Application Note

Document No.: AN1177

Non-Blocking Bootloader Operation Guide

Version: V1.1

1 Introduction

Unlike a blocking bootloader, a non-blocking bootloader does not continuously poll for connection requests from the host computer. Therefore, the connection procedure is different. This application note explains how to use the GeehyProg host software to connect to a non-blocking bootloader and perform related operations.

Contents

2 Host Computer Version Requirements

To use a non-blocking bootloader, upgrade GeehyProg to V1.0.6 or later.

3 Supported Chips and Pins

Table 1 lists the chip series and UART pins supported by the non-blocking bootloader.

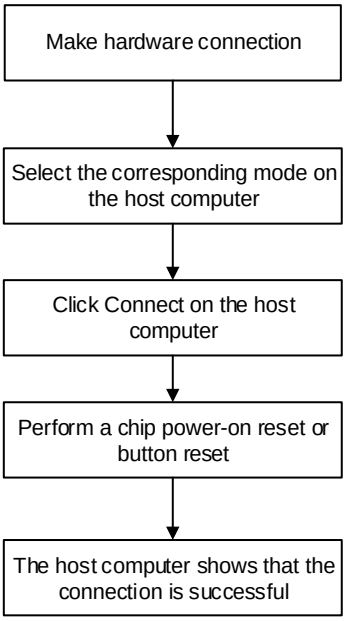
Table 1 Bootloader-Supported Chips and Pins

Chip Series	Supported UART Pins (TX/RX)
G32M3101	PA7\PA8
	PB1\PB2
G32F031	PA7\PA8
	PB1\PB2
G32F002	PA7\PA4

4 Operation Overview

If the non-blocking bootloader does not receive a connection request from the host computer within the specified time, it jumps to the user program and starts running it. To ensure that the bootloader receives the request in time, first start sending connection requests from the host computer, and then reset the MCU to enter Bootloader mode. The connection flow is shown below:

Figure 1 Non-Blocking Bootloader Connection Flowchart



5 Detailed Operation Procedure

5.1 Determine the Boot Mode

For an MCU with a non-blocking bootloader, the boot mode is determined by a predefined word in the user option-byte area. Therefore, before connecting to the bootloader, read the user option byte area to confirm that the MCU is in Boot mode.

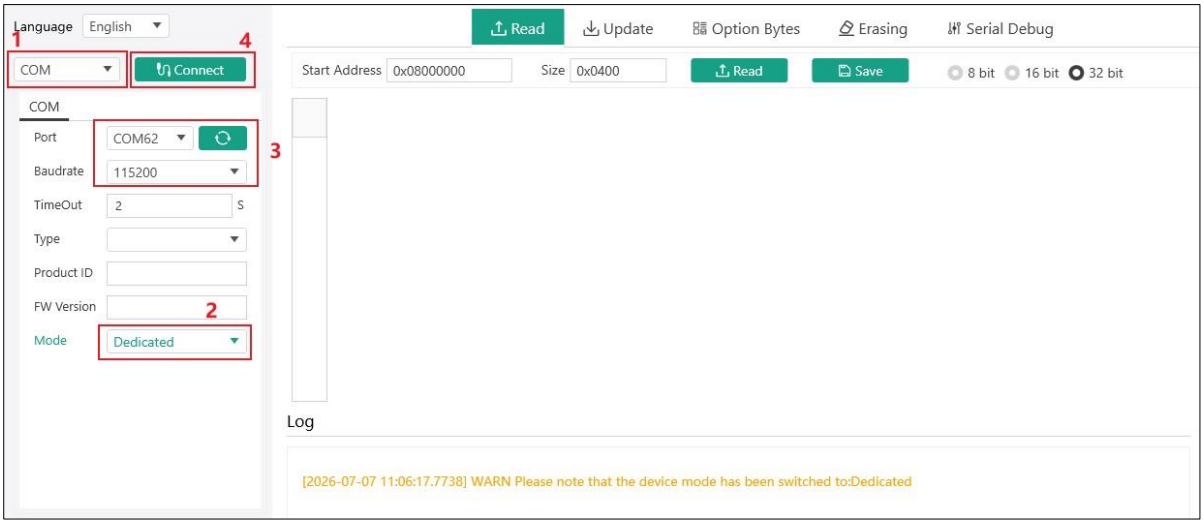
For example, the boot mode of the G32M3101 chip is determined by the SYS_REMAP value in the user option byte area, as shown below.

Table 2 G32M3101 User Option Byte Area

Address	Name	Size	R/W	Description
0x00100BE8	SYS_REMAP	32-bit	R/W	Power-on startup area selection: 0x55AAAA55: Start from the MAIN area Other values: Start from the BOOT area

5.2 Host Computer Connection

Figure 2 GeehyProg Connection Interface



(1) Select the connection method. For ISP mode, select COM.

(2) Switch the working mode to “Dedicated” when connecting to a non-blocking bootloader. A message will be displayed after the mode is switched.

(3) Select the serial port number and baud rate.

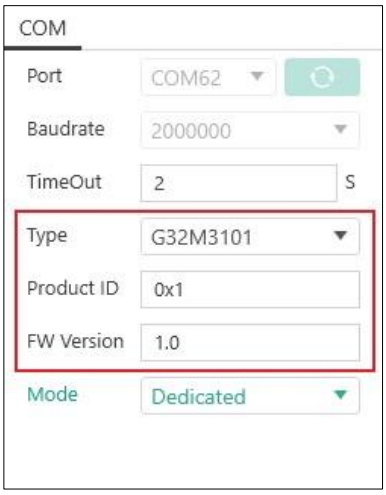
(4) Click “Connect”. The host computer will start sending connection commands continuously.

(5) While the host computer is sending connection commands, perform a power-on reset or button reset on the MCU.

Note: After “Connect” is clicked, the host sends connection commands for only 6 seconds. If the MCU is not reset within this time, click “Connect” again.

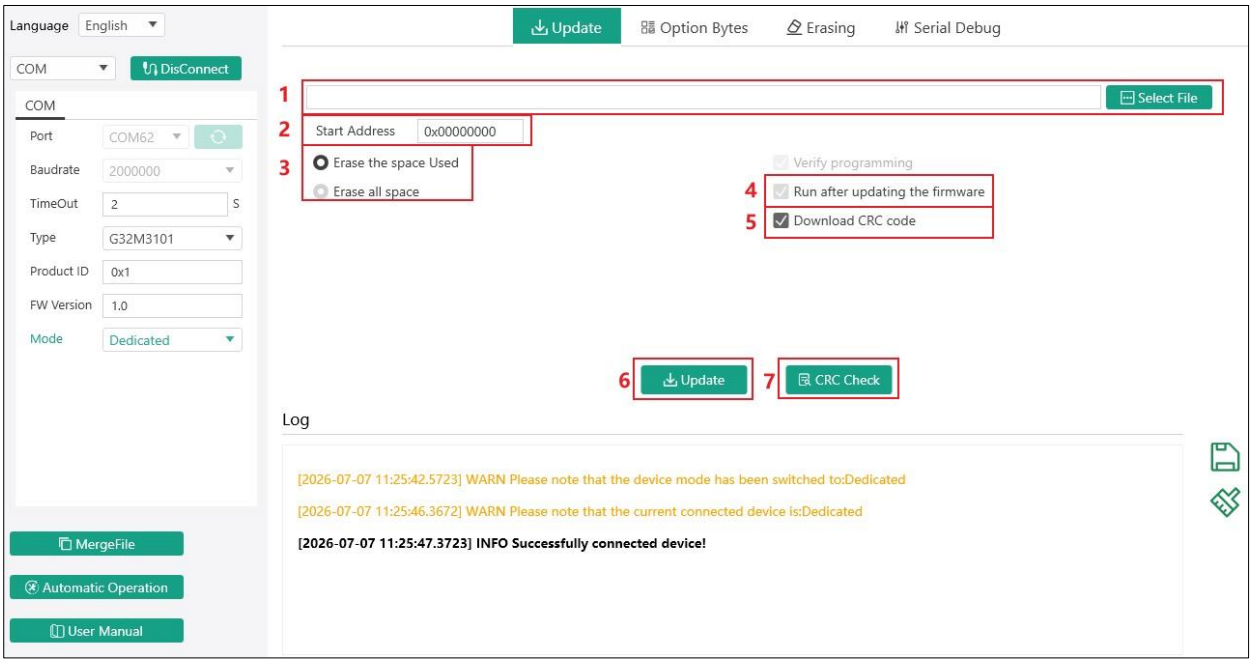
After the connection is complete, the status bar on the left displays the chip type, product ID, and bootloader firmware version of the connected MCU, as shown below.

Figure 3 GeehyProg Status Bar



5.3 Writing Data

Figure 4 GeehyProg Update Interface



(1) Select the file to be updated.

(2) Set the programming start address. When a BIN file is selected, the start address can be entered or changed.

(3) Select the erase method: erase used space or erase all space.

(4) If this option is selected, the system resets after the update is complete and runs the code in the MAIN area.

(5) If this option is selected, the CRC code segment of the update file is downloaded to the end of FLASH during the update.

(6) Click “Update” to start the update.

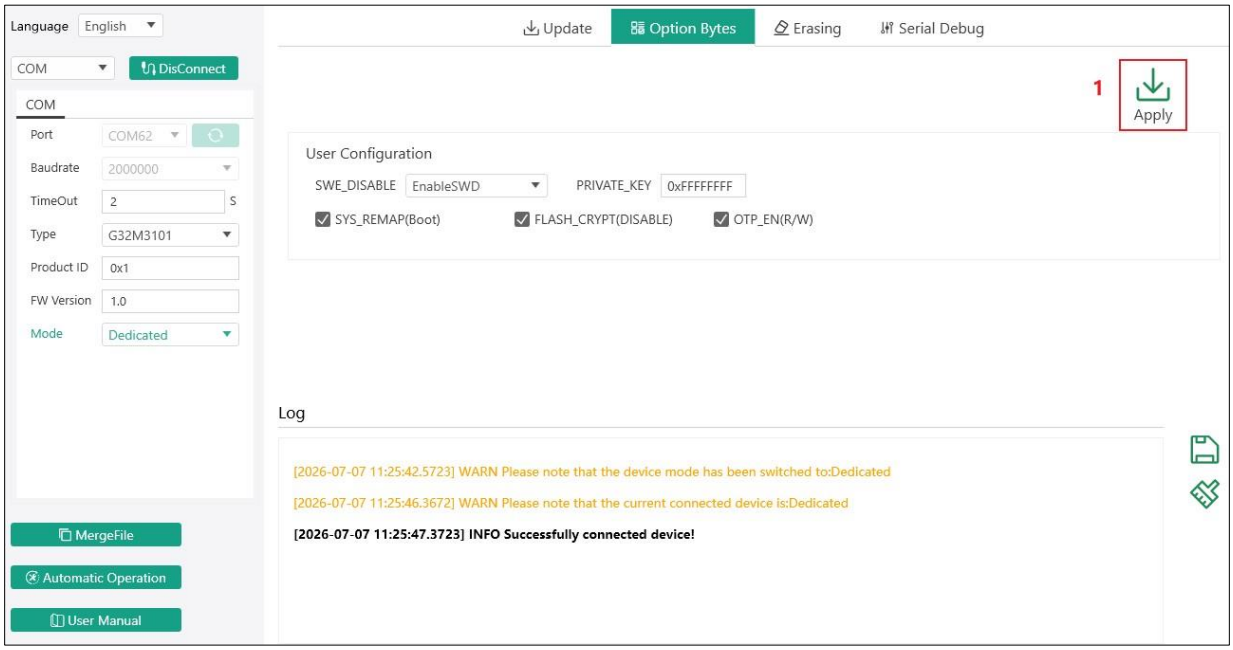
(7) Click “CRC Check” to perform CRC verification on the specified code based on the CRC code segment.

Note:

1. Selecting “Download CRC Code” writes the CRC code segment to the last 16 bytes of FLASH. If the user code uses the last 16 bytes, do not select this option.
2. After the CRC code is downloaded, a full erase or erasing the last page will erase the CRC code segment and cause CRC verification to fail.

5.4 Updating the Option Bytes

Figure 5 GeehyProg Option Byte Interface



(1) Click “Apply” to update the option byte data.

(2) SYS_REMAP: Startup hardware configuration

a) Selected: Boot startup; b) Not selected: Flash startup.

(3) FLASH_CRYPT: Encryption/decryption switch

a) Selected: no encryption/decryption; b) Not selected: encryption/decryption enabled.

(4) PRIVATE_KEY: Encryption key

Encryption/decryption key input field. 0xFFFFFFFF means the default value, 0x1122AABB, is used.

(5) SWD_DISABLE: SWD access permission

a) EnableSWD: SWD works normally; b) DisableRead: SWD cannot read FLASH; c) DisableSWD: SWD is disabled.

(6) OTP_EN: User configuration area permission

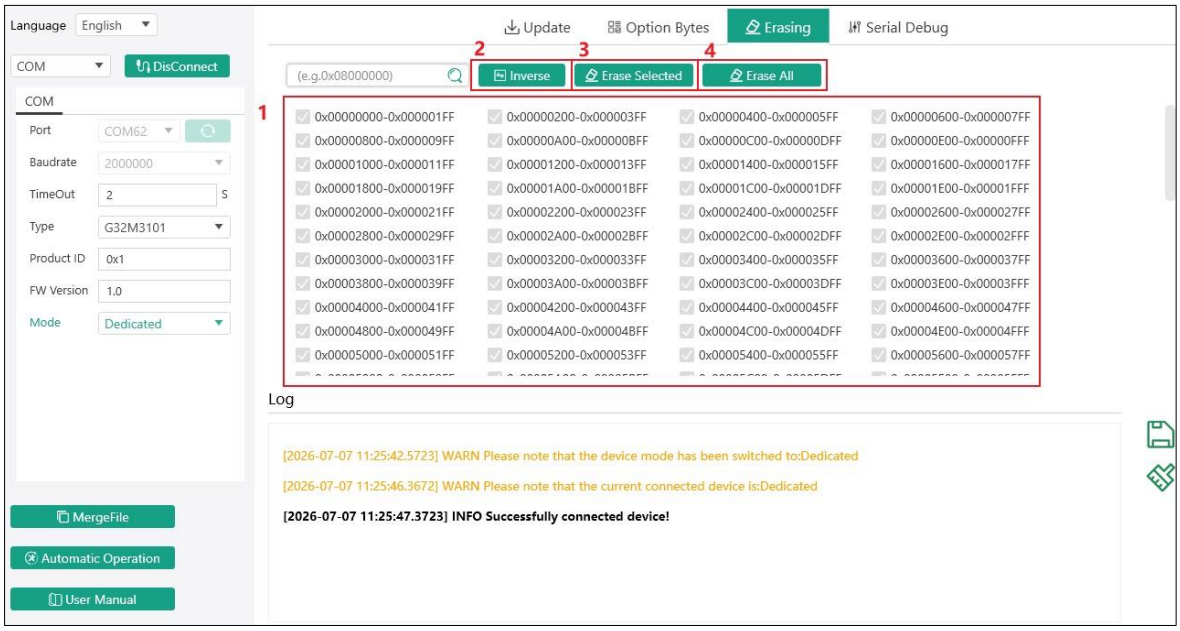
a) Selected: the user configuration area can be read and written; b) Not selected: the user configuration area is read-only.

Note:

1. The bootloader can run only when encryption/decryption is disabled. If encryption/decryption is enabled, the bootloader cannot run properly.
2. After write protection is enabled for the user configuration area, the area cannot be modified, and the write protection cannot be disabled.
3. The user configuration area is write-only. The value displayed by the host computer is the default value, not the actual chip value.

5.5 FLASH Erase

Figure 6 GeehyProg Erase Interface



(1) In the FLASH erase sector selection area, select the sectors to be erased. Use this with the “Erase Selected” button.

(2) Click “Inverse” to invert the selection in the sector selection area.

(3) Click “Erase Selected” to erase the selected sectors.

(4) Click “Erase All” to erase the entire chip.

6 Precautions

6.1 Bootloader Cannot Connect Due to Pin Back-Powering

When some serial cables, such as USB-to-TTL cables, are connected, pin back-powering may prevent the chip from powering off. As a result, the chip cannot perform a normal power-on reset and return to Boot mode. Use the following procedure to avoid this issue:

a) Power off the development board. Connect the RX and GND pins of the serial cable to the board, and leave the TX pin disconnected.
b) Start the connection from the host computer.
c) Connect the TX pin of the serial cable to the bootloader RX pin.
d) Power on the development board.
e) The host computer shows that the connection is successful.

Note: If the development board has a hardware reset circuit, the chip can re-enter Boot mode through a hardware reset, except for G32M3101 series chips.

6.2 Bootloader Cannot Connect Due to Serial Cable Hardware Limitations

Due to the performance limitations of some USB-to-serial adapters, the host may be unable to maintain the preset 7 ms command interval. As a result, the Bootloader may fail to detect the connection request within its limited time window.

To ensure stable communication during the high-frequency handshake process, use a low-latency, high-performance serial chip, such as a serial cable based on the CH340. This helps prevent connection failures caused by slow hardware response. The specific cases are as follows:

Figure 7 Failed COM Connection with A Low-Performance Chip (Command Interval Too Long)

Device	Address	Length	Data	Description	Delta	Cmd.Phase.Ofs(rep)	Time
25		1	7f	.	31ms	155.1.0	16:11:40.268
25		1	7f	.	31ms	156.1.0	16:11:40.300
25		1	7f	.	31ms	157.1.0	16:11:40.331
25		1	7f	.	32ms	158.1.0	16:11:40.363
25		1	7f	.	31ms	159.1.0	16:11:40.395
25		1	7f	.	31ms	160.1.0	16:11:40.427
25		1	7f	.	31ms	161.1.0	16:11:40.458
25		1	7f	.	31ms	162.1.0	16:11:40.490

Figure 8 Successful CH340 COM Connection

Device	Address	Length	Data	Description	Delta	Cmd.Phase.Ofs(rep)	Time
17		1	7f	.	7.2ms	129.1.0	15:39:20.856
17		1	7f	.	6.9ms	130.1.0	15:39:20.863
17		1	7f	.	6.9ms	131.1.0	15:39:20.870
17		1	7f	.	6.1ms	132.1.0	15:39:20.876
17		1	7f	.	7.0ms	133.1.0	15:39:20.883
17		1	7f	.	6.7ms	134.1.0	15:39:20.890
17		1	7f	.	6.2ms	135.1.0	15:39:20.896
17		1	79	y	1.5ms	136.1.0	15:39:20.898

7 Revision History

Table 3 Document Version History

Date	Version	Revision History
April, 2026	V1.0	Initial release
July, 2026	V1.1	Added bootloader pin descriptions

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