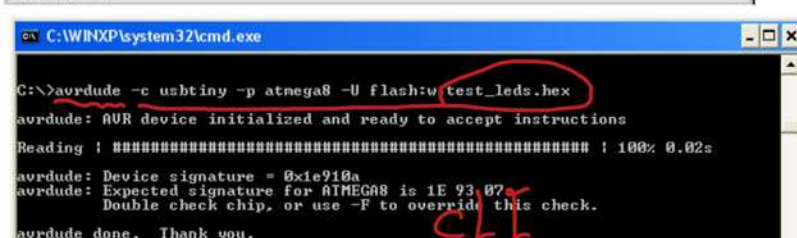
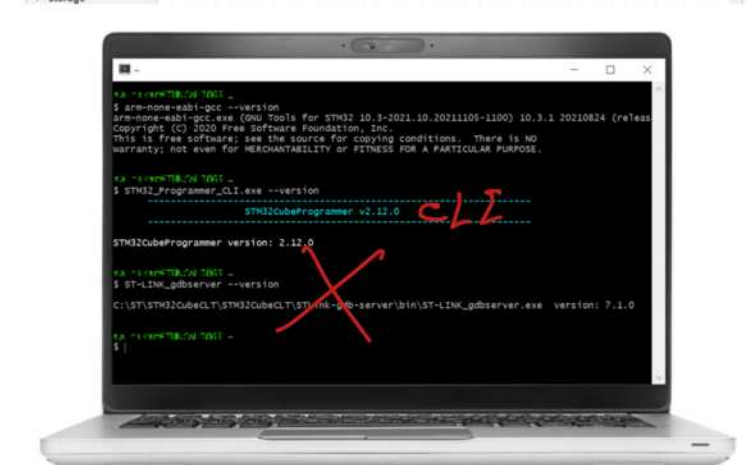


ST MCUFinder 5.0.0.exe	190 MB
STM32 Flash Loader 2.8.0.exe	34 MB
STM32 ST-LINK Utility 4.6.0.exe	26.4 MB
STM32Cube IDE 1.14.1.exe	953 MB
STM32Cube Monitor 1.7.0.exe	103 MB
STM32Cube Monitor Power 1.2.1.exe	55.5 MB
STM32Cube Monitor RF 2.11.0.exe	57.2 MB
STM32Cube Monitor UCPD 1.3.0.exe	60.5 MB
STM32Cube MX 4.7.1.exe	50.8 MB
STM32Cube MX 6.11.0.exe	545 MB
STM32Cube Programmer 2.18.0.exe	254 MB
STM32CUBECLT 1.16.0.exe	479 MB
STMStudio 3.6.0.exe	14.6 MB



STM32 CubeMonitor-RF
STM32 CubeMonitor-UCPD

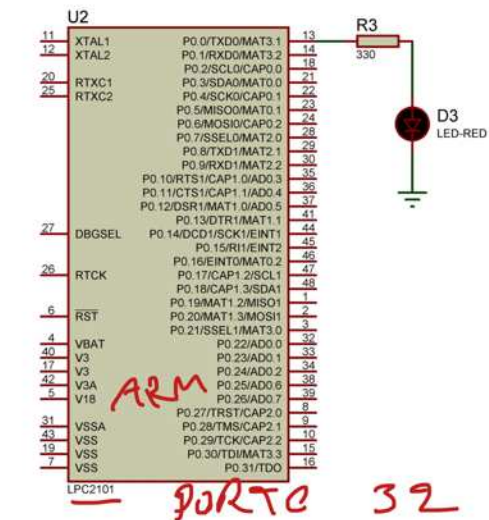
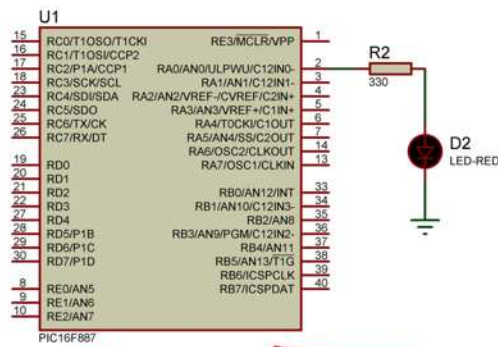
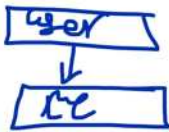
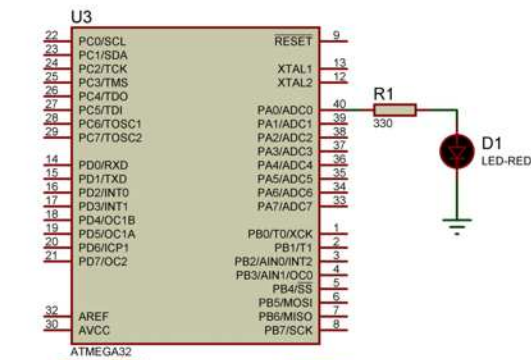


Common Microcontroller Software Interface Standard (CMSIS)

Low-level Library (LL)

Standard Peripheral Library (SPL)

Hardware Abstraction Layer (HAL)



```
#include <avr/io.h>
#include <util/delay.h>
```

```
int main(void)
{
    /* Set PA0 as output */
    DDRA |= (1 << PA0);

    while (1)
    {
        /* Turn off LED (set output to 0) */
        PORTA &= ~(1 << PA0);

        /* Wait for 1 second */
        _delay_ms(1000);

        /* Turn on LED (set output to 1) */
        PORTA |= (1 << PA0);

        /* Wait for 1 second */
        _delay_ms(1000);
    }
}
```

API

```
#include <util/delay.h>
#include "gpio_api.h"
```

```
int main(void)
{
    gpio_init();

    while (1)
    {
        gpio_write_low(); /* Turn LED off */
        _delay_ms(1000);

        gpio_write_high(); /* Turn LED on */
        _delay_ms(1000);
    }
}
```

```
#include <xc.h>
```

```
void main(void)
{
    /* Set RA0 (bit 0 of TRISA) as output */
    TRISA &= ~(1 << 0);

    while (1)
    {
        /* Turn off LED (set RA0 to 0) */
        PORTA &= ~(1 << 0);

        /* Delay 1 second */
        _delay_ms(1000);

        /* Turn on LED (set RA0 to 1) */
        PORTA |= (1 << 0);

        /* Delay 1 second */
        _delay_ms(1000);
    }
}
```

```
#include <xc.h>
#include "gpio_api.h"
```

```
void main(void)
{
    gpio_init();

    while (1)
    {
        gpio_write_low(); /* Turn LED off */
        _delay_ms(1000);

        gpio_write_high(); /* Turn LED on */
        _delay_ms(1000);
    }
}
```

```
#include <LPC21xx.h>
```

```
int main(void)
{
    /* Set P0.0 as output */
    IO0DIR |= (1 << 0);

    while (1)
    {
        /* Turn off LED (output 0) */
        IO0CLR = (1 << 0);

        /* Wait 1 second */
        delay_ms(1000);

        /* Turn on LED (output 1) */
        IO0SET = (1 << 0);

        /* Wait 1 second */
        delay_ms(1000);
    }
}
```

```
#include "gpio_api.h"
```

```
int main(void)
{
    gpio_init();

    while (1)
    {
        gpio_write_low(); /* Turn LED off */
        delay_ms(1000);

        gpio_write_high(); /* Turn LED on */
        delay_ms(1000);
    }
}
```


AVR

```
#include <avr/io.h>
#include "gpio_api.h"

void gpio_init(void)
{
    DDRA |= (1 << PA0); /* Set PA0 as output */
}

void gpio_write_low(void)
{
    PORTA &= ~(1 << PA0); /* Clear PA0 (LED OFF) */
}

void gpio_write_high(void)
{
    PORTA |= (1 << PA0); /* Set PA0 (LED ON) */
}
```

PIC

```
#include <xc.h>
#include "gpio_api.h"

void gpio_init(void)
{
    TRISA &= ~(1 << 0); /* Set RA0 as output */
}

void gpio_write_low(void)
{
    PORTA &= ~(1 << 0); /* Clear RA0 (LED OFF) */
}

void gpio_write_high(void)
{
    PORTA |= (1 << 0); /* Set RA0 (LED ON) */
}
```

LPC

```
#include <LPC21xx.h>
#include "gpio_api.h"

void gpio_init(void)
{
    IO0DIR |= (1 << 0); /* Set P0.0 as output */
}

void gpio_write_low(void)
{
    IO0CLR = (1 << 0); /* Clear P0.0 (LED OFF) */
}

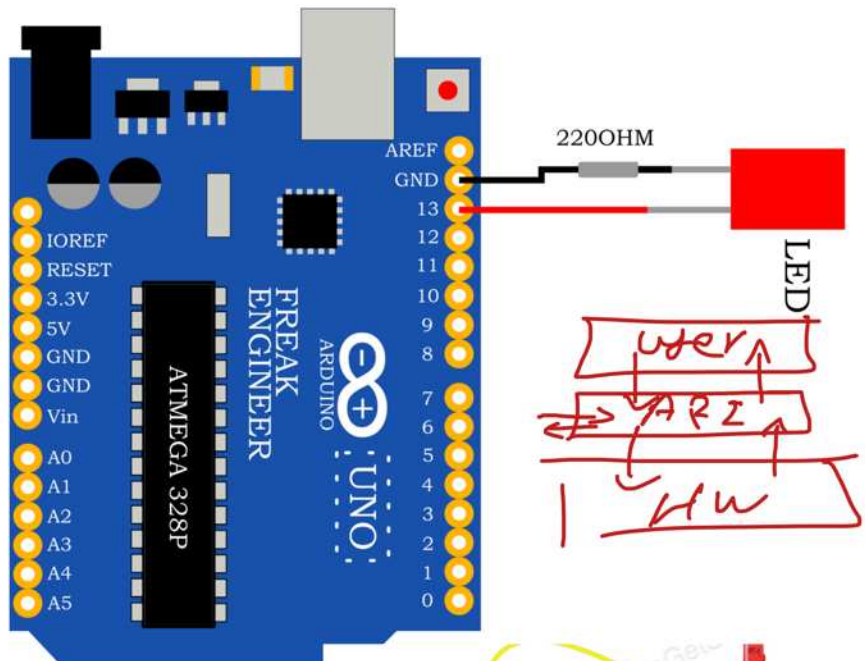
void gpio_write_high(void)
{
    IO0SET = (1 << 0); /* Set P0.0 (LED ON) */
}
```

Arduino

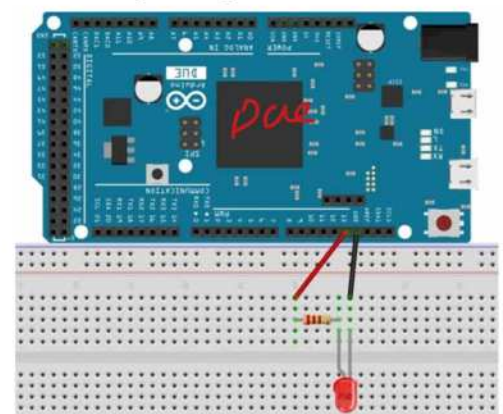
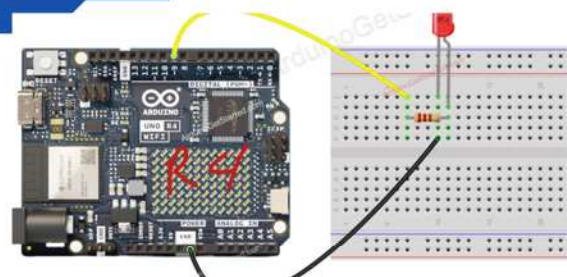
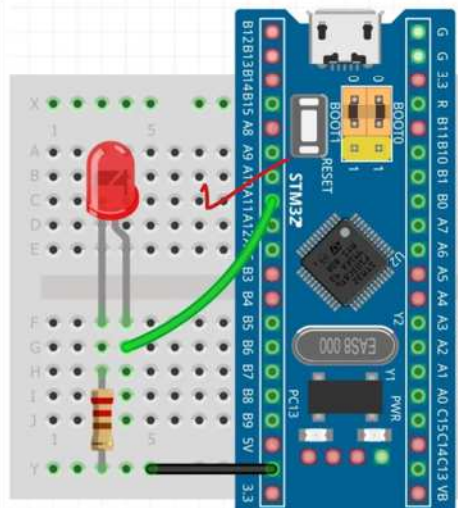
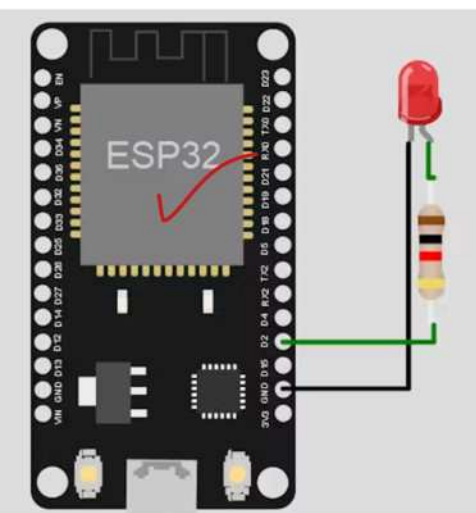
```
void setup()
{
    // initialize digital pin LED_BUILTIN as an output.
    pinMode(LED_BUILTIN, OUTPUT);
}

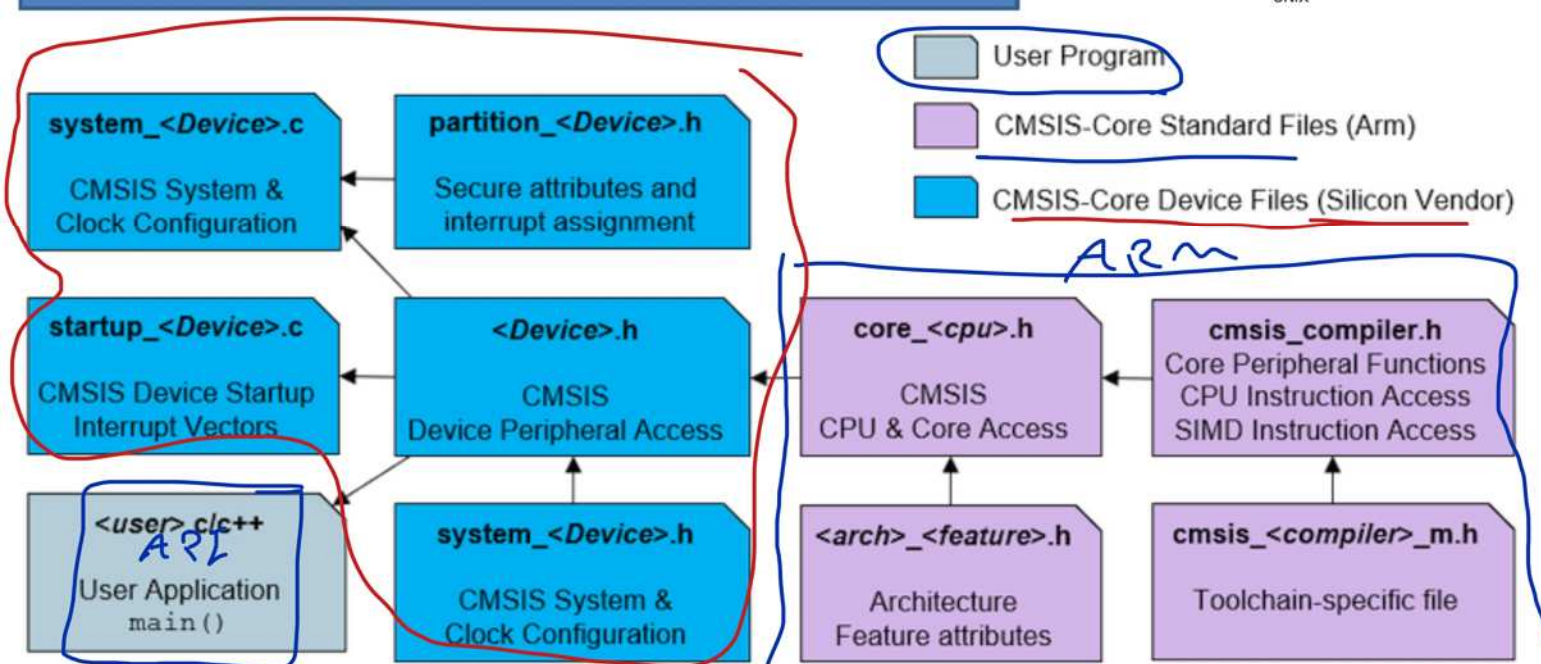
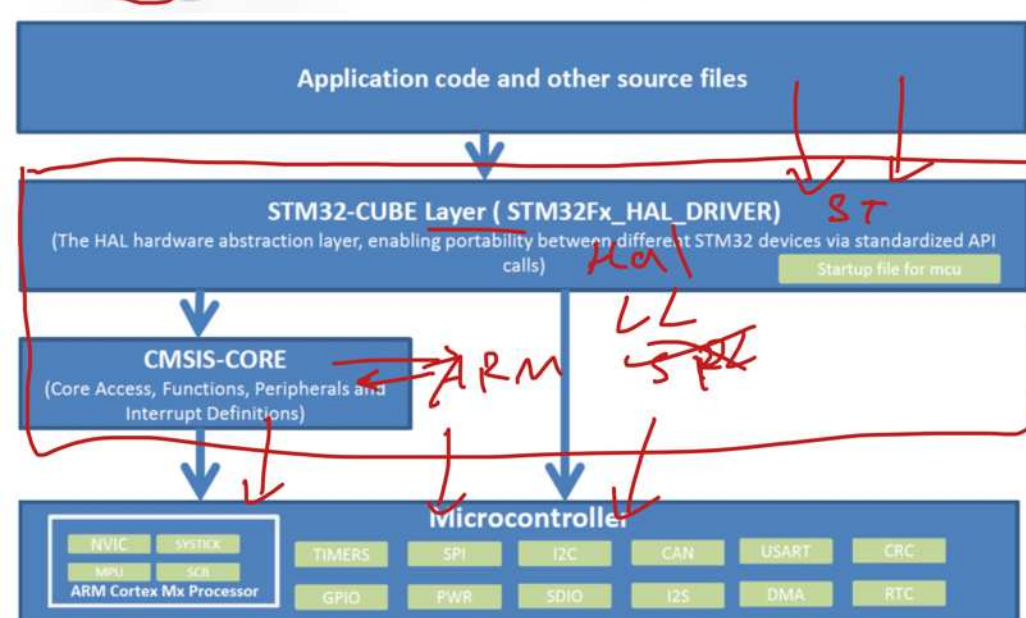
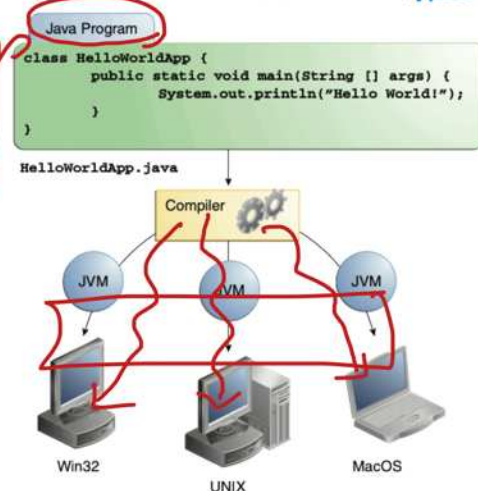
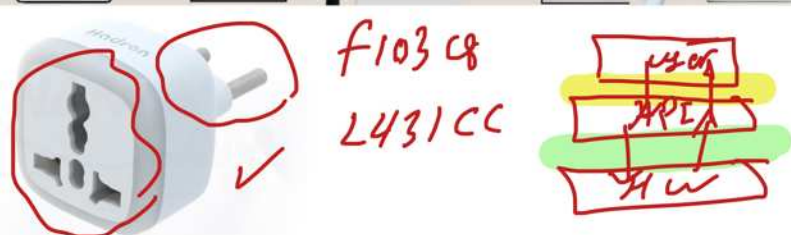
void loop()
{
    // turn the LED on (HIGH is the voltage level)
    digitalWrite(LED_BUILTIN, HIGH);
    // wait for a second
    delay(1000);

    // turn the LED off by making the voltage LOW
    digitalWrite(LED_BUILTIN, LOW);
    // wait for a second
    delay(1000);
}
```



user
GND
LED





```
#include "stm32f10x.h"
```

```
void delay(uint32_t ms) {  
    ms *= 12000;  
    while (ms-->0) {  
        __NOP();  
    }  
}
```

Reg

```
int main(void) {  
    // Enable clock for Port C  
    RCC->APB2ENR |= RCC_APB2ENR_IOPCEN;  
  
    // Configure PC13 as output  
    GPIOC->CRH &= ~(GPIO_CRH_MODE13 | GPIO_CRH_CNF13);  
    GPIOC->CRH |= GPIO_CRH_MODE13_1; // Output with 2MHz speed  
  
    while (1) {  
        // Turn ON the LED  
        GPIOC->BSRR = GPIO_BSRR_BR13; // Reset (LED ON)  
        delay(1000);  
  
        // Turn OFF the LED  
        GPIOC->BSRR = GPIO_BSRR_BS13; // Set (LED OFF)  
        delay(1000);  
    }  
}
```

```
#include "stm32f1xx.h"  
#include "stm32f1xx_ll_bus.h"  
#include "stm32f1xx_ll_gpio.h"
```

```
void delay(uint32_t ms) {  
    ms *= 12000;  
    while (ms-->0) {  
        __NOP();  
    }  
}
```

LL

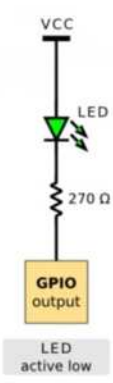
```
int main(void) {  
    // Enable clock for Port C  
    LL_APB2_GRP1_EnableClock(LL_APB2_GRP1_PERIPH_GPIOC);  
  
    // Configure PC13 as output  
    LL_GPIO_InitTypeDef GPIO_InitStruct;  
    LL_GPIO_StructInit(&GPIO_InitStruct);  
    GPIO_InitStruct.Pin = LL_GPIO_PIN_13;  
    GPIO_InitStruct.Mode = LL_GPIO_MODE_OUTPUT;  
    GPIO_InitStruct.Speed = LL_GPIO_SPEED_FREQ_LOW;  
    GPIO_InitStruct.OutputType = LL_GPIO_OUTPUT_PUSHPULL;  
    LL_GPIO_Init(GPIOC, &GPIO_InitStruct);  
  
    while (1) {  
        // Turn ON the LED  
        LL_GPIO_ResetOutputPin(GPIOC, LL_GPIO_PIN_13);  
        delay(1000);  
  
        // Turn OFF the LED  
        LL_GPIO_SetOutputPin(GPIOC, LL_GPIO_PIN_13);  
        delay(1000);  
    }  
}
```

```
#include "stm32f10x.h"  
#include "stm32f10x_rcc.h"  
#include "stm32f10x_gpio.h"
```

```
void delay(uint32_t ms) {  
    ms *= 12000;  
    while (ms-->0) {  
        __NOP();  
    }  
}
```

X
8 PL

```
int main(void) {  
    GPIO_InitTypeDef GPIO_InitStructure;  
  
    // Enable clock for Port C  
    RCC_APB2PeriphClockCmd(RCC_APB2Periph_GPIOC, ENABLE);  
  
    // Configure PC13 as output  
    GPIO_InitStructure.GPIO_Pin = GPIO_Pin_13;  
    GPIO_InitStructure.GPIO_Mode = GPIO_Mode_Out_PP;  
    GPIO_InitStructure.GPIO_Speed = GPIO_Speed_2MHz;  
    GPIO_Init(GPIOC, &GPIO_InitStructure);  
  
    while (1) {  
        // Turn ON the LED  
        GPIO_ResetBits(GPIOC, GPIO_Pin_13);  
        delay(1000);  
  
        // Turn OFF the LED  
        GPIO_SetBits(GPIOC, GPIO_Pin_13);  
        delay(1000);  
    }  
}
```

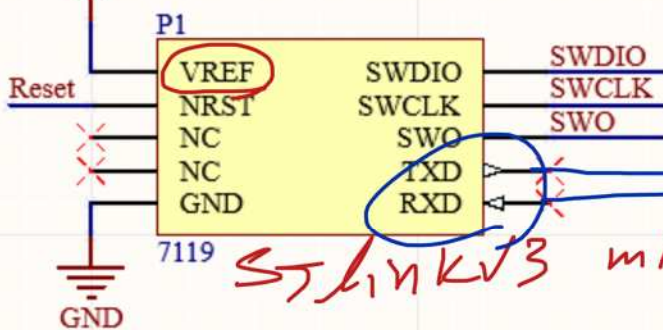
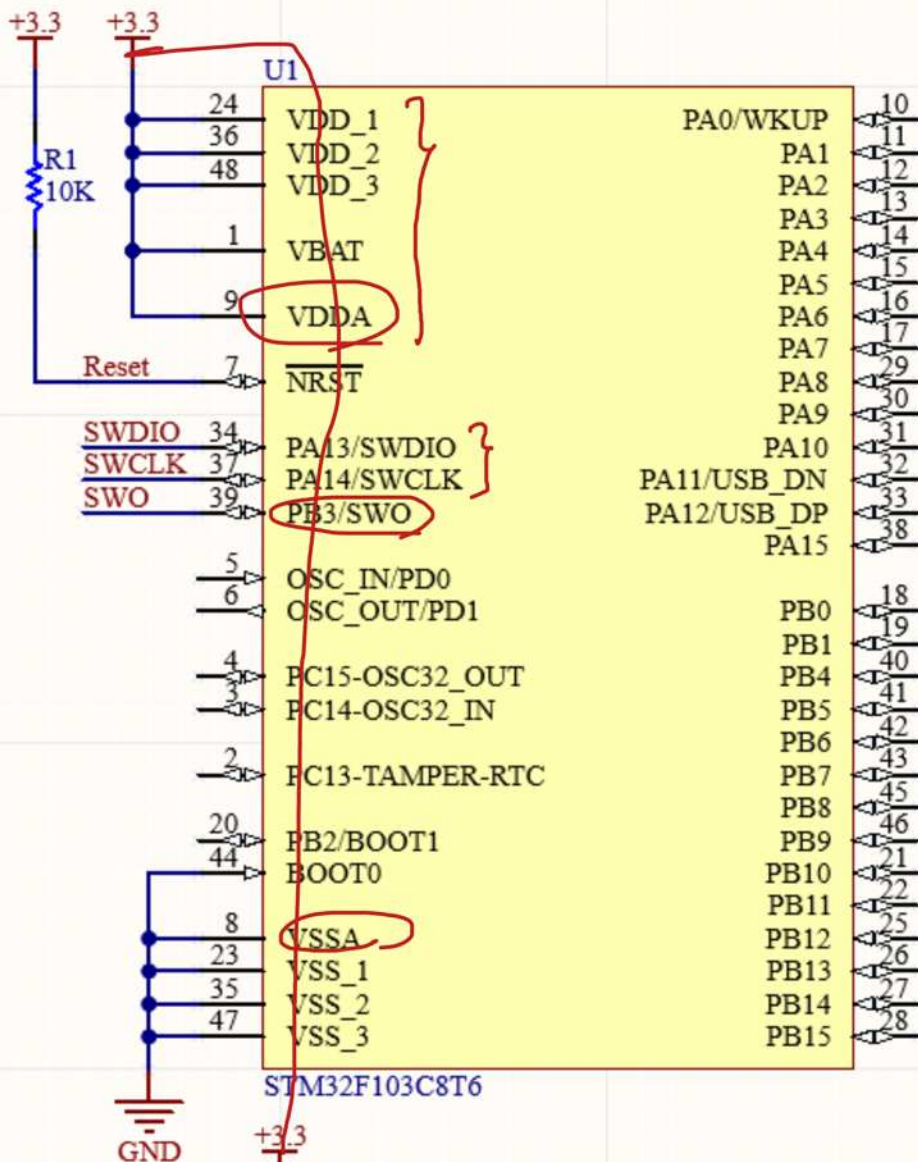


```
#include "stm32f1xx_hal.h"
```

```
void SystemClock_Config(void);  
void Error_Handler(void);
```

HAL

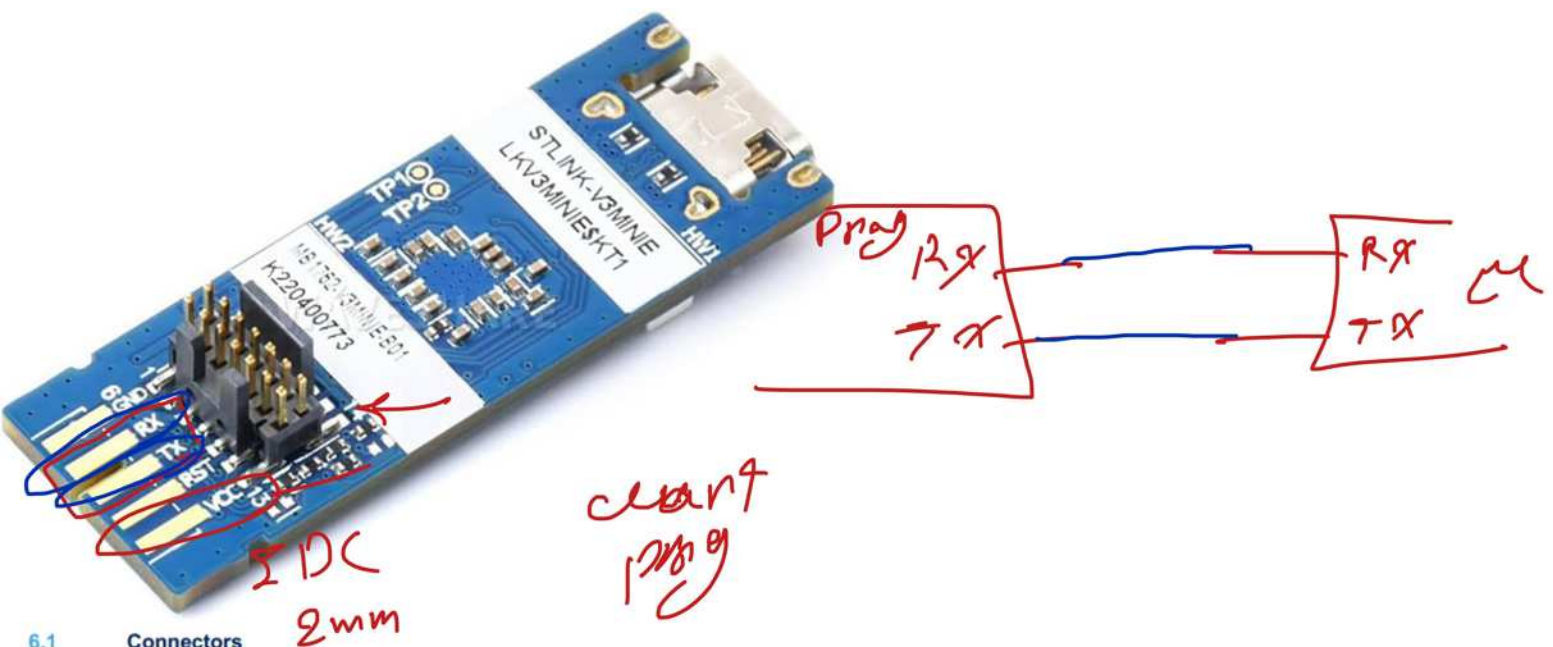
```
int main(void) {  
    HAL_Init();  
    SystemClock_Config();  
    GPIO_InitTypeDef GPIO_InitStruct = {0};  
  
    // Enable clock for Port C  
    __HAL_RCC_GPIOC_CLK_ENABLE();  
  
    // Configure PC13 as output  
    GPIO_InitStruct.Pin = GPIO_PIN_13;  
    GPIO_InitStruct.Mode = GPIO_MODE_OUTPUT_PP;  
    GPIO_InitStruct.Speed = GPIO_SPEED_FREQ_LOW;  
    GPIO_InitStruct.Pull = GPIO_NOPULL;  
    HAL_GPIO_Init(GPIOC, &GPIO_InitStruct);  
  
    while (1) {  
        // Turn ON the LED  
        HAL_GPIO_WritePin(GPIOC, GPIO_PIN_13, GPIO_PIN_RESET);  
        HAL_Delay(1000);  
  
        // Turn OFF the LED  
        HAL_GPIO_WritePin(GPIOC, GPIO_PIN_13, GPIO_PIN_SET);  
        HAL_Delay(1000);  
    }  
}
```

STlink v3 mini'e

VCC →

STlink v2 →



6.1

Connectors

Per convention, refer to Table 2 for the I/O type definition:

Table 2. I/O type definition

Type	Definition
S	Supply pin
I	Input-only pin
O	Output-only pin
I/O	Input and output pin

6.2

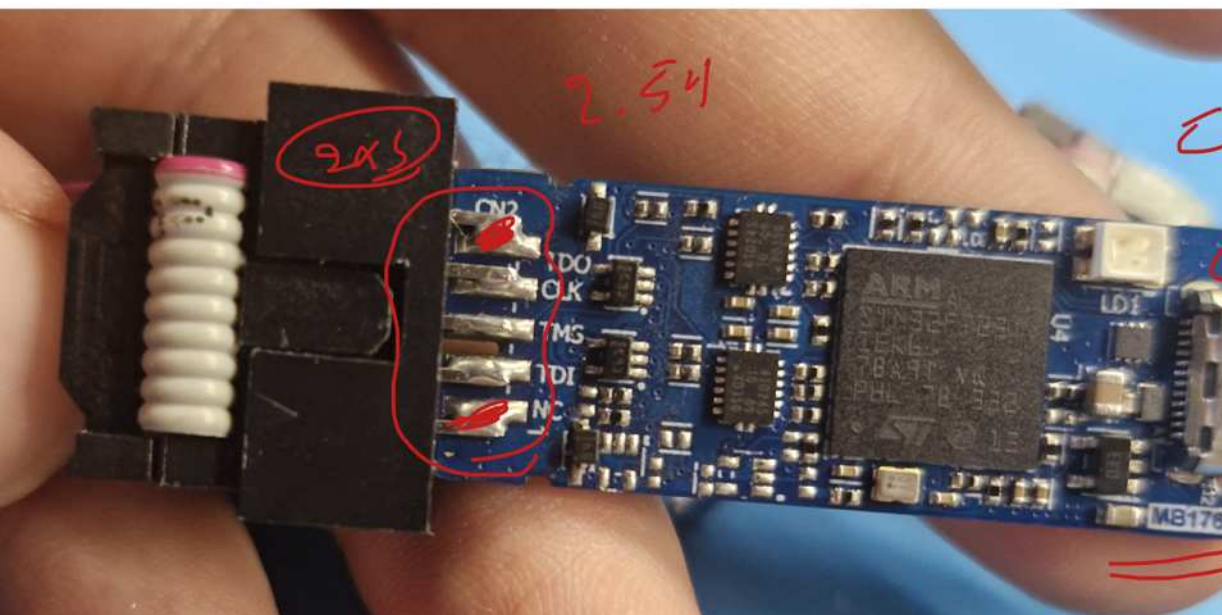
Pads on board to BTB card edge connector (CN2)

The pads on the board have the same function as the STDC14 connector. The user can select a BTB card edge connector to connect STLINK-V3MINE and the target board. The board-to-board card edge connector reference is 009159010061911 from AVX.

Table 3. Pads on board to BTB card edge connector (CN2)

Side	Pin number	Pin description	Type
TOP	1	Reserved ⁽¹⁾	-
	2	T_JTDI/NC ⁽²⁾	O
	3	T_JTMS/T_SWDIO	I/O
	4	T_JCLK/T_SWCLK	O
	5	T_JTDO/T_SWO ⁽³⁾	I
BOTTOM	6	GND	S
	7	T_VCP_RX	O
	8	T_VCP_TX	I
	9	T_NRST	O
	10	T_VCC	I

1. Do not connect on target.
2. NC means is not required for SWD (Serial Wire Debug) connection.
3. SWO (Serial Wire Output) is optional and only required for SWV (Serial Wire Viewer) trace.



Filters

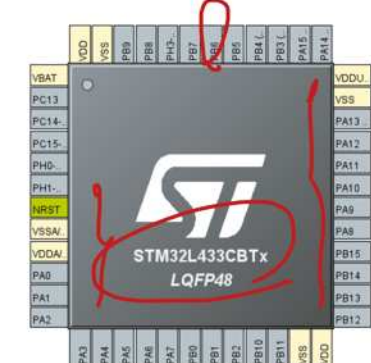
Part Number Search:

-- All vendors --

STM32F103C8Tx-QFP48

Matching ST candidates (500)

Part number	Match
STM32L433CBUx	98 %
STM32L433CBTx	98 %
STM32L433CCUx	97 %
STM32F302CBTx	97 %
STM32F303CBTx	97 %
STM32L433CCTx	97 %
STM32F103CBUx	97 %
STM32F373CBTx	97 %
STM32F103CBTx	97 %
STM32F303CCTx	97 %
STM32F302CCTx	97 %
STM32F373CCTx	97 %
STM32L452CEUx	97 %
STM32L452CETx	97 %
STM32L462CETx	97 %
STM32F413CHUx	96 %
STM32L412CBUx	96 %
STM32L412CBUxP	96 %
STM32L412CBTx	96 %
STM32L412CBTxP	96 %
STM32L431CBUx	95 %
STM32L431CBTx	95 %
STM32F302C8Tx	95 %
STM32F401CBUx	95 %
STM32G431C8Ux	95 %
STM32L462CEUx	95 %
STM32L452CETxP	95 %
STM32F423CHUx	95 %
STM32F413CGUx	95 %
STM32G431CBUx	95 %
STM32L451CCUx	95 %
STM32F401CCUx	95 %
STM32G431CBTx	95 %
STM32L443CCUx	95 %
STM32L452CCUx	95 %
STM32L443CCTx	95 %
STM32F411CCUx	94 %
STM32G491CCUx	94 %



Comparing STM32F103C8Tx with other STMicroelectronics solutions

Used ?	Importance	Category	Parameter	STM32F103C8Tx	STM32L433CBTx (98% match)	STM32F373CBTx (97% match)	STM32L412CBTx (96% match)	STM32G431CBTx (95% match)
?	1	Product	Public Price	2.795 USD (for 10K)	2.708 USD (for 10K)	3.207 USD (for 10K)	2.190 USD (for 10K)	3.081 USD (for 10K)
?	1	System Core	busArch	32 bit	32 bit	32 bit	32 bit	32 bit
?	1	System Core	core	ARM Cortex-M3 at 72 MHz	ARM Cortex-M4 at 80 MHz	ARM Cortex-M4 at 72 MHz	ARM Cortex-M4 at 80 MHz	ARM Cortex-M4 at 170 MHz
?	1	System Core	package	QFP48	QFP48	QFP48	QFP48	QFP48
?	1	System Core	GPIO	37 io	38 io	37 io	38 io	38 io
?	1	System Core	Temperature range	-40 °C to 105 °C	-40 °C to 105 °C	-40 °C to 105 °C	-40 °C to 125 °C	-40 °C to 125 °C
?	1	System Core	Voltage range	2.00 V to 3.60 V	1.71 V to 3.60 V	2.00 V to 3.60 V	1.71 V to 3.60 V	1.71 V to 3.60 V
?	1	System Core	RAM	20 KB	64 KB	24 KB	40 KB	32 KB
?	1	System Core	eprom	no	no	no	no	no
?	1	System Core	flash	64 KB	128 KB	128 KB	128 KB	128 KB
?	1	System Core	Touch Sensing	no	yes	yes	yes	no
?	1	Analog	ADC	10xADC 12-bit	10xADC 12-bit	9xADC 12-bit + ADC 16-bit 7xADC 16-bit	10xADC 12-bit	17xADC 12-bit
?	1	Analog	Comparator (COMP)	no	2	2	1	4
?	1	Analog	OPAMP	no	1	no	1	3
?	1	Timers	Timer	4xTimer 16-bit	5xTimer 16-bit 2xTimer 32-bit	12xTimer 16-bit 2xTimer 32-bit	4xTimer 16-bit Timer 32-bit	9xTimer 16-bit Timer 32-bit
?	1	Timers	Timer (HRTIM)	no	no	no	no	no
?	1	Timers	Timer (LPTIM)	no	yes	no	yes	yes
?	1	Connectivity	CAN	1 ch	1 ch	1 ch	no	no
?	1	Connectivity	CAN (FD/CAN)	no	no	no	no	1 ch
?	1	Connectivity	Ethernet	no	no	no	no	no
?	1	Connectivity	FM3	no	no	no	no	no
?	1	Connectivity	FM3 (FSMC)	no	no	no	no	no
?	1	Connectivity	I2C	2 ch	3 ch	2 ch	3 ch	3 ch
?	1	Connectivity	I2C (FMPI2C)	no	no	no	no	no
?	1	Connectivity	IRTIM	no	yes	yes	yes	yes
?	1	Connectivity	MIOS	no	no	no	no	no
?	1	Connectivity	SOMMC (SDIO)	no	no	no	no	no
?	1	Connectivity	SOMMC	no	no	no	no	no
?	1	Connectivity	SPI	2 ch	3 ch	3 ch	2 ch	3 ch
?	1	Connectivity	SPI (QUADSPI)	no	yes	no	yes	no
?	1	Connectivity	SPI (OCTOSPI)	no	no	no	no	no
?	1	Connectivity	SWPMI	no	yes	no	no	no
?	1	Connectivity	UART	3xUSART	3xUSART	3xUSART	3xUSART	3xUSART
?	1	Connectivity	UART (LPUART)	no	yes	no	yes	yes
?	1	Connectivity	UCPD (USB Type-C Power Delivery)	no	no	no	no	1
?	1	Connectivity	USB	Dev FS	Dev FS	Dev FS	Dev FS	Dev FS
?	1	Multimedia	CEC (HDMI)	no	no	yes	no	no
?	1	Multimedia	DCMI	no	no	no	no	no
?	1	Multimedia	DSIHOST	no	no	no	no	no
?	1	Multimedia	GFXMMU	no	no	no	no	no
?	1	Multimedia	I2S	no	2 ch	3 ch	no	4 ch
?	1	Multimedia	I2S (SAI)	no	1 ch	no	no	1 ch
?	1	Multimedia	JPEG	no	no	no	no	no
?	1	Multimedia	LCD (TFT LTDC)	no	no	no	no	no
?	1	Multimedia	LCD (Segment)	no	yes	no	no	no
?	1	Multimedia	SPI2IFRX	no	no	no	no	no
?	1	Security	AES	no	no	no	no	no
?	1	Security	CRYP	no	no	no	no	no
?	1	Security	DES/TDES	no	no	no	no	no
?	1	Security	HM3C	no	no	no	no	no
?	1	Security	MD5	no	no	no	no	no
?	1	Security	RNG	no	yes	no	yes	yes
?	1	Security	SHA	no	no	no	no	no
?	1	Middleware	FATFS	no	no	no	no	no
?	1	Middleware	FreeRTOS	no	no	no	no	no
?	1	Middleware	lwIP	no	no	no	no	no
?	1	Other	RTC	yes	yes	yes	yes	yes