

Akida 1000 and 1500 Raspberry Pi 5 Evaluation Kit *User Guide*



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Version 1.5

INTRODUCTION

The Akida Evaluation Kit is an all-in-one system for Akida technology assessment. It includes web-based demonstrations for typical ML use cases but also includes a preinstalled python virtual environment for rapid development and testing.

Note: Power measurement is not available on the M.2 boards. Power measurement is supported only on the AKD1000 & AKD1500 PCIe boards, which include onboard current-monitoring hardware.



Figure 1.1: Akida1000 M.2 Card



Figure 1.2: Akida1500 M.2 Card

Akida Evaluation Kit content and description:

- Raspberry Pi 5 (8GB RAM)
- Pre-installed 32GB SDCard
- Akida1000 or 1500 M.2 Reference Board
- Ubuntu server 20.04 / python 3.7
- MetaTF Development Environment

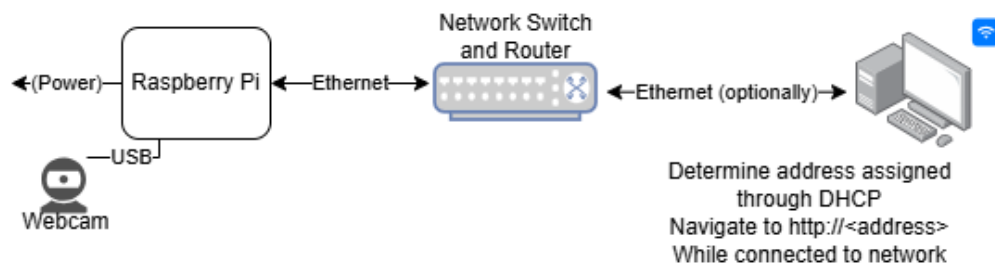
Testing requires a USB camera connected to the Akida Evaluation Kit.

1 GETTING STARTED

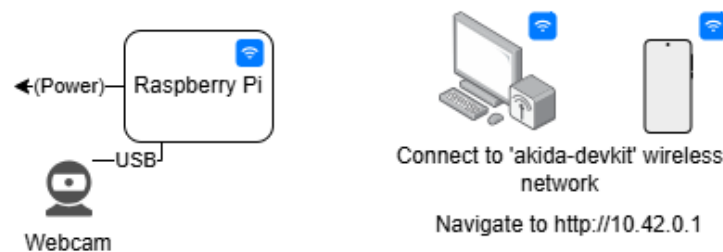
1.1 CONNECTING TO THE DEVICE

The Akida Evaluation kit will automatically host a local web application that can be accessed when connected to the same network. There are multiple methods of connecting to the device through the network.

Wired Connection



WIFI Connection



Wireless Connection:

Once you have supplied power, the device will host a wireless network. Connect to the 'akida-devkit-`{xxxx}`' network using the password *Demo123Demo123*.

Wired Connection:

To connect the evaluation kit to an existing network, connect the device to a network router with a switch via an ethernet cable. Additional devices that connect to the network hosted by the router via ethernet or Wi-Fi will have access to the evaluation kit.

1.2 RUNNING DEMOS

Once the Akida evaluation kit boots, you can run the demos included in your evaluation kit through a web browser.

For direct wireless connection (if you are connected to the 'akida-devkit' network):

- Open <http://10.42.0.1> in a web browser to run the Akida Demonstrations launcher

If your evaluation kit is connected to an existing network (if you have connected it to a network switch):

- You must first determine the IP address of your evaluation kit.
 - This can be done on Linux through tools like nmap and on Windows through tools like Advanced IP Scanner. Alternatively, you can access the terminal by connecting a monitor and keyboard to the development kit and typing `ip -4 addr show eth0 | grep inet`. Please see section 3.2 for Ubuntu login credentials.
- Once you have the IP address of the device, open <http://<device IP address>> in a web browser to run the Akida Demonstrations launcher.
- Be sure to enable popups in the browser to open each demo
- **Please note:** You can use a browser on a cell phone, tablet, laptop, or desktop computer. Some of the images below were taken from cell phone and some from a laptop.

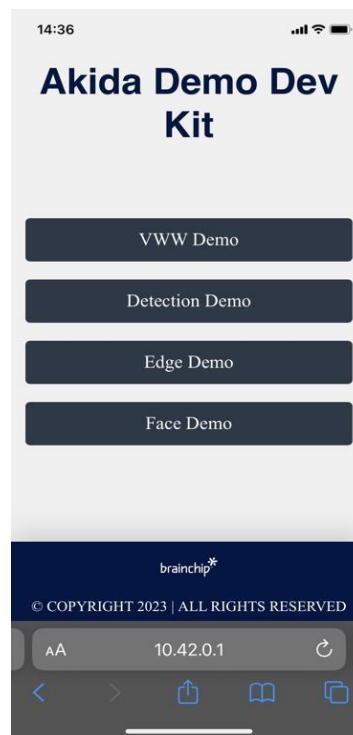


Figure 2: Akida Demonstrations launcher

2 AKIDA DEMOS

2.1 RUN THE AKIDA DEMOS

Select the demo you would like to run. It will take a few seconds to come up.

Note: Ensure popups are allowed in your browser to launch demos.

2.2 TO CHANGE DEMOS

Click on the "Akida Dev Kit" tab, click on the green button to stop the running demo and then select another one.

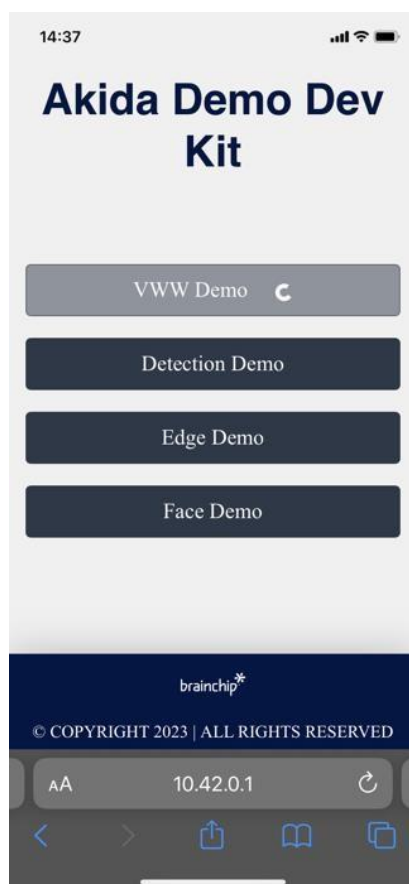


Figure 3: Akida Demonstration selection

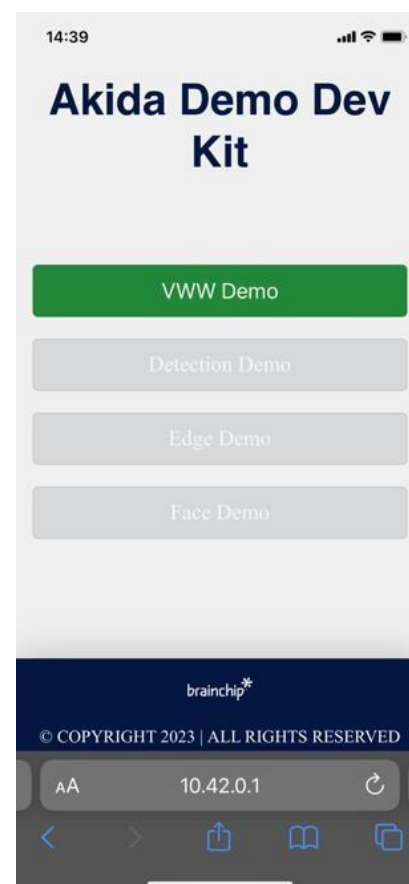


Figure 3: Changing demos

2.3 AKIDA VISUAL WAKE-WORD DEMO

This demo uses the AkidaNet/VWW model from Akida-models to identify whether a person is present or not.

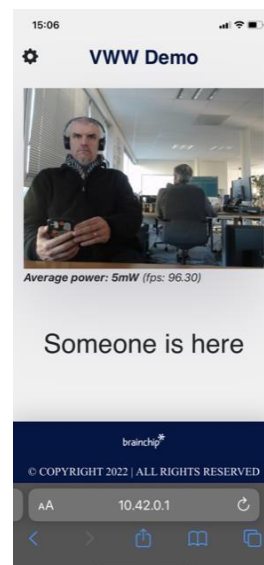


Figure 5: Akida VWW demo

2.4 AKIDA EDGE LEARNING DEMO

This application uses MobileNet models replacing the top layer to learn new classes from the Webcam frames.

Enter class name in the label field and click **learn** for each new class. Start with background as the first class. Next choose other objects similar to images in the ImageNet dataset for best results. For testing, place learned object in the field of view.

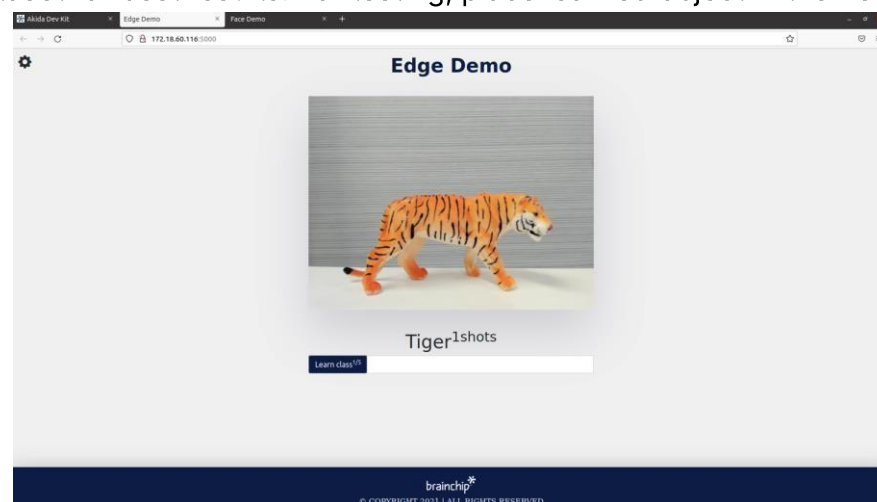


Figure 6: Akida Edge Learning demo

2.5 EDGE FACE RECOGNITION DEMO

This application uses MobileNet models replacing the top layer to learn new classes from the Webcam frames.

Enter person's name in the label field and click **learn** for each new person. When a person re-enters the field of view, their face is recognized, surrounded by a boundary box and his name is displayed.

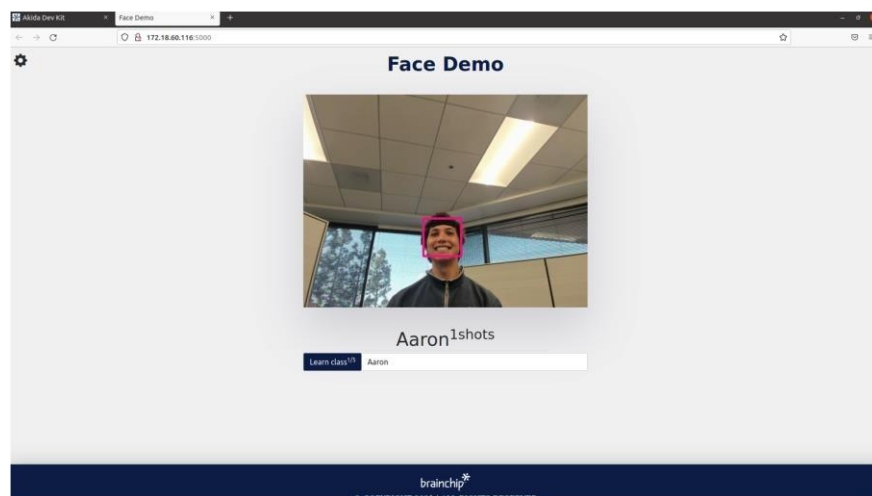


Figure 7: Akida Face Recognition demo

2.6 DETECTION DEMO

This application uses YOLO Akida models to detect objects or faces into webcam frames. Face, person, or object detection should occur with bounding boxes as well as scores. Two modes available: *car/person* and *face*.

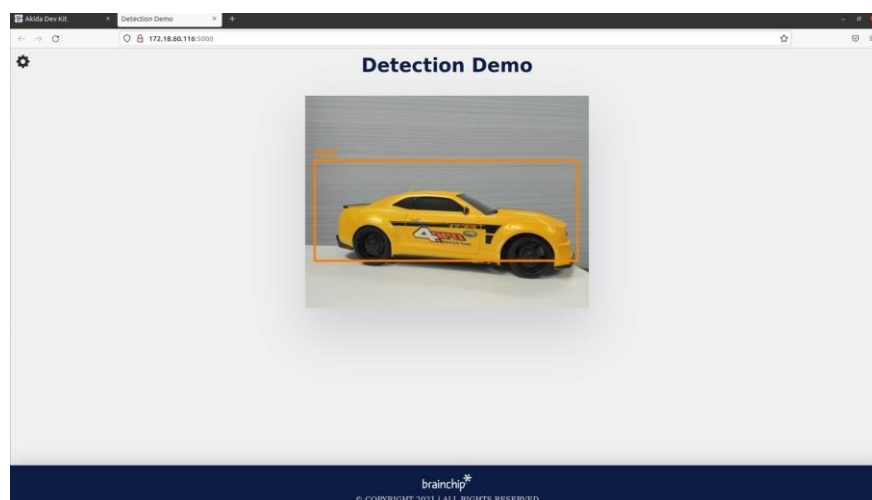


Figure 8: Akida Detection demo

3 DEVELOPMENT

MetaTF development details can be found at <https://doc.brainchipinc.com/index.html>

3.1 ENVIRONMENTS

- MetaTF Development Environment
 - For development and testing, a python virtual environment is provided with MetaTF requirements pre-loaded.

Note: The pre-configured MetaTF Development Environment is located in `/home/bcdev`. It can be activated by executing `source venv_akida/bin/activate` from the same directory.

- Development requires Python 3.10 to 3.12 as well as TF-Keras 2.19 (or pytorch ≥ 2.6). See MetaTF documentation linked above for further information.
- Running models on device additionally requires Python 3.10 to 3.12 and the Akida package

3.2 CONNECTING TO THE DEVICE FOR DEVELOPMENT

The simplest way to connect to the device for development and testing is over an **ssh** connection.

The system comes with the following developer credentials:

- User: **bcdev**
- Password: **Demo123**

Alternatively, root privileges are provided under:

- User: **Ubuntu**
- Password: **brainchip**

Transferring files to the device can be done simply by using the **scp** protocol.

Example: `scp localFilePath bcdev@10.42.0.1:/home/bcdev`

You will then be prompted to enter the password for the user, which can be found above.

3.3 AKIDA DRIVERS

Instructions for downloading and configuring the Akida PCIe drivers can be found [here](#).

4 TROUBLESHOOTING

4.1 RUNNING ISSUE

If the system is stuck or if the demos do not run after performing the required steps in this user guide start by rebooting the system by cycling the power.

4.2 DEMO SELECTION PAGE LOADS, BUT DEMOS WON'T OPEN

Ensure that popups are allowed in your browser.

4.3 NETWORK DOES NOT APPEAR UNDER AVAILABLE NETWORKS

This can often be resolved by checking from another device or by connecting to the network manually. If you are unable to see the network after several minutes, reboot the system by cycling the power.