



qBoxMini DIY IOT Enclosure Kits

User Manual

Abstract

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

IBT-QBM-BAS-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 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

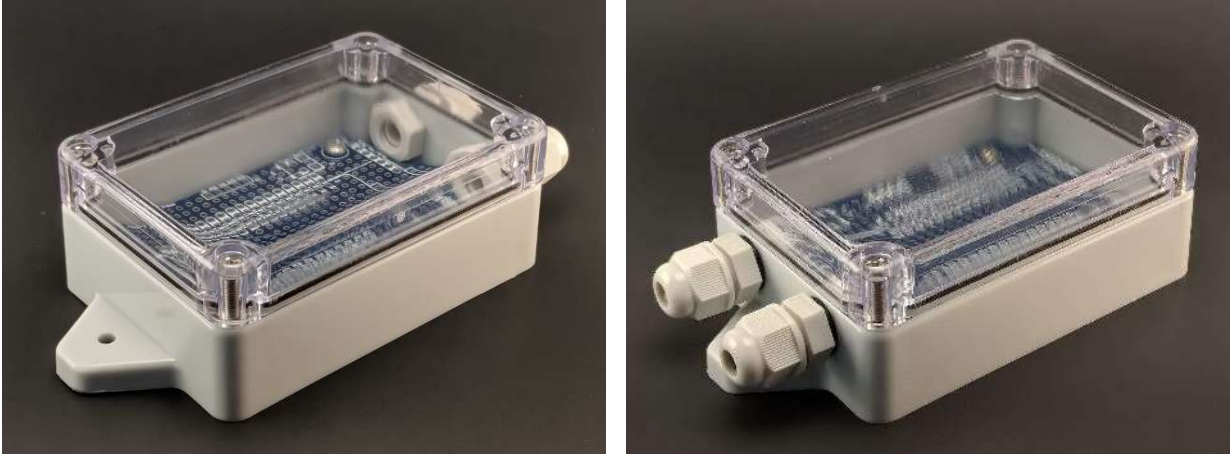
- Flanged IP65 waterproof enclosure: Sealed, made of high-quality ABS material suitable for indoor and outdoor DIY IOT projects;
- Incorporated M8 cable glands: Two cable inputs securely allow bringing the power in and connecting sensors and actuators;
- Perfect fit PCB: High-quality double-sided PCB 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.

Description

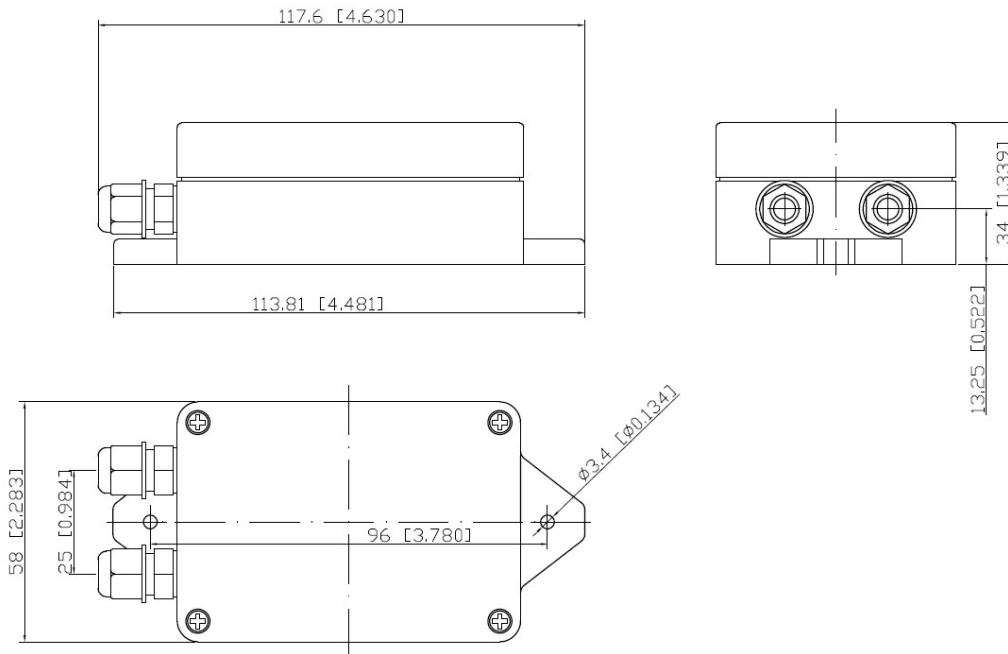
Each qBoxMini Enclosure Kit consists of durable waterproof IP65 enclosure with installed M8 glands, double sided PCB with dedicated placements for IOT controller and connectors and integrated SMA to u.FL adapter cable (up to two, depending on kit model).

qBoxMini Enclosure Kit (No SMA)

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



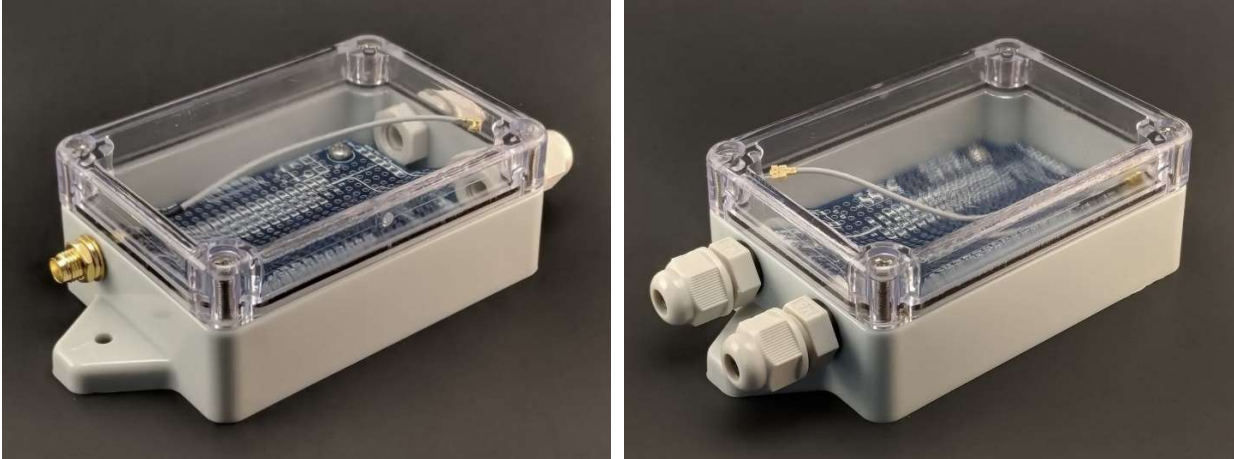
Pic.1. qBoxMini Enclosure Kit (No SMA) common view



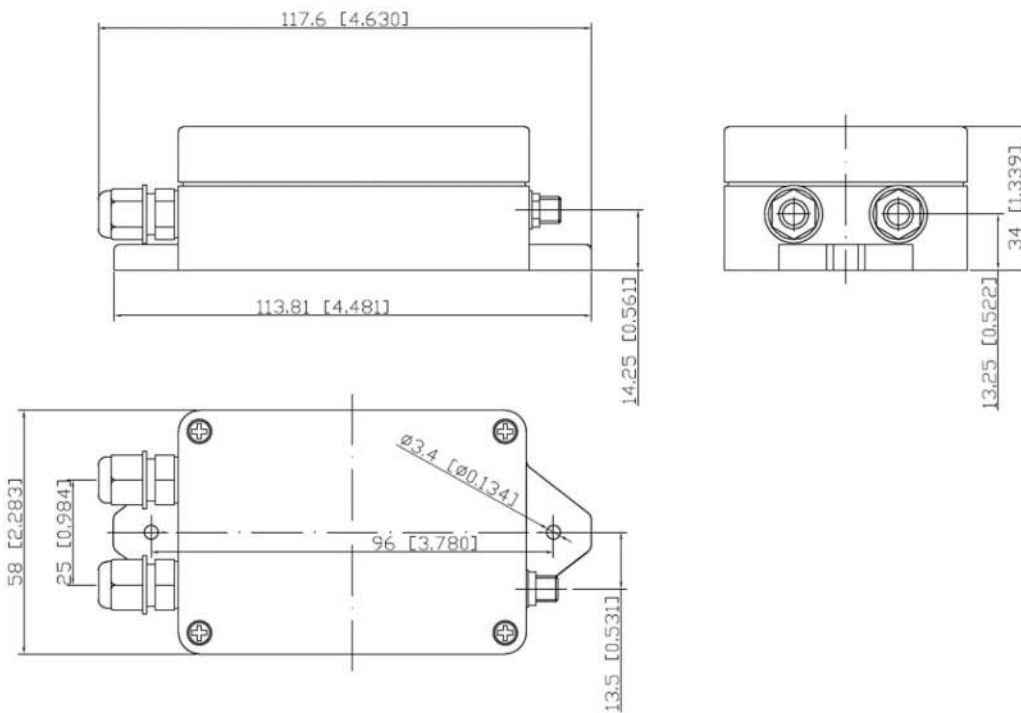
Pic. 2. qBoxMini Enclosure Kit (No SMA) dimensions

qBoxMini Enclosure Kit (One SMA)

qBoxMini Enclosure Kit (One SMA) is the member of qBoxMini Enclosure 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.



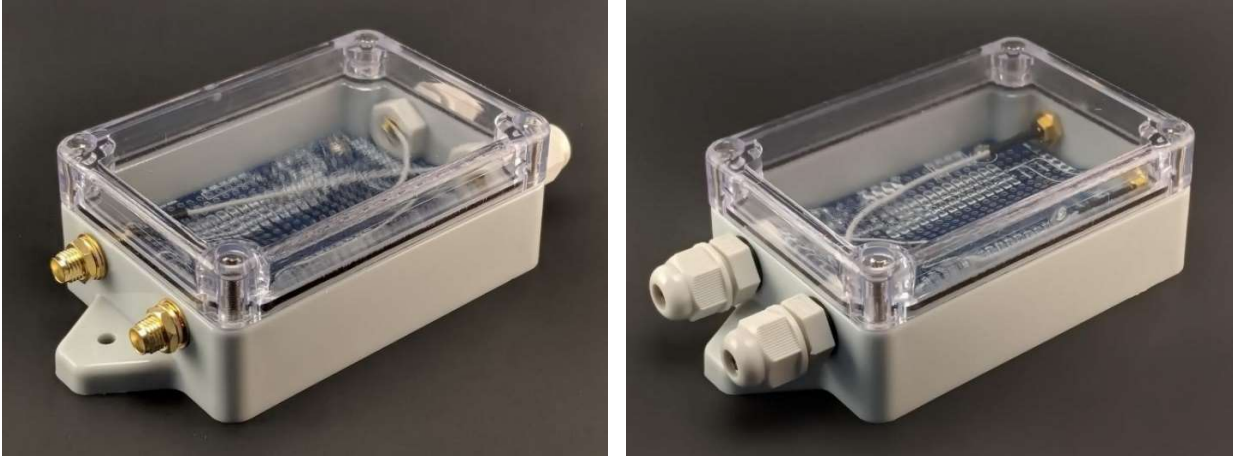
Pic.3. qBoxMini Enclosure Kit (One SMA) common view



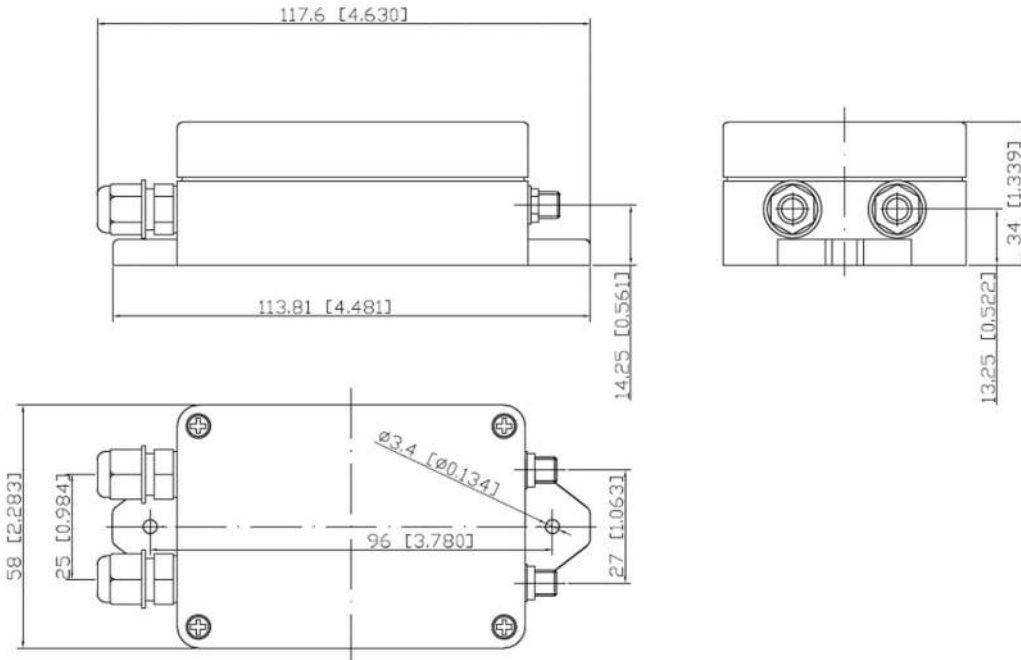
Pic. 4. qBoxMini Enclosure Kit (One SMA) dimensions

qBoxMini Enclosure Kit (Two SMAs)

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



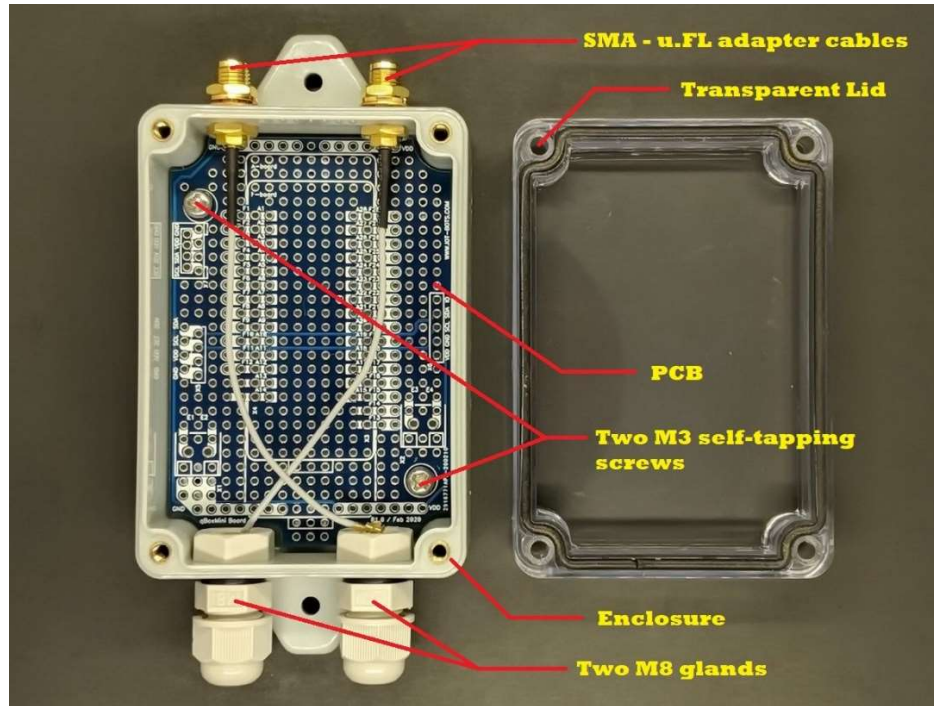
Pic.5. qBoxMini Enclosure Kit (Two SMAs) common view



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

qBoxMini Enclosure Kit parts

Each qBoxMini Enclosure Kit has got several parts built in.



Pic.7. qBoxMini Enclosure 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.

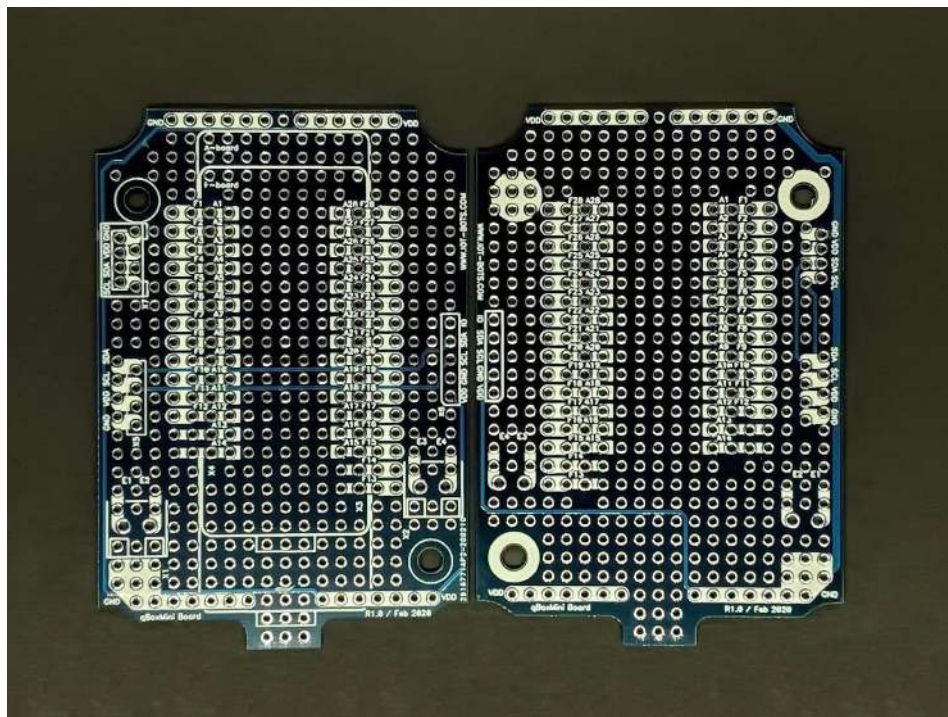


Pic.8. qBoxMini Enclosure Kit with Adafruit Feather Compatible board installed



Pic.9. qBoxMini Enclosure 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.

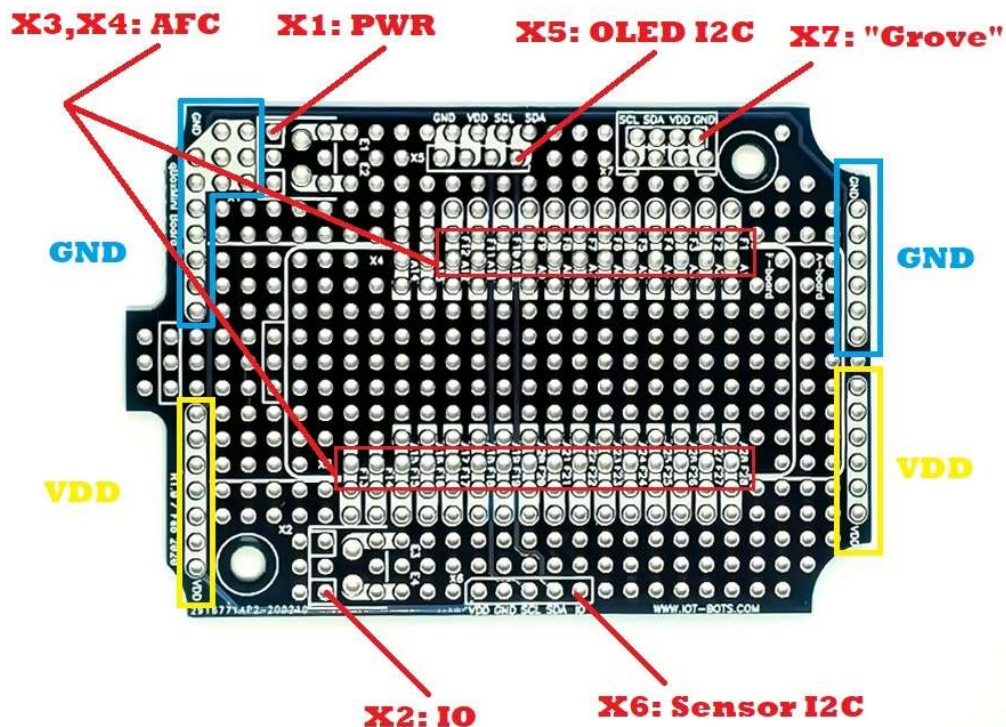


Pic.10. qBoxMini Enclosure Kit PCB common view (Front and Back)

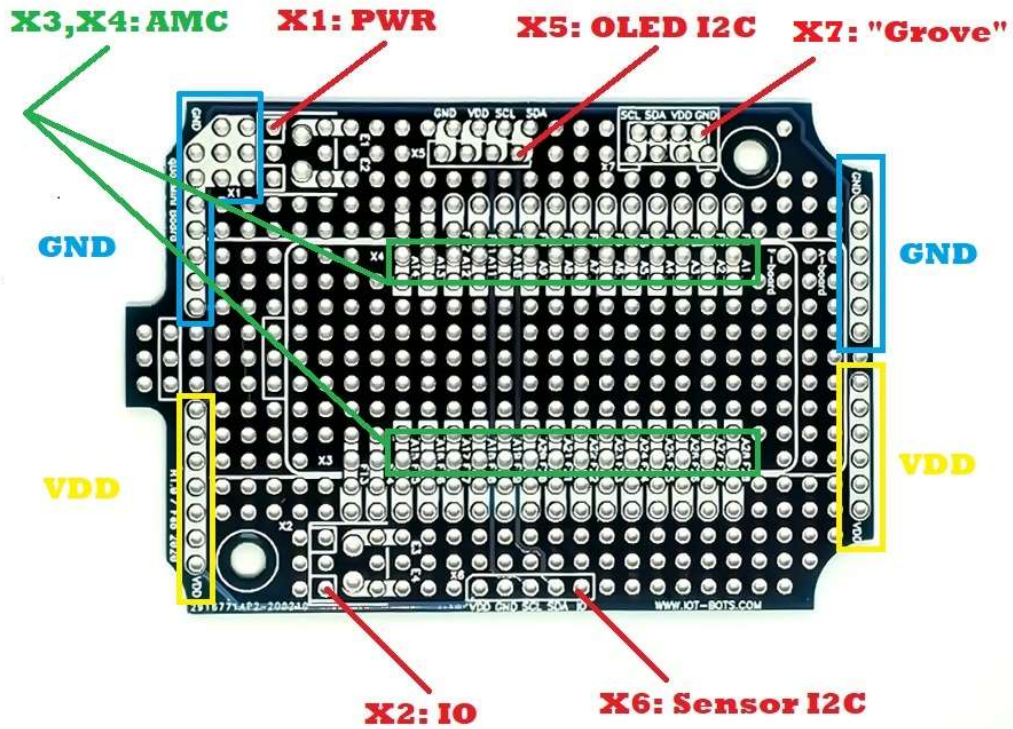
Each connector pin has got a trace with DIP contacts that wires from other modules could be easily soldering.

There is example of connectors proposal:

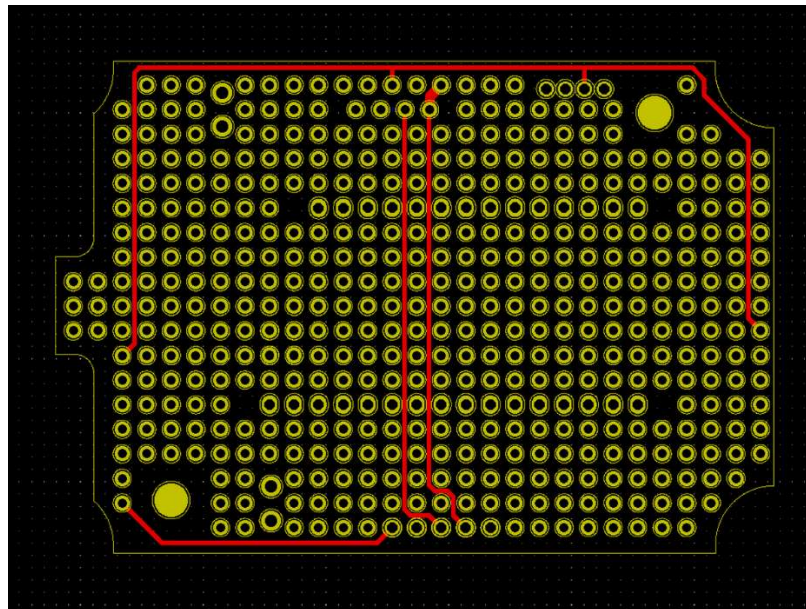
- X1: External power connection through pluggable 3,5mm terminal block;
- X2: External Input / Output sensor / actuator connections through pluggable 3,5mm terminal blocks;
- X3, X4: IOT board connectors could be located (0,1" DIP);
- X5: OLED I2C connector placement (0,1" DIP) with pins: VDD, GND, SCL,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



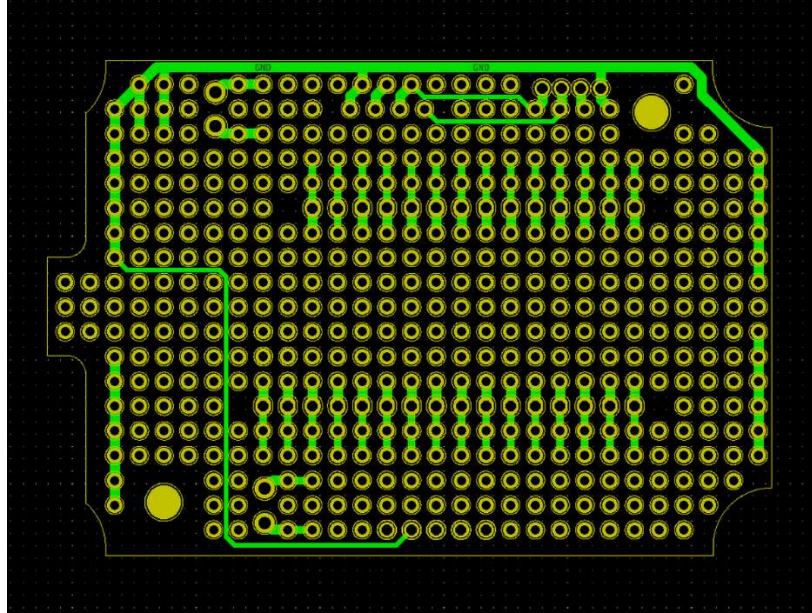
Pic.10. Connectors placement proposal: Adafruit Feather Compatible board based



Pic.11. Connectors placement proposal: Arduino MKR Compatible board based

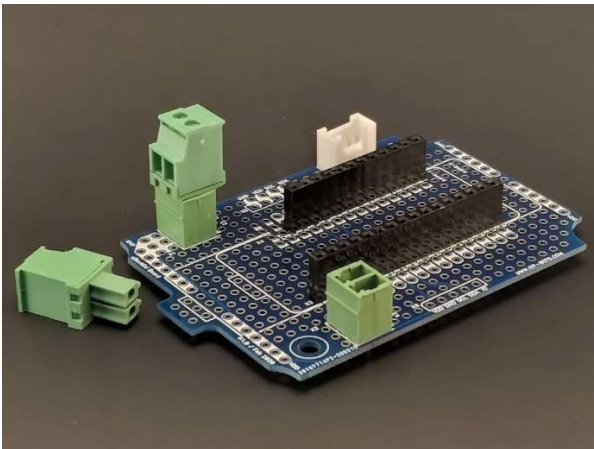


Pic.12. PCB Front Copper traces

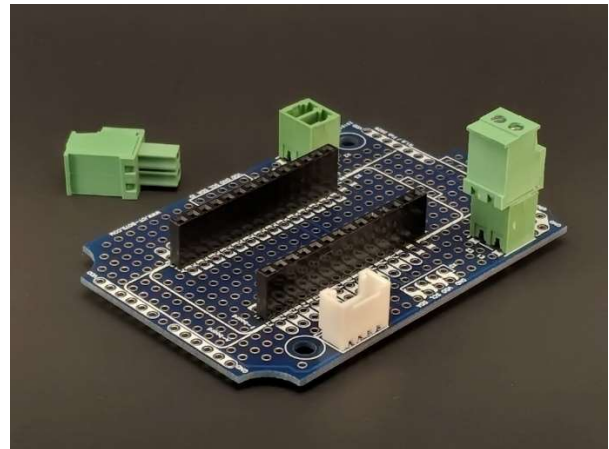


Pic.12. PCB Back Copper traces

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

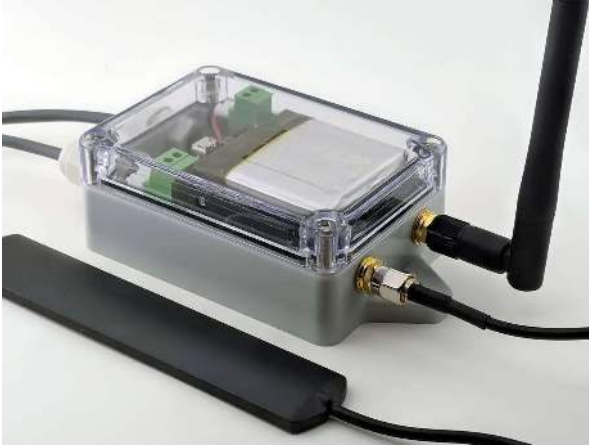


Pic.13. qBoxMini Enclosure Kit PCB with connectors setup for Adafruit Feather Compatible board



Pic.14. qBoxMini Enclosure Kit PCB with connectors setup for Adafruit for Arduino MKR Compatible board

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



Pic. 16. 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 Kit content

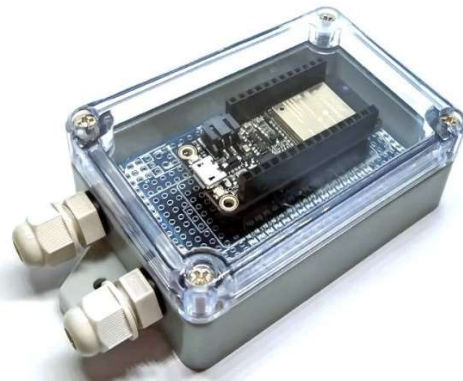
- IP65 waterproof enclosure with two M8 glands installed and up to two SMA u.FL adapter cables glued (depending on kit type);
- High quality prototyping double sided PCB mounted with two M3 self-tapping screws (**No connectors included**);
- packaging bag and shipping box.

Project ideas

Using qBoxMini Enclosure 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 bee hive monitoring system, GSM GPS asset tracking solution and many others.



Pic. 17. WiFi LoRa controller with OLED



Pic. 18. WiFi ESP32 No SMA project



Pic. 19. IP65 Enclosure for STM DevKit



Pic. 20. 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

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