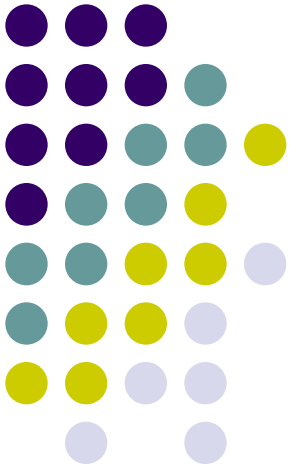
Chapter 2: Introducing STM32L4 and mbed

EE2405

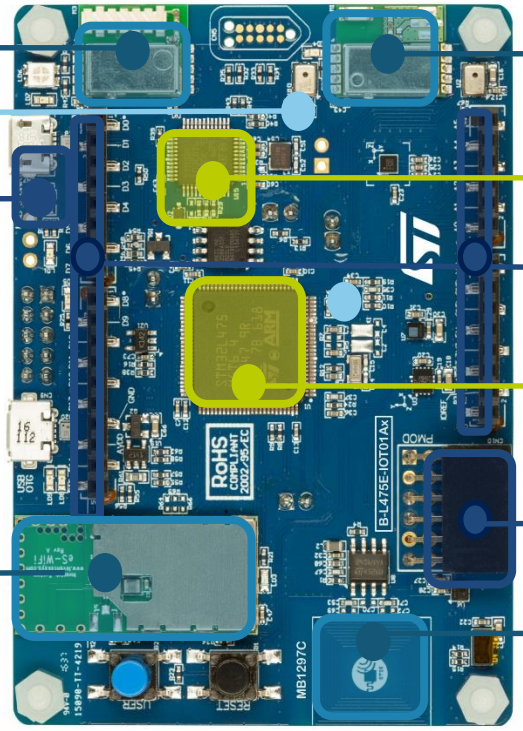
嵌入式系統與實驗

Embedded System Lab



STM32L4+ Discovery IoT node

- Based on STM32L4+ SoC
- For IoT application prototyping



BLE module (BlueNRG)

Audio mics

Power supply through USB

Gyro/Accelero/Magnetometer, Proximity, Pressure, Humidity, Temperature sensors

Wi-Fi module

SubGHz module

Integrated ST-Link/V2-1: drag & drop Flash programming

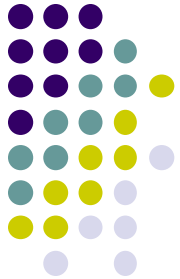
Arduino Uno extension connectors

STM32L475 MCU

PMOD extension connector

Simplified NFC configuration

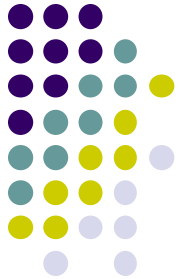
STM32L4+ Discovery IoT node Features



- STM32L4 microcontroller based on the Arm® Cortex®-M4 core with 2 Mbytes of Flash memory and 640 Kbytes of RAM
- 64-Mbit Quad-SPI Flash memory
- Bluetooth® 4.1 module
- 802.11 b/g/n Wi-Fi
- NFC tag
- 2 digital omnidirectional microphones
- Humidity and temperature sensor
- 3-axis magnetometer
- 3D accelerometer and 3D gyroscope
- 260-1260 hPa absolute digital output barometer
- Time-of-flight and gesture-detection sensor
- Highly-secure solution
- 2 push-buttons (user and reset)
- USB OTG FS with Micro-AB connector
- ARDUINO® Uno V3 expansion connector
- USB mass storage, Virtual COM port, and debug port

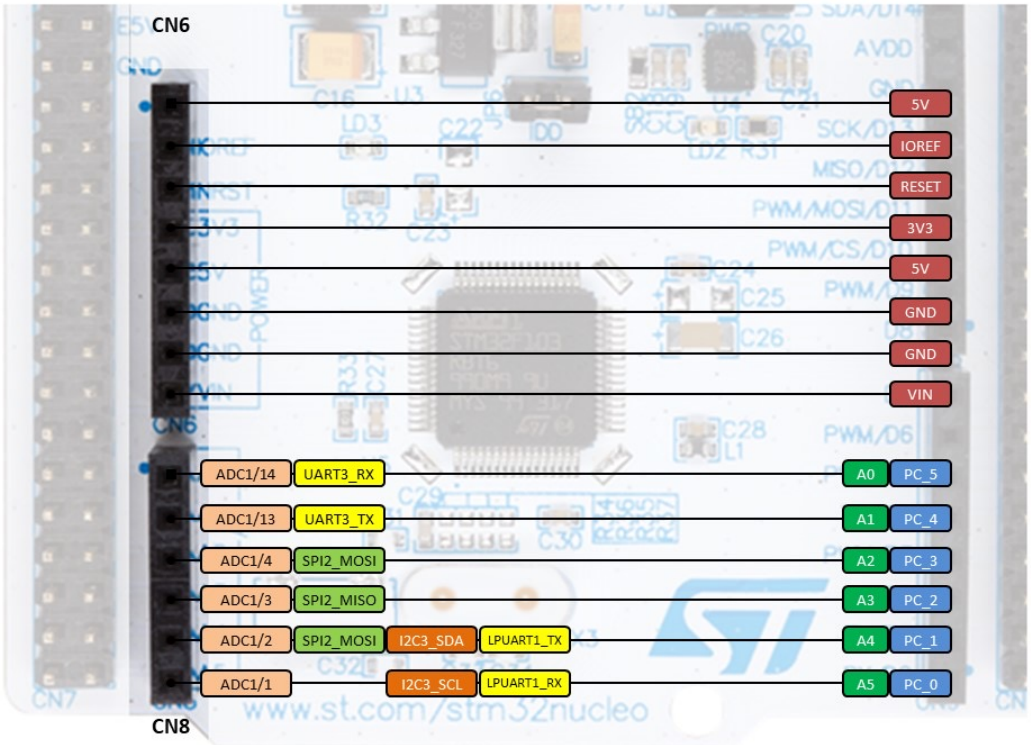
https://os.mbed.com/platforms/B-L4S5I-IOT01A/

STM32L4+ Arduino Interface: Left Side

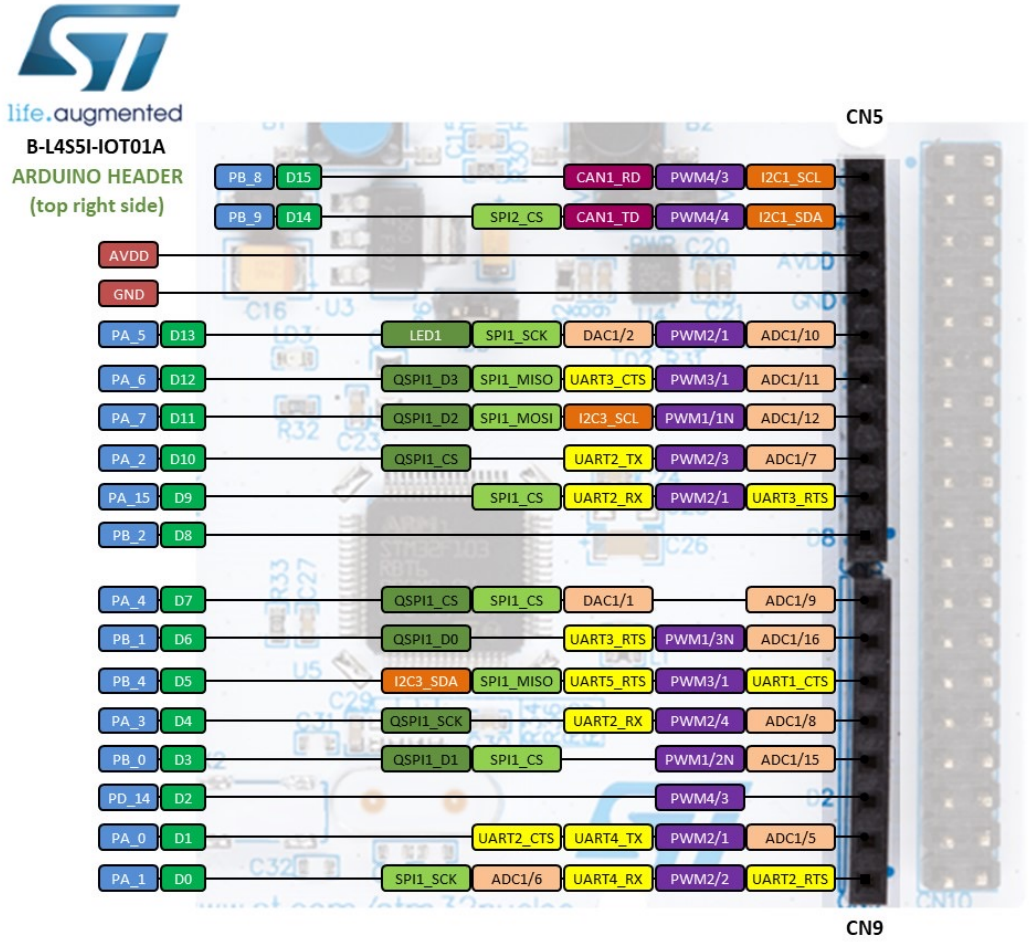


life.augmented

B-L4S5I-IOT01A
ARDUINO HEADER
(top left side)



STM32L4+ Arduino Interface: Right Side



STM32L4+ Additional Interface

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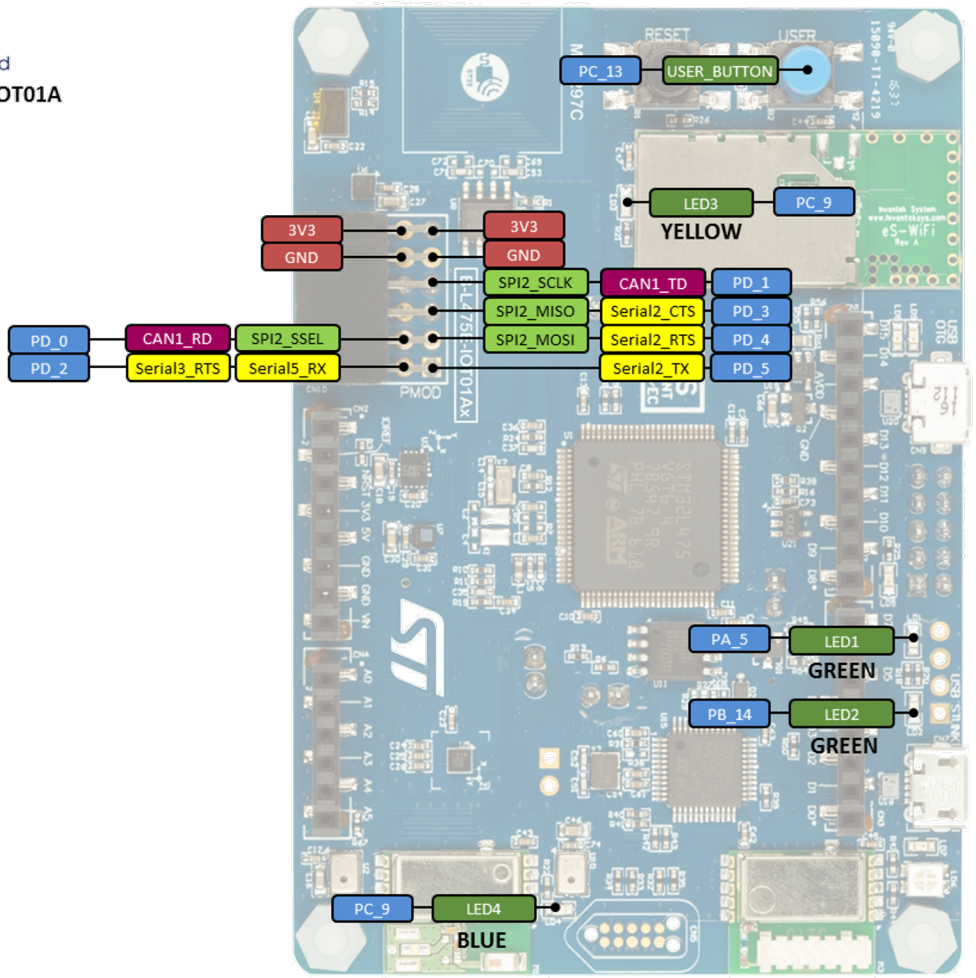
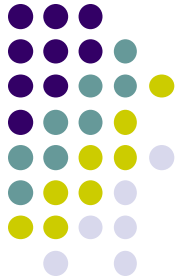
DISCO-L475VG-IOT01A

OTHERS



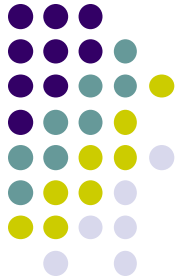
Mbed OS



- ARM Mbed OS is a free, open-source embedded operating system designed specifically for the "things" in the Internet of Things.
- Based on an ARM Cortex-M microcontroller.
- Device and component libraries
- Isolated security domain and TLS for communications
- Drivers for Bluetooth Low Energy, Thread, 6LoWPAN, Mobile IoT (LPWA), Ethernet and WiFi.
- Toolchains from ARM, GCC, IAR, etc.

https://www.mbed.com/en/platform/mbed-os/

A Typical mbed Program



```
#include "mbed.h"

DigitalOut myled(LED1);

int main()
{
    // Blink LED
    while (1) {
        myled = 1;              // set LED1 pin to high
        ThisThread::sleep_for(500ms);

        myled.write(0);         // set LED1 pin to low
        ThisThread::sleep_for(500ms);
    }
}
```