Catalog UM1504



# UM1504 User Manual

## PY32™ DFU Tool Software Description

## **Preface**

This document describes the installation and use of the PY32DfuTool software. This software can rewrite the FLASH and option bytes of the PY32 MCU by using the USB peripheral of the MCU and the bootstrap program embedded in the PY32 MCU System Memory. It supports erase, download, verify and read functions.

This software can also be nested in Keil MDK software for easy development and debugging.

Table 1: Applicable products

| Туре                    | Product Line        |
|-------------------------|---------------------|
| Micro controller series | PY32F072, PY32F071, |
|                         | PY32F403            |

# Catalog

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Bootstrap procedure UM1504

## Bootstrap procedure

## 1.1 Device related bootstrap program parameters

Table 1-1. Device related bootstrap program parameters

| MCU      | USB                          | RCC(MHz)              | PID    | BL ID | SRAM                       | System Memory              |
|----------|------------------------------|-----------------------|--------|-------|----------------------------|----------------------------|
| PY32F071 | USB_DM: PA11                 | PLL_48                | 0x0448 | 0xA0  | 0x20000000 -               | 0x1FFF0000 -               |
| PY32F072 | USB_DP: PA12                 | (HSI_24 x 2)          |        | UXAU  | 0x200007FF                 | 0x1FFF2F00                 |
| PY32F403 | USB_DM: PA11<br>USB_DP: PA12 | PLL_48<br>(HSI_8 × 6) | 0x0413 | 0xA0  | 0x20000000 -<br>0x200007FF | 0x1FFF0000 -<br>0x1FFF4F00 |

## 1.2 Cautions

This application only supports Windows 64-bit operating systems.

Software Installation UM1504

## **2 Software Installation**

This software is green and free to install, unzip it and double click PY32DfuTool\_x64.exe to use it.

APP File

Download Function

Erase Full Chip

Erase Sectors

Option Bytes

Do not Erase

Run to App

Download

App Function

Run to App

Upload

Download

Figure 2-1. PY32DfuTool main interface

Hardware Connection UM1504

## 3 Hardware Connection

Before hardware connection, please make sure the MCU's BOOT0 pin is connected high, nBOOT1 is 1, and select System memory as boot area.

Table 3-1. Boot Configuration

| Boot mode configuration |           | Mode                               |  |
|-------------------------|-----------|------------------------------------|--|
| nBOOT1 bit              | BOOT0 pin | Mode                               |  |
| X                       | 0         | Select Main flash as the boot area |  |
| 1                       | 1         | Select System memory as boot area  |  |
| 0                       | 1         | Select SRAM as boot area           |  |

The boot loader program is stored in System memory and is used to download Flash programs via USART/I2C/USB interfaces.

When using DFU software, please connect the MCU to the USB port of PC via USB cable.

Software Use UM1504

## 4 Software Use

#### 4.1 Device Selection

Figure 4.1-1. Selecting DFU devices



#### 4.2 Open file

The software supports opening files in both \*.hex/\*.bin formats.

If the software opens a file in hex format, the software automatically sets the programming start address and the program run address.

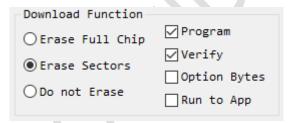
If the software opens a bin format file, the software sets the programming start address and the program run address to 0x08000000.

Figure 4.2-1. Open file



### 4.3 Download Settings

Figure 4.3-1. Download settings



#### Erase Full Chip

"Erase Full Chip" means mass erase, which corresponds to the whole address area of Main Flash. If you check this box, clicking the "Download" button will perform the Erase Full Chip operation.

#### Erase Sectors

The software automatically adjusts the sectors to be erased according to the loaded program code. If you check this box, clicking the "Download" button will perform the Erase Sectors operation.

#### Do not Erase

"Do not Erase" applies to both of the following cases:

- > The area of the chip to be programmed has been erased
- SRAM Programming

If you check this box, clicking the "Download" button will not execute the Erase operation.

#### Program

If you check this box, clicking the "Download" button will execute the Program operation.

### Verify

If you check this box, clicking the "Download" button will perform the Verify operation.

### Option Bytes

By default, the software only performs erase, write, and read operations on the Main Flash area.

Software Use UM1504

If you check this box, clicking the "Download" button will perform the write Option Bytes operation.

× Option Bytes Name ☐ Option byte for Flash User option RDP 0xAA: level 0, read protection inactive IWDG\_SW 1: software watchdog WWDG\_SW 1: software watchdog NRST\_MODE 0: RST nBOOT1 1: boot from SYSTEM when BOOT0=1 IWDG\_STOP 1: RUN Option byte for Flash SDK area addres BOR\_EN 0: BOR Disable BOR\_LEV 000: rise threshold is 1.8V, descent threshold is 1.7V SDK\_STRT 0x0001F000 SDK\_END 0x00000FFF Option byte for Flash WRP address WRP[0] 1: No Write Protection WRP[1] 1: No Write Protection WRP[2] 1: No Write Protection WRP[3] 1: No Write Protection WRP[4] 1: No Write Protection Cancel

Figure 4.3-2. Setting Option Bytes

#### Run to App

If this is checked, clicking the "Download" button will cause the MCU to jump from the bootstrap program area to the user program area.

## 4.4 Software Operation

#### Run to App

If this button is clicked, it will cause the MCU to jump from the bootstrap program area to run in the user program area.

#### Upload

Retrieve data to the local disk at the specified address and size.

 Set addr and size:
 X

 Addr: 0x
 080000000

 OK
 Cancel

Figure 4.4-1. Setting the read data address and size

#### Download

According to the settings in the "Download Settings" section, the software executes "Erase

Full Chip/Erase Sectors/Do no Erase", "Program ", "Verify", "Option Bytes", and "Run to App".

Embed into MDK for use UM1504

## 5 Embed into MDK for use

Open MDK, go to Option for Target 'XXXXXX' settings, switch to Utilities tab and Select Use External Tool for Flash Programming.

Select the installation location of PY32DfuTool in Command, such as D:\Program Files\PY32DfuTool\_x64.exe. Type #H in Arguments

Click OK, the settings are finished. Then click "LOAD" on the toolbar to download.

Using this method requires MDK software to generate a hex format file.

Figure 5-1. MDK software calls PY32DfuTool software to download Flash

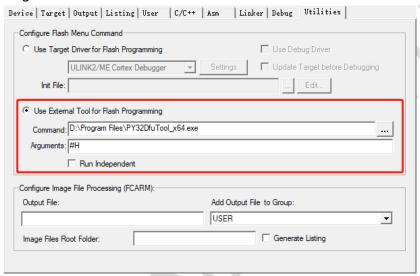
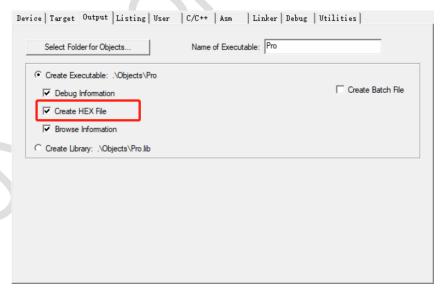


Figure 5-2. MDK software Create HEX File



Version History UM1504

## **6 Version History**

| Versions | Date     | Update Record |
|----------|----------|---------------|
| V1.0     | 2023.4.2 | First Edition |
|          |          |               |
|          |          |               |
|          |          |               |
|          |          |               |
|          |          |               |
|          |          |               |



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