

i.MX51 3-Stack 5.0.0 Linux Standard

Release Notes

This document contains important information about the package contents, supported features, and known issues/limitations.

Contents

| | | |
|-----|-------------------------------|---|
| 1 | Release Contents | 2 |
| 1.1 | Contents | 2 |
| 1.2 | Cross Platform Matrix | 2 |
| 1.3 | License | 3 |
| 2 | System Requirements..... | 3 |
| 2.1 | Linux Host server | 3 |
| 2.2 | ATK tool | 3 |
| 2.3 | i.MX51 EVK Components | 3 |
| 3 | What's New..... | 3 |
| 4 | BSP Supported Features | 4 |
| 5 | Known Issues/Limitations..... | 6 |



1 Release Contents

1.1 Contents

This release consists of three ZIP files: L2.6.28_5.0.0_SS_Sep2009_source.tar.gz, L2.6.28_5.0.0_SS_Sep2009_images_MX51.tar.gz, and L2.6.28_5.0.0_SS_Sep2009_docs.tar.gz.

L2.6.28_5.0.0_SS_Sep2009_source.tar.gz contains the following files:

| File | Description |
|--|---|
| EULA | Freescale End User License Agreement |
| install | install script for LTIB |
| ltib.tar.gz | ltib (Linux Target Image Builder) |
| package_manifest.txt | Freescale LTIB package lists |
| pkgs | Source and patches for root file system |
| pkgs/imx-test-5.0.0.tar.gz | Source of unit tests |
| pkgs/imx-lib-5.0.0.tar.gz | Source of libraries |
| pkgs/linux-2.6.28-imx_5.0.0.bz2 | Freescale 2.6.28-5.0.0 kernel patches |
| pkgs/tc-fsl-x86lnx-armeabi-nptl-4.1.2-3.i386.rpm | Open source tool chain for ARM9 and ARM11 |
| redboot_200938.zip | RedBoot Release |
| tftp.zip | A Windows TFTP server program |

L2.6.28_5.0.0_SS_Sep2009_images_MX51.tar.gz contains the following files:

| File | Description |
|--|--|
| imx51/rootfs.ext2.gz | Root file system ext2 image for Linux 2.6.28 kernel |
| imx51/rootfs.jffs2 | Root file system JFFS2 image for Linux 2.6.28 kernel (MX51 3-Stack NAND) |
| imx51/u-boot-3ds.bin | Uboot bootloader for i.MX51 3-Stack board |
| imx51/ulmage | Binary kernel image for uBoot |
| imx51/zlimage | Binary kernel image for Linux 2.6.28 kernel for 3 stack and EVK |
| imx51/amd-gpu-bin-mx51_5.0.0-1_armel.deb | Debian package for amd gpu binary |
| imx51/imx-lib_5.0.0-1_armel.deb | Debian package for imx-lib binary package |

L2.6.28_5.0.0_SS_Sep2009_docs.tar.gz contains the following files:

| File | Description |
|-------------|--|
| EULA | Freescale End User License Agreement |
| readme.html | readme |
| doc/mx51 | i.MX51 Linux BSP release note, user guide, reference manual and uboot documents. |

1.2 Cross Platform Matrix

For basic environment compatibility among different FSL MAD, please see CompatMatrix.html.

For features list supported among different FSL MAD chips, please see [FeatureMatrix.html](#).

1.3 License

- All BSP source-code files are GPL or LGPL or another open source license.
- Some binary files contained in the included root file systems are built from proprietary source (not included in the BSP):
 - Files in package `csr-bt-bin-1.2.0.tar.gz`
 - Files in package `gl-gps-1.2.2.tar.gz`
 - File in package `amd-gpu-bin-mx51-5.0.0.tar.gz`

2 System Requirements

2.1 Linux Host server

To build with LTIB or to program images to an MMC/SD card, you need to setup a Linux host server. In order to build the GNOME Mobile profile we recommend that you install Ubuntu 9.04 to this Linux host .

2.2 ATK tool

ATK Tool V1.6.8

2.3 i.MX51 EVK Components

This kit contains the following items:

Table 2.1 Kit Components

| Hardware Modules | Comments |
|----------------------------------|----------|
| i.MX51 3-Stack CPU board | |
| i.MX51 3-Stack Personality board | |
| i.MX51 3-Stack Debug board | |
| Power Supply (5V) | |
| Ethernet Cable | |
| Serial cable | |

3 What's New

The section describes the new changes in this release, including new features and defect fixes.

3.1. New Features

See [ResolvedEnhancements.html](#) for the complete list of new features and enhancements since the last release.

A summary of the main new features is as follows:

- Enable bluez for USB BT dongle
- Add GPIO common driver support
- Support IPUV3 DP alpha blending
- Power optimization for stop mode

3.2. Defect Fixes

See ResolvedDefects.html for the list of the defects fixed in this release.

4 BSP Supported Features

The following table describes the features that are supported in this BSP.

| Feature | Supported? | Comments |
|---------------------------------|------------|--|
| Kernel | | |
| Kernel | Y | Kernel version: 2.6.28 |
| File System | Y | JFFS2 and UBIFS are tested on MX51 3-Stack board EXT2 and EXT3 are used as the file system in MMC/SD, Hard Disk |
| Bootloader | | |
| Redboot | Yes | Redboot version: redboot_200938 version Supports NAND and MMC/SD boot. Supports FEC and Console output |
| U-Boot | Yes | Support NAND and MMC/SD boot. Support FEC and Console output |
| Machine Specific Layer | | |
| ARM Core | Y | Support Cortex-A8 |
| Interrupt | Y | Support MXC TZIC module. |
| Clock | Y | Control system frequency, clock tree distribution, and provide support for low power management |
| Timer (GPT) | Y | System timer tick support |
| GPIO/EDIO | Y | GPIO is initialized in earlier phase according to hardware design. Note that all GPIO activate/deactivate functions used in the drivers are dummies. See the MSL code for the details. |
| IOMUX | Y | Provides the interfaces for IO configuration |
| SPBA | Y | Provides the interfaces to allow different masters to take or release ownership of a shared peripheral. |
| SDMA | Y | SDMA script version: SS15 |
| Character Device Drivers | | |
| MXC UART | Y | Console support via internal UART1. Can support 3 UARTs by configuring UART PINs. |
| Graphic Drivers | | |
| Frame Buffer Driver | Y | MXC Frame buffer driver for IPU V3 |
| WVGA | Y | Support WVGA panel via external socket. |
| VGA | Y | Support EPSON VGA panel |
| GPU | Partial | GPU software version: RC6 release. Support Z430 (3D) and Z160 (2D). Support OpenGL ES 2.0 and 1.1, OpenVG 1.1, C2D custom API using Z160 |
| MultiMedia Drivers | | |
| IPU V3 driver | Y | Provides the interfaces to access IPU V3 modules |
| V4L2 Output/Capture | Y | Provide V4L2 implementations |
| Camera | Y | Support OmniVision OV3640 camera via IPU CSI interface |

| Feature | Supported? | Comments |
|---------------------------------|------------|---|
| TVOut | Partial | Support embedded TV encoder. Support PAL and NTSC modes. TVout 720p and TVOut crop features are not supported in this release. |
| VPU | Y | VPU firmware version: V1.2.1 Support VPU encoder and VPU decoder. For RV support, contact business manager. |
| Power Management Drivers | | |
| PMIC (MC13892) | Y | Support MC13892 2.0 via I2C interface in the EVK. Support regulator management for voltage controls. |
| MC13892 battery driver | Y | MC13892 battery driver only support MC13892 TO2.0 or above version. |
| Lower Power mode | Y | Support stop mode in "mem" state. |
| DVFS-Core | Y | Support hardware DVFS core driver |
| CPUFreq | Y | CPUFreq can be used for CPU frequency adjustment and bus scaling. |
| XEC | Y | XEC is used to save power by adjusting backlight. For XEC delivery, contact business manager. |
| Sound Drivers | | |
| S/PDIF | Y | Support S/PDIF Tx. |
| ASoc (SSI/AUDMUX) | Y | ASOC version "0.13.2" Support STGL5000 stereo audio codec under ASoc framework. Support audio playback and record. |
| Input Device Drivers | | |
| Keypad | Y | Support the keypad on the accessory card |
| Touch panel | Y | Support touch panel via MC13892 ADC. |
| USB devices | Y | Support USB mouse and USB keypad via USB ports |
| MTD driver | | |
| NAND | Y | Support Supports Micron MT29F32G08QAA (MLC flash). To generate rootfs for MX51 TO2 NAND, please use the command: mkfs.jffs2 -r rootfs -e 0x80000 -s 0x1000 -n -o rootfs.jffs2 Interleave mode is disabled by default. |
| Networking Drivers | | |
| External Ethernet | Y | Support Ethernet driver LAN9217 on the debug board. |
| BT CSR | Y | Support APM6628 CSR BT driver via UART. |
| WiFi CSR | Y | Support APM6628 CSR WiFi driver via SDIO interface. |
| USB Drivers | | |
| USB Host | Y | Support USB HOST1 and USB OTG host. Can support USB camera and USB SATA devices. Note that USB OTG host mode is disabled by default in the MX51 configuration. |
| USB Device | Y | Support USBOTG device mode |
| USBOTG | Y | Support USBOTG PIN detect function. |
| Security Drivers | | |
| Security drivers | Y | Support SCC2, SAHARA drivers. |
| General drivers | | |
| SRTC | Y | Support for LP domain. It's disabled by default. |
| MC13892 RTC driver | Y | MC13892 RTC driver is enabled by default |
| MMC/SD/SDIO | Y | Support i.MX eSDHC module with PIO and DMA modes. |
| WatchDog | Y | Support Watchdog reset |
| I2C | Y | Support I2C master. Support I2C1, I2C2 |
| SPI | Y | Support SPI master mode. |
| 1-Wire | Y | Support DS2438 via 1-Wire |
| SIM | Y | Support T0 smart card and compatible with ISO7816-3 spec. |
| GPS | Y | Support Broadcom GPS driver via UART |
| P-ATA driver | Y | ATA driver is compliant to the ATA-6 standard. Support PIO, MDMA and UDMA modes. |
| FM driver | Y | Support FM si4702 driver. |

5 Known Issues/Limitations

See [UnresolvedEnhancements.html](#) and [UnresolvedDefects.html](#) to see a complete list of known issues. Here we just list some key limitations and hardware workarounds:

| Features | Category | Description | Resolution/Workaround |
|-------------|---------------|--|--|
| Display | Configuration | Display automatic blank functionality is enabled by default. So the display will power off automatically when the time is expired. | To disable LCD automatic blank functionality, enter the command: echo -e "\033[9;0]" > /dev/tty0 Or when the display is off, enter the command to power on the display: echo 0 > /sys/class/graphics/fb0/blank |
| Video | Configuration | When playing the video for a long time, allocation of contiguous memory may fail (memory fragmentation). | To play video when the system memory is low, run the command "echo 1 > /proc/sys/vm/lowmem_reserve_ratio" to protect the DMA zone and avoid memory allocation errors. |
| ATA | hardware | ATA PINs conflict with NAND and SIM module. | <ul style="list-style-type: none"> • Test the i.MX51 P-ATA driver using an NFS mount of the root file system, due to certain pin conflicts between the P-ATA and the NAND flash. Add "ata" option in command line. For example: exec -c "noinitrd console=ttyMXC0 root=/dev/nfs nfsroot=10.193.20.181:/data/rootfs_mx51 rw ip=dhcp ata" • Short J69 in the i.MX51 prototype personality board before loading ATA modules for P-ATA tests. • ATA, NAND and SIM have PIN conflict. Only one device is supported at the same time. |
| SIM | Hardware | ATA PINs conflict with NAND and SIM module. | Add "sim" option in command line when enabling sim card tests due to pin conflict with NAND and ATA. |
| Debug board | Hardware | The software can not boot if removing debug board with some CPU boards. | <p>To make software run on MX51 3-Stack without debug board, do as follows:</p> <ul style="list-style-type: none"> • Ensure R217 and R218 in CPU board are removed. • Need to program the software on NAND or MMC/SD. • In redboot console, use fc command to change "Use BOOTP for network configuration:" as "false" |

| Features | Category | Description | Resolution/Workaround |
|-----------------|----------|--|---|
| | | | <ul style="list-style-type: none"> • Plug the power supply into personality board. |
| FM | Hardware | FM signal is not good on MX51 3-Stack board. | Contact Hardware support team for recommended design. |
| BT | Hardware | Sound is not continuous from BT headphone when testing A2DP (ENGR107860). BT and WiFi can not work at the same time since reset PIN is connected together. | Contact Hardware support team for recommended design. |
| TVOut | Hardware | ENGR00112796: When using Component RGB (J1~J3) interface for TVOut 720p test, the signal is disconnected if plugging in headphone. | This is because there is one connection from the headphone connector J4 to TVOut composite interface with combined audio/video support. If a standard phone is plugged, it will short the video signal to GND. To prevent ENGR00112796 from happening, R117 on personality board can be removed for test purpose. |
| Camera (OV3640) | Hardware | ENGcm09112 (MX51 TO2): IPU: CSIx_DATA_EN_POL Bit is Not Functional | To enable the V4L2 video capture function, plug a headphone into the headphone jack on J4. This is because the CSI_DATA_EN signal is pulled up by the headphone. This is a hardware workaround for CSI. |
| Camera | Hardware | ENGcm09128(MX51 TO2): Under certain conditions, the DMA controller in the IPU may cause image corruption. This applies to all IPU image sources, including both an external smart camera sensor and general images stored in memory. The problem most frequently occurs with non-interleaved YUV420 formatted images that are rotated. The problem applies to WRITE channels only. READ channels are not affected. | Only interleaved YUV and RGB output pixel formats are supported by IPU idmac channels for i.MX51 TO2 chips. This makes V4I2 capture and V4I2 still don't support non-interleaved output pixel format. See Test Document to get the detailed camera test steps. |
| Camera | BSP | Camera encoding can not work together with a interlaced video playback | The VDI uses PRP channel which conflicts with the camera. The solution is to depart PRP channel from the VDI. Will integrate the solution in further |

| Features | Category | Description | Resolution/Workaround |
|----------|------------------------|---|--|
| | | | release. |
| GPU | Hardware | If the resolution of DVI monitor is 1280X1024 , OpenVG test program "tiger" fails. | The Z160 only supports resolutions up to 1024X1024. You have to limit resolutions for Z160 OpenVG tests. If you see a display problem on the OpenVG tiger tests, please check the resolution first . You can use command option such as "video=mxcfb:1024x768-16M@60" to limit resolution. See the display entry above for more information. |
| Rootfs | BSP | Mounting the root file system on some MMC/SD cards or hard disks may fail. | This issue is related to timing. You can add "rootdelay=5" command option in launch command. It can ensure additional time is reserved for storage initialization before mounting the rootfs. |
| uBoot | BSP | Current uboot version provides basic functionality for SPI and MMC bring up. It doesn't support to program kernel images to SPI-NOR and read images to MMC /SD card whose size is >=4G. | If using uboot to program images to MMC/SD card, please use the card which size is less than 4G. This limitation will be removed into the coming release. |
| uBoot | BSP | uboot only supports to save environment to the first device. In EVK board, the environment is stored to SPI-NOR flash whether booting from MMC or SPI-NOR. | The workaround is to build different bootloader for different boot modes. So the first device is the boot device. |
| uBoot | BSP | ENGR00116785 Uboot: Timeout when downloading a big size file via tftp. Possibility: 100% | Under investigation. Please use ATK or NFS to flash rootfs. Take NFS as the example, the following command can be used to program rootfs to NAND: flash_eraseall /dev/mtd2 nandwrite -p /dev/mtd2 /rootfs.jffs2 |
| Video | Application/Test codes | ENGR00115848: VIDIOC_DQBUF failure is reported when conducting VPU unit test with interlaced clips | The application (VPU unit test program or Gstreamer plug-in) needs to queue 3 buffers before dequeue for interlaced clips. |
| Video | System | The system can not enter suspend state when playing video. Video playback can not be continuous after the system resume from the suspend status. | These cases are not supported in current version. One workaround is: Call V4L VIDIOC_STREAMOFF IOCTL and pause video before suspend, then call |

| Features | Category | Description | Resolution/Workaround |
|----------|----------|-------------|--|
| | | | VIDIOC_STREAMON after resume. Contact Support team to get the solution in ubuntu. |

How to Reach Us:

Home Page:

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Web Support:

<http://www.freescale.com/support>

USA/Europe or Locations Not Listed:

Freescale Semiconductor
Technical Information Center, EL516
2100 East Elliot Road
Tempe, Arizona 85284
+1-800-521-6274 or +1-480-768-2130
www.freescale.com/support

Europe, Middle East, and Africa:

Freescale Halbleiter Deutschland GmbH
Technical Information Center
Schatzbogen 7
81829 Muenchen, Germany
+44 1296 380 456 (English)
+46 8 52200080 (English)
+49 89 92103 559 (German)
+33 1 69 35 48 48 (French)
www.freescale.com/support

Japan:

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

Asia/Pacific:

Freescale Semiconductor China Ltd.
Exchange Building 23F
No. 118 Jianguo Road
Chaoyang District
Beijing 100022
China
+86 010 5879 8000
support.asia@freescale.com

For Literature Requests Only:

Freescale Semiconductor Literature Distribution
Center
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