



TracMap TM465

User's Manual

Firmware Version 2.3.1

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Chapter 1

Terms of Trade

All items supplied by TracMap NZ Limited (TracMap) are supplied on the following terms of trade. TracMap may vary these terms by notice.

1.1 Limitation of Liability

1.1.1 TracMap liability for any defect in the items is limited to the purchase price of those items.

1.1.2 Without limiting clause 1, the Buyer shall ensure that:

- a) the items are fitted by qualified tradesperson; or
- b) the items are fitted to a good trade standard; or
- c) the items are not in any way adapted (or tampered with) to a use for which they are not specifically intended; or
- d) the items are not added to or repaired using components not recommended or approved by the manufacturer of such item

Notwithstanding any other provision of these Terms of Trade, TracMap will not under any circumstances be responsible for any damage, malfunction and/or cost to repair items regardless of when and howsoever caused if (a)(d) above are not complied with.

- 1.1.3 TracMap shall have no further liability or responsibility for any direct, indirect or consequential injury, loss or damage arising from any supply of goods of any kind.

1.2 Consumer Guarantees Act

- 1.2.1 Where a supply is for business purposes, the Buyer agrees that the provisions of the Consumer Guarantees Act 1993 do not apply.
- 1.2.2 Nothing in these terms limits any rights the Buyer may have under the Consumer Guarantees Act 1993.

1.3 Warranty

- 1.3.1 Subject to these Terms and Conditions, TracMap will accept the return of faulty or defective items, which are not reasonably fit for the purposes to which they were supplied, for the period specified in this clause from the date of Possession, for either a full refund less any expenses (such as freight), repair of the item by TracMap or replacement of the relevant unit (each at TracMap's option). The period of Warranty for a TM465 is 2 years from the date of supply. The Buyer will pay any associated freight costs.
- 1.3.2 Without derogating from the above, if the items are returned within 30 days of the Possession Date and the provisions of clause 1.1.2 (a)(d) are complied with, TracMap will refund the purchase price (less any taxes payable by TracMap) to the Buyer.
- 1.3.3 All warranties shall be void and TracMap will not accept returned items if the items, including the TracMap unit, have been tampered with in any way. In this event the items may be returned to the Buyer at the Buyer's expense.
- 1.3.4 The Buyer acknowledges that given the nature of GPS reception, and the fact that TracMap obtains the receiver from a third party, TracMap cannot promise the accuracy of the GPS receiver.

1.4 Disclaimer

Your TracMap unit incorporates the latest tracking technology available, with many advanced features designed to make your work easier and safer, and to achieve efficiencies of vehicle operation. We have taken the best care possible in designing and manufacturing this unit to operate successfully in an agricultural environment. However, as a consequence of there being a large number of factors over which TracMap NZ Limited has no control, the Company, its employees, and its agents will not accept responsibility for any consequential costs, loss of income, or damage which may result from using the TracMap product.

1.5 Important Safety

Improper use of the product can lead to death or injury to persons, damage to property and/or malfunction of the product. The product should be repaired by TracMap NZ Limited or an authorised service agent. You should closely review the safety warnings and directions as to the proper use of the product in the manual and at all times comply with the same.

Caution - when working in times of poor visibility, or on unfamiliar ground, do not rely on the TM465 display to ensure you avoid obstacles or dangerous ground. A failure or error in position reporting could have serious consequences.

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

1.6 Application

You accept these Terms and Conditions by purchasing the product from TracMap NZ Limited or from one of TracMap NZ Limited product resellers. If any part of these Terms and Conditions would be unenforceable, the provision must be read down to the extent necessary to avoid that result, and if the provision cannot be read down

to that extent, it must be served without affecting the validity and enforceability of the remainder of these Terms and Conditions.

Chapter 2

Introduction

2.1 Introducing TracMap

TracMap specialises in GPS based guidance and mapping systems for vehicles operating in challenging environments. We believe nothing else can match a TracMap system for productivity gain made simple.

The TracMap system consists of a GPS antenna, a head unit, on/off switch, power cable and USB dongle. The TM465 is the latest release in the TracMap range. It has been in development for 3 years and is more powerful and user friendly than ever before.

2.2 Why TracMap?

TracMap is an award winning company and we believe that we have the best product on the market. So what makes the TM465 such a great product?

Easy to Use

While TracMap is a sophisticated system, it has been designed to be intuitive and easy to use. Many of the basic operations can be performed with a few button presses and in most cases little training is needed.

Cost Effective

TracMap is a cost effective system and most of our customers report savings of between 10 & 20%. Your unit pays for itself in no time.

Data Portability

TracMap provides the ability to transfer data between units, export and import job and geometry data as ESRI format shapefiles which can be used in many mapping applications, export and import KML format files used by Google Earth.

The TracMap Office system also provides the ability to convert to other formats and upload data via the internet for viewing by others.

2.3 Using this manual

If you have time and want to make use of all the powerful features in the TM465 read the entire manual from front to back. If not, it is suggested that you read at least the quick start guide. Also check out the Frequently Asked Questions.

2.4 Support

After reading this manual if you still have any unanswered questions you can contact the support line. If your call is unanswered please leave a message and someone will get back to you as soon as possible.

The helpline number is **0800 TRACMAP (0800 87 22 62)**.

You can also email **support@tracmap.co.nz**.

Chapter 3

Quick Start Guide



3.1 Keypad Buttons

Key	Function
[ESC]	Used to back out of a menu or dialog box.
[TAB] or [PAGE]	<i>Your unit will either have a [TAB] or [PAGE] button. In this manual we will use [TAB]</i> Acts like the TAB key on a computer keyboard. In the main view, accesses the job and satellite pages. In dialog boxes, used to switch between control elements (text boxes, buttons etc.).
[MENU]	In the main view, used to open the main menu. In dialogs (e.g. Outline) it will open the context menu.
[ENT]	Used to activate a menu item or control element. Used to place point in the <i>Utility</i> page in cursor mode. Used to reposition the screen to default location in the main navigation page.
[Rocker pad]	Used to navigate between menu options and control elements, or to shift the viewpoint in main navigation and <i>Utility</i> pages.
[+]	In the main view, used to zoom the viewpoint in. In a page list, used to scroll up by an entire page. In an option box moves up by one item.
[-]	In the main view, used to zoom the viewpoint out. In a pages list, used to scroll down by an entire page. In an option box moves down by one item.
[F1]	Used to place a marker at current GPS location. In multi-select mode, to toggle an item.
[F2]	In dialogues, toggles the onscreen keyboard. Opens the view menu in the main navigation and <i>Utility</i> pages.
[Power]	Hold for 1 second to switch the head unit on. Hold for 3 seconds to shut down.

Table 3.1: Keypad button behaviour

3.2 Terminology used in this manual

[Bold] – refers to a key on the head unit.

Italics – refers to a menu option.

In focus – means the dialogic box surrounded by a yellow box. Use the **[Tab]** key to tab successively around the dialogic boxes.

3.3 Initial Setup

See section 6.11 for more detail.

If *NOT* in New Zealand, you need to set your location before first using the unit. This involves the correct time zone and UTM zone. If you have a GPS fix the unit will tell you which UTM zone you are in. Otherwise see appendix B.1 for a map, or from the internet at <http://www.dmap.co.uk/utmworld.htm>.

Setting the UTM zone

1. Turn the unit on by pressing the **[Power]** button for 1 second
2. Press **[Menu]** to open then main menu
3. Use the **[Rocker pad]** to highlight *Unit Setup*, press **[Ent]**
4. Once the *Unit Setup* dialogic opens, use the **[Rocker pad]** to access the Map tab
5. Press **[Tab]** to access the *Projection* box then use the **[Rocker pad]** to select UTM
6. Then press **[Tab]** to highlight the zone number drop down box and use the **[Rocker pad]** to set the correct zone number
7. Then if required press **[Tab]** again to highlight the North / South drop down and use the **[Rocker pad]** to change
8. Then press **[Tab]** to highlight the OK button and press **[Ent]**

Setting the time zone

1. Turn the unit on by pressing the **[Power]** button for 1 second
2. Press **[Menu]** to open then main menu
3. Use the **[Rocker pad]** to highlight *Unit Setup*, press **[Ent]**
4. Press **[Tab]** to access the *Locale* box then use the **[Page]** to highlight the Time Zone region
5. Press the **[Ent]** to open the list of regions then use the up & down arrows to select the correct region
6. Press page to highlight **[OK]** and press **[Ent]**

3.4 Basic Tasks

Turning the Unit On

Turn on the unit by pressing the **[Power]** button for 1 seconds

Turn the Unit Off

Turn off the unit by pressing the **[Power]** button for 3 seconds

Starting a New Job

Start a new job by pressing **[Menu]**, select *New Job*, and press **[Ent]**

Switching Coverage On/Off (with switch connected)

If a spreader switch is wired to head unit coverage will be painted when a job is open and the switch is **On**

Switching Coverage On/Off (using menu)

If spreader switch is not connected, press **[Menu]**, select *Vehicle Setup*
Then press **[Tab]** to highlight the *On/Off* drop down and **[Ent]** and select *Menu Toggle*
Press **[Tab]** three times to **[OK]** and press **[Ent]** to exit *Vehicle Setup*
Now when a job is open the press **[Menu]** and select *Coverage On* or *Coverage Off*

Stopping the Current Job

Stop the current job by pressing [Menu], select *Stop Job*, and press [Ent]

While in a job

Press [Tab] to change to the job summary or satellite pages

Press [+],[-] to zoom in and out

Press [F1] to place a marker at current location

Press [Menu] to open the job related menu

Resume a Job

Resume a job by pressing [Menu]

If a job is currently open select *Stop Job* and press [Ent]

If not select *Manage Jobs*, use the [Rocker Pad] to highlight the correct job, press [Menu], select *Resume* and press [Ent]

Delete a Job

To delete a job [Menu]

If a job is currently open select *Stop Job* and press [Ent]

If not select *Manage Jobs*, use the [Rocker Pad] to highlight the correct job, press [Menu], select *Delete* then choose either *Selection* or *All* and press [Ent]

When prompted to confirm select [OK]

Enter Job Name and Other Details

When you have a job open, press [Menu]

Highlight *Job Details* and press [Ent]

Press [F2] to open the on screen keyboard

Then [Page] successively to access each of the fields

To enter details use the arrows keys to select each key and press [Ent]

Once you finished press [F2] to dismiss the key board

Highlight [OK] then press [Ent]

Job Geometry

In the job menu, this manages geographic information associated with a job

See “Area Remaining” on the next page and section 6.7

Export a job or template

If a job is open, *Stop Job*

If not select *Manage Jobs*, use the **[Rocker Pad]** to highlight the correct job(s), press **[Menu]**, select *Export USB / Job (or template)* and press **[Ent]**

Select the correct directory on the USB drive for export using the **[Rocker Pad]** to highlight and **[Ent]** to open folders.

Press **[Tab]** and change the coordinate system if required

Press **[Tab]** to highlight OK and press **[Ent]**

Import a job or template

If a job is open, *Stop Job*

If not select *Manage Jobs*, press **[Menu]**, select *Import USB / Job (or template)* and press **[Ent]**

Select the correct job folder or template file (.ttz) on the USB drive for import using the **[Rocker Pad]** to highlight and **[Ent]** to open folders

Press **[Tab]** to highlight OK and press **[Ent]**

Change the spread width

Press **[Menu]**, and select vehicle setup

If not already in focus press **[Tab]** to focus the *Width* field

Press **[F2]** to access the on screen keyboard and use the **[Rocker Pad]** to highlight and **[Ent]** select the correct digits for your spread width

Press **[F2]** to close the on screen keyboard. The **[Tab]** to focus the OK button and press **[Ent]**

Change main navigation screen display

Press **[F2]** to display the view menu options

Use the **[Rocker Pad]** to select the item you wish to change and press **[Ent]**

Import map for display on screen

Your map items should be loaded onto a USB flash drive in either ESRI shapefile or Google Earth KML format. (Note - Only KML files created as outlines, lines or markers directly in Google Earth will reliably import into the TM465.)

Press **[Menu]** and use the **[Rocker Pad]** to select outlines, lines or markers and press **[Ent]**

Choose which set to import the map items into. Press **[Tab]** key until the top box showing set numbers is in focus and select a set using the **[Rocker Pad]**
 Press **[Menu]** use the **[Rocker Pad]** to select *[Import USB]* and press **[Ent]**
 Use the **[Rocker Pad]** to scroll through the items listed and press **[Ent]**
 A dialogue box will open, providing colour and other choices. Use the **[Tab]** key to move between the item choices and **[Ent]** and **[Rocker Pad]** to change the option choices
 Then **[Tab]** to focus the OK button and press **[Ent]**

Exporting, deleting and changing map items

Use **[Menu]**, the **[Rocker Pad]** and **[Ent]** to open and select the relevant set.
 To select multiple items, press **[Menu]** and use the **[Rocker Pad]** to highlight *Select / Multi-Select* and press **[Ent]**, then press **[Page]** to highlight the list, then select the items you want to select and press **[F1]**
 Once the item(s) are selected, press **[Menu]** and then **[Rocker Pad]** to highlight the relevant menu option and press **[Ent]** to commence the task
 For more details on each see chapter 7

Area Remaining

Before the TM465 can display area remaining when a job is open, you must first specify a reference area.

This can either be done by –

Importing existing map shapes into *Job Geometry*. When in a job press **[Menu]** to open the job menu

Select *Job Geometry*, press **[Ent]** and then **[Menu]** to import outlines from the existing outline sets (*Import / Global*) or USB flash drive (*Import / USB*)

See section 6.7 for more details

Or by –

Creating a new reference area. This is achieved by drawing a boundary around the outside of the area being treated.

When in a job press **[Menu]** to open the job menu, select *New Ref Area* and press **[Ent]**.

Change the offset setting, highlight OK and press **[Ent]**

Do a circuit of the field and as you approach the start point, press **[Menu]**,

highlight *Use Ref Area* and press **[Ent]**
Repeat this process for each new field

See section 6.4 for more details

Chapter 4

Tracmap Concepts

This section details the basic concepts of how TracMap works.

4.1 GPS Fix

TracMap is a GPS based guidance system. GPS signals are weak radio signals received from a series of satellites orbiting the earth. They can easily be interfered with by other radio signals, such as a standard FM radio receiver, and wireless and broadband signals.

The TM465 requires at least four satellites to gain a fix (or six if you are using the higher accuracy TM465e). Generally, the more satellites, the better the fix. To check the satellites, press **[Page]** when in the navigation page to bring up the satellite page (see section 6.3). The page will display a diagram showing the satellite constellation, vertical bars showing the strength of the satellite signal, the PDOP (see appendix A), current position and heading, and date and time. If the signal is weak, the vertical bars will be red and there is likely to be less accurate position reporting.

If you are having trouble getting a GPS fix try changing location and turn off your cellphone and the vehicle radios. If after this you are still having trouble, check that you have a clear view of the sky.

Press [PAGE] to return to the navigation page.

4.2 Geometry

Like most other mapping applications, TracMap stores features in a layered structure. The TM465 stores three different geometry types: outlines, lines and markers. These are collectively referred to as Global Sets. There are four global sets per type. Each can be set to visible or invisible at any time in the appropriate dialogue.

4.2.1 Outlines

In the TM465 outlines are closed polygons. They are mainly used to represent paddocks but are also useful in displaying exclusion zones such as ponds, buildings or any other polygon feature that need to be marked.

4.2.2 Lines

In the TM465 lines represent a series of connected points. They can be used to represent irrigation pull lines, orchard rows, trackd or any other linear feature that needs to be marked.

4.2.3 Markers (sometimes called Waypoints)

In the TM465 markers are a single point feature. They can be used to display hazards, hydrants, shift points or any other feature point that need to be marked.

4.3 Using sets, colour and symbols

Sets, colours and symbols can be used to organise the data that describes the farm / land unit. Organising your data makes it easier to use and maintain.

Markers, lines and outlines can be red, green, blue, khaki, turquoise, orange or black. Red is a globally recognised warning colour so TracMap recommends that you reserve

red for things to be avoided. Orange is globally recognised as a warning colour so you might want to assign that to ‘do not spray’, or other warnings.

Jobs have comment fields so if a job is to be done in an area that has red or orange warnings, you can record what NOT to do in the comment field. markers can have a particular symbol (e.g square, circle, triangle, diamond, cross, plus). Outlines, lines and markers can have names that will be displayed on the page. Keep the names short to avoid clutter on the page. You can use the names that you ordinarily use, e.g. ‘pump’ for the pump paddock, or you could number them. Numbering is likely to be more useful if you have a large number of paddocks.

Hint – when creating your map in a mapping program, include the paddock area as part of the name. This way the information is always available for view (e.g. ‘Pump [3.6]’ means the Pump paddock with a size of 3.6 ha/ac).

Figure 5.2(b) shows a screenshot example.

4.3.1 Display order

When map items are drawn onscreen, they are displayed in the following order –

Outlines – set 1, set 2, set 3, set 4

Lines – set 1, set 2, set 3, set 4

Markers – set 1, set 2, set 3, set 4

This means set 2 markers will be drawn on top of set 1 markers and set 1 lines will be drawn on top of set 1 outlines etc.

Type	Set #	Represents	Colour
Outlines	1	Paddocks (Grazing Rotation 1)	Green
Outlines	2	Paddocks (Grazing Rotation 2)	Khaki
Outlines	3	Void zones (e.g. swamp)	Red
Outlines	4	Do not spray areas (e.g trees)	Orange
Lines	1	Farm tracks	Black
Lines	2	Ditch and drainage channel	Orange
Lines	3	Irrigation lines	Blue
Markers	1	Hazards	Red
Markers	2	Hydrants	Black
Markers	3	Sprinkler shift pattern 1	Blue
Markers	4	Sprinkler shift pattern 2	Green

Table 4.1: An example of set & colour definition

4.4 Jobs

A job is a representation of a specific piece of work carried out on the land. The TM465 stores job data that includes coverage, job details and geometry. The job data is only available onscreen when that particular job is selected.

4.4.1 Coverage

Coverage is turned on either using a spreader switch or by toggling a menu item (see section 6.10). Whilst spreading you will see onscreen that a grey track matching your spread width will trail your vehicle. Areas of overlap will appear blue allowing you to adjust your course accordingly.

4.4.2 Job details

Each job has some textual data stored along with it. This data is called the *Job Details*. For more information on what is stored see section 6.8.

4.4.3 Job geometry

Each job also has its own set of outlines, lines and markers. This is called the *Job Geometry*. For more details on this see section 6.7.

Chapter 5

Basic Operation

The chapter details the basic operation of the TM465.

5.1 Main Menu

Most operations are performed using the *Main Menu* (see figure 5.1). To open the *Main Menu* simply press [**Menu**] after the unit has powered up and the main navigation page is onscreen. To access menu a item use the [**Rocker Pad**] to scroll and press [**Ent**] to select an item. In most cases this will open another page or dialogue.

The contents of the main screen can change depending on the current situation. For example the *Main Menu* is different when you have a job open as opposed to when you don't. It also changes depending on whether the unit is set to *Menu Toggle* or *GPIO Switch* see *Vehicle Setup*(section 6.10) or if you are currently recording a *New Ref Area* (see section 6.4).



(a) Main Menu without a job open

(b) Main Menu with a job open

Figure 5.1: The Main Menu

5.2 Pages and dialogues

The TracMap System has two types of screens: pages and dialogues (see figure 5.2).

Pages contain information used for guidance, but do not contain information that is editable. Therefore, the onscreen key board is not available when a page is open. From the main navigation screen press [**Page**] to access the job page (which is available only when a job is open) and the satellite page.

Dialogues on the other hand allow you to enter and edit data. To change the focus in a dialogue press [**Page**]. The item in focus is bounded by a yellow box. To enter text into data fields you can use either the onscreen keyboard ([**F2**]) or connect a USB keyboard to the unit via a dongle. To exit from a dialogue press [**Esc**] to return to the main page.



(a) An example of a page

(b) An example of a dialogue

Figure 5.2: Pages and dialogues

5.2.1 Onscreen keyboard

Press **[F2]** to display the onscreen keyboard when you are in a dialogue. Use the **[Rocker pad]** arrow keys to move the cursor to the character you want to enter. Press **[Ent]** to enter the character. When you are finished entering data press **[F2]** again or **[Esc]** to stop displaying the onscreen keyboard.

The **[Page]** button is still active when the onscreen keyboard is visible. This means there is no need to close and reopen the keyboard when accessing different fields on the same page.

5.2.2 USB keyboard

A USB keyboard can also be used with the TM465. Simply, connect the black USB cable to the black socket on the back of the TM465. Then plug the keyboard into the USB port and use it as you would normally use it.

5.2.3 Lists & preview maps in dialogues

Many dialogues contain both a list and map preview showing items that are stored in a particular set. When the list is in focus these items can be selected by using the **[Rocker Pad]** up & down arrows.

It is also possible to select from the map preview window. Using the **[Rocker Pad]** to pan, you will see cross hairs appear. Stop panning with the central point over the desired item to select it.

More than one item can be selected using the *Multi-select* function, see section 7.2.3. After selecting the desired items a number of operations maybe performed on the selection using the context menus.

5.2.4 Context menus

In a dialogue press **[Menu]** and the context menu will be displayed. Depending on the dialogue from which it is accessed, the context menu contains options like *Preview*,

Select, Find, Go to, Properties, Delete, Import, Export, and Limit Detail. Chapter 7 describes the operation of the context menus in detail.

5.2.5 Create Marker from GPS or cursor

To create a marker at the current GPS position, press **[F1]** from the navigation page. The *Create Marker (from GPS/Cursor)* dialogue will display with options to set the marker *name, symbol, colour* and the *set* to which you want to be stored in (see figure 5.3).

Press **[F2]** to use the onscreen keyboard to enter a name for the marker if you do not want to use the default name displayed. Then press **[Page]** to highlight *Symbol*. Use the rocker pad arrow keys to highlight a symbol and press **[Ent]** to select.

Press **[Page]** to highlight *Colour*. Use the rocker pad arrow keys to highlight a colour and press **[ENT]** to select. The default colour is green and symbol is a +. Next press **[Page]** to highlight *Set*. Press **[Ent]** to show the list of available sets. Use the rocker pad arrow keys to highlight the set you want the marker to be in and press **[ENT]** to select.

Press **[Page]** to highlight **OK** and **[Ent]** to save or to cancel without saving **[Page]** again to highlight **Cancel** and **[Ent]**. The navigation page will be displayed.

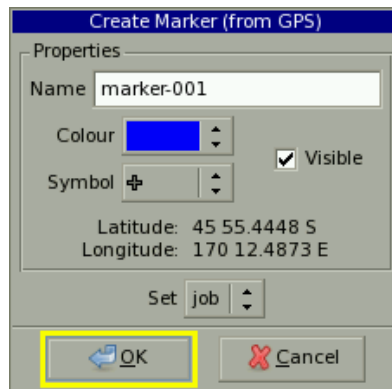


Figure 5.3: Creating a marker at the GPS location

Chapter 6

Page & Dialogue Reference

This chapter contains detailed information on what the different pages and dialogues do and how best to use them.

6.1 Main Navigation Page

The main navigation page is the screen that is loaded when the unit is switched on. This is the screen that you will use most of the time while completing a job. Your vehicle is represented in this screen by a green triangle (see figure 6.1).

6.1.1 View Menu

In the main navigation page (and the *Utility* page see section 6.9) you can alter the display settings and map orientation by accessing the *View Menu*. This is done by pressing [F2].

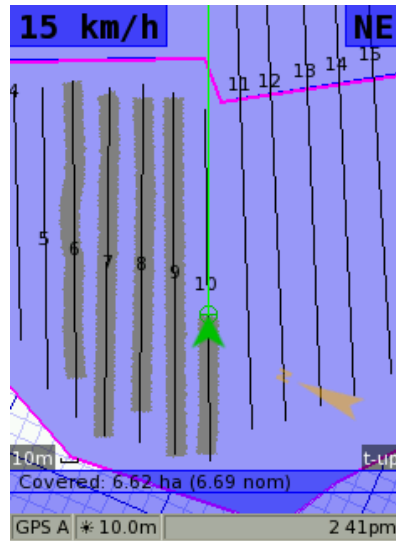


Figure 6.1: The main navigation screen

Map Orientation

There are a number of different map orientation options which can be set in the *View Menu*.

Track up

In *Track up* mode your vehicle will always point to the top of the screen and the map will rotate around your vehicle as you navigate. When set you will see **t-up** displayed at the bottom right of the screen.

North up

In *North up* mode north will always be at the top of the screen and the vehicle will move around the map as you navigate. When set you will see **n-up** displayed at the bottom right of the screen.

North up/Auto-pan

In *North up/Auto Pan* mode north will always be at the top of the screen and the vehicle will move around the map as you navigate. If your vehicle approaches

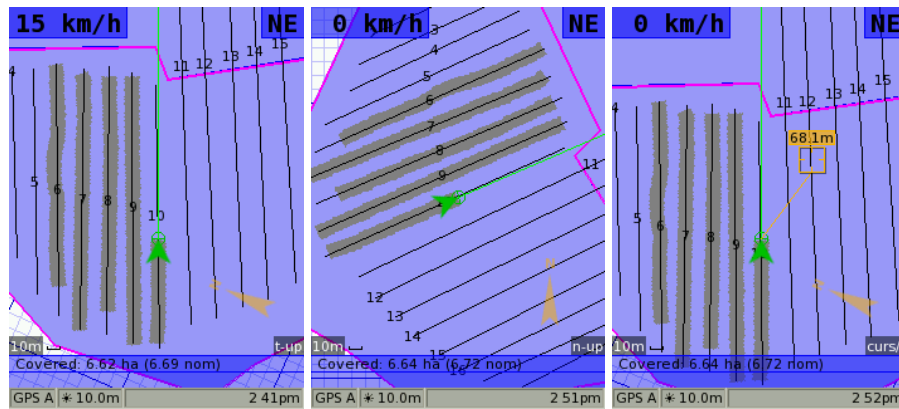
the edge of the current display the map will pan automatically to re-center the vehicle. When set you will see **n-up/a** displayed at the bottom right of the screen.

Cursor

In *Cursor* mode a yellow cursor will display in center of the screen. The map will pan by pressing the **[Rocker Pad]** and the cursor will remain centered. When set you will see **curs** displayed at the bottom right of the screen.

Cursor/Floating

In *Cursor/Floating* mode a yellow cursor will display in center of the screen. The cursor will pan by pressing the **[Rocker Pad]** until it reaches the edge of the screen and then the map will pan. When set you will see **curs/f** displayed at the bottom right of the screen.



(a) Track-up mode

(b) North-up mode

(c) Cursor mode

Figure 6.2: Map orientation

Display settings

The view menu allows display options to be configured.

Global/Outlines

This option toggles the visibility of all global outlines.

Global/Lines

This option toggles the visibility of all global lines.

Global/Markers

This option toggles the visibility of all global markers.

Global/Labels

This option toggles the visibility of all labels on global geometry.

Guide/Circle

This option toggles the visibility of the green guide circle.

Guide/Line

This option toggles the visibility of the green guide line.

Gridlines

This option toggles the visibility of the gridlines.

Speed/Heading

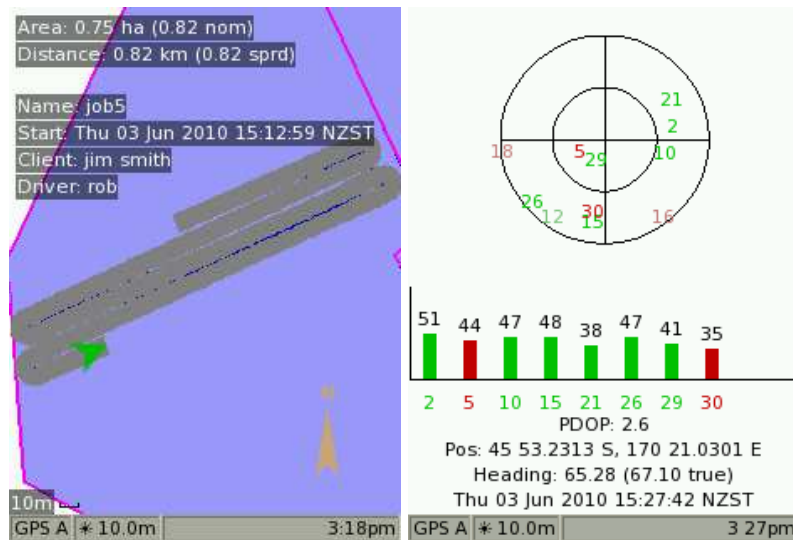
This option toggles the visibility of the speed and heading display.

6.2 Job Page

The *Job Page* can be accessed while in a job by pressing [**Page**] on the main navigation screen (see figure 6.3(a)). It displays the full extent of the coverage that has been applied to date in the job. It also displays area and distance data as well as the job details. Pressing [**Page**] twice more will return you to the main screen.

6.3 Satellite Page

The *Satellite Page* can be viewed by pressing [**Page**] on the main screen (once when not in a job, and twice when in one; see figure 6.3(b)). The satellite pages shows the current satellite constellation and the strength of the signal as well as the PDOP (see appendix A), current position, heading and GPS time. Pressing [**Page**] once will return you to the main screen.



(a) Job page

(b) Satellite page

Figure 6.3: Job & Satellite Pages

6.4 New Ref Area

Creating a New Reference area is a quick and easy way of creating an outline for calculating area remaining. First you will want to drive the vehicle to the location at which you will begin recording.

A new reference area can be created by accessing the main menu while a job is open and selecting *New Ref Area*. This will open the *New Reference Area* window which is where you to set an offset (see figure 6.4(a)). This offset allows you to drive around the area at say 5m from the boundary and still record points the correct position. By default the offset will be half of your spread width to the right hand side. This can be adjusted using the onscreen keyboard ([F2]). Press [Page] then use the [Rocker Pad] left and right arrows to adjust the side, then [Page] again and press [Ent] on the OK button to set the offset.

Now as you begin to drive you will notice a magenta line is created at the offset distance from your current location. As you turn, points will be placed to mark out the boundary. At the bottom of the screen the calculated area will update as you drive (see figure 6.4(b)).

Once you have marked out the are you wish to save press [Menu] and select *Use Ref Area*. This will open the *Use Reference Area* window which also allows you to set the properties for the outline (see figure 6.4(c)).

Once you select **OK** the outline will be saved in the job geometry and you will see it onscreen.

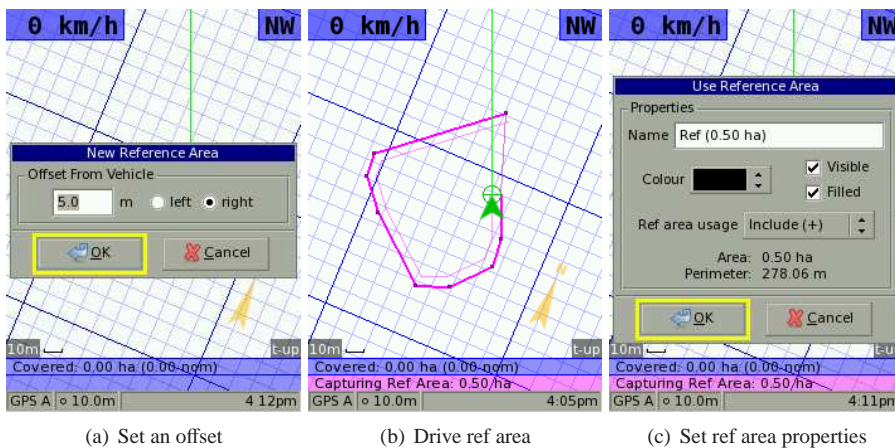


Figure 6.4: Creating a reference area

6.5 Outline, Line & Marker Dialogues

The Outline, Line & Marker dialogues (figure 6.5) are accessed from the main menu. In each are in four ‘global’ sets. The tab for each set is located at the top of the dialogue. Sets can be changed with the left and right arrows on the **[Rocker Pad]** when the set names are in the focus box. The individual features for the selected set are listed at the top of the dialogue and displayed in the map preview pane at the bottom.

The visibility of each set can be changed by highlighting the set and pressing the **[Ent]** button. A set is visible in the navigation page when there is a check mark beside the set name at the top of the dialogue.

Pressing **[Page]** will move between the different parts of the dialogue. When the list is in focus the **[Rocker Pad]** up and down arrows can be used to cycle through the individual outlines in the set. The highlighted block will be displayed in the map preview. When the map preview is in focus the **[Rocker Pad]** can be to pan the map and select outlines.

Pressing the **[Menu]** button will display the context menu (see chapter 7). The context menu for outlines includes the following options - *Preview, Select, Find, Properties, Delete, Export USB, Import & Options.*

Note

If there are a large number of items in the list it will be slow to display on the preview pane. Be patient. Divide large numbers of objects into multiple sets.

6.6 Manage Jobs Dialogue

The *Manage Jobs* dialogue (figure 6.6(a)) is accessed from the main menu when no job is open. It is where you can access all of the jobs that you have stored on the unit. In this dialogue you can view coverage, geometry or details for any stored job, resume an unfinished job, delete a job, create an empty job, import or export a job or job template.

At the top of the screen is a list showing all of the available jobs. At the bottom is a

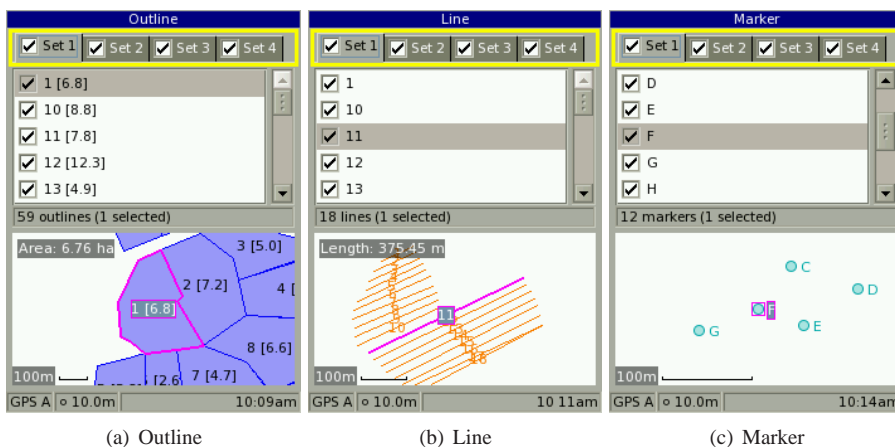


Figure 6.5: The outline, line and marker dialogues

map preview showing the coverage and geometry for the selected job.

Pressing the [Menu] button will display the for *Manage Jobs* context menu (see chapter 7). The context menu for markers includes the following options - *Preview, Select, Find, Resume, Details, Geometry, Delete, Create, Export USB, Import & Limit Detail*.

6.7 Job Geometry Dialogue

The *Job Geometry* dialogue (figure 6.6(b)) is accessed through the main menu when a job is open or via the *Manage Jobs* context menu. It contains one outline, one line and one marker set. These sets are only visible in the main page when this particular job is open.

Job geometry is useful when you have geometry that will only need to be viewed whilst the current job is open. This is particularly useful for contractors who visit many farms and don't wish to save the geometry for each job into the 'global' sets. This will also speed up the performance of the unit as it is not try to draw unnecessary objects.

In the context menu the *Preview*, *Select*, *GoTo*, *Delete*, *Import*, *Export* and *Limit Details* tools work the same way as they do in the *Outline*, *Line* and *Marker* dialogues. There is also some additional functionality called *Ref area usage* used for calculating the area remaining for a job (see section 7.5).

6.8 Job Details Dialogue

The *Job Details* dialogue (figure 6.6(c)) is accessed through the main menu when a job is open. It can also be accessed via the *Manage Jobs* dialog when no job is open. The *Description* tab displays the *Name*, *Client*, *Driver*, *Order #* and *Comments* for the job. Pressing **[Page]** will cycle through the fields. You can enter or change the information using the on screen keyboard (**[F2]**) and select *OK* to save, or *Cancel* to return without saving.

The *Summary* tab displays the *Name*, *Start* (date & time), *Area* and *Distance* data for the job.

Note	Options to list products applied and have 'drop down' lists of clients will be available in a future software upgrade.
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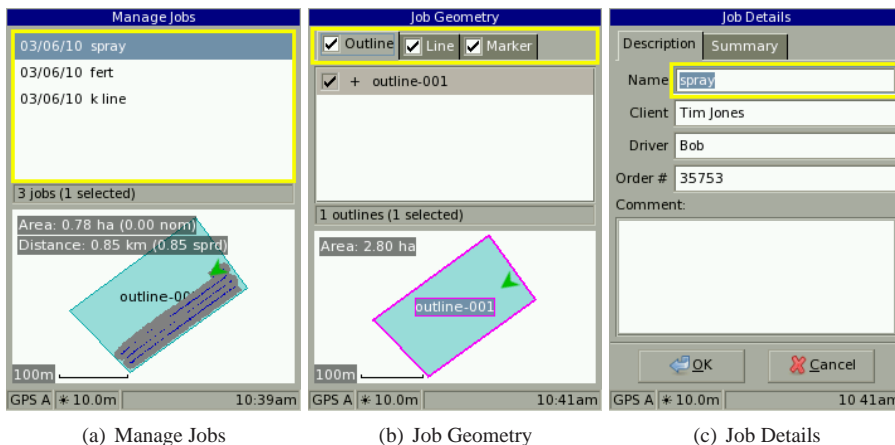


Figure 6.6: The job pages

6.9 Utility Page

The *Utility* page is opened from the main menu. It can be accessed regardless of whether a job is open or not. Like the main navigation page it has its own set of display parameters (e.g. gridlines, guide circle, etc - (see section 6.1.1)) which are accessed by pressing [F2]. The *Utility* page can perform a number of functions such as creating outlines, lines and markers, measuring area or distance and providing an alternative navigation view.

6.9.1 Recording outlines, lines or markers

The *Utility* page can be used to record outlines, lines or markers which can then be saved to either the 'global' sets to to a jobs geometry. When the *Utility* page is set to either north-up or track-up orientation (in the view menu) GPS points can be placed at the current vehicle location or at an offset from the current location(see section 7.15). This can either be done manually, by pressing a button to place a point or automatically at either high or low resolution (figure 6.7).

When the *Utility* page is set to cursor mode points can be placed at the the current cursor location or an offset from the cursor location (figure 6.7(a)). It is also possible to swap between modes whilst creating features. When you are ready to save the select *Save Global* (see section 7.13) from the context menu.

The *Utility* page can be used as an alternative viewpoint, by setting different display settings from your navigation page. You may want to set the *Utility* page to the full extent of your farm or a the extent of the current job. This will enable you to quickly change between the working scale and an overview.

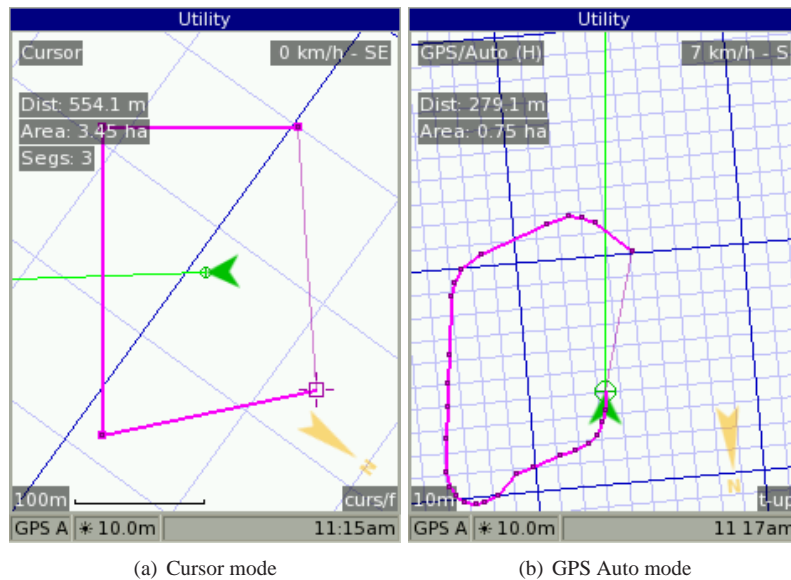


Figure 6.7: Recording geometry using the Utility page

6.9.2 Measuring distances or area

The *Utility* page can also be used to measure distances or areas. Simply place points as you would when recording outlines, lines or markers and the distance (and area

provided the *Area* is checked in the view menu) will be displayed on screen.

6.10 Vehicle Setup Dialogue

The *Vehicle Setup* dialogue (figure 6.8) is accessed through the main menu and is available at any time. It is used for setting the spread *Width*, *On/Off* and *GPS Antenna Offset*.

6.10.1 Coverage settings

The *Width* setting defines the vehicle spread width in meters. It will accept values greater than one meter and will accept one decimal place. The *On/Off* setting lets you chose how you want the unit to toggle spreading. There are two options: Menu Toggle & Switch (GPIO). If the head unit is wired to a spreading switch select the *Switch* option and if not the *Menu toggle* is the correct setting.

When Menu Toggle is selected and a job is open, in the main menu you will see either a *Coverage On* or *Coverage Off* option depending on the current spreader status. This menu option is highlighted when the menu is open for quick access. So when you to turn spreading on or off simply press [Menu] then [Ent]. When Switch (GPIO) is selected spreading will turn on or off when the spreader switch is flicked.

6.10.2 GPS Antenna Offset

The *GPS Antenna Offset* field also you to input an offset for the position of your antenna relative to the center of you coverage. So for example if your GPS antenna is 1.3m to the left of your center set the GPS offset to 1.3m right to compensate.

6.11 Unit Setup Dialogue

The *Unit Setup* dialogue is accessed through the main menu. It can accessed at any time. This dialogue has four tabs: *General*, *Map*, *Local* & *Admin*.

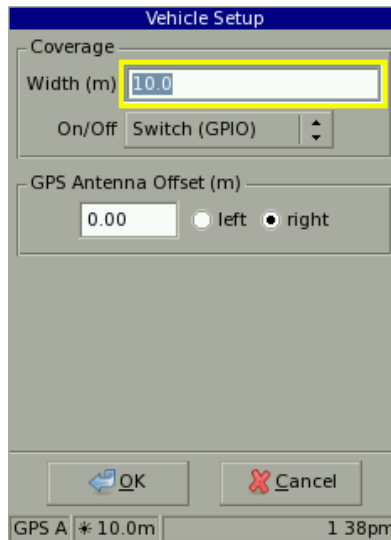


Figure 6.8: The vehicle setup dialogue

6.11.1 General

In this tab (figure 6.9(a)) you can set the screen brightness with the slider bar. Use the [**Rocker pad**] left and right arrows to set the desired level. This setting will be reset to 100% when the power is switched off and back on.

6.11.2 Map

In this tab (figure 6.9(b)) you set the map projection. There are three options to choose from (for more information see appendix B).

UTM - The Universal Transverse Mercator zones

NZ Map Grid - The New Zealand Map Grid projection

NZ Transverse Mercator 2000 - The New Zealand Transverse Mercator projection

Note

The correct map projection should be set prior to beginning any jobs or importing data. **Changing the map projection will result in all jobs, outlines, lines and markers being deleted from the head unit** Be sure that all important data has been backed up if you need to change map projections.

6.11.3 Locale

In this tab (figure 6.9(c)) you can set the correct language and time zone settings. This tab may take a few seconds to load.

Language

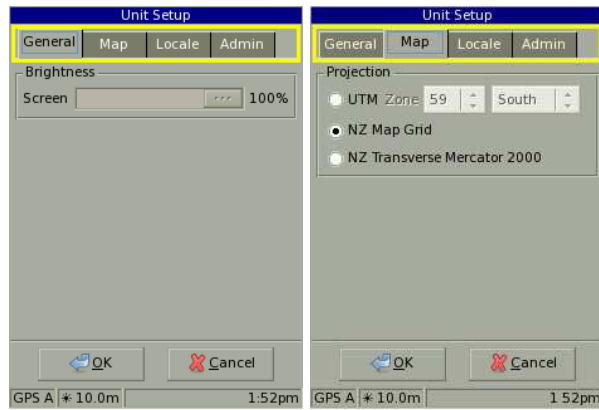
The language choice only affects the way dates and times are displayed. English (USA) will cause dates to be displayed in MM/DD/YY format where as the other English choices will display dates in DD/MM/YY format. English (USA) & English (Canada) will cause times to be displayed with AM or PM following where as the other choices will display 24 hour time.

Time Zone

Regions are stored alphabetically, use the [**Rocker Pad**] up and down arrows to select the correct one. Some regions have more than one time zone. If the correct zone is not displayed below it can be changed by pressing [**Page**] then using the [**Rocker Pad**].

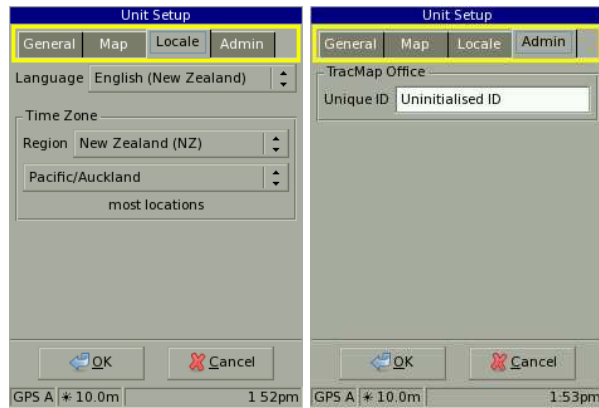
6.11.4 Admin

In this tab (figure 6.9(d)) you can set the Unique ID. This ID is used by the TracMap office website to identify which unit a job has come from. If you do not subscribe to TracMap office it is not necessary to set the Unique ID.



(a) General

(b) Map



(c) Locale

(d) Admin

Figure 6.9: The Unit Setup dialogue

6.12 About Dialogue

The *About* dialogue displays the software version, TracMap Address & telephone numbers and the percentage of storage that is currently being used by the unit.

Chapter 7

Context Menu Command Reference

This section details the operation of the TM465 context menu commands (i.e. menu options that (may) appear when dialogue boxes are in focus).

7.1 Preview

The *Preview* sub menu controls the behaviour of the map preview pane in the Outline, Line, Marker, Job Geometry and Manage Jobs dialogues.

7.1.1 Maximise

Selecting *Maximise* will hide the list from the top half of the dialog and resize the map preview pane to full screen. This is useful if you prefer selecting items from the map rather than the list.

7.1.2 Restore

Selecting *Restore* will return the map preview to the bottom half of the screen and display the list at the top.

7.1.3 Fit Selection

The *Fit Selection* command is available in the outline, line, marker and job geometry dialogues. It will redisplay the map preview pane to fit all of the selected items in the current set.

7.1.4 Fit All

The *Fit All* command is available in the outline, line, marker and job geometry dialogues. It will redisplay the map preview pane to fit all of the items in the set.

7.1.5 Fit Coverage

The *Fit Coverage* command is available in the manage jobs dialogue. It redisplay the map preview to show all of the coverage saved in the current job.

7.1.6 Fit Geometry

The *Fit Geometry* command is available in the manage jobs dialogue. It redisplay the map preview to show all of the geometry saved in the current job.

7.2 Select

The *Select* sub menu is used for selecting items in the outline, line, marker, manage jobs and job geometry dialogues. Items have to be selected before operations maybe performed on them (e.g. export or delete).

7.2.1 All

This command selects all of the items in the current list.

7.2.2 None

This command deselects all of the items in the current list.

7.2.3 Multi-select

This command puts the unit into multi-select mode, which allows you to select multiple items from a list or map preview.

Selecting multiple items from the list

To select more than one item from a list, ensure the list is focused by pressing [**Page**]. Scroll to the first item you want to select using the [**Rocker pad**] arrow keys.

Press [**MENU**], then scroll down to Select, press the right arrow to move into the Select sub menu and then scroll down to Multi-select and press [**ENT**]. This activates multi-select mode (this is indicated by [m-sel] being visible on the right side of the status bar between the list and map preview panes).

Press [**F1**] to toggle the selection of an item. Use the arrow keys on the [**Rocker pad**] to scroll the list to the next item you want to select and press [**F1**] to select the item. Repeat until all required items are selected. Then perform the required action on the selected items.

Selecting multiple items from the map

To select more than one item from the map, ensure the map is focused by pressing the page button. Pan to the first item you want to select using the [**Rocker pad**] arrow buttons.

Press [**MENU**], then scroll down to Select, press the right arrow to move into the

Select sub menu and then scroll down to Multi-select and press **[ENT]**. This activates multi-select mode (this is indicated by [m-sel] being visible on the right side of the status bar between the list and map preview panes).

Press **[F1]** to toggle the selection of an item. Use the arrow keys on the **[Rocker pad]** to scroll the map to the next item you want to select and press **[F1]** to select the item. Repeat until all required items are selected. Then press **[Menu]** to perform the required action on the selected items.

Note	Alternatively, multi-select can be activated by pressing [F2] to display the onscreen keyboard. Then using the arrow keys on the [Rocker pad] to move to the bottom left corner (where the Ctrl key is on a QWERTY keyboard), and pressing [ENT] . Press [F2] to hide the keyboard.
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7.2.4 Toggle Item (F1)

The *Toggle Item* menu command toggle an item for selected to no selected and visa versa (pressing **[F1]** also toggles).

7.3 Find

The *Find* menu item is available in the outline, line, marker, job geometry and manage jobs dialogues. It is used to search for items in current list. Enter text using the on screen keyboard. The matching items can be scrolled through using the **[Rocker pad]**.

7.4 GoTo

The *GoTo* command will display the selected item(s) in the navigation page in cursor mode. The distance from the current position is displayed above the cursor and a gold line marks the direction back to the vehicle. If you cannot see your current vehicle position using the [-] to zoom out.

If the selected item is an outline or line the GoTo will show the geographic center.

For lines wvvhich are not straight this may not actually be on the line.

Note	GoTo will not work if the navigation page is set to North-up and Autopan.
-------------	---

7.5 Properties

The *Properties* menu option accesses the properties window. It is available in the outline, line, marker and job geometry dialogues. It lets you control the *Name*, *Colour*, *Symbol*, *Visibility & Fill* of items in your sets. It also displays *Area*, *Perimeter*, *Latitude & Longitude* for outlines, *Length*, *Latitude & Longitude* for lines and *Latitude & Longitude* for markers.

Name

This is the name of the outline, line or marker that will be stored in the list and displayed as a label on screen.

Colour

This list box lets you pick the colour for the selected items.

Visible

This check box toggles the visibility of the selected item(s). If the box is checked the item(s) will be visible. This is still overridden by the visible setting for the set or global view.

Filled

This check box is only available in the outline sets. It toggles the filled of the selected item(s). If the box is checked the item(s) will be filled.

Symbol

This check box is only available in the marker sets. It lets you select the symbol of the selected markers(s).

Use ref area

The Job Geometry properties dialogue has additional functionality for outlines. There is a control called *Ref area usage* which is used to calculate the Remaining Area(ha) for the job. There are three possible settings for this control -

- **Ignore**
The selected feature(s) area is not used in the area remaining calculation.
- **Include**
The selected feature(s) area is added in the area remaining calculation.
- **Exclude**
The selected feature(s) area is subtracted in the area remaining calculation.

When a feature is Included or Excluded the a (+) or (-) is visible in the Job Geometry list. The navigation page will now display the Remaining Area for the job.

Note	The exclude setting is useful when regions inside block boundaries are not part of the job (e.g. paddocks or fields that are not being treated).
-------------	--

7.6 Delete

This sub menu is used to delete geometry or jobs from the unit. It is available in the outline, line, marker, manage jobs and job geometry menus.

7.6.1 Selection

This option deletes the selected items or jobs from the current list.

7.6.2 All

This option deletes all of the items or jobs from the current list.

7.7 Create

This option is available in the *Manage Jobs* dialogue. When selected it creates a new job with a default job name and no other data. You can then add map shapes to the

Job geometry and either save for later use or export as a template, for example (see section 7.9.3).

7.8 Import

The import menu is used to get data into the TM465. In the outline, line, marker and job geometry dialogs you can import features from other sets or from a USB drive. In the manage jobs dialogue you can import a job or job template from USB.

7.8.1 USB

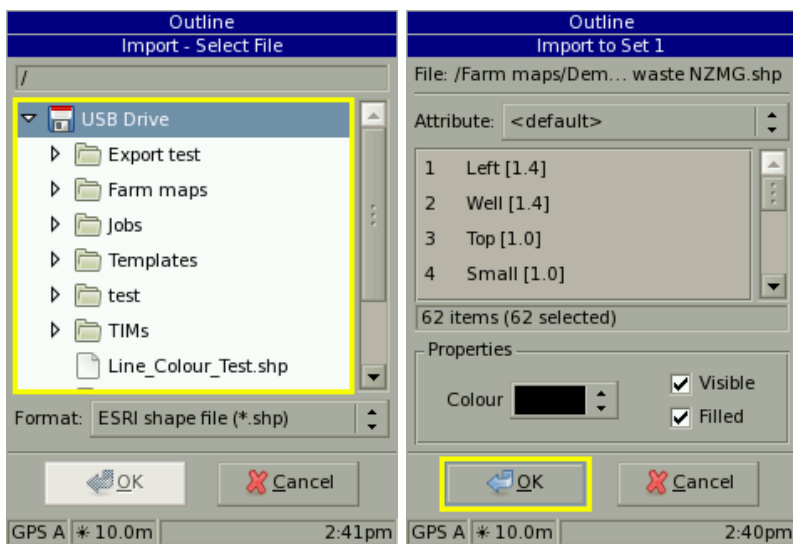
The function allows you to browse a USB drive for ESRI shapefiles (.dbf, .shp & .shx) and Google Earth (.kml) files that you wish to import, either as outlines, lines, markers or job geometry. Once you have selected the file, the import to set dialogue will open allowing you to select which features to import and the properties you want them to have once loaded (e.g. colour, fill, symbol, visibility).

By default all features in the file will be imported provided the file is valid and contains the correct geometry type. If you only wish to import some of the features you can do this by activating multi-select from the menu, highlighting the list box using the **[Page]** button and selecting the features you wish to import using the **[Rocker pad]** and **[F1]**.

Importing colour and symbol from file

The TM465 will detect colour and symbol attributes from the shapefile provided the following conditions are met.

- To import colour and / or fill for outlines from a shapefile an attribute must exist named 'color' or 'colour'.
- Data in the colour field must match the following format '#RRGGBBAA'. Where 'RR' is hex for red, 'GG' hex for green, 'BB' hex for blue and 'AA' is



(a) Choose file

(b) Set properties

Figure 7.1: Importing from USB

optional and is used to set fill. To set an item to unfilled 'AA' must be set to '00'. Other hex values will fill the object. See table below for colour definitions.

- To import symbols to a marker set an attribute must exist in the shapefile named 'symbol'. This attribute will accept the following values: plus, cross, square, circle, diamond, triangle or hazard.

7.8.2 Global

The Import Global tool (see figure 7.8.2) allows you to shift data between your sets or into job geometry. When opened from an outline, line or marker set a dialogue will open showing the other three sets for that geometry type. When opened from job geometry all four global set of the same type will be displayed.

To import all features from another set into the current set use **[Menu]**, *Select / All* then select OK in the dialog. To select some of the features in a set activate multi-

Colour Field Value	Colour
#00AA00	Green
#0000FF	Blue
#808000	Gold
#00AAAA	Aqua
#FF8000	Orange
#000000	Black
#FF0000	Red

Table 7.1: Hexidecimal codes for colour import

select using **[Menu]**, *Select / Multi-Select*. Then press select features in the list or map using **[F1]** and select OK in dialogue.

7.8.3 Job

The Import Job function allows you to load a job on to the head unit from a USB drive. It is available in the Manage Jobs context menu. When selected this tool will open a file browser window. To import a job use the **[Rocker Pad]** up & arrows and the **[Ent]** key to navigate to the folder that the job data is stored in, then select OK. The job coverage, details and geometry will all be imported and the application will return to the Manage Jobs dialogue, where the imported job will now be listed.

7.8.4 Template

A template is like a job but does not contain any coverage or start / finish data. Templates are useful when jobs need to be repeated over time. You can simply import the template and you are ready to go. A template file has a '.ttz' file extension.

Import Template is available from the manage jobs context menu. Importing a tem-

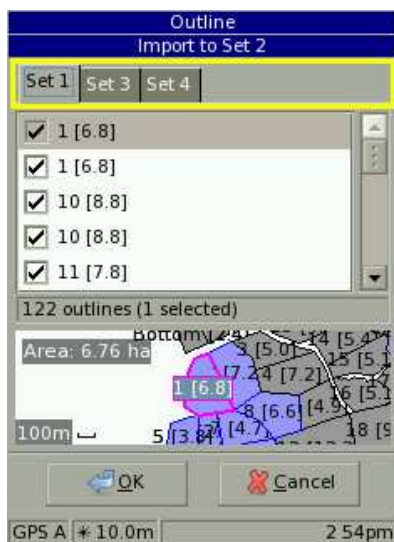


Figure 7.2: The global import screen

plate is easy, simply select the '<filename>.ttz' file in the file browser window, then select OK. The job will now be available in the manage jobs list.

Note The date will default to '<unknown>' until the job has been started.

7.9 Export

The export menu is used to get data out of the TM465. In the outline, line, marker and job geometry dialogs you can export features from other sets. In the Manage Jobs dialogue you can export a job or template to USB.

7.9.1 USB

The function allows you to save geometry data to a USB drive. You can export outlines, lines, markers or job geometry. The first step is to select the items in the set that you wish to export using either *Select / All* and *Select / Multi-Select* tools. Then choose Export USB. This will open the file browser window.

Use the **[Rocker Pad]** and **[Ent]** to select the directory you wish to export to. Next press **[Page]** to change the file name, and coordinate system if desired and select OK. Press **[Menu]** to create a new sub directory.

Note	Presently the TM465 supports ESRI Shapefile (*.shp) for import and export of geometry and job coverage data and Google (*.kml) files for geometry data only. Additional formats are available by uploading job coverage data to the TMO (TracMap office website).
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7.9.2 Job

The Export Job function is accessed through the Manage Jobs dialogue. It is used to export all job data (coverage, details & geometry) to a USB drive. When selected the Export Job function will open a file browser window. To export a job use the **[Rocker Pad]** up & arrows and the **[Ent]** key to navigate to the folder that you want job data to be stored in, press page to change the coordinate system if desired and then select OK. A new folder which has the same name as the exported job will be created in the directory that you selected.

It will contain the files listed in table 7.2.

7.9.3 Template

The Export Template function is accessed through the Manage Jobs dialogue. It is used to create a template file for the selected job(s) on a USB drive. When selected, Export Template will open a file browser window. To export a template use the **[Rocker Pad]** up & arrows and the **[Ent]** key to navigate to the folder that you want template to be stored in and then select OK. After the export has completed there will be a new file created in the directory selected named <job_name>.ttz.

File Name	Description
<job_name>.ttz	TracMap template file
log.dbf, log.shp, log.shx	Coverage shapefile
secondary.dbf, secondary.shp, secondary.shx	Secondary shapefile
outlines.dbf, outlines.shp, outlines.shx	Job geometry outlines
lines.dbf, lines.shp, lines.shx	Job geometry lines
markers.dbf, markers.shp, markers.shx	Job geometry markers
summary.txt	Summary text file
tmo.tm_raw	Compressed job data for uploading to TMO (TracMap Office website)

Table 7.2: The files created on export

7.10 Options

The *Options* menu item allows you set the Limit Detail and Line Thickness for the current set.

7.10.1 Limit Detail

Limit detail is used to control the amount of detail that is shown onscreen as you zoom out. It can be set for global outlines, lines and markers as well as job geometry. The Limit Detail dialogue consists of an Enable check box and a Limiting Size field. To set a limit, press **Ent** on the check box to make limit detail active for the current set, then set a limiting size.

Then limiting size is the maximum distance between two objects where they can be individually distinguished onscreen. Once the limiting size is reached the entire set will be shown onscreen as a single box which is drawn around the full extent of the set (see figure 7.3).

Setting limit detail gives greater detail whilst zoomed in and less clutter and better performance when zoomed out. It is particularly useful for large and closely spaced sets. An example of this is pull lines for irrigation sprinklers. You may have to

experiment a little for find the optimum level for each set.

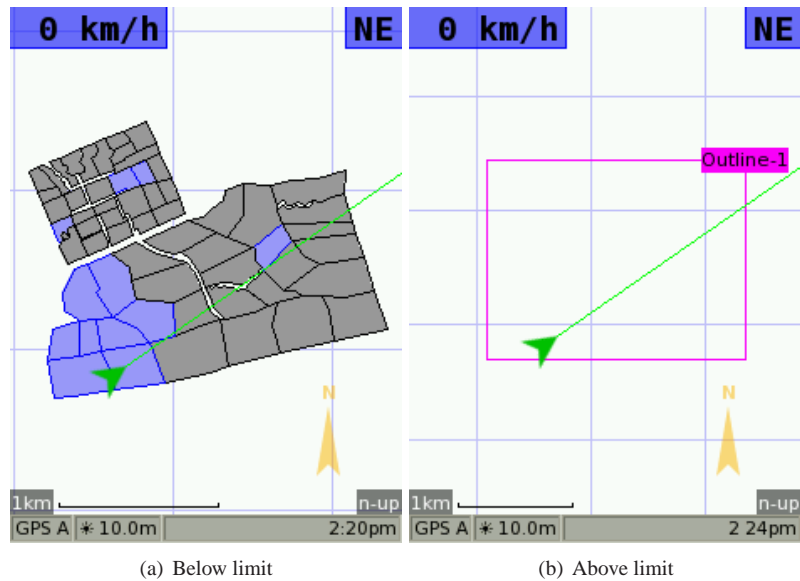


Figure 7.3: Limit detail

7.10.2 Thick Lines

This option is available in the Outline, Line and Job Geometry dialogues. Enabling this check box will double the thickness of lines or outline boundaries in the current set (see figure 7.4).

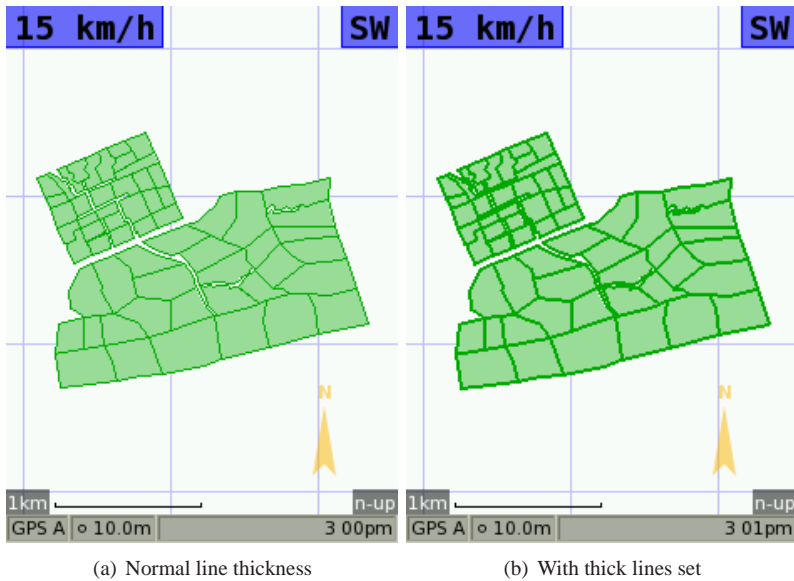


Figure 7.4: Line thickness

7.11 Undo Point

The Undo Point menu option is available in the Utility page menu. It is available when using cursor mode or GPS manual mode. When selected Undo Point will remove the last point that was placed onscreen.

7.12 Clear All

Clear All is available in the Utility page menu. It will remove all of the points that have been placed onscreen.

7.13 Save Global

The Save Global sub menu is used for saving user define outlines, lines and markers to a global set or job geometry in the Utility page.

7.13.1 Outline

Saves the current geometry as an outline. When selected the Save Outline window opens. In this window you can select the name, colour, visibility, fill and the set you want to save to.

7.13.2 Line

Saves the current geometry as a line. When selected the Save Line window opens. In this window you can select the name, colour, visibility and the set you want to save too.

7.13.3 Marker

Saves the current geometry as a marker. When selected the Save Marker window opens. In this window you can select the name, colour, visibility, symbol and the set you want to save too.

7.14 GPS Record

The GPS Record menu item is available in the Utility Page context menu. It is available when you are using North-up or Track-up navigation modes. Its is used to set the method of point capture whilst navigating.

7.14.1 Manual

Manual mode allows the user to enter points as required by pressing [Ent].

7.14.2 Auto

Auto mode will place points without any input for the user. Points will be placed at set intervals or as the direction of navigation changes. There are two settings for Auto: Hi Res & Lo Res.

Hi Res

Using the high resolution setting will place more points resulting in a greater level of accuracy.

Lo Res

Using the low resolution setting will place less points and will result in a smaller file size.

7.15 Offset

The Offset menu option is available in the Utility page. Here you can set a distance in meters and a direction (left or right) to Offset the points that are recorded in the Utility page.

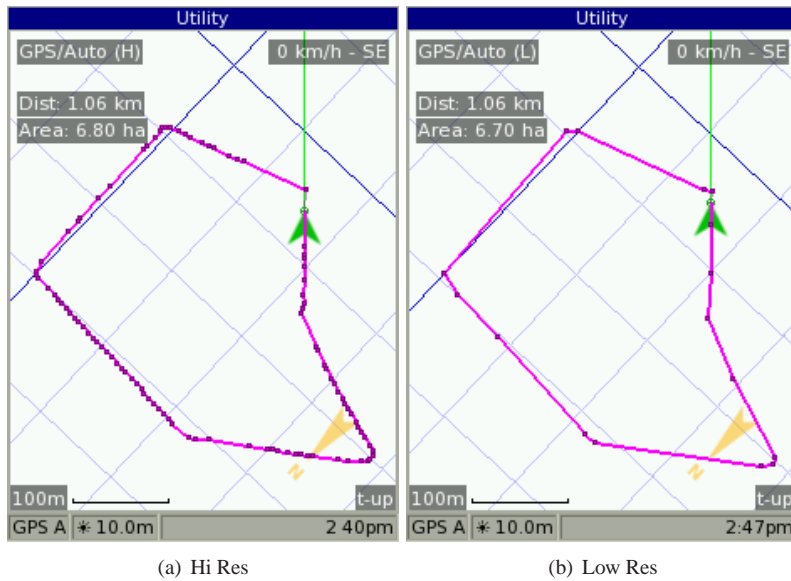


Figure 7.5: Auto GPS placement

Chapter 8

Process Guides

This chapter provide step by step guides for common tasks.

8.1 Creating a farm map

Usually the first task for farmers after purchasing a TM465 is to load or create a farm map into the unit. There are a number of ways to do this -

8.1.1 Import an existing map in shape file format

If you already have your farm mapped and the data is in ESRI Shapefile (*.shp) format the simplest way to get a farm map on the head unit is to import the shapefile (see section 7.8.1).

Note

Please check that the data you are importing matches the coordinate system that the head unit is set to. Otherwise data may not be imported to the correct location.

8.1.2 Import an existing map in KML file format

Create your field outlines in Google Earth, save them to a USB drive as a KML file and import into the TM465.

Note

The Google Earth imagery is often offset from the true position, so the resulting imported map may not correctly align. KML files created by any other method except directly from Google Earth may not import or display correctly in the TM465.

8.1.3 Using the Utility Page to map farm

If you don't have an existing farm map that you can import then you can use the Utility page to map your farm.

Once fields have been mapped, you can –

- Keep it the way it is, but export a backup copy to a USB flash drive.
- Export to a farm mapping package to tidy up and then import back into the TM465.
- Use cursor mode to redraw field outlines and then delete the original polygons created by driving around.

8.1.4 Using a PC mapping program to create a farm map

Any mapping program that allows the export of maps in ESRI shapefile format can be used to create a map for display in the TM465.

Step	Action	See Section
1	Turn the unit on by pressing the power button	3.4
2	Press [Menu] and select Utility then press [Ent]	6.9
3	Set the navigation mode in the view menu to North-up or Track-up by pressing [F2]	6.1.1
4	Set the capture method for recording points to <i>Auto / Hi Res</i> or <i>GPS Manual</i>	7.14
5	If appropriate set an offset from the vehicle to allow for the distance between the GPS antenna and the field boundary	7.15
6	Drive the perimeter of the field. If there are corner you cannot reach by driving to, use [F2] to switch to cursor mode to mark these points	6.1.1
7	Then select <i>Save Global / Outline</i>	7.13
8	Next drive to the starting point for the next paddock and select <i>Clear All</i> to remove the existing points	7.12
9	Repeat steps 6, 7 & 8 until all fields have been mapped	

Table 8.1: Creating a farm map using the Utility page

8.2 Shifting K-line

This section describes how to use the TM465 to shift irrigation without previously record pull lines. There are two options for using the TM465 to shift KLine irrigation without existing pull lines.

1. **Coverage** - ensure that the area is irrigated by “spreading” as you drive around shifting the KLines. The TM465 will display the spread width along path driven. Check that there are no gaps in the displayed coverage before turning the irrigation on.
2. **Pull Lines** - record pull lines (where you want to place the irrigation) using the utility dialog and saving them to a global set for future reference.

The steps and actions for both options are described below. Refer to the relevant Manual section for more detailed instructions about each action.

8.2.1 K-Line Coverage

1. Set the spread with to the diameter of irrigation by pressing [**Menu**], select *[Vehicle Setup]*, and press [**Enter**]. Then press [**F2**] to open the onscreen key board. Key in the desired width, press [**F2**] to close the keyboard. Press page to highlight [**OK**] and press [**ENT**]
2. Start a new job by pressing [**Menu**] and select *[New Job]* and press [**ENT**]. Then drive your fist line with the coverage turned on
3. For each subsequent line use the edge of the green guide circle to line up with your previous line and ensure there are no gaps in coverage
4. When required stop the job by press [**Menu**] and select *[Stop Job]*
5. The next time you need to shift the K-Line resume the job by selecting [**Menu**] and choose *[Manage Jobs]*. Use the up and down arrows to highlight the job, then press [**Menu**] and select *[Resume]*
6. When you are finished with the job and do not wish to keep it for future reference press [**Menu**] and choose *[Manage Jobs]*. Use the up and down arrows to highlight the job, then press [**Menu**] and select *[Delete]*

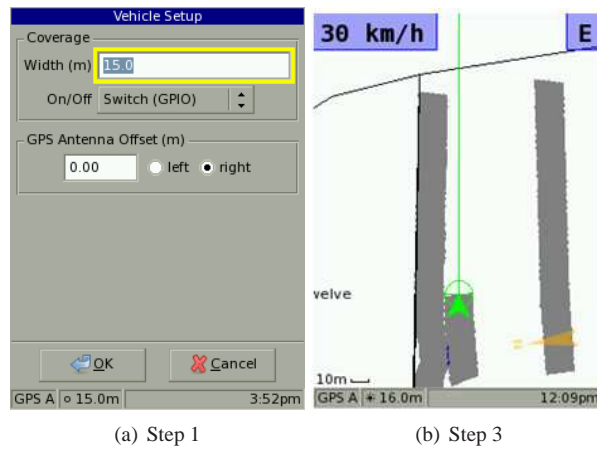


Figure 8.1: Shifting K-Line using Coverage

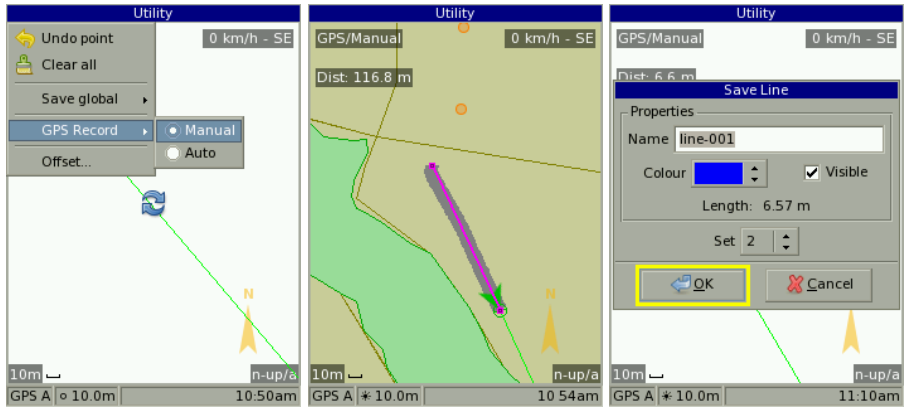
8.2.2 K-Line Pull Lines

1. Set the spread width to the diameter of irrigation by pressing **[Menu]**, select *[Vehicle Setup]*, and press **[Enter]**. Then press **[F2]** to open the onscreen key board. Key in the desired width, press **[F2]** to close the keyboard. Press page to highlight **[OK]** and press **[ENT]**
2. Drive to where you want to start your pull line, then start a new job by pressing **[Menu]** and selecting *[New Job]*.
3. Then press **[Menu]** and select *[Utility]*. When the utility page opens press **[F2]** and select either *Track Up* or *North Up* navigation modes and press **[ENT]**
4. Next press **[Menu]** and set *[GPS Record]* to *[Manual]* (select *[Clear All]* if you have already begun recording data)
5. Now turn spreading on and drive the first line. As you drive press **[ENT]** to create a mark at the position where the last sprinkler will be. At the end of the line or at any direction change, press **[ENT]**. This will create your pull line.
6. Stop once you have driven the line and press **[Menu]** and select *[Save Global / Line]*. The save line dialog box will open. Here you can set a Name, Colour,

Visibility and Set that you want to save the line to. Press **[Page]** to move between the different controls and use the up and down arrows and **[ENT]** to change the settings. Then press **[Ent]** to save the line (it is recommended that you save the lines into one of your global sets so that they can be viewed no matter which job is open)

7. After saving the line, turn the spreader off and drive to the start of the next line. Select **[Menu]** and choose *[Clear All]*. Now repeat the process.
8. When you are ready to drive the next pull line, turn the spreader on and drive keeping the edge of the guide circle against the coverage of the previous line
9. Once you have complete your second line - repeat steps 6, 7 & 8 until all of your pull lines have been saved. Then press **[Menu]** and select *[Stop Job]*
10. You now have saved pull lines that can be used to shift K-Line

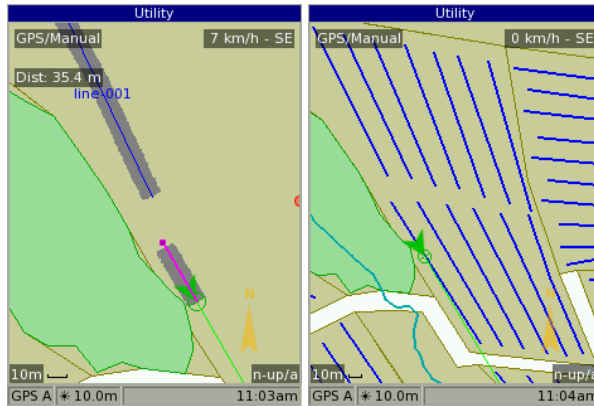
Once the lines have been created they will appear on the navigation page whenever the unit is turned on, and the check mark is present next to the set tab those lines are stored in. The operator simply has to pull the sprinkler line to the next highest numbered line for each hydrant at each shift. If you want to save the tracks because they are not being shifted in number order, or to be able to review job performance, create a job for each shift.



(a) Step 4

(b) Step 5

(c) Step 6



(d) Step 8

(e) Step 9

Figure 8.2: Shifting K-Line using Pull Lines

Chapter 9

FAQ

This section answers frequently asked questions.

Q. What coordinates system should I set my unit to?

A. In NZ we recommend that you use the NZTM coordinate system. For other countries set the correct UTM zone.

Q. What coordinates system should I use for export & import?

A. We recommend WGS84, as it overcomes the risk of inadvertently using the wrong coordinate system.

Q. What UTM zone should I use?

A. A map of UTM zones can be found in appendix B.1.

Q. How can I declutter my map?

A. Make use of the limit detail function see section 7.10.1 or hide global labels and geometry using the View Menu see section 6.1.1.

Q. I can't access my USB drive, what should I do?

A. First unplug and replug the USB, if this is unsuccessful try turing the power on and off.

Q. How can I speed up the performance of my unit?

A. Reduce the amount of storage that is used by deleting old jobs. Keep the amount of geometry that is being drawn onscreen to a minimum.

Q. Can I import my existing farm map?

A. Yes, provided it is in ESRI shapefile format, see section 7.8.1.

Q. How do I create a farm map using the TM465?

A. See section 8.1

Q. Can I get a higher accuracy GPS?

A. Yes. Talk to your TracMap representative about the various options.

Q. How do I upload maps to the internet for others to view?

A. You need an account and login with TracMap. There are various plans and associated costs start from as low as \$50/year.

To see some examples go to www.tracmap.co.nz –
Click on 'Your maps @ TracMap'
Login as – 'tm-demo'
Password is – 'headunit'

You will now be able to access some example files.

Q. How do I get support with TracMap?

A. If you cannot find the answers to your question in this manual, you can email us at *support@tracmap.co.nz* or call us on *0800 862 262*.

Q. How do I get software upgrades?

A. Log into the TMO site on the internet (as per the instructions above).

- Click on the “Download Software Upgrade” link on the green panel on the left of screen
- Click on the appropriate link to begin download. Save the file to a USB drive
- With the TM465 turned off, plug the USB flash drive into the USB dongle
- Hold the [**F2**] and [**Power**] buttons down for 3 seconds
- The screen will display the message “Scanning USB...”
- The screen will then display any available upgrade files that are on the USB drive
- Highlight the most recent file (if you have more than one) and press [**Ent**]
- Wait until the screen displays “Upgrade complete Press a key”

Chapter 10

Glossary

Coverage - An onscreen representation of product application

Dialogue - A screen that allows the input of data

Focus - The focus in a dialogue is the active item it is identified by the yellow box around it

Geometry - Outlines, lines and markers

GPS - Global Positioning System

Head Unit - The TM465 unit

Job - Coverage, geometry and detail data about a specific piece of work

KML - (Keyhole Markup Language) The format used by Google for map data

Page - A screen displaying information used for guidance

USB drive - Flash memory storage device integrated with USB (Universal Serial Bus)

Set - A group of related outlines, lines or markers

Shapefile - An ESRI shapefile is a commonly used format for mapping. A shapefile consists of a .dbf, .shp & .shx file (and sometimes optional .prj, .sbn & .sbx files)

Appendix A

PDOP

Position Dilution of Precision (PDOP) describes the geometric strength of satellite configuration on GPS accuracy. When visible GPS satellites are close together in the sky, the geometry is said to be weak and the DOP value is high; when far apart, the geometry is strong and the DOP value is low. Thus a low DOP value represents a better GPS positional accuracy due to the wider angular separation between the satellites used to calculate a GPS unit's position. The table below shows the meaning of DOP values.

DOP Value	Rating	Description
1	Ideal	The highest possible confidence level to be used for applications demanding the highest possible precision at all times
2-3	Excellent	At this confidence level, positional measurements are considered accurate enough to meet all but the most sensitive applications
4-6	Good	Represents a level that marks the minimum appropriate for making business decisions. Positional measurements could be used to make reliable in-route navigation suggestions to user
7-8	Moderate	Positional measurements could be used for calculations, but the fix quality could still be improved. A more open view of the sky is recommended
9-20	Fair	Represents a low confidence level. Positional measurements should be discarded or used only to indicate a very rough estimate of the current location
21-50	Poor	At this level, measurements are inaccurate by as much as 300 metres with a 6 meter accurate device ($50 \text{ DOP} * 6\text{m}$) and should be discarded

Table A.1: PDOP values

Appendix B

Map Projections

WGS 84 (World Geodetic System 1984) is the datum used by the Global Positioning System (GPS). It is geocentric and globally consistent within 1m. A datum defines the position of the spheroid relative to the centre of the earth. The origin and orientation of latitude and longitude lines are determined by the datum. A datum is necessary for the GPS system to model the earth's surface and calculate the position of the GPS giving a latitude and longitude in decimal degrees (DD) e.g. 92.5 or degrees/minutes/seconds (DMS) e.g. 92° 30' 00".

Latitude and longitude are excellent for locating positions on the surface of a globe however they are not effective for measuring distances and areas because they are not uniform units of measure. One degree of longitude at the equator = 111.321 km whereas one degree of longitude at 60 latitude = 55.802 km (based on the Clarke 1866 spheroid).

To use the GPS data to map and measure, geographic coordinates must be projected onto a flat plane or 2 dimensional view, resulting in projected coordinates.

Map projections are used to transform latitude and longitude into Cartesian (projected) coordinates (x,y). Map projections allow longitude and latitude coordinates to be projected from a 3 dimensional position on the earth's surface to a plane or 2 dimensional surface. This enables the GPS data to be used for mapping (proof of placement etc) and measuring (distance and area, etc).

Map projections portray the surface of the earth or a portion of the earth on a flat surface. Transverse Mercator projections result from projecting the sphere onto a cylinder tangent to a central meridian. Transverse Mercator projections are often used to portray areas with larger north/south than east/west extent. Distortion of scale, distance, direction and area increase away from the central meridian.

The TM465 offers a choice of three transverse mercator map projections -

- UTM
- NZ Transverse Mercator
- NZ Map Grid

These projections are discussed in more detail below.

B.1 Universal Transverse Mercator (UTM)

The Universal Transverse Mercator (UTM) projection is used to define horizontal positions worldwide by dividing the surface of the Earth into 6 degree zones, each mapped by the Transverse Mercator projection with a central meridian in the centre of the zone as shown in the figure B.1.

UTM zone numbers designate 6 degree longitudinal strips extending from 80 degrees South latitude to 84 degrees North latitude. UTM zone characters designate 8 degree zones extending north and south from the equator. There are special UTM zones between 0 degrees and 36 degrees longitude above 72 degrees latitude and a special zone 32 between 56 degrees and 64 degrees north latitude.

Eastings are measured from the central meridian (with a 500km false easting to insure positive coordinates).

Northings are measured from the equator (with a 10,000km false northing for positions south of the equator).

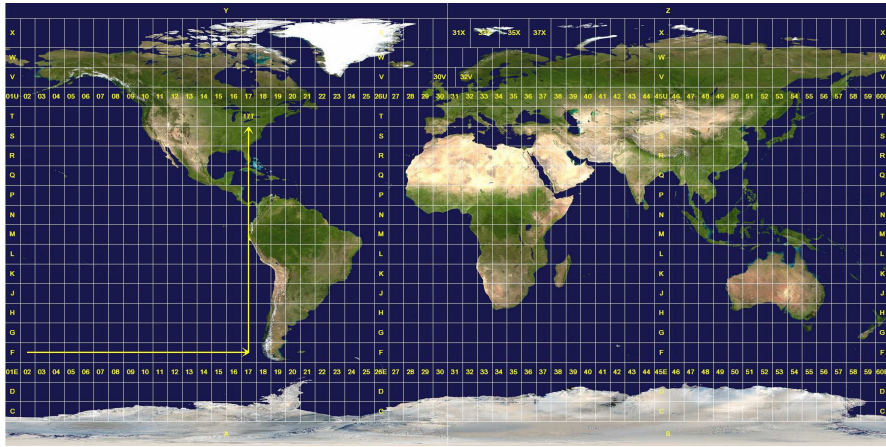


Figure B.1: UTM Zones.

B.2 New Zealand Map Projections

Two map projections are used in New Zealand the NZ Map Grid and its modern replacment the NZ Transverse Mercator 2000.

B.2.1 NZ Transverse Mercator 2000

In 2000 Land Information New Zealand (LINZ) released a new national datum, New Zealand Geodetic Datum 2000 (NZGD2000). NZGD2000 is based on the GRS80 ellipsoid to be consistent with international reference systems. It was chosen because it is an internationally recognised type of projection that exhibits a low level of distortion at its east/west extents. The projection is only applicable for the main New Zealand island group (North, South, Stewart/Rakiura and the smaller coastal islands). Separate projections are defined for the New Zealand's offshore islands and for its continental shelf.

For all practical purposes, NZGD2000 is the same as WGS84. Subsequently LINZ has also defined a new projection for national topographic mapping, the New Zealand Transverse Mercator 2000 (NZTM2000) projection, to replace the New Zealand Map Grid (NZMG) projection.

New Zealand Transverse Mercator 2000 (NZTM2000) is the projection that will be used for New Zealand's future Topo50 1:50,000 and other small scale mapping. Land Information New Zealand (LINZ) encourages spatial data users to use NZTM2000 where a projection is required within mainland New Zealand.

B.2.2 NZ Map Grid

The NZMG map projection is a unique projection crafted to minimize the scale error over the land area of New Zealand. It was specifically defined in terms of the International Ellipsoid used by the NZGD1949 datum. It is rapidly being over taken by the NZTM2000 as the standard map projection for New Zealand.

Appendix C

Installation

Locate a suitable place to mount the TM465 where the driver can see it and use it with ease - see examples below.



Figure C.1: Tracmap installations.

You may need to fabricate a small metal bracket to mount the pedestal on, or purchase one from TracMap.

The Garmin GPS antenna needs to be mounted on the roof in the centre line of the vehicle, not to one side. If it's a plastic roof, then the antenna will need to be placed on a metal plate that will need to be glued to the roof. If it's a metal roof, the Garmin is a magnetic mount antenna, and will stay where it is placed. Keep the antenna away

from other transmitting antennas that may be on the roof. Run the antenna cable inside the vehicle. Use the Velcro to attach the spreading switch to the TM465 or in the vehicle where the driver can easily reach it. Please note that the spreading switch can be replaced with any powered switch providing a closed loop when spreading is on (530 volts). Contact TracMap for more information. Plug the blue plug into blue socket, and the green plug into the green socket. Plug the black cable into the black socket. This is the USB port for plugging in a USB stick when importing and exporting data, or a USB Keyboard.

Plug the power supply into the cigarette lighter. Start to use the TM465.

Note

If your Tracmap spreading switch is connected to an inductive device such as a solenoid or relay, when it is switched off, a back EMF is generated by the collapsing magnetic field around the inductor. This back EMF can easily attain a surprisingly high voltage that can damage the Tracmap Head unit's electronics. The solution is to place a diode across each digital input into the Tracmap head unit, such that the diode is in reverse bias when the coil is energized. When the coil is de-energized the back EMF then has a closed path and high voltages are not generated. See figure C.2.

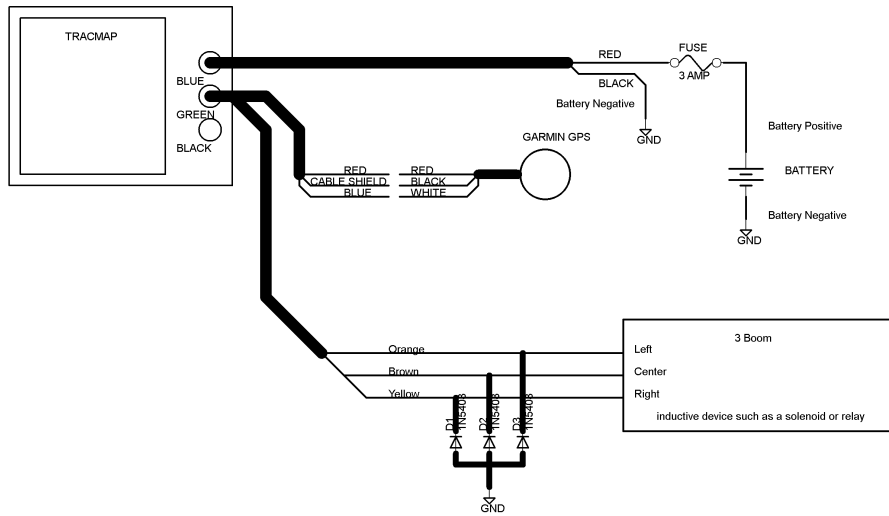


Figure C.2: Diode Protection.

Appendix D

TM465 Template Builder

The TM465 Template Builder is a PC based web application that can be used to set up job templates that can be imported into the headunit via USB. A job template consist of job geometry (Outlines, Lines & Markers) and job details (Job Name, Client, Driver, Order # & Comments). The template builder enables office staff to quickly and easily set up a job to give to field staff to import and use.

Prerequisites

For the template builder to run you must have – internet access, a web browser (either Internet Explorer or Firefox) and Java (version 6 Update 1 or higher) installed on your computer.

Website Address

To access the template builder go ton the following website – <http://office.tracmap.co.nz>.

Login

If you already have a login to TracMap Office enter your Login Name and Password now.

If not you can access the template builder enter -

Login	tm-demo
Password	headunit

Once you have logged in, click the *TM465 Template Builder* link on the panel on the left side of the page. Then click the link to launch the template builder on the next page and click run to accept the security warning.

When the Template Builder loads you will see four buttons at the top left of the screen.

Button	Function
Import Template	Import an existing template
Export Template	Export a template
Load Shapes	Load Outlines, Lines & Markers from ESRI shapefile (.dbf, .shp, .shx) or Google Earth (.kml) into template
Reset	Clears all data in the template builder

Table D.1: Template builder buttons

Loading Shapes

To create a new template click **Load Shapes**. You will now see a screen like figure D.1. On the left hand side you can enter job details see figure D.2. Below these fields you can toggle the visibility of Outlines, Lines & Markers, show whole map and zoom the map using the slider bar.

On the right side of the page you will see three tabs for loading Outlines, Lines & Markers. On each tab there is a button for loading in shapes, an undo button and a

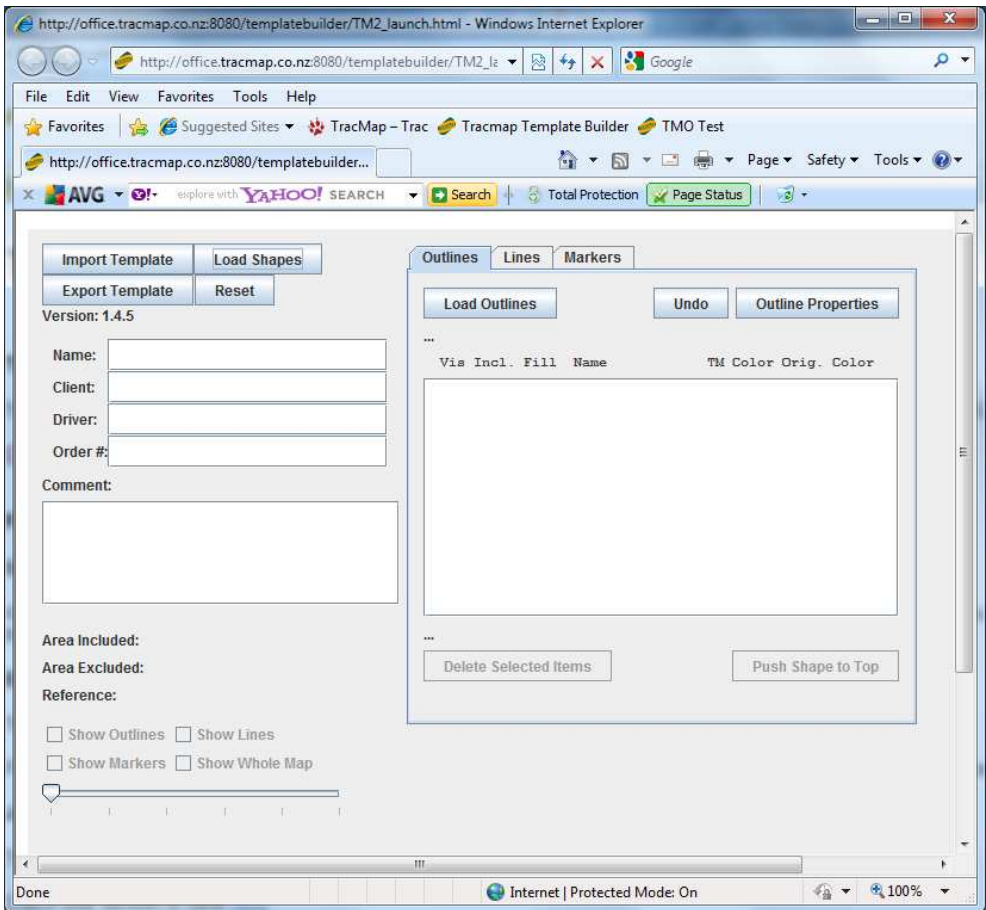


Figure D.1: TM465 Template Builder

properties button.

To load shapes into your template hit the load button on the appropriate tab. this will bring up a file browse window where you can choose the file to import.

After selecting a file a properties box will display (see figure D.2). Here you can choose the Colour, Fill (Outlines only), Visibility & Symbol (Markers only).

Field	Description
Name	The job name (must not include spaces)
Client	The client name or ID for the job
Driver	The driver name or ID that is going to do the job
Order #	The order number for the job
Comment	Any comments or special instructions for the job

Table D.2: Template builder details

For Outlines you can also choose the Ref Area Usage. This determines whether the outline is included (added to), excluded (subtracted from e.g. void zones such as a pond or building) or ignored in job area calculations.

Once you have set the properties click **OK** and your shapes will be loaded into the list box on the right side of the page and will also be visible in the map preview below.

Now you can select individual or multiple (hold down Ctrl key) shapes by clicking on them in either the list or the map preview. You can change the properties of the select by clicking the button above the list or delete the selection by clicking the properties button below the map preview.

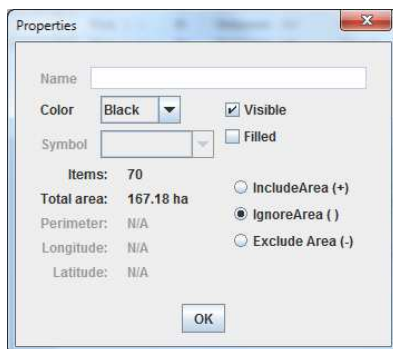


Figure D.2: Shape properties

Exporting Template

Once you have all of your job details filled, your shapes loaded and your properties set you can export your template by clicking the **Export Template** at the top left of screen.

You will now be given the option to Export All Shapes or only the Selected shapes choose the appropriate option and select **OK**. Browse to the directory that you want to save to and click **OK**. A template file (.ttz) will be created in the directory that you have specified.

Importing Template

You can also import a template that has been created previously either on the head-unit or the template builder by clicking the **Import Template** button and selecting the .ttz file. This is useful when you want to change a template before re-exporting.

Appendix E

Specifications

Physical	
Operating Temperature	4C to 70C
Waterproof Case	IP67 Rated
Electrical Specifications	
Nominal Input Voltage	12V or 24V
Max Input Voltage	32V
Min Input Voltage (Full operation)	8V
Min Input Voltage (CPU only)	5V

CPU Only	
Normal Power Consumption (13.8V)	530mA or 7.3W
Max Power Consumption (13.8V)	1A or 4W
Over Voltage Protection	200V
Reverse Polarity Protection	-36V
Digital Inputs	4
Max Isolation	200V
Max Voltage	+32V
Min Voltage	-32V
Voltage Thresholds	Min 3V = on Max2V = off
RS232 Serial Ports (GPS & Aux)	
Nominal In / Out Voltage	+/- 10V
Max Input Voltage	+/- 25V
Max Output Voltage	+/- 13.2V
RS485 Serial Port	
Max Voltage Any Pin	+/- 80V
Nominal Signal Voltage	+/- 5V
Other	
5V Outputs (2)	500mA max each
AC Signal Detection	>50 HZ = on <50 HZ pass through

Table E.1: Technical specifications

Appendix F

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Appendix G

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Version 2, June 1991

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