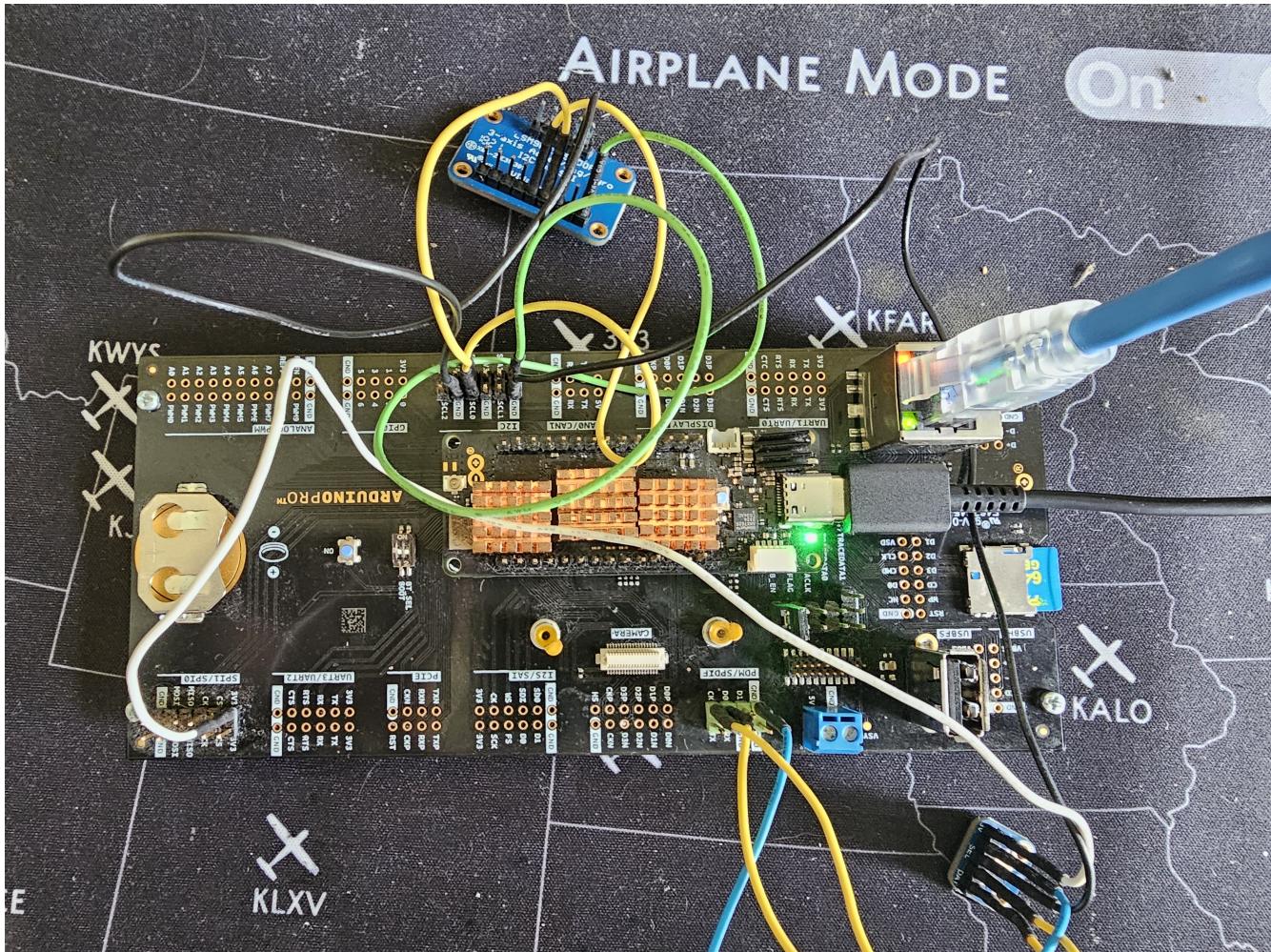


# WAcouSense

## HW-Setup



## Overview

This document describes which HW components (modules) are needed to setup (wire) the **Portenta-H7** based **WAcouSense** system.

## HW components needed

- **Portenta-H7 MCU module:**  
<https://store-usa.arduino.cc/products/portenta-h7?selectedStore=us>
- **Portenta-H7 Breakout Board:**  
[https://store-usa.arduino.cc/products/arduino-portenta-breakout?pr\\_prod\\_strat=jac&pr\\_rec\\_id=f3c6b3a81&pr\\_rec\\_pid=6545910694095&pr\\_ref\\_pid=6544099082447&pr\\_seq=uniform](https://store-usa.arduino.cc/products/arduino-portenta-breakout?pr_prod_strat=jac&pr_rec_id=f3c6b3a81&pr_rec_pid=6545910694095&pr_ref_pid=6544099082447&pr_seq=uniform)
- **PDM Microphone** (as demo, reference):

<https://www.adafruit.com/product/3492>

- **IMU Sensor LSM9DS1 9-DOF:**  
<https://www.adafruit.com/product/3387>
- male header pins, two-rows, 2.54mm pitch and row spacing, to solder on breakout board:  
example:  
<https://www.digikey.com/en/products/detail/samtec-inc/TD-110-G-AA/10218850>
- “**flying wires**”, jumper cables, female-female, to connect PDM MIC and IMU
- an **ETH network cable**, RJ-45, CAT5 to connect to computer
- **USB-C cable** for power and UART connection to host computer
- (optional, **but recommended**): **ST-LINK** debugger:  
<https://www.st.com/en/development-tools/stlink-v3set.html>  
needed for SW/FW debugging, otherwise: just flashing FW possible (via Arduino “dfu-util.exe”, no debug features, debug just with using STM32 IDE, not Arduino)
- (optional): **Micro-SD-Card** for PICO-C scripts (FAT32 formatted)

Remark:

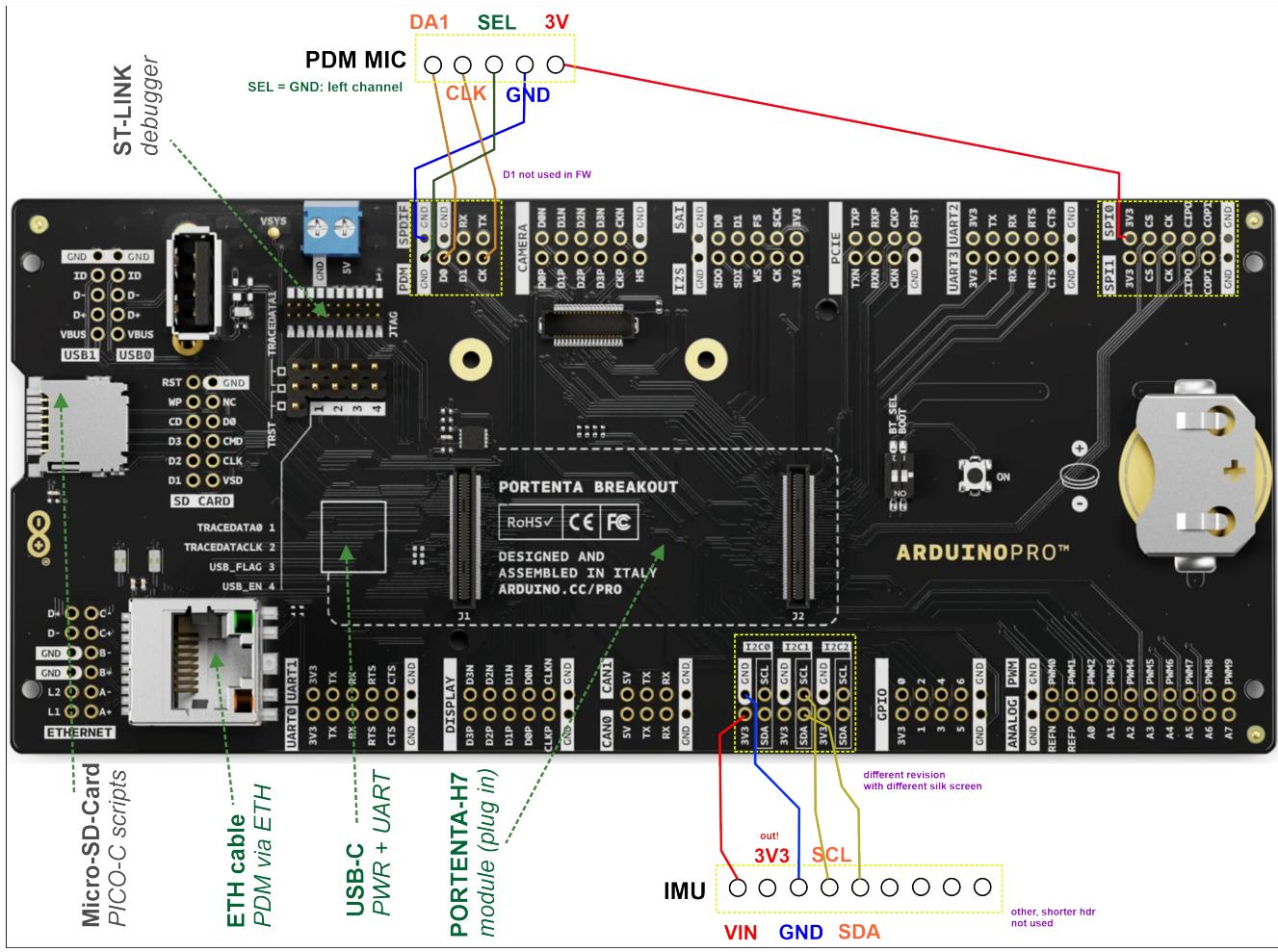
There is a new HAT extension board for the Portenta-H7:

<https://store-usa.arduino.cc/products/portenta-hat-carrier?selectedStore=us>

It was not checked if this board could be used instead of the breakout board, esp. if the PDM MIC signals are populated. Potentially: it might be an option.

## Steps to do

1. **Solder the male header** pins on breakout board and sensor modules, esp. the PDM/SPDIF header (2x4) and the I2C header (2x6), optional: solder also the SPI1/SPI0 header (2x6): maybe useful, at least for having PWR pins as 3V3 for PDM MIC and IMU
2. **Plug on top the Portenta-H7** module (a careful “push until clicks”)
3. use the **flying wires** to connect PDM MIC and IMU (see drawing below)
4. **flash the MCU FW**: via USB-C connection, Arduino “dfu-util.exe” tool (see separate SW setup guidelines)
5. Open **UART terminal** on host computer and start using the setup (via UART commands)



Remarks:

The latest Breakout Board seems to have a fixed silk screen (not sure about the I2C1, it was I2C0 on older version: here shown the working wiring on older board).

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