

# **i.MX31 PDK Linux Demo Image**

## **Readme**

This document contains important information about the package contents and flashing procedures.

### **1 Release Contents**

This is a release of the Freescale Semiconductor i.MX31 PDK 1.5 Linux BSP (Demo Image).

#### **1.1 Supported Hardware**

This package supports the i.MX31 PDK Rev. 3.0 board.

#### **Contents**

1	Release Contents.....	1
1.1	Supported Hardware.....	1
1.2	Supported Features in this Release.....	2
1.3	Release Contents.....	2
2	Flashing Procedures.....	2
2.1	Erasing the NAND Flash and Flashing the Bootloader.....	2
2.2	Flashing the Kernel, rootfs, and Demo Program.....	6
2.3	Running an Image on the Target.....	8

## 1.2 Supported Features in this Release

- Audio Player Demo Test: proper playback for 30 seconds per stream
- Video Player Demo Test: proper playback for 30 seconds per stream
- Picture Viewer
- Settings
- CMOS Camera Sensor
- TV-Out
- 3D demo
- FM radio

## 1.3 Release Contents

The following table identifies the files and documents provided in this release package.

Item	Description
mx31_3stack_redboot.bin	Bootloader
zImage	Kernel Image
rootfs_3stack.tgz	Root file system tarball
rootfs.jffs2	Root file system image
appdata.jffs2	Application data image
i.MX31 PDK Linux Demo Image Readme	This file

## 2 Flashing Procedures

This section explains where to obtain instructions for erasing the NAND flash and flashing the bootloader.

It also provides procedures for flashing the kernel image, rootfs, and demo program into the i.MX31 PDK, and running the image on the target.

### 2.1 Erasing the NAND Flash and Flashing the Bootloader

Obtain the ATK tool install package from the Freescale release web site or from Freescale support. Ensure that you are using ATK version 1.52 or above.

If your board does not boot up, reports many bad blocks, or presents issues when booting up, erasing the NAND flash may help solve these issues.

### 2.1.1 Erasing the NAND Flash

To erase the NAND Flash, use these steps:

1. Set the boot mode jumper and dip switches on the Debug board to internal boot (bootstrap mode) as shown in the following figure:



2. Power on the PDK.
3. Open the ATK application, and select the following configuration:
  - **i.MX CPU:** i.MX31 TO2
  - **Device memory initial:** DDR
  - **Serial Port:** COM1 (or any serial port available in your PC)

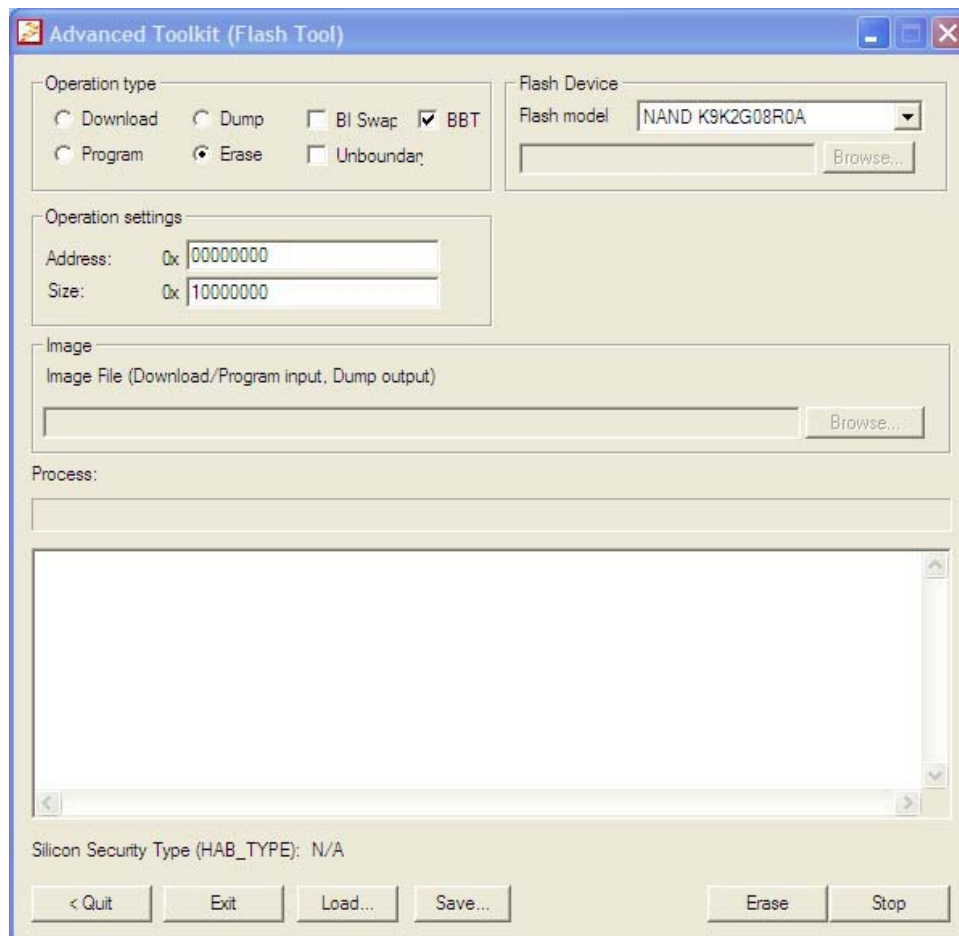
The Configuration Screen is displayed (Figure 2-1).



Figure 2-1 Configuration Screen

4. Click **Next**.
5. Select **Flash Tool**, and then click **Go**.

The Flash Tool screen is displayed (Figure 2-2).



**Figure 2-2 Flash Tool Screen**

6. To erase the NAND flash, select the following configuration:
  - **Operation Type:** Erase with BBT enabled
  - **Operation Settings:** Address 0x00000000, Size 0x10000000
  - **Flash Model:** NAND K9K2G08R0A
7. Click **Erase**.

## 2.1.2 Flashing the RedBoot Bootloader

To flash the bootloader to the NAND, use these steps:

1. Open the Flash Tool Screen (Figure 2-3).

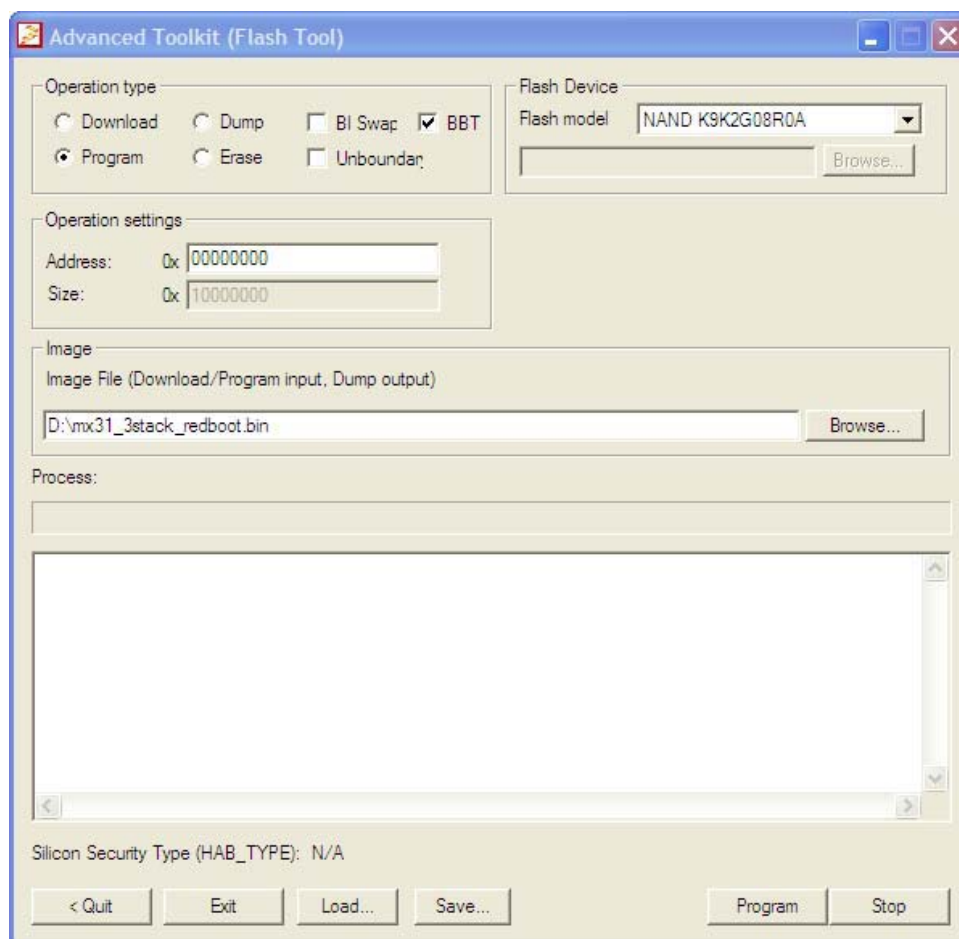


Figure 2-3 Flash Tool Screen

2. Select the following configuration:
  - **Operation Type:** Program with BBT enabled
  - **Operation Settings:** Address 0x00000000
  - **Flash Mode:** NAND K9K2G08R0A
3. Click **Browse** to select the RedBoot `mx31_3stack_redboot.bin` binary file.
4. Click **Program** to flash the bootloader.
5. After programming is complete, you may turn off the PDK and close the ATK application.

## 2.2 Flashing the Kernel, rootfs, and Demo Program

To flash the kernel, rootfs, and demo program, use these steps:

1. Extract the package to a folder in your home directory, and then copy the required files to your `tftp` folder.
2. In order to continue, the TFTP daemon must be properly configured and running on your Linux host. If you have not done that configuration already, use these steps:
  - a) Turn off the firewall, to enable the tftp to work.

```
iptables -F
```

OR, at the command line, type:

```
setup
```

and then disable the firewall.

- b) Install the **tftp** server (procedures vary among Linux distributions).
- c) Install the **nfs** server (procedures vary among Linux distributions).
- d) Create the `tftpboot` directory.

The kernel images and anything that needs to be uploaded by **tftp** (such as the zImage kernel image file) will be stored in this directory.

```
mkdir /tftpboot
```

- e) Edit `/etc/xinetd.d/tftp` as follows:

```
service tftp
{
    socket_type      = dgram
    protocol         = udp
    wait             = yes
    user             = root
    server            = /usr/sbin/in.tftpd
    server_args       = /tftpboot
    disable           = no
    per_source        = 11
    cps               = 100 2
    flags             = IPv4
}
```

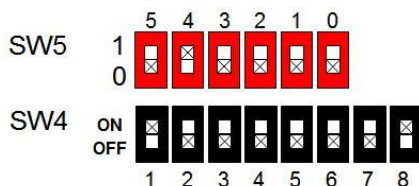
- f) Restart the tftp daemon:

```
/etc/init.d/xinetd restart
```

- When **tftp** is set up, continue by entering the following commands:

```
#mkdir /home/test
#cp L2.6.24_2.3.2_SDK_082008_images.tar.gz /home/test
#cd /home/test
#tar -zxvf L2.6.24_2.3.2_SDK_082008_images.tar.gz
#cp L2.6.24_2.3.2_SDK_082008_images/imx31_3stack/zImage <your tftp folder>
#cp L2.6.24_2.3.2_SDK_082008_images/imx31_3stack/rootfs.jffs2 <your tftp folder>
```

- Set the boot mode jumper and dip switches on the Debug board to **External Boot from Flash**, as shown in the following figure (notice that switch 4 on SW5 is currently set to "1").



- Power on the PDK.
- Bind an IP address to the PDK network interface:
- Press **Enter** until you see **Use BOOTP for network configuration**.
- Use backspace to delete the word **True** and enter the word **False**.
- Set the IP addresses to match the configuration on your Linux host. It is best to use private IP addresses that are part of the same sub-network. For example:

```
Gateway IP address: 192.168.0.1
Local IP address: 192.168.0.2
Local IP address mask: 255.255.255.0
Default server IP address: 192.168.0.1
```

- Accept the other default settings by pressing **Enter**, until you are asked whether to update the configuration to flash.
- Type **"Y"**, and then press **Enter**.
- Restart the PDK.
- Verify that the PDK and the PC can communicate with each other through the network. To do so, from a Terminal Console at the Linux host, use the following command:

```
ping 192.168.0.2
```

- Download the Kernel Image (zImage under tftp folder) to RAM:

```
RedBoot> load -r -b 0x100000 /<your tftp folder>/zImage -h <host IP address>
```

15. Program the downloaded image into Flash:

```
RedBoot> fis init
About to initialize [format] FLASH image system - continue (y/n)? y
*** Initialize FLASH Image System
... Erase from 0x00080000-0x000a0000: .
... Program from 0x07ee0000-0x07f00000 at 0x00080000: .
RedBoot> fis create -f 0x100000 kernel
... Read from 0x07ee0000-0x07eff000 at 0x00080000: .
... Read from 0x07ee0000-0x07eff000 at 0x00080000: .
... Read from 0x07ee0000-0x07eff000 at 0x00080000: .
... Erase from 0x00100000-0x002c0000: .....
... Program from 0x00100000-0x002a9c5c at 0x00100000: .....
... Erase from 0x00080000-0x000a0000: .
... Program from 0x07ee0000-0x07f00000 at 0x00080000: .
RedBoot>
```

16. Download the **jffs2** formatted root file system (`rootfs.jffs2` under the `tftp` folder) to RAM:

```
RedBoot> load -r -b 0x100000 rootfs.jffs2 -h <host IP address>
```

17. Program the downloaded **rootfs** into Flash:

```
RedBoot> fis create -f 0x600000 root
... Read from 0x07ee0000-0x07eff000 at 0x00080000: .
... Read from 0x07ee0000-0x07eff000 at 0x00080000: .
... Read from 0x07ee0000-0x07eff000 at 0x00080000: .
... Erase from 0x00600000-0x023a0000: .....
.....
.....
... Program from 0x00100000-0x01e9f5f4 at 0x00600000: .....
.....
.....
... Erase from 0x00080000-0x000a0000: .
... Program from 0x07ee0000-0x07f00000 at 0x00080000: .
RedBoot>
```

## 2.3 Running an Image on the Target

To run the image on the target, use these commands:

```
fis load kernel
exec -c "noinitrd console=ttyMxc0,115200 root=/dev/mtdblock2 rw rootfstype=jffs2 ip=none"
```

When prompted for the Freescale login, type **root**, and then press **Enter**.

### NOTE

You can select to have the target run automatically by configuring RedBoot via **fconfig** commands.



To have the target run automatically, set **True** when prompted with **Run script at boot**, and then enter the RedBoot commands you want to be auto-executed after power on, as follows:

```
RedBoot> fconfig
Run script at boot: true
Boot script:
Enter script, terminate with empty line
>> fis load kernel
>> exec -c "noinitrd console=ttymxc0,115200 root=/dev/mtdblock2 rw rootfstype=jffs2 ip=none"
>>
Boot script timeout (1000ms resolution): 1
Use BOOTP for network configuration: true
Default server IP address: 192.168.0.1
Board specifics: 0
Console baud rate: 115200
Set eth0 network hardware address [MAC]: false
GDB connection port: 9000
Force console for special debug messages: false
Network debug at boot time: false
Update RedBoot non-volatile configuration - continue (y/n)? y
... Read from 0x07ee0000-0x07eff000 at 0xeff80000: .
... Erase from 0xeff80000-0xeffa0000: .
... Program from 0x07ee0000-0x07f00000 at 0xeff80000: .
RedBoot>
```

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Freescale Semiconductor Japan Ltd.  
Headquarters  
ARCO Tower 15F  
1-8-1, Shimo-Meguro, Meguro-ku,  
Tokyo 153-0064, Japan  
0120 191014 or +81 3 5437 9125  
[support.japan@freescale.com](mailto:support.japan@freescale.com)

##### **Asia/Pacific:**

Freescale Semiconductor China Ltd.  
Exchange Building 23F  
No. 118 Jianguo Road  
Chaoyang District  
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China  
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