



## QY-RK3288 Android User Manual

V1.0

2017/10/16

## Version Record

Date	Version	Description	Revisor
2017-10-16	V1.0	Initial version Software : Android5.1.1, kernel 3.10.0 Hardware : QY-RK3288 Rev.A	

## Introduction

QY-RK3288 is a high performance platform that has powerful function of muti-threading, graphic processing and hardware decoding, and it applies to the Android version of 5.1.1. It can be applied to industrial control, data acquisition, information communication, medical equipment, video monitoring, on-board entertainment and so on.

QY-RK3288 can support infrared, bluetooth 4.0, dual-band wifi, 4K\*2K HDMI output and rich outer extension interfaces, which are suitable for some high performance occasions such as smart living room, smart kitchen, background music and smart home control etc.

QY-RK3288 supports 4k HDMI output and hardware decoding of H.265. And it can build high definition indoor outdoor advertisement machine and build car intelligent entertainment media center and so on. Welcome to visit our website of [www.qiyangtech.com](http://www.qiyangtech.com).

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# I . Tutorials

## 1.1 Start Guidance

### 1.1.1 Accessories

QY-RK3288 includes the following accessories:

- ◆ A piece of QY - RK3288S motherboard
- ◆ A USB-OTG connecting line, Debug serial line(three lines), Serial connection
- ◆ A piece of 12V-2.5A power adapter
- ◆ WIFI antenna

### 1.1.2 Starting up

Use the dedicated adapter to power the board and wait for more than 10 seconds, the D6 heartbeat lights on the board will start flashing, which indicates the system has started normally.

## 1.2 Firmware update

### 1.2.1 Preface

This article explains how to program the firmware files on the host to the flash memory of the development board through the Micro USB OTG line. When upgrading, you need to select the appropriate upgrade mode according to the host operating system and firmware type.

## 1.2.2 Preparation

- ◆ A piece of QY - RK3288S motherboard
- ◆ Firmware
- ◆ Host machine
- ◆ A piece of Micro USB OTG cable

Generally, there are two types of firmware:

- ◆ A single unified firmware update.img will pack the parameters loader, parameters and all partitions images together for the firmware release.
- ◆ Rich partition images ,such as kernel.img, boot.img, recovery.img, etc. are generated during the development phase.

Here, we will explain how to program the firmware:

Host machine should support the following operating systems:

- ◆ Windows XP (32-bit or 64-bit)
- ◆ Windows 7 (32-bit or 64-bit)
- ◆ Windows 8 (32-bit or 64-bit)
- ◆ Linux (32-bit or 64-bit)

## 1.2.3 windows

You should use the AndroidTool.exe to program/flash the firmware, and you need to install the RK USB driver before using the programming tools. If the driver has been installed, you can skip this step.

## 1.2.4 Install the RK USB driver

Copy the [DriverAssitant\_v4.2.rar] driver package to the host machine, extract, and

then run the [driverinstall.exe]. In order to make all devices to use the updated drivers, please select "driver uninstall" and then select driver install. The steps as shown below:



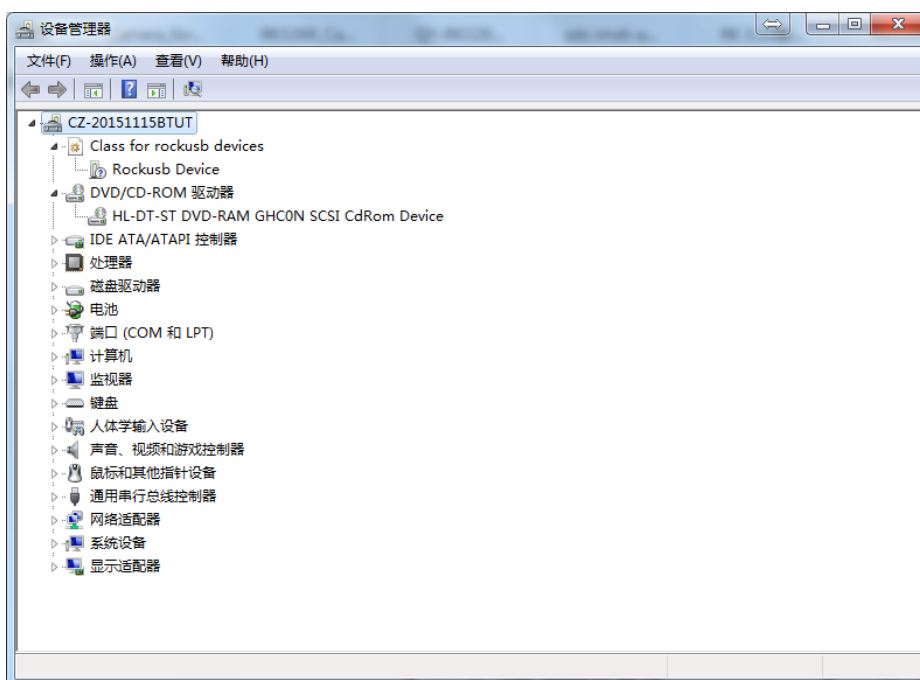
## 1.2.5 Connecting device

1. Make sure the device is connected to the power adapter, and power on.
2. Use the micro usb otg cable to connect the device and host machine.
3. Press the RECOVERY(SW1) key on the device and hold it.
4. Press the RESET(SW2) button with several seconds.
5. After 2 seconds later, loose [RECOVERY]button.

Release the RECOVERY key after two seconds.

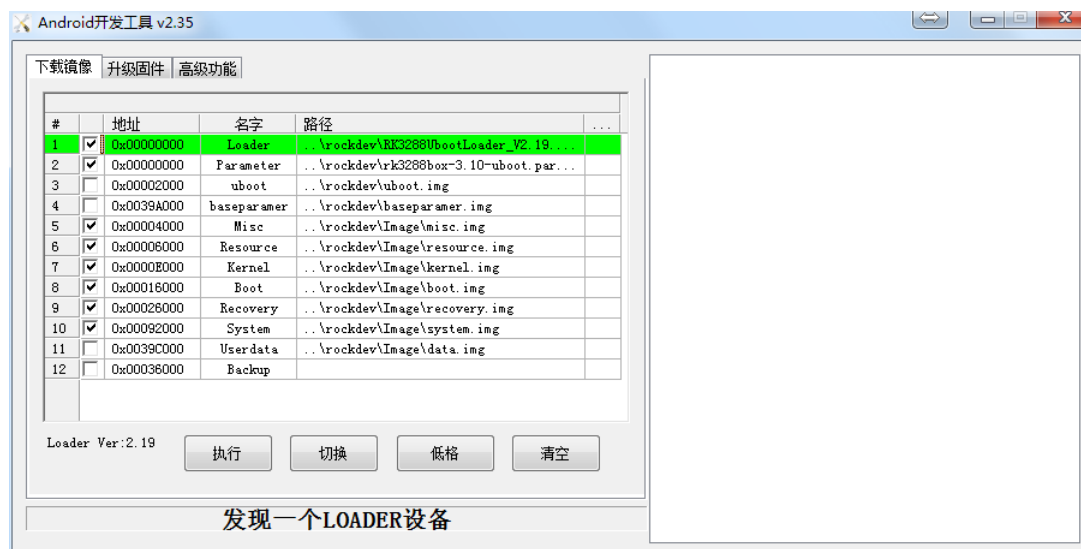
6. You should note it that if the device is not found after press the RESET key, please press the POWERON key when you still press the RECOVERY key, and then release the RECOVERY.

Host machine would indicate that the new hardware is discovered and configured successfully. Open the device manager, you will see the new device "Rockusb Device" as shown below. If not, you need to come back to the previous the step to reinstall the driver.



## 1.2.6 Program the firmware

Copy the firmware [AndroidTool\_Release\_v2.35\_xxxxx.zip] to the host, then extract it, run the [AndroidTool.exe] in the directory, and then click [Execute] as shown:



Next, the partition images will be programmed automatically.



## 1.2.7 Program the Unified Firmware

Steps are as follows:

1. Switch to the upgrade firmware page as shown below
2. Press the “firmware” button and open the firmware file you want to upgrade under the [AndroidTool\_Release\_v2.35\rockdev\directory]. The upgrade tool will display the detailed firmware information.
3. Press the “upgrade” button.

If it fails to upgrade, you can try to press the “erase the flash” button to erase the flash, and then to upgrade.

4. You should note it that if the firmware loader version you programmed is not consistent with original machine, please erase the flash before upgrading the firmware.



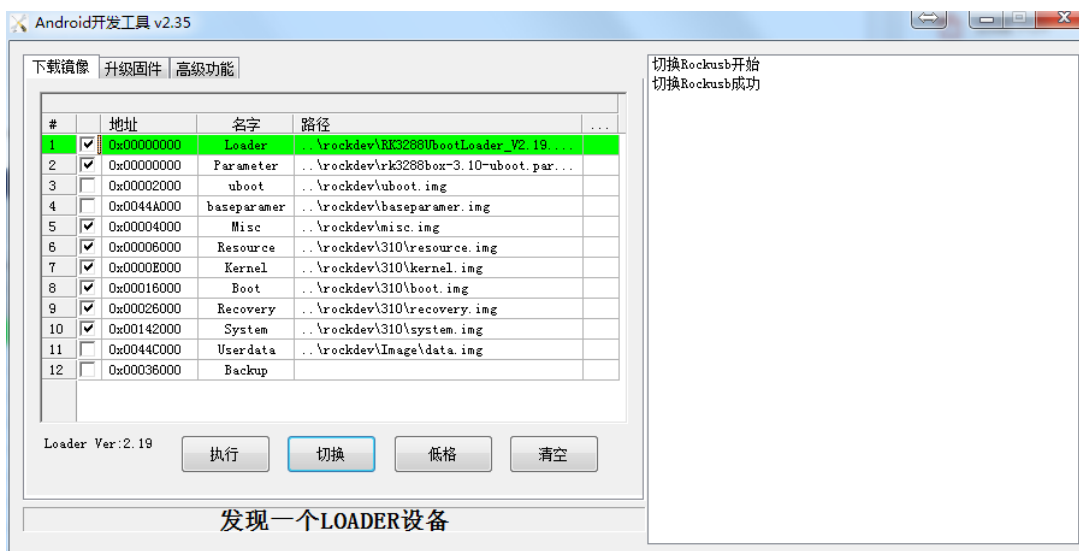
## 1.2.8 Program/Flash the partition mapping

Steps:

1. Switch to the “download mirror” page as below.
2. Tick the partitions you need to program/flash ,and you can tick more.

Make sure that the path of the image file is correct, and the blank table cell on the right of the point path will be selected again if needed.

3. Click the “excute” button to upgrade, and the device will restart automatically after upgrade.



## 1.2.9 Linux

No testing.

## 1.3 Serial Port Debugging

### 1.3.1 Select adapter

Generally, the desktop host is provided with the RS232 serial port. If you don't have or use a laptop, you will need a USB To UART adapter. The adapters are divided into the following types according to the chips

- ◆ PL2303
- ◆ CH340

In general, the adapter with GH340 chip is more stable, but expensive.

### 1.3.2 Hardware Connection

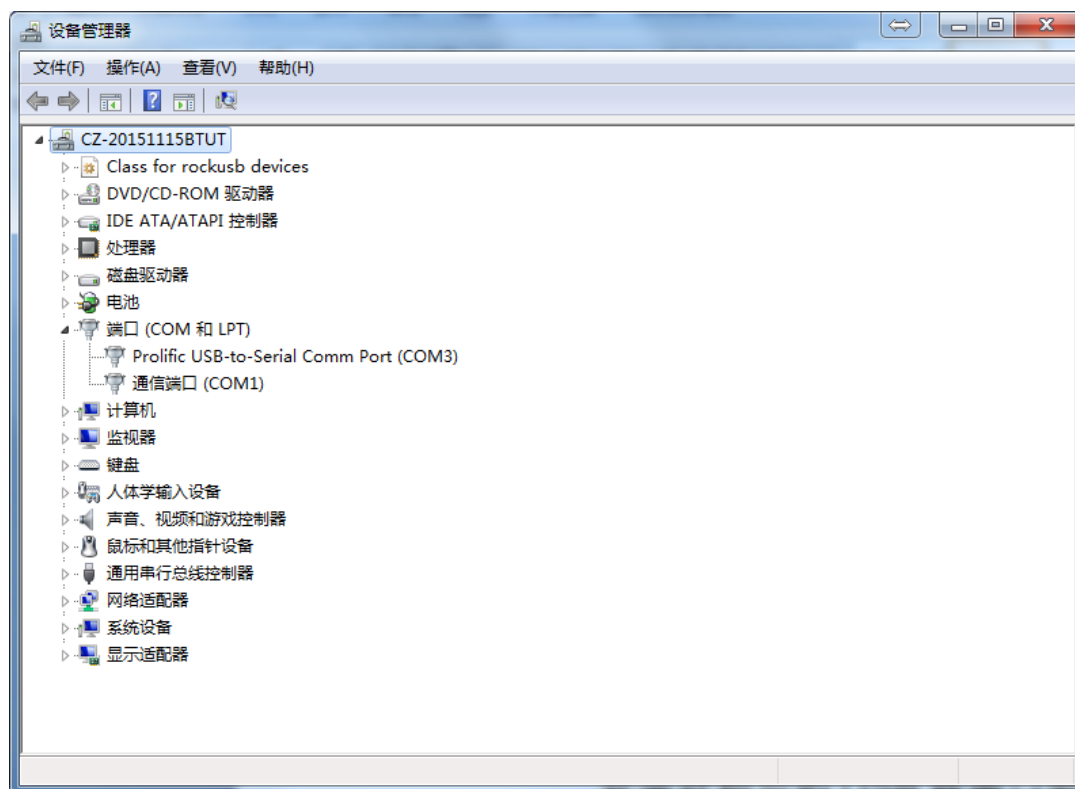
Connect the UART of host machine to UART connector of the development board

### 1.3.3 RK3288 uses the following serial parameters

- ◆ Baud rate: 115200
- ◆ Data bits:8
- ◆ Stop bits:1
- ◆ Parity check: Without
- ◆ Fluid control: Without

### 1.3.4 Use Windows UART to debug

After installing the USB To UART driver, inserting the USB to UART cable, the system will hint the new hardware and initialization, then COM port can be found from the device manager, as below:



The COM1 comes from the host machine, and the COM3 is the USB to UART port. Putty or SecureCRT is usually used in Windows. Putty is an open source software which is easy to use. And the specific application method can be searched online.

## 1.4 Start Mode Description

### 1.4.1 Preface

RK3288 has flexible start modes. In generally, the development board is not bricking unless the hardware is damaged. If the accident such as the bootloader corrupted occurs during the upgrade progress, you can't re-upgrade it. You still can go to MaskRom mode to fix it.

## 1.4.2 Loading Method

RK3288 has 20KB of BootRom and 100KB internal SRAM to support the loading system of the following devices:

8-bit Async Nand Flash

8-bit toggle Nand Flash

SPI interface

eMMC interface

SDMMC interface

In other words, RK3288 not only supports Nand Flash, SPI Flash, eMMC Flash startup, but also supports SD card startup.

## 1.4.3 Start Mode

Three types of start modes:

### ◆ Normal mode

Normal mode is the normal boot process, and each components are loaded in sequence and enter into the system normally.

### ◆ Loader mode

In the Loader mode, the bootloader will enter into the upgrade status and wait for the host command, used for firmware upgrade. To enter into Load mode, you must let the bootloader detect the RECOVERY key pressed at startup, and the USB is connected:

Make sure the device is connected to the power adapter and in Power On status.

Use the micro usb otg line to connect the device and host.

Press the RECOVERY key on the device and hold it.

Press the RESET button briefly.

Release the RECOVERY key

Notice: You should note it that if the device is not found after press the RESET key, please also press the POWERON key when you still press the RECOVERY key, then release the RECOVERY.

#### ◆ MaskRom mode

The MaskRom mode is used to repair the system when the bootloader is damaged. In general, you don't need to go into MaskRom mode, only if the bootloader check fails (the IDR block is not read or the bootloader is corrupted), the BootRom code enters MaskRom mode. At this point, the BootRom code waits for the host to pass the bootloader code through the USB port, then load and run it.

## II. Android Development

### 2.1 Compile Android Firmware

#### 2.1.1 Preparation

The computer should be with high configuration to compile Android.

- ◆ CPU supports 64-bit
- ◆ 6GB physical memory and swap memory
- ◆ 30GB free Disk space , and source tree should occupy about 8G.

Supports: Ubuntu14.04.

Software packages need to be installed:

JDK7

vim git samba gnupg flex bison gperf build-essential zip curl zlib1g-dev libc6-dev  
lib32ncurses5-dev x11proto-core-dev libx11-dev lib32z-dev libgl1-mesa-dev  
g++-multilib tofrodos python-markdown libxml2-utils xsltproc libc6-dev:i386

Any question, please send E-mail:[supports@qiyangtech.com](mailto:supports@qiyangtech.com)

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Sales E-mail:trade@qiyangtech.com\_sales@qiyangtech.com

Website:http://www.qiytech.com

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gcc-multilib lzma git-core libc6-dev-i386 ccache unzip m4 u-boot-tools uuid-dev  
liblzo2-dev liblzo2-dev:i386 uuid-dev:i386 openssh-server

## 2.1.2 Download the default Android SDK

Copy the android source code from CD to host machine, and unzip it.

## 2.1.3 Compile image

Enter into the SDK root directory:

Execute [source build.sh]

Next, you start compiling, it takes long time for first compiling.

## 2.1.4 Flash partition image

After compiling, the following image files are generated:

boot.img : The boot image of the Android initial file, which initializes and loads system partition.

Kernel.img : Kernel image

misc.img : Misc partition image, which is used for switching the start mode and the parameter passing of the recovery mode.

Recovery.img : The recovery image

resource.img : Resource image, which contains boot image and the kernel's device tree information.

system.img : System partition image of Android, ext4 file system format.

If you are using the Windows system, copy the above images to AndroidTool's(firmware upgrade for windows) rockdev\Image directory and then use the update document to program the partition Image. The advantages are that you can use the default configuration and not modify the path of the file.

## 2.2 Use ADB

### 2.2.1 Foreword

ADB (Android Debug Bridge) is an Android command-line debugging tool that can perform multiple functions, such as tracking system logs, uploading and downloading files, and installing applications etc.

### 2.2.3 Ready to connect

Enter the developer option under the option, and check the “USB debug” option. Then connect device and host with the USB OTG cable.

### 2.2.4 The installation of ADB under the Windows

Install the RK USB driver at first, then download the adb tool from the web and unzip it to the host, and add the adb’s path to the environment variable for easy use.

Open a command-line window and write down [adb shell].

If work normally, you can enter the [adb shell] and run commands on the device.



**Zhejiang Qiyang Intelligent Technology Co. Ltd.**

**Tel :** 0571-87858811 / 87858822

**Fax :** 0571-89935912

**Support :** 0571-89935913

**E-MAIL :** [supports@qiyangtech.com](mailto:supports@qiyangtech.com)

**Web :** <http://www.qiytech.com>

**Add :** 5F, building 3A, NO.8 Xiyuanyi Road, West Lake Science  
Park, Hangzhou, China

**Postcode :** 310012