

# MPSoc Petalinux

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## 1. 创建一个硬件平台

使用Vivado建立基础的硬件平台，如使用SDsoc请按照SDsoc标准来建立硬件平台。

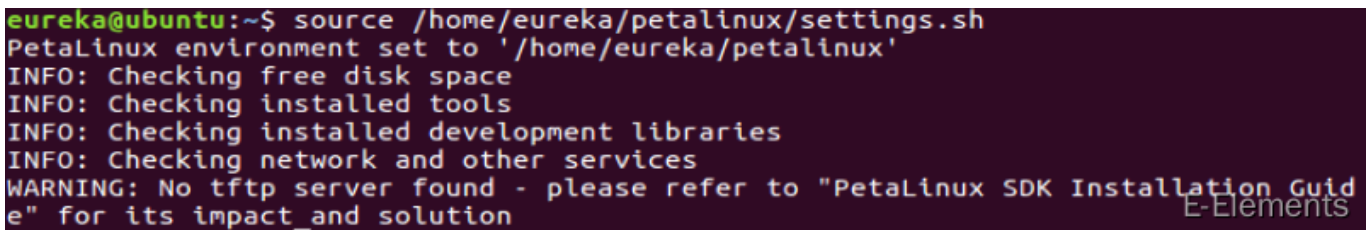
## 2. 导出硬件描述文件

在Vivado生成Bit文件后，执行 **Export Hardware** 后在工程目录下的 XXX.sdk 下会有类似于 system\_wrapper.hdf 的硬件描述文件生成，将 xxx.sdk 拷贝到linux下之后会用到。

## 3. 启动PetaLinux工作环境

PetaLinux的启动非常简单，进入到petalinux的安装目录后，在命令窗口输入以下命令:即可启动

```
$ source ./settings.sh
```

A terminal window showing the execution of the settings.sh script. The output includes: 'PetaLinux environment set to '/home/eureka/petalinux'', 'INFO: Checking free disk space', 'INFO: Checking installed tools', 'INFO: Checking installed development libraries', 'INFO: Checking network and other services', and a 'WARNING: No tftp server found - please refer to "PetaLinux SDK Installation Guide" for its impact and solution'. The E-Elements logo is visible in the bottom right corner of the terminal output.

```
eureka@ubuntu:~$ source /home/eureka/petalinux/settings.sh
PetaLinux environment set to '/home/eureka/petalinux'
INFO: Checking free disk space
INFO: Checking installed tools
INFO: Checking installed development libraries
INFO: Checking network and other services
WARNING: No tftp server found - please refer to "PetaLinux SDK Installation Guide" for its impact and solution
```

## 4. 创建一个PetaLinux工程

使用 petalinux-create 命令来创建petalinux工程.

```
$ petalinux-create --type project --template <PLATFORM> --name <PROJECT_NAME>
```

其中的变量说明:

- --template -是和你使用的硬件平台有关
  - zynqMP (for UltraScale+ MPSoC)
  - zynq (for Zynq)
- microblaze (for MicroBlaze).
- --name <PROJECT\_NAME> -这是你所创建PetaLinux工程的名字

```
$ petalinux-create --type project --template zynqMP --name MPSoc
```

```
eureka@ubuntu:~/Desktop$ petalinux-create --type project --template zynqMP --name MPSoc
INFO: Create project: MPSoc
INFO: New project successfully created in /home/eureka/Desktop/MPSoc
```

使用这个命令来创建一个默认模板,之后通过命令来导入硬件信息.

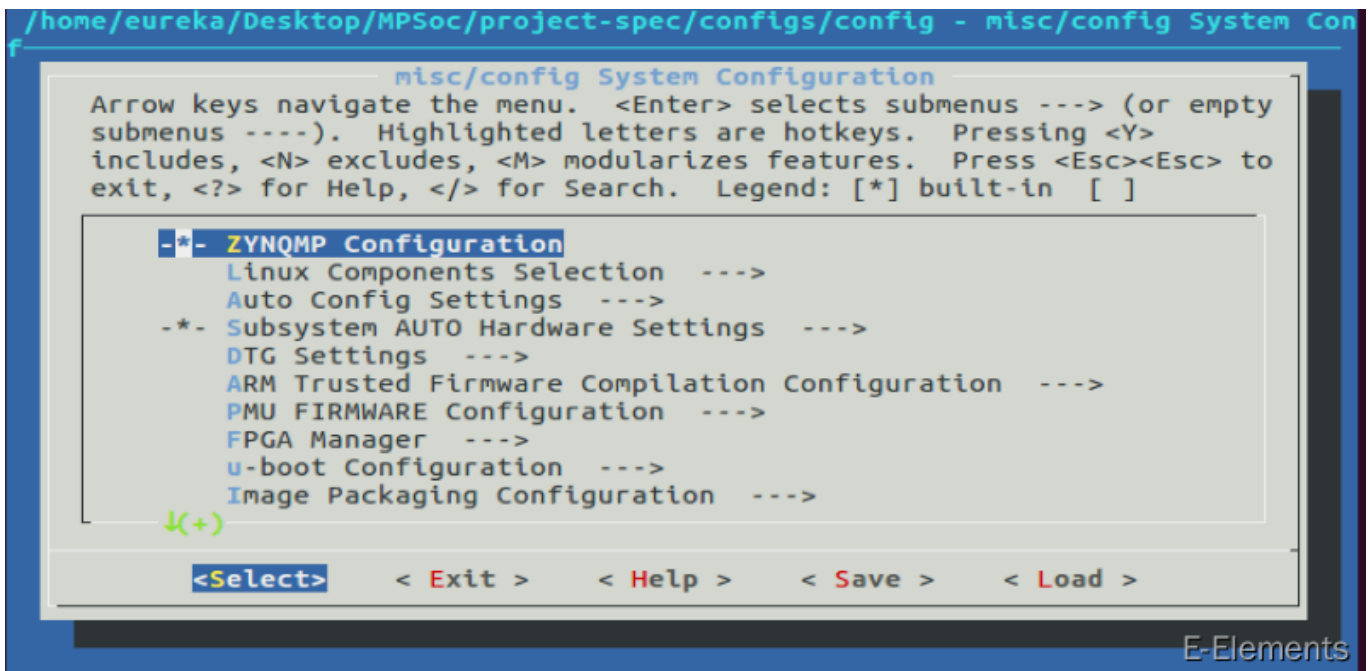
## 5. 获取硬件信息

使用 `petalinux-config` 命令来获取硬件信息

1. 将xxx.SDK拷贝到linux
2. 在命令行输入命令 (**\$ cd test**) 进入工程文件夹,此步非常关键,如果不进入会提示找不到指令.
3. 进入工程文件夹后,在窗口中输入以下命令,petalinux会自动读取硬件信息,定位到 HDF的文件路径就可以了.

```
$ petalinux-config --get-hw-description=<path-to-directory-containing-hardware
description-file>
```

等待一段时间后会进入如下图的配置界面(下面是Petalinux的系统配置菜单,例如“**Subsystem AUTO Hardware Settings**”“**Auto Config Settings**”他们直接影响包含设备树、内核配置和uboot等配置步骤,这里可以直接悬着Exit退出并保存,退出后可以使用 **petalinux-config** 命令来进入这个界面)



- 设置第二分区启动,如果使用RAMdisk启动,就选择 **INITRD**

## PetaLinux Configuration and Build System Image

Steps to configure PetaLinux for SD card ext filesystem boot and build the system image are as follows:

1. Change to root directory of your PetaLinux project.

```
$ cd <plnx-proj-root>
```

2. Launch top level system configuration menu.

```
$ petalinux-config
```

3. Select **Image Packaging Configuration ---> Root filesystem type**.

4. Select **SD card** as the RootFS type.

5. Exit menuconfig and save configuration settings.

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- PetaLinux Auto Login(自动登录)

1. Change the root directory of your PetaLinux project

```
cd <plnx-proj-root>
```

2. Run `petalinux-config`

3. Select **Yocto-settings > Enable debug-tweaks**

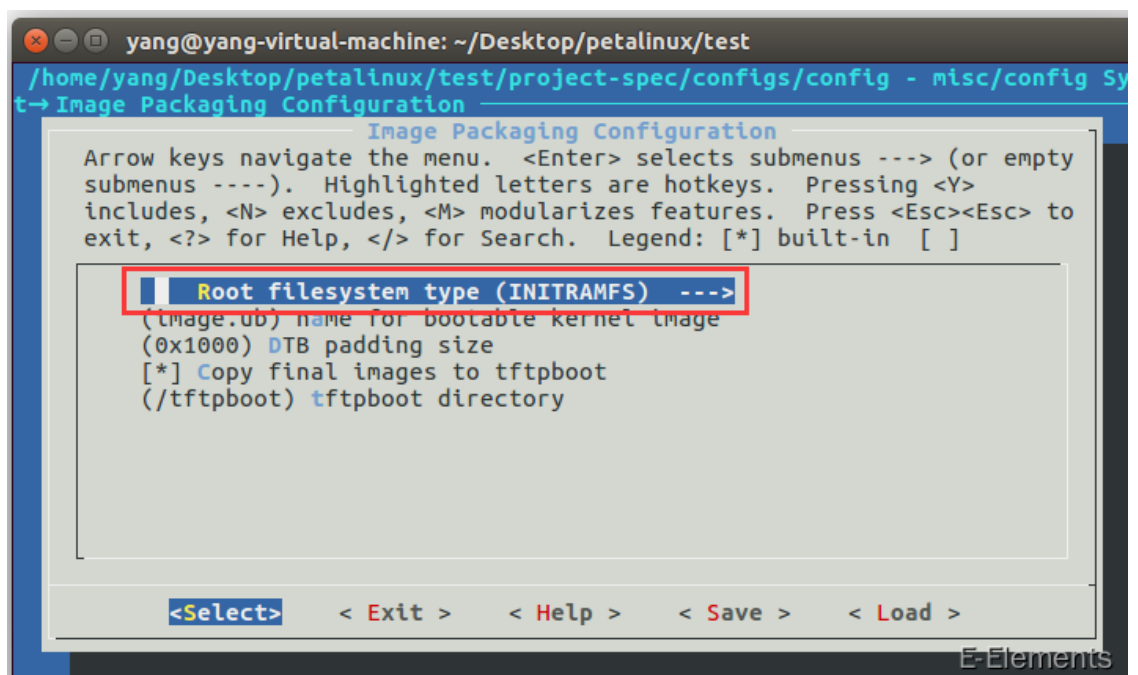
4. Save the configuration and exit

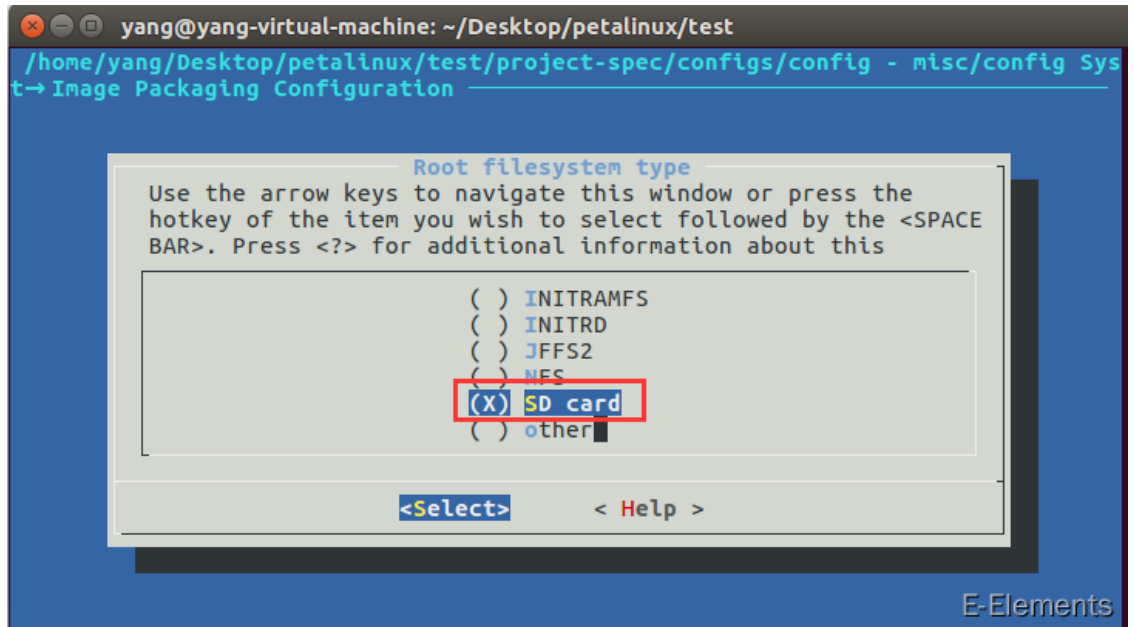
5. Run `petalinux-build`.

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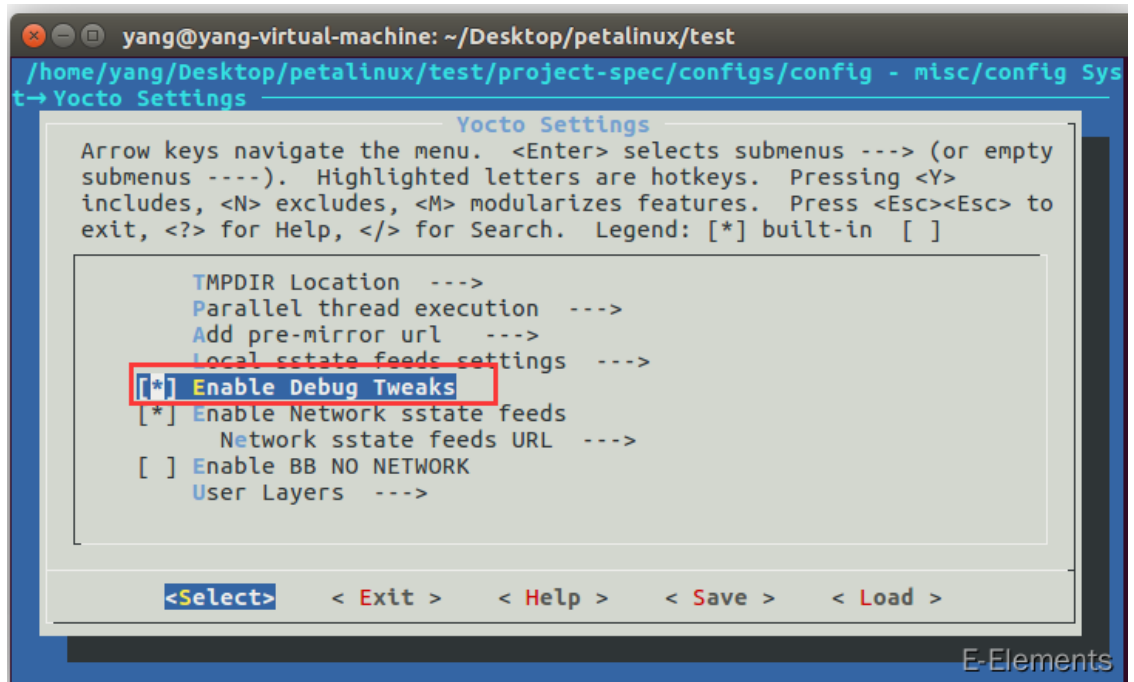
- 具体操作

- 设置SD卡





- 设置自动登录



#### 4. 配置linux内核

在获取硬件信息完成后，输入以下指令后还可以继续修改内核配置，进入内核配置界面。

```
petalinux-config -c kernel
```

在 **SDSoc** 使用的PateLinux中需要配置如下：

Set CMA size to be larger, for SDS-alloc buffers:

- for Zynq UltraScale+ MPSoc: Device Drivers→ Generic Driver Options → Size in Mega Bytes(1024)
- for Zynq-7000 SoC: Device Drivers→ Generic Driver Options → Size in Mega Bytes(2048)

Enable staging drivers:

- Device Drivers → Staging drivers (ON)

Enable APF management driver:

- Device Drivers → Staging drivers → Xilinx APF Accelerator driver (ON)

Enable APF DMA driver:

- Device Drivers → Staging drivers → Xilinx APF Accelerator driver → Xilinx APF DMA engines support (ON)

**Note:**

For Zynq UltraScale+ MPSoC, you must turn off CPU idle and frequency scaling. To do so, mark the following options:

- CPU Power Management → CPU idle → CPU idle PM support (OFF)
- CPU Power Management → CPU Frequency scaling → CPU Frequency scaling (OFF)

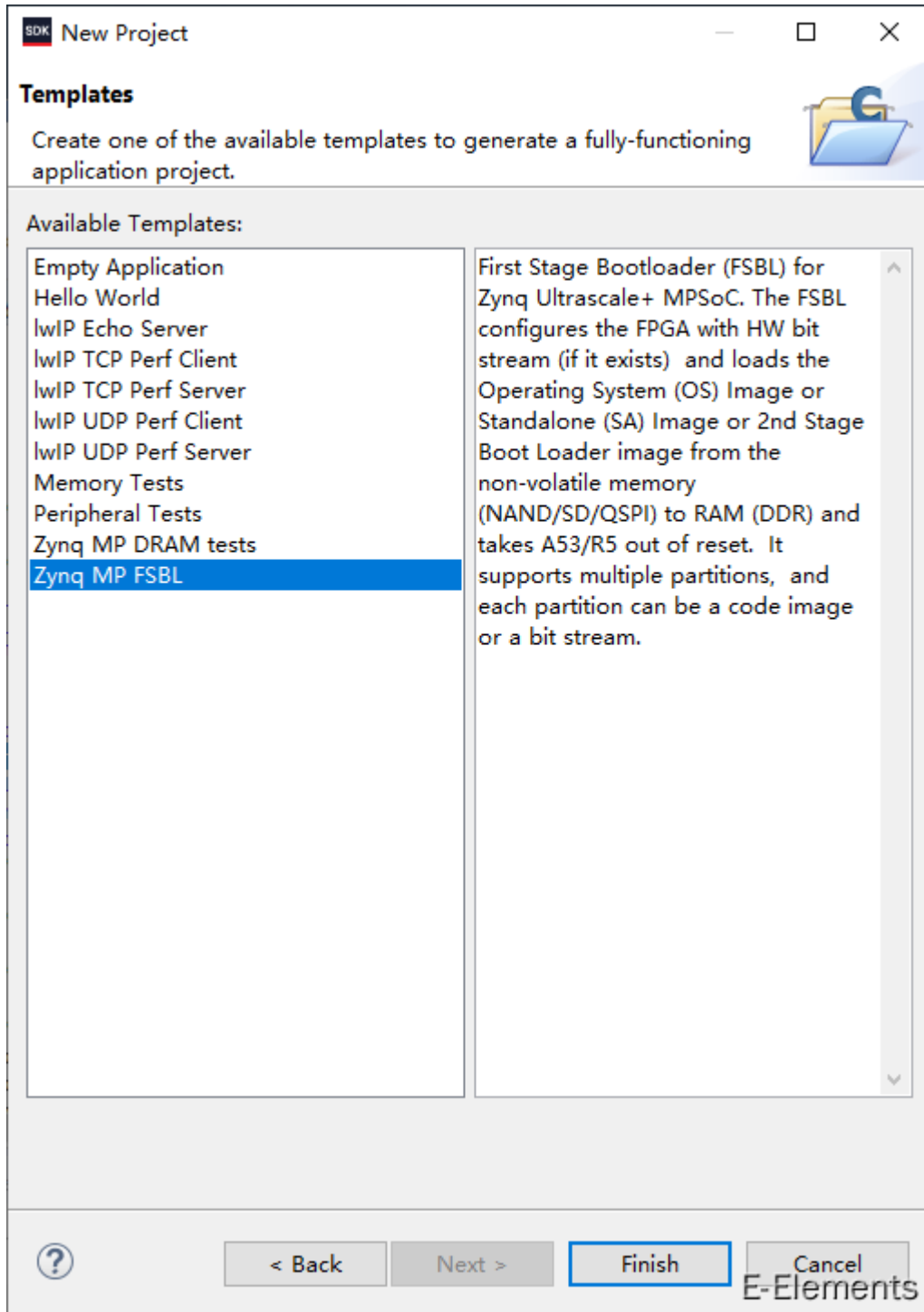
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5. 修改设备树信息

在工程目录下的 `~/project-spec/meta-user/recipes-bsp/files/system-user.dtsi` 文件中添加设备树文件。  
具体参考文件在本目录中的 `system-user.dtsi` 文件中  
[system-usr.dtsi](#)

6. 在FSBL中添加 GTR 时钟的 IIC 配置

在导出到SDK后打开SDK新建一个FSBL文件



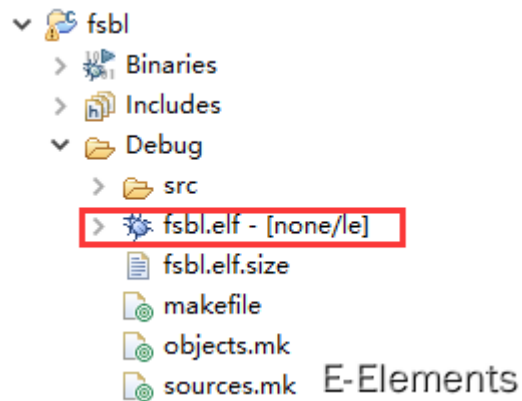
创建完成后在src文件夹中添加以下文件



添加完成后在 xfsbl\_main.c 中添加代码，具体代码在本目录中的 xfsbl\_main.c 中。

[xfsbl\\_main.c](#)

添加完成后进行编译，编译完成后在在SDK工程目录下的Debug文件夹中找到 **fsbl.elf** 文件将其拷贝出备用。



## 6. 编译Petalinux工程

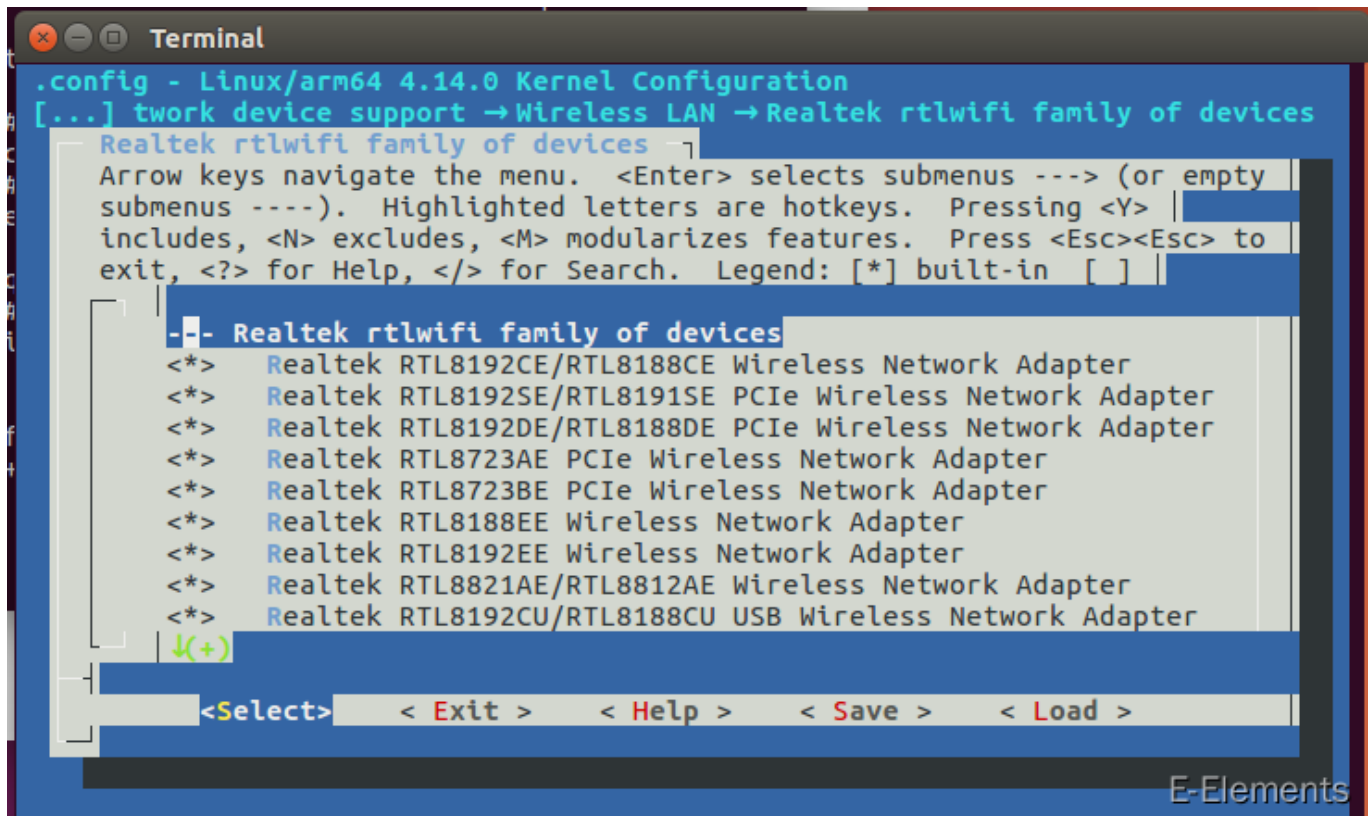
```
$ petalinux-build
```

编译完成后将上一步骤中的第六步中生成的 fsbl.elf 拷贝到 petalinux 工程目录下的 ~/images/linux 目录下。然后在工程的根目录下输入以下指令来生成 BOOT.BIN 文件

```
petalinux-package --boot --format BIN --fsbl images/linux/fsbl.elf --u-boot  
images/linux/u-boot.elf --pmufw images/linux/pmufw.elf --fpga images/linux/*.bit -  
-force</p>
```

## 7. 附录

usbWifi配置



The image shows a terminal window titled "Terminal" with a dark background. The text is displayed in a monospaced font. At the top, it says ".config - Linux/arm64 4.14.0 Kernel Configuration". Below that, a path is shown: "[...] twork device support → Wireless LAN → Realtek rtlwifi family of devices". The main menu is titled "Realtek rtlwifi family of devices" and contains a list of network adapters, each preceded by "<\*>". A green cursor is positioned at the bottom left of the list. At the bottom of the terminal, there is a navigation bar with the following options: "<Select>", "< Exit >", "< Help >", "< Save >", and "< Load >". The "E-Elements" logo is visible in the bottom right corner of the terminal window.

```
.config - Linux/arm64 4.14.0 Kernel Configuration
[...] twork device support → Wireless LAN → Realtek rtlwifi family of devices
Realtek rtlwifi family of devices
Arrow keys navigate the menu.  <Enter> selects submenus ---> (or empty
submenus ----).  Highlighted letters are hotkeys.  Pressing <Y>
includes, <N> excludes, <M> modularizes features.  Press <Esc><Esc> to
exit, <?> for Help, </> for Search.  Legend: [*] built-in [ ]

-- Realtek rtlwifi family of devices
<*> Realtek RTL8192CE/RTL8188CE Wireless Network Adapter
<*> Realtek RTL8192SE/RTL8191SE PCIe Wireless Network Adapter
<*> Realtek RTL8192DE/RTL8188DE PCIe Wireless Network Adapter
<*> Realtek RTL8723AE PCIe Wireless Network Adapter
<*> Realtek RTL8723BE PCIe Wireless Network Adapter
<*> Realtek RTL8188EE Wireless Network Adapter
<*> Realtek RTL8192EE Wireless Network Adapter
<*> Realtek RTL8821AE/RTL8812AE Wireless Network Adapter
<*> Realtek RTL8192CU/RTL8188CU USB Wireless Network Adapter
↓(+)
```

<Select> < Exit > < Help > < Save > < Load >

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