NavBox One

User Manual

NavBox One is a compact, ruggedized module designed to accelerate robotics and autonomous systems research. With powerful edge AI computing, high-precision localization, and multimodal sensing, it's ideal for outdoor and indoor experiments in navigation, SLAM, mapping, and data collection.

NOTE: Even though the used box says IP65 the current configuration **is not IP rated.**

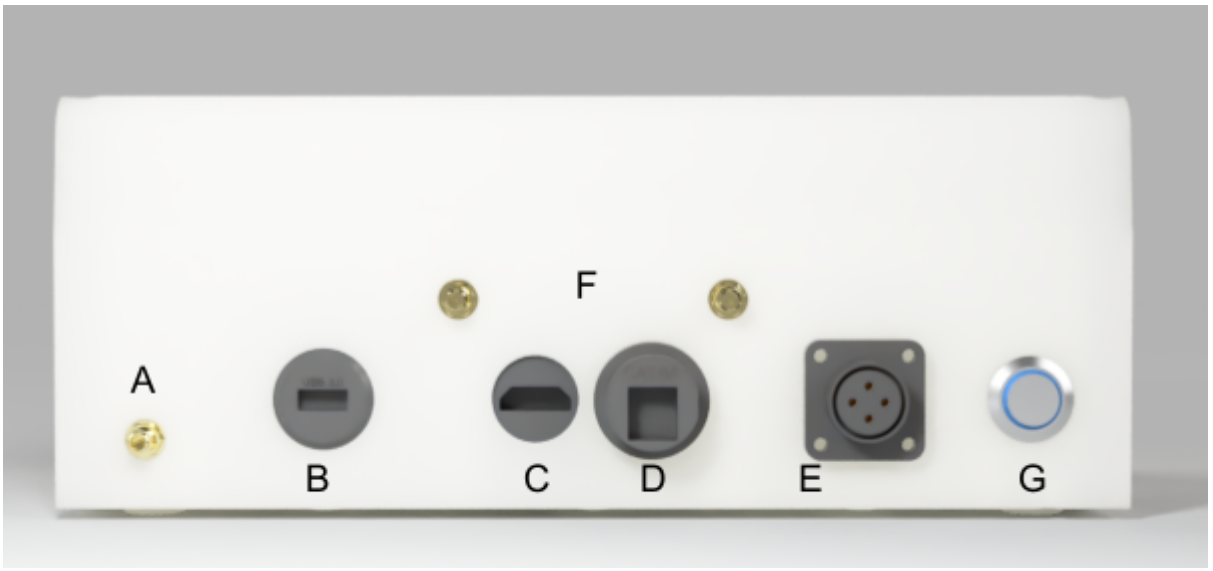
Table of Contents

1. Main Components

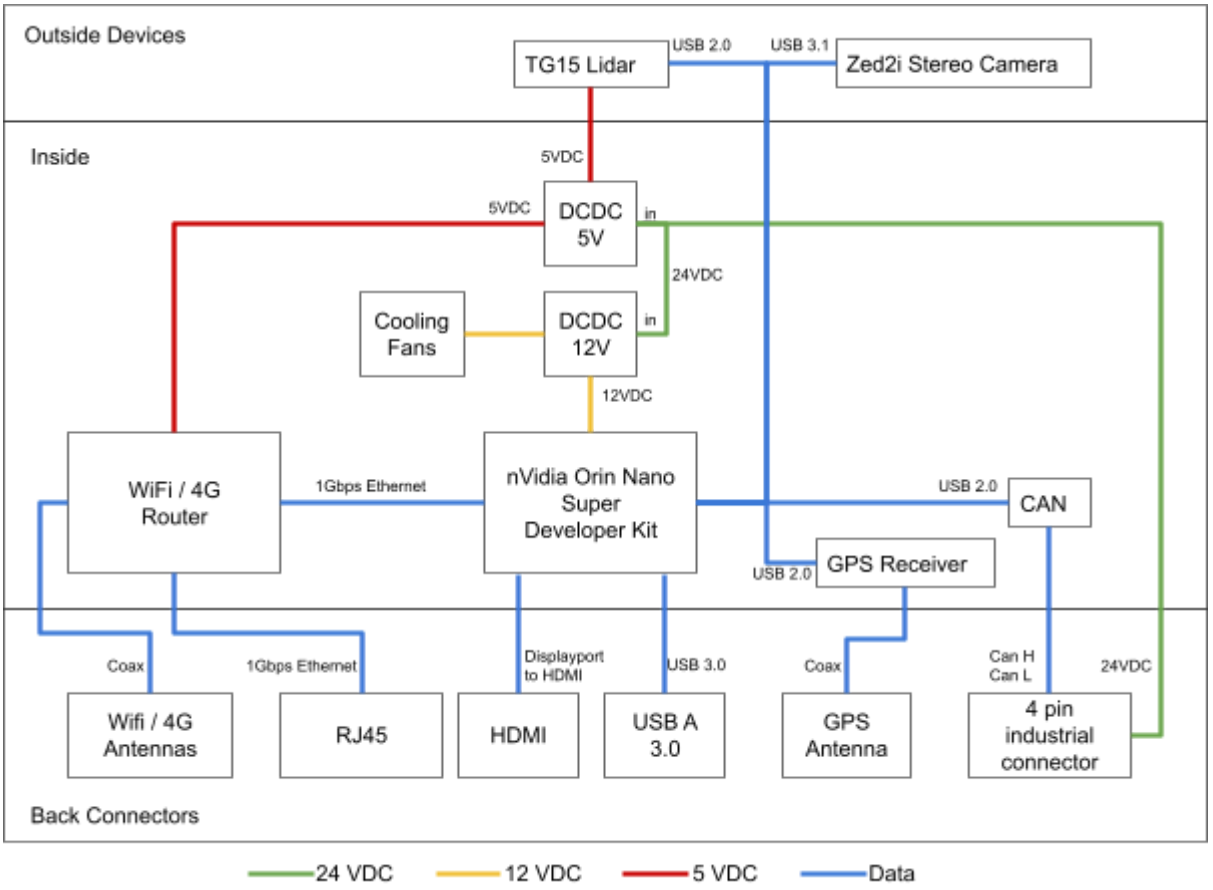
1 x nVidia Jetson Orin Nano Super Developer Kit with 64GB SD Card + 512GB SSD
1 x Zed2i Stereo Camera
1 x MiktoTik hAP ax lite LTE6, Wifi + 4G Router
1 x GPS receiver Quadband GNSS RTK LG290P
1 x Lidar YDLidar TG15

2. External IO

A: GPS Antenna Connector
B: USB 3.0
C: HDMI
D: RJ45 Ethernet
E: 13VDC to 50 VDC input + CAN (H + L)
F: Router Wifi/4G Antennas
G: Power Button.



3. Connections Diagram



4. Usage with Agilex Scout Mini Platform

NavBox One was initially designed to be used with the Agilex Scout Mini wheeled platform. You should first turn on the power on the Agilex Scout Mini power button located in the back of the wheeled platform and then turn on the power of the NavBox One using the Power Button (G).

The power button will light indicating that the DC/DC converters are being powered, the Orin Nano Super Developer Kit will automatically boot, please wait about one minute for it to boot completely.

For development purposes you can connect an HDMI monitor and keyboard/mouse to the outside connectors. The external Ethernet port is not connected directly to the nVidia Orin Nano but to the internal Router instead.

The Orin Nano is pre-loaded with the latest nVidia as per their instructions on the link below including the Super Performance unlock that allows the board to use up to 40W of computing power. https://www.jetson-ai-lab.com/initial_setup_jon.html

The current setup includes a 64GB microSD card together with a minimum of 512GB SSD.

Ubuntu login credentials:
username: scoutmini
password: scoutmini

The MiktoTik hAP ax lite is reset to factory defaults; you should configure it to your desired application. You can find the instructions manual here:
https://mikrotik.com/product/hap_ax_lite_lte6

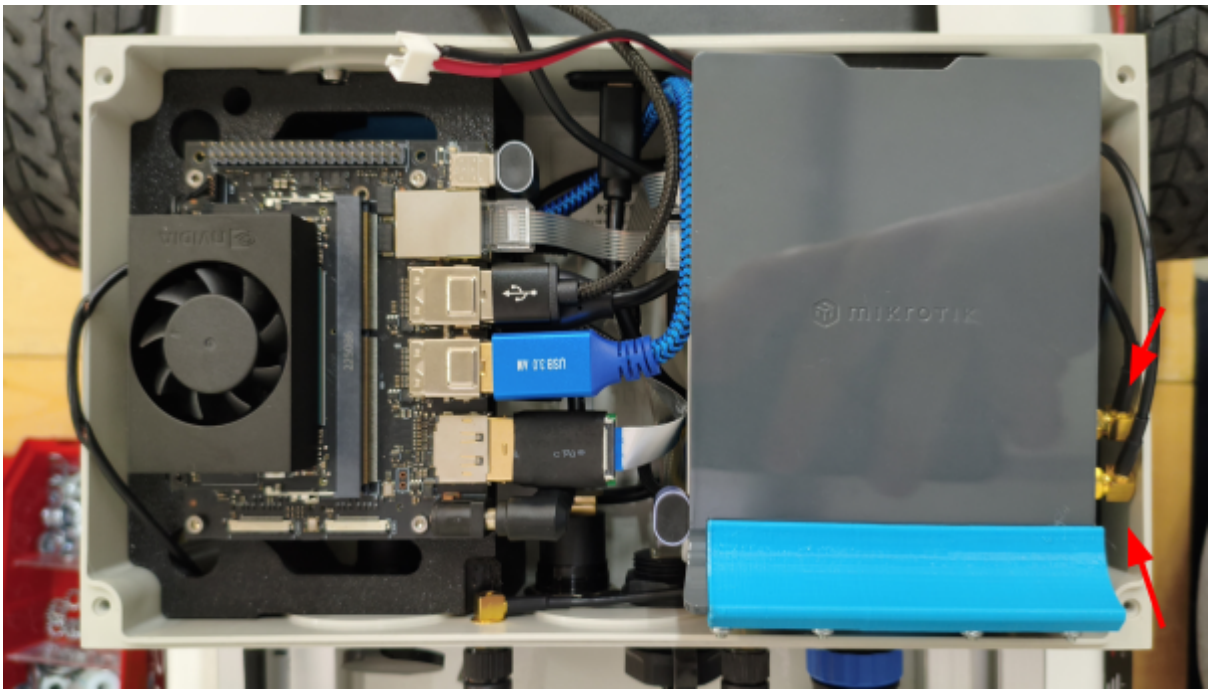
5. NavBox One internal disassembly

If you ever need to make any changes on the inside of the NavBox One you should know that there's an order on how to remove the internal components.

Step 1 - Open the NavBox One

Remove the top lid by unscrewing the 4 screws located in each corner. After the lid becomes loose you should raise it slightly and disconnect the two USB connectors that go to the Lidar (inside of the lid) and the fan connector.

After these steps the top lid can be completely separated from the base.



NavBox One top inside components

Step 2 - Remove the nVidia Jetson

Unplug all the cables from the nVidia Jetson Orin board (4 x USB A, 1 x USB C, 1 x Ethernet, 1 x Display Port, 1 x DC Jack connector)

You can remove the ethernet cable and the USB cable that connect to the Lidar on the top.

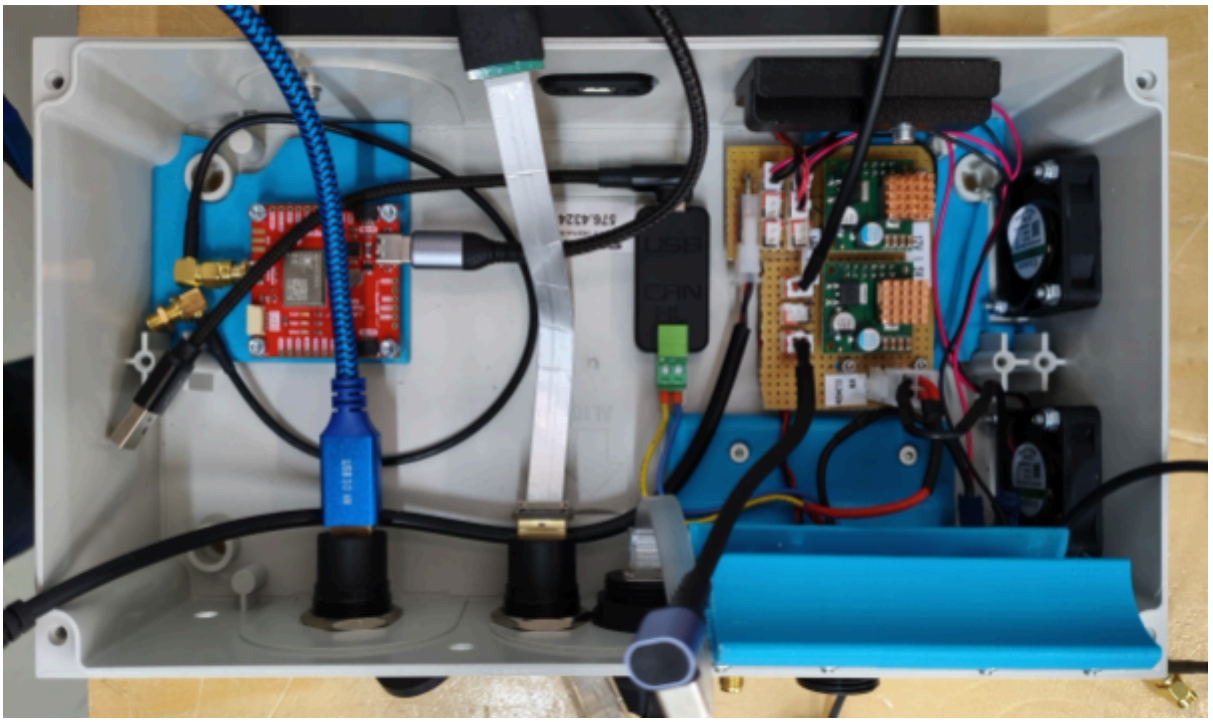
Before removing the nVidia you need to unscrew the GPS antenna connector (A) and the left Router Wifi/4G Antenna (F), without removing this the nVidia support platform will not come out.

The nVidia is screwed into a base support but it should be removed from the NavBox One enclosure together with the base. This is because the original nVidia Wifi antennas are now glued to this new support.

The support is secured in place using double sided tape on the two “legs” near to the router, apply some pressure upwards and they will become loose. You can now extract it vertically.

Step 3 - Remove the Router

The mikrotik router is secured in place with two 3D printed parts and it slides in place. First disconnect the remaining ethernet cable and the angled USB C power connector.
To remove the router, slide it out in the direction of where the nVidia board was. You should also remove the antenna cables from the router as seen on the photo above (red arrows).
After removing the router you will see something similar to the photo below.



NavBox One lower inside components

Step 4 - Remove remaining items

Now you have access to all the remaining components, you can now remove all the cables or do any maintenance or replacements needed.

6. Internal Power regulation

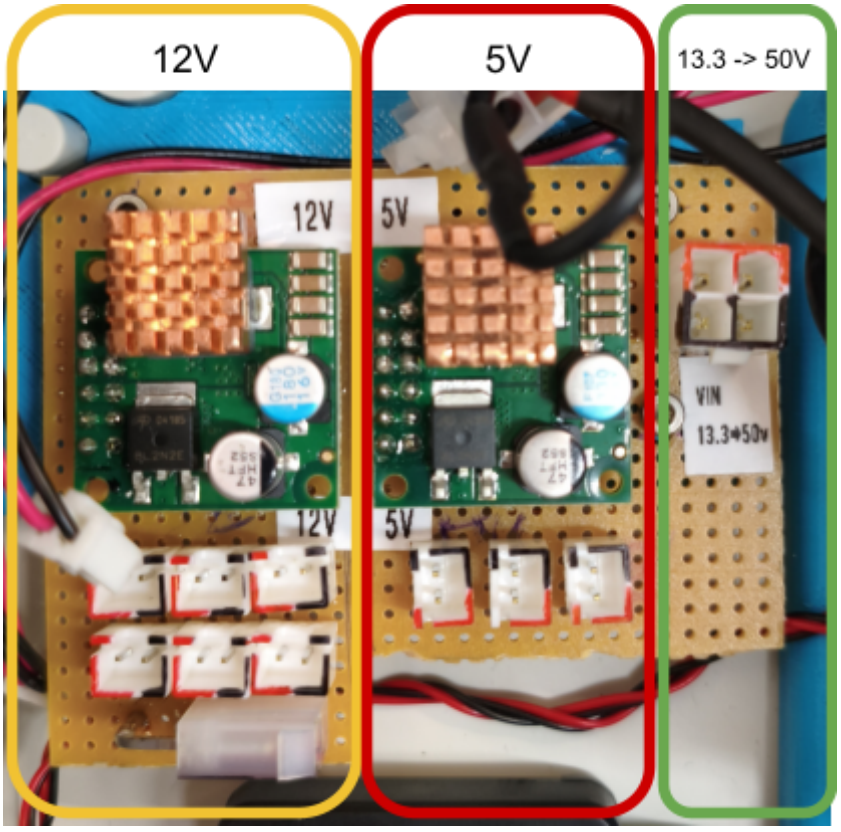
The NavBox One comes with two DC/DC step down regulators, one for 12V and another for 5V, these are assembled into a power PCB with power IN and power OUT connectors. The left side of the board is the 12V output and the right side corresponds to the 5V output.

On this first assembly the connectors are the same so **be careful to** not connect them in the wrong place. The connectors are also painted red and black to better understand ground and power pins.

The 12V connectors are used to all the fans, the LED of the power button and the nVidia Jetson (through a different connector)

The 5V are used to power the router and to provide extra power to the Lidar.

Even though the Agilex Scout Mini provides 24VDC, if you want to use the NavBox One in another configuration you can power it from 13.3V to 50V DC.



NavBox One power regulation board

If you are interested contact us through info@robosavvy.com
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You can also find us on https://robosavvy.co.uk and on all major social networks.