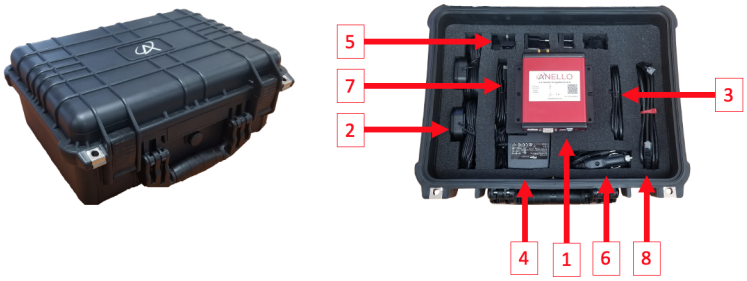
Quick Getting Started Guide

Thank you for choosing the Anello A-1! The following guide will get you started with hardware configuration and data collection. Please contact support@anellophotonics.com with any questions.

1 A-1 Hardware Connections

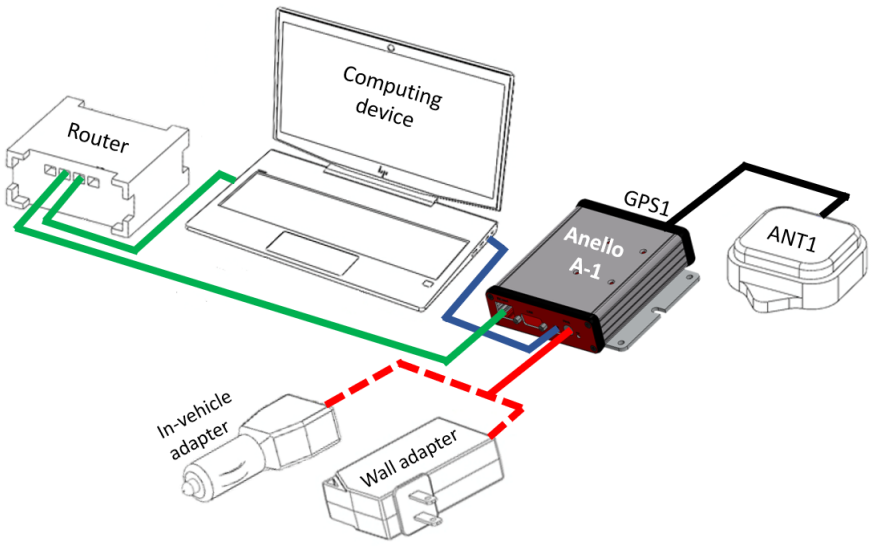
The Anello A-1 Evaluation Kit (EVK) includes the eight items highlighted below:



Anello A-1 EVK Contents

1	Anello A-1 EVK
2	Two Dual-Band Multi-Constellation GNSS Antennae
3	Power Cable
4	110-240V AC Wall-Power Adaptor
5	International Wall-Power Plug Inserts
6	In-Vehicle Power Adaptor
7	USB-C Cable
8	Ethernet Cable

Connect the hardware as follows:



Anello A-1 Connection Diagram

1. Connect A-1 to power using either the wall-power adaptor or the in-vehicle adaptor (red). Do NOT use USB for power.
2. Connect A-1 to computing system using USB-C (blue) for configuration. (If A-1 is already configured, Ethernet interface (green) is recommended for data collection.)
3. Connect primary GNSS antenna (ANT1) to GPS1 on the back of the A-1 (black). An additional antenna connected to GPS2 is optional.

2 A-1 Configurations

2.1 Install Anello Python Program

Confirm that Python is installed and the version is at least 3.6:

```
>python -V
```

Clone the GitHub repository:

```
>cd <local directoy to store Anello Python Program>
>git clone https://github.com/Anello-Photonics/user_tool.git
```

Install dependencies using pip:

```
>cd user_tools
>pip install -r requirements.txt
```

2.2 Run the Tool

```
>cd board_tools
>python user_program.py
```

2.3 Connect to the A-1

Use the arrow keys to select *Connect* and press enter. Select *COM* then *Auto* to auto-detect the unit.

Note: If your arrow keys do not work, please enter the following command in the terminal:

```
>pip install readchar==3.0.4
```

The Anello A-1 uses two logical ports:

Logical Port	**Physical Port** (Serial/USB-C)
Data Port	lowest port number e.g., COM7
Configuration Port	highest port number e.g., COM10

Note: If four COM ports do not show in the manual connection mode or Windows device manager, you may need to install the FTDI drivers from https://ftdichip.com/drivers/d2xx-drivers/

2.4 Adjust Unit Configuration

Select *User Configuration* from the main menu. To change a configuration from the default, select *Edit*, then the configuration to change, then select the new value.

The A-1 Ethernet (UDP) interface is recommended for in-vehicle data collection. To connect via UDP:

1. If you haven't already, connect to the A-1 over COM (section 2.3).
2. In *User Configuration*, set the A-1 IP address statically or automatically using DHCP (default).
3. Set the IP address of where you want the A-1 to send data, i.e., the receiving computer's IP.
4. Set the Data Port and User Messaging Port numbers.
5. Connect to the A-1 via UDP. Use the same A-1 IP, configuration port and data port as in steps 2 & 3.
6. If you receive a Windows Security Alert pop up, click "Allow Access" to enable UDP communication.

Congratulations!!! You have completed the initial setup of the Anello A-1.

3 A-1 Data Collection

3.1 Log a Data File

Select *Log* in the main menu, then *Start*. Use either the default filename or enter a custom name.

To end the log, select *Log* and then *Stop*.

The log files are saved in the "logs" directory within user_tools, grouped by month and then day.

To export a log file to CSV, Select *Log* in the main menu, then *Export*, then choose the log file. Three CSV files will be saved in the "exports" directory, under the name of the original log file:

- imu.csv : raw IMU data such as acceleration and angular rates (APIMU messages)
- gps.csv : GNSS data (APGPS messages)
- ins.csv : primary inertial navigation solution data (APINS messages)

If the A-1 antenna was collecting GNSS data during logging, the exported CSVs can be visualized at Kepler, an online tool for geo-spatial data analysis.

3.2 Monitor Output

Monitoring mode opens a display to watch the data of the INS solution in real-time. It also supports toggling the logging and GNSS connection with the LOG and GPS buttons

To start monitoring, select *Monitor* in the main menu. This will launch a separate window.

Live Output Monitoring

3.3 Connect to NTRIP Caster

Connecting to an NTRIP caster will improve the accuracy of GNSS positioning using RTK corrections. For firmware versions 0.4.3 and earlier, NTRIP requires the A-1 to be connected by UDP.

From the main menu, select *NTRIP* and then *Start*. Enter the NTRIP caster details as prompted. The *System Status* will show the NTRIP connection status.

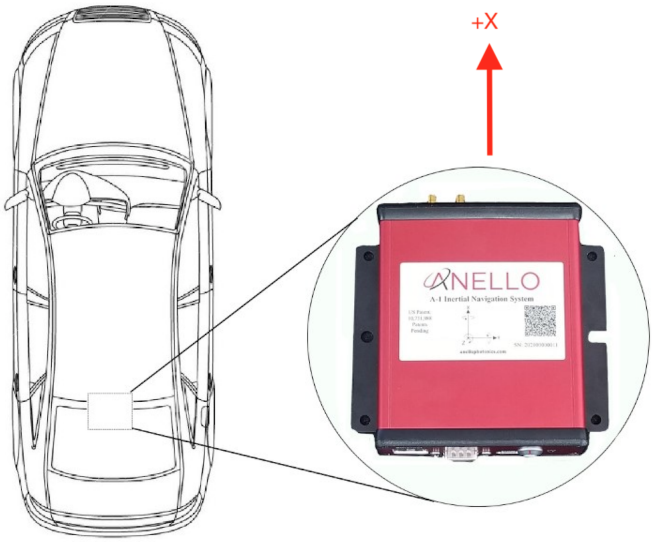
4 A-1 Vehicle Installation

4.1 Set Vehicle Configurations

From the main menu, select *Vehicle Configurations* to set the positions as prompted.

4.2 Install the A-1

The A-1 can be configured for various installation positions. To minimize configuration, mount the unit near the center of the vehicle's rear axle, with the X-Axis facing the direction of travel.



Default A-1 Installation Location

The GNSS antennae should be magnetically mounted on the roof of the vehicle.

Congratulations!!! You are now ready to collect data! Note that the system requires exceeding 2m/s velocity to enter full INS mode, and the performance will improve after several minutes of driving.