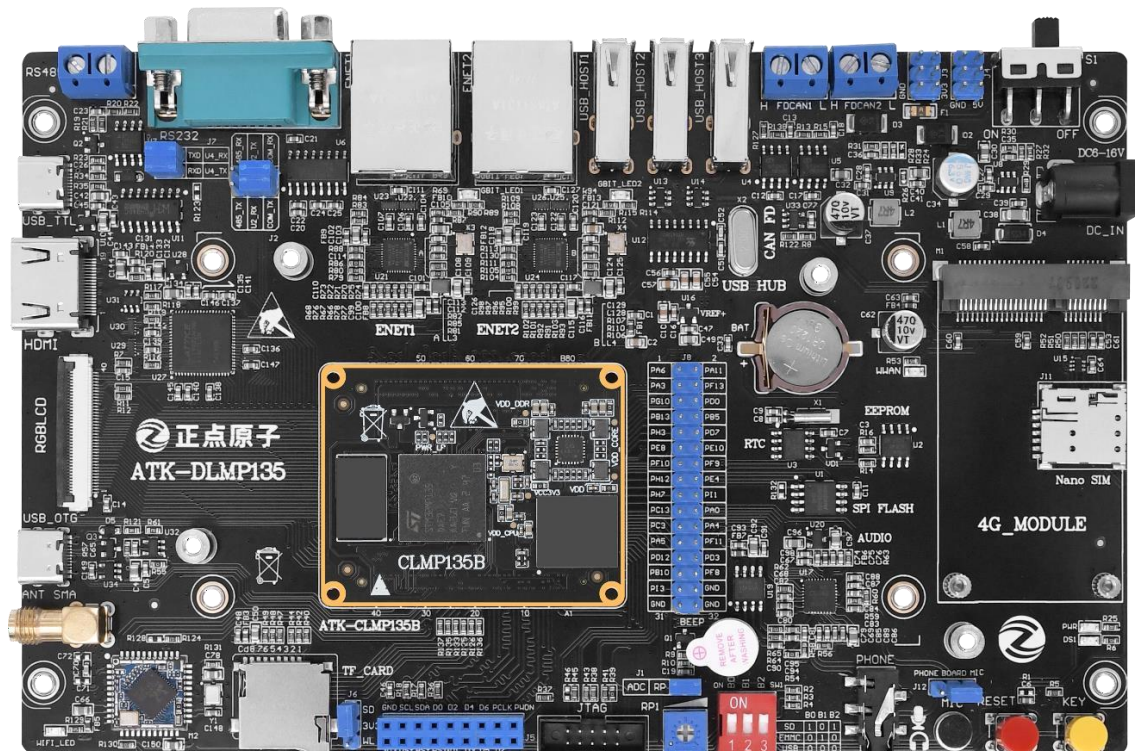


ATK-DLMP135

Factory System Qt cross-compiler environment setup

V1.0



1. Shopping:TMALL: <https://zhengdianyuanzi.tmall.com>TAOBAO: <https://openedv.taobao.com>**2. Download**Address: <http://www.openedv.com/docs/index.html>**3. FAE**Website : www.alientek.comForum : <http://www.openedv.com/forum.php>Videos : www.yuanzige.com

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In order to get the latest version of product information, please regularly visit the download center or contact the customer service of Taobao ALIENTEK flagship store. Thank you for your tolerance and support.

Revision History:

Version	Version Update Notes	Responsible person	Proofreading	Date
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Brief

The environment used in this document:

Host: Windows 10 64-bit.

Virtual machine with Ubuntu 18.04 64-bit. It is recommended to use 18.04; otherwise, differences in installation and compilation environment may cause errors. Please solve them yourself! Ubuntu requires internet access.

Users are required to know how to transfer files between Ubuntu and Windows.

Chapter 1. Installing Cross-Compilation Tools

1.1 Installing the Factory System Qt Cross-Compilation Tools

Create a folder in the Ubuntu virtual machine and copy the latest cross-compilation toolkit provided by ALIENTEK from the network drive to the newly created directory.

Network drive: Board development disc A - Basic materials / 5_tools / 1_Cross-compiler / atk-dlmp135-toolchain-arm-buildroot-linux-gnueabi-hf-x86_64.run

As shown in the figure below, the cross-compilation tools have been copied to Ubuntu.

```
alientek@ubuntu18:~/mp135-Qt$ ls
atk-dlmp135-toolchain-arm-buildroot-linux-gnueabi-hf-x86_64.run
alientek@ubuntu18:~/mp135-Qt$
```

The file is large and the copying process will take some time. Please be patient. After copying to Ubuntu, grant execute permission to atk-dlmp135-toolchain-arm-buildroot-linux-gnueabi-hf-x86_64.run.

```
chmod +x atk-dlmp135-toolchain-arm-buildroot-linux-gnueabi-hf-x86_64.run
```

Then, when this file is executed, it will directly install. During the installation process, it will ask for the installation directory. We can just use the default setting. Press Enter to continue. The installation process will take a long time. Please be patient and wait.

```
./atk-dlmp135-toolchain-arm-buildroot-linux-gnueabi-hf-x86_64.run
```

```
alientek@ubuntu18:~/mp135-Qt$ ./atk-dlmp135-toolchain-arm-buildroot-linux-gnueabi-hf-x86_64.run
ATK-DLMP135 toolchain installer version 1.0.0 Generated by Buildroot!
=====
Enter target directory for toolchain (default: /opt/atk-dlmp135-toolchain):
You are about to install the toolchain to "/opt/atk-dlmp135-toolchain". Proceed[Y/n]? y
[sudo] password for alientek:
Extracting toolchain.....done
Relocating the toolchain to /opt/atk-dlmp135-toolchain...
Toolchain has been successfully set up and is ready to be used.
Each time you wish to use the Toolchain in a new shell session, you need to source the environment setup script e.g.
$ . export PATH=$PATH:/opt/atk-dlmp135-toolchain/usr/bin
alientek@ubuntu18:~/mp135-Qt$
```

Ask for the installation path. Press the Enter key to confirm the default path.

Enter the current user password

Press Enter after entering "y" to confirm the installation.

Installation completed

When there is a prompt [y/N] later, we just press the Enter key. The default installation will be performed.

After the installation is completed, the cross-compiled toolchains installed will all be placed in the /opt/ directory.

```
ls /opt/st
```

```
alientek@ubuntu18:~/mp135-Qt$ ls /opt/
atk-dlmp135-toolchain
alientek@ubuntu18:~/mp135-Qt$
```

Check the qmake and Qt versions:

Execute the following command to view the qmake version and Qt version.

```
alientek@ubuntu18:~/mp135-Qt$ /opt/atk-dlmp135-toolchain/usr/bin/qmake -v
QMake version 3.1
Using Qt version 5.12.9 in /opt/atk-dlmp135-toolchain/arm-buildroot-linux-gnueabi-hf/sysroot/usr/lib
alientek@ubuntu18:~/mp135-Qt$
```

It can be seen that the version of qmake in the cross-compilation toolchain is 3.1, and the version of Qt is 5.12.9.

Chapter 2. Setting up the Cross-Compilation Environment for Qt Creator

In order to compile the Qt application so that it can run on the development board, we need to set up a cross-compilation environment. Programs compiled using the cross-compiler for the ARM platform can only run on the ATK-DLMP135 development board. The cross-compiler used by the ALIENTEK factory system is `atk-dlmp135-toolchain-arm-buildroot-linux-gnueabi-hf-x86_64.run`. We have already installed it in Chapter 1.

2.1 Download Qt Creator

To develop Qt on the Ubuntu platform, you need a corresponding IDE (Integrated Development Environment), which is Qt Creator.

Go to the Qt official website to download Qt 5.14.2. The URL is:

<https://download.qt.io/archive/qt/5.12/5.12.9/>

The Qt official has packaged Qt Creator into the following `qt-opensource-linux-x64-5.12.9.run`. We need to download this `qt-opensource-linux-x64-5.12.9.run` and copy it to Ubuntu to perform the installation.

Qt Downloads			
Qt Home Bug Tracker Code Review Planet Qt Get Qt Extensions			
Name	Last modified	Size	Metadata
↑ Parent Directory		-	
submodules/	16-Jun-2020 07:04	-	
single/	16-Jun-2020 07:04	-	
qt-opensource-windows-x86-5.12.9.exe	16-Jun-2020 18:07	3.7G	Details
qt-opensource-mac-x64-5.12.9.dmg	16-Jun-2020 14:49	2.7G	Details
qt-opensource-linux-x64-5.12.9.run	16-Jun-2020 14:48	1.3G	Details
md5sums.txt	16-Jun-2020 18:14	207	Details

Simply click to download or copy the download link and paste it into Xunlei for downloading.

We can also download it directly on Ubuntu using the `wget` command. Just copy the download link and use the following `wget` command.

```
wget -c https://download.qt.io/archive/qt/5.12/5.12.9/qt-opensource-linux-x64-5.12.9.run
```



```

allientek@ubuntu18:~/qt-atk$ wget -c https://download.qt.io/archive/qt/5.12/5.12.9/qt-opensource-linux-x64-5.12.9.run
--2021-07-26 14:52:44-- https://download.qt.io/archive/qt/5.12/5.12.9/qt-opensource-linux-x64-5.12.9.run
正在解析主机 download.qt.io (download.qt.io)... 77.86.229.90
正在连接 download.qt.io (download.qt.io)|77.86.229.90|:443... 已连接。
已发出 HTTP 请求, 正在等待回应... 302 Found
位置: http://mirrors.ustc.edu.cn/qtproject/archive/qt/5.12/5.12.9/qt-opensource-linux-x64-5.12.9.run [跟随至新的 URL]
--2021-07-26 14:52:45-- http://mirrors.ustc.edu.cn/qtproject/archive/qt/5.12/5.12.9/qt-opensource-linux-x64-5.12.9.run
正在解析主机 mirrors.ustc.edu.cn (mirrors.ustc.edu.cn)... 202.141.160.110, 2001:da8:d800:95::110
正在连接 mirrors.ustc.edu.cn (mirrors.ustc.edu.cn)|202.141.160.110|:80... 已连接。
已发出 HTTP 请求, 正在等待回应... 200 OK
长度: 1410748558 (1.3G) [application/x-makeself]
正在保存至: "qt-opensource-linux-x64-5.12.9.run"

qt-opensource-linux-x64-5.12.9.r 0%[ ] 3.54M 1.11MB/s 剩余 20m 17s

```

It is possible that an error message such as "Segmentation Fault (core dumped)" will appear due to the large size of the downloaded file.

```

已发出 HTTP 请求, 正在等待回应... 200 OK
长度: 1410748558 (1.3G) [application/x-makeself]
正在保存至: "qt-opensource-linux-x64-5.12.9.run"

qt-opensource-linux-x64-5.12.9.r 60%[=====] 808.97M 1004KB/s 剩余 11m 39s
段错误 (核心已转储)
allientek@ubuntu18:~/qt-atk$

```

You can simply re-execute the previous download command here to continue the download. If it still doesn't work, it is recommended to download it on Windows and then copy it to Ubuntu.

```

qt-opensource-linux-x64-5.12.9.r 60%[=====] 808.97M 1004KB/s 剩余 11m 39s
段错误 (核心已转储)
allientek@ubuntu18:~/qt-atk$ wget -c https://download.qt.io/archive/qt/5.12/5.12.9/qt-opensource-linux-x64-5.12.9.run
--2021-07-26 15:16:46-- https://download.qt.io/archive/qt/5.12/5.12.9/qt-opensource-linux-x64-5.12.9.run
正在解析主机 download.qt.io (download.qt.io)... 77.86.229.90
正在连接 download.qt.io (download.qt.io)|77.86.229.90|:443... 已连接。
已发出 HTTP 请求, 正在等待回应... 302 Found
位置: http://mirrors.ustc.edu.cn/qtproject/archive/qt/5.12/5.12.9/qt-opensource-linux-x64-5.12.9.run [跟随至新的 URL]
--2021-07-26 15:16:47-- http://mirrors.ustc.edu.cn/qtproject/archive/qt/5.12/5.12.9/qt-opensource-linux-x64-5.12.9.run
正在解析主机 mirrors.ustc.edu.cn (mirrors.ustc.edu.cn)... 202.141.160.110, 2001:da8:d800:95::110
正在连接 mirrors.ustc.edu.cn (mirrors.ustc.edu.cn)|202.141.160.110|:80... 已连接。
已发出 HTTP 请求, 正在等待回应... 206 Partial Content
长度: 1410748558 (1.3G), 剩余 562374046 (536M) [application/x-makeself]
正在保存至: "qt-opensource-linux-x64-5.12.9.run"

qt-opensource-linux-x64-5.12.9.r 100%[+++++=====] 1.31G 1.05MB/s 用时 8m 14s

2021-07-26 15:25:01 (1.09 MB/s) - 已保存 "qt-opensource-linux-x64-5.12.9.run" [1410748558/1410748558]

allientek@ubuntu18:~/qt-atk$ ls
qt-opensource-linux-x64-5.12.9.run  st-example-image-qtwayland-openstlinux-weston-stn32mp1-x86_64-toolchain-3.1-snapshot.sh

```

2.2 Installing Qt Creator

After the download is complete, you will obtain the file "qt-opensource-linux-x64-5.12.9.run". Grant the file execution permissions and then proceed with the installation.

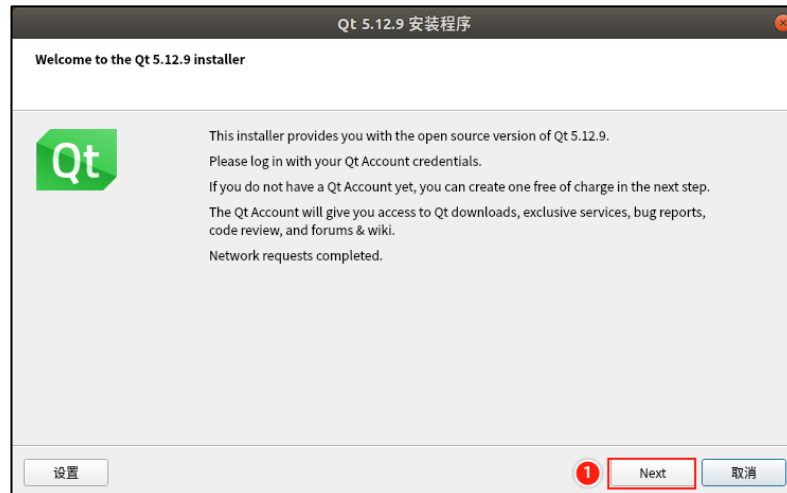
```

chmod u+x qt-opensource-linux-x64-5.12.9.run
sudo ./qt-opensource-linux-x64-5.12.9.run

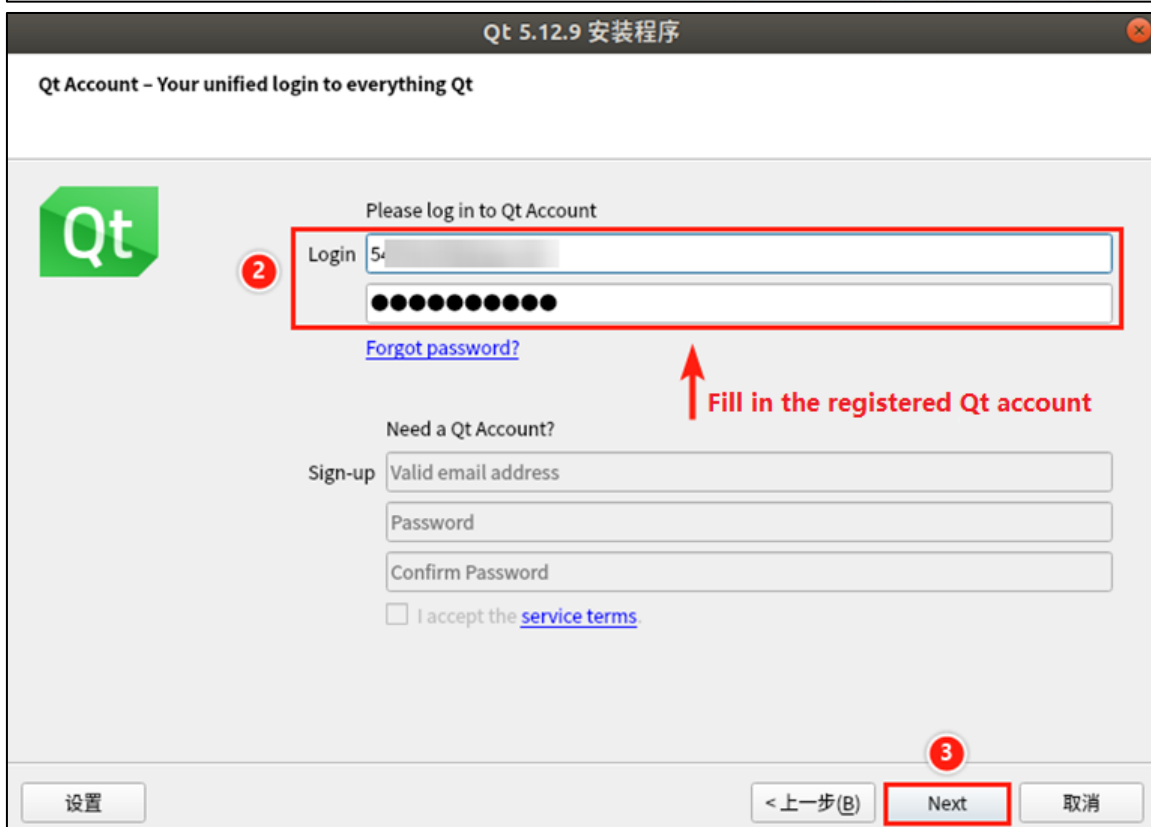
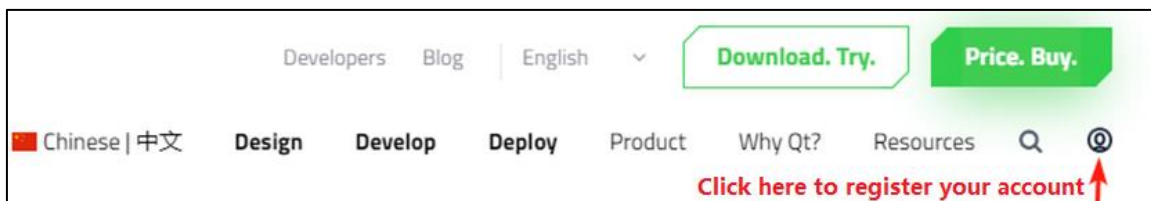
```

It is recommended to use "sudo" when installing here. Otherwise, it will be installed in the current directory.

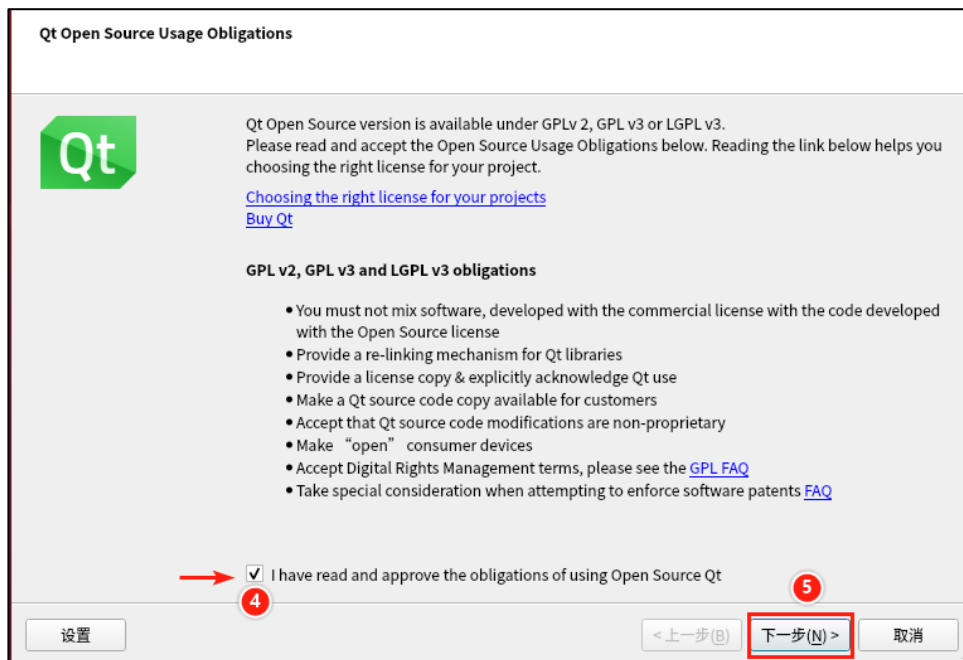
If there are no unexpected issues, the Qt 5.12.9 installation interface will pop up, as shown in the following picture.



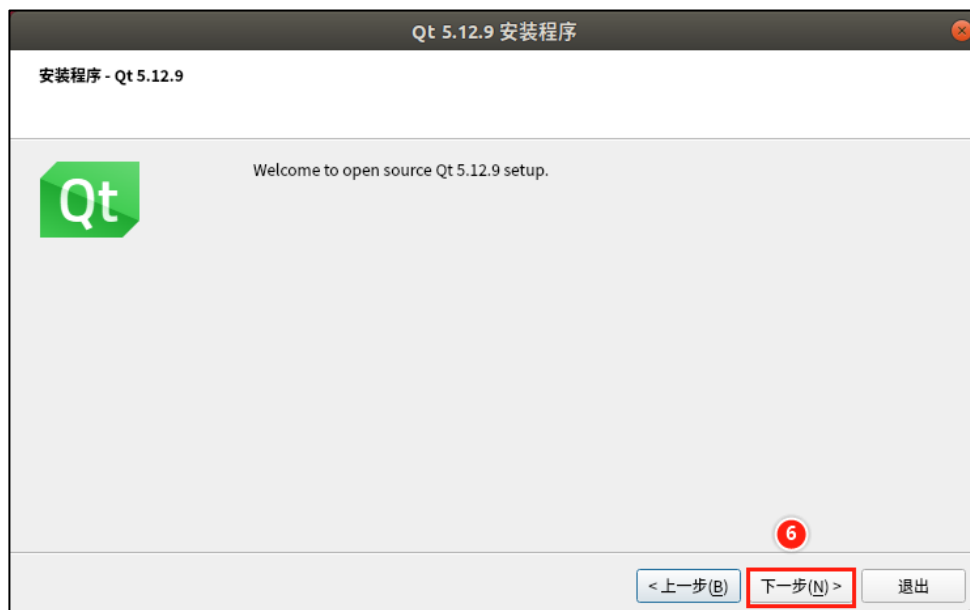
Later, you will need to use the Qt account. You need to register one yourself at the Qt website: <https://www.qt.io/>. Here, we are using the open-source version of Qt. If you want to use the commercial version, please purchase it directly from the official website. If you don't want to register, you can click on the settings in the Qt installation interface and select "No proxy for the network". Or disconnect the virtual machine network and reinstall Qt.



Agree to the terms of use, as shown in the following picture.



Welcome installation interface. Just click "Next" directly.



Select the installation directory. It is recommended to keep the default setting. The installation will be made in the /opt directory. Click Next.



Install as needed. We selected to install for all options except Android. Click Next.



Agree to the license agreement and click "Next".



Click to install.

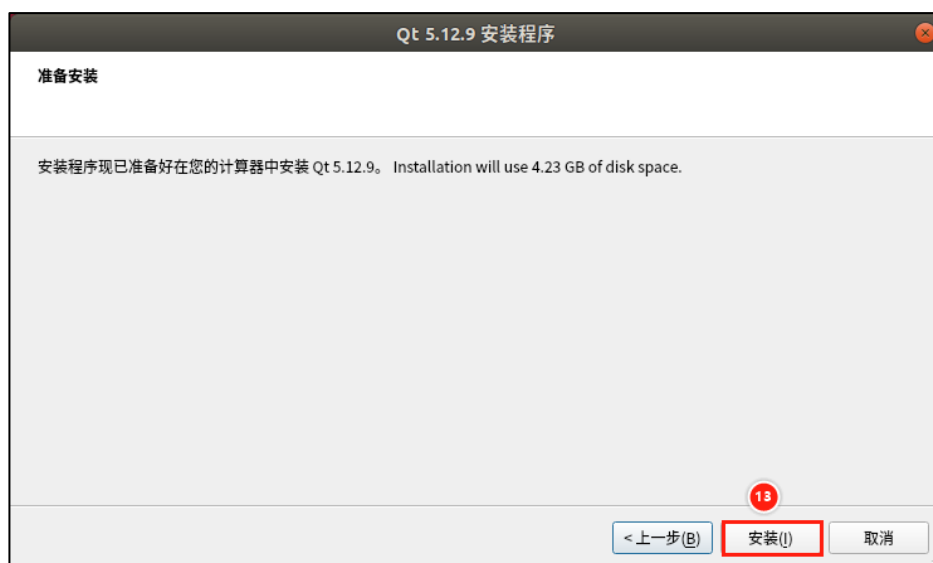


Figure 2.2-1 Start installation

The installation is completed as shown in the picture. Click "Next".

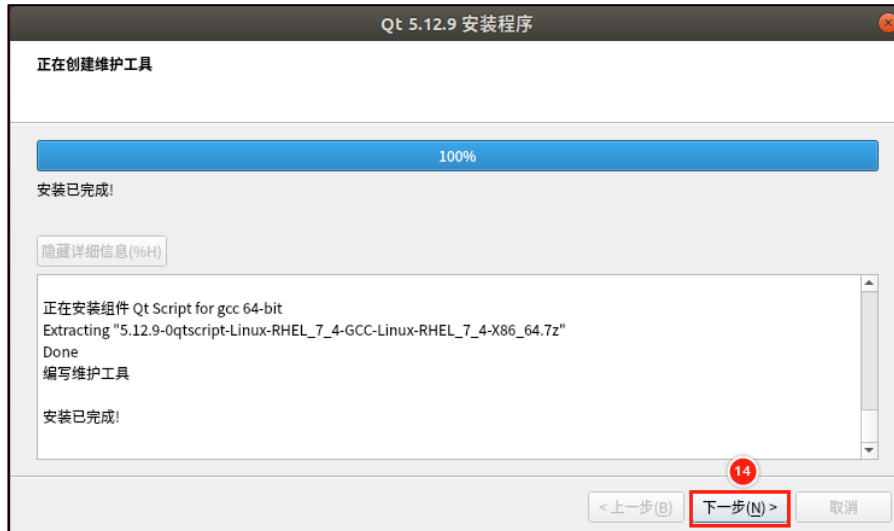


Figure 2.2-2 Click "Next".

Then click "Installation Complete".



Figure 2.2-3 Installation complete

2.3 Configuring Qt Creator Kits

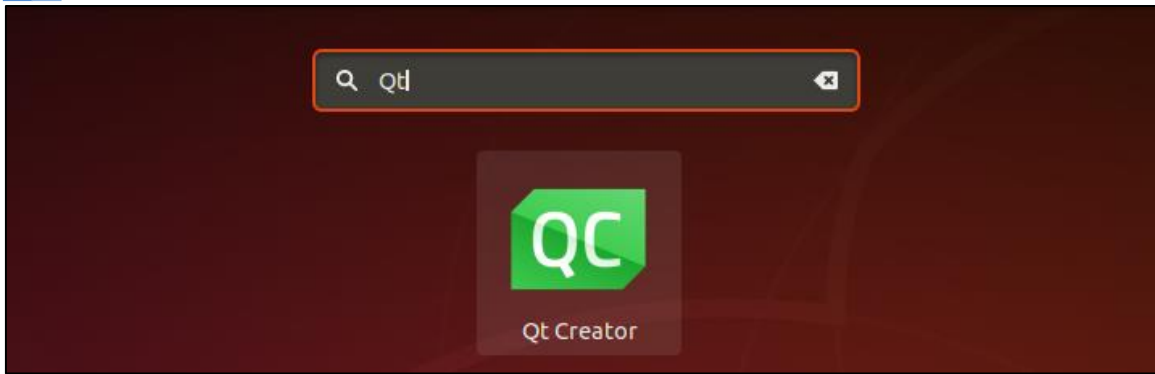
Kits are translated as "kits". Qt Creator Kits refer to the development compilation environment kits. We can set up kits for different platforms and compile applications for different platforms using different kits, which is the cross-platform feature of Qt.

If the installation directory is the same as the one where the compiler is installed (i.e., the default installation directory), then you can open Qt Creator using the following command. The "&" symbol indicates running in the background.

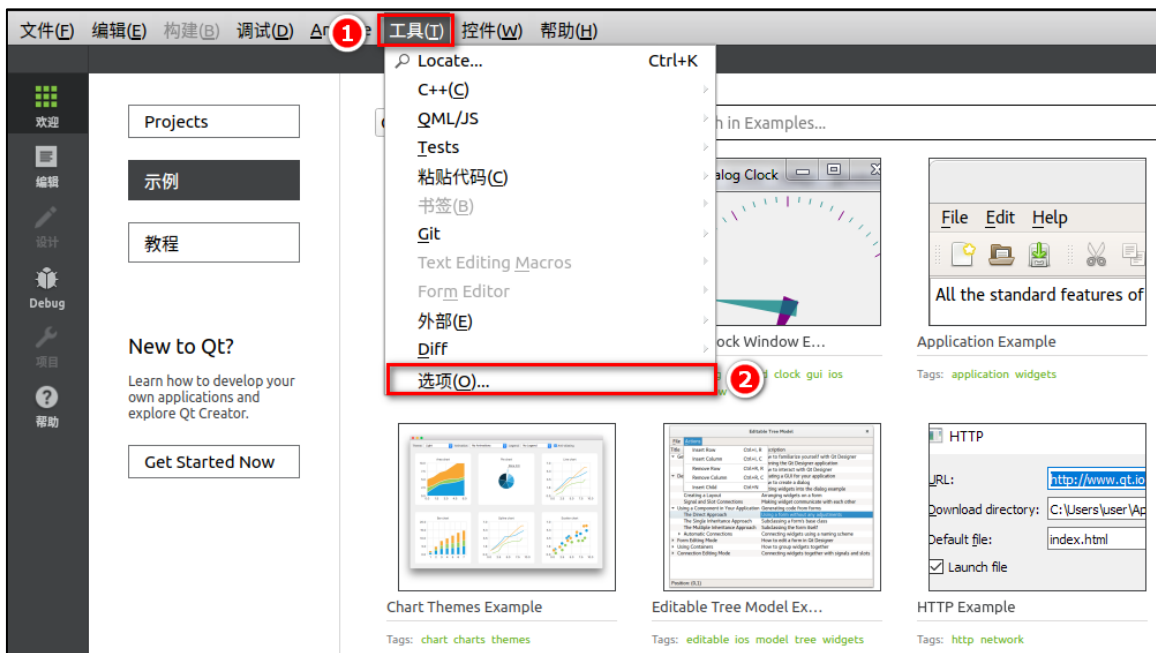
```
/opt/Qt5.12.9/Tools/QtCreator/bin/qtcreator.sh &
```

```
alientek@ubuntu18:~$ /opt/Qt5.12.9/Tools/QtCreator/bin/qtcreator.sh &  
[2] 101172
```

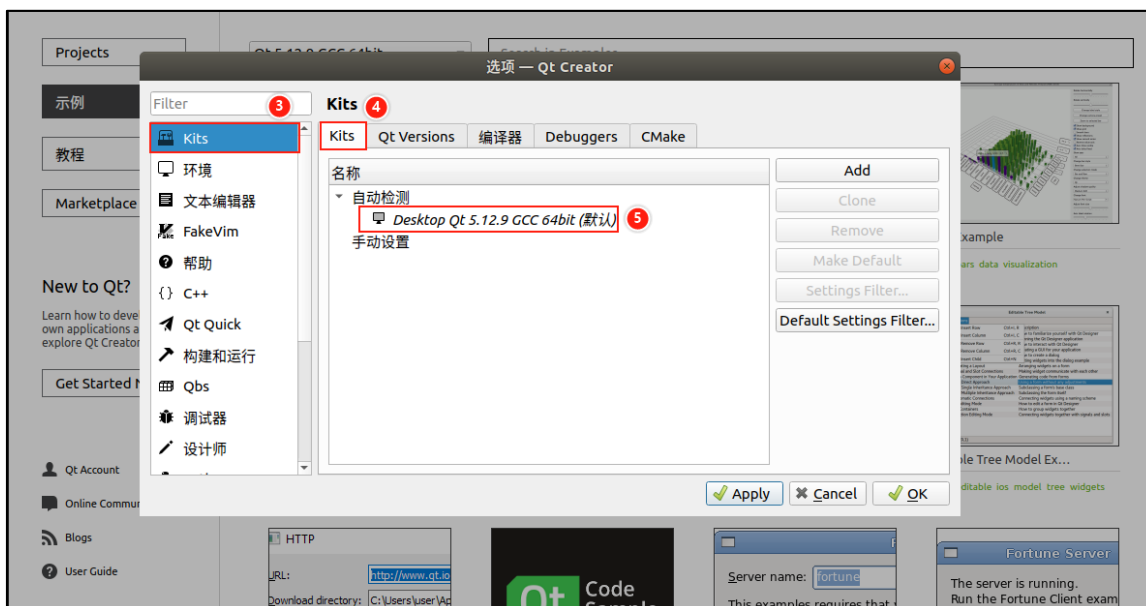
You can also enter the search term "Qt Creator" in the software center section at the bottom left corner, and then click to open it.



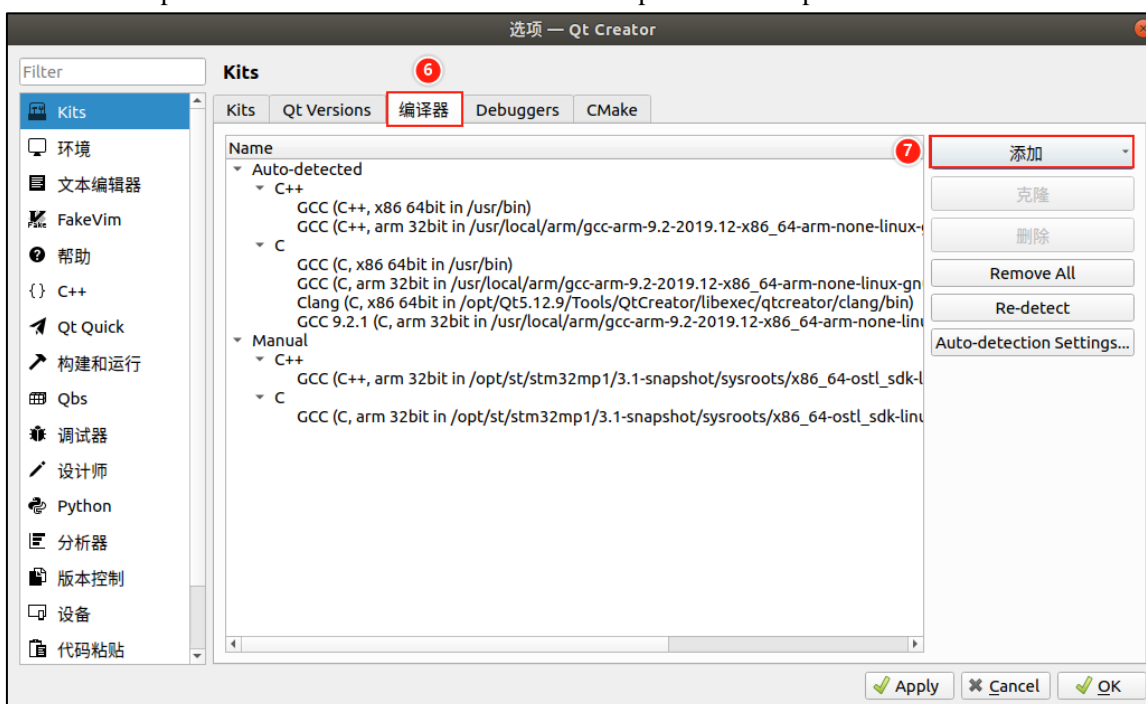
Select the tool, then choose the option item.



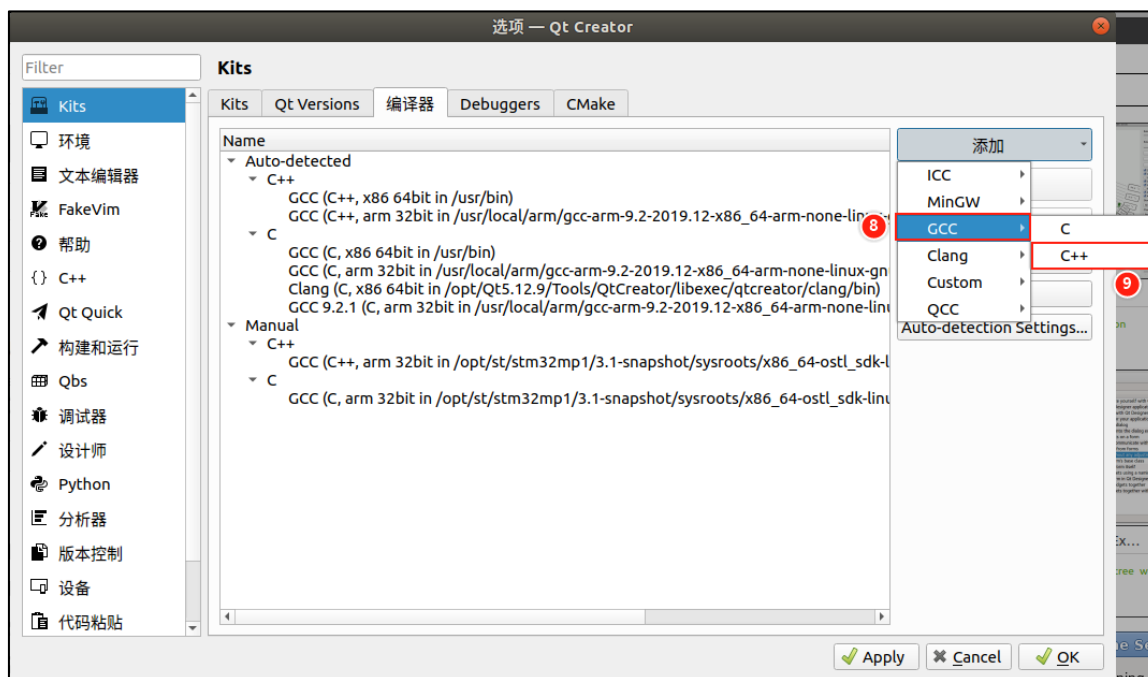
As can be seen at point 5, this is the desktop application development suite for Ubuntu. That means the Qt applications developed can run on Ubuntu. Usually, we develop the interface on Ubuntu. If some code doesn't work on Ubuntu (that is, these codes are related to the hardware of the development board), then we must compile this program and run it on the development board to observe the running results.



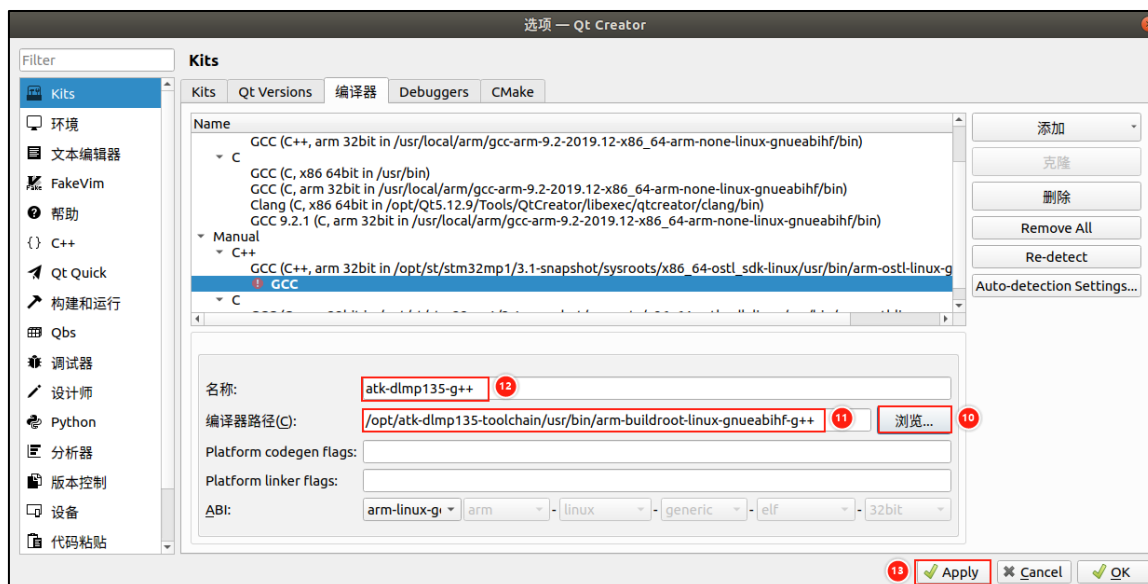
Currently, there is only one kit. We need to add another kit to increase our ATK-DLMP135 configuration. Click on the compiler options, and you can see that there are many compilers on Ubuntu, including C compilers and C++ compilers. The reason for having so many compilers is because there are different GCC versions and different operating system bits (number of bits). Then click the add button to add our ATK-DLMP135 cross-compiler for platform compilation. We have already installed the cross-compiler earlier. So we will use this cross-compiler at this step.



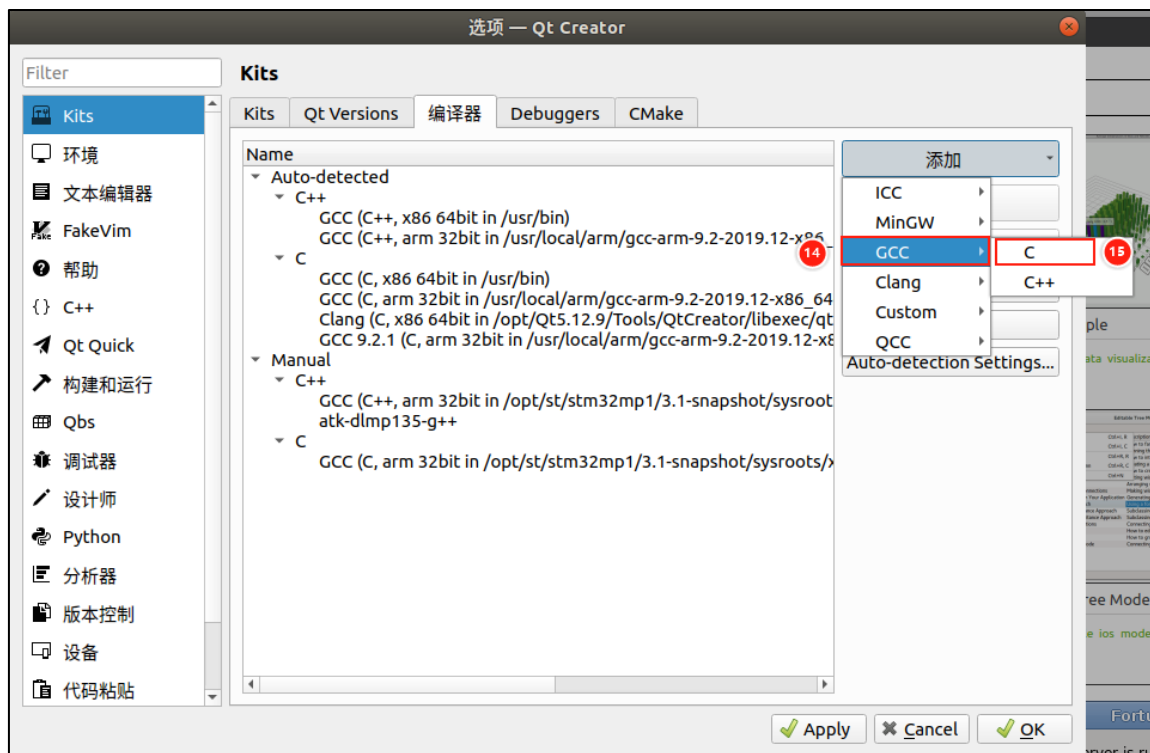
We chose GCC. Why did we choose GCC? Because the name of the compiler we use is of the GCC type. Then we first configured C++, which is the compiler for compiling C++.



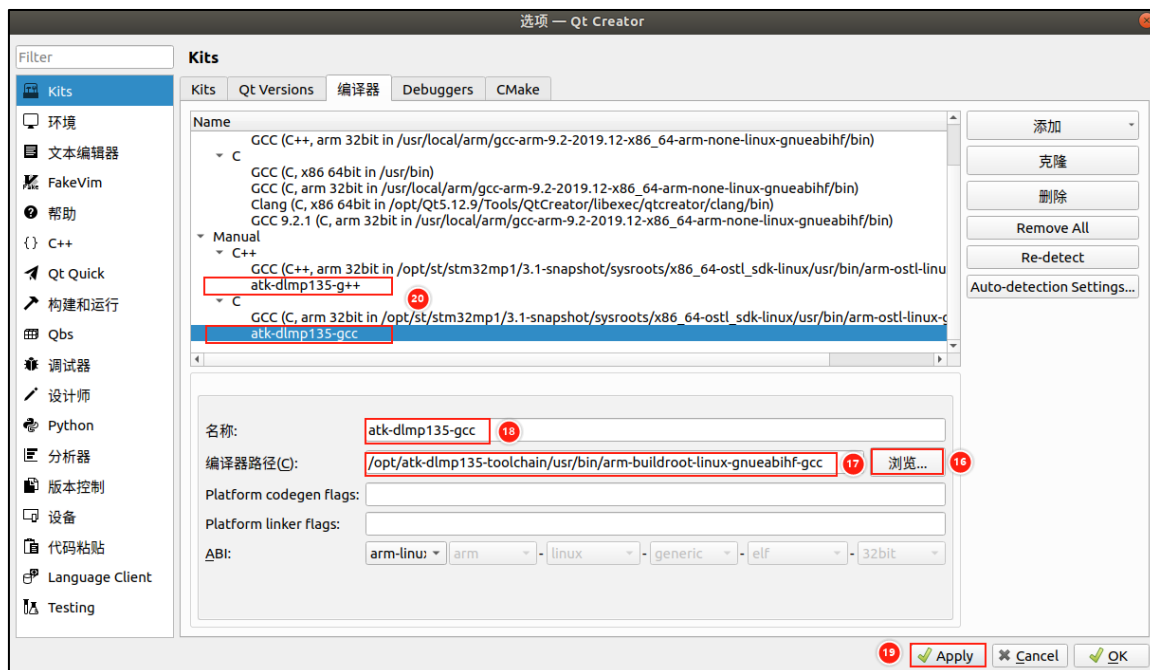
After clicking, we need to enlarge the pop-up interface a little. Otherwise, you won't be able to see the "10 Browse Path" button. In step 11, this path is /opt/atk-dlmp135-toolchain/usr/bin/arm-buildroot-linux-gnueabi-hf-g++. If your cross-compiler is also installed in this path, then our result will be the same. In step 12, we need to customize the name of this compiler. Let's call our ATK-DLMP135 development board atk-dlmp135-g++! Writing it in lowercase is better for recognition, but of course, you can also name it something else if you like!



After configuring C++ as mentioned above, we must click "Apply" (Apply). Now let's configure C. Repeat the above steps. Add the C compiler.

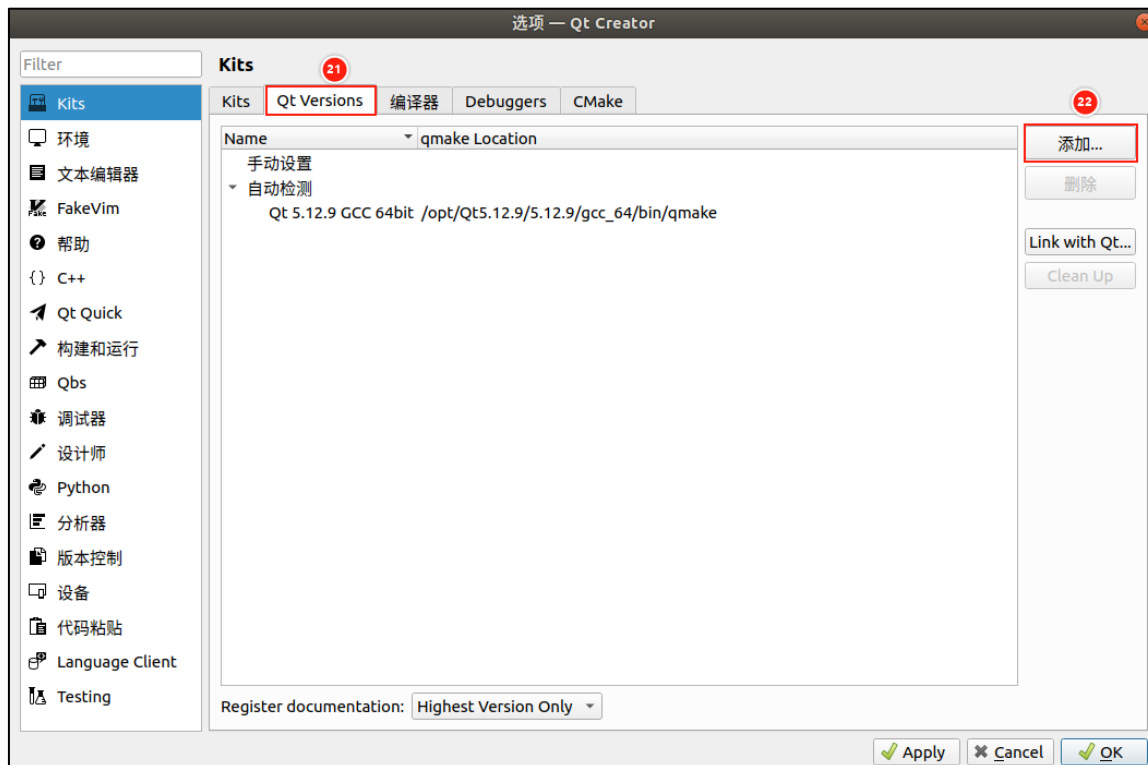


As shown in the figure below, the path for gcc is `/opt/atk-dlmp135-toolchain/usr/bin/arm-buildroot-linux-gnueabi-hf-gcc`. The custom name is `atk-dlmp135-gcc`. Click "Apply" to proceed. As you can see in step 20, we have already added two compilers.

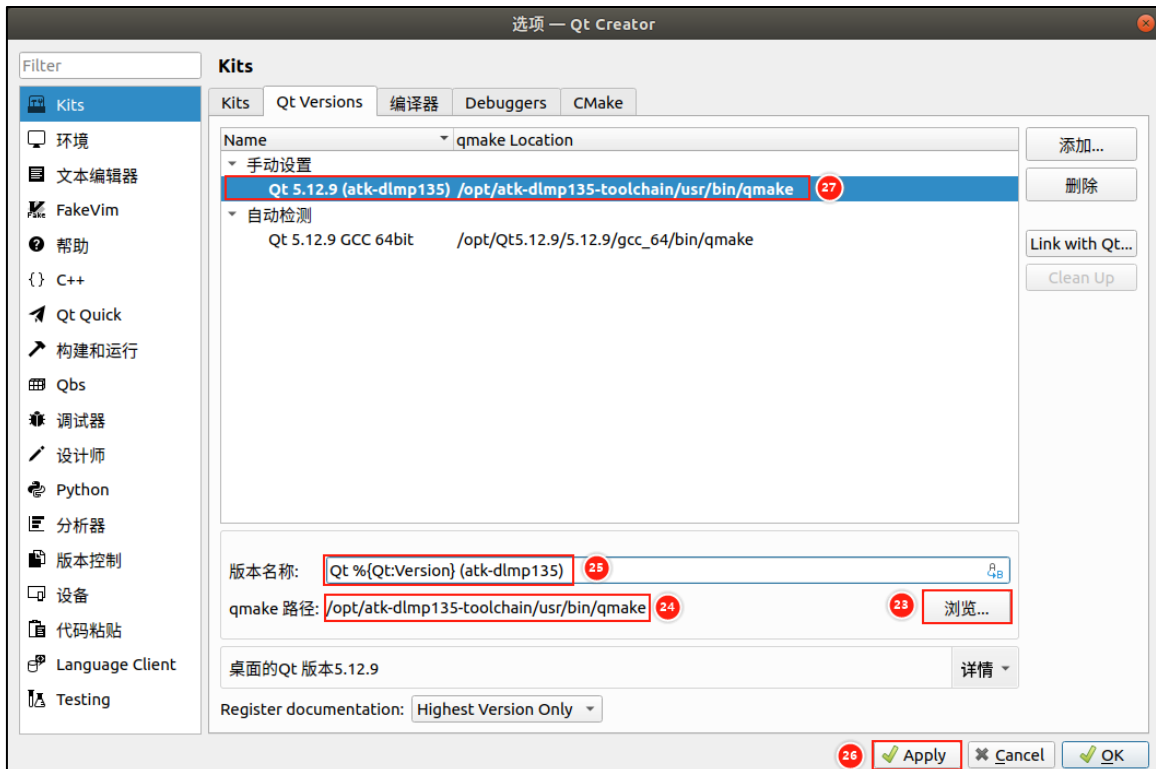


2.3.1 Configure qmake

After configuring the cross-compiler above, now let's configure qmake. Note that the order of these configurations is not fixed. You can configure qmake first and then the cross-compiler, or vice versa - it doesn't matter. Click on the Qt version, then click on "Add".



As shown in the figure below, add qmake. If your cross-compiler is installed in the same path as mine, the path of qmake will be `/opt/atk-dlmp135-toolchain/usr/bin/qmake`. In step 25, we change the name to `Qt % {Qt:Version} (atk-dlmp135)`. Click Apply to apply! Don't forget!



2.3.2 Configuration Kit

In this step, we need to add our own cross-compilation kit. Click on "Add".

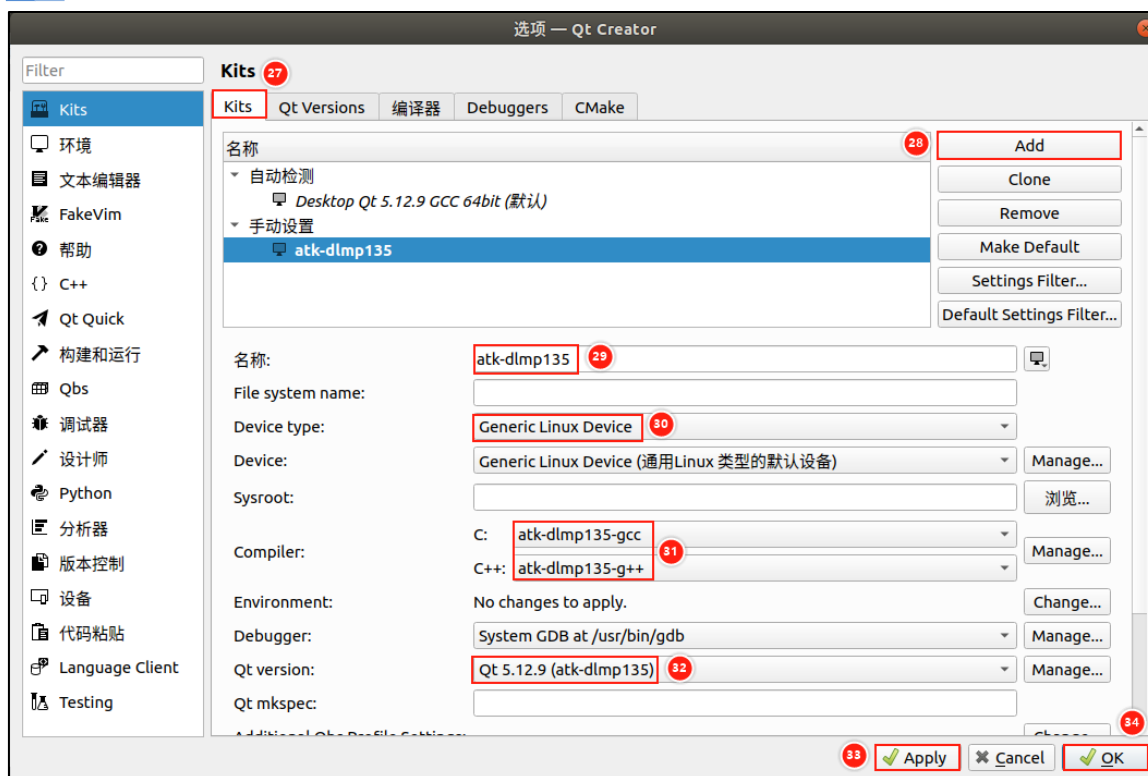
Sequence Number 29: Here we name it atk-dlmp135. This is the name of our development board. Writing it in lowercase looks more pleasing to the eye.

Sequence Number 30: We select the general Linux device.

Sequence Number 31: We select the cross-compilation type that was previously configured.

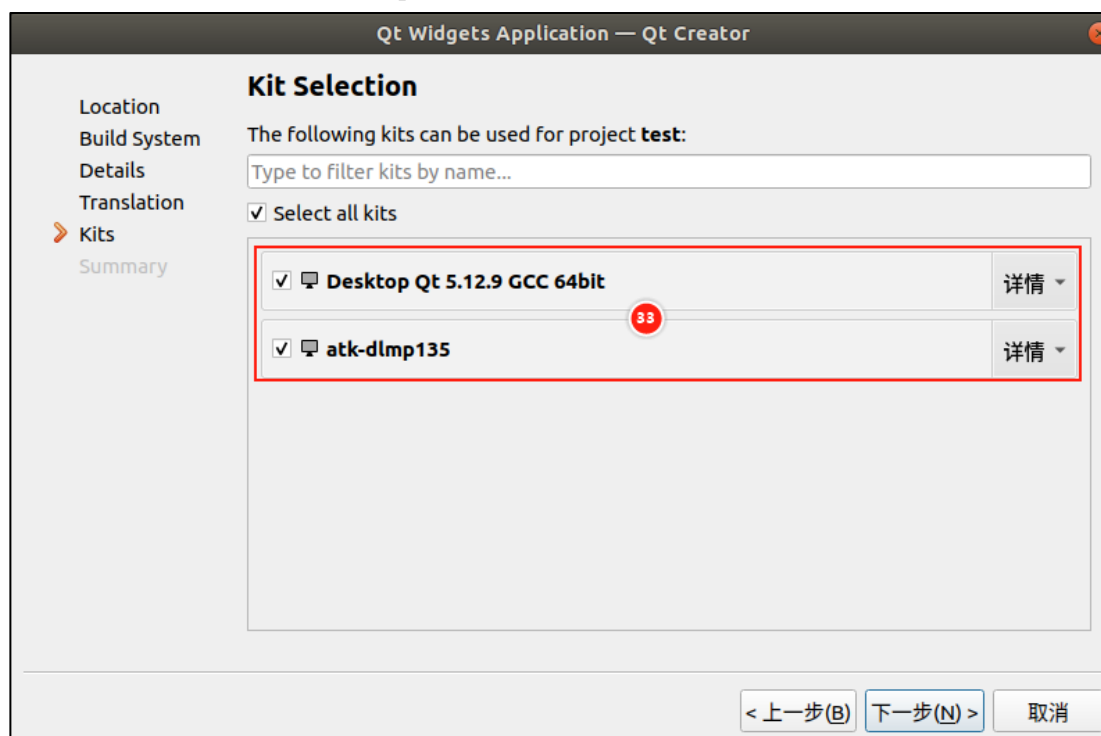
Sequence Number 32: We select the qmake that was previously configured.

Then we click "Apply" and then "Confirm OK"!

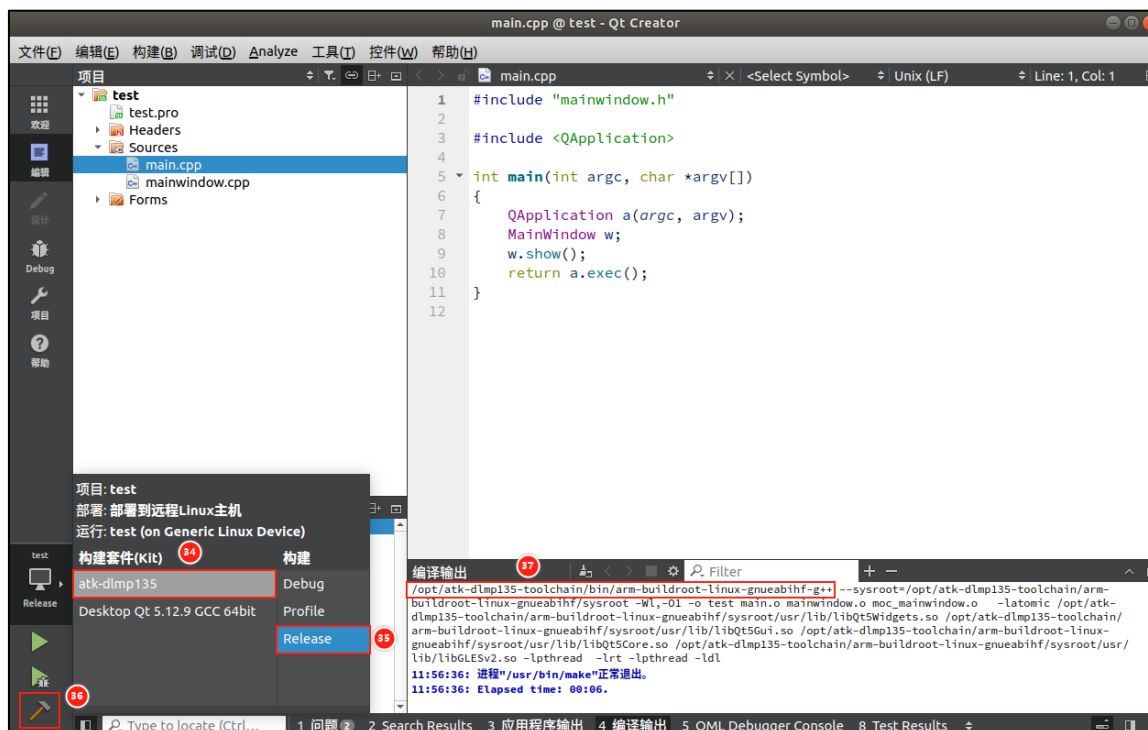


2.3.3 Compilation Test

Now, let's create a simple project to test. The author quickly set up a project. When creating the project, we need to select the compilation suite we set up in the previous step. Here, we choose both options. This allows us to compile Qt programs to run on Ubuntu and also to compile Qt applications that can run on the ATK-DLMP135 platform.



Click on the "Build Kits" at the bottom left corner. We select the "atk-dlmp135" compilation kit, and choose the Release or Debug version. Note that we click the small hammer icon at step 36 for the build process, and do not click "Run". You can see that in step 37, the cross-compiler we installed is used, and the compilation was successful!



The compiled executable file is located in the "build-<project name>-atk_dlmp135-Release/" directory. Please check it yourself. Simply copy it to the development board system and execute it!

2.4 Remote Deployment of Qt Applications

In Section 2.3, the application built and compiled using "atk-dlmp135" cannot run on the local Ubuntu machine. It can run on the ATK-DLMP135 platform, but we need to copy the executable file to the ATK-DLMP135 development board and then execute it; this is actually very inconvenient for developers because it is very time-consuming. Every time we want to check the running effect, we need to copy the executable file to the development board, which is quite troublesome!

In this chapter, we will introduce to you how to remotely deploy the application to the ATK-DLMP135 development board through Qt Creator. That is, without the need for us to manually copy, we can directly click "run" (or use the shortcut key) in the Qt Creator software on the Ubuntu host machine to achieve that the Qt program automatically "runs to" the development board and directly view the program running effect on the development board!

2.4.1 Configuring the Running Device

The default Desktop Qt 5.12.9 GCC 64bit compilation suite has configured the running device, which is the Ubuntu desktop. The programs compiled with this suite can run on the Ubuntu desktop. The atk-dlmp135 compilation suite we configured requires the configuration of the running device, and this running device is our development board.

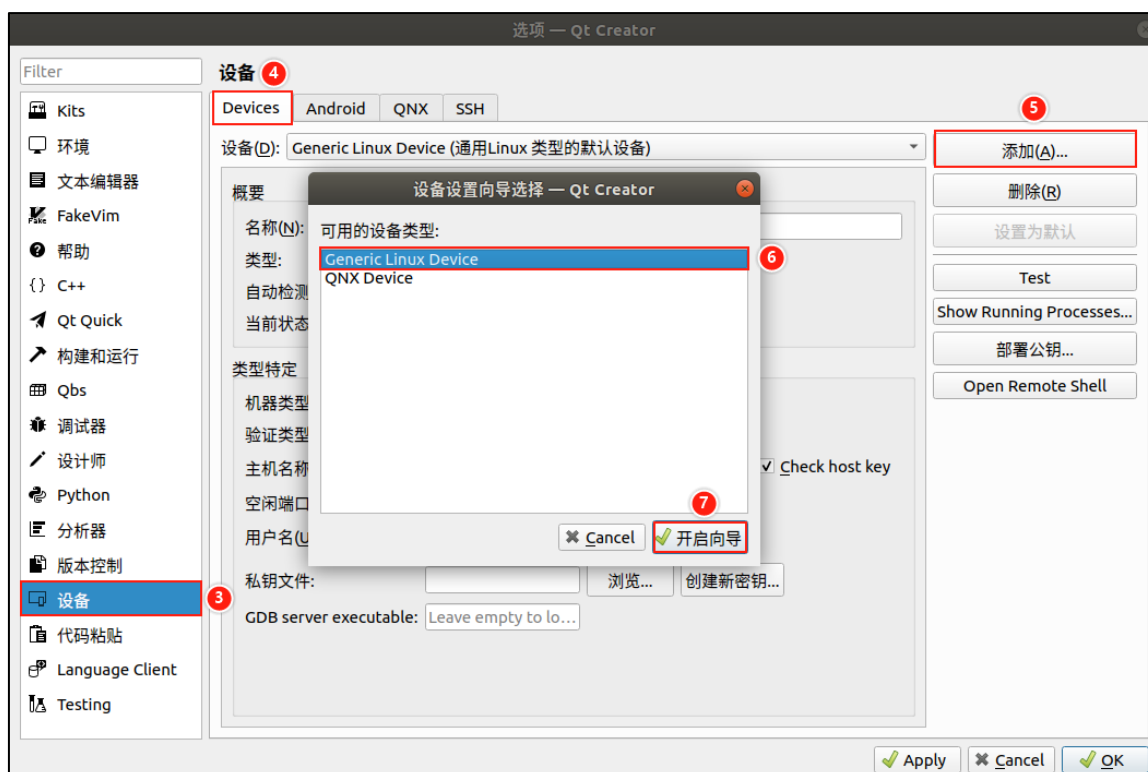
Alright, now let's create the running device. This running device is not on our Ubuntu, so how do we connect our ATK-DLMP135 development board device? The answer is through the network!

Similarly, we click on the Tools menu and select the Options item, as shown below.



Before creating the device, ensure that the ATK-DLMP135 development board is currently running the Linux Buildroot system, and that the development board has been connected to the router device via a network cable.

We start to create a device. Click on the device entry, then click on "Add". Follow the steps below to add a general Linux device.



Step 8: Name this device as "atk-dlmp135-device", and you can choose any name you like.

Step 9: Enter the IP address of the development board. Please fill in the IP address of your own development board.

Step 10: Log in to the development board as the device user. Our device logs in as the root user. By default, the development board already has a root user.

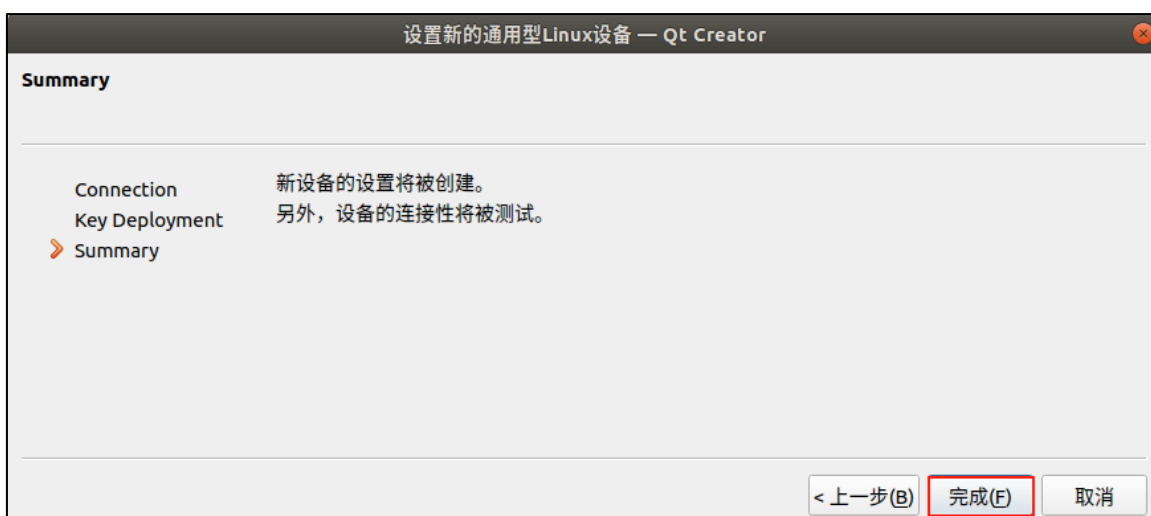
Click "Next".



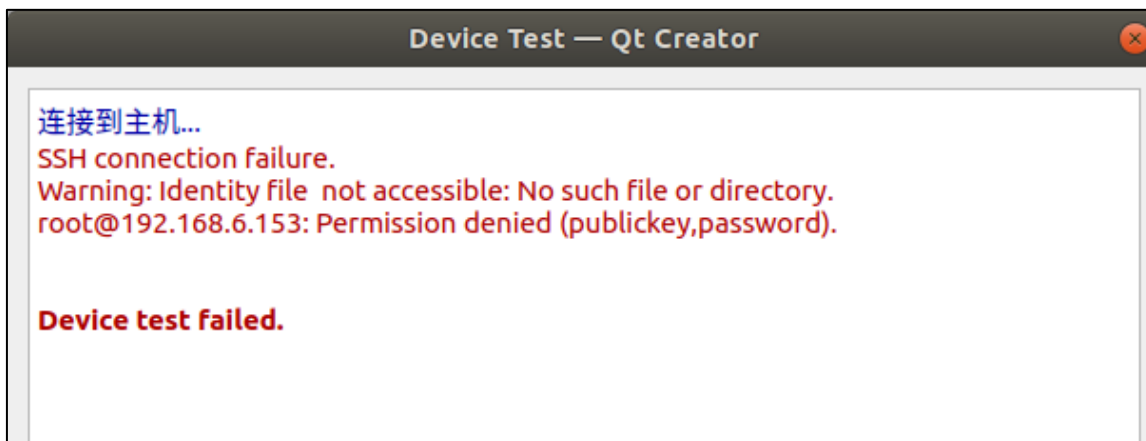
Configure the secret key. Here, we don't need to configure it. Just select "Next" directly.



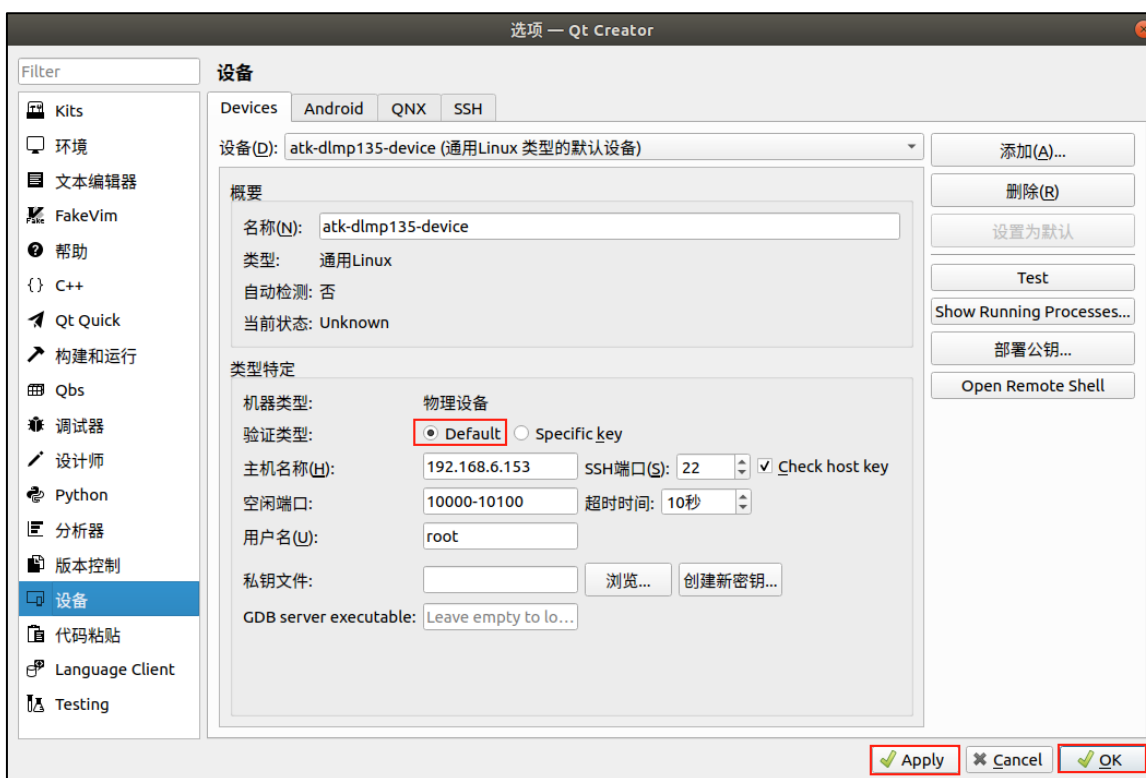
Click "Complete".



At this point, a failure to connect will be indicated because the device password has not been configured yet. Please first close the connection window.



In the device information, the verification type is set to "Default". The final device configuration is as follows:

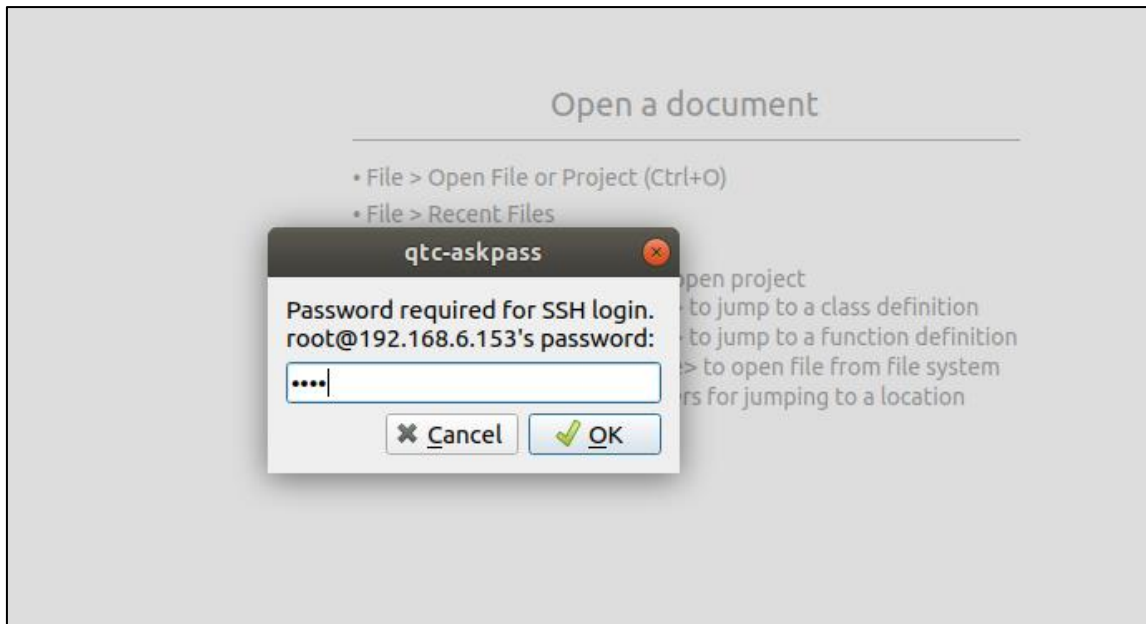


2.4.2 Running Device Test

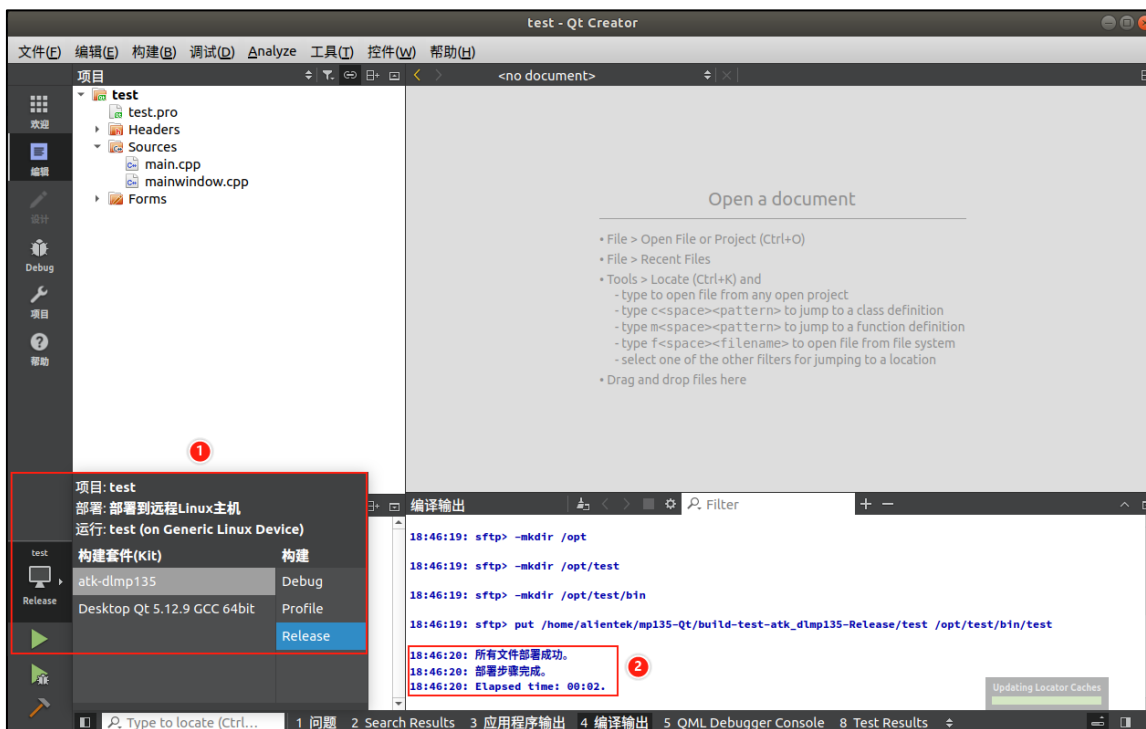
Since the ATK-DLMP135 development board came with a Qt interface pre-installed, if we immediately run the device we have configured, it will definitely not work. Because there is only one screen. The Qt used in the factory version is based on the linuxfb platform. If two interface programs are running, then these two interface programs will compete with each other and fight for display on this screen. As a result, you will see the interface stuttering.

Therefore, the correct approach is to first stop the factory Qt program, click the settings icon on the interface, and then click "Exit". Then, run the device we configured in 2.4.1 on Ubuntu.

As shown in the following figure, select our atk-dlmp135 compilation suite, choose Debug or Release, click the green triangle icon, or use the shortcut key "Ctrl + r" to run our Qt program on the ATK-DLMP135 development board. After connection, it will prompt us to enter the device password. The default username in the factory system is root, and the password is also root.



Since this example is a blank window, you will see a white screen with no other content. The program has run successfully. The information can be found in the compilation output window as shown in Figure 2.



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