



qBoxMini DIY IOT Enclosure Plus Kits

User Manual

Abstract

User Manual describing the qBoxMini DIY IOT Enclosure Plus Kits. Kits features, content and project ideas provided.

IBT-QBM-CON-X-UM

www.iot-bots.com





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Revision History

NoNo	Version	Date	Author	Description
1	1.0	05.25.2020	lotbotscom	Initial
2	1.1	11.03.2020	lotbotscom	Brand Identity Update
3				



Overview

Perfect for any DIY IOT project, qBoxMini Enclosure Plus Kit series is the part of the newest HW platform designed to help hobbyists, makers and all DIYers to build environmental ready IOT solutions.

Features

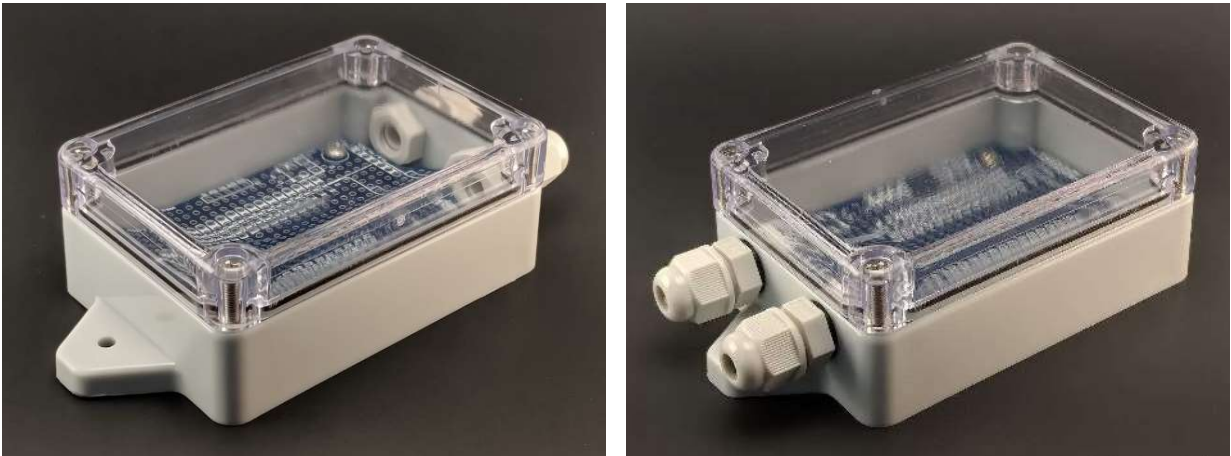
- Flanged IP65 waterproof enclosure: Sealed, made of high-quality ABS material suitable for indoor and outdoor DIY IOT projects;
- Incorporated M8 cable glands: Two cable inputs securely allow bringing the power in and connecting sensors and actuators;
- Perfect fit PCB: High-quality double-sided PCB with 0.1" hole spacing for DIP integrated circuits, modules, and main controller board;
- Fixed placement for controller board: Well-designed PCB allows to carry a variety of MCU boards like Adafruit Feather Compatible, Arduino MKR Compatible, NodeMCU, etc;
- Built in SMA connectors: Up to two SMA Straight Female to IPEX (u.FL) adapter cables give external antennas connections to your wireless board;
- Dedicated Connectors positions: Terminal blocks, Grove and 0.1" DIP power and interface connectors could be easily soldered onto the PCB;
- Prototyping connectors set included: All necessary connectors included, saving time and allows to build IOT device right away.

Description

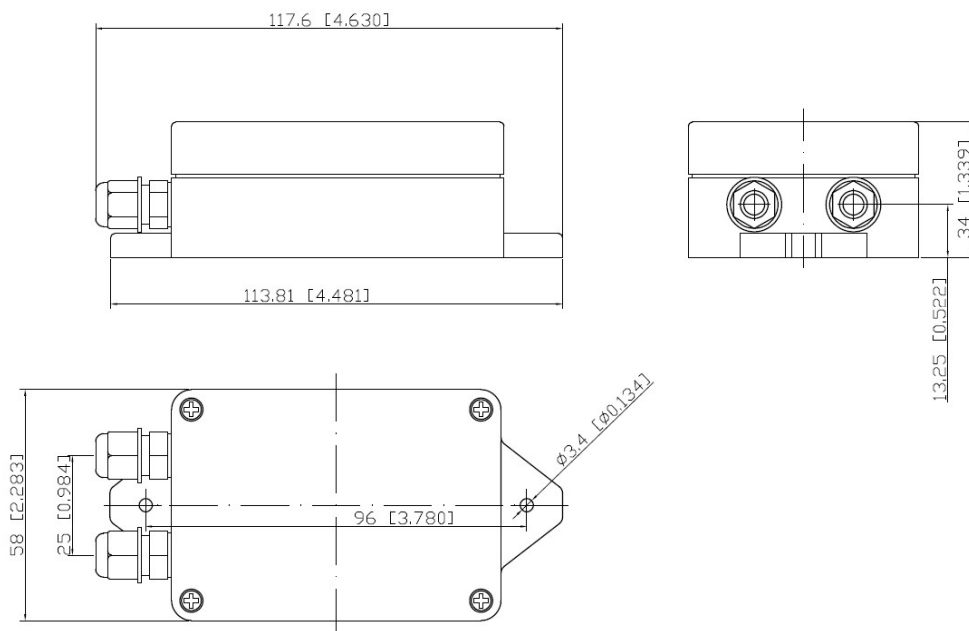
Each qBoxMini Enclosure Plus Kit consists of durable waterproof IP65 enclosure with installed M8 glands, double sided PCB with dedicated placements for IOT controller and connectors, integrated SMA to u.FL adapter cable (up to two, depending on kit model) and connectors set.

qBoxMini Enclosure Plus Kit (No SMA)

qBoxMini Enclosure Plus Kit (No SMA) is the simplest member in qBoxMini Enclosure Plus Kit family. It has no integrated SMA to u.FL adapter cable, but still able to keep wireless connectivity device with internal antennas.



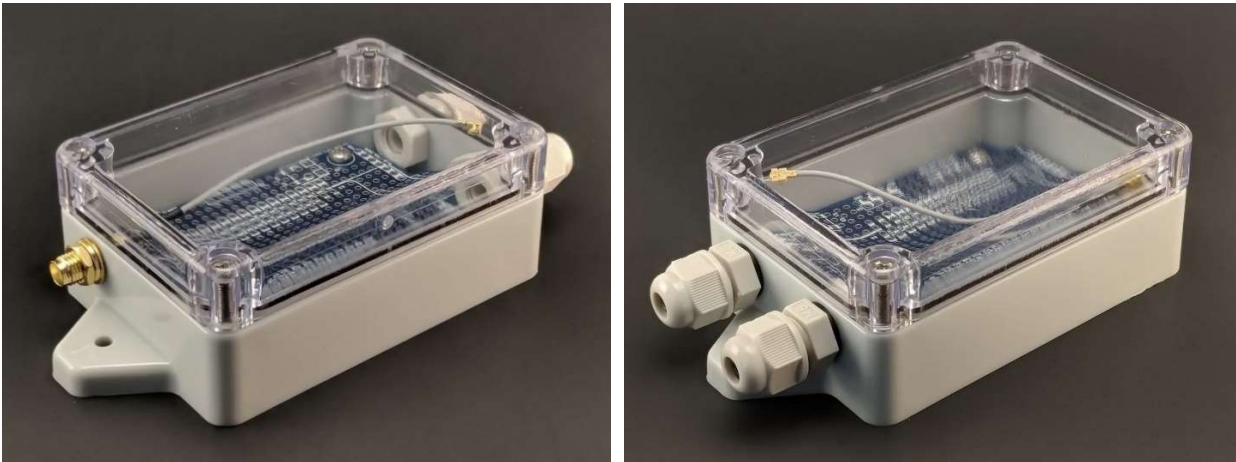
Pic.1. qBoxMini Enclosure Plus Kit (No SMA) common view



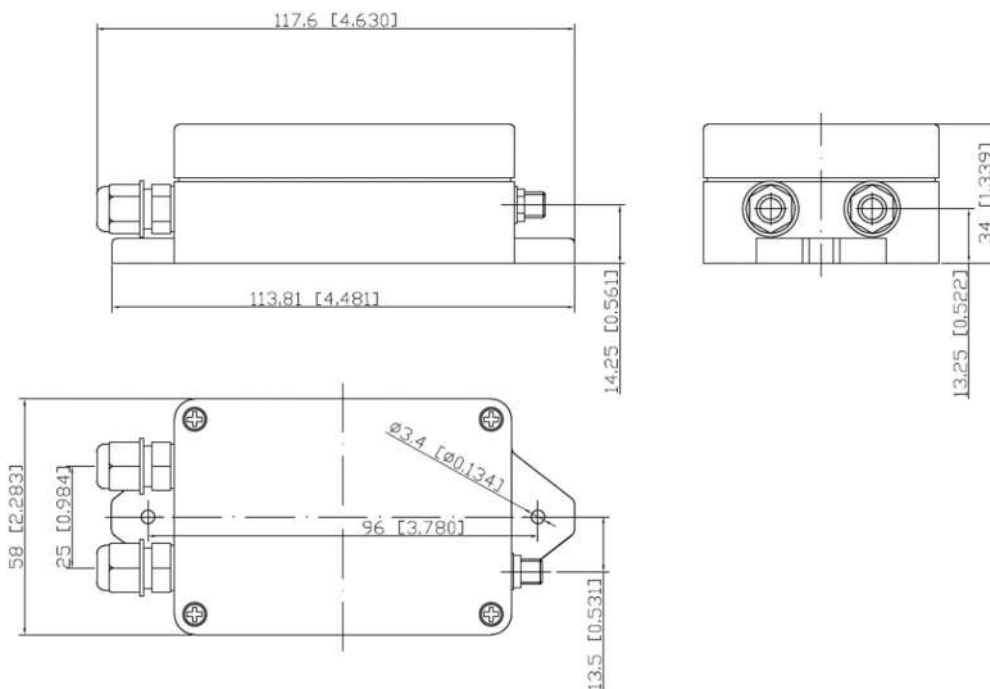
Pic. 2. qBoxMini Enclosure Plus Kit (No SMA) dimensions

qBoxMini Enclosure Plus Kit (One SMA)

qBoxMini Enclosure Plus Kit (One SMA) is the member of qBoxMini Enclosure Plus Kit family which is able to bring up to one external antenna signal to IOT device located inside. It has one integrated SMA to u.FL adapter cable.



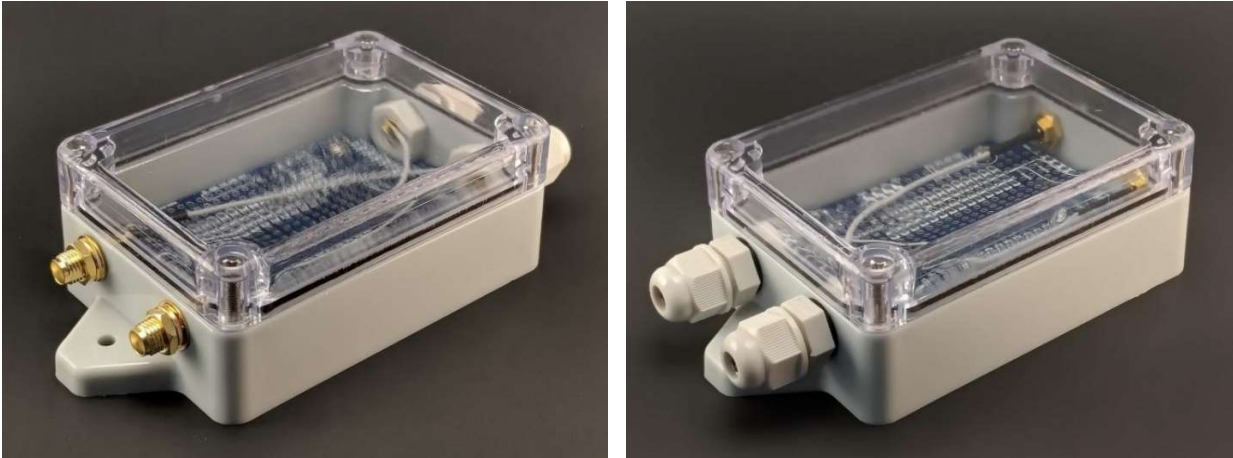
Pic.3. qBoxMini Enclosure Plus Kit (One SMA) common view



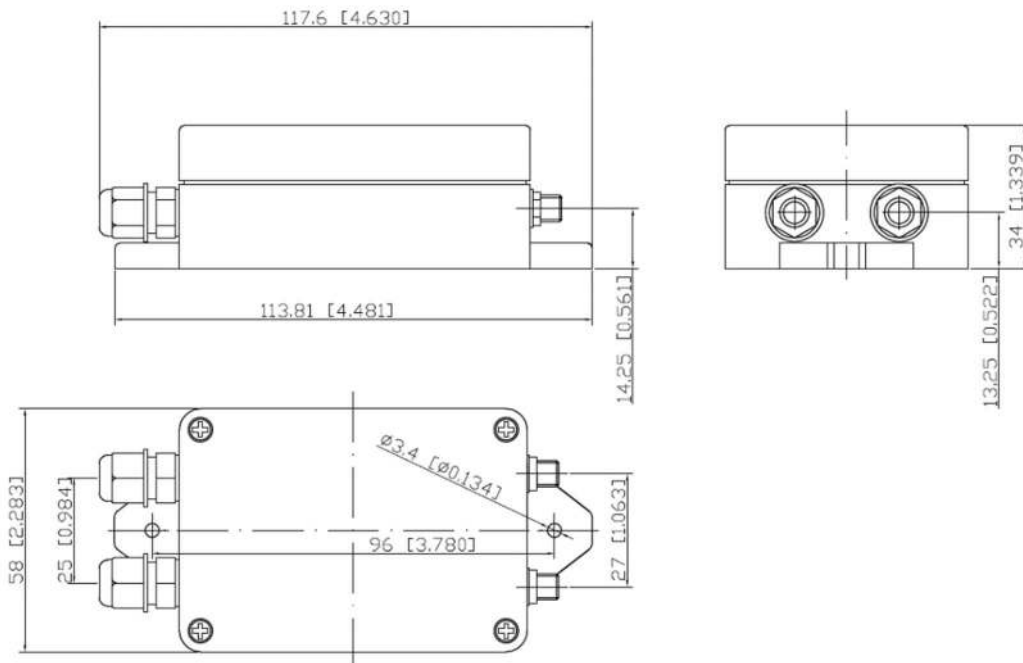
Pic. 4. qBoxMini Enclosure Plus Kit (One SMA) dimensions

qBoxMini Enclosure Plus Kit (Two SMAs)

qBoxMini Enclosure Plus Kit (Two SMA) is the most charged member of qBoxMini Enclosure Plus Kit family which has got two integrated SMA to u.FL adapter cables.



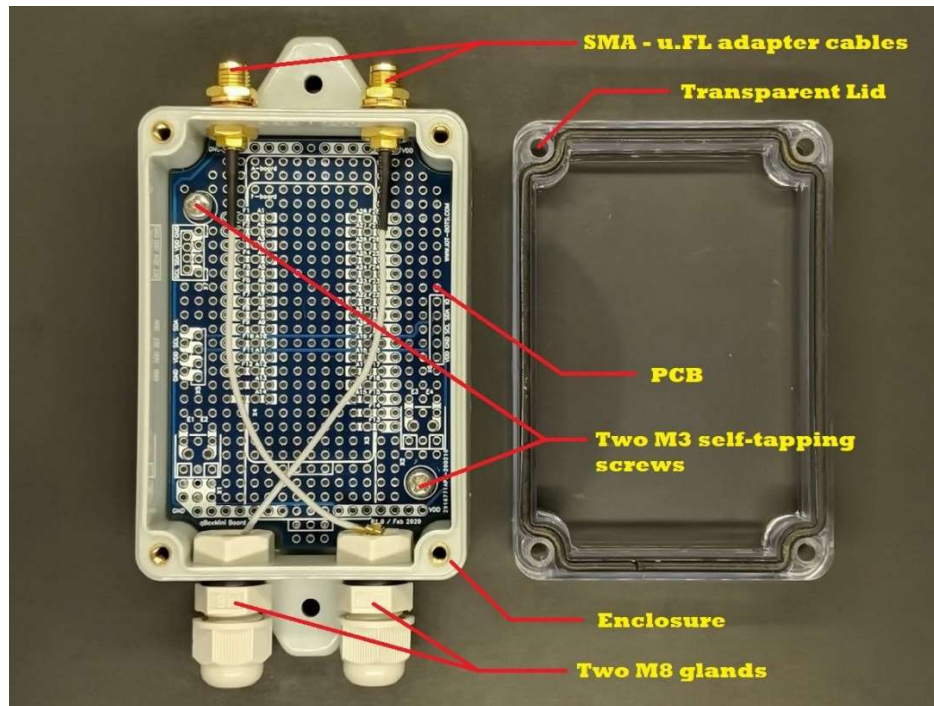
Pic.5. qBoxMini Enclosure Plus Kit (Two SMAs) common view



Pic. 6. qBoxMini Enclosure Plus Kit (Two SMAs) dimensions

qBoxMini Enclosure Plus Kit parts

Each qBoxMini Enclosure Plus Kit has got several parts built in.



Pic.7. qBoxMini Enclosure Plus Kit parts

External DC voltage from power adapter or solar system could be brought by cable through the one gland inner and another gland gives opportunity to connect external sensors or actuators.

Up to two (depending on kit type) GSM / LTE / WiFi / LoRa / etc. external antennas could be connected to wireless board u.FL PCB connector via SMA to IPEX (u.FL) adapter cables glued into enclosure wall.

Two M3 self-tapping screws securely attach the PCB to the enclosure. Same time board could be easily removed.

Enclosure has enough room to keep with or without stacking header one IOT controller board like Adafruit Feather Compatible (AFC) or Arduino MKR Compatible (AMC) or another IOT board, power supply (DC/DC), OLED display and sensor modules using plain grid proto holes.

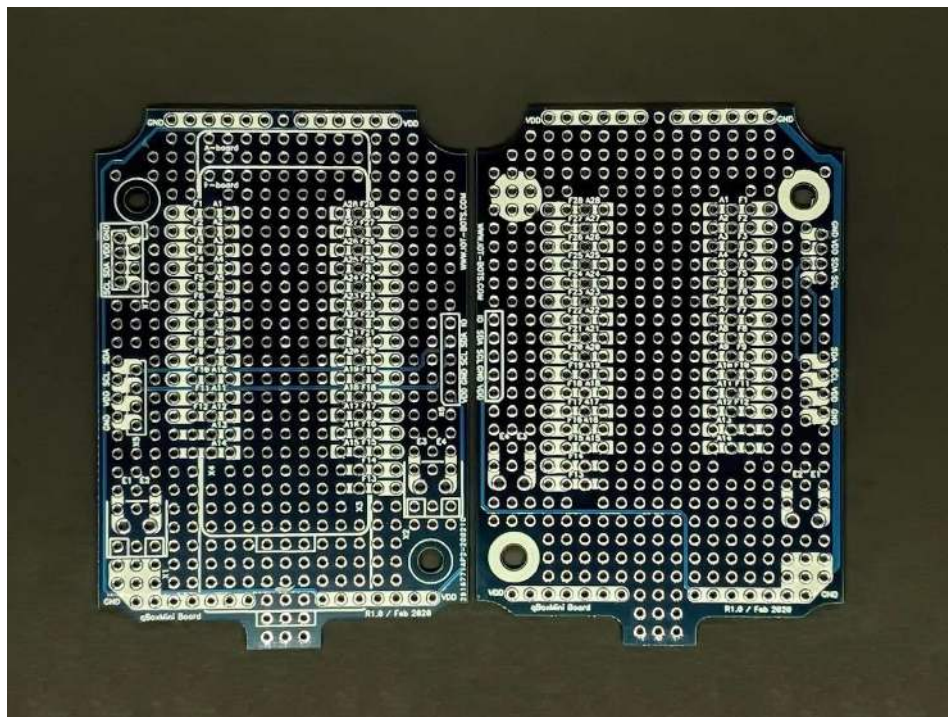


Pic.8. qBoxMini Enclosure Plus Kit with Adafruit Feather Compatible board installed



Pic.9. qBoxMini Enclosure Plus Kit with Arduino MKR Compatible board installed

Up to two pluggable 3,5mm terminal blocks, one Grove and several DIP 0.1" I2C interface connectors could be populated. Two separate power traces for VDD and GND along short PCB sides allow bring the power to sensor boards.

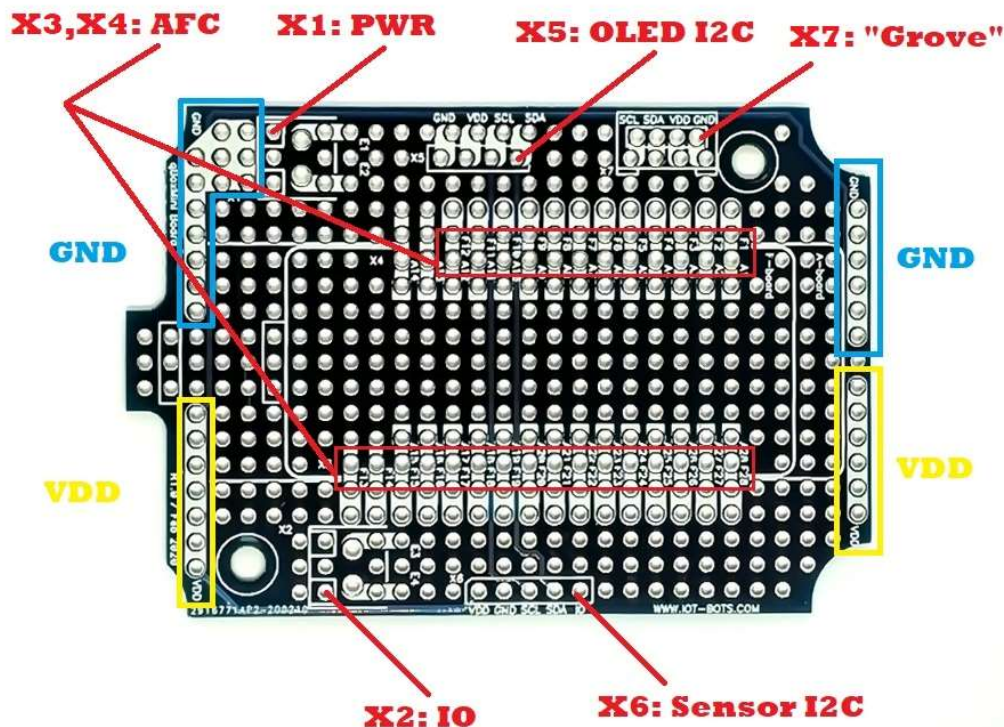


Pic.10. qBoxMini Enclosure Plus Kit PCB common view (Front and Back)

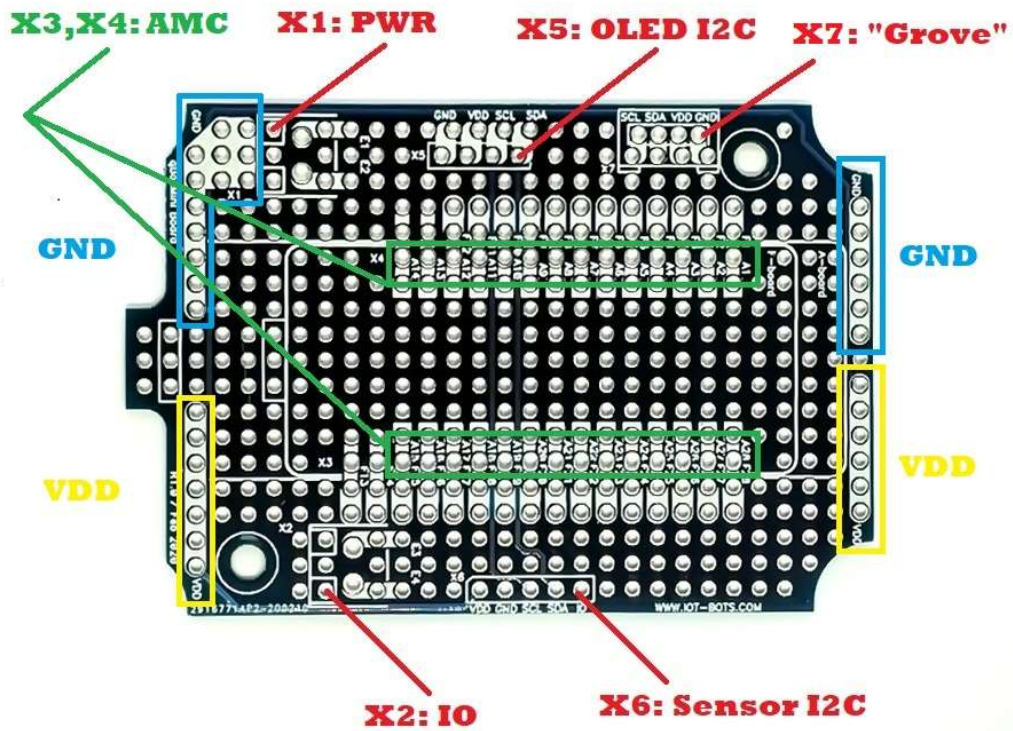
Each connector pin has got a trace with DIP contacts that wires from other modules could be easily soldering.

There is example of connectors proposal:

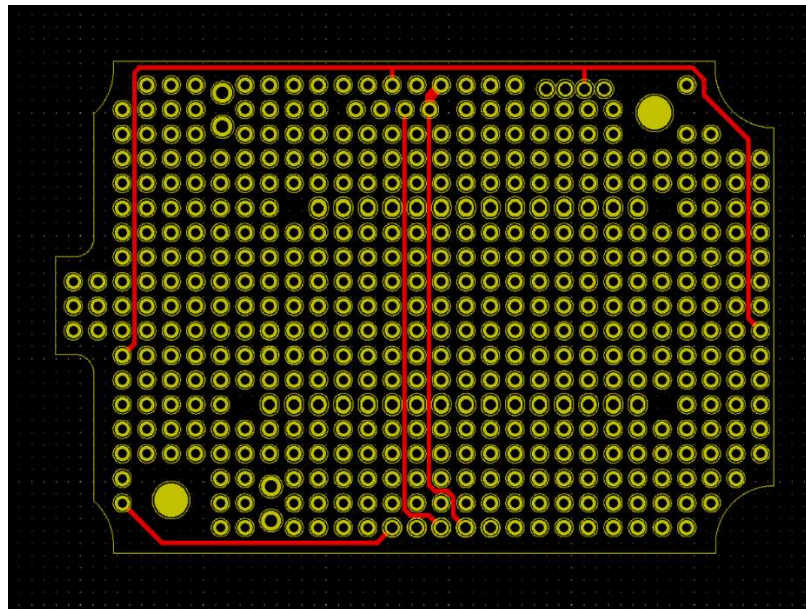
- X1: External power connection through pluggable 3,5mm terminal block;
- X2: External Input / Output sensor / actuator connections through pluggable 3,5mm terminal blocks;
- X3, X4: IOT board connectors could be located (0,1" DIP);
- X5: OLED I2C connector placement (0,1" DIP) with pins: VDD, GND, SCL, SDA;
- X6: I2C sensors connector placement (0,1" DIP) with pins: VDD, GND, SCL, SDA, IO;
- X7: "Grove" I2C connector placement (2,0 mm DIP) with pins: VDD, GND, SCL, SDA.



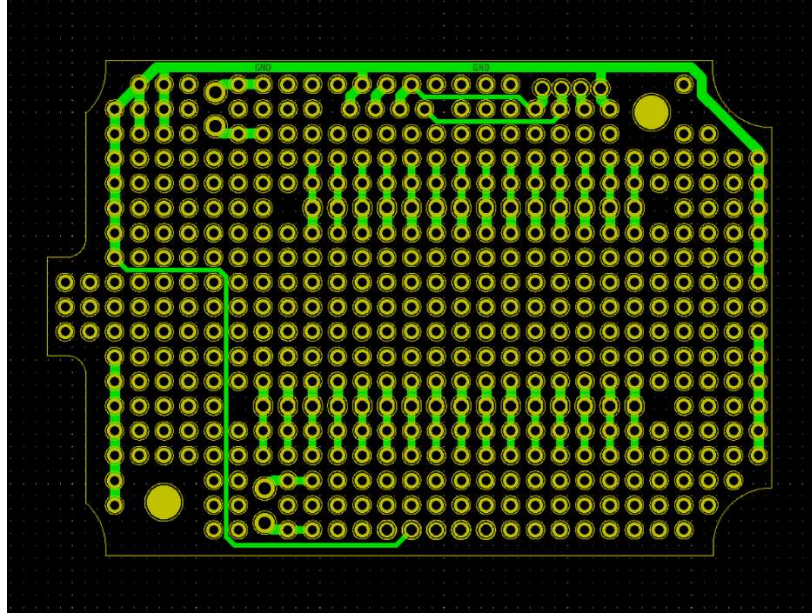
Pic.11. Connectors placement proposal: Adafruit Feather Compatible board based



Pic.12. Connectors placement proposal: Arduino MKR Compatible board based

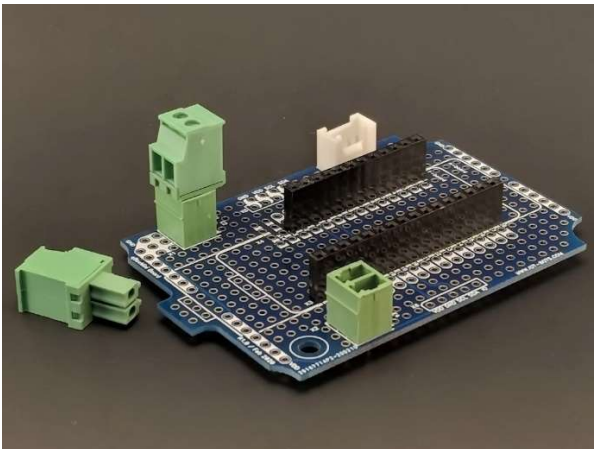


Pic.12. PCB Front Copper traces

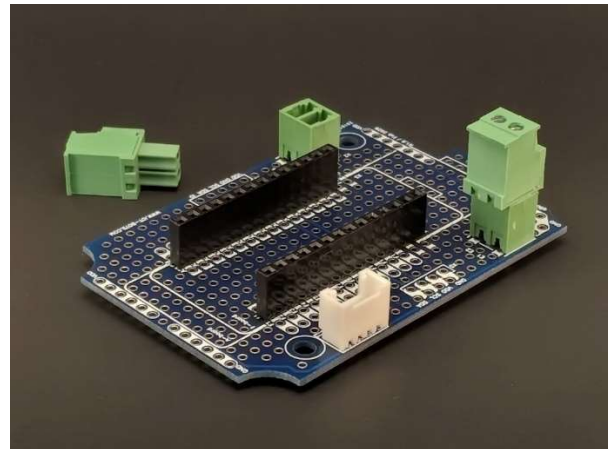


Pic.13. PCB Back Copper traces

IOT board connector pins have conditional names: A1...A28 for AMC boards, F1...F28 for AFC board.

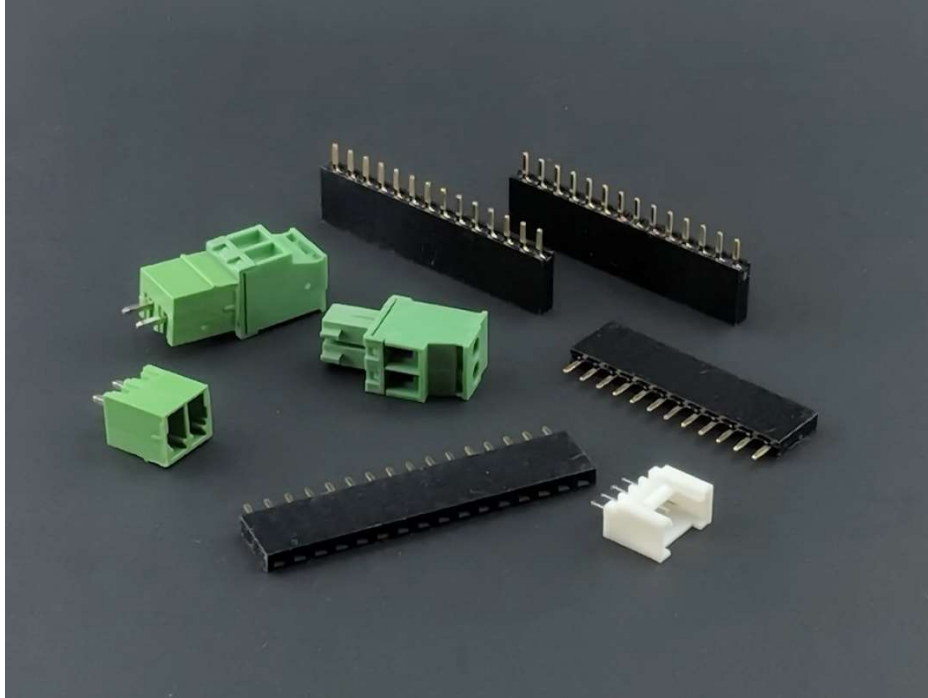


Pic.14. qBoxMini Enclosure Plus Kit PCB with connectors setup for Adafruit Feather Compatible board



Pic.15. qBoxMini Enclosure Plus Kit PCB with connectors setup for Adafruit for Arduino MKR Compatible board

qBoxMini Enclosure Plus Kits include connector set, that saves time and efforts for logistic and helps to build IOT device right out of the box.



Pic.16. Connectors Set

Transparent lid allows to see internal parts, electronics, LEDs and even display and is able to hold LiPol battery to be applied to the internal surface.



Pic. 17. LiPol battery applied to a transparent lid (assembled view)



Pic. 18. LiPol battery applied to a transparent lid (inside view)

Specification

Housing Material: ABS



Water and Dust Proof: IP65

Enclosure Outer Size: 4.63"x2.28"x1.34" (L*W*H)

Enclosure Inner Size: 3.0"x2.0"x1.1" (L*W*H)

Gland model: M8

Cables with diameters: 0.08-0.19"

PCB size: 2.93"x2.0"

SMA u.FL adapter cables : up to 2

SMA u.FL adapter cable length : 3.15"

qBoxMini Enclosure Plus Kit content

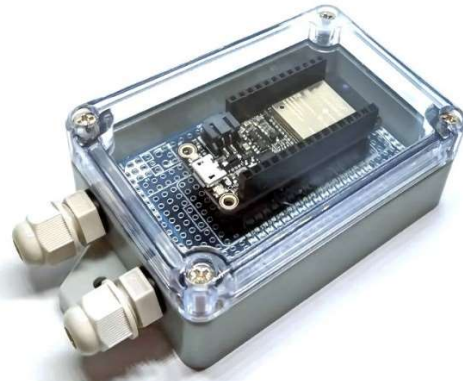
- IP65 waterproof enclosure with two M8 glands installed and up to two SMA u.FL adapter cables glued (depending on kit type);
- High quality prototyping double sided PCB mounted with two M3 self-tapping screws;
- Connectors set (**connectors are NOT populated onto PCB**):
 - o Arduino MKR Compatible board female header set (two 0,1" pitch 1x14 pins connectors);
 - o Adafruit Feather Compatible board female header set (0,1" pitch 1x12 and 1x16 pins connectors);
 - o Two 3,5mm 2 pins terminal blocks with plugs;
 - o Seeed Grove 2mm DIP connector.
- Packaging bag and shipping box.

Project ideas

Using qBoxMini Enclosure Plus Kits the variety of IOT DIY and POC projects could be done, like LoRa-based soil moisture monitoring project, home WiFi garage door opener, NB-IOT beehive monitoring system, GSM GPS asset tracking solution and many others.



Pic. 19. WiFi LoRa controller with OLED



Pic. 20. WiFi ESP32 No SMA project



Pic. 21. IP65 Enclosure for STM DevKit



Pic. 22. LTE CAT-M1 WiFi outdoor POC

Abbreviations

NoNo	Abbreviation	Explanation
1	AFC	Adafruit Feather Compatible
2	AMC	Arduino MKR Compatible

Trademark notice

All referenced brands, product names, service names, and trademarks are the property of their respective owners.



Ordering info

No	Item	SKU
1	qBoxMini DIY IOT Enclosure Plus Kit (No SMA)	IBT-QBM-CON-0
2	qBoxMini DIY IOT Enclosure Plus Kit (One SMA)	IBT-QBM-CON-1
3	qBoxMini DIY IOT Enclosure Plus Kit (Two SMAs)	IBT-QBM-CON-2