

qGround DIY IOT Arduino MKR Compatible PCB Kit

User Manual

Abstract

User Manual describing the qGround AMC DIY IOT PCB Kits.
Kits features, content and usage examples provided.

IBT-QGX-AMC-X-UM

www.iot-bots.com





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Revision History

NoNo	Version	Date	Author	Description
1	1.0	01.07.2021	lotbotscom	Initial
2				
3				



Overview

"Nice to have" for any DIY IOT project, qGround AMC PCB Kit is the part of the newest HW PCB Kits line designed to help hobbyists, makers and all DIYers to build IOT POCs and making HW prototyping easily.

Features

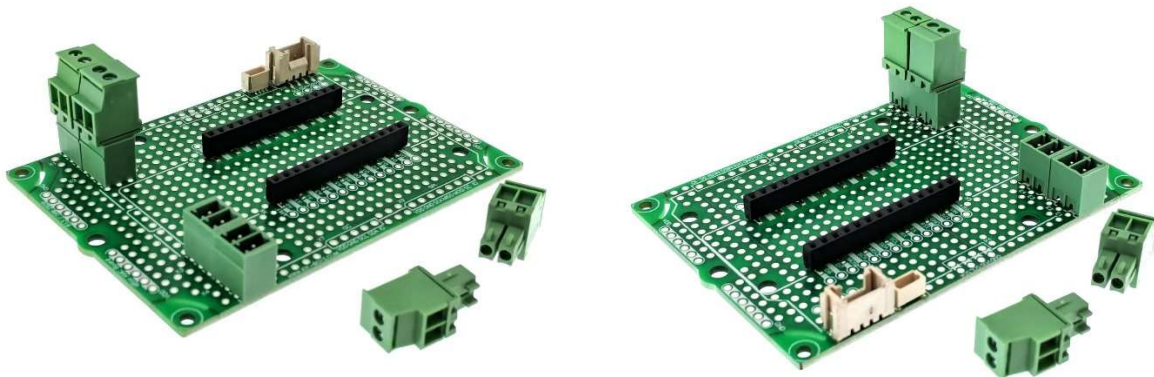
- High quality PCB : Double-sided FR-4 PCB with 0.1" hole spacing for DIP integrated circuits, modules, and main controller board;
- Dedicated placement for controller board : Well-designed PCB allows to carry Arduino MKR Compatible MCU board;
- Rich set of interface options : Four terminal blocks, Grove I2C and 4-pin JST I2C&Power, low profile 0.1" Arduino MKR Compatible interface connectors;
- More space for prototyping : Proto holes grid across whole PCB space for DIP components installation and wiring;
- Environmental ready : Developed to be perfectly fit and mounted inside qBox Collection Enclosures for indoor and outdoor DIY IOT projects.

Description

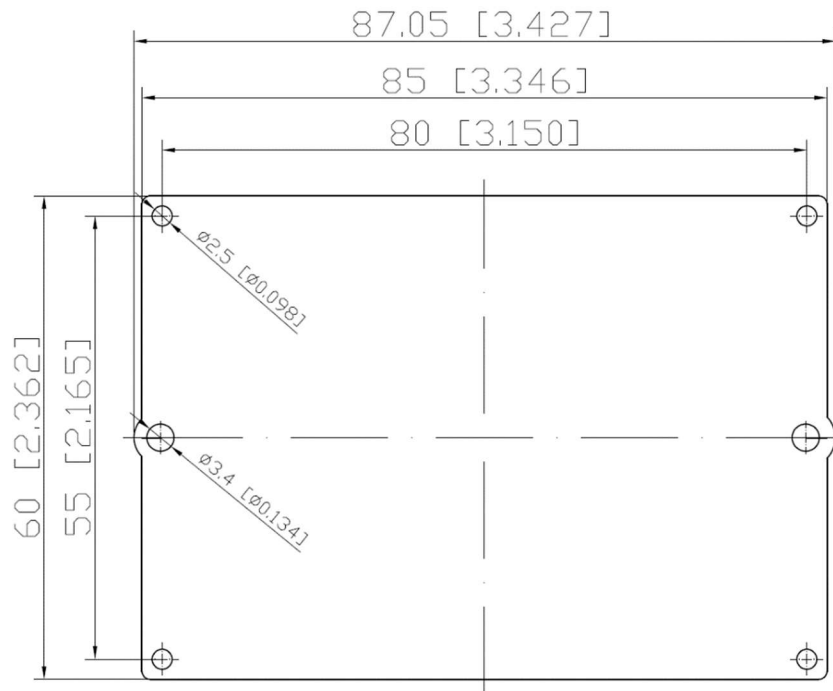
qGround AMC PCB Kits are part of qGround AxC PCB Kits line and developed especially to be used with AFC or AMC boards. So, each PCB kit has dedicated connectors main CPU board could be plugged in (AFC or AMC).

The PCB of qGround AMC PCB Kit is used as PCB for qBox AMC Enclosure Kits.

Each qGround AxC PCB kit consists of high-quality double sided PCB with rich set of connectors installed and the set of 3,5mm terminal plugs.



Pic.1. qGround AMC PCB Kit common view



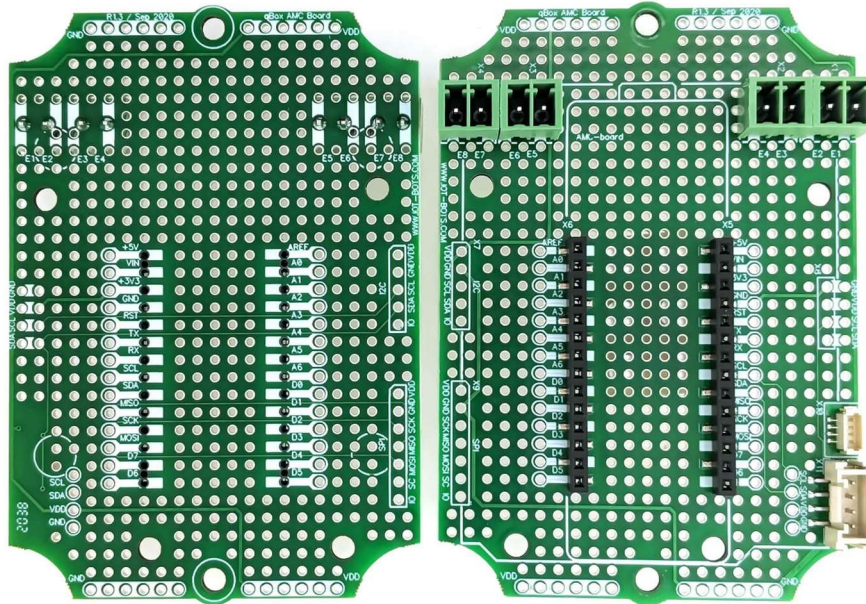
Pic. 2. qGround AMC PCB Kit PCB dimension

qGround AMC PCB Kit overview

Kit's PCB has enough space to keep one Arduino MKR Compatible (AMC) IOT board, power supply (DC/DC), OLED display and sensor modules, as example, using plain grid proto holes.

Each board has got four pluggable 3,5mm terminal blocks, one Grove, one 4-pin JST and two low profile pass-through 0,1" SMT AMC interface compatible connectors

installed. Several DIP 0.1" I2C and SPI interface connectors could be populated. Two separate power traces for VDD and GND along short PCB sides allow bring the power to sensor boards.



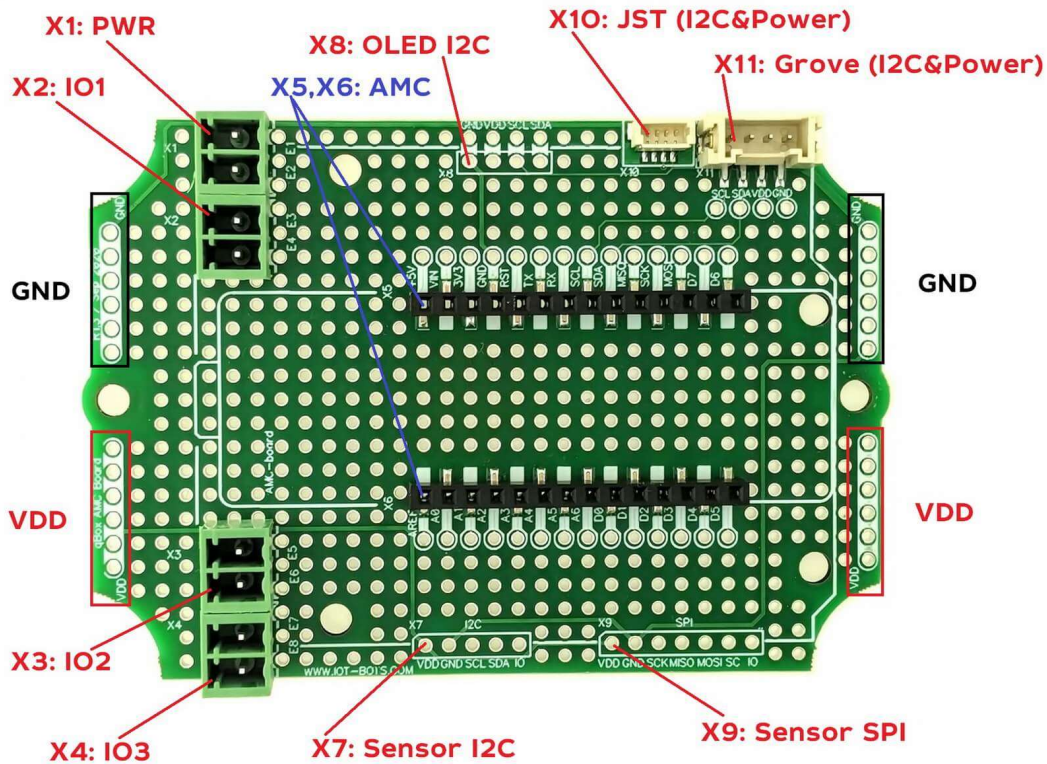
Pic.3. qBox AMC Enclosure Kit PCB common view
(Front and Back, no corners)

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

Connector list:

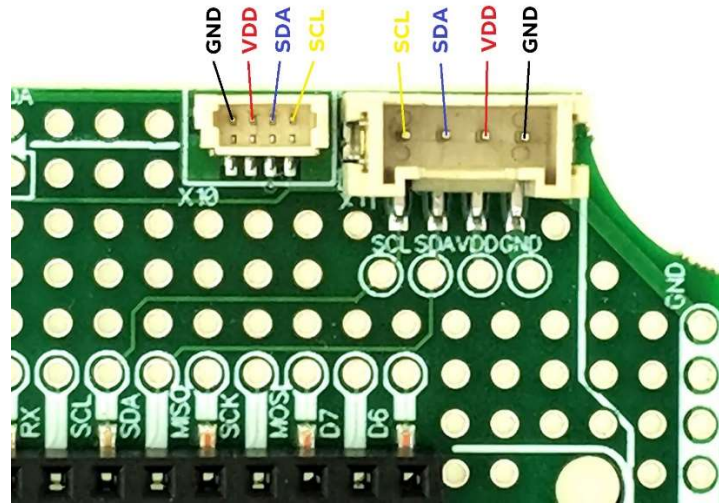
- X1: External power connection through pluggable 3,5mm terminal block;
- X2...X4: External Input / Output sensor / actuator connections through pluggable 3,5mm terminal blocks;
- X5, X6: IOT board connectors (low profile 0,1" pass through SMT receptacle);
- X7: I2C sensors connector placement (0,1" DIP) with pins: VDD, GND, SCL, SDA, IO;
- X8: OLED I2C connector placement (0,1" DIP) with pins: VDD, GND, SCL, SDA;
- X9: SPI sensors connector placement (0,1" DIP) with pins: VDD, GND, SCK, MISO, MOSI, CS, IO;
- X10: 4 pins JST I2C&Power connector with pins: VDD, GND, SCL, SDA;

- X11: 4 pins Grove compatible I2C&Power connector (2,0 mm SMT) with pins: VDD, GND, SCL, SDA.

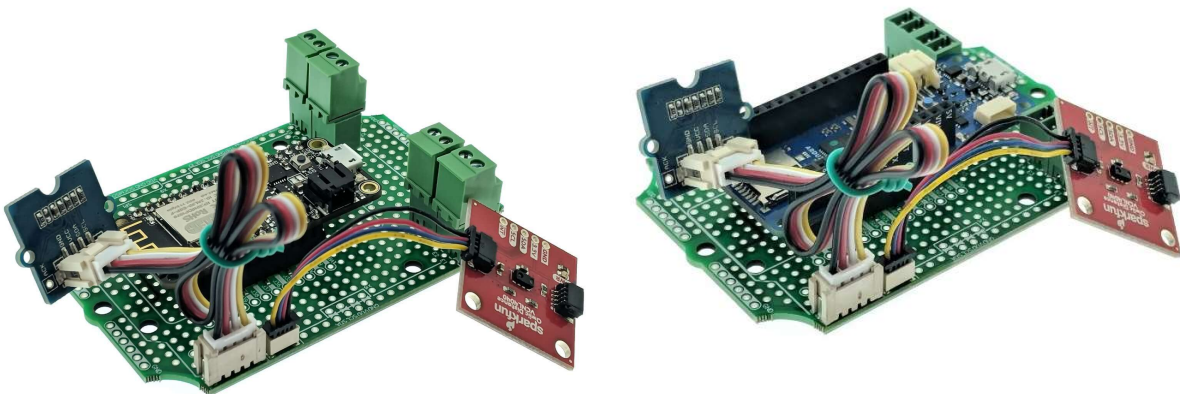


Pic.4. qBox AMC PCB Connectors (no corners)

There are VDD, GND and I2C connections between appropriate connectors pins and CPU board, so no needs to make these connections separately, just plug a CPU board and I2C sensors to Grove or JST connectors and get solution working. Two separate power traces for VDD and GND along short PCB sides allow bring the power to sensor boards.



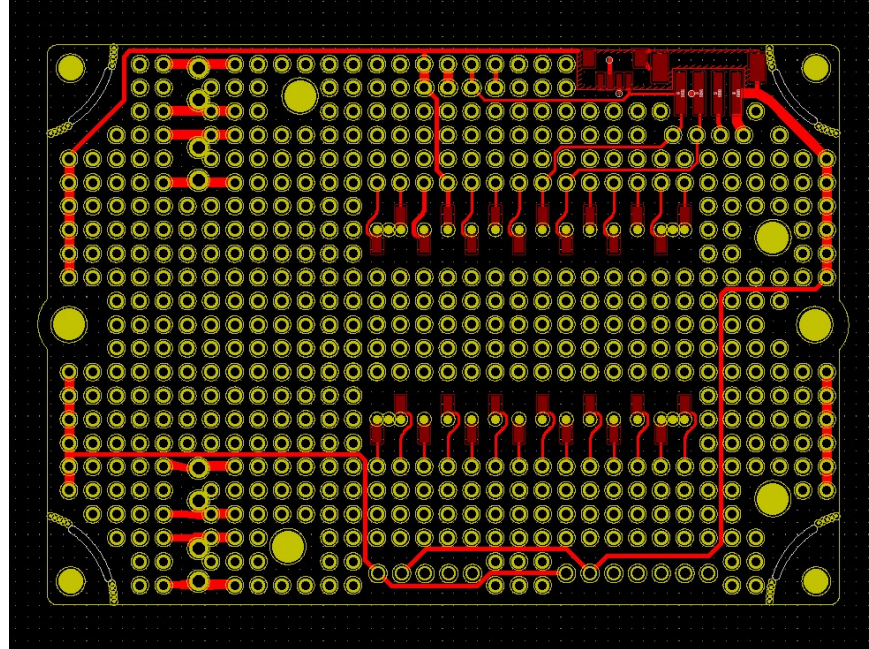
Pic.5. qBox AMC JST and Grove connectors pinout



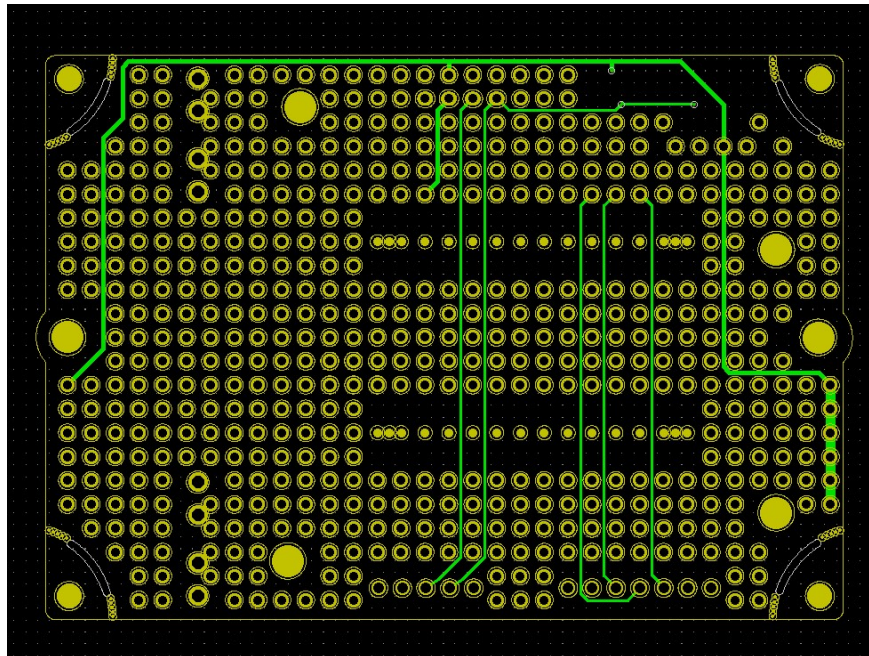
Pic.6. Grove and JST sensors board connection examples

PCB overview

IOT board connector pins have power, interfaces and GPIOs names printed out on PCB.

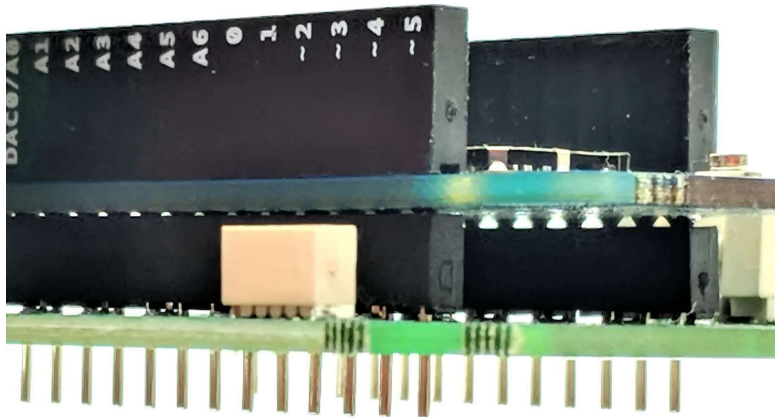


Pic.7. AMC PCB Front Copper traces



Pic.8. AMC PCB Back Copper traces

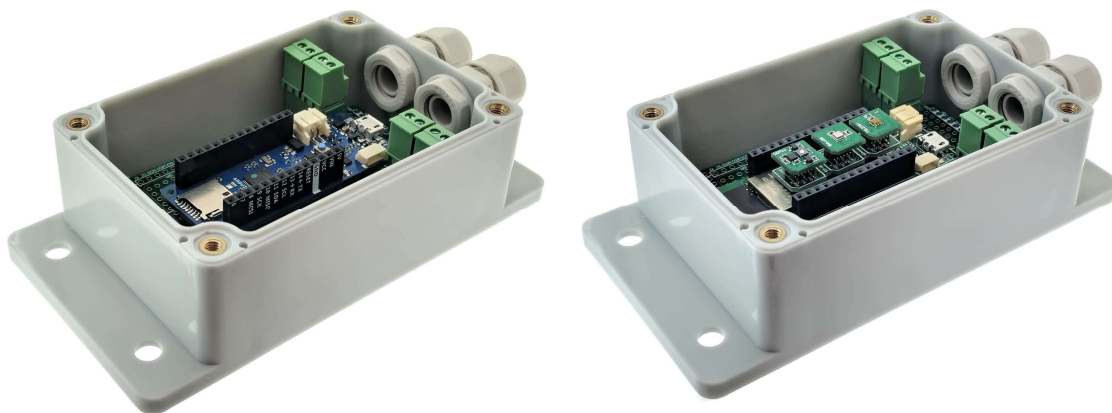
Low profile 0,1" pass through SMT connectors allow to carry Controller board as closer as possible to Kit PCB, saving space above that board to place additional components, like battery, OLED or sensors.



Pic.9. Low profile 0,1" pass through SMT connectors

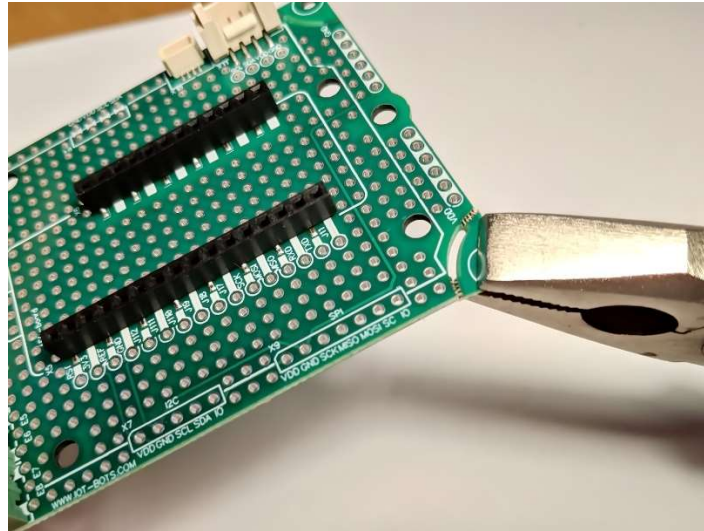
Enclosure option

To use the device created with this PCB kit outdoor or just put an electronics developed in nice enclosure an extra option exists : the board of the PCB kit is developed to be used together with qBox collections enclosure.



Pic.10. qBox collections enclosures to be used

To make it happens several simple steps to be done : just remove PCB corners by plier, mount PCB inside an enclosure and secure it by two 3,5mm self-tapping screws.



Pic.11. "Corners removal" PCB Enclosure option

Specification

PCB material grade: FR-4

PCB layers number: 2

PCB size: 3.43"x2.37"

Connectors installed:

- 1x14 pins low profile pass through 0,1" pitch AMC : 2
- 4-pins 2mm pitch Grove I2C&Power : 1
- 4-pins 1mm pitch JST I2C&Power : 1
- 2-pins 3,5mm terminal block : 4

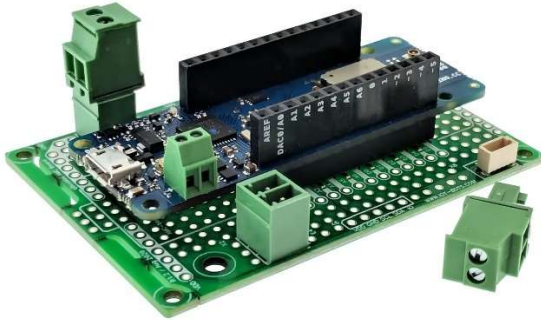
qGround AMC Enclosure Kit content

- High quality prototyping double sided PCB with connectors installed:
 - o Arduino MKR Compatible board female headers set (two low profile pass through 0,1" pitch 1x14pins connectors);
 - o Four 2-pins 3,5mm terminal blocks;
 - o One 4-pins Grove I2C&Power;
 - o One 4-pin JST I2C&Power connector;
- Four 2-pins 3,5mm terminal plugs;

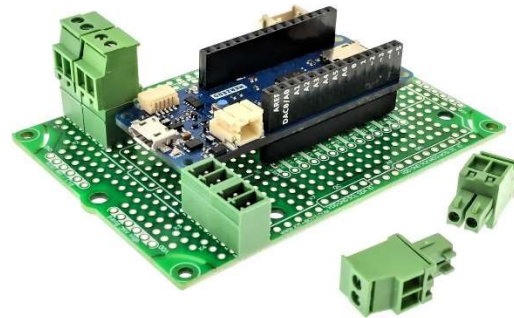
- Packaging bag and shipping box.

Usage examples

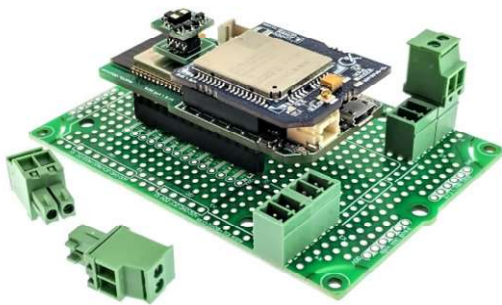
Using qGround AMC PCB Kits the variety of IOT DIY and POC and prototyping projects could be done.



Pic. 12. Arduino MKR 1300 project



Pic. 13. Arduino MKR Zero POC



Pic. 14. NB-IOT ToF proto



Pic. 15. qBoard Sensor Hub controller

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	qGround DIY IOT Arduino MKR Compatible PCB Kit	IBT-QGX-AMC-B