

IDO-Purple Pi OH RK3566-V1 Linux开发手册

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IDO-Purple Pi OH RK3566-V1 Linux开发手册

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文档修订历史

版本	PCBA版本	修订内容	修订	审核	日期
V1.0	V1B	创建文档	TWX	IDO	2022/04/14
V1.1	V1B	增加IO Domain Checklist说明	TWX	IDO	2023/04/15
V1.2	V1B	修改固件烧录参考文档名称为"Purple-Pi-OH Android/Linux固件及烧录手册"	TWX	IDO	2023/05/15
V1.3	V1B	增加内核config和dts的路径说明	TWX	IDO	2023/07/11
V1.4	V1B	增加解压SDK不要使用sudo提示	TWX	IDO	2023/07/21
V1.5	V1B	文档优化	LZR	IDO	2024/07/30

1 SDK下载

1.1 源码下载

以下地址下载Purple Pi OH的Linux SDK：

链接：<https://pan.baidu.com/s/1cGk7rsKbP8EuFpmAo-A9-g?pwd=1234>

提取码：1234

1.2 源码解压

由于SDK打包后体积较大，在上传到百度云盘前把SDK包按照4GB大小分割了，因此下载后需要合并：

```
1 cat Industio-Purple-Pi-0H_Linux4.19_230410.tar.gz.a* > Purple-Pi-0H_Linux4.19_SDK.tar.gz
```

结果如下图所示：

```
industio@ubuntu22:~/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410$ ls
Industio-Purple-Pi-0H_Linux4.19_230410.tar.gz  Purple-Pi-0H_Linux4.19_230410.tar.gz.a*
Industio-Purple-Pi-0H_Linux4.19_230410.tar.gz.a*
industio@ubuntu22:~/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410$ cat Industio-Purple-Pi-0H_Linux4.19_230410.tar.gz.a* > Purple-Pi-0H_Linux4.19_SDK.tar.gz
industio@ubuntu22:~/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410$ ls
Industio-Purple-Pi-0H_Linux4.19_230410.tar.gz  Purple-Pi-0H_Linux4.19_SDK.tar.gz
Industio-Purple-Pi-0H_Linux4.19_230410.tar.gz.a*
industio@ubuntu22:~/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410$
```

合并后，进行解压，（注意不要使用sudo编译，否则会导致编译失败），命令如下：

```
1 tar -zxvf Purple-Pi-0H_Linux4.19_SDK.tar.gz
```

结果如下图所示：

```

inductio@ubuntu22:~/RK3566/Inductio-Purple-PI-DH_Linux4.19_200410$
inductio@ubuntu22:~/RK3566/Inductio-Purple-PI-DH_Linux4.19_200410$ tar -zxvf Purple-PI-DH_Linux4.19_SDK.tar.gz
./Purple-PI-DH-sdk/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Hardware/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Hardware/Rockchip_RK3288_Hardware_Design_Guide_V1.0_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Hardware/Rockchip_RK3288_TU_快速开始指南_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Hardware/Rockchip_RK3288_EVB2.0_User_Guide_V1.0_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Hardware/Rockchip_RK3288_EVB2.0_User_Guide_V1.0_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Hardware/Rockchip_RK3288_Hardware_Design_Guide_V1.0_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Hardware/Rockchip_RK3288_IO_List_V1.0_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Hardware/Rockchip_RK3288_Cafe_Power_SMT_Note_V1.0_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Rockchip_RK3288_Introduction_To_Power_Domains_Configuration_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Quick-start/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Quick-start/Rockchip_RK3288_Quick_Start_Linux_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Quick-start/Rockchip_RK3288_Quick_Start_Linux_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Rockchip_RK3288_Linux_SDK_Release_V2.0.0_20220620_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Rockchip_RK3288_Linux_SDK_Note.md
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Rockchip_RK3288_Linux4.19_SDK_Release_V1.0.0_20220620_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Rockchip_RK3288_Linux4.19_SDK_Release_V1.0.0_20220620_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Rockchip_RK3288_Linux4.19_SDK_Note.md
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Rockchip_RK3288_Linux_SDK_Release_V2.0.0_20220620_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Datasheet/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3288/Datasheet/Rockchip_RK3288_datasheet_V2.7-20191227.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3328/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3328/Rockchip_RK3328_User_Manual_EVB_V1.0_20170223_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3328/RK3328_Linux_Release_Note.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3328/Rockchip_RK3328_Linux_SDK_Release_V1.0.0_20181101_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_User_Manual_EVB_V1.0_20181226_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_Instructions_Linux_MediaServer_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_IO_LIST_V1.0_for_EVB_20181121.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_Developer_Guide_Linux_Docker_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_Instruction_Linux_AI_Camera_Demo_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_Instruction_Linux_QFacialGate_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_Hardware_Design_Guide_V1.0_20190116_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_Linux_SDK_Release_V1.0.0_20190609_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/RK1808_Linux_SDK_Release_Note.txt
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_Hardware_Design_Guide_V1.0_20190116_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_Instructions_Linux_MediaServer_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_Developer_Guide_Linux_Facial_Gate_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_Developer_Guide_Linux_RKNN_Demo_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_Linux_SDK_Release_V1.0_20190609_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_Developer_Guide_Linux_Compute_Stack_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_Developer_Guide_Linux_RKNN_Demo_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_Datasheet_V1.0_20181024.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_Instruction_QFacialGate_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_Instruction_Linux_QFacialGate_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK1808/Rockchip_RK1808_User_Manual_EVB_V1.0_20181226_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/PX35E/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/PX35E/Rockchip_PX35E_Linux_SDK_Release_Note_EN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/PX35E/Rockchip_PX35E_Linux_SDK_Release_V0.0.0_20180817_CN.pdf
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3588/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3588/Hardware/
./Purple-PI-DH-sdk/rk356x_Linux_sdk/docs/.Socs/RK3588/Hardware/Rockchip_RK3588_Hardware_Design_Guide_V1.0.pdf

```

2 安装SDK编译依赖环境

建议使用Ubuntu 22.04版本系统编译SDK。在编译前需执行以下命令安装依赖环境，命令如下：

```

▼ | Bash |
1  sudo apt-get install repo git ssh make gcc libssl-dev liblz4-tool \
2  expect g++ patchelf chrpath gawk texinfo chrpath diffstat binfmt-support \
3  qemu-user-static live-build bison flex fakeroot cmake \
4  unzip device-tree-compiler python3-pip libncurses-dev expect

```

安装SDK编译环依赖环境，如下图所示：

```
indus@ubuntu22:~/RK3566/Indus-Purple-Pi-0H-Linux/4.19.230410/Purple-Pi-0H-sdk/rk356x_linux_sdk$ sudo apt-get install repo git ssh make gcc libssl-dev liblz4-dev \
+ expect g++ patchelf chrpath gawk texinfo chrpath diffstat binfmt-support \
+ qemu-user-static lvsy-build bison flex fakeroot cmake \
+ unzip device-tree-compiler python3-pip libncurses-dev expect
正在读取软件包列表... 完成
正在分析软件包的依赖关系树... 完成
正在读取状态信息... 完成
bunfmt-support 已经是最新版 (2.2.1-2)。
bison 已经是最新版 (2:3.8.2dfsg-1build1)。
device-tree-compiler 已经是最新版 (2.6.1-1)。
diffstat 已经是最新版 (1.64-1build2)。
fakeroot 已经是最新版 (1.28-1ubuntu1)。
flex 已经是最新版 (2.6.4-8build2)。
g++ 已经是最新版 (4:11.2.0-1ubuntu1)。
gcc 已经是最新版 (4:11.2.0-1ubuntu1)。
make 已经是最新版 (4.3-4.1build1)。
chrpath 已经是最新版 (0.16-2)。
expect 已经是最新版 (5.45.4-2build1)。
liblz4-dev 已经是最新版 (1:0.9.2build2)。
patchelf 已经是最新版 (0.14.3-1)。
texinfo 已经是最新版 (6.8-4build1)。
cmake 已经是最新版 (3.22.1-1ubuntu1.22.04.2)。
gawk 已经是最新版 (1:5.1.0-1ubuntu0.1)。
git 已经是最新版 (1:2.34.1-1ubuntu1.18)。
libncurses-dev 已经是最新版 (6.3-2ubuntu0.1)。
libssl-dev 已经是最新版 (3.0.2-0ubuntu1.15)。
lvsy-build 已经是最新版 (3.0+437-1ubuntu1.22.04.1)。
ssh 已经是最新版 (1:0.9p1-1ubuntu0.7)。
unzip 已经是最新版 (6.9-26ubuntu0.2)。
python3-pip 已经是最新版 (22.0.2+dfsg-1ubuntu0.4)。
qemu-user-static 已经是最新版 (1:6.2+dfsg-2ubuntu0.19)。
下列软件包是自动安装的并且现在不需要了：
  apturl-common gir1.2-goa-1.0 gir1.2-snapd-1 hplip-data libasound2-dev libblkid-dev libccata-dev libffi-dev libgl-dev libglv2-dev libglv2-dev-btr libglv2-mesa-dev libglv2-dev libhpmud0
  libimagequant0 libmount-dev libpcre2-16-0 libpcre2-16-0 libpcre2-dev libpcre2-posix3 libpcre3-dev libpcre3-2 libpcrecpp0v5 libpng-dev libpng-tools libraqd librsync-hpate
  libstdc++6 libsystemd-dev libsystemd0 libsystemd-shared libsystemd-sysd libsystemd0 libsystemd-sysd libsystemd0 libsystemd0 libsystemd0 libsystemd0 libsystemd0
  python3-dateutil python3-debian python3-olefile python3-renderpm python3-reportlab-ascii python3-software-properties sgml-base software-properties-common
  ubuntu-advantage-desktop-daemon unattended-upgrades update-notifier-common uuid-dev xml-core
使用 'sudo apt autoremove' 来卸载它(它们)。
下列【新】软件包将被安装：
  repo
升级了 0 个软件包，新安装了 1 个软件包，要卸载 0 个软件包，有 4 个软件包未被升级。
需要下载 0 B/116 kB 的归档。
解压后会消耗 371 kB 的额外空间。
您希望继续执行吗？ [Y/n] Y
正在选中未选择的软件包 'repo'。
正在安装依赖项... 系统当前共安装有 259177 个文件和目录。
准备解压 .../archives/repo_2.17.3-3_all.deb ...
正在解压 repo (2.17.3-3) ...
正在设置 repo (2.17.3-3) ...
正在处理用于 man-db (2.10.2-1) 的触发器 ...
```

3 SDK编译

3.1 配置选择

根据显示 (HDMI, MIPI) 和系统 (Debian, Ubuntu) 的不同，提供了4种配置选择，命令如下：

```
▼ Bash |
1 //进入sdk目录
2 # cd Purple-Pi-0H-sdk/rk356x_linux_sdk
3
4 //选择配置
5 # ./build.sh lunch
6 processing board option: lunch
7 processing option: lunch
8
9 You're building on Linux
10 Lunch menu...pick a combo:
11
12 0. default BoardConfig.mk
13 1. BoardConfig-rk3566-Purple-Pi-0H-hdmi-debian.mk
14 2. BoardConfig-rk3566-Purple-Pi-0H-hdmi-ubuntu.mk
15 3. BoardConfig-rk3566-Purple-Pi-0H-mipi-debian.mk
16 4. BoardConfig-rk3566-Purple-Pi-0H-mipi-ubuntu.mk
```

配置选择如下图所示：

```
indus1@ubuntu22:~/RK3566/Indus1to-Purple-PI-DH_Linux4.19_239410/Purple-PI-DH-sdk$ cd rk356x_linux_sdk/
indus1@ubuntu22:~/RK3566/Indus1to-Purple-PI-DH_Linux4.19_239410/Purple-PI-DH-sdk/rk356x_linux_sdk$
indus1@ubuntu22:~/RK3566/Indus1to-Purple-PI-DH_Linux4.19_239410/Purple-PI-DH-sdk/rk356x_linux_sdk$ ./build.sh lunch
processing option: lunch
You're building on Linux
Lunch menu: pick a combo:
0. default BoardConfig.mk
1. BoardConfig-rk3566-Purple-PI-DH-hoax-debian.mk
2. BoardConfig-rk3566-Purple-PI-DH-hoax-ubuntu.mk
3. BoardConfig-rk3566-Purple-PI-DH-rpi-debian.mk
4. BoardConfig-rk3566-Purple-PI-DH-rpi-ubuntu.mk
which would you like? [0]: 3
switching to board: /home/indus1/RK3566/Indus1to-Purple-PI-DH_Linux4.19_239410/Purple-PI-DH-sdk/rk356x_linux_sdk/dev/rockchip/rk356x/BoardConfig-rk3566-Purple-PI-DH-rpi-debian.mk
indus1@ubuntu22:~/RK3566/Indus1to-Purple-PI-DH_Linux4.19_239410/Purple-PI-DH-sdk/rk356x_linux_sdk$
indus1@ubuntu22:~/RK3566/Indus1to-Purple-PI-DH_Linux4.19_239410/Purple-PI-DH-sdk/rk356x_linux_sdk$
```

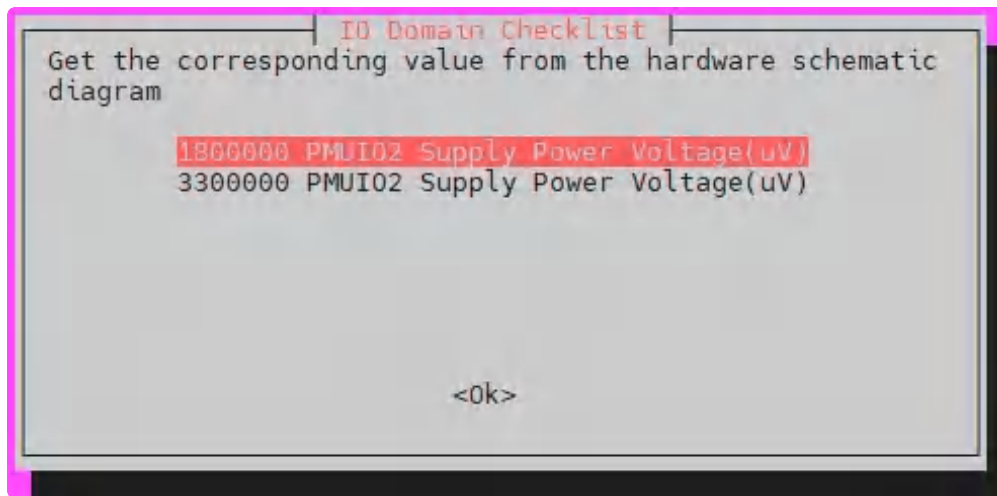
3.2 开始编译

3.2.1 完整编译

首次编译请在sdk顶层目录执行build.sh（注意不要使用sudo编译，否则会导致编译失败），命令如下：

```
▼ Bash |
1 # ./build.sh
```

首次编译过程中，会弹出IO Domain Checklist窗口，如下图所示：



按照以下表格进行选择：

名称	电压
PMUIO2	3300000
VCCIO1	3300000
VCCIO3	3300000

VCCIO4	1800000
VCCIO5	1800000
VCCIO6	3300000
VCCIO7	3300000

编译完成，将在rockdev/目录生成完整升级固件update.img，如下图所示：

```

Make firmware OK!
----- DK
*****KImageMaker ver 2.0*****
Generating new image, please wait...
Writing head ...
Writing boot file...
Writing firmware...
Generating MDS data...
MDS data generated successfully
New image generated successfully
Making ./image/update.img OK.
Running build updateimg succeeded.
Running build save succeeded.
grep: /home/industrial/Industio-Purple-Pi-0H_Linux4.19_230410/Purple-Pi-0H-sdk/rk356x_linux_sdk/kernel/arch/arm64/boot/dts/rockchip/ido-pi-0h3566-v1-ds10-mipi.dump.dts: exceeded PCRE's backtracking limit
grep: /home/industrial/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410/Purple-Pi-0H-sdk/rk356x_linux_sdk/kernel/arch/arm64/boot/dts/rockchip/ido-pi-0h3566-v1-ds10-mipi.dump.dts: exceeded PCRE's backtracking limit
grep: /home/industrial/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410/Purple-Pi-0H-sdk/rk356x_linux_sdk/kernel/arch/arm64/boot/dts/rockchip/ido-pi-0h3566-v1-ds10-mipi.dump.dts: exceeded PCRE's backtracking limit
grep: /home/industrial/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410/Purple-Pi-0H-sdk/rk356x_linux_sdk/kernel/arch/arm64/boot/dts/rockchip/ido-pi-0h3566-v1-ds10-mipi.dump.dts: exceeded PCRE's backtracking limit
grep: /home/industrial/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410/Purple-Pi-0H-sdk/rk356x_linux_sdk/kernel/arch/arm64/boot/dts/rockchip/ido-pi-0h3566-v1-ds10-mipi.dump.dts: exceeded PCRE's backtracking limit
grep: /home/industrial/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410/Purple-Pi-0H-sdk/rk356x_linux_sdk/kernel/arch/arm64/boot/dts/rockchip/ido-pi-0h3566-v1-ds10-mipi.dump.dts: exceeded PCRE's backtracking limit
grep: /home/industrial/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410/Purple-Pi-0H-sdk/rk356x_linux_sdk/kernel/arch/arm64/boot/dts/rockchip/ido-pi-0h3566-v1-ds10-mipi.dump.dts: exceeded PCRE's backtracking limit
Running build allsave succeeded.

```

3.2.2 编译uboot/kernel

调试时，可单独编译uboot或kernel部分，命令如下：

```

▼ Bash
1 //编译uboot
2 # ./build.sh uboot
3
4 //编译kernel
5 # ./build.sh kernel

```

编译uboot结果如下图所示：

```

*****uboot merger ver 1.2*****
Bin:Pack loader ok
pack loader okay! Input: /home/industrial/Industio-Purple-Pi-0H_Linux4.19_230410/Purple-Pi-0H-sdk/rk356x_linux_sdk/rkbin/RK3566/RK3566MIBI(L)_bin
/home/industrial/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410/Purple-Pi-0H-sdk/rk356x_linux_sdk/u-boot
Image(ma-signed, version=0) u-boot.img (FIT with u-boot, fdt, ...) is ready
Image(ma-signed): rk356x spl loader v1.15.132 bin (with spl, ddr, usbplug) is ready
pack uboot: ok okay! Input: /home/industrial/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410/Purple-Pi-0H-sdk/rk356x_linux_sdk/rkbin/RK3566TRUST_bin
platform rk3566 is build ok, with new config! make rk3566 defconfig rk3566.config -j38
/home/industrial/RK3566/Industio-Purple-Pi-0H_Linux4.19_230410/Purple-Pi-0H-sdk/rk356x_linux_sdk/prebuilt/s/qqe/Linux-sdk/arch64/gcc-arm-10.3-2021.07-x86_64-aarch64-none-linux-gnu/bin/aarch64-linux-gnu-ld
Wed May 15 10:11:40 CDT 2024
Running build uboot succeeded.
industrial@ubuntu2021~$RK3566/Industio-Purple-Pi-0H_Linux4.19_230410/Purple-Pi-0H-sdk/rk356x_linux_sdk

```

编译kernel结果如下图所示：

```
Running build kernel succeeded.
```

编译完成后，将在rockdev/目录生成对应的uboot.img、boot.img。