

# **i.MX START 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.MX53 START 2011 Linux BSP (Demo Image).

#### **1.1 Supported Hardware**

This package supports the i.MX53 Quick Start Boards Rev. B and Rev C boards.

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## 1.2 Supported Features in this Release

The demo image supports the following features:

- Kernel version: 2.6.35.3
- U-Boot
- SDMA
- MXC UART
- Frame Buffer Driver
- VGA (XGA)
- GPU
- IPU V3 driver
- V4L2 Output
- VPU
- PMIC
- Lower Power mode
- DVFS-Core
- USB devices
- FEC
- USB Host
- USB Device

## 1.3 Release Contents

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

Item	Description
u-boot-mx53-ard.bin	U-Boot bootloader for the i.MX53 SABRE ARD board.
u-boot-mx53-loco.bin	U-Boot bootloader for the i.MX53 START board.

u-boot-mx53-smd.bin	U-Boot bootloader for the i.MX53 SABRE Tablet board.
u-boot-mx53-ard-vcc135.bin	U-Boot bootloader for the i.MX53 SABRE ARD board with a TO 2.0 SoC.
u-boot-mx53-loco-vcc135.bin	U-Boot bootloader for the i.MX53 START board with a TO 2.0 SoC. Rev B boards.
u-boot-mx53-smd-vcc135.bin	U-Boot bootloader for the i.MX53 SABRE Tablet board with a TO 2.0 SoC.
ulmage	Binary kernel image for the Linux 2.6.35 kernel. The same image can run in all i.MX5 boards.
rootfs.tar.bz2	Ubuntu 10.04 demo rootfs with demo applications.
amd-gpu-x11-bin-mx51_11.01.00-1_armel.deb	Debian package for the GPU driver and the application for X11.
firmware-imx_11.01.00-1_armel.deb	Debian package for the firmware files, which includes VPU and Atheros WiFi.
imx-lib_11.01.00-1_armel.deb	Debian package for imx-lib binary.
imx-test_11.01.00-1_armel.deb	Debian package for the imx unit test binary.
kernel_2.6.35.3-imx_11.01.00_armel.deb	Debian package for the Linux kernel image, kernel modules and the header files.
libz160-bin_11.01.00-1_armel.deb	Debian package for the GPU Z160 2D driver.
modeps_11.01.00-1_armel.deb	Debian package for module dependencies.
xserver-xorg-video-imx_11.01.00-2_armel.deb	Debian package for the i.MX accelerated video driver.
udev-fsl-rules_11.01.00-5_armel.deb	Debian package for udev rules.

## 2 Flashing Procedures

### 2.1 Flashing U-boot

Use dd command in linux server to perform the copying. At first you can run following command to identify the device node assigned to the SD card:

```
$ cat /proc/partitions
major minor #blocks name
8 0 78125000 sda
8 1 75095811 sda1
8 2 1 sda2
8 5 3028221 sda5
8 32 488386584 sdc
8 33 488386552 sdc1
8 16 3921920 mmcblk0
```

In this case, the device node assigned by kernel is /dev/mmcblk0. Then run the following command to copy the u-boot image to the SD card (pick the command that matches the platform you want to use):

```
sudo dd if=u-boot-mx53-loco.bin of=/dev/mmcblk0 bs=512 && sync && sync
```

Please note this operation will delete the partition table present on the medium.

## 2.2 Flashing the Kernel

The following command will copy the kernel image to the SD card.

```
sudo dd if=ulmage of=/dev/mmcblk0 bs=512 seek=2048 && sync && sync
```

## 2.3 Flashing the rootfs

### Create the partition table:

```
sudo fdisk /dev/mmcblk0
```

Use the p, d, n, and w commands to delete any existing partition and to create a new partition. The partition for root file system should be located after kernel image. So the first 4M bytes (8192 sectors of 512 bytes) can be reserved for MBR, boot loader and kernel sections.

### Create the ext3 file system

```
sudo mkfs.ext3 /dev/mmcblk0p1
```

### Mount the SD card and uncompress the root file system files:

```
sudo mount /dev/mmcblk0p1 /mnt/hd  
cd /mnt/hd  
sudo tar --numeric-owner -xjvf /<path>/rootfs.tar.bz2
```

Note the option “--numeric-owner” may not be available if you are using busybox. Using this option is mandatory though, so please make sure you use the full blown version of tar.

### 3 Running an Image on the Target

To boot the system from MMC/SD flash follow the steps bellow:

1. Set a serial connection between the host and the board with this settings:
  - Baud rate: 115200
  - Data bits: 8
  - Parity: None
  - Stop bits: 1
  - Flow control: None
2. Press the “POWER” key to power up the board.
3. Assume the kernel image start from the address 0x100000 byte (the block start address is 0x800). The kernel image size is less than 0x300000 byte. The `rootfs` is located into `/dev/mmcblk0p1` partition. Enter the following commands in the U-Boot prompt:

```
u-boot> setenv bootfile 'dexter/ulmage'
u-boot> setenv filesize '2D47BC'
u-boot> setenv fileaddr '70800000'
u-boot> setenv bootcmd_mmc 'run bootargs_base bootargs_mmc; mmc read 0 ${loadaddr} 0x800 0x1800; bootm'
u-boot> setenv lvds 'video=mxcdi0fb:RGB666,XGA ldb'
u-boot> setenv bootcmd_obds 'ext2load mmc 0:1 0x70800000 /unit_tests/obds.bin; go 70800000'
u-boot> setenv lcd 'video=mxcdi0fb:RGB24,SEIKO-WVGA'
u-boot> setenv vga 'video=mxcdi1fb:GBR24,XGA di1_primary tve'
u-boot> setenv hdmi 'video =mxcdi0fb:RGB24,1024x768M@60'
u-boot> setenv bootcmd 'run bootcmd_mmc'
u-boot> setenv bootargs_mmc 'set bootargs ${bootargs} root=/dev/mmcblk0p1 rw rootwait'
u-boot> setenv bootargs_base 'setenv bootargs console=ttymx0,115200 ${vga}'
u-boot> saveenv
```

4. Reset the board.

After flash U-boot, Kernel and Rootfs on SD card, it's ready to run on Quick Start Board. By default, it will boot Ubuntu Lucid Linux, use VGA connector as video output and Serial connector as Linux terminal.

Log in as **lucid** (not root), the password is **lucid**.

Some bootloader settings can be changed as described below.

#### Changing U-boot settings:

When booting the board, U-boot starts a 3 seconds countdown on serial. Press any key to enter on U-boot prompt.

### Changing video output

- To change the video output, type on U-boot prompt: *set bootargs\_base 'set bootargs console=ttyMXC0,115200 **\${hdm}**'*
- It's possible to change **\${hdm}** to **\${vga}**, **\${lcd}** or **\${lvs}** according to your preferences.

### Calling OBDS (OnBoard Diagnostics Suite)

- Set bootcmd as following to boot OBDS: *set bootcmd 'run bootcmd\_obds'*
- Set bootcmd as following to boot from SD (Ubuntu): *set bootcmd 'run bootcmd\_mmc'*

### Important:

- After making changes on U-boot, use the command “save” to save the settings and “reset” to reset the board
- If you want check the current variable, use the command “print”

## 4 Use of the Demo Applications

When Ubuntu Lucid starts on i.MX53 Quick Start board, the following four items will be available on Desktop:

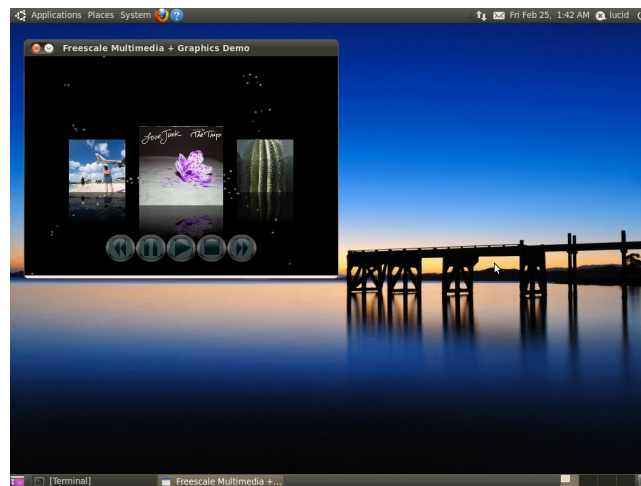


- **gpu-sdk1008**

GPU sdk package, contains all source codes and binaries of demos built for i.MX5X. They were made using GPU and VPU capabilities.

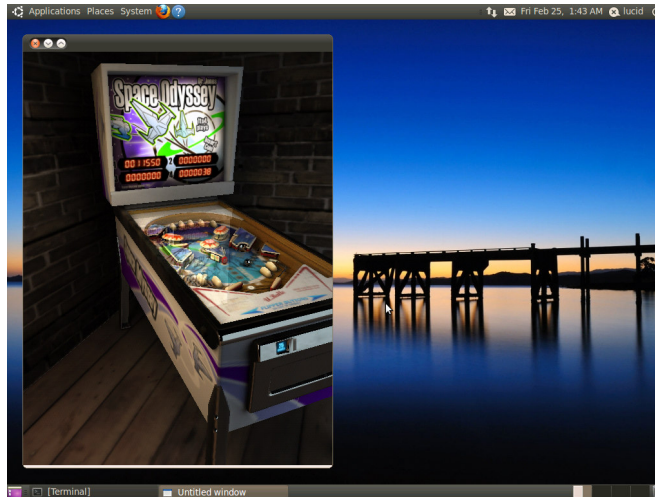
- **Demo-GPU**

GPU demo works as a music and video player using GPU and VPU capabilities. All source code is opened on Desktop\gpu-sdk1008.



- **Pinball**

Pinball demo shows a 3D animation using GPU capabilities. All source code is opened on Desktop\gpu-sdk1008.



- **trailer 1080p.mov**

The Full HD test video will be opened using Totem player, showing VPU processor's capabilities to decode and resize videos in 1080p resolution.



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