

SPIN TROL

Contents

1	IAP Introduction.....	7
1.1	Implementation Principle.....	7
2	Running the IAP Loader Program	9
2.1	Distribution of the IAP Loader Program.....	9
2.2	Downloading the IAP Loader Program to the Target Chip's Flash	9
2.3	Configuring the IAP Loader Host Tool.....	9

SPIN TROL

Figure List

Figure 1-1: Program Flowchart	8
Figure 2-1: Usage of Flash memory and SRAM memory	9
Figure 2-2: IAP Loader Host Tool Interface	10
Figure 2-3: Serial print interface of the user application program.....	10

SPIN TROL

Table List

SPIN TROL

Version History

Version	Date	Author	Status	Change
A/0	2023-06-11	CanChai	Released	Initial release

SPIN TROL

Term or Abbreviation

Term or Abbreviation	Description
IAP	In Application Programming

SPIN TROL

1 IAP Introduction

For most Flash-based systems, an essential requirement is the ability to update the firmware program in the end product. This capability is commonly referred to as In-application Programming (IAP), which involves updating the application program in the Flash memory by invoking a specific bootloader program.

IAP technology allows for the use of various communication protocols (e.g., UART, SPI, I2C, SIO) to facilitate the reprogramming process. This article provides a reference for creating an IAP application using a UART-based IAP Loader example program. Users can modify the mentioned IAP Loader example program accordingly to suit the specific requirements of their application.

1.1 Implementation Principle

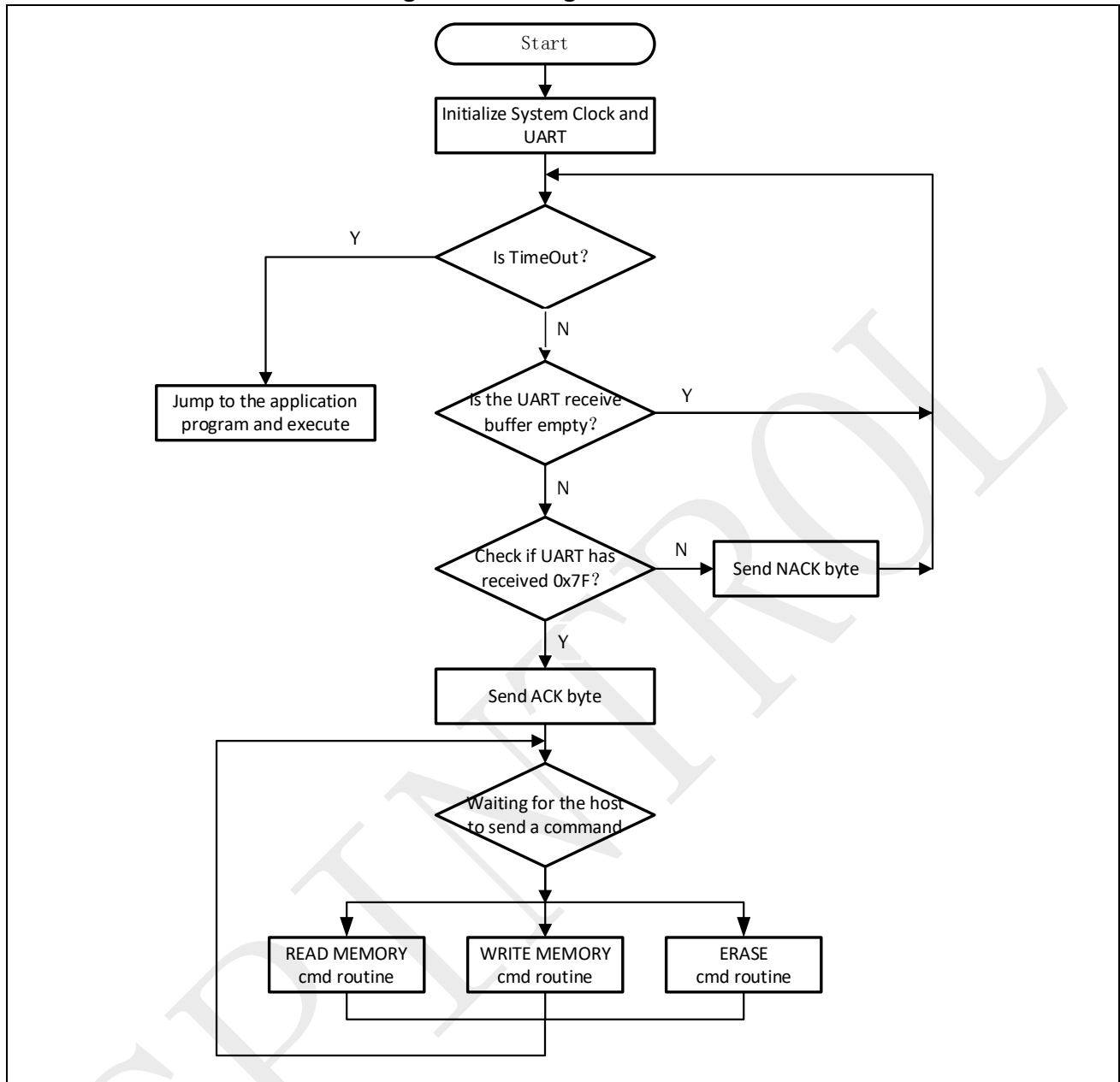
The IAP Loader program needs to be initially downloaded to the base address of the Flash memory. This process can be achieved using the JTAG/SWD interface of the chip or by utilizing the UART interface with the built-in bootloader of the chip.

The IAP Loader program primarily consists of the following source files:

- main.c: It handles system clock initialization, UART interface initialization, performs handshake operations with the host computer, carries out the application program update, and jumps to the application program for execution.
- iap.c: It enables write operations to the Flash registers, performs read/write/erase operations on the Flash based on commands received from the host computer, and calculates the checksum.

The flowchart of the IAP Loader program is illustrated in Figure 1-1.

Figure 1-1: Program Flowchart

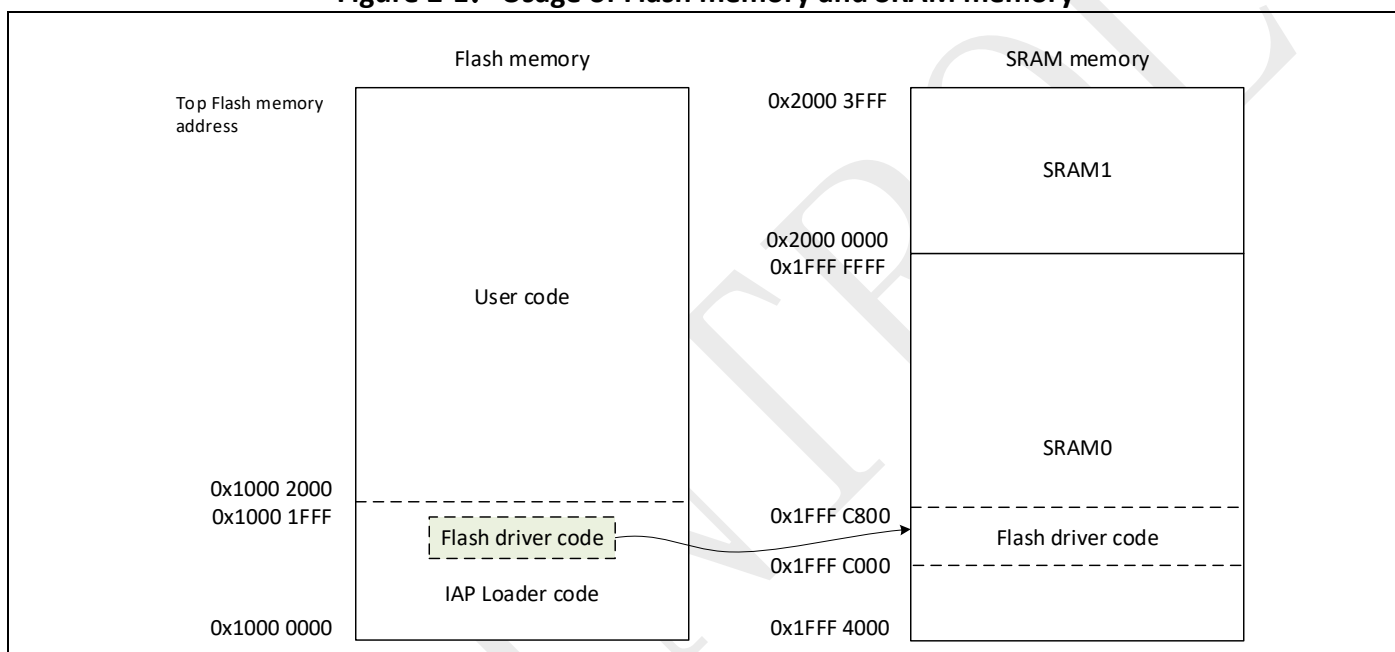


2 Running the IAP Loader Program

2.1 Distribution of the IAP Loader Program

The IAP Loader program is programmed into the Flash memory and occupies the Flash memory addresses from 0x1000 0000 to 0x1000 1FFF. The remaining Flash memory space is used to store user application programs. The usage of the Flash memory is illustrated in Figure 2-1. It's important to note that during the execution of the IAP program, the SRAM region from address 0x1FFF C000 to 0x1FFF C7FF is utilized as the execution domain for the Flash driver code.

Figure 2-1: Usage of Flash memory and SRAM memory



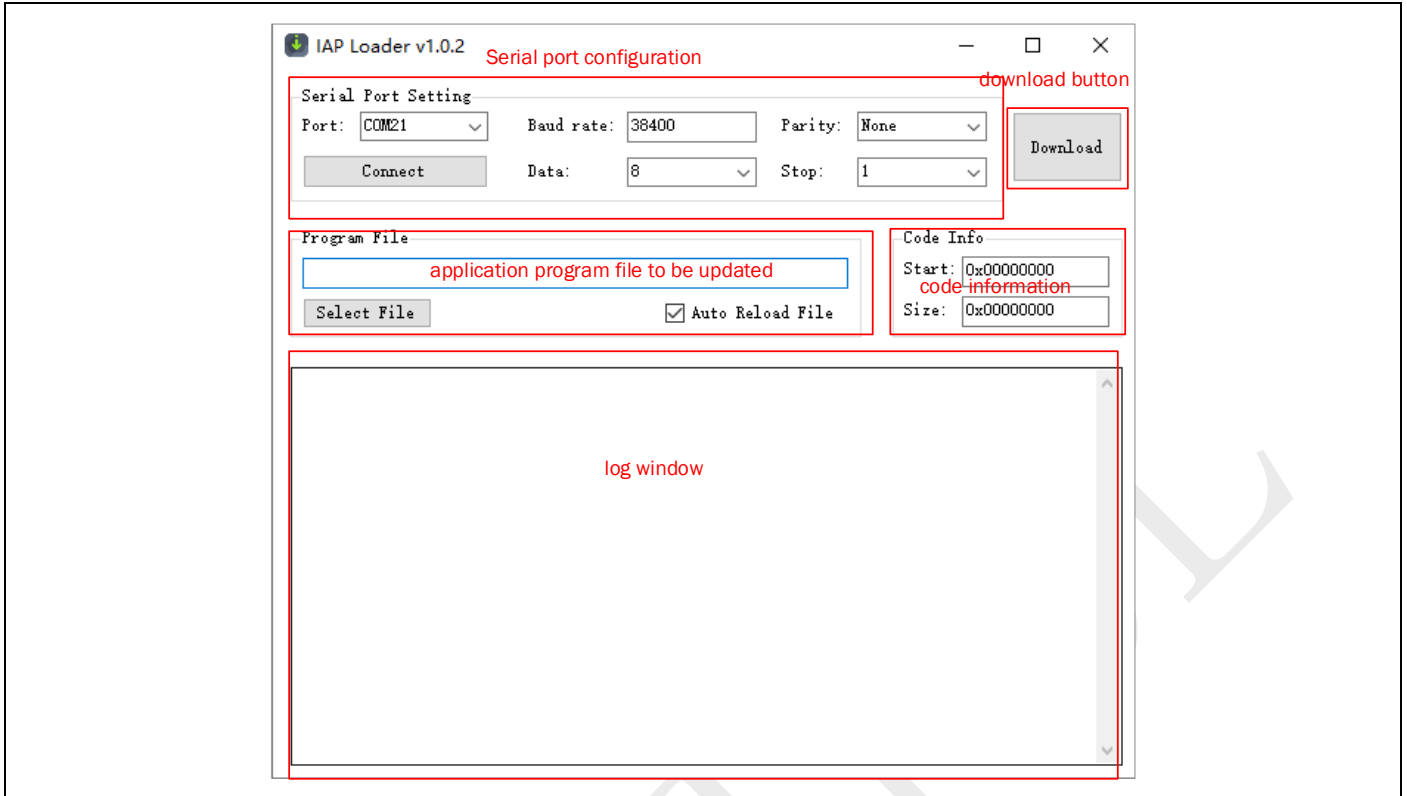
2.2 Downloading the IAP Loader Program to the Target Chip's Flash

Before running the IAP Loader program and communicating with the IAP Loader host tool, it is necessary to download the IAP Loader program to the Flash memory of the target chip. This can be done through the JTAG/SWD interface of the target chip or by utilizing the built-in bootloader and using the ISP Download Tool provided by Spintrol in conjunction with the UART interface.

2.3 Configuring the IAP Loader Host Tool

The IAP Loader tool allows for updating application programs. After configuring the appropriate serial port parameters and establishing a connection to the target board's serial port, select the desired application program file (HEX file). Upon powering on the chip, the pre-programmed IAP Loader program stored in the Flash memory will run. Then, by clicking the "Download" button in the IAP Loader host software (before the IAP Loader timeout), the program download can be completed, achieving the goal of updating the application program.

Figure 2-2: IAP Loader Host Tool Interface



As shown in Figure 2-2, after successfully downloading the user program, restart the chip, and the IAP Loader will jump to the user program and execute it.

Figure 2-3: Serial print interface of the user application program

