

The ARA development kit is shipped with 3 components :

- Ara Development Board (rev. D) : that's the main board, embedding an ARMv7l processor, SD Card with a custom Android Operating System (v4.3)
- Generic Endpoint : it provides GPIO connectivity
- Endo Dev Board

Dev Board assembly and wiring

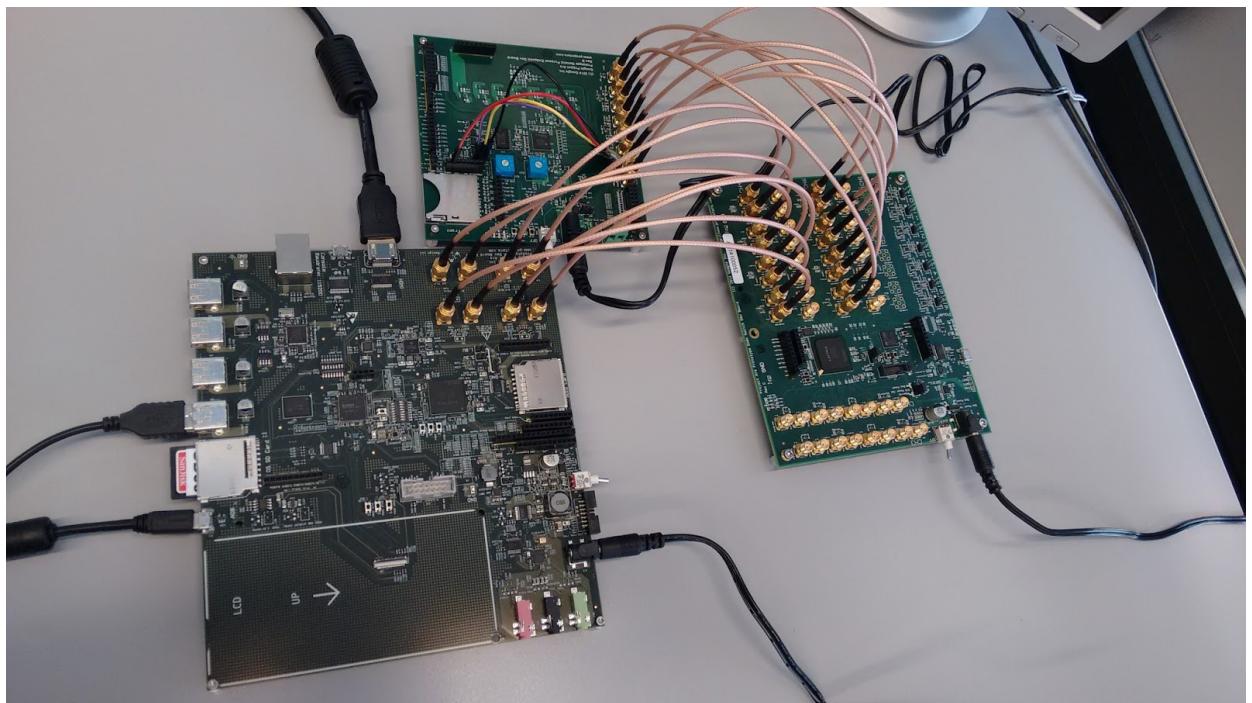
Endo Switch CH6 -> GPIO Extension Board

Endo Switch CH4 -> AP Android Board

Tx -> Rx

N -> N and CLK\_N -> CLK\_N

P -> P and CLK\_P -> CLK\_P

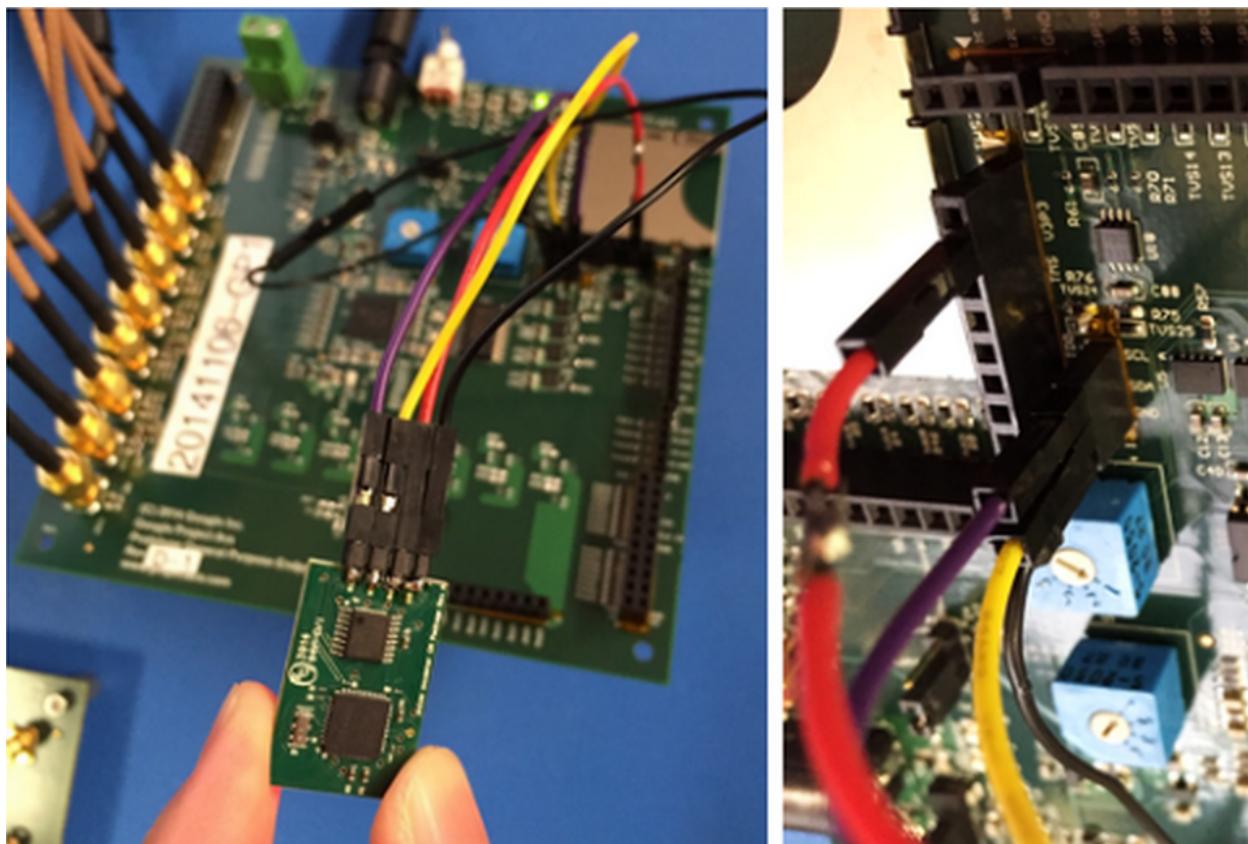


Pulse Oxymeter

From left (purple) to right (black), the connections : SCL, SDA, Power (3V3) and Ground.

**J15 Header** : GND, SDA, and SCL

**J5 header** : 3V

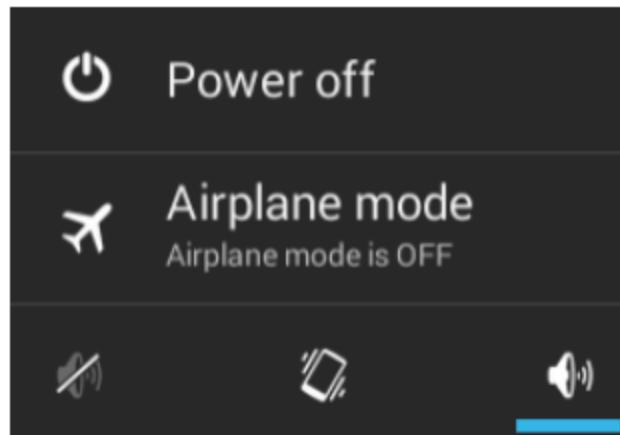
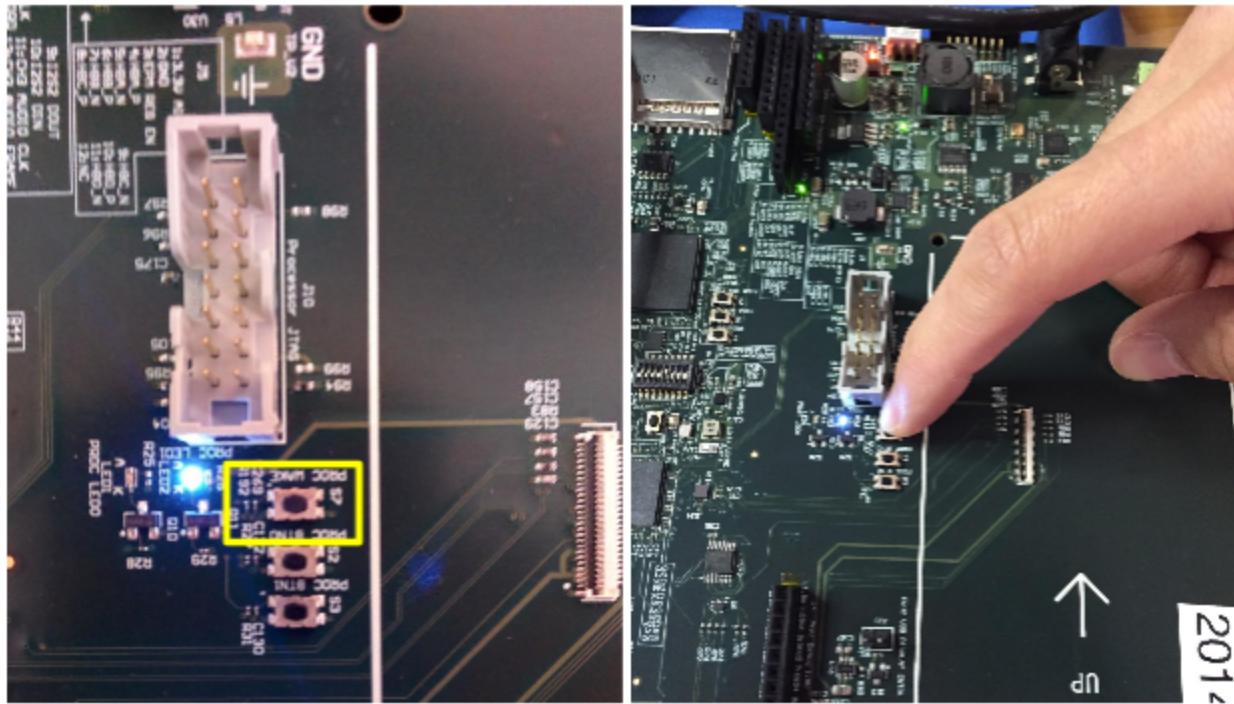


#### Power Sequence

- 1 Switch on the Endo Switch Board
- 2 Wait at least 15 seconds (to allow the switch to boot)
- 3 Switch on the GP Endpoint Board
- 4 Wait a few seconds for UniPro linkup
- 5 Switch on the AP Board

#### Shutdown

- 1 Power Off Android. Press during 3-4 seconds.
- 2 Once Android is down, no order importance.



### Additional LCD Screen

Moto X on the DSI port.

### Speed Modulation, Byte Rate and Framing

- **system rate:** 20000 micro seconds =  
(<https://ara-mdk.googlesource.com/platform/frameworks/base/+/master/core/java/android/hardware/SensorManager.java#624>)
- **on the app :** 20 ms => 50hz

Used in the demo application provided with the DevKit that use infrared to get the heart rate.

### Pulse Oximeter Sensor



- TI AFE4400 : Analogic front-end for PulseOx

<http://www.ti.com/product/afe4400>

- 4 Mhz clock
- PRP Count - Pulse repetition period count - Can be set from 800 to 64000. Set by the Android app to 7999.
- Max sampling rate = 1,3 KSPS
- Default sampling rate = 500 SPS
- Max résolution = 22 Bits

- IS602B : I2C to SPI

[http://www.nxp.com/products/interface\\_and\\_connectivity/bridges/i2c\\_slave\\_to\\_spi\\_master\\_gpio\\_bridges/SC18IS602BIPW.html](http://www.nxp.com/products/interface_and_connectivity/bridges/i2c_slave_to_spi_master_gpio_bridges/SC18IS602BIPW.html)

- supports I<sup>2</sup>C data transfers up to 400 kHz.
- SPI master operating up to 1.8 Mbit/s
- 200-byte data buffer