

# Compile Klipper firmware available for Lerdge boards

## Foreword:

Before using Klipper, let's sort out Klipper first. Klipper consists of Klipper software and Klipper firmware in two parts.

One part is the Klipper software. This part mainly runs various computing and human-computer interaction interfaces. The code of this part runs on a card computer such as Raspberry Pi. It can be understood as a software installed in the computer or an APP in the phone. Unlike the software we usually install on the computer or the APP in the mobile phone, the installation can be completed with a few clicks. The installation of this software requires more professional commands and tools. Klipper software can usually be installed on many platforms, such as raspberry Pi, Orange Pi, tablet computers, mobile phones, industrial computers and even all devices that can run OS. Since Klipper is developed on Raspberry Pi, this tutorial is still based on Raspberry Pi. Installation on other platforms will require stronger knowledge, and it is only recommended for professionals.

The other part is the firmware that runs on various microcontroller-built boards, which we call "Klipper Firmware". This firmware needs to be generated by the Klipper software running on the Raspberry Pi (called compilation in professional terms), and different microcontroller models require different configurations when compiling. This tutorial explains how to compile Klipper firmware that can run on Lerdge boards, so that Klipper software can be used on Lerdge boards.

For the first part of the installation of Klipper software on Raspberry Pi or other platforms, please refer to the tutorial on Klipper's official website. This tutorial only describes how to compile Klipper firmware that can run on Lerdge board.

This tutorial takes the operation on the Raspberry Pi as an example, and the Klipper host computer has been installed on the Raspberry Pi.

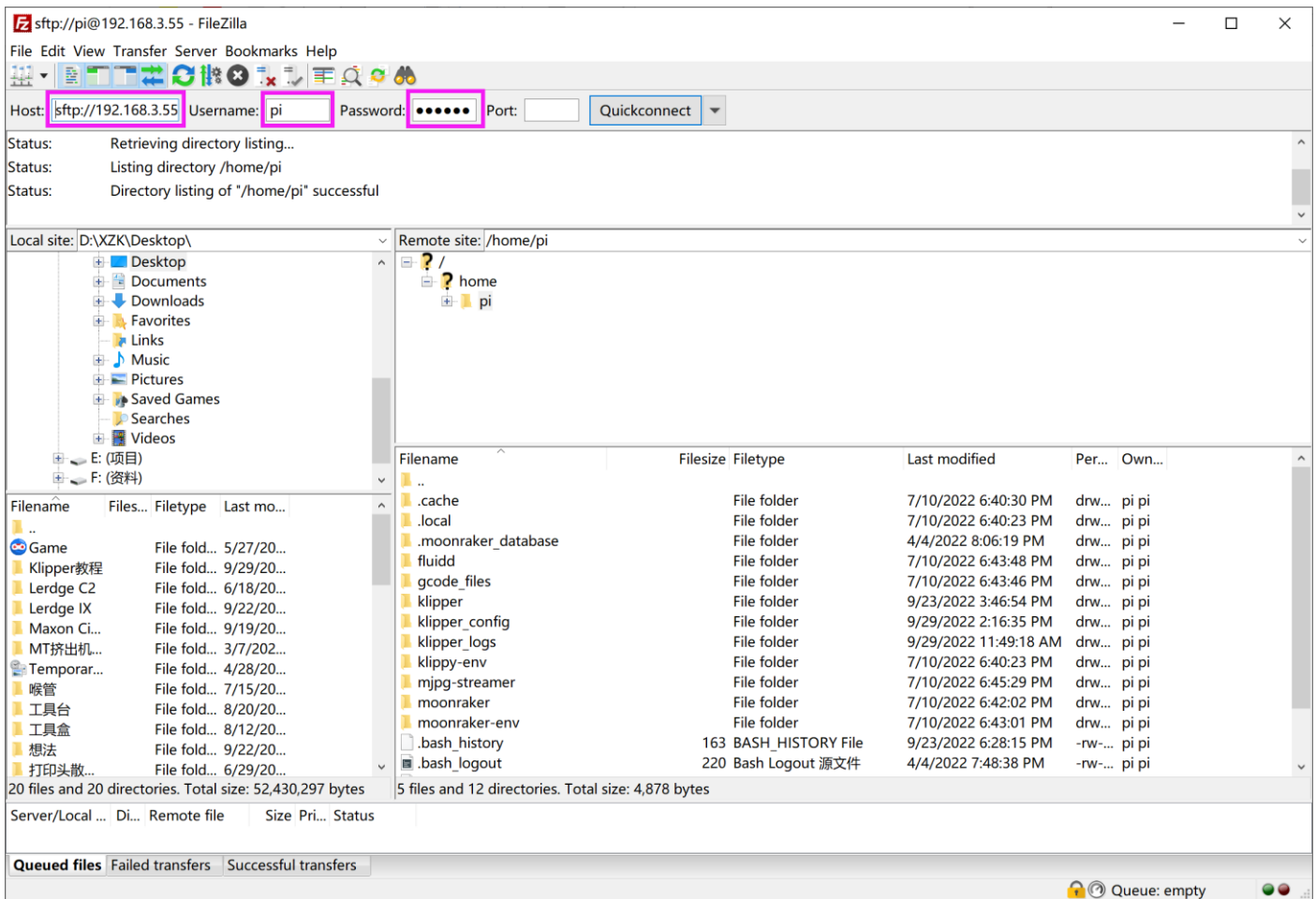
## Steps:

First, download and install the [FileZilla Client](#) and [Putty](#) in advance, which will be used later.

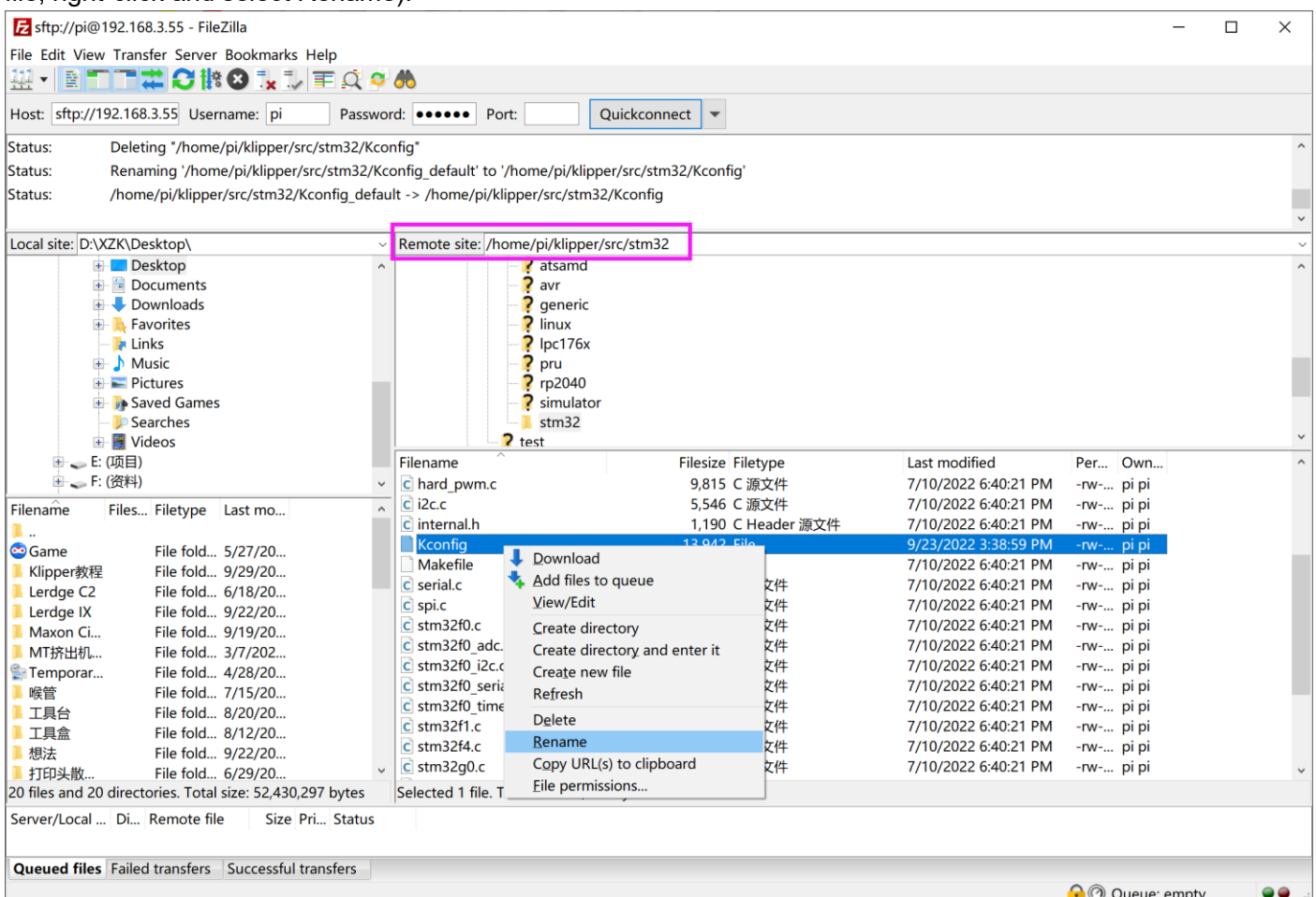
The FileZilla client is an FTP (File Transfer Download) software for manipulating files on various "Fruit Pi" (eg Raspberry Pi; Orange Pi, etc.). Download link: <https://filezilla-project.org/download.php?type=client>

Putty is a remote login client that can operate various "Fruit Pi" through the command line. Download link: <https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html>

Use FileZilla to connect to the Raspberry Pi: Open FileZilla and fill in the IP address, username and password of Raspberry Pi. This information is already obtained when Klipper is installed. Note that the sftp:// prefix needs to be added before the host IP. Default username: pi, default password: raspberry.



Enter the remote site: klipper/src/stm32 folder, rename the “KConfig” in it to “Kconfig\_default” (find the KConfig file, right-click and select Rename).



sftp://pi@192.168.3.55 - FileZilla

File Edit View Transfer Server Bookmarks Help

Host: sftp://192.168.3.55 Username: pi Password: Port: Quickconnect

Status: /home/pi/klipper/src/stm32/Kconfig\_default -> /home/pi/klipper/src/stm32/Kconfig  
 Status: Renaming '/home/pi/klipper/src/stm32/Kconfig' to '/home/pi/klipper/src/stm32/Kconfig\_default'  
 Status: /home/pi/klipper/src/stm32/Kconfig -> /home/pi/klipper/src/stm32/Kconfig\_default

Local site: D:\XZK\Desktop\ Remote site: /home/pi/klipper/src/stm32

Filename	Files...	Filetype	Last modified	Per...	Own...
..					
Game	File fold...	5/27/20...			
Klipper教程	File fold...	9/29/20...			
Lerdge C2	File fold...	6/18/20...			
Lerdge IX	File fold...	9/22/20...			
Maxon Ci...	File fold...	9/19/20...			
MT挤出机...	File fold...	3/7/202...			
Temporar...	File fold...	4/28/20...			
喉管	File fold...	7/15/20...			
工具台	File fold...	8/20/20...			
工具箱	File fold...	8/12/20...			
想法	File fold...	9/22/20...			
打印头散...	File fold...	6/29/20...			

20 files and 20 directories. Total size: 52,430,297 bytes

Filename	Files...	Filetype	Last modified	Per...	Own...
atsamd					
avr					
generic					
linux					
lpc176x					
pru					
rp2040					
simulator					
stm32					
test					

Filename	Files...	Filetype	Last modified	Per...	Own...
hard_pwm.c		9,815 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
i2c.c		5,546 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
internal.h		1,190 C Header 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
Kconfig_default		13,942 File	9/23/2022 3:38:59 PM	-rw----	pi pi
Makefile		4,236 File	7/10/2022 6:40:21 PM	-rw----	pi pi
serial.c		2,843 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
spi.c		4,123 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
stm32f0.c		6,298 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
stm32f0_adc.c		4,005 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
stm32f0_i2c.c		2,648 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
stm32f0_serial.c		3,166 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
stm32f0_timer.c		2,931 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
stm32f1.c		9,727 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
stm32f4.c		8,579 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
stm32g0.c		5,590 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi

Selected 1 file. Total size: 13,942 bytes

Server/Local ... Di... Remote file Size Pri... Status

Queued files Failed transfers Successful transfers

Queue: empty

Drag and drop the "KConfig" file in the "stm32" folder attached to this tutorial to the remote site: klipper/src/stm32 folder.

sftp://pi@192.168.3.55 - FileZilla

File Edit View Transfer Server Bookmarks Help

Host: sftp://192.168.3.55 Username: pi Password: Port: Quickconnect

Status: Retrieving directory listing of "/home/pi/klipper/src/stm32" ...  
 Status: Listing directory /home/pi/klipper/src/stm32  
 Status: Directory listing of "/home/pi/klipper/src/stm32" successful

Local site: D:\XZK\Desktop\ Remote site: /home/pi/klipper/src/stm32

Filename	Files...	Filetype	Last modified	Per...	Own...
..					
Game	File fold...	5/27/20...			
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20 files and 20 directories. Total size: 52,430,297 bytes

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avr					
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lpc176x					
pru					
rp2040					
simulator					
stm32					
test					

Filename	Files...	Filetype	Last modified	Per...	Own...
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internal.h		1,190 C Header 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
Kconfig		13,941 File	9/29/2022 3:38:56 PM	-rw----	pi pi
Kconfig_default		13,942 File	9/23/2022 3:38:59 PM	-rw----	pi pi
Makefile		4,236 File	7/10/2022 6:40:21 PM	-rw----	pi pi
serial.c		2,843 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi
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stm32f4.c		8,579 C 源文件	7/10/2022 6:40:21 PM	-rw----	pi pi

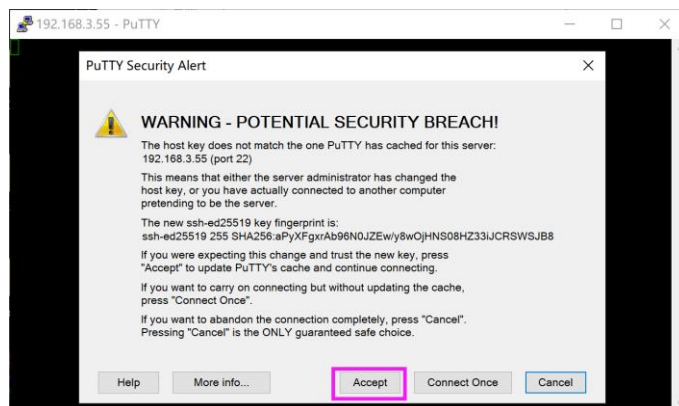
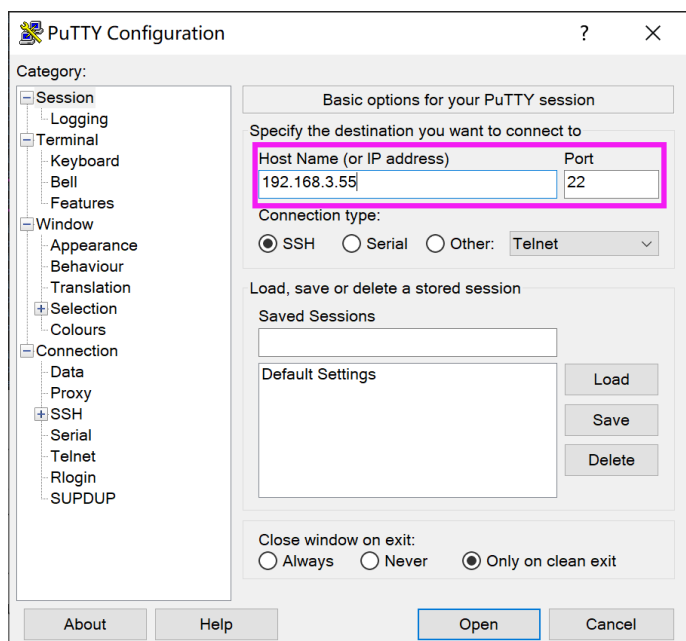
Selected 1 file. Total size: 13,941 bytes

Server/Local ... Di... Remote file Size Pri... Status

Queued files Failed transfers Successful transfers (1)

Queue: empty

Use PuTTY to connect to the Raspberry Pi, enter the IP address of the Raspberry Pi to connect, and accept the warning prompt.



Enter username: pi



Enter password: raspberry

Note: When entering the password, there will be no display. After the input is completed, press Enter to confirm. Entering the correct password, you can enter successfully.

```
192.168.3.55 - PuTTY
login as: pi
pi@192.168.3.55's password: 
```

```
pi@fluidpi: ~
login as: pi
pi@192.168.3.55's password:
Linux fluidpi 5.15.32-v7l+ #1538 SMP Thu Mar 31 19:39:41 BST 2022 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@fluidpi:~ $ 
```

Execute the command: "cd klipper" to enter the klipper folder.

```
pi@fluidpi: ~/klipper
login as: pi
pi@192.168.3.55's password:
Linux fluidpi 5.15.32-v7l+ #1538 SMP Thu Mar 31 19:39:41 BST 2022 armv7l

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SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@fluidpi:~ $ cd klipper
pi@fluidpi:~/klipper $ 
```

Execute the command: "make menuconfig" to open the firmware compilation options interface.

```
pi@fluidpi: ~/klipper
login as: pi
pi@192.168.3.55's password:
Linux fluidpi 5.15.32-v7l+ #1538 SMP Thu Mar 31 19:39:41 BST 2022 armv7l

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the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri Sep 23 07:52:04 2022 from 192.168.3.139

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@fluidpi:~ $ cd klipper
pi@fluidpi:~/klipper $ make menuconfig
```

After entering the configuration interface, use the keyboard direction keys to control the movement, the Enter key to enter or select, and the Q key to exit. Set each option in turn as shown in the figure below, and then press Q to exit the configuration interface. Note that when exiting, press Y to save the option modification.

```
pi@fluidpi: ~/klipper
(Top)
Klipper Firmware Configuration
[*] Enable extra low-level configuration options
Micro-controller Architecture (STMicroelectronics STM32) --->
Processor model (STM32F407) --->
Bootloader offset (64KiB bootloader) --->
Clock Reference (25 MHz crystal) --->
Communication interface (Serial (on USART1 PA10/PA9)) --->
(250000) Baud rate for serial port
() GPIO pins to set at micro-controller startup (NEW)

[Space/Enter] Toggle/enter  [?] Help  [/] Search
[Q] Quit (prompts for save) [ESC] Leave menu
```

```
pi@fluidpi: ~/klipper
(Top)
Klipper Firmware Configuration
[*] Enable extra low-level configuration options
Micro-controller Architecture (STMicroelectronics STM32) --->
Processor model (STM32F407) --->
Bootloader offset (64KiB bootloader) --->
Clock Reference (25 MHz crystal) --->
Communication interface (Serial (on USART1 PA10/PA9)) --->
(250000) Baud rate for serial port
() GPIO pins to set at micro-controller startup (NEW)

Quit
Save configuration?
(Y)es (N)o (C)ancel

[Space/Enter] Toggle/enter  [?] Help  [/] Search
[Q] Quit (prompts for save) [ESC] Leave menu
```

Execute the command: "make" to compile the board firmware

```
pi@fluidpi: ~/klipper
Last login: Fri Sep 23 07:52:04 2022 from 192.168.3.139

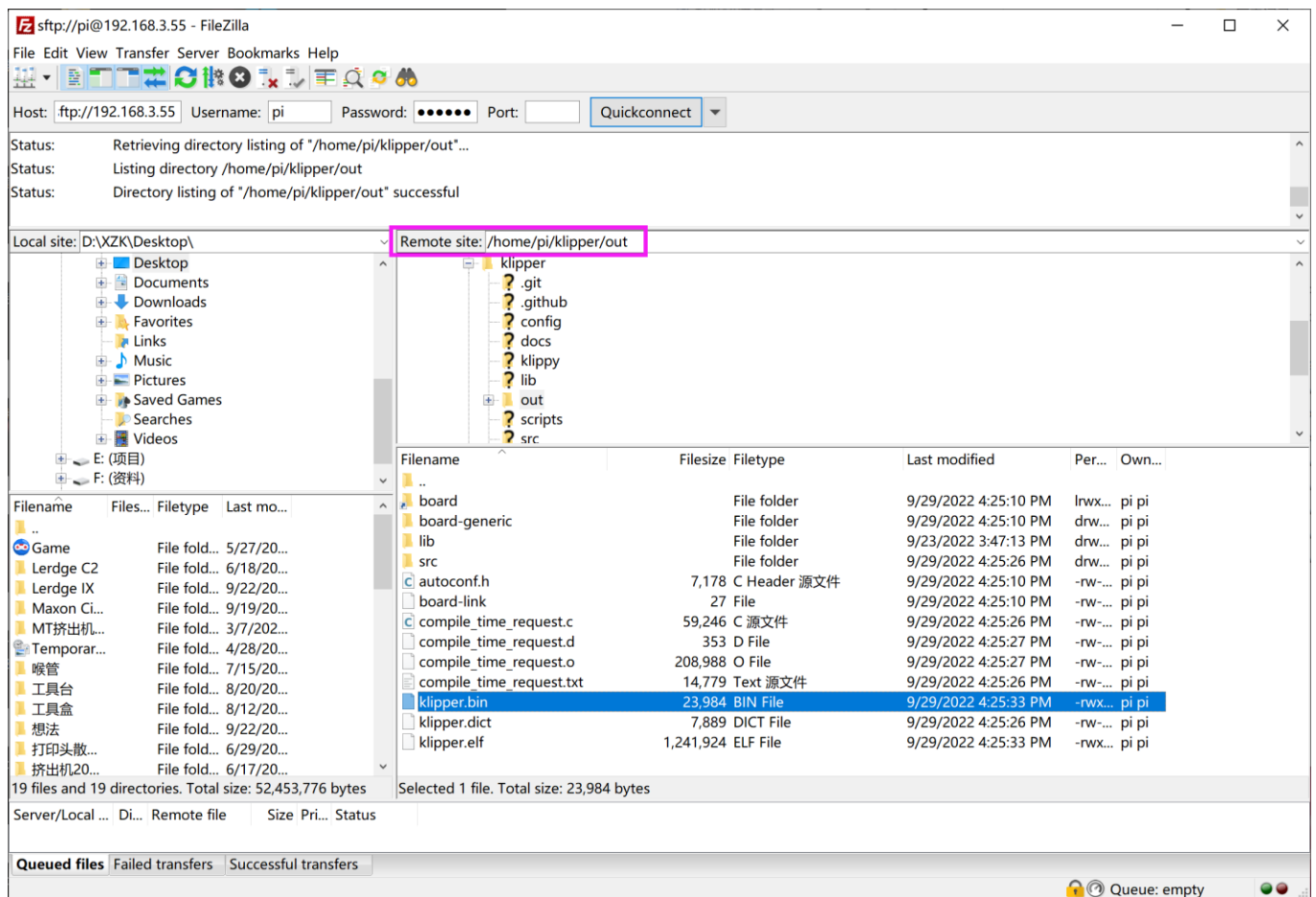
SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.



pi@fluidpi:~ $ cd klipper
pi@fluidpi:~/klipper $ make menuconfig
Using default symbol values (no '/home/pi/klipper/.config')
Configuration saved to '/home/pi/klipper/.config'
Creating symbolic link out/board
Loaded configuration '/home/pi/klipper/.config'
Configuration saved to '/home/pi/klipper/.config'
pi@fluidpi:~/klipper $ make
Creating symbolic link out/board
Building out/autoconf.h
Compiling out/src/sched.o
Compiling out/src/command.o
Compiling out/src/basecmd.o
Compiling out/src/debugcmds.o
Compiling out/src/initial_pins.o
Compiling out/src/gpiocmds.o
Compiling out/src/stepper.o
```

After compiling, you can see the remote site through FlieZilla: There is a "Klipper.bin" file in the Klipper/out folder, copy it to the local computer (select the path of the local computer in the local site on the left, drag "Klipper.bin" to



the left, you can copy to the local computer).



Open the "Lerdge Firmware Tool.exe" under the "Tools" folder in this tutorial, select the "Klipper.bin" file you just downloaded, and click the "make" button. The source file will be processed into a format recognized by the Lerdge board Bootloader, automatically renamed to "Klipper for Lerdge.bin", and overwritten with the original file. The file can be updated to the Lerdge motherboard through TF card or U disk (insert the memory into the corresponding interface of the printer, click the  icon to enter the "System Settings" interface, click the  icon, and select "Klipper for Lerdge.bin" in the corresponding storage device and the update is performed).

