

i.MX 6SoloLite EVK Linux Release Notes

Contents

1 Release Contents

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

Additionally, the following sections contain release contents and license information.

1.1 Contents

This release consists of the following package files:

- L3.0.35_12.10.02_GA_source.tar.gz
- L3.0.35_12.10.02_GA_images_MX6S.tar.gz
- L3.0.35_12.10.02_GA_docs.tar.gz

The release version is named as
"L<Kernel_version>_<yy>.<mm>.<ij>."

"<Kernel_version>": BSP Kernel version. (For example, "L3.0.35" indicates that this BSP release is based on the kernel version 3.0.35.)

"<yy>.<mm>.<ij>": Release date. (For example, "12.10.02" indicates that this BSP was released in November, 2012)

This release is also known as GA release for i.MX 6SoloLite.

Tables below list the contents included in each package:

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Table 1. L3.0.35_12.10.02_GA_images_MX6S.tar.gz Content

File	Description
ulmage	Binary kernel image for the Linux 3.0.35 kernel.
firmware-imx_12.10.02-1_armel.deb	Debian package for the firmware files which includes VPU and Atheros WiFi.
imx-lib_12.10.02-1_armel.deb	Debian package for imx-lib binary.
imx-test_12.10.02-1_armel.deb	Debian package for the imx unit test binary.
kernel_3.0.35-imx_12.10.02_armel.deb	Debian package for the Linux kernel image, kernel modules, and the header files.
modeps_12.10.02-1_armel.deb	Debian package for module dependencies.
udev-fsl-rules_12.10.02-5_armel.deb	Debian package for udev rules.
atheros-wifi_12.10.02-1_armel.deb	Debian package for Atheros WiFi driver.
gpu-viv-bin-mx6q_12.10.02-1_armel.deb	Debian package for GPU base driver.
xserver-xorg-video-imx-viv_12.10.02-1_armel.deb	Debian package for xserver EXA driver.

Table 2. L3.0.35_12.10.02_GA_source.tar.gz Content

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 open source packages.
pkgs	Source and patches for the root file system.
pkgs/imx-test-12.10.02.tar.gz	Source code for the unit tests.
pkgs/imx-lib-12.10.02.tar.gz	Source code for the libraries.
pkgs/linux-3.0.35-imx_12.10.02.bz2	Freescale 3.0.35-12.10.02 kernel patches.
pkgs/u-boot-v2009.08-imx_12.10.02.tar.bz2	i.MX U-Boot patches based on U-Boot version 200908.
pkgs/firmware-imx-12.10.02.tar.gz	i.MX firmware packages.
pkgs/gcc-4.6.2-glibc-2.13-linaro-multilib-2011.12-1.i386.rpm	Linaro toolchain 4.6.2 which is built by FSL for multiple ARM platform support.
tftp.zip	A Windows TFTP server program.

Table 3. L3.0.35_12.10.02_GA_docs.tar.gz Content

File	Description
EULA	Freescale End User License Agreement.
readme.html	Readme file containing links to additional documentation.
doc/mx6	i.MX 6 Linux BSP Release Notes, User's Guide, and Reference Manual.

1.2 License

All source code files of the Board Support Package (BSP) are either GNU General Public License (GPL), 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 `gpu-viv-bin-mx6q-12.10.02.tar.gz`

2 System Requirements

The following subsections introduce the system requirements.

2.1 Linux Host Server

See "`Itib_build_host_setup.pdf`" for host server setup. This is tested against Ubuntu 9.04.

2.2 MFG Tool

The `Mfgtools-Rel-12.10.02_GA_MX6SL_UPDATER.tar.gz` package contains the image downloading tool.

2.3 EVK Board Components

Table below lists the hardware items contained in the EVK Board package. Read EVK Board Hardware User Guide before using it.

3 What's New?

This 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:

- Added HDMI video support
- Added HDMI audio (Source from SPDIF Tx) support
- Added Bluetooth basic support
- Added sensor camera (ov5640) support via CSI
- Added MFGTool 4 boards support
- Added Dithering support on EPDC

3.2 Supported Power Management Features

- Audio playback mode support (DDR @50MHz, AHB @ 24MHz)
- Optimized IDLE power consumption
 - IDLE mode – All PLLs are in bypass mode when ARM is in WFI in system IDLE mode
 - Lower DDR I/O power in system IDLE mode
- VDDSOC/VDDPU voltages now track the VDDARM voltages as required by the HW design (in LDO bypass and enabled mode)

3.3 Defect Fixes

See ResolvedDefects.html, referenced inside the file readme.html, for the list of the defects fixed in this release. Only hot fixes are listed here.

4 BSP Supported Features

Table below describes the features that are supported in this BSP release.

Table 4. Supported Features

Feature	Supported	Comments
Kernel		
Kernel	Yes	Kernel version: 3.0.35
File System	Yes	EXT2/EXT3/EXT4 are used as the file system in MMC/SD Hard Disk.
Bootloader		
U-Boot	Yes	<ul style="list-style-type: none"> • U-Boot delivery is based on U-Boot version 200908. • Supports LPDDR2 400MHz@32bit, ENET, UART, MMC/SD, eMMC4.3/4.4, SPI-NOR, OTP Fuse, Clock, Anapop regulator, boot using L2Cache as OCRAM, splash screen via EPDC, and secure boot.
Machine Specific Layer		
ARM Core	Yes	Supports Cortex-A9. Supports reboot and power-off.
Memory	Yes	512M memory is used.
Interrupt	Yes	GIC
Clock	Yes	Controls system frequency and clock tree distribution.
Timer (GPT)	Yes	System timer tick support.
GPIO/EDIO	Yes	GPIO is initialized in earlier phase according to hardware design.
IOMUX	Yes	Provides the interfaces for I/O configuration. IOMUX-V3 version is used.
DMA Engine		
SDMA	Yes	Conforms to DMA engine framework.
Character Device Drivers		

Table continues on the next page...

Table 4. Supported Features (continued)

MXC UART	Yes	Console support via internal Debug UART.
Graphic Drivers		
CSI	Yes	Support CSI Camera (ov5640)
HDMI	Yes	Support external HDMI (sii902x)
WVGA panel	Yes	Supports SEIKO WVGA panel.
EPDC	Yes	<p>Enable EPDC:</p> <ul style="list-style-type: none"> - Support for RGB565 frame buffer format. - Support for Y8 frame buffer format. - Support for full and partial EPD screen updates. - Support for up to 256 panel-specific waveform modes. - Support for automatic optimal waveform selection for a given update. - Support for synchronization by waiting for a specific update request to complete. - Support for screen updates from an alternate (overlay) buffer. - Support for automated collision handling. - Support for 64 simultaneous update regions. - Support for pixel inversion in a Y8 frame buffer format. - Support for posterization of the update contents (driving all pixels to either solid black or white). - Supports use of a color map to remap Y8 frame buffer contents. - Support for 90, 180, and 270 degree HW-accelerated frame buffer rotation. - Support for panning (y-direction only). - Support for three EPDC driver display update schemes: Snapshot, Queue, and Queue and Merge. - Support for user control of the delay between completing all updates and powering down the EPDC.

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Table 4. Supported Features (continued)

SPDC	Yes	<p>Enable SPDC:</p> <ul style="list-style-type: none"> - Support for SPDC driver as a loadable or built-in module. - Support for RGB565 and Y4 frame buffer formats. - Support 800x600 resolution. - Support for full and partial EPD screen updates. - Support for automatic optimal waveform selection for a given update. - Support for synchronization by waiting for a specific update request to complete. - Support for screen updates from an alternate (overlay) buffer. - Support for 90, 180, and 270 degree HW-accelerated frame buffer rotation. - Support for panning (y-direction only). - Support for automated full and partial screen updates through the Linux fb_deferred_io mechanism. - Support for three SPDC driver display update schemes: Snapshot, Queue, and Queue and Merge. - Support for setting the ambient temperature through either a one-time designated API call or on a per-update basis. - Support for user control of the delay between completing all updates and powering down the SPDC.
GPU	Yes	GC355, GC320
Multimedia Drivers		
PxP	Yes	Enables PxP driver for EPDC.
Power Management Drivers		
Anatop Regulator	Yes	Supports Anatop regulator management.
Lower Power mode	Yes	Supports standby mode (map to SoC stop mode). Supports mem mode (map to SoC DSM mode).
DVFS-Core	Yes	
CPUFreq	Yes	CPUFreq can be used for CPU frequency adjustment. The userspace, performance, conservative, and powersave governors are supported and conservative governor is enabled by default.
Bus scaling	Yes	Bus Scaling is enabled by default.
Battery charging	Yes	Done by hardware. No software intervention.
Sound Drivers		
WM8962/SSI	Yes	Supports playback.
Input Device Drivers		
Touch panel	Yes	Supports E Ink touch screen on DC2/DC3 add-on card.
Keypad	Yes	Supports 4x4 keypads on DC2/DC3 add-on card.
USB devices	Yes	Supports USB mouse and USB keypad via USB ports.
MTD driver		
SPI NOR	Yes	
Networking Drivers		
ENET	Yes	

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Table 4. Supported Features (continued)

USB Drivers		
USB	Yes	- Supports USB OTG2.0 port. - USB Host mode: MSC, HID, UVC, USB audio. - USB device mode: MSC, Ethernet, Serial. - USB OTG pin detect.
Security Drivers		
General drivers		
uSDHC	Yes	- Supports SDHC2, SDHC3,SDIN5C2-8G via SDHC4. - SD2.0 - SD3.0 - eMMC 1bit/4bit/8bit SDR/DDR mode. - SDXC
WatchDog	Yes	Supports Watchdog reset.
I2C	Yes	Supports I2C master.
SPI	Yes	Supports SPI master mode.
PWM	Yes	Supports the backlight driver via PWM.
Temperature monitor	Yes	Requires chip calibration data.
WiFi	Yes	Supports AR6003 WiFi.
Bluetooth	Yes	Supports AR3001 Bluetooth, need board re-work.

5 Kernel boot parameters

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

Table below describes the different boot parameters.

Table 5. Kernel Boot Parameters

Kernel Parameters	Description	Typical Values	Used When
console	Where to output kernel logging by printk.	console=ttymxc0,115200	All cases
ip	Tell kernel how or 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."

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Table 5. Kernel Boot Parameters (continued)

root	The location of the root file system.	root=/dev/nfs or root=/dev/mmcblk0p2	Used in "boot from tftp/NFS" (that is, root=/dev/nfs); Used in "boot from SD" (that is, root=/dev/mmcblk1p2).
rootfstype	Indicates the file system type of the root file system.	rootfstype=ext4	Used in "boot from SD" together with "root=/dev/mmcblk1p2."
rootwait	Wait (indefinitely) for root device to show up.	rootwait	Used when mounting SD root file system.
mem	Tell kernel how much memory can be used.	None or mem=864M	Note: MemTotal-<mem> - <gpu_memory> is reserved.
max17135	Configure Maxim17135 EPD PMIC pass number and VCOM voltage.	max17135:pass=[pass_num],vcom=[vcom_uV]	Used when enabling EPDC. pass_num should equal 2 for all IMXEBOOKDC2 cards. vcom_uV, in microvolts, should be equal to the value printed on the cable connector that is attached the E Ink panel being used.
video	Tells EPDC FB driver which E Ink panel is in use and what bpp should be used for the Frame Buffer.	video=mxcepdcfb:E060SCM,bpp=16	Used when enabling EPDC to select the correct E Ink panel parameters to use. bpp=16 selects RGB565 FB pix format bpp=8 selects Y8 FB pixel format
video	Tells SPDC FB driver which Sipix panel is in use and what bpp should be used for the Frame Buffer.	video=mxcspscfcfb:ERK_1_4_A01,bpp=16	Used when enabling SPDC to select the correct Sipix panel parameters to use. bpp=16 selects RGB565 FB pix format
video	Tells ELCDIF FB driver which LCD panel is in use and which bpp should be used for the Frame Buffer.	video=mx_elcdif_fb:SEIKO-WVGA,bpp=16	Used when enabling LCDIF to select the correct panel parameters to use. bpp=16 selects RGB565 FB pix format Note: if only use EPDC FB, then turn off ELCDIF FB by "video=mx_elcdif_fb:off"
hdmi	Enable HDMI (sii902x) driver	hdmi	Used when enabling HDMI
csi	Enable CSI driver	csi	Used when enabling CSI driver(needed by ov5640) Note: CSI and EPDC has pin conflicts. When csi is enabled, then EPDC cannot be used.
spdc	Enable SPDC	spdc video=mxcspscfcfb:ERK_1_4_A01,bpp=16	Add to kernel options if prioritize SPDC over EPDC when both are built-in.
fec_mac	Tells the Ethernet Mac address.	fec_mac=xx:xx:xx:xx:xx	Changes mac address.
enable_wait_mode	enable wait mode	enable_wait_mode=on	This feature is ON by default for this release.

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Table 5. Kernel Boot Parameters (continued)

arm_freq	Limit max CPU frequency and set default frequency to arm_freq.	arm_freq=800 arm_freq=1000	Used when changing ARM CPU frequency. 1G CPU frequency is set by default.
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6 Known Issues/Limitations

Read through all hardware related reference material and ensure the necessary hardware modifications have been made before using the software.

Table below lists some key known issues.

Table 6. Known Issues and Workarounds

Features	Category	Description	Resolution/Workaround
EPDC	Software	Enabling E-Ink Auto-update mode (Device Drivers > Graphics Support > E-Ink Auto-update Mode Support) causes E Ink panel updates to be distorted and flaky.	Disable the E-Ink Auto-update Mode feature in the menuconfig.
Thermal	Hardware	Temperature Monitor should only be enabled for chips that have undergone proper thermal sensor calibration.	Ensure proper temperature calibration before using the temperature monitor.
vfat	Software	vfat file system hangs if udisk is unplugged during data transfer.	No.
VI editor	Software	After using aplay/arecord (version 1.0.24) software, VI editor can't be used.	Use aplay/arecord version other than 1.0.24.
ALSA	Software	Pause/resume feature by "ctrl+z"/"fg" commands are not available on Ubuntu when aplay/arecord is used.	Update alsa-lib/aplay/arecord version to 1.0.26.
GPU	Software	Driver recovery mechanism may not work properly sometimes.	No.
GPU	Software	CTRL+C to exit some GPU applications may cause "GPU STATE DUMP".	No.
GPU	Software	Updating EGLImage can't take effect immediately.	No.
GPU	Software	Shader programs can't use more than 8 varying attributes. Otherwise, linker will fail.	No.
SDHC	Software	Occasionally, MMC will complain timeout during transferring.	No.
SDHC	Software	MMC will timeout during suspend/resume when transferring files with WiFi.	No.
Keypad	Hardware	Reset key on DC2/DC3 add-on card does not work.	No, since the signal is not connected to EVK board.

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Table 6. Known Issues and Workarounds (continued)

System	Hardware	Reboot may not work on EVK board.	Reboot function should be always okay if the hardware can trigger PMIC reset(which ensures RESET key and watchdog reset can control PMIC_ON_REQ pin).
CSI/EPDC	Hardware	Can not be used simultaneously since they have pins conflicts.	re-organize the pin use.
Boot	Hardware	When select the boot setting to (arm/ddr)528 / 307 MHz, ROM code fails to read uboot for a Transcend SDHC class 6 card.	<ol style="list-style-type: none"> 1. This is only found on Transcend card while card with different type has no such issue. The cause is the signal integrity of the SD signals, especially the SD clock signal. 2. If HYS bit of the pad setting set, the issue fixed, while ROM code cannot set this bit. 3. Fine tuning the driver strength of the SD pads(can be done by blowing some fuse), the issue fixed.
X-Acceleration	Hardware/ Software	meet out of memory during x11perf test.	It's kind of system limitation because x11perf need much memory.
Mfgtool2	Software	Mfgtool2 may fail to execute "frf" command if there is no "send" or "pipe" command executed prior to it.	Remove this "frf" command from ucl2.xml can fix this issue.

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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 10 5879 8000
support.asia@freescale.com

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