TracBox:
Quick Start Guide

Prepared for:
FTP Technologies' Customers

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Version History

Date	Version	Author	Description of Change
2015	**1.x**	**Acea Quigg**	**TracBox 1.0**
2016	**2.x**	**Acea Quigg**	**TracBox 2.0**
2017	**3.x**	**Acea Quigg**	**TracBox 3.0**
2018	**5.5**	**Acea Quigg**	**TracBox 5.5**
2018	**5.6**	**Acea Quigg**	**TracBox 5.6**
2018	**5.6.1**	**Acea Quigg**	**TracBox 5.6.1**
2019	**v6a7**	**Acea Quigg**	**TracBox 6.0**
2019	**v6a7r**	**Mitch Kelly**	**TracBox 6.7 Relay**
2020	**V6a11**	**Acea Quigg**	**TracBox v6a11**

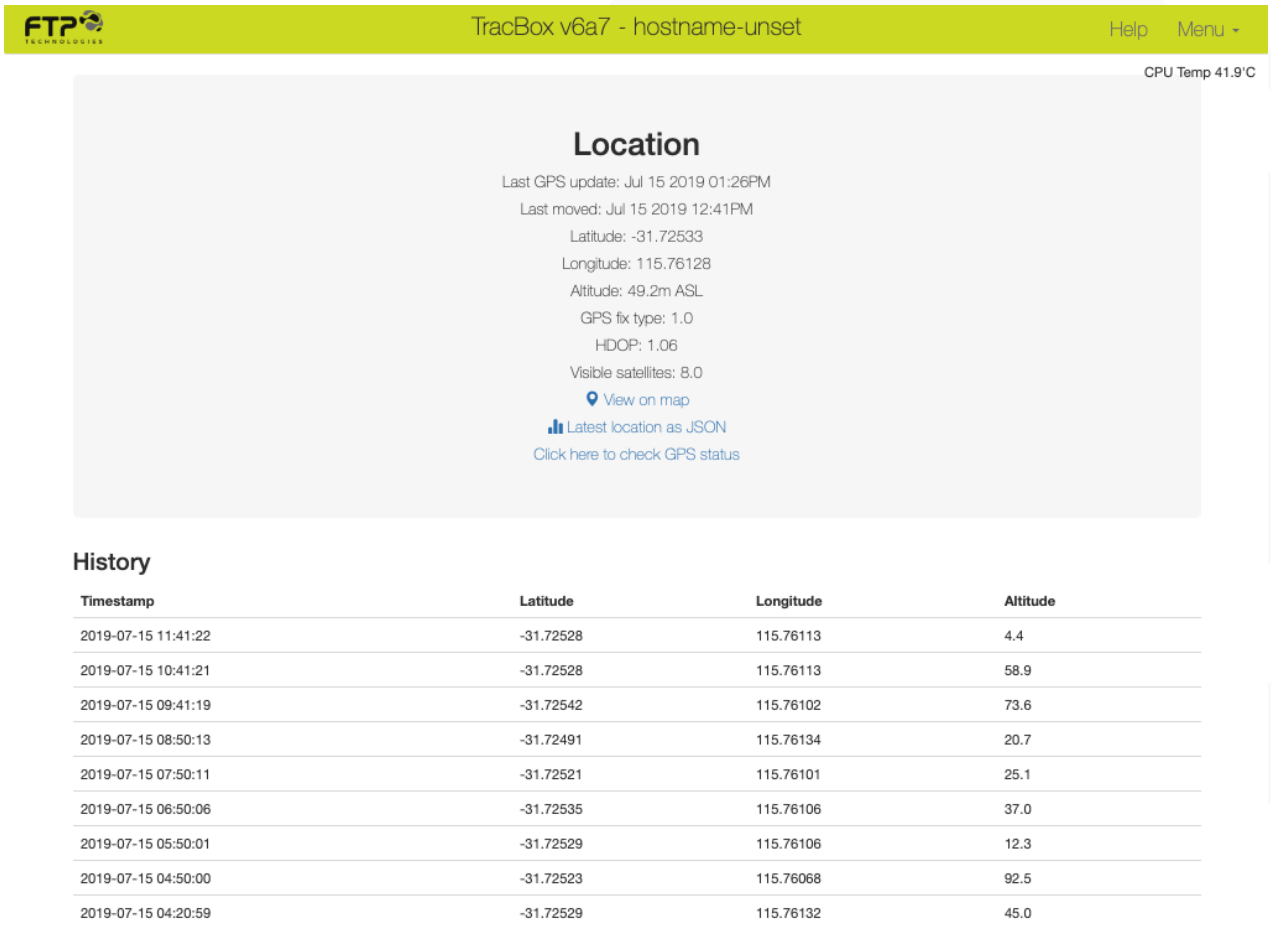
Contents

1 TracBox Overview

TracBox is designed to be used with the Integrated Management System to provide cost effective means of monitoring communications infrastructure, namely, the GPS location and the battery voltage of a trailer or skid.

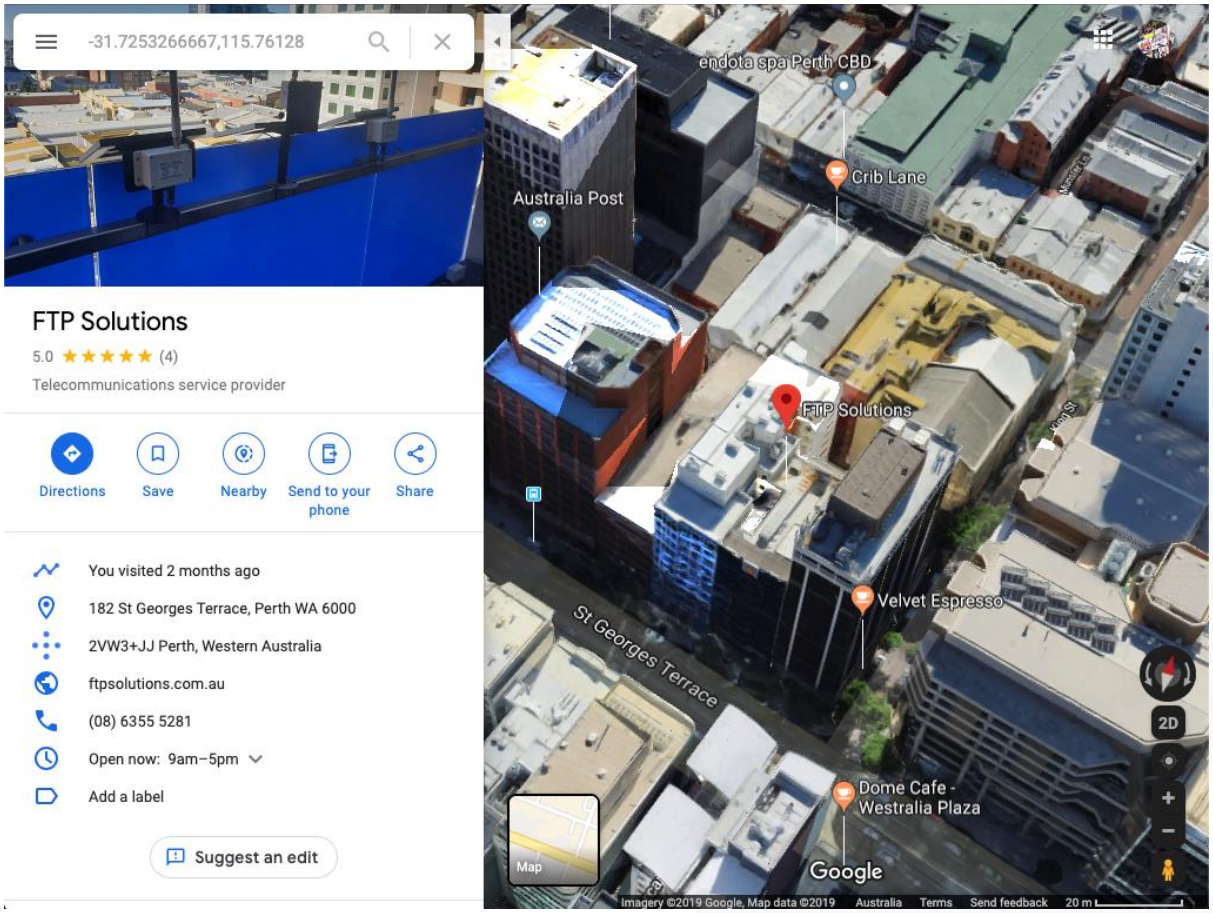
TracBox has an inbuilt web server that serves up location and voltage information. To access this information, browse to the device's IP, 192.168.137.137/24 or 10.10.10.10/16 by default.

You will be presented with the TracBox interface:



2 Google Maps Location

TracBox is designed to be integrated into the IMS platform, however, by clicking the 'View on map' link you can see the TracBox's location in Google Maps:



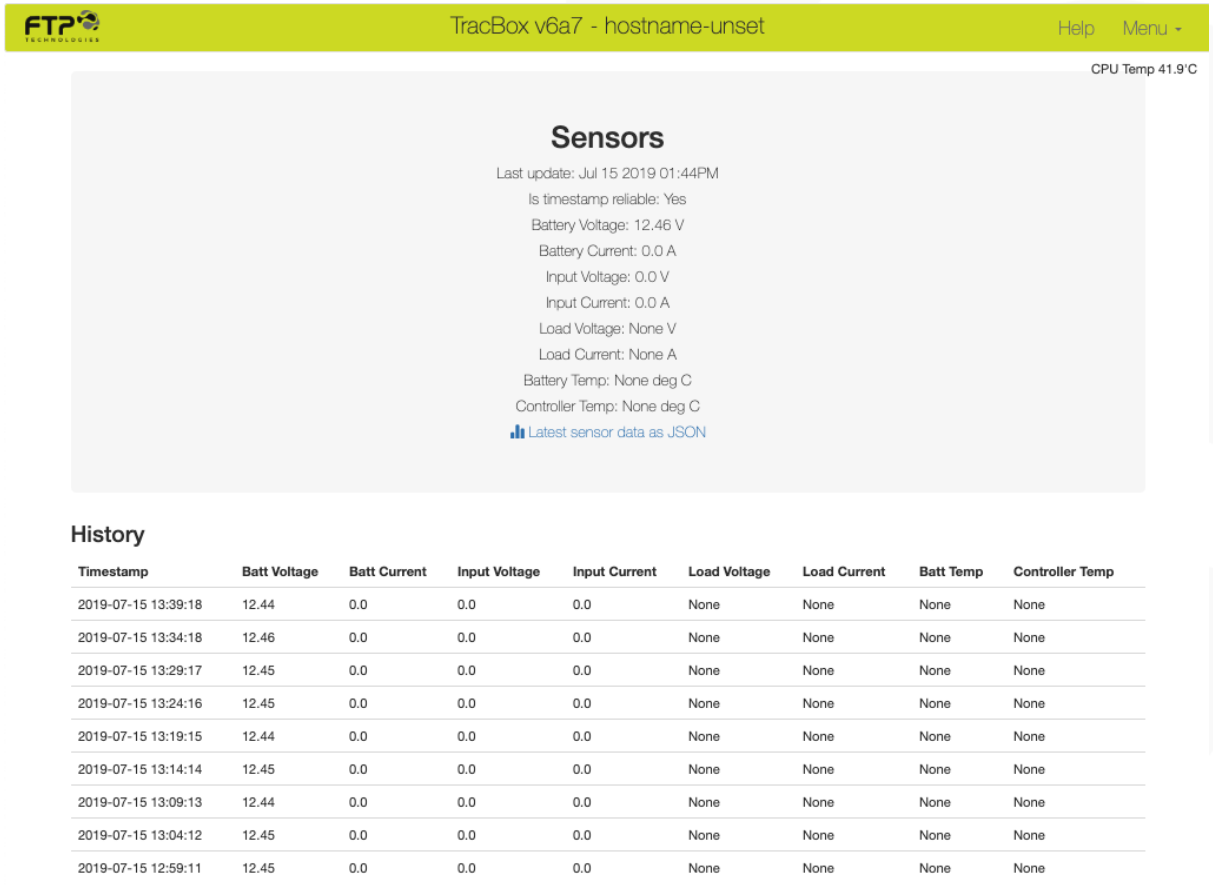
3 Sensor Data / Relay Control

Out of the box the TracBox is designed to read the voltage of 4 analog channels. These are called Battery Voltage, Battery Current, Input Voltage and Input Current.

As a minimum, TracBox needs to be connected to a voltage source, like a Trailer battery or an unregulated power system. By connecting the positive and negative terminals of the TracBox to a voltage source, the Battery Voltage channel will show the relevant voltage.

The Tracbox also includes 2 Controllable Relays via the r1i/r1o and r2i/r2o Pins, These can be controlled using the IO Control Page on the top Left Meu.

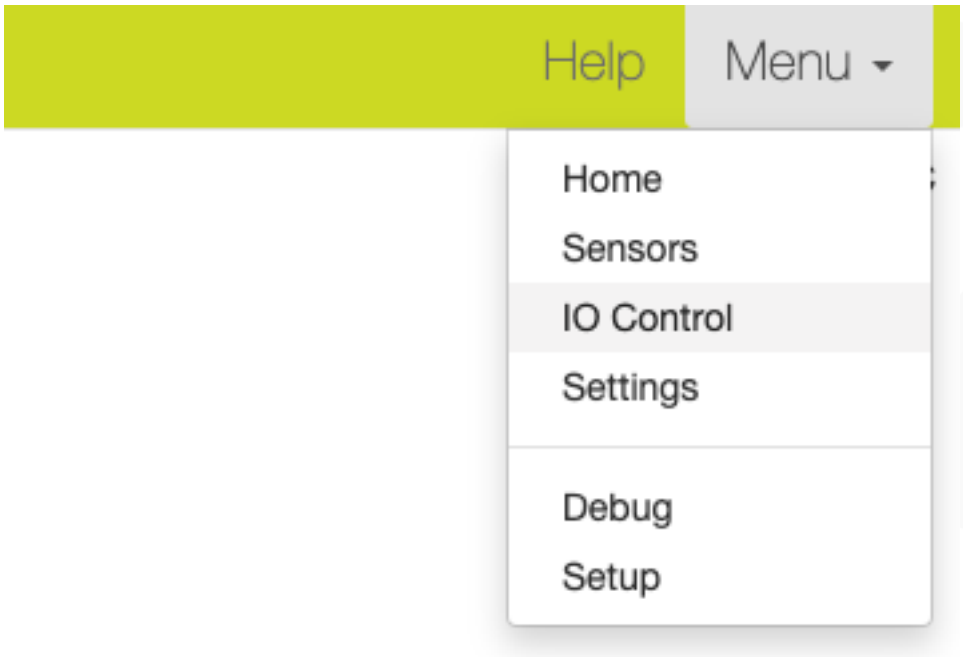
Navigating to Menu>Sensors in the header takes you to the sensor input data page:

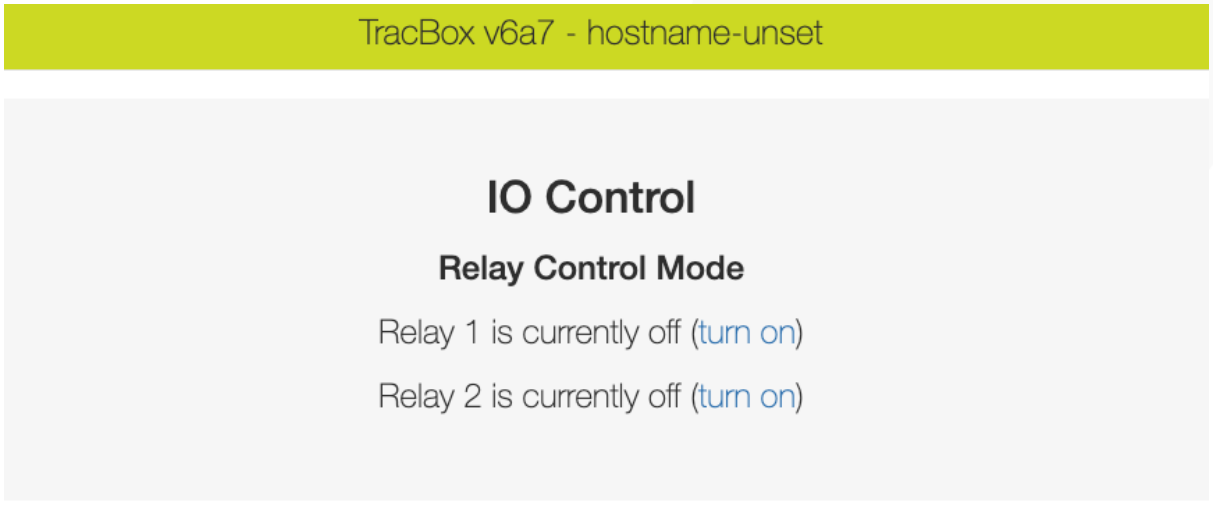


History

Timestamp	Batt Voltage	Batt Current	Input Voltage	Input Current	Load Voltage	Load Current	Batt Temp	Controller Temp
2019-07-15 13:39:18	12.44	0.0	0.0	0.0	None	None	None	None
2019-07-15 13:34:18	12.46	0.0	0.0	0.0	None	None	None	None
2019-07-15 13:29:17	12.45	0.0	0.0	0.0	None	None	None	None
2019-07-15 13:24:16	12.45	0.0	0.0	0.0	None	None	None	None
2019-07-15 13:19:15	12.44	0.0	0.0	0.0	None	None	None	None
2019-07-15 13:14:14	12.45	0.0	0.0	0.0	None	None	None	None
2019-07-15 13:09:13	12.44	0.0	0.0	0.0	None	None	None	None
2019-07-15 13:04:12	12.45	0.0	0.0	0.0	None	None	None	None
2019-07-15 12:59:11	12.45	0.0	0.0	0.0	None	None	None	None

- Navigate to the Menu>IO Control Page to control the relays 1 and 2, These both have a Maximum Amp Rating of 1 Amp and are designed to control an external device such as an extrernal relay for controlling other higher power devices.
- Username: ftp
- Password: tracbox



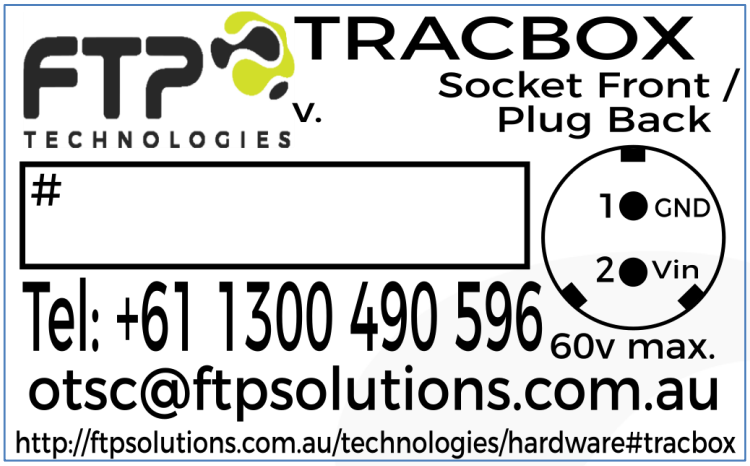


4 Hardware Configuration

The minimum requirement for a TracBox to provide value is for the unit to be powered on through the 2 or 9 pin connector with positive and negative being attached to the external power source, like a trailer or generator battery, having the GPS antenna conencted, and for the TracBox to have a valid IP and be connected to an IP network.

As a minimum, this configuration will provide accurate input voltage reading and GPS location data.

4.1 TracBox with a 2 pin socket



4.2 TracBox with a 9 pin socket

5 Software Configuration

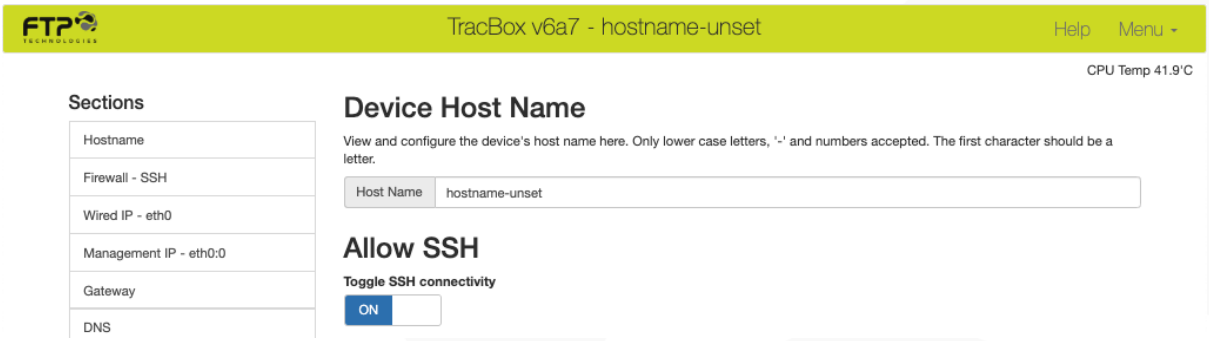
In order to configure the TracBox, you can navigate to Menu>Settings or go direct to http://192.168.137.137.137/admin or the configured IP, where you will land on the Settings Page.

5.1 Hostname Setting

The Hostname can be used to give a 'friendly name' or a better way to visually identify a TracBox. This setting will also update the LLDP hostname configuration. Once the Hostname has been set, the TracBox will display that name in the web page header, CLI prompt and LLDP broadcasts.

5.2 SSH Firewall Setting

It is possible to completely disable SSH access to the TracBox. To do this, toggle the Allow SSH slider to the off position. After the setting has been applied, the only way to access the TracBox will be through the Web Interface.



5.3 Network Settings

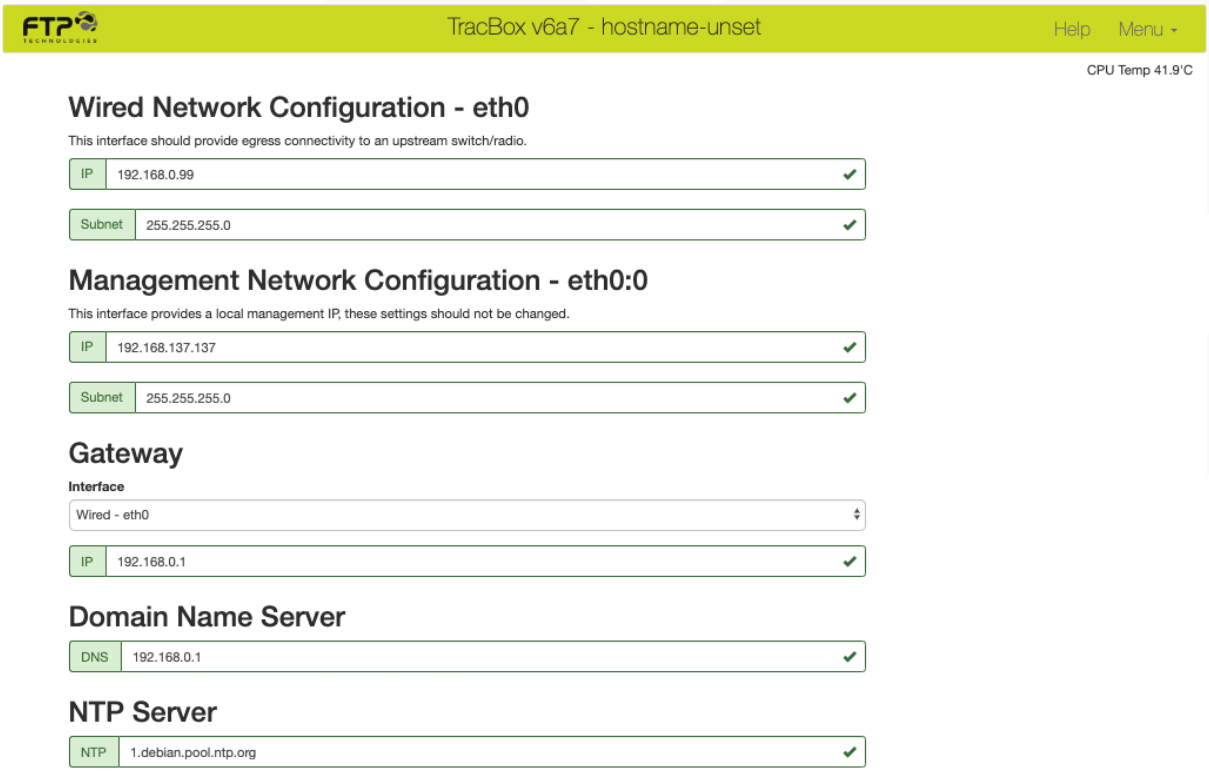
The TracBox ships with two configured IP addresses, eth0 is set to 10.10.10.10/16 with a gateway of 10.10.0.1, and a DNS Server address of 8.8.8.8. The eth0 interface is designed to be used in production and will need to be changed to suite your environment. The second interface, eth0:0 is purely for management and has an IP address of 192.168.137.137/24. You can set the gateway to use this interface but generally speaking, you should only set the gateway on a production interface.

5.4 Domain Name System (DNS) Setting

TracBox can be configured to use a DNS server to resolve domain names, hostnames and FQDNs. The default is 8.8.8.8, which is the OpenDNS. You can change this to be the IP of your corporate DNS server.

5.5 Network Time Protocol (NTP) Setting

TracBox requires a valid date/time to be set. Where the GPS antenna is plugged in and the GPS has lock, the TracBox will set the time from GPS. If TracBox does not have a GPS antenna or cannot get lock, it is a requirement that a valid NTP server address be set.

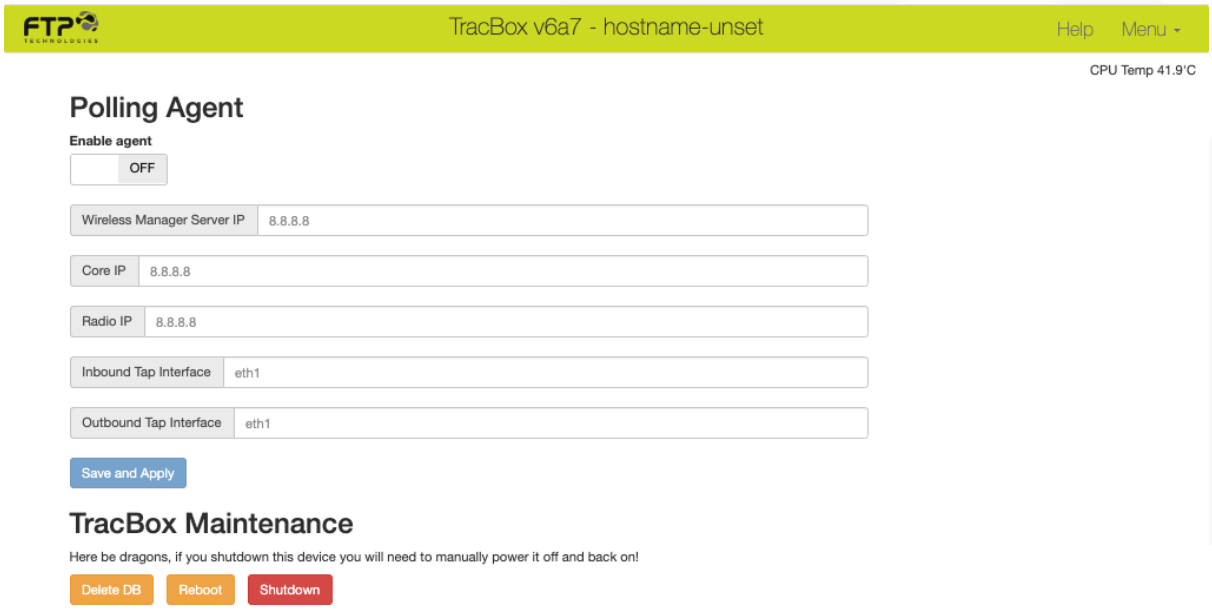


5.6 Polling Agent Settings

By default, the Polling Agent Settings should not be configured or enabled. If you have not purchased a TapBox, do not enable this feature.

5.7 TracBox Maintenance Settings

If there is ever a need to shut down or restart the TracBox, the TracBox Maintenance options will allow you to do that. You can also drop the TracBox database, however, this would only be a last resort option if there are errors on the web page indicating that the Database had become corrupt.



6 JSON Data Endpoints

The TracBox web interface provides two JSON data endpoints, in a API type manner. This allows customers to integrate the TracBox data into 3rd party applications with ease.

Note: The TracBox will update its location data once per hour when it is stationary. If the TracBox moves then the updated information will be available instantly, as long as the trailer has moved more than 50 metres.

6.1 Location Data Endpoint

The Location Data endpoint is available at http://192.168.137.137/location_data or via the configured IP using the same trailing URL parameters.

The Output looks something like:

```
{ "altitude": 25.0, "latitude": -31.9463683333, "longitude":
115.920133333, "timestamp": "2018-01-24 10:31:32" }
```

6.2 Sensor Data Endpoint

The Location Data endpoint is available at http://192.168.137.137/sensor_data or via the configured IP using the same trailing URL parameters.

The Output looks something like:

```
{ "batt_current": null, "batt_voltage": 11.68,
"reliable_timestamp": true, "solar_current": null,
"solar_voltage": null, "timestamp": "2018-01-25 05:46:29.948764" }
```

6.3 Relay Control Endpoint

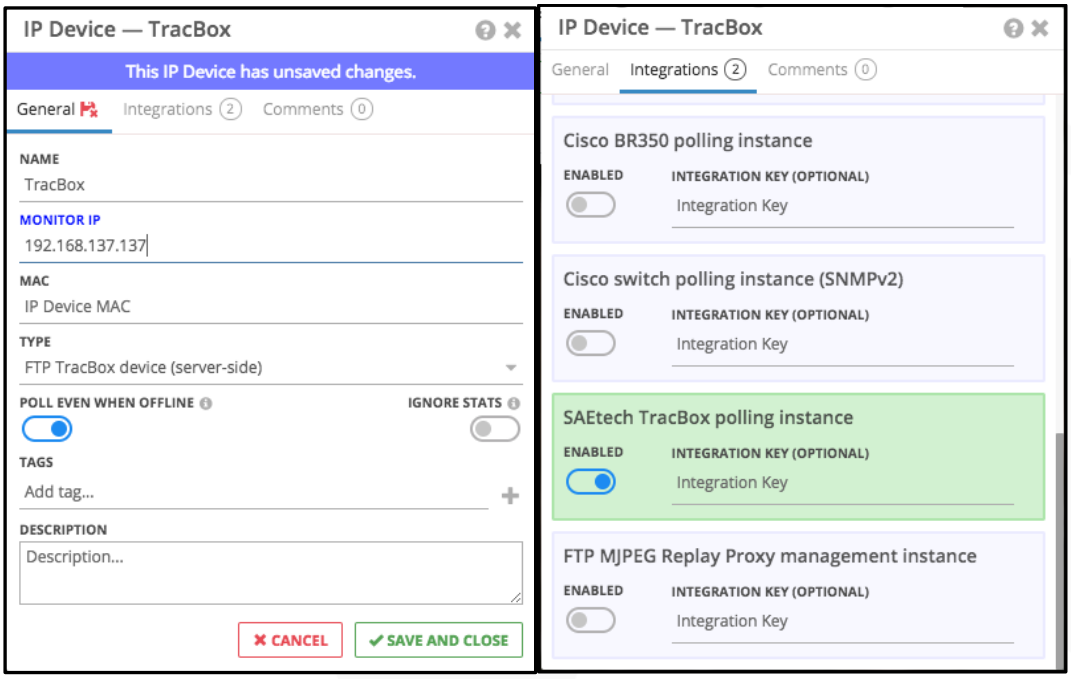
Relays 1 and 2 Can be controlled via an API Request. The requests are as follows:

Relay 1 On: http://192.168.137.137/35/on
Relay 1 Off: http://192.168.137.137/35/off
Relay 2 On: http://192.168.137.137/37/on
Relay 2 Off: http://192.168.137.137/37/off

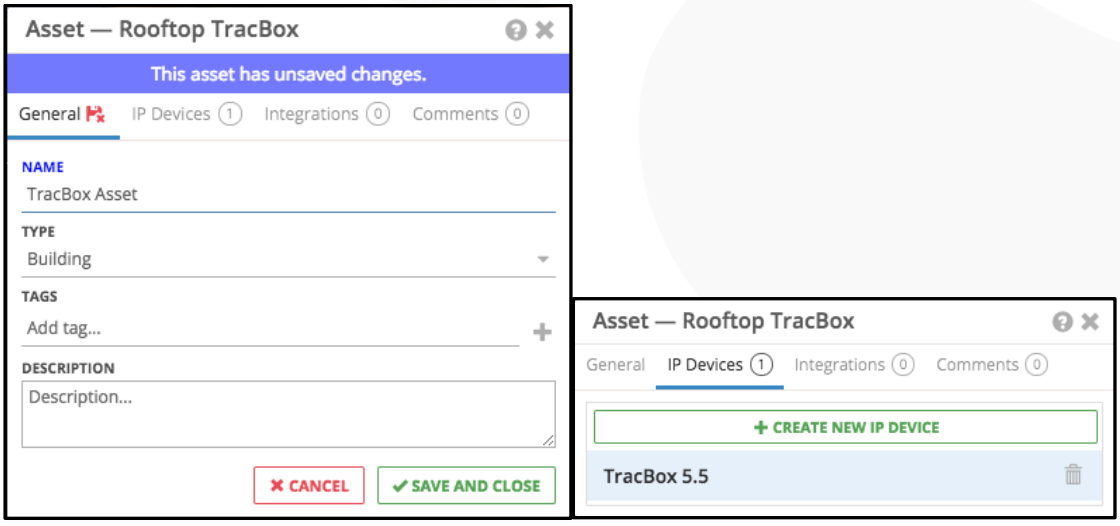
7 TracBox IMS Integration

IMS has a TracBox polling engine that utilises the JSON endpoints to scrape the date from a remote TracBox device. To configure IMS to poll a TracBox follow these steps:

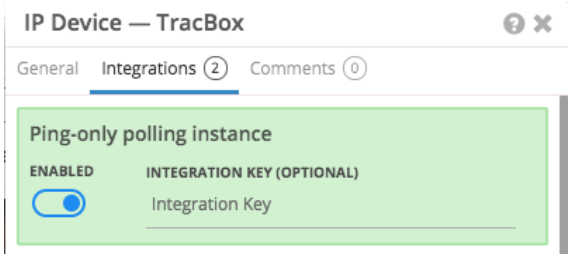
- Add a new IP device and configure it to be a TracBox



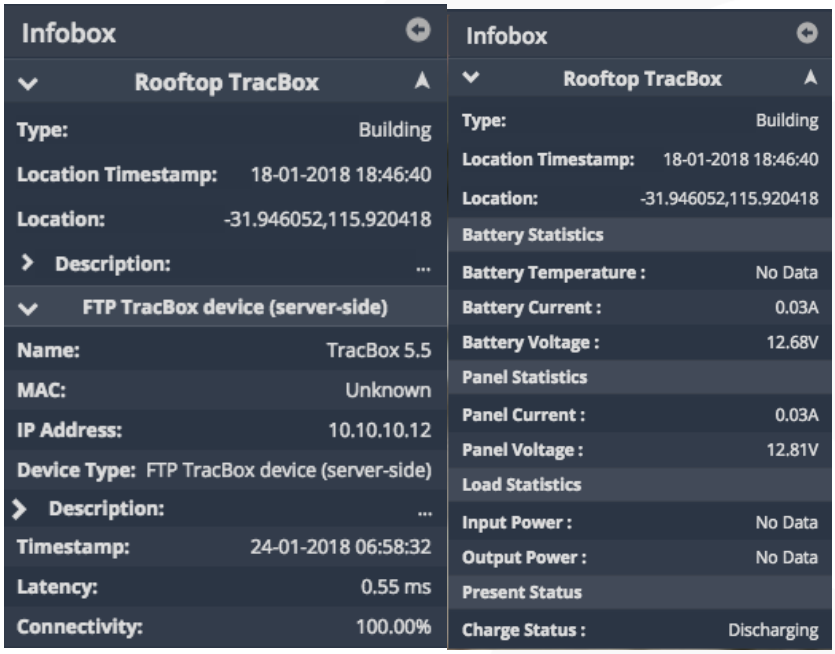
- Create an Asset if necessary and then add the TracBox IP device to it:



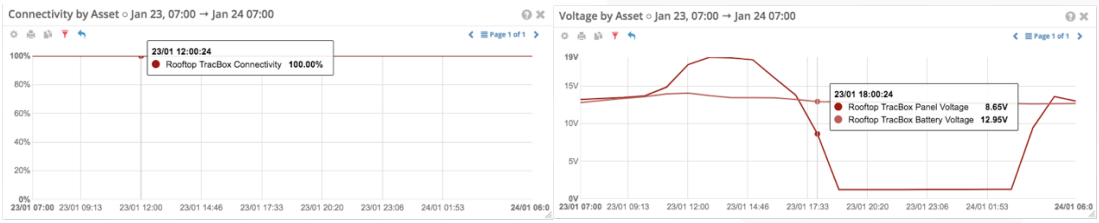
- If there is a requirement to track the latency and availability of a TracBox it can also be integrated against the 'ping only' polling instance, like so:



After ~60 seconds the TracBox data will be available in the IMS application, like so:

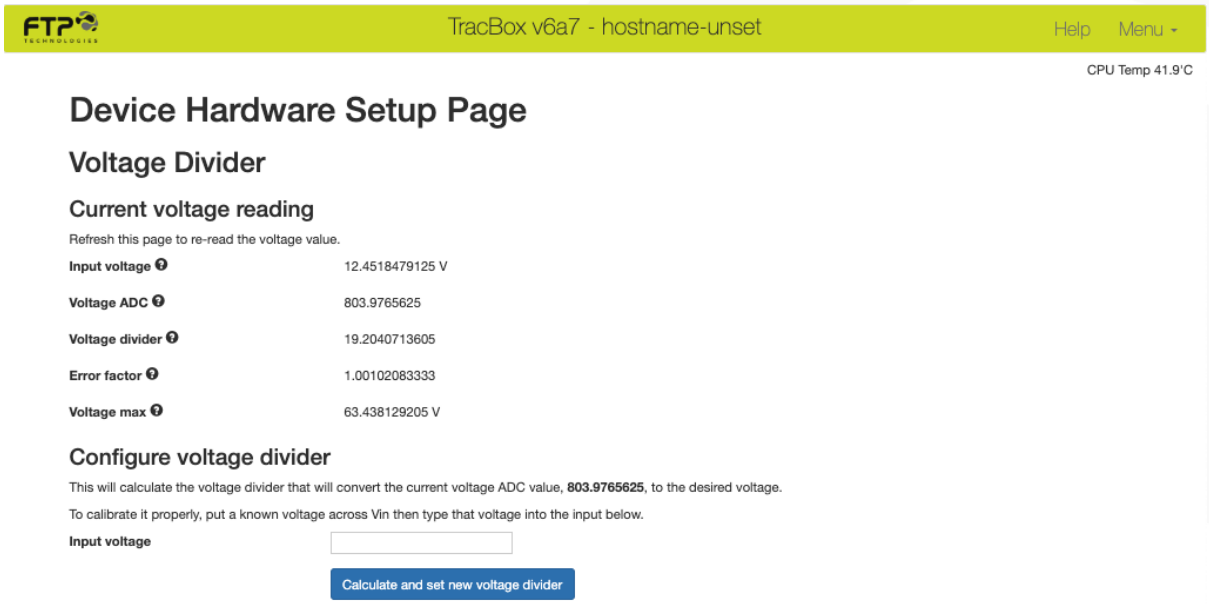


And at that point the ability to graph the data will become available:



8 Recalibration and Hardware Setup

TracBox is calibrated at the time of manufacture. Each TracBox has a slightly different calibration factor, mostly to do with the variances between one piece of hardware to the next, taking into account the fast that resistors are never exactly what they say on the packet. To deal with the hardware variations, TracBox has an ability to be told what voltage is being fed into it on the GND and Vin pins. Make sure that you measure the voltage with the TracBox connected to the source voltage supply with the TracBox running and with the GPS antenna attached. Navigate to http://192.168.137.137/setup or to the configured IP with the trailing URL parameter. In the 'Input Voltage' input box, type in the voltage being fed to the TracBox on the GND and Vin pins, like so:

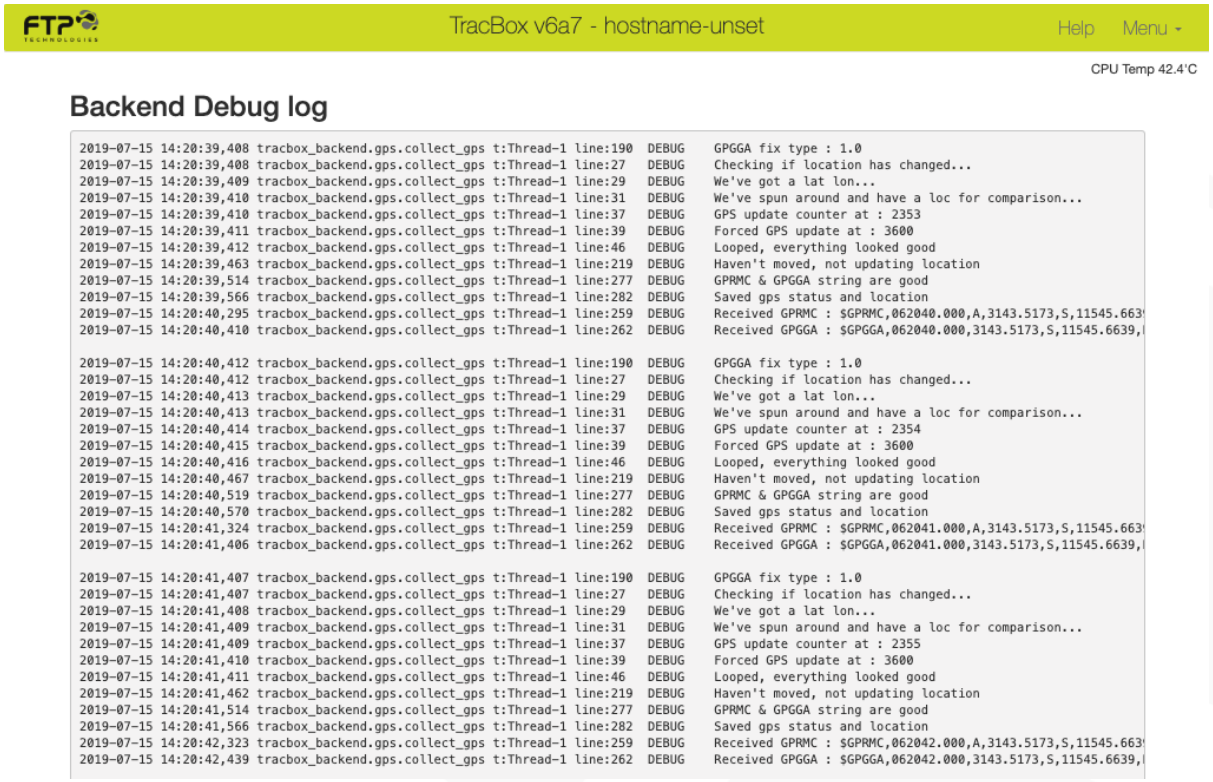


There are other settings on this page, they should be left alone unless you have been directed by FTP to make changes.

9 Fault Finding

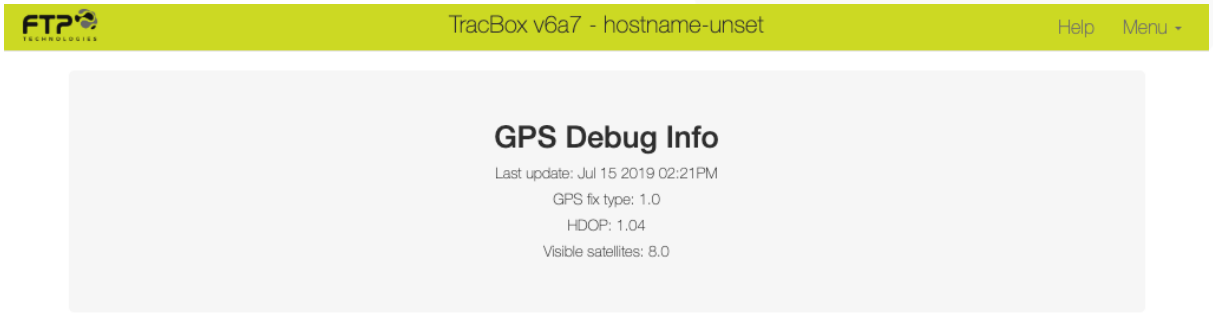
TracBox has a few HTML pages that can aid in the diagnosis of a fault and where the web interface does not provide enough information. It is possible to SSH into the device, check 9.2 for info.

The main debug page can be found via Menu>Debug:



9.1 GPS Debug Endpoint

- http://192.168.137.137/gps_debug



You can also see the raw NMEA strings, specifically GPGGA and GPRMC, in the Backend Debug log.

9.2 SSH Debugging

SSH to the IP of TracBox that you would like to debug, using the following credentials:

User: pi
Pass: KJg$R%FGV&2

```
ssh tracbox@10.10.10.10
pi@10.10.10.10's password:
Linux hostname 4.9.59-v7+ #1047 SMP Sun Oct 29 12:19:23 GMT 2017 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
pi@hostname:~ $
```

From there you can execute the following commands to check the logs:
tail -f /tmp/tracbox_backend_stdout.log
tail -f /tmp/tracbox_backend_stderr.log
tail -f /tmp/tracbox_frontend_stderr.log
tail -f /tmp/tracbox_frontend_stderr.log

If there is nothing sinister in the logs or you would like help with your issues, you will need to call the FTP support line on:
1300 490 596

For less urgent advice you can email:
otsc@ftpsolutions.com.au

To log a bug, browse to:
https://bugs.ftpsolutions.com.au

To get an electronic copy of this guide, browse to:
http://ftpsolutions.com.au/hardware#tracbox

For information regarding FTP, it's service, software or hardware, you can visit:
http://ftpsolutions.com.au

10Technical Specifications

Name:	TracBox v6a11
Mounting:	DIN
Operational Temperature:	0-60 degrees C
Input Voltage:	9-60v DC
Fuse:	Self-healing 750mA poly fuse
Current Draw:	~110mA @ 24v DC (~2.5w)
Real Time Clock:	No (GPS Time Sync)
Enabled Interfaces:	Ethernet, GPS, 4 x ADC. All others are optional extras
Inbuilt Firewall:	Yes
Management IP:	192.168.137.137/24
Onboard Storage:	16GB
Onboard RAM:	1GB
CPU Cores:	4
CPU Clock Speed:	600Mhz, 1.2Ghz max.
USB Ports:	4 (software development will be required to use)
ADC Resolution:	12bit
ADC Channels:	4
Relay Channels (1A Max):	2
GPS Chipset:	uBlox M8N
GPS Channels:	77 search, 32 continuous
GPS Accuracy:	2.5m, standard
GPS Rx Sensitivity:	-167dBm tracking, -148dBm cold start
GPS Update Rate:	1Hz
External GPS Antenna:	SMA Female, active 3.3v
Dimensions:	W:70mm L:90mm H:61mm
Weight:	~200g

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