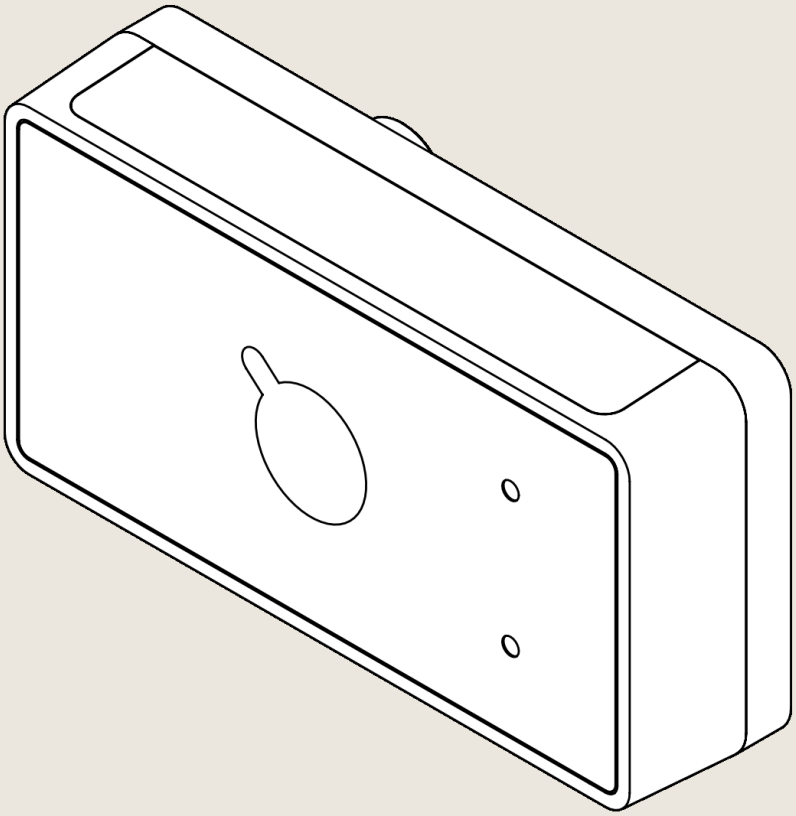
Sonair



ADAR Quick Start Guide

Version 1.0

Details in this document are subject to change without notice.
2025-09-05

Introduction

The goal of this guide is to go from receiving a new ADAR test kit to visualizing a real-time point cloud.

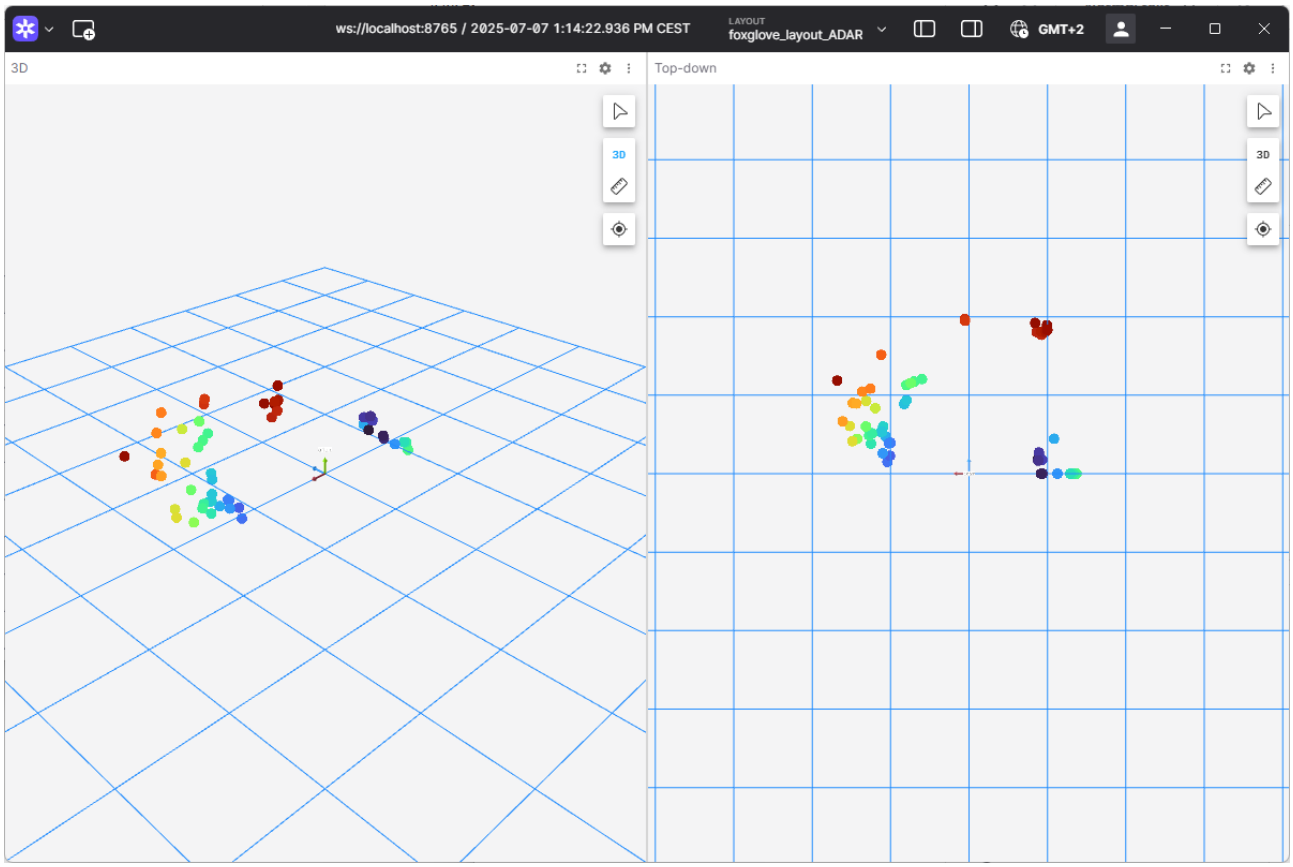


Figure 1: A point cloud visualized in Foxglove

Getting started

1. Download the ADAR User Manual
2. Download and install the latest version of ADAR Designer, the configuration software for the sensor from https://github.com/Sonair-AS/adar-designer-releases/releases. Refer to the User Manual for further instructions.
3. Connect the cables to the ADAR sensor.

- Use a 4-pin M12 D-code connector to RJ45 cable for Ethernet
- Use a 17-pin M12 A-code connector for power and IO. As a minimum connect 24v and 0v to pins 1 (`PWR_IN`) and 2 (`PWR_RET`) respectively.

Refer to section **5.3. Pinout description** in the User Manual for more details.

4. Connect your computer directly to the ADAR sensor using an Ethernet cable.

A factory reset ADAR device is configured with a static IP address of `10.20.30.40`. In order to communicate with the device, the network port on your computer needs to be configured with an IP address in the same range as the ADAR device (`10.20.30.0/24`). For more information, see Appendix A: How to configure your computer with a static IP address

5. Using ADAR Designer you can now configure the ADAR sensor by connecting to IP 10.20.30.40.

Figure 2: Connecting to a device for the first time

> By default there are no zone presets configured. The OSSD indication LED on the sensor will therefore be red, indicating OSSD OFF.

6. To set a protective zone, you can create and upload a configuration in ADAR Designer (see section **6.3. Protective, warning and exclusion zone setting** in the User Manual for details).

> When a zone preset has been uploaded to the device and activated via the ZONE_SELECT input pins, the OSSD LED will indicate the state of the OSSD output. A green OSSD LED indicates that nothing is inside the protective zone and that the OSSD signal is ON. A red OSSD LED indicates that an object **is** detected within the protective zone and that the OSSD signal is OFF.

7. (Optional) Consider if you want to reconfigure or disable the static IP configuration on the device. There is usually a DHCP server running on your network router that will dynamically assign an IP address to the device if the static IP configuration parameter is disabled. Using an address on the local network (rather than an address in the range `10.20.30.0/24`) makes it easier to access the device from any computer on the network.
    a. Reconnect to the device using the new IP address.

> Make sure you have a way to retrieve the new IP address of the device before changing the network configuration. If it is unclear what this means, please contact local IT-support for assistance.

8. Download a recent version of Python (version 3.12 or newer is recommended) and install it by following the official instructions for Windows, Linux or MacOS. Make sure you select the option to “Add Python to PATH”.
9. Install the `adar_api` python package by following the instructions in Appendix B: Installing the adar_api Python package.

   Up-to-date instructions for the latest version of `adar_api` can be found in the public code repository.

The `adar_api` repository provides documentation, and a reference implementation, for how to communicate with ADAR over Ethernet - via the Constrained Application Protocol (CoAP). It also contains an example script on how to stream the point cloud produced by the ADAR sensor to Foxglove.

10. Execute the example script (replace the default IP address with the IP of your device)

```
pointcloud-publisher 10.20.30.40
```

This should result in a live stream of the point cloud

```
Starting CoAP observer...
Published 1 messages.
Published 100 messages.
```

You can visualize the point cloud in Foxglove by connecting to `localhost:8765` (or by writing out the full localhost IP address `127.0.0.1:8765`) and visualize the /adar/pointcloud Topic. An example layout for Foxglove is available in the examples folder of the ADAR API repository . See Appendix C: Visualizing the point cloud in Foxglove for more information.

The example layout is split in two. On the left side there is a 3D side-view, on the right side there is a top-down view. In the screenshot below, the top-down view shows detections that are not visible in the side-view (in red and yellow) these are reflections from the ceiling that are outside of the visible canvas in the side-view.

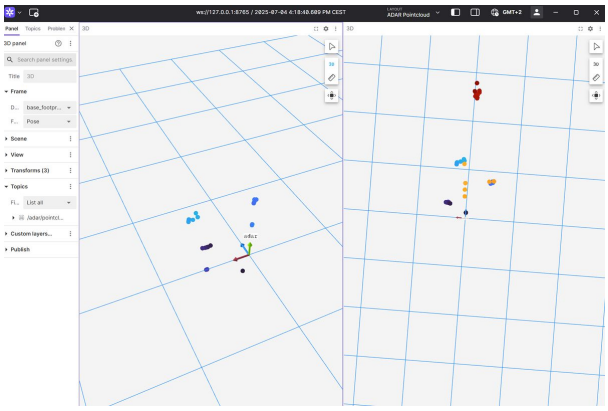


Figure 3: Point cloud from an example scene visualized in Foxglove

Figure 4: The example scene

In the scene above the sensor is placed 40 cm above the floor with two poles and a box placed in front of it, a picture of the scene follows:

Congratulations, you are now streaming a real time ADAR pointcloud, try to interact with it!

See the User Manual or refer to the ADAR API repository for more details, or contact us at support@sonair.com if you have any questions.

Appendix A: How to configure your computer with a static IP address

To establish a connection to a device using a static IP address you may need to configure your computer with a static IP address.

The following sections describe how to do this for Windows and Ubuntu.

Configuring static IP address (Windows)

Note: *To prevent potential issues with existing wired connections on your computer, we recommend using an USB to ethernet adapter when using a direct connection with the ADAR sensor. If you do not have an adapter, any settings applied in these steps must be undone if you want to use your ethernet port normally again.*

1. Open the Run dialog box (Win+R), type “Ncpa.cpl” and click "Ok".

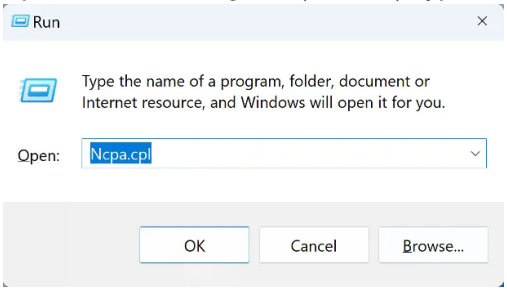


Figure 5: Run Ncpa.cpl

2. Right-click on the Ethernet connection you are using with the device and click Properties

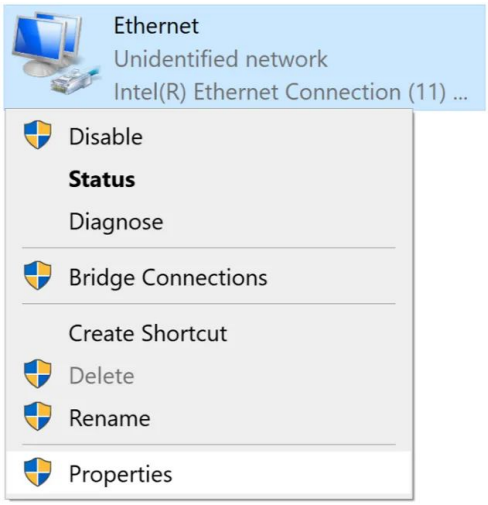


Figure 6: Select “Properties”

3. In the Networking tab, select Internet Protocol Version 4 (TCP/IP) and click properties:

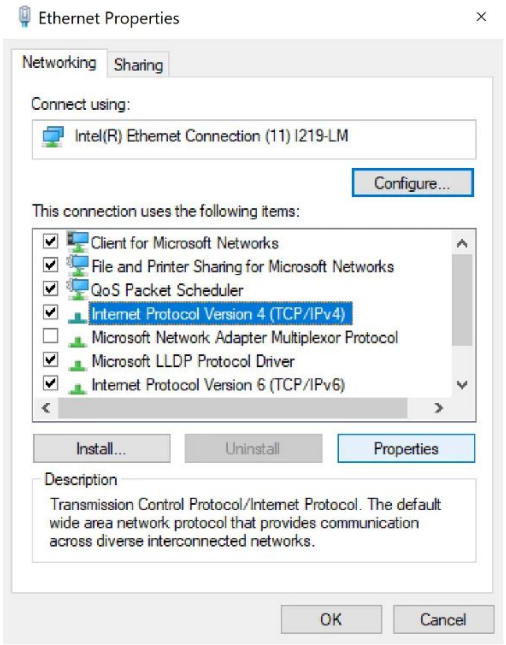


Figure 7: Select IPv4 properties

4. Edit the settings as shown in the picture below

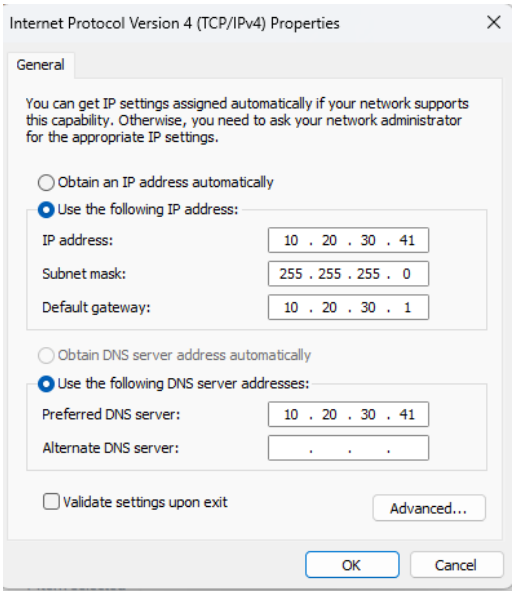


Figure 8: Specify a static IP address on the same network as ADAR

5. This will cause Windows to configure your Ethernet port with a static IP address `10.20.30.41`.

Configuring static IP address on your computer (Ubuntu):

Note: *While verified only on Ubuntu, these steps are applicable on most Linux systems.*

1. Make sure that you have **NetworkManager** installed. If not, run:
   sudo apt-get update && sudo apt-get upgrade && sudo apt-get install network-manager

2. Identify your ethernet ports interface name by running `nmcli device show`. The output should be a list of all network interface settings, grouped by interface:

   oscar@oscar:~$ sudo nmcli device show

   GENERAL.DEVICE: lo
   GENERAL.TYPE: loopback
   GENERAL.HWADDR: 00:00:00:00:00:00
   GENERAL.MTU: 65536
   GENERAL.STATE: 100 (connected (externally))
   GENERAL.CONNECTION: lo
   GENERAL.CON-PATH: /org/freedesktop/NetworkManager/ActiveConnection/1
   IP4.ADDRESS[1]: 127.0.0.1/8
   IP4.GATEWAY: --
   IP6.ADDRESS[1]: ::1/128
   IP6.GATEWAY: --

   GENERAL.DEVICE: p2p-dev-wlp0s20f3
   GENERAL.TYPE: wifi-p2p
   GENERAL.HWADDR: (unknown)
   GENERAL.MTU: 0
   GENERAL.STATE: 30 (disconnected)
   GENERAL.CONNECTION: --
   GENERAL.CON-PATH: --

   GENERAL.DEVICE: enxa0cec8aa027a
   GENERAL.TYPE: ethernet
   GENERAL.HWADDR: A0:CE:C8:AA:02:7A
   GENERAL.MTU: 1500
   GENERAL.STATE: 20 (unavailable)
   GENERAL.CONNECTION: --
   GENERAL.CON-PATH: --
   WIRED-PROPERTIES.CARRIER: off
   IP4.GATEWAY: --
   IP6.GATEWAY: --

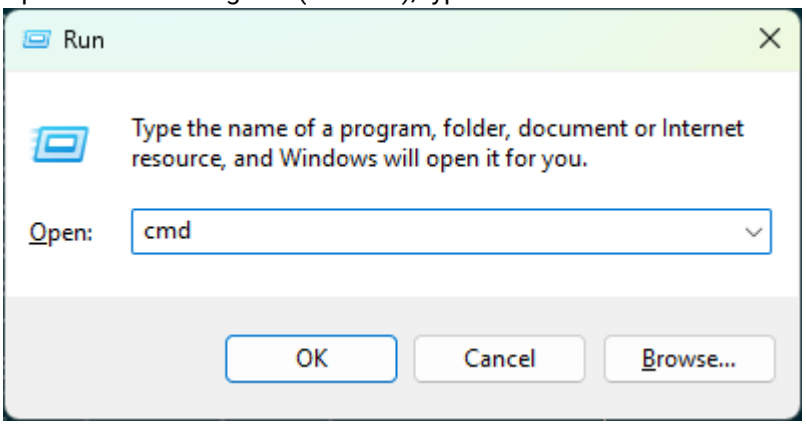
   In this case, we have 3 interfaces, and the Ethernet port we want to select is **enxa0cec8aa027a** (shown in **GENERAL.DEVICE**)

3. Replace <**name**> and <**interface**> with an appropriate name and the value of **GENERAL_DEVICE** from the previous step and run the following command:
   nmcli connection add con-name <name> type ethernet ifname <interface> ipv4.method manual ipv4.addresses 192.168.137.1/24 ipv6.method disable

4. Disconnect power from the evaluation kit and reconnect it. Assuming you are using default settings on the evaluation kit, it should now be reachable.

Appendix B: **Installing the** `adar_api` Python package

`adar_api` is available on the official Python Package Index (PyPi), and can therefore be easily installed with `pip`. We recommend using a new virtual environment to prevent dependency conflicts with other installed packages. Up-to-date installation instructions for the latest version of `adar_api` can be found in the repository README.
The following steps assume Python 3.12 or newer is already installed.

1. Open a new terminal window
   Windows:
   Open the Run dialog box (“Win+R”), type “cmd” and click "Ok".
   

   Linux:
   A common keyboard shortcut for opening the terminal is “Ctrl+Alt+T”
   Mac:
   Open spotlight by typing “⌘+Spacebar”, type “terminal” and press enter
2. In the terminal, navigate to your preferred working directory by using the change directory (`cd`) command. In the next step we will create a new folder in this directory.

   ```
   cd my/preferred/working/directory
   ```
3. Create a new virtual environment for python. Doing so prevents dependency conflicts.

   ```
   python -m venv .venv
   ```

   The command above will create a virtual environment named `.venv` (standard naming convention) in the current working directory.
4. Activate the virtual environment.
   Windows:

```
.venv\Scripts\activate
```

Linux/Mac:

```
source .venv/bin/activate
```

After activating the virtual environment, you should see `(.venv)` at the beginning of the next line in your terminal, indicating that the virtual environment is active.
e.g. `(.venv) C:\Users\Username\Documents>` in the Windows “cmd” terminal

5. Install the `adar_api` package

   ```
   pip install adar-api==1.1.3
   ```

   The command above installs version 1.1.3 of the `adar_api` package, which has been tested with the rest of the instructions in this guide. If a newer version of `adar_api` is desired, please refer to the code repository for up-to-date usage instructions.
6. You can now run python scripts that use the `adar_api`, such as the `pointcloud-publisher` example (see the steps in the main Getting started guide).
7. When you are done running code that depends on `adar_api` you can either close the terminal window or type `deactivate` to exit the virtual environment.

Appendix C: **Visualizing the point cloud in Foxglove**

Install Foxglove from https://foxglove.dev/download

Or run it in a browser. You might have to register. NB: Note that Firefox does not support running Foxglove in the browser.

The following steps assume that the example script `pointcloud_to_foxglove.py` is already running.

1. Choose “Open Connection”. You might have to click the Foxglove icon, located at the upper left corner.

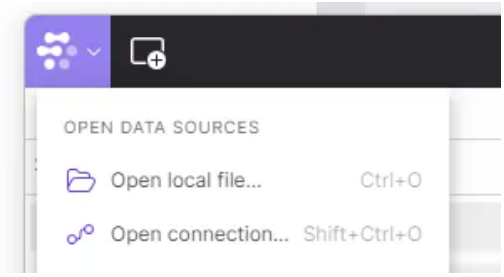


Figure 9: Click “Open connection…”

2. Enter localhost (or `127.0.0.1`) as the address: “ws://localhost:8765”.

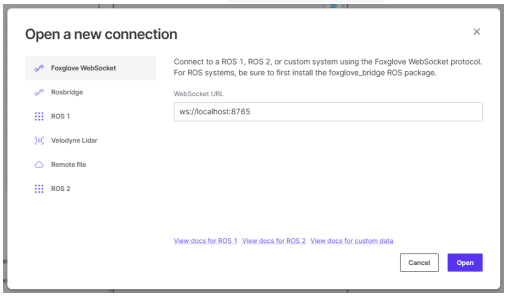


Figure 10: Specify “localhost” as the IP

3. Click “Open” to establish the connection.
4. *You have to allow “Load Unsafe Scripts” if you use Foxglove in a browser*

To view the point cloud, follow these steps:

1. Download the file “foxglove_layout_ADAR.json” from here.
2. Open Foxglove and import the JSON file by clicking the “Layout” dropdown menu in the upper right corner, then select “Import from file…”.

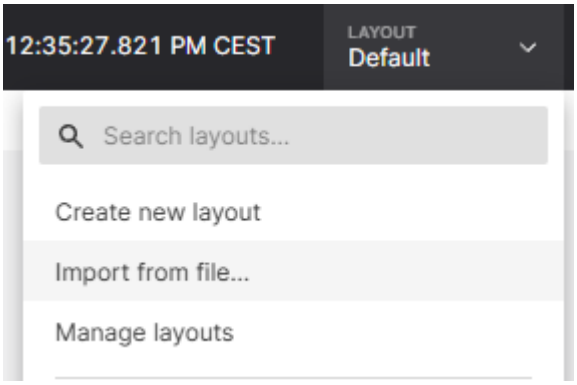


Figure 11: Import layout from file

3. You should now see two panels: one displaying a 3D view and the other a 2D top-down view.

   If you do not see any points in the panels, try hitting "Open connection" again.
4. To customize the point cloud visualization, click the “Settings” wheel in the top right corner of a panel, then click the panel tab on the left menu.
5. On the left pane, under “Panel->Topics”, locate and expand “/adar/pointcloud” to adjust point size, colour, and other settings.
6. *If you get an error with the “Display frame” - refresh the web page or hit “Open connection” again.*