

RD4750 APUS Quick Start

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Release history

Date	Revision	Change
Mar 2009	1.0	First release
Sep 2009	1.1	Delete JDI boot section

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1 Overview

JZ4750 is an embedded processor introduced by Ingenic Semiconductor Co., Ltd, which integrates a high performance and low power 32-bit MIPS core. Its main frequency is 360MHz. JZ4750 supports MMU, with 16K instruction cache and 16K data cache, and also integrates many peripherals. JZ4750 supports many Embedded Operating Systems such as Linux™, WinCE™, etc. This document will introduce how to use the reference design board APUS and help readers gain a quick start of Linux and WinCE.

2 Quick start Linux

2.1 Compile U-Boot

Compile as the following step and generate the **u-boot-nand.bin**:

Firstly, prepare the U-Boot source:

```
# tar -xjf u-boot-1.1.6.tar.bz2
# cd u-boot-1.1.6
# gzip -cd ../u-boot-1.1.6-jz-yyyymmdd.patch.gz | patch -p1
```

And then Compile as following steps:

```
$ make apus_nand_config
$ make
```

2.1.1 Use usb boot tool program u-boot

Before programming u-boot, now introduce the way of APUS board boot from usb device:

- 1) Press **SW6** and **reset** key, if success you can see a new usb device on PC.
- 2) The SDRAM is 64MB on APUS board. The NandFlash type is K9GAG08U0M. Rename **USBBoot_APUS.cfg** to **USBBoot.cfg** in the toolkit. **USBBoot_APUS.cfg** includes default configuration of the APUS board.
- 3) Run **usb_boot.exe**, if the connection is correct, execute **list** command you can see the number of device is not zero.
- 4) Execute **boot** command, the following information can be seen:

```
USBBoot :> boot 0
Checking state of No.0 device: Unboot
Now booting No.0 device:
Download stage one program and execute at 0x80002000: Pass
Download stage two program and execute at 0x80c00000: Pass
Boot success!
Now configure No.0 device:
Now checking whether all configure args valid:
Current device information: CPU is Jz4750
Crystal work at 24MHz, the CCLK up to 336MHz and PMH_CLK up to 112MHz
Total SDRAM size is 16 MB, work in 4 bank and 16 bit mode
Nand page size 4096, ECC offset 24, bad block ID 127, use 1 plane mode
Configure success!
```

Execute programming command:

```
USBBoot :> nerase 0 8 0 0
USBBoot :> nprog 0 u-boot-nand.bin 0 0 -n
```

If SDRAM size is 128M, you should nprog u-boot-nand-sdram-128.bin instead of u-boot-nand-sdram-64.bin.

To here, the U-Boot has been programmed to target board.

The serial port's configuration is : 57600bps, 8N1

Connect the serial port of target board to PC, start HyperTerminal and set parameters. And then hardware reset the target board, start the U-Boot, there will be start message of U-Boot on HyperTerminal console.

2.2 Compile and start Linux

Firstly, compile and generate ulmage as following step:

```
$ tar xjf linux-2.6.24.3.tar.bz2
$ cd linux-2.6.24.3
$ gzip -cd ../linux-2.6.24.3-jz-yyyymmdd.patch.gz | patch -p1
$ make apus_defconfig
$ make ulmage
```

2.2.1 Use USB tool program ulmage

Use usb boot tool program ulmage is similar to program u-boot. Because reading ulmage from NAND to SDRAM is through u-boot, so please be sure that the corresponding of the NAND configuration file between u-boot and USB boot tool.

Execute programming command:

```
USBBoot :> nprog 1024 ulmage 0 0 -n
```

To here, the ulmage has been programmed to target board too.

Execute as following step to program YAFFS2 file:

```
USBboot :> nprog 2048 root.yaffs2 0 0 -o
```

After power on the board, there will be output on the console via serial port and LCD panel. After a moment, the demo of a QTOPIA application will be launched.

3 Quick start WINCE

3.1 Use USB download Bootloader

1. When you get BSP, in the PLATFORM\VENUS\Bin\USBBOOT\JZ4750 directory, there is a compiled boot.nb0,execute USB_Boot.exe, you will see a command window, the following information can be seen:

```
Welcome!  
USB Boot Host Software!  
USB Boot Software current version: 1.4b  
Handling user command.
```

2. Insert USB. if the device is not recognized, you need to install the driver that is placed in this director. Press SW6 key, then press reset key, then loosen reset key, you will see the device icon on the PC. Enter "Boot 0" in the command line, then press enter key, the following information can be seen:

```
USBBoot :> boot 0  
Checking state of No.0 device: Unboot  
Now booting No.0 device:  
Download stage one program and execute at 0x80002000: Pass  
Download stage two program and execute at 0x80c00000: Pass  
Boot success!  
Now configure No.0 device:  
Now checking whether all configure args valid:  
Current device information: CPU is Jz4750  
Crystal work at 24MHz, the CCLK up to 336MHz and PMH_CLK up to 112MHz  
Total SDRAM size is 16 MB, work in 4 bank and 16 bit mode  
Nand page size 2048, ECC offset 3, bad block ID 127, use 1 plane mode  
Configure success!  
USBBoot :>
```

3. Enter "nprog 0 boot.nb0 0 0 -n" in the command line, the following information can be seen:

```
USBBoot :> nprog 0 boot.nb0 0 0 -n  
Programing No.0 device...  
Erasing No.0 device No.0 flash..... Finish!  
Operation end position: 1  
Force erase, no bad block infomation !  
Total size to send in byte is: 262144  
Image type: without oob  
It will cause 2 times buffer transfer.  
No.1 Programming... Finish! Checking...
```

Now, we have already downloaded the boot.nb0 in the JZ4750 board successfully.

3.2 Start WinCE

1. first we can use `x x x.msi.msi` or `VENUS.cec` file to install BSP, if we use `VENUS.cec` file ,the step is followed :

Select Manage Catalog Items from the File toolbar in the PB environment, you will see a dialog box, then import relevant cec file.

2. Open `VENUS.bat` file, define project name:

```
SET BSP_BASED_CHIP=JZ4750
SET BSP_BASED_BOARD=APUS
```

Open `JZ4750_APUS.bat` file in the `\VENUS\Files\SCRIPT` directory, you can add some driver selectively, for example:

```
SET BSP_APUS_WAVEDEV_INTERNAL=1
SET BSP_APUS_MEDIA_PLAYER=1
```

After modification, select "Open Release Directory" from PB menu "Build OS" to enter PB50 command line, execute "set bsp" command to confirm whether the environment variable is right.

3. When the setting is OK we execute Sysgen, there is a `NK.bin` in the `WINCE500\PBWorkspaces\VENUS\ReIDir\VENUS_MIPSII_Release` directory. Then select "Open Release Directory" from PB menu "Build OS" to enter PB50 command line, we don't need to change this directory, execute "getnb0.bat" command directly, a `Nk.nb0` is generated in this directory.

We copy the `NK.nb0` from the directory to the SD card, and then reset the development board after insert the SD card to the slot.

Note: Here `VENUS` is project name.