

## **Introduction**

This document is used to describe the installation and use of Puya Programmer software. This software can be used to program PY32F030 series MCU with PY-LINK and USB-TTL. This software supports SWD/ISP two programming methods. Supports functions such as erasing, blank checking, programming, verifying, reading, and writing option bytes.

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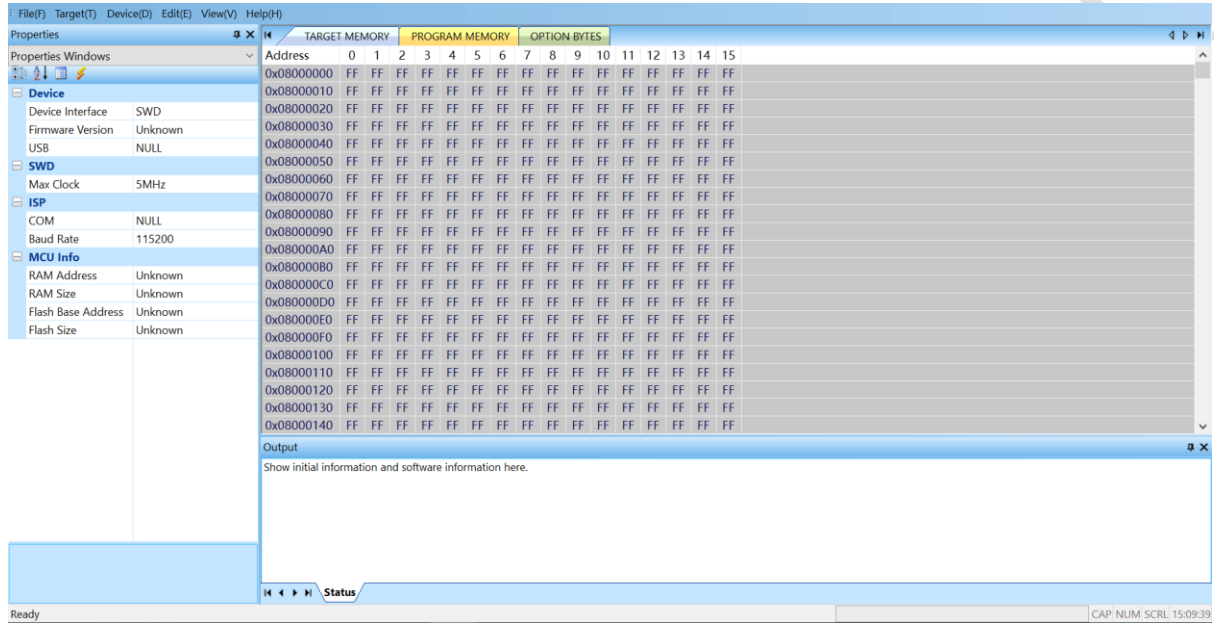
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# 1 Software Installation

PuyaProgrammer is a portable software. After decompression, double-click PuyaProgrammer.exe to use it.

Figure 1-1 Main interface of Puya Programmer software



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## 2 Hardware connection

Before hardware connection, please make sure that the BOOT0 pin of MCU is connected to low level, and select Main memory as the boot area.

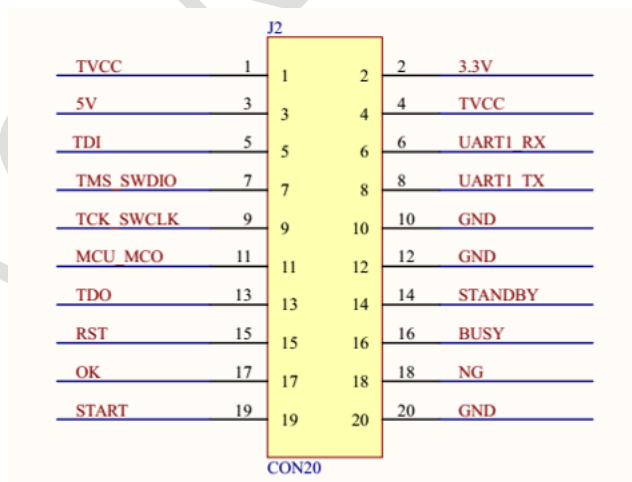
### 2.1 Use USB-TTL (ISP only)

PRESC[2:0]	MCU	Remark
5V/3.3V	VCC	power supply
GND	VSS	ground
TXD	PA3/PA10/PA15	ISP RX
RXD	PA2/PA9/PA14	ISP TX

### 2.2 Use PY-LINK (support SWD and ISP)

PY-LINK	MCU	Remark
5V/3.3V	VCC	power supply
GND	VSS	ground
USART1_TXD	PA3/PA10/PA15	ISP_RX
USART1_RXD	PA2/PA9/PA14	ISP_TX
TMS_SWDIO	PA13	SWD data line (internal pull-up)
TCK_SWCLK	PA14	SWD clock line (internal pull down)

Figure 2.2-1 Schematic diagram of PY-LINK adapter



## 3 Software usage

### 3.1 Properties Windows

#### 3.1.1 Device

Device Interface: Select SWD/ISP.

Firmware Version: Display the PY-LINK firmware program version.

USB: Select the PY-LINK USB port.

#### 3.1.2 SWD

Set the SWD transmission speed between PY-LINK and MCU, the optional range is 5kHz~10MHz.

#### 3.1.3 ISP

COM: Select the COM port of PY-LINK or USB-TTL.

Baud Rate: Set the ISP baud rate, the optional range is 1200~1000000.

#### 3.1.4 MCU Info

Display the base address and size of MCU RAM and ROM (Main Flash).

### 3.2 TARGET MEMORY

This window displays the data that read from the MCU Flash.

### 3.3 PROGRAM MEMORY

This window shows the contents of the opening hex/bin/ pyf file.

### 3.4 OPTION BYTES

This window is used to set Option Bytes, please refer to the reference manual for detailed settings.

### 3.5 Output

This window is used to display the log information.

### 3.6 File

#### 3.6.1 Open

After clicking "File(F) -> Open(O)" in the menu, the software pops up the "File Open" dialog, and the user can select and open the files in the three formats of hex/bin/ pyf .

#### 3.6.2 Save As

After clicking "File(F) -> Save As(A)" in the menu, the software pops up the "Save As" dialog. This menu bar is used to save files in bin/ pyf formats.

The software uses aes encryption to save programming files in pyf format, which can effectively prevent the user's program code from being stolen.

#### 3.6.3 Exit

After clicking "File(F) -> Exit(X)" in the menu, the software exits the application.

### 3.7 Target

In this chapter, you need to confirm whether the hardware connection is correct and the file is opened successfully, and whether the settings in "4.4 OPTION BYTES", "4.4 OPTION BYTES" and "4.7.5 Configuration" are successful.

#### 3.7.1 Connect

After clicking "Target(D) -> Connect" in the menu, the software connects to the target MCU and reads the basic information of the MCU, including Option bytes, UID,

RAM/Flash, etc.

Before executing "Erase Full Chip", "Erase Sectors", "Blank Check", "Program", "Verify", "Read Data", "Program Option Bytes" and "Run App", you need to perform "Connect" to connect to the target MCU first.

### 3.7.2 Disconnect

After clicking "Target(D) -> Disconnect" in the menu, the software is disconnected from the target MCU. After the disconnection, the MCU will reset and run the program in the Main Memory.

### 3.7.3 Download

After clicking "Target(D) -> Download" in the menu, the software operates the MCU according to the process. The process is as follows: (1) Connect, (2) Erase Full Chip/Erase Sectors, (3) Program, (4) Verify, (5) Program Option Bytes, (6) Run App, (7) Disconnect. Whether to execute (2)(3)(4)(5) can be set by referring to the "4.7.1 Configuration" chapter; whether to execute (5) can be set in the OPTION BYTES window, referring to the "4.4 OPTION BYTES" chapter.

### 3.7.4 Erase Full Chip

After clicking "Target(D) -> Erase Sectors" in the menu, the software will erase the entire Main Memory area of the MCU.

Erase Full Chip is also known as Mass Erase. For details, please refer to the Flash memory mass erase section of the Embedded flash memory chapter of the Reference Manual.

### 3.7.5 Erase Sectors

After clicking "Target(D) -> Erase Sectors" in the menu, the software will erase the necessary sectors of the MCU (the sectors occupied by the opened hex/bin file).

For details on Sector Erase, please refer to the contents of the Flash Memory Sector Erase section of the Embedded Flash Memory chapter of the Reference Manual.

### 3.7.6 Blank Check

After clicking "Target(D) -> Blank Check" in the menu, the software will perform a blank check on the necessary pages of the MCU (the pages occupied by the opened hex/bin file).

### 3.7.7 Program

After clicking "Target(D) -> Program" in the menu, the software will program the necessary pages of the MCU (the pages occupied by the opened hex/bin file).

### 3.7.8 Verify

After clicking "Target(D) -> Verify" in the menu, the software will verify the necessary pages of the MCU (the pages occupied by the opened hex/bin file).

### 3.7.9 Read Data

After clicking "Target(D) -> Read Data" in the menu, the software reads the code stored in the Main Memory.

### 3.7.10 Program Option Bytes

After clicking "Target(D) -> Program Option Bytes" in the menu, the software will program the Option Bytes of the MCU.

### 3.7.11 Run App

After clicking "Target(D) -> Run App" in the menu, the software resets the MCU to run

the program.

### 3.8 Device

#### 3.8.1 Update File

After clicking " Device(D) -> Update File " in the menu, the software will download the pyf programming file to PY-LINK. After confirming that PY-LINK and MCU are connected correctly, pressing the button of PY-LINK can realize offline programming of MCU.

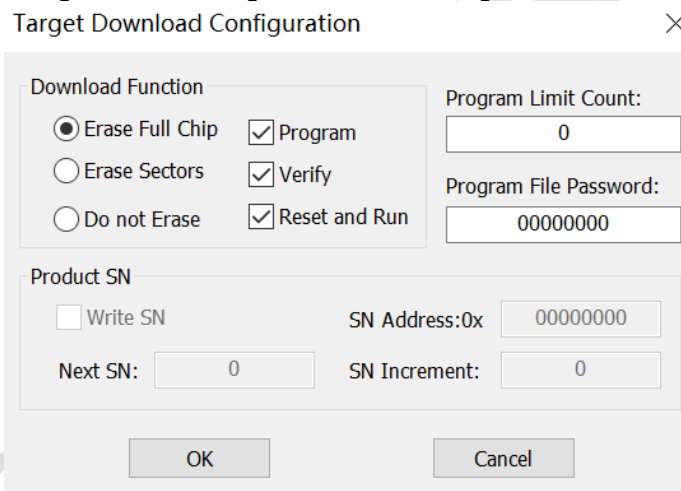
During the offline programming process, the LED keeps flashing, and the green LED is on when it is successful, and the red LED is on when it fails.

START, BUSY, OK, NG, and GND of PY-LINK with these pins of the programming machine, you can use the machine to realize automatic programming.

#### 3.8.2 Configuration

After clicking " Device(D) -> Configuration " in the menu, the software will pop up the "Online Download"/"Offline Programming" setting dialog, and the user can configure it according to actual needs.

Figure 3.8.2-1 Target Download Configuration



- Download Function group can set "Online Download" and "Offline Programming", corresponding to " Download " and " Update File " chapters respectively.
- Erase Full Chip: Mass Erase, which is used to erase the entire chip of the Main Memory area of the MCU.
- Erase Sectors: Erase the Main Memory area of the MCU by sector.
- Do not Erase: Do not erase the MCU.
- Program: Program the Main Memory/SRAM area of the MCU.
- Verify: Verify the Main Memory/SRAM area of the MCU.
- Reset and Run: Reset the MCU to run the program in Main Memory/SRAM.
- Program Limit Count: The maximum allowable number of offline programming, if it is set to 0, it means that the number of programming is not limited.

#### 3.8.3 PY-LINK Firmware up date

After clicking " Device(D) -> PY-LINK Firmware update " in the menu, the software will pop up the firmware update dialog.

Users can click " Device Connect " to make PY-LINK enter firmware upgrade mode, which cannot perform "online download" and "offline programming" operations. If you enter this mode by mistake and do not want to perform the firmware upgrade operation, please plug and unplug the USB cable of the PY-LINK. After the PY-LINK is reset, it will automatically enter the CMSIS-DAP mode.

After PY-LINK enters the firmware upgrade mode, click the " Yes>>> " button to upgrade the firmware of the PY-LINK. After the upgrade is completed, the PY-LINK will

automatically reset and enter the CMSIS-DAP mode.

Figure 3.8.3-1 PY-Link Upgrade initial main interface

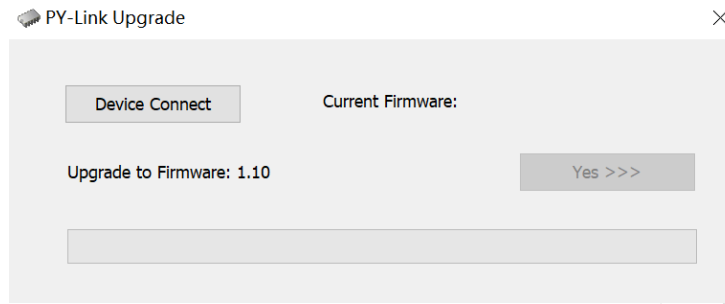


Figure 3.8.3-2 Click the Device Connect button to enter the firmware upgrade mode

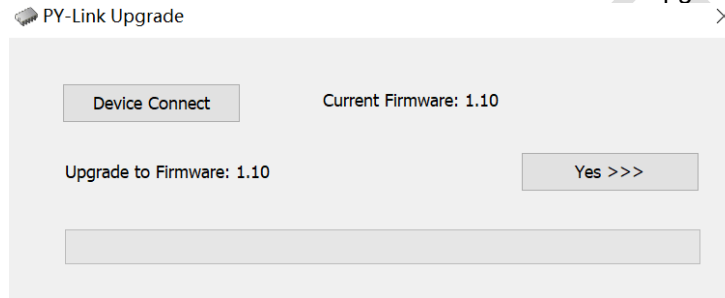


Figure 3.8.3-3 Click the "Yes >>>" button to upgrade the firmware of the PY-LINK

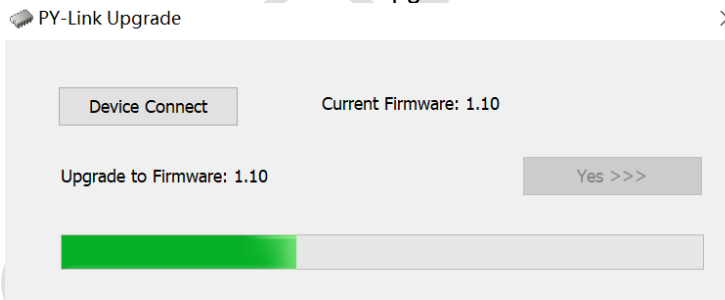
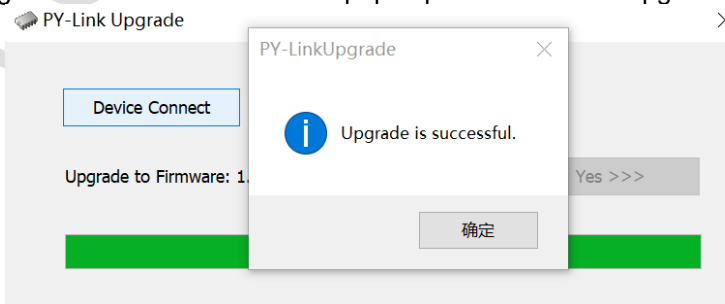


Figure 3.8.3-4 "Upgrade is successful." window pops up when firmware upgrade is successful

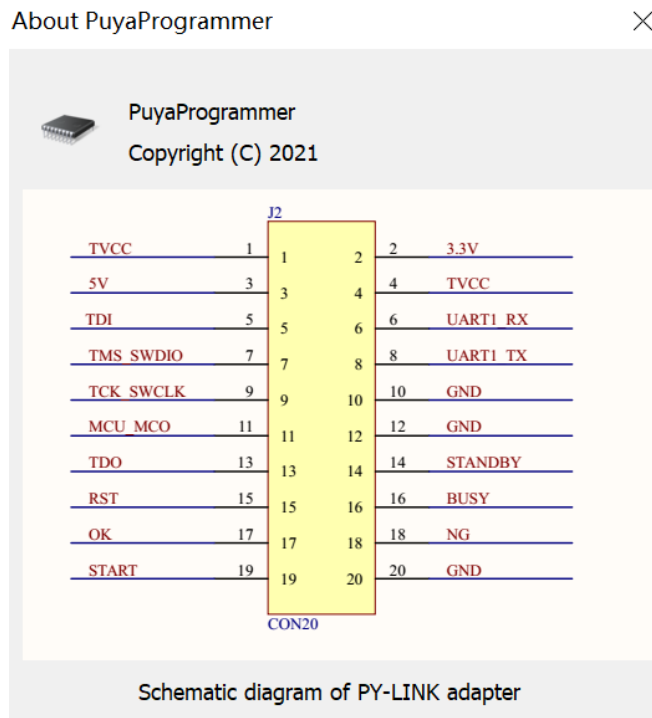


### 3.9 Help

After clicking " Help(H) -> About Puya Programmer (A) " in the menu, the software will pop up the " About Puya Programmer " dialog, where the user can view the software copyright information and the PY-LINK hardware schematic diagram.



Figure 3.9-1 About Puya Programmer



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## 4 Precautions

- Using the ISP download method, the peripheral RX pins not used by this bootloader must be held at a known level (low or high) and must not be left floating during the detection phase, as described below:
  - If USART1 (TX:PA2, RX:PA3) is used to connect the bootloader, during the detection phase, the USART1\_RX (PA10, PA15) pins must be held high or low and must not be left floating.
  - If USART1(TX:PA9, RX:PA10) is used to connect the bootloader, during the detection phase, the USART1\_RX (PA3, PA15) pins must be held high or low and must not be left floating.
  - If USART1 (TX:PA14, RX:PA15) is used to connect the bootloader, during the detection phase, the USART1\_RX (PA3, PA10) pins must be held high or low and must not be left floating.

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## 5 Version history

Version	Content	Date
Rev 1.0	Initial Release	2021-11-8



Puya Semiconductor Co., Ltd.

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