

# INTEL-IRRIS

Intelligent Irrigation System for Low-cost Autonomous Water Control  
in Small-scale Agriculture



# Intelligent Irrigation System for Low-cost Autonomous Water Control in Small-scale Agriculture



## Building the INTEL-IRRIS IoT platform Annex-1: ordering PCBs, including PCBA

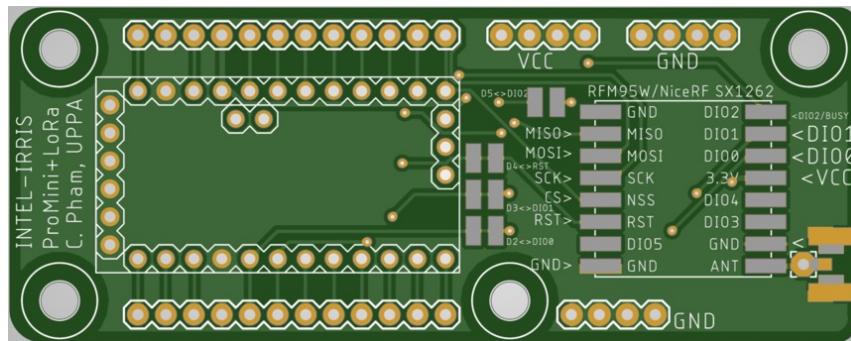


Prof. Congduc Pham  
<http://www.univ-pau.fr/~cpham>  
Université de Pau, France

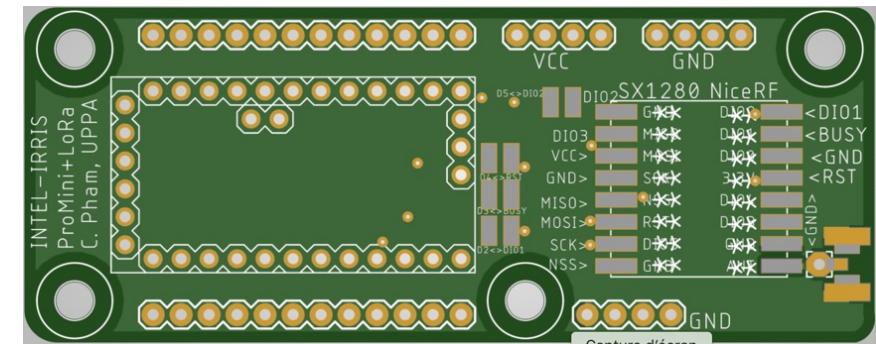


# Various PCBs for soil device

# Simple PCB v2



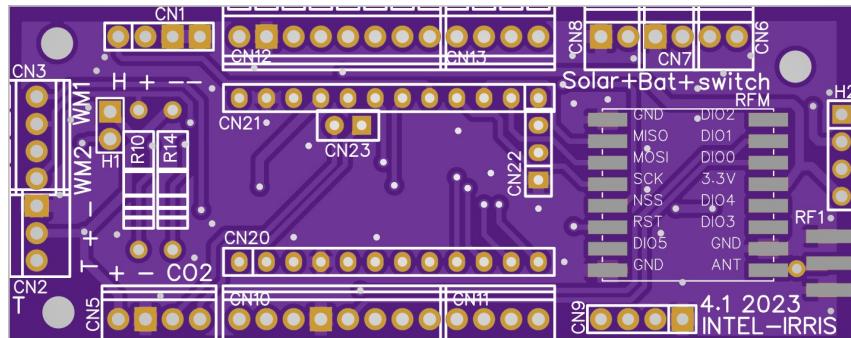
Arduino ProMini with  
RFM95W (868MHz)  
RFM96W (433MHz)  
NiceRF SX1262 (868MHz)



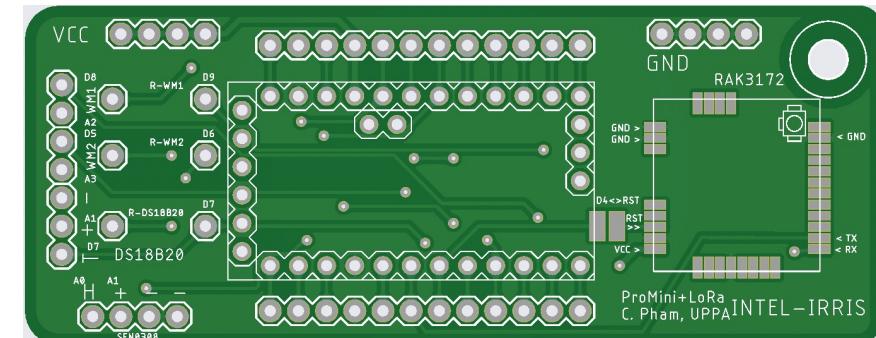
## Arduino ProMini with NiceRF SX1280 (2.4GHz)

# IRD PCB

## v4.1



# PCB for RAK3172



# Download ProMini PCBs Gerber files

- <https://github.com/CongducPham/PRIMA-Intel-IrriS/tree/main/PCBs>

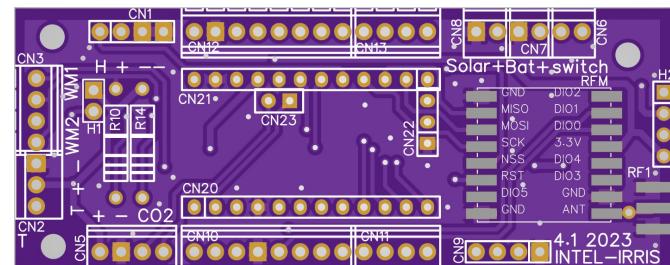
[PRIMA-Intel-IrriS](#) / [PCBs](#) / [...](#)



**CongducPham** Update README.md

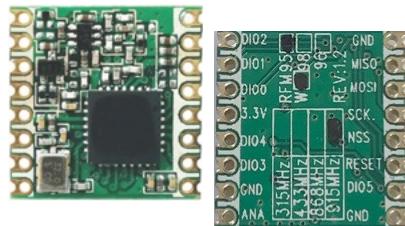
Name	Last commit message
..	
IRD_PCB_4_1	Update PCB files and tutorials
MySecondProMiniLoRaBreakout_2022-01-20.zip	Update PCB files
MySecondProMiniLoRaBreakout_RAK3172_2023-0...	Add new PCBs and update tutorials
MySecondProMiniLoRaBreakout_SX128X_2022-01-...	Update PCB files

**Latest and most achieved  
PCB is IRD PCB v4.1  
in folder IRD\_PCB\_4\_1**



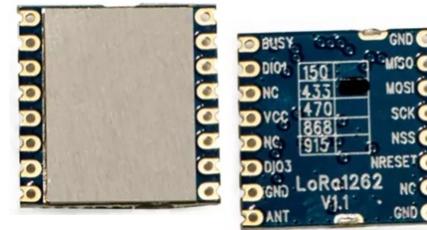
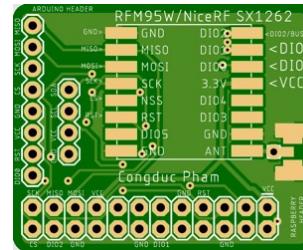
# PCBs for LoRa hat, for the gateway

RFM95W  
RFM96W  
NiceRF SX1262  
breakout



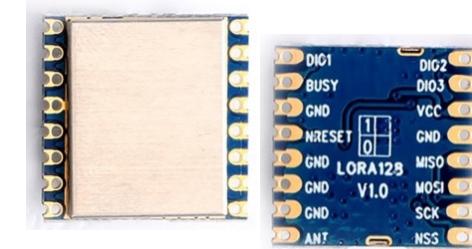
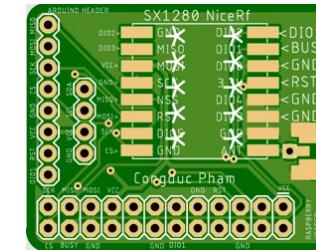
RFM95W (868MHz) | RFM96W (433MHz)

[https://github.com/CongducPham/LowCostLoRaGw/blob/master/PCBs/RFM95Breakout\\_2020-11-14.zip](https://github.com/CongducPham/LowCostLoRaGw/blob/master/PCBs/RFM95Breakout_2020-11-14.zip)



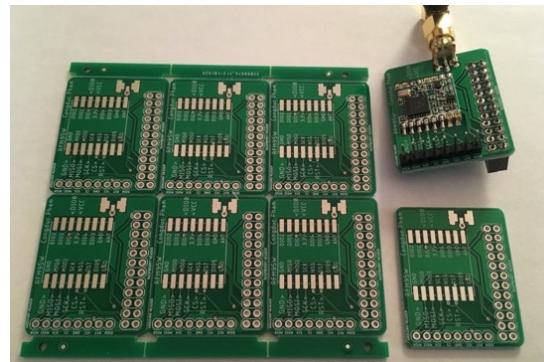
NiceRF SX1262 (868MHz)

NiceRF SX1280  
breakout



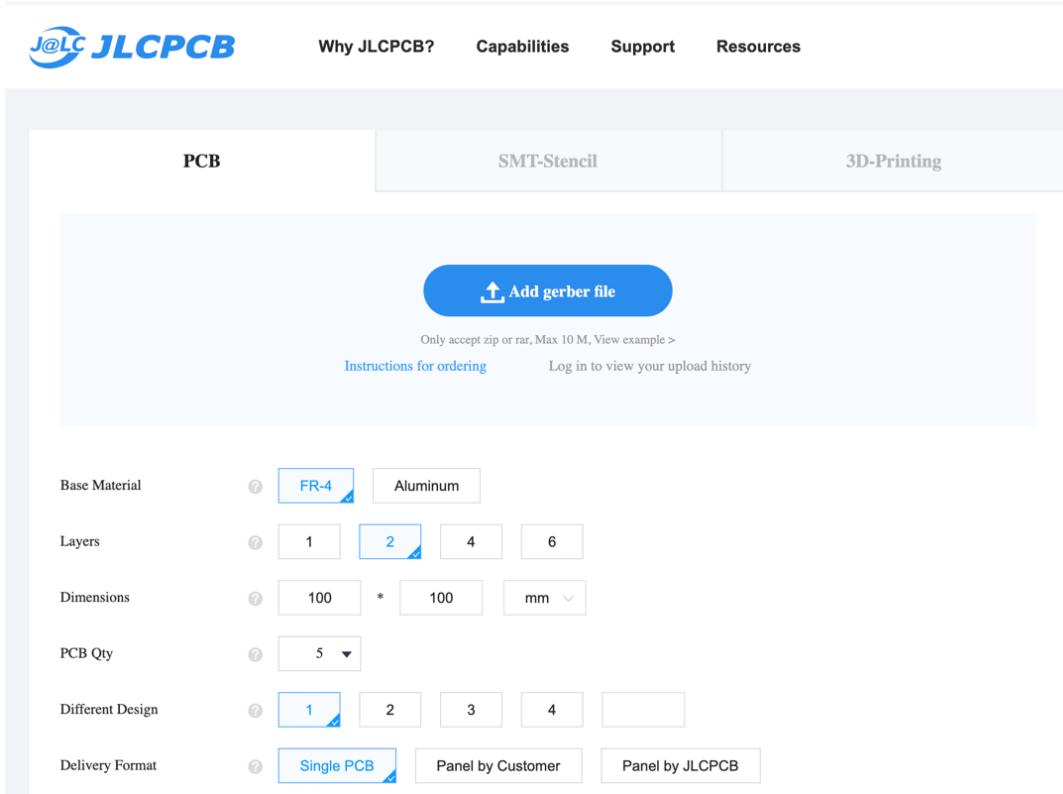
NiceRF SX1280 (2.4GHz)

[https://github.com/CongducPham/LowCostLoRaGw/blob/master/PCBs/SX1280Breakout\\_2020-11-14.zip](https://github.com/CongducPham/LowCostLoRaGw/blob/master/PCBs/SX1280Breakout_2020-11-14.zip)



# Manufacture the PCBs

- Example: JLCPCB: <https://jlpcb.com/>
- Click on "Instant Quote"

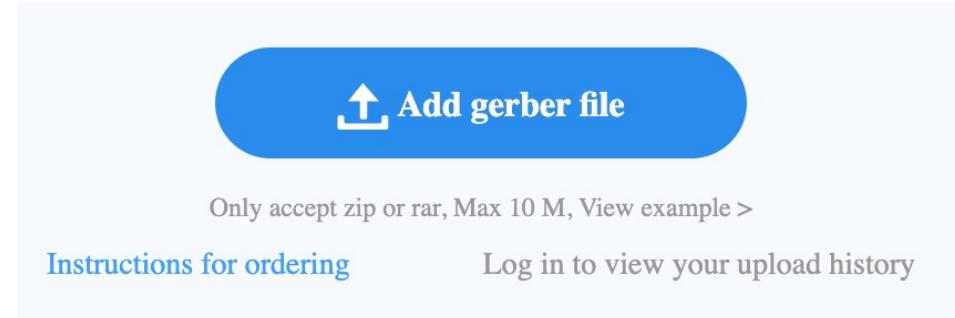


The screenshot shows the JLCPCB Instant Quote interface. At the top, there are tabs for PCB, SMT-Stencil, and 3D-Printing. Below the tabs is a large button labeled "Add gerber file" with an upward arrow icon. Underneath the button, it says "Only accept zip or rar, Max 10 M, View example >". To the left of the button are links for "Instructions for ordering" and "Log in to view your upload history". The main form area contains the following settings:

- Base Material: FR-4 (selected)
- Layers: 1, 2 (selected), 4, 6
- Dimensions: 100 \* 100 mm
- PCB Qty: 5
- Different Design: 1 (selected), 2, 3, 4
- Delivery Format: Single PCB (selected)

# Add your PCB Gerber files

- Click "Add gerber files" and select one of the PCB .zip files, do not unzip the downloaded file



Processing Gerber files...



- Some parameters will be defined by the Gerber file itself, for instance the PCB size

**J@LC JLCPCB** ☰ EUR

**Standard PCB/PCBA** **Advanced PCB/PCBA** **SMT-Stencil** **3D/CNC**

[← Back to Upload File](#)      Detected 2 layer board of 30.89x79.5mm(1.22x3.13 inches). [Gerber Viewer](#)

Base Material													
Layers	1	2	4	High Precision PCB	6	8	10	12	14	16	18	20	
Dimensions	79.5	*	30.89	mm									
PCB Qty	5												
Product Type	Industrial/Consumer electronics	Aerospace	Medical										

# Quantity and Panel format

- Change "PCB Qty" to 10 for instance and select "Panel by JLCPCB"
- Indicate 1 (column) by 3 (rows)

Dimensions      79.5 \* 30.89 mm

Panel Qty **10** Panel Single Pieces Qty: 30

Product Type Industrial/Consumer electronics Aerospace Medical

**PCB Specifications**

Different Design **1** 2 3 4

Delivery Format Single PCB Panel by Customer **Panel by JLCPCB**

Panel Format Column : **1** 79.5mm Row : **3** 30.89mm

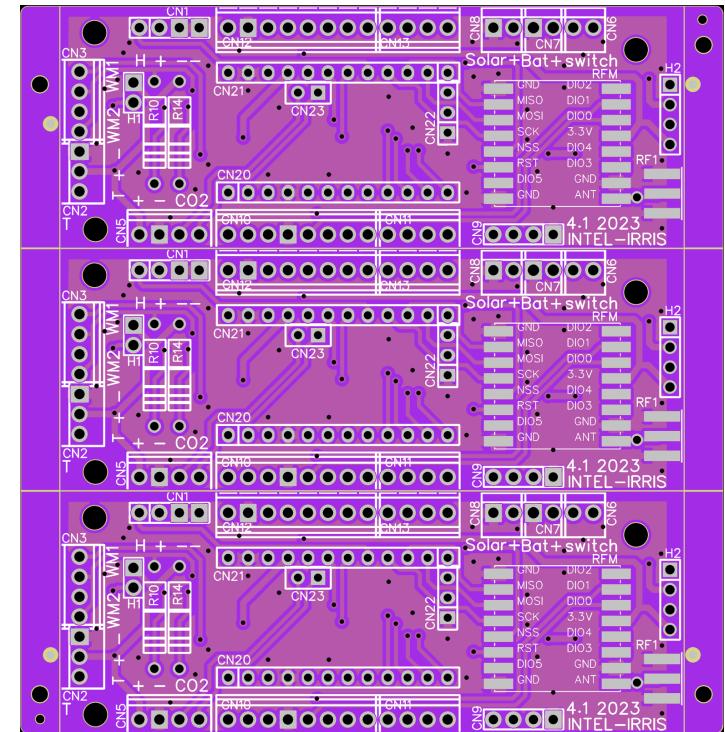
Edge Rails **No** On 2 Sides On 4 Sides

Panel size X : ( 79.5 x 1 ) = 79.500 mm Y : ( 30.89 x 3 ) = 92.670 mm

PCB Thickness **1.6** 0.4 0.6 0.8 1.0 1.2 2.0

# What is "panelized"?

- Panelized will put several PCBs on the same PCB panel, with v-cut so that you will be able to easily separate them by hand
- For minimal cost, JLCPCB offers 10cm X 10cm PCB panel
- Here 1 x 3 will give 3 PCBs per PCB panel
- For radio breakout PCB, use 3 x 2 to have 6 PCB boards
- So if Qty=10, you will have
  - $10 \times 3 = 30$  for the ProMini PCB boards
  - $10 \times 6 = 60$  for the radio breakout PCBs



# Save to cart

- You do not need to change the other parameters
- Save your board to cart
- Then, add another PCB .zip file and repeat the same procedure, if needed
- The shipping cost is probably the most expensive cost, so better to order all PCBs at the same time!
- You have several shipping option, you can select faster or cheaper options
- Once you are done, display your cart, review carefully your order and then checkout

**Charge Details**

Engineering fee	€3.54
Board	€5.22

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Build Time ?

PCB :	2-3 days	€0.00
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**Calculated Price** €8.76

Additional charges may apply for [special cases](#)

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Weight ? 0.23kg

**SAVE TO CART**

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Shipping Estimate	€11.66
▼ EuroPacket	8-12 business days

A close-up photograph of a young green plant with several leaves and a thin stem, growing in dark brown soil. The background is slightly blurred.

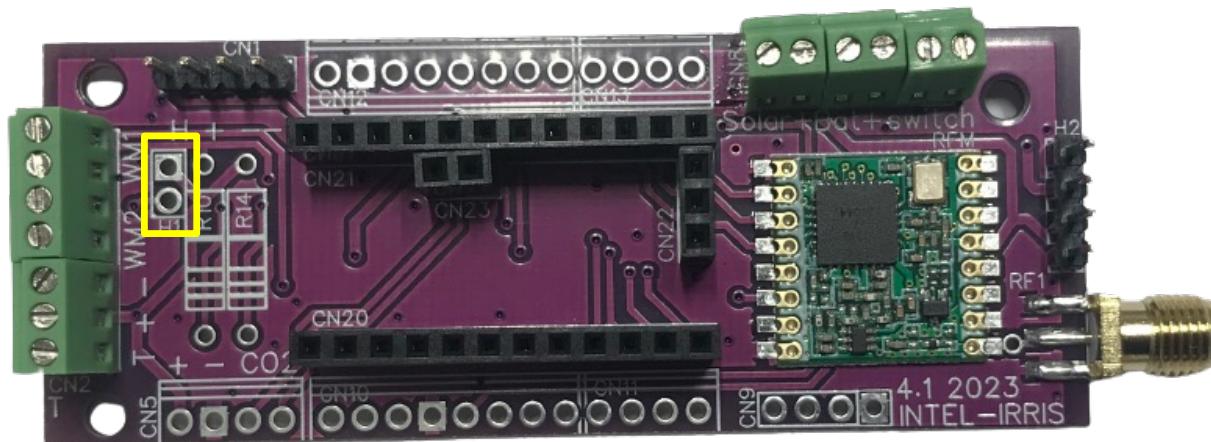
# INTEL-IRRIS

Intelligent Irrigation System for Low-cost Autonomous Water Control  
in Small-scale Agriculture

PCBA FOR  
FULLY  
ASSEMBLED

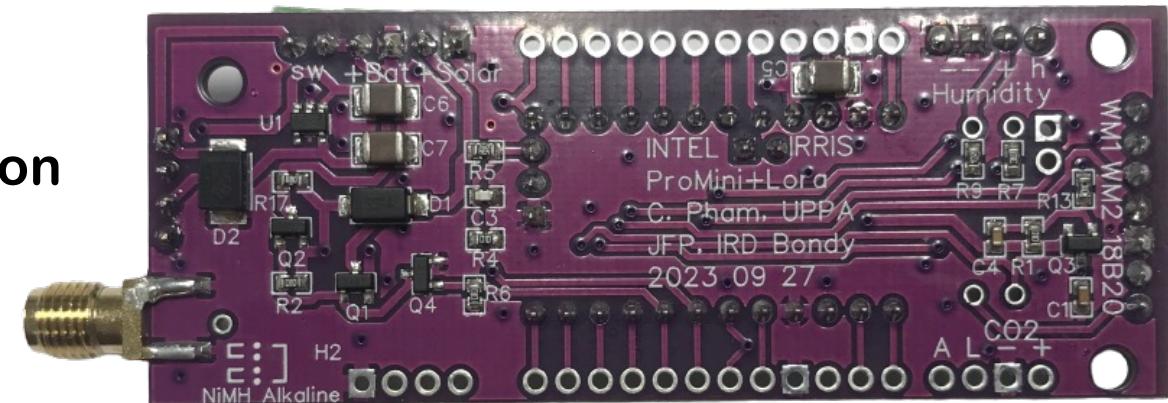
# PCB Assembly

- The IRD PCB v4.1 is intended to be fully assembled by the PCB manufacturer in order to have the solar charging circuit



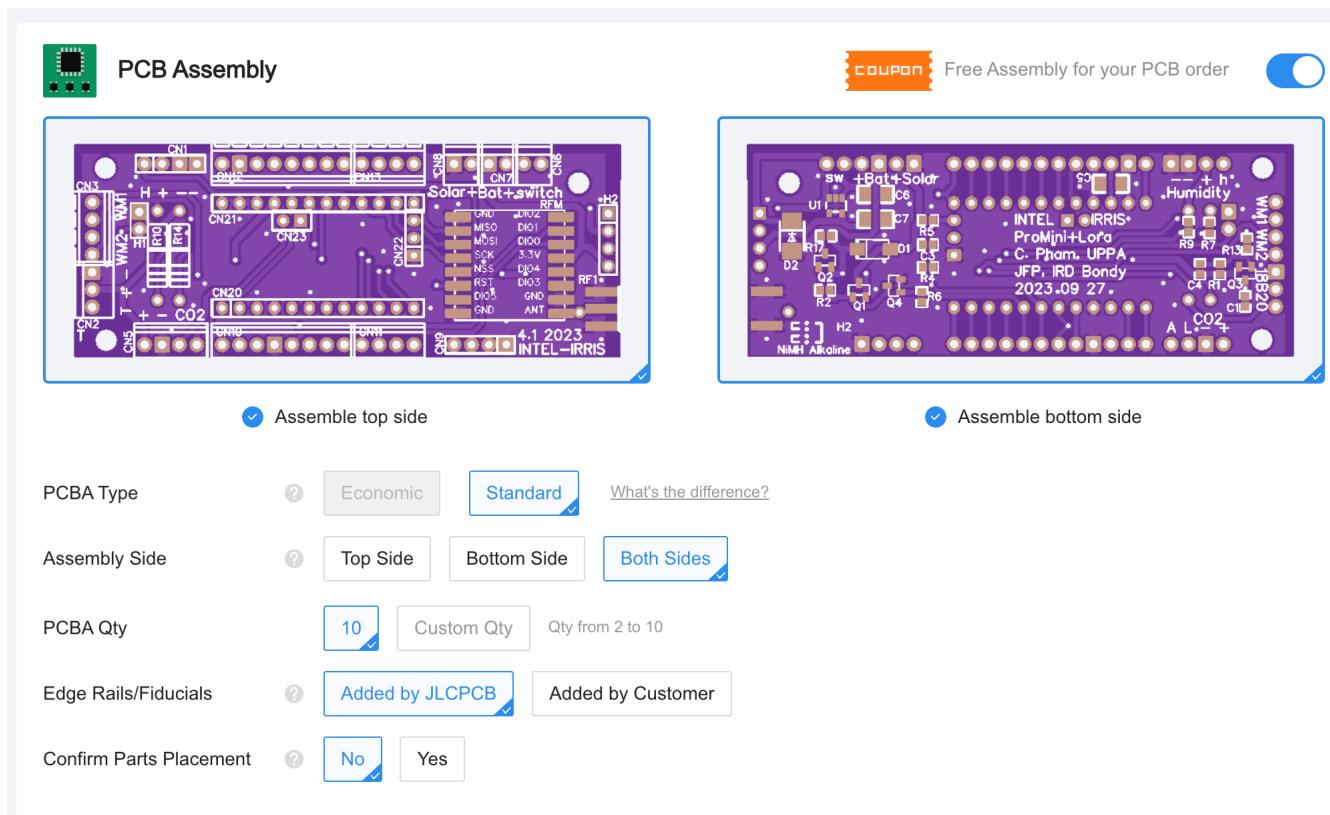
The full version  
does not need to  
have header for H1

The solar circuit is on  
the back side



# Enabling PCB assembly

- Click on PCBA to indicate you want PCB assembly
- Choose Standard PCBA type and select "Both sides" option



# BOM & CPL

- BOM: Bill of Material file (2 files: RFM95W or RFM96W)
- CPL: Pick&Place file

PRIMA-Intel-IrriS / PCBs / IRD\_PCB\_4\_1 / ...

 **CongducPham** Update PCB Gerber, BOM and CPL files for PCB Assembly 42cbaeb · 1 minute ago 

Name	Last commit message	Last commit date
..		
 BOM_SMT_TB_RF95_868_IISS_PCB4_1_wh2.xlsx	Update PCB Gerber, BOM and CPL files for PCB Assembly	1 minute ago
 BOM_SMT_TB_RF96_433_ISSI_PCB4_1_wh2.xlsx	Update PCB Gerber, BOM and CPL files for PCB Assembly	1 minute ago
 CPL.csv	Update PCB Gerber, BOM and CPL files for PCB Assembly	1 minute ago
 Gerber_PCB4_1_ISSI_2023_09_27.zip	Update PCB files and tutorials	2 weeks ago
 Schematic_ISSI_4_1_2023-09-27.pdf	Update PCB files and tutorials	2 weeks ago

- At next step, you will be invited to upload BOM & CPL files

 **JLCPCB** Why JLCPCB? Capabilities Support Resources Order now My file congd

Gerber\_PCB4\_1\_ISSI\_2023\_09\_27 Automatically saved, last update

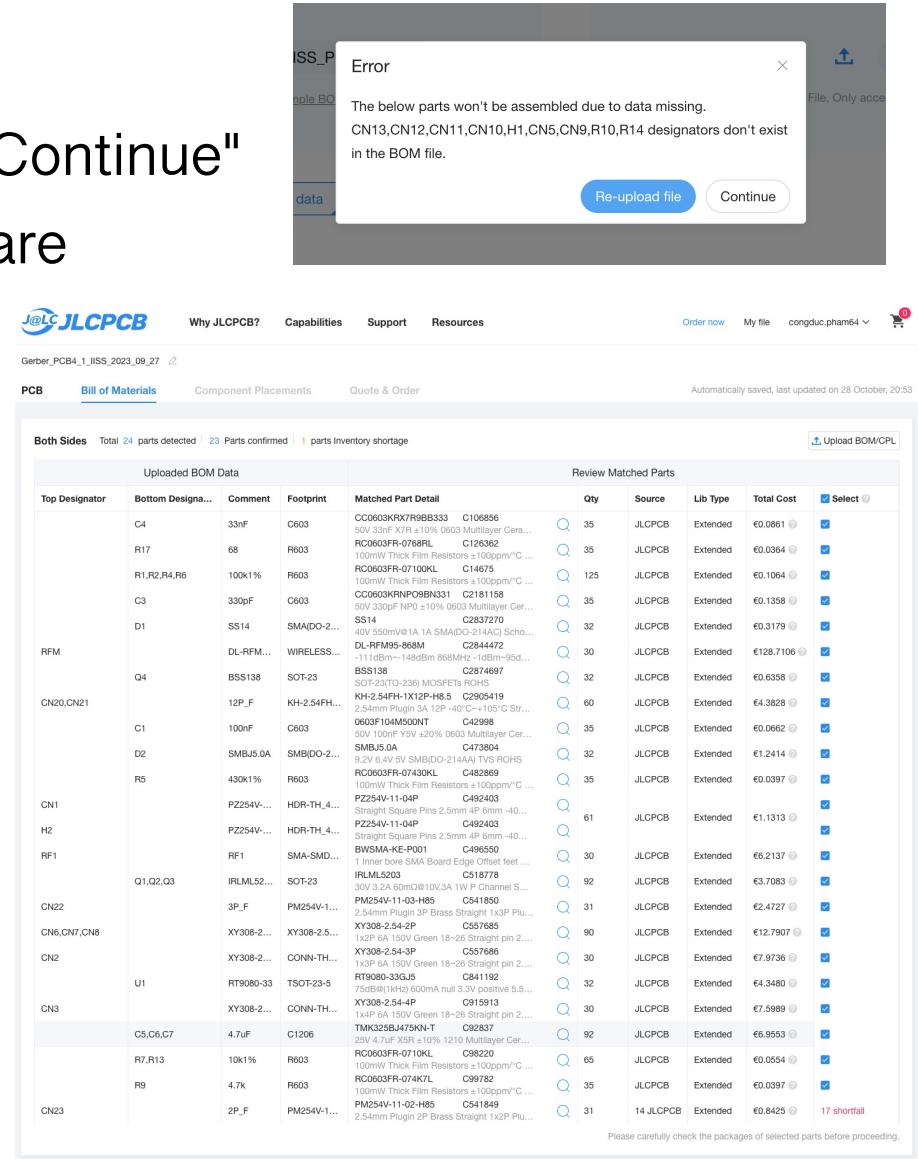
PCB Bill of Materials Component Placements Quote & Order

↑ Add BOM File ↑ Add CPL File

Only accept XLS,XLSX,CSV [View Sample BOM](#)

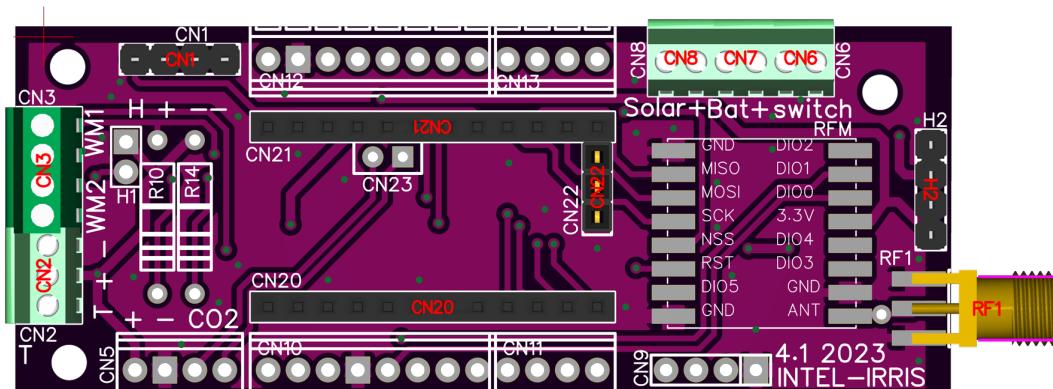
Pick&Place File, Only accept XLS,XLSX,CSV [View Sample CPL](#)

- If you see this message, click on "C"
  - Then, check that all components are available. Here, there are not enough components for CN23 (2-pin female header).
  - You can wait until they are all available (recommended), or decide that you do not want to place them (you must know what you are doing then)
  - You can also have the choice to replace by another similar component with  , if any



# Customize your PCB Assembly

- You can also decide which component you actually do not want the manufacturer to assemble
- For instance, if you un-select the radio module (RFM), you will have a fully assembly board, but without the LoRa module



- This solution can be used to have a board where you will solder yourself the radio module (RFM95W 868/915/923 or RFM96W 433), according to the frequency band of the target countries

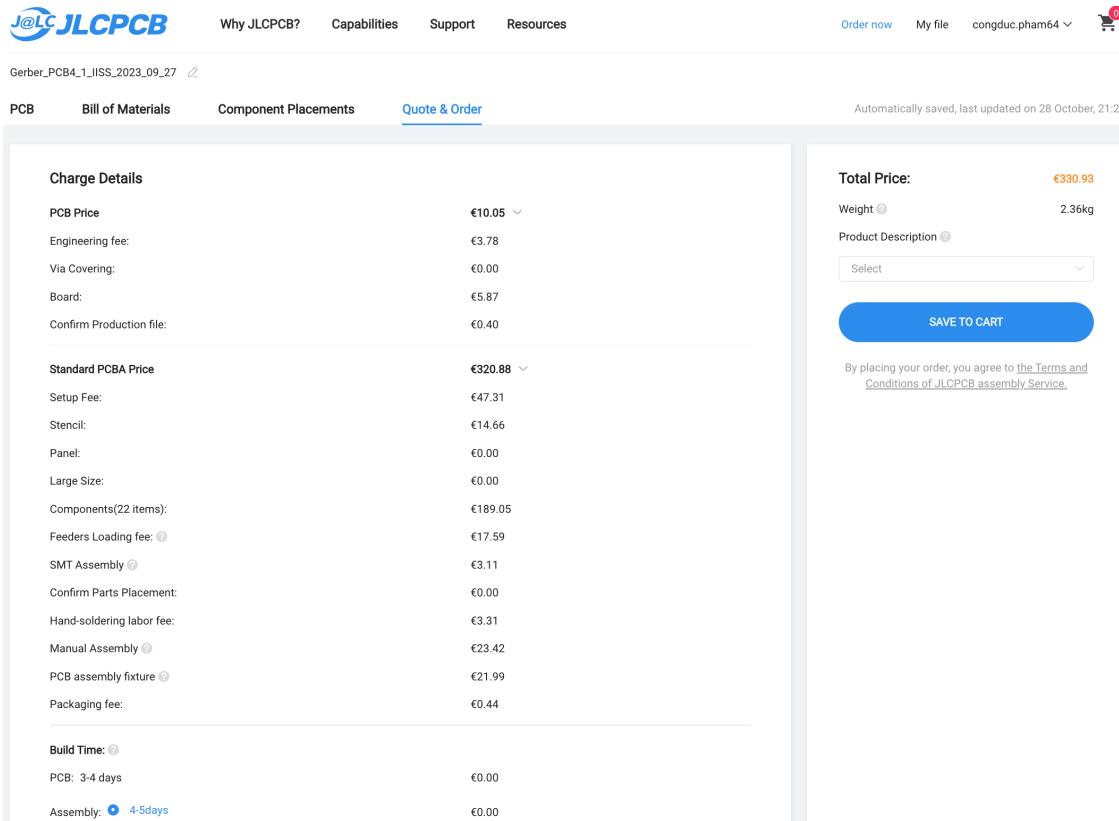
# Checking the expected result

- At next step, you will be able to visually check the final result
- You can switch between 2D & 3D display
- Check top & bottom side



# Saving to cart

- ➊ Finally, you will be able to save the configured PCBA to cart
- ➋ You will also have the detail of all the pricing



The screenshot shows the JLCPCB Quote & Order interface. At the top, there are navigation links: Why JLCPCB?, Capabilities, Support, Resources, Order now, My file, congduc.pham64, and a shopping cart icon.

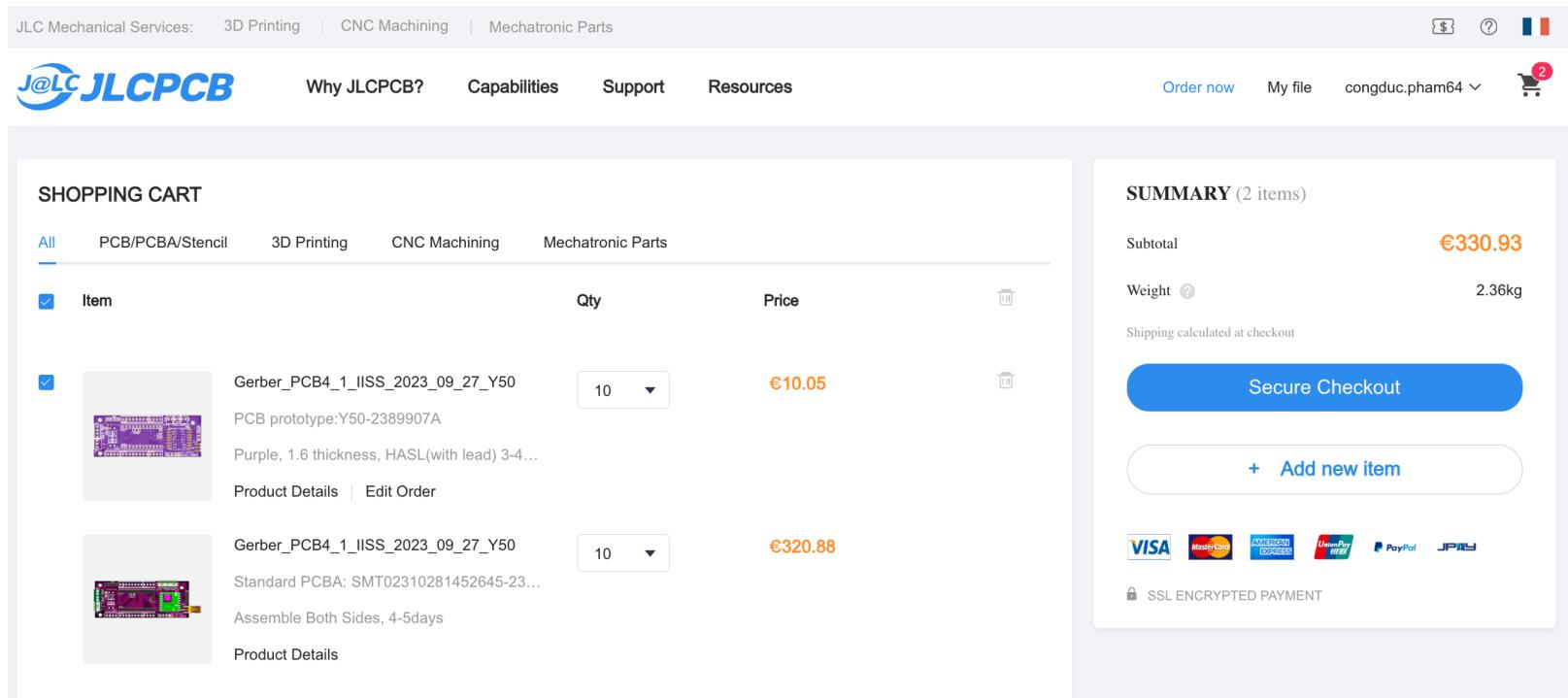
The main content area has tabs: PCB, Bill of Materials, Component Placements, and Quote & Order (which is selected). Below these tabs, it says "Automatically saved, last updated on 28 October, 21:27".

The left panel displays "Charge Details" with two sections: "PCB Price" and "Standard PCBA Price". The right panel shows the "Total Price: €330.93" with fields for "Weight" (2.36kg) and "Product Description" (Select), and a large blue "SAVE TO CART" button. Below the button, a small note states: "By placing your order, you agree to the [Terms and Conditions of JLCPCB assembly Service](#)".

Charge Details	
PCB Price	€10.05
Engineering fee:	€3.78
Via Covering:	€0.00
Board:	€5.87
Confirm Production file:	€0.40
Standard PCBA Price	€320.88
Setup Fee:	€47.31
Stencil:	€14.66
Panel:	€0.00
Large Size:	€0.00
Components(22 items):	€189.05
Feeders Loading fee:	€17.59
SMT Assembly	€3.11
Confirm Parts Placement:	€0.00
Hand-soldering labor fee:	€3.31
Manual Assembly	€23.42
PCB assembly fixture	€21.99
Packaging fee:	€0.44
Build Time:	PCB: 3-4 days
	Assembly: 4-5 days

# Final step, pay to order!

- This is the final step, pay to order your PCBA
- You will be able to choose the shipping methods and other details



The screenshot shows the JLCPCB website interface during the checkout process. The top navigation bar includes links for JLC Mechanical Services, 3D Printing, CNC Machining, and Mechatronic Parts, along with user account and cart icons.

**SHOPPING CART**

All	PCB/PCBA/Stencil	3D Printing	CNC Machining	Mechatronic Parts
<input checked="" type="checkbox"/> Item				
		Qty	Price	
<input checked="" type="checkbox"/>		Gerber_PCB4_1_IISS_2023_09_27_Y50 PCB prototype:Y50-2389907A Purple, 1.6 thickness, HASL(with lead) 3-4...	10	€10.05
		<a href="#">Product Details</a>   <a href="#">Edit Order</a>		
<input checked="" type="checkbox"/>		Gerber_PCB4_1_IISS_2023_09_27_Y50 Standard PCBA: SMT02310281452645-23... Assemble Both Sides, 4-5days	10	€320.88
		<a href="#">Product Details</a>		

**SUMMARY (2 items)**

Subtotal	€330.93
Weight	2.36kg
Shipping calculated at checkout	

**Secure Checkout**

[+ Add new item](#)

Payment methods available: VISA, MasterCard, AMERICAN EXPRESS, UnionPay, PayPal, JPAY

SSL ENCRYPTED PAYMENT

# Receiving your PCBA!

