Freescale Semiconductor
Release Notes

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i.MX53 EVK 10.10.01 Linux

Release Notes

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

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1 Release Contents

1.1 Contents

This release consists of 3 package files: `L2.6.35_10.10.01_ER_source.tar.gz, L2.6.35_10.10.01_ER_images_MX5X.tar.gz, L2.6.35_10.10.01_ER_docs.tar.gz.`

Beside above, additional package "`L2.6.35_10.10.01_ER_images_MX5X_GCC433.tar.gz`" built with gcc4.3.3 toolchain is included.

Release version is named as "`L<Kernel_version>_<yy>.<mm>.<ij>`".

- `<Kernel_version>`: BSP Kernel version. "`L2.6.31`" indicates this BSP release is based on kernel version 2.6.31.
- `<yy>.<mm>.<ij>`": Release time. For example, "`09.12.00`" indicates this BSP is released on December, 2009.

Tables 1-1 to 1-4 list the content included in each file.

Table 1-1. L2.6.35_10.10.01_ER_images_MX5X.tar.gz content

File	Description
u-boot-mx53.bin	U-Boot bootloader for the i.MX53 EVK board
u-boot-mx53-ard.bin	U-Boot bootloader for the i.MX53 ARD board
uImage	Binary kernel image for the Linux 2.6.35 kernel. The same image can run in all i.MX5 boards.
amd-gpu-x11-bin-mx51_10.10.01-1_armel.deb	Debian package for the GPU driver and the application for X11
atheros-wifi_10.10.01-1_armel.deb	Debian package for the Atheros WiFi AR6102 driver
firmware-imx_10.10.01-1_armel.deb	Debian package for the firmware files which includes VPU and Atheros WiFi.
imx-lib_10.10.01-1_armel.deb	Debian package for imx-lib binary
imx-test_10.10.01-1_armel.deb	Debian package for the imx unit test binary
kernel_2.6.35.3-imx_10.10.01_armel.deb	Debian package for the Linux kernel image, kernel modules and the header files.
libz160-bin_10.10.01-1_armel.deb	Debian package for the GPU Z160 2D driver.
modeps_10.10.01-1_armel.deb	Debianpackage for module dependencies
~~xserver-xorg-video-imx_10.10.01-2_armel.deb~~	~~Debian package for the i.MX accelerated video driver~~
udev-fsl-rules_10.10.01-5_armel.deb	Debian package for udev rules

Table 1-2. L2.6.35_10.10.01_ER_source.tar.gz content

File	Description
EULA	Freescale End User License Agreement
install	Install script for LTIB

File	Description
ltib.tar.gz	LTIB (Linux Target Image Builder)
package_manifest.txt	Freescale LTIB open source packages
pkgs	Source and patches for the root file system
pkgs/ imx-test-10.10.01.tar.gz	Source code for the unit tests
pkgs/ imx-lib-10.10.01.tar.gz	Source code for the libraries
pkgs/ linux-2.6.35.3-imx_10.10.01.bz2	Freescale 2.6.35.3-10.10.01 kernel patches
pkgs/ u-boot-v2009.08-imx_10.10.01.tar.bz2	i.MX U-Boot patches based on U-Boot version 200908
pkgs/firmware-imx-10.10.01.tar.gz	i.MX firmware packages
pkgs/atheros-wifi-10.10.01.tar.gz	Source code of the Atheros WiFi AR6102 drivers
pkgs/ xserver-xorg-video-imx-10.10.01.tar.gz	Source code of the i.MX accelerated video driver
Pkgs/ kobs-ng-10.10.01.tar.gz	Source code of kobs-ng package which is used to flash MX53 U-Boot.
pkgs/gcc-4.4.4-glibc-2.11.1-multilib-1.0-1.i386.rpm	FSL Open source optimized toolchain gcc 4.4.4 which enables NEON for ARM cortex-A8.
pkgs/gcc-4.3.3-glibc-2.8-cs2009q1-203-1.i386.rpm	Codesourcery toolchain gcc 4.3.3.
tftp.zip	A Windows TFTP server program

Table 1-4. L2.6.35_10.10.01_ER_docs.tar.gz content

File	Description
EULA	Freescale End User License Agreement
readme.html	Readme file containing links to additional documentation
doc/mx5	i.MX53 Linux BSP Release Notes, User's Guide, Reference Manual

The default Ubuntu RFS of this release is version 10.04 (lucid). If you would like to use Ubuntu RFS 9.10 or earlier version, please use the packages of L2.6.35_10.10.01_ER_images_MX5X_GCC433.tar.gz built with gcc 4.3.3. The glibc version of gcc 4.3.3 is same with Ubuntu 9.10. If you install debian packages built with gcc4.4.4 on Ubuntu 9.10, you will meet glibc symbol error when running GPU applications.

1.2 License

All Board Support Package (BSP) source-code files are GNU General Public License (GPL) or GNU Lesser General Public License (LGPL) or another open source license.

The following binary files contained in the included root file systems are built from proprietary source not included in the BSP:

- Files in package `libz160-bin-10.10.01.tar.gz`
- Files in package `amd-gpu-bin-mx51-10.10.01.tar.gz`

2 System Requirements

2.1 Linux Host server

To build with LTIB or to program images to an MMC/SD card it is necessary to setup a Linux host server. To build the GNOME Mobile profile it is recommended to install Ubuntu 9.04 in the Linux host.

2.2 MFG tool

Use Mfgtools-Rel-10.10.01_ER_MX53_UPDATER.tar.gz for the image downloading.

2.3 i.MX53 EVK Components

Table 2-1 lists the hardware items contained in the i.MX53 EVK package.

Table 2-1 Kit Components

Item	Description
Boards	i. i.MX53 EVK Main Board ii. i.MX53 Automotive Port Card (APC)
Display	i. CLAA WVGA panel ii. Optional DVI daughter card iii. Optional LVDS panel iv. Optional HDMI daughter card
Cables	DB9 M/F RS-232 serial cable USB type A/M to MicroUSB type B/M, shielded cable Ethernet straight cable
Data storage	4GB SD cards or above
Power Supply	100/240 VAC – 5 VDC, 3.8A, with AC adaptors
WiFI daughter card	Optional. WiFi SDIO daughter card for AR6102 or AR6003

3 What's New

The section describes the 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:

- Upgrade Linux kernel to 2.6.35.3 version
- Upgrade GPU driver to AMD Production R1.1 release
- Upgrade SDMA script to V1.1.0 version to support SSI dual FIFO.
- Upgrade vpu firmware to v1.4.14
- Switch IOMUX to V3 version.
- Add NAND boot support.
- Add NAND support in U-Boot.
- USB restructure for better wakeup support.
- Add power key driver support.
- Add SSI3 support
- Add SII9022 HDMI driver support

3.2 Defect Fixes

See `ResolvedDefects.html`, referenced inside the file `readme.html`, for the list of the defects fixed in this release. Following are some issues which are resolved:

- ENGR00123735 (System resume was broken due to FEC change in ENGR00123446. However, system resume works well on a RevB board with the same changes): Resolved by cherry-pick FEC patches from kernel community.
- ENGR122000 (USB disk will be reset if the heavy loading is conducted on two USB disks. Possibility: 100% SD Write performance via IOZONE is poor): Closed since HIGHMEM is 0K byte after 2G/2G user/kernel space split is enabled.

3.3 GNOME Mobile Notes

To build the GNOME Mobile profile with LTIB, you must use Ubuntu 9.04 or above version as the Linux host. For HOST server setup, See ltib_build_host_setup.pdf.

4 BSP Supported Features

Table 4-1 describes the features that are supported in this BSP release.

Table 4-1 Supported features

Feature	Supported?	Comments
Kernel		
Kernel	Yes	Kernel version: 2.6.35.3
File System	Yes	EXT2/EXT3/EXT4 are used as the file system in MMC/SD, Hard Disk, UBIFS and JFFS2 are used for NAND.
Bootloader		
U-Boot	Yes	U-Boot delivery is based on U-Boot version 200908. Supports SPI NOR, MMC/SD slot1, slot3 boot and NAND boot. See "README_MX53_NAND_BOOT.pdf" for more details about NAND boot. Supports FEC and console output. Supports fuse and clock operations. Support s the board detection according to board ID. For MX53 RevA board, set DDR as 300MHZ. For MX53 RevB board, set DDR as 400MHZ.
Machine Specific Layer		
ARM Core	Yes	Supports Cortex-A8 (800MHz)
Memory	Yes	1G memory is used. The user/kernel space is split as 2G/2G.
Interrupt	Yes	Supports MXC TZIC module
Clock	Yes	Control system frequency, clock tree distribution
Timer (GPT)	Yes	System timer tick support
GPIO/EDIO	Yes	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	Yes	Provides the interfaces for IO configuration. IOMUX-V3 version is used.
SPBA	Yes	Provides the interfaces to allow different masters to take or release ownership of a shared peripheral
SDMA	Yes	SDMA script version is V1.1.0.
Character Device Drivers		
MXC UART	Yes	Console support via internal UART1, UART2/UART3 support via APC
Graphic Drivers		
Frame Buffer Driver	Yes	MXC Frame buffer driver for IPU V3
WVGA	Yes	Supports 16bit CLAA WVGA panel with the resolution 800X480. The pixel format is IPU_PIX_FMT_RGB565. It's the default display for the i.MX53 EVK.
DVI monitor	Yes	The supported pixel format is IPU_PIX_FMT_RGB24. The default resolution is 1024x768. Support DVI resolution up to 1280x1024. For the most part, only the default resolution 1024x768 has been tested.
LVDS	Yes	Supports XGA LVDS panel (Model number: 150XG01 V2). The pixel format is IPU_PIX_FMT_RGB24. Supports 1080p LVDS panel (Model number: M216H1-L01). Please add 'ldb' option to bootup command line to enable LDB driver.
HDMI	Yes	Support external HDMI chip SII9022 (SPDIF audio support is not enabled now). The support format and video modes are same as DVI.
GPU	Partial	GPU software version: AMD Production Release 1.1. Supports Z430 (3D) and Z160 (2D). Support s OpenGL ES 2.0 and 1.1, OpenVG 1.1, C2D custom API using Z160 Provides debian packages to support EGL X-Window in Ubuntu 9.10 or earlier version.

Feature	Supported?	Comments
MultiMedia Drivers		
IPU V3 driver	Yes	Provides the interfaces to access IPU V3 modules
V4L2 Output/Capture	Yes	Provides V4L2 implementations. Currently V4L only supports one instance. IPU library located in the imx-lib package can support multiple instances. De-interlace function for split mode (> 1024x1024) is not supported in this version.
Camera	Yes	Supports OmniVision OV3640 camera via IPU CSI interface. The OV3640 driver supports QVGA, VGA, XGA, NTSC, and PAL modes. It supports 15fps and 30fps. In MX53 EVK, please use APC to test camera.
TVOut	No	
TVIN	Yes	Support ADV7180 driver
VPU	Yes	VPU firmware version: v1.4.14 Supports VPU encoder and VPU decoder For Real Video and DivX3 support information contact a Freescale representative
Power Management Drivers		
PMIC	Yes	Supports the MC13892 2.0a PMIC via a I2C interface. Supports regulator management for voltage controls.
Lower Power mode	Yes	Supports stop mode in mem state
DVFS-Core	Yes	Supports hardware DVFS core driver. Please apply the patch
DVFS-Peripheral	No	
CPUFreq	Yes	CPUFreq can be used for CPU frequency adjustment
Bus scaling	Yes	Bus scaling driver can be used for bus frequency adjustment
XEC	No	
Sound Drivers		
S/PDIF	Yes	Supports S/PDIF Transmit. Support 44.1KHZ. To support 48K and 32K sample rates requires to connect 24.576MHZ OSC to CKIH2.
ASoC (SSI/AUDMUX)	Yes	Supports the STGL5000 stereo audio codec under ASoC framework Supports audio playback and record
ESAI/ CS42888	Yes	Support CS42888 audio codec via ESAI interface.
Input Device Drivers		
Keypad	No	The keypad driver was tested in standalone environment. Due to Keypad PIN conflict with other features (Audio, CAN etc), the code was not merged. You can contact the support team to get PIN settings if need.
Touch panel	Yes	Supports touch panel via MC13892 ADC on WVGA panel
USB devices	Yes	Supports USB mouse and USB keypad via USB ports
MTD driver		
SPI NOR	Yes	Supports atmel 4M SPI NOR flash
NAND	Yes	Support NAND driver
SATA	Yes	Support SATA driver
Networking Drivers		
FEC	Yes	Supports LAN8720 PHY
MediaLB	Yes	Supports MOST network data transport modes: synchronous stream data, asynchronous packet data and control message data
FlexCAN	Yes	Compatible with CAN2.0 protocol.
USB Drivers		
USB Host	Yes	Supports USB HOST1 and USB OTG host
USB Device	Yes	Supports USBOTG device mode
USBOTG	Yes	Support USB Host/device switch by ID PIN detection.
Security Drivers		

Feature	Supported?	Comments
Security drivers	Yes	Supports SCC2and SAHARA
General drivers		
SRTC	Yes	Support for the LP domain. It's disabled by default.
MC13892 RTC driver	Yes	The MC13892 RTC driver is enabled by default
MMC/SD/SDIO	Yes	Supports i.MX eSDHC module with PIO and DMA modes. Supports eSDHC Slot 1 and eSDHC slot 3 on the EVK board. Support eMMC4.4 DDR and SDR mode.
WatchDog	Yes	Supports Watchdog reset
I2C	Yes	Supports I2C master. Supports I2C1, I2C2
SPI	Yes	Supports SPI master mode
PWM	Yes	Supports the backlight driver via PWM for the WVGA panel.
USB BT dongle	Yes	Enables BLUEZ.
WiFi	Yes	Supports Atheros AR6102 and AR6003. AR6003 is enabled by default.

5 Kernel boot parameters

Depending on the booting/usage scenario, you may need different kernel boot parameters.

Kernel Parameters	Description	Typical Values	Used When
console	Where to output kernel logging by printk	console=ttymxc0	*All cases*
ip	Tell kernel how/whether to get IP address	ip=none ip = dhcp ip=static_ip_address	*"ip=dhcp" or "ip=static_ip_address" is mandatory in "boot from TFTP/NFS".*
nfsroot	The location of the NFS server/directory	nfsroot=<ip_address>:<rootfs path>	*Used in "boot from tftp/NFS" together with "root=/dev/nfs"*
root	The location of the root file system	root=/dev/nfs or root=/dev/mmcblk0p2	*Used in "boot from tftp/NFS" (i.e., root=/dev/nfs); Used in "boot from SD" (i.e., root=/dev/mmcblk0p2)*
rootfstype	Indicates the file system type of the root file system	rootfstype=ext4	*Used in "boot from SD" together with "root=/dev/mmcblk0p2"*
rootwait	Wait (indefinitely) for root device to show up.	rootwait	*Used when mounting SD rootfs*

video	Tell kernel/driver which resolution/depth and refresh rate should be used for display port 0 or 1. See the parameter information under Documentation/fb/modedb.txt and video_modes in arch/arm/mach-mx5/mx53_evk.c Tells the kernel/driver which IPU display interface format should be used.	1.video=mxcdi0fb:RGB24, 1024x768M-16@60 2.video=mxcdi0fb:RGB565,CLAA-WVGA 3. video=mxcdi0fb:RGB24,XGA ldb 4. video=mxcdi1fb:RGB24,XGA di1_primary ldb 5. video=mxcdi0fb:RGB24,1080P60 ldb 6. video=mxcdi0fb:RGB24,1024x768M@60	*1. Used when displaying on a DVI monitor is connected to display port 0 with the resolution 1024x768. The resolution can be adjusted per the monitor information.* *2. Used when displaying on a WVGA LCD is connected to display port 0 (The default setting for MX53 EVK)* *3. Used when displaying on an XGA LVDS connected toLVDS0* *4. Used when displaying on an XGA LVDS connected to LVDS1, used as the primary display* *5. Used when displaying on an 1080p LVDS connected toLVDS0* *6. Used when displaying on a HDMI output devices via HDMI daughter card. The resolution size can be adjusted as 720P, 1080P per output device.*
di1_primary	Tells the kernel/driver that DI1 is the primary display	di1_primary	*Used when primary display is on DI1 port.*
ldb	Tells the kernel/driver to enable LDB driver	ldb	*Used when LVDS panel is connected.*
dmfc	Tells the kernel/driver how to set IPU DMFC segment size	None Or dmfc=3	*" dmfc=1" means DMFC_HIGH_RESOLUTION_DC,* *"dmfc=2" means DMFC_HIGH_RESOLUTION_DP,* *"dmfc=3" means DMFC_HIGH_RESOLUTION_ONLY_DP .* *NOTE: DMFC_HIGH_RESOLUTION_ONLY_DP can only be set by the command line*
mem	Tell kernel how much memory can be used.	None or mem=864M	*Note: 1G -<mem> - <gpu_memory> is reserved for X-Acceleration.*
gpu_memory	Tell kernel how much memory is reserved for GPU usage.	None or gpu_memory =128M	*Used to indicate the memory size reserved for the GPU.*
spdif	Tell kernel to enable SPDIF Tx	spdif	*Used to enable SPDIF since SPDIF_OUT pin conflicts with 12V pin used by CAN feature.*
apc	Tell kernel to enable EASI	apc	*Used to enable CS42888 via ESAI since ESAI pins conflict with FEC. When this option is added, FEC driver is disabled.*

6 Known Issues/Limitations

Please read through all hardware related materials and ensure the necessary hardware reworks are done before using the software. Table 5-1 lists some key known issues.

Table 5-1 Known issues and workarounds

Features	Category	Description	Resolution/Workaround

1GHZ CPU frequency	BSP/Hardware	1GHZ CPU frequency is not enabled by default.	• Ensure the RevB board can support 1GHZ
			• Increase GP voltage into uboot:
			`/* Increase GP to 1.15v */`
			`EVK U-Boot > i2c nm.l 0x08 0x18.1`
			`00000018: 454a5445 ? 0x454a5645`
			`00000018: 454a5645 ? v`
			• Switch CPU core to 1GHZ in uboot: Type command "clk core 1000" in uboot console.
			• If there is still boot issue with 1GHZ, please consider to raise VCC and VDDA voltages.

SRPG	Hardware	System crash if enable ARM SRPG when entering WFI.	Current workaround (ENGR00121658) is to disable ARM SRPG when entering WFI.
GPU	BSP	The OpenVG is not supported when X-Acceleration is enabled.	The 'tiger' sample is for OpenVG and should not be run if X acceleration is enabled.
USB	Hardware	38120513 (Android: System can not remount SD space automatically after the USB cable is unplugged).	The driver detects disconnect event when the VBUS is lost. However, the VBUS PAD on some boards is broken and cannot drop to 0V when the USB device is detached according to ENGcm11192. The recommended work-around is to add a 4.7V uf capacitor on VBUS when designing the board to avoid VBUS pad damage. Contact the hardware team for the detailed change list.

Features	Category	Description	Resolution/Workaround
Video	Hardware	Frame dropping is observed when playing 1080p stream on 1080p display with resize operation.	Please contact business manager to get the detailed 1080p capability document.
TVIN	Hardware	The camera and TVIN share the same hardware interface.	Please remove ov3640_camera module before "modprobe mxc_v4l2_capture" when testing TVIN module.
TVIN	BSP/Hardware	ENGR00125283 The flicker is observed sometimes when running TVIN on MX53 EVK.	Under investigation.
HDMI	Hardware	The display color is not right when using the default HDMI daughter card.	The data line is connected wrongly in HDMI daughter board. Please contact HW team for the cable rework method.
VPU	BSP	ENGR00133052 VPU: System hang when VPU decode with some parameters. Possibility: 100%	This failure is related to MPEG2 post processing. Suggest to remove the parameter “-e 1 -d 1 -r 0” from command line as the workaround.
LTIB Build	LTIB	When you install LTIB host packages and build elftosb, the following error is reported /usr/bin/ld: ElftosbAST.o: in function elftosb::BinaryOpExprASTNode::reduce(elftosb::EvalContext&):/opt/freescale/ltib/usr/src/rpm/BUILD/elftosb-10.10.00/elftosb2/ElftosbAST.cpp:758: error: undefined reference to 'powf'	Please modify elftosb-10.10.00/makefile.rules and change as the following: -LIBS = -lstdc++ +LIBS = -lstdc++ -lm
ARMV7	Hardware	ENGcm11413 (Data abort when AXI access with BL>8 is made): If a 8-bits NEON load to strongly ordered/device memory, and if the access size is more than 8 bytes , the AXI bus will use the burst (burst len more than 8, burst size is 1 byte). MX53 M4IF just supports the burst length up to 8.if burst length is larger than 8, MX53 reports the data abort.	The user should avoid pgprot_noncached to be used in xxx_mmap for DDR memory. The user should use pgprot_writecombine instead of pgprot_noncached to map the DDR memory to the user space. If the pgprot_writecombine is used for mapping a DDR area and DMA is enabled for this area, the user must do DSB(Data Synchronization Barrier) by using dsb() function to drawing the write buffer, before the DMA starting read from this area.

Features	Category	Description	Resolution/Workaround
NEON	Software	NEON should not be used at all for Linux kernel modules	Follow this rule.

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