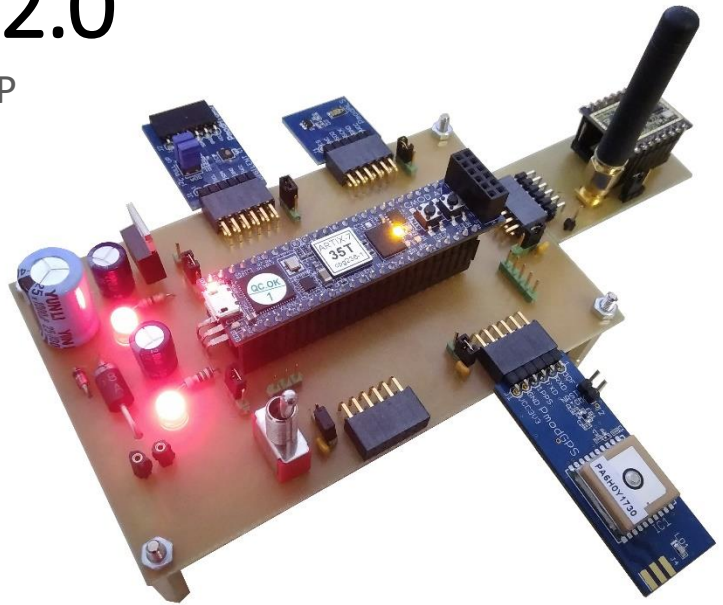# Smart Sensor V2.0

card designed by Paul LELOUP

Additionnal features

- Integrated CmodA7 card of Digilent
- A Pmod Connector for plug and play (using FPGA card for prototype)
- An SMA connector for the antenna
- Small card dimensions : 27.9mm x 50.9 mm
- 4 connectors for measure current and tension of the modules
- 5 connectors for use optionnals PINS of the RF-LoRa-868

CmodA7-CortexM0-MCU Features

- A ARM cortex-m0 processor
- 2 kB ROM containing a bootloader code
- A 128 kB RAM and a 16 kB RAM used for both code and volatile data
- General Purpose Inputs and Outputs (GPIO) modules
- Universal Asynchronous Receiver Transmitter (UART) modules
- Serial Peripheral Interface modules (SPI)
- Inter-Integrated Circuit modules (I2C)
- Pin Peripheral Selection (PPS) modules (for inputs and outputs)
- An activity monitor

Application

- Prototype with FPGA
- Smart Sensor
- Home Automation
- RF Alarms
- Sensor networks
- Long Range Telemetry
- Meter Reading
- Irrigation Systems
- Wireless Applications

Part Numbers

Pmod connector A

PIN	Definition	Direction	Function
1	PC2	In/Out	Digital I/O software configured
2	PC1	In/Out	Digital I/O software configured
3	PC0	In/Out	Digital I/O software configured
4	PB13	In/Out	Digital I/O software configured
5	GND	-	Ground connection
6	VCC	Out	Power connection
7	PC3	In/Out	Digital I/O software configured
8	PC4	In/Out	Digital I/O software configured
9	PC5	In/Out	Digital I/O software configured
10	PC6	In/Out	Digital I/O software configured
11	GND	-	Ground connection
12	VCC	Out	Power connection

Pmod connector B

PIN	Definition	Direction	Function
1	PB8	In/Out	Digital I/O software configured
2	PB7	In/Out	Digital I/O software configured
3	PB6	In/Out	Digital I/O software configured
4	PB5	In/Out	Digital I/O software configured
5	GND	-	Ground connection
6	VCC	Out	Power connection
7	PB9	In/Out	Digital I/O software configured
8	PB10	In/Out	Digital I/O software configured
9	PB11	In/Out	Digital I/O software configured
10	PB12	In/Out	Digital I/O software configured
11	GND	-	Ground connection
12	VCC	Out	Power connection

Pmod connector C

PIN	Definition	Direction	Function
1	PB0	In/Out	Digital I/O software configured
2	PD15	In/Out	Digital I/O software configured
3	PD14	In/Out	Digital I/O software configured
4	PD13	In/Out	Digital I/O software configured
5	GND	-	Ground connection
6	VCC	Out	Power connection

7	PB1	In/Out	Digital I/O software configured
8	PB2	In/Out	Digital I/O software configured
9	PB3	In/Out	Digital I/O software configured
10	PB4	In/Out	Digital I/O software configured
11	GND	-	Ground connection
12	VCC	Out	Power connection

Pmod connector E

PIN	Definition	Direction	Function
1	PD7	In/Out	Digital I/O software configured
2	PD6	In/Out	Digital I/O software configured
3	PD5	In/Out	Digital I/O software configured
4	PD4	In/Out	Digital I/O software configured
5	GND	-	Ground connection
6	VCC	Out	Power connection
7	-	-	Unused
8	-	-	Unused
9	-	-	Unused
10	-	-	Unused
11	-	-	Unused
12	-	-	Unused

Pmod connector F

PIN	Definition	Direction	Function
1	PC13	In/Out	Digital I/O software configured
2	PC12	In/Out	Digital I/O software configured
3	PC11	In/Out	Digital I/O software configured
4	PC10	In/Out	Digital I/O software configured
5	GND	-	Ground connection
6	VCC	Out	Power connection
7	PD0	In/Out	Digital I/O software configured
8	PD1	In/Out	Digital I/O software configured
9	PD2	In/Out	Digital I/O software configured
10	PD3	In/Out	Digital I/O software configured
11	GND	-	Ground connection
12	VCC	Out	Power connection

5 Pins connector D

PIN	Definition	Direction	Function
1	PD8	In/Out	Digital I/O software configured
2	PD9	In/Out	Digital I/O software configured
3	PD10	In/Out	Digital I/O software configured
4	PD11	In/Out	Digital I/O software configured
5	PD12	In/Out	Digital I/O software configured

3 Pins connector G

PIN	Definition	Direction	Function
1	PC7	In/Out	Digital I/O software configured
2	PC8	In/Out	Digital I/O software configured
3	PC9	In/Out	Digital I/O software configured

3 Pins connector A, B, D, E, F, G and H

PIN	Definition	Direction	Function
1	VCC	-	Imput current probe (+)
2	VCC	-	Output current probe (-)
3	VCC	-	Output tension probe

1 Pins connector I

PIN	Definition	Direction	Function
1	GND	-	Ground connection for probes

2 Pins connector C

PIN	Definition	Direction	Function
1	GND	-	Ground connection for extern alimentation
2	VCC	In	Power connection for extern alimentation

Pin Description

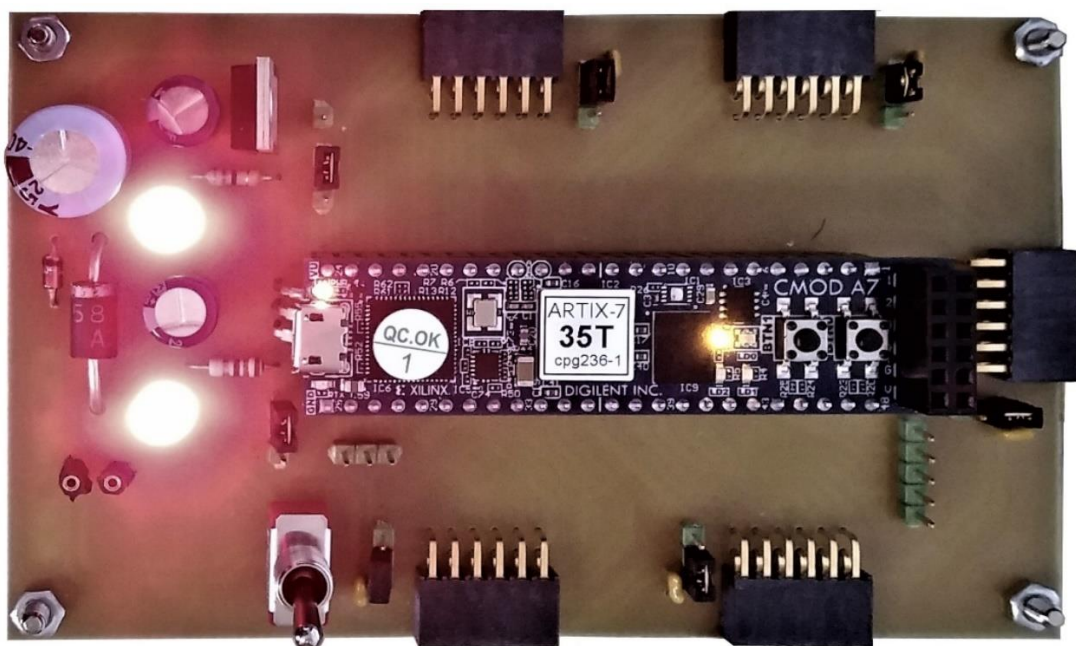**X** **Pins of the CMOD A7**

X **Pins for current measures**
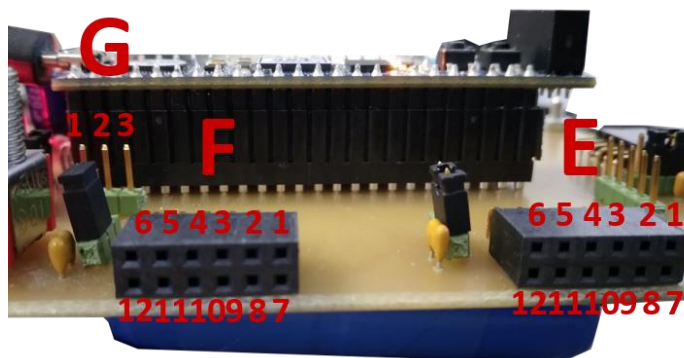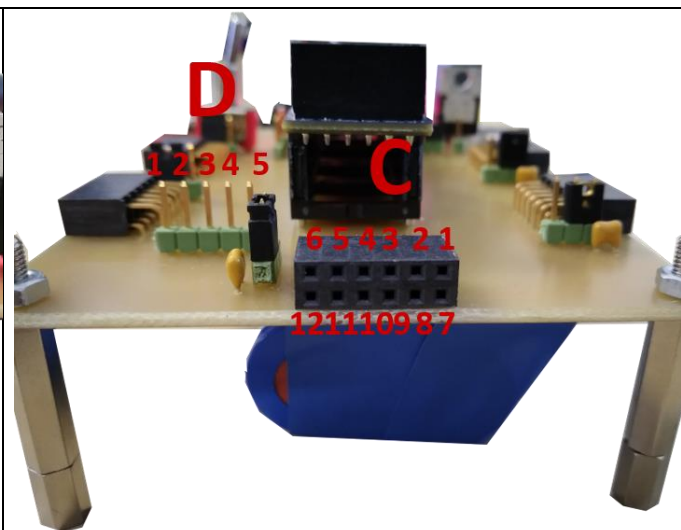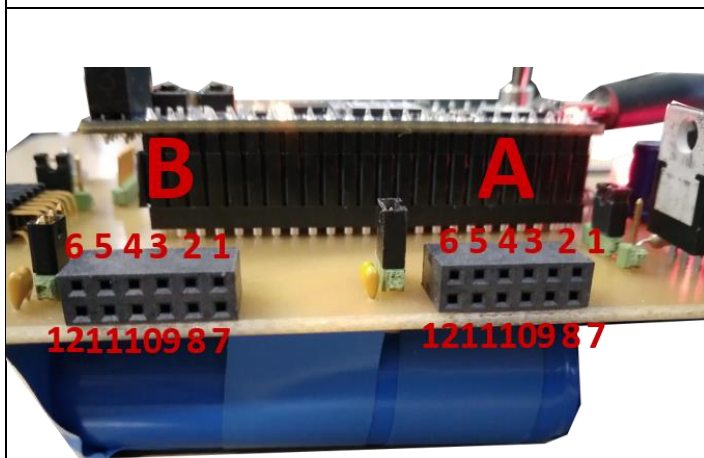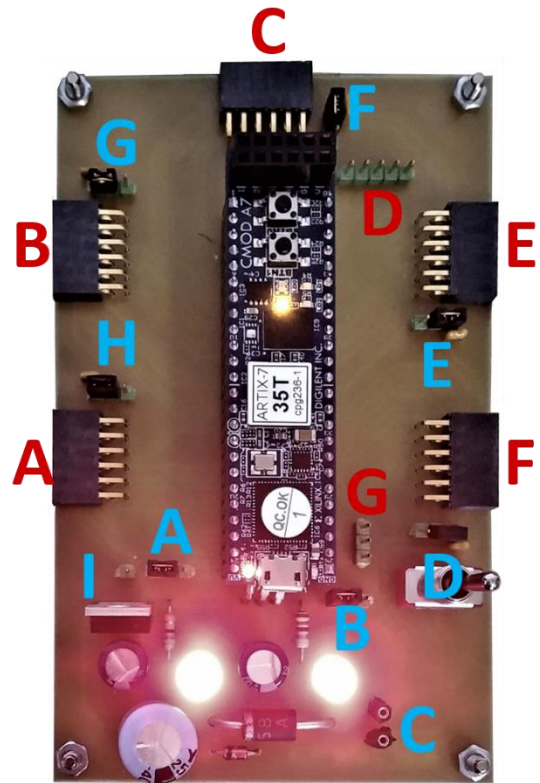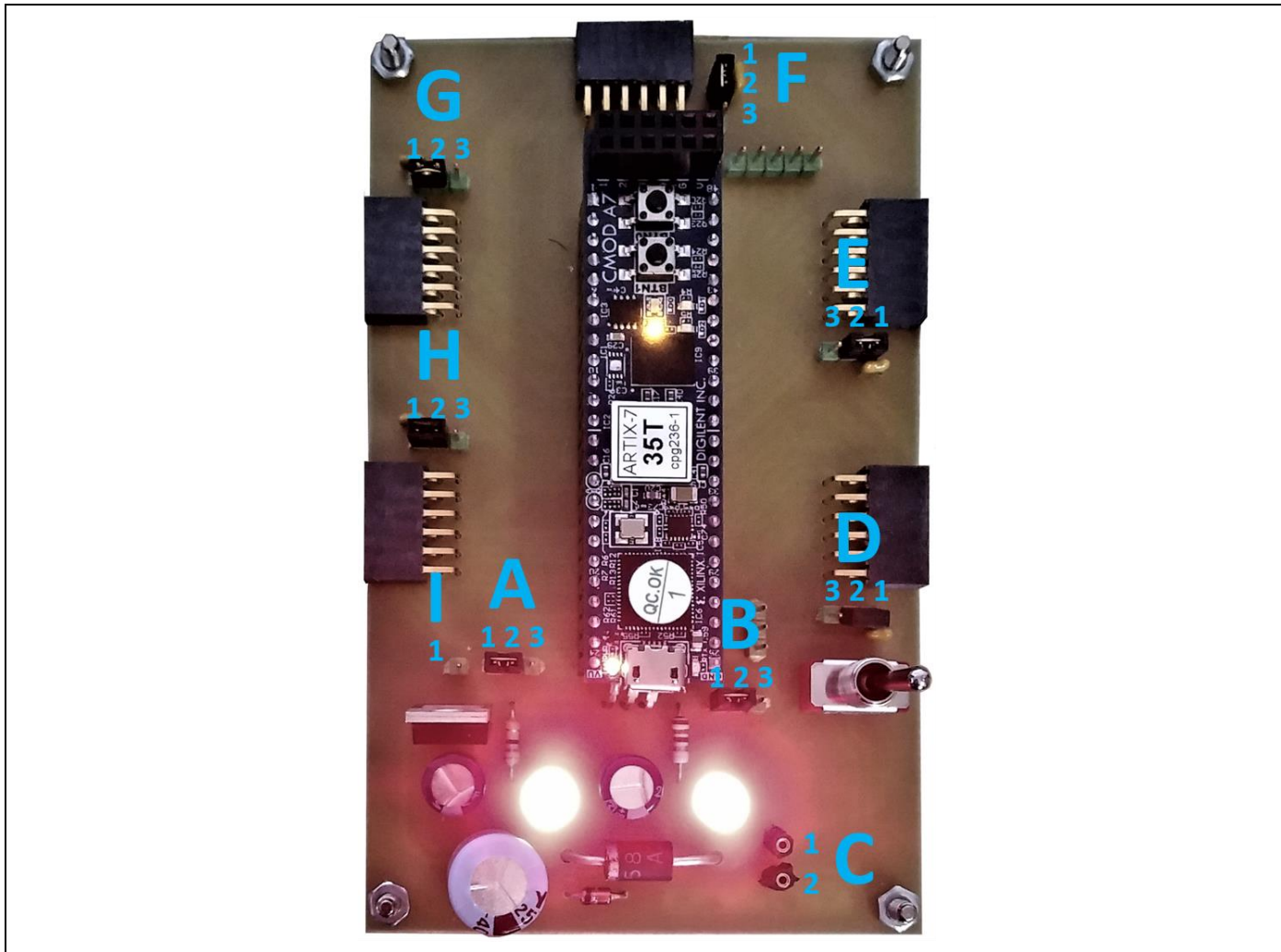
Using the Smart Sensor

First you can plug the CMOD A7 like this in the Smart Sensor card :

For begin, plug the battery to it connector below the card

Then for turn ON the alimentation of the Pmod modules and the CMOD A7, you have to put jumpers between the Pin 1 and 2 of A, B, D, E, F, G and H current measures . Now there is 3.3V to the module Pmod and 5 V to the CMOD A7.

If the LEDs don't shine, turn ON the lever switch.

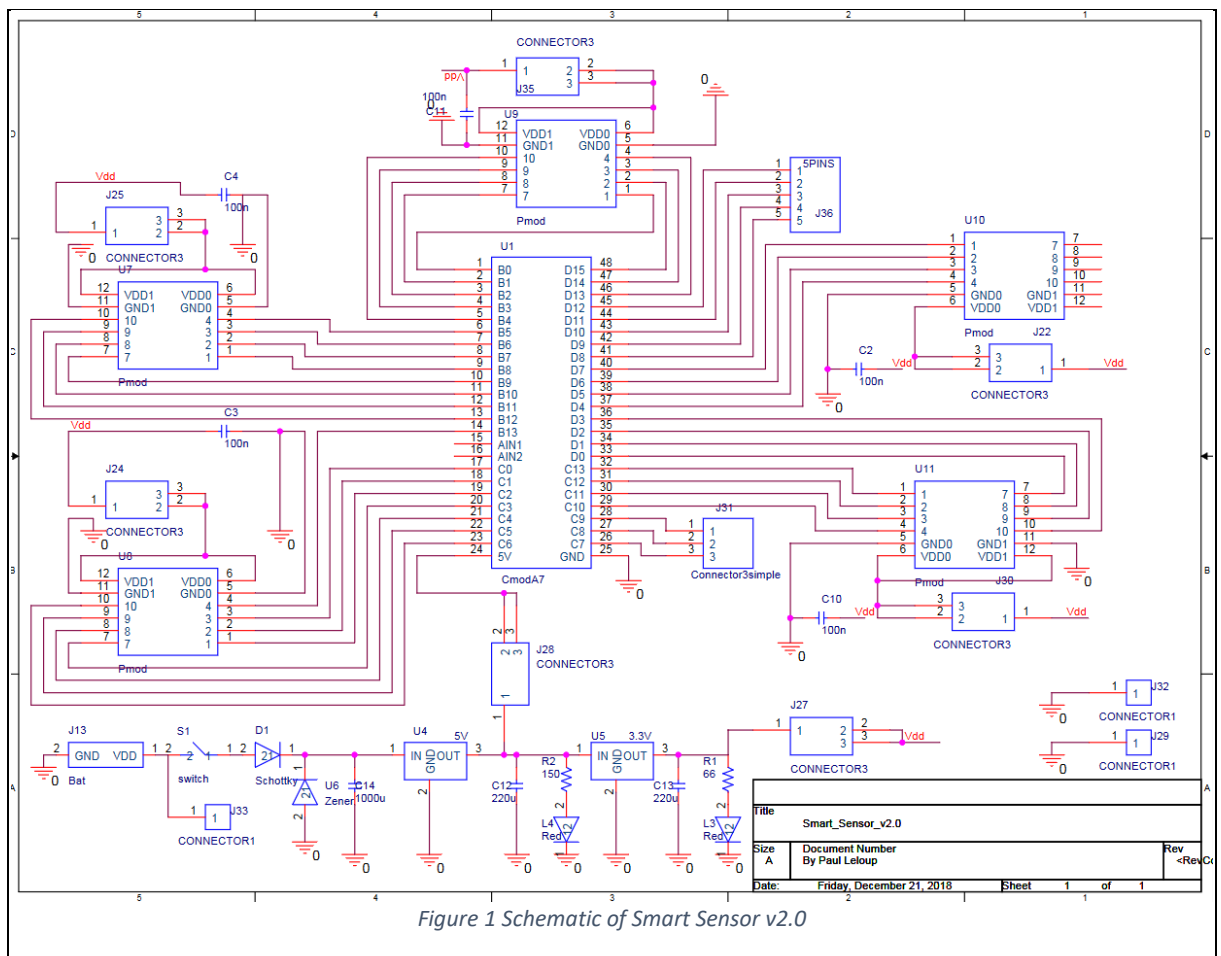The LED 1 indicate the 5V is in the circuit.

The LED 2 indicate the 3.3V is in ths circuit too.

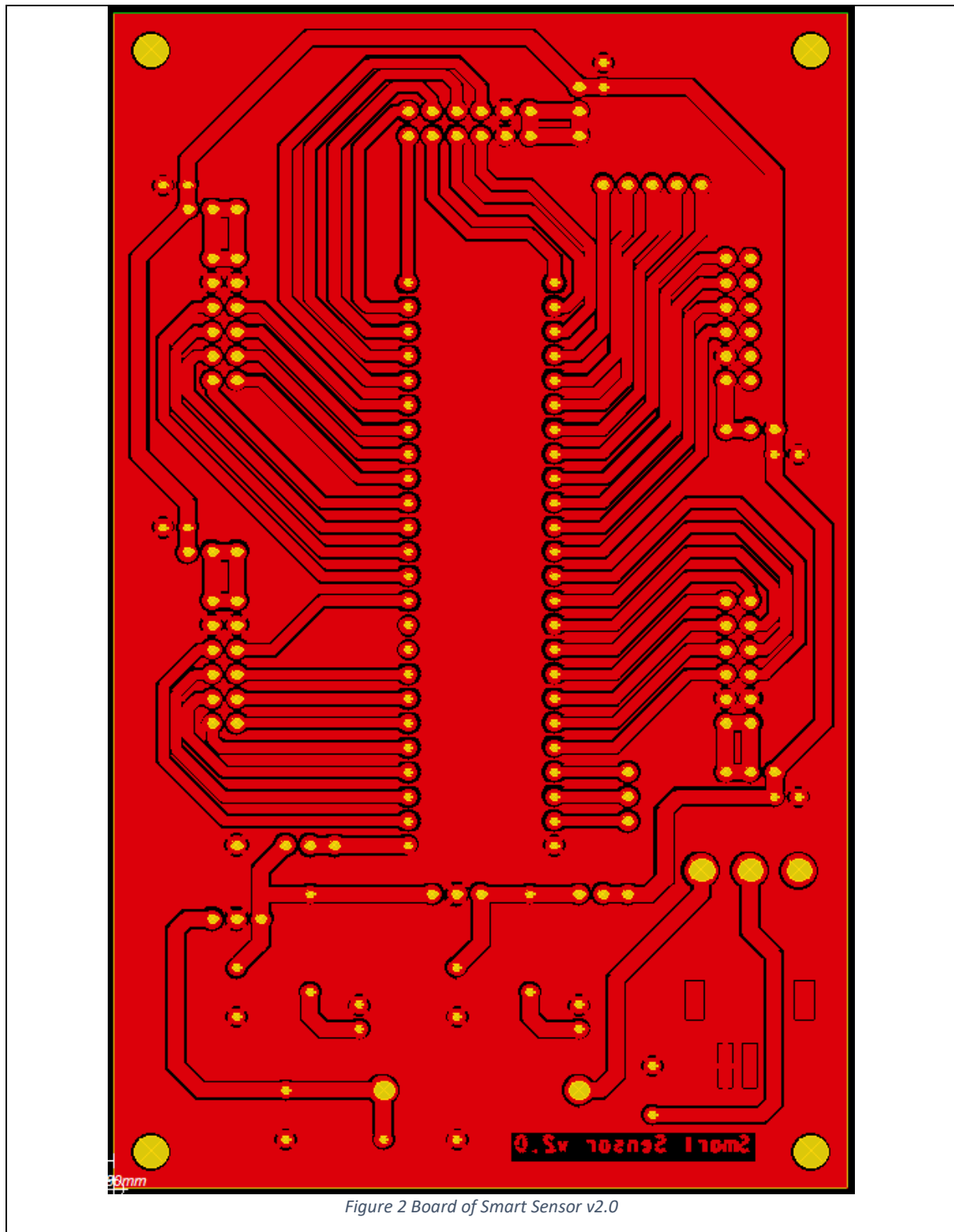Go on your keyboards, you can use the Smart Sensor !

For more help about using the CMOD A7, go to see the tutorial.

Schematic

Figure 1 Schematic of Smart Sensor v2.0

Board

Figure 2 Board of Smart Sensor v2.0

Référence

- Datasheet CMOD A7
  https://reference.digilentinc.com/_media/reference/programmable-logic/cmod-a7/cmod_a7_rm.pdf