



iDitch™

T3RRA iDitch™

# Operators Manual

T3RRA iDitch Manual

© 2023 T3RRA Pty Ltd

## **Notice of Rights**

No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual, or otherwise, without the prior written permission of T3RRA Pty Ltd.

## **Trademark Notice**

T3RRA™, T3RRA Cutta™, T3RRA Plane™, T3RRA Ditch™, T3RRA Survey™ and T3RRA iDitch™ software images and their logos are the exclusive trademarks of T3RRA. All other trademarks, service marks, software images and logos used in this documentation belong to their respective owners.

## **Notice of Liability**

The information in this document is distributed on an 'as is' basis, without warranty. While every precaution has been taken in the preparation of this course, neither the authors nor T3RRA shall have any liability to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the instructions contained in this book or by the computer software and hardware products described in it.

## **Disclaimer**

We make a sincere effort to ensure the accuracy of the material described herein; however, T3RRA makes no warranty, expressed or implied, with respect to the quality, correctness, reliability, accuracy, or freedom from error of this document or the products it describes. Data used in examples and sample data files are intended to be fictional. Any resemblance to real persons or companies is entirely coincidental.

All information in this manual was correct at the time of writing. T3RRA reserves the right to make corrections to the courseware at any time and without notification.

## Manual version changes

version	Release date	T3RRA version	Changes
1.0	February 2022		Initial release of T3RRA iDitch Manual
1.1	July 2023		Added Unlock with license code.

# Table of Contents

<b>Disclaimer</b>	<b>6</b>
<b>How we work with iGrade™</b>	<b>7</b>
<b>Installing T3RRA Software</b>	<b>10</b>
<b>Updating T3RRA Software</b>	<b>11</b>
How do you know an update is available?	11
How do you update?	11
When should you update?	11
What should you do if updating causes more problems than it fixes?	12
<b>Hardware</b>	<b>13</b>
Choosing a tablet to run T3RRA software in-cab	14
Consider the system as a whole	16
<b>System Startup</b>	<b>17</b>
<b>Opening Page</b>	<b>18</b>
<b>Options</b>	<b>22</b>
Edit Settings	22
GPS Port Settings	24
About	26
Unlock iDitch / Licencing	27
<b>Edit View</b>	<b>28</b>
Image Overlays	30
<b>Exit Project</b>	<b>31</b>
<b>Markers</b>	<b>31</b>
<b>Zoom Controls</b>	<b>32</b>
<b>Drain Surveying</b>	<b>33</b>
<b>Start, Pause and Stop controls</b>	<b>33</b>
Drain Profile	36
'Follow position'	37
'Reset Zoom'	37
'Clear As Applied'	37
'Edit'	38
Drain Design	39
Linear fit	39
Best fit	40
Exporting Guidance lines from T3RRA™ and importing into AutoTrac™	41
Vertical offset shift in iGrade	44
Understanding how "As-applied" works	46
<b>Definitions</b>	<b>48</b>

<b>Troubleshooting guide</b>	<b>52</b>
General notes on troubleshooting	52
<b>TABLET</b>	<b>53</b>
Tablet screen freezes.	53
Surface Pro tablet not updating or freezing.	55
Mouse pointer flickers across the screen randomly.	56
Windows are opening and closing on the tablet randomly.	58
T3RRA software does not automatically start when the tablet boots.	59
Can't find an onscreen keyboard.	60
T3RRA software will not install.	62
T3RRA software is not updating.	63
In-cab tablet is too small to design effectively.	63
Tablet is in 'Tablet Mode' and you can't find the desktop icon for your T3RRA Software.	65
Access to the port 'COM X' is denied.	66
<b>SET UP &amp; INSTALLATION</b>	<b>68</b>
Unable to install T3RRA software.	68
Diagnosing guidance line location issues.	69
<b>GPS</b>	<b>70</b>
No GPS signal is being received from iGrade.	70
Baud rate is set correctly but messages from iGrade are still garbled.	74
Vertical Performance Issues (GPS drift).	75
You are getting GPS data but the fixed quality is not RTK.	76
<b>SURVEYING</b>	<b>78</b>
Elevation Offset during surveying.	78
Surveying at heights close to sea level results in an incorrect surface.	79
<b>IMPLEMENTING</b>	<b>80</b>
Troubleshooting performance.	80
Implementing issues with iGrade (will occur without T3RRA connected).	81
Bi-Directional error in iGrade.	82
Blade continuously loads on one side.	83
Poor "on grade" performance.	84
Engaging auto causes the scraper to rise into the air.	85
Scraper is "washboarding".	86
Implement blade moves to an extreme position when placed in Auto.	87
Blade not staying on grade & acting inconsistently.	88
Implementing issues with T3RRA connected	90
The implement blade does not seem to follow the design surface.	90
Place iGrade in "Remote Control" mode and cycle power on the tractor.	

<b>Consult your iGrade manual for instructions.</b>	<b>90</b>
<b>Bi-Directional error in T3RRA.</b>	<b>91</b>
<b>Implement blade is intermittently jumping up or attempting to deep dive.</b>	<b>92</b>
<b>iGrade is indicating that Remote Commands are not being received from T3RRA software or indicating 'No Surface Defined'.</b>	<b>93</b>
<b>Error from grade values do not match on iGrade and T3RRA software.</b>	<b>95</b>
<b>Map icon on the T3RRA software screen lags behind the actual field position.</b>	<b>96</b>
<b>Users cannot turn "Grade On" with iGrade 2.</b>	<b>97</b>

# Disclaimer

**Important:** Please read this before using any of our software products.

We at T3RRA are software developers. We are not irrigation engineers or designers.

We build tools. We do **NOT** create designs for customers, or provide advice on any aspect of agronomy, irrigation, drainage, landforming, or earthworks design. **We cannot (and do not) warrant or guarantee the appropriateness of any design created with our software for any purpose.**

It is your responsibility to evaluate the fitness and correctness of the designs created in our software for your purposes. This includes meeting all local rules, regulations, requirements, and laws.

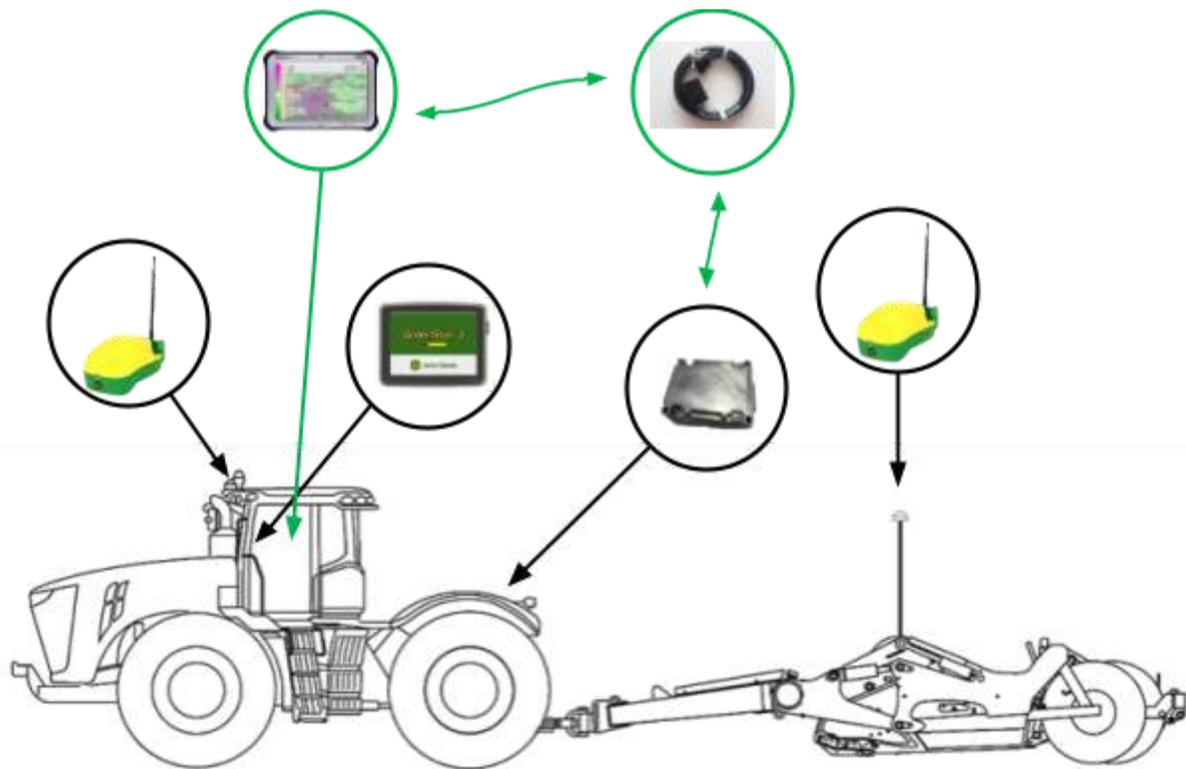
**Do NOT** blindly follow the output of this software. Monitor work progress and evaluate the correctness of implementation continuously. Independently verify that the evolving job is meeting your exact requirements. Any perceived deviation, real or imagined, must be taken seriously and work must cease until you are satisfied that results are within your tolerable margins of error. Seek professional advice from qualified and certified engineering personnel if you have *any* doubts about the correctness or suitability of your design.

Use of our software constitutes an implicit and explicit agreement that we and our partners (dealers, distributors, representatives, business associates etc) will not be held responsible for any damages resulting from the use of our software

# How we work with iGrade™

Important: John Deere iGrade™ has a comprehensive manual. We do not try to replicate it here. We strongly recommend reading the iGrade™ manual prior to reading this one. This chapter only seeks to inform you of how we interact with iGrade™. If you have any questions regarding the operation of iGrade™ please refer to the iGrade™ Manual.

T3RRA software (apart from T3RRA Plane and T3RRA Levee) operates in conjunction with John Deere's iGrade™ system. Because T3RRA relies on iGrade™ performing accurately it is important that iGrade™ is installed and configured correctly. If iGrade™ is not working properly, then neither will T3RRA software.



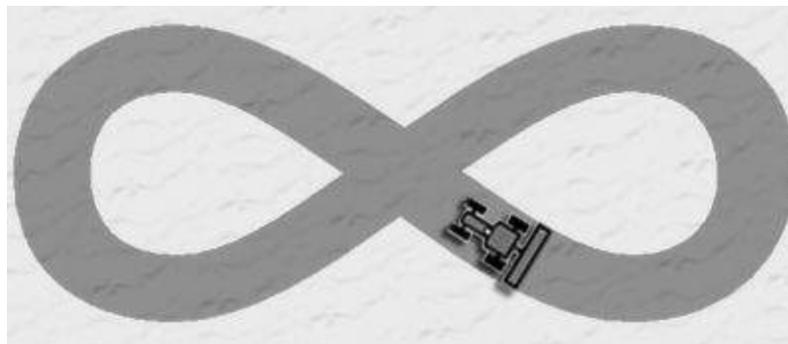
**Important Concept!**

It might seem obvious, but it is important to note that iGrade™ will work without T3RRA software. Before setting up T3RRA, best practice is to first test iGrade™ in isolation. Only once you have confirmed that iGrade™ is working properly should you start to troubleshoot the T3RRA software.

For all information on how to correctly make adjustments to iGrade™ please refer to your iGrade™ user manual or contact your local John Deere representative.

T3RRA software “talks” to iGrade™ over the “iGrade™ Remote Control Harness”. For iGrade™ and T3RRA software to communicate, the serial port settings of each must match. If an iGrade™ UCC1 unit is being used we recommend setting the baud rate to 38400 and NMEA - GGA & GSA and a rate of 5Hz. If an iGrade™ UCC2 unit is being used we recommend setting the baud rate to 115200 with NMEA set to ALL at a rate of 5Hz.

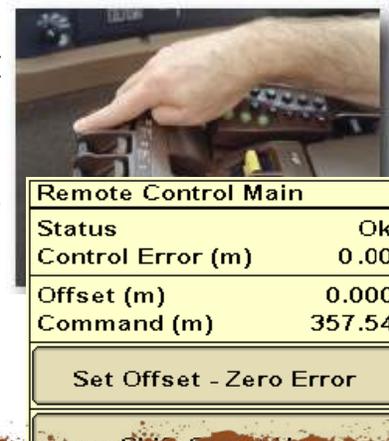
**Important:** Ensure that the hydraulic threshold setup, and TCM calibrations on iGrade™ have been completed correctly. If not done this will directly impact the performance of the system and the implementation of your field designs. Make sure to carefully follow the instructions in the iGrade™ user’s manual. Perform the figure 8 calibration to make sure that everything is running smoothly. If in doubt, consult your dealer.



iGrade™ controls implement activity using hydraulic plugins SCV1 and SCV3. In order to allow T3RRA software to take control it is important to tell iGrade™ to accept remote commands for SCV1 and SCV3. To control an implement with a single control surface (such as a scraper with only up/down control) ensure that iGrade™ has SCV1 control type set to **‘Remote Control’**. If using dual scrapers make sure to set both SCV1 and SCV3 control type to **‘Remote Control’**.

To make sure that the SCVs will receive the commands correctly also ensure that their switches in the cab are set to **‘Detent’**.

**NOTE:** iGrade™ UCC1 will “time out” approximately 5 seconds after the tractor stops receiving remote commands. It will then display **‘No Remote Commands’**. If this happens it will



need to be re-engaged. T3RRA software attempts to keep the connection alive by continuously sending data and you should not normally see the time out message.

NOTE: T3RRA software is not limited to receiving GPS messages solely from iGrade™. Although only T3RRA Cutta and T3RRA Ditch send control messages to iGrade™, all T3RRA software (including T3RRA Plane and T3RRA Survey) can connect to both iGrade™ and any other GPS to receive GPS messages.

NOTE: Before implementing make sure to use Zero Error to set Zero to current blade height in iGrade™. You should zero iGrade™ Offsets whenever you set Zero in your T3RRA™ software.

# Installing T3RRA Software

- Make sure you have a good internet connection and your computer has the latest Windows updates installed.
- T3RRA software is normally installed by your dealer<sup>1</sup>.

## Windows & OS maintenance

Requirements:  
Win10 64 bit

Recommended:  
Intel i5 or better processor  
>= 8GB RAM  
>= 256GB HDD  
Serial port (preferred) or USB port

Windows updates should be performed whenever an error is encountered or a new version of T3RRA software is downloaded. We suggest doing updates and testing software prior to the earthmoving season each year.

Optimizing a tablet for in-cab use (can do during installation utilizing last tab on installer):

- Adjust Power & Sleep to 'Never' so the tablet will not automatically sleep.
- Turn off 'Connect automatically' when in range for saved networks.
- Adjust 'Display Brightness' level to the highest setting.
- Turn on 'Automatically Hide Taskbar' in tablet and desktop mode.

REMEMBER to update T3RRA software after installation. Best practice is to regularly connect your tablet to the internet at home or in the office to provide adequate time for software updates to occur and successfully install. iDitch software is updated manually by opening the software and choosing '**Update**'.

If you are using antivirus software, help T3RRA run without interference by adding an exclusion for the T3RRA folder for your username. For more information, see [T3RRA software will not install](#) in [Troubleshooting](#).

---

<sup>1</sup> Refer to Dealer T3RRA Install Manual

# Updating T3RRA Software

The software developers at T3RRA have many faults. One of them is that we love tinkering with our software in an effort to make it better. In order to allow our users to benefit from our latest efforts we've built-in a system to allow users to update the software whenever a new fix or feature is available.

## How do you know an update is available?

The software will check on startup to see if an updated version is available. This only happens if the tablet on which it is running has an active internet connection. If so, one of two messages will be displayed briefly in the bottom of the main window. One will note that the software is up to date and no update is available.

## How do you update?

Tap the download 'Update' button (Update button is also available in Options>About). If you are online, downloading of the update will begin immediately.



A window will appear showing the progress of the download. When complete you will be prompted to close the software and re-open it. At this time the upgrade process will be complete. A strong internet connection is recommended for updating.

## When should you update?

Don't fix what isn't broken! If the software is doing everything you want then don't tempt fate by changing anything. In particular don't update the software while in the middle of an operation. Only update if there is a clear problem apparent, or if you have been advised to do so by your dealer.

## What should you do if updating causes more problems than it fixes?



The Version Manager in 'About' is a provision to revert updates if needed. This is not a process that should normally be necessary, or that is recommended to be performed by customers. Please contact T3RRA or your dealer for information about this.

# Hardware



**12V Vehicle charger**



**Windows tablet with serial interface**



**Mount**



**AE3166:** Harness to connect T3RRA software to iGrade™.



**AE3070:** Optional harness used to T into StarFire receiver harness to connect GPS to T3RRA software for field survey (iGrade™ not required).

The part numbers associated with these harnesses are from AgExpress in North America.

# Choosing a tablet to run T3RRA software in-cab

Our in-cab software will run on any 64bit Windows 10 PC. It will run on a desktop, a laptop, or a tablet. It will work with a regular mouse and keyboard, but it is designed to be used with a touch screen.

In most instances we would expect the software to be loaded onto a tablet. The screen is expected to be oriented in landscape format (wider than taller). Any screen size will work but in most cases we expect users to prefer 10inch (or greater) screen sizes.

There is a wide range of Windows 10 tablets on the market. These vary in computational performance, ruggedness, and price. The best choice for a given user will depend on the specific needs of that user.

In general, we divide tablets as follows:

Category	Consumer	Ruggedized
Example	<ul style="list-style-type: none"> <li>● Microsoft Surface Pro 7</li> </ul>	<ul style="list-style-type: none"> <li>● RuggON PX501</li> </ul>
Performance	<ul style="list-style-type: none"> <li>● High (if correctly specified)</li> </ul>	<ul style="list-style-type: none"> <li>● High</li> </ul>
Pros	<ul style="list-style-type: none"> <li>● Relatively inexpensive</li> <li>● Easy to acquire</li> <li>● Quickly replaced</li> </ul>	<ul style="list-style-type: none"> <li>● Very reliable</li> <li>● Long warranty</li> <li>● Designed for vehicle use</li> <li>● Comes with dedicated serial connector RS232</li> </ul>
Cons	<ul style="list-style-type: none"> <li>● Require careful handling</li> <li>● Short warranty</li> <li>● Not designed for outdoor use or high vibration</li> <li>● Unlikely to have dedicated serial connection</li> </ul>	<ul style="list-style-type: none"> <li>● Relative expensive</li> <li>● Available from limited sources</li> </ul>
Suitability	<ul style="list-style-type: none"> <li>● Owner-operators with pedantic care &amp; maintenance tendencies</li> </ul>	<ul style="list-style-type: none"> <li>● Contractors</li> <li>● Hired operators</li> <li>● Time critical operations</li> </ul>

At T3RRA we only sell and supply high-end ruggedized tablets. In our opinion raising the price of a consumer grade tablet to the level that would adequately cover the increased support

and warranty claims that are likely when these tablets are used in a field scenario negates the benefits of selling them.

Just because we do not sell consumer tablets does not mean we will not support our software if it is run on them. As long as the tablet meets our minimum feature specification and is not damaged or poorly maintained we expect our software to work normally on it.

In many cases we have had users running consumer grade tablets like the Microsoft Surface Pro for years on end without issue. However, the nature of consumer tablets is that they are not designed to operate in dusty environments which are potentially high vibration, have large temperature extremes, and are subject to rough handling. They are not weatherproof and don't have screens designed for outdoor viewing.

We expect all users to carefully consider the impact of a hardware failure, and the time lost due to waiting on a replacement, on their operation. If the potential losses from tablet failure are high they should not consider the consumer grade tablet option, or at the very least should have a backup option that can be quickly implemented.

The modern tablet PC is a highly capable machine with the ability to run many different software applications and to be used in many different roles. We ask customers to consider the impact of using their in-cab PC for other activities. There are software programs and usage activities that can use up disk and processor resources. This may result in sluggish performance when running T3RRA software in the field, and should be avoided.

**NOTE: Maintaining your tablet PC is important. Take your tablet PC to your home/office at regular intervals (when you are not in a rush to start a dirt moving operation) to perform both Windows updates and T3RRA updates.**

## Consider the system as a whole

Modern dirt moving is a complicated operation. It involves a mix of mechanical, hydraulic, electronic, and software technologies. To perform with the high accuracy most users expect it is *critical* that *all* the involved technologies are performing at maximum potential. Your T3RRA software application is an important part of your landforming system. But, it is one of the smaller and least expensive parts of the operation. The performance of T3RRA software is *heavily* reliant on all other parts of the system being properly maintained and tuned.

Before putting T3RRA software into action ensure that:

- Your tractor is in good condition with all mechanical, hydraulic, and electronic systems in proper working order.
- Your implement is in good condition with all mechanical and hydraulic systems in proper working order. Yes, we really do need both tractor AND implement in good condition!
- Your RTK GPS (including base station) is properly configured for best possible vertical accuracy.
- You have carefully studied your iGrade™ manual.
- Your iGrade™ is properly configured with all appropriate settings, and thresholds calibrated.
- Your tablet PC is current with operating systems updates, is not laden with 3rd party software, and has adequate disk and RAM space available.
- Your T3RRA software is properly updated and configured.

**NOTE: Do not disengage your brain when engaging T3RRA software. Failure to continuously observe, monitor, measure, and critically evaluate the performance of the system **WILL** result in suboptimal results.**

# System Startup

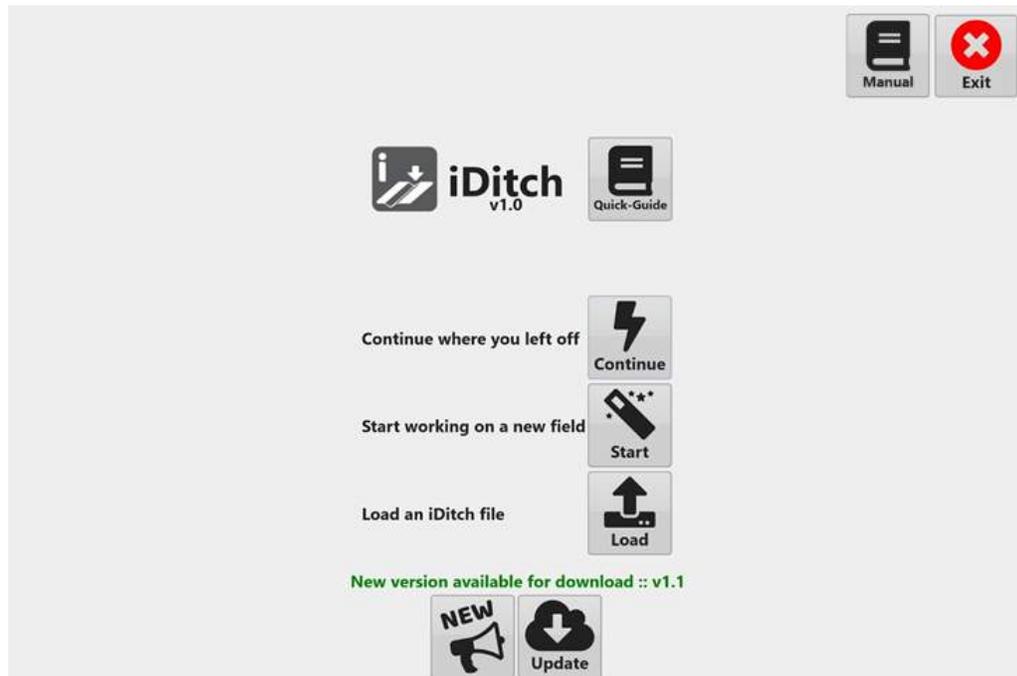
Normally the T3RRA software will start automatically when the tablet boots. If this does not occur and you wish it to, then check the accompanying troubleshooting guide for instructions.

If the T3RRA software does not start on tablet boot (after a reasonable period has elapsed) then it can be started manually by tapping twice on the desktop icon.

The initial screen will then open.



# Opening Page



Select 'Continue' button to load the last project you worked on.

Select 'Start' button to start surveying a new project or load existing tci or SWP project.

Select 'Load' Project button to load an existing iDitch file (idz).

Select 'Exit' button to Exit iDitch.

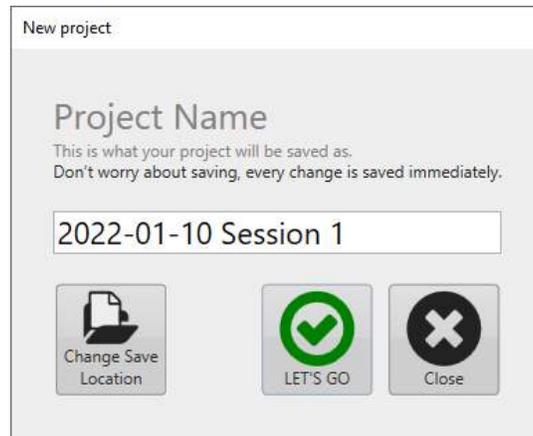
Select 'Update' to update to the latest version.

Selecting 'Start' will open the window to name and save the new project.



Use the default location or choose where you want to Save. All changes are saved immediately, so you don't have to worry about it.

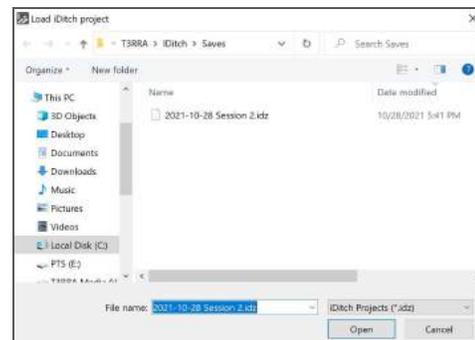
This option allows you to survey a new drain project or load an existing tci or SWP project. You use the default name or rename the project. You can use the default Save location or choose a different Save location.



Selecting 'Load' will open a file location window for you to choose the iDitch (idz) project to Load.



You will be ready to Apply so please pay attention to the warning message.



Selecting 'Continue' will open the last project saved so you can continue where you left off.



You will be ready to Apply so please pay attention to the

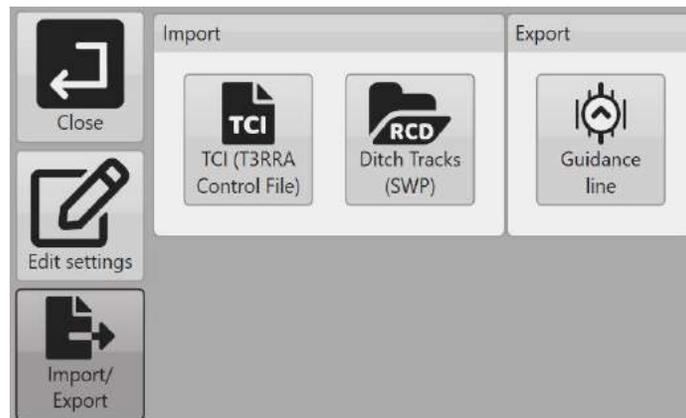
warning message.



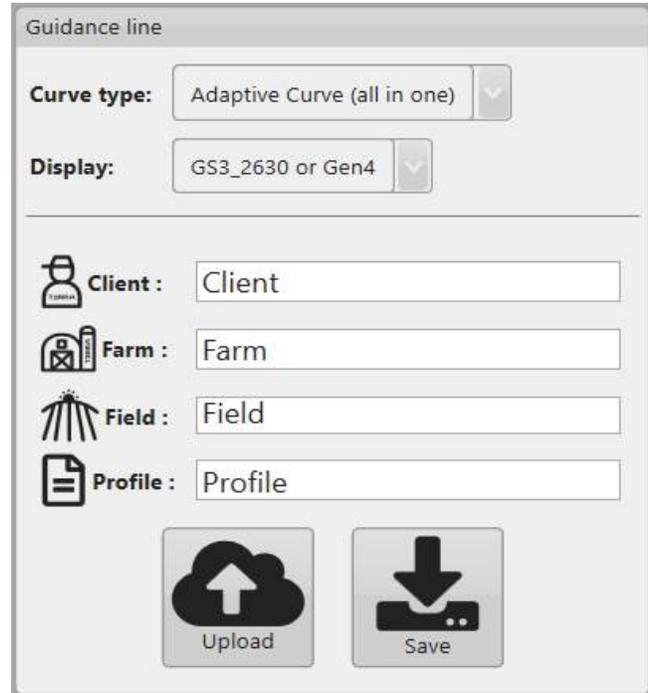
Choose 'Start>Options>Import/Export' to import a .tci file or Ditch Tracks created in SWP and to export guidance lines.



Choosing the TCI or Ditch Tracks button will open a file location window for you to choose the file to import.



Choosing 'Guidance line' button will allow you to export the driven drain lines as guidance lines to Save to your hard drive or Upload to JDOC.



The screenshot shows a software dialog box titled "Guidance line". At the top, there are two dropdown menus: "Curve type:" set to "Adaptive Curve (all in one)" and "Display:" set to "GS3\_2630 or Gen4". Below these are four input fields, each with an icon and a label: "Client:" with a person icon, "Farm:" with a house icon, "Field:" with a field icon, and "Profile:" with a document icon. All fields contain text. At the bottom, there are two large buttons: "Upload" with a cloud and arrow icon, and "Save" with a downward arrow icon.

# Options



## Edit Settings



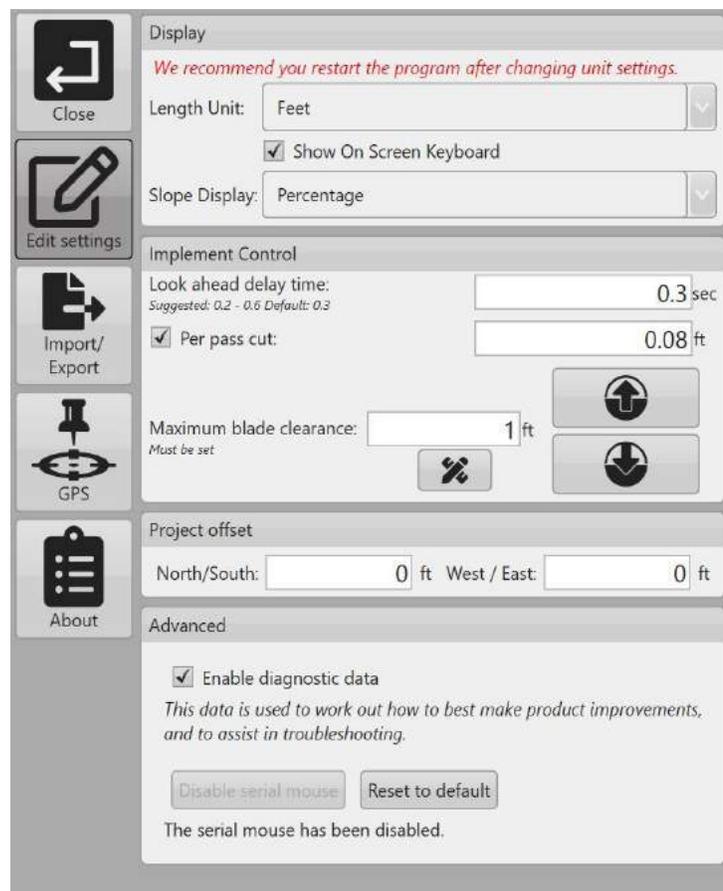
### Display

Length Unit: Millimeters, Centimeters, Meters, Inches, or Feet  
 Enable Show On Screen Keyboard  
 Slope Display: Percentage or Ratio

### Implement Control

A saved group of settings for the tractor and implement.

Creating a 'Maximum blade clearance' is **required**. By setting the blade clearance you are able to continually create new drain projects without having to -re-zero for each one. The 'Maximum blade clearance' is exclusive to the tractor and implement used during the profile creation and will not be accurate if either the tractor or implement is changed.



If you survey with a tractor/implement combination using one base station and then implement using another it is not guaranteed that the implement zero will not need to be recalibrated. However, it should only need to be done once at the start of the implementation process.

**Look ahead delay time** - In order to control blade height the software must receive an elevation from iGrade™, process that elevation, and then return a control signal to

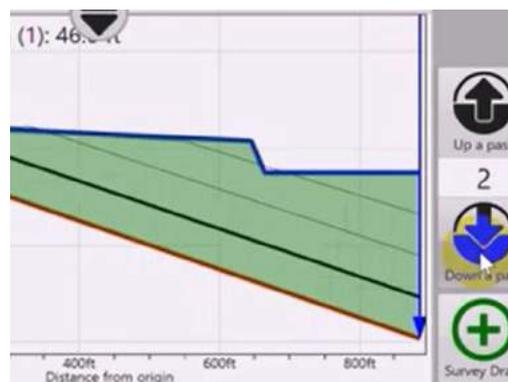
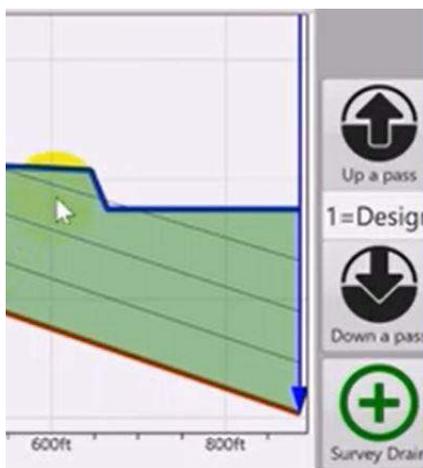
iGrade™. This control loop is quick but the time delay can cause inaccurate implementation in certain situations.

A normal “Look ahead” time is 0.3 to 0.5 seconds. The exact time is machine specific and can be determined through experimentation (see [Bi-Directional error in T3RRA in the troubleshooting section](#)). The look ahead time helps to account for the delay in the control loop.

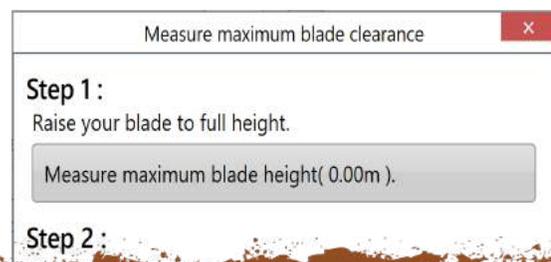
If the look ahead time is not set the delay can cause a “bi-directional error”. This is where the blade offsets incorrectly, moving up when going down a slope and down when going up a slope. This error occurs consistently. If the look ahead time is set too LOW the implement will always grade high when going down-slope and low when going up-slope, the opposite effect will occur if the look ahead time is set too HIGH. Bi-directional error is most noticeable when working steep slopes at higher speeds.

**Per Pass Cut** - The increment which the blade will move per pass. It allows progressively cutting to a total depth without over cutting on an individual pass. This feature is designed to allow cuts to be taken in “bite size” chunks without causing the machine to be overloaded. It uses the as-applied functionality to track blade heights on previous passes in order to set the current blade height.

Setting a ‘Per pass cut’ allows the user to choose a specific designed Pass Depth line to cut to. Pass numbers count from bottom to top with “1” being the last pass (design surface) and larger numbers being the top passes.



**Maximum blade clearance** - Maximum blade clearance is the difference in the blade/bucket height



between it being fully raised and on the ground. By saving this setting you will not need to zero during implementation. This value can be manually entered, or automatically calculated by pressing the 'Measure' button and following the instructions in the calculator window (shown right). **NOTE: You must be connected to iGrade and be receiving the implement's GPS data for this to work.**



Up and Down arrows can be utilized to offset the blade height if needed.

## Project offset

These settings allow for any GPS discrepancies to be accounted for during implementation. The 'North/South' and 'West/East' directions to move the map (+ is North, - is South) (+ is West, - is East).

## Advanced

### 'Enable diagnostic data'

It is highly recommended to keep this enabled because the data collected is valuable for us in assisting you if any issues should occur.

### 'Disable serial mouse'

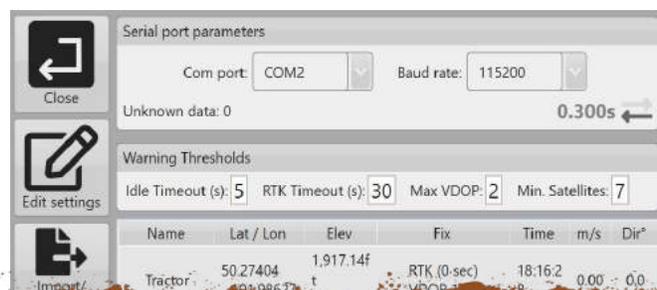
If your cursor is jumping around the screen or you are getting "COM in use" errors it can be corrected by disabling the serial mouse.

'Reset to Default' This will reset all settings to Default.



## GPS Port Settings

Serial Port Settings tab (iGrade, T3RRA, & Receiver need identical Baud Rate):



Select Options button and then GPS Port Settings.

- Set 'COM Port' to the **correct** port
- Set 'Baud rate' to 115200 for iGrade UCC2 and 38400 for iGrade UCC1
- Open port
- Confirm raw data is streaming in window

**Com port** - The channel that is used to communicate with the GPS. Use the drop down menu to ensure you have selected the correct port.

**Baud Rate** - The communication speed between software and GPS (it should match the baud rate of the GPS)

**Flashing arrows** - indicate communication is being received and transmitted.

#### Warning Thresholds:

**Idle timeout:** If no GPS messages have been received in this time period an error warning will show.

**RTK Timeout:** This monitors the time since the last good RTK correction packet was received. It should not normally be set above 10-20sec.

**Max VDOP:** Vertical Dilution of Precision is a measure of the altitude accuracy. For the most accurate implementation you will want this value as low as possible however setting lower than 2 may cause interruptions in the use of T3RRA software.

**Min Satellite Count:** Sets how few satellites the GPS needs to see before a warning is shown.

**Serial port raw data** - Is primarily used for diagnostics, should support be required.

**Open Device Manager** - used to investigate Com port issues if required.

**NOTE:** T3RRA software and iGrade™ must have identical Com port and Baud Rate settings in order to communicate.

# About



**Download Updates** - if connected to the Internet, downloads and installs the latest update. You will be prompted to restart iDitch.

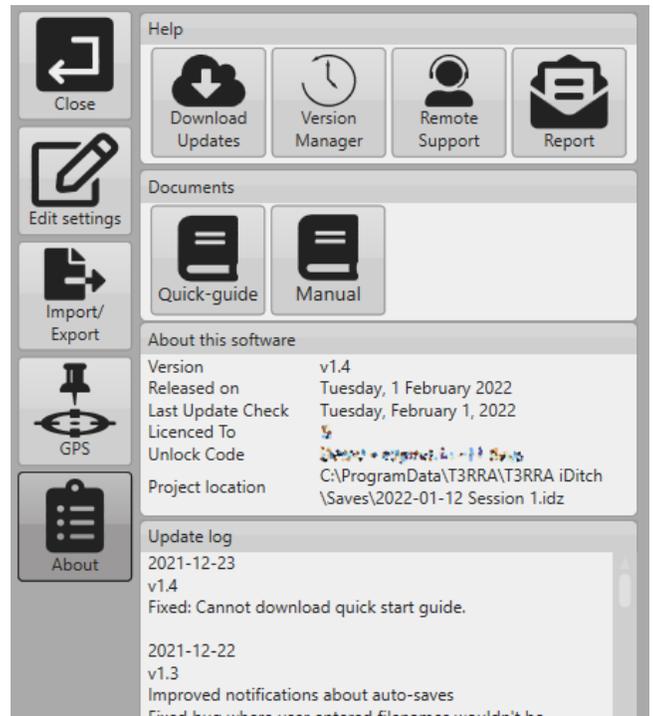
**Version Manager** - a provision to revert updates if needed.

**Remote Support** - connect with the remote support tool, AnyDesk.

**Report** - opens up a bug report/feature request window allowing you to report issues to T3RRA. The name and email address fields of this window are automatically filled using the details linked to the software licence. You must be connected to the internet for this to work.

**Quick-guide** - will download a digital copy of the iDitch Quick reference guide and install it on your device. After it has been downloaded, pressing the same button will open it.

**Manual** - will download a digital copy of the iDitch Operators Manual to your device. After it has been downloaded, pressing the same button will open it.



**'About this software'** provides:

- Version number and date released
- Last date you checked for updates
- Who the software is licensed to
- Unlock code
- Where current project file loaded is located

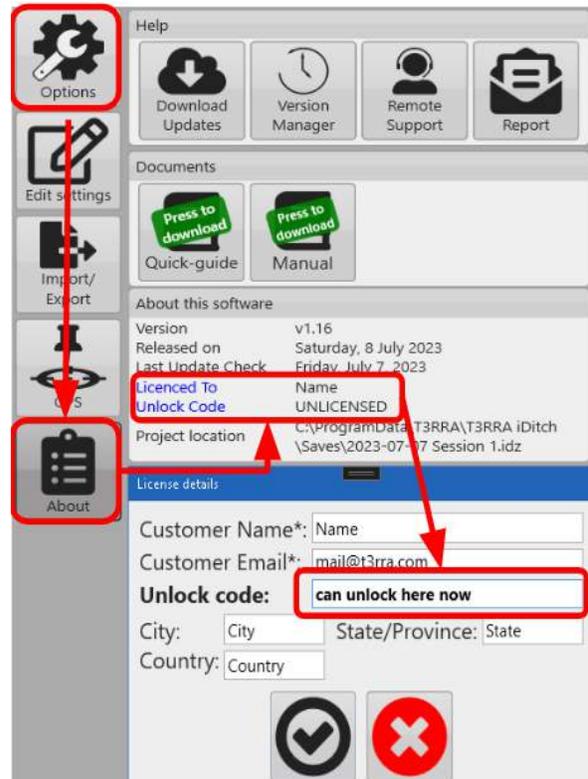
**'Update log'** describes all changes for each version update.

## Unlock iDitch / Licencing

To unlock iDitch, you must first acquire an unlock code. Your dealer will provide this after completing your iDitch order.

The License details window is opened by clicking the text shown at Options > About > Licenced To / Unlock Code. Fill out your details, including the Unlock code and click the Okay button (✓). You will now have unlocked iDitch and are able to use it's full functionality

If you wish to preview/trial iDitch, your dealer can provide a demo unlock<sup>2</sup> which will give you access to the full program for a limited time.



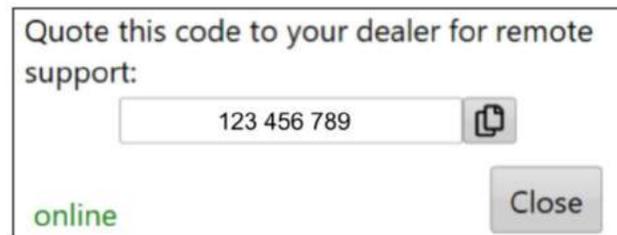
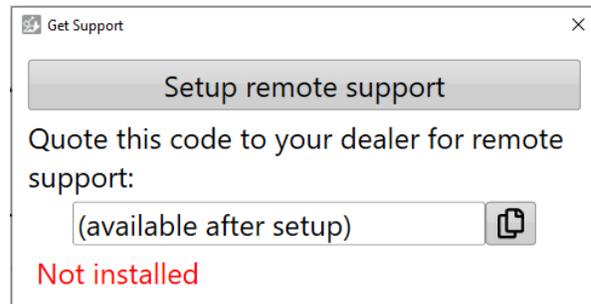
<sup>2</sup> Dealers: to get a demo unlock code you must place a dealer demo order on T3RRA.com

## Remote Support Tool

The AnyDesk Remote support tool is found in Options > About.

On first use of the tool, you will have to be connected to the internet and click on the Setup remote support button. This will automatically install the program.

After installation, press on the 'Remote Support' button and a 9 digit number will be presented for you to pass on to the dealer to access your tablet. Once connected, they will be able to see and use your tablet remotely to assist you.



## Edit View

Choose Edit View button to:



- **Load image** - load a georeferenced background image (kml, kmx, tif, bmp, gif file types).
- **Full Screen** - this option allows you to switch T3RRA software between full screen mode or windowed mode. This is helpful if you need to be looking at other pages on the tablet at the same time as using the T3RRA software. If a keyboard is attached you can use the shortcut of F11.
- **Change Tracking** - When surveying or implementing there are 4 options that control how vehicle location is tracked on the screen in 2D. The options for 2D tracking are 'Scroll', 'Center',



‘Dir. up’, and ‘Manual’. Try them out as you drive around to see what they do.

### Tracking options

When surveying or implementing there are 4 options that control how vehicle location is tracked on the screen. The options for tracking are ‘**Scroll**’, ‘**Center**’, ‘**Dir. up**’, and ‘**Manual**’.

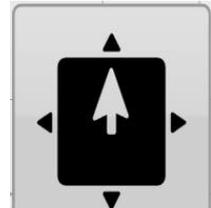
#### Scroll

This option will show the GPS position indicator moving freely on the screen and will move the screen as the indicator approaches the edge to ensure that the indicator is always present on the screen.



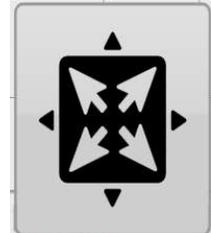
#### Dir. Up

When the ‘**Direction Up**’ option is active the map will rotate to make sure that the direction of travel is always to the top of the screen.



#### Center

The Center option has 2 parts, first it locks the indicator to the center of the screen so as it moves the map moves to make sure it stays in the center. The second part is that the map is locked to always have north at the top of the screen.



#### Manual

This option makes it so that the system does not lock the direction of the map or fixate on the location of the indicator so that even while surveying or implementing you can inspect other sections of the map. Caution: in this mode the vehicle icon can move off the edge of the map.



## Image Overlays

'Image overlays' allows geo-referenced image data to be imported into a field. The image overlay is accessed by pressing the 'Load image' button.

When the button is pressed a file window will open to select the desired file. The file types that are currently supported as overlay images are KML, KMX, TIF, BMP and GIF.

Drag images to adjust ordering (above or below the main layer).



### Delete images

Overlay images can be deleted by unchecking the box next to them and pressing the 'delete images' button. This will delete the layer from the available list.

### Transparency

Overlay images can be set to be transparent so that layers below them can be seen. Check the box to the left of the layer and then press the transparency button on the right side.

### Layers

Pressing on any of the layers will cause it to be displayed over the others.

# Exit Project

T3RRA software autosaves project data while working and Saves when you Exit project. This is to assist in case of accidentally closing the software, or software or hardware failure.



# Markers

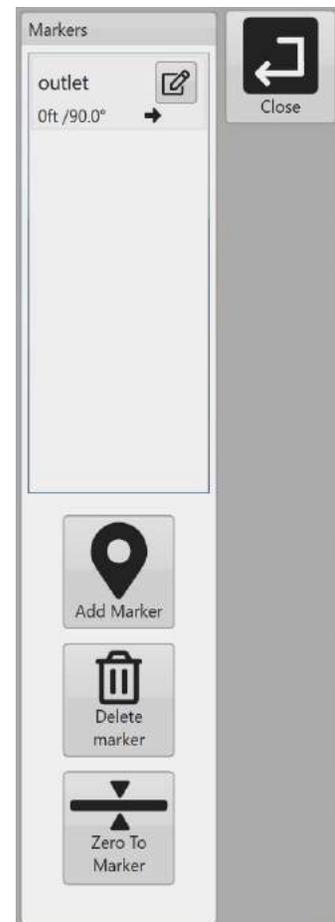


Markers on the drain line or map allow for setting points of interest at user-selected locations. This includes using a marker as a benchmark “control point” location in the design. Markers are always placed at the current location.

When a new marker is created, a window will appear assigning a default name to the marker that allows renaming of the marker. If multiple Markers exist, touching one will select it. You can Delete the selected marker. You can also choose to ‘Zero To Marker’.

## Zero to marker

This method is best used when you have a digital marker that you know has the correct horizontal position associated with it. You also must be at the exact location in (or out of) the field that the digital marker represents. Ideally this will be marked by a peg, or other permanent object. **This method zeroes the control map in the horizontal direction only. Use Maximum blade clearance to adjust the vertical positioning when working with imports.**



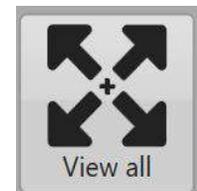
# Zoom Controls

There are multiple methods available for zooming your map.

The first method that can be used is the 2-finger pinch controls. By pinching your fingers together on the screen you can zoom out and by moving your fingers apart you can zoom in.



The 'View all' button (zoom to full) when pressed zooms the map in or out to the maximum size that shows the entire surface grid of the map.



# Drain Surveying

When surveying a drain, you must drive the length of the drain in order to collect the data. It doesn't matter whether you drive from source to outlet or vice versa. You will be asked before the survey to choose the direction of travel (Downhill or Uphill).



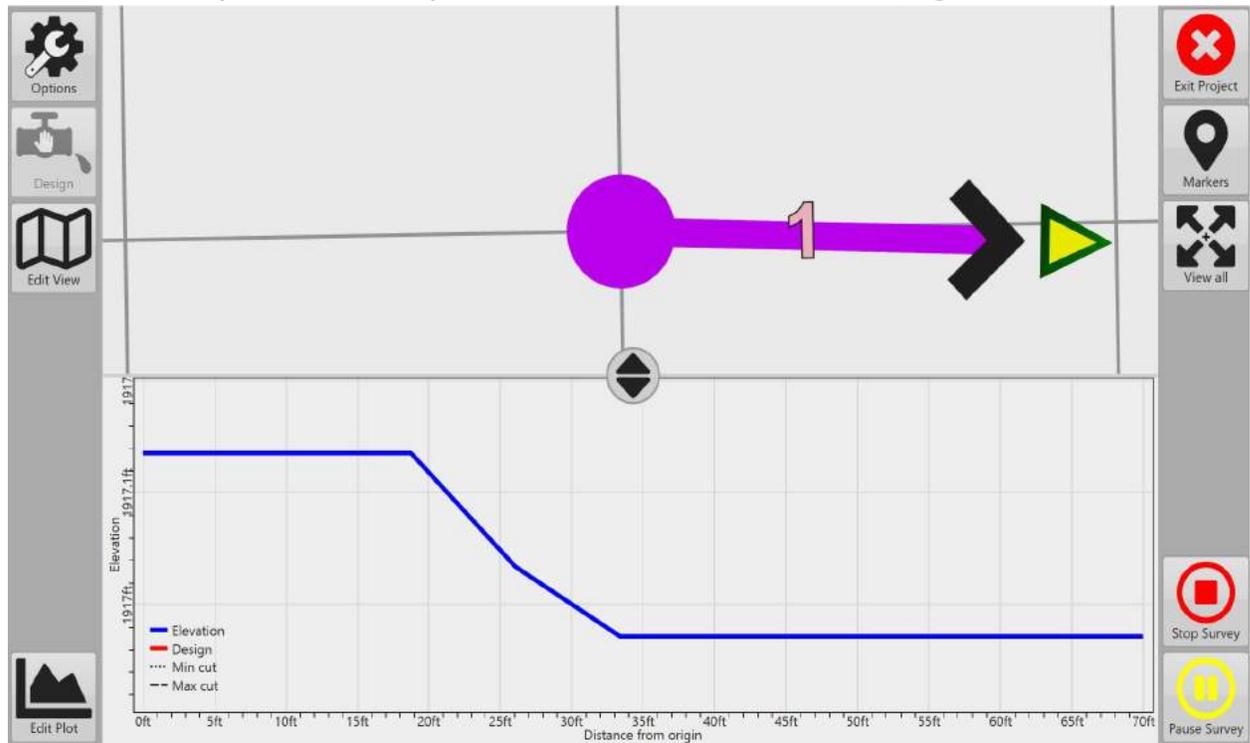
## Start, Pause and Stop controls

When surveying, the **'Survey Drain'** button starts the survey. **'Pause Survey'**, and **'Stop Survey'** buttons are used to control the beginning and ending of the relevant activities.



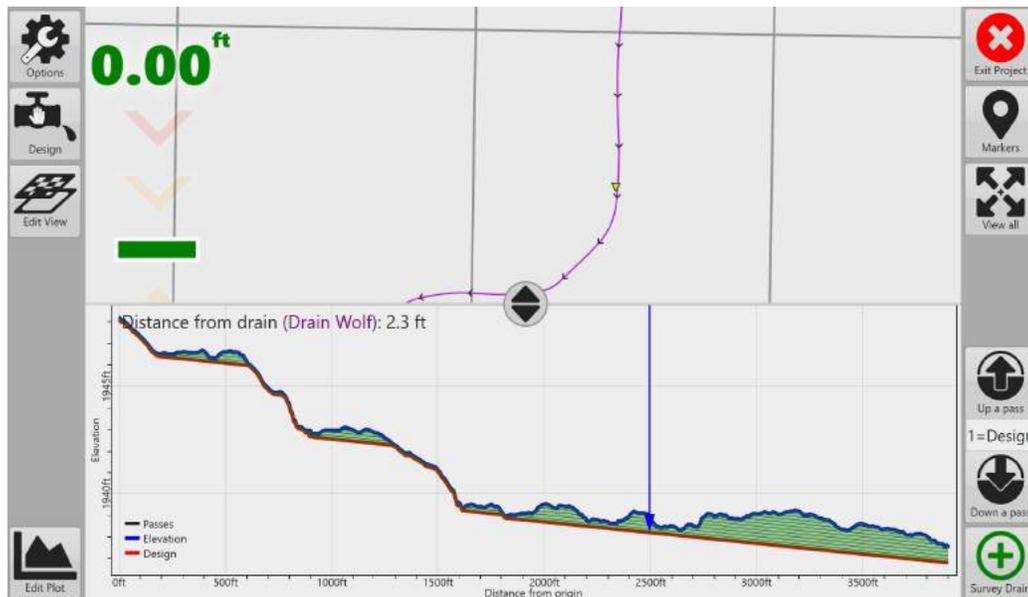
Pausing collection is designed to allow for situations where the collecting vehicle cannot physically traverse a section of drain line.

When you are surveying a design, the receiver will appear as a triangle pointing towards your current heading. Arrows along the drain line indicate the direction of flow. The surveyed line will be represented in the profile view as a blue line while surveying.



# Implementing

Stopping a Survey automatically creates a Drain design using parameters entered in the Design Settings and you are automatically in Apply mode.



**CAUTION**



**WARNING:** When not collecting, control data is being sent. Blade control can occur any time iGrade is active [minimum speed exceeded and hydraulic controls in Auto].

Do not show this again



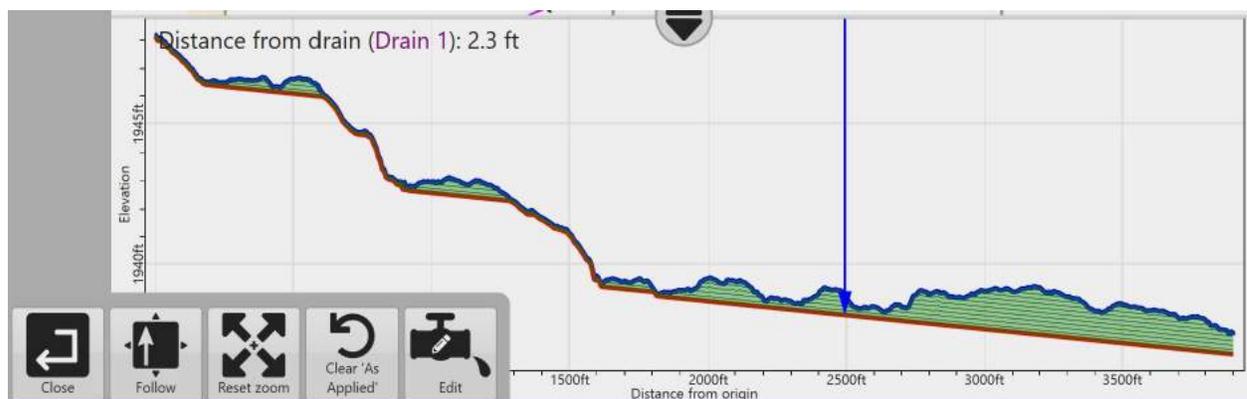
When you are implementing a design, the receiver will appear as a triangle pointing towards your current heading.

**NOTE:** The 'Drain Bottom Width' is set at a default of 25m or 82ft away from the drain's center line. If the implement is traveling outside of this distance, the blade will not go to the design height. If you want a drain bottom with a defined non-zero cross slope, you should manually set the cross slope control in iGrade's Cross Slope control page.

On-Grade Indicator shows chevrons of current blade height relative to target design height. They show how far the blade needs to move (and in what direction) for the blade to be “on grade”. They are located at the upper left side of the map screen. They are a grouping of up/down chevrons that show the current blade height relative to the target design height.

Map display. Drain line is present with arrows indicating direction of flow. Touch the drain line to choose which drain to implement. Overlays are displayed on the map, but the important vertical information is all shown in the Drain Profile.

## Drain Profile



When implementing a drain, you are shown the profile of the drain. A small circular drag handle can be found between the drain profile and map display. Double tapping, or dragging this handle will display this screen.

The window displays your current position relative to the drain centerline. It will indicate whether you are currently on the shoulder or in the bottom of the drain.

The drain profile shows design heights and original heights for the drain’s full length.

The red line in the diagram is the designed drain, the blue line shows the pre-implementation level of the ground and the green shading area is what will either be cut or filled.

With this diagram you will be able to see cut depths along the length of the drain and the number of passes required to achieve grade.

Per pass cuts are represented with black lines along the green shaded cut area. ‘Per pass cut’

up and down buttons change depth of cut per pass. Pass '1' is design height. To assist with selecting a pass while moving, swiping up or down (on the buttons or pass text) will select the next pass up or down from your current pass.

The blue arrow points to your current location and indicates the height of the blade. The blue arrow travels along the drain bottom and not on the backslope if one has been designed. You can touch along the drain line to see the information at that location.

## Edit Plot

- Follow
- Reset Zoom
- Clear 'As Applied'
- Edit



### 'Follow position'

Zooms into the blue arrow and follows it along the graph as it implements the drain design.

### 'Reset Zoom'

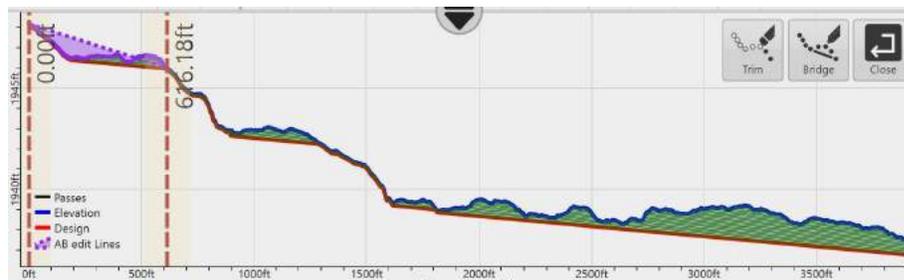
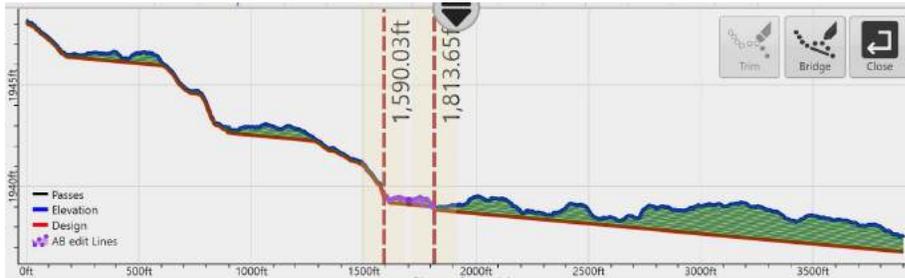
This tool resets the drain profile view to full screen.

### 'Clear As Applied'

This tool resets the green shaded area in the drain profile view to represent 'no work completed'.

## 'Edit'

Edit drain line by selecting start point and end point. Choose to trim points from the ends or bridge points. Typical areas to 'bridge' include filling in a low spot or sloping a steep hill to a lesser grade to prevent erosion. To remove points on the ends, select a start point and an end point then choose Trim points.



# Drain Design



When you stop a Survey, Apply mode starts automatically with a Drain using existing Design parameters. Within 25m (82ft) of the centerline, the implement will be sent to the design height. Outside this distance, the blade will not go to the design height.

When you are in Apply mode, you can change the design by pressing the Design button. In the Drain Design panel, you are able to rename and delete the drain, reverse its direction, and, of course, change the design.

Drain designs come in two types - Linear fit and Best fit. Each will be explained below.

NOTE: Drain design parameters are initially set to default values. These need to be changed to provide the desired outcome. Once set, they will not change unless the user opens the Drain Design tool and enters new values.

NOTE: To create a drain with cross slope (or backslope), manually set it in iGrade's Cross Slope control page, and offset the blade as desired in iGrade, or by selecting a different pass in iDitch.

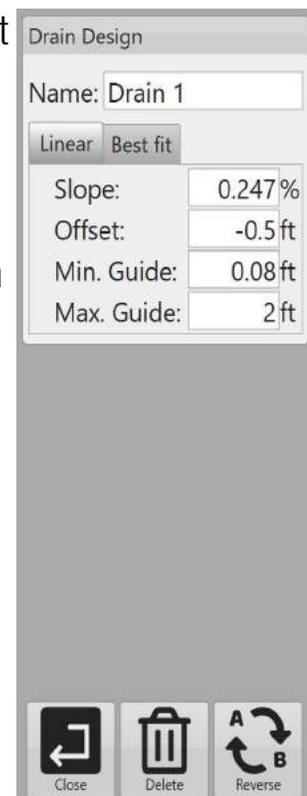
## Linear fit

Creates a single straight 'plane' along the drain path. This design has a consistent slope along the drain's whole length.

**'Slope'**- is the gradient at which the drain is installed to ensure that water flows in the direction you want.

**'Offset'**- allows for vertical offsetting of the drain. Setting a positive value will lift the offset creating a fill effect along the entire drain, while a negative value in the offset will lower the design height creating a deeper cut drain.

**'Min. Guide'**- is the minimum depth desired and is ONLY a guide.



'Max Guide'- is the maximum depth desired and is ONLY a guide.

## Best fit

Adjusts the slope to try and follow the natural curve of the field.

'Min. Slope'- The lowest gradient of slope you will accept in the drain.

'Max. Slope'- The highest gradient slope you will accept in the drain

'Min. Cut'- ensures the design will consistently cut at least this amount.

'Max. Cut' sets the maximum depth that the design will cut to and ensures that it never exceeds this point.

Drain Design

Name:

Linear  Best fit

Min. Slope:	0.1%
Max. Slope:	10%
Min. Cut:	0.08 ft
Max. Cut:	2 ft

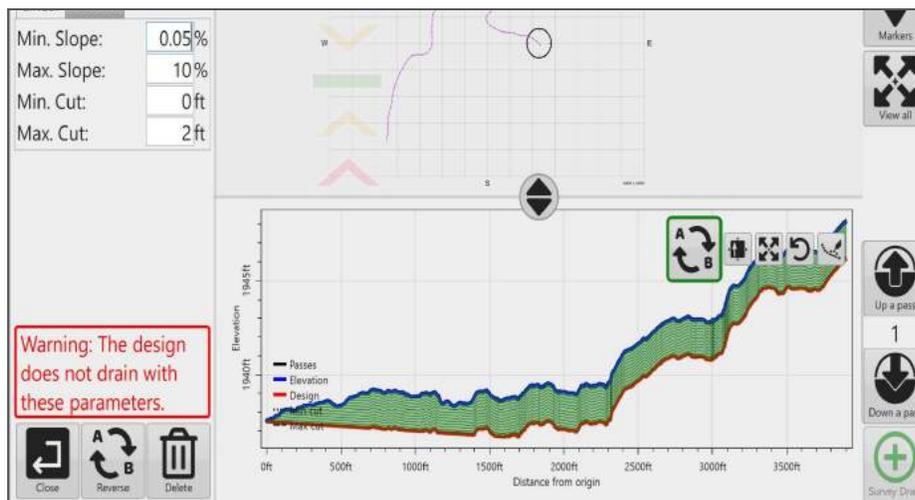
Close
Delete
Reverse

## AB Reverse

The 'A↔B Reverse' button reverses the profile as it is displayed in the profile view. This also affects how the software designs the profile as the software will always try to slope the design from left to right.

Reasons to reverse AB:

- If the drain was driven 'Uphill' and you chose 'Downhill' before surveying.
- If tci project was loaded and the survey was driven 'Uphill'.



# Exporting Guidance lines from T3RRA™ and importing into AutoTrac™

Should you wish to export guidance lines from T3RRA software for use with AutoTrac™ be sure to follow the following steps to be sure that the process is successful.

## How to export guidance lines from T3RRA

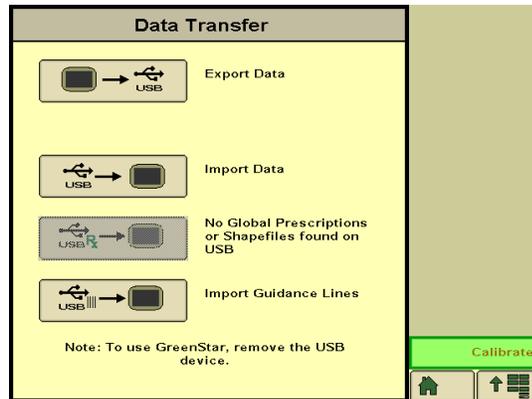
1. A window should appear similar to the image to the right when you select 'Guidance line'.
2. Select curve type.
3. Set the display to the model number of the John Deere display you will be using.
4. Input project information into client, farm, field and profile.
5. Press "Save" and a file with your guidance lines will be saved in the set location.
6. Press "Upload" and a file will be uploaded to JDOC where it can be assigned to equipment.



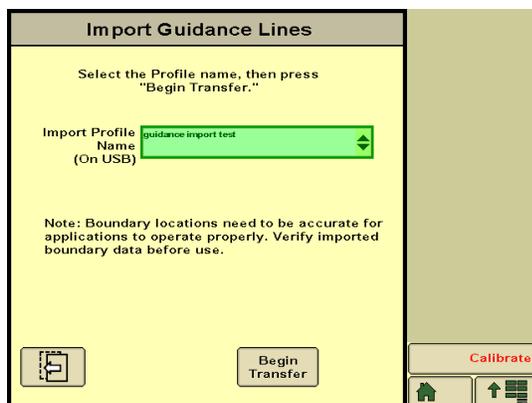
## How to transfer guidance lines to a John Deere display

(Instructions given are for the GS3 2630 Display, steps for other displays may vary: refer to the appropriate display manual)

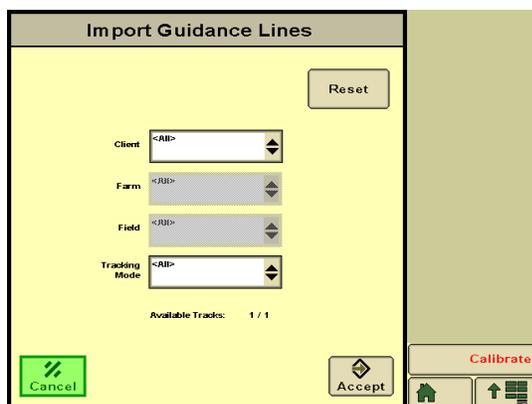
1. Insert USB with guidance lines saved on it into John Deere Greenstar display. (The display will automatically detect the USB and display the available options.)
2. Select "Import Guidance Lines" which should be the bottom option.



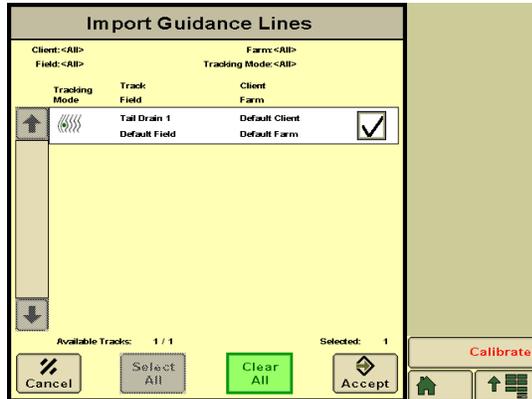
3. Select the desired profile and press “Begin Transfer”.



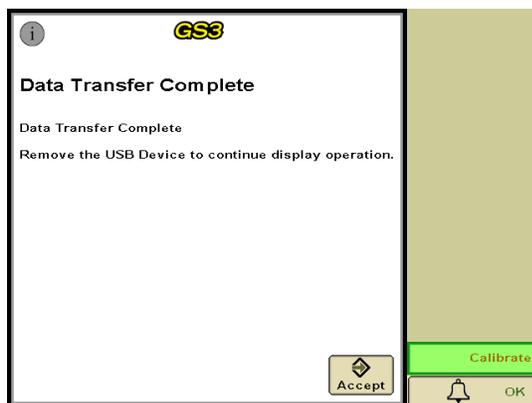
4. On this screen select which client, farm, field and tracking option of the file you want to import and press “Accept”. (The tracking option should be set to adaptive curves.)



5. Make sure the correct line/s you want to import are ticked and press “Accept”.



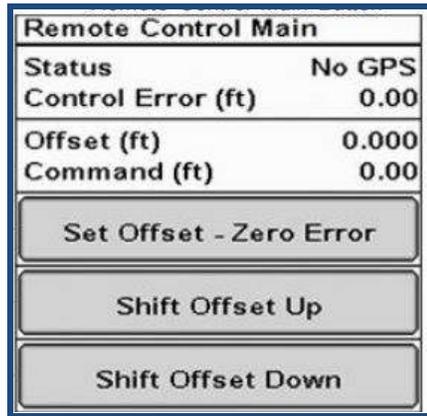
6. A loading bar should appear, if everything has been successful the Data Transfer Complete screen should appear and you will be able to press "Accept".



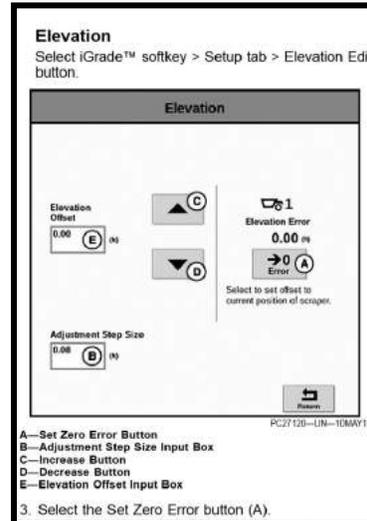
7. Your guidance lines have been imported to your John Deere Greenstar display and are now ready to be used with Autotrac™.

# Vertical offset shift in iGrade

The blade offset buttons in iGrade serve to manually shift the height of the blade, either up or down.



iGrade



UCC1 and UCC2

We recommend limiting the cut depth which reach in a heavy cut area by selecting a instance, if you have a six inch cut to make but you can only realistically cut in 2 inch increments, then you can "shift up" two passes for the first cut, and then lower your pass each time you are ready to cut deeper. In this way, you can shave down to grade without over-taxing your equipment.

T3RRA will try to higher pass. For

To offset transient GPS variations, use Maximum blade clearance. If an operator feels like the GPS has drifted upward, then they can adjust for this with the up and down arrow buttons beside it in the settings.



**NOTE:** Blade Shift should be used for temporary manual vertical adjustments. If the vertical adjustment is intended to be permanent then it is more appropriate to adjust the Zero Offset value.

# iDitch™ & iGrade™

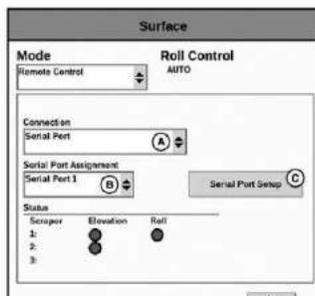
## Navigate to Application Controller Pages

NOTE: Turn key OFF and allow the display to completely power down before connecting or disconnecting ISOBUS implements or sensors. After navigating to the Application Controller pages, the GreenStar™ 3 and Generation 4 Displays have the same layouts.

To navigate to the Application Controller pages using a GreenStar™ 3 Display: Select Menu button then Application Controller button

To navigate to the Application Controller pages using a Generation 4 Display: Select Menu button then Application tab. Select the ISOBUS VT application then the ISOBUS VT Menu button. Select the Application Controller button.

**Surface**  
Select iGrade™ softkey > Setup tab > Surface Edit button.



in iGrade, T3RRA, & Receiver



**iGrade UCC2:**  
**Baud Rate: 115200**  
**NMEA: ALL**  
**NMEA Rate: 5 Hz**

**iGrade UCC1:**  
**Baud Rate: 38400**  
**NMEA: GGA and GSA**  
**NMEA Rate: 5 Hz**

Note: Serial Port settings need to match

# Understanding how “As-applied” works

When moving earth there are three states:

1. What you started with.
2. What you intended to do.
3. What you actually did.

You start with the original drain heights. You intend to end up with the drains matching your design. “As-applied” (or “As-built”) heights are a record of what you actually did.

More than that, the “As applied” heights are a constantly updating record of what you have done, and what still remains to be done. At the start of a job no work has been done. Therefore the “As-applied” heights will be exactly the same as the original heights. At the end of a job the field surface will match the design heights. At this point the “As-applied” heights should match the design heights. Between starting and ending the job the “As-applied” heights will be somewhere between the original and the design heights (as will the actual real world field surface).

The “As-applied” heights are constantly updated by keeping track of cuts and fills as they occur. The software tracks the blade constantly. At the beginning of a job all it knows is that the field matches the original surface heights. Any time the blade goes below this, it knows that a cut has taken place. It tracks this cut and updates the “As-applied” heights accordingly. At this point the “As-applied” heights are no longer the same as the original heights. As the blade continues to cut lower and lower the heights will continue to be updated.

The nice thing about cuts is that there is no way for the blade to go lower than a previous cut without the new cut level being the new true earth surface. So our cut measurements will tend to be quite accurate. But what about fills? Just because the blade is above the surface does not mean any dirt is actually coming out of the scraper pan. The implement could be simply moving from one location in the field to another location. So measuring the fills using blade height is a bit problematic. We deal with this in a number of clever ways, taking into account whether or not the design calls for a cut (or a fill) and where the blade is relative to the design height. But fill measurements *will not be perfect*.

It is important to understand that the T3RRA software tracks activity over time. It is constantly surveying the current status of the job surface.

**Important:** T3RRA software has no way of knowing what other equipment is doing. If another machine is operating in the same work area as you, your “As-applied” map will not be accurate. You can only track your own activities.

**Important:** T3RRA software has no way of knowing what work has been done in a field prior to your arrival. If the original surface map is not representative of the true state of the terrain when you arrive (because another operator has already done part of the job) then the “As-applied” map will not be accurate. If you want to make it accurate you will need to drive over the entire surface again to calibrate the as-applied map. **It only knows what it has surveyed.**



# Definitions

**As-Applied:** This refers to the state of the map as it reflects current reality. The As-Applied surface should normally progress from being equal to the original surface to being equal to the design surface as a job proceeds. Synonymous with 'As-Built'.

**Backslope/Batter:** This is the cross sectional slope that leads into a drain from the field surface. The “sides” of a drain.

**Baud Rate:** This is a number representing the speed at which messages are sent over a serial connection. A bigger number corresponds to a faster data rate. Both the sending and receiving systems must have the same baud rate in order to communicate.

**Benchmark:** Synonymous with “control point”. This is a known location (horizontal only) in or out of the field that can be returned to as required.

**Bi-directional error:** A term for the consistent (equal and opposite) vertical error of the cutting edge that is sometimes seen when going in opposite directions. This error can be solved by applying an appropriate look-ahead time setting.

**Blade Shift:** Blade shifting is used to describe how the blade of the implement moves either automatically or manually.

**Borrow pit:** A pit or depression that is created when dirt is removed from a location for use elsewhere. Is often a channel beside a bank, where the channel was dug in order to provide dirt for the bank.

**Bulking:** The act of making all the largest cuts and fills first before approaching the final stages of the implementation. Generally thought of as being a low accuracy activity.

**Burning:** The act of embedding a certain design element into an existing surface.

**Button push:** Touching/tapping an on-screen button with your finger. Synonymous with button click.

**Com port:** Also known as a ‘serial port’. This is a hardware connection used to connect a cable to another device so that data can be transferred. A computer may have 0, 1, or several of these. Sometimes a com port may represent a connection to an internal device (modem or

GPS) so may be present even if there is no external connector present. Sometimes a com port will not exist until a device is connected to a USB port.

**CSV:** Comma Separated Values. This is a generic text file format often used to store columns of numeric data. To view the contents of a CSV file, open the file in a text editor such as “Notepad” or “Excel”. Users in countries where a comma is used as a decimal place separator should be particularly careful when using this format.

**Cut area:** A cut area is a zone where soil needs to be removed.

**Cut/fill map:** A map using different coloring to show the difference between an original and a design surface.

**Cut/Fill Ratio:** A ratio that is determined by the type of material being moved. It relates to what percentage of it will “settle” or “shrink” once compacted. Example: Using a cut/fill ratio of 1.2 means that you require 1.2 cubic yards of cut soil to create 1.0 cubic yards of compacted fill.

**Design surface:** A surface that has been designed, this model represents the finished/target surface after all earthworks have been completed.

**Detent:** is a term used by John Deere that means to place the iGrade™ system into automatic and allow another system to send control commands.

**Feather:** To feather something is to soften it or soften the transition between regions so that the interface is gradual.

**Fill area:** A region where dirt must be added in order to meet a target surface design.

**Finishing:** Final passes to achieve design height.

**Geo-referenced:** Data or images that have geographic coordinates (latitudes and longitudes) associated with them can be described as being ‘geo-reference’. Normally, data must be geo-referenced in order to be used with a GPS based guidance or mapping system.

**GPS:** Global Positioning System.

**Haul:** The activity of picking up dirt in the bowl of a scraper pan and moving it some distance to a new location.

**Heading:** the heading is the direction a tractor is moving or facing.

**Importing/Exporting dirt:** Importing refers to the action of bringing dirt into a region from outside the field. It may come from a stockpile of dirt, or from some other place where it is not needed, or where removal of dirt is called for. Exporting is the opposite action.

**Land forming:** The process of altering the land surface using non-linear curves and slopes.

**Land leveling:** The process of altering the land surface using large flat planes. These planes are normally graded to drain water in one or more directions.

**NMEA:** National Marine Electronics Association. NMEA messages are data strings that conform to a particular standard established by the National Marine Electronics Association. These are commonly used with GPS data communications.

**Original heights:** A surveyed or imported set of data that forms the shape of a set of drains before it is leveled or formed.

**On-grade:** The position of an implement cutting edge when it is considered to be at the correct elevation in order to achieve the desired target design.

**Project file:** This is a proprietary binary file used to store data for T3RRA Cutta, T3RRA Ditch, and T3RRA Plane will always end in the '.tci' extension. iDitch is '.idz' (You may have to enable 'Show file extensions' in Windows to see this extension).

**RTK:** Real Time Kinematic. This is a term for a type of GPS position solution that has very high accuracy.

**Settle/Shrink:** Settle or shrink is used when discussing the compaction of soil after it has been moved.

**Slope:** A measure of the steepness, incline, grade/gradient, or constant rate of elevation change, of a surface. A higher slope value indicates a steeper incline. In T3RRA software positive slopes always refer to "downhill" slopes.

**Stockpile:** A pile of dirt/soil/material that has been exported from some other area.

**Survey point:** A point measured with a location (x,y) and an elevation (z). Collections of survey points are used to create the original heights of a drain.

**TCM:** Terrain Compensation Module. A sensor that is part of the John Deere StarFire receivers. Used to measure and control cross slope in iGrade™.

**Time-out:** When an application “times out” it means that whatever it is talking to has taken too long to respond and it does not know what to do.

**Topography:** The physical features of an area of land, especially the shape of its surface.

**Topsoiling:** The action of adding a layer of new soil over the top of an existing surface. Often done in heavy cut areas to ensure there is a layer of more organic, fertile soil above the subsoil that has been exposed by the removal of dirt during the leveling process.

**Washboarding:** A term used to describe undesirable systematic up and down movement of a scraper blade. The bumpy resulting nature of the soil surface resembles an old fashioned washboard, hence the name.

**Zeroing:** The process by which the elevations in a control map are calibrated against the elevations being measured by the GPS. By ‘zeroing’ we are able to compensate for:

- the offset from the GPS to the cutting edge,
- differences in a surveyors GPS to the implement GPS,
- differences in implement height when surveying verse implementing, and
- other factors.

# Troubleshooting guide

## General notes on troubleshooting

### **Isolate the problem**

This is a key technique. To solve a problem you first must understand it. A given set of symptoms can arise from multiple unrelated issues. Simplify your system by decreasing the number of possible sources of problems. Turn off features and functionality until the issue no longer occurs. Then gradually turn features back on until the problem occurs again.

### **Act methodically**

Only make one change or adjustment at a time. Then check to see if the problem is fixed. If you change multiple things you will be unable to definitively know which change solved the issue. In the worst case, one change may have solved the problem, and another change may have re-ignited it.

### **Do not rush**

The tortoise almost always wins the troubleshooting race. Logical thought and considered action are the natural allies of problem solving.

### **Read the manual**

Yup. It can actually help sometimes.

# TABLET

## Tablet screen freezes.

### Symptoms:

The screen of the tablet PC has frozen and is not responding to inputs such as pressing on the screen or the mouse (if one is attached).

Your tablet becomes slow and sluggish.

### Cause:

The Tablet may not have enough available memory.

Windows or the T3RRA software needs updating.

If you have connected your tablet to the Wi-Fi hotspot previously, the tablet will retain Internet access credentials and connect to the internet. Automatic updates of the operating system, or software can start without your knowledge. These can slow operations.

If you have surveyed the field in 'drain mode' rather than 'field survey mode' the tablet can become sluggish when implementing (due to continual calculations positioning the displayed position relative to the large drain line created).

### Solutions:

1) Confirm tablet running T3RRA meets minimum requirements:

- ✓ Windows 10
- ✓ CPU: Intel i5
- ✓ RAM: 8GB, HDD
- ✓ HDD 128GB (minimum)

2) Perform updates for T3RRA and Windows:

T3RRA needs to be updated regularly in order to perform at its best. When connected to a good Internet connection, click on 'Download Updates' under Options > About and the newest version will install. iDitch will let you know there is an update available on the Opening page when a new version is available if connected to the Internet. Windows & .NET need to be regularly updated. Windows 10 is best updated using the Windows 10 Update Assistant downloadable from the Microsoft website. Perform a hard restart after updates are completed.

3) Create manageable projects:

Break large projects into smaller projects that are less taxing on the computer.

4) Check for applications running in the background:

Make sure there is nothing else running on the computer and bogging it down (you can go into Task Manager and look at the performance charts).

5) Report detailed information to T3RRA if the problem persists.

- Does the tablet freeze?
- Does the software freeze?
- Does the freeze 'unfreeze' at some time?
- Can the software be killed manually or does the machine have to be re-started?

Please provide this information when reporting an issue.

# Surface Pro tablet not updating or freezing.

## Symptoms:

Surface Pro tablet does not update T3RRA software completely and/or freezes.

## Cause:

Windows updates require hard restart to take effect.  
High speed internet connection required.

## Solution:

Microsoft suggests executing the “Two Button Shutdown” after restart and before signing in. This is only to be used on Surface Pros. Do not use this process on Surface RT, Surface 2, or Surface 3. Using this two-button shutdown process ensures that your Surface is turned off completely. Here’s how:

- Step 1: Press and hold the power button on your Surface for 45 seconds and then release it.
- Step 2: Press and hold the volume-up button and the power button at the same time for at least 20 seconds and then release both. The screen may flash the Surface logo or something else, but continue holding the buttons down.
- Step 3: After you release the buttons, wait 10 seconds.
- Step 4: Press and release the power button to turn your Surface back on.

## Things we have also found useful:

Connect to the hotspot on your cell phone for a possible higher speed Internet connection.  
Make sure there is nothing else running on the computer and bogging it down (you can go into the task manager and look at the performance charts).  
Break large projects into smaller projects that are less taxing on the computer.

# Mouse pointer flickers across the screen randomly.

## Symptoms:

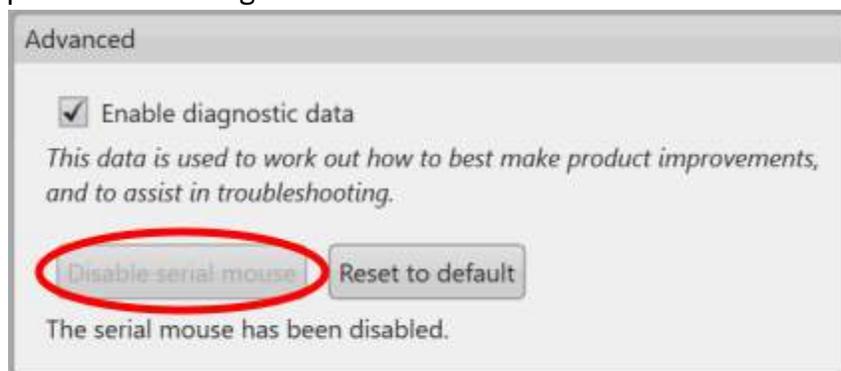
When the tablet starts the on-screen mouse jumps randomly about the screen. Windows may open and close as the mouse clicks on desktop or program icons. Input is difficult due to competition from the 'crazed and possessed' mouse arrow. You will likely receive a pop-up error about your desired com port being taken already when you try to open your T3RRA software.

## Cause:

When booting, some tablets check the serial port for the presence of a serial mouse (a common type of mouse prior to PS1 and bluetooth mice). If a stream of GPS data is present the operating system can mistake it for mouse data and direct the data to the onscreen pointing device. As the data is not mouse data it simply results in random movement and clicking. This also monopolizes the serial port, which then cannot be used by T3RRA software. **Note:** Even after implementing the registry fix below a 'Windows Update' can sometimes cause this fix to be reverted and the problem will re-appear.

## Solutions:

1. Go to 'Options > Edit settings > Advanced' and disable the serial mouse.

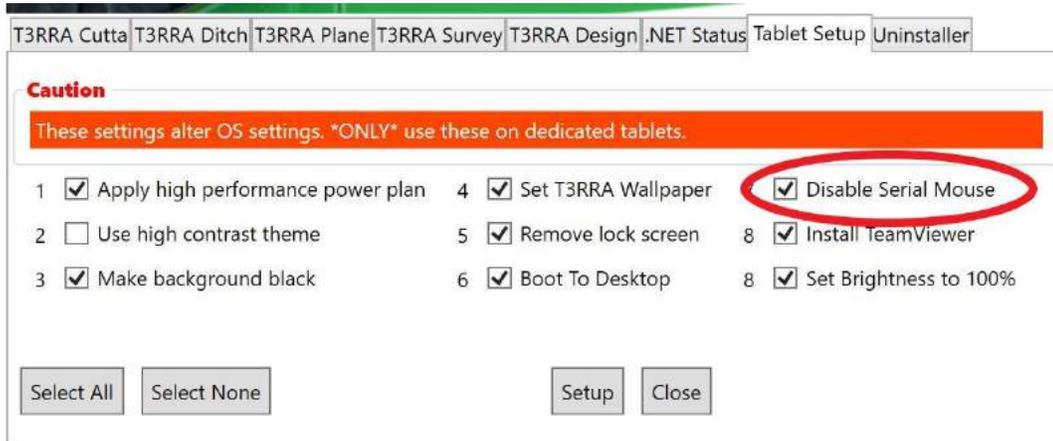


2. Always start the tablet before the tractor is turned on. If the tablet starts prior to any incoming GPS data the problem will not occur.
3. Search for the serial mouse with the Windows 'Device Manager' and disable it.
4. Permanently disable serial mice using the Windows Registry. Instructions for doing this can be found online at pages like:

[http://www.taltech.com/support/entry/windows\\_2000\\_nt\\_serial\\_mice\\_and\\_missing\\_com\\_port](http://www.taltech.com/support/entry/windows_2000_nt_serial_mice_and_missing_com_port)

**NOTE:** Do not alter the Windows Registry unless you are competent to do so and understand the possible issues of doing so. If in doubt contact your dealer or T3RRA.

5. Request that your dealer uses their T3RRA Installer software to correct the issue. This software will perform the Registry fix action. The relevant tab in the software is the “Tablet Setup” tab.



# Windows are opening and closing on the tablet randomly.

## Symptoms:

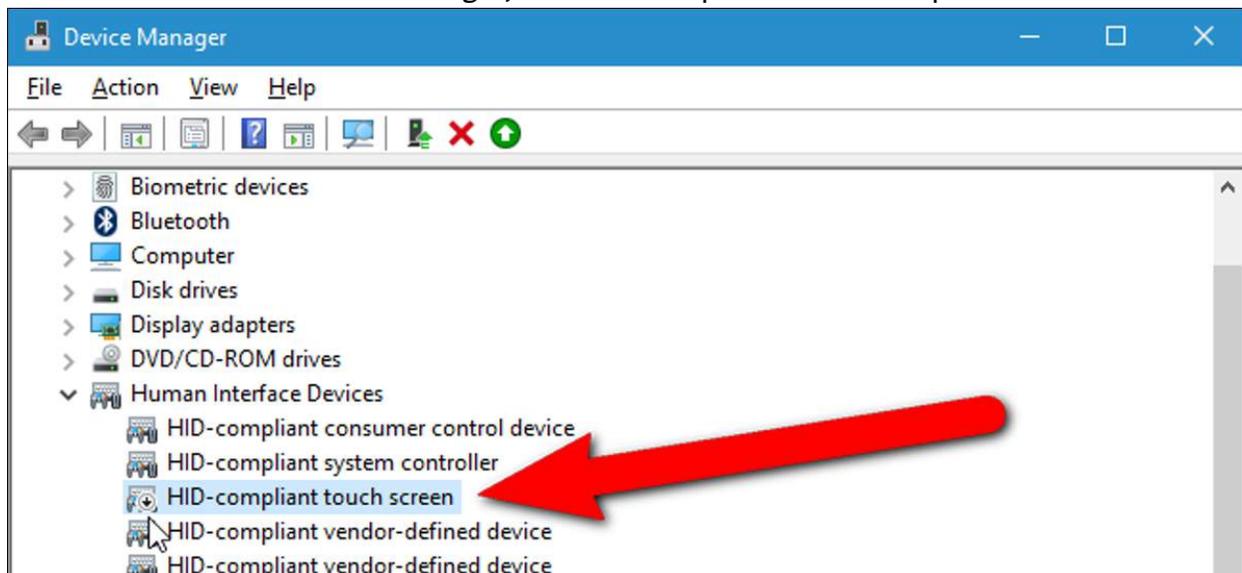
Windows are opening and closing randomly as if someone was tapping on desktop or program icons.

## Cause:

It is possible that the touch screen is malfunctioning. A crack in the screen may be a good indicator. This happens whether or not GPS data is streaming into the tablet COM port (see [Mouse pointer flickers across the screen randomly.](#))

## Solutions:

Tablet repair may be required. Alternatively, disable touch input (via the Human Interface Devices section of the *Windows Device Manager*) and use a computer mouse for input.



# T3RRA software does not automatically start when the tablet boots.

## Symptoms:

When the tablet starts it is normal for T3RRA software to automatically load. However if you wait a reasonable period (sometimes up to several minutes, if updates or other activities are occurring) the T3RRA software still may not load.

## Cause:

The tablet has not been properly configured to load the T3RRA software on startup, or the load routine has been disabled.

## Solutions:

Configure your system to start T3RRA software on startup. There are several ways to do this. Google will provide many answers. See below for answers from Microsoft at <https://support.microsoft.com/en-au/help/4026268/windows-10-change-startup-apps>

Note: If you are asked to copy the T3RRA software program file to a startup location DO NOT copy an actual executable file from any of the T3RRA software program directories. Copy the *shortcut* that is on the Windows desktop instead. Alternatively, create a shortcut pointing to the executable file and copy it. Note that the executable file that the shortcut must point to will normally be in a folder with two subfolders named 'd' and 'v' (see below for iDitch's program file, other T3RRA software will be named similarly, according to the application name).

Name	Date modified	Type	Size
d	23/12/2021 11:15 AM	File folder	
v	23/12/2021 11:15 AM	File folder	
T3RRA iDitch.exe	3/11/2021 10:12 AM	Application	72 KB

**Important:** you should be familiar with working with files in Windows in order to apply this fix. Mistakes while performing these types of activities can cause serious system problems. If you are not confident of your abilities please contact T3RRA or your dealer.

# Change which apps run automatically at startup in Windows 10

Applies to: Windows 10

---

## Change apps

Here are two ways you can change which apps will automatically run at startup in Windows 10:

- Select the **Start**  button, then select **Settings**  > **Apps** > **Startup**. Make sure any app you want to run at startup is turned **On**.
- If you don't see the **Startup** option in **Settings**, right-click the **Start**  button, select **Task Manager**, then select the **Startup** tab. (If you don't see the **Startup** tab, select **More details**.) Select the app you want to change, then select **Enable** to run it at startup or **Disable** so it doesn't run. Watch the video to see how to do it.

## Add apps

To add an app to **Startup**:

1. Select the **Start**  button and scroll to find the app you want to run at startup.
2. Right-click the app, select **More**, and then select **Open file location**. This opens the location where the shortcut to the app is saved. If there isn't an option for **Open file location**, it means the app can't run at startup.
3. With the file location open, press the Windows logo key  + R, type `shell:startup`, then select **OK**. This opens the **Startup** folder.
4. Copy and paste the shortcut to the app from the file location to the **Startup** folder.

---

Last Updated: 29 Mar 2019

---

## Can't find an onscreen keyboard.

Symptoms:

You need to enter text (like a filename) while running T3RRA software but you can't figure out how to.

**Cause:**

Microsoft Windows has at least one onscreen keyboard available to use for text input on tablets. However it can sometimes be challenging to find it.

Windows may be set to desktop mode and the Keyboard won't automatically open when a text box is selected.

**Solutions:**

There are 3 current solutions to this problem.

1. Plug a physical keyboard into your tablet.
2. Enable 'Show keyboard' in Settings.
3. Swipe in from the "right" side of the screen and check if tablet mode is on/off, the icon should be highlighted blue if tablet mode is on.

If tablet mode is on, press the small image of a keyboard on the task bar in the lower right corner of the screen (in case you have moved the taskbar the keyboard icon should be next to the clock).

# T3RRA software will not install.

## Symptoms:

Installation proceeds smoothly. However, when attempting to run the software it will not start. The program shortcut icon may disappear. Subsequent attempts to re-install may throw errors indicating the user does not have sufficient permissions to perform file writing or folder accessing tasks.

## Cause:

It is likely that you are running some type of anti-virus or malware protection software. This software may be seeing T3RRA software as a potential threat and refusing to run it. Alternatively, your administrative settings may be such that software cannot be installed without help from your system administrator.

## Solutions:

1. Read the documentation provided with your malware protection software. Follow directions to allow the T3RRA software to run as a whitelisted application. The path to add as an exclusion is:

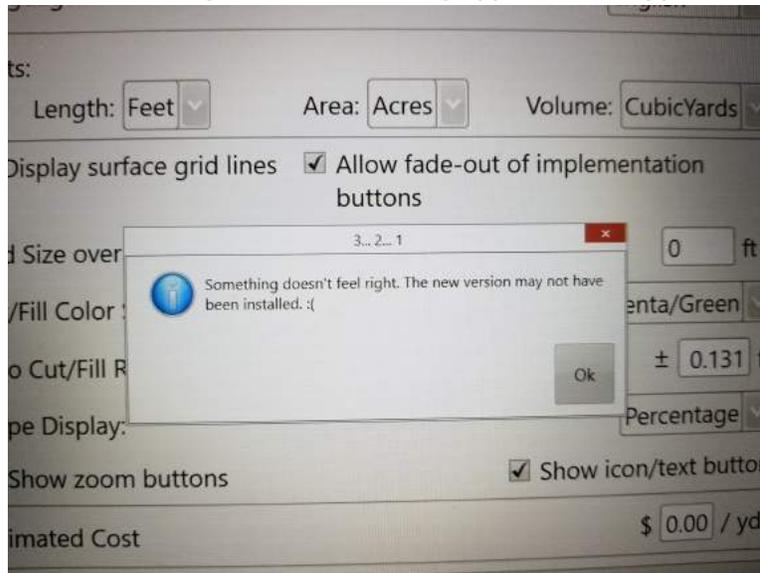
```
C:\Users\YourUserName\AppData\Local\T3RRA\T3RRA_Cutta  
2
```

2. Alternatively, uninstall your malware product and install the T3RRA software while it is uninstalled. Then re-install your malware software.
3. Seek advice from your system administrator.

## T3RRA software is not updating.

### Symptoms:

When attempting to update T3RRA software using the normal method in the Settings area an error message like the following appears. You appear to have a good Internet connection.



### Cause:

If you are on a corporate network it might be configured not to allow access to certain websites. Our download server may not be on an approved whitelist.

### Solution:

Request help from the company network administrators. Alternatively switch to another network (such as by tethering the tablet to your phone's internet signal).

## In-cab tablet is too small to design effectively.

### Symptoms:

You are having difficulty performing designs on a tablet screen that is 10 or 12 inches in size.

**Cause:**

Small screens can be difficult to work with, particularly for anyone with impaired vision.

**Solution:**

Take the tablet back to your office. Plug the tablet into a large PC monitor or TV. Most tablets will have an HDMI connector for this purpose. Consult your local IT retail firm regarding cables or adapters required. Duplicate your tablet screen on the external monitor.

# Tablet is in 'Tablet Mode' and you can't find the desktop icon for your T3RRA Software.

## Symptoms:

The screen on your tablet when T3RRA Cutta is not running appears different from what you expect. It does not display the regular Windows desktop. You are unable to find the T3RRA software icon to activate your T3RRA software.



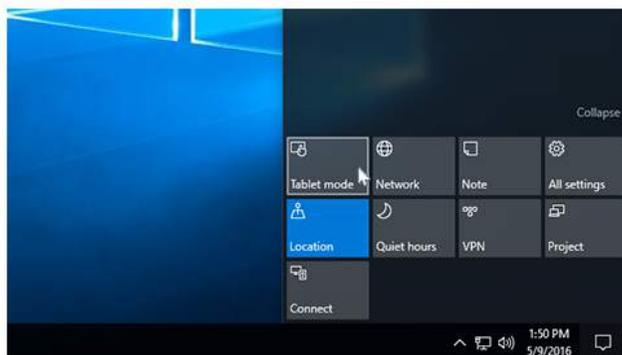
## Cause:

Your tablet has somehow been placed in 'Tablet' mode.

## Solution:

Turn off tablet mode.

Tablet mode makes Windows 10 more touch-friendly when using your device as a tablet. Select action center  on the taskbar (next to the date and time), and then select **Tablet mode** to turn it on or off.

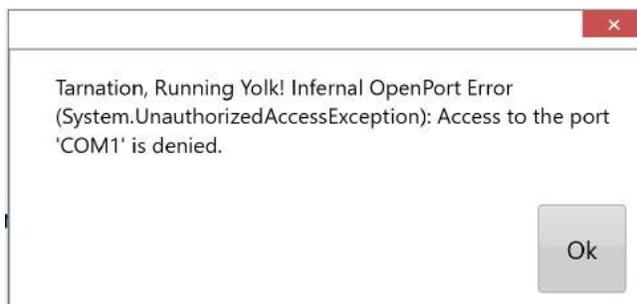


# Access to the port 'COM X' is denied.

See also: “[Mouse Pointer flickers across screen Randomly](#)”.

## Symptoms:

The following message appears.



## Cause:

This message generally occurs when an attempt is made to open a serial connection to iGrade or directly to a GPS, but the serial/COM port in question is already being used by another piece of software.

## Solutions:

- 1) Check that no other software is running on the tablet and already using the port.
- 2) Check the connection of the cable to the tablet.
- 3) Power down the tablet running T3RRA and the tractor. Next, remove the serial cable or USB-Serial cable from the tablet. Turn on the tablet and start T3RRA. Once you are looking at the GPS screen, plug in the cable. Now, start up the tractor.

Plug all cables for iGrade in before starting the tractor. In other words, the tractor needs to be OFF until iGrade is plugged in and the T3RRA tablet is powered on.

The tablets that do not have true dedicated serial ports require USB-to-serial cables which create 'virtual' COM ports. Best practice is to update the USB to Serial cable driver before initial use of T3RRA in-field.

### Steps:

1. Turn on the tablet that has T3RRA installed.
2. Connect to the internet.

3. Insert your USB to Serial cable.
4. Select Settings, then GPS Port settings, click on 'Device Manager'.
5. When the Device Manager window opens, locate 'Ports (COM & LPT)\*'.
6. Click on 'Ports (COM & LPT)' to show which COM port has been assigned.
7. Right click on 'COM Port'.
8. Select 'Update Driver'. You will be notified once the software has been updated or if it has the current driver.
9. Set COM port in T3RRA GPS Port Settings to correct port from the drop down.

\*NOTE: If 'Port' is not in the list, you may need to download the driver from the product website and install manually. We ONLY recommend FTDI USB to Serial Port adapters. This is the URL to download FTDI Setup executable file:

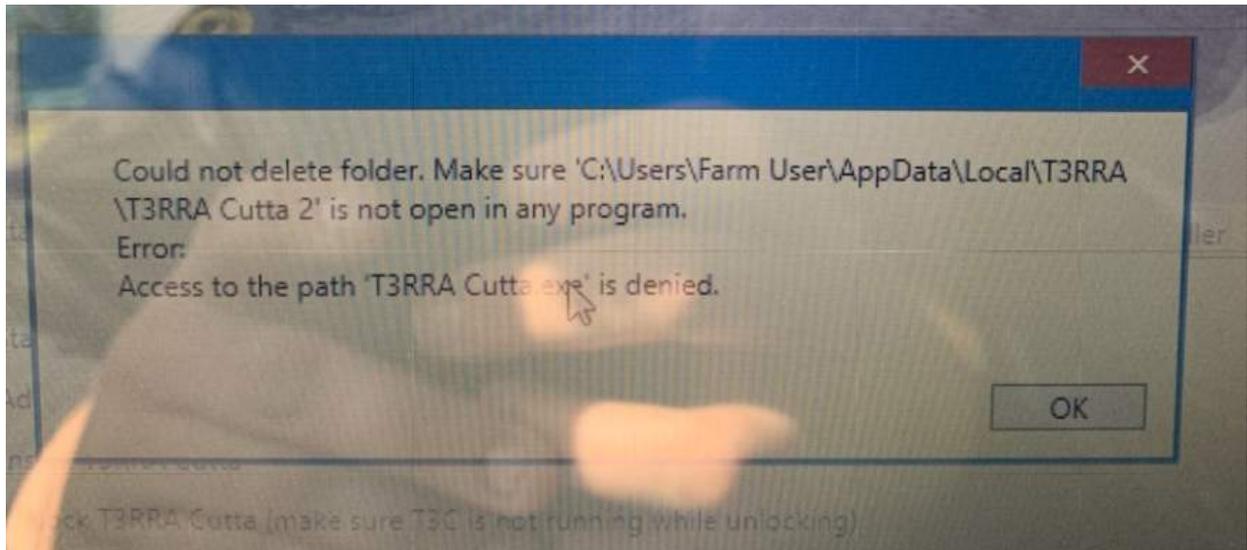
[https://www.ftdichip.com/Drivers/CDM/CDM21228\\_Setup.zip](https://www.ftdichip.com/Drivers/CDM/CDM21228_Setup.zip)

# SET UP & INSTALLATION

## Unable to install T3RRA software.

### Symptoms:

“Access denied” type errors occur when attempting to install T3RRA software. The installation fails, or the software disappears from the computer shortly after installation.



### Causes:

- 1) Antivirus software on the tablet prevents installation, or quarantines the installed files shortly after installation.
- 2) Company IT staff have locked down the tablet such that software cannot be installed.

### Solutions:

- 1) Disable your antivirus software or ‘whitelist’ T3RRA files with an exclusion. Consult your antivirus software documentation for information on how to do this. In some situations you may have to uninstall the antivirus software. It can normally be reinstalled afterwards.
- 2) Consult your company IT staff.

# Diagnosing guidance line location issues.

## Symptoms:

Guidance lines imported into the display are not in the correct location:

- Tractor is manually steered down lines displayed on T3RRA.
- Tractor is auto steered down lines.
- Auto and manual steering result in significantly different paths.

## Possible causes with solutions:

**Cause:** For 2630 only - Repeat box was not checked.

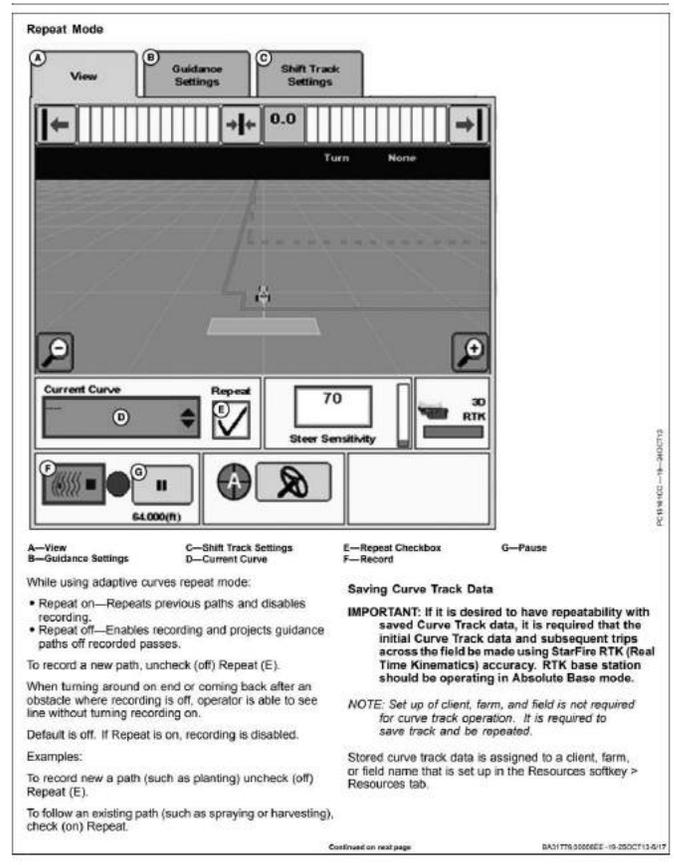
**Solution:** For 2630 only - check Repeat box then cycle.

**Cause:** Survey data used to Generate paths captured on a different correction source (SF3, Dealer base, SF1 and others).

**Solution:** Due to the inability to shift Guidance lines North-South, East-West in a JD display, we cannot correct or guarantee the accuracy of lines created from another correction than the correction used to survey them. It is best practice (and highly recommended) that users survey, design, and implement from a single GPS source.

**Cause:** Survey completed from Dealer base and implementing from a Quick survey base

**Solution:** It is always good practice to implement with an absolute base. If there is a dealer network base coverage available at the location of the base used for implementation, we highly recommend connecting that base to the dealer network as a vehicle. Take note of the lat/long and elevation values then enter those details into the base location after configuring the base to absolute base. (refer to JD technical documentation for more information on editing base parameters).



# GPS

## No GPS signal is being received from iGrade.

### Symptoms:

- Tractor position icon not appearing on map-screens.
- 'GPS info' button in the bottom right of map-screens is red.
- In the 'Settings' window there are no characters streaming into the 'Serial port raw data' window in the 'GPS Port Settings' tab.

### Symptoms of incorrect baud:

Incorrect baud rate settings are identifiable by viewing the incoming data in the window provided in the GPS setting tab.

Good data looks like normal text, as below.

```
Serial port raw data
GA,000019.83,2659.99181619141,S,15059.9999999914,E,4,10,0,200,,0,,0
,*5D
$GPGSA,A,3,01,05,00,00,00,18,00,22,30,31,48,51,2.5,1.1,1.9*39
$JD,GPGGA,1,000019.83,2659.99181619141,S,15059.9999999914,E,4,10,
0,200,,0,,0,*4E
$GPGGA,000019.93,2659.99172625938,S,15059.9999999914,E,4,10,0,20
0,,0,,0,*59
$GPGSA,A,3,01,05,00,00,00,18,00,22,30,31,48,51,2.5,1.1,1.9*39
```

Incorrect baud looks like:

```
Serial port raw data
????????Fd!??Z??????????%????????????????A$ ?????????????????
f????????????F$ ?????????????????????????????
Fd!????????????????????????????gA$ ?Y????????????????????
Z????????????@$ ?????????????????????????????
Fd!????????????????????????K?????@
$ ?????????????????????????D$ ?????????????????????????Fd!
H????????????@????????????????????E$ ?????????R????????????????
@$ ?????????????????????????Fd!????F????????????????????F
```

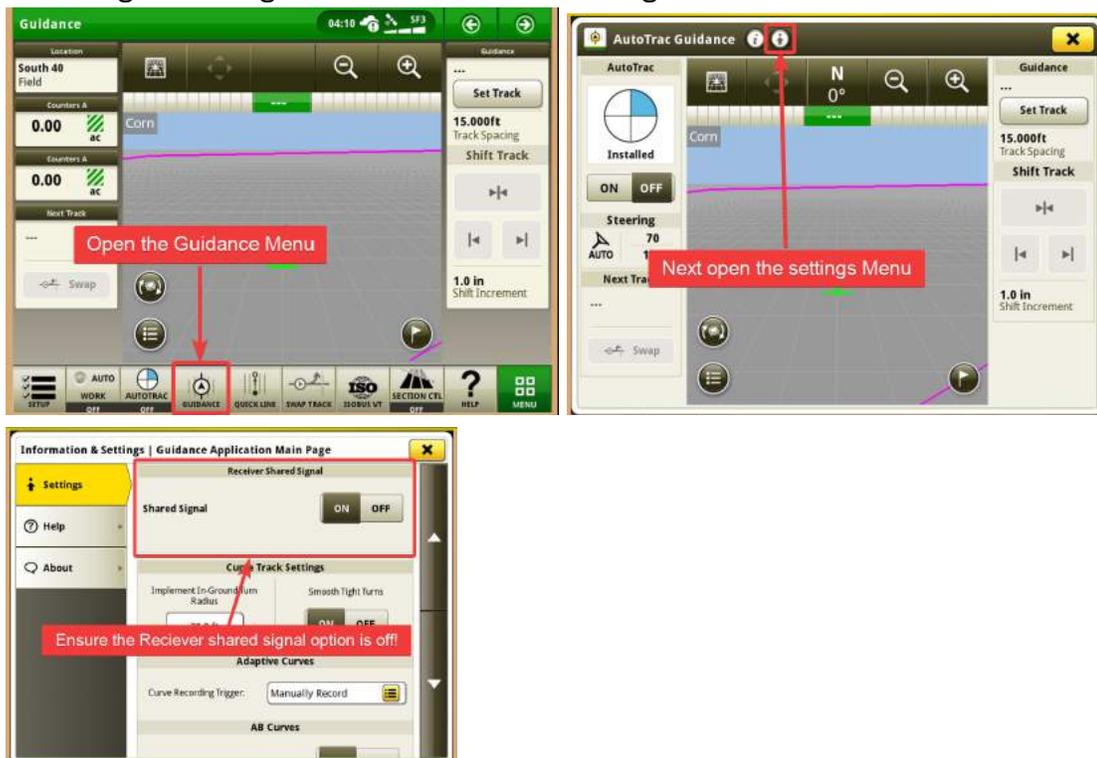
### Causes:

The port for the GPS to T3RRA software may be closed.

Signal sharing is causing iGrade to lose GPS.  
 Drivers for the tablet's serial port or USB-to-serial cable may not be up-to-date.  
 Cables may not be seated correctly.

**Solutions:**

- 1) Ensure all Windows updates are performed.
- 2) Open the GPS info screen by pressing on the GPS button in the bottom right of the Collect or Apply step. Confirm that you have an RTK GPS signal and that the Open Port button is greyed out.
- 3) Ensure Signal Sharing is disabled in Autotrac settings



- 4) Confirm USB-to-serial cable's driver is up-to-date if applicable (refer to 'Access to the port 'COM X' is denied'. for instructions on how to update driver)
- 5) Confirm harnessing is correctly installed using AE3166 to connect T3RRA to iGrade app controller or AE3070 to T into receiver for surveying without iGrade.
- 6) Perform a continuity check on the iGrade harness to make sure the pin configuration is correct and the cable is not damaged.
- 7) Check settings in both iGrade and T3RRA (iGrade and T3C need identical Baud Rate):

**IMPORTANT:** When using T3RRA Products with iGrade you must configure the serial settings in "iGrade Settings". You only need to configure the serial port in "Receiver Settings" if you are

connecting directly to the StarFire (as you might do when you are surveying in a Gator for instance).

In iGrade UCC1:

- Select Main Menu
- Select Control Selection
- Select Serial Port Setup
- Baud Rate – 38400
- NMEA – GGA, GSA
- NMEA Rate – 5 Hz
- Set Last Altitude - Off

In T3RRA (using iGrade UCC1):

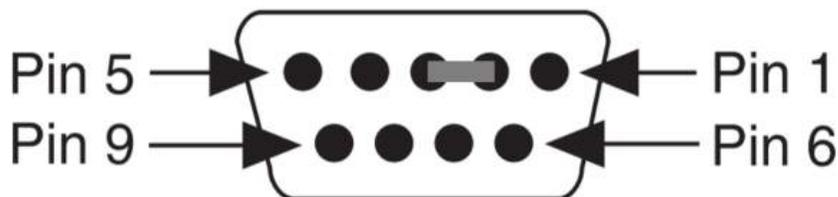
- Open T3RRA program and go to Settings > GPS Port Settings
- Set 'COM Port' to the correct port
- Set Baud rate to 38400
- Select Ok button

## Testing Serial harnessing.

The most reliable way to confirm correct serial port harnesses operation when using T3RRA Products is to utilise the Port data window and use a testing method called Serial Loopback.

A loopback test can verify the operation of serial communication by sending and receiving data from the same serial port. It can show problems in the serial port, the cable, or the software generating the messages without having to connect to third party hardware.

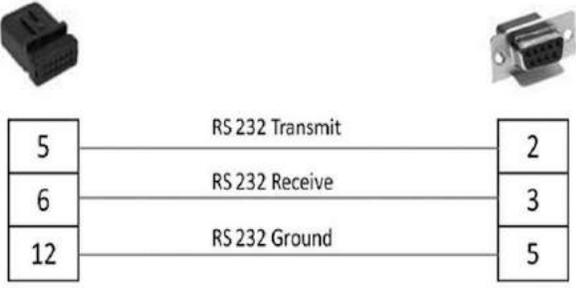
**VERY CAREFULLY!** connect the transmit (TXD) signal to the receive (RXD) signal pins 2&3 on the serial port connector. Or pins 10&3 on the JD SF Receiver connector. Or Pins 5&6 on the iGrade connector.



5



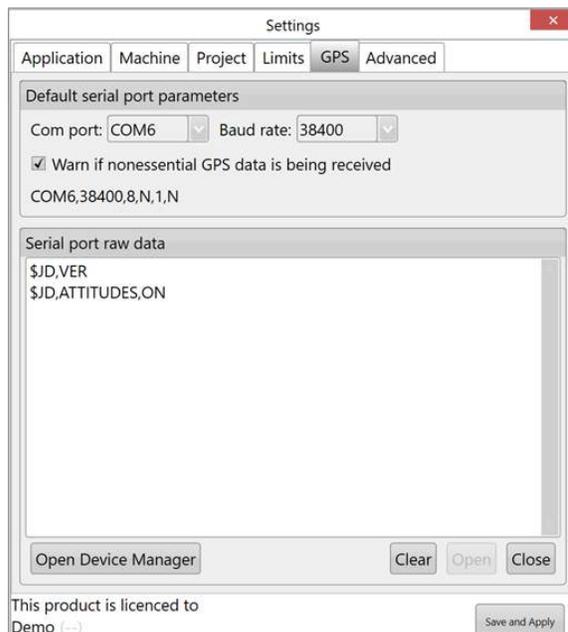
Pin Number	Circuit Code	Function
3	933	TX1 (SF to Aux)
7	070A	Power Ground
10	936	RX1 (SF from Aux)



Serial Port Wiring Pinouts

While these pins are connected, press the **Open Port** button.

The serial port raw data should populate the messages as indicated below, this would indicate both the send and receive pins are working correctly and the harnessing is connected correctly.



Settings

Application Machine Project Limits GPS Advanced

Default serial port parameters

Com port: COM6 Baud rate: 38400

Warn if nonessential GPS data is being received

COM6,38400,8,N,1,N

Serial port raw data

```
$JD,VER
$JD,ATTITUDES,ON
```

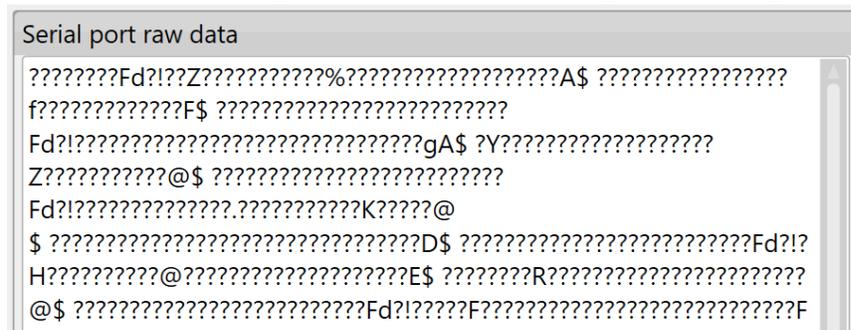
Open Device Manager Clear Open Close

This product is licenced to Demo (-) Save and Apply

# Baud rate is set correctly but messages from iGrade are still garbled.

## Symptoms:

Baud rates are set correctly on both T3RRA software and in iGrade. The T3RRA software is not receiving GPS and the GPS diagnostics window is showing an unintelligible data stream:

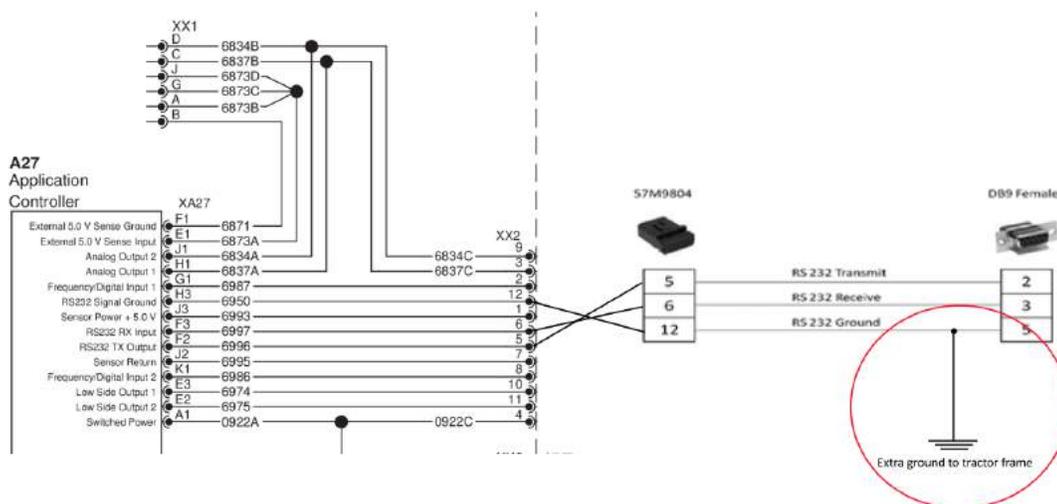


## Causes:

The serial connection is not properly grounded. Pin 5 is disconnected or connected to the wrong pin at the other end of the cable.

## Solutions:

Carefully check the remote control cable and the iGrade harness. Ensure that the ground wire is properly grounded. In at least one case we have had a user report that an additional grounding wire was required as shown below.



## Vertical Performance Issues (GPS drift).

### Symptoms:

Blade seems to drift throughout the day. When grading over a section of drain that is thought to be 'finished' the blade consistently begins to either cut or fill.

### Possible Cause:

- Using SF6000 and SF3000 receivers together as a base and rover, or as tractor and implement.
- Base is configured as a Quick Survey base when using iGrade.
- Poor GPS availability throughout the day.
- Base station in a non-ideal location.
- Base station being interfered with by passing vehicles.
- High VDOP values are shown by T3RRA Software

### Solutions:

- ALWAYS look for correlations with something that is happening in your vicinity when the issue is occurring. If the issue always happens at a certain time, or in proximity to buildings, trees, powerlines or other features then troubleshooting options can be narrowed.
- If using a 3000 receiver on the implement, John Deere recommends using an external antenna.
- John Deere recommends not mixing Receiver generations, as Base-Rover or as Machine-Implement configurations.
- Ensure the base is always configured as an absolute base when using iGrade.
- You must ensure Signal sharing is turned off in AutoTrac settings when using iGrade.
- Check GPS conditions at <http://satpredictor2.deere.com/address>. GPS conditions may be non-ideal, shift activities to bulking work until the GPS constellation improves.
- Use a mobile base and place it as close to the working area as practically possible.
- Move the base away from obstructions (building, vehicles, trees) and higher off the ground.
- Tune iGrade hydraulic thresholds.
- If you notice that degraded accuracy consistently occurs at certain times of the day there may be unavoidable satellite/atmosphere conditions. Try and schedule bulking work for this period, leaving high accuracy finishing grading for other periods in the day.

Dealers are encouraged to file a John Deere DTAC case if vertical accuracy issues are not solved using other recommendations in this guide.

# You are getting GPS data but the fixed quality is not RTK.

## Symptoms:

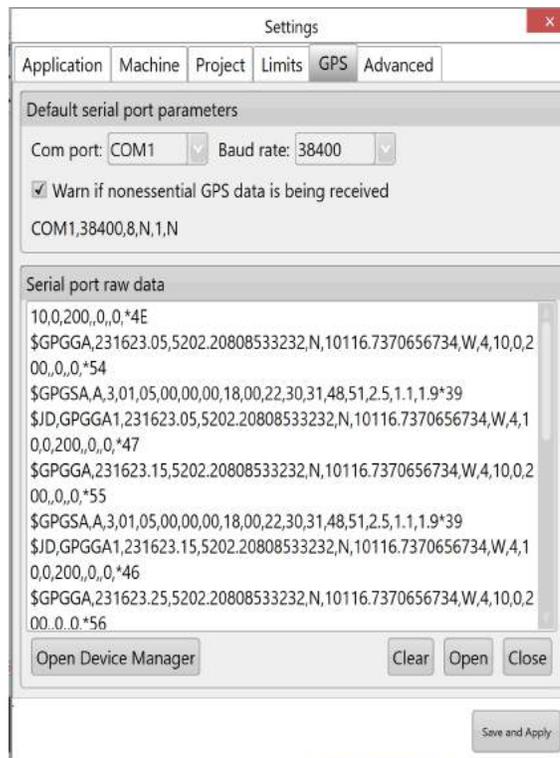
When you open a COM port you clearly see that positional data is being received. However the GPS Info window is displaying a fix other than *FixedRealTimeKinematic*.

## Cause:

1. You are connected to the wrong COM port. This is possible if your tablet has an internal GPS and you are connecting to it's port.
2. Your GPS is not receiving RTK correction packets from it's base station.

## Solutions:

1. Check to see that you are connected to the correct serial port.
2. There are many reasons a GPS may not be receiving correction packets from it's base station. Check your GPS documentation for solutions.



# GPS data stops and COM port number has changed.

## Symptoms:

The position stops updating and it is apparent that position data is no longer being received.

When you open the 'GPS Info' window it is apparent that the COM port has changed to a different port from normal. The regular port may or may not be there. If it is there and you change back to it everything is ok, but the problem may intermittently continue to occur.

## Cause:

You are using a USB-to-Serial adapter. It is loose and the connection is randomly lost when the machine vibrates or travels over bumps.

## Solutions:

1. Check connector ends for obvious damage.
2. Secure the adapter more securely using cable ties or other restraints.
3. Clean the USB metal contacts using contact cleaner and a cotton swab (or similar).
4. If the tablet has more than one USB port try the USB-to-Serial adapter in an alternative USB port.
5. Replace the USB-to-Serial adapter (please only use an approved FTDI adapter).

# SURVEYING

## Elevation Offset during surveying.

### Symptoms:

Recorded elevation data collected while surveying is offset and not in the correct location.

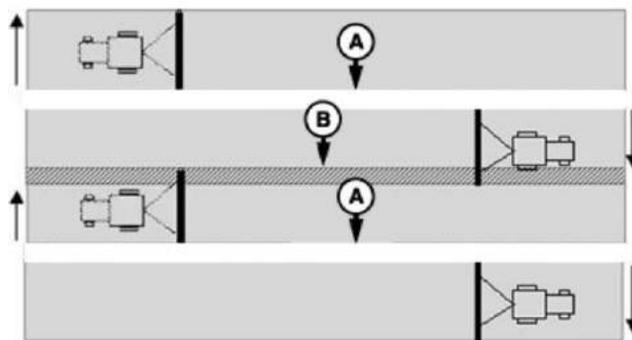
### Possible Cause:

- StarFire Receiver needs calibrated

### Solutions:

- Calibrate receiver's TCM (refer to John Deere SF OM)
- Re-Survey

**IMPORTANT:** Vehicle must be on a hard, flat level surface for calibration. If TCM is not calibrated on a level surface or TCM mounting angle is not level in relation to vehicle angle (StarFire mounting bracket or vehicle cab being slightly offset, uneven tire pressures from one side to other, etc.) operator may see offset during operation. This offset could look like a consistent skip (A) or overlap (B) in pass-to-pass operation. To eliminate offset, recalibrate on a level surface, drive down a pass, turn around and drive down the same pass in the opposite direction. If the vehicle does not follow the same pass, measure offset distance and enter an implement offset. After initial calibration of TCM, it is not necessary to calibrate again unless TCM angle in relation to the vehicle has changed. For example, tire pressure has been lowered on one side of vehicle.



A—Skip

B—Overlap

## Surveying at heights close to sea level results in an incorrect surface.

### Symptoms:

The collected field elevation map (in T3RRA software) appears vastly different from your expectation of what the actual field looks like. You are surveying a field where elevations can be both negative and positive (i.e., partially above and partially below sea level). When you examine your field map you see that all elevation values are either negative or positive (not both). You are using a StarFire 3000 receiver and receiving serial data directly from the receiver (not via iGrade).

### Cause:

The StarFire 3000 has a bug that causes problems with output elevations when it crosses between positive and negative elevation values.

### Solution:

1. Alter your base station height so that the whole field can be surveyed using elevations that are either all positive or all negative.
2. Use iGrade and an implement receiver to survey the field.

# IMPLEMENTING

## Troubleshooting performance.

### Symptoms:

- Implement responds too slowly to changes in grade
- Blade fails to hold grade
- Unexpected shifts in blade elevation occur
- Implement appears not to respond to commands
- Cross slope not working
- Cross slope behaving unexpectedly

### Cause:

“Performance” is a subjective term. There are many ways in which a system can suffer poor “performance”. Thus there are also many causes for this. The exact cause will differ with the type of performance degradation present. Specific types will be discussed further in other parts of this document. However the below advice is almost always relevant.

### Solutions:

The first step when diagnosing any performance issue is to disconnect the T3RRA software and to test iGrade *in isolation*. Only once you have confirmed that iGrade is working properly, you can then start to troubleshoot the T3RRA software. Place iGrade in Plane Control or Grade Control and establish that it is performing as expected. If it is, reconnect the T3RRA software and continue with other solutions in this troubleshooting guide. If it isn't, please consult your John Deere dealer.

# Implementing issues with iGrade (will occur without T3RRA connected).

**NOTE:** There will be situations where your dealer may ask you to capture a StarFire message log for further diagnosis. This can be done on the Deere display using the SF6000 VT as follows:



## Bi-Directional error in iGrade.

### Symptoms:

The implement consistently cuts when heading in one direction and fills in the other direction. Final grade is never achieved. If T3RRA software is halted and iGrade is run in 'Plane Control' only the problem is still present. Changing height control to SCV3 may resolve the issue.

### Cause:

This problem has been seen in cases where check valves within the tractor SCVs are malfunctioning. The implement blade is failing to hold height properly. The bidirectional nature of the issue perhaps comes from different amounts of dirt (weight) within the scraper when it is going in different directions. If changing height control to SCV3 fixes the issue then it may indicate that only SCV1 is malfunctioning.

### Solutions:

Replace check valves with tractor SCVs.

## Blade continuously loads on one side.

### Symptoms:

System is grading low on one side.

### Cause:

iDitch does not control cross slope. To change cross slope, use iGrade. Cross slope control may not work because:

- iGrade has not been set correctly.
- SCV's have been put accidentally in float instead of detent.

### Solutions:

- 1) Ensure this is actually the case, try grading in both directions along a single pass be sure to confirm the blade stays low on one side
- 2) Be sure the SCV is set to the auto detent position
- 3) Complete a TCM calibration on the receiver, be sure to drive a complete figure eight to wake up the TCM before completing the calibration, ensure the blade is close to the ground and level before proceeding through each step of the TCM calibration.
- 4) If there are two receivers on the one scraper, check to see that the Implement GPS Receiver Offsets are set correctly in iGrade.

## Poor “on grade” performance.

### Symptoms:

Blade Struggling to hold grade.

### Cause:

There are multiple possible causes for this issue.

- Interruptions to GPS.
- Incorrect surface offset.
- Incorrect settings in iGrade.

### Solutions:

- 1) Disconnect T3RRA software. Perform performance tests using iGrade alone to simplify. After you are satisfied with the iGrade performance, reconnect T3RRA software and re-evaluate performance.
- 2) Be aware of your environment, GPS can experience interference from trees, buildings, the tractor, water and some soil types can cause interference.
- 3) Ensure the base is set up clear of trees and obstructions of its view of the sky.
- 4) Ensure the base is set up well clear of any traffic or vehicles passing by.
- 5) Ensure GPS accuracy is adequate, ensure you are operating within 1 mile (1.6kms) of your base station.
- 6) Check the GPS accuracy is adequate, Ensure your VDOP is below 1.6, do this by either opening the GPS info window in T3RRA Cutta by tapping the GPS in the lower right of the display.
- 7) Ensure the settings in iGrade are correct and re-calibrate iGrade thresholds and set the grade sensitivity. Calibrate thresholds using a potentiometer or a pressure gauge. See dealer for details.
- 8) Check your base has adequate power and is configured as an absolute base, low base power when set as a quick base can cause strange results.
- 9) If using a StarFire 3000 be aware that John Deere recommended practice is to use an external antenna. Check that the coaxial cable is not squashed or damaged.
- 10) Dealers are encouraged to file a John Deere DTAC case if vertical accuracy issues are not solved using other recommendations in this guide.
- 11) Also see - [The implement blade does not seem to follow the design surface.](#)

## Engaging auto causes the scraper to rise into the air.

### Symptoms:

Operator engages scraper into detent (auto mode) and the scraper extends to full stroke on the lift cylinders.

### Cause:

iGrade has Load Limiting and/or Max Cut enabled in Application controller settings. The engine speed (RPM) threshold is set lower than the field working engine speed (RPM) threshold.

User is using UCC2 in Proprietary valve mode (CANBUS). But has the application controller also connected via the legacy option connector.

### Solution:

Disable Load Limiting and/or Max Cut in Application controller settings.

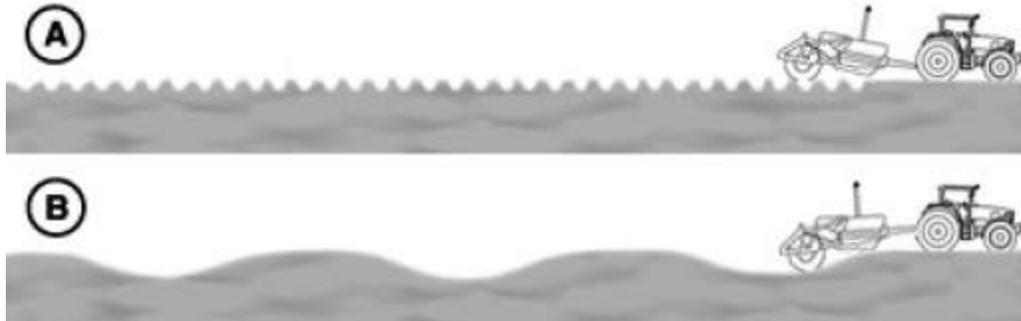
Enter an engine speed threshold that is greater than the factory default of 1500 rpm or make sure your working engine speeds are greater than your current load limiting engine speed.

Disconnect the legacy valve mode SCV connector at the application controller.

## Scraper is “washboarding”.

### Symptoms:

Scraper causes a washboard effect.



A- If washboarding is close together, flow rate is too high.

B- If washboarding is far apart, flow rate is too low.

### Cause:

- SCV flow rate is set too high or too low.
- Washboarding can occur when the blade is at an overly aggressive angle (construction model scrapers have a more aggressive angle while 'finishing' scrapers do not).
- It can occur when the ground is hard and has not been prepped for dirt moving.
- It can also occur when the tires' air pressure on the scraper does not match (one is lower than the other).
- It can also occur if the scraper has split hydraulics and the cylinders controlling height over the right and left walking tandem are not equally pressurized (one cylinder may have a leak).
- It can also occur if the tractor hitch is mounted to the scraper drawbar too high or too low.

### Solutions:

Decrease or increase the SCV flow rate. If still present, adjust counterbalance valve pressure. Contact implement service provider.

# Implement blade moves to an extreme position when placed in Auto.

## Symptoms:

When placing the machine in Auto, the implement's blade dives deep, climbs to full height, or tips fully to one side.

## Cause:

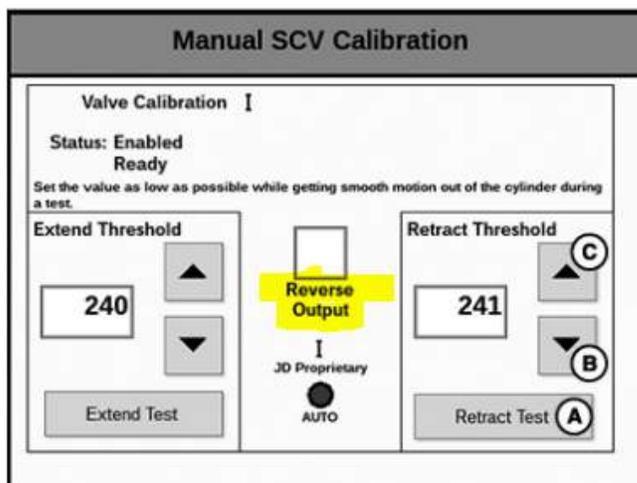
SCV hoses are incorrectly configured (reversed).

UCC2 with JD proprietary mode configured for SCV control but JD Legacy "Option connector" is also connected to the tractor.

## Solutions:

Short of altering the hydraulic hose configuration on the implement's cylinders, there is no known solution for iGrade v1.

iGrade v2 also gives the option of reversing the outputs.



Ensure Option connector on rear of machine is disconnected, Then complete 2X power cycles to reset the SCV Controller

# Blade not staying on grade & acting inconsistently.

## Symptoms:

Blade is acting erratically.

Blade height is on grade for a while but then moves down a few inches and then back up.

Blade is reacting inconsistently while implementing. The blade wants to cut over ground that is already on grade.

When implementing design, the system is not cutting and filling as per map on screen.

## Causes:

Base is being used as a Quick Survey base.

Base power is low.

iGrade and/or application controller need to be updated.

This is related to the GPS receiver not being mounted correctly and not moving with the blade.

## Solutions:

Use an Absolute Base.

Charge base to fullest amount.





Mount GPS receiver so that it moves with the blade.

ITC 2.80 S	StarFire™ 3000 Receiver
ITC 3.73 H	StarFire™ ITC Receiver
LCR 1.10 C	StarFire™ 300 Receiver
SF 7.70 B	StarFire™ Gen II Receiver
1.10A	Machine Communication Radio
TCM 1.09 A	TCM
2.71 Z	Application Controller 1100 (iGrade™, Active Implement Guidance, Distance Trip) (S.N. PCXL01B100000 - )
1.51 Y	Application Controller 1120 (Yield Documentation Specialty Crop, Mobile Weather, Harvest Identification, Cotton) (S.N. PCXL02B100000 - )
3.14 A	Application Controller 1100 (iGrade™, Active Implement Guidance, Distance Trip) (S.N. PCXL01C201000 - )
3.14 A	Application Controller 1120 (Yield Documentation Specialty Crop, Mobile Weather, Harvest Identification, Cotton) (S.N. PCXL02C201000 - )
ATU 1.13 A	AutoTrac™ Universal 100
ATU 2.30 A	AutoTrac™ Universal 200
ATU 3.23 J	AutoTrac™ Universal 300
RG2 2.04 B	AutoTrac™ RowSense™ – Universal
CAT 1.11 B	AutoTrac™ Controller (Deere)
ATC 3.23 J	AutoTrac™ Controller 300
GRC 3.70 K	GreenStar™ Rate Controller
GDC 2.11 A*	GreenStar™ Rate Controller Dry
VGC 4.01 V	AutoTrac™ Vision Guidance
HMCT 1.20 A	Harvest Monitor™ Cotton SCM
CMFS 2.07 C	Cotton Mass Flow Sensor CMFS

Contact your John Deere dealer and ask if updates are available for iGrade and/or application controller.

## Implementing issues with T3RRA connected

**The implement blade does not seem to follow the design surface.**

**Symptoms:**

The blade is moving up and down in ways that indicate that it is being successfully controlled. However the blade positions do not seem to be what is expected based on the design in T3RRA.

**Cause:**

iGrade is not in “Remote Control” mode. It may be in Plane Control, or Grade Control. Drain design bottom width is narrow and the implement is traveling outside the design width. The user is working outside of the drain bottom width design so the blade is not going to the design height.

**Solutions:**

Place iGrade in “Remote Control” mode and cycle power on the tractor. Consult your iGrade manual for instructions.

## Bi-Directional error in T3RRA.

### Symptoms:

The implement consistently cuts when heading in one direction and fills in the other direction. Final grade is never achieved. If T3RRA software is halted and iGrade is run in 'Plane Control' only the problem goes away.

### Cause:

There is a slight time lag from when a GPS location is measured to when the blade actually actuates to seek the desired target elevation. If the look-ahead time is set incorrectly, when going up a slope this causes the cutting edge to be consistently low, and when going down a slope it causes the cutting edge to be consistently high.

The key to understanding this problem is to realize there is a slight time delay from when iGrade first sends the T3RRA software a position, and when the T3RRA software returns a target elevation value to iGrade. In this time the tractor has moved a certain distance and the target elevation is technically out of date. It is intended for a position in the field that is now some distance behind the cutting blade. If the tractor is traveling down a slope this will result in the blade being higher than it should be. If the tractor is traveling up a slope this will result in the blade being lower than it should be. The problem is repeatable and the vertical offset is always in the same direction (relative to whether you are going uphill or downhill). If you understand why the problem occurs it is normally quite simple to adjust for this time delay and nullify the issue.

### Solutions:

Refer to the Option chapter of this manual for more information.

## Implement blade is intermittently jumping up or attempting to deep dive.

### Symptoms:

Work is progressing normally but occasionally the blade will suddenly rise up, or attempt to aggressively dig.

### Cause:

A bad USB-to-Serial conversion dongle/adaptor is causing corrupted height commands to be sent to iGrade. This can be diagnosed by checking the I/O Voltages page on the iGrade display and observing the last received messages. Occasionally you may see values being received to be truncated or otherwise corrupted.

### Solution:

1. Replace your USB-to-Serial cable with the one recommended. - FTDI US232R.
2. Contact T3RRA or your dealer for a recommended make and model.



## iGrade is indicating that Remote Commands are not being received from T3RRA software or indicating ‘No Surface Defined’.

### Symptoms:

The iGrade display is showing a “No Remote Commands” error message, and iGrade is not controlling your implement.

iGrade v2 displays “No Surface Defined” when moving.

### Causes:

- Your T3RRA software may not actually be sending control messages.
- If it is sending messages there may be a problem with the messages, or the cable may be incorrectly attached, or damaged.
- SCV’s have not been set to detent.

### Solutions:

1. Check that you are in the ‘Implementation’ screen in your T3RRA software, and that you have pressed on the ‘Start’ button.
2. Check that the T3RRA software is not in ‘Demo’ mode.
3. Check that the data send arrow is flashing.



4. Check that your iGrade Remote Control Harness is in place and connections at both ends are well seated, and that no pins are loose/bent/damaged/pushed-in.
5. If you are using a USB-to-Serial dongle that has activity lights (recommended) check to see that the appropriate TX light is indicating activity.
6. Make sure that your iGrade Remote Control Harness does not have reversed TX and RX lines. The iGrade manual describes the required pin configuration for this cable. Check that the pin configuration is correct.
7. Check continuity in your iGrade Remote Control Harness TX and RX lines to ensure that a pin has not become disconnected.

8. Check the I/O voltages screen on the iGrade display to view the “Last Received Command”. If there are messages being shown it is possible that the messages are defective in some way. Take a photo of this screen and forward it to T3RRA or your dealer for diagnosis.

## Error from grade values do not match on iGrade and T3RRA software.

### Symptoms:

When stationary, or at very low speeds, the value for error from grade reads 0 on the iGrade display. The error from grade value in the T3RRA software is non-zero and at the expected error value. As soon as you start moving the error value on iGrade returns to expected levels.

### Cause:

At low speeds (below iGrade's activation speed) T3RRA software stops sending iGrade true target elevations. Rather, the T3RRA software returns the current blade height to iGrade. This is done as a safety measure to ensure that the blade will not move, as well as to keep the remote connection alive.

### Solutions:

This is a software issue that is being investigated for alternative solutions. Ignore the error value on iGrade when stationary. Make sure you are updated to the latest software version as this problem may have been solved.

## Map icon on the T3RRA software screen lags behind the actual field position.

### Symptoms:

The screen update appears to be “laggy”. When you turn a corner and are back on a straight path you may see that the position icon on the screen is still turning the corner.

### Cause:

This normally indicates that the software is having to do a lot of calculations, or that there are insufficient resources (CPU, HDD, Memory) available on the tablet.

### Solutions:

1. Check for updates online. There may have been performance enhancements included in newer versions of code.
2. Check that the tablet you are running meets our minimum specifications.
3. Do any Windows updates that are pending.
4. Make sure that your tablet has no other applications running. Close any unneeded applications.
5. Divide the work area in your project into smaller areas. Having to process a smaller data set should result in better performance.
6. Surface your elevations with a larger pixel size. Larger pixel sizes result in smaller data sets and this will result in a performance increase.

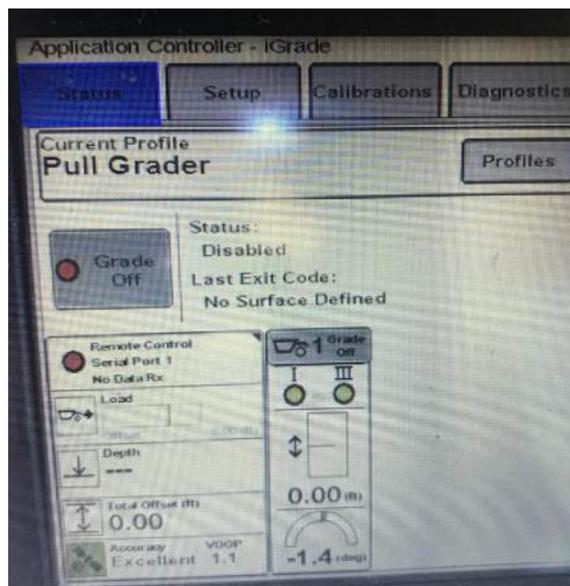
## Users cannot turn “Grade On” with iGrade 2.

### Symptoms:

You have iGrade setup for remote Control. You select the “Grade Off” button to turn “Grade On” with no luck.

You have checked T3RRA to make sure you are sending commands to iGrade and it is.

Under the Status tab near the “Grade Off” button you will see the “Status: Disabled” and “Last Exit Code: No Surface Defined”.



### Cause:

iGrade is not receiving messages from iDitch, therefore “No Surface Defined” will be displayed and iGrade will not let the user turn “Grade On”

### Solution:

Check the serial connection from iDitch to iGrade. Use the Diagnostics built into iGrade to ensure serial communications are being received. You should see the “Line Count” steadily counting up.

Check that the iGrade harness is not faulty, or has pins backed out.

T3RRA Educational Resources  
[www.t3rra.com](http://www.t3rra.com)

