Program simulation

The tutorial mainly demonstrates the simple debugging steps of the development board using ST-Link.

Tutorial Demonstration Case: LED Control (GPIO)

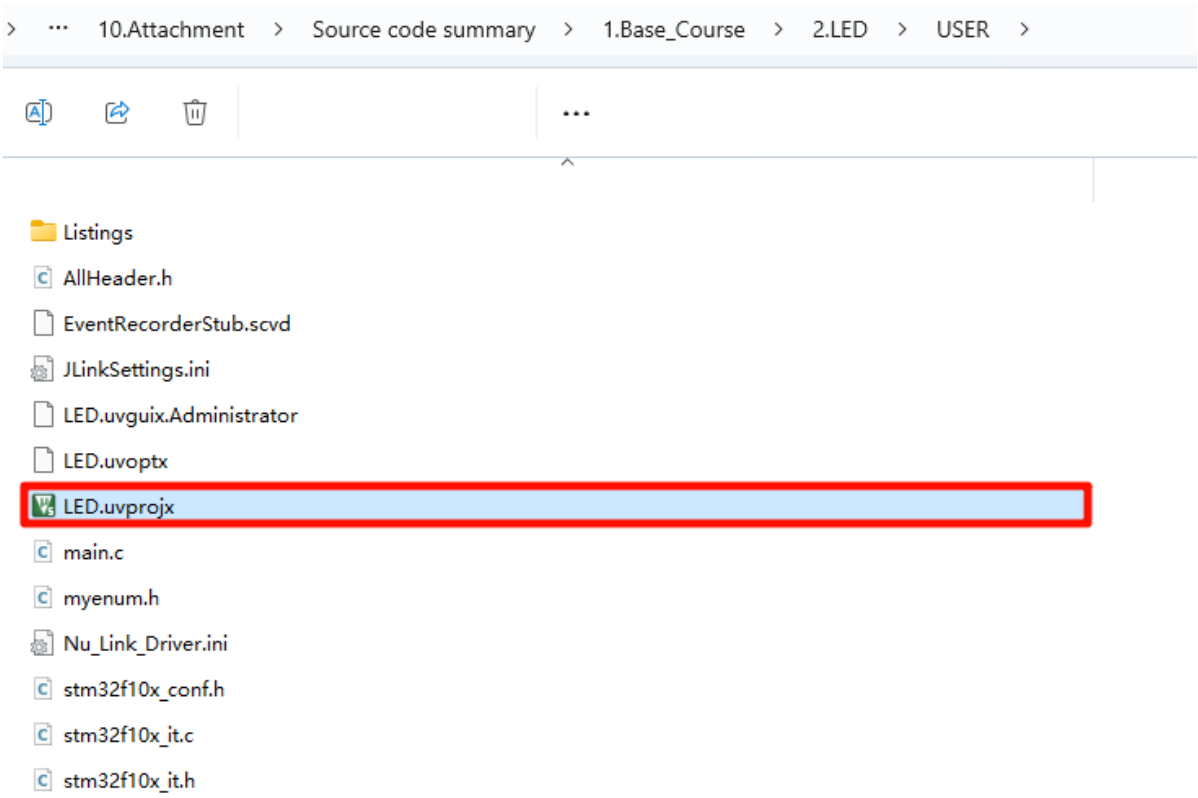
```
Since we only provide the standard library version source code for a single case, the tutorial only demonstrates the simulation steps of MDK-ARM
```

Open the project

```
Product supporting materials source code path: Attachment → Source Code Summary → 1.Base_Course → 2.LED
```

After decompressing the corresponding project file, find the file with the `.uvprojx` suffix and double-click it to open it.

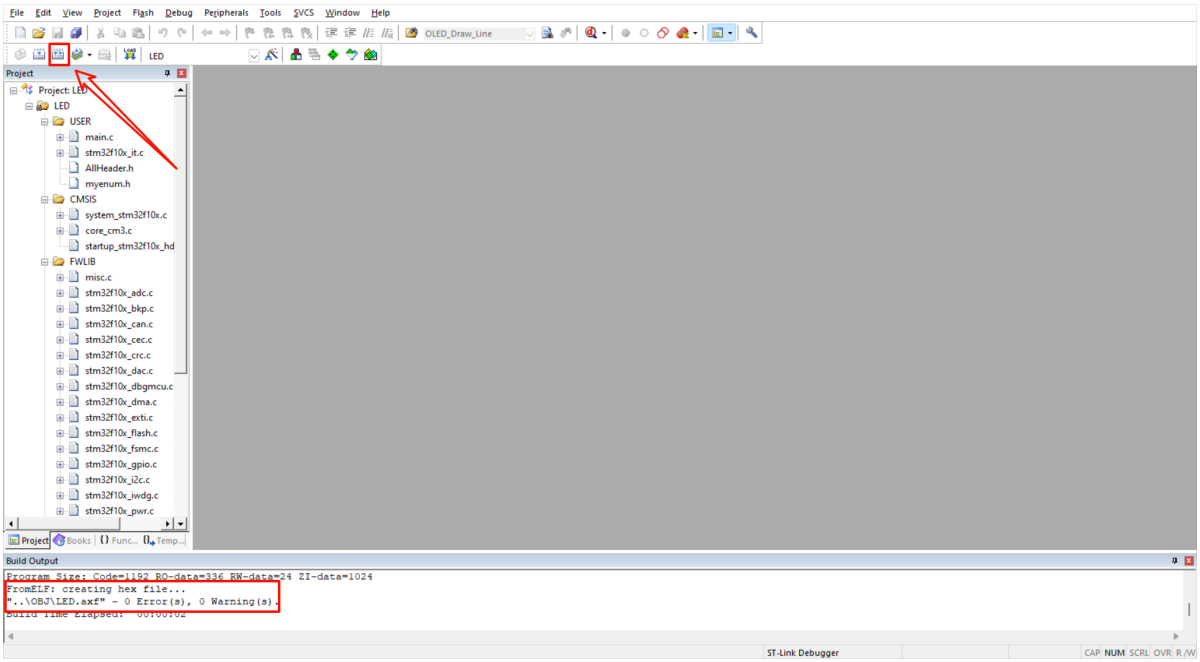
```
The .uvprojx suffix file is located in the USER directory of the project file
```



Compile the project

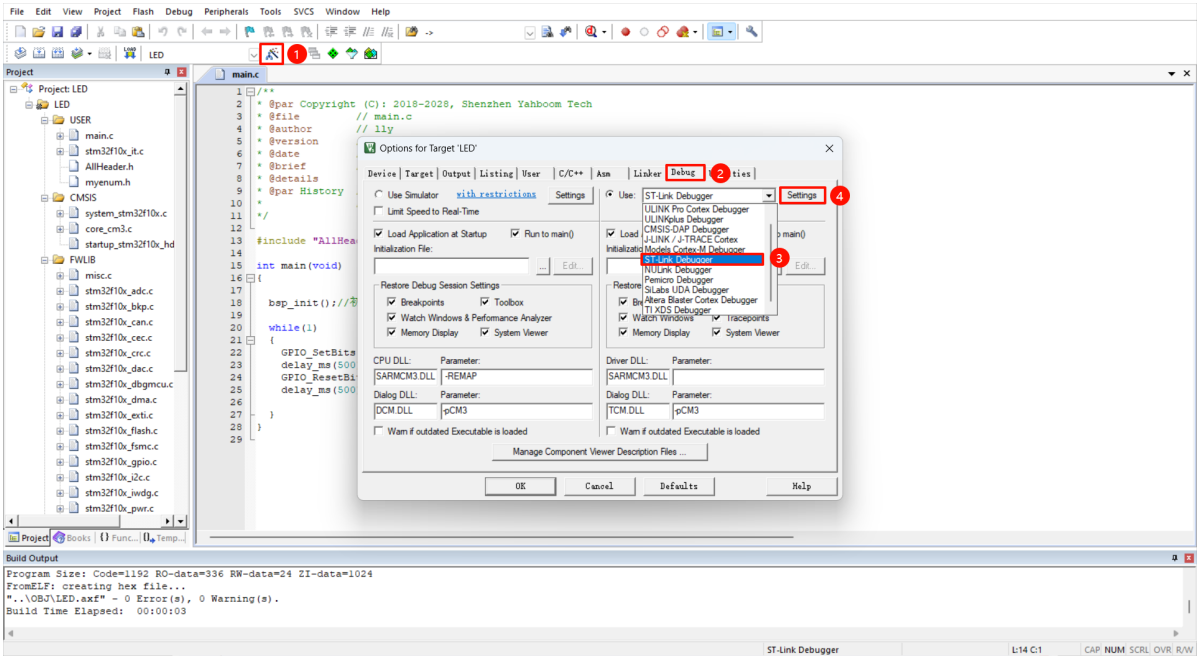
Click the `Rebuild` option on the toolbar to compile the project, and the compilation output bar will prompt the compilation result.

```
Compiling the project can confirm whether there are any syntax problems in the program you programmed
```

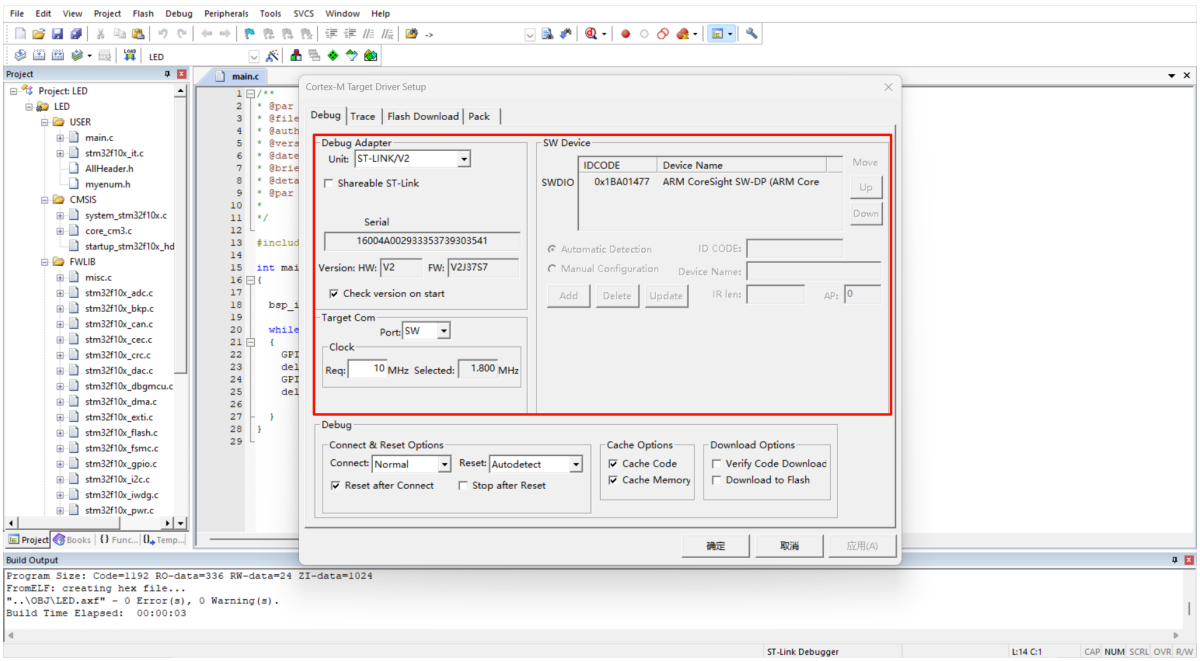


Configure the debugger

Select `Options for Target...` → `Debug` → `ST-Link Debugger`

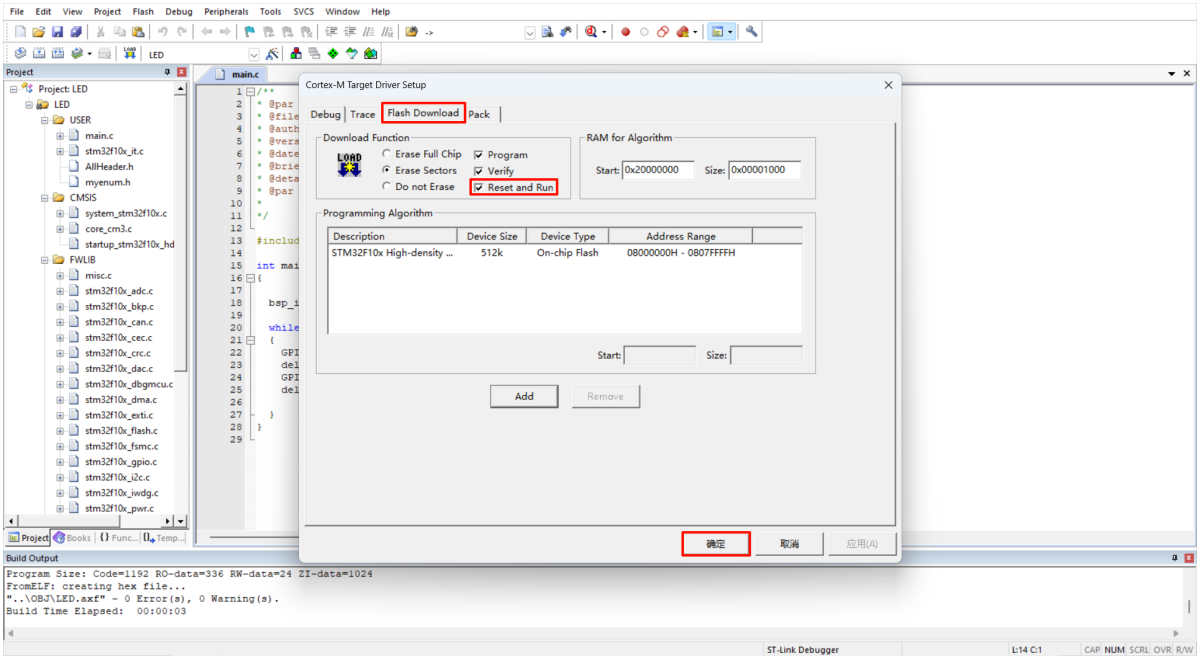


If the system detects ST-Link, you can see the hardware information when entering the debugger interface:

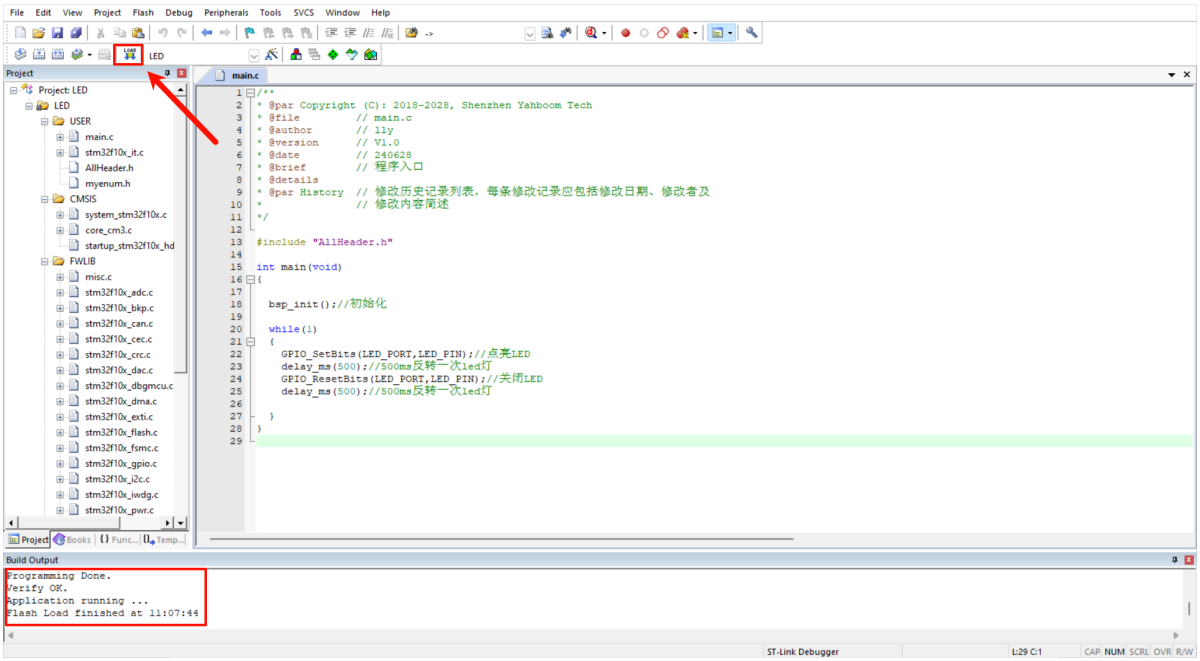


Program download

Check `Reset and Run` to run automatically after downloading the program using ST-Link:



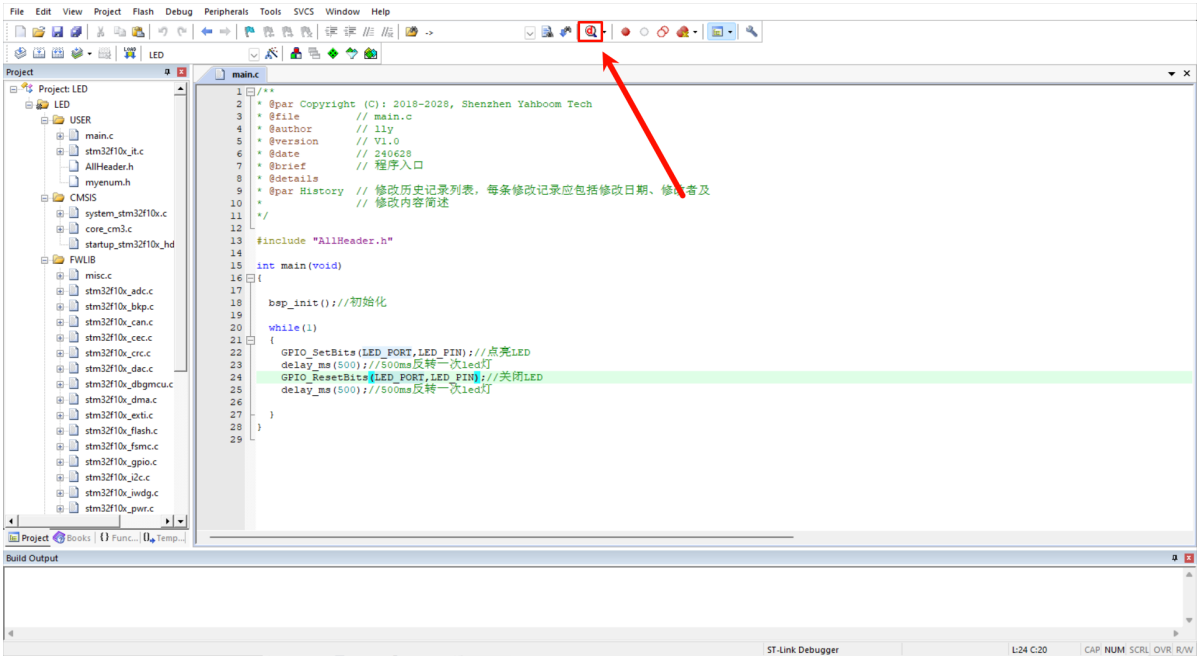
Click `Download` to download the program to the development board via ST-Link:



Program debugging

Start/stop debugging

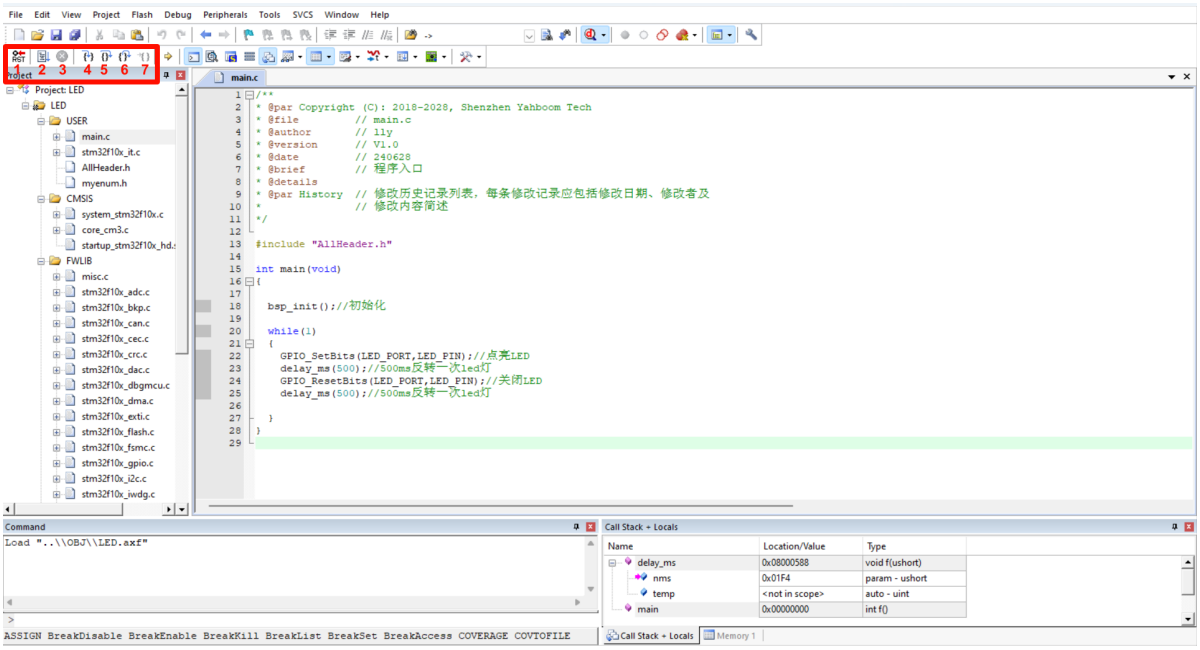
Click `Start/Stop Debug Session` to start and stop debugging mode:



Debug options

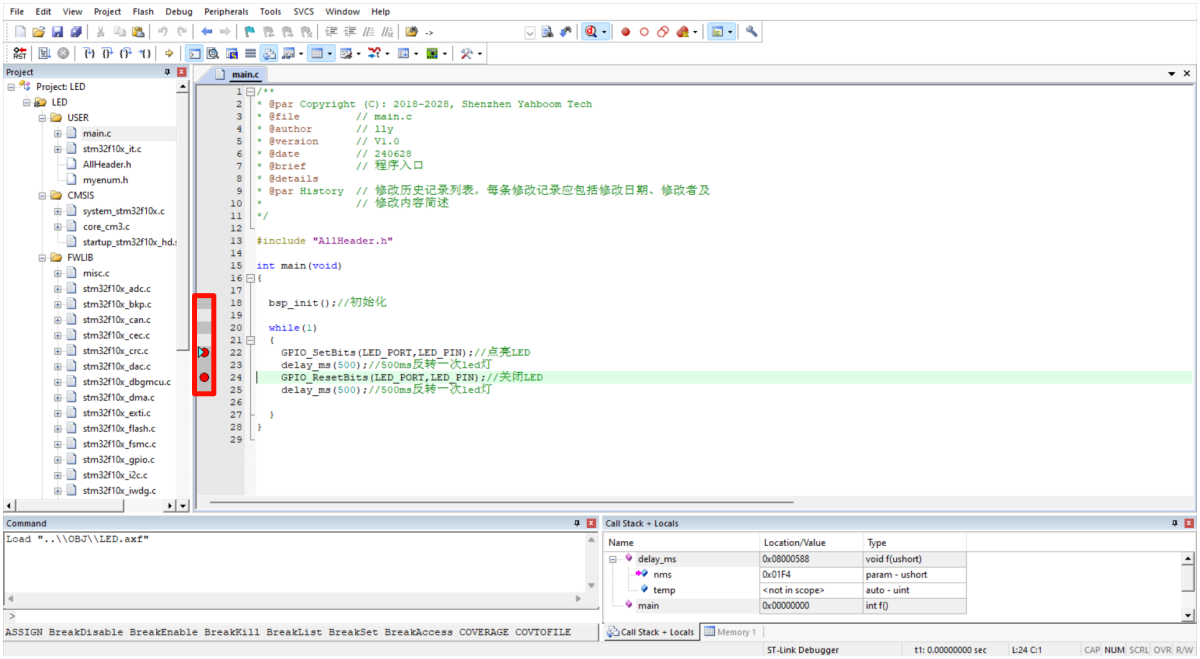
The tutorial only introduces commonly used options:

Serial number	Description
1	Reset: The program performs a reset operation
2	Run at full speed: The program starts to run normally at full speed until the program stops when it encounters a breakpoint
3	Stop running: The program stops running
4	Enter function to run: Run once per click
5	Run line by line: Do not enter the function, run single line
6	Jump out of function to run: Run other statements in the function, and then jump out of the current function to run
7	The program runs to the cursor



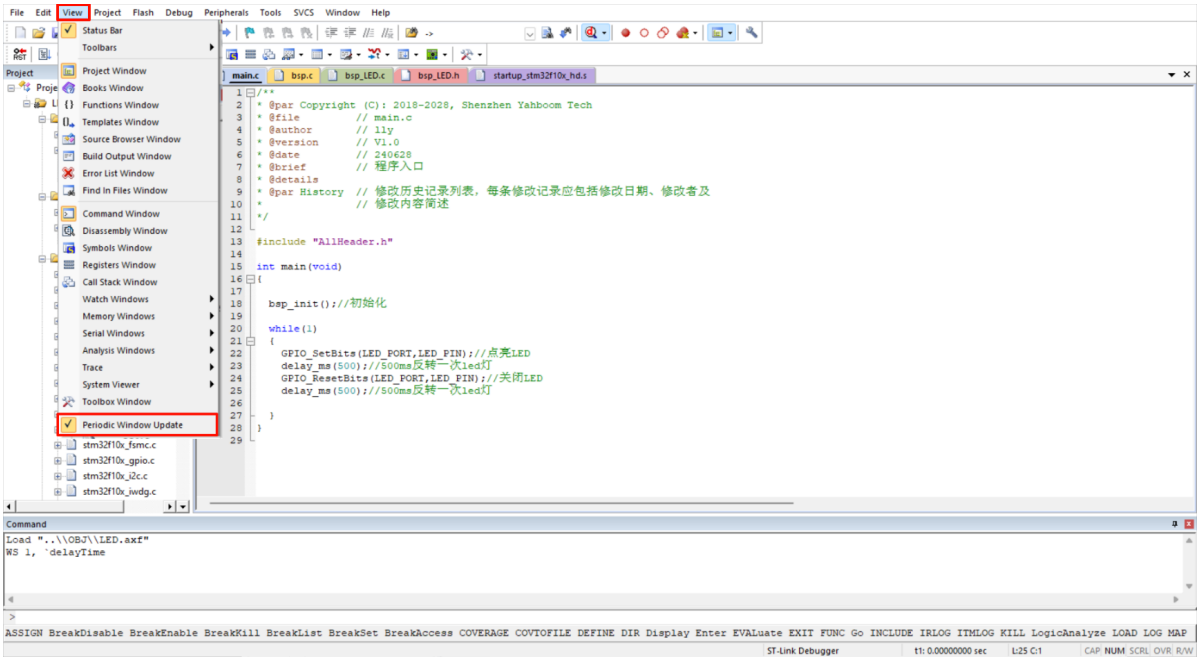
Breakpoints

When the program reaches a breakpoint, it will stop running. Click the gray area of the picture to add and cancel breakpoints: click once to add, and click again to cancel the breakpoint



Monitor variables

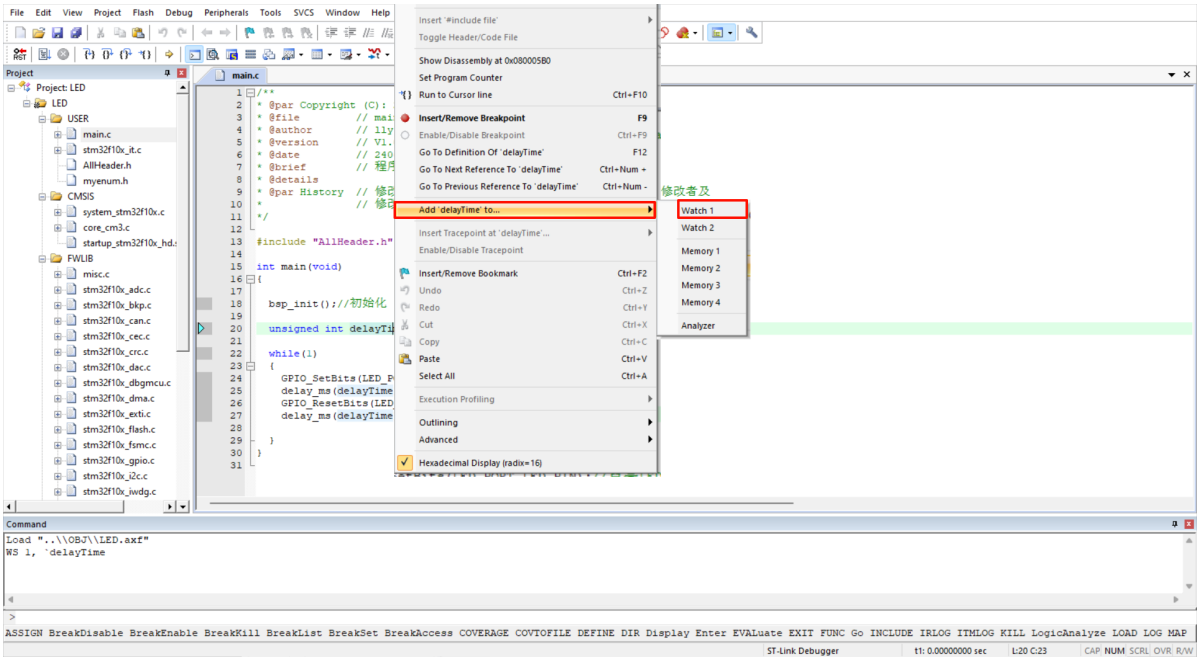
To view the program's variable data in real time, you need to check `View` → `Periodic Window Update`:



Since there are no viewable variables in the program, we slightly adjust the code: To adjust the code, you need to exit Debug mode, then recompile the project, and re-enter Debug mode

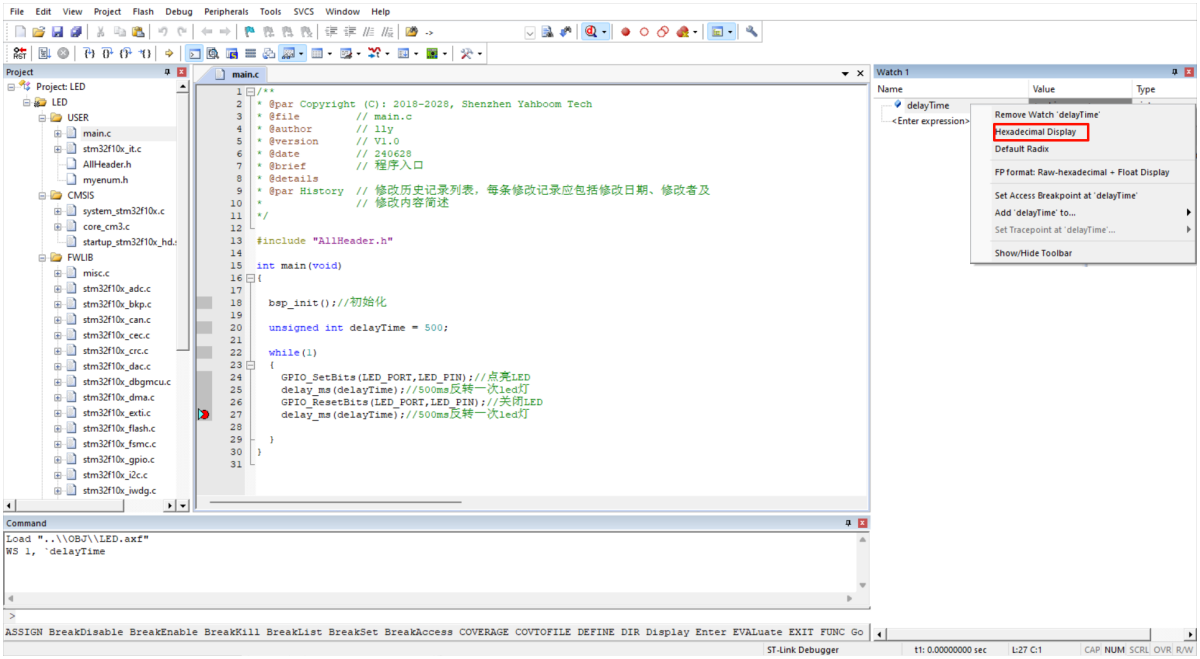
Add variables

Select the variable in the program and right-click to add it to the monitoring window:



Select the variable in the monitoring window and right-click to change the data display format: cancel the hexadecimal display and use decimal for easy observation

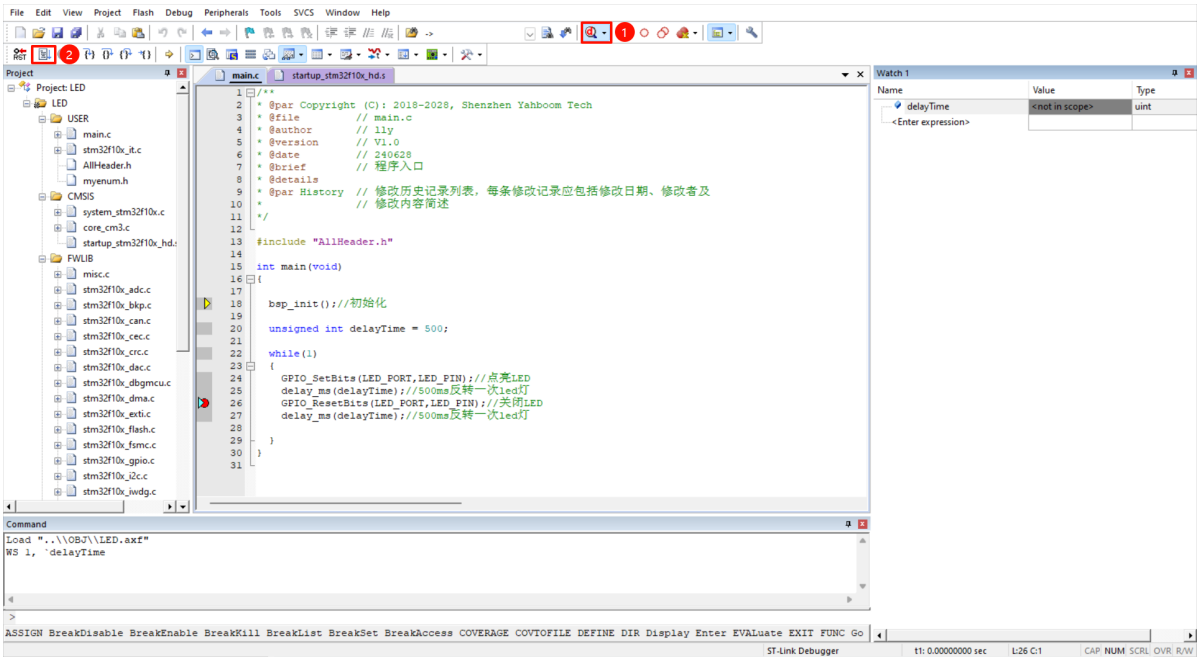
> A breakpoint needs to exist in the program, otherwise the data will not be updated when the program is running, and it will be displayed as out of range



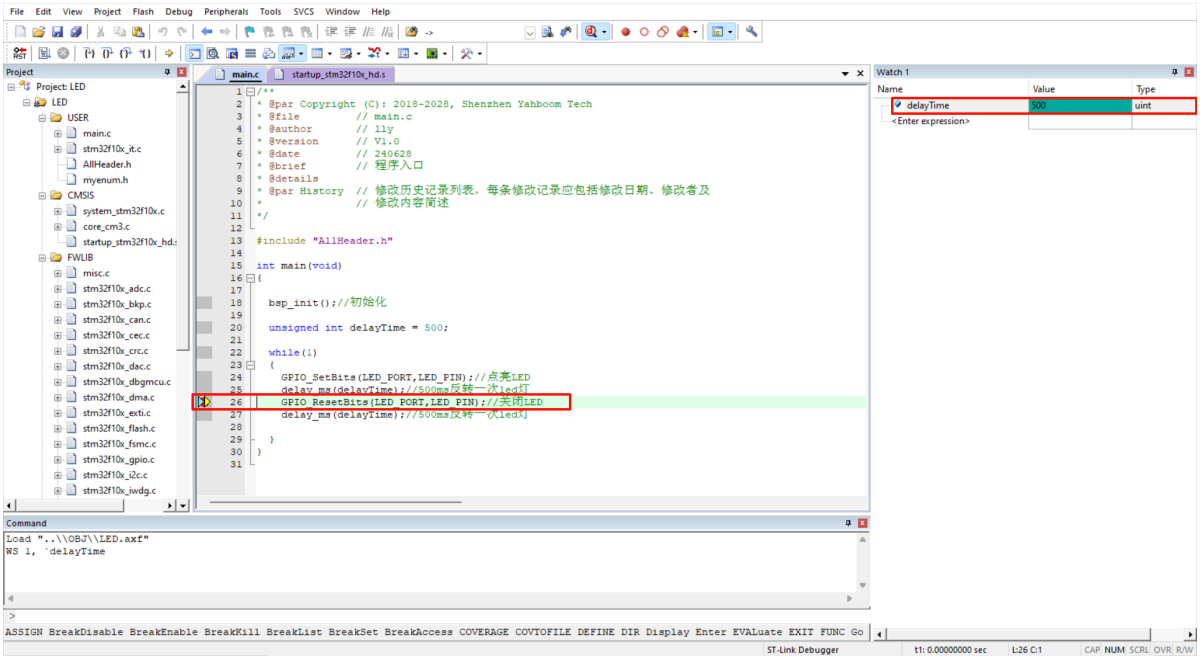
Complete demonstration

Use LED control (GPIO) project to demonstrate a simple simulation process.

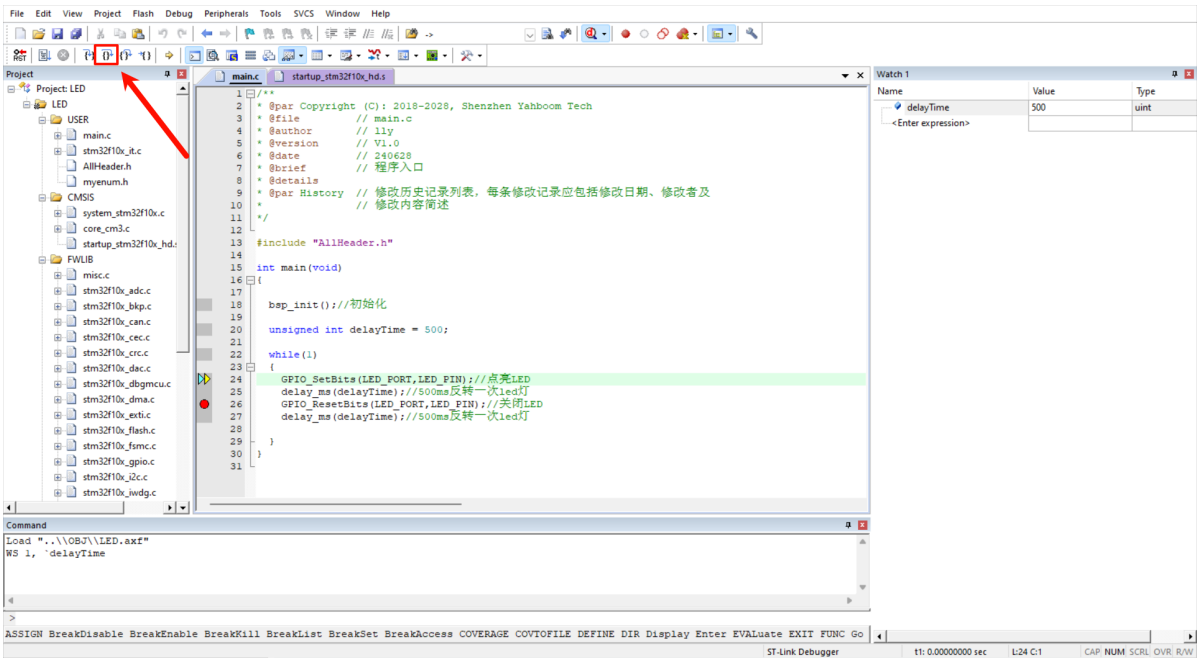
Run the program



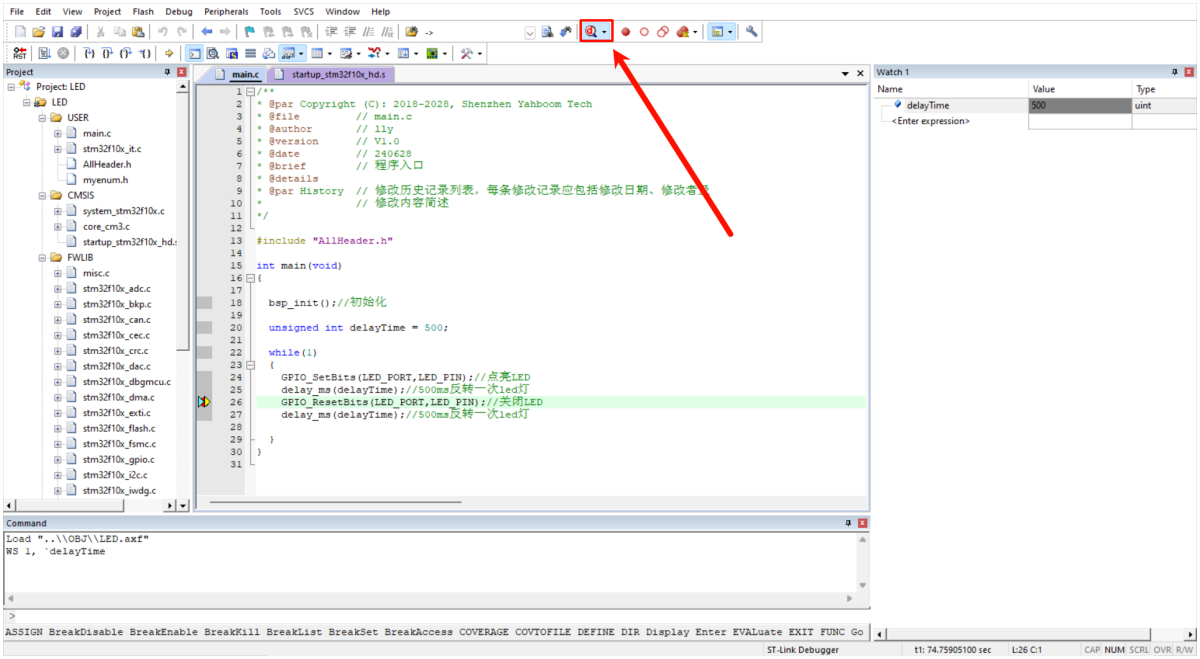
The program will run to the breakpoint and the delay time value will be updated to 500:



Click the line-by-line run icon to control the progress of code execution. At this time, you can observe the LED light phenomenon of the development board.



Click the Debug option to exit the debugging interface:


File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Project
Project: LED
LED
USER
main.c
stm32f10x_it.c
AllHeader.h
myenum.h
CMSIS
system_stm32f10x.c
core_cm3.c
startup_stm32f10x_hd.s
FWLIB
misc.c
stm32f10x_adc.c
stm32f10x_bkp.c
stm32f10x_can.c
stm32f10x_cec.c
stm32f10x_crc.c
stm32f10x_dac.c
stm32f10x_dbgmcu.c
stm32f10x_dma.c
stm32f10x_exti.c
stm32f10x_flash.c
stm32f10x_fsmc.c
stm32f10x_gpio.c
stm32f10x_i2c.c
stm32f10x_iwdg.c
main.c
startup_stm32f10x_hd.s
/**
* @par Copyright (C): 2018-2028, Shenzhen Yahboom Tech
* @file // main.c
* @author // lly
* @version // V1.0
* @date // 240628
* @brief // 程序入口
* @details
* @par History // 修改历史记录列表，每条修改记录应包括修改日期、修改者及
* // 修改内容简述
*/
#include "AllHeader.h"
int main(void)
{
bsp_init();//初始化
unsigned int delayTime = 500;
while(1)
{
GPIO_SetBits(LED_PORT,LED_PIN);//点亮LED
delay_ms(delayTime);//500ms反转一次led灯
GPIO_ResetBits(LED_PORT,LED_PIN);//关闭LED
delay_ms(delayTime);//500ms反转一次led灯
}
}
Watch 1
Name
Value
Type
delayTime
500
uint
<Enter expression>
Command
Load "..\\OBJ\\LED.axf"
WS 1, `delayTime
ASSIGN BreakDisable BreakEnable BreakKill BreakList BreakSet BreakAccess COVERAGE COVTOFILE DEFINE DIR Display Enter EVALuate EXIT FUNC Go
ST-Link Debugger
t1: 74.75905100 sec
L:26 C:1
CAP NUM SCRL OVR R/W