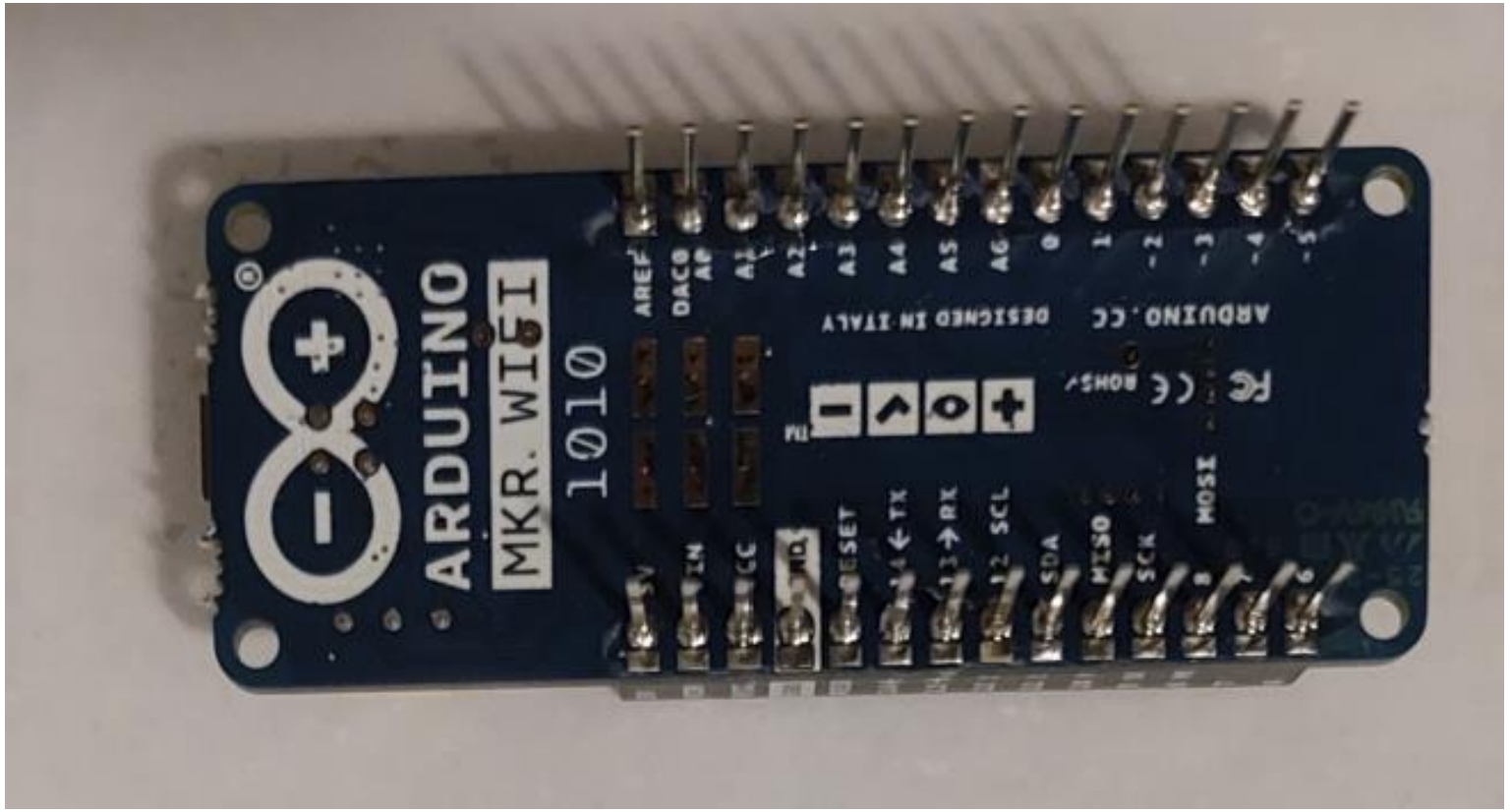
Arduino IoT kit

Arduino MrkWifi1010

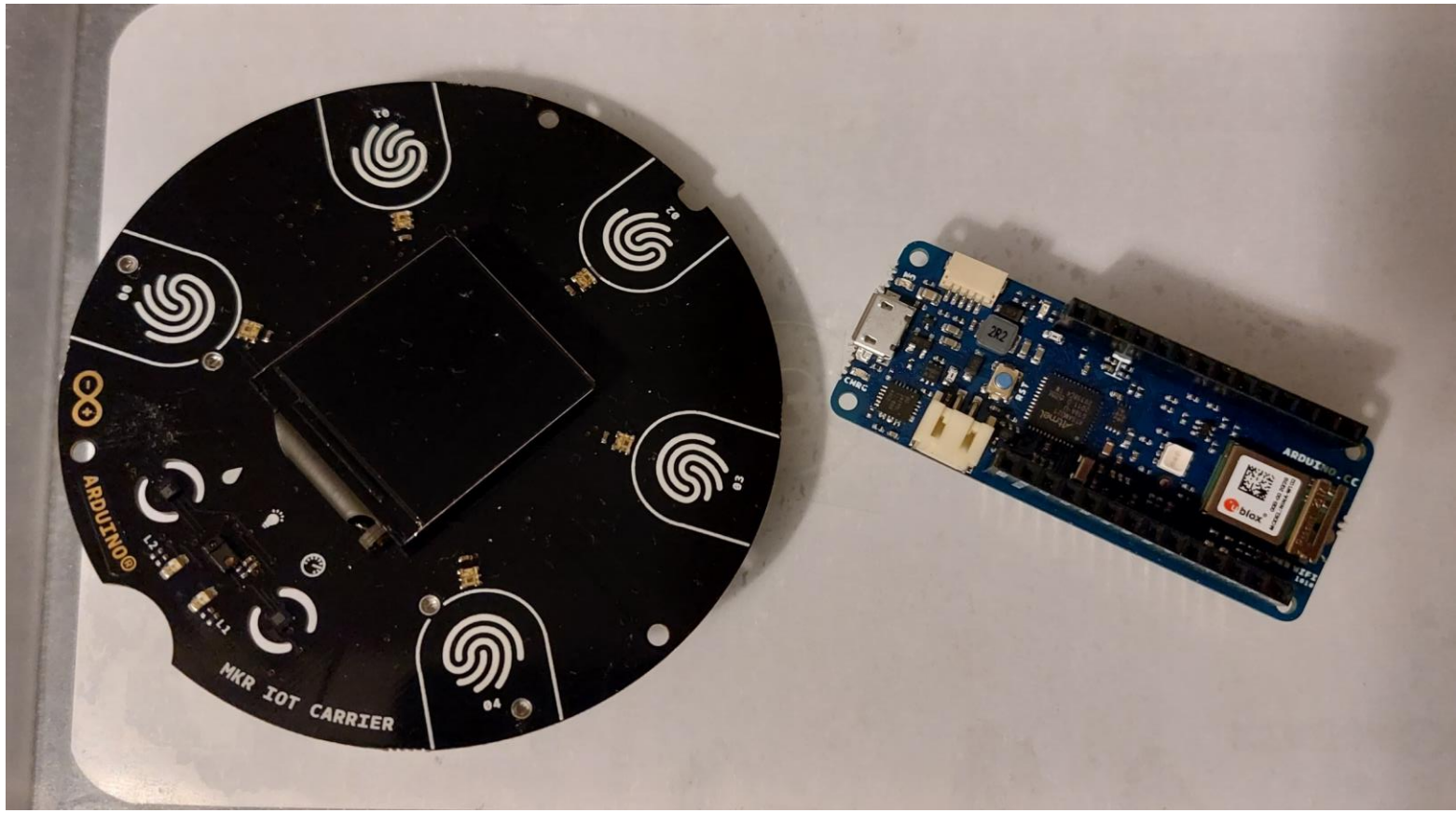


https://docs.arduino.cc/hardware/mkr-wifi-1010

Arduino MKR WiFi 1010

- **Microcontrollore:** SAMD21 Cortex-M0+ 32bit low power ARM MCU
- **Alimentazione (USB/VIN):** 5 VDC
- **Supporta alimentazione a batteria:** 1 batteria Li-Po a singola cella da 3,7 Volt – minimo 700 mAh
- **Tensione operativa:** 3,3V
- **I/O digitali:** 8
- **PWM:** 12 (pin 0, 1, 2, 3, 4, 5, 6, 7, 8, 10, A3 o 18, A4 o 19)
- **UART:** 1
- **SPI:** 1
- **I2C:** 1
- **Connettività:** Wi-Fi
- **Ingressi analogici:** 7 (ADC 8/10/12 bit)
- **Uscite analogiche:** 1 (DAC 10 bit)
- **Interrupt esterni:** 8 (0, 1, 4, 5, 6, 7, 8, A1 o 16, A2 o 17)
- **Corrente DC per pin I/O:** 7 mA
- **Memoria Flash:** 256 KB
- **SRAM:** 32 KB
- **EEPROM:** No
- **Velocità di Clock:** 48 MHz
- **Dimensioni (mm):** 61,5x25x20,80
- **Peso:** 32 grammi

MkrIoTcarrier



https://www.arduino.cc/reference/en/libraries/arduino_mkriotcarrier/

https://docs.arduino.cc/hardware/mkr-iot-carrier

http://docs.arduino.cc/tutorials/mkr-iot-carrier/mkr-iot-carrier-01-technical-reference

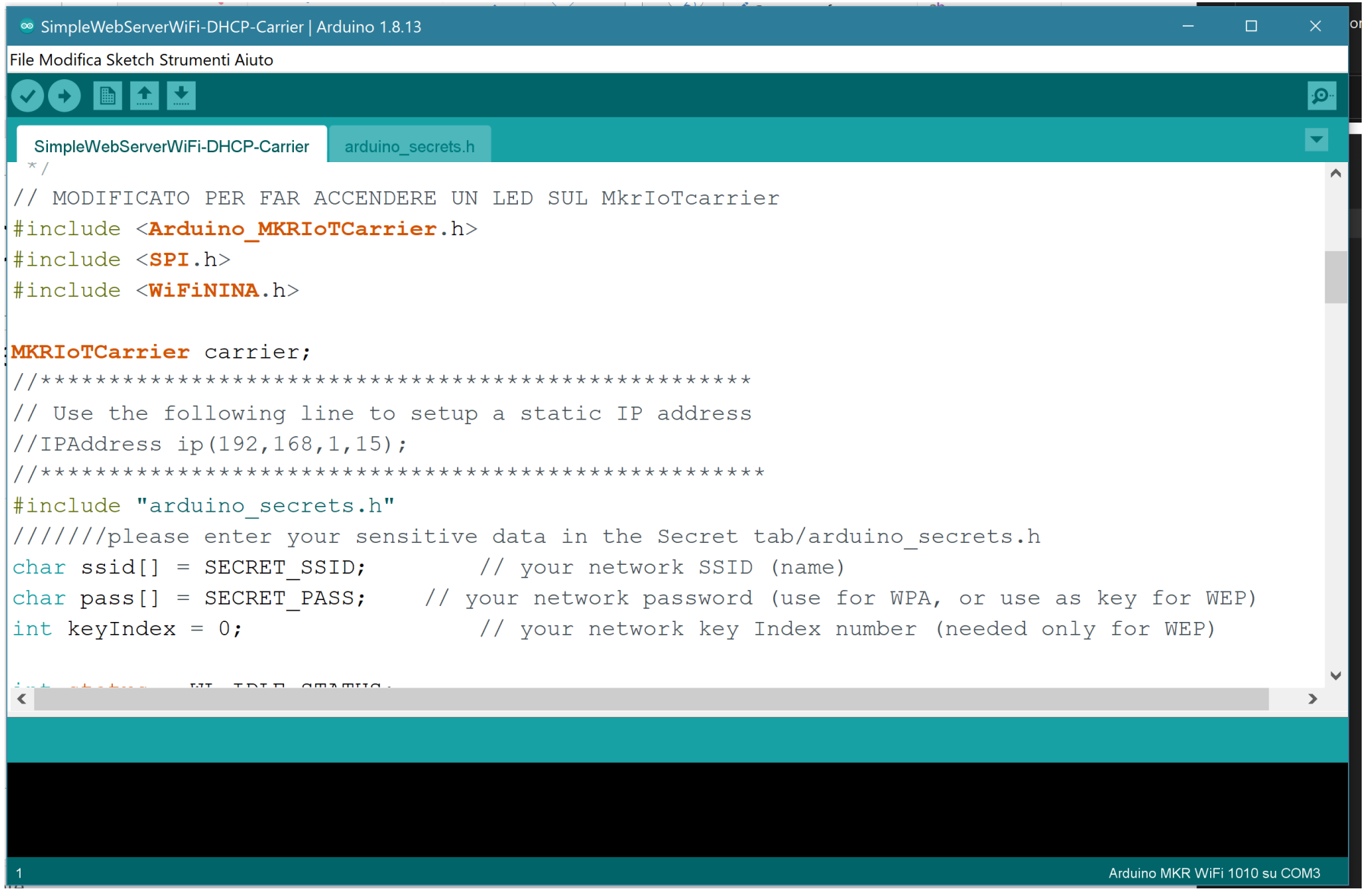
Programmare Arduino

- Installare l’IDE sul proprio PC
- Utilizzare l’IDE on-line

Collegando Arduino alla porta USB è possibile

- Fare l’upload del programma da eseguire
- Comunicare attraverso l’interfaccia seriale con l’IDE

L’IDE di Arduino



Esempio 1: connessione alla WiFi

Utilizza alcune librerie:

#include <SPI.h>

#include <WiFiNINA.h>

E per interfacciarsi con lo shield (il Carrier)

#include <Arduino_MKRIoTCarrier.h>

setup e loop

I programmi comprendono una funzione setup(), eseguita una sola volta all'avvio, e una funzione loop() ripetuta all'infinito.

```
WiFiServer server(80);
void setup() { …  status = WiFi.begin(ssid, pass);
                … server.begin();  }
void loop() { … WiFiClient client = server.available();
              while (client.connected()) {          // loop while the client's connected
                 if (client.available()) {          // if there's bytes to read from the client,
                 char c = client.read();
                  …    }  // legge una riga alla volta = richiesta proveniente dal client (via browser)
                  client.print("Click <a href=\"/H\">here</a> turn the LED on pin LED_BUILTIN on<br>");
                  client.print("Click <a href=\"/L\">here</a> turn the LED on pin LED_BUILTIN off<br>");
                 if (currentLine.endsWith("GET /H")) {
                       Carrier.leds.setPixelColor(0, color); // set Led 0 to color "color"
                       carrier.leds.show();                  //  Refresh strip
              …        }
              client.stop();
}
```

Esempio 2: comunicazione con MQTT

```
#include <MQTT.h>
MQTTClient client;
#define BROKER_IP    "193.206.52.98"
#define DEV_NAME     "mqttdevice"
#define MQTT_USER    "pissir"
#define MQTT_PW      "pissir2020"
…
void setup() {   client.begin(BROKER_IP, 1883, net);
                  client.onMessage(messageReceived);
                 … client.connect(DEV_NAME, MQTT_USER, MQTT_PW);
                …  client.subscribe("/hello");}
void loop()  { … client.publish("/hello", "world");  … }
```

Esempio 2: comunicazione con MQTT (cont.)

```
void messageReceived(String &topic, String &payload) {
  Serial.println("incoming: " + topic + " - " + payload);
   if (topic == "/hello") {
   if (payload == "open") {
     Serial.println("open");
     carrier.leds.setPixelColor(0, color); // set Led 0 to color "color"
     carrier.leds.show();                  // Refresh strip
   } else if (payload == "closed") {
     Serial.println("closed");
     carrier.leds.setPixelColor(0,0); // switch Led 0 off
     carrier.leds.show();    }
 }
}
```

Grove connectors

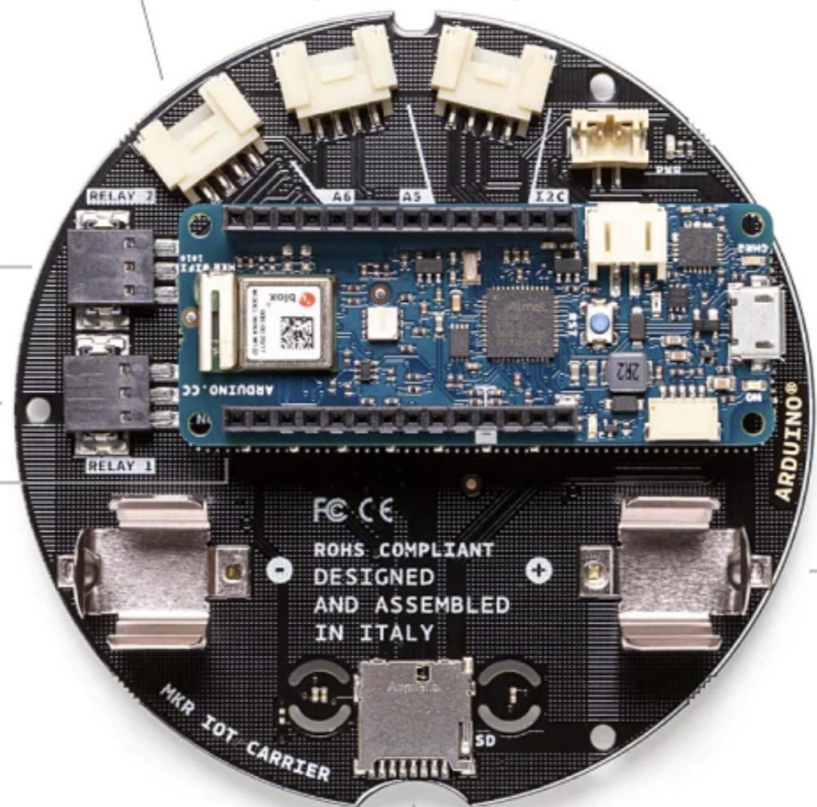
Analog compatible

Grove connector

I2C compatible

Relay connectors

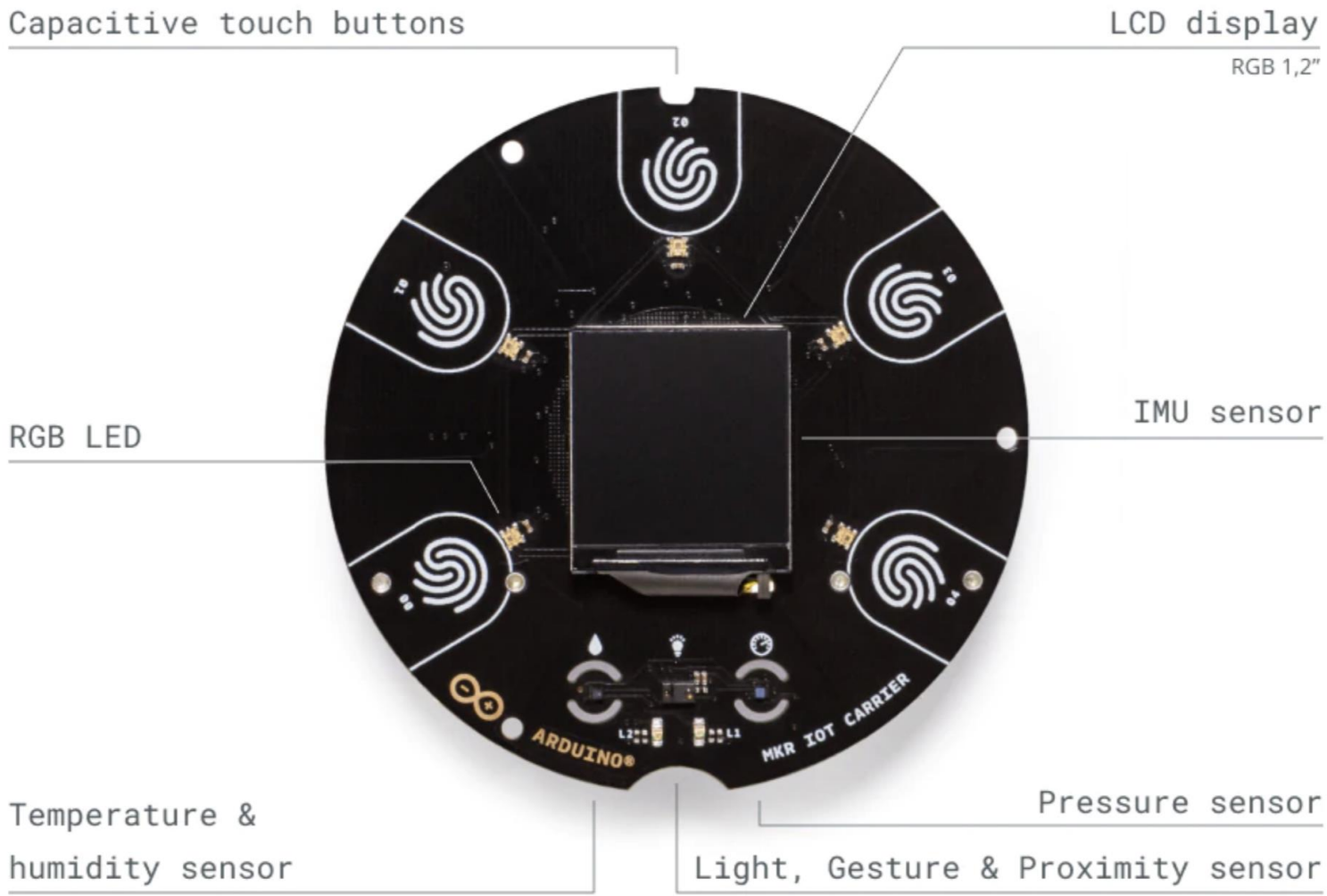
Piezo



Battery clip

18650 Li-Ion

SD card slot


Capacitive touch buttons
LCD display
RGB 1,2”
RGB LED
IMU sensor
Temperature &
humidity sensor
Pressure sensor
Light, Gesture & Proximity sensor
ARDUINO®
MKR IOT CARRIER

Due moduli grove esterni

- Per misurare l’umidità del terreno
- Per rilevare il movimento