X35 Guidance and Auto Steering

Operator Manual

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Preface

This manual provides information about operating and maintaining this Topcon Precision Agriculture product. Correct use and servicing is important for safe and reliable operation of the product.

It is very important that you take the time to read this manual before using the product.

Information in this manual is current at the time of publication. A system may vary slightly. The manufacturer reserves the right to redesign and change the system as necessary without notification.

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Note: Please read these Terms and Conditions carefully.

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Limited Warranty

ELECTRONIC AND MECHANICAL COMPONENTS -TPA warrants that the electronic components manufactured by TPA shall be free of defects in materials and workmanship for a period of one year from the original date of shipment to the dealer. TPA warrants that all valves, hoses, cables and mechanical parts manufactured by TPA shall be free of defects in materials and workmanship for a period of 90 days from the date of purchase.

RETURN AND REPAIR - During the respective warranty periods, any of the above items found defective may be shipped to TPA for repair. TPA will promptly repair or replace the

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(ii) normal wear and tear

(iii) improper use and/or maintenance

(iv) unauthorized modifications of the product; and/or

(v) use of the product in combination with other products not supplied or specified by TPA.

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- the laws of South Australia if the product is sold and supplied to you in Australia (in which case the courts of South Australia or the Federal Court of Australia (Adelaide Registry) have exclusive jurisdiction in respect of any claim or dispute) or
- the laws of the State of California if the product is sold and supplied to you outside of Australia
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All information, illustrations, and applications contained herein are based on the latest available information at the time of publication. TPA reserves the right to make product changes at any time without notice.

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Service Information

Service assistance can be provided by contacting your local TPA Authorized Dealer.

Communications Regulation Information

FCC Compliance Statement (USA)

This equipment has been tested and found to comply with the limits for a Class ‘A’ digital device, pursuant to Part 15 of the FCC Rules. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's expense.

15.19

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

15.21

Changes or modifications made to this equipment not expressly approved by Topcon may void the FCC authorization to operate this equipment.

15.105:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

IC Compliance Statement (Canada)

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulation.

CE EMC Statement (European Community)

Warning: This is a class ‘A’ product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

EMC Statement (Australia & New Zealand)

This product meets the applicable requirements of the Australia and New Zealand EMC Framework.

Type Approval and Safety Regulations

Type approval may be required in some countries to license the use of transmitters on certain band frequencies. Check with local authorities and your dealer. Unauthorized modification of the equipment may void that approval, the warranty and the license to use the equipment.

The receiver contains an internal radio-modem. This can potentially send signals. Regulations vary between countries, so check with the dealer and local regulators for information on licensed and unlicensed frequencies. Some may involve subscriptions.

Radio and Television Interference

This computer equipment generates, uses, and can radiate radio-frequency energy. If it is not installed and used correctly in strict accordance with TOPCON Precision Agriculture instructions, it may cause interference with radio communication.

You can check if interference is being caused by this equipment by turning the Topcon equipment off to see if the interference stops. If the equipment is causing interference to a radio or other electronic device, try:

- Turning the radio antenna until the interference stops
- Moving the equipment to either side of the radio or other electronic device
- Moving the equipment farther away from the radio or other electronic device
- Connecting the equipment to another circuit that is not linked to the radio.

To reduce potential interference operate the equipment at the lowest gain level that will allow successful communication.

If necessary contact your nearest Topcon Precision Agriculture dealer for assistance.

Note: Changes or modifications to this product not authorized by TOPCON Precision Agriculture could void the EMC compliance and negate authority to operate the product.

This product was tested for EMC compliance using Topcon Precision Agriculture peripheral devices, shielded cables and connectors. It is important to use Topcon Precision Agriculture devices between system components to reduce the possibility of interference with other devices

General Safety

DANGER: It is essential that the following information and the product specific safety information is read and understood.

Most incidents arising during operation, maintenance and repair are caused by a failure to observe basic safety rules or precautions. Always be alert to potential hazards and hazardous situations.

Always follow the instructions that accompany a Warning or Caution. The information these provide aims to minimize risk of injury and/or damage to property.

In particular follow instructions presented as Safety Messages.

Safety Messages and Warnings

The safety symbol is used with the relevant word: DANGER, WARNING or CAUTION.

Messages marked in this way recommend safety precautions and practices. LEARN and apply them.

DANGER: Indicates an imminently hazardous situation that, if not avoided, could result in DEATH OR VERY SERIOUS INJURY.

WARNING: Indicates a potentially hazardous situation that, if not avoided, could result in DEATH OR SERIOUS INJURY.

CAUTION: Indicates a potentially hazardous situation that, if not avoided, may result in MINOR INJURY.

Safety Signs

WARNING: DO NOT remove or obscure safety signs. Replace any safety signs that are not readable or are missing. Replacement signs are available from your dealer in the event of loss or damage.

If a used vehicle has been purchased, make sure all safety signs are in the correct location and can be read. Replace any safety signs that cannot be read or are missing. Replacement safety signs are available from your dealer.

Operator Safety

WARNING: It is YOUR responsibility to read and understand the safety sections in this book before operating this vehicle. Remember that YOU are the key to safety.

Good safety practices not only protect you, but also the people around you. Study this manual as part of your safety program. This safety information only relates to Topcon equipment and does not replace other usual safe work practices.

WARNING: Ensure power is removed from the Topcon equipment prior to maintenance or repair of the vehicle or implements.

WARNING: Ensure appropriate precautions are taken prior to handling any hazardous substances. Always read the Material Safety Data Sheet prior to commencing work.

WARNING: In some of the illustrations or photos used in this manual, panels or guards may have been removed for demonstration purposes. Never operate the vehicle with any panels or guards removed. If the removal of panels or guards is necessary to make a repair, these MUST be replaced before operation.

WARNING: Always check that any suspended vehicle attachments are lowered to the ground before beginning repair or maintenance work on a vehicle.

WARNING: Vehicle and implement parts can become hot during operation and may be under pressure. Refer to vehicle manuals.

WARNING: Wear appropriate protective clothing for the task being undertaken and conditions.

WARNING: Do not operate equipment around explosive equipment or supplies.

WARNING: Topcon is committed to good environmental performance and minimizes the use of any potentially harmful substances in its products. However, it is always advisable not to handle damaged electronic equipment. This Topcon product may contain a sealed lithium battery. Always dispose of any electronic equipment thoughtfully and responsibly.

Radio frequency radiation exposure Information:

This equipment complies with FCC and IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 30 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

WARNING: Products using cellular modem or an RTK base station can transmit radio frequency energy. Check with your dealer.

This device is designed to operate with TPA approved antennas. Discuss with your dealer.

Preparation for Operation

- Read and understand this manual and learn all of the controls before you use the equipment.
- Keep the manual with the equipment.
- If the equipment is moved to another vehicle, move the manual as well.

- Read the manual for the vehicle with which the equipment will be used and check that the vehicle has the correct equipment required by local regulations.
- Make sure you understand the speed, brakes, steering, stability, and load characteristics of the vehicle before you start.
- Check all controls in an area clear of people and obstacles before starting work.
- Identify possible hazards.

WARNING: Topcon equipment must not be used by an operator affected by alcohol or drugs. Seek medical advice if using prescription or over-the-counter medication.

Disclaimer

Topcon accepts no responsibility or liability for damages to property, personal injuries, or death resulting from the misuse or abuse of any of its products.

Further, Topcon accepts no responsibility for the use of Topcon equipment or the GNSS signal for any purpose other than the intended purpose.

Topcon cannot guarantee the accuracy, integrity, continuity, or availability of the GNSS signal.

The operator must ensure that the equipment is correctly turned off when not in use.

Before operating any vehicle equipped with Topcon products, read and understand the following product specific safety precautions.

Important Safety Information

Operator Alertness and Responsibility

The console helps the operator to steer the vehicle, but the operator remains in charge and must be alert and in complete control of the vehicle at all times. The operator is ultimately responsible for safe operation of this equipment.

It is essential that safety requirements are met when operating the console and any of its components. All operators and other relevant personnel must be advised of safety requirements.

Electrical Safety

WARNING: Incorrectly connected power can cause severe injury and damage to people or the equipment.

When working with electrical components, you must do the following:

- Make sure the negative terminal of the battery is disconnected before doing any welding on the vehicle.

- Check that all power cables to system components are connected to the correct polarity as marked. Please refer to the vehicle manual for safety information.
- Check that equipment is grounded in accordance with installation instructions.

Operation and Risk of Obstacles

The following list is not exhaustive or limited. To use the console for assisted steering along a defined wayline, the operator must ensure that it is used:

- Away from people and obstacles
- Away from high voltage power lines or other overhead obstructions (identify any clearance problems before activating the console)
- On private property without public access
- Within cleared fields
- Off public roads or access ways.

Note that:

- The operator needs to know the vehicle's position and the field conditions at all times.
- The operator will need to respond if the GNSS satellite or differential correction signal is lost momentarily.
- The console cannot detect obstacles (people, livestock or other).
- Only use the console in areas that are clear of obstacles and keep a proper distance.
- Steering needs to be disengaged for manual control if an obstacle appears in the path or the vehicle moves away from the wayline.

On/Off and Manual Control

WARNING: Ensure the steering switch is Off to prevent unintentional engagement of the assisted steering. When repairing or maintaining the vehicle/implement, ensure the vehicle CANNOT be moved. Disengage steering, apply brakes and remove keys.

The operator must ensure that the steering switch is Off (*all* LED indicators are off) when assisted steering is not being used.

The operator must disengage assisted steering and use manual control if an obstacle is in the line of travel or moves into the line of travel, or if the vehicle steers away from the desired wayline.

To disengage assisted steering:

- Turn the steering wheel a few degrees OR
- Select the Disengage Auto Steering button on the console AND/OR
- If using an external steering switch, disengage using the switch if the above actions do not disengage assisted steering.

Vehicle Shut Down Safety

Before leaving the vehicle, disengage assisted steering, disengage external steering switch if this is being used, and remove the key from the key switch.

Using a Reference (Base) Station

WARNING: Do not move a reference station while in operation. Moving an operating reference station can interfere with the controlled steering of a system using the reference station. This could result in personal injury or damage to property.

Operators and other affected personnel must be advised of the following safety precautions.

- Do not erect the reference station under or within the vicinity of high voltage power lines.
- When using the portable reference station, make sure that the tripod is securely mounted.

To Get the Best Out of the Product

Back up data regularly. The console has large, but limited storage capacity. Use the Diagnostics Mini-view to view capacity available. A warning screen displays if storage is reaching its limit.

Be aware of file format compatibility. Discuss compatible formats with the dealer.

Topcon Agricultural Products are hardy and designed to work in tough conditions. However, if equipment is unused for a length of time, store away from water and direct heat sources.

Alert Symbols

In this manual two alert symbols are used:

Note: This offers additional information.

WARNING: A warning signal appears on safety signs and in this manual to show that this information is very important to your safety. LEARN these and APPLY them.

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Chapter 1 – Console Overview

1.1. Introduction

The X35 is a vehicle-mounted electronic console with LCD display and touchscreen. The console allows operators to work with auto steering, guidance and other control functions from the console. The console is designed to interact with GPS and Electronic Control Units (ECUs), centralizing the ability to communicate, record, store and display data for agricultural uses.

Note: Before using guidance and auto steering, please read the safety instructions and learn about the controls by reading this manual carefully.

The console is a touchscreen. To select something on the screen, touch the area with the tip of a finger.

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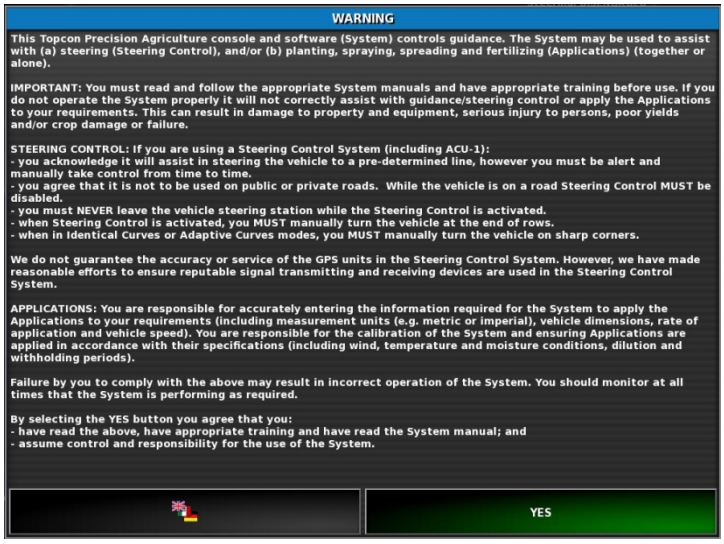
1.3. Starting the console

1. Connect the console to a power supply. Ensure associated devices (such as GPS (Global Positioning System) and ECU (Electronic Control Unit)) are connected.
2. Press and hold the green ON/OFF button on the rear of the console for a few seconds to start the console.

3. To change the language on the console, select .



4. Use the scroll bar, or slide a finger down the list, to see more languages. Confirm the selection .

   The Warning Screen displays in the chosen language.
5. Read the Warning Screen and if you agree select **YES**.

Note: Selecting Yes confirms your understanding and accepts your responsibility for liabilities described in the Warning Screen.

The console may display the following warning.

6. To acknowledge the alarm, press the center of the alarm window.

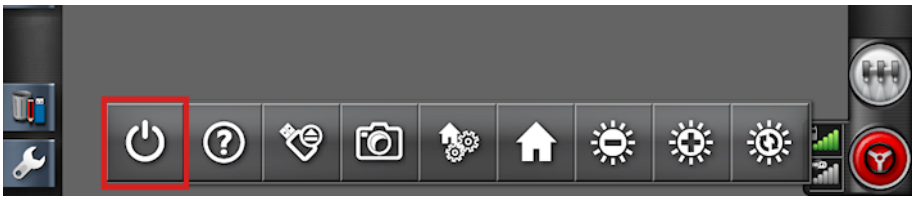
   Note that extra details may be displayed for some alarms by dragging the window downwards.

7. Confirm the GPS receiver is connected correctly and communicating.

Note: If the warning appears again, this should be remedied during setup by referring to Setting up GPS, page 58.

1.4. Shutting down the console

To shut down the console, swipe up from the base of the screen to display the console toolbar and select the off icon. The system will ask if you want to power down. Select **Yes** to turn off or **No** to continue working.

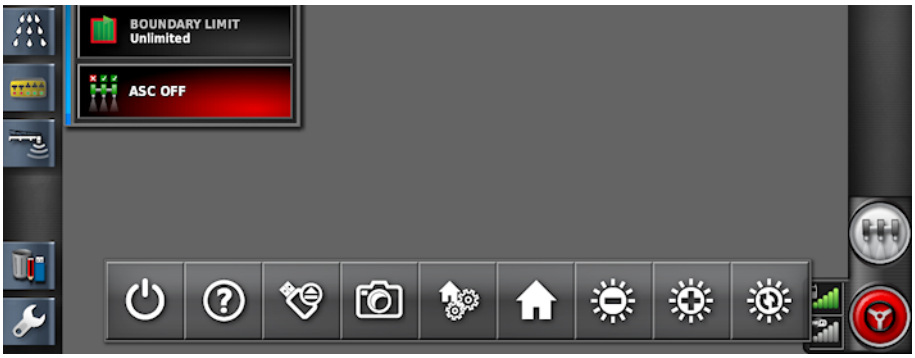


Alternatively, to shut down the console, briefly press the green ON/OFF button.

The system will ask if you want to power down. Select **Yes** to turn off or **No** to continue working.

Note: Pressing and holding the green ON/OFF button will also shut down the console, however data may be lost and this method is not recommended.

1.5. Using the console toolbar



The console toolbar is displayed by swiping upwards from the base of the screen.

Power off button

The power off button may be used to shut down the console.

Help

The **Help hint** feature displays the names of the user interface elements on the screen.

Touch the Help icon on the base of the screen. Question marks appear on the screen next to the icons. Select the screen element showing a question mark to view the names.

USB eject

The **USB port** is on the rear of the console. This can be used to import data to and export data from the console.

Before removing the USB, always disconnect first by touching the **USB eject** icon. A message will display that it is safe to remove the USB.

Screenshots

Use the **screenshot** icon to take screenshots (which are stored on the USB). Press the USB eject icon before unplugging the USB.

Manage global home screens

Enables Operation screen layouts to be saved. This may be useful to de-clutter the Operation screen or quickly return to displaying required information.

Display/hide the required views on the Operation screen and select **Save Home Screen** to save the layout.

Go to Home Screen

Displays a list of saved global home screens or toggles between saved screens. Refer to Global home screen mode, page 29.

Brightness control

Brightness control adjusts the brightness of the display. Use plus or minus to adjust display.

Day/night mode

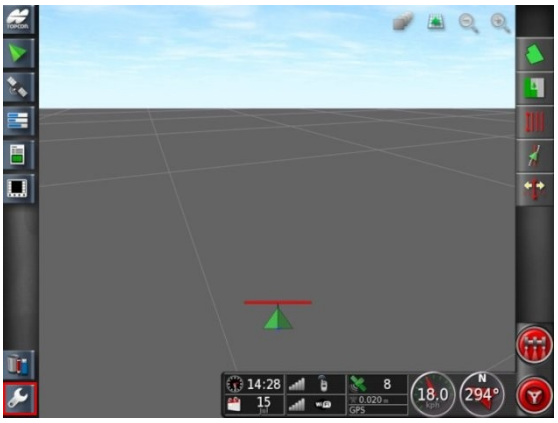
Day/night mode changes the brightness of the display.

Settings are Day, Night and Auto. Auto light mode will set the brightness automatically, depending on light conditions.

Chapter 2 – User Interface Description

2.1. Switching between setup and operation screen

The console has two main screens; the Setup screen and the Operation screen.



Use the highlighted buttons to switch between the screens.

2.2. Setup screen controls

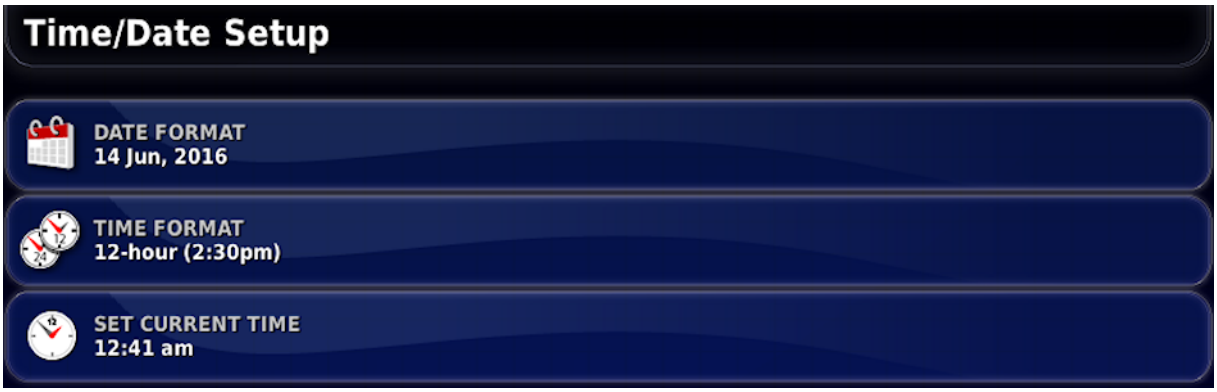
This section describes the Setup screen controls.

The Setup screen has the following types of controls:

Menus

Menu items are selected from the base of the screen to display the next level of sub-options. When features are enabled, more items may appear in the menus.

Option lists



Selecting menu items will typically display a list of options at the top of the screen. As features are enabled, more options may appear.

Selection lists

Selection lists are used to choose one or more items from a list. A message is displayed if too many items are selected in a multiple choice list. Selections must be confirmed using the tick button.

Cancel and confirm buttons

These buttons are used to cancel or confirm an entry or a selection. One of the buttons must be selected to progress from any screen displaying them.

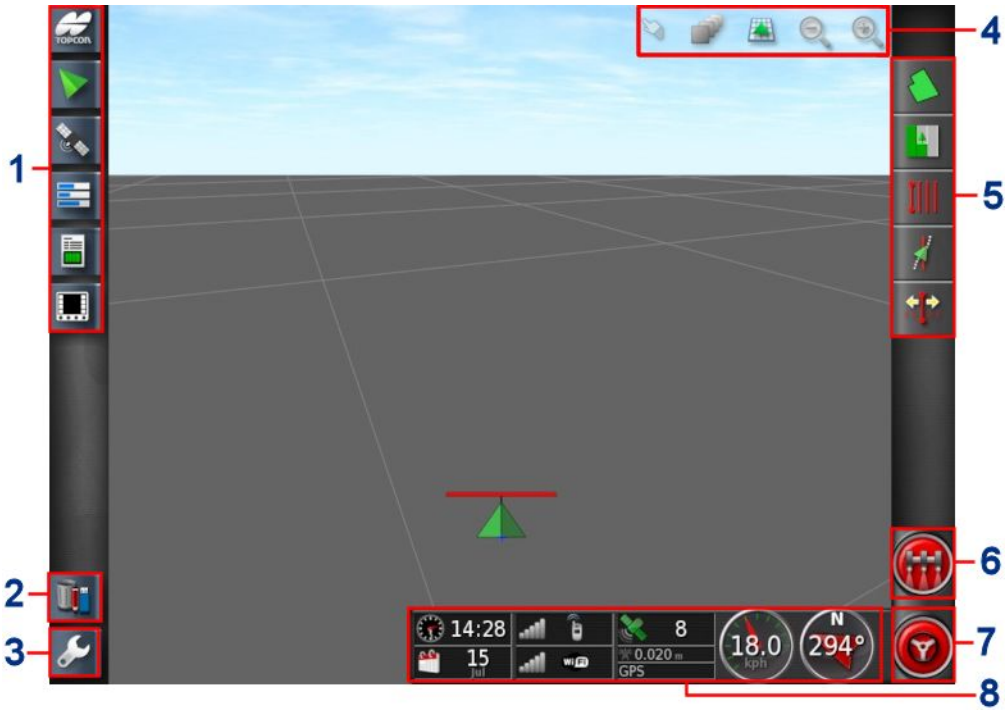
Keyboard and number-pad

Letter and number keypads are used to enter alphanumeric characters or numeric characters. Entries must be confirmed.

Wizards

Wizards are used to guide the operator through a complex configuration of the system by answering a series of questions. The answers provided determine which questions will follow.

2.3. Operation screen controls



1 **Navigation bar**: Opens mini-views to access other parts of the system. Refer to Using mini-views, page 109.

2 **Inventory manager**: Enables management of vehicles, implements, fields, jobs, guidance lines and so on. Refer to Inventory Manager, page 215.

3 **Setup screen**: Switches to the Setup screen.

4 **View controls**: Allows the user to control what is displayed on the guidance map and how it displays. Refer to Using view controls, page 112.

5 **Guidance toolbar**: Provides tools used to control guidance.

6 **Master switch**: Turns product application on and off if ‘virtual master switch’ has been enabled during implement setup. Refer to Setting up the master switch, page 105.

7 **Auto steer engage**: Turns auto steer on and off.

8 **Dashboard**: Provides selected information from the system for monitoring. Refer to Monitoring on the dashboard, page 124.

2.3.1. Implement color indicators

This indicates the position and direction of the vehicle and its implement. The implement color indicates product application status:

- **Red**: Section is off.
- **Blue**: Section is inhibited (on and not flowing, typically due to low speed or pressure).
- **Yellow**: Section is on and not flowing intentionally (typically due to auto-section control stopping the flow).
- **Green**: Section is on and flowing.
- **Orange**: Section is on and not flowing unintentionally or OFF but still flowing unintentionally (typically due to a delay in the time it takes for the flow to start up).

Chapter 3 – Quick Setup Guide

This chapter provides a quick overview to installing software onto the console, setting up the basics and operating the console.

WARNING: It is not recommended to operate the console for the first time without reading the complete manual to become familiar with all safety and operational issues.

3.1. Software update instructions

Note: This procedure should not be necessary when receiving a new console. It is only necessary if a software upgrade is required.

1. On a Windows machine, unzip the installation ZIP file into the root folder of a USB flash drive.
2. Safely eject the USB flash drive from the Windows machine.
3. Plug the USB flash drive into the powered-down console.
4. Power up the console by pressing and holding the green power button on the back of the console.
5. Go to the Setup screen (via the wrench button in lower left corner).
6. Select **System** / **Utilities** / **PROVISION USB FOR UPGRADE** and select **Yes**.
7. Power down the console by swiping up from the base of the screen to display the console toolbar and select the off icon.
8. The system will ask if you want to power down. Select **Yes** to turn off.
9. Leave the USB plugged into the console and restart by pressing and holding the green power button.
10. The installation procedure will start automatically and will take a few minutes.

11. The console will provide the option to restore all user data to the state it was before the upgrade. **WARNING**: Selecting **No** will delete all data saved on the console. The console will restart automatically.
12. After the console starts up, the software is ready for use.

3.2. Getting started

To configure the system:

1. Connect a GPS receiver to the console.
2. Go to the Setup screen (via the wrench button in lower left corner).
3. Select **System** / **GPS** and select:
   - The GPS receiver that is being used (see page 58).
   - The Correction Source required (see page 60).
4. Select **System** / **Serial Ports** and select the serial port on which the GPS receiver is connected (see page 67).
5. Once the system receives GPS data for the first time, it will prompt for configuration of the local time. Accept the current time or modify it to your local time.
6. Select **Vehicle** / **New** and create a new vehicle profile by selecting the appropriate model from the factory profile. Check and if needed modify the geometry of the vehicle (see page 87).
7. Select **Implement** / **New** and create a new implement profile by selecting the appropriate implement type. Check and if needed modify the geometry of the implement (see page 97).
8. If you select ASC-10 or Apollo as your ECU type, you will be guided through the steps to connect and configure all ECUs on your implement.

9. Go to the Operation screen (via the Exit button in the Setup screen).
10. Go to Select Field (via the top button on the guidance toolbar at the right hand side) and create new Client, Farm and Field (see page 149).
11. Go to New Job (via second button from the top on the guidance toolbar) and create a new job (see page 167). The system is now operational.
12. To enable Auto Steering, go to Setup screen, **System** / **Features** / **Guidance** / **AUTO STEER** (see page 187).
13. To enable Auto Section Control, go to Setup screen and:
    - Create or load an implement.
    - In **Implement** / **Section Control** / **Sections** configure the number of sections and their width (see page 102).
    - If required, change the section timing in **Implement** / **Section Control** / **Timing** (see page 103).
    - If required, configure a physical or virtual switchbox in **Implement** / **Section Control** / **Section Switch** (see page 103).
    - Enable the Auto Section Control feature in **System** / **Features** / **Implement** / **AUTO SECTION CONTROL** (see page 50).
14. To control any of the enabled features from the Operation screen, use the buttons on the Navigation bar down the left hand side of the screen. Those will open 'mini-views' of the features (see page 109).
15. To expand a mini-view to full screen (if the feature supports that), drag the mini-view to the right onto the main screen area.

Chapter 4 – Regional and User Settings

On the Setup screen, the **User** menu option provides the following menu items:

- **Region**: Selects the language, time/date and units.
- **Lightbar**: Sets operation of the LED bar for guidance use.
- **Environment**: Sets up console interaction.
- **Map**: Sets how maps work on the Operation screen.
- **Access Level**: Selects access levels to determine which controls are accessible.
- **User controls**: Defines which controls are accessible for different users.
- **Remote support**: Allows support personnel to remotely access and control console functions.

4.1. Setting the region

4.1.1. Language setup

The language displayed on the console may be changed if required and decimal separators may be represented by a period or a comma.

To set the language or decimal point format:

1. Select **User** / **Region** / **Language** .

The following options are available:

Language

There is a choice of languages available.

Use the scroll bar, or slide a finger down the list, to see more languages. Confirm the selection. The console will restart.

Note: The language may also be changed on the warning screen at startup by selecting .

Decimal point format

A decimal point may be represented by a period (.) or a comma (,).

4.1.2. Time/date setup

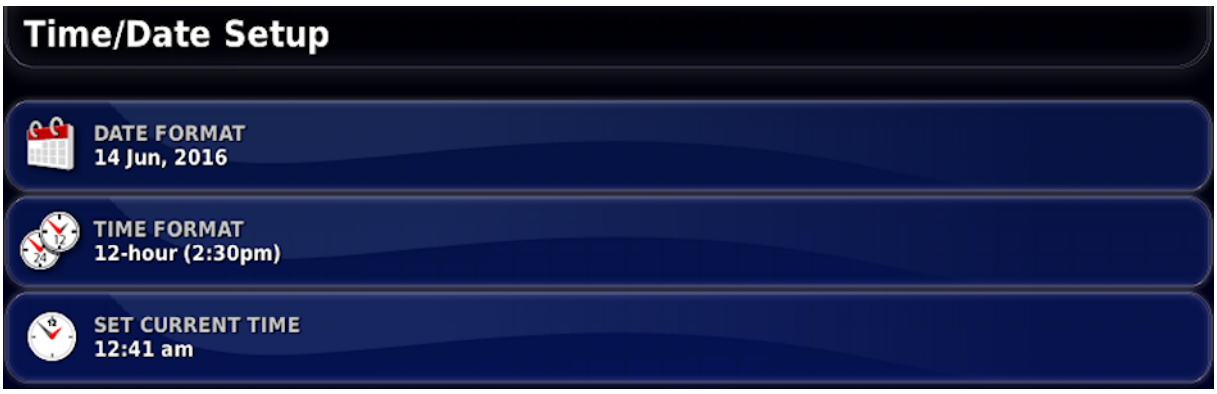
The date information is used on the console for job start and end dates, as shown on job reports. The current date is supplied from the GPS signal.

Note: Both time and date will not work if there is no GPS signal.

The current date and time can be displayed on the Operation screen by selecting the Topcon icon in the top left of the display (or shown on the dashboard).

To set date and time information:

1. Select **User** / **Region** / **Time/Date** .



The following options are available:

Date format

- Day of the month first (12 August 2015)
- Month first (August 12 2015)

Time format

- Twelve hour time (2:30pm)
- Twenty four hour time (14:30)

Set current time

Current time (does not change automatically for daylight saving).

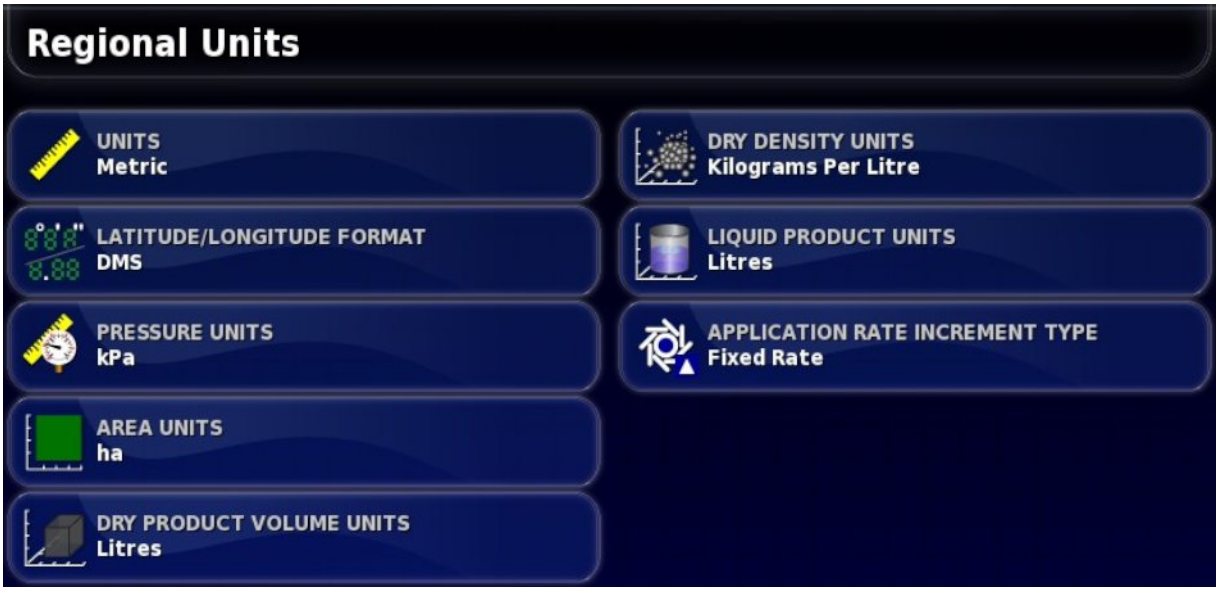
Note that -/+ will change time incrementally.

4.1.3. Units setup

The units options sets the displayed units of measurement (metric or imperial), units for pressure, area and products, the latitude/longitude format and the application rate increment type.

To set unit information:

1. Select **User** / **Region** / **Units** .



The following options are available:

Units

- Metric
- Imperial (US)
- Imperial (UK)

The United States (US) and United Kingdom (UK) imperial options are provided because gallons, fluid ounces and bushels have different measurements in the US and the UK.

Note: Changing this setting will not override the selection of individual units (Pressure, Area etc.) that have been changed.

Latitude/longitude format

- Standard (decimal degrees: 45.54)
- DMS (Degrees, Minutes, Seconds: 45°, 23’ 36”)

Pressure units

- kPa (kilopascal)
- psi (pounds per square inch)
- bar
- Default: Selects the default setting appropriate for the selected **Units**

Short distance units

- Meters
- Inches
- Feet
- Default: Selects the default setting appropriate for the selected **Units**

Area units

- ha (hectare)
- ac (acre)
- Default: Selects the default setting appropriate for the selected **Units**

Dry product volume units

- Litres
- Kilograms
- Cubic meters
- US bushels
- UK bushels
- Gallons
- Pounds
- Cubic feet
- Cubic yards
- Tonnes

Dry density units

- Kilograms per litre
- Kilograms per cubic meter
- Kilograms per US bushel
- Kilograms per UK bushel
- Pounds per gallon
- Pounds per cubic foot
- Pounds per US bushel
- Pounds per UK bushel

Liquid product volume units

- Litres
- Cubic meters
- Tonnes
- Gallons
- Cubic feet
- Pounds

Application rate increment type

- Fixed rate
- Percentage of Rate 1

This option changes the behavior when the operator presses the up/down buttons to change the requested product application rate. These can either change by a fixed rate or by a percentage of the rate set for **RATE PRESET1** (**SPRAY RATE** on an Apollo Sprayer).

Application rate units

- L/ha
- L/100m
- L/100m^2
- gal/ha
- gal/100yd
- gal/kft^2

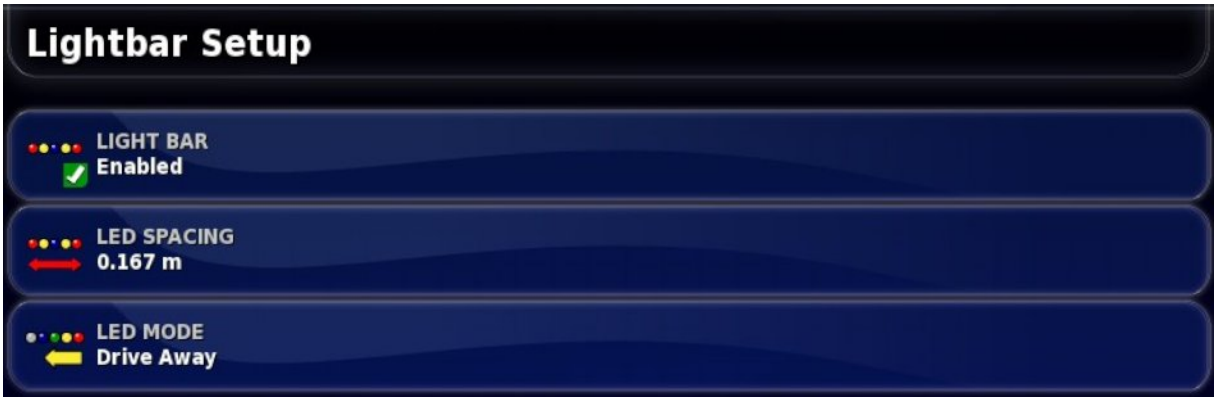
See the Spreader, Sprayer or Seeder operator manuals for more information.

4.2. Setting up the lightbar

During operations, the virtual lightbar on the top of the guidance screen can show how far the vehicle is deviating from the set guideline.

To set up the lightbar:

1. Select **User** / **Lightbar** .



The following options are available:

Light bar

Enabled or disabled.

LED spacing

Sets the ground distance from the wayline (guideline) that each LED represents.

If the LED spacing is set to 10 cm (0.1 m), the following behavior is observed:

- The center LED is blue and will be illuminated all the time (unless the cross track error is 100 cm or more). When on the wayline by less than 10 cm (+ or -) that is the only LED that is illuminated.
- Once you reach a cross track error of 10 cm, the next LED (green) will also illuminate.
- At 20 and 30 cm another green LED illuminates.
- Yellow LEDs illuminate at 40, 50 and 60 cm.
- Red LEDs illuminate at 70, 80 and 90 cm.

- Once the cross track reaches 100 cm or more, all LEDs turn off except for one red LED on the far side of the console.

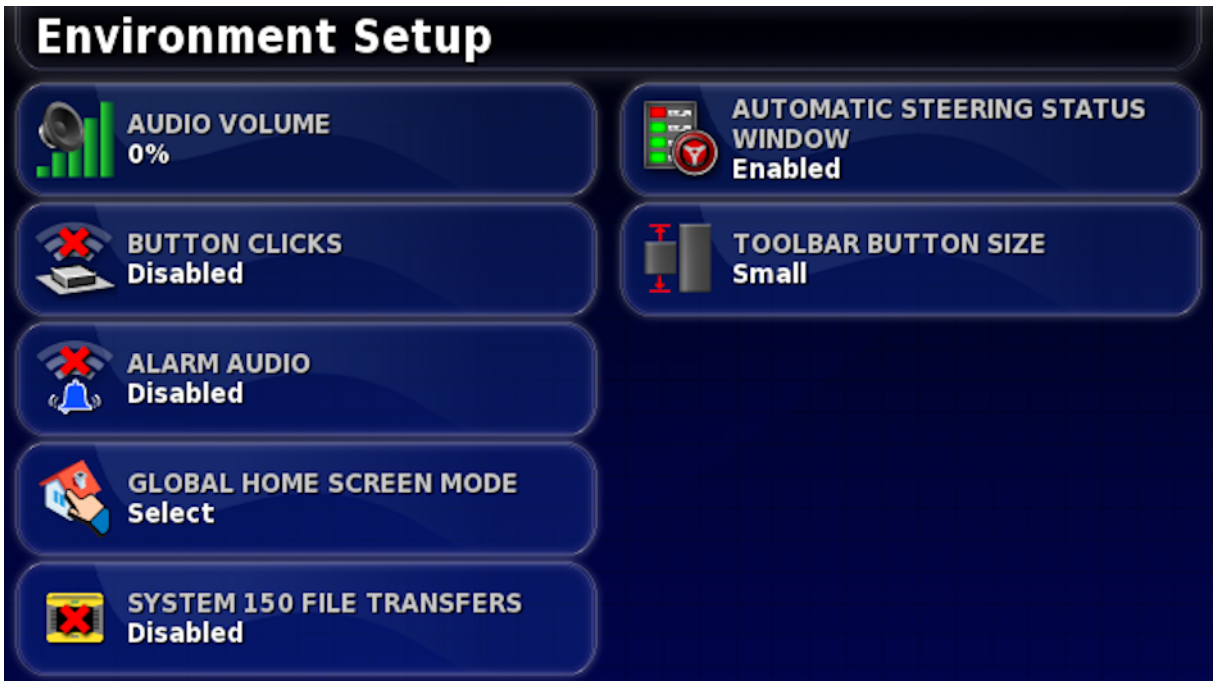
LED mode

- **Drive away**: Activates the LEDs on the side of the vehicle veering away from the guideline. Drive away from the lit LEDs to move back to the guideline.
- **Drive towards**: Activates the LEDs on the side of the vehicle veering towards the guideline. Drive toward the lit LEDs to move back to the guideline.

4.3. Setting up environment

Sets up console interactions.

1. Select **User** / **Environment** .



The following options are available:

Audio volume

Sets the volume of console sounds.

Button clicks

Enable or disable sounds when making a selection on the console.

Alarm audio

Enables sounds when an alarm is triggered.

Global home screen mode

Enables Operation screen layouts to be saved. This may be useful to de-clutter the Operation screen or quickly return to displaying required information.

- **Select**: Selecting the home icon displays a list of saved global home screens to select.

- **Toggle**: Selecting the home icon toggles between saved global home screens. Refer to Manage global home screens, page 10.

System 150 file transfers

Enables the following System 150 (GX-45) files to be imported and exported: AB lines, Pivots, Curves, Optimal lines, Project lines and Field boundaries.

System 150 file transfers allow the operator to export files in a format that matches Topcon's System 110/150 system and import files that were exported from System 110/150.

Enabling this option displays the System 150 icon at the base of the Inventory Manager on the Operation screen (refer to Inventory Manager, page 215).

Automatic steering status window

Displays a Steering Status window when the Auto Steer Engage button is selected on the Operation screen if the steering is unable to engage. The Steering Status window displays issues that may be preventing the steering from engaging. If Auto Open and Close is selected, the Steering Status window will automatically close once any issues preventing the steering from engaging have been resolved.

Note: The Steering Status window may still be displayed via the **Steering Options Menu** / **Auto Steer Status** (see page 187) if this setting is disabled.

Toolbar button size

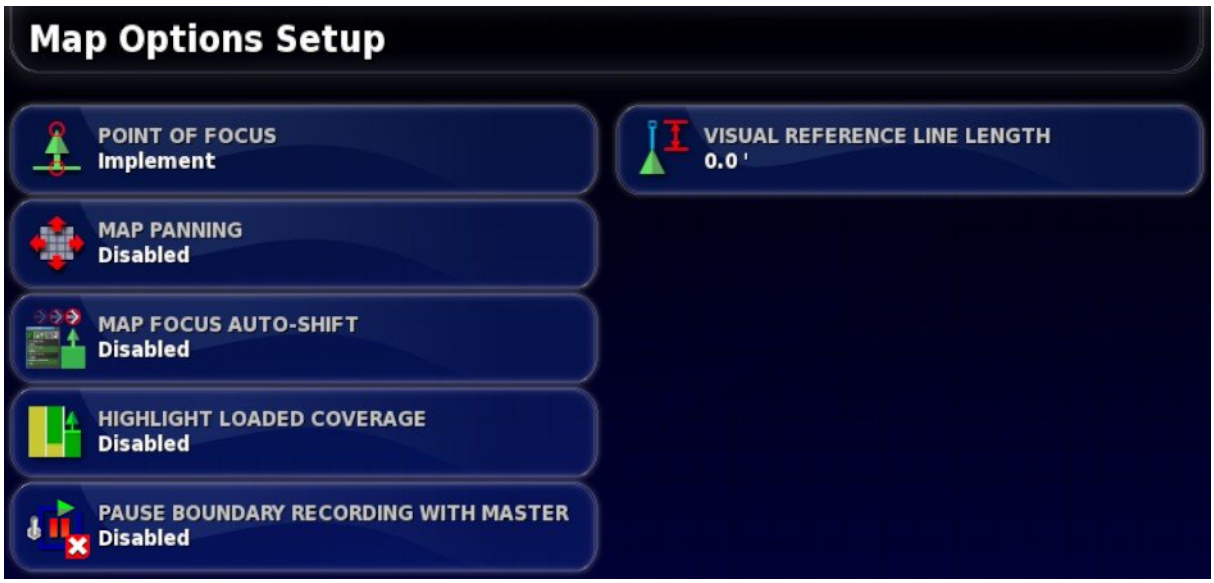
Changes the size of the buttons on the Operation screen.

4.4. Setting up map options

Sets how maps work on the Operation screen.

To set up the maps:

1. Select **User** / **Map** .



The following options are available:

Point of focus

- **Vehicle**: Places the vehicle at the center of the screen.
- **Implement**: Places the implement at the center of the screen.

Map panning

Allows the screen to move around in a map when the user slides a finger across the screen.

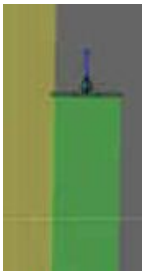
Enabling this option places the map panning icon beside the Toggle Map View and Map Layers at the top of the Operation screen. Touching this icon re-centers a panned map to the current location of the vehicle.

Map focus auto-shift

Sets the vehicle in the center of the available screen, when mini-views are open.

Highlight loaded coverage

After loading an existing job, shows previously completed and loaded coverage in a different color from the newly created coverage.



Previously covered areas are shaded yellow if this has been enabled and past job information has been recorded.

New coverage is shaded green. If this option is not enabled, both the previous coverage (from the loaded job) and the newly recorded coverage are shown in the same green color.

Pause boundary recording with master

If the master switch is turned off while a boundary is being recorded, the boundary recording is paused. Turning the master switch back on resumes the boundary recording.

This may be useful to automatically pause boundary recording if product application is paused to maneuver in a tight corner or deviate around an object.

Note that boundary recording may still be manually paused (refer to Setting a new boundary, page 152).

Visual reference line length

Provides a display marker at the user prescribed distance in front of the vehicle icon to help accurately acquire the wayline after a turn when using manual guidance.

4.5. Setting access level

Setting the access level determines which controls are accessible to the user. The accessibility of the controls can be configured on the user controls screen (only available when Expert is selected as the Access Level). Refer to Setting user controls, page 34.

To change the access level:

1. Select **User** / **Access Level** .

The Access Level may be set at Easy, Standard or Expert. A password may be set for the Standard and Expert levels to prevent inexperienced users from accessing higher levels.

The console will turn on in whichever level was set before turning it off.

4.6. Setting user controls

This screen is only available when Expert is selected as the Access Level. Refer to Setting access level, page 33.

Access to console controls can be configured by setting the user controls. There are three levels of access available: Easy, Standard and Expert.

- **Easy**: This mode is recommended for everyday operator use. It allows access to all basic controls and some status information. This provides an uncluttered and easy to learn user interface.
- **Standard**: This mode has extended functionality, intended for more experienced users who want more control of the functions they are using. This includes more advanced controls (for example; clearing coverage, deleting items).
- **Expert**: This mode has all the configuration options for setting up a vehicle, implement, GPS receiver, etc. It can also be used for normal farming by power users who want everything visible at once.

To define the user controls:

1. Select **User** / **User Controls** .

The accessible controls for the three levels are set by default. They may be edited as required by pressing the tick or cross for each option.

The Reset button enables settings to be returned to either the factory defaults or to the settings the console had when it was powered up.

The Preview buttons enable you to see how the settings will look in Easy or Standard mode, without leaving Expert mode.

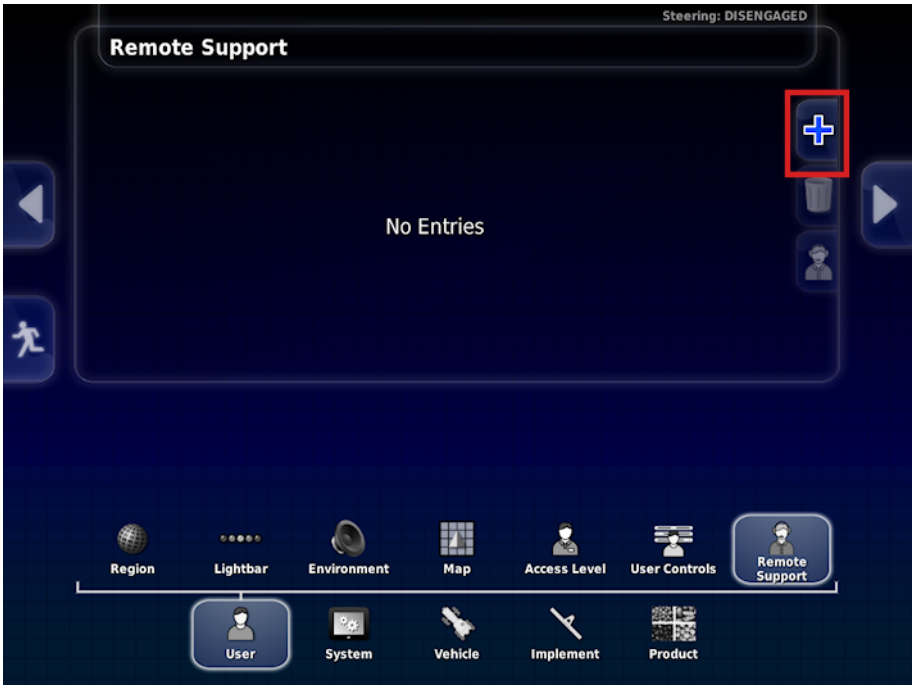
4.7. Setting up remote support

Remote support enables a support person to remotely access and control the console via the Topcon Support app. Internet access is required. See Wireless setup, page 54.

4.7.1. Setting up support

To configure remote support on the console, the support person must supply the PIN number that is displayed at the top of their Topcon support app. This will allow the console to connect remotely to the Topcon Support app.

1. Select **User** / **Remote Support** , then click on the plus symbol at the top right of the screen.

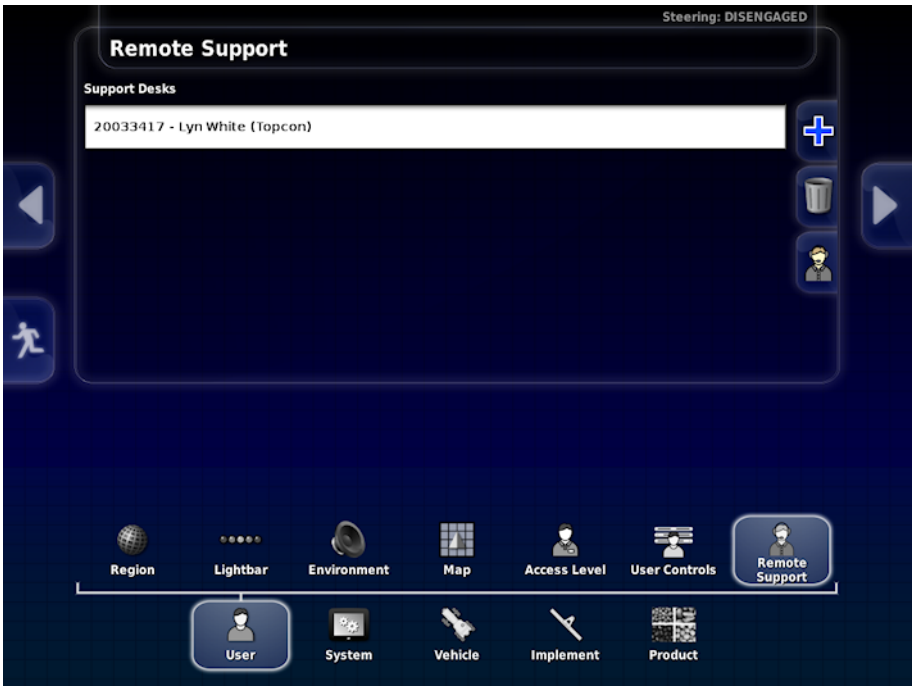


   The Add Support Desk window is displayed.

2. Enter the supplied PIN number in the **DESK PIN** field and press the tick button.

The console connects with the Support person's device and displays their name.

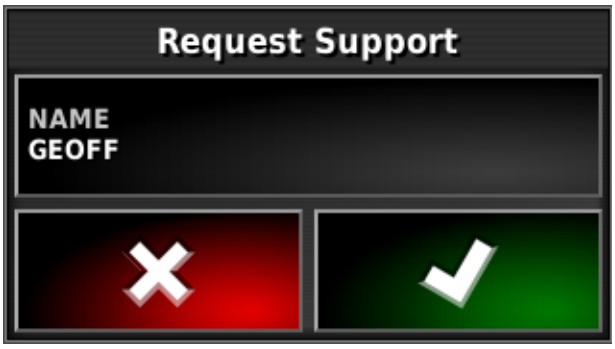
The configured support person is displayed in the list of Support Desks.



4.7.2. Requesting support

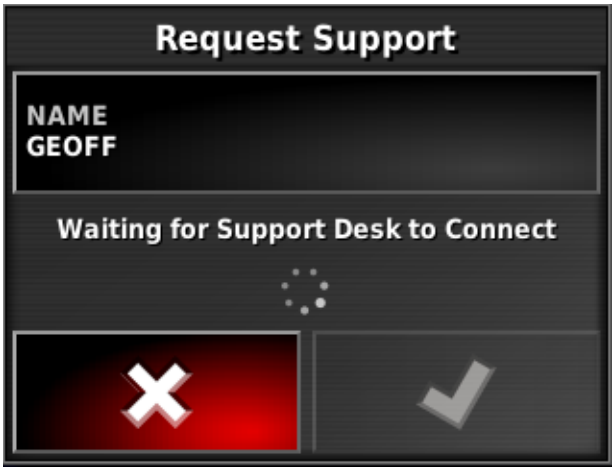
1. To request remote support, select **User** / **Remote Support** . A list of configured support desks is displayed.
2. Press the required support option from the list of support desks and then select the request support icon .

The Request Support window is displayed.



3. Enter an identifying name and press the tick button.

   A support request is sent to the selected support desk.



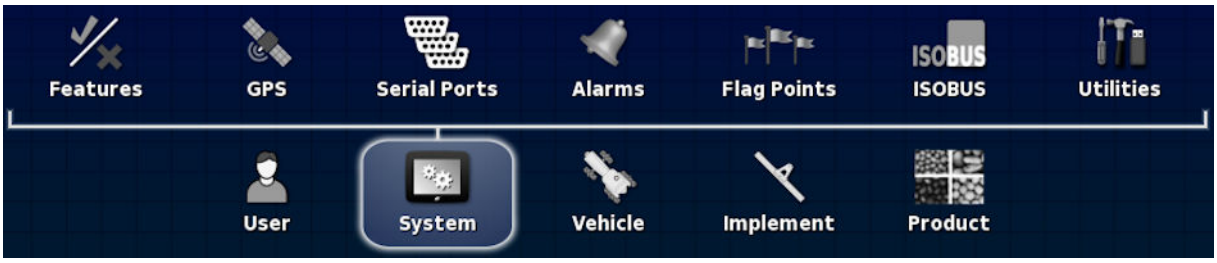
Once the support desk responds to the support request, they have access to and control of the console (excluding steering, master switch and Universal Terminal).

Chapter 5 – System Setup

This chapter explains how to set up system elements such as GPS connections, alarms and optional features.

The **System** menu option provides the following menu items:

- **Features**: Enables or disables optional features.
- **GPS**: Sets up the functionality of the connected GPS receiver.
- **Serial Ports**: Selects the console serial port assigned to a particular function.
- **Alarms**: Sets alarm functionality.
- **Flag Points**: Selects icons and labels for flag points. Flag points show obstacles or other land features on a guidance map.
- **ISOBUS**: Allows interaction with ISOBUS compliant ECUs via the ISOBUS Universal Terminal.
- **Utilities**: Allows a USB to be provisioned to upgrade software.



5.1. Setting features

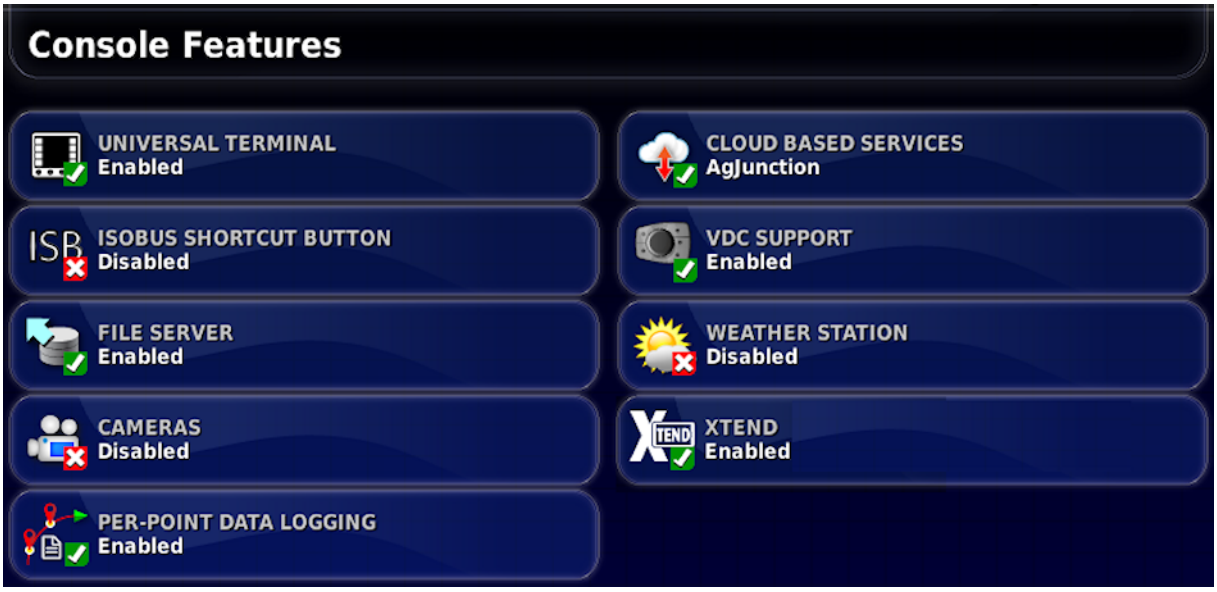
The **Features** menu option provides the following menu items:

5.1.1. Console setup

Configure console features.

To set up features:

1. Select **System** / **Features** / **Console** .



Universal terminal

Enables the ISOBUS Universal Terminal server that allows interaction with ISOBUS compliant ECUs.

Refer to Setting up ISOBUS / universal terminal, page 78.

ISOBUS shortcut button

Adds a button on the operator screen above the master switch, which enables the operator to directly deactivate functions that were activated by an ISOBUS control. Pressing the button again will not restart the functions, but will permit them to be restarted manually via the standard mechanism for each function.

File server

Can store files for an ISOBUS ECU if the ECU has file server capability. It allows implement and other profiles to be moved between ECUs. Files can be exported and imported using the USB.

Cameras

Allows the operator to monitor connected digital cameras on the console. A registration code must be purchased to enable this functionality.

Per-point data logging

Records each GPS data point during the job and a number of associated data fields such as elevation, heading, GPS quality, section states, CropSpec readings. These are exported as a .csv file (refer to Exporting a job report, page 172).

Cloud based services

Magnet

Enables file transfer and GPS location sharing via Topcon Magnet software. Refer to Using MAGNET, page 206.

VDC support

The VDC (Vehicle Display Controller) is an optional device that may be used to perform a selection of console functions. Refer to VDC setup, page 54.

Weather station

Enables support for the AirMar 150WX Weather Station via the CAN NMEA2000 data output from the sensor. Select the CAN port to which the weather station is connected. An icon is added to the Navigation bar on the operation screen. Refer to Using weather station, page 211.

A registration code must be purchased to enable this functionality.

XTEND

Using the XTEND technology, you can extend the user interface of your display to the screen of your mobile device. Get access to many of the Horizon software features directly on your mobile device, both within and outside the cab of your vehicle. Use your mobile device to perform calibration, diagnostics, tank fill and many other activities anywhere around your machine via the Horizon user interface. A dedicated Wi-Fi connection keeps your mobile device always in sync with the main display in the cab. The XTEND app (available in Android or iOS) is used in conjunction with the XTEND feature on the console.

A registration code must be purchased to enable this functionality.

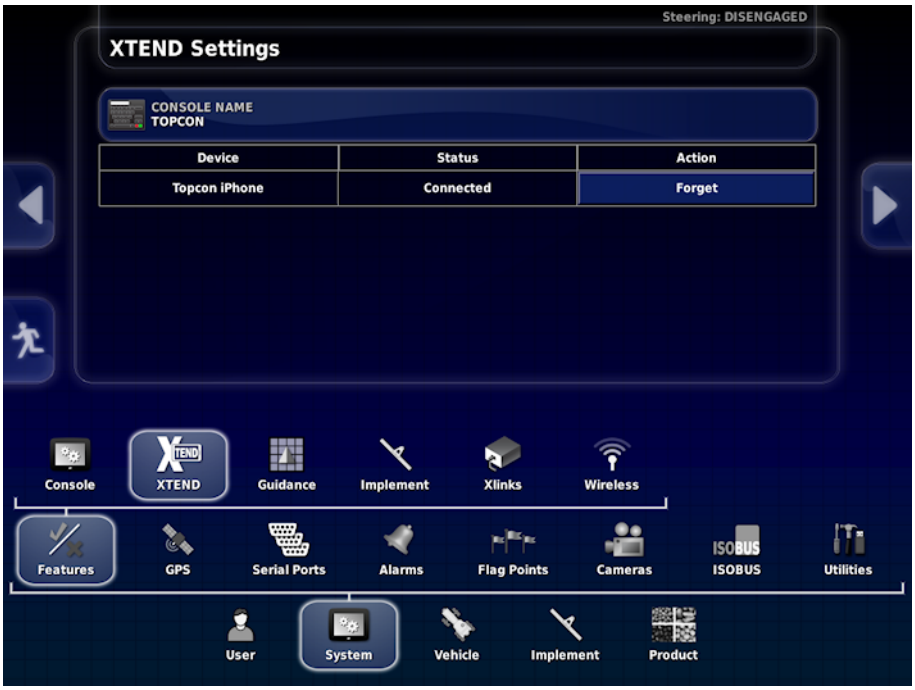
5.1.2. XTEND setup

Setup on the console

Note: It is recommended that an EDIMAX AC 600 dongle is connected to the console for use with XTEND. Other dongles that do not have an external antenna may not provide adequate signal strength for operating outside the vehicle cabin. Configure the mobile device as a wireless hotspot and enable the wireless connection on the console. See Wireless setup, page 54.

1. Select **System** / **Features** / **XTEND** .

This screen enables a console name to be entered that will be displayed on the XTEND app and displays a list of external devices that are paired with this console.



- **Console name**: The name displayed on the XTEND app on the mobile device when choosing a console to view.

Devices that are currently paired with the console can reconnect without console operator confirmation. The **Forget** option prevents an external

device from reconnecting to this console via XTEND, unless the console operator confirms the connection.

Setup on the mobile device

The XTEND app is available for iOS and Android devices from the Apple and Google app stores. Configure the mobile device as a hotspot for use with XTEND.

XTEND example use cases

Guidance / Universal Terminal:

- Display the guidance map at different zoom levels on the console and external device, or have one map layer displayed on the console and another displayed on an external device so you can see yield, applied rate for multiple tanks etc.
- Increase the viewable area of your console. Rather than display a mini view on the console, display that screen maximised and display the guidance view on an external device (or vice versa). Alternatively, two different screens related to one implement can be shown on the console and mobile device.
- When installing a wheel angle sensor, display the WAS position value on an external device when setting up the centre position for the sensor bearing shaft, to ensure the sensor is centered when the wheels are facing straight ahead.
- Enter boundary offset figures while measuring distances in the field.

Sprayer:

- Check sprayer nozzles to see if they are blocked. Turn on one section at a time (while standing at the back of the boom - at sufficient distance not to get sprayed) and make sure all nozzles are spraying correctly.
- Display Auto Fill Control for sprayers fitted with an Apollo ECU. With the auto fill window displayed on the mobile device, you can set the 'target volume', monitor the 'actual volume' and 'volume remaining to target', as well as start and stop the fill operation, without having to return to the cabin.
- View the valve balancing wizard for sprayers fitted with an ASC-10 ECU. Currently you have to be able to see the screen to know if you need to increase / decrease the return flow for each section, which can be difficult for a large sprayer. This is much easier to do with the wizard displayed on a mobile device.
- Display the recipe calculator on an external device, to display quantities of chemicals required to be mixed while standing at the sprayer. This removes the need to return to the cabin if you want to check the values or change a recipe. With the recipe calculator running on your mobile device, you can remain at the mixing station while you make the adjustments.
- Perform sprayer flow meter calibration. With the wizard displayed on the mobile device, you can run through each step of the calibration (which is usually performed at the back of the machine) without having to return to the cabin.

Seeder:

- Perform seeder implement seed rate calibration. With the calibration window on the mobile device, you can perform the entire calibration, including entering weights, without needing to return to the cabin.
- Display the blocked head sensor setup on an air seeder. During the setup for the blocked head sensors, you need to connect the sensors in the order in which you want them to appear on the screen as you assign them to heads. Currently this either requires two people, or

you have to return to the cabin each time you connect a sensor. With the setup window displayed on the mobile device, this process can easily be performed by one person.

- Perform down force calibration on an air seeder. This requires recording and then entering the load that is applied by the press wheel, so you need to return to the cabin to do this step. With the wizard on the mobile device, the process can be performed without needing to return to the cabin.
- Setup and replace ECUs for a seeder implement. This requires ECUs to be disconnected / reconnected while pressing 'Next' on the screen.

YieldTrakk:

- Enter the true weight of grain from the scales on the grain cart when calibrating YieldTrakk. The operator in the combine can use XTEND to view the screen on the console in the grain cart so they can instantly see the weight as they unload.

NORAC:

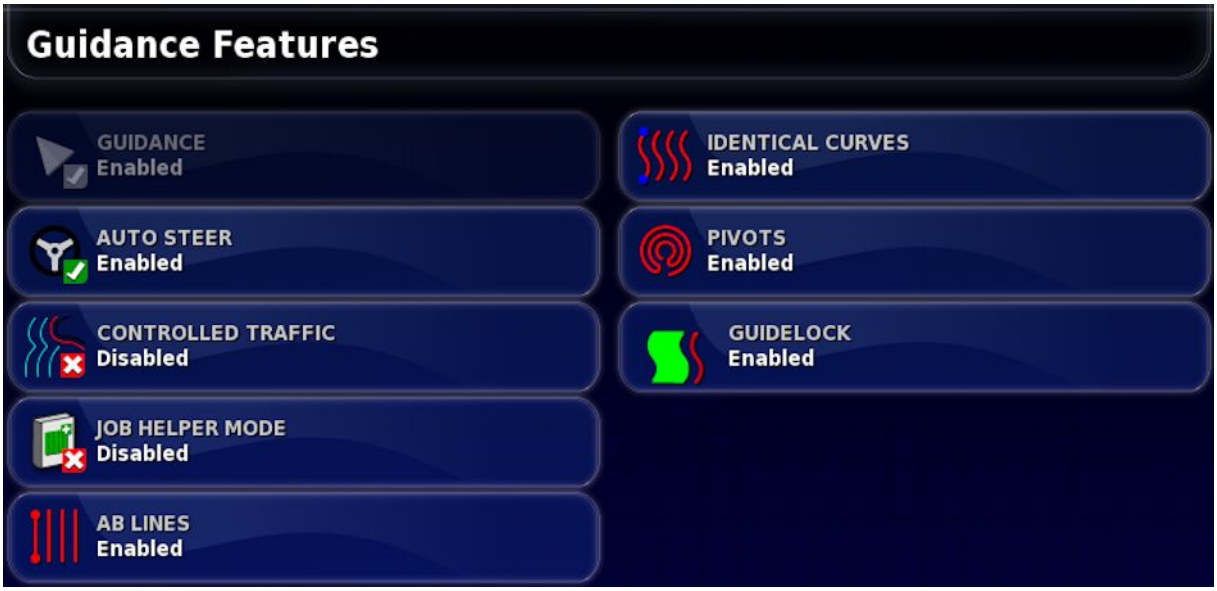
- Perform testing of the initial installation of Norac and set the proper target height for each field via the display on a mobile device.

5.1.3. Guidance setup

Sets the guidance system functionality.

To set up guidance features:

1. Select **System** / **Features** / **Guidance** .



Guidance

This is a standard feature of the console and cannot be disabled.

Auto steer

Enables auto steering and can only be used on vehicles fitted with an auto steering system such as the AES-25.

Controlled traffic

The Controlled Traffic feature adds two new guidance modes; Optimal Lines and Project Lines. When the feature is enabled, the operator is able to select either of these modes to use for guidance or auto-steering.

Optimal Lines mode allows multiple lines or curves to be recorded in a single file and all recorded lines or curves can be viewed on the screen at the same time. Any of the lines or curves recorded in a set of optimal lines can be selected and used for guidance or auto-steering.

Project Lines mode is similar to Optimal Lines mode in that it allows multiple curves that can be used for guidance in the same file and to be viewed on the screen at the same time. The main difference between Project Lines and Optimal Lines is that waylines are not generated for Project Lines. Only the path that each Project Line follows can be used for guidance or auto steering.

A registration code must be purchased to enable this functionality.

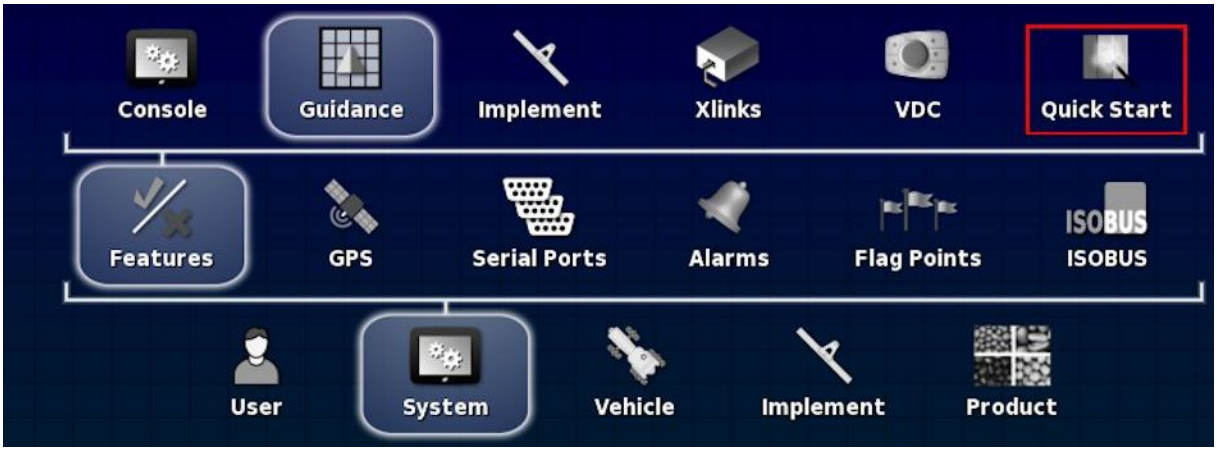
Refer to AGA5196 Controlled Traffic Operator's Manual for more information.

Job helper mode

- **Disabled**: No job helper modes are available.
- **Job Assist**: A help screen that may be used to step through the tasks in a typical job. This may be useful when learning to use the console. Enabling the option places a new icon at the top right of the Operation screen.

Selecting the icon displays the help screen. As options are selected, the Job Assist screen lists the next possible steps.

- **Quick Start**: Automatically steps through the tasks required to complete a typical job. This may be useful to speed up the performance of standard tasks. Enabling the option places a new menu item on the right hand side of the **Features** menu.



1. Select **System** / **Features** / **Quick Start**. The Quick Start Settings page is displayed. This page is used to select the tasks that quick start will automatically step through. Enable the required tasks.

- **Export job report for previous job**: Refer to page 172.
- **Change field**: Refer to page 149.
- **Record boundary**: Refer to page 152.
- **Change job**: Refer to page 167.
- **Configure job regions**: Refer to page 167.
- **Load VRC map**: Refer to page 175.
- **Set guidance mode**: Refer to page 179.
- **Change guideline**: Refer to page 179.
- **Auto-hide on success**: Closes the Quick Start window once all required tasks are completed.

2. To use Quick Start, select the button at the top right of the Operation screen.

Selecting the button opens the first task enabled in the Quick Start setup.

Guidelines (AB lines, identical curves...)

The four guideline types (AB lines, identical curves, pivots and guidelock) are all enabled by default. If some guideline types are not required, they can be disabled. It is not possible to disable all guideline types at the same time. Refer to Guideline Menu, page 179.

5.1.4. Implement setup

Sets up the functionality for the attached implement.

To set up implement functionality:

1. Select **System** / **Features** / **Implement** .

Auto section control

Permits the system to turn sections on for new areas to be covered and off for areas that have already been covered (refer to page 203).

Variable rate control

Works with a prescription map to vary application rates over the mapped areas (refer to page 175).

Task data

Task Data allows import/export and editing of ISOBUS task data XML files. Task Data mode allows you to select, configure and run a task from the imported task data. Shapefiles can be imported to

automatically control the ECU. Enabling this feature will disable some field and job menu items during operations that are not relevant when using task data.

The Task Data Menu icon replaces the Job Menu icon on the Operation screen (refer to page 219).

Note: If task data is enabled, Job Helper mode (page 48) changes to Task Helper Mode.

Area counters

Area counters are used with spreaders, sprayers and seeders to record data such as treated area, product used, operating time, average rate and productivity rate. Area counters are not available when using ISO implements or Xlinks.

- **Enabled (Stored per job)**: Area counters are stored separately for each job, (if a job is started and coverage laid, then another job is selected and coverage laid, going back to the first job displays the area counters from the first job).
- **Enabled (Stored per implement)**: Area counters continue across jobs, but loading a new implement displays new area counters. Reloading the first implement displays the area counters as they were when that implement was last used.

  Note: Area counters can be enabled for both jobs and implements at the same time.

Refer to the Spreader, Sprayer and Seeder operator manuals for more information.

Enabling area counters per job displays the **Reset job area counters** option:

- **Never**: The area counters must be reset manually, or they will continue to accumulate data.
- **Prompt**: When a job is erased you will be asked if area counters should be reset.

- **Auto**: Creating a new job or erasing a job will automatically reset the area counters.

Water conservation

Must be enabled to create and use a scraper implement.

A registration code must be purchased to enable this functionality.

Refer to 1004639-01 Water Conservation Operator Manual for more information.

Nitrogen sensing

Topcon CropSpec

A Topcon real-time integrated crop monitoring and application system. Used to monitor in-field variability, treat on-the-go, or keep data for future analysis or prescription applications.

CropSpec is displayed via the Universal Terminal (refer to page 204), using a map overlay.

Yield monitoring

A yield monitor is a console device that captures sensor data from a harvesting machine, combines that sensor data with geodetic data, and logs that information to its file system in real time.

A registration code must be purchased to enable this functionality.

NORAC boom height control

Automatically controls the height of the boom above the ground or the crop canopy. Requires NORAC sensors and Electronic Control Unit (ECU) to be installed. See Using NORAC Boom Height Control, page 213.

Lock setup menu when master switch is on

Disables access to the setup menu when the master switch is on.

Hypro Prostop-E

Allows connection to the Hypro Pentair CAN controlled nozzle system to provide individual nozzle control on the boom.

A registration code must be purchased to enable this functionality.

LH5000 rate sensor

This option allows a third party device to provide a real time RS232 rate input to the console. This can then be used with both liquid and granular controllers as an alternative to a Variable Rate Control (VRC) map. The serial port that the sensor is connected to must be selected. See Setting up serial ports, page 67.

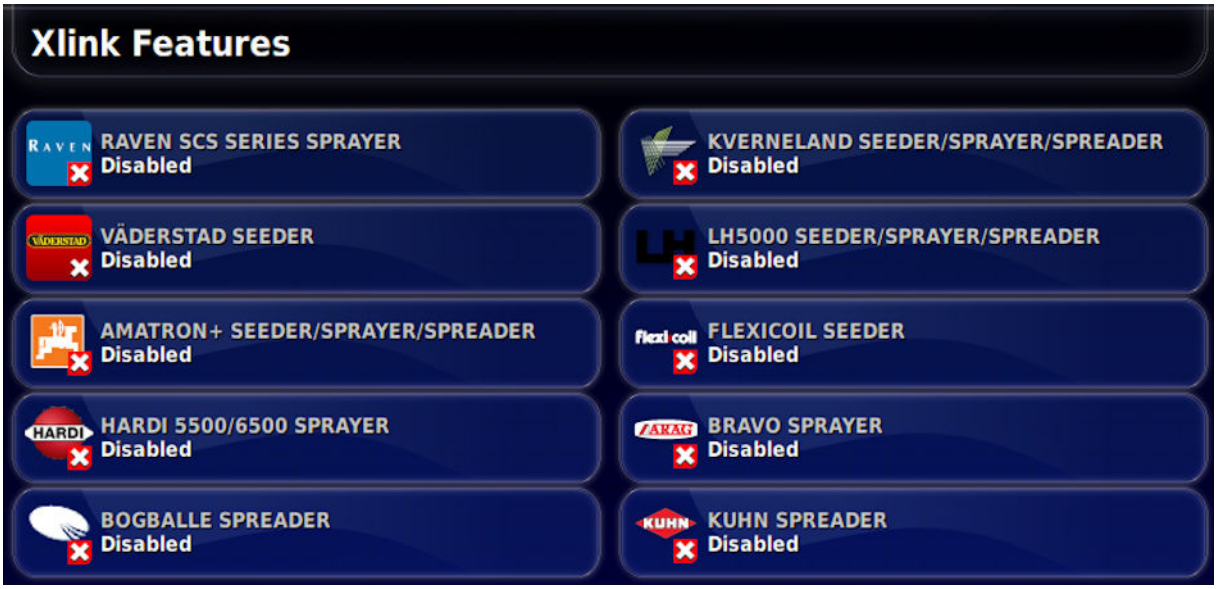
A registration code must be purchased to enable this functionality.

5.1.5. Xlinks setup

An Xlink is a software interface that allows the console to communicate with a third party controller using a non-ISOBUS serial interface. The third party controller may have its own console that can be externally controlled via the Xlink.

To set up Xlink functionality:

1. Select **System** / **Features** / **Xlinks** .



Each third party controller has its own proprietary serial interface specification that details what functionality it provides to the console via the Xlink.

Xlink interfaces are not standard like ISOBUS. The available features depend upon the third party controller's manufacturer. They will also vary depending on the third party controller's version.

A registration code must be purchased to enable this functionality.

Refer to AGA5332 Xlinks Operator's Manual for more information.

5.1.6. VDC setup

The VDC (Vehicle Display Controller) is an optional device that may be used to remotely perform a selection of console functions.

To set up VDC functionality:

1. Select **System** / **Features** / **Console** .
2. Select **VDC SUPPORT** to enable the VDC functionality.
3. Select **System** / **Features** / **VDC** to assign functions.

Button 5 is always set as the Back button.

Select Button 1 - 4 to assign a function.

5.1.7. Wireless setup

This is required for XTEND, MAGNET and for the remote support feature (see Setting up remote support, page 36). A specific Wi-Fi

dongle is required. The supported dongles are listed below.

Note: This option is only visible if a supported wireless dongle is attached to the console.

Note: The options that are enabled on this screen are dependent on the type of dongle that is connected.

- **Wireless connection**: Connect to a wireless hotspot (a phone or router setup as a hotspot). Enabling this option displays a wizard.
- **Wireless hotspot**: Create a wireless hotspot for phones and tablets to connect to. When hotspot settings are changed, the changes are not applied until you leave the setup screen.
- **SSID**: Enter the console name that will be displayed on wireless devices to identify the hotspot.
- **Encryption**: Different levels of encryption are provided for the wireless connection. This may be necessary to prevent access to the console via the Wi-Fi connection or it can be switched off (open) if this is not a concern. If using encryption, either WPA or WPA2 is recommended, as these are widely supported by connecting devices and offer good security (compared to WEP).
- **Key**: Enter the password that must be entered into the wireless device when connecting to the network if encryption is in use.

The key length for WPA security must be between 8 and 63 ASCII characters (or 64 hexadecimal digits, 0123456789ABCDE).

The key length for WEP security must be 5 or 13 ASCII characters (or 10 or 26 hexadecimal digits for 64 bit / 128 bit security respectively).

- **Channel**: Select a channel from 1 to 7 for the wireless hotspot for 2.4 GHz.

Wi-Fi behavior:

- Wi-Fi signal strength is shown on the dashboard.
- Stores the last five access points and keys to simplify reconnecting to frequently used devices.
- Wi-Fi logo in dashboard panel will flash when reconnecting to access point if connection is lost (when access point becomes available again).

Supported Wi-Fi devices:

- EDIMAX AC 600 **Note**: This is the recommended Wi-Fi device for use with XTEND.

  Note: Installing the EDIMAX onto another device and operating it at 5 GHz may violate the allowed frequency spectrum for the region. This device should only be used in conjunction with the supplied Topcon console.
- TP-Link TL-WN821N (V3) (300Mbps Wireless N USB adaptor)
- TP-Link TL-WN821N (V4) (300Mbps Wireless N USB adaptor)
- Netgear WNA1100 (N150 Wireless USB adaptor)
- Netgear WNA1000M G54/N150 WiFi USB Micro adaptor
- Netgear WNA1000Mv2 N150 WiFi USB Micro adaptor
- Netis WF2120
- D-Link DWA-131 H/W Ver.:B1 F/W Ver.:2.01
- D-Link DWA-131 H/W Ver.:E1

5.1.8. Quick start setup

This option is available under **System** / **Features** / **Quick Start** if **Quick Start** is selected as the **Job Helper Mode** under **System** / **Features** / **Guidance** . Refer to Job helper mode, page 48.

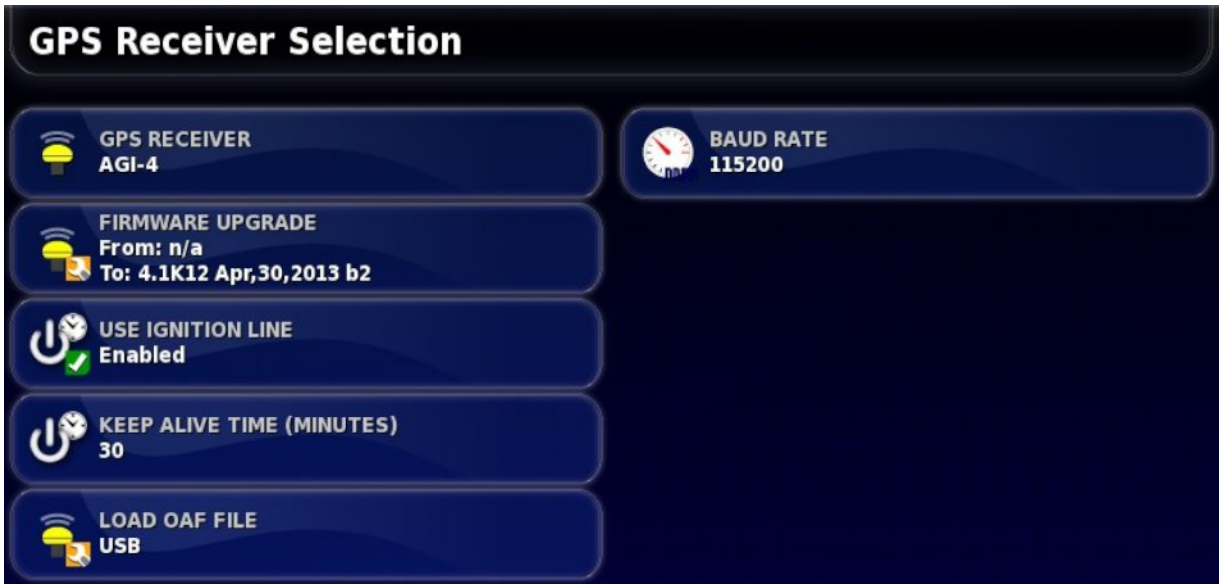
5.2. Setting up GPS

5.2.1. Receiver setup

Sets up GPS receiver capabilities.

To set up the GPS receiver:

1. Select **System** / **GPS** / **Receiver** .



GPS receiver

Select the GPS receiver type from the selection list.

The console can accept GPS input from a third party GPS receiver provided the receiver can be configured to output the data in the required correct format. Please consult the GPS receiver manufacturer to find out if your receiver can be set up in the correct way.

The console requires the following input if **Other** is selected under **GPS RECEIVER**:

- GGA 0.2 seconds (5Hz)
- VTG 0.2 sec (5Hz)
- ZDA 15 seconds

RS-232 communications

- 19200 baud rate (preferred) 8 data bits, No Parity, 1 Stop bit (19200, 8N1)

Firmware upgrade

Initiates a GPS receiver firmware upgrade via USB (if required) or via the package that comes bundled internally with the console software. The Firmware Upgrade button shows the version of the firmware that is currently in the GPS receiver and the version of the firmware to which it will be upgraded.

Use ignition line

Note: This feature should only be used **if the vehicle wiring and harnessing is compatible**.

(AGI-4 only) Separates the power supply to the AGI-4 receiver from the vehicle ignition. This enables the GPS receiver to remain powered after the vehicle is turned off. The **Keep Alive Time** determines how long the receiver remains powered.

Keep alive time

Note: This feature is only available if **Use Ignition Line** is set to **Enabled**.

(AGI-4 only) Keeps the GPS receiver active after the system has been shut down. This is useful to retain accurate positioning information (satellite convergence). For example: To keep the receiver on for 1 hour after the system is shut down, enter 60.

Load OAF file

Loads an Options Authorization File to the GPS receiver. This is normally done prior to receiver installation, but the file can be updated in the field via USB (if required).

Baud rate

The data transmission rate for modems. GPS receiver baud rate can be changed from the default value. This setting should not normally be

altered. If the setting does need to be changed, refer to the manual supplied with the modem.

5.2.2. Correction setup

GPS correction sources are used to increase the accuracy of the GPS position.

To set up the GPS correction source:

1. Select **System** / **GPS** / **Correction** .

2. Select the required **CORRECTION SOURCE**.

Note: The available correction sources are defined below. The extra options that must be defined vary depending on the correction source selected, refer to Correction source options, page 62.

Correction sources

Correction Source	Description
Autonomous	Let the receiver find any free available satellites. Will not use any correction. Precision: 2 - 5 m.
Automatic	Let the receiver select the best available correction source.

Correction Source	Description
WAAS	Use Wide Area Augmentation System. North America only. Precision: sub-meter.
EGNOS	Use the European Geostationary Navigation Overlay Service. Europe only. Precision: sub-meter.
MSAS	Use Multi-functional Satellite Augmentation System. East Asia only. Precision: sub-meter.
TopNET Global D	Uses TopNET Global D correction. Precision: 10 cm.
OmniSTAR VBS	Use OmniSTAR Virtual Base Station (VBS) correction. Precision: sub-meter.
RTK	Use Real Time Kinematic navigation. Precision: 2 cm.
RTK (External Modem)	Use external modem connected to GPS receiver for RTK corrections. Precision: 2 cm.
RTK (NTRIP)	Use a cellular delivered RTK correction source from a network provider. Precision: 2 cm.
DGPS (External Modem)	Use an external modem to import DGPS corrections from a network provider. Precision: sub-meter.
DGPS (NTRIP)	Use a cellular delivered DGPS correction source from a network provider. Precision: sub-meter.

Note: The source selected here will affect the functioning of guidance and auto steering. It is important to be aware of the needs of the GPS equipment. Refer to the manual supplied with the GPS equipment.

Note: Precision figures depend on many variables (number of satellites, distance from the correction source, ionospheric conditions, receiver, antenna) and cannot be guaranteed.

Correction source options

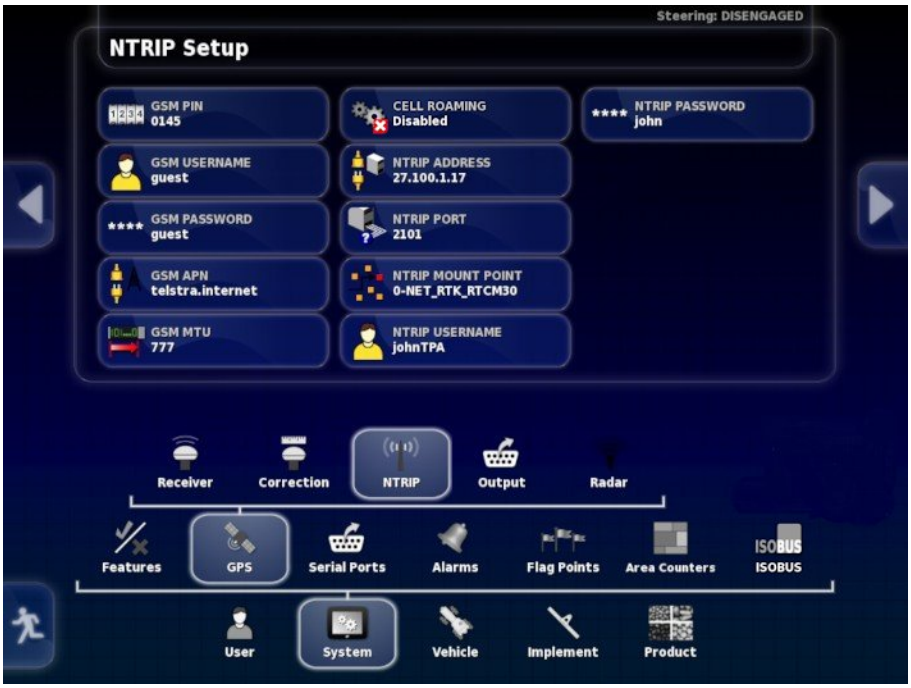
Note: The correction source options that must be defined vary depending on the correction source selected.

Option	Description
GLONASS	Allows the GPS receiver to use the Russian satellite navigation system GLONASS, in addition to GPS.
TRUPASS	Topcon's GPS drift compensation algorithm, used to provide better pass to pass performance. Available with the following correction sources: Autonomous, WAAS, EGNOS, MSAS, OmniSTAR VBS, TopNET Global D. Note: This option must be purchased separately.
RTK Protocol	Communication protocol for data transfer between the RTK base station and the rover (tractor). Must be set to same protocol as base station. Refer to base station setup information.
Region	The Region must be selected to determine the frequency used by OmniSTAR. The frequency for the region is set automatically.
Fallback	If the system is not receiving enough data to compute the vehicle's position with the required accuracy, auto steering cannot be engaged. The fallback feature allows the system to reduce the position accuracy requirement so that auto steering can be engaged. This is useful in situations where a high degree of position accuracy is not required.
Baud Rate	The data transmission rate for modems. Refer to documentation supplied with modem.

Option	Description
GGA Output	Some network providers require a GGA (position) to be sent to them to allow them to identify the location of the rover (tractor).

NTRIP setup options

If DGPS NTRIP is selected, a wizard launches to detect the attached modem, then the following screen is displayed.



- **GSM APN**: The telecommunication provider's internet link.
- **GSM MTU** (Maximum Transmission Units): The largest protocol data unit that can be passed onwards.
- **Cell roaming**: This may be used to disable cell roaming to prevent accidental cross-border data charges (useful if working near the border of another country).
- **NTRIP Mount point**: The ID of the base station (either real or virtual).

The GSM and CELL ROAMING settings can be obtained from your cellular network provider. The remaining settings are provided by your NTRIP service provider.

RTK setup options

If RTK is selected, a wizard launches to detect the attached modem, then the following screen is displayed.

- **Frequency**: The frequency used.
- **Channel spacing**: The frequency difference between adjacent allocations in a frequency plan.
- **Net ID**: The setting for scrambling (1-255 = on, 0 = off).
- **Link protocol**: Radio data transmission protocol.
- **Modulation**: The type of modulation used.
- **FEC** (Forward Error Correction): A technique used for controlling errors in data transmission over unreliable or noisy communication channels.

Note: If RTK is selected and an AGI-3 or AGI-4 is connected, the base station settings can be automatically synced with the entered receiver settings. Select **System** / **GPS** / **Base Station Sync** and follow the instructions displayed on the wizard.

5.2.3. Output setup

GPS output refers to the console's ability to export various data strings in NMEA 0183 format. The most common of these is the GGA (Position) message and the VTG (Velocity and Heading) message.

This may be useful to connect to third party devices for position and speed outputs.

To set up the GPS output:

1. Select **System** / **GPS** / **Output** .

- **VTG legacy mode**: Supports VTG data output for NMEA standards below V4.00. Outputs VTG strings compatible with NMEA V3 and below.

Refer to documentation provided with third party device for more information.

Note: Devices using GPS and plugged into the console may need information from the console. The information is contained in sentences based on NMEA.

5.2.4. Radar setup

The console can provide radar output to external devices. This may be useful to connect to a third party device to provide a ground speed

signal.

To set up radar output:

1. Select **System** / **GPS** / **Radar** .

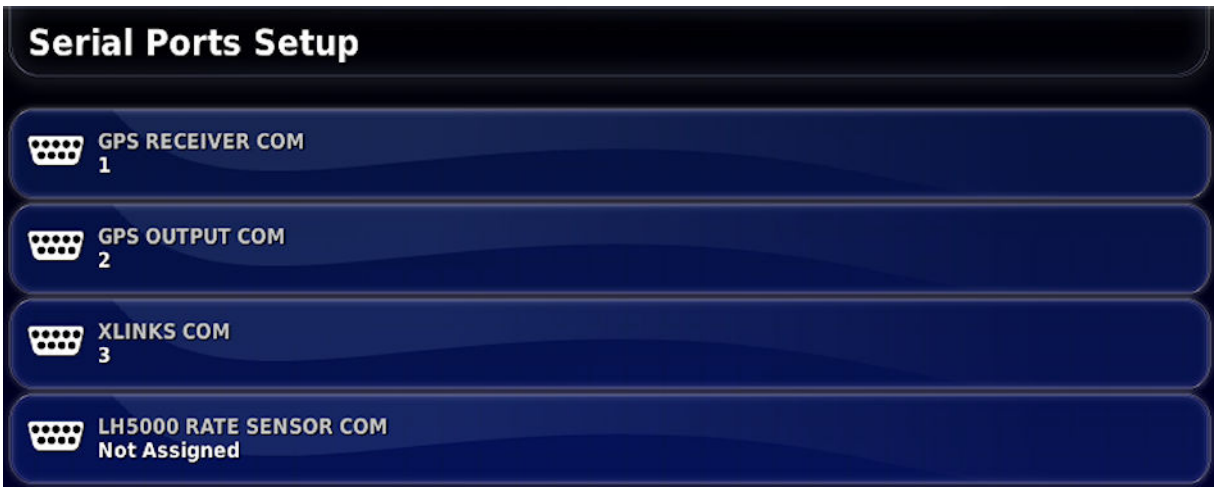
- **Calibration Factor**: Refer to the third party device for this figure if the radar speed signal is not accurate.

5.3. Setting up serial ports

Sets the console serial port assigned to a particular function.

To set the serial ports:

1. Select **System** / **Serial Ports** .



2. Select the required function and from the selection list, select the console serial port to which the device is connected.

   For example: SGR-1, AGI-3 or AGI-4 GPS Receiver is connected to serial port 1 with all Topcon harnesses.

   NMEA GPS Output is generally on serial port 2 if in use.

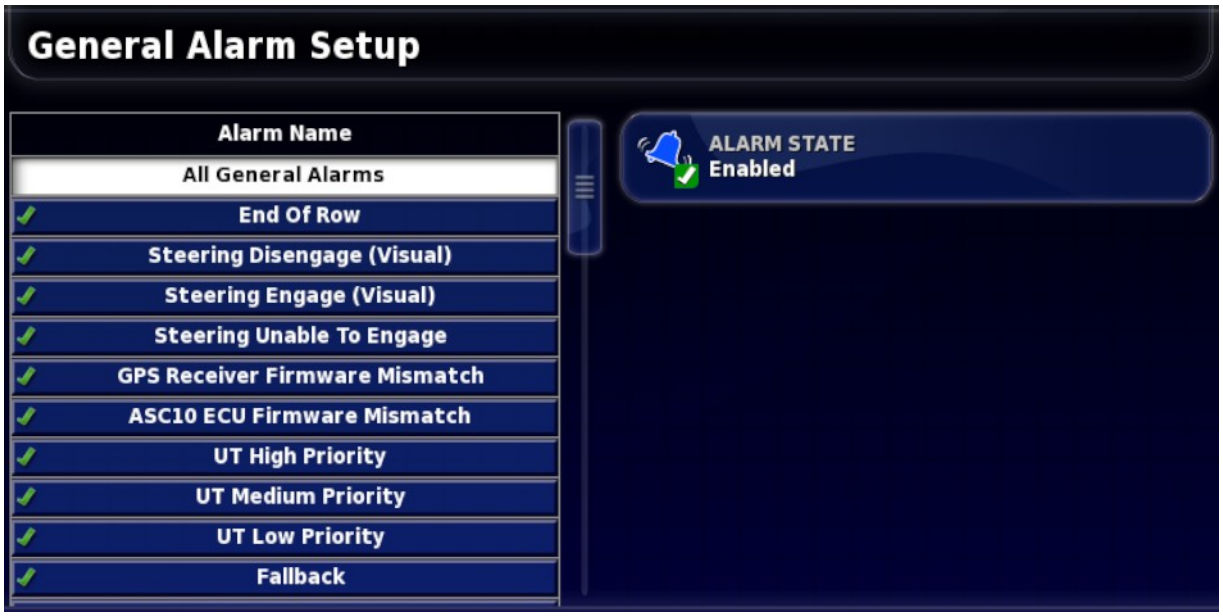
   Xlinks is on serial port 3 if in use, or on serial port 2 if NMEA GPS out is not in use.

5.4. Setting up alarms

If no implements have been set up in the system, only General alarms are available to set up. Implement specific alarms are available once an implement has been defined. Refer to the Spreader / Sprayer / Seeder Operator manuals for more information.

To set up general alarms:

1. Select **System** / **Alarms** / **General** .



The list of general alarms is displayed. All general alarms may be enabled or disabled by selecting **All General Alarms**.

Alternatively, each general alarm may be enabled or disabled independently.

Note that for safety reasons, the **Steering Engage/Disengage** audible alarm may not be disabled.

The **End of Row** alarm requires extra information. This alarm sounds and displays when the vehicle is approaching the boundary and the operator should slow down to prepare for manual control.

- **First Distance**: Distance from the boundary at which the alarm will first trigger. Distance is measured from the tractor to the boundary along the wayline (guideline).

- **Second Distance**: Distance from the boundary at which the second alarm will trigger, warning the operator to immediately take control of the vehicle.
- **Look Ahead Distance**: Sets how many meters in front of the vehicle that the system looks to respond with actions.

5.4.1. Alarm window description

To acknowledge an alarm, press the center of the alarm window.

The alarm window may be dragged down to display additional details about the alarm if **Drag down for details** is displayed at the top of the alarm window.

The speaker icon may be used to mute the alarm.

The spanner icon displays the appropriate alarm setup page to configure that alarm (or disable it if it's not relevant to your current setup). There are a few exceptions to this behavior:

- The GPS Receiver Firmware Mismatch spanner displays the setup screen to upgrade your GPS receiver firmware.
- The ASC-10 ECU Firmware Mismatch spanner displays the screen to upgrade your ASC-10 firmware.
- The No GPS Time alarm displays the time/date setup screen to enter the correct local time.

5.4.2. Alarms list

This is a list of all the alarms on the console and their descriptions.

Alarm	Description
Active field far away	The active field is more than 8 km (5 miles) away. Ensure the correct field is loaded or create a new field.

Alarm	Description
Apollo hardware warnings	Provides information about Apollo hardware problems.
Applying guideline nudge offset	Notification that an existing nudge offset is being applied.
ASC10 ECU firmware mismatch	Select the spanner to display the screen required to update the applicable firmware.
Base station location mismatch	The location of the base station used to create a guidance pattern doesn't match the current base station position.
COM port fail	Triggered if the specified COM port cannot be opened.
Conveyor speed high	Triggered when the conveyor speed high alarm indicates that the speed signal input has exceeded the alarm point setting.
Conveyor stopped	Triggered when the conveyor belt has stopped, the tank and master switch is on, ground speed indicates that there is movement and that the belt should be moving.
Conveyor stuck valve	If the tank is just turned off, the stuck valve alarm is inhibited for a period of time to give the belt time to stop moving, after which if it hasn’t stopped, the alarm will be triggered.
End of row	Triggered when the vehicle is approaching the boundary and the operator should soon take control.
Exclusion map distant	Triggered when the exclusion map is too far from the current GPS position. The exclusion map is unloaded automatically.

Alarm	Description
Fallback	Triggered when the selected GPS correction source is not available and the system must use a less accurate correction source temporarily.
Field unloaded	Triggered when a field has been exited due to current distance from the selected field.
Flow sensor failure	Triggered whenever the master switch is turned on, there is movement over the ground, at least one section is turned on, and there are no flow sensor pulses being received.
Firmware version mismatch / outdated	Select the spanner to display the screen required to update the applicable firmware.
GPS drift correction	Triggered on startup as an informational reminder that the GPS drift correct has been applied. Since GPS drift varies with time this is a reminder that GPS drift compensation may need to be recalculated.
GPS lost	Triggered when the GPS signal is lost but the receiver is still connected.
GPS receiver firmware mismatch	Select the spanner to display the screen required to update the applicable firmware.
Incorrect gear ratio	There is an incorrect ratio between the channel shaft and motor encoders.
Incorrect rate	The implement is in auto mode and the target application rate is not achieved.

Alarm	Description
Invalid vehicle profile	The selected vehicle profile contains invalid parameters. Please create a new vehicle profile or contact your dealer for assistance.
Invalid / obsolete profile loaded	Triggered when an old implement or vehicle profile is active on the system. This can occur if upgrading from a very old version of the software to the latest version.
Liquid pressure high	Triggered if the tank pressure is greater than the maximum specified tank pressure.
Liquid pressure low	Triggered if the tank pressure is less than the minimum specified tank pressure.
Low resources	Triggered when the system resources (memory or space on the file system) are more than 90% full.
Master switch off	Triggered when the operator is driving over an area that is untreated on the coverage map with the master switch off. (To prevent operators from forgetting to engage the master switch at the start of a run.)
Max guideline length exceeded	Triggered when the length of the recorded line exceeds the maximum number of points (typically several kilometres, but will vary based on how complex the curve is).
No comms	Triggered if the console is unable to communicate with the implement ECU.
No GPS	Triggered if the GPS connection is lost.
No GPS time	Triggered if the GPS receiver is not configured to send time messages (ZDA NMEA messages).

Alarm	Description
No ground speed	Triggered if the auto steering is on and there is no ground speed present.
Not flowing	Triggered if no liquid/NH3 flow is detected by the flow confirmation sensor with the master switch and tank on.
NTRIP failure	GPS correction source failure.
Parameters mismatch	Vehicle geometry parameters do not match the geometry configuration in the steering system. Re-select the vehicle on the Setup screen or ensure the vehicle geometry in the vehicle geometry screen is correct.
Path too far away	Triggered if the active guideline (AB line, curve or pivot) is too far away from the current GPS position.
Prescription map distant	Triggered if the active VRC map is too far away from the current GPS position.
Prescription map / guidance shapefile load fail	Triggered if the file being loaded is invalid or corrupted.
Pressure high	The high pressure alarm indicates that the pressure signal input has exceeded the alarm point setting. If correctly set, this usually indicates a blockage, booms off when they should be on, or sprayer speed too high.
Pressure low	The most common cause is an empty tank. With minimum flows set for nozzles, flow meter and pressure, this alarm will only display with pump or plumbing failures or an empty tank.
Project line too far	Triggered if the active set of project lines is too far away from the current GPS position.

Alarm	Description
Pump speed low	Triggered if pump speed sensing is enabled and the pump speed drops below the minimum RPM threshold setting for the alarm.
Pump speed high	Triggered if pump speed sensing is enabled and the pump speed exceeds the maximum RPM threshold setting for the alarm.
Receiver disconnected	The GPS receiver is not responding. Check the receiver connections.
Registration expiring	Registered feature expires within the next <days until expiry> days. Please contact your dealer to renew registration.
Requested rate is zero	Triggered when auto rate control is enabled, tank is on, master switch is on and the requested rate is zero. If there is a switchbox, check that at least one switch is on.
Resources exhausted	Triggered if the system resources (memory or space on the file system) are more than 97% full.
Reverse station	Informational alarm triggered when the operator's seat is rotated by 180 degrees (only applicable for tractors with dual driving stations).
Shaft is moving tank off	Triggered if the shaft is moving but the tank or master is off.
Shaft stopped	Triggered if the tank is active but the shaft has stopped moving. 'tank active' means: tank on, master switch on, at least one section on, moving.
Spinner not active	Triggered if the main periodic processing timer has expired, the tank is on, master switch on and there are no active sections.

Alarm	Description
Steering disengage (visual)	Triggered when the steering has been disengaged. This may be due to losing satellites, losing the guideline or manually turning the steering wheel.
Steering engage (visual)	The Steering Engage/Disengage alarms cannot be silenced for safety reasons, however, the visual component of the alarm can be suppressed if desired.
Steering profile mismatch	The parameters in the selected vehicle profile do not match the vehicle configuration in the steering subsystem. Select the correct vehicle profile for this vehicle.
Steering restart needed	Triggered if the steering subsystem needs to be power cycled. Occurs for some types of steering subsystem after calibration.
Steering unable to engage	The steering status popup which appears when steering cannot be engaged as requested can be suppressed. If the engage button is pressed this auto clearing alarm is shown to indicate the requested could not be completed.
Tank active, no rate	Triggered if master switch is on, tank is enabled, tank is active, tank is not in manual, vehicle is moving and the set rate is zero.
Tank empty	This indicates that the calculated volume has reached zero. If there are still contents in the tank, the system will still operate showing the tank volume as a negative figure.
Tank low	This gives a warning that the tank is running low.
Tank off	Triggered if the tank is off while the master switch is on and the vehicle is moving with at least one section turned on.

Alarm	Description
Unregistered feature	Triggered if there is an enabled feature that is no longer registered (registration has expired). This is to inform the operator that the feature has been disabled.
UT high priority	Universal Terminal high priority alert. There is an urgent issue the user should address on the UT immediately.
UT medium priority	Universal Terminal medium priority alert. There is an important issue the user should address on the UT when possible.
UT low priority	Universal Terminal low priority alert. There is an issue the user should address on the UT when possible.
VDC connection	No communication with VDC. Occurs if VDC is enabled, but there is no physical VDC device or it hasn't been connected properly.
Wireless connection	Triggered when the wireless network connection is no longer in range.

5.5. Setting up flag points

Flag points show obstacles or other land features for a field on the Operation screen. Flag points are set during operation by driving to the flag point location. Refer to Setting flag points, page 162.

Flag point symbols and names can be defined in the Setup screen.

To change flag point preset symbols and names:

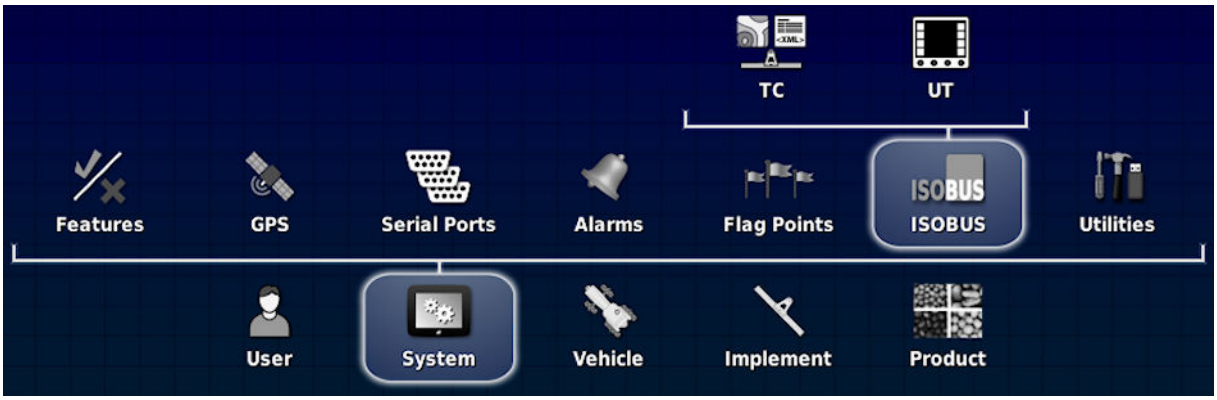
1. Select **System** / **Flag Points** .

2. Select the flag having its symbol or name changed.
3. Select the new symbol or select **FLAG POINT NAME** and type in the new name for the flag, then confirm.

   Note that flags can be changed but new preset flags cannot be created.

5.6. Setting up ISOBUS / universal terminal

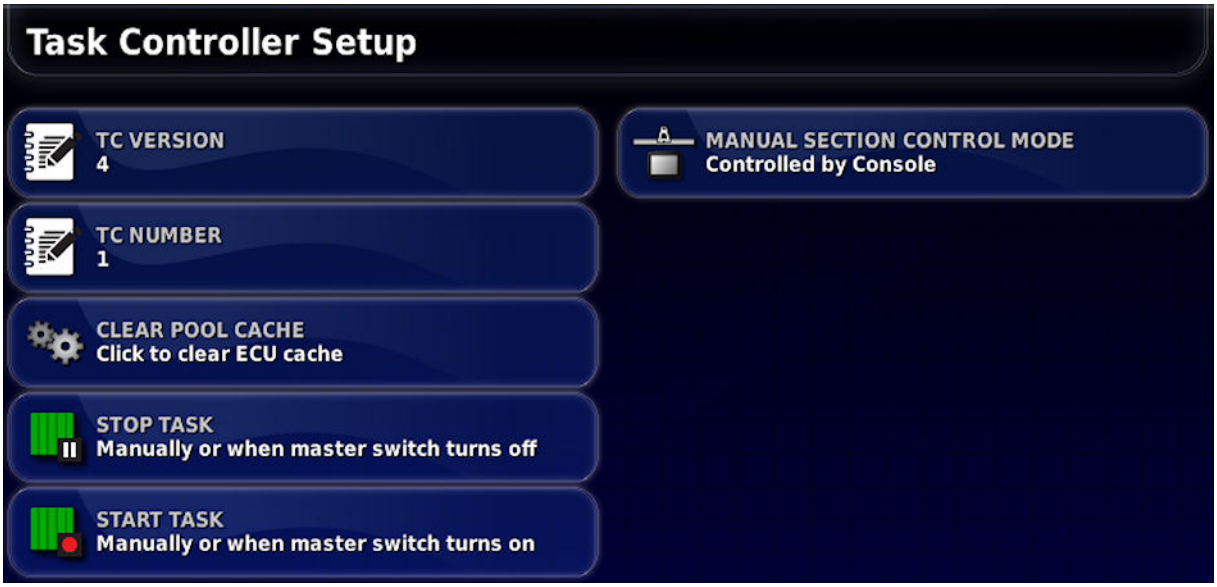
1. Select **System** / **ISOBUS**.



5.6.1. Task controller setup

To set up the task controller:

1. Select **System** / **ISOBUS** / **TC**.



- **TC Version**: Sets the task controller version. This should be left at the highest version, unless TC issues are encountered.
- **TC Number**: Sets the task controller instance number for the console. If there are multiple TCs on the bus, use this setting to assign a unique number to this TC to avoid conflicts. The TC with number 1 will be the default TC.

- **Clear pool cache**: Clears the contents of the TC pool cache. Should only be used if a TC error is displayed.
- **Manual section control mode**: Sets how section control will work in manual mode (ASC off):
  - **Controlled by console**: The console virtual section switchbox can be used to turn sections on and off.
  - **Controlled by ECU**: A physical switch connected to the ECU or the UT user interface can be used to turn sections on and off.

Tasks may be configured to start and stop:

- Manually or using the master switch, or
- Only manually (regardless of the master switch state). See Running a task, page 227.

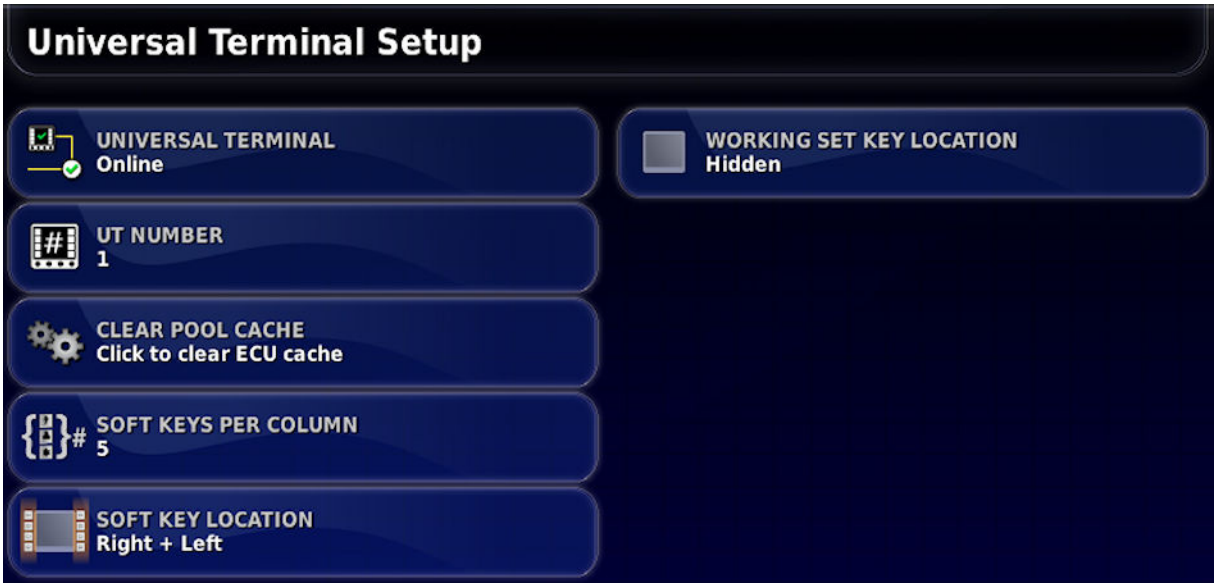
  Stop and Start task is available if **Task Data** is enabled under **System** / **Features** / **Implement**. Refer to Implement setup, page 50.

Refer to Setting up the master switch, page 105 for an explanation of master switch functionality.

5.6.2. Universal terminal setup

1. Select **System** / **ISOBUS** / **UT** .

   The Universal Terminal Setup page is displayed.



- **Universal terminal**: Controls whether the UT server is actively receiving connections from other devices.

  This may be useful if there are multiple UTs on the bus and multiple UTs claim to be the primary UT (in which case the UT will go offline automatically and require the **UT Number** to be changed before it will go online again), or to temporarily deactivate the UT on the console.

- **UT number**: Sets the UT number for the console. If there are multiple UTs on the bus, use this setting to assign a unique number to this UT to avoid conflicts. The UT with number 1 will be the default UT. If the UT client doesn't appear on the correct UT you may need to reconfigure its UT number appropriately. If there is a conflict, the following message will appear:

  'The UT Number of this UT conflicts with another UT on the bus, and this UT has been disabled. Please make sure that this UT has a unique UT Number.'

- **Clear pool cache**: Clears the contents of the UT pool cache. Should only be used if a UT error is displayed.
- **Soft keys per column**: Sets the number of available softkeys on the UT interface on the Operation screen.
- **Soft key location**: Sets the location of the softkeys on the UT interface and the number of columns (1 or 2).
- **Working set key location**: Sets the visibility and location of the keys that switch the interface between ECUs (if more than one ISOBUS compliant ECU is connected).

Refer to Using universal terminal (ISOBUS), page 204.

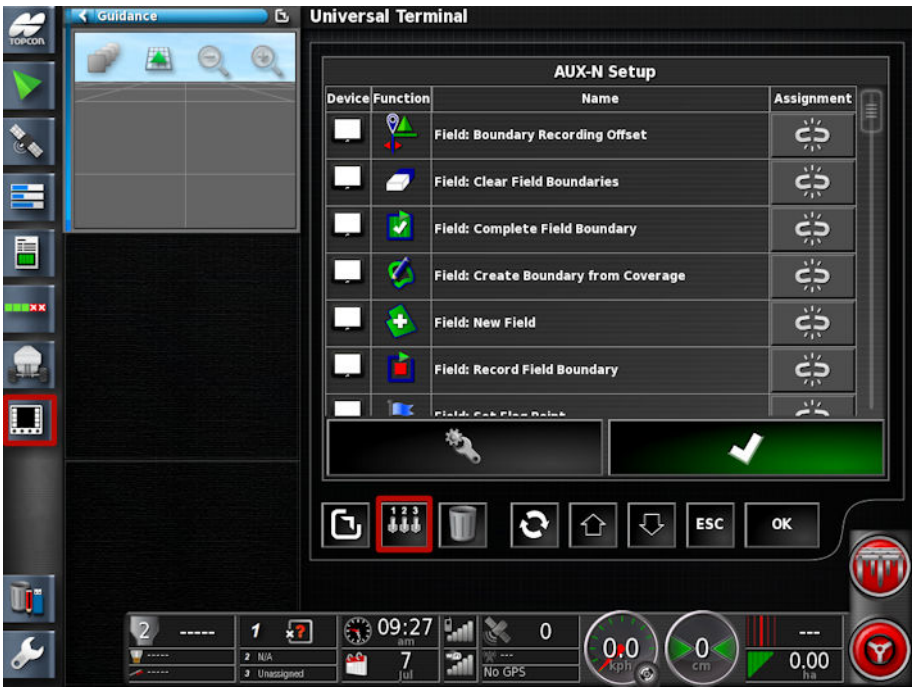
5.6.3. Auxiliary control setup

This option is available if **Universal Terminal** is enabled under **System** / **Features** / **Console**. Refer to Universal terminal, page 40.

The AUX controls allow for external ISO compatible devices and the console to provide a set of functions that can be assigned to inputs on ISO compatible joysticks or other input devices.

To assign AUX controls:

1. Select **Universal Terminal** from the Navigation bar to open the mini-view.



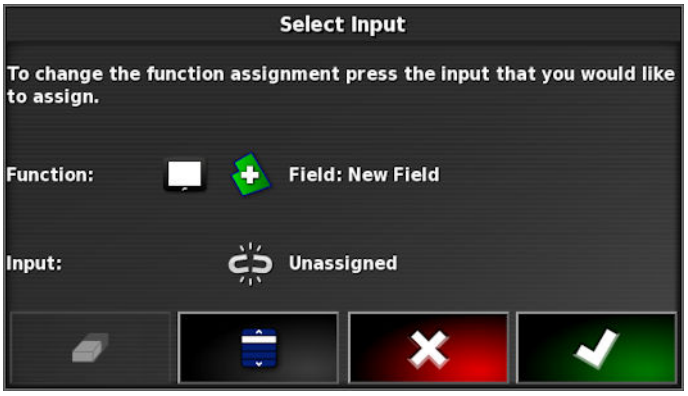
Note: The icon/s displayed for the universal terminal vary depending on the attached ISOBUS compatible equipment. There may be more than one icon displayed. It does not matter which icon is selected.

2. Expand the mini-view by selecting the arrow in the top right, or by swiping left to right across the mini-view.

3. Select the auxiliary control setup button to display the functions that can be assigned to an input.

   Note: If more than one device is providing functions, the functions that are displayed can be filtered by selecting the filter by device button .

4. Scroll down the list to select the function to be assigned to an input and select the associated assignment button . The Select Input screen displays.



5. To assign the function, press the input button on the device (for example, external joystick) that will be used to perform the function, or press the manual assignment button to select the input from a list.
6. To un-assign a function, open the select input screen and select the clear assignment button .

Once all the desired functions have been assigned and the AUX-N Setup screen has been closed, the assigned functions can be activated by pressing the assigned inputs. Please be aware that some functions will require the device or console to be in a ready state before the function can be activated.