How to Burn the Bootloader of Arduino with FT232

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1. Hardware configuration

Please operate the connections of the relative pin headers on the UNO PLUS, as Figure 1 shows.



Figure 1: The hardware connections on UNO PLUS

2. Setting avrdude-GUI

 Unzip the package FT232RL AVRDUDE under the directory of Software, and open the file avrdude-GUI (located at the folder avrdude-GUI-1.0.5). Then, you will enter the following interface, as Figure 2 shows.

🖳 avrdude-GUI (yuki-lab.jp Version 1.0.5)				
avrdude.exe File				
Programmer			Display Window	
Port	Device		Command line Option	
Fuse	Flash			
hFuse h F	Read			
IFuse h		Read	Write	
eFuse h V	Vrite	Verify	Erase - Write - Verify	
Lock Bit	EEPR	OM		
F	Read			
h V	Vrite	Read	Write	
Chip E	rase	Terminal	Exit	

Figure 2: avrdude-GUI interface

- 2) Fill in the path of avrdude.exe in the box under the tab Avrdude.exe File. You can also click the browse button (...) on the right of the box to select the corresponding path.
- Select FT232R Synchronous BitBang (diecimila) under the pull-down menu Programmer.
- Choose the corresponding Part number of the CPU under the pull-down menu Device. UNO PLUS uses an on-board CPU ATmega328P-AU, so ATmega328P(m328p) is selected in here.
- 5) Input the interface information to the box under the tab Command line Option: -P ft0.

🖥 avrdude-GUI (yuki-lab.jp Version 1.0.5)					
E:\FT232R	e File L AVRDUDE\avrd	ude\avrdude.exe			
Programme FT232R Sy	er /nchronous BitBa	ng (diecimila)	 Display Window 		
Port	-	Device ATmega328P (m328p)	Command line Option		
Fuse hFuse IFuse eFuse	h Read h h Write	Flash Read Verify	Write Erase - Write - Verify		
Lock Bit	h Read Write Chip Erase	EEPROM Read Terminal) Write Exit		

Figure 3: Setting avrdude-GUI

3. Configuring the Fuse Bit of UNO PLUS

1) Click the buttons **Read** in the areas of Fuse and Lock Bit to read out the Fuse Bit settings, as Figure 4 shows.

🖷 avrdude-GUI (yuki-lab.jp Ve				
avrdude.exe File				
E:\FT232RL AVRDUDE\avrdud				
Programmer		Display Window		
FT232R Synchronous BitBang (diecimila)				
Port)evice	Command line Option		
	ATmega328P (m328p) -	-P ft0		
Fuse	Flash			
hFuse DE h Read				
IFuse FF h	Read	Write		
eFuse 05 h Write	Verify	Erase - Write - Verify		
Lock Bit				
Read				
UF h Write	Read	Write		
Chip Erase	Terminal	Exit		

Figure 4: Reading out the Fuse Bit settings

- 2) The Fuse Bit settings read out are not always the one that you need. Here is the official recommendation by Arduino:
 - high_fuses=0xde
 - Iow_fuses=0xff
 - extended_fuses=0x05
 - Iock_bits=0x0F
 - unlock_bits=0x3F

Notices: The relative Fuse Bit configurations for each version of Arduino can be found in the file boards.txt under the Arduino installation folder: hardware\arduino. Users can operate relative configuration as required.

If the read-out settings are different from the official recommendation by Arduino, you should write the official recommendation settings into the CPU. Fill in the relative settings, and click the button Write to end the configuration.

4. Programming Bootloader

1) Fill in the path of optiboot_atmega328-Mini.hex in the box under the tab Flash. You can also click the browse button (...) on the right of the box to select the corresponding path.

Arduino provides different Bootloader files for different versions in the installation folder: hardware\arduino\bootloaders. In here, the file optiboot\optiboot_atmega328-Mini.hex is in used.

2) Click the button Erase-Write-Verify to write hex file into the CPU, and wait until the writing finished, as Figure 5 shows.

avrdude-GUI (yuki-lab.jp avrdude.exe File	Version 1.0.5]	
E:\FT232RL AVRDUDE\avro		
Programmer FT232R Synchronous BitBa	ang (diecimila)	Display Window
Port	Device ATmega328P (m328p)	Command line Option -P ft0
Fuse	Flash	
hFuse DE h Read	D:\Program Files\Arduino\hardwar	e\arduino\bootloaders\opti
IFuse FF h	Read	Write
eFuse 05 h Write	Verify	Erase - Write - Verify
Lock Bit	EEPROM	
Read		
ur h Write	Read	Write
Chip Erase	Terminal	Exit

Figure 5: Writing the file Bootloader into the CPU

3) When the programming finished, power off the Board. The Bootloader can run properly in the CPU.