0
Back Version	CAN F	ault	Sensor

10. Select Version DGPS Part # Software Version 5peed (GPS) 0.0 mph 84274970 Framework V25.2.0.0 BSP V2.3.0.0 84263593 **Generic Tractor** V25.1.0.0 V25.1.0.0 87696989 Planter V25.3.0.0 84299939 **Precision Farming** V RDI Back GPS GPS2 Res Speed Signals

11. Select **RDI**. The following screen will appear.



#### NOTICE

The settings contained in the text below have been thoroughly tested and verified. The change in settings resulted in improved RTK availability in real field conditions when used with the Slingshot<sup>®</sup> system. However, Raven Industries in no way guarantees or warranties the equipment configuration of non-Raven equipment. Please contact your Trimble customer support for further details.

To ensure optimal RTK signal availability with the AgGPS 262/AG-372 receiver, it may be necessary to adjust the DOP mask settings. While a low RTK DOP mask setting provides high confidence in GPS position, GPS constellation settings often drop RTK fix in some geographic regions.

Trimble provides a DOP predictor tool that assists in determining acceptable settings for specific geographical areas. Adjust the receiver settings as indicated below to change the "to fix" and "when fixed" conditions.

If the settings do not match what is shown, toggle through the options until the settings change to match the settings shown. To change the settings.

- 1. Press the pre
- 2. Select the A or V button to change the setting.
- 3. Select Enter.

12. Select The following screen will appear:



13. Select . The following screen will appear:



14. Select **V**. The following screen will appear:



15. Select **V** . The following screen will appear:



16. Select **V** . The following screen will appear.



17. Select **V** . The following screen will appear (AG-372 Only):



18. Select  $\mathbf{V}$  . The following screen will appear:



**Note:** A lower Elevation Mask setting offers a better view of satellites, which can improve RTK availability.

19. Select  $\mathbf{V}$  . The following screen will appear:



20. Select V. One of the following screens will appear depending on which receiver is installed:

#### AgGPS 262



#### AG-372



21. Select **ESC**. When the GPS Config screen reappears, select **FSC**. The following screen will appear:



23. Select **ESC**. The following screen will reappear:



24. Select . The following screen will appear.



25. Select **V** . The following screen will appear:



26. Select **V** . The following screen will appear:



27. Select **V** . The following screen will appear:



**Note:** Selecting the Favor Avail setting will result in improved RTK availability.

28. Select V. One of the following screens will appear depending on which receiver is installed:

#### AgGPS 262



#### AG-372



29. Select **V** . The following screen will appear:



30. Select **V** . The following screen will appear:



31. Select **V**. The following screen will appear:



32. Select **V** . The following screen will appear:



33. Select **V** . The following screen will appear:



34. Select ESC.

### **Port C Configuration**

1. Arrow over to the Port C Configuration screen. Arrow down until the screen below is shown. If Port C Out is on, turn it off.

**Note:** If using an Ag450 radio or similar configure Port C per the device manufacture's recommendations.



## **Port B Configuration**

- 1. Press the right button until "Configuration" displays on the screen.
- 2. Press the down button to select "Configuration".
- 3. Press the right button until "Port B Config" displays.
- 4. Press the down button to select "Port B Config".
- 5. Ensure the input (I) messages are set to CMR and the baud rate is set to 115K.
- 6. Verify the Output (O) messages are set to 8N1 and that the NEMA and baud rates are set to 115K.



- 7. Press Enter to save the settings.
- 8. Press the Down button until **NEMA1** displays.

9. Verify that **GGA** and **GSA** are capitalized so they are on.



- 10. Press Enter to save the settings.
- 11. Press the Down button until **NEMA2** displays.
- 12. Verify that **VTG** and **ZDA** are capitalized so they are turned on.



- 13. Press the down button to continue configuring Port B.
- 14. Press the down button until **CFG: Port B Out RTS\_CTS** displays.

15. Verify CFG: Port B Out RTS\_CTS is off.



- 16. Press Enter to save the settings.
- 17. Press the Down button to continue configuring Port B.
- 18. Press Enter to save the settings.
- 19. Press the Down button until **NEMA** out displays.
- 20. Ensure that **NEMA** out and **TSIP** out are set to **ASAP**. This will require arrowing over a second time once the "s" field is underlined.



21. Press Enter to save the settings.

- 22. Press the Down button until **CFG: NEMA Quality** displays.
- 23. Verify the setting is **Report True Mode**.



24. Press Enter to save the settings.

## **Provision the Trimble 392 Receiver**

**Note:** The Trimble 392 receiver is commercially known as the Nav-900 Guidance Controller.

**Note:** RDI screen configuration is the same as a Trimble 372 with the following difference: You must configure through port C NOT port B.

1. From the AFS Pro700 main menu select **Toolbox**.

Speed (GPS) 0.0 mph	Toolbox	Diagnostics	Data Management
	Run	Performance	Calibration
	VT		Work Condition
		2:25 pm - Jun 14, 20	110

2. The Display Setup Screen will open.

		Display Setup
DGPS	Month	Day
	6	22
Speed (GPS)		
•••• 0.0 mph	Year	Day/Night
	2010	pm 🚺
	Hour	Minute
	2	7
	Language	Interface Level
and the second second	Deutsch	Advanced
A State of the sta	Backlight	Current Vehicle
	1 100	Generic Tractor
Back Disp	Oper Layout Impl	Vehicle Config.

- 3. Select
- 4. Select GPS.

Speed (GPS) 0.0 mph		Display Setup
	Month	Day
	6	22
	Year	Day/Night
	2010	pm
	Hour	Minute
	2	7
	Language	Interface Level
	Deutsch	Advanced
	Backlight	Current Vehicle
	1	Generic Tractor
Back Gain	GPS Marks Mai	nual Product Contnr

5. Select the **DGPS Type** drop-down box.


6. Select RTK.

		GPS Setup	
DGPS	- GPS Location	Connection Type	
	Custom	RS232-B	
0.0 mph	DGPS Type	$\mathbf{X}$	
	Autonomou	s	
	HP/XP		
	RTK		
	VBS		
	WAAS/EGN	os	
	KTK SOUICE		
	AgGPS Radio		
Back Gain	GPS Marks	Manual Product Contrr	

- 7. Verify that the Chanel ID field displays **No Radio** and that the RTK/RTX Source is set to **AgGPS Radio**.
- 8. Press the **Back** button on the GPS Setup screen.



9. Select **Diagnostics**.

Speed (GPS) 0.0 mph	Toolbox	Diagnostics	Data Management
	Run	Performance	Calibration
	VT		Work Condition
	and the second second	2:25 pm - Jun 14, 20	10

10. The following screen will open and select

DGPS		9		Version
		Part #	Software	Version
Speed (GPS) 0.0 mph		84274970	Framework	V25.2.0.0
			BSP	V2.3.0.0
		84263593	Generic Tract	or V25.1.0.0
		87696989	Planter	V25.1.0.0
		84299939	Precision Far	ming V25.3.0.0
Back Vers	ion	CAN	Fault Planter	Count Sensor

11. Select RDI.

	9		Version
	Part #	Software	Version
Speed (GPS) 0.0 mph	84274970	Framework	V25.2.0.0
		BSP	V2.3.0.0
	84263593	Generic Tractor	V25.1.0.0
	87696989	Planter	V25.1.0.0
	84299939	Precision Farmin	ng V25.3.0.0
Back Speed	Signals R	tes GPS	GPS2 RDI

12. The following screen will appear.



#### NOTICE

The settings contained in the text below have been thoroughly tested and verified. The change in settings resulted in improved RTK availability in real field conditions when used with the Slingshot® system. However, Raven Industries in no way guarantees or warranties the equipment configuration of non-Raven equipment. Please contact your Trimble customer support for further details.

To ensure optimal RTK signal availability with the AG-392 receiver, it may be necessary to adjust the DOP mask settings. While a low RTK DOP mask setting provides high confidence in GPS position, GPS constellation settings often drop RTK fix in some geographic regions.

Trimble provides a DOP predictor tool that assists in determining acceptable settings for specific geographical areas. Adjust the receiver settings as indicated below to change the "to fix" and "when fixed" conditions.

If the settings do not match what is shown, toggle through the options until the settings change to match the settings shown. To change the settings.

- 1. Press the pre
- 2. Select the for V button to change the setting.
- 3. Select Enter.

13. Select The following screen will appear:



14. Select . The following screen will appear:



15. Select **V** . The following screen will appear:



16. Select **V** . The following screen will appear:



17. Select **V**. The following screen will appear.



18. Select **V** . The following screen will appear (AG-372 Only):



19. Select **V** . The following screen will appear:



**Note:** A lower Elevation Mask setting offers a better view of satellites, which can improve RTK availability.

20. Select  $\mathbf{V}$  . The following screen will appear:



21. Select V. One of the following screens will appear depending on which receiver is installed:

### AgGPS 262



#### AG-372



22. Select **ESC**. When the GPS Config screen reappears, select **ESC**. The following screen will appear:



23. Select **V** . The following screen will appear:



- Config Press v to Enter Esc Config Config
- 24. Select **ESC**. The following screen will reappear:

25. Select . The following screen will appear.



26. Select **V** . The following screen will appear:



27. Select **V** . The following screen will appear:



28. Select  $\mathbf{V}$ . The following screen will appear:



**Note:** Selecting the Favor Avail setting will result in improved RTK availability.

29. Select V. One of the following screens will appear depending on which receiver is installed:

## AgGPS 262



#### AG-372



30. Select **V** . The following screen will appear:



31. Select **V** . The following screen will appear:



32. Select **V** . The following screen will appear:



33. Select **V** . The following screen will appear:



34. Select **V**. The following screen will appear:

VT CoralRun	GPS receiver
Speed (GPS) 0.0 mph	CFG:RTK DOP Mask 99 when fixed
	ESC Enter

35. Select **ESC**.

## **Port B Configuration**

- 1. Press the right button until "Configuration" displays on the screen.
- 2. Press the down button to select "Configuration".
- 3. Press the right button until "Port B Config" displays.
- 4. Press the down button to select "Port B Config".
- 5. Ensure the input (I) messages are set to CMR and the baud rate is set to 38,400K.

6. Verify the Output (O) messages are set to 8N1 and that the NEMA and baud rates are set to 38,400K.



- 7. Press Enter to save the settings.
- 8. Press the Down button until **NEMA1** displays.
- 9. Verify that **GGA** and **GSA** are capitalized so they are on.



- 10. Press Enter to save the settings.
- 11. Press the Down button until **NEMA2** displays.

12. Verify that **VTG** and **ZDA** are capitalized so they are turned on.



- 13. Press the Down button to continue configuring Port B.
- 14. Press the Down button until **CFG: Port B Out RTS/CTS** displays.
- 15. Verify CFG: Port B Out RTS/CTS is off.



- 16. Press Enter to save the settings.
- 17. Press the Down button to continue configuring Port B.
- 18. Press Enter to save the settings.

- 19. Press the Down button until **NEMA** out displays.
- 20. Ensure that **NEMA** out and **TSIP** out are set to **ASAP**. This will require arrowing over a second time once the "s" field is underlined.



- 21. Press Enter to save the settings.
- 22. Press the Down button until CFG: NEMA Quality displays.
- 23. Verify the setting is **Report True Mode**.



24. Press Enter to save the settings.

# **Port C Configuration (If Streaming RTK Corrections)**

1. If inputting RTK Corrections into the Trimble 392, configure Port C using the same settings as Port B.

**Note:** Refer to the specific instructions for your modem if you are streaming RTK corrections to confirm port configuration.

## **Confirm GPS Status**

1. Select the **VT** button to bring up the object pool.



2. Select the RS Lite **UT** working set.



3. Select the **Settings** button on the right side of the screen.

4. Select the **GPS Setup** Button at the top of the screen.



- 5. Select the **Differential Configuration Setup** button.
- 6. **RTK** and **Float** should be shown.

Differential Configuration			
	Differential Source:		
	R T K		
	Fallback Mode:		
	Float		

7. Select the check mark button.

8. Select GPS Information button.



9. A **4** should be displayed in the **GGA Quality (Mode)** section in the center of the screen.

GPS Informat:	GPS Information				
	?				
Latitude	43*42'6.6"				
Longitude	-97*17'29.5"				
Elevation(MSL)(ft)	1525.42				
Speed (mph)	0.0				
GGA Quality(Mode)	4				
Number Of Satellites	8				
HDOP	1.2				
Heading	63.0				
Differential ID	0133				
Differential Age (seconds) RAVEN	4				

# Verify / Update the Combine to the Correct Datum

**Note:** All tractors and combines being used for Raven Cart Automation<sup>™</sup> need to be referencing the same datum. NAD83 (NSRS2011) is the default datum for RTX in North America. If you are going to run Raven Cart Automation<sup>™</sup> in a different region, you will need to look up the default RTX datum and switch to that datum in the field computer.

RTX datums are hard coded in the Trimble 372 and 392. Even if the datum is changed in the combine display, the actual datum will not be changed. Verify the combine datum and if it is for some reason not NAD83, update the tractor datum to match what is being used on the combine.

- 1. Check the combine datum.
- 2. If the combine datum is not set to NAD83 (NSRS2011), update the tractor datum to match that of the combine. Refer to "Verify / Update the Tractor to the Correct Datum" on page 50 for more information.

## **Update the Combine RCU**

- 1. Navigate to the Slingshot® object pool.
- 2. Select the gear icon icon the right side of the screen.

0 🕑 🖸	
Slingshot Name	90
	<b>\$</b> -\$
RTK Source	
Remote Diagnostics	
	-

- 3. Select the **System Information** tab.
- 4. Select **RS1<sup>™</sup> Information** from the drop-down menu.
- 5. Press the ECU Updates Prompt.



6. Select the desired software version and press **Download and Install**.

**Note:** If no update is needed the screen will display that **All ECUs are at the correct** *software version*.

Select Software To Download		<b>_</b>	
Software Version	Statu	s	
23.4.0.13	OTA		
23.3.0.73	ОТА		
23.3.0.69	ΟΤΑ		
23.3.0.68	OTA		
23.3.0.67	OTA		
Current S	oftware Version oftware Version	23.3.0.67	
Downlo and Insta	ad LL RAVE	Check For Server Updates	
	K X Y E	$\sim$	-

- 7. The Data Usage Warning window will open confirming to download the update.
- 8. Press the Check Mark.



9. A Notice window will open to notify to not turn off power during the update process.

10. Press the Check Mark.



## **Setup the Combine RCU**

1. Enter the **VT Menu** and select the **RCU** page if it does not automatically open.



2. Select Combine.

**Note:** Press the arrows in the External Vehicle RCU window to see the other vehicles in the area that are on the same channel.

Radio Control Unit - Main	
Combine Grain Cart	
External Vehicle RCU	***
Index: 0 SN: 0 Address: 30.48.AA Function: Combine Latency (ms): 0 Link Quality (dBm): 26	

3. Press the **Gears** button 🔀.

4. Set the Radio Channel. The default channel is 9. Refer to "Scan for the Optimal Combine RCU Channel" on the next page on how to search for the optimal channel.

Note: All machines must be set to the same radio channel. Up to six machines are supported.

Radio Control Unit - Setup   System Settings	
Radio Channel 9	Ş.
	*
System Reboot Reset Defaults	

5. Press the **Diagnostic** button to verify the software version.

Radio Control Unit - Diagnostics	on	
Hardware/Software		20
Hardware Part Number	0640171457	98° -+/
Hardware Serial Number	1110	**
Hardware Revision	А	
Software Part Number	0770171632	
Software Version Number	22.4.0.27	
Bootloader Version Number	1.0.0.4	-

# Scan for the Optimal Combine RCU Channel

It is recommended to perform a scan for the optimal RCU channel with the lowest interference levels.

Note: The default channel is 9.

- 1. Open the RCU object pool.
- 2. Press the **Diagnostic** button

Radio Control Unit - Main	
Combine Grain Cart	
	-+-+v+=
External Vehicle RCU	
Index: 0 SN: 0	
Address: 30.48.AA	
Function: Combine	
Latency (ms): 0	
Link Quality (dBm): 26	

- 3. Press the **RCU Test** tab.
- 4. Select **Channel Scan** from the drop down.

5. Press the **Play** button.



- 6. Run the channel scan for 2 to 5 minutes and select the recommended channel.
  - The black bars are an average of background noise.
  - The red lines are spikes (large spikes can drop messages ultimately causing kick outs).



7. Set the RCU to the recommended channel.

# **Combine Slingshot® Communication Settings (If Equipped)**

1. Enter the VT Menu and select the Slingshot® page.



- 2. Press the **Gear Icon** on the right side.
- 4. Set the RS Lite to Field Hub Client Mode.



5. Select the **WiFi Settings** 🖤 tab.

6. Change the mode to **Manual-Client**.



- 7. Press the Home Icon and select the WiFi Symbol.
- 8. Find the combineField Hub and select it in the available WiFi signal list.
- 9. Enter the Field Hub password and verify that there is a green check mark after it is entered.

**Note:** The password is located on the card taped to the bottom of the Field Hub.



# **Setup the Combine Vehicle Navigation**

**Note:** The following steps describe the settings required for the Raven Cart Automation<sup>M</sup> system. Refer to the RS1<sup>M</sup> and RS Lite Calibration and Operation Manual (P/N 016-4010-001) for additional information when completing the profile wizard.

1. Enter the VT Menu and select the Vehicle Navigation tab.



2. Select **Combine/Rear Steered** as the Machine Type, select the Machine Make and the Machine Model.

**Note:** If the machine model is selected the dimensions for vehicle navigation will be pre-populated. Verify that all dimensions are correct.

3. Press the **Next** button.



4. Press the **GPS Only Configuration** button.



- 5. Set the Antenna Fore / Aft dimensions.
- 6. Press the **Next** button.

Setup Antenna Fore/Aft	0
Please enter the distance from the antenna to the rear axle. A negative value should be used if the antenna is behind the rear axle.	
168.0 (in)	

7. Set the Antenna Center Offset dimension.

8. Press the **Next** button.



- 9. Set the Antenna Height dimension.
- 10. Press the **Next** button.



11. Set the Wheel Base dimension.
12. Press the **Next** button.



- 13. Setup the Differential Configuration.
  - Differential Source RTK or RTX
  - Fallback Mode Float
- 14. Press the **Next** button.

Differential Configuration	0
Differential Source	
Fallback Mode	
Float	

15. Wait for the GPS Status to change to **Converged**.

16. Press the **Next** button.



- 17. Perform the Terrain Compensation Calibration.
- 18. Press the **Next** button.



19. Press the **Calibrate** button and follow the on screen instructions.



20. The Terrain Compensation Calibration Completion screen will open after the Terrain Compensation Calibration has been completed.

21. Press the **Next** button.



22. The Calibration Wizard Summary screen will open.



23. Return to the **Vehicle Navigation** home page.

24. Drive the machine forward and verify the vehicle direction icon of the bottom of the page.

**Note:** On software version 22.4.0105 and prior the vehicle direction can be flipped around and not auto correct on a sudden stop of the machine or if the machine backs up and then gets shut off.



# **Raven Cart Automation<sup>™</sup> Combine Calibration**

1. Enter the **VT Menu** and select the **Raven Cart Automation**<sup>™</sup> tab.



2. Press the **Gears** button



- 3. Press **Combine** as the machine type.
- 4. Press the **Next** button.



5. Enter the width of the combine header.

**Note:** The entire width of the combine header is measured.

6. Press the **Next** button.

Combine Header Width	
Please enter the width of the combine's header.	
0.0 (ft)	

7. Enter the Toward / Away Nudge Increment Amount.

**Note:** The maximum allowed configurable nudge distance set is 38 cm [15 in] the default is 15 cm [6 in].

*Note:* The maximum distance that can be nudge away from the combine is 152 cm [60 in]. The maximum distance that can be nudge towards combine is 38 cm [15 in].

8. Press the Check Mark.



# **Chapter 3:**

# **Raven Cart Automation<sup>™</sup> Operation**

#### NOTICE

Important Safety: Operator should always use this system in connection with all safety systems in the machine, including without limitation using a seatbelt.

The following section describes the operation of the Raven Cart Automation<sup>™</sup> system.

# **Tractor Run Screen Overview**

Open the Raven Cart Automation<sup>™</sup> user interface.



### 1. Steering Status

- Blue Engaged 🞯
- Gray Disengaged

### 2. Propulsion Status

- Blue Engaged
- Gray Disengaged
- Green Speed Hold State
- Amber Speed Freeze State

**Note:** Speed Hold is a user-initiated hold while the cart is in sync while speed freeze is the propulsion behavior for user override behaviors.

### 3. Information 🚺

- If only one tractor is being used for Raven Cart Automation<sup>™</sup> select the Information icon to view directional information.
- In Multi-Machine mode select the **Information** icon to view the other vehicles on the same radio channel.

#### 4. System Status

- Error State An error is preventing engagement.
- Not Ready System is not ready to engage.
- Steering Not Ready (SC1<sup>™</sup> not ready) There is an SC1<sup>™</sup> issue preventing engagement.
- Ready to Engage System is ready to engage.
- Acquiring Sync Point Currently driving to the sync point.
- Synced Synced with the combine +/- 1 meter [3.3 feet].

#### 5. Sync Commands 🔤

• Select the Sync Commands icon to view the sync options.

#### 6. Zoom Commands

• The +/- command zooms in and out of sync window.

### 7. Sync Point

• This is the position offset from the combine that the tractor will target when it enters a sync.

### 8. Automatic/Manual Mode

• Changes to automatic or manual sync mode when used with multi-machines.

#### 9. Max Speed

• Used to set the tractor's max speed. Max speed allowed is 24.14 km/h [15 mph]. Default is 19.31 km/h [12 mph].

# **Combine Run Screen Overview**

Open the Raven Cart Automation<sup>™</sup> user interface.



### 1. Steering Status

- Blue Engaged 🞯
- Gray Disengaged 🎯

#### 2. Propulsion Status

- Blue Engaged
- Gray Disengaged
- Green Speed Hold State
- Amber Speed Freeze State 🚔

**Note:** Speed Hold is a user-initiated hold while the cart is in sync while speed freeze is the propulsion behavior for user override behaviors.

## 3. Information 🚺

• The information button brings up a detailed list of all other machines on your radio channel and their status



• Press the machine name for more detailed information

*Note:* Machine name can be changed by clicking into the header text box.

- Synced With Displays the synced machine.
- Sync Status Displays the sync status.
- Cart Status If the cart has UHarvest<sup>®</sup> Pro installed, the cart status will display the weight. If UHarvest<sup>®</sup> Pro is not installed, it will display there is no grain cart scale connected.



#### 4. System Status

- Error State An error is preventing engagement.
- Not Ready System is not ready to engage.
- Steering Not Ready (SC1<sup>™</sup> not ready) There is an SC1<sup>™</sup> issue preventing engagement.
- Ready to Engage System is ready to engage.
- Acquiring Sync Point Currently driving to the sync point.
- Synced Synced with the combine +/- 1 meter [3.3 feet].

# 5. Sync Commands 📧

• Select the Sync Commands icon to view the sync options.

### 6. Speed Hold

- When engaged the tractor and grain cart will maintain it's current speed regardless of the combine movement.
- When disengaged the tractor and grain cart will return to previously selected Sync Nudge Location.

# **Combine Cart Remote Overview**

The combine Cart Remote can be used to manually adjust the sync point of the grain cart.



Note: Required sync point minimum distance between vehicles is 1 m [3.3 ft].

#### **Default Functions for the Cart Remote**

Input ID	Function
1	Call Grain Cart
2	Notify Cart to Unload
3	Save Sync Point
4	Combine Auger to the Rear Section of the Cart
5	Combine Auger to the Front Section of the Cart
6	Nudge Towards the Combine
7	Nudge Auger One Position Towards the Front Section of the Cart
8	Nudge Away from the Combine
9	Nudge Auger One Position Towards the Rear Section of the Cart
10	No Function Assigned
11	No Function Assigned
12	No Function Assigned

#### NOTICE

Important! For any configuration change, including but not limited to changing the auger extension, changing a header, tire configuration, or changing a grain cart, operator must review and consider whether a sync point reset is needed.

# **Configure the Cart Remote**

The Cart Remote can be configured for the individual user preferences.

1. Press the **Remote Configuration Button** on the combine UI.



2. Press the button to be configured and select the desired corresponding function from the drop down window.

Available Function Options:

- Front Nudge
- Center Nudge
- Back Nudge
- Mid-Front Nudge
- Mid-Back Nudge
- Left Nudge
- Right Nudge
- Speed Hold
- Back One
- Front One
- Unload Notification
- Set Sync Point
- Grain Cart Request
- 3. Toggle the Invert Switch to flip the default nudge directions.

**Note:** Nudges will then become relative to the cart position.



# Set the Left/Right Nudge Amount

- 1. Position the grain cart in the desired position.
- 2. Press the **Tools Icon** on the combine UI.
- 3. Navigate to the Combine Settings window.
- 4. Set the Combine Header Width.
- 5. Set the Left/Right Nudge Amount.

**Note:** The maximum allowed configurable nudge distance set is 38 cm [15 in] the default is 15 cm [6 in].

**Note:** The maximum distance that can be nudge away from the combine is 152 cm [60 in]. The maximum distance that can be nudge towards combine is 38 cm [15 in].



6. If the nudge limit is reached an alert will be displayed.



# **Turn On the ISOBUS Switch**

**Note:** There may be some occurrences when the ISOBUS switch needs to be turned on in the terminal. Complete the following steps to turn it on.

1. Press the icon in the upper right corner of the screen.

×		Productivity	-√≁ Diagnostics	Menu	Engine Power
ent		or n 400 PS RCT	Tractor	System 03.30.05.0	
	lement n	Vehicle/Im Configurati		Ø Data	
udielau			GNSS	ISOBUS	Cross Track Error in Economy
naition	Work Co	ide	AccuGu	Connectivity	gal/ac Average Workin
		ide	AccuGu	Connectivity	Average Workin

2. Press the ISOBUS icon.



3. Toggle the Universal Terminal / File Server button to On.



# Sync the Grain Cart with the Combine

#### NOTICE

Important: It is recommended to use auto guidance at all times on the combine while operating Raven Cart Automation<sup>™</sup>.

**Note:** It is important operator can hear machine alarms at all times during operation.

1. Locate the ISOBUS switch in the upper right of the headliner.



2. Enable the ISOBUS switch by pressing the **Tractor AUTO** icon.



3. The ISB icon in the terminal will turn green.



4. Drive the tractor and grain cart into the sync window.

*Note:* The 3 pie icon will turn green in the upper left hand corner of the screen.



5. Engage Auto-Steering by pressing the Auto-Steer button on the Multi-Function Handle.

**Note:** The tractor must be moving, within the Sync Window and have a heading that is within 90° of the combine to allow auto-steer engagement.



- 6. Engage propulsion by pressing the button on the back hand side of Multi-Function Handle.
  - **Note:** Propulsion can only be engaged after steering has been engaged.



7. The tractor will sync with the combine by positioning the cart under the combine auger at the sync point.



8. The icon in the upper left hand corner will turn solid when the system is engaged.



## **Nudge the Grain Cart**

**Note:** After the grain cart has synced it can be manually nudged ahead or behind and left or right in the terminal or by the Cart Remote.

The grain cart can be filled in 5 different locations.

- Front
- Front Mid
- Center
- Back Mid
- Back

1. The grain cart fill position can be adjusted by selecting nudge presets on the Cart Remote or by pressing the Cart Nudge buttons in the terminal.

**Note:** The grain cart can also be nudge ahead or behind by pushing the Cart Remote knob forward or rearward.



#### Tractor Run Screen

#### **Combine Run Screen**



The color of the cart nudge button will changed based on the sync command.

- Green Active
- Blue Inactive
- Yellow Command has been sent but not acknowledged by the tractor/combine.
- 2. Once the system is disengaged the sync point will automatically return to the center sync point next time the system is reengaged.

#### **User Override Behavior**

User Action	Steering	Speed/Propulsion	Automation Icons
No Action (Steering and propulsion active)	Steering con- trols, based on Harvester ori- entation	Speed controls based on the Har- vester position.	
MFH Handle Movement or Foot Throttle Movement	Maintain Auto Steering	Speed will return to the MFH set speed.	
Steering Wheel Movement	Disengage Auto Steering	Propulsion no longer automated, will maintain last speed until there is a user-initiated change.	
Brakes Pressed	Maintain Auto Steering	Propulsion no longer automated on brake release, will maintain last speed until there is a user initiated change.	

User Action	Steering	Speed/Propulsion	Automation Icons
Auto Steer or Propulsion But- ton Pressed	No change in function	No change in function.	
Neutral Switch Pressed	Maintain Auto Steering	Speed control goes inactive.	
Engine Brake- Push Button (floor)	Maintain Auto Steering	Speed control stays active, however engine performance is degraded until the engine brake is released.	

# **Multi-Machine Operation**

- There can be up to six machines on one radio channel.
- If there are multiple combines on the same radio channel there are two modes for tractor operators:
  - Automatic Mode Automatically selects the closest combine with the same heading
  - Manual Mode User manually selects the combine to sync with
  - If there are not multiple combines the auto/manual button will not be present in the UI





# **Automatic Mode**

- 1. Toggle the auto/manual button to auto.
- 2. The tractor will automatically select the closest available combine.



# Manual Mode

There are two methods to enter the manual mode.

- Auto/Manual Button
- Vehicle Information Button

#### Auto/Manual Button

1. Toggle the auto/manual button to manual.



2. A list of available vehicles will open.





3. Choose the desired machine and press **Select**.

#### Vehicle Information Button

- 1. Press the vehicle information button **1** in the bottom left side corner.
- 2. Select the desired machine.



3. Press Select.


# **Adjust the Sync Point**

#### NOTICE

Important! For any configuration change, including but not limited to changing the auger extension, changing a header, tire configuration, or changing a grain cart, operator must review and consider whether a sync point reset is needed.

*Note:* Required sync point minimum distance between vehicles is 1 m [3.3 ft].

The sync point can be set from the combine while moving from the Cart Remote. The sync point can be set from the tractor while moving from the UI.

#### **Cart Remote**

- 1. Position the grain cart in the desired position.
- 2. Press number 10 on the Cart Remote.



#### **User Interface**

- 1. Position the grain cart in the desired position.
- 2. Press the **Tools Icon** on the combine UI.
- 3. Navigate to the Sync Point window (Machine Settings>Sync Point).

4. Press Save Sync Points.



# **Message the Grain Cart**

The combine can send messages to the grain cart to request certain function.

**Note:** The Cart Remote is customizable so any changes made to the Cart Remote can affect the functionality. The default settings are shown.

- Combine Request: Go Unload
- Grain Cart Full
- Combine Requesting Grain Cart

#### **Combine Request: Go Unload**

The combine operator can request the grain cart to go unload. This function is only available when the combine and tractor are in sync.

1. Press the number 2 button on the Cart Remote to notify the grain cart drive to go unload.



2. A window will open in the grain cart terminal requesting the cart operator to go unload.



#### **Grain Cart Full**

The combine operator can notify the grain cart when the grain cart is full. This function is only available when the combine and tractor are in sync.

1. Press the programmed number on the Cart Remote to notify the grain cart that it is full.

**Note:** There is no default number set to notify the grain cart that it is full. This must be customized in the Cart Remote configuration.



2. A window will open in the grain cart terminal notifying the cart operator that it is full.



### **Combining Requesting Grain Cart**

The combine operator can send a request a grain cart to perform a sync. This function is only available when the combine and tractor are not in sync.

1. Press the number 1 on the Cart Remote to request the grain cart to perform a sync.



2. A window will open in the grain cart terminal requesting the grain cart to perform a sync.



# Raven Cart Automation<sup>™</sup> Sync Point Error Windows

The following is a list of error windows that are possible when trying to sync the Raven Cart Automation<sup>™</sup> system.

#### There are no tractors in range of the combine



# The combine and tractor heading is too far

#### apart



# The tractor's GPS quality is not the level required for a sync point to be set



The combine's position data is too old for a sync point to be set



# The tractor is not within the sync window of the combine



# The combine's GPS quality is not at the level required for a sync point to be set



## **Machine Storage and Transport**

The Intended Purpose for Raven Cart Automation<sup>™</sup> is in-field use only during the unload process on straight swaths. Do not operate Raven Cart Automation<sup>™</sup> on any public roads or outside of the intended purpose.

Perform the following procedure to prepare the tractor for storage/transport.



1. Disable the ISOBUS switch in the upper right of the headliner.

2. After the ISOBUS has been disabled the pie icon in the upper left-hand corner will disappear.



3. Press the bottom of the auto guidance/steering mode switch for On-Road mode to disable autoguidance functionality before driving on the road.

**Note:** Operator must follow all steps for operation and use of the machine as outlined by the manufacturer.



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# **Return the Tractor to Factory Guidance**

- 1. Press the AccuGuide tab.
- 2. Set the AccuGuide Guidance to On.

*Note:* Guidance will need to be turned off again if a user wants to return to Raven Cart Automation<sup>™</sup> use. Refer to "Turn off Guidance" on page 44 for more information.



## **Chapter 4:**

# **Support Resources**

**Note:** Please review the Raven Applied Technology product "Disclaimer" on page a as well as the Limited and Extended Warranties information.

#### **Product Information and Support**

RavenPrecision.com offers:

- Product features and benefits
- compatibility guide for other Raven components and systems
- Resources to help find an authorized Raven dealer near you
- Dealer login options for various Raven portals including EDGE and Slingshot®.

#### Portal.RavenPrecision.com offers:

- Application drawings and replacement parts diagrams
- Online conversion calculators
- Software and firmware updates for Raven components
- User assistance and product documentation
- Product warranty registration and activation key requests
- Product documentation, application drawings, and updates

Or visit the Raven Public Knowledge Base (PKB) at <a href="https://ravenind.force.com/ATDSupport/s/">https://ravenind.force.com/ATDSupport/s/</a>.

#### Updates

Software and manual updates are available on the Raven Applied Technology website.

https://portal.ravenprecision.com

Sign up for email alerts and you will be automatically notified when updates for Raven products are available.

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

Your feedback will help shape the future of our product documentation and the overall service we provide. We want to see ourselves as our customers see us and are eager to learn how we have been helping you or how we could do better.

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

techwriting@ravenind.com

- P/N P/N 016-2612-002-A
- Raven Cart Automation<sup>™</sup> Provisioning and Operation Manual
- Any comments or feedback (please include URLs, chapter, or page numbers as applicable).
- Let us know how long have you been using this or other Raven products.

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

We thank you for your time.

#### Warranty Service and Repair

Review the <u>Product Service and Repair</u> page for additional details about what is not covered under warranty, general repair pricing, and locations of authorized repair centers as well as to complete a Return of Materials Authorization (RMA) form to return your Raven products for warranty or repair.

**Note:** An RMA must accompany all products returned to Raven for inspection or repair, including returns to authorized repair centers in North America. Returns received without a valid RMA may be returned at customer expense.

#### **Training Tutorials and Videos**

Video tutorials and additional training content can be found on Raven EDGE at <u>EDGE.RavenPrecision.com</u>.

#### **Raven Slingshot**®

Information regarding Slingshot® products and services may be found at <u>RavenSlingshot.com</u>.

#### **Social Media and Raven Podcast**

Raven invites you to follow us on your favorite social media!



The Raven Precision Podcast may be found at <u>RavenPrecision.podbean.com</u> or on <u>Apple</u> <u>iTunes</u>, <u>Google Play</u>, and <u>Spotify</u>.

# **Activate or Register a New Raven Product**

Activate full agricultural automation capabilities with Raven. Completing product activations for each new Raven product ensures that Raven technology is operating at full capability with full warranty protection.

#### **Hardware Key Activation**

Activate hardware to use unlocks and advanced features. To complete Hardware Key Activation:

- 1. Visit the Activation Key Request website.
- 2. Select the product that you're using.
- 3. Enter in your registration code information from your product/dealer.
- 4. Download the activation key.
- 5. Enter the activation key back into your Raven product, activating it.

#### **Warranty Registration**

Register the Raven product to ensure you are covered in case of product faults or defects.

- 1. Visit the <u>Product Registration</u> website.
- 2. Fill out the form with your product information.

3. You will be emailed a confirmation of warranty registration. Save this email for your records.

Successful Product Regis	stration					
Raven Customer Portal «noreply@ravenind.com»		».	f) Reply	的 Reply All	-> Forward	45
Te O Corner Johnson					Mon-4/	10/2023 2:10
Thank you for registering your Rave records.	n product(s). This email is to	confirm that you have succe	issfully registe	red. Please kee	p this email for	your
Registrant Information						
Name: Caralana						
Email: Cravenind.co	am					
Phone:						
Address Sloux Fails, SD	57107					
Country: USA						
Company:						
Dealer Information						
Dealer Purchased from:						
Dealer Location: Sioux Falls						
Dealer Postal Code: 57104						
Sales Person:						
Registered Product Information						
Raven Product Description	Raven Part Number	Raven Serial Number	Raven Ba	r Code I	Date of Retail P	urchase
RS1	123-4567-890	1234567890			Monday, April 3	0, 2023

#### **Slingshot® Hardware Activation**

Activate Slingshot<sup>®</sup> on your Field Hub 2.1, Viper<sup>®</sup> 4, CRX field computer, and/or RS1<sup>™</sup> to get the most out of your subscriptions.

1. Visit the <u>Slingshot® Activation</u> website. Alternatively, on the Slingshot® Portal homepage, go to **Manage** > **Activations** > **New Hardware Activation**.

**Note:** If you are not already logged in, you will be redirected to the Slingshot<sup>®</sup> account login page.

- 2. Assign your device to a company.
- 3. Enter product information, including the barcode and information about the device.
- 4. Select a Slingshot® system to add the device to or create a new system.
- 5. Configure your device.

#### **Further Product Configuration and Updates**

Further instructions can be found on the <u>https://portal.ravenprecision.com</u>. Visit the portal to download the most up-to-date documentation, manuals, and software for your product.

# **Raven Cart Automation™ Troubleshooting**

#### **Tractor Troubleshooting**

#### Tractor Sync

Problem	Probable Cause	Actions to Confirm and/or Resolve
	RCU not powered on	Verify that the RCU is plugged in, has power, and the LED is on.
	RCU not in range	Verify that the RCU is in range and powered on.
	Sync point not set	Verify a sync point has been set and saved for the Com- bine desiring to sync with. View in the Raven Cart Auto- mation™ Run screen, settings, 'Sync Points'.
Upabla to	Tractor and/or Com- bine not moving	Verify that the Tractor and Combine are in motion at a speed above 1.6 kph [1 mph] when attempting to sync
Sync	Auto Steer switch has not been flipped on	Verify the autoguidance switch has been flipped to on to enable autoguidance.
	ISOBUS Class 3 switch hasn't been flipped	Confirm the ISOBUS Class 3 switch has been toggled to the tractor icon refer to "Sync the Grain Cart with the Combine" on page 160 for more information.
	Tractor not in sync window	Verify that the tractor is in the sync window
	Combine not moving	Verify that the combine is moving 'Raven Cart Auto- mation™ Tractor Calibration'
Unable to Set Sync Point	Tractor not in sync window	Verify the tractor is inside the sync window, the sync window is displayed in the Raven Cart Automation™ home screen
	Tractor heading is not inline with the combine	Verify that the tractor and combine are facing the same direction
	RCU not in range	Verify that the RCU is in range and powered on. Verify that the RCU LED is on and has power.
	RCU's are on dif-	Verify RCU turbo mode is on and radio channel is the

Problem	Probable Cause	Actions to Confirm and/or Resolve
	ferent channels	same as the radio channel on vehicle attempting to sync with refer to "Setup the Tractor RCU" on page 56 for more information.
	RCU firmware not compatible	
	RCU Vehicle Profile not set up.	Verify the RCU is correctly configured. Refer to "Setup the Tractor RCU" on page 56 for more information.
	Vehicle Navigation Application not set up	Verify in the 'Vehicle Navigation' Application that the 'Setup the Tractor Vehicle Navigation' steps have been followed and a machine selection has been completed.
	Raven Cart Auto- mation™ Application not set up	Verify the vehicle profile has been set up in the UT. Refer to "Raven Cart Automation™ Tractor Calibration" on page 72 and verify the Vehicle type, and Usable grain cart length.
	Both vehicles are not on a Valid RTK cor- rection source.	Verify in the 'Vehicle Navigation' Application in both vehicles are using an RTK correction source
Sync Point Offset	The machines oper- ating in sync are on different correction source datums	In the display verify that the correction datum is on NAD83 (NSRS2011) and that the syncing machine is running on the matching correction source datum.

#### Tractor GNSS Connectivity

Problem	Probable Cause	Actions to Confirm and/or Resolve
Not Receiv- ing GPS Sig-	The CGR is not receiving power	Is the CGR plugged in to port B and receiving power. Unplug, wait 20 seconds, then plug back in. Verify plug and wiring harness are in tact and free of any corrosion and/or damages.
nal	Incorrect GPS configuration.	Verify corrections are set up to send correction data to the RS Lite via serial. Refer to "Setup the AFS Vector Pro Out- put to the RS Lite" on page 40for more information.
Not receiv-	Slingshot®	Verify the serial plug is plugged into the Slingshot®

Problem	Probable Cause	Actions to Confirm and/or Resolve
ing RTK Sig- nal (Sling- shot®)	modem con- nections not connected	modem and the other end is plugged into 'RTK In' con- nector found on the roof close to the RS Lite. Verify the 'Cell antennas' and 'Antenna Patch' are plugged into the Slingshot® modem, mounted on the roof, and have have a clear view of the sky. Refer to Install the Tractor Cables for more information.
	Slingshot® modem is not powered on	Verify the cabling connections are correctly attached to the Slingshot® modem: plugging into power (are the LEDs on?)
	Slingshot® hasn't been set up to send cor- rection to Sling- shot® modem	Verify correction source in Slingshot <sup>®</sup> is active and set up to send corrections to the Slingshot <sup>®</sup> Modem.
	RTK source not configured to receive cor- rections from Slingshot®	Verify the Vehicle receiver is configured to receive the cor- rections from the modem. Refer to "Configure RTK Cor- rections into the AFS Vector Pro from the Raven Field Hub" on page 45 for more information.
Not receiv- ing RTK (Slingshot®)	Slingshot® modem doesn't have an active cel- lular plan	Verify that there is an active cellular plan for the Sling- shot® modem.
	RTK correction not configured to base station in Slingshot® cloud	Verify The modem is connected to a base station and the correction setting is set to active in the cloud. Make sure your base station is set up to send and receive GNSS data.
	Problem with serial con- nector plug	Check the end of the serial plug on the roof of the machine and verify the pins are not pushed in. Check serial gound in Pin 5, PIN 10 High current power, PIN 11 High current ground. 'RTK' Connector .

Problem	Probable Cause	Actions to Confirm and/or Resolve
Not receiv- ing RTK (N-	GNSS Receiver not configured to receive sig- nal	Keep GNSS receiver at the default setting for receiving RTK correction or refer to "Configure RTK Corrections into the AFS Vector Pro from the Raven Field Hub" on page 45 and undue all of the steps to set configuration back to default Enter in User name and password to set up profile.
Trip)	RTK sub- scription is not valid	Contact a dealer to set up reciever to receiver RTK cor- rections
Not receiv- ing RTK (Satalite RTX Novatel)	GNSS Receiver not configured to receive sig- nal	Keep GNSS receiver at the default setting for receiving RTK correction or refer to "Configure RTK Corrections into the AFS Vector Pro from the Raven Field Hub" on page 45 and undue all of the steps to set configuration back to default.
	RTK sub- scription is not valid	Contact a dealer to set up receiver to receiver RTK cor- rections

#### Radio Control Unit (RCU Connectivity

Problem	Probable Cause	Actions to Confirm and/or Resolve
RCU not receiving signal	RCU antenna loose or dis- connect RCU is not in range or on wrong channel	Verify the antenna cable for the RCU is connected and cabling is in tact. (Cabling is free of cuts, breaks, kinks or frays) Verify the RCU attempting to connect with is in range and on the same channel
	RCU not receiving power	Verify the power plug and cable for the RCU is connected and cabling/plug is in tact. (Cabling is free of cuts, breaks, kinks or frays) and plug is free of corrosion and pins are not loose or pushed into the plug.

#### Object Pool Not Loading/Missing

Problem	Probable Cause	Actions to Confirm and/or Resolve
RCU Object	RCU ECU not receiv- ing power	Verify the RCU is plugged in and receiving power (Verify the LED in on)
ing		Verify the plug is receiving power High current power PIN 7 High current ground PIN 6
Raven Cart Automation™ Object Pool not loading	RCU antenna not connected	Verify the RCU is plugged in and receiving power (Verify the LED in on) Verify the RCU antenna is connected, cable and antenna are intact.
	RS Lite not receiving power	Verify the RS Lite is plugged in and receiving power (Verify the LED is on) Verify the plug and cables are not damaged (free of any pinches, breaks, cuts, corrosion, and cracking)
	RS Lite ECU not receiv- ing power	Verify the plug is receiving power High current power PIN 1 and 3 High current ground PIN 2
RS1 <sup>™</sup> (Sling- shot®) Object pool not load- ing	RS Lite not receiving Power	Verify the RS Lite is plugged in and receiving power (Verify the LED is on) Verify the plug and cables are not damaged (free of any pinches, breaks, cuts, corrosion, and cracking)
The RS1 <sup>™</sup> (Slingshot®) object pool populates but others are miss- ing	Missing object pool (s) but have the sling- shot object pool.	If the slingshot pool is active preform system reboot. Sling- shot setting-> dropdown-> System options-> Reboot sys- tem
RS1™ Object pool not load- ing	RS Lite ECU not receiv- ing power	Verify the plug is receiving power High current power PIN 1 and 3 High current ground PIN 2

Problem	Probable Cause	Actions to Confirm and/or Resolve
No object pools at all.	System did not load properly	Verify the RCU and RS Lite are receiving power. (Look for the LEDs, if power is on they should be emitting light). Unplug the main plug from the RS Lite, wait 20 seconds then plug back in.
	System not receiving power	Verify all the cable connectors are correctly and firmly con- nects to the appropriate connections. Refer to Install the Tractor Cables -> 'Raven Cart Automation™ System Dia- grams - Tractor' for more information.
	System did not load properly	Run a power cycle by turning the Key, wait for system to power down (3-5 minutes) power back on by starting the tractor. Power Cycle can also be preformed by turning off the key, flipping the battery disconnect switch (if applicable) then flipping the batter disconnect back on, then starting the tractor.

#### ECU Not Getting Power

Problem	Probable Cause	Actions to Confirm and/or Resolve
RS Lite	RS Lite not plugged in/ Plug is dam- aged	Verify the LED is emitting light and the RS Lite is plugged in. Check plug for loose or missing pins
	Cabling not connected to bulkhead con- nection	Verify The cabling has been connected to the appropriate locations and plugs. Refer to Install the Combine Cables -> 'Raven Cart Automation™ System Diagrams for more information
	Not getting power at the pins of the plug	Go to the RS Lite plug and check pin 1 and 3 for high cur- rent power and pins 2 for high current ground, 'RS Lite' Connector.
RCU	Cabling not connected to bulkhead con-	Verify The cabling has been connected to the appropriate locations and plugs. Refer to Install the Combine Cables -> 'Raven Cart Automation™ System Diagrams for more

Problem	Probable Cause	Actions to Confirm and/or Resolve
	nection	information
	RCU is not plugged in/Plug is dam- aged	Verify the LED is emitting light and the RCU is plugged in. Check plug for loose or missing pins
	Not getting power at the pins of the plug	Check pin 7 for high current power and pin 6 for high cur- rent ground. 'RCU' Connector
Slingshot® (if Applic- able)	Slingshot® not Plugged into power inside the cab	Verify the modem is plugged into a power source and the LEDs are lighting up
	Power source is faulty	Verify the power source it functioning properly and that it is supplying power (verify with something you have on hand. Ex. phone car charger)
CGR	Not receiving power to the CGR	Verify the pins in the plug going into the CGR are not pushed in and verify power and ground at the PINS 11 high current power, PIN 12 High current ground. 'CGR' Port B connector

### **Combine Troubleshooting**

#### Combine Sync

Problem	Probable Cause	Actions to Confirm and/or Resolve
Unable to Sync	RCU not powered on	Verify that the RCU is plugged in, has power, and the LED is on.
	RCU not in range	Verify that the RCU is in range and powered on.
	Sync point not set	Verify a sync point has been set and saved for the Com- bine desiring to sync with. View in the Raven Cart Auto- mation™ Run screen, settings, 'Sync Points'.
	Tractor and/or Com-	Verify that the Tractor and Combine are in motion at a

Problem	Probable Cause	Actions to Confirm and/or Resolve
	bine not moving	speed above 1.6 kph [1 mph] when attempting to sync
	Auto Steer switch has not been flipped on in the tractor	Verify the autoguidance switch has been flipped to on to enable autoguidance.
	ISOBUS Class 3 switch hasn't been flipped in the tractor	Confirm the ISOBUS Class 3 switch has been toggled to the tractor icon refer to "Sync the Grain Cart with the Combine" on page 160 for more information.
	Tractor not in sync window	Verify that the tractor is in the sync window
	Combine not moving	Verify that the combine is moving 'Raven Cart Auto- mation™ Tractor Calibration'
	Tractor not in sync window	Verify the tractor is inside the sync window, the sync window is displayed in the Raven Cart Automation <sup>™</sup> home screen
	Tractor heading is not inline with the combine	Verify that the tractor and combine are facing the same direction
	RCU not in range	Verify that the RCU is in range and powered on. Verify that the RCU LED is on and has power.
Unable to Set Sync Point	RCU's are on dif- ferent channels	Verify RCU turbo mode is on and radio channel is the same as the radio channel on vehicle attempting to sync with refer to "Setup the Tractor RCU" on page 56 for more information.
	RCU firmware not compatible	
	RCU Vehicle Profile not set up.	Verify the RCU is correctly configured. Refer to "Setup the Combine RCU" on page 128 for more information.
	Vehicle Navigation Application not set up	Verify in the 'Vehicle Navigation' Application that the 'Setup the Combine Vehicle Navigation' steps have been followed and a machine selection has been com- pleted.
	Raven Cart Auto- mation™ Application	Verify the vehicle profile has been set up in the UT through the RDI screens. Refer to "Raven Cart Auto-

Problem	Probable Cause	Actions to Confirm and/or Resolve
	not set up	mation™ Combine Calibration" on page 142 (Vehicle type, Usable grain cart length)
	Both vehicles are not on a Valid RTK cor- rection source.	Verify in the 'Vehicle Navigation' Application in both vehicles are using an RTK correction source
Sync Point Offset	The machines oper- ating in sync are on different correction source datums	In the display verify that the correction datum is on NAD83 (NSRS2011) and that the syncing machine is running on the matching correction source datum.

#### Combine GNSS Connectivity

Problem	Probable Cause	Actions to Confirm and/or Resolve
Not receiv- ing GPS Sig- nal	Incorrect GPS configuration	Verify corrections are set up to send correction data to the RS-Lite via serial, this can be set up through the RDI screens. Refer to "Provision the Trimble 372 Receiver" on page 76 for more information.
	Open Hopper	GNSS receiver is inside the hopper so it needs to be open in order to receiver a signal.
Not receiv- ing RTK Sig- nal (Slingshot®)	Slingshot® not activated in the cloud	If using Slingshot <sup>®</sup> , verify a base station has been selected and correction source is active for your modem via Sling- shot <sup>®</sup> portal.
Not receiv- ing GPS Sig- nal	The CGR is not receiving power	Is the CGR plugged in to port B and receiving power. Unplug, wait 20 seconds, then plug back in. Verify plug and wiring harness are in tact and free of any corrosion and/or damages.
Not receiv- ing RTK Sig- nal (Slingshot®)	Slingshot® modem con- nections not connected	Verify the serial plug is plugged into the Slingshot® modem and the other end is plugged into 'RTK In' con- nector found on the roof close to the RS Lite. Verify the 'Cell antennas' and 'Antenna Patch' are plugged into the Slingshot® modem, mounted on the roof, and have a clear view of the sky. Refer to the Install the Combine Cables -> 'Raven Cart Automation <sup>™</sup> System Diagrams.

Problem	Probable Cause	Actions to Confirm and/or Resolve
	Slingshot® modem is not powered on	Verify the cabling connections are correctly attached to the Slingshot <sup>®</sup> modem: plugging into power (are the LEDs on?)
	Slingshot® hasn't been set up to send cor- rection to Slingshot® modem.	Verify correction source in Slingshot <sup>®</sup> is active and set up to send corrections to the Slingshot <sup>®</sup> Modem.
	RTK source not configured to receive cor- rections from Slingshot®	Verify the Vehicle receiver is configured to receive the cor- rections from the modem. Refer to "Provision the Trimble 372 Receiver" on page 76 for more information.
Not receiv- ing RTK (Slingshot®)	Slingshot® modem doesn't have an active cel- lular plan	
	RTK correction not configured to base station in Slingshot® cloud	Verify The modem is connected to a base station and the correction setting is set to active in the cloud. Make sure your base station is set up to send and receive GNSS data

Problem	Probable Cause	Actions to Confirm and/or Resolve
Not receiv- ing RTK (N- Trip)	GNSS Receiver not configured to receive sig- nal	Keep GNSS receiver at the default setting for receiving RTK correction or refer to "Provision the Trimble 372 Receiver" on page 76 and undue all of the steps to set configuration back to default Enter in User name and password to set up profile.
	RTK sub- scription is not valid	Contact a dealer to set up receiver to receiver RTK cor- rections
Not receiv- ing RTK (Satalite RTX	GNSS Receiver not configured to receive sig-	Keep GNSS receiver at the default setting for receiving RTK correction or refer to "Provision the Trimble 372 Receiver" on page 76 and undue all of the steps to set configuration
ivovatel)	nai	back to default.

#### Radio Control Unit (RCU Connectivity

Problem	Probable Cause	Actions to Confirm and/or Resolve
RCU not receiving signal	RCU antenna loose or dis- connected	Verify the antenna cable for the RCU is connected and cabling is in tact. (Cabling is free of cuts, breaks, kinks or frays)
	RCU is not in range or on wrong channel	Verify the RCU attempting to connect with is in range and on the same channel
	RCU not receiv- ing power	Verify the power plug and cable for the RCU is connected and cabling/plug is in tact. (Cabling is free of cuts, breaks, kinks or frays) and plug is free of corrosion and pins are not loose or pushed into the plug.
RCU has poor sig- nal	More then 2 vehicles are on the same radio channel	Verify that each tractor combine pair are on their own sep- arate RCU radio channels and that there are no more then one combine and one tractor on the same channel.

#### **Object Pool Not Loading/Missing**

Problem	Probable Cause	Actions to Confirm and/or Resolve
RCU Object	RCU ECU not receiving power	Verify the RCU is plugged in and receiving power (Verify the LED in on)
ing		Verify the plug it receiving power High current power PIN 7 high current ground PIN 6
	RCU antenna not connected	Verify the RCU is plugged in and receiving power (Verify the LED in on) Verify the RCU antenna is connected, cable and antenna are intact.
Raven Cart Automation™ Object Pool	RS Lite not receiving Power	Verify the RS Lite is plugged in and receiving power (Verify the LED is on) Verify the plug and cables are not damaged (free of any pinches, breaks, cuts, corrosion, and cracking)
not loading	RS Lite ECU not receiv- ing power	Verify the plug is receiving power High current power PIN 1 and 3 High current ground PIN 2
RS1™ (Sling- shot®) Object pool not load- ing	RS Lite not receiving Power	Verify the RS Lite is plugged in and receiving power (Verify the LED is on) Verify the plug and cables are not damaged (free of any pinches, breaks, cuts, corrosion, and cracking)
The RS1 <sup>™</sup> (Slingshot®) object pool populates but others are miss- ing	Missing object pool (s) but have the Sling- shot® object pool.	If the Slingshot <sup>®</sup> pool is active preform system reboot. Slingshot <sup>®</sup> setting-> dropdown-> System options-> Reboot system
RS1™ Object pool not load- ing	RS Lite ECU not receiv- ing power	Verify the plug is receiving power High current power PIN 1 and 3 High current ground PIN 2
No object pools at all	System did not load properly	Verify the RCU and RS Lite are receiving power. (Look for the LEDs, if power is on they should be emitting light). Unplug the main plug from the RS Lite, wait 20 seconds then plug back in.
	System not	Verify all the cable connectors are correctly and firmly con-

Problem	Probable Cause	Actions to Confirm and/or Resolve
	receiving power	nects to the appropriate connections. Refer to the Install the Combine Cables -> 'Raven Cart Automation™ System Diagrams.
	System did not load properly	Unplug the main plug from the RS Lite and wait 20 seconds then plug back in or turn off combine, flip the bat- tery disconnect to power off the combine, wait 20 seconds then power back on.
		Run a power cycle by turning the Key, wait for system to power down (3-5 minutes) power back on by starting the Combine. Power Cycle can also be preformed by turning off the key, flipping the battery disconnect switch (if applic- able) then flipping the batter disconnect back on, then starting the tractor.
No VT	The Pro 700 needs to be unlocked	Contact dealer for VT unlock, If dealer is doing VT load, load only VT software unlock. Do not delete customers data. "Do you want to delete existing program files from display?" Answer 'No". " Do you want to delete existing data base files and internal storage data from the display?' answer "No". 'Do you want to start download from memory device to the display?" answer "Yes".
At Bootup the UT Memory is too Full	Some files need to deleted off the Pro 700	Go to Diagnostics > VT > NVM > Delete or clear files. Power cycle monitor and object pools should load into the UT

#### ECU Not Getting Power

Problem	Probable Cause	Actions to Confirm and/or Resolve
RS Lite	RS Lite not plugged in/ Plug is dam- aged	Verify the LED is emitting light and the RS Lite is plugged in. Check plug for loose or missing pins
	Cabling not connected to bulkhead con- nection	Verify The cabling has been connected to the appropriate locations and plugs. Refer to the Install the Combine Cables -> 'Raven Cart Automation™ System Diagrams.
	Not getting power at the pins of the plug	Check pin 1 and 3 for high current power and pins 2 for high current ground
RCU	Cabling not connected to bulkhead con- nection	Verify The cabling has been connected to the appropriate locations and plugs. Refer to the Install the Combine Cables -> 'Raven Cart Automation™ System Diagrams.
	RCU is not plugged in/Plug is dam- aged	Verify the LED is emitting light and the RCU is plugged in. Check plug for loose or missing pins
	Not getting power at the pins of the plug	Check pin 7 for high current power and pin 6 for high cur- rent ground
Slingshot® (if Applic- able)	Slingshot® not Plugged into power inside the cab	Verify the modem is plugged into a power source and the LEDs are lighting up

Problem	Probable Cause	Actions to Confirm and/or Resolve
	Power source is faulty	Verify the power source it functioning properly and that it is supplying power (verify with something you have on hand. Ex. phone car charger)
372/CGR	Not receiving power to the CGR	Verify the pins in the plug going into the CGR are not pushed in and verify power and ground at the PINS 11 high current power, PIN 12 High current ground. 'CGR' Port B connector
Bulk head cable plug	Power and ground pins not getting sig- nal	Verify the pins in the plug going into the CGR are not pushed in and verify power and ground at the PINS 11 high current power, PIN 12 High current ground. 'CGR' Port B connector

# Raven Cart Automation<sup>™</sup> System Diagrams

#### **Tractor System Diagram**








## **Combine System Diagrams**



