GigaDevice Semiconductor Inc.

GD-Link Adapter

User Guide

Revision 2.4

(May. 2022)

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1. Introduction

GD-Link adapter is a three-in-one multi-function development tool for GD32 series of MCUs. It provides CMSIS-DAP debugger port with JTAG/SWD interface. User can use GD-Link adapter for online programming or debugging code in compatible IDE such as Keil or IAR. Another important function is offline programming.

The objective of this user guide is to describe how to use GD-Link adapter to achieve the above function.

2. Interactive mode and hardware connection

2.1. Buttons and LED

There are a button KEY1 and 4 LEDs on GD-Link. The button KEY1 is used for firmware upgrade and offline programming. The LEDs are used to display the working status of GD-Link. The ***Figure 2-1. GD-Link adapter hardware*** shows the position of KEY1 and LEDs on GD-Link. ***Table 2-1. The working status of GD-Link adapter represented by different LEDs*** briefly describes GD-Link working status indicated by each LED status. The specific meaning of the LED status and the use of the button will be described in detail in the following chapters.

Figure 2-1. GD-Link adapter hardware

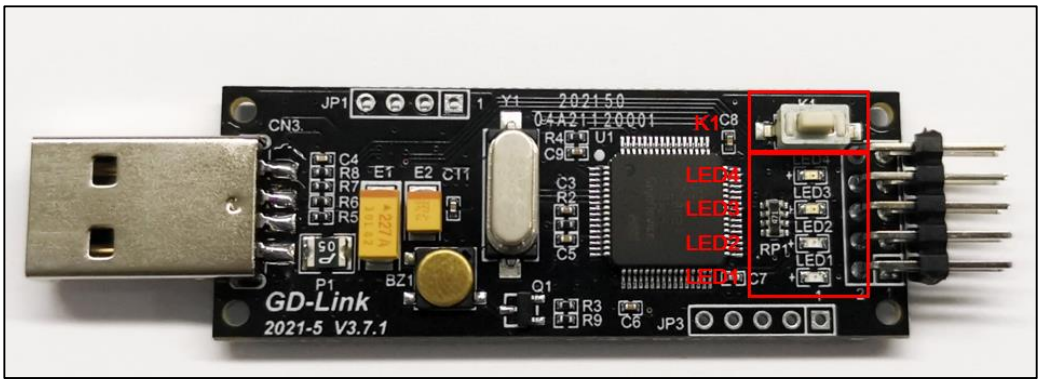


Table 2-1. The working status of GD-Link adapter represented by different LEDs

LED	LED status	GD-Link working status
LED1	always bright	offline programming successful
	flashing	offline programming
LED2	always bright	firmware upgrade status
	flashing fast	USB connection successful
	flashing slow	USB not connected
LED3	always bright	firmware upgrade status

LED	LED status	GD-Link working status
LED4	always bright	power supply is normal

2.2. Connecting GD-Link adapter with target board

The ***Figure 2-2. Schematic diagram of GD-Link adapter*** and ***Table 2-2. Pin function of GD-Link adapter*** shows the electrical connection relationship between GD-Link adapter and SWD interface of the target board, according to the information, connect GD-Link adapter with target board via DuPont lines or other connecting wires.

Note: It is recommended that the length of the DuPont lines not exceed 10cm.

Figure 2-2. Schematic diagram of GD-Link adapter

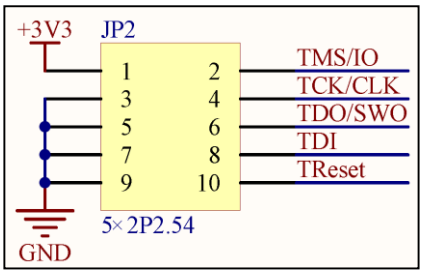


Table 2-2. Pin function of GD-Link adapter

GD-Link	Target Board(SWD)	Target Board(JTAG)
+3V3	+3V3	+3V3
GND	GND	GND
TMS/IO	JTMS/SWDIO(PA13)	JTMS/SWDIO(PA13)
TCK/CLK	JTCK/SWCLK(PA14)	JTCK/SWCLK(PA14)
TDO/SWO	---	JTDO(PB3)
TDI	---	JTDI(PA15)
TReset	NRST	NRST

3. Offline programming

3.1. Tool download

When using the GD-Link offline programming function, please download the latest version of the PC tool GigaDevice GD-Link Programmer from the website ***https://www.gd32mcu.com/cn/download/7?kw=*** and perform the following operations.

3.2. Update user code

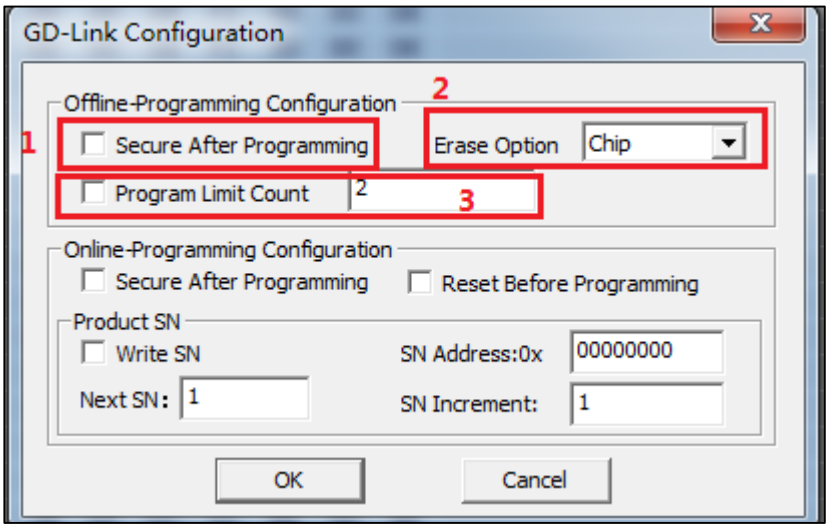
Plug GD-Link adapter into PC USB connector, LED4 will turn on, which indicates that GD-

Link is powered on normally. LED2 will flash faster when GD-Link communication with PC correctly, and GD-Link will be enumerated as HID by PC, it indicates that GD-Link is working normally.

First configure the offline download file, open GD-Link Programmer software, click tool menu “GD-Link->Configuration”.

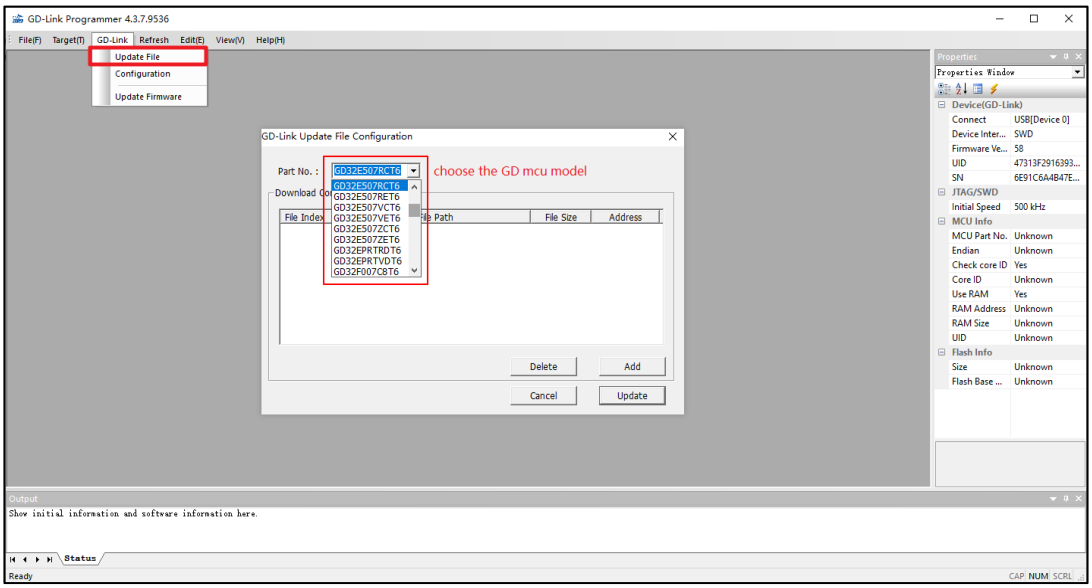
1. Configure whether to add read protection to the target chip after downloading code.
2. Select erase mode, page erase or chip erase.
3. Set the maximum number of programming.

Figure 3-1. GD-Link adapter offline download configuration



Then select the file to download, click tool menu “GD-Link->Upadata file”, and choose a specific GD MCU model.

Figure 3-2. Choose the GD MCU model



Next, click “Add” label and load the bin file, fill in the address of the target mcu to be downloaded in the pop-up interface box. In this process, user can add multiple bin files (supports up to eight files) at the same time and download them to different address ranges of the target MCU.

Figure 3-3. Load the bin file

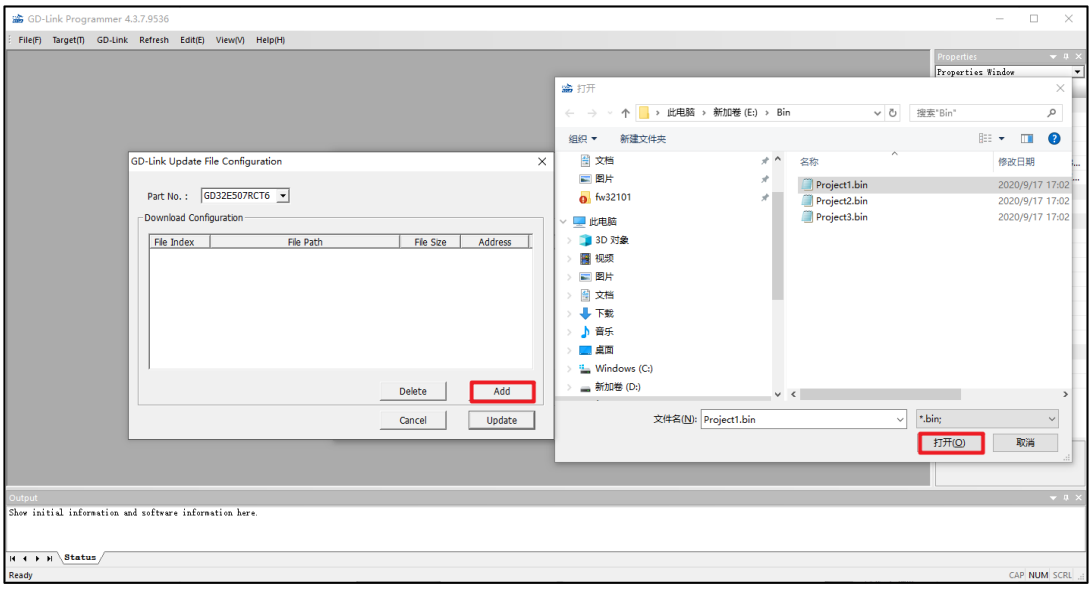
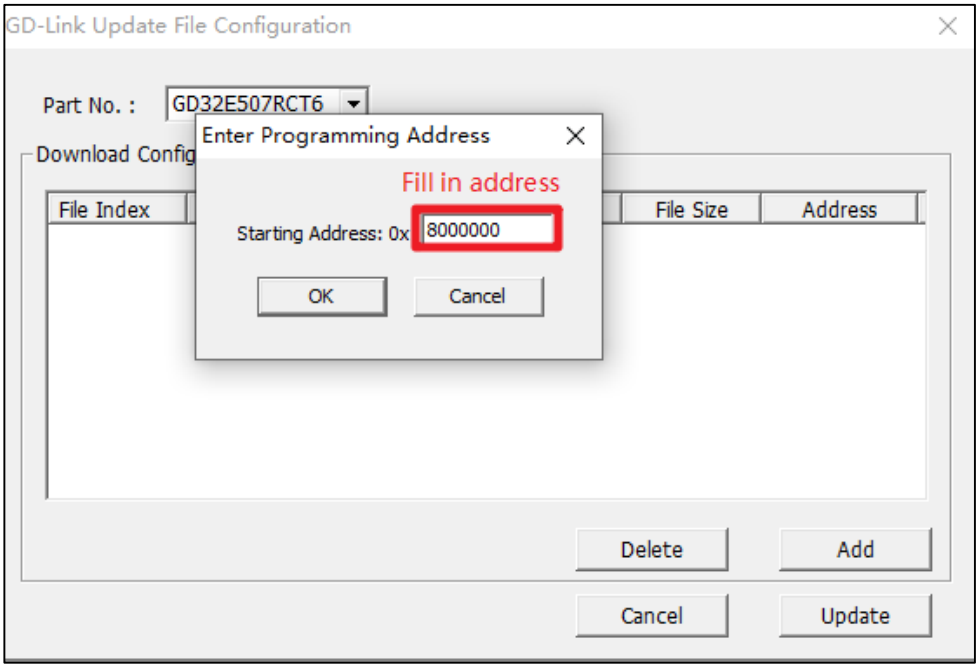
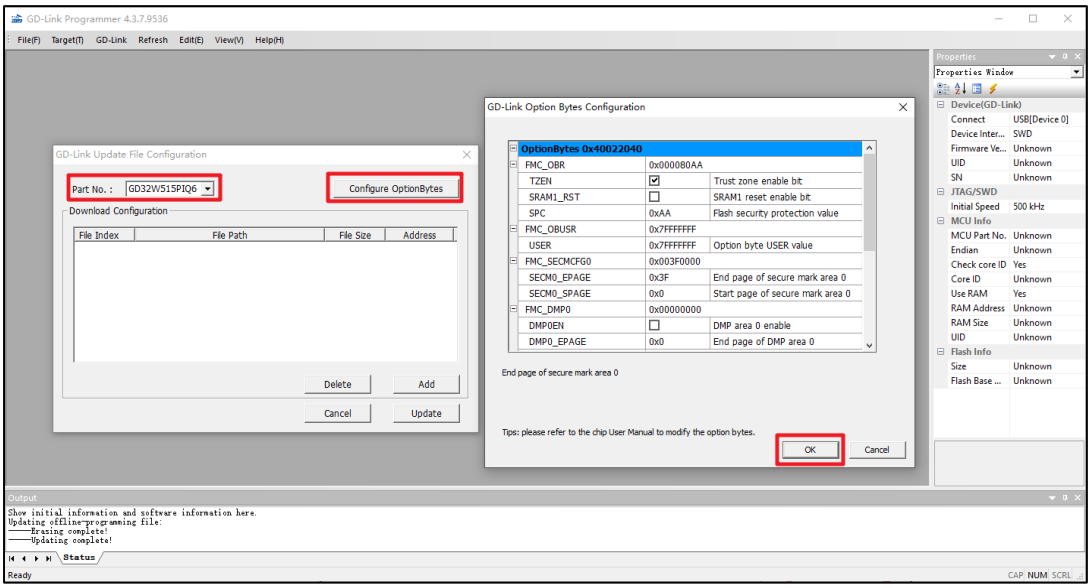


Figure 3-4. Fill in the address



If the MCU selection is the GD32W515 series chip, it will also support option bytes configuration. The user can configure the option bytes of the target MCU through this interface. If the configuration is completed, click “OK” lable.

Figure 3-5. Configure option byte



After adding the bin file and configuring option bytes, click lable menu “Update” and "Yes" to update user code.

Figure 3-6. Updata bin file

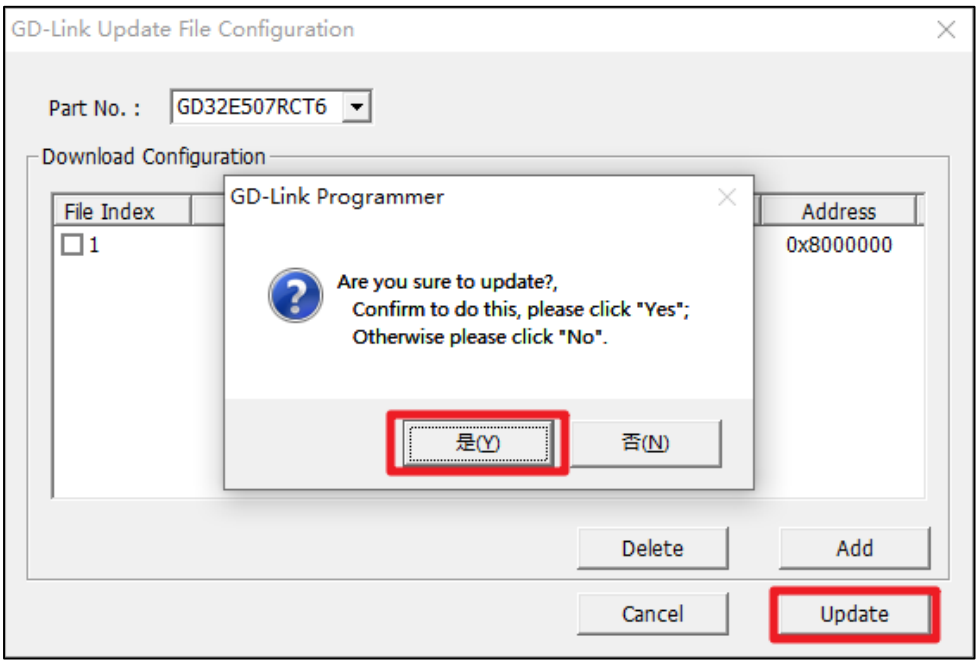
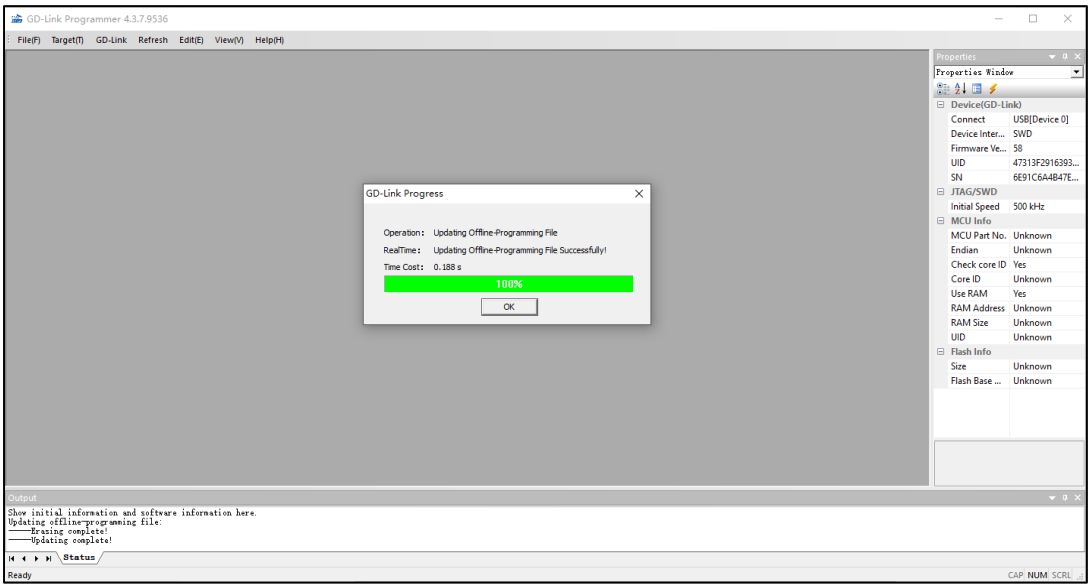


Figure 3-7. GD-Link adapter update file finished



Complete the above steps correctly, presses button KEY1, then LED1 will flash at the moment, it indicates that the GD-Link adapter is downloading the user code to target board.

If the user code is downloaded to the target board correctly, the buzzer will sound and at the same time, LED1 will stop flashing and turn on normally.

3.3. Update firmware

When updating the firmware using the new version of the GD-Link Programmer, click tool menu “GD-Link->Updata Firmware” first. There are two specific situations, please follow the instructions of GD-Link Programmer to upgrade the firmware.

3.3.1. Update prompt type 1

1. When the GD-Link Programmer prompts that GD-Link needs to be powered off, click OK. The prompt interface is shown in ***Figure 3-8. GD-Link adapter update firmware situation 1 figure 1***.
2. Then long press KEY1 to power on, when LED3 is always on, release the button KEK1, and click the tool menu "GD-Link->Updata Firmware" to update again. The prompt interface is shown in ***Figure 3-9. GD-Link adapter update firmware situation 1 figure 2***.

Figure 3-8. GD-Link adapter update firmware situation 1 figure 1

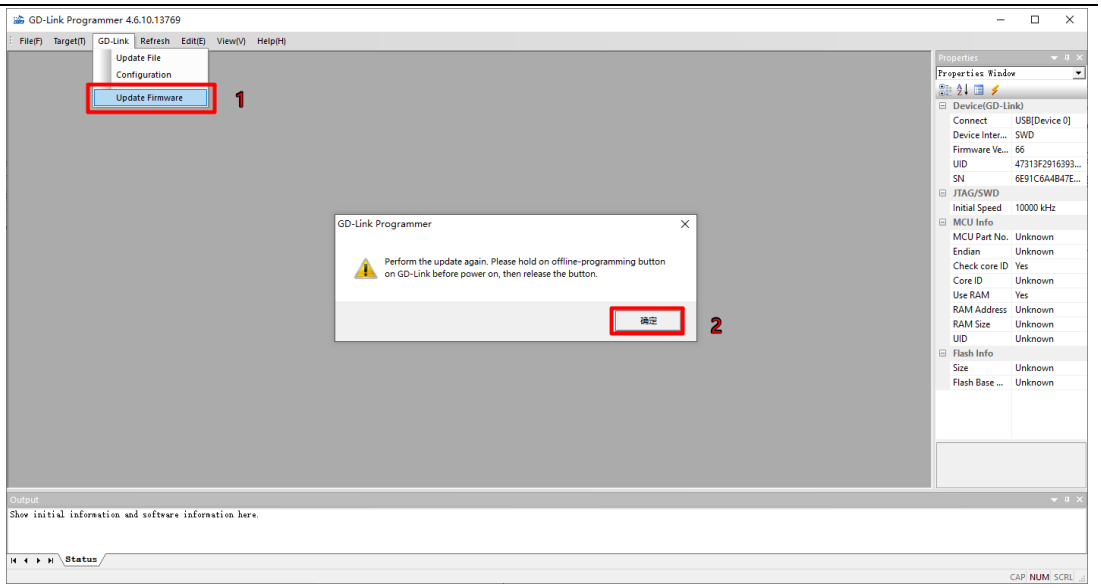
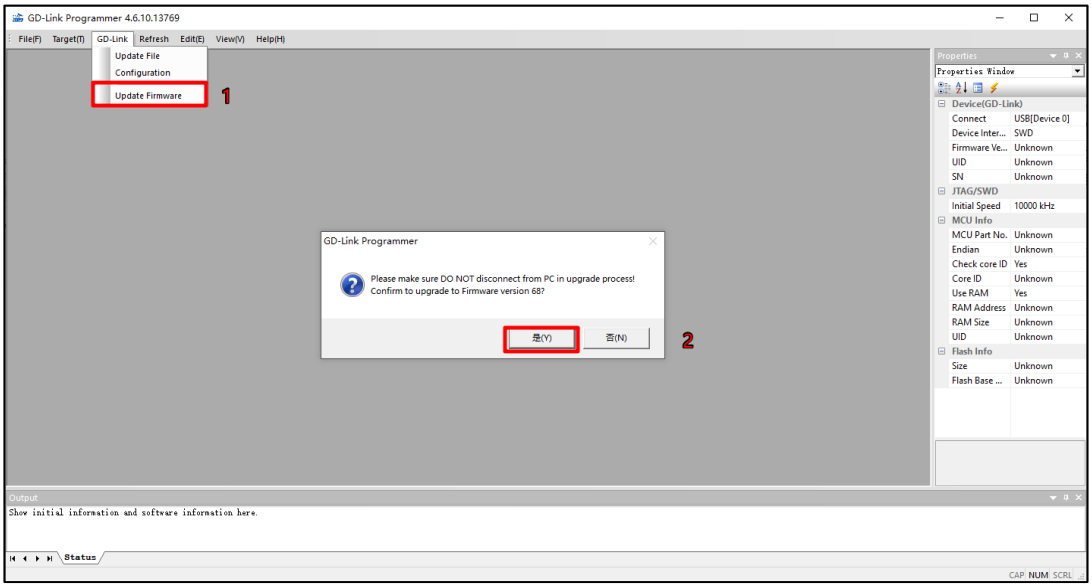


Figure 3-9. GD-Link adapter update firmware situation 1 figure 2



3. There are two steps in the upgrade process. In step1, GD-Link LED3 is always bright. In step2, GD-Link LED2 is always bright. The prompt interface is shown in ***Figure 3-10. GD-Link adapter update firmware situation 1 figure 3*** and ***Figure 3-11. GD-Link adapter update firmware situation 1 figure 4***.

Note: Please do not disconnect the GD-Link from the computer during the upgrade process.

Figure 3-10. GD-Link adapter update firmware situation 1 figure 3

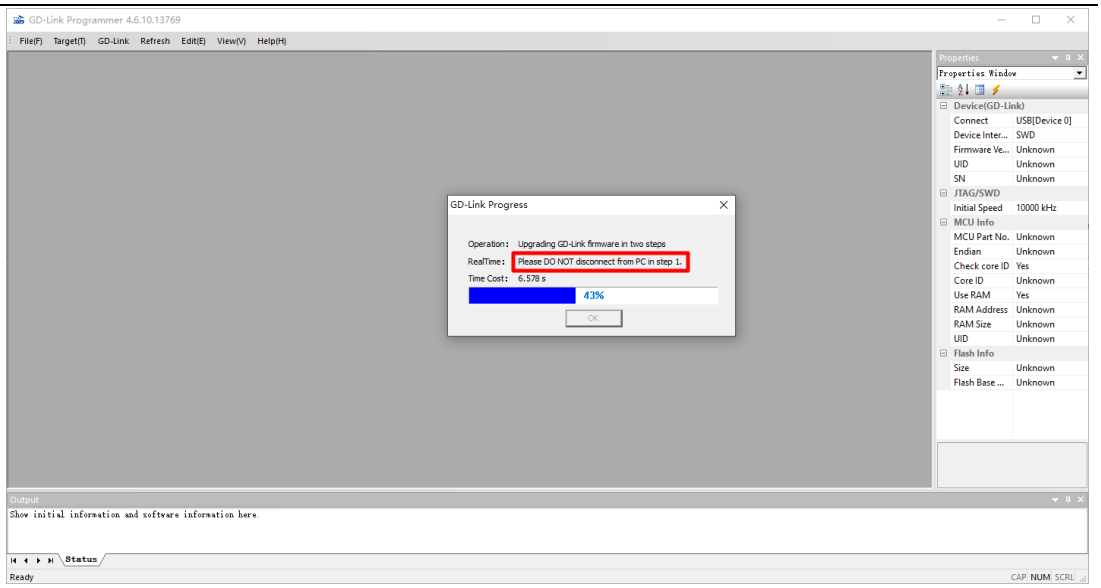
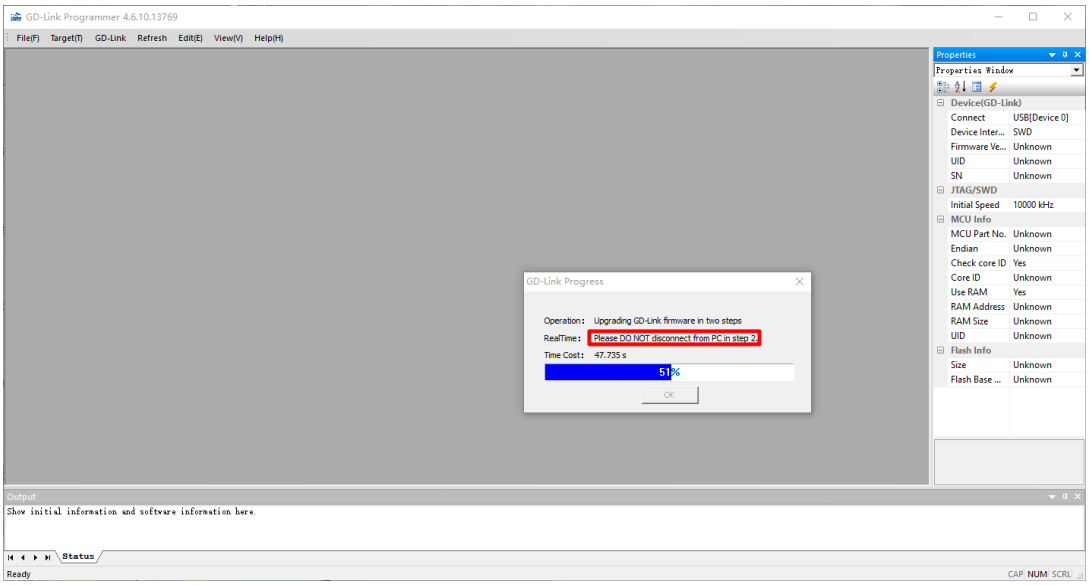
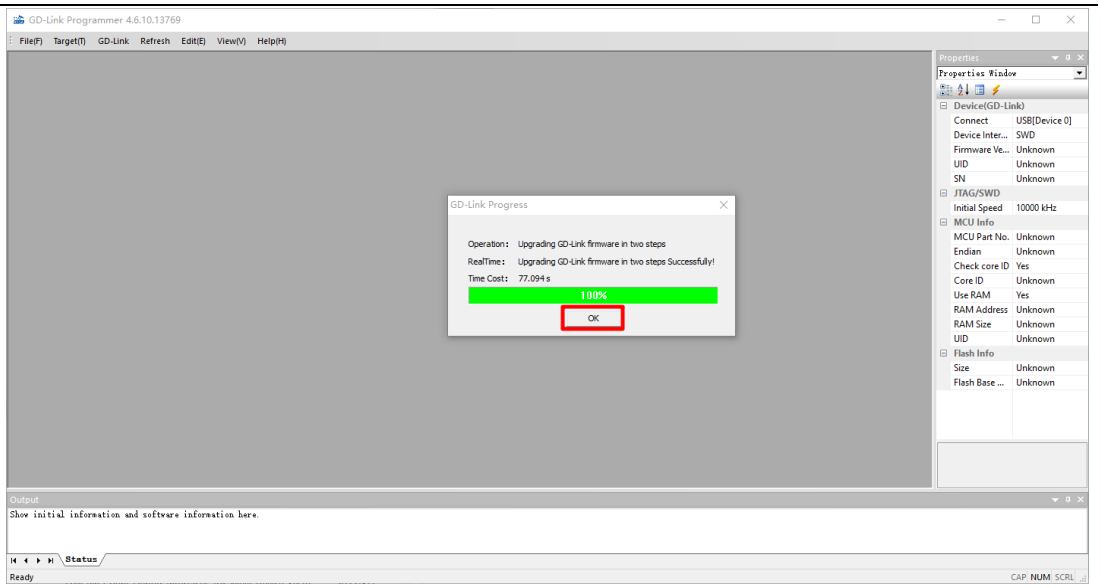


Figure 3-11. GD-Link adapter update firmware situation 1 figure 4



4. When the progress bar reaches 100%, click OK to complete the firmware update. The prompt interface is shown in ***Figure 3-12. GD-Link adapter update firmware situation 1 figure 5***.

Figure 3-12. GD-Link adapter update firmware situation 1 figure 5



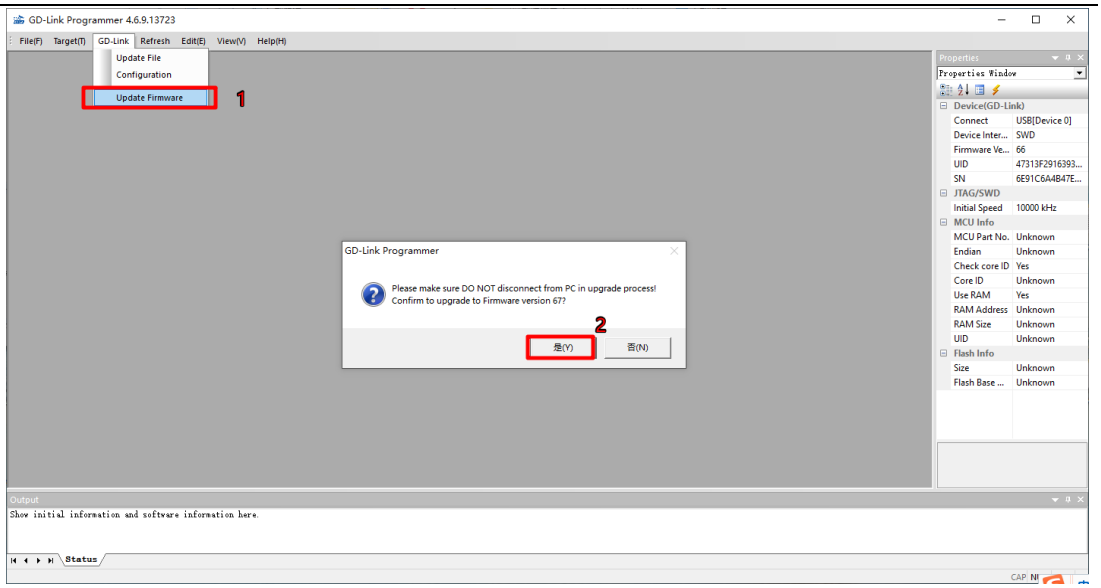
5. The firmware version number is displayed on the right side of the interface, indicating that the firmware upgrade is successful. The prompt interface is shown in ***Figure 3-13. GD-Link adapter update firmware situation 1 figure 6***.

Figure 3-13. GD-Link adapter update firmware situation 1 figure 6

3.3.2. Update prompt type 2

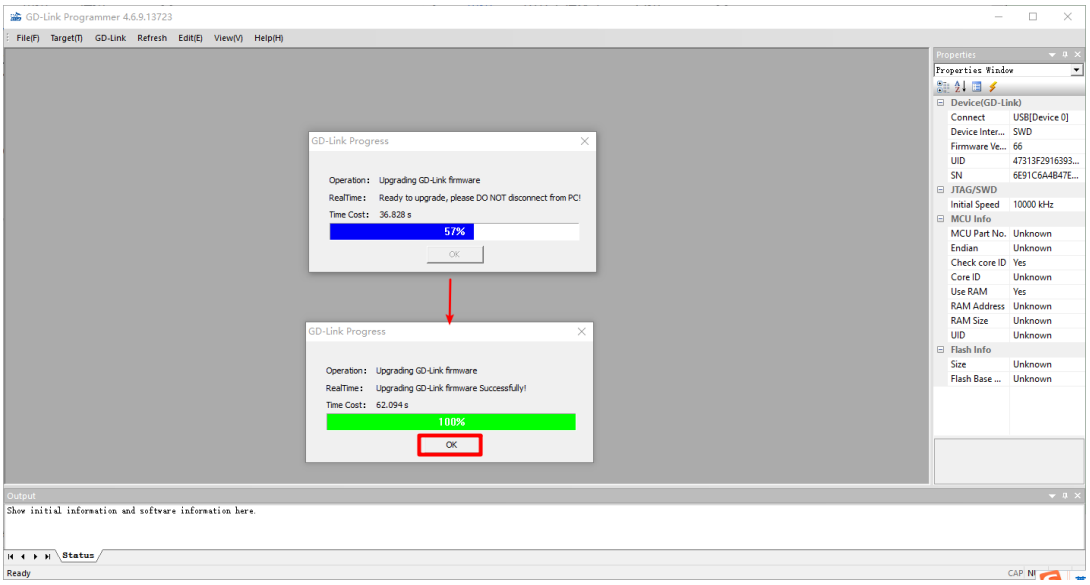
1. After clicking tool menu "GD-Link->Updata Firmware", user can directly update the firmware without powering off and then long pressing KEY1 to power on, and click “OK” for firmware update. The prompt interface is shown in ***Figure 3-14. GD-Link adapter update firmware situation 2 figure 1***.

Figure 3-14. GD-Link adapter update firmware situation 2 figure 1



2. Complete the firmware update when the progress bar reaches 100%. During the firmware update process, the GD-Link LED2 is always bright. The prompt interface is shown in ***Figure 3-15. GD-Link adapter update firmware situation 2 figure 2***.

Figure 3-15. GD-Link adapter update firmware situation 2 figure 2



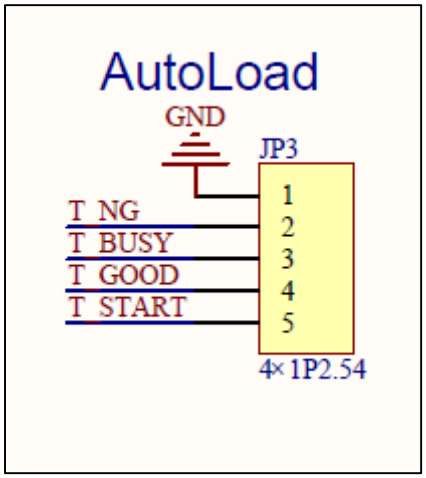
3. The firmware version number is displayed on the right side of the interface, indicating that the firmware upgrade is successful. The prompt interface is shown in ***Figure 3-16. GD-Link adapter update firmware situation 2 figure 3***.

Figure 3-16. GD-Link adapter update firmware situation 2 figure 3

3.4. Auto-load signal introduction

GD-Link provides some signals for the burning machine. The ***Figure 3-17. Schematic diagram of GD-Link auto load signals*** shows the definitions of the auto-load signals.

Figure 3-17. Schematic diagram of GD-Link auto load signals



All signals are active low.

When is programming, the BUSY signal is low (0V). The GOOD signal and NG signal are high (3.3V).

When programming is successful, the GOOD signal is low (0V). The BUSY signal and NG signal are high (3.3V).

When the programming fails, the NG signal is low (0V). The BUSY signal and GOOD signal are high (3.3V).

The START signal is normally weakly pulled-up and remains high (3.3V). If the device is in

the idle state of offline programming, the START signal line receives a low-level signal of 100ms and then a pragramming can be started.

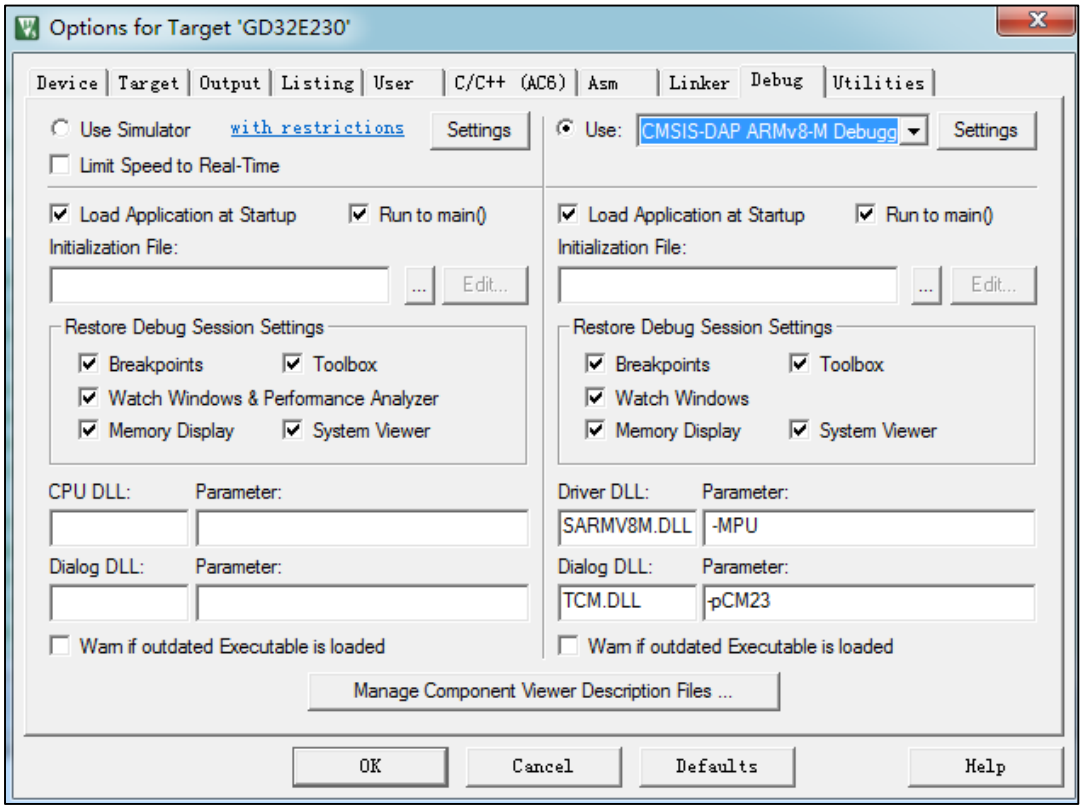
4. Programming in IDE

4.1. In Keil (Version 5.26 above) for programming

Power on and connect GD-Link adapter with target board via JTAG/SWD interface.

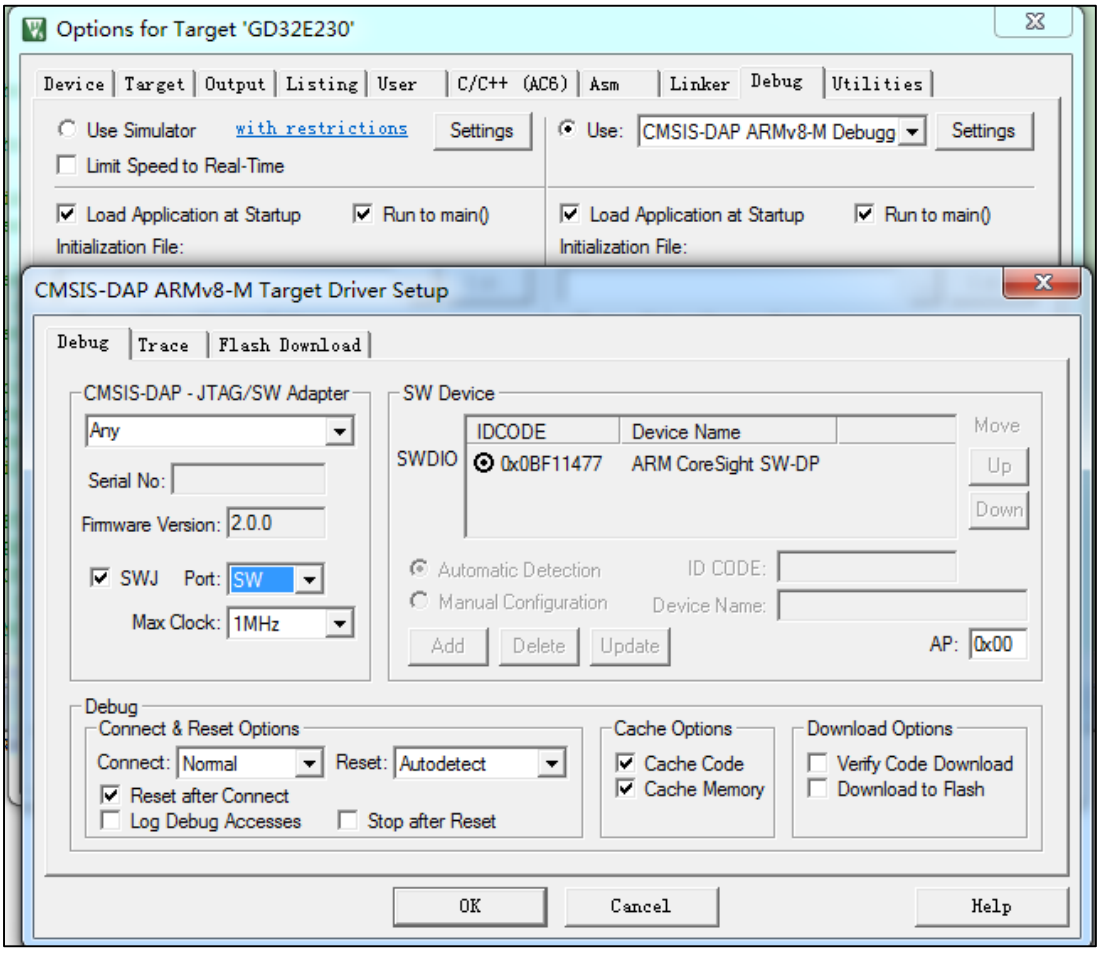
Select “CMSIS-DAP Debugger” or “CMSIS-DAP ARMv8-M Debugger” in “Configure Flash Tools” Tools menu.

Figure 4-1. Debug settings in Keil



Click “Settings” command button, select “JTAG” or “SWD” port.

Figure 4-2. JTAG/SWD Port selection in Keil



Select “Utilities” page, and then select “CMSIS-DAP Debugger”, then click “Settings” command button, “Add” the correct flash programming algorithm according to the GD32 MCU which is using.

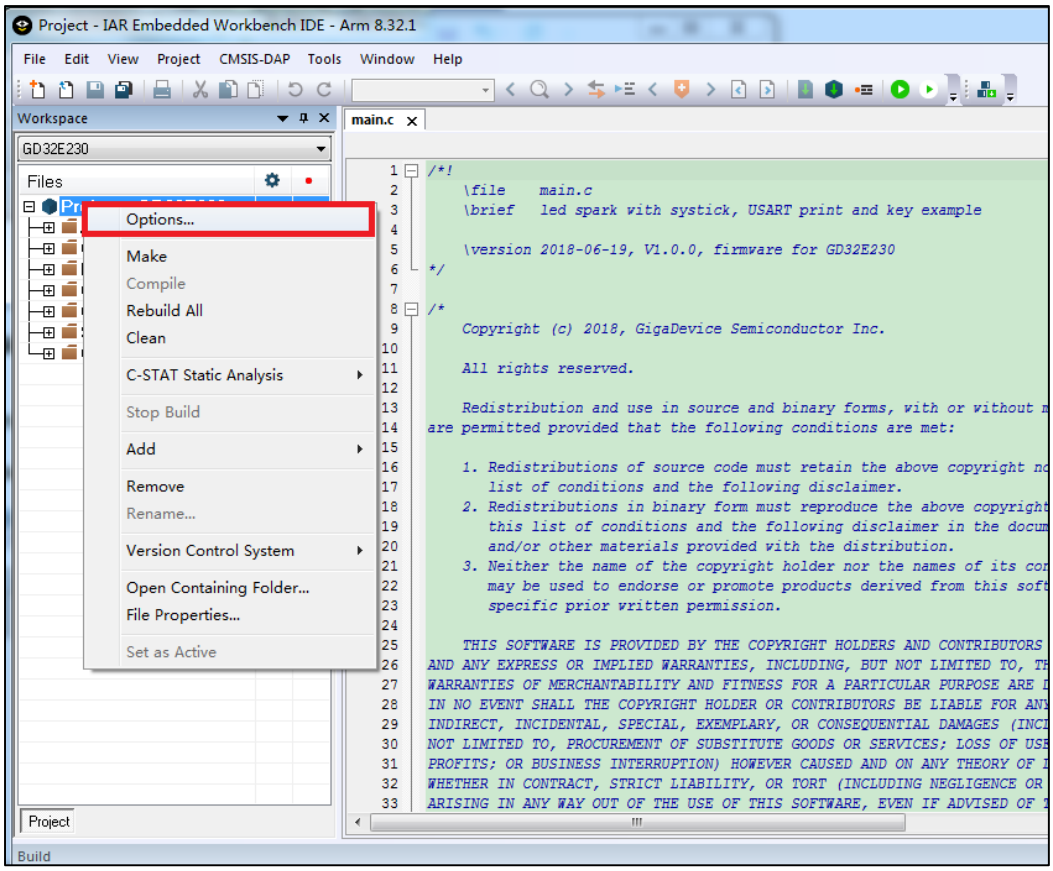
Figure 4-3. Flash programming algorithm selection in Keil

4.2. In IAR (Version 8.32 above) for programming

Power on and connect GD-Link adapter with target board via JTAG/SWD interface.

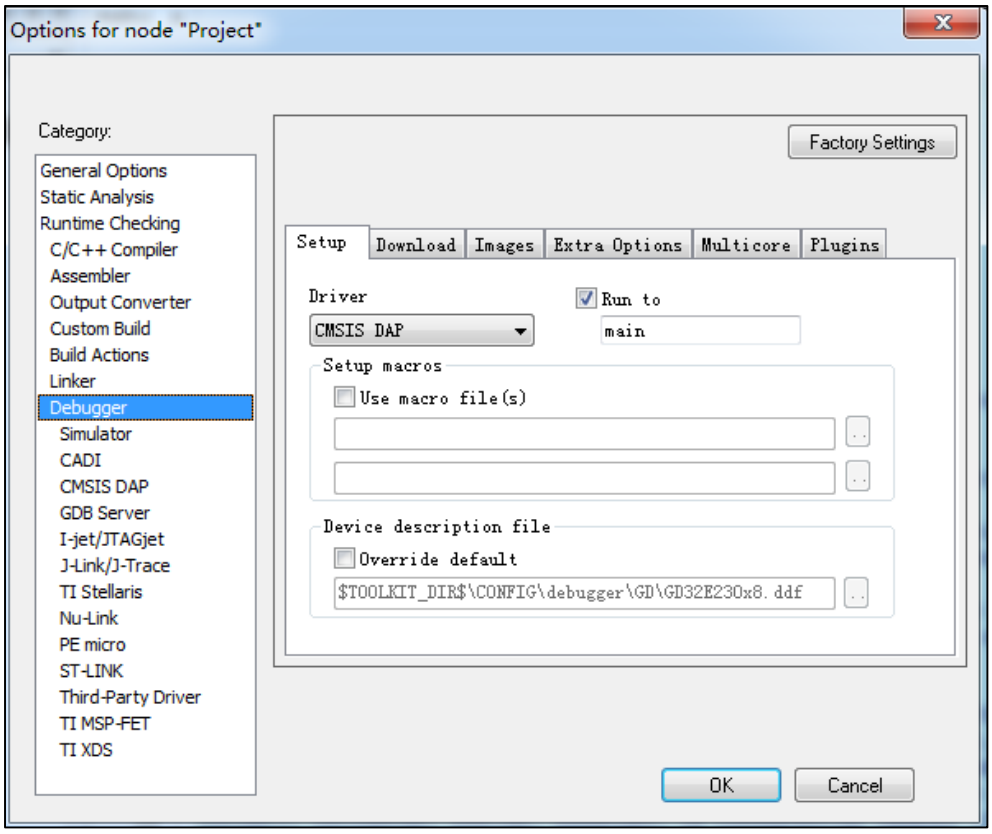
Right-click the project name, select the “Options”.

Figure 4-4. Project Options in IAR



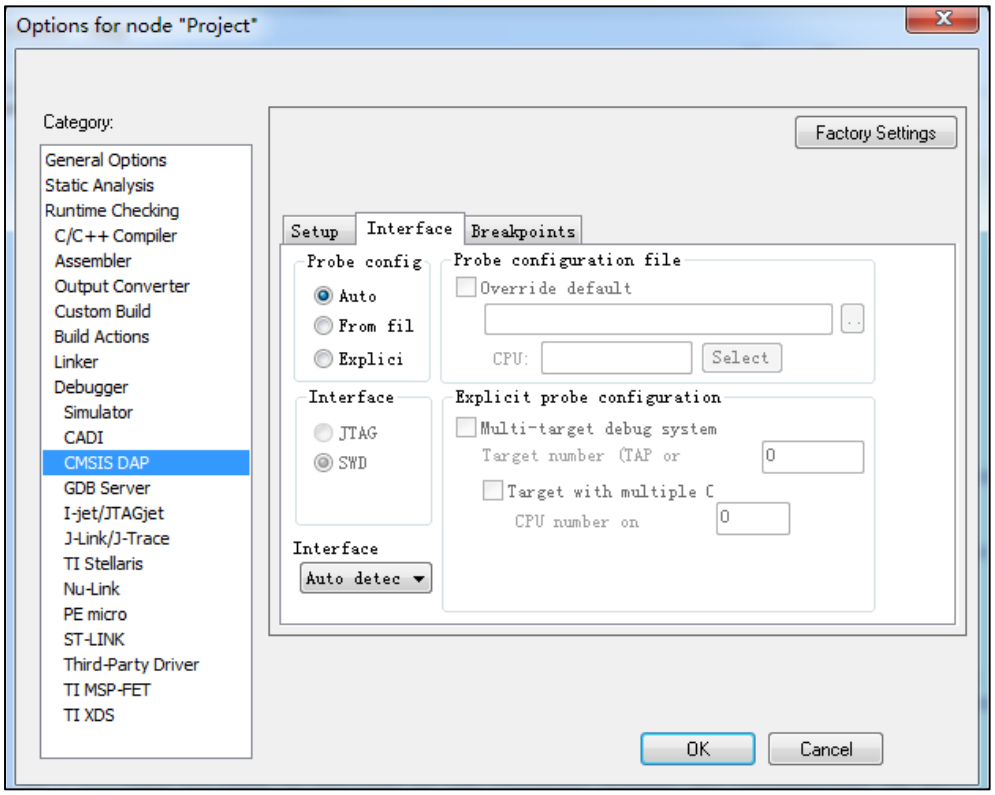
Select “CMSIS-DAP” in “Debugger->Setup->Driver” tools menu.

Figure 4-5. Debugger settings in IAR



Select “JTAG or SW” interface in “CMSIS DAP->JTAG/SW->Interface” tool menu.

Figure 4-6. Interface selection in IAR



5. Revision history

Table 5-1. Revision history

Revision No.	Description	Date
1.0	Initial Release	Jul.15, 2015
2.0	Update file	Jul.8, 2019
2.1	Add instructions for new features in version 3.6	Sept.23, 2019
2.2	1. Add recommended line length range 2. Add the new version of the GD-Link Programmer to update the firmware operation process	Aug.20, 2020
2.3	1. Add the new version of the GD-Link Programmer to update the bin file operation process 2. Support multiple bin files offlineload function 3. Offlline download supports option byte configuration function (only GD32W515 serials)	Mar.20, 2021
2.4	1.Add button and LEDs description 2. Add PC tool download address 3. Update firmware update chapter description	May.12, 2022

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