TracMap Flight 3
Install & Initial Setup Guide
Jan 2017 Version

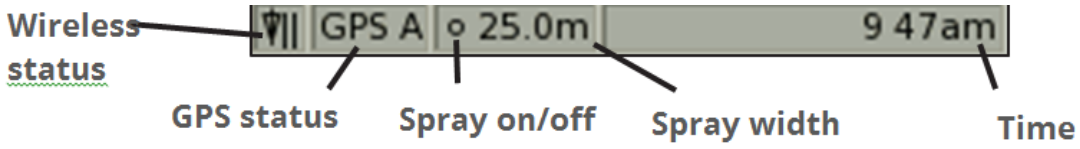
Initial Setup

Before installing or using your TracMap display unit for the first time, read this Getting Started section, and Installation Guide.

We recommend working methodically through each of the steps outlined below.

Steps Before First Use

- Install the unit in the aircraft.
- Power on by holding down [POWER] for three seconds, until the TracMap logo appears on screen.
- Move the aircraft to where you can get a GPS fix. The status bar at the bottom of the screen should look something like this.



Check switch connections

- Check the log on/off is working. The small circle at the bottom of the screen should change to an asterisk when spray/spread is on.
- Check remote switches are working.
    - Press Button connected to Input 1: The menu should appear on screen
    - Press Button connected to Input 5: The menu selection should scroll down one menu item
    - Press Button connected to Input 6: The menu selection should scroll back up to previous position
- Press [ESC]

Set/Check the UTM Zone to match your location (if will be operating in two neighbouring UTM zones, set to the lower number).

- If there is an ORANGE band at the top of the screen displaying 'Incorrect UTM Zone' (see Section 5.1.3):
    - Press [MENU]
    - [ROCKER] down to 'Unit Set Up' and press [ENT]
    - [ROCKER] across to 'Map'

- Press [TAB]. The selection should be 'NZ Transverse Mercator 2000'.
- The correct UTM zone will be set automatically from the GPS fix. [ROCKER] up so that UTM zone is highlighted
- [TAB] to 'OK' and press [ENT]. The unit will erase any stored maps and restart

Set important preferences (also see Section 5 of full manual)

- Press [MENU], go to 'Unit Setup' and [ROCKER] across to 'Locale'
- Use the [TAB], [ENT] and [ROCKER] keys to set:
  - Language
  - Metric or US customary units
  - Time zone
- [TAB] to 'OK' and press [ENT]
- Press [MENU], go to 'Preferences' and use [ENT], [ROCKER] and [TAB] keys to set
  - Mode (Track up, North up, or Line up) under the 'View' page
  - Autoboom offline limit, if autobooms is installed, found under 'Guidance'
  - Speed display (knots, or kph or mph) under 'General'
- You can also set your other preferences now, or later (see Section 5 of the manual)

Set up your Menu and Shortcut keys (also see Section 6 of full manual)

- Go to 'Menu Setup'
- [TAB] to 'Item Two'
- Press [ENT] to display all the options. [ROCKER] to your selection and press [ENT]
- Repeat for the other free boxes
- [TAB] to 'OK' and press [ENT]

Set up your Lightbar. (Section 4 of full manual)
This is particularly important for the LB17 (external) lightbar.
Set:

- The traffic light timing (see 4.1.1) at 1 second for LB16, 8 seconds for LB17
- The guidance LEDs (see 4.1.2). The default is suitable for helicopters, but needs to be changed for fixed wing
- The numeric displays (see 4.1.3) presently set to only display groundspeed and line number

Set other preferences - not essential to start flying, but do need to be selected at some stage.

Note: Remember to select 'OK' every time you make changes to save those changes. Press [ESC] to revert back to existing settings.

Connections

TracMap Display Unit Connections

Viewed from the back, the unit has four connectors which are numbered from top to bottom.

The functions of each connector are:

Connector 1

Red

Powers the Display Unit and lightbar

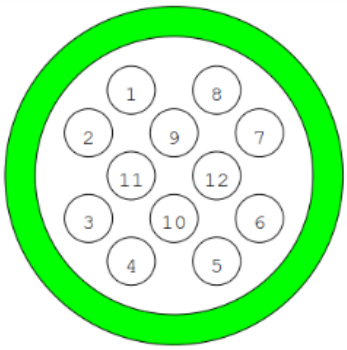
Requires 8V to 32V, Negative Earth

Connector 2

Yellow

Connects to the GPS

Connector 3



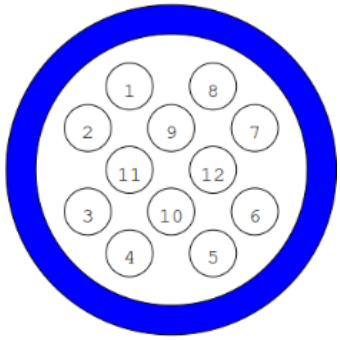
Green

Provides the serial and digital inputs

For Single Boom, wire to input 3

For Twin Boom, wire to inputs 2 & 4

For Three Boom, wire to inputs 2,3,4



Connector 4

Blue

Connects to the Lightbar

Output for Autobooms (using TMW-1027S) cable

Serial Input for Aux3 (special cable loom required)

USB

The two smaller connectors on the left side of the Display Unit when viewed from the back. USB connection is via the supplied USB connector cable (often referred to as a 'USB Dongle').

This allows you to attach memory sticks and keyboards. A USB hub may be attached to this cable if you wish to use a keyboard and memory stick at the same time.

The top connector is also used for connecting the cell modem for wireless data transfer.

MODEM

The modem must only be connected to the **top** connector of the two USB dongle connectors on the back of the TracMap unit.

Installation

Overview - Helicopter

Display Unit

Typically, the Display Unit is mounted to a purpose designed folded metal bracket using the screw mounting points on the back of the unit, and the 4 supplied M4 mounting screws. This mounting in turn is attached to a mounting point(s) on the instrument console and/or cockpit frame.

A suitable bracket can be sourced from TracMap, or made up by a suitably equipped engineering shop.

GPS

The GPS receiver is often also attached to the back of the bracket.

Lightbar

The lightbar is mounted using the RAM mount to the top of the same bracket, or to the instrument console. It should be positioned at a suitable height so is in direct line of sight of the pilot when actively working.

GPS Antenna

The GPS antenna should be mounted where has a good view of the entire sky when the aircraft is flying. Externally on a wirecutter is ideal, but many customers are getting adequate results by just positioning the antenna on top of the instrument console.

NOTE

On some 4 and 5 blade aircraft using the TMR-200 GPS receiver, harmonic interference can disrupt the GPS signal. In these situations the antenna needs to be located clear of the rotor arc.

Switch Inputs

Spray/spread on/off should be wired to provide +ve voltage when spray is on.

- For single boom, connect to Input 3
- For twin boom, connect to input 2 & 4
- For three boom, connect to inputs 2,3,4

This input can come from the spray activation switch (as shown in the wiring diagram in Appendix E), or from pressure switches mounted on the boom.

Three momentary switches should be fitted to the cyclic to operate the remote inputs. Many customers use a single “witches hat” rocker switch for this purpose, others a two way self-centering switch for “Next Line”/”Prev Line” (Input 5 & 6) combined with a single press button for “Menu”/”Enter” (Input 1).

Power

We recommend routing the power supply via a panel mounted On/Off switch.

Overview – Fixed Wing

Display Unit

Either mount the Display Unit in the instrument panel using the supplied 4 M4 mounting screws, or attach to the frame using the optional pedestal mount.

GPS

The GPS receiver should be mounted where there is no risk of condensation or moisture running down the connecting cable onto the GPS receiver.

Lightbar

If using the internal LB16 lightbar, many people remove the ball from the back and use a Velcro strip to mount directly on top of the instrument panel. (Note, any damage caused by disassembling the Lightbar to remove the ball is not covered by warranty)

If using the external LB17 lightbar, mount to the engine cowling using the supplied bracket.

GPS Antenna

The GPS antenna should be mounted externally on the centreline of the aircraft.

Switch Inputs

Spray/spread on/off should be wired to provide +ve voltage when spray is on. Typically this achieved with a contact switch next to the spray on handle, or from a pressure switch on the boom.

- For single boom, connect to Input 3
- For twin boom, connect to input 2 & 4
- For three boom, connect to inputs 2,3,4

Three momentary switches should be fitted to the control stick to operate the remote inputs. Many customers use a single “witches hat” rocker switch for this purpose, others a two way self-centering switch for “Next Line”/”Prev Line” (Input 5 & 6) combined with a single press button for “Menu”/”Enter” (Input 1).

There are several suppliers of aftermarket grips with suitable button arrangements.

Power

We recommend routing the power supply via a panel mounted On/Off switch.

Be sure to arrange the wiring so that condensation will not run down wires into the junction box or connectors.

Wiring Connections – Standard Install using TMW1024 Loom and VL34 Junction Box

All aircraft wiring is connected to the TracMap via a junction box, which is connected via a short cable to a 19pin cannon plug connector, typically mounted in the instrument panel.

This delivers all the digital inputs, as well as provision for two serial connections to auxiliary devices (such as rate controllers, or the VL69 with 4 additional shortcut keys and lightbar brightness dial).

Wiring Connections – Upgrade from Flight Pro using TMW1028 Loom and existing VL27 Junction Box.

You have the option ordering the alternative TMW1028 loom that connects to the existing 10 pin cannon plug, connected in turn to the existing VL27 junction box. This avoids having to do any rewiring in the aircraft, but limits you to only one serial connection, and no additional digital inputs.

Contact TracMap for a copy of the wiring diagram.

Connection Voltage

All wiring should be negative earth.

The TracMap system will operate on both nominal 12V and 24V aircraft.

The digital inputs are used to detect whether the spraying (logging) switch is on and to control the menus. These inputs require a voltage of at least 3V to activate and can be pulled to 12 volts or 24 volts dc. Normally these are wired to the aircraft's cyclic or joystick switches.

- On = 12/24 volts
- Off = 0 volts.

The digital input connections are described in detail in Appendix B of the manual.

Remote Switches

The Flight 3 can be operated using the display unit keypad. However, it is strongly recommended that you connect three remote switches to control the system via your stick.

The remote switches function in 3 ways:

On Flight screen:

Switch 1/Enter	Menu Screen
Switch 5	Whatever has been set under 'Shortcuts' (see 6.2), typically 'Prev Line'.
Switch 6	Whatever has been set under 'Shortcuts' (see 6.2), typically 'Next Line'.

On Flight screen - with action box at bottom (eg Create Job Outline):

Switch 1/Enter	Activates 1st option (e.g. Cancel)
Switch 5	Activates 2nd option (e.g. add point)
Switch 6	Activates 3rd option (e.g. delete point)

On Menu Screen:

Switch 1/Enter	Selects highlighted action
Switch 5	Scrolls down menu list
Switch 6	Scrolls up menu list

Autoboom Wiring using the TMW1027-S

To connect autoboom requires a replacement TMW1027S lightbar cable, instead of the standard TMW1027 cable. The replacement cable has two additional bare wires which need to be connected to switching relay(s) placed in the power lead to activate “Spray On”. The Autoboom works by supplying +ve voltage to the switch relay when spraying is permitted (under the rules applying to autoboom activation, see below).

The switching relay(s) should be wired so as to close the switch to the “Spray On” when +ve voltage applied to the activation side.

- For single boom, connect to Digital Out 1 only.
- For twin boom, connect to Digital Out 1 & 2.

Spray aircraft with a mechanical fan brake will need to replace with an electric brake, or install an electrically actuated valve in the supply line.

The +ve voltage input for ‘log on’ (digital 2, 3, 4) does not have to come from the spray switch circuit as shown, but can be supplied from a pressure switch or other input.

Autoboom Activation Rules

- Aircraft speed is over 16 knots
- Offline distance is less than the tolerance setting
- Aircraft is within a spreading permissible area
    - Inside a target polygon outline (if being used)
    - Outside any exclusion zone
    - Not over existing coverage

Connecting Auxiliary Devices

Auxiliary Devices

Contact TracMap for the wiring schematic diagrams and more detailed setup instructions for the following.

- Intelliflow Rate Controller
- Autocal Rate Controller
- TMA-100 Autoboom and Pulse release controllers
- Various buckets

Compatible devices

Your TracMap unit supports a range of spreading equipment.

The I/O tab (under Unit Setup) lists the serial devices that can be connected to the TracMap unit and allows you to enter settings for some of them (Intelliflow, VL-26, VL23), as well as monitor inputs.

To access the setup (if applicable) and ability to monitor the serial string, assign the device to an Auxiliary Port, and then press [MENU] to access a submenu which will show in the top left of the screen.

AUTOCAL

The Autocal is a flow controller. For a description of its operation see the manufacturer's operating manual.

The only interaction possible with the Autocal is to monitor the data being sent from it to the Tracmap unit. To do this, select Autocal in the I/O tab drop-down and press [MENU]. The Monitor Port option will be highlighted – press [ENT]. If the Autocal is not connected this will show ***EMPTY***. If the autocal is successfully connected a $DS string will be displayed every second (for a description of the $DS string see your Autocal Manual).

INTELLIFLOW

The Intelliflow is a flow controller. For a description of its operation see the manufacturer's operating manual.

To access the Intelliflow Setup page, select Intelliflow in the I/O drop-down, press [MENU] then [ENT].

Use [TAB] to highlight the Meter Calibration field and enter a calibration value using the onscreen keyboard ([F2]).

The Meter Calibration is stamped on the side of the flow meter next to the label "Tag". If this is followed by PPG (pulses per Gallon) it will need to be converted to PPL (Pulses per Litre) before entry.

The TAD is the additional reversal time (in milliseconds) given to the IntelliFlow motor when reversing direction. See Intelliflow manual.

Transland

This is a rate controller for liquid and solid application. The TM DU sends the Transland controller speed, rate and spread width. Data from the Transland controller is saved by the TM DU and transferred to TracMap Online with the job data.

Whitehead

This is a flow controller for solid application (drygate). The TracMap display unit sends the controller Spread Width, Target Rate and Speed and receives Target and Actual spread rate which is transferred to TracMap Online with the job data.

TracMap Devices

Data logger (VL-31)

This device records GPS coordinates every (1 second), saving them to an SD card.

Is primarily used to capture a detailed track log for audit purposes.

Flow meter (VL33)

This device measures flow rate from an attached flow meter. A meter calibration is entered on the DU in Pulses per Litre. Application rate is reported on screen and reported in the job file.

TM AUX (VL69)

Provides 4 additional shortcut keys, and a quick dial for adjusting the LB17 lightbar brightness.

AUTOBOOMS (TMAB-100A & TMAB-100C)

Although your Flight 3 unit has Automatic Autoboom compatibility built in (see Section 5.2.3 of the manual), you can also connect to the Flight Pro Autoboom system comprising a separate hardware device wired into the aircraft system.

The reasons you might want to do this are

- to trigger periodic pulses at preset intervals (such as a camera shutter or cluster baiting)
- to avoid rewiring the spray system when upgrading from a Flight Pro

Both the 100A and the 100C replace a manual switch. To achieve activation (e.g. release of product or camera activation) the following conditions must be met:

- The pilot has turned the ‘Log On’ switch on (+ve voltage)
- Aircraft speed is over 16 knots
- Offline distance is less than the tolerance setting
- Aircraft is within a spreading permissible area
    - Inside a target polygon (if being used)
    - Outside any exclusion zone
    - Not over existing coverage

These conditions are also listed in the diagnostic info on the Autobooms setup page. To access this, select Autobooms as the serial device on the I/O tab and press [MENU]. The options shown are AutoBooms Setup and Monitor Port. Highlight Autobooms Setup and press [MENU]. Enter values for:

Offline tolerance

How far the aircraft can be offline before the device is inactive.

Forward projection

Compensation for the delay until falling product hits the ground.

Access the onscreen keyboard ([F2]) then use [ROCKER] and [ENT] to enter values in each field. To save your settings, use to highlight '**OK**' and press [ENT].

Pulse Mode (TMAB-100C)

Used in applications with pulsed release of product (e.g. helicopter bucket) or camera with on/off switch toggled at intervals. Enter values as above. During operation, the SD card in the TMAB- 100C device will record time and GPS coordinates at each switch pulse (See hardware documentation for details).

The Diagnostic Info section shows what info is being received by the TracMap Unit from the attached Autoboom controller. If the unit is not connected it will show the sentence "Controller not connected". If the controller is connected "$TMABA, RECEIVING" indicates that the Autobooms controller is being detected correctly by the TracMap display unit.

This screen can also be used to monitor whether each of the four conditions required for an active switch pass or fail.

Press [ESC] to return to Flight screen

NOTE 1

The Autoboom controller only operates while the display unit is in a Job.

NOTE 2

While in a job, if the Autoboom becomes disconnected, a warning will be shown in red in the 'Status Bar' at the bottom of the screen.

NOTE 3

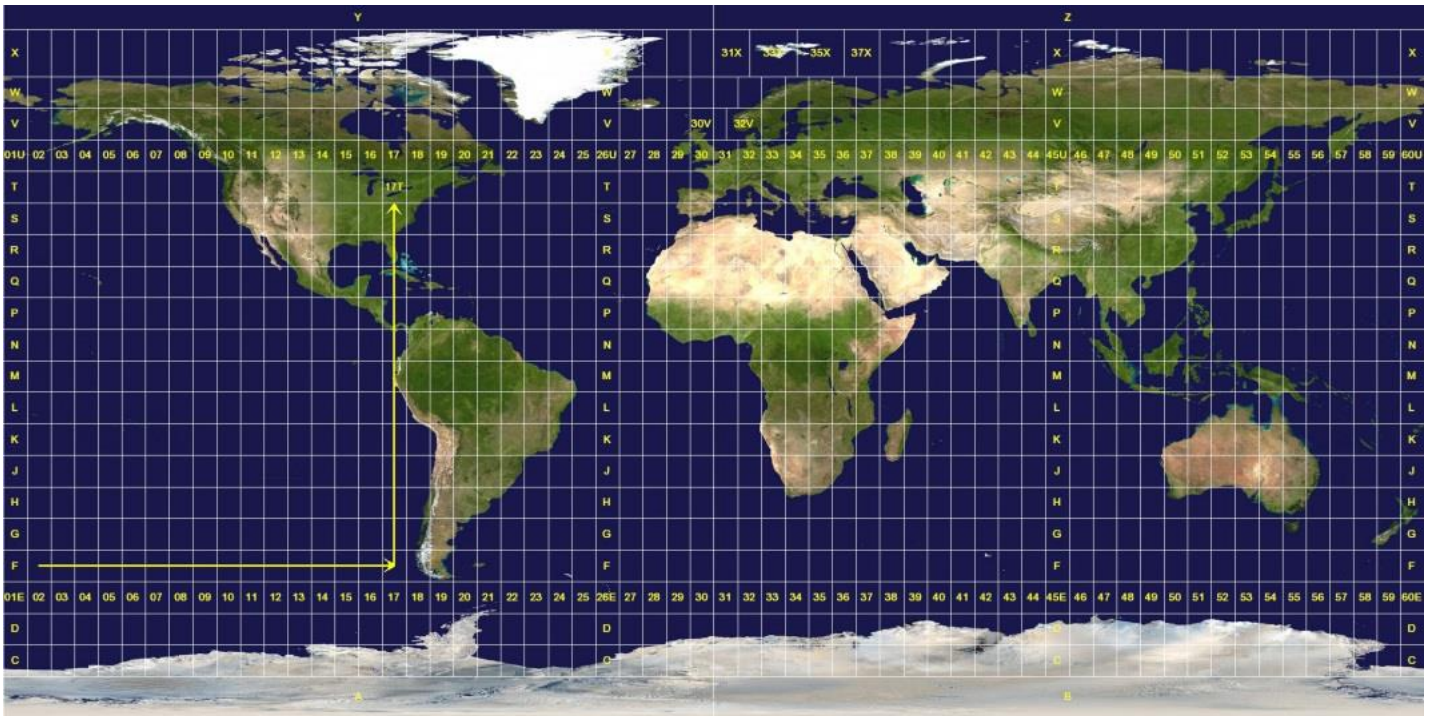
The 'Log On' with the TMAB-100 works differently to when using the standard Autoboom output function wired directly from the Display Unit.

- With the standard Autoboom configuration, the spray on switch is part of the spray circuit wiring.
- With the TMAB-100, the spray switch must be ONLY connected to the TracMap system.

Technical specifications

Operating voltage	8 - 32 V
Operating current	270 - 900 mA
Power consumption	7.3 - 13.8 W
GPS baud rate	38400
GPS sentences required	RMC GSA GSV
GPS supply voltage	5 V
GPS supply current	500 mA max
Digital input threshold	3 V

UTM Zone Map



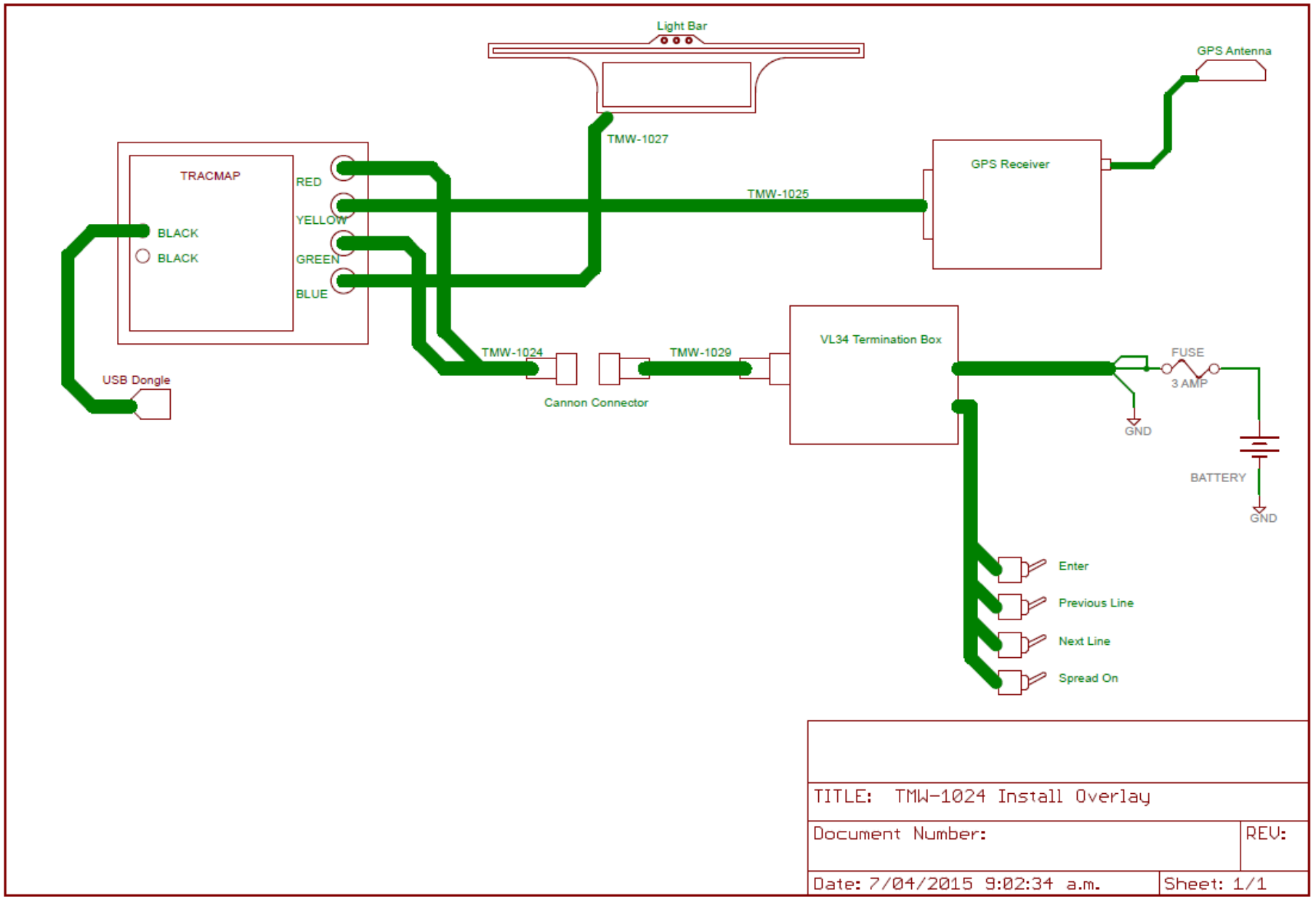
Shows the division of the globe into Universal Transverse Mercator (UTM) zones. The north zone is rows N and above, while the south zone is rows up to M.

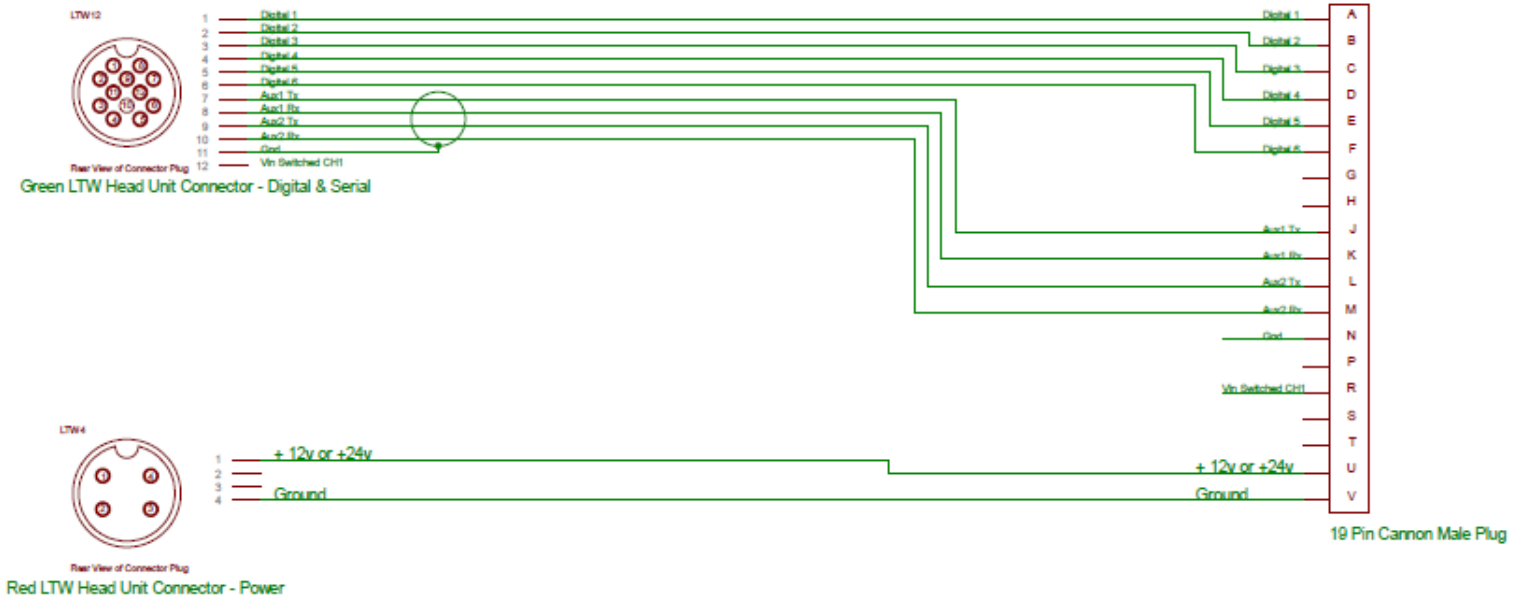
In addition, Flight 3 also supports the following special map projections:

- New Zealand Map Grid
- New Zealand Transverse Mercator 2000

Wiring Diagrams

TMW -1024 Standard Installation with VL34 Junction Box





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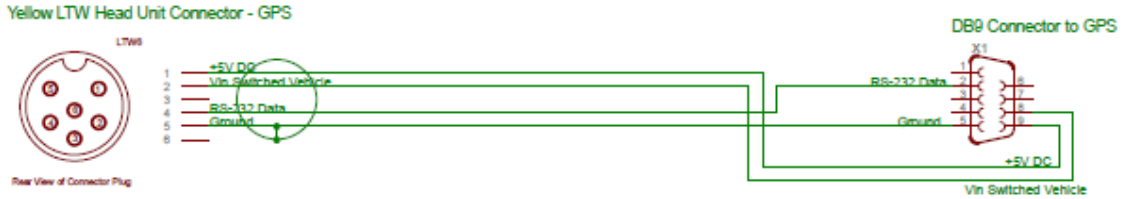

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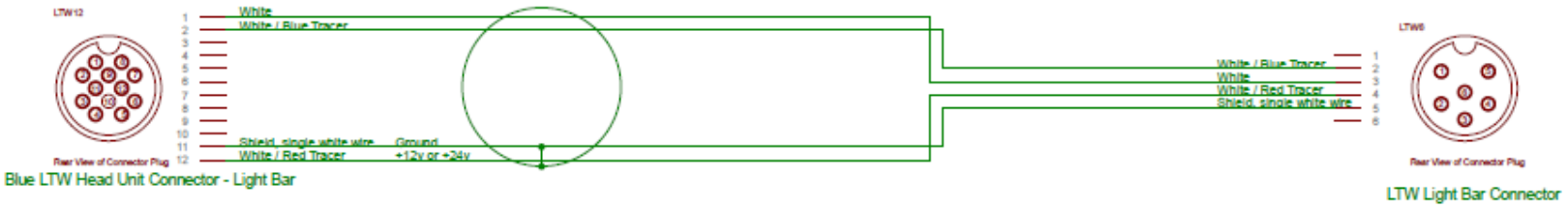

Blue LTW Head Unit Connector - Light Bar

LTW Light Bar Connector

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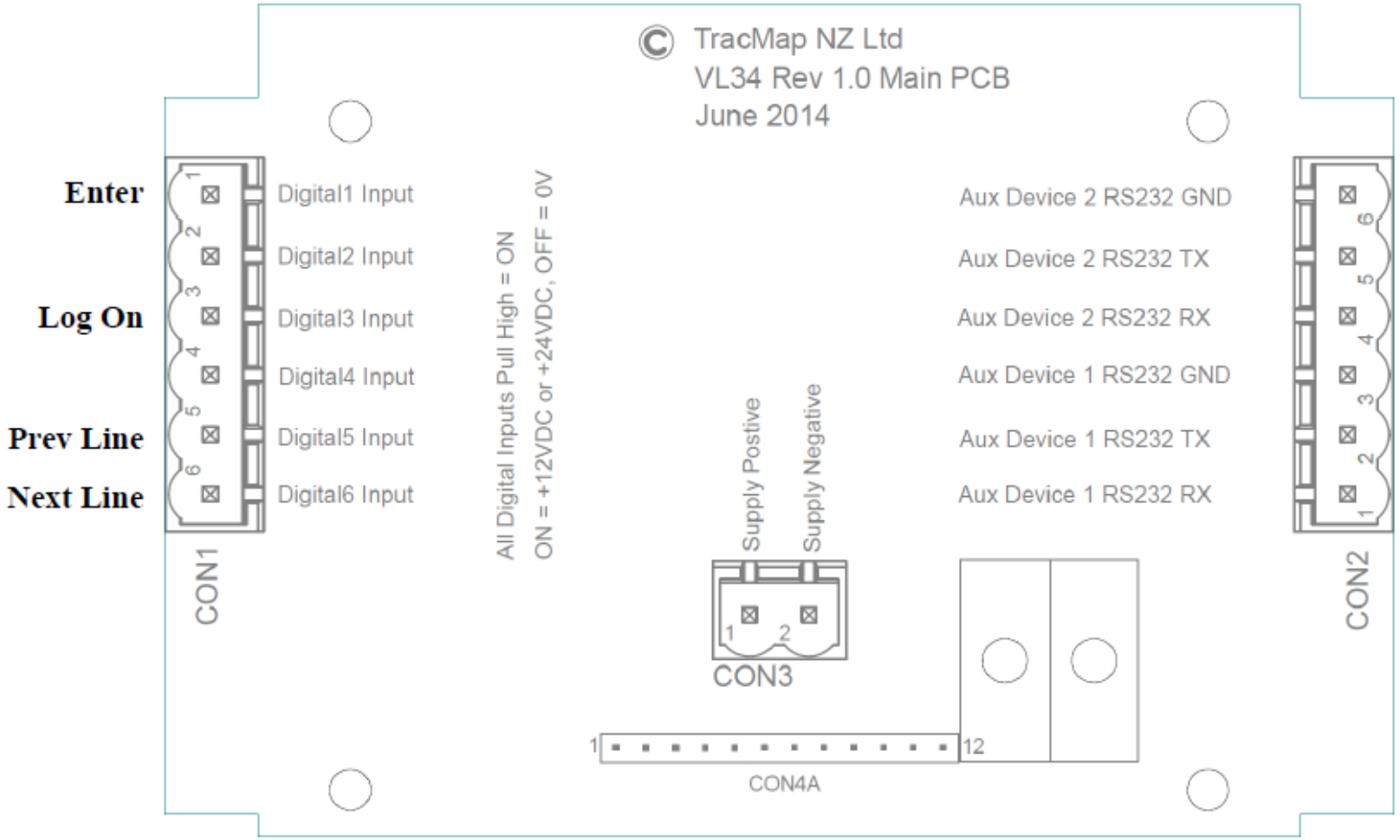
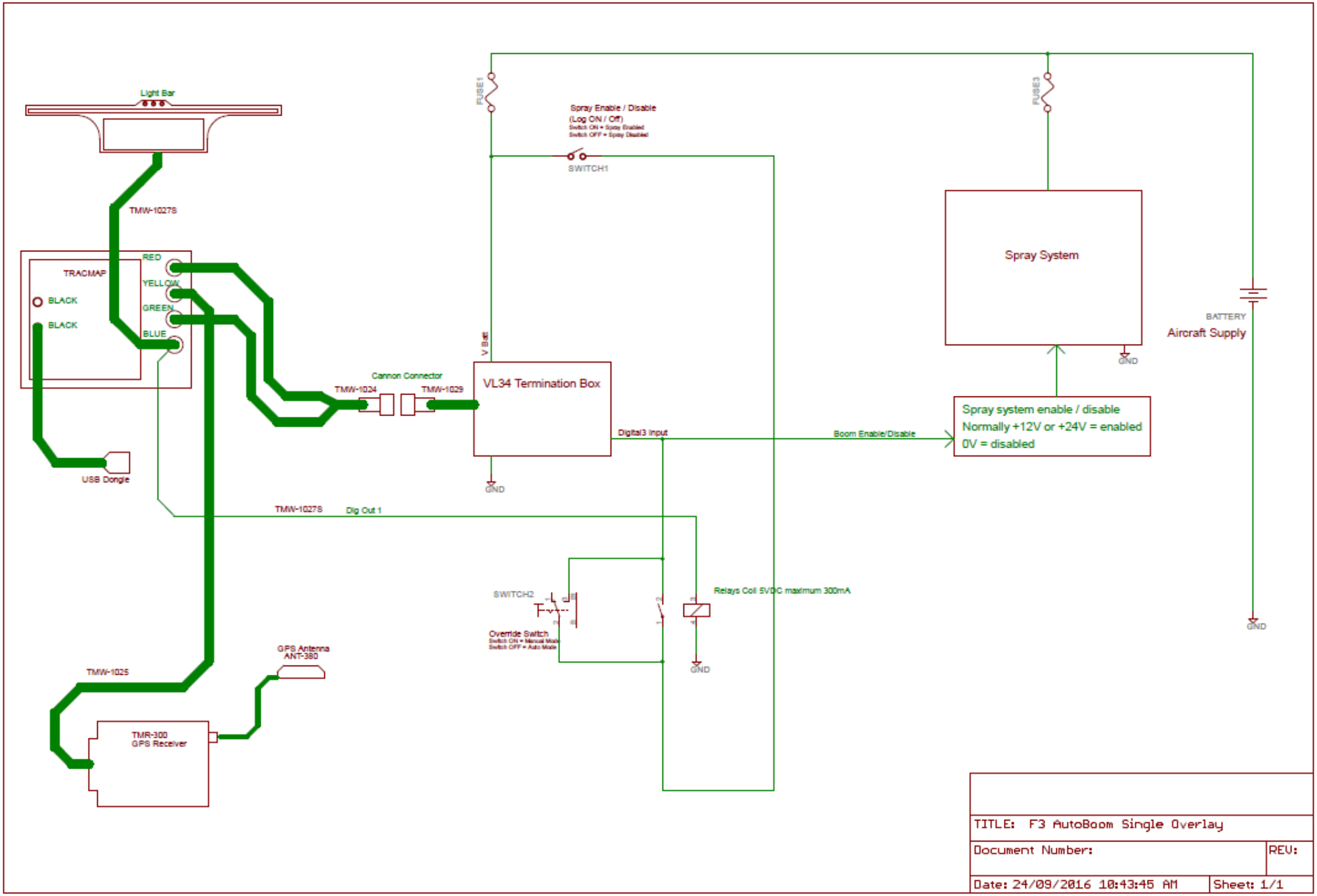
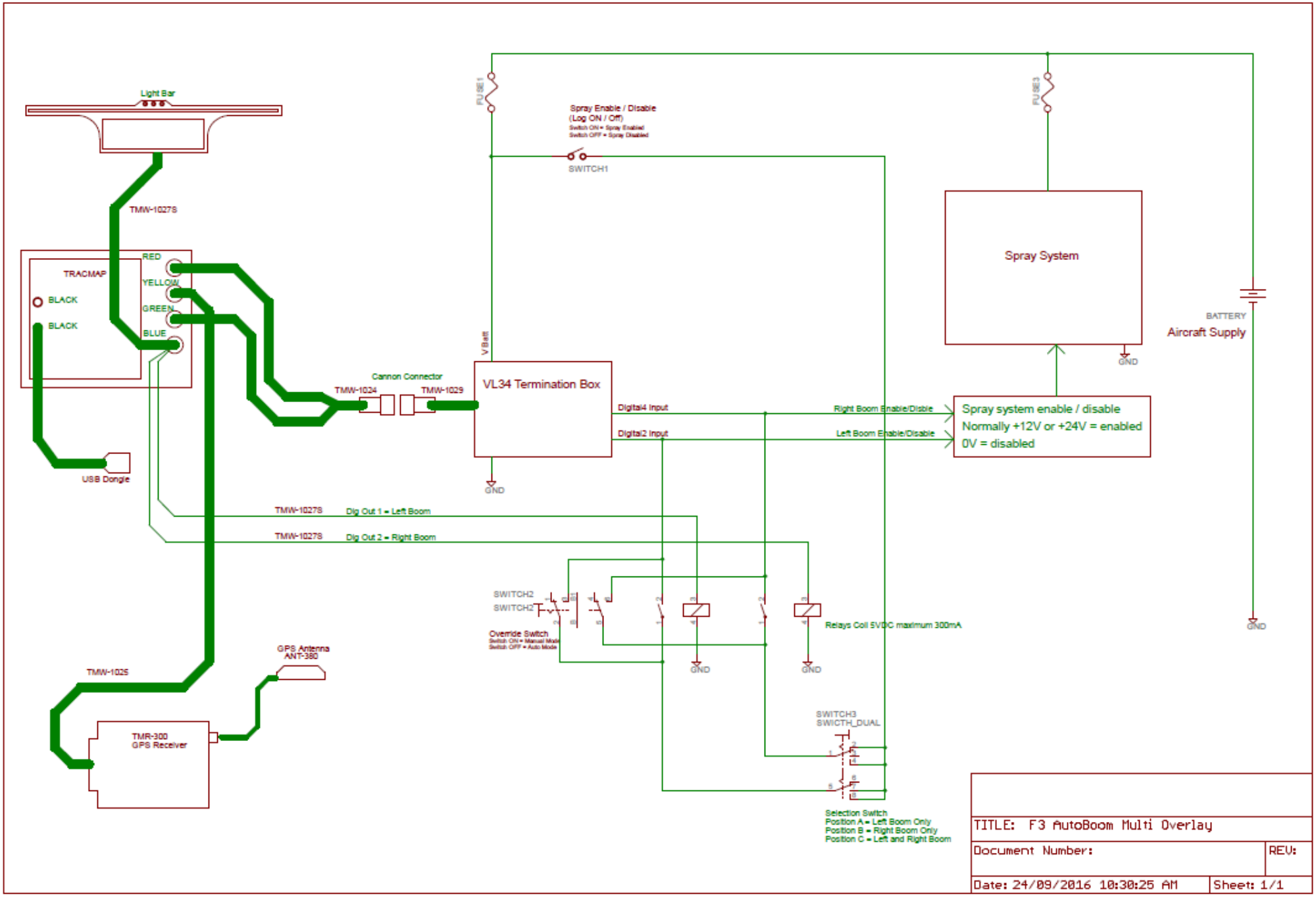

© TracMap NZ Ltd
VL34 Rev 1.0 Main PCB
June 2014
Enter
Log On
Prev Line
Next Line
Digital1 Input
Digital2 Input
Digital3 Input
Digital4 Input
Digital5 Input
Digital6 Input
CON1
All Digital Inputs Pull High = ON
ON = +12VDC or +24VDC, OFF = 0V
Supply Postive
Supply Negative
CON3
CON4A
Aux Device 2 RS232 GND
Aux Device 2 RS232 TX
Aux Device 2 RS232 RX
Aux Device 1 RS232 GND
Aux Device 1 RS232 TX
Aux Device 1 RS232 RX
CON2

Single Autoboom




Light Bar
TMW-10278
TRACMAP
RED
YELLOW
GREEN
BLUE
BLACK
BLACK
USB Dongle
Cannon Connector
TMW-1024
TMW-1029
VL34 Termination Box
V Batt
GND
FUSE1
Spray Enable / Disable
(Log ON / Off)
Switch ON = Spray Enabled
Switch OFF = Spray Disabled
SWITCH1
FUSE3
Spray System
GND
BATTERY
Aircraft Supply
GND
Digital4 Input
Digital2 Input
Right Boom Enable/Disble
Left Boom Enable/Disable
Spray system enable / disable
Normally +12V or +24V = enabled
0V = disabled
TMW-10278
Dig Out 1 = Left Boom
TMW-10278
Dig Out 2 = Right Boom
SWITCH2
SWITCH2
Override Switch
Switch ON = Manual Mode
Switch OFF = Auto Mode
GND
GND
Relays Coil 5VDC maximum 300mA
GPS Antenna
ANT-380
TMW-1025
TMR-300
GPS Receiver
SWITCH3
SWICTH_DUAL
Selection Switch
Position A = Left Boom Only
Position B = Right Boom Only
Position C = Left and Right Boom
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