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EU programme for education, training, youth and sport

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Research And Development International Offices

Research & innovAtive Development International Offices networking for upscaling research capacities and encouragement of multidisciplinary studies

Erasmus+ Enriching lives, opening minds

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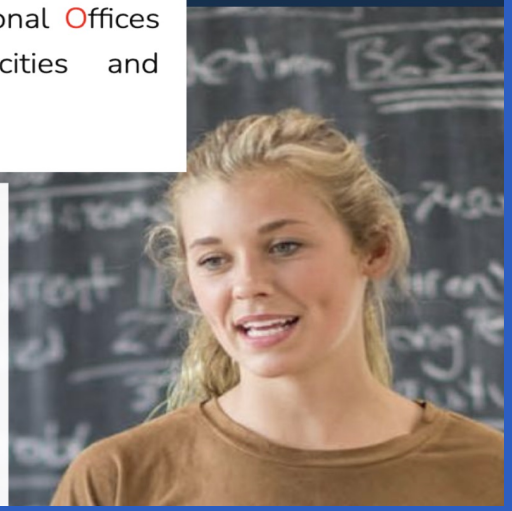
Explore the Erasmus+ programme



Training & Capacity Building with UPPA's Generic Sensor Platform

USTHB

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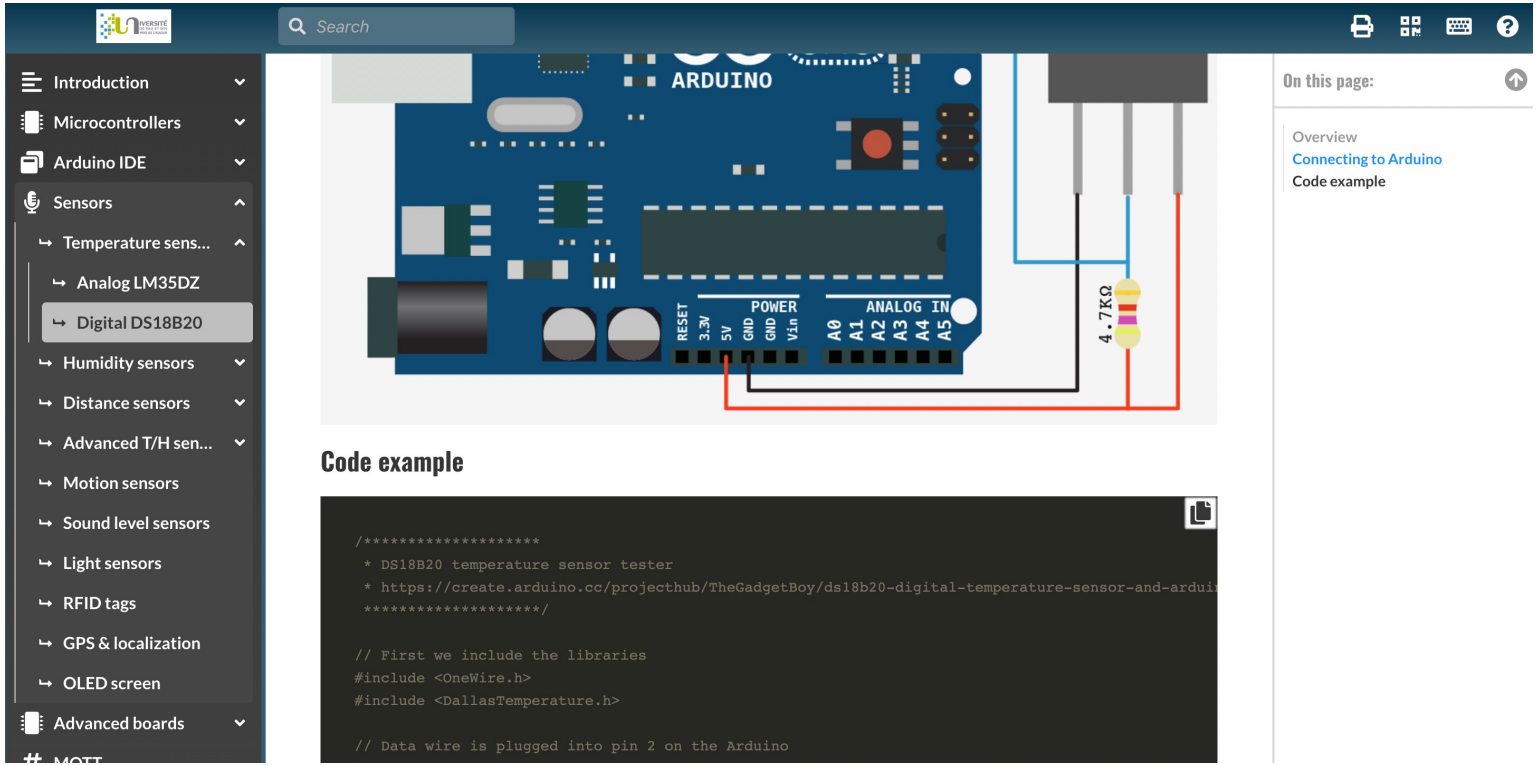
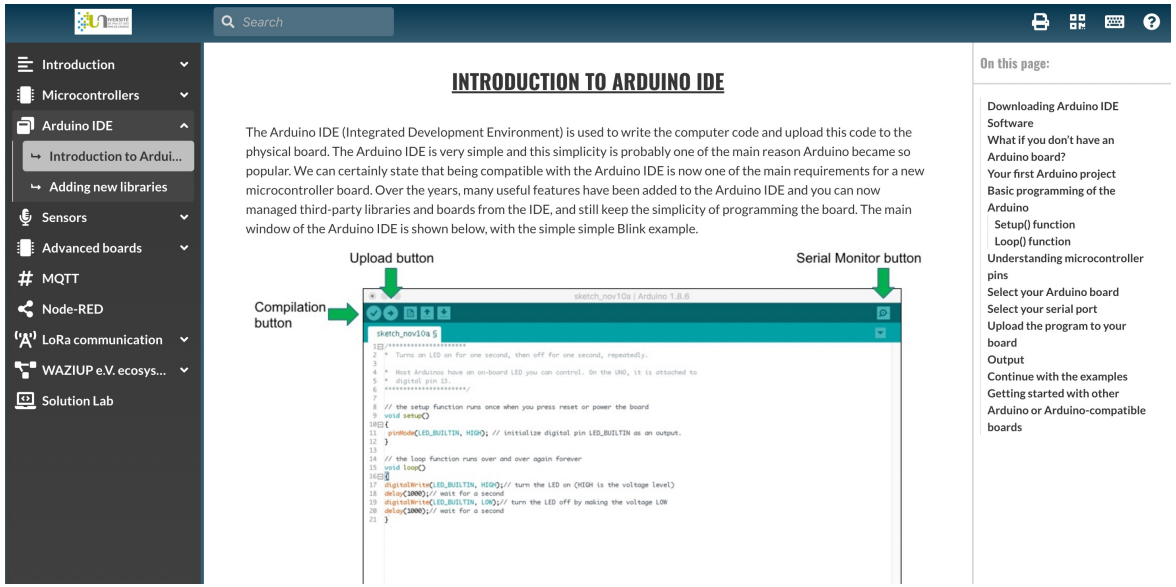
Online Arduino & Sensor tutorial

- https://cpham.perso.univ-pau.fr/LORA/HUBIQUITOUS/solution-lab/arduino-lora-tutorial

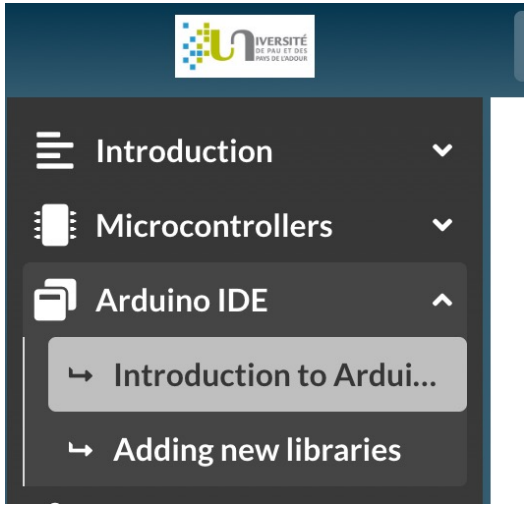


Discover the Arduino ecosystem

- Understand microcontrollers & their architecture
- Discover the most advanced boards with WiFi capabilities
- Get to know how to program microcontrollers with Arduino IDE
- Then, step-by-step tutorial on connecting various sensors



Navigate and read:



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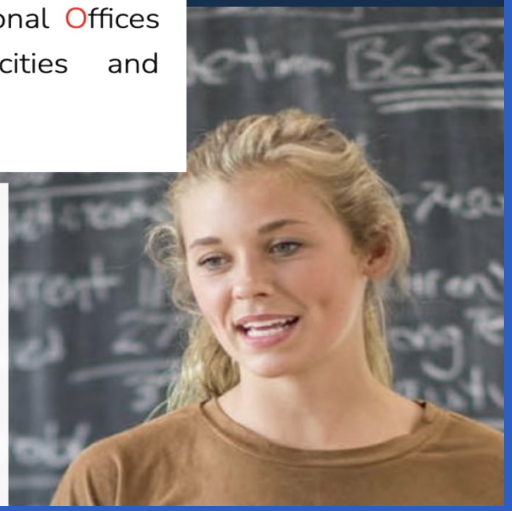

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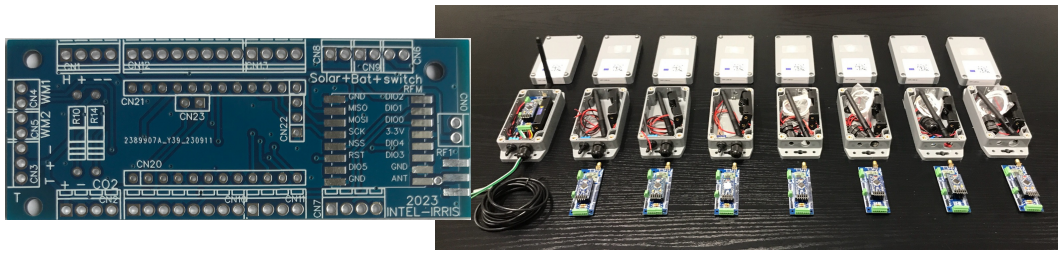
LAB ACTIVITY



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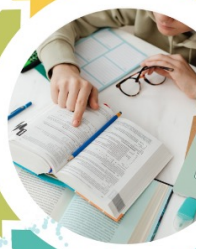
Research & innovAtive Development International Offices

networking for upscaling research capacities and encouragement of multidisciplinary studies

IN RESPONSE TO THE GROWING SOCIETAL DEMANDS FOR UNIVERSITIES TO ACTIVELY ADDRESS CRUCIAL ISSUES LIKE CLIMATE CHANGE, THE RADIO PROJECT EMERGES AS A POWERFUL CATALYST FOR TRANSFORMATIVE CHANGE. THROUGH THE ESTABLISHMENT OF REINFORCEMENT OF RESEARCH AND DEVELOPMENT INTERNATIONAL OFFICES (RIOS) ACROSS SIX PARTNER UNIVERSITIES, RADIO CULTIVATES AN ENVIRONMENT WHERE ACADEMICS AND STUDENTS COLLABORATE TO TRANSLATE KNOWLEDGE INTO IMPACTFUL SOLUTIONS.
BY ESTABLISHING A DYNAMIC MULTIDISCIPLINARY RESEARCH HUB ENCOMPASSING THE FIELDS OF BIOLOGY, PLANNING, AGRICULTURE AND ENGINEERING, RADIO AIMS TO DELIVER INNOVATIVE SOLUTIONS THAT TRANSCEND TRADITIONAL DISCIPLINARY BOUNDARIES. ULTIMATELY, RADIO STANDS AS A TESTAMENT TO THE POWER OF COLLABORATIVE, MULTIDISCIPLINARY RESEARCH IN EMPOWERING UNIVERSITIES TO BECOME POTENT FORCES FOR POSITIVE CHANGE IN THE PURSUIT OF A MORE SUSTAINABLE FUTURE.

DELIVERABLES OBJECTIVES

- ACADEMIC Collaboration
- INDUSTRIAL Collaboration
- RESEARCHERS TRAINING
- SPECIALIZED DIGITIZATION
- ENHANCED PUBLICATION
- KNOWLEDGE TRANSFER

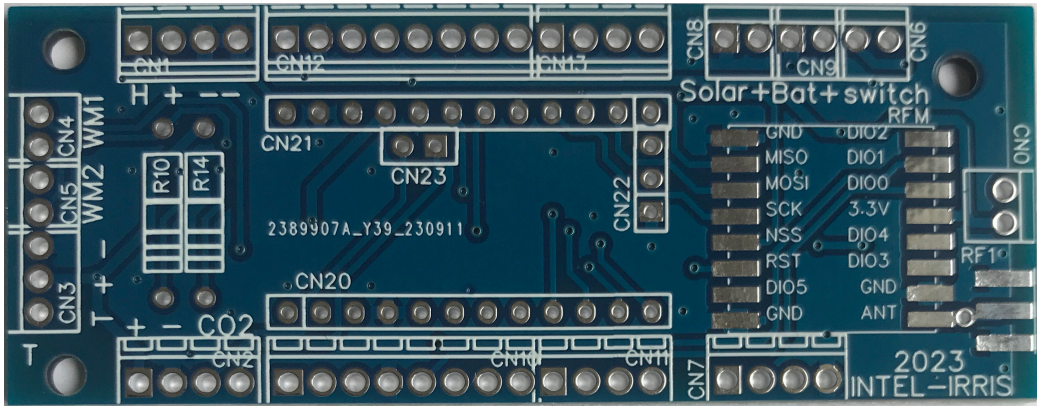


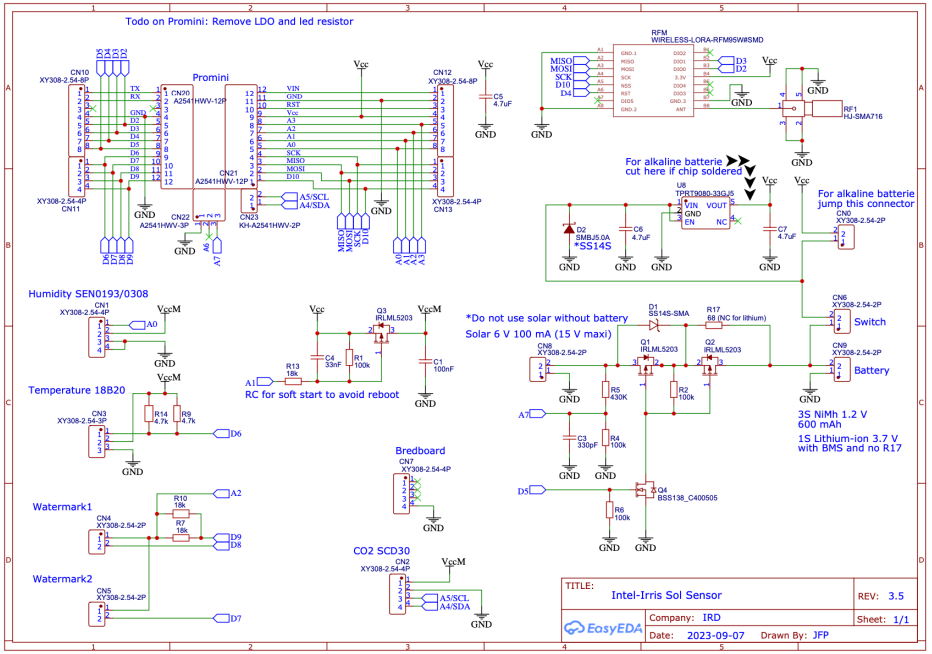
PROJECT PARTNERS

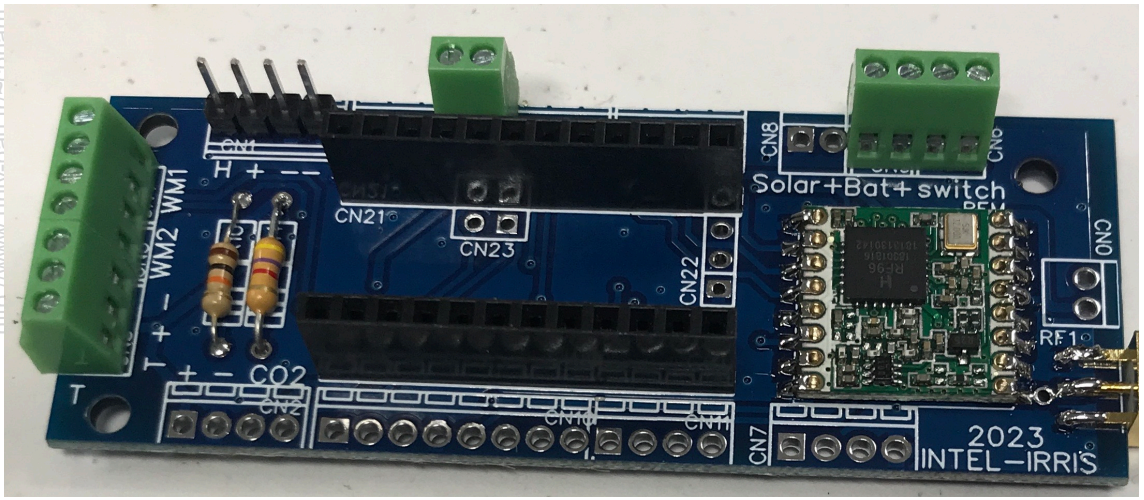
USTHB · GUC · UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR · İSTANBUL NİŞANTAŞI UNIVERSITY

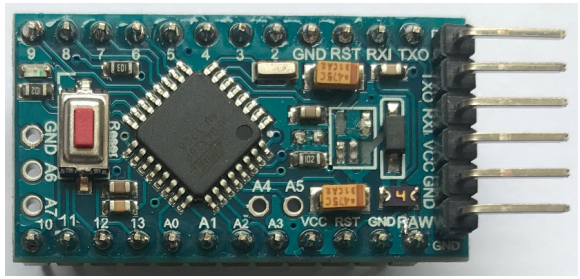
GRANTING AUTHORITY: EUROPEAN EDUCATION AND CULTURE EXECUTIVE AGENCY - PROJECT NUMBER: 101179198 - NOV 2024 - 2027

The IRD PCB v4 (raw version)



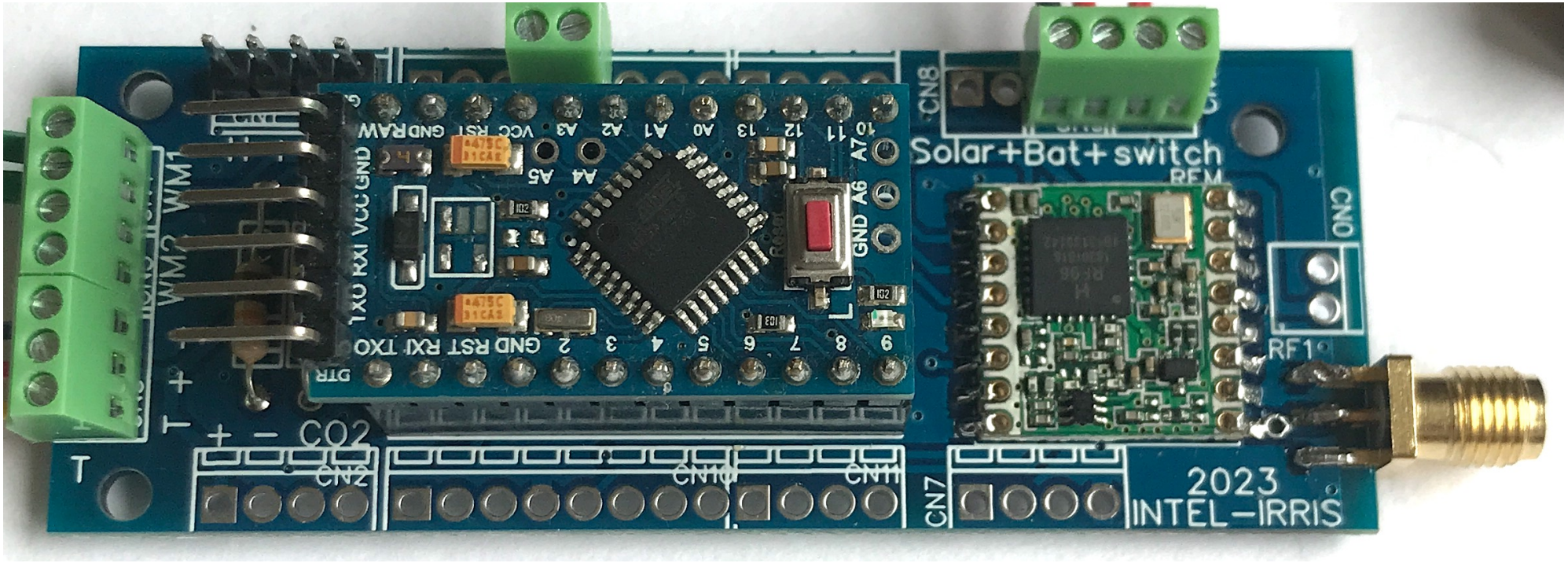




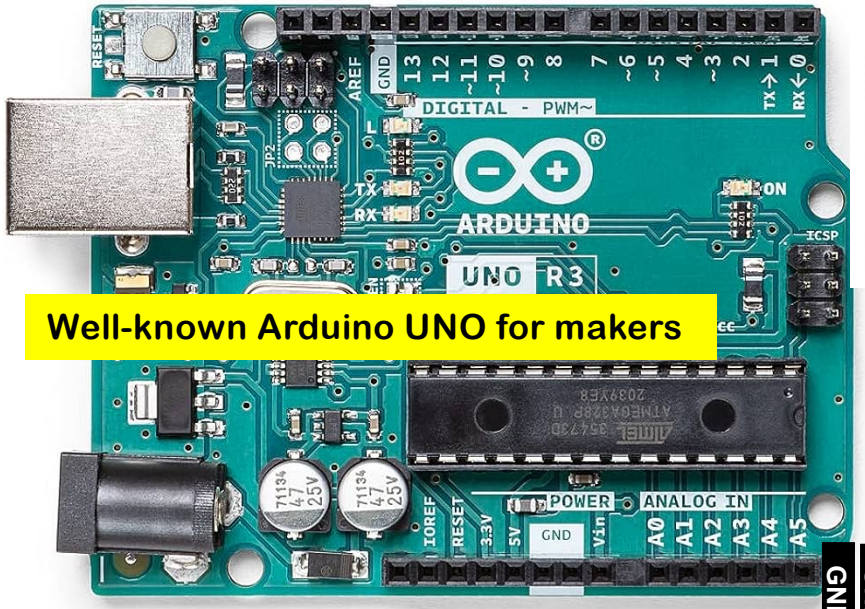


Arduino Pro Mini

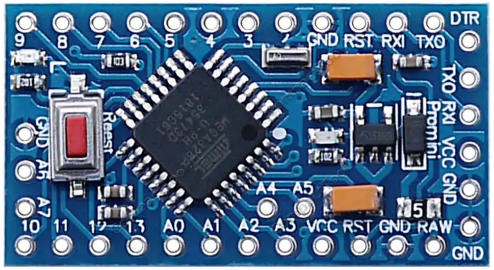
The IRD PCB v4: close-up view



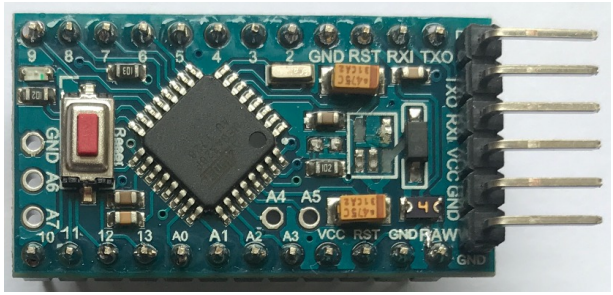
Arduino pins exposed on the PCB

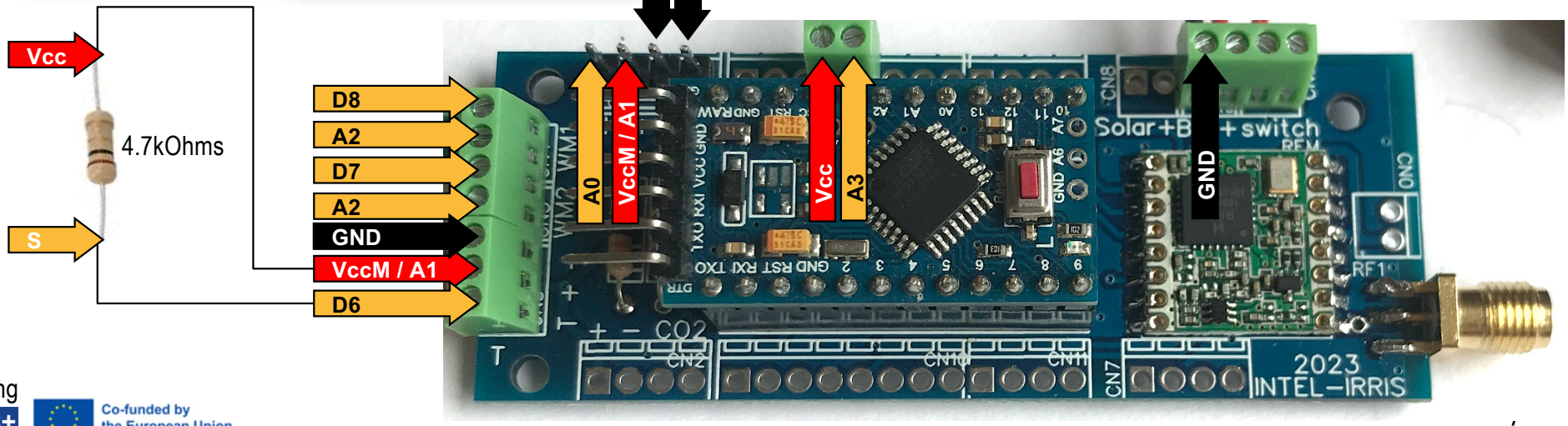


Well-known Arduino UNO for makers



The compact Arduino Pro Mini





Prof. Congduc Pham
http://www.univ-pau.fr/~cpham

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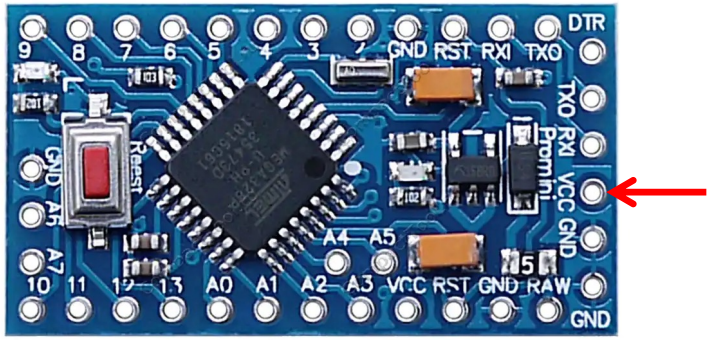
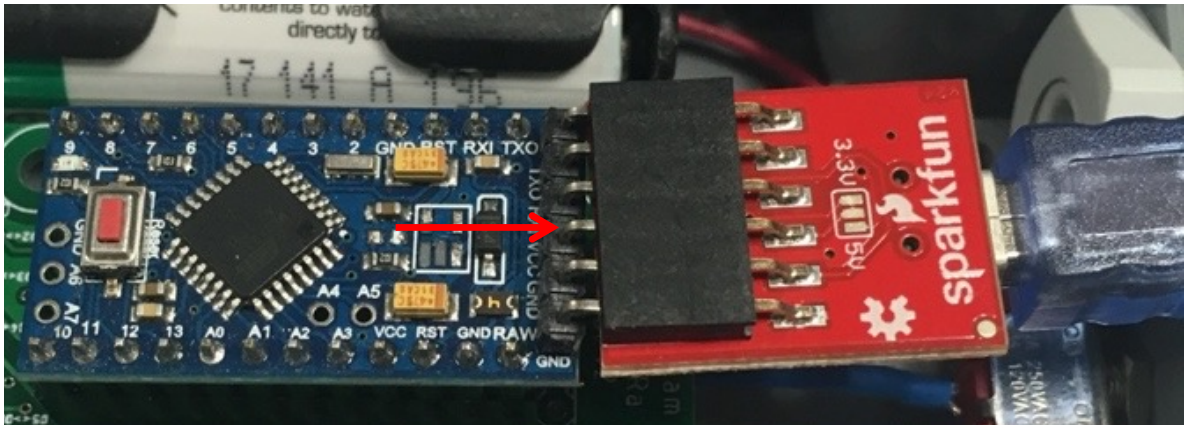
Programming the microcontroller

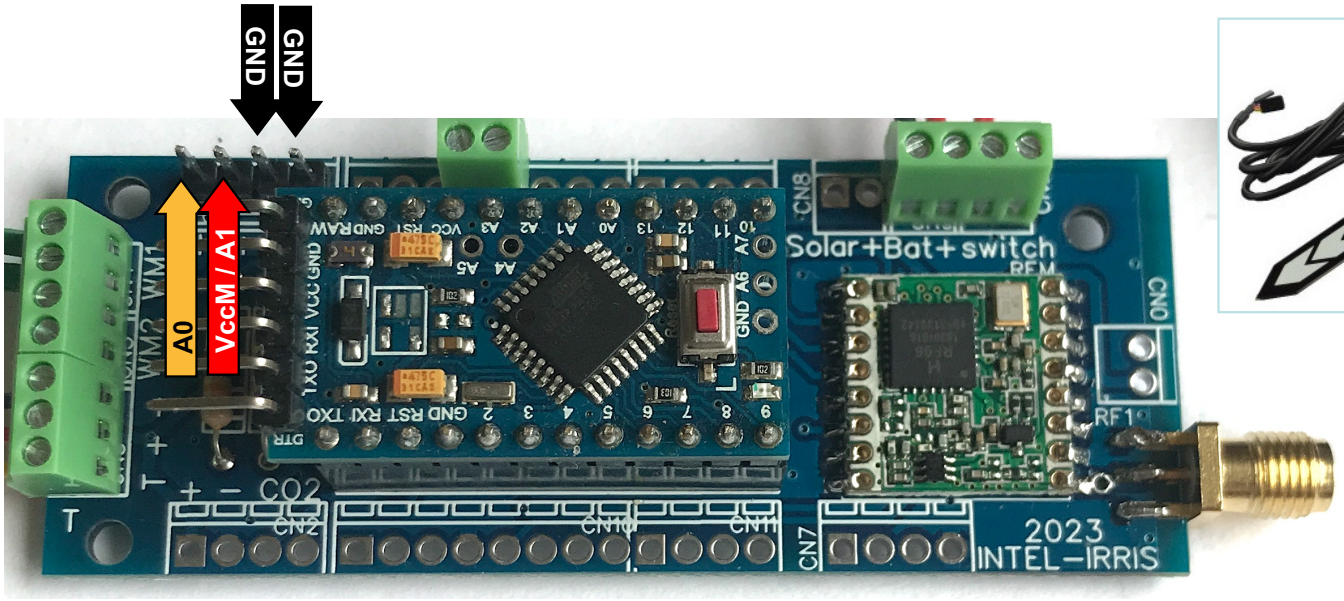
Most Chinese clone version,
check the VCC pin

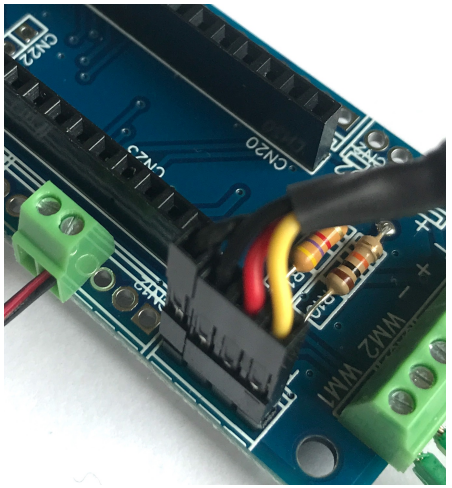




1st example: read from analog

- https://cpham.perso.univ-pau.fr/LORA/HUBIQUITOUS/solution-lab/arduino-lora-tutorial/sensors/humidity/soil-humidity/





- Adapt the code to use A0 for DATA and A1 for Vcc to power the sensor

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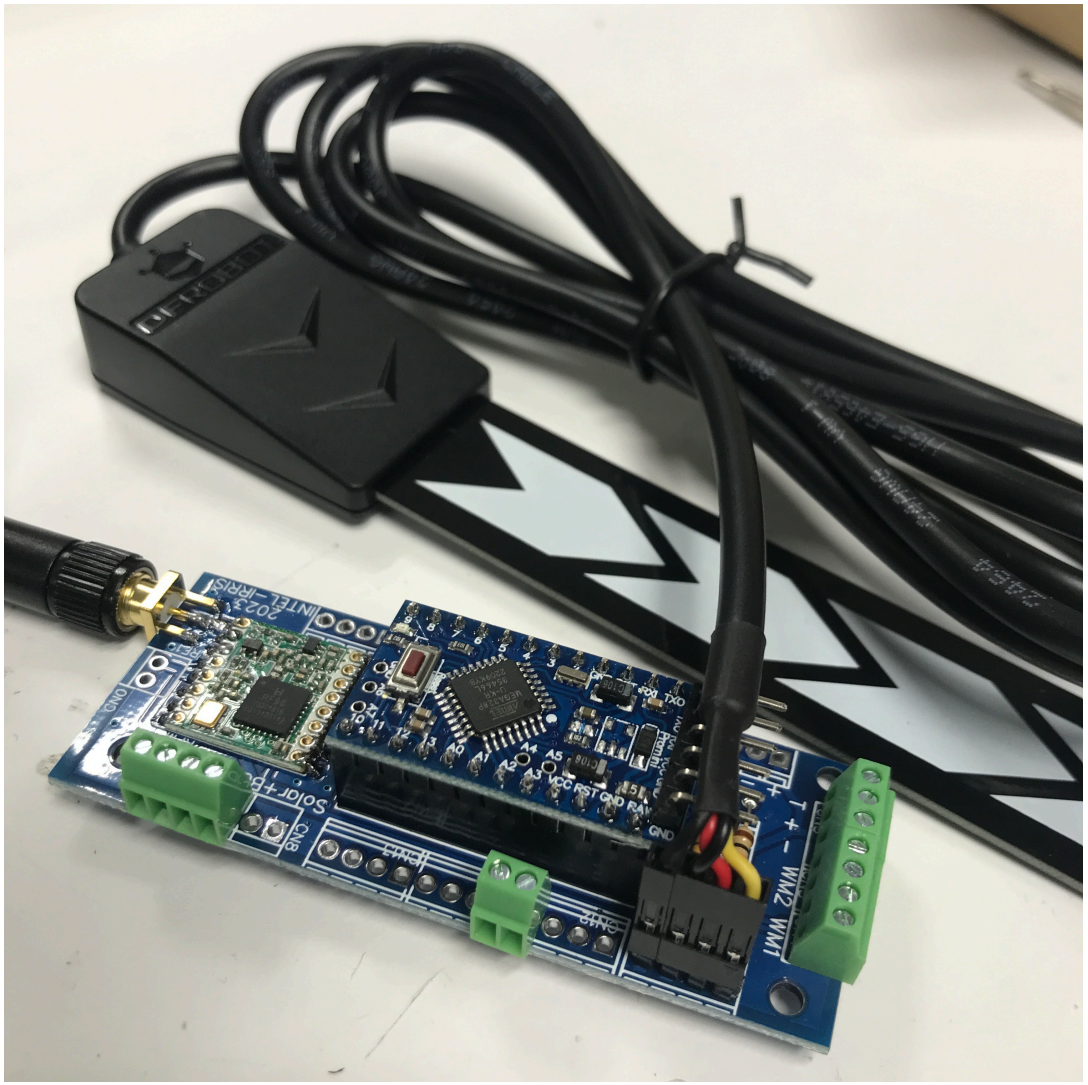
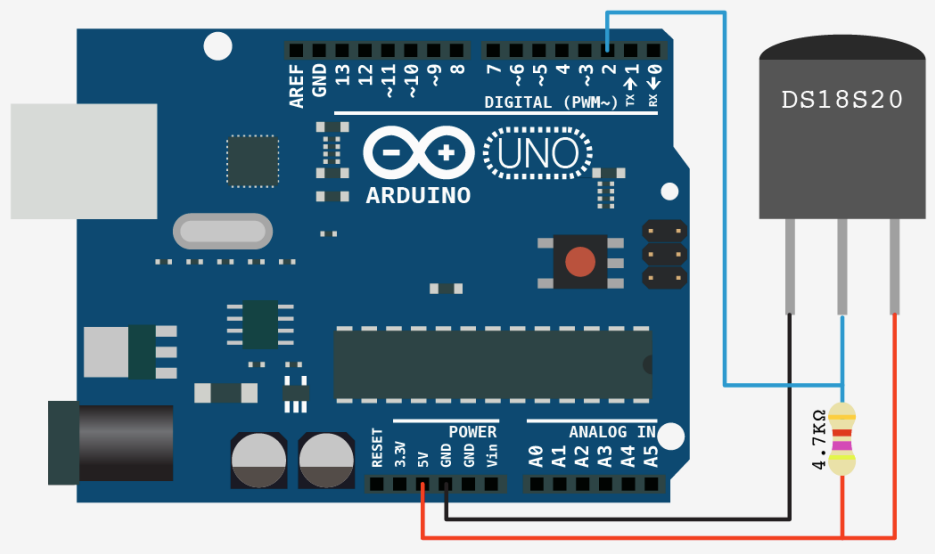
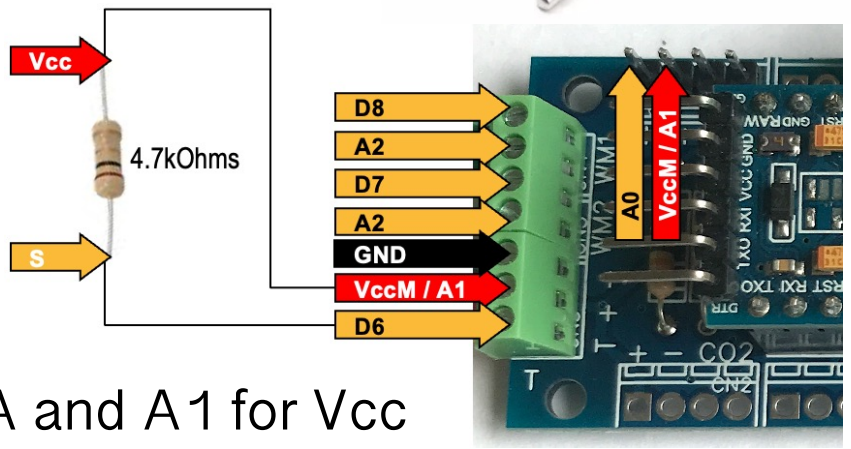
Connecting SEN0308 in image



2nd example: read from digital, 1-wire

- https://cpham.perso.univ-pau.fr/LORA/HUBIQUITOUS/solution-lab/arduino-lora-tutorial/sensors/temperature/ds18b20/
- Use a digital temperature sensor DS18B20





- Adapt the code to use D6 for DATA and A1 for Vcc to power the sensor

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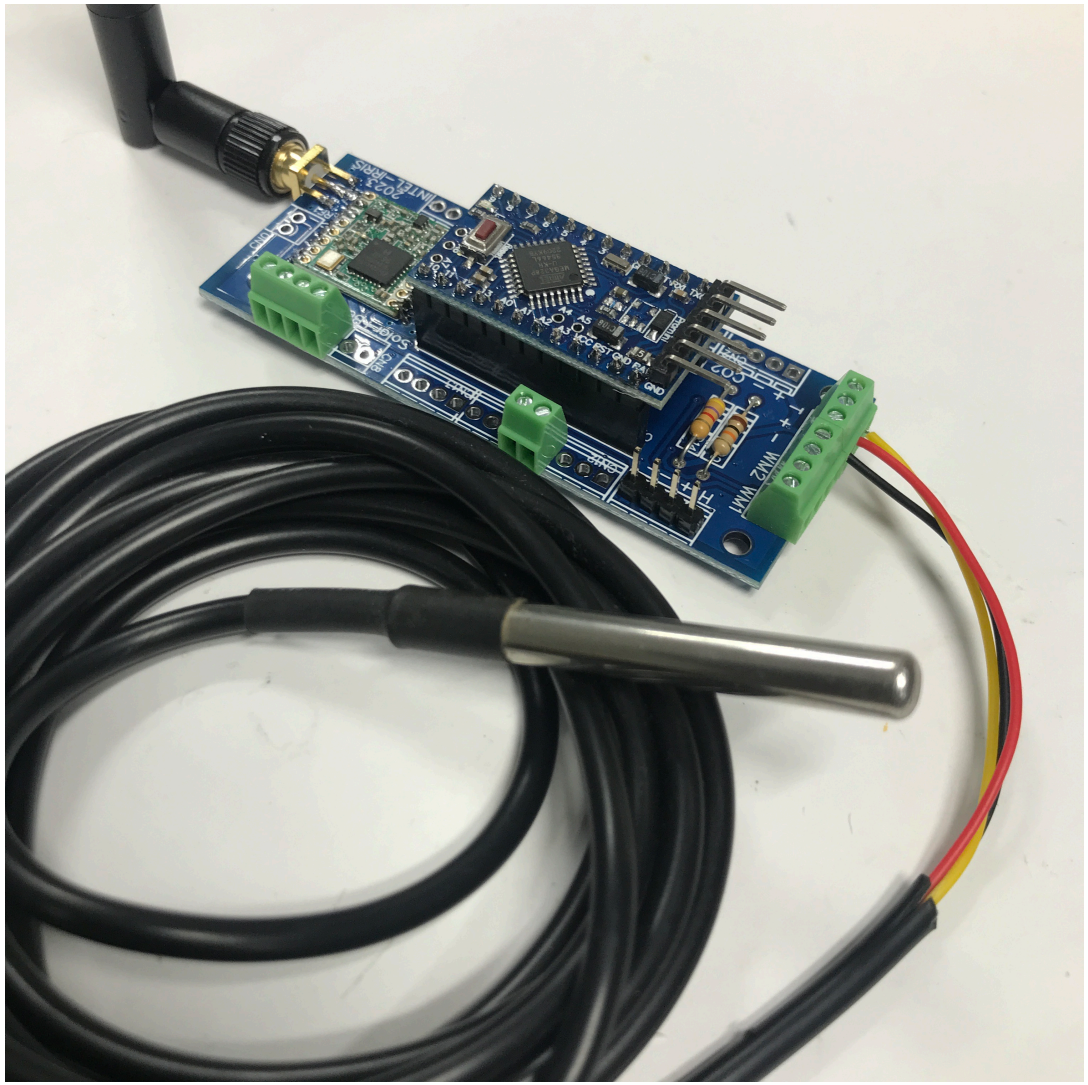
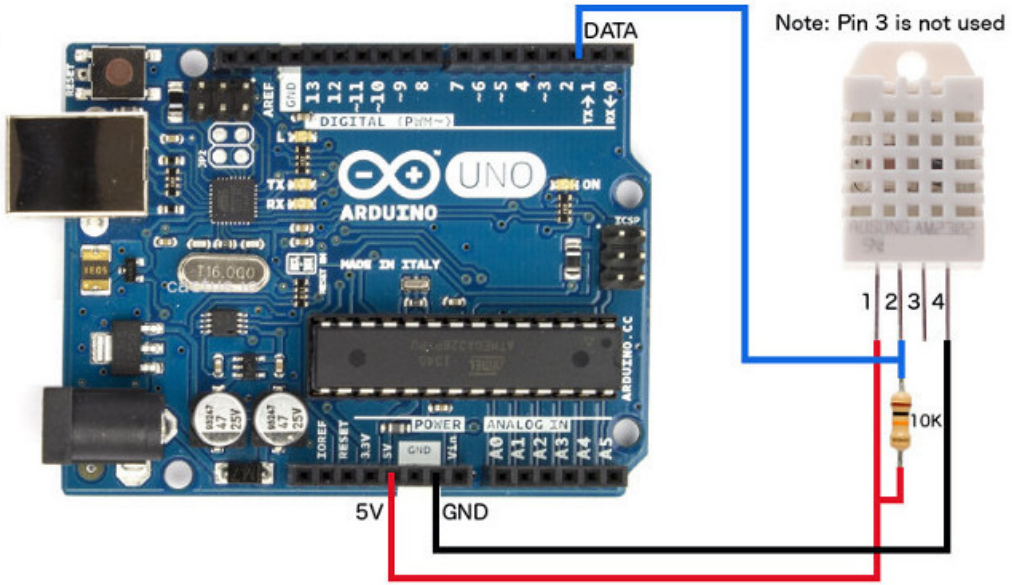
Connecting DS18B20 in image

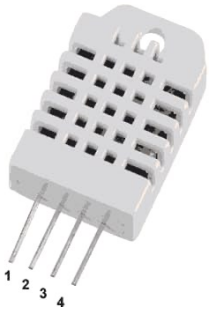


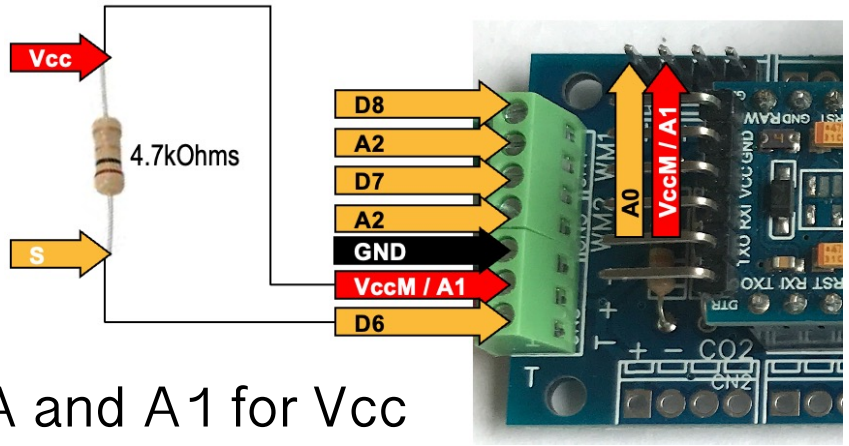
3rd example: read from digital DHT22

- DHT22: combined temperature & humidity sensor
- https://cpham.perso.univ-pau.fr/LORA/HUBIQUITOUS/solution-lab/arduino-lora-tutorial/sensors/temp_hum/dht22/



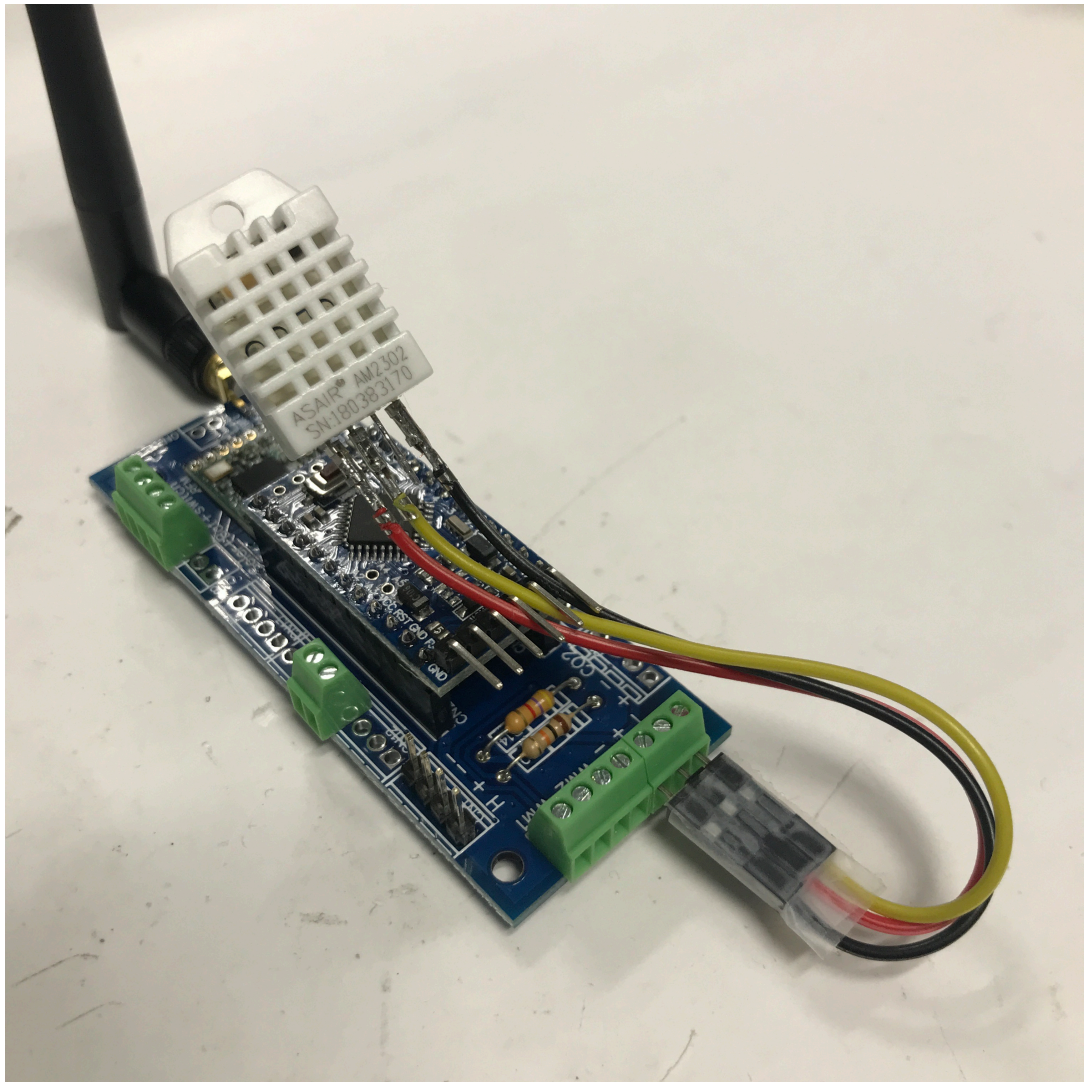
DHT22 pins	
1	VCC
2	DATA
3	NC
4	GND





- Adapt the code to use D6 for DATA and A1 for Vcc to power the sensor

Connecting DHT22 in image



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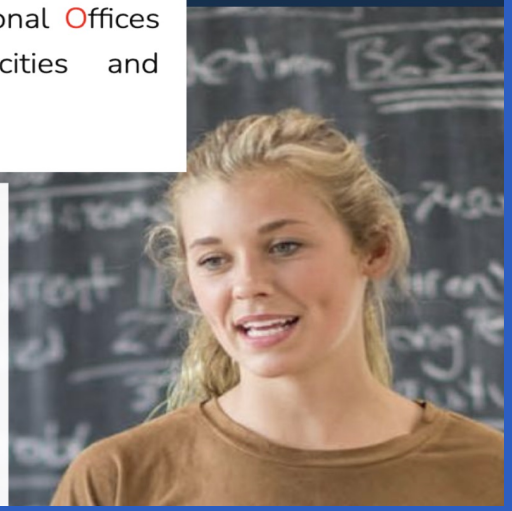

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BUILDING THE STARTER KIT

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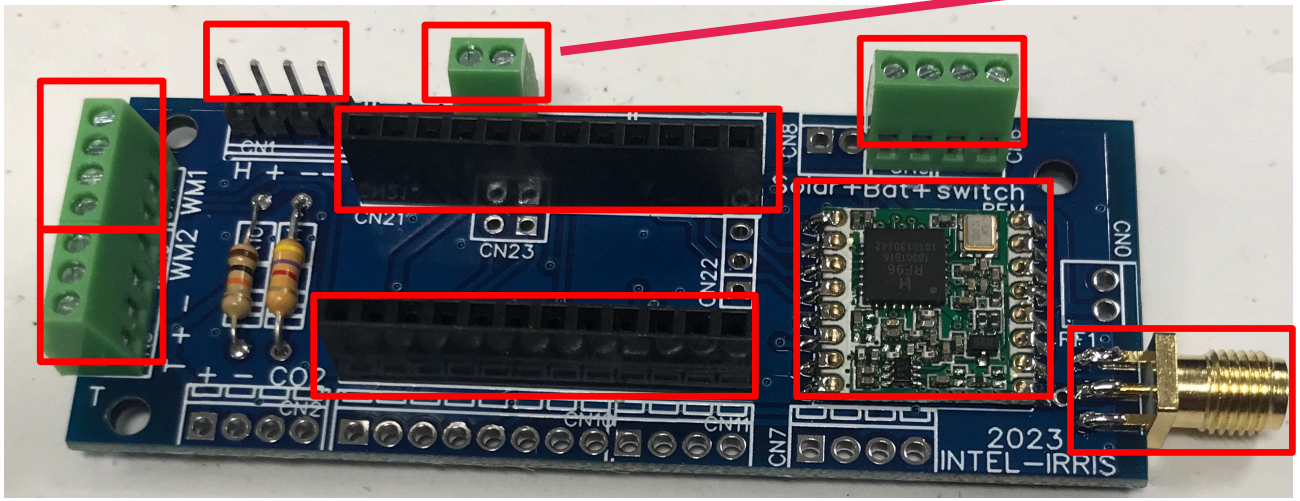
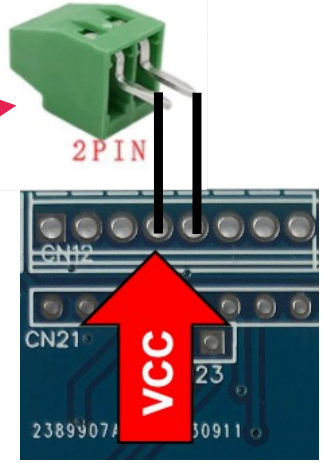
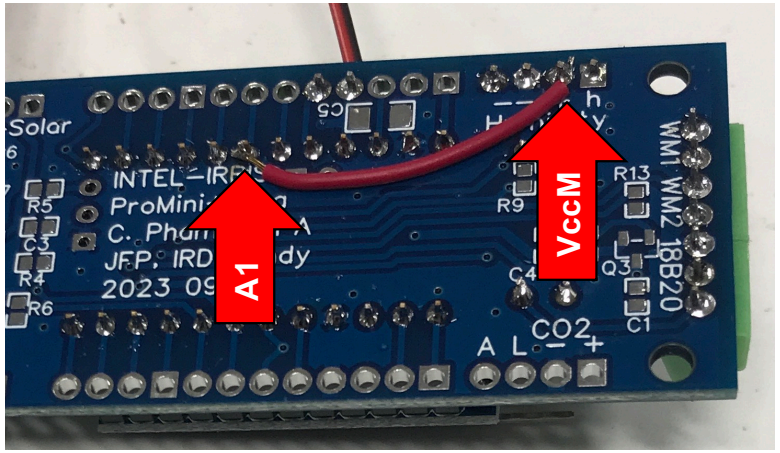
Wiring with IRD PCB v4 (raw version)

- First, solder the various components



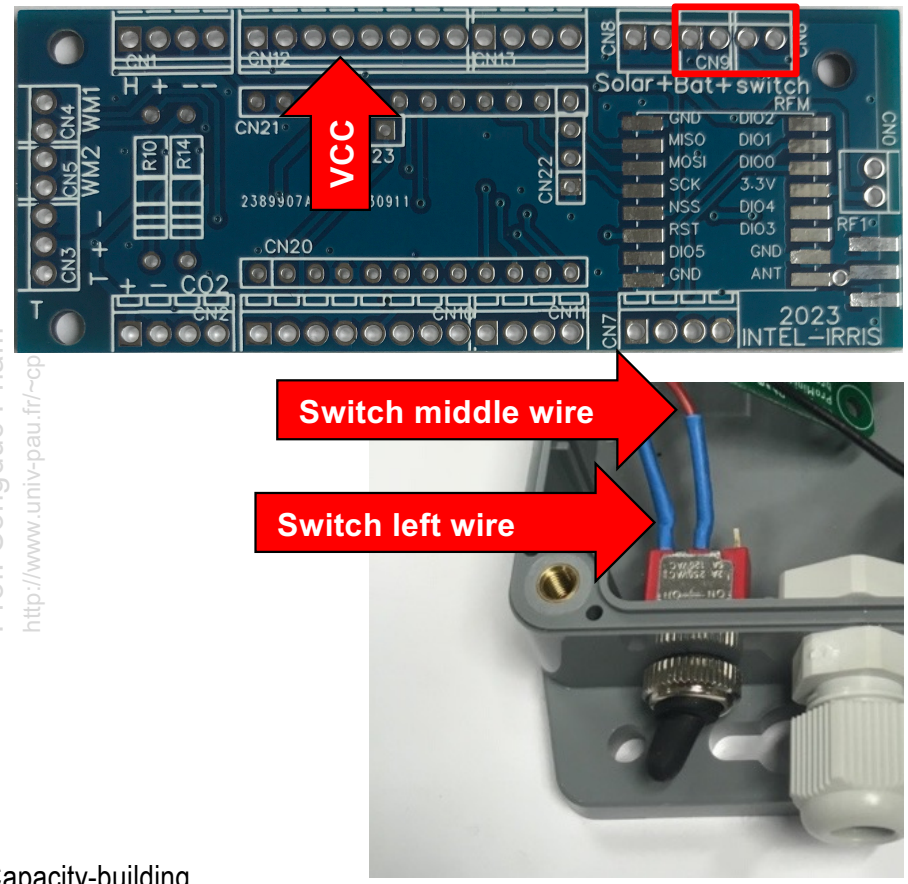


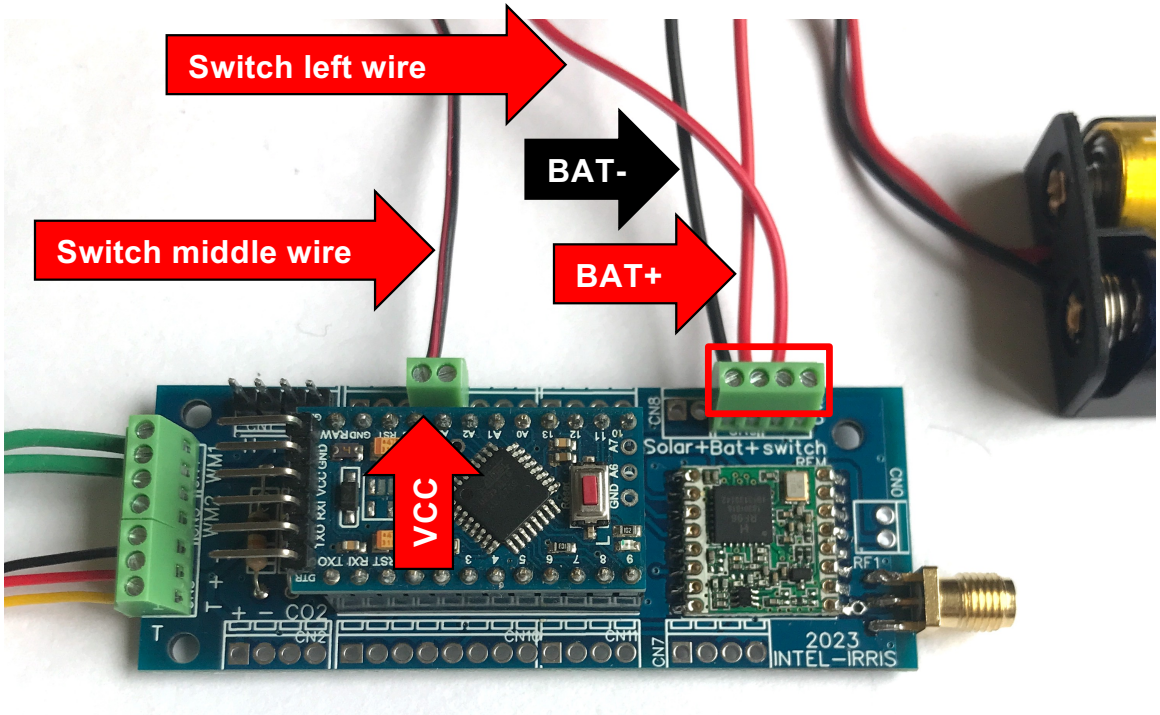
- For the raw PCB (no circuit for solar), need to link A1 to VccM on the back side of the PCB
- VccM can be taken on the + of the soil humidity sensor



Wiring with IRD PCB v4 (raw version)

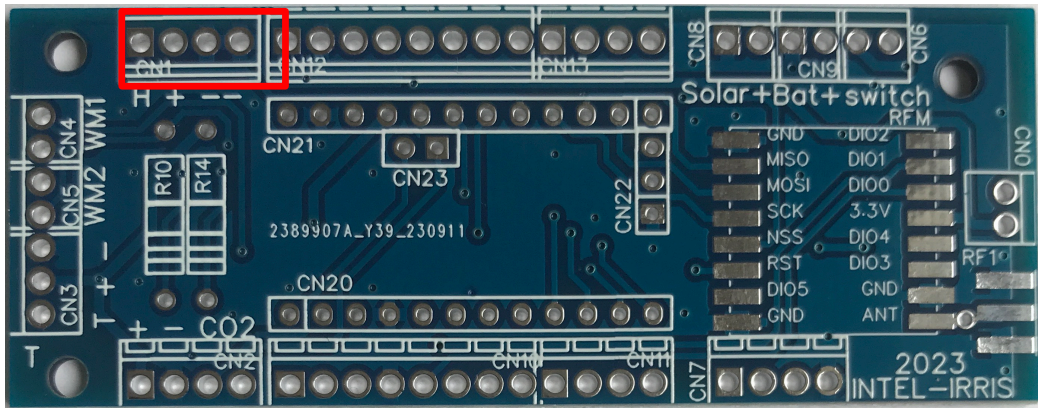
- Power wires



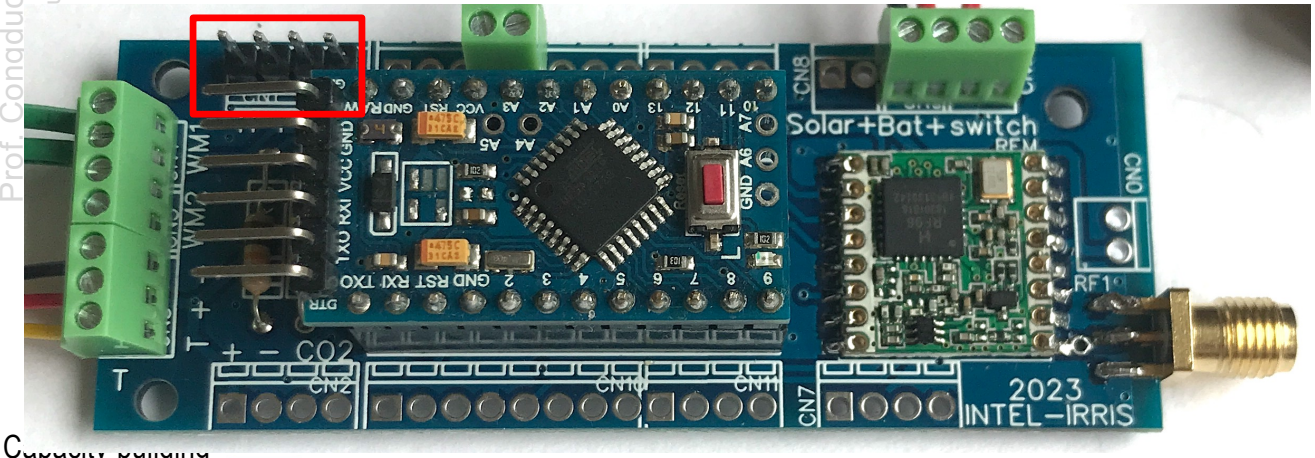


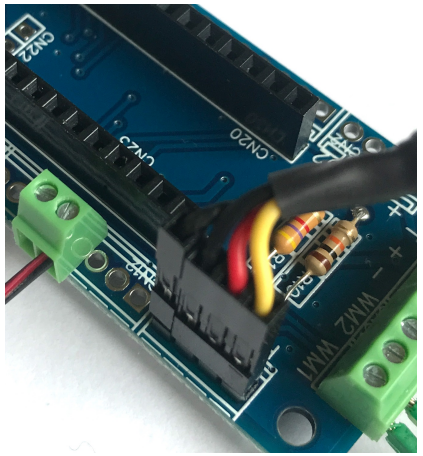
Wiring with IRD PCB v4 (raw version)

- SEN0308 capacitive



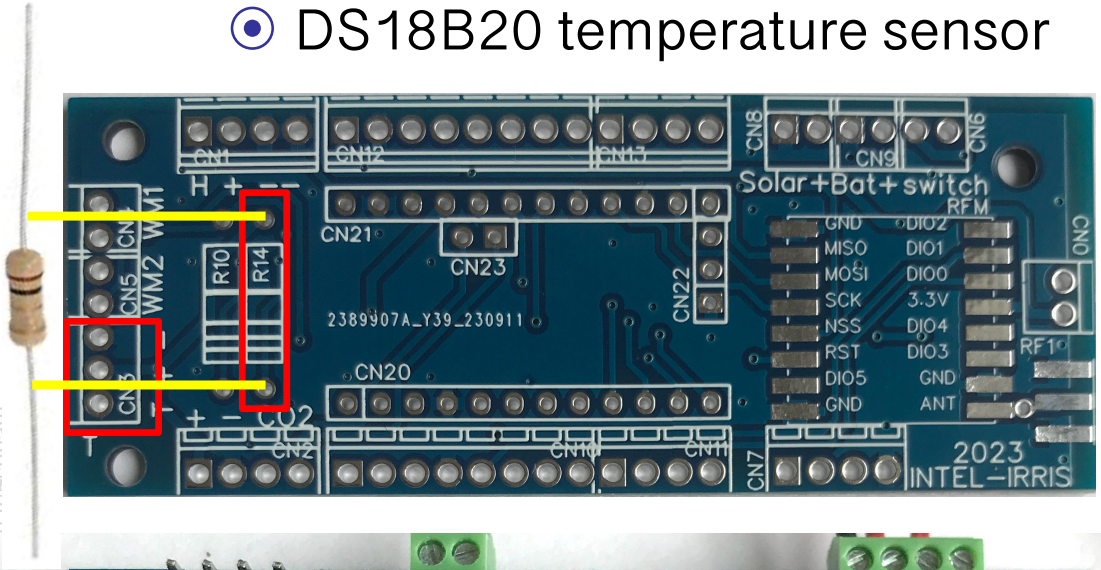
Just connect the sensor in the dedicated header
– – are the 2 black wires
+ is red and H is yellow





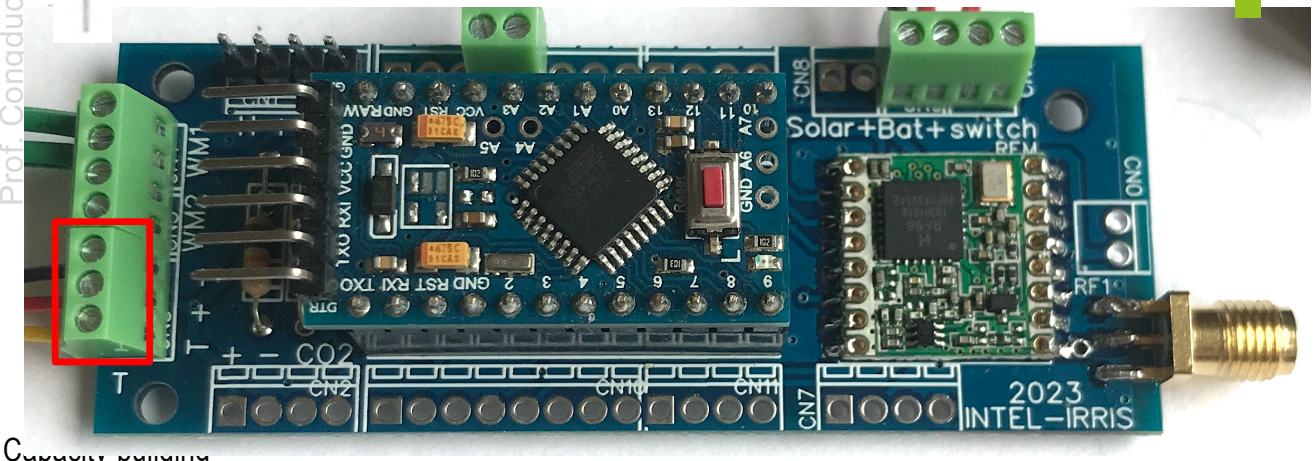
Wiring with IRD PCB v4 (raw version)

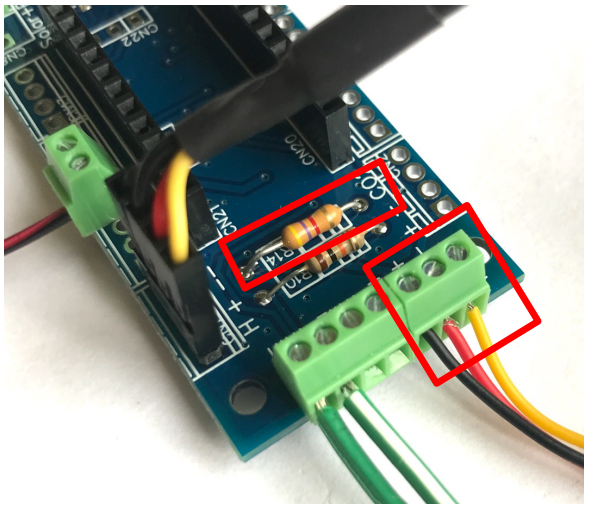
- DS18B20 temperature sensor



Solder a 4.7kOhms resistor then wire in the dedicated terminal block

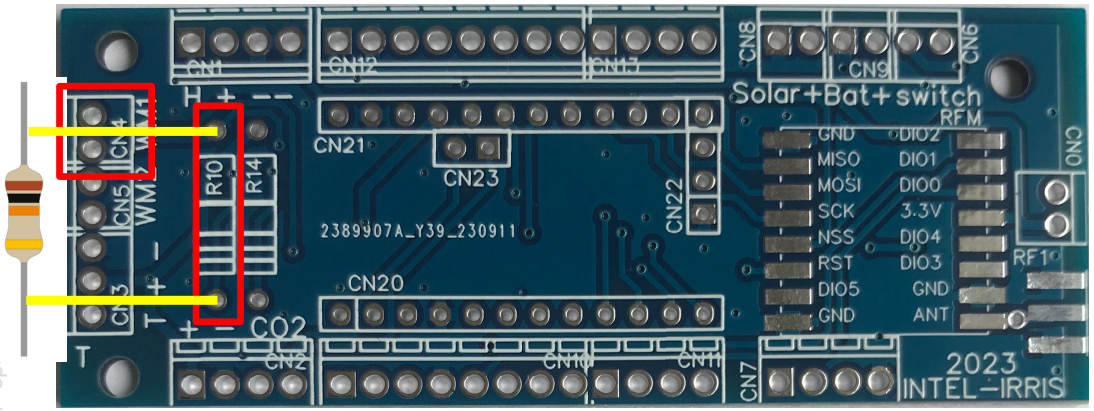
T+ – : Yellow, Red, Black wires



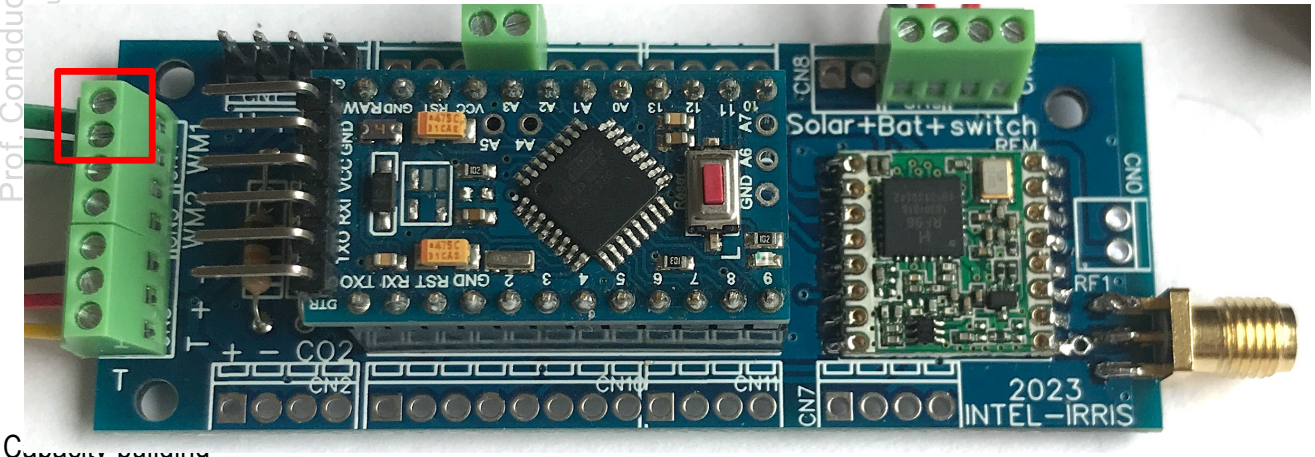


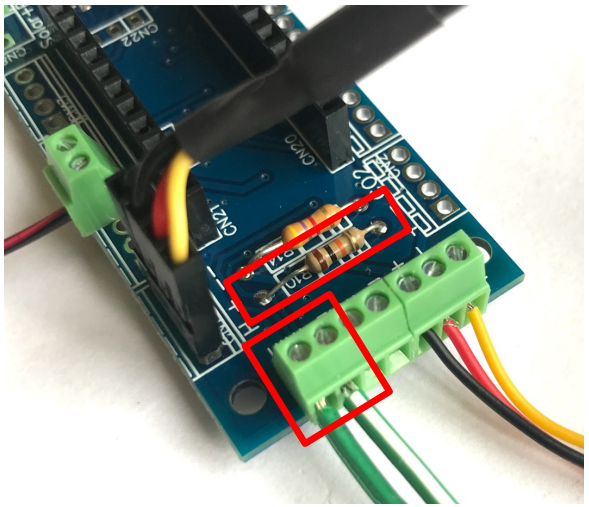
Wiring new IRD PCB v4 (raw version)

- First Watermark



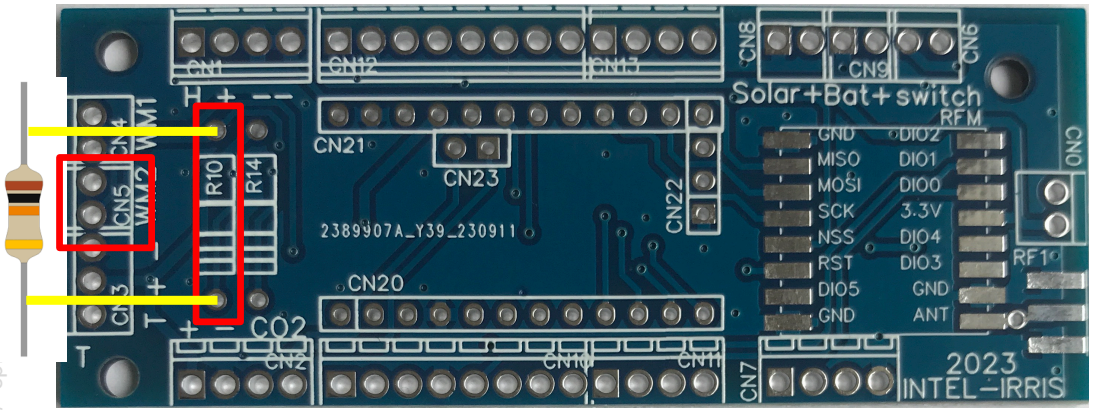
Solder a 10kOhms resistor then wire in the dedicated WM1 terminal block



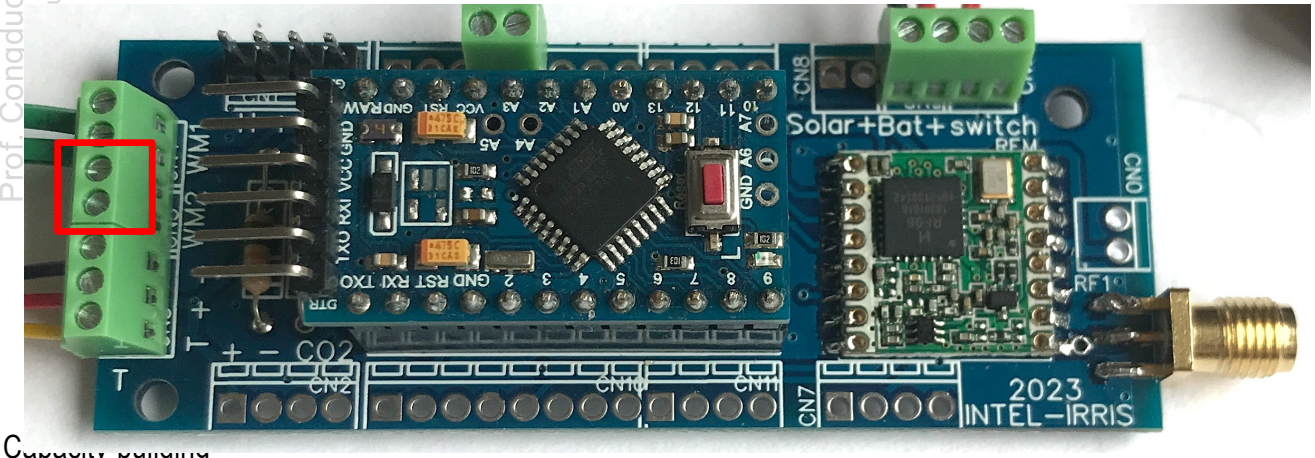


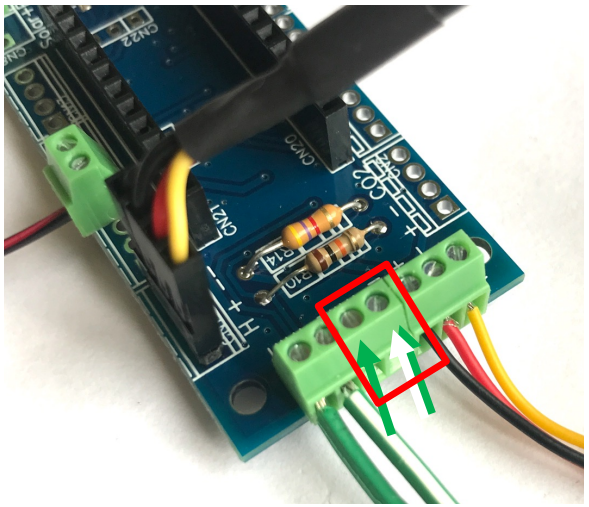
Wiring with IRD PCB v4 (raw version)

- Second Watermark

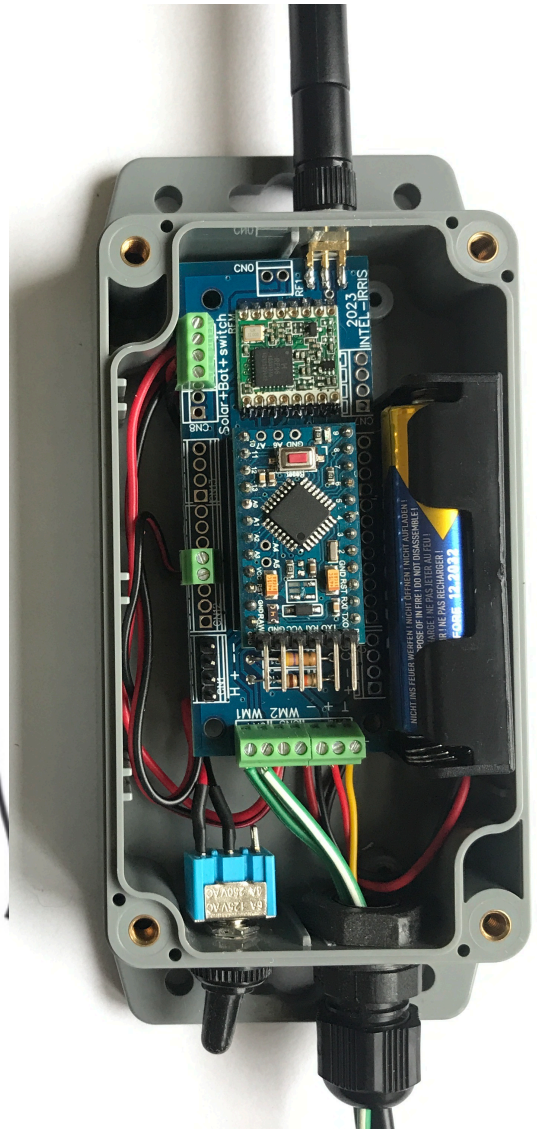


No additional resistor
just wire in the dedicated WM2 terminal block





Final result with casing & sensors



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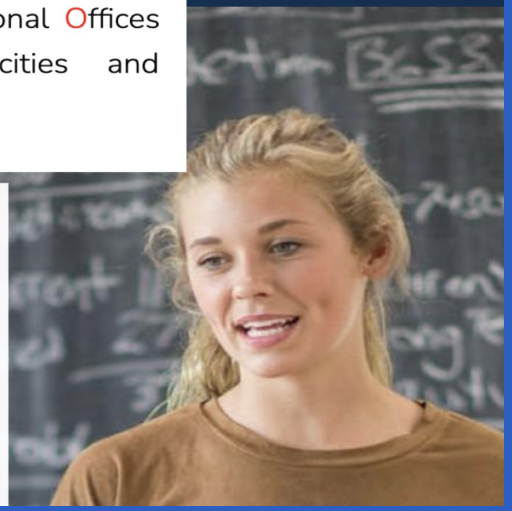
R.A.D.I.O

Research And Development International Offices

Research & innovAtive Development International Offices networking for upscaling research capacities and encouragement of multidisciplinary studies



Erasmus+ Enriching lives, opening minds

The new Erasmus+ starts here

Explore the Erasmus+ programme

TRANSMISSION TO GATEWAY

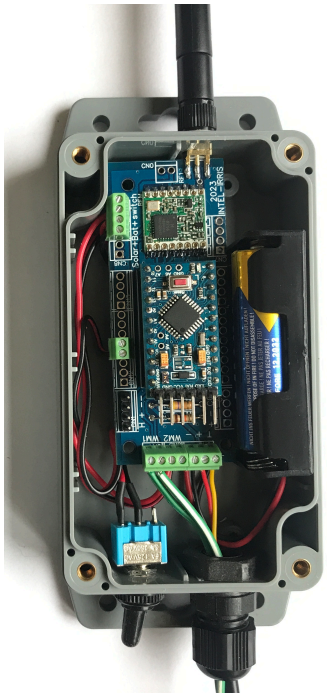
USTHB

GUC German University in Cairo

UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR

İSTANBUL NİŞANTAŞI UNIVERSITY

Transmission to gateway



LoRa parameters

Limited LoRaWAN
SF12BW125
868.1MHz
ABP mode
Dev addr is 26011DAA
1 msg/60mins
1 sensor
XLPP data

This dedicated video will show all these steps, from connecting the SEN0308 to testing transmission to the gateway
Video n°4: https://youtu.be/j-1Nk0tv0xM

Capacity-building with Erasmus+
Co-funded by the European Union

Live demo