CEC Continuing Education Center

DesignNews

IoT Designs Using STmicro Microcontrollers

Day 2:

Microchip Meets NUCLEO

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Webinar Logistics

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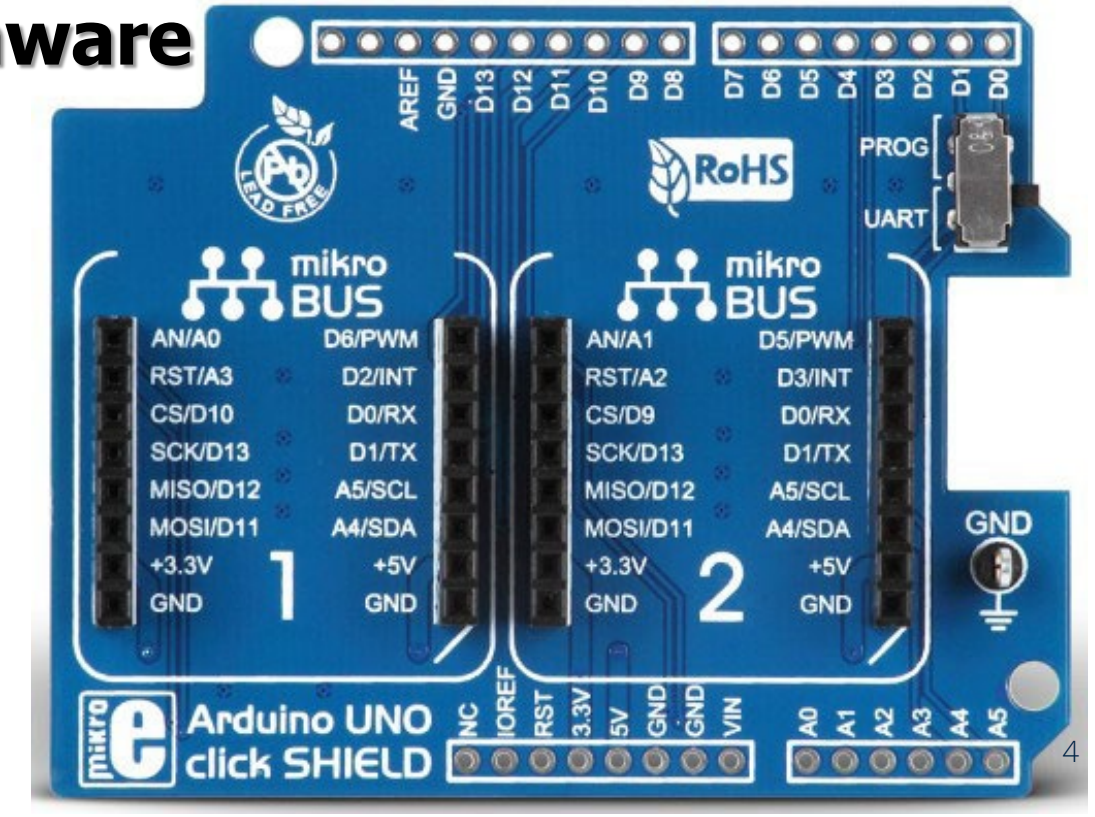
Fred Eady

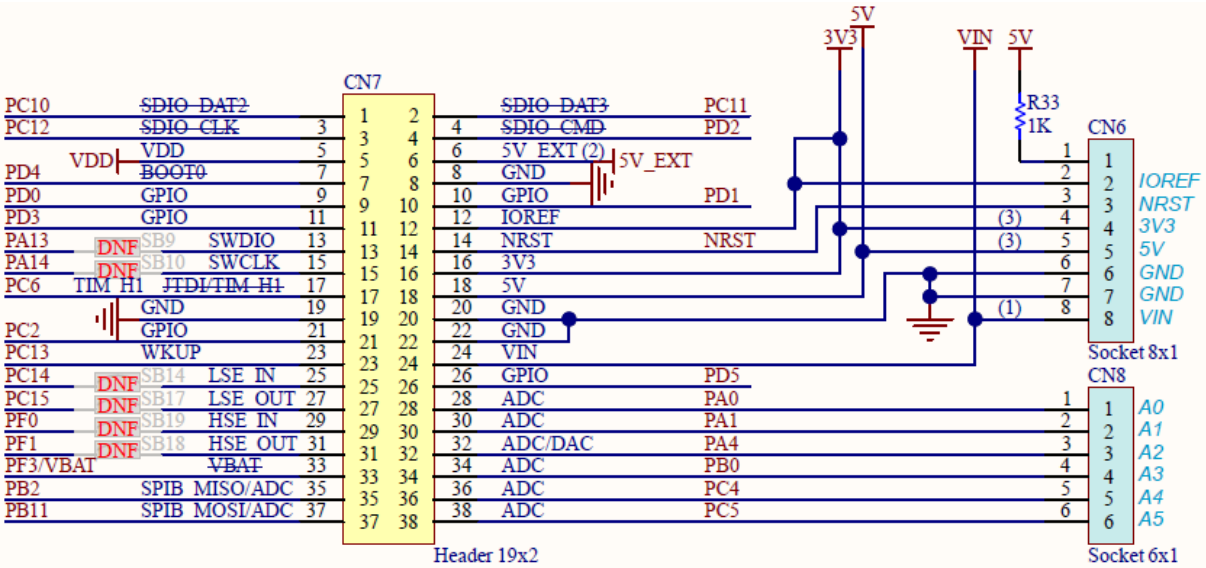
Visit ‘Lecturer Profile’ in your console for more details.

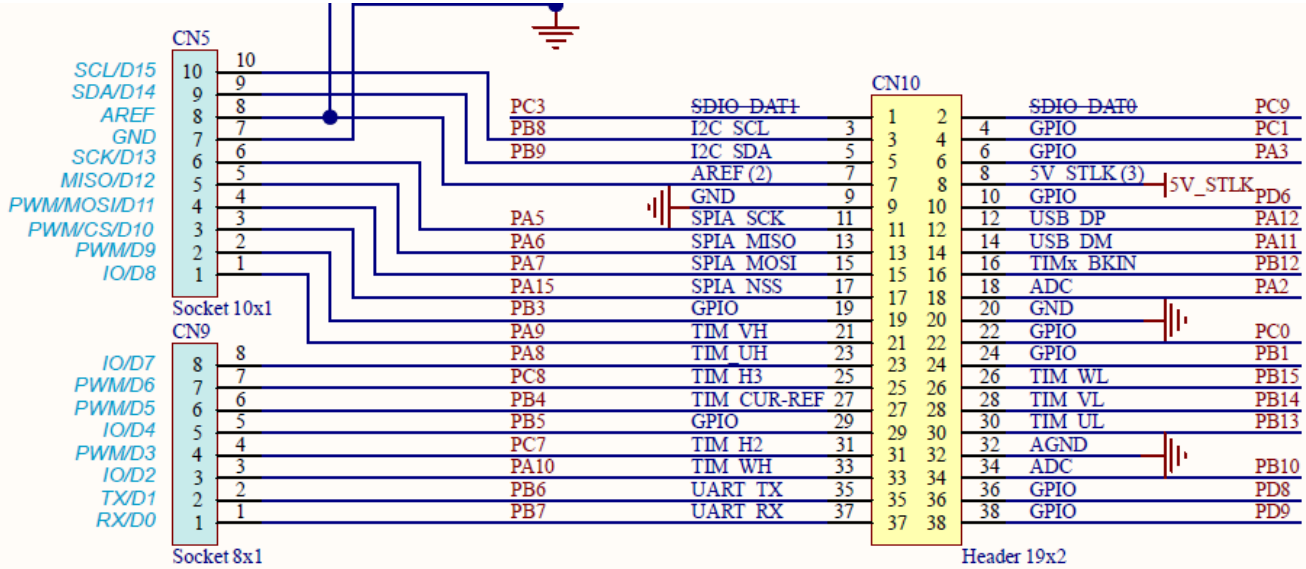
AGENDA

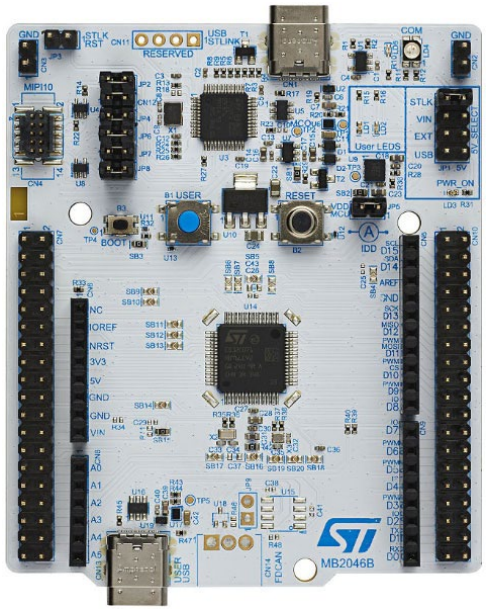
- NUCLEO-C071RB/Arduino UNO click SHIELD Setup
  - STM32C071RB Pin Configuration
  - Arduino UNO click SHIELD Hardware Modification
- Code an RN4871 Driver
  - Update the RN4871 click Firmware
  - Code the RN4871 click Driver
  - Test the RN4871 click Driver



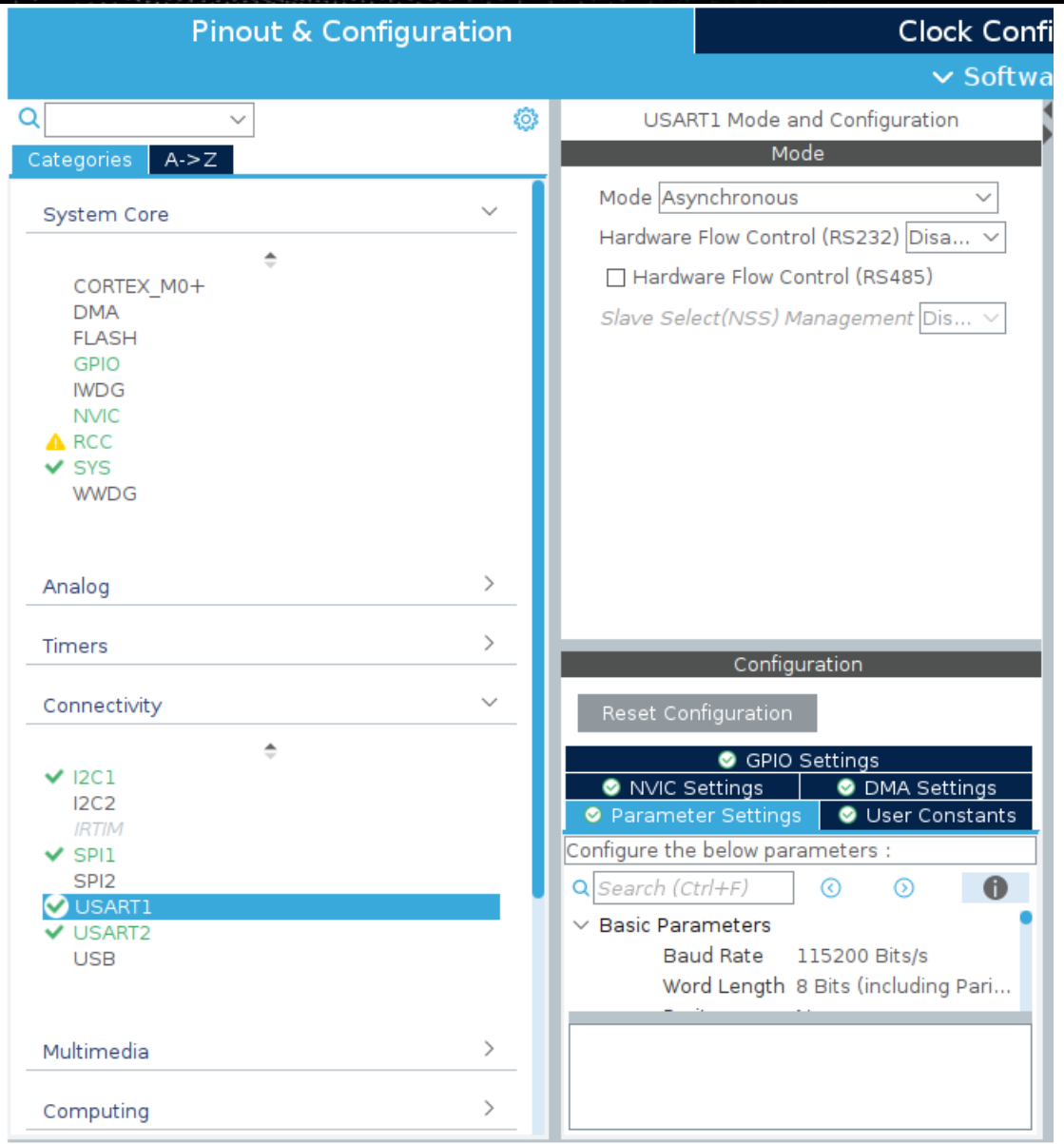
STM32C071RB Pin Configuration

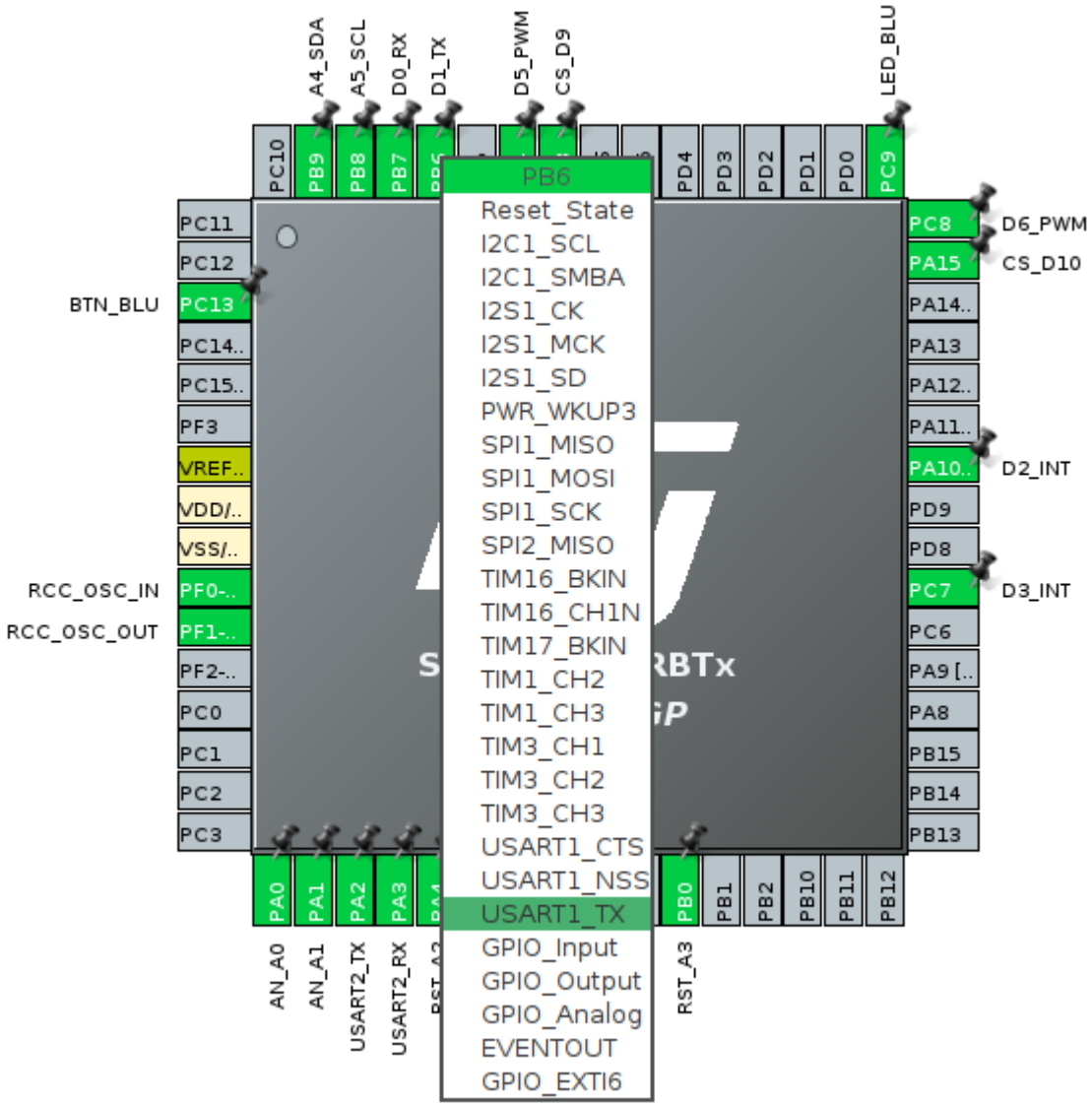




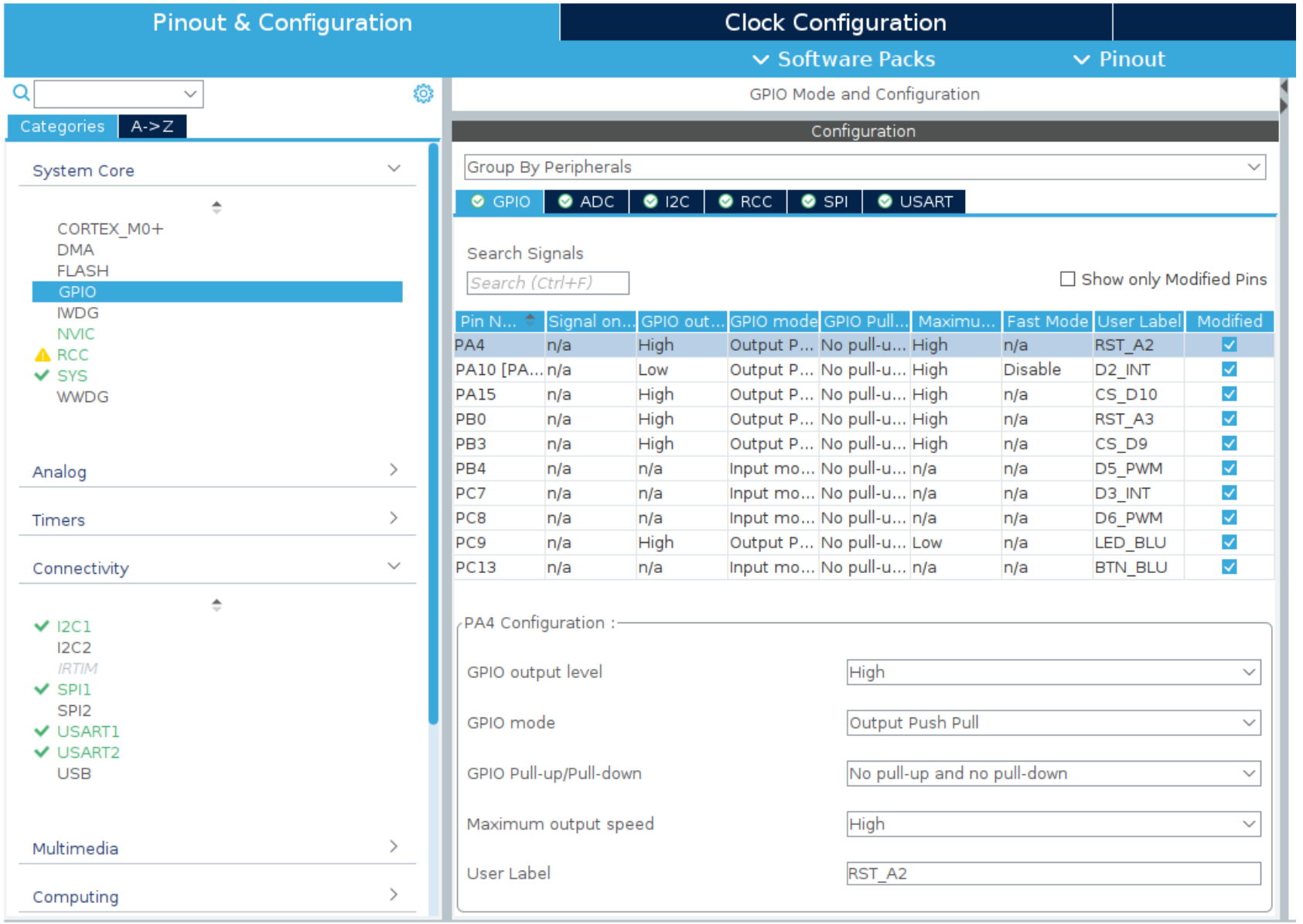


STM32C071RB Pin Configuration

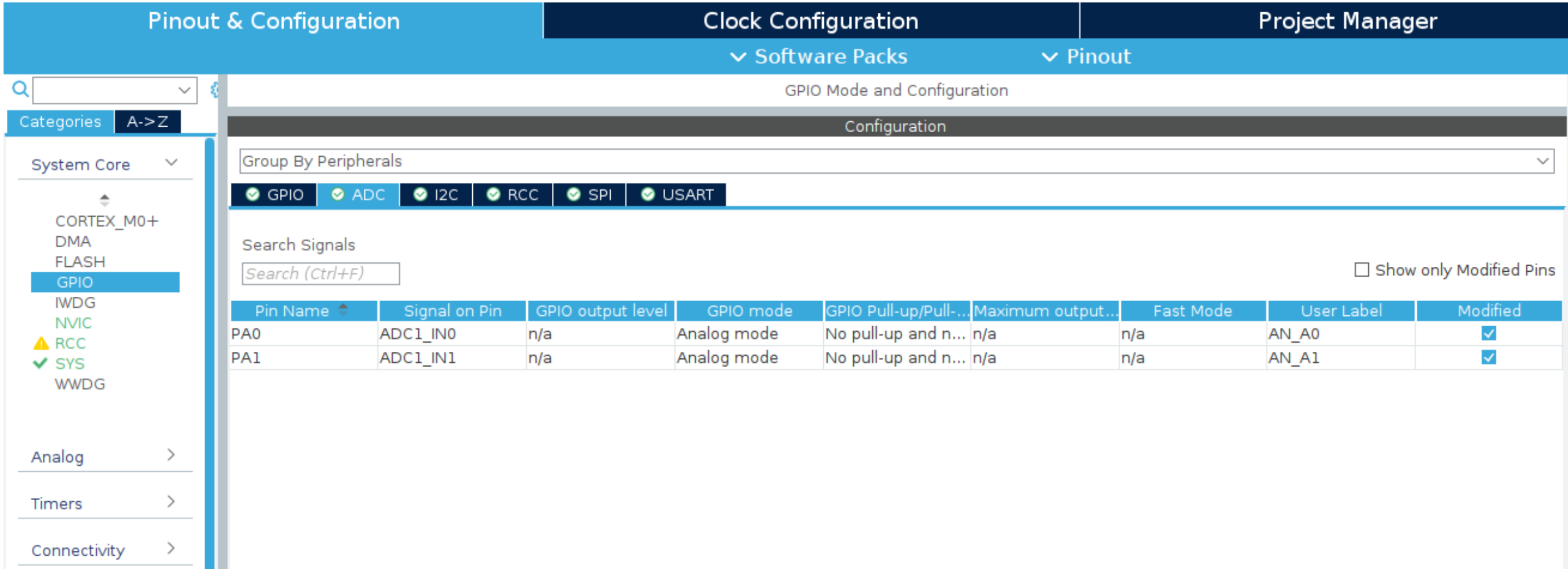




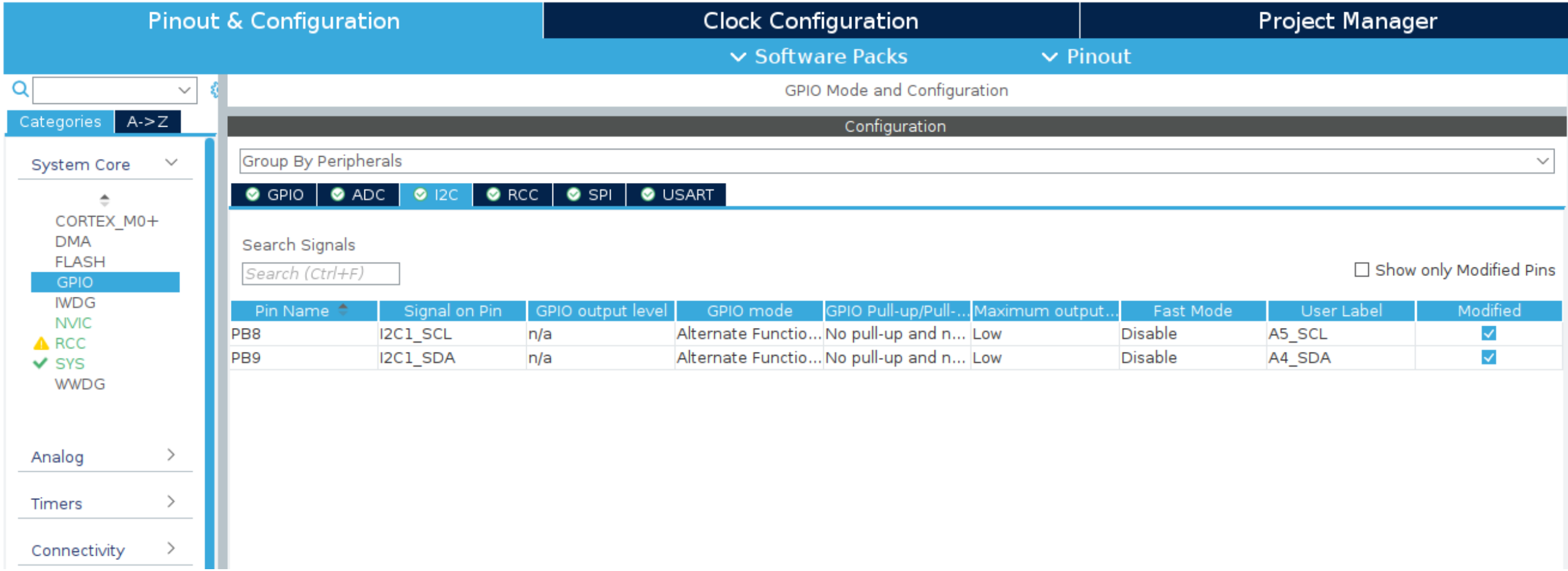
STM32C071RB Pin Configuration - GPIO



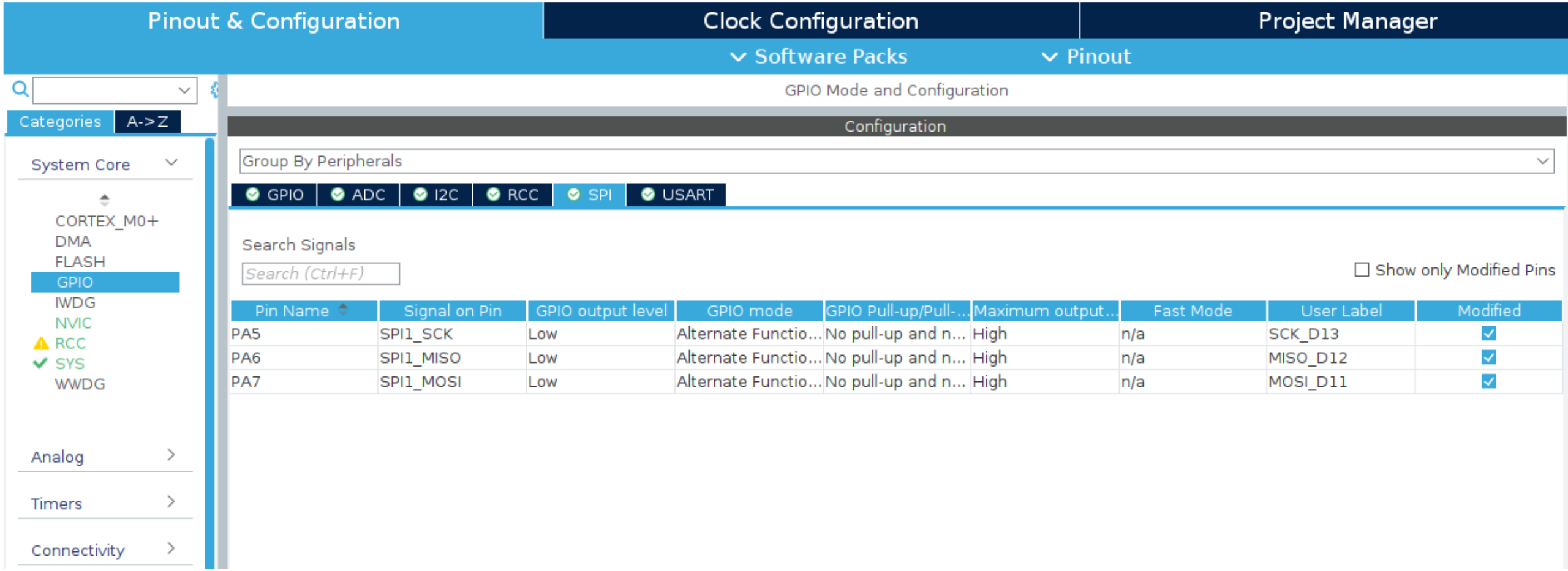
STM32C071RB Pin Configuration - Analog



STM32C071RB Pin Configuration – I²C



STM32C071RB Pin Configuration - SPI



STM32C071RB Pin Configuration – USART1

Pinout & Configuration | Clock Configuration | Project Manager

Software Packs | Pinout

Categories | A->Z

System Core
- CORTEX_M0+
- DMA
- FLASH
- GPIO
- IWDG
- NVIC
- RCC
- SYS
- WWDG

Analog

Timers

Connectivity

GPIO Mode and Configuration

Configuration

Group By Peripherals

GPIO | ADC | I2C | RCC | SPI | USART

Search Signals

Search (Ctrl+F)

Show only Modified Pins

Pin Name	Signal on Pin	GPIO output level	GPIO mode	GPIO Pull-up/Pull-...	Maximum output...	Fast Mode	User Label	Modified
PA2	USART2_TX	Low	Alternate Functio...	No pull-up and n...	High	n/a		☑
PA3	USART2_RX	Low	Alternate Functio...	No pull-up and n...	High	n/a		☑
PB6	USART1_TX	n/a	Alternate Functio...	No pull-up and n...	High	Disable	D1_TX	☑
PB7	USART1_RX	n/a	Alternate Functio...	No pull-up and n...	High	Disable	D0_RX	☑

STM32C071RB Pin Configuration - Interrupts

Pinout & Configuration | Clock Configuration | Project Manager

Software Packs | Pinout

Categories | A->Z

System Core
- CORTEX_M0+
- DMA
- FLASH
- GPIO
- IWDG
- NVIC
- RCC
- SYS
- WWDG

Analog

Timers

Connectivity

Multimedia

NVIC Mode and Configuration

Configuration

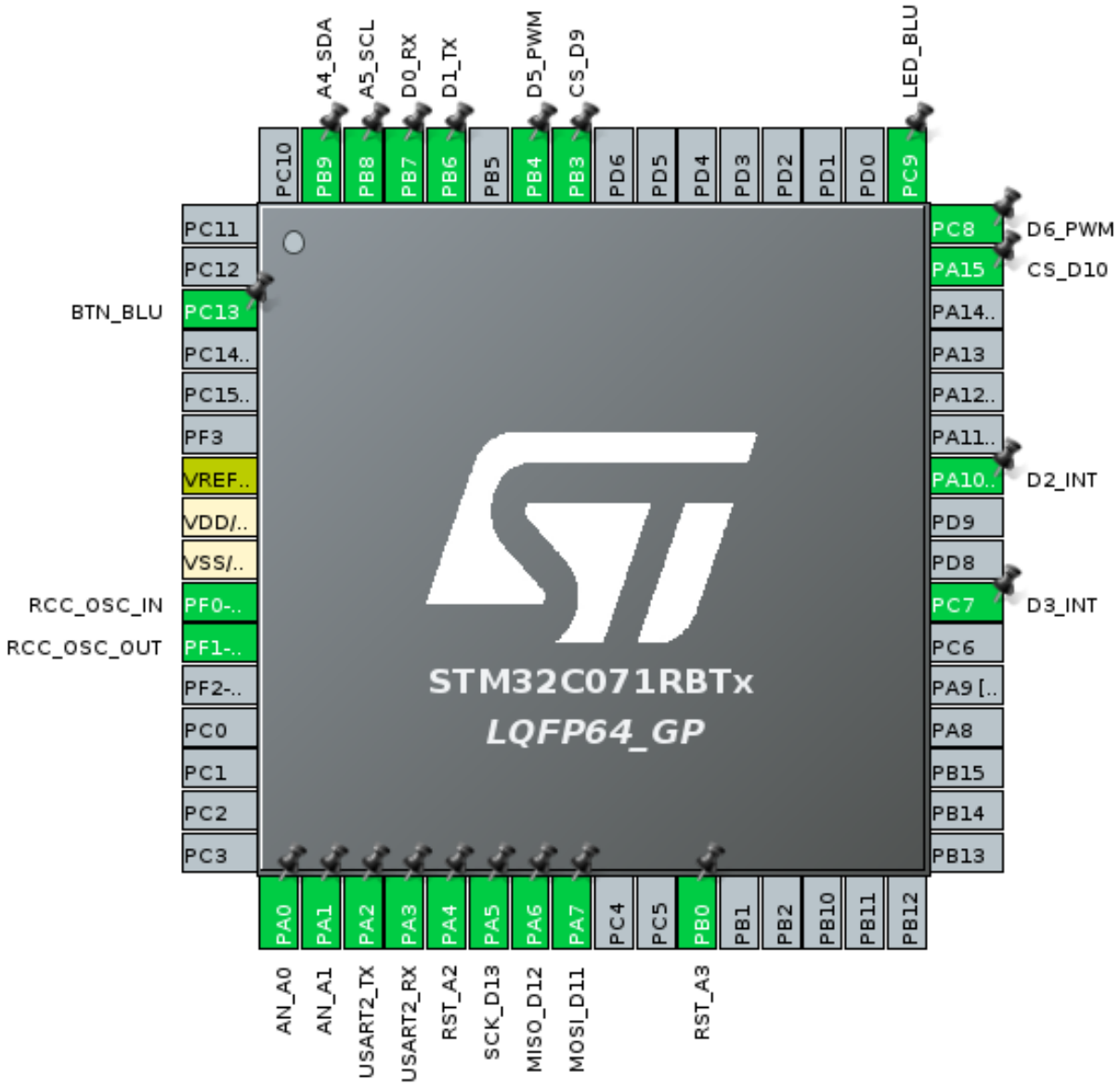
NVIC | Code generation

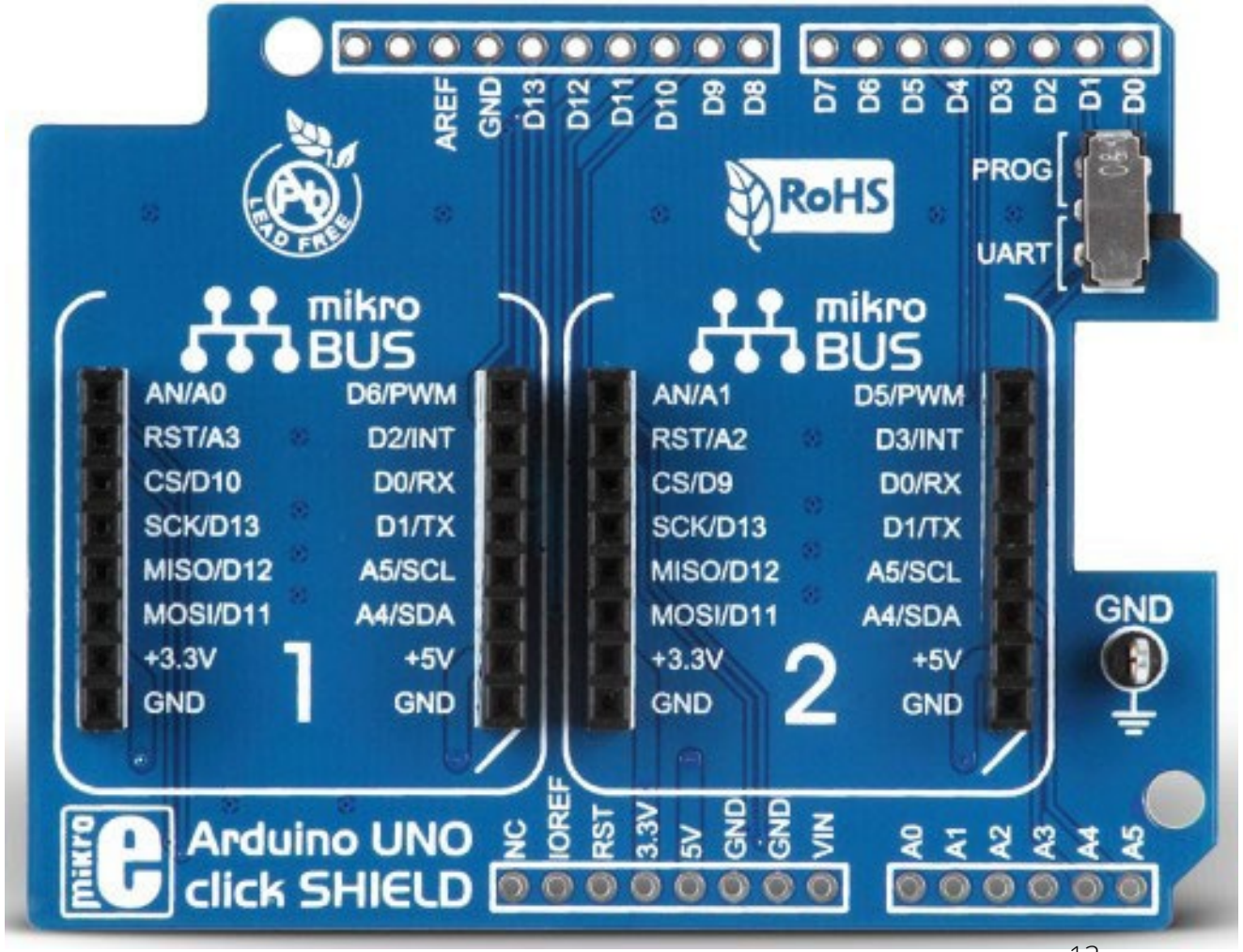
Sort by Premption Priority and Sub Priority | Sort by interrupts names

Search (Ctrl+F) | Show available interrupts | Force DMA channels Interrupts

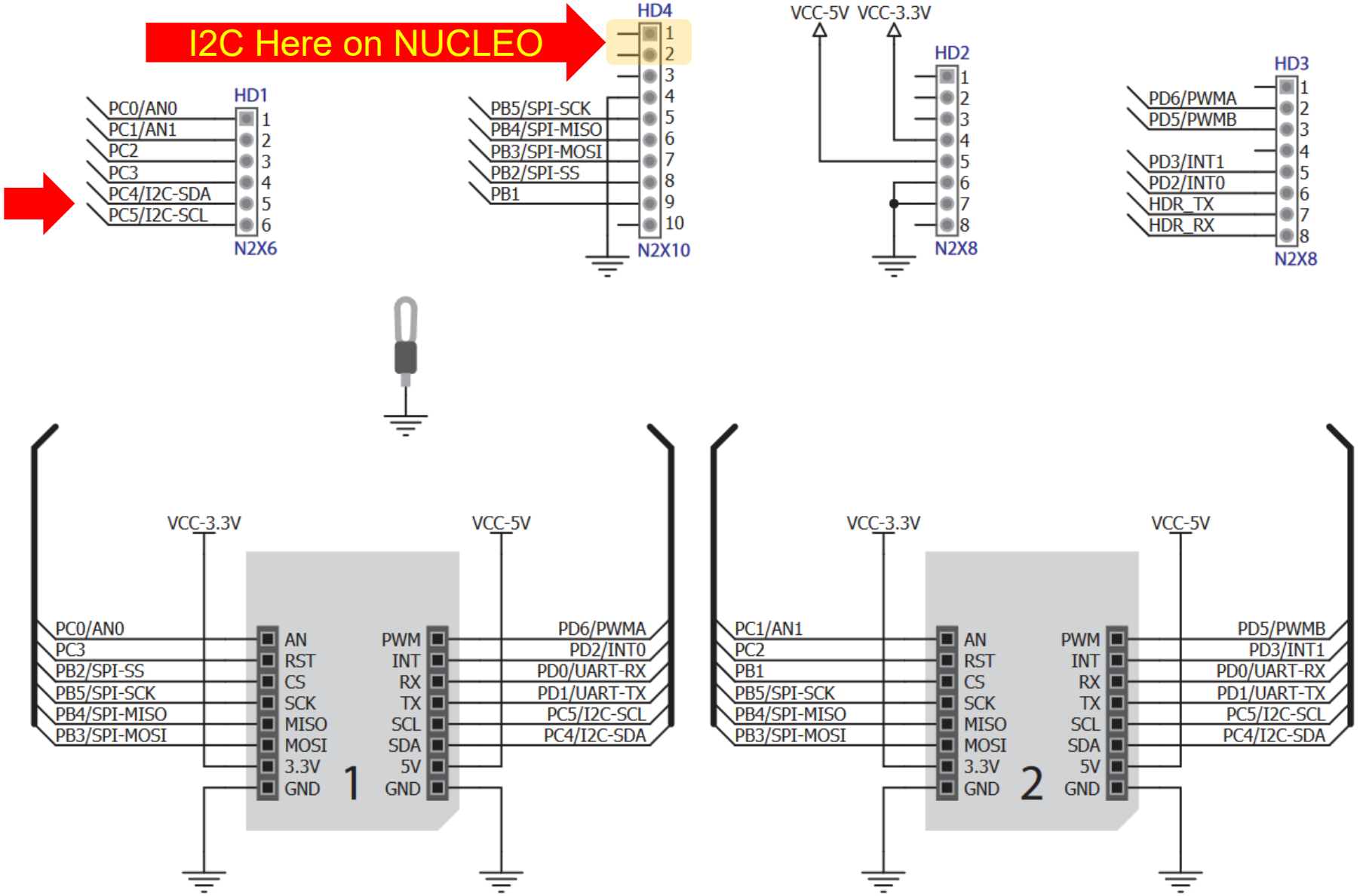
NVIC Interrupt Table	Enabled	Preemption Priority
Non maskable interrupt	☑	0
Hard fault interrupt	☑	0
System service call via SWI instruction	☑	0
Pendable request for system service	☑	0
Time base: System tick timer	☑	3
Flash global interrupt	☐	0
RCC global Interrupt + CRS global interrupt	☐	0
ADC1 interrupt	☐	0
TIM1 break, update, trigger and commutation interrupts	☐	0
TIM1 capture compare interrupt	☐	0
I2C1 interrupt (combined with EXTI 23)	☐	0
SPI1 interrupt	☐	0
USART1 interrupt	☑	0
USART2 interrupt	☐	0

STM32C071RB Pin Configuration – Pin Assignments

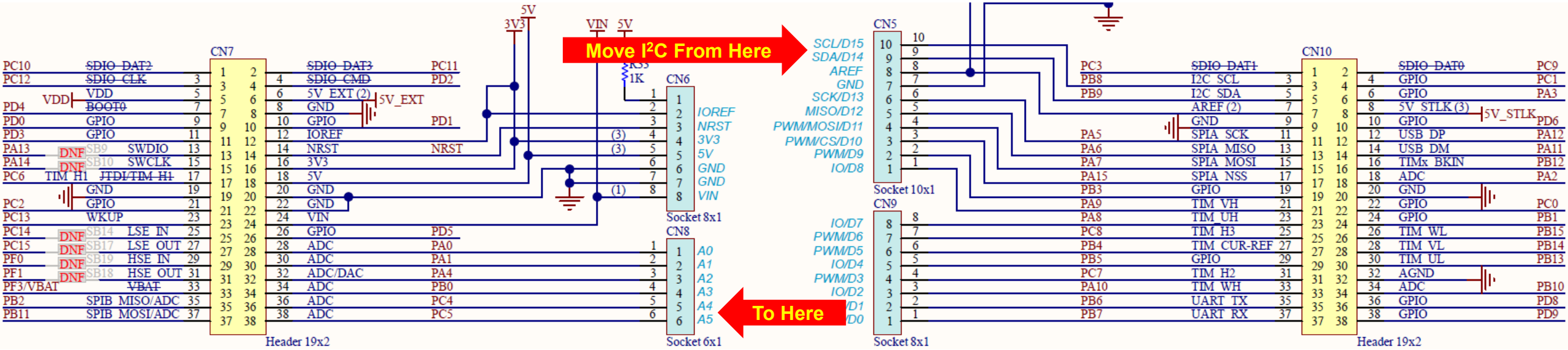




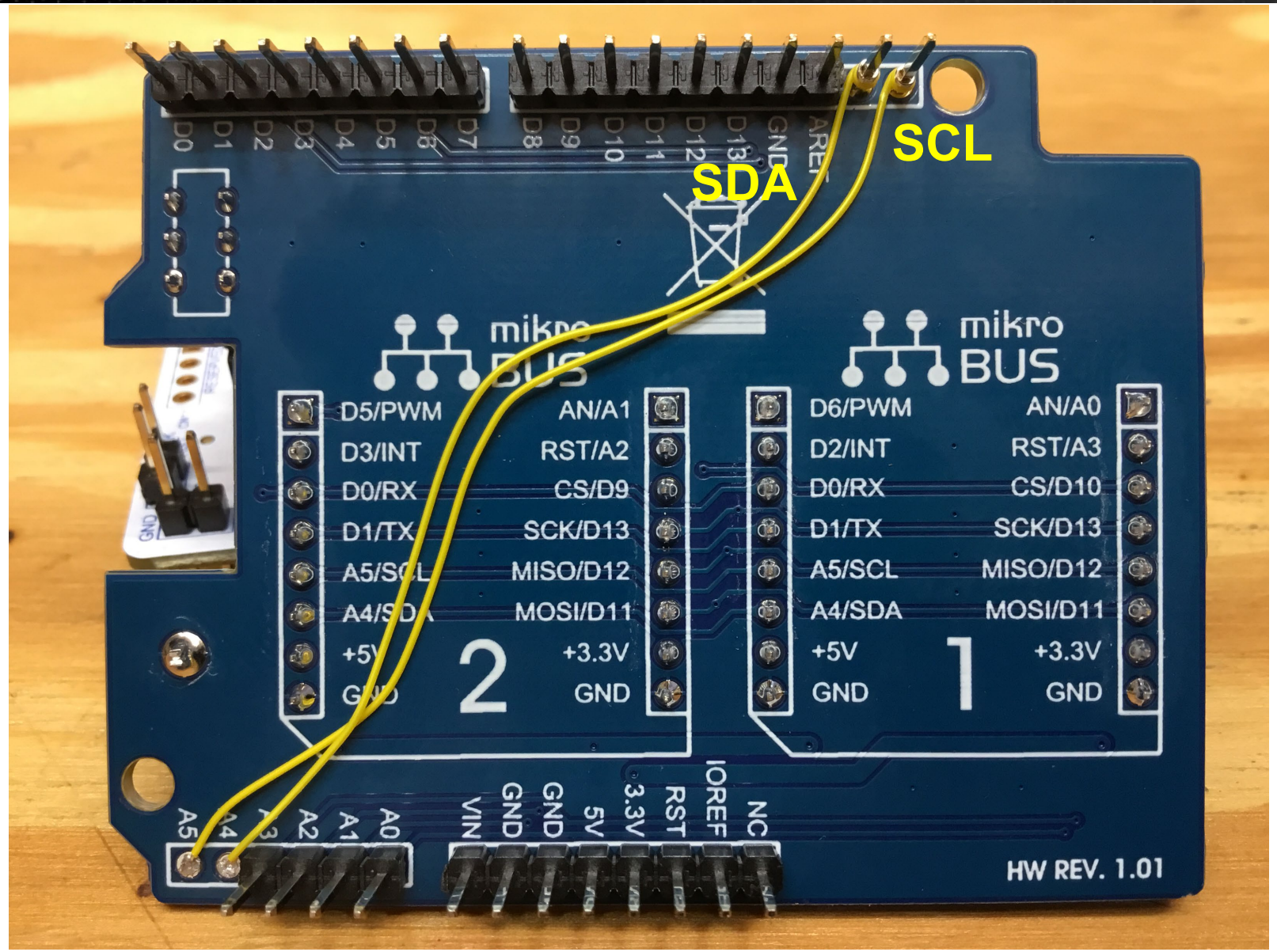
Arduino UNO click SHIELD Hardware Modification



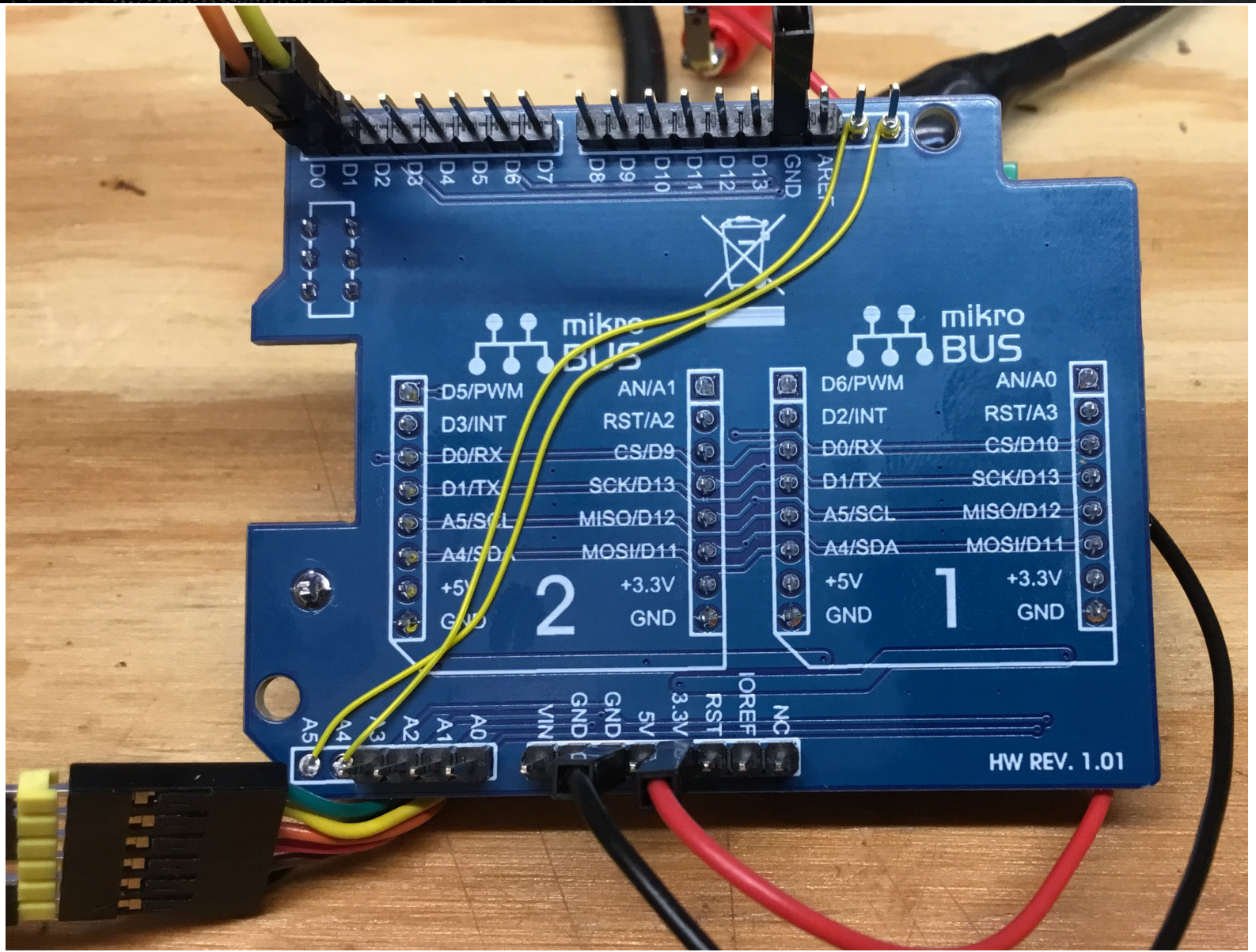
Arduino UNO click SHIELD Hardware Modification

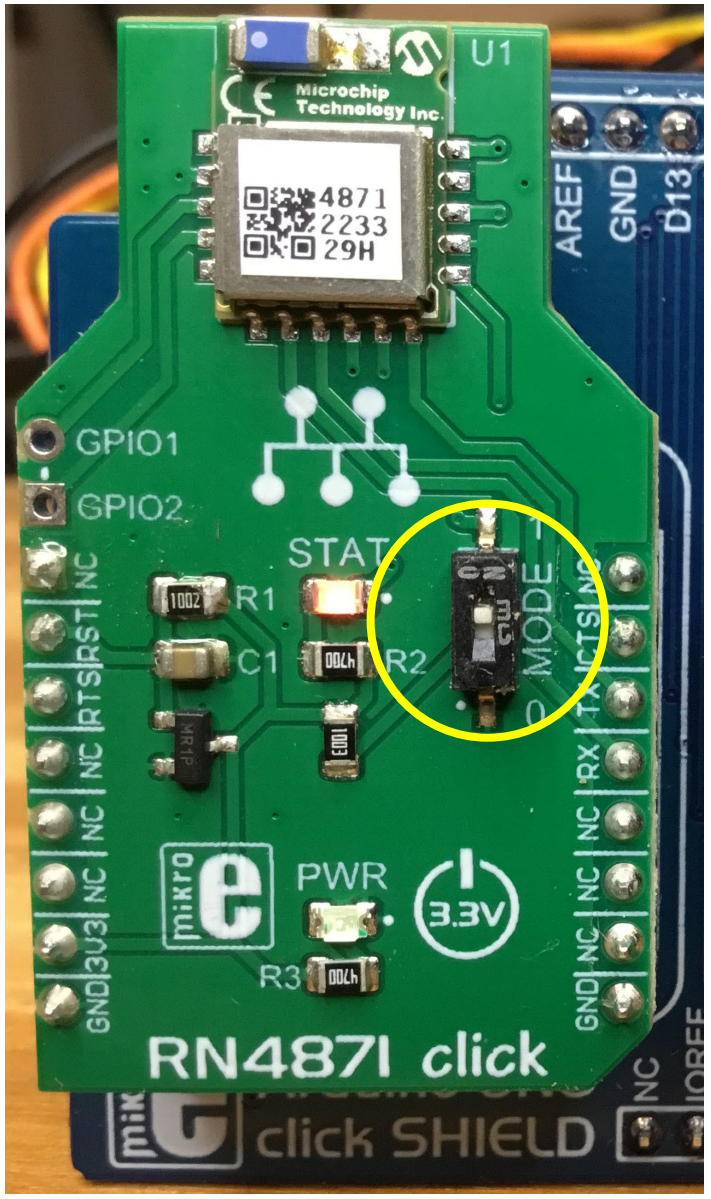


Arduino UNO click SHIELD Hardware Modification

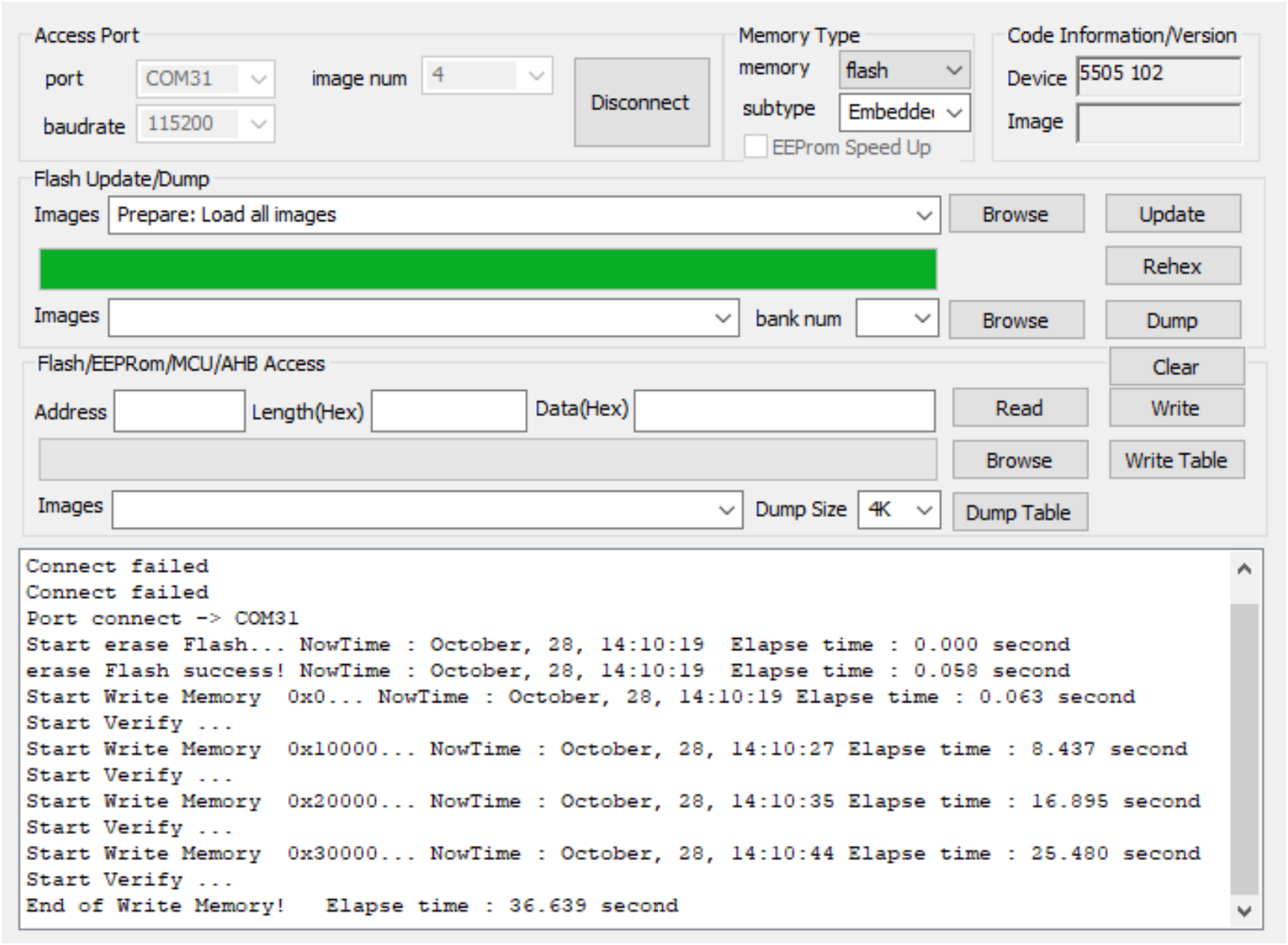


Update the RN4871 click Firmware



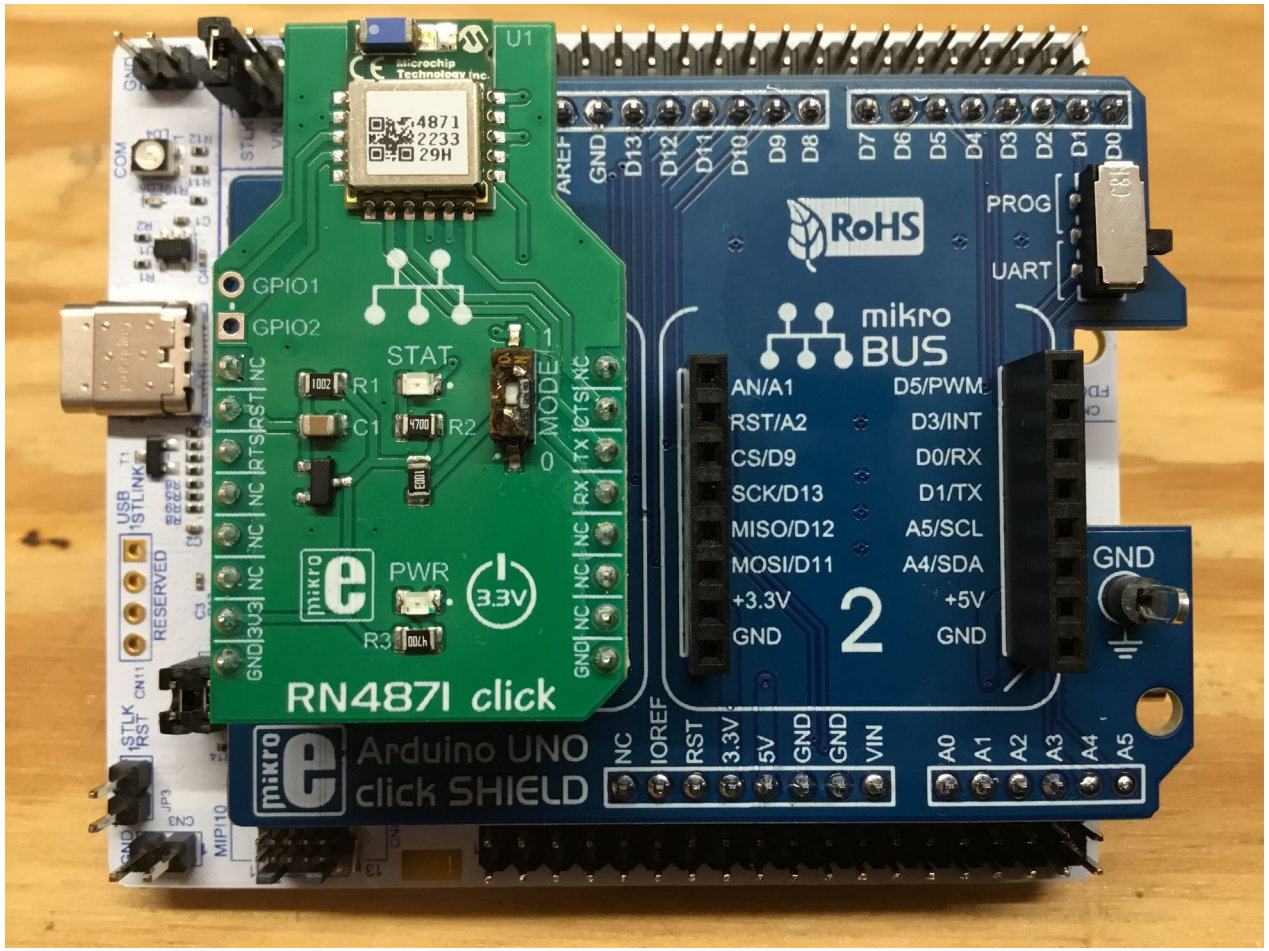


Update the RN4871 click Firmware Using isupdate.exe



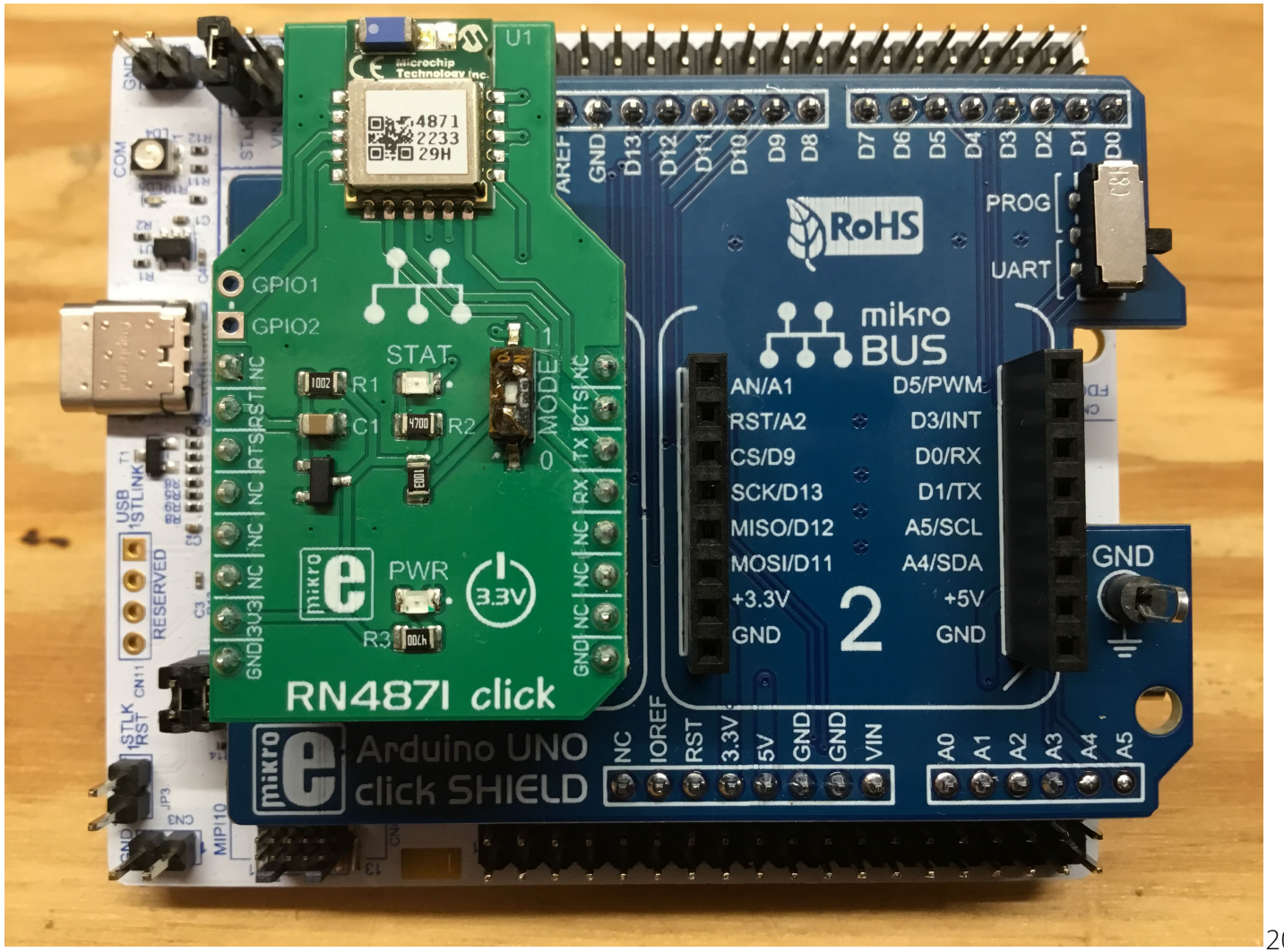
Code the RN4871 click Driver – rn4871.h

```
//*****************************************
//* rn4871.h
//* Written by: Fred Eady
//* Last Update: 10-26-2024
//* Notes:
//*****************************************
#ifndef INC_RN4871_H_
#define INC_RN4871_H_

#include "stm32c0xx_hal.h"
#include <string.h>
#include <stdint.h>
#include "main.h"

#define click1 1
#define click2 2

//*********************************************************************
//* Function Prototypes
//*********************************************************************
void rn4871_init(uint8_t click_position);
void recvPkt(void);
void sendPkt (void);

#endif /* INC_RN4871_H_ */
```

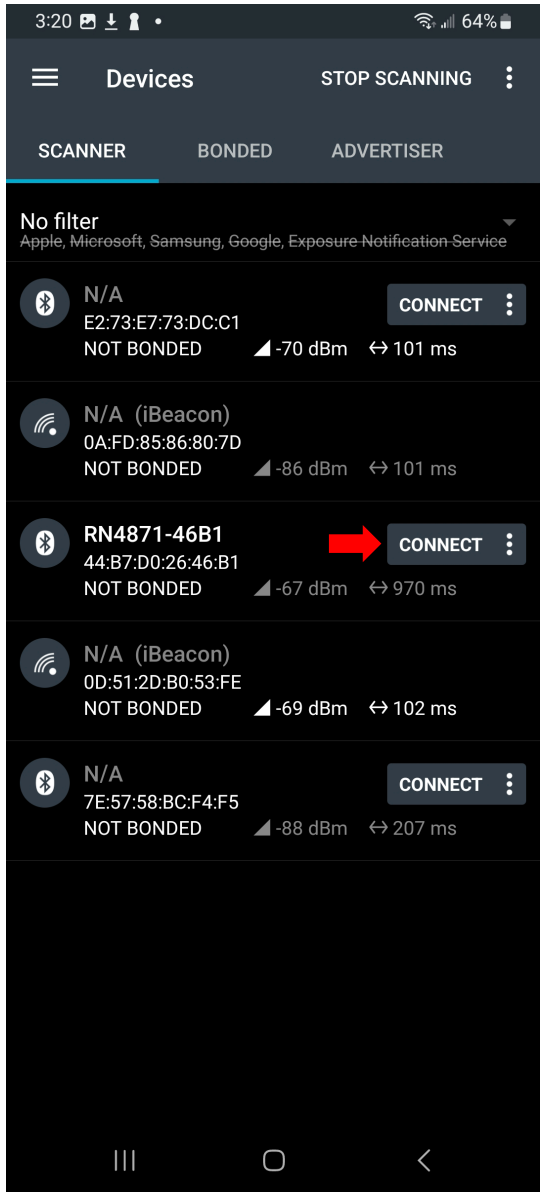


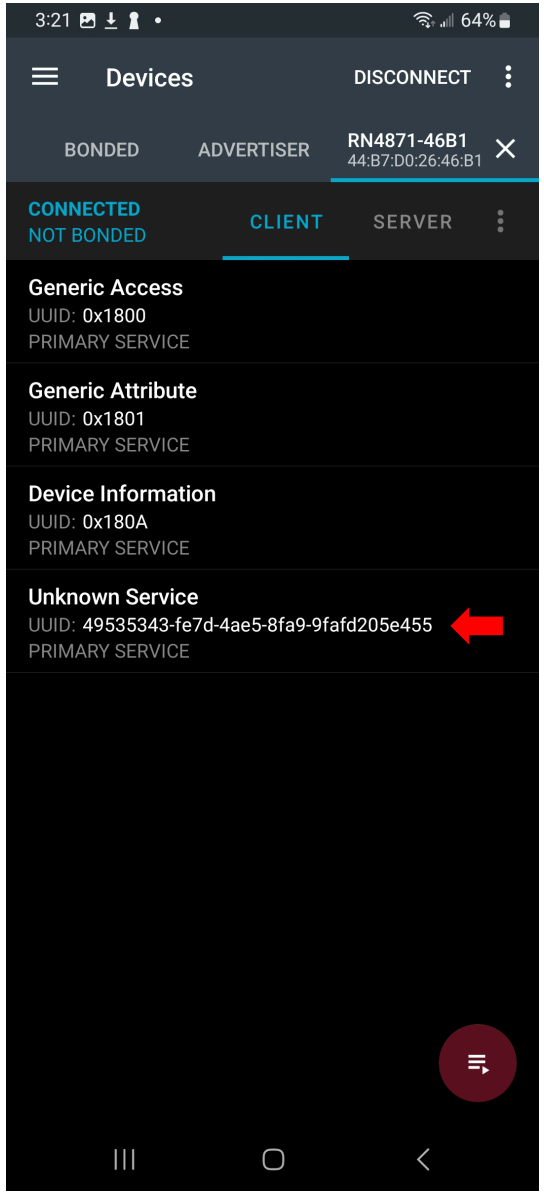
Code the RN4871 click Driver – rn4871.c

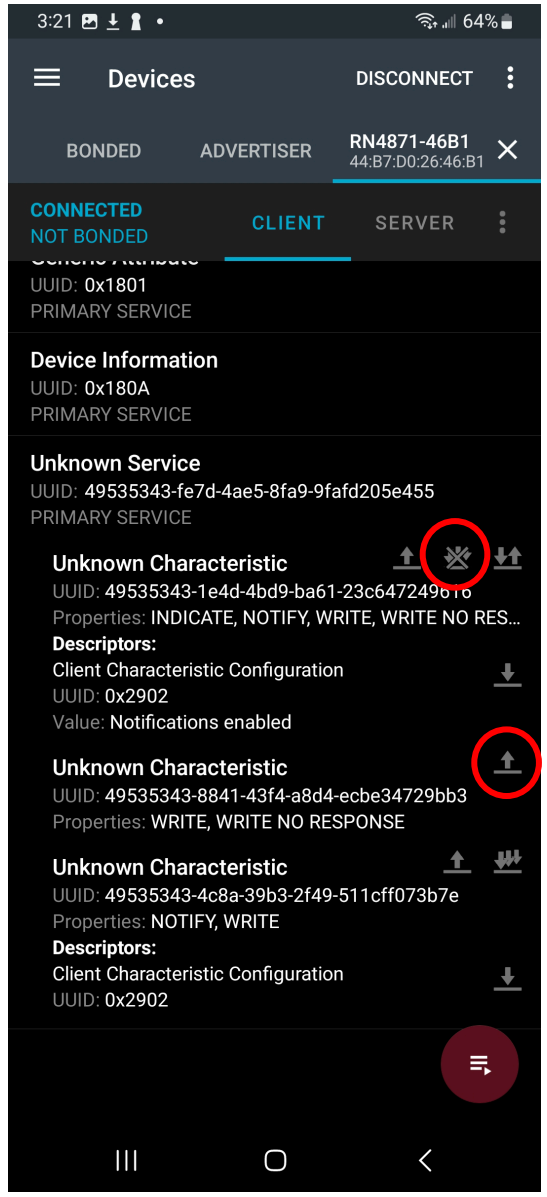
```
//*****************************************************************
//* Initialize the RN4871
//*****************************************************************
void rn4871_init(uint8_t click_position)
{
 // reset the RN4871
 switch(click_position)
 {
   case 1:
    HAL_GPIO_WritePin(RST_A3_GPIO_Port, RST_A3_Pin, GPIO_PIN_SET);
    HAL_Delay(1000);
    HAL_GPIO_WritePin(RST_A3_GPIO_Port, RST_A3_Pin, GPIO_PIN_RESET);
    HAL_Delay(100);
    HAL_GPIO_WritePin(RST_A3_GPIO_Port, RST_A3_Pin, GPIO_PIN_SET);
    HAL_Delay(200);
   break;
   case 2:
    HAL_GPIO_WritePin(RST_A2_GPIO_Port, RST_A2_Pin, GPIO_PIN_SET);
    HAL_Delay(1000);
    HAL_GPIO_WritePin(RST_A2_GPIO_Port, RST_A2_Pin, GPIO_PIN_RESET);
    HAL_Delay(100);
    HAL_GPIO_WritePin(RST_A2_GPIO_Port, RST_A2_Pin, GPIO_PIN_SET);
    HAL_Delay(200);
   break;
 }
 // Factory Reset
 HAL_Delay(200);
 cmd[0] = '$';
 cmd[1] = '$';
 cmd[2] = '$';
 HAL_UART_Transmit(&huart1,cmd,0x03,0xFFFFFFFF);
 HAL_Delay(200);

 cmd[0] = 'S';
 cmd[1] = 'F';
 cmd[2] = ',';
 cmd[3] = '1';
 cmd[4] = '\r';
 HAL_UART_Transmit(&huart1,cmd,0x05,0xFFFFFFFF);
 HAL_Delay(2000);
```

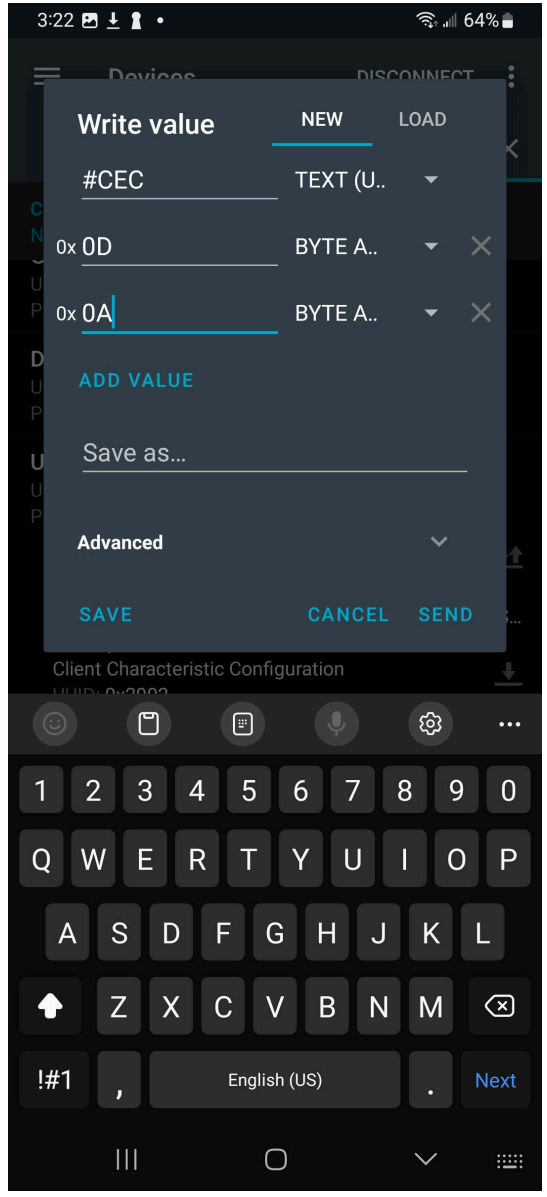


Test the RN4871 click Driver





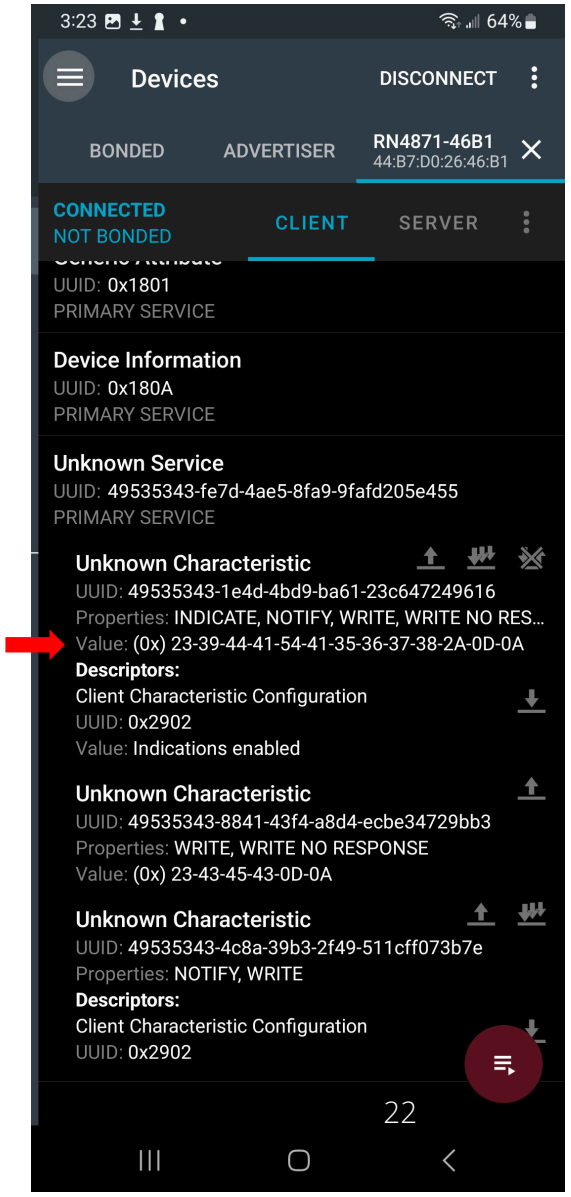




Test the RN4871 click Driver


```
//*****************************************************************
//* Global Variables (This code in rn4871.c)
//*****************************************************************
uint8_t f_pktReceived;
uint8_t f_pktParsed;
uint8_t rxPkt[64];
char txPkt[64];
uint16_t pktSize;
uint8_t cmd[32];
uint8_t bufIndx;
char pktData[8] = {'D','A','T','A','5','6','7','8'};


void sendPkt (void)
{
// Construct the pktData
txPkt[ 0 ] = '#';
txPkt[ 1 ] = '9';
strcat( txPkt, pktData );
strcat( txPkt, "*\r\n\0" );
pktSize = strlen(txPkt);
HAL_UART_Transmit(&huart1,(uint8_t *)txPkt,strlen(txPkt),0xFFFFFFFF);
}
```

```
/* Infinite loop in main.c */
/* USER CODE BEGIN WHILE */
while (1)
{
 if(CharInQueue())
 {
  recvPkt();
 }

 if(f_pktParsed)
 {
  f_pktParsed = 0;
  sendPkt();
 }
/* USER CODE END WHILE */
/* USER CODE BEGIN 3 */
}
/* USER CODE END 3 */
```



(0x) 23-39-44-41-54-41-35-36-37-38-2A-0D-0A

#- 9- D- A- T- A- 5- 6- 7- 8- *-CR-LF

Next Time…

MORE TO COME..

Thank you for attending!!!

Please consider the resources below:

- Today's Download Package
- STM32C071RB Datasheet
- NUCLEO-C071RB Schematic
- RN4871 Datasheet

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Thank You

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