# CRX Operation Guide

*016-0171-664 Rev. K 2/21 E36808*

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# IMPORTANT SAFETY INFORMATION

This is a safety-alert symbol. When you see this symbol on the field computer, be alert because there is the potential for personal injury.

Follow the recommended precautions and safe operating practices.

# CR7 AND CR12 OVERVIEW

Both the CR7 and CR12 field computers feature a dust-proof design (IP65); bright, easy-to-use touchscreen interface; and ISO Universal Terminal (UT) and Task Controller (TC) capabilities making these field computers a flexible plug-and-play option for building an affordable system.

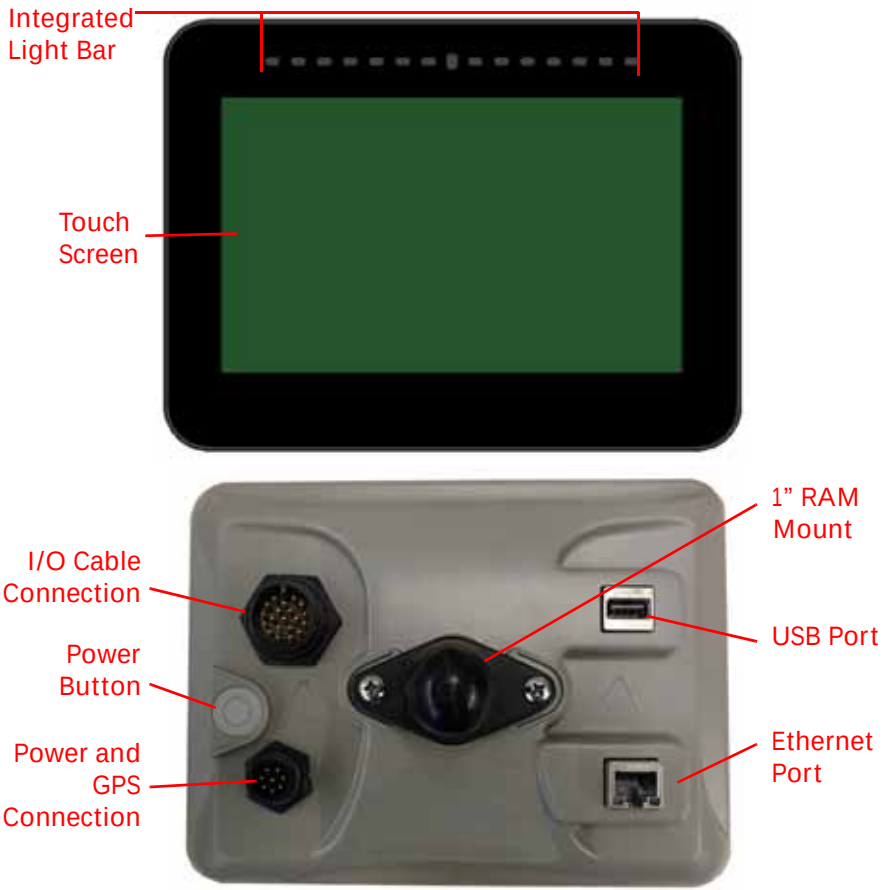
Both the CR7 and CR12 utilize the CRX operating software platform featuring easy job set-up; customizable in-job layouts; and an intuitive tablet-style interface. These field computers are also compatible with many Raven systems including:

- SmarTrax™ or SmarTrax MD™ automated steering control.
- Slingshot Online Services.
- Raven ISO Products such as Hawkeye® and Raven Rate Control Module (RCM).
- Raven ISO AutoBoom™ boom height management.
- Raven AccuBoom™.
- Raven SCS 400, 600, 4400, and 4600 series consoles.

NOTE: Contact a local Raven dealer for information on additional features and options available for use with the CR7 and CR12 field computers

The CR7™ is a 7" lightweight field computer with a simplified widget concept.

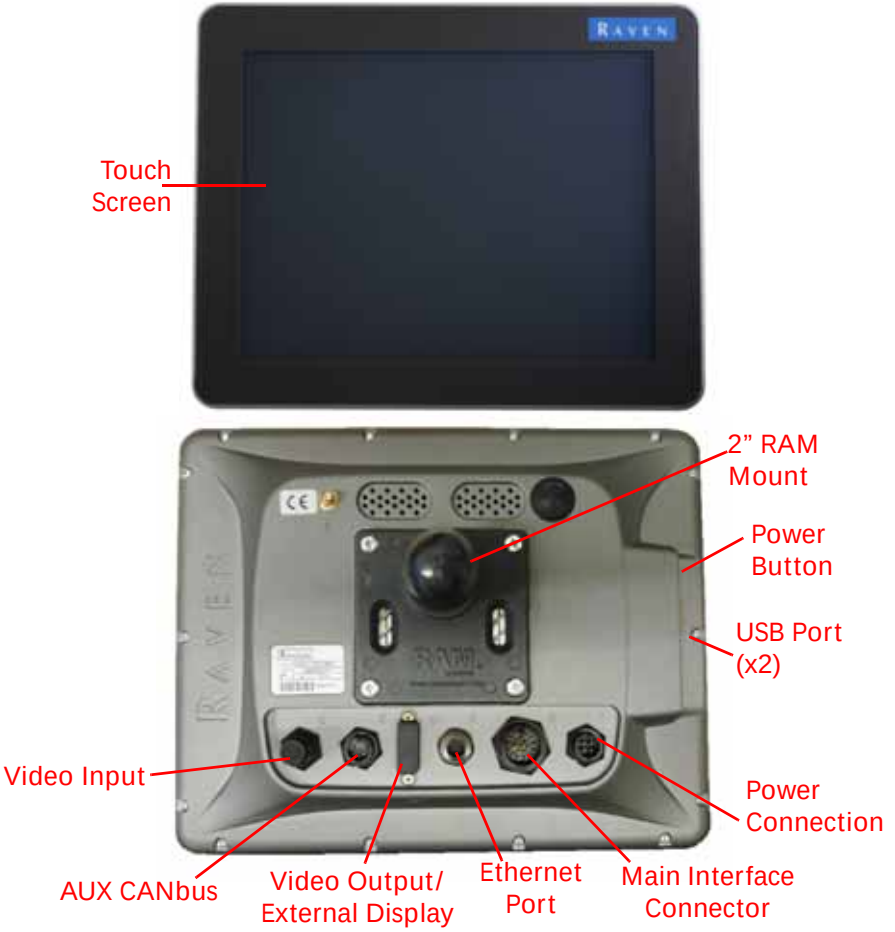
FIGURE 1. CR7 Field Computer



The CR12 is a larger version of the CR7 with a 12.1" capacitive touch screen, and an intuitive, tablet-style interface. Both the CR7 and CR12 consoles feature:

- Dustproof design
- Anti-reflective touch screen for optimal visibility
- Clear and easy to use
- Integrated Wi-Fi module for easy remote support

FIGURE 2. CR12 Field Computer



## SPECIFICATIONS

| | CR7 | CR12 |
|---|---|---|
| Connections | • 2 ISOBUS Channels<br>• 3 Serial Channels<br>• 1 USB 2.0 Port<br>• 1 Gigabit Ethernet Port<br>• 1 Wi-Fi 802.11 b/g/n<br>• 1 Radar Speed Output<br>• 2 Digital Sense Inputs | • 2 USB 2.0 ports<br>• 4 ISOBUS 2.0 Compatible Ports<br>• 5 RS232 Series Data Ports (GPS Out, GPS In, Console, Auxiliary, RTK) |
| Display | • 7" Widescreen<br>• Capacitive Touch<br>• 480 x 800 Resolution<br>• Screen Brightness 850 NITS<br>• Integrated Lightbar | • 12" Widescreen<br>• Capacitive Touch<br>• 1024 x 768 Resolution<br>• Screen Brightness 850 NITS |
| Computing | • 8 GB Storage<br>• 1 GB RAM<br>• 852 MHz Quad Core Processor | • 30 GB Internal Storage<br>• 1 GB RAM<br>• Quad Core Cortex A9 Processor |
| Power | • 7 to 16 VDC Input<br>• 850 mA Typical<br>• Supply Power Fuse: 5 Amp MINI® Fuse<br>• Keyed Power Start-Up and Shut-Down | • 4 to 35 VDC Input |
| Mechanical | • 7.5" x 5.6" x 3.0" (19 cm x 14.25 cm x 7.62 cm)<br>• Weight: 1.4 lbs (0.64 kg)<br>• 1" RAM Ball Mount | • 9.63" x 12.02" x 1.79" (24.46 cm x 30.53 cm x 4.55 cm)<br>• Weight: 4.7 lbs (2.13 kg)<br>• 2" RAM Ball Mount |
| Environmental | • Operating Temperature Range: -20°C to 70°C<br>• Storage Temperature Range: -40°C to 70°C<br>• IP65 Moisture Protection<br>• Operating Altitude: 2000m Maximum | • Operating Temperature Range: -20°C to 70°C<br>• Storage Temperature Range: -40°C to 85°C<br>• IP65 Moisture Protection |
| Certifications | • CE<br>• E-Mark | • CE<br>• ANATEL |

## CARE AND MAINTENANCE

- Harsh chemicals may damage the touch screen. Clean the touch screen and exterior as needed with a soft cloth dampened with glass cleaner. Apply the cleaner to the cloth and then wipe the screen gently.
- Removing power from the field computer without shutting down may result in damage to the unit which will require the field computer to be returned for service.
- To avoid scratching the touch screen, do not use any type of sharp instrument.
- Store the field computer in a dry environment when not in use.
- Damage to the field computer may occur if the USB ports are used to charge mobile devices such as cellular phones, tablets, or mp3 devices. USB ports should only be used for performing file transfer and maintenance.
- Route cables to prevent tripping hazards and to keep wires from pinching or breaking.
- When temperatures are expected to be 10° F (-12° C) or lower, remove the field computer from the vehicle and store it in a climate controlled environment.
- Even when powered down, the field computer will draw a small amount of power from the vehicle battery. If the machine will not be in operation for an extended period of time (e.g. more than a couple weeks), disconnect the power cable from the back of the field computer.

# REGULATORY STATEMENTS

## ANATEL COMPLIANCE STATEMENT

Este produto contém a placa CC IMX6 código de homologação Anatel 02268-19-01209.

# UPDATES

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

http://portal.ravenprecision.com/

Sign up for e-mail alerts to receive notifications when Raven products updates are available on the Raven website.

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-CRX Operation Guide
-016-0171-664 Rev. K
-Any comments or feedback (include chapter or page numbers if applicable).
-Let us know how long have you been using this or other Raven products.

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# INSTALLATION

1. Mount the antenna on the centerline of the tallest point of the vehicle (usually on the top of the vehicle cabin) using the magnetic mount. Make sure that the antenna has a clear, 360° view of the sky.

NOTE: If the mounting location is non-magnetic, use a mounting plate to mount the antenna.

2. Route the Power/GPS cable to the back of the field computer and connect it to the Power/GPS port.
3. Use the provided RAM mount arm to install the field computer inside the cab.
4. For additional cabling and connection assistance, refer to the CR7 and CR12 Installation Guide. Additional system diagrams are available on the Raven website.

http://portal.ravenprecision.com/

# INITIAL SET UP

When starting the system for the first time, a setup wizard will walk you through a setup process and, if desired, allow you to quickly begin creating guidance lines. This section covers the first time startup.

IMPORTANT: Check all measurements before entering values into the field computer and enter all measurements as accurately as possible. Check that values entered on the field computer are consistent with measurements.

IMPORTANT: The CR12 startup wizard will ask for the cable harness type used with the field computer. The default option is 115-8000-064 and should only be used if the part number of the cable harness connected to the CRX field computer matches. If using a different cable, select "Other" from the drop-down. If needed, the cable selection can be edited later in the GPS Information tab.

After powering up the system for the first time:

1. Select the desired language from the drop-down on the First Run Setup: Select Language screen.

FIGURE 3. Select Language


NOTE: Screen layout and button/widget location may vary slightly from the images shown in this manual.

2. Press Next . The First Run Setup: Select Time Zone screen will be displayed.

NOTE: At any time press Previous to return to the previous screen.

3. Select the desired time zone from the drop-down.

NOTE: Time zones are based on an offset from Coordinated Universal Time (UTC). Ex. Los Angeles is UTC-08:00, New York is UTC-05:00, Berlin is

UTC+01:00, and Moscow is UTC+03:00. It may be necessary to add an extra hour for daylight savings time for some regions.

4. Press Next . The First Run Setup: Select Units screen will be displayed.
5. Select the desired units (US Standard, Metric, or Turf) for each of the measurement types (Distance, Speed, Area, Weight, Volume, Pressure, and Temperature).

FIGURE 4. Select Units


6. Press Next . Either the First Run Setup: Simplified User Interface or the First Run Setup:Grower/Farm screen will display. Skip to step 9 when configuring a CR12.
7. CR7 offers a Simplified User Interface option which provides a basic set of guidance focused features and options.
   Do not enable this feature if the field computer will be used to control product application or planting operations, if detailed application maps and reports will be needed for multiple operations, if it will be connected to an ISO or CANbus system, or detailed file maintenance is necessary for field operation reporting.
8. Press Next . The First Run Setup: Grower/Farm screen will display.
9. Enter the desired grower name in the Name the Default Grower field.
10. Press Next . The First Run Setup: Configure Machine Configuration screen will be displayed.

NOTE: A Machine Configuration allows the user to select the type of equipment used for various field operations (e.g. tractor and implement, self-propelled sprayer, etc.) and quickly switch between configurations when using the CRX system with various machines or types of towed implements.

11. Select the Quick Start 

option to set up a basic machine configuration or select the Create Detailed Machine Configuration 

option to set up a more detailed machine configuration such as a tractor with a towed implement.

NOTE: Selecting the Quick Start provides simple set up to complete the initial configuration and begin using the CRX system. Both configuration options may be edited later as needed.

## QUICK START MACHINE CONFIGURATION

NOTE: The Quick Start option only allows the operator to create basic guidance lines. For additional functionality, select the Create Detailed Machine Configuration option during the initial set up.

1. Select Quick Start 

. The Machine Configuration: Quick Start window will be displayed.
2. Enter the desired Guidance Width in feet (meters).

NOTE: The Guidance Width is the width of the implement and that will be "painted" to display previous area covered during a field operation. This measurement is used for creating swath widths for guidance lines and is crucial for most field applications.

3. Press Accept  . The End User License Agreement prompt will be displayed.
4. Review the information in the End User License Agreement and select OK. The Warning prompt will be displayed.
5. Read and acknowledge the information on the Warning window. The Home screen (see Figure 5 on page 10) will be displayed and the CRX system is ready for in-field operations.

NOTE: Press the Settings  button at any time it is visible to return to the Settings screen.

## DETAILED MACHINE CONFIGURATION

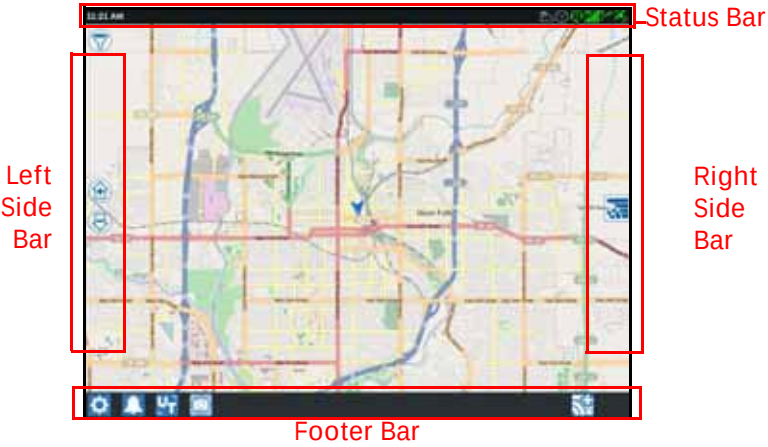
A detailed machine configuration allows the user to enter detailed machine and implement measurements for optimized guidance for specific equipment types (e.g. self-propelled sprayer versus towed planter behind an articulated tractor) and additional guidance features.

Refer to the ***Machine Configuration*** section on page 16 for additional information regarding setting up detailed machine configurations.

# HOME SCREEN OVERVIEW

The Home screen (see Figure 5 on page 10) provides a basic location display, access to system and machine settings, and options for starting New Jobs.

FIGURE 5. Home Screen




NOTE: Go to portal.ravenslingshot.com to locate and download Street Maps for use with CRX.

- Review *Initial Set Up* section on page 7 for additional assistance with system setup.
- Refer to *Start a Job* section on page 22 for assistance with starting a job.
- See *Run Screen Overview* section on page 30 for additional information on using tools and features during an in-field operation.

## STATUS BAR

The status bar provides a quick reference for status of the CRX system and connected devices. Note that some status icons use different icon colors to indicate a different status.

TABLE 1. Status Bar Icons

| Icon | Name | Description |
|---|---|---|
|  | GPS No Data | GPS is not detected. For assistance with GPS issues, refer to the *GPS* section on page 43. |
|  | GPS Bad | No GPS. For assistance with GPS issues, refer to the *GPS* section on page 43. |

| | | |
|---|---|---|
|  | GPS Warning | Poor GPS signal. To address GPS issues, refer to the *GPS* section on page 43. |
|  | GPS Ideal | GPS is active and receiving a good signal. |
|  | Slingshot Disabled | Slingshot is not available. Refer to the Slingshot operation manual for additional information on Slingshot functionality. |
|  | Slingshot Connected | Slingshot is connected. Refer to the Slingshot operation manual for additional information on Slingshot functionality. |
|  | Slingshot Transfer | Slingshot is currently transferring data. Refer to the Slingshot operation manual for additional information on Slingshot functionality. |
|  | Signal Strength | Strength of wireless signal. Refer to the Slingshot operation manual for additional information on Slingshot functionality. |
|  | Remote Support Disabled | Remote support session is not active. Refer to the “Remote Support” on page 44 for additional information on remote support. |
|  | Remote Support Active | Remote support session active. |
|  | SmarTrax Disabled | SmarTrax is turned off. If desired, press one of the SmarTrax resume switches on the machine to turn SmarTrax back on. Refer to the SmarTrax operation manual for additional information on SmarTrax operation. |
|  | SmarTrax Not Ready | SmarTrax is not ready to be engaged. Refer to the SmarTrax operation manual for additional information on SmarTrax operation. |
|  | SmarTrax Ready | SmarTrax is ready to operate. Refer to the SmarTrax operation manual for additional information on SmarTrax operation. |
|  | SmarTrax Node Download | SmarTrax node update is being installed. Refer to the SmarTrax operation manual for additional information on SmarTrax operation. |
|  | Software Update | A CRX software update is available. Refer to “Software and Hardware Updates” on page 59 for additional information on performing a CRX software update. |

| | | |
|---|---|---|
|  | USB Scanning | Indicates that CRX is scanning the connected USB drive. Refer to "Software and Hardware Updates" on page 59 for additional information on updates. |
|  | USB Transfer | CRX is transferring files from the connected USB drive. |
|  | Outdoor Sensor | Outdoor Sensor is communicating. |

## FOOTER TOOLS

The buttons at the bottom of the screen provide easy access to settings and features such as the UT, any active alarms or notifications, and also different views for use during an in-field operation. Review the following descriptions of the function of the icons displayed in the footer.

TABLE 2. CRX Footer Tools

| Icon | Name | Description |
|---|---|---|
|  | Toggle View | Toggle between the 3D/2D guidance view, widget view, and aerial view. |
|  | Alarms | Display information about active alerts or review notification history. |
|  | Confirm | Select confirm to either accept the change or exit the job. |
|  | Cancel | Select Cancel to stop performing the current selection. |
|  | Screen Capture | Press this to capture a screen shot of the current screen. |
|  | Create Job in a New Field | Select this icon to start a new job in a new field. |
|  | Settings Menu | Open the Settings Menu. |
|  | UT | Select UT to open and control components on the ISOBUS. |
|  | Widget View | Display simultaneous view of the job screen and any other available widget. The UT widget is only available in the Widget View for CR12. |

# CRX SETTINGS MENU

## OVERVIEW AND SHORTCUTS

FIGURE 6. Settings Menu


The following settings and options are available via the various menu screens.

NOTE: Menu options may appear over multiple screens. Swipe to the left or right to view additional menus.

TABLE 3. Settings Screens

| Icon | Information |
|---|---|
|   | Add menu options to the Shortcut Bar for quick access to frequently used settings and features. |
|   | Adjusts the settings for the analog camera viewer while not in a job. Only available on CR12. |
|   | Base Stations allows for the creation and configuration of local base stations. |
|   | The display can be set to Day or Night Mode and the Screen and Lightbar Brightness can be adjusted in the Display screen. |

| Icon | Information |
|---|---|
|   | Allows users to import/export files as well as view and delete files. |
|   | Create, Rename, or Delete Growers, Farms, or Fields. |
|   | Review GPS information, diagnostics, and adjust settings. |
|   | Provides settings for Path Deviation Sensitivity, Center settings, and Reverse LED Indication. |
|   | Provides setting options for Language, Time Zone, and Units of Measure. |
|   | Networking allows for the creation and configuration of Wi-Fi and other network connections. |
|   | Allows the user to add a new machine or to update the existing machine configuration. |
|   | Provides options that can be used as the input for master switch status of connected nodes. If no other options are selected, select the On-Screen option to record coverage. |
|   | Select this page to adjust prescription map Look Ahead settings for Variable Rate Applications (VRA). |
|   | Select this page if working with technical support and they request access to the CRX via Slingshot. Click Enable Remote Support to allow them access to the CRX. |
|   | Provides control for individual settings including the On Override, Turn Off Percentage, and Look Ahead settings for section control. |

| Icon | Information |
|---|---|
|   | Configures the units for use with product control of the console. Typically these match the units configured within the SCS console. |
|   | Provides information on the serial connection speed and the type of serial device. |
|   | Slingshot is a subscription based service that allows the user to transfer files remotely. Slingshot also allows the service desk to perform remote service on the system. |
|   | Allows the user to adjust On Line (OL) Sensitivity and the Line Acquire speed, configure all SmarTrax settings and run SmarTrax calibration. |
|   | If there is a software update available, it can be installed on this page using either Slingshot Link or a USB drive. GPS and CRX unlock status and System information can also be found on this page. |
|   | Provides information on UT instances, identify UT's or clear UT object pools. |
|   | Select volume to adjust notification volume levels. |
|   | The weather sensor provides support for add on components that measure temperature, humidity, etc. The information from the weather station can be recorded along with other job information. |
|   | Manage the products applied to the field. These can be tank mixes, liquid or granular products, or plant varieties. |

## ADD SHORTCUTS

To add a widget to the Shortcut Bar:

1. Touch Add Shortcut  in the Customizable Shortcut Bar.
2. Select the desired setting menu.

### REMOVE OR CHANGE SHORTCUTS

To remove or change an icon in the Customizable Shortcut Bar:

1. Touch and hold the desired menu option for 2 seconds. An "X" will be displayed in the top, left corner of the selected menu item.
2. Touch the X to remove the menu item or select a different menu item from the Settings Menu options.

## MACHINE CONFIGURATION

IMPORTANT: Entering all measurements as accurately as possible will ensure the best coverage and guidance results during in-field operations. Verify all measurements before entering them into CRX and check values entered for each setting or option.

Perform machine configuration when installing the CRX system on a new machine. To configure a machine:

1. On the settings screen, press the Machine 

button. The machine Configuration window will open.
2. Press the Add Machine button  . The Select Machine window will open.
3. Press Create New Machine.
4. Select the machine type. Available options are:
   - Traditional
   - Self Propelled
   - Articulated
   - Tracked

NOTE: During machine configuration, if creating a self-propelled machine with an ISO boom connected to the CANBUS, select the ISO Boom instead of creating a new boom.

NOTE: During machine configuration, if selecting a SCS, select the desired SCS instead of creating a new boom.

5. Enter the machine name in the <enter name> field.
6. Press Next  . The Antenna Height Above Ground window will open.
7. Enter the Height from the ground to the center of the antenna.

8. Press Next  . The Distance: Antenna Offset From Center will open.
9. Enter the distance the antenna is offset from the center of the implement.
10. Use the Left or Right check boxes to set whether the antenna is mounted to the Left or Right of the centerline.
11. Press Next  . The Distance: Rear Axle to Antenna window will open.
12. Enter the distance from the center of the rear axle to the center of the antenna.
13. Use the Ahead or Behind check boxes to set whether the antenna is Ahead of or Behind the axle.

NOTE: If configuring CRX for an Articulated machine, select whether the antenna is in front of or behind the articulation point.

If a Tracked machine, select if the antenna is in front of or behind the track center.

14. Press Next. For Articulated Tractors, enter The Distance: Rear Axle to Pivot.

NOTE: This allows CRX to calculate the correct position of the implement for determining the coverage rate and section control functions.

15. Enter the distance from the pivot point to the center of the rear axle.
16. Press Next  . The Connection Point Offsets window will open.
17. Enter the Rear Axle to Front Equipment Mount, Rear Axle to Drawn Equipment Hitch, and Rear Axle to 3 Point Hitch Distances.
18. Press Accept  .

## DELETE AN EXISTING MACHINE

To delete an existing machine:

1. Press Machine 

on the CRX settings screen.
2. Select the desired machine.
3. Press Delete  . The Confirm Delete Machine window will open.
4. Select Accept  to delete the machine or cancel to return to the Select Machine window.

## MOUNTED IMPLEMENT

To create a new implement that is mounted to the frame structure or the machine:

1. On the settings page, press the Machine 

button. The Machine Configuration window will open.
2. Press the Edit icon. Either modify the existing machine or select an implement to mount to an existing machine.
3. Add Machine button  . The Select Machine window will open.
4. Verify a machine is selected from the drop down.
5. Select if the equipment is front or rear mounted.
6. Press Create New Equipment.
7. Enter a name for the equipment.

NOTE: If selecting a SCS or an item connected to the ISObus, skip to step 15.

8. Enter the Total Width.
9. Enter the Number of Sections.
10. Press Next  . The Guidance Width will open. The Guidance Width is automatically assigned the same value as the Total Width.
11. If desired, enter a different Guidance Width.
12. Press Next  . The Section Layout window will open.
13. Review the information on the Section Layout information. If desired, select the width below one of the sections to adjust the width for that section.
14. Press Next  . The Axle to Equipment window will open.
15. Enter the Distance from the axle to the equipment or the distance from the connection point to the connection point.

NOTE: For ISO supported products, it will be possible to adjust individual section offsets in the ISO connected piece of equipment and operate it in CRX.

16. Press Next  . The GPS Solution Source screen will open.
17. If desired, select a GPS source. If a GPS source is selected, there will be additional screens before the next step.
18. Select if the equipment is Ahead or Behind the axle.

19. Press Next  . The Equipment Offset From Center window will open.
20. Enter the Distance from the center of the implement to the center of the machine.
21. Select if the equipment is offset to the Left or Right of center.
22. Press Accept  if all of the settings are correct. If needed, press previous  and adjust information.

## DRAWN EQUIPMENT

This section describes how to add a piece of drawn equipment to an existing machine:

NOTE: Drawn equipment included two wheel and four wheel carts. Unless the equipment is steered from the front wheels choose a two wheel cart.

1. On the settings page, press the Machine  button. The machine Configuration window will open.
2. Press Add Drawn Equipment  . The Configure Carts window will open.
3. Select the desired cart from the drop down list or select Create New Cart.
4. After selecting Create New Cart the Create New Cart screen will open. If creating a new cart continue with the process. If selecting an existing cart, skip to step 11.
5. Enter the desired name.
6. Select if the cart is a Two Wheel Cart, Four Wheel Cart, or Drawn Equipment.
7. Press Next  . The Distance: Tongue to Axle will open.
8. Enter the distance from the center of axle to the front of the tongue.
9. Press Next  . If a Four Wheel Cart the Distance: Axle to Axle window will open. Enter the distance between the two axles. If using a Two Wheel Cart or Drawn Equipment, the Distance: Axle to Hitch screen will open.
10. Enter the distance from the center to the rear axle to the back hitch.

NOTE: If using Drawn Equipment, additional steps will be necessary to enter the Total Width, Number of Sections, and Distance Toolbar to Axle.

11. Press Accept  .
12. Press Mount Equipment. The drawn equipment is now mounted to the implement.

13. To edit a piece of Drawn Equipment, press the Edit button.
14. To remove a piece of Drawn Equipment, press the Remove button on the Machine Configuration screen.

NOTE: Resetting an implement or piece of equipment will not delete previously created profiles but will place it back in the inventory.

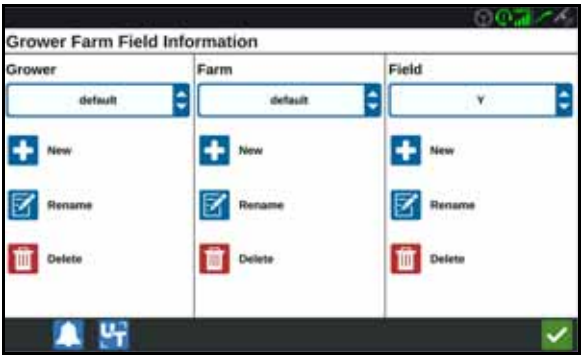
# GROWER, FARM, FIELD (GFF)

## CREATE A NEW GFF

GFF data can be added to CRX prior to starting a new job.

1. On the Settings screen, press GFF. The Grower Farm Field Information window will open.
2. Select New from the Grower column. The Add Grower window will open.
3. Press in the Enter Grower Name cell and enter the desired grower name.
4. Press Accept. The Grower Farm Field Information window will open.

FIGURE 7. Grower, Farm, Field Information




5. In the Farm column select New. The Add Farm window will open.
6. Press in the Enter Farm Name cell. Enter the desired farm name.
7. Press Accept.

8. In the Field column select New  . The Add Field window will open.
9. Press in the Enter Field Name cell. Enter the desired field name.
10. Press Accept  .

## EDIT GFF

NOTE: When starting a new job, CRX will select the default grower and farm. When saving, always ensure that the correct GFF information is selected to save an in-field operation in the correct location.

1. On the CRX Settings screen, select GFF  . The Grower Farm Field Information window will open.
2. Select the desired Grower, Farm, and/or Field from the drop-down options.

### RENAME A GROWER, FARM, OR FIELD

1. Ensure the desired GFF is visible in the drop-down.
2. Select Rename  . The Rename Grower, Rename Farm, or Rename Field prompt is displayed.
3. Enter the new name.
4. Press Accept  .

## DELETE GFF

1. Ensure the desired GFF is visible in the drop-down.
2. Select Delete  .

NOTE: If deleting a Farm with associated Fields, delete the Fields before attempting to delete the Farm.

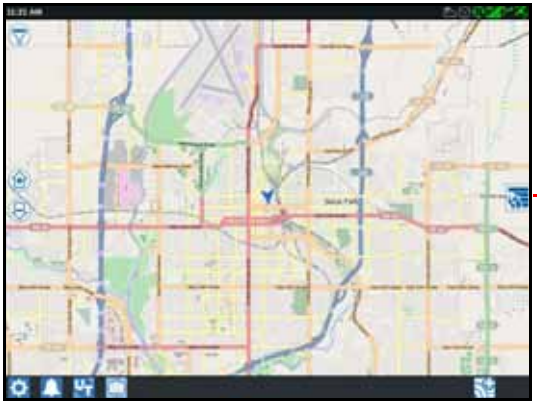
NOTE: If deleting a Field with associated files (jobs, scouted objects, guidance lines), delete the files before attempting to delete the Field.

# START A JOB

## START OR RESUME A JOB

1. On the home screen, press Select Existing Job  half way up the right side of the home screen.

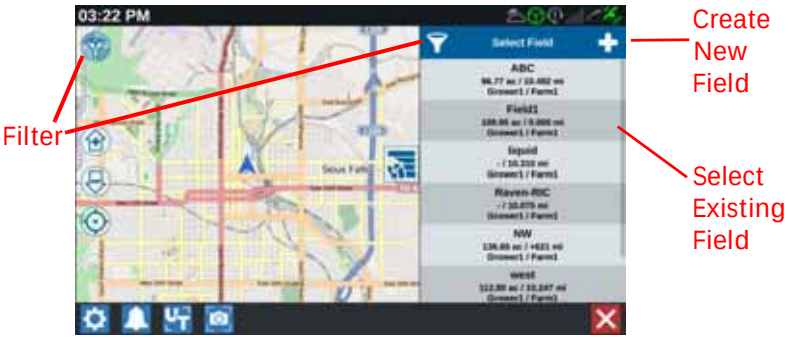
FIGURE 8. Select an Existing Job




2. Select the desired field from the Select Field list.

NOTE: Touch the Add  button in the upper, right corner to create a new grower, farm, or field for the job.

FIGURE 9. Select Existing Field



3. Select the desired job to resume the previous coverage or touch the Next button and select the New Job option to start the job with a new coverage map.

NOTE: The "Filter" options allow filtering based on GFF info, as well as selecting how the fields are sorted.

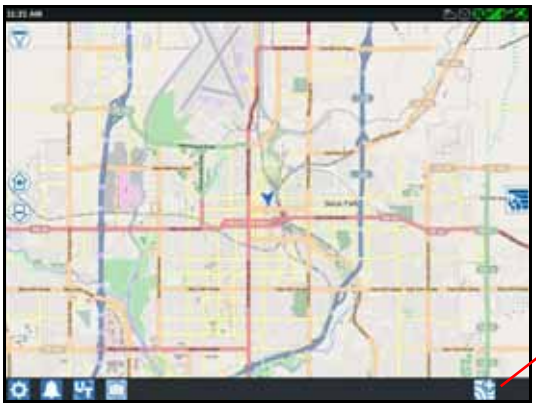
There are three checkboxes to specify the type of job.

FIGURE 10. Filtering Options


## START A NEW JOB IN A NEW FIELD

1. On the home screen, touch the Create New Field button at the bottom of the screen.

FIGURE 11. Start New Job in New Field



2. Use the Grower and Farm drop down lists to select the appropriate location for the new field.
3. Enter the field name in the space provided.
4. Enter a job name in the Give Your Job a Name cell.
5. Touch the Next  button. The Product To Implement Assignment window will open.
6. Review the coverage to implement assignments. If desired, press Edit  . The Edit window will open.
7. Select the desired coverage option(s) from the drop-down menu.
8. Press Accept  .
9. Press Next  . The run screen will be displayed. Refer to the "Run Screen Overview" on page 30 for additional assistance with using the CRX Run Screen.

## OPERATION PLANNING

Operation planning is a method to define guidance lines (including tram lines) and headland application regions for an operation on a field. A operation plan can be selected to use for any job in a field that has an operation plan association. Also, preconfigured guidance lines, headrows, and tramlines can be selected and applied to numerous jobs within an existing field boundary.

Operation planning consists of two parts:

- Pre-planning allows the user to adjust field boundary and lines that are created based on the boundary.
- Planning allows the user to create a plan for the field using the boundary modified in pre-planning or existing guidance lines, and application zones.

To create a new operation plan:

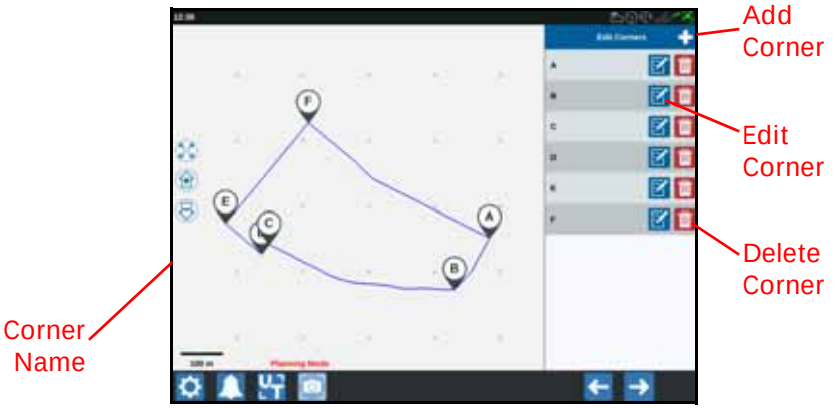
1. Select the desired field and press Next  . The Field Management window will open.
2. Select Operations Planning.

NOTE: If needed, select Scouting to create a field boundary to use for operations planning. A screen similar to the run screen will open but will not apply product.

NOTE: Pre-planning must be selected.

1. Select the desired boundary.
2. Press Accept . The Edit Corners window will open.

FIGURE 12. Edit Corners in Pre-Planning

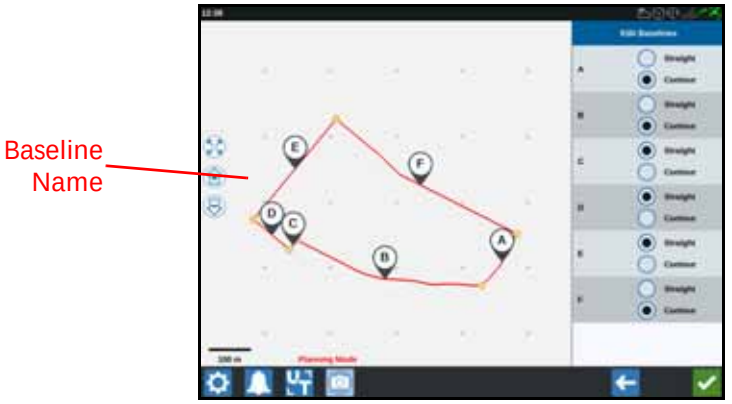



3. If a corner is missing, press Add Corner.
4. Press the location on the screen for the new corner. If needed, use the zoom controls to zoom in on the desired segment of the field boundary. The Adjust Corner screen will open.
5. The Adjust Corner screen allows the user to adjust the corner. Each corner is assigned a letter designation. Select Edit by the desired corner in the Edit Corners list and move the Adjust Corner Detection Radius slider until the edge of the corner has the desired radius or use the arrow buttons to move the corner.
6. Press Accept to accept the corner changes or use the Left and Right arrows to cycle through the rest of the corners.

7. Press Next . The Edit Baselines window will open. Each line is assigned a letter. For each baseline, select if the baseline is a straight line or a contoured line.

NOTE: A baseline is a segment of a boundary that can be used to create guidance lines and application zones.

FIGURE 13. Editing Baselines




NOTE: Changes to baselines will affect the field boundary used when running the plan.

8. To change a baseline from a contoured line to a straight line, select the desired radial button next to the baseline name in the Edit Baselines list.

9. Press Accept .

## PLANNING

1. Select Operation Plans and the Add button in the upper, right corner. The Create Operation Plan window will open.
2. Enter a Name for the plan.
3. Enter a Swath Width that matches the implement width.

NOTE: If using tram lines, enter the width of the planter.

4. If desired, select Tramlines Setup. The Tramlines Setup window will open.

FIGURE 14. Tramlines Setup


NOTE: Tramlines are spaces between rows that are not planted so future operations in that field (such as spraying) will not drive over rows of crops.

5. In the S1: Enter the number of swaths before the first tramline or extra wheel width will start. Typically, this will be the number of planter swaths it takes to apply half of the sprayer width.

NOTE: Adjust any of the cells on the Tramlines Setup page automatically adjusts the Sprayer Width cell on the right side of the window.

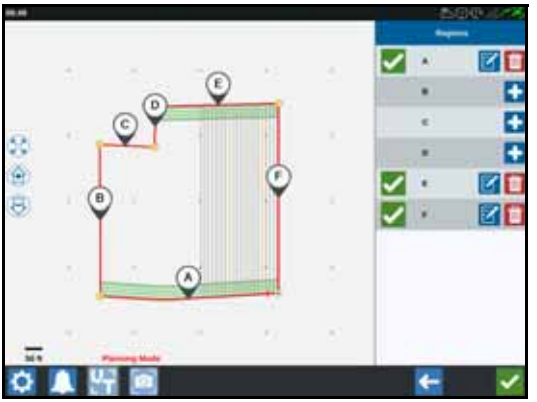
6. In the W1: Enter the value for the extra width of one of the side tires. This is typically the wheel width plus a few inches.
7. In the W2: Enter the value for the extra width of one of the side tires. This is typically the wheel width plus a few inches.
8. In the S2: Swath Between Tramlines cell, desired number of swaths between the tramlines. Generally this will be the number of planter swaths it takes to cover one pass for the sprayer.
9. Press Accept .
10. Press Create. The Region Settings window will open.

## PLAN OVERVIEW

The plan overview screen displays the full plan. Each plan consists of field regions, lines, and offsets specific to that field. From this page, the user can add, edit, or remove regions. Any changes to the regions will be reflected in the plan overview screen.

1. Press the Add button to the right of the desired baseline. The first baseline selected will generate the guidance line for the main or center field region. Additional baselines will be added in headland regions.

FIGURE 15. Create Regions




2. Press the Edit button to modify a region.
3. Adjust the desired settings.

FIGURE 16. Region Settings

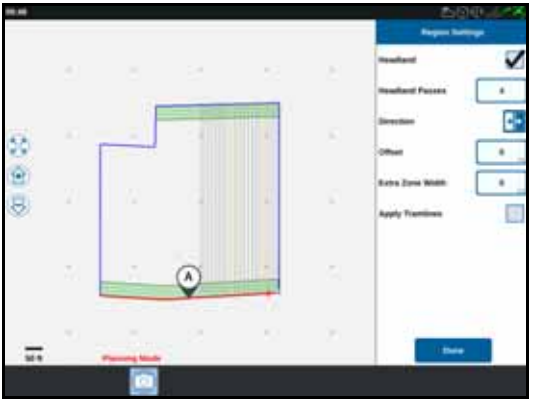


TABLE 4. Region Settings Descriptions

| Setting Option | Description |
|---|---|
| Apply Tramlines | This typically will only be used for areas not assigned as a headland region. Enabling this option will apply the tramline sequence to the selected baseline. |
| Extra Zone Width | Assign extra space between the main or center field region and the headlands. A non-zero value will leave a gap between the headland and the main field region. |
| Direction | Toggle to which side of the selected baseline the region will be set. |
| Headland | Select this box if you want an application region to be created that will allow automatic shutoff. |
| Headland Passes | Enter the number of swaths needed for turn around. Guidance lines will be created based on this setting. |
| Offset | Assign extra space between the baseline and the first swath. This space will be a non-covered area around the edge of the field. |

4. To add to the plan, select Add Baseline or Guidance line.
5. If this baseline will be a headland, check the Headland checkbox.
6. Enter a Swath Count. For headlands this may only be a few swaths. For using the baseline for the entire field, this will be as many lines as necessary to complete the field or leave as zero. CRX will insert guidance lines as needed to fill the entire field.
7. Select whether the offset Direction will be inside or outside of the baseline.
8. Enter an Offset measurement. This will offset the tramline from the edge of the field boundary.
9. Enter an Extra Zone Width measurement. This will add an additional offset at the inner side of the headland region.
10. Select Apply Tramlines. Apply Tramlines will add an additional offset at the inside of the headland region.
11. Edit any Additional Tramlines using the side panel.
12. Select an existing guidance line and select the Add button to create a new tramline.

NOTE: If necessary, select the remove button to delete a tramline from the operation plan.

13. Select Done.

14. Apply the Region Settings to all the desired baselines.

NOTE: The region settings will default to the most recent Region Setting Configuration. As a rule, apply all the same types of offsets in order to minimize reconfiguration.

15. When starting a job, select the desired operation plan.
16. During a job, select the Operation Planning widget to access the settings. Any settings updated within the job will be saved and applied to the plan.

## RUN SCREEN OVERVIEW

The image below is an example of a run screen. This section provides basic information on run screen layout and widgets.

FIGURE 17. CRX Run Screen

# RUN SCREEN OVERVIEW

## SIDE BAR ICONS

There are many side bar icons available on the run screen. The table below shows the widget image as well as a brief description of function. Run screen configuration will vary by device and settings.

TABLE 5. Side Bar Icons

| Icon | Name | Description |
|---|---|---|
|  | AB Contour | Indicates that the currently selected line is an AB Contour. |
|  | AB Heading | Allows the user to enter a GPS heading. |
|  | AB Load | Load an AB guidance line. |
|  | AB Straight | Indicates the current line is a straight AB guidance line. |
|  | Center to Vehicle | Adjusts the map so the vehicle is in the center. |
|  | Guidance Lines | Start or load a new guidance line. |
|  | Last Pass | Create a Last Pass line with this widget. |
|  | Pivot | Create an pivot guidance line with this widget. |
|  | Scouting Object | Provides information on existing scouting features and creating scout features. |
|  | Widget Menu | Select or remove widgets displayed on the run screen or edit the widget layout. |
|  | Zoom In | Zooms into the run screen map. |
|  | Zoom Out | Press zoom out to zoom out on the run screen map. |
|  | 3D Toggle | Toggle to the 3D down-field view of the Run screen during active field operations. |
|  | 2D Toggle | Toggle to the 2D over-head view of the Run screen during active field operations. |

## WIDGETS

CRX offers additional tools, in the form of widgets, that may be placed on the run screen. Refer to the following table for a brief overview of the widgets available for use during in-field operations.

TABLE 6. CRX Widgets

| Widget | Name | Function |
|---|---|---|
|  | AccuBoom Control | Shows AccuBoom Override status and also provides quick access to additional AccuBoom information. Green indicates AccuBoom is active, Blue indicates AccuBoom is available but not running. |
|  | Add Flag | Provides the option to place a marker flag on the CRX run screen. |
|  | Altimeter | Displays the machine elevation. |
|  | Analog Video | Allows for view of multiple analog cameras for real-time vision while in a job. |
|  | Applied Area | Provides options for showing the applied area(s). |
|  | Course Over Ground | Provides settings for configuring the settings for the GPS course. |
|  | Day/Night Switch | Changes the color scheme of the display. |
|  | Distance Off Guidance Line | Displays the distance the implement is off of the guidance line. |
|  | Guidance Line Nudge | Provides settings for nudging the guidance line left or right. |
|  | Guidance Width Status | Displays the actual guidance width. |
|  | ISO Generic | Provides generic information from a connected ISO device. |
|  | ISO UT | Displays the ISO Universal Terminal on top of the run screen. |

| Widget | Name | Function |
|---|---|---|
|  | Line Recal | Recalibrates the line. If in last pass, it will try to find a different line. |
|  | Master Switch | Indicates if the master switch is on (green) or off (red). |
|   | Object Pool Toggle | Switch between ISO UT screens if there are multiple ISO devices. |
|  | Product Assignment | Assign a different product to the selected coverage. |
|  | Product Rate | Allows the user to adjust the product rate. |
|  | Product Select | Allows the user to select different products. |
|  | Section Status | Available in various widths and allows the operator to select the best option for displaying configured sections. |
|  | Seed Plot | Displays additional information about the current and upcoming seed plot. |
|  | SmarTrax Status | Add the SmarTrax widget to easily view SmarTrax status or access SmarTrax Settings. |
|  | Steering Status | Steering is engaged. |
|  | Implement Disk Angle | Display actual position of the discs/wheels. |
|  | Implement Side- Shift | Display actual position of the side-shift cylinder. |
|   | Swath Number Status | Shows the swath number. Depending on configuration, it will display either relative or absolute. |
|  | Switch Box | Provided access to easily turn sections on or off. |

NOTE: CRx supports Windows Mask widget. When an ISO node has Windows Masks, they will appear at the bottom of the widget list.

To add/change the widgets visible on the run screen:

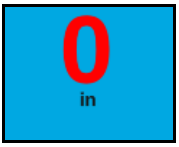
1. Touch the Widget Menu button.
2. Select or deselect the desired widget(s) to display on the run screen.
   Adding a widget will enter the widget Layout Mode. In the Layout Mode, the user may move widgets around as desired to customize the display of information on the run screen.

NOTE: Use the Enable Snapping option to prevent new widgets from covering up previously added widgets on the Run screen.

3. Touch the Accept button in the lower, right corner to return to the run screen and resume normal in-field operation and application controls.

## WIDGET OPTIONS

Several widgets offer additional settings or options accessible on the run screen directly through the widget. Touch and hold a widget to display a settings prompt for the specific widget.



## ANALOG VIDEO CONFIGURATION

NOTE: This feature is only available on CR12.

The analog video widget allows viewing of up to four analog cameras in real-time while in a job. The designated rear view camera will automatically activate when in reverse. To configure and use the analog video functions after placing the widget on the run screen:

1. Press and hold the analog video widget. The widget settings window will open.
2. Up to four analog cameras will display. If desired, click on Camera 1-4 to rename the cameras.
3. Use the directional arrows to assign each camera to one of the numbers listed on the left side of the screen.

NOTE: Only one camera can be viewed at a time within a job.

4. If desired, assign one of the four cameras to the automatic rearview camera. This camera will automatically turn on when the machine is in reverse.

### ANALOG VIDEO OPERATION

To view a real-time analog camera while in a job:

1. Short-press the analog video widget. The widget will expand.
2. Select which camera to view by pressing the assigned number of the desired camera.

FIGURE 18. Analog Video Widget Expanded


NOTE: If an analog camera is assigned to the automatic rearview camera, the video feed will automatically change to the assigned rearview camera when the machine is in reverse.

## SWITCHBOX OPERATION

The switchbox widget allows the user to enable or disable sections or groups of sections while in the CRX run screen. To configure and use the switchbox after placing the widget on the run screen:

1. Turn the Master Switch on.
2. Select the desired switch to turn it on or off. Press override (left-most button) to turn on or off all switches that are not already manually turned on. If a switch button is blue, the switch is being automatically controlled by the system. If a switch button is red, the switch is off. If a switch button is green, the switch is on.

FIGURE 19. Switchbox Widget

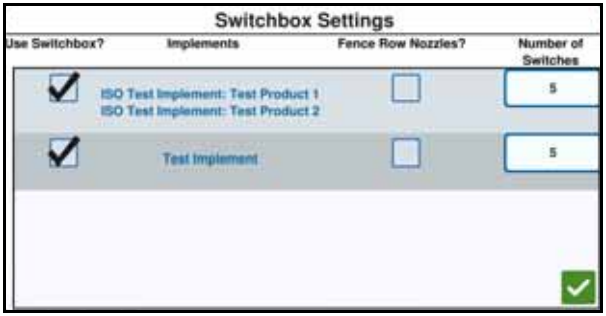

NOTE: If switchboxes are present for multiple products, the boxes will stack in the order the corresponding products appear in when configuring a job.

## SWITCHBOX CONFIGURATION

To configure the switchbox from the widget:

1. Press and hold the switchbox widget. The widget settings window will open.
2. Press Settings. The switchbox widget will open.
3. Select the desired Implements to use with the switchbox(es).

FIGURE 20. Switchbox Configuration




4. Enter the number of switches. This number can be no greater than the total number of sections. If the number of switches is less than the number of sections, the sections are assigned to the switches proportionally. Any remaining switches are assigned from the center out.
5. If desired, select the Fence Row Nozzles checkbox to map the outside sections to the outside switches. The remaining sections will be reassigned proportionally to the remaining switches.

# SCOUT OBJECTS

Scouting objects allows the user to create or mark different areas of the field to indicate obstacles, low spots, or field boundaries. The following options are available for Scouting Objects:

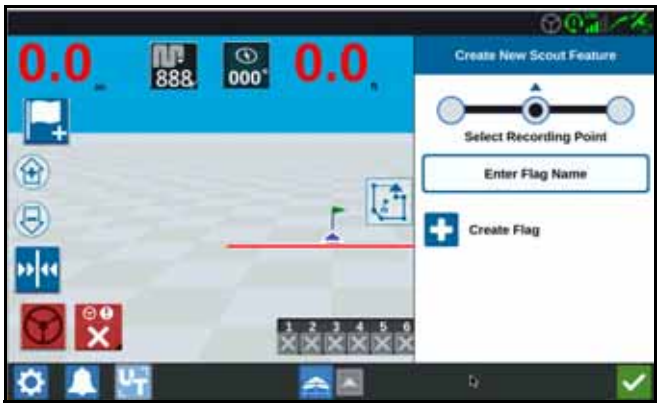
- Field Boundary
- Do Not Apply Zone
- Application Zone
- Line
- Flags

## CREATING A FLAG

Flags can be used to indicate large rocks or other obstacles that may be present in the field but may not be visible with mature crops.

1. Select Scout Object icon.
2. Select the Add icon next to Scout Features.
3. Enter the desired name. In this case, Enter Flag Name.

FIGURE 21. Create New Scout Feature




4. Select the desired recording point for the flag. It can be either centered with the implement, or on either side of the implement.
5. Select Create Flag .

## CREATE A FIELD BOUNDARY, DO NOT APPLY ZONE, OR APPLICATION ZONE

Field boundaries indicate the edges of a field.

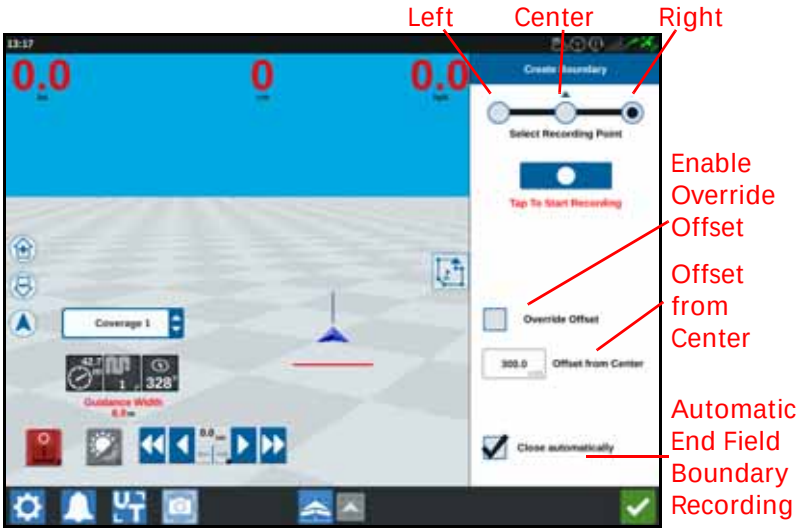
Do not apply zones indicate an area in the field where application is prohibited.

Application zones indicate an area where product should always be applied. They are generally used inside a do not apply zone.

1. Select Scout Object icon.
2. Select the Add icon next to Scout Features.

3. Select the desired task.
4. Select the desired start recording point. It can be either centered with the implement or on either side of the implement. If left or right is selected, there is the option of offset the line from the center using Override Offset. Select Override Offset and enter the distance to Offset from Center. The recording point will now be the Offset from Center distance from the selected recording location (left or right).

FIGURE 22. Create Line




5. Press Start Recording.
6. Drive the desired path/boundary.
7. When complete, select Scout Object .
8. Select either Pause recording or End Recording .

NOTE: Enable the Close automatically option to allow CRX to automatically close the field boundary when the position nears the spot where the field boundary recording started.

9. After selecting End Recording, press Accept to confirm the end of the job if selected.
10. Enter a name for the feature. If desired, press Delete .

# CREATE GUIDANCE LINES

1. Select the guidance line icon.

NOTE: The guidance line icon is the lowest icon on the right side of the screen and will be displayed as one of the available guidance line options.

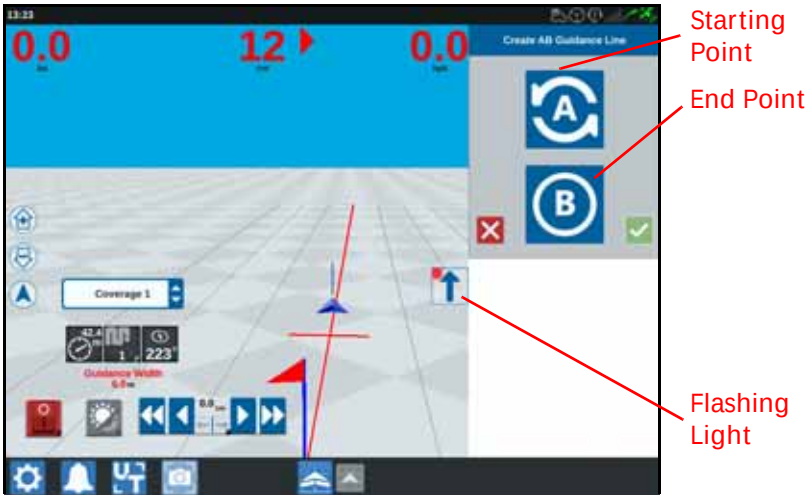
2. Select the desired guidance line type.

TABLE 7. Guidance Line Types

| Widget | Name | Function |
|---|---|---|
|  | Straight AB | Create a straight guidance line. |
|  | A+ | Create a straight guidance line using a starting (A) point and a compass heading. |
|  | Contour | Create a curved guidance line with a starting (A) point and numerous additional points along the path driven by the operator. |
|  | Pivot | Create a guidance line to use as a sharp pivot. |
|  | Load | Load an existing guidance line. |

3. When the machine is on the desired starting point and in the proper orientation, select the guidance line starting point. During the recording, the line widget will display a flashing red light.

FIGURE 23. AB Guidance Line Recording



4. When done recording, press the next point (in this case it will be B).
5. Select Accept  to complete the line.
6. Select the guidance line icon along the right side of the screen.
7. Select the Edit  next to the newly created line. The Edit Guidance Line window will open.
8. Enter a name for the guidance line.
9. Press Accept  . If desired, select Delete  to delete the guidance line.
10. When in a job, select Load  to load and use an existing guidance line.

## ADJUST SECTION CONTROL

The number of sections is based on the information entered while creating the implement. The default settings for On Override is five seconds.The default Turn Off Percent is 95%. The default Exiting/Entering Overlap is zero meters. To adjust the number of sections, adjust the tractor settings.

NOTE: The On/Off Override feature allows the operator to override the automatic section control and force all AccuBoom controlled sections on for a user defined interval. This feature is useful for re-applying product to a heavily infested field area or when accelerating from a complete stop. The time for the override may be modified to match specific application needs.

Turn Off/On Percent allows the user to define the amount of coverage tolerated during an application. For applications which require complete coverage, the coverage percent setting should be set to a higher value (80% to 100%). When applying products that do not tolerate overlaps, the percent coverage should be set to a lower value.

Coverage Overlap settings allows the operator to avoid gaps in coverage by adjusting the amount (in meters) of entering and exiting coverage overlap. If sections turn off too early while entering existing coverage, adjust the Entering Overlap setting to force the sections to remain on for an additional specified distance. Conversely, if sections turn on too late when exiting coverage, adjust the Exiting Overlap setting to force sections to turn on earlier, avoiding possible gaps in coverage. If Entering Overlap is set to 1 meter, the implement sections will stay activated for an extra meter of coverage. If Exiting Overlap is set to 1 meter, the implement sections will activate 1 meter early.

On/Off Look Ahead monitors the GPS position and coverage map while considering the look ahead times to begin controlling sections on or off before the section crosses spray or no-spray boundaries. Look ahead times may help compensate for delays in the sprayer system including the time it takes for boom or control valves to open.

- Adjust the Off Look Ahead to determine how far (in seconds) to turn a section off.
- Adjust the On Look Ahead to determine how far (in seconds) to turn a section on.

NOTE: Off Look Ahead is the amount of time before entering an already applied area or a no spray zone that the section will turn off.

On Look Ahead is the amount of time before area that needs to be applied that a section will turn on.

To adjust the Off Look Ahead, On Look Ahead, On Override, Turn Off Percentage, Exiting Overlap, and Entering Overlap:

1. On the CRX Settings page, select Section Control 

.
2. Press in the cell to the right of the desired setting.
3. Enter the desired setting.

NOTE: If using a Raven AccuBoom node, select the Use AccuBoom check box and the AccuBoom node will control the sections for the implement selected in the drop-down list.

4. Press Accept  .

## ADJUST RATE CONTROL SETTINGS

1. On the CRX Settings page, select Rate Control 

.
2. Select the desired implement from the drop-down.
3. Select the cell next to the Prescription Map Look Ahead.
4. Enter the desired look ahead distance (in seconds).
5. Select if Zero Rate Control should be Auto or Manual.
6. Press the Coverage tab.
7. If desired, select Enable Thresholds.
8. Enter the desired Min “Rate OK” value.
9. Enter the desired Max “Rate OK” value.
10. If desired, select the color cells next to the Rate High Color, Rate OK Color, and Rate Low Color to adjust those colors.
11. Press Accept.

# CRX SETTINGS MENU

## DISPLAY

To access display settings:

1. Press Display 

on the CRX Settings page. The Display Settings window will open.
2. The default settings for the display are Day Mode with the Screen Brightness and Lightbar Brightness at 100%. If desired, select Night Mode which switches the screen background and foreground colors and sets the Screen Brightness to 30% and Lightbar Brightness to 30%.

NOTE: Lightbar brightness will be hidden on CR12 unless an external lightbar is detected.

3. In Day Mode or Night Mode it is possible to adjust the Screen Brightness or Lightbar Brightness by dragging the slider bar to the desired brightness. It is also possible to enable CRX to automatically switch between day and night mode.

## LOCALIZATION

The Localization page provides options to adjust the language, time zone, and measurement units. To access Localization settings:

1. Press Localization  on the CRX Settings screen. The Localization window will open.
2. Select the desired language from the Language drop down.
3. Select the desired Time Zone from the drop down.

NOTE: The time zones are based on an offset from Coordinated Universal Time (UTC). Ex. Los Angeles is UTC-08:00, New York is UTC-05:00, Berlin is UTC+01:00, and Moscow is UTC+03:00.

4. Select either an AM/PM clock or a 24 hour clock.
5. Use the check box options to set the desired display units for Speed, Area, Weight, Volume, Pressure, and Temperature.
6. Touch the Accept  button to save the displayed settings and return to the Settings Menu.

## SERIAL PORT

To access serial port information:

1. Press Serial Port 

on the CRX Settings screen. The Serial Ports - Port A window will open. Information for the Serial Port such as Baud Rate, Stop Bits, Parity, TX, and RX will display. If needed, select Detect Device to update the information.
2. To access information on other serial ports, select the desired Port from the left side of the window.
3. After viewing the Serial Port information, Press Accept  .

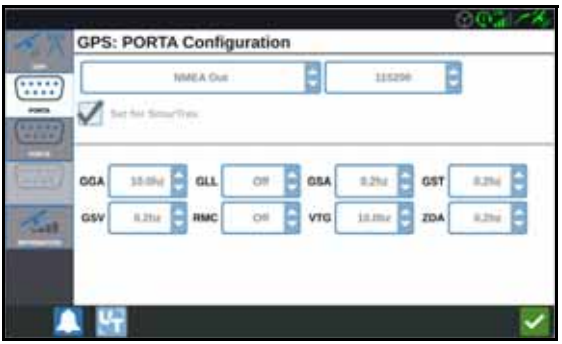
## GPS

NOTE: If Implement Steering is available, verify the Implement Steering GPS in addition to the machine's GPS.

1. Press GPS 

on the CRX Settings screen.
2. Press the DIFF  tab to view and select GPS Differential Setup information such as available differential Type and PRN.
3. Press the PORT A  tab to view and edit information on Port A GPS configuration. If desired, press additional port tabs to view and edit GPS information for those ports. In some cases Port may be referred to as COM.

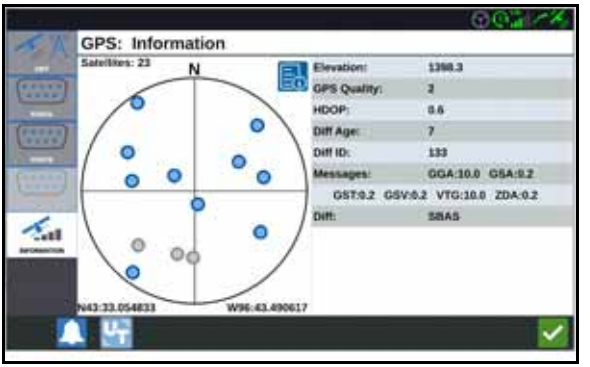
FIGURE 24. GPS Port Configuration




NOTE: Port A is not configurable.

4. Press the INFORMATION  tab to view information on the number of satellites visible, Elevation, GPS Quality, HDOP, Diff Age, Diff ID, Messages, and Differential type. The image below shows an example of what a GPS satellite array may look like above an implement. The blue dots are GPS satellites current being used for corrections. The GPS satellites that are grayed out indicate satellites not being used for correction.

FIGURE 25. GPS Information




5. After viewing and editing the GPS information, Press Accept  .

## REMOTE SUPPORT

Remote support allows a Raven service specialist to remotely view and control the CRX system. Remote support must be enabled by the user to allow a service specialist to help troubleshoot or access information. To enable remote support:

NOTE: Remote support on CRX can only be performed via Slingshot.

1. Press Remote Support  on the CRX Settings screen. The Remote Support page will open.
2. Select the Enable Remote Support checkbox.
3. Provide the support code displayed in the lower-left corner of the CRX to the service specialist. Once remote support is connected, the name of the Remote Viewer will be visible in the list.
4. Accept the waiver to enable remote support.
5. After Enabling Remote Support, press Accept  .

## MASTER SWITCH CONFIGURATION

1. Press Master Switch  on the CRX Settings screen. The Master Switch Control Configuration window will open.
2. If desired, select the Require All On checkbox. This requires all selected inputs to be On for the Master to be on. Otherwise only one selected input needs to be on.
3. The default for On-Screen checkbox is selected.

NOTE: Aux Input - Select this option if there is a wired switch to the CRX Aux Input wire to act as a master switch.

AccuBoom - Select this option if there is a wired switch on the AccuBoom cabling orange wire to act as a master switch.

Steering - Select this option if you want the SmarTrax to record data only when steering is engaged.

On-Screen - Only selectable if all other options are not selected.

4. After adjusting all the settings, press Accept  .

## ISOBUS SETTINGS

The ISOBus Settings page provides options to identify connected ISOBus devices, clear the ISOBus Object Pool or change the ISOBus UT instance when multiple universal terminals are available on the ISOBus. To access the UT Settings page, press ISOBus Settings  on the CRX Settings page.

## LIGHTBAR

NOTE: Lightbar configuration will only be available on CR12 if an external lightbar is detected.

1. To access the Lightbar Configuration settings, press Lightbar 

. The Lightbar Configuration window will open.
2. The default setting for the lightbar is that it is enabled. To disable the light-bar, deselect the Enable checkbox.
3. The default setting for the Reverse LED Indication is active. When disabled, LEDs will illuminate in the direction the operator needs to steer to get back on line.
4. Enable the Use CrossTrack Error option to have the lights directly correlate to the distance from the guidance line. This option is automatically enabled if steering is detected and the option has not been manually changed by the user. The option is disabled by default and the lights integrate both cross track and track angle errors to give the user a more natural steering feedback response for manual steering.
5. The default setting for Path Deviation Sensitivity is Fine. To adjust the Path Deviation Sensitivity select the desired radial button. While adjusting the sensitivity, note that the light bar increments along the bottom indicates the distance off line for each light. For example, with Fine selected the first red light will turn on when the implement is 4" (10 cm) off line, and the second light will turn on when the implement is 10" (26 cm) off line. After adjusting all the settings for the light-bar, press Accept  .
6. If an external lightbar is connected via the serial port, that option will display on the Lightbar Settings page and be selected. If desired, deselect the external lightbar.

## NOTIFICATIONS

Press the Notifications  button to access the Notification History. To view more information on a specific notification, press the notification. A notification window will open displaying the notification type, additional notification details, and how long ago the notification occurred. After reviewing the notification, press Complete  . When done viewing the notifications, press Accept  .

# WI-FI CONFIGURATION

To configure Wi-Fi settings and create a priority connection list:

1. Select the Networking 

button from the CRX Settings page.
2. Select the client and access point tabs. A list of available Wi-Fi connections will appear.

FIGURE 26. Wi-Fi Connections


3. Select the desired Wi-Fi Connection. If needed, press Refresh to update the Wi-Fi connection list.
4. If needed, enter the Wi-Fi Password to connect to that network.
5. Press Connect. The CRX will attempt to connect to that Wi-Fi hotspot. If an invalid password is entered, a notification will open saying the password was invalid.

NOTE: If desired for future Wi-Fi connections to this hotspot, select Connect Automatically. This will allow the CRX to connect to that hotspot when it is in range.

6. After a successful connection, the hotspot information will have a blue background.
7. If you have multiple hotspots you want to connect to, repeat step 3 through step 6 for all desired connections.

NOTE: Wi-Fi priority is created by the CRX connecting to the Wi-FI connections that do not have data or speed restrictions. Unrestricted connections will take priority over restricted networks.

## MANUAL NETWORK CREATION

1. Press Configure Networks at the bottom of the Network Settings screen.
2. Enter a name for the network in the SSID field.
3. Select the desired security level. If a secured network is selected, enter the desired Password.
4. If desired, select Data Restriction to limit the amount of data that is transferred via the network.
5. If desired, select Auto-Connect to allow devices to automatically connect to this network.

## CREATING A PERSONAL HOTSPOT

Creating a Personal Hotspot will allow other devices to connect to, and use, the CRX Internet source. To create a Personal Hotspot:

1. Press Hotspot.
2. Select the Enable Wi-Fi Hotspot checkbox. The SSID number displayed will the be network name. The Password is the password to connect to the network.

# SCREEN CAPTURE

NOTE: CRX will store the last ten screen captures. CRX will begin replacing stored screen shots after ten screens are captured. Refer to the *Exporting Screen shots* section on page 49 to transfer screen shots to a USB drive for viewing.

There are two ways to capture screen shots:

- *Using Screen Capture Tool*
- *Using the Power Button*

## USING SCREEN CAPTURE TOOL

1. Press the Screen Capture  icon on the bottom of the screen.
2. To move files from the CRX to a USB stick, perform the steps in the *Exporting Screen shots* section on page 49.

## USING THE POWER BUTTON

1. Press the power button until the Power Button Pressed prompt is displayed.
2. Select Screen Capture.
3. To move files from the CRX to a USB stick, perform the steps in “Exporting Screen shots” on page 49.

## EXPORTING SCREEN SHOTS

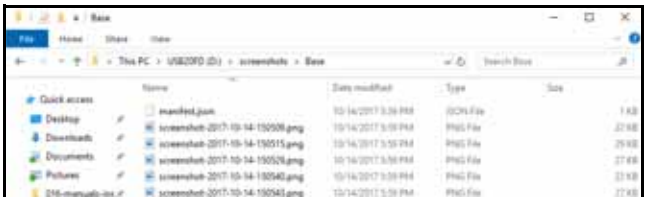
1. Select  .
2. Select File Manager.
3. Select Diagnostics  .
4. Select the desired USB drive from the Send To dropdown.
5. Select Screen captures.
6. If desired, enter a Comment about the screen shot.

## VIEWING SCREEN SHOTS

After the screen shot has been exported to a USB drive view the screen shot:

1. Complete the *Exporting Screen shots* procedure to transfer the screen shot to a USB drive.
2. Insert the USB into a computer.
3. Use the file browser to open the USB drive directory.
4. Navigate to the screen shots folder.

FIGURE 27. Screenshots Folder on USB Drive



5. View or copy the screen captures as desired.

# FILE MANAGER

The file manager allows the user to sort and move files (if desired). If the file is currently located on a USB stick, connect to the USB port on the back of the CRX.

## FILE TYPES

The table below shows available file types on the CRX.

For a comprehensive list of file types, their extension type, and where they are typically located when saved to a USB stick, refer to Table 9 on page 66.

TABLE 8. File Types

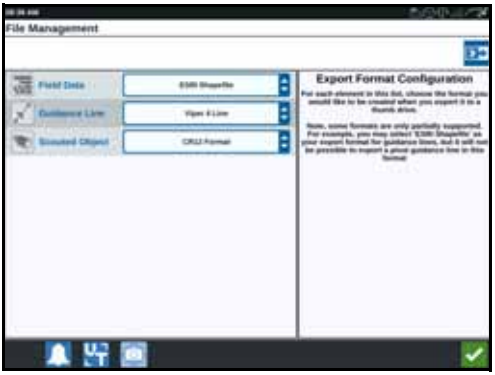
| Icon | File Type | Description |
|---|---|---|
|  | All Files | Select this to select all of the files stored on the device or on the installed USB memory stick. |
|  | Backup | Backup files can be saved on the CRX or moved to a USB port. These files can include backups of machine configurations, GFF information, and jobs. |
|  | Guidance Line | This icon indicates the file type is a guidance line. |
|  | Field Data | Select this to view/move field data files. |
|  | Job | This icon indicates that the file type is a job file. |
|  | Prescription Map | This icon indicates the file is a prescription map either create for, or downloaded to, the CRX. |
|  | Scouted Object | This icon indicates that the file type is a scouted object which includes Field Boundaries, Zones, Lines and Flags. |
|  | Street Maps | This icon indicates that there is a Street Map available for download to the CRX. |

## COPY A FILE

1. Press File Manager on the CRX Settings page. The File Management window will open.
2. Select either USB (if connected to the CRX) or Local (on CRX) from the source drop-down.
3. Select the checkbox for desired file(s) or All Files checkbox to select all of the files on the CRX or sort files by GFF.
4. Select the desired file(s) to be copied.
5. Press Copy to copy the selected file. The Copy Files window will open. Select OK to copy the file or Cancel to stop copying the file.
6. Press Accept after selecting the desired file(s).

NOTE: There are options available to change the format of the exported data.

FIGURE 28. Export Data Configuration




## DELETE A FILE

1. Press File Manager on the CRX Settings page. The File Management window will open.
2. Select either USB (if connected to the CRX) or Local (on CRX) from the source drop-down.
3. Either select the desired files or All Files checkbox to select all of the files on the CRX or sort files by GFF.
4. Select the desired file(s) to be deleted.

5. Press Delete to delete the selected file. The Delete Files window will open. Press OK to delete the file(s) or Cancel to not delete the file.

6. Press Accept after selecting the desired file(s).

## IMPORT MAPS, GUIDANCE LINES, AND FEATURE UNLOCKS

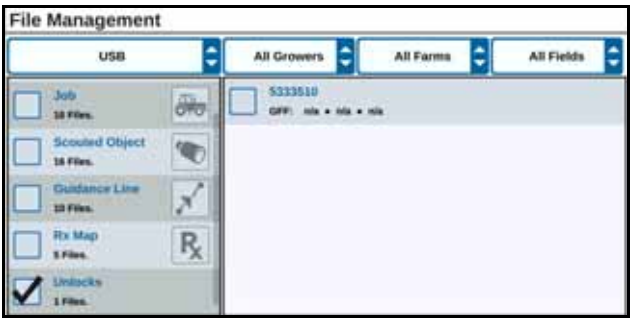
After downloading the desired file to a USB and inserting the USB into the CRX:

1. Press File Manager on the CRX Settings page. The File Management window will open.
2. Select USB from the left-most drop-down.

FIGURE 29. File Management All Files

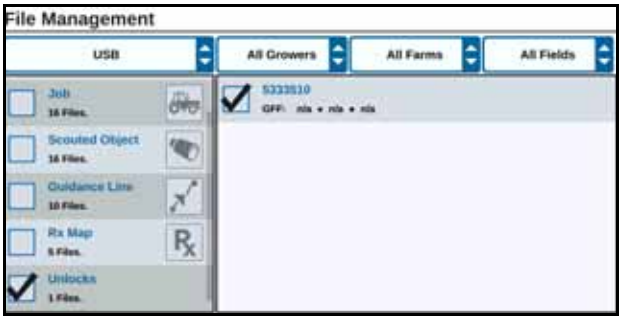

3. Navigate to and select the desired file type. For this example it is a feature unlock.

FIGURE 30. File Management Unlocks



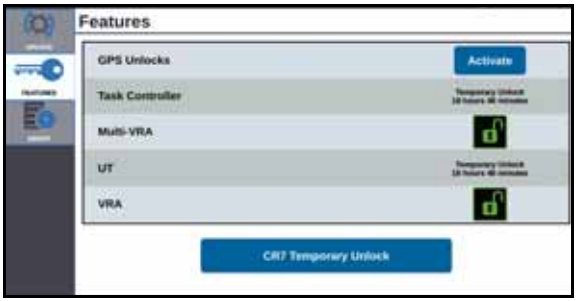
4. Select the desired file from the cell to the right.

FIGURE 31. File Management GFF Select




5. Press Copy Files  . The files will copy to the CRX.
6. To verify unlocks have transferred successfully, navigate to the Features tab in the System Update field. The downloaded unlocks should now display with an open lock icon beside the feature.

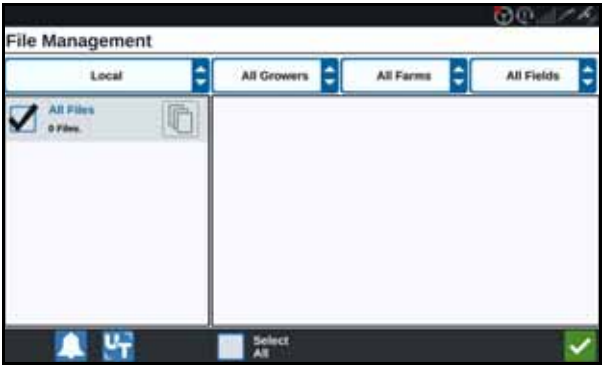
FIGURE 32. Features



## LOAD A PRESCRIPTION MAP

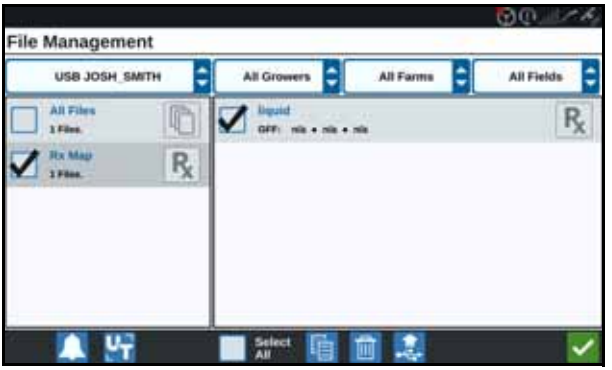
1. Place the prescription map file (this will be a .dbf, .shp, .shx file) on a USB drive. Do not create subfiles for the prescription maps.
2. Insert the USB drive into the CRX.
3. Select File Manager  on the settings page.
4. Select the desired USB drive from the left-most drop down.

FIGURE 33. File Management All Files




5. Select the desired prescription map from the list.

FIGURE 34. File Management RX Map

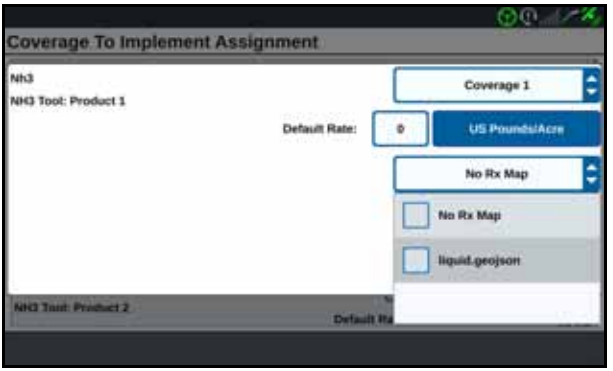



6. Select Copy  .
7. Select Accept  . A Copy Files window will open.

8. Press Accept to continue copying the file or press Cancel to select a different file. A Please Wait prompt will open while the files are being transferred.

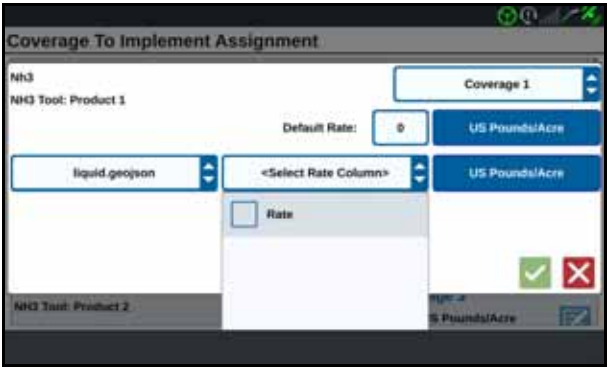
9. Start a job. On the Coverage to Implement Assignment screen select Edit beside the desired prescription map.

FIGURE 35. Coverage to Implement Assignment




10. Select the desired prescription map from the No Rx Map drop-down.
11. Select Rate from the <Select Rate Column> drop-down.

FIGURE 36. Coverage to Implement Assignment NH3




12. If needed, adjust the units and conversion factor.

13. Press Accept . The Coverage to Implement Assignment window will open showing the Rx Control for the product.

14. Press Next  to begin the job. The prescription map will be visible on the run screen.

FIGURE 37. Run Screen Prescription Map


## EJECT THE USB

If a USB stick was installed, press Eject USB  button to properly save the information on the USB stick so it can be removed.

## VIRTUAL THUMB DRIVE (VTD)

Virtual Thumb Drive (VTD) is a feature that allows for easy transfer of data between CRx field computers. After creating and linking a Microsoft OneDrive account to the CRx, users can transfer data between VTD without the need of a physical USB drive. Additional computers linked to the same OneDrive account will be able to access all data saved to VTD.

NOTE: Use of VTD requires a Slingshot subscription.

### CONNECT ONEDRIVE ACCOUNT TO VTD

Use of the Virtual Thumb Drive requires the creation of a Microsoft OneDrive account. To authenticate and connect a Microsoft OneDrive to VTD:

1. On a computer or mobile device, enter https://products.office.com/onedrive/online-cloud-storage into the address bar.
2. Select "Sign up for free" and follow the instructions to create a Microsoft OneDrive account.

3. Create a directory titled “vtd” on the OneDrive account.

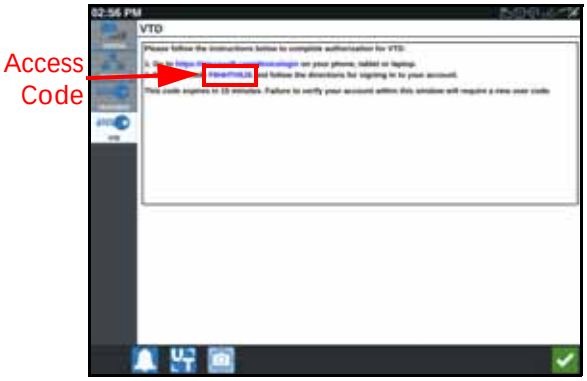
NOTE: Ensure that “vtd” is all in lowercase on the OneDrive account.

4. Connect the field computer to the internet.
5. On the CRx device, press the settings button to navigate to the Settings menu.
6. In the Settings menu, press the Slingshot button to navigate to the Slingshot settings menu.
7. Press “VTD” on the sidebar to navigate to the VTD authorization screen.

FIGURE 38. VTD Authorization


8. Select “Connect Account” on the prompted page.
9. On a computer or mobile device, enter https://microsoft.com/devicelogin into the address bar.
10. Once on the web page on the computer or mobile device, enter the access code prompted on the CRx screen.

FIGURE 39. VTD Access Code




NOTE: The access code will not be the same code as shown in Figure 39, “VTD Access Code,” above.

11. Once the account is linked with VTD, the screen shown in Figure 40, "Device Connected to VTD," will display.

FIGURE 40. Device Connected to VTD


NOTE: The folder structure of the VTD should be the same structure as USB. See "File Manager" on page 50 for more information about folder structure of USB.

## OPERATE VIRTUAL THUMB DRIVE (VTD)

VTD will utilize a remote VTD hosted in the OneDrive account, and a local VTD located directly in the CRx software. Local and remote VTD files synchronize, sending local files to the remote drive, and remote files to the local drive. Files locally stored on the CRx device but not in the local VTD folder will be stored in "local file storage."

NOTE: Files must be transfered from VTD to local file storage for usage.

To transfer a file stored locally on the CRx to VTD:

1. Press File Manager on the CRX Settings page. The File Management window will open.
2. Select Local from the source drop-down.
3. Select the checkbox for desired file(s) or All Files checkbox to select all of the files on the CRX or sort files by GFF.
4. Select the desired file(s) to be copied.
5. Press Copy to copy the selected file. The Copy Files window will open.
6. Select the VTD and select OK to copy the file or Cancel to stop copying the file.
7. Press Accept after selecting the desired file(s).

To transfer a file stored remotely on VTD to CRx:

1. On the OneDrive account, place the desired file into the vtd folder.
2. On the CRx device, press File Manager  on the CRX Settings page. The File Management window will open.
3. Select VTD from the source drop-down.
4. Press Sync  to send files from the OneDrive vtd folder to local VTD folder on the CRx.

NOTE: After the VTD sync completes, import the files to CRx with the same process as a physical USB drive to use the transfered files.

5. Select the checkbox for desired file(s) or All Files checkbox to select all of the files on the VTD or sort files by GFF.
6. Select the desired file(s) to be copied.
7. Press Copy  to copy the selected file. The Copy Files window will open.
8. Press Accept  to begin the copy operation or Cancel  to stop the copy operation.

NOTE: To delete a file in the local VTD folder in the CRx device, the file must first be deleted in the OneDrive vtd folder. Then resynchronize on the CRx device to remove the deleted file from the local VTD folder.

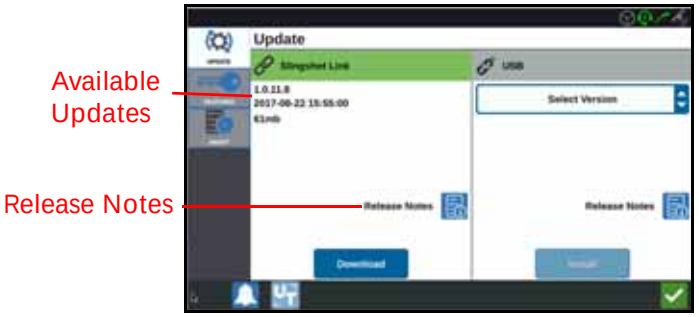
# SOFTWARE AND HARDWARE UPDATES

## SOFTWARE

To check for CRX software updates via Slingshot:

1. Press Software Update  on the CRX Settings page. The Update page will open.
2. If there is an update available via Slingshot it will be listed under the Slingshot Link column. To learn more information about what is included in the update, read the release notes.

FIGURE 41. Updates




3. To install the update, press download. The update will download to the CRX. After the CRX update has downloaded, the Download button will change to Install. Press Install to install the software update.

4. If desired, press the Features tab to access the desired unlock. The following options are available:

- GPS Unlocks: Unlock to access more precise GPS corrections.
- Task Controller: The task controller unlock is required to allow the UT to automatically control sections.
- Multi-VRA: Unlock Multi-VRA to use prescription maps to automatically apply multiple products to a field.
- UT: UT allows the user to monitor and adjust nodes connected to the ISOBUS network.
- VRA: Unlock VRA to use a prescription map to automatically apply the desired product as configured in the prescription map.
- Operation Planning: Operation planning allows the creation of headlands, offsets, and guidance lines within an existing boundary. The operation plan can then be selected jobs for various implements.

5. If desired, press the About tab to view information about the CRX including the software version, when the software version was installed, Run Hours, and Total Run Hours. If desired, press Erase Data to reset the system and erase all data stored on the CRX. This includes all implements, Grower/Farm/Field data, and settings on the CRX.

6. After adjusting all the settings, press Accept .

## DOWNLOADING A CRX UPDATE TO USB

To locate and download a CRX software update to a USB stick:

1. On a computer, enter http://portal.ravenprecision.com/ into the address bar.

2. Press Enter.
3. Click Product Documentation.
4. Click CRX.
5. Navigate to the dropdown.
6. Select the desired Software.

NOTE: If desired, review the download and installation instructions.

7. Select Save As from the Save dropdown.
8. Select the desktop as the desired save location.
9. Press Save.
10. Click and drag the .zip file into the root directory of the USB stick.

IMPORTANT: Do not “unzip” or extract the software update file.

## INSTALL CRX UPDATES VIA USB

To apply a software update to the CRX device:

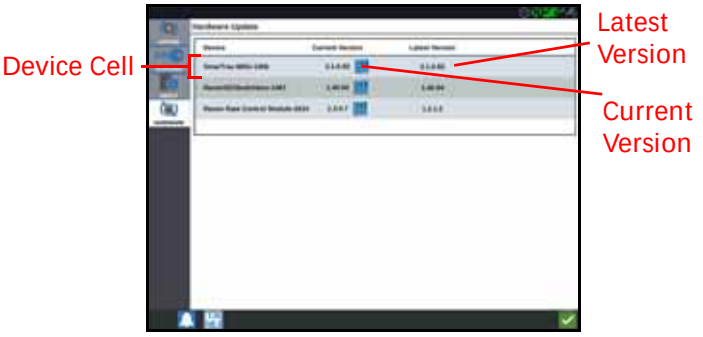
1. Insert the USB flash drive with the CRX update in the required folder into the CRX device.
2. Once the update file is detected on the USB drive, select the desired update from the USB drop down list then press Install.

## ISO NODE AND GPS UPDATES

To check for ISO Node or GPS updates via Slingshot:

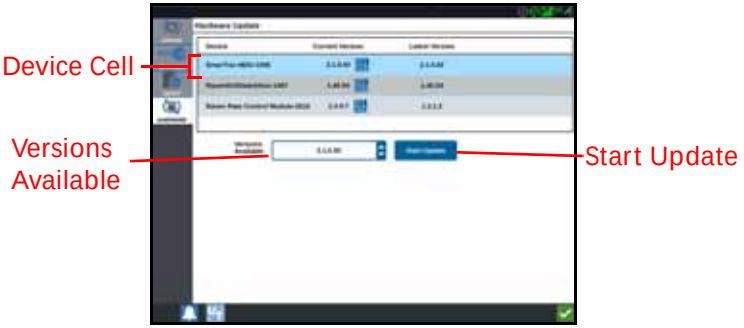
1. Press Software Update  on the CRX Settings page. The Update page will open.
2. Select the Hardware tab.
3. If there is an update available via Slingshot it will be listed under on the Hardware Update page. To learn more information about the current version, select the information icon. To see the if there is a newer version, compare the Current Version to the Latest Version.

FIGURE 42. Hardware Updates




4. To install the update, press anywhere on the device cell except the information icon. A Versions Available field will open below the list of Device Cells.
5. Select the desired version from the Versions Available drop down.

FIGURE 43. Available Versions




6. Select Start Update. The update will install.
7. If desired, press the About tab to view information about the CRX including the software version, when the software version was installed, Run Hours, and Total Run Hours. If desired, press Erase Data to reset the system and erase all data stored on the CRX. This includes all implements, Grower/Farm/Field data, and settings on the CRX.
8. After adjusting all the settings, press Accept.

## SMARTRAX SYSTEM INFORMATION

The SmarTrax System Information page provides options for adjusting sensitivity, performing diagnostics, and general SmarTrax information. For SmarTrax operation and calibration information, refer to the appropriate SmarTrax Calibration and Operation Manual.

## IMPLEMENT STEERING SYSTEM INFORMATION

The Implement Steering Information page provides options for adjusting sensitivity, performing diagnostics, and general Implement Steering information. For Implement Steering operation and calibration information, refer to the appropriate Implement Steering Calibration and Operation Manual.

# FEATURE UNLOCKS

Some CRX features are locked, or temporarily unlocked, when shipped. These features include:

- VRA: Allows the operator to assign a prescription map to a product control channel to automatically apply the desired product as configured in the prescription map.
- Multi-VRA: Allows multiple prescription maps per job.
- Task Controller: Task controller is required to allow the CRX UT to automatically control sections based on field position and previous coverage data collected during the application.

## TEMPORARY UNLOCK

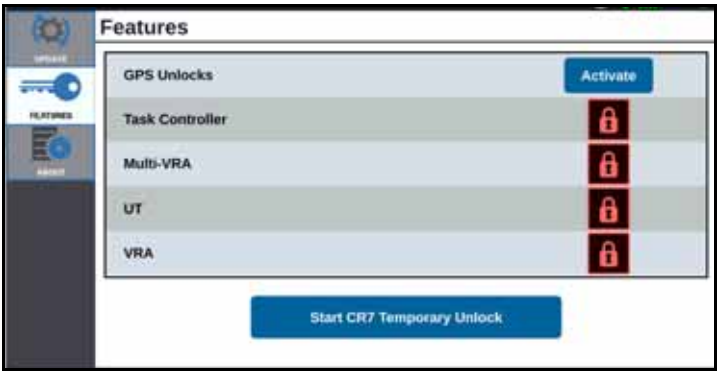
Any temporary unlock will remain active for 20 hours of CRX operation after the unlock is activated. The temporary unlock timer will continue until the unlock expires. Once the temporary unlock expires, the feature will be available using the activation package. Contact a local Raven dealer for additional assistance with temporary unlocks or feature activation.

To activate a temporary unlock:

1. Select Software Update 

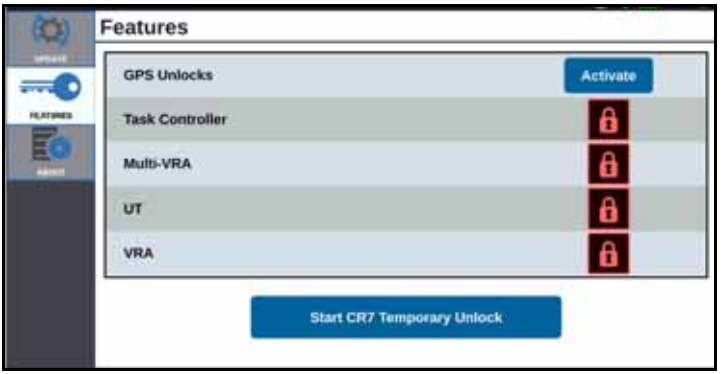
from the CRX Settings page. The Update page will open.

FIGURE 44. Features




2. Press Start CRX Temporary Unlock. The unlock timer will start.

FIGURE 45. Features



3. Press the Features  tab to review the Subscription Status along the bottom of the window. This portion of the window includes information such as Status, Job Code, Identification Number, and the countdown clock for the subscription.

FIGURE 46. Subscription Status


## PERMANENT UNLOCK

Permanent unlocks must be purchased through a Raven dealer. After purchasing the unlocks the files are loaded to the CRX with a USB drive. To install a permanent unlock on the CRX:

1. Locate the file sent to you from the Raven dealer.
2. On a computer, create a folder named Raven.
3. Transfer the unlock file to the Raven folder.
4. Install a USB drive into one of the USB ports on the computer.
5. Transfer the Raven folder to the USB drive.
6. Insert the USB drive into the CRX.
7. On the Raven settings screen, select File Manager  .
8. Select USB from the left drop-down.
9. Select the unlock file.
10. Select Copy  .
11. Restart the CRX after the files have transferred.

## SYSTEM SHUTDOWN

1. To turn off the system, press the System Shutdown  button or press the power button on the back of the CRX. A Confirm Shutdown window will open.
2. Press Accept  to turn off the system or Cancel  to return to the CRX Settings screen.

# USB IMPORT AND EXPORT FILE TYPES

TABLE 9. USB Import and Export Types

| Function | Import Type | Export Type | Typical USB Location |
|---|---|---|---|
| KWS | .kws (AreaFeature.shp, LineFeature.shp, Boundary.shp) | | |
| SBGuidance Fields | /export/*.kml | | |
| ISO Tasks | /*/TASKDATA.xml | | /ISOXML/*/TASKDATA.xml |
| Backup | /*.crb | /*crb | |
| Cruizer Flags | | | /WorkOrders/Jobs/{Job Dir}/*.jdf (.zone, .inj, .fld, .fcp, .com) |
| Cruizer Flags | | | /Coverage_Maps/{Job Dir}/ logs/scout.dat |
| Diagnostics | | /*.dbg | |
| ePro Line | | | /ePro/WorkOrders/ GuidanceLines/*.ab |
| Field | | | /Raven/GFF/{Grower Name}/ {Farm Name}/ {Field Name}*.fld |
| Field Extent | | | • GFF/{Grower Name}/ {Farm Name}/{Field Name}/*.shp (.shx, .dbf, .prj)<br>• /Raven/GFF/{Grower Name}/ {Farm Name}/ {Field Name}/*.shp (.shx, .dbf, .prj) |
| Firmware 500S | • /Raven/500S/ *.bin | • | |
| Firmware 600S | • /Raven/600S/ *.hex<br>• /Raven/600S/ *.shex | • | |

| Function | Import Type | Export Type | Typical USB Location |
|---|---|---|---|
| Firmware CAN | • /Raven/CAN/ *.hex<br>• Raven/CAN/ *.rvu<br>• /*.hex<br>• /*.rvu | | |
| Job | • /*.jdp | • /*.jdp | |
| Multi Boundary | | | • GFF/{Grower Name}/ {Farm Name}/{Field Name}/*shp (.shx, .dbf, .prj)<br>• Raven/GFF/{Grower Name}/ {Farm Name}/ *.shp (.shx, .dbf, .prj) |
| Prescription Map | • /*.shp (.shx, .dbf, .prj)<br>• /rsmap/*.shp (.shx, .dbf, .prj)<br>• /rpmaps/*shp (.shx, .dbf, .prj) | /*.shp (.shx, .dbf, .prj) | /Raven/GFF/{Grower Name}/ {Farm Name}/ {Field Name}/RxMaps/ *.shp (.shx, .dbf, .prj) |
| ROS Line | | | /Raven/GFF/{Grower Name}/ {Farm Name}/ {Field Name}/scoutRoot/ {ScoutGroup}/*id |
| Scouted Object | /*.sct | /*.sct | |
| Street Map | • /*.rsm<br>• /streetmap/ *.rsm | | |
| Trimble Boundary | | | /AgGPS/Data/{Grower Name}/ {Farm Name}/ {Field Name}/Boundary.shp |
| Trimble Swaths | | | /AgGPS/Data/{Grower Name}/ {Farm Name}/ {Field Name}/Swaths.shp |
| Unlock | /Raven/ {Barcode}.zip | | |

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# LIMITED WARRANTY

## WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

## HOW LONG IS THE COVERAGE PERIOD?

Raven Applied Technology products are covered by this warranty for 12 months from the date of retail sale. In no case will the Limited Warranty period exceed 24 months from the date the product was issued by Raven Industries Applied Technology Division. This warranty coverage applies only to the original owner and is non-transferable.

## HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries.

## WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the warranty claim, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

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## WHAT IS NOT COVERED BY THIS WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

**Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.**

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# EXTENDED WARRANTY

## WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

## DO I NEED TO REGISTER MY PRODUCT TO QUALIFY FOR THE EXTENDED WARRANTY?

Yes. Products/systems must be registered within 30 days of retail sale to receive coverage under the Extended Warranty. If the component does not have a serial tag, the kit it came in must be registered instead.

## WHERE CAN I REGISTER MY PRODUCT FOR THE EXTENDED WARRANTY?

To register, go online to www.ravenhelp.com and select Product Registration.

## HOW LONG IS THE EXTENDED WARRANTY COVERAGE PERIOD?

Raven Applied Technology products that have been registered online are covered for an additional 12 months beyond the Limited Warranty for a total coverage period of 24 months from the date of retail sale. In no case will the Extended Warranty period exceed 36 months from the date the product was issued by Raven Industries Applied Technology division. This Extended Warranty coverage applies only to the original owner and is non-transferable.

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## HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries. In addition, the words "Extended Warranty" must appear on the box and all documentation if the failure is between 12 and 24 months from the retail sale.

## WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the product's registration for the Extended Warranty and the claim itself, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

## WHAT IS NOT COVERED BY THE EXTENDED WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. Cables, hoses, software enhancements, and remanufactured items are not covered by this Extended Warranty. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

**Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.**

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