

i.MX 6Dual/6Quad SABRE-SD 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_4.1.0_130816_source.tar.gz
- L3.0.35_4.1.0_130816_images_MX6.tar.gz
- L3.0.35_4.1.0_130816_docs.tar.gz

The release version is named as
"L<Kernel_version>_<x.y.z>_<yymmdd>."

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

"<x.y.z>": Semantic versioning specification, where X is the major version, Y is the minor version and Z is the patch version.

"<yymmdd>": Release candidate build date.

Tables below list the contents included in each package:

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Table 1. Release Metadata

SoC	Kernel Version	Boards Supported
i.MX 6Dual/6Quad	3.0.35	Sabre Board for Smart Devices (MCIMX6Q-SDB), Sabre Platform for Smart Devices (MCIMX6Q-SDP)

Table 2. L3.0.35_4.1.0_130816_images_MX6.tar.gz Content

File	Description
u-boot-mx6q-sabresd.bin	U-Boot bootloader for the Sabre Board for Smart Devices (MCIMX6Q-SDB), Sabre Platform for Smart Devices (MCIMX6Q-SDP) Board and Platform.
ulmage	Binary kernel image for the Linux 3.0.35 kernel.
firmware-imx_L3.0.35_4.1.0_armel.deb	Debian package for the firmware files that includes VPU, SDMA, and Atheros Wi-Fi.
imx-lib_L3.0.35_4.1.0_armel.deb	Debian package for imx-lib binary.
imx-test_L3.0.35_4.1.0_armel.deb	Debian package for the imx unit test binary.
kernel_3.0.35-imx_L3.0.35_4.1.0_armel.deb	Debian package for the Linux kernel image, kernel modules, and the header files.
modeps_L3.0.35_4.1.0-1_armel.deb	Debian package for module dependencies.
udev-fsl-rules_L3.0.35_4.1.0-5_armel.deb	Debian package for udev rules.
atheros-wifi_L3.0.35_4.1.0_armel.deb	Debian package for Atheros WiFi driver.
gpu-viv-bin-mx6q_L3.0.35_4.1.0_armel.deb	Debian package for GPU base driver.
gpu-viv-wl-bin-mx6q_L3.0.35_4.1.0_armel.deb	Debian package for GPU wayland driver.

Table 3. L3.0.35_4.1.0_130816_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-L3.0.35_4.1.0.tar.gz	Source code for the unit tests.
pkgs/imx-lib-L3.0.35_4.1.0.tar.gz	Source code for the libraries.
pkgs/linux-3.0.35-imx_L3.0.35_4.1.0.bz2	Freescale 3.0.35-L3.0.35_4.1.0 kernel patches.
pkgs/u-boot-v2009.08-imx_L3.0.35_4.1.0.tar.bz2	i.MX U-Boot patches based on U-Boot version 2009.08.
pkgs/firmware-imx-L3.0.35_4.1.0.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 4. L3.0.35_4.1.0_130816_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-L3.0.35_4.1.0.tar.gz`

2 System Requirements

The following subsections introduce the system requirements.

2.1 Linux Host Server

See *Setting Up a Linux Host for LTIB Builds on Ubuntu 9.04* document included in the release package to set up the Linux host server. This is tested against Ubuntu 9.04.

2.2 MFG Tool

The `Mfgtools-Rel-L3.0.35_4.1.0_130816_MX6Q_UPDATER.tar.gz` package contains the image downloading tool.

2.3 Sabre Board for Smart Devices (MCIMX6Q-SDB), Sabre Platform for Smart Devices (MCIMX6Q-SDP) Components

To find out more about SABRE-SDP components, see SABRE-SDP Quick Start Guide (SABRESDP_IMX6_QSG), which is available here: http://www.freescale.com/files/32bit/doc/quick_start_guide/SABRESDP_IMX6_QSG.pdf?fpsp=1.

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:

- HDMI HDCP support
- HDMI CEC support
- HDMI HDCP certification
- Upgrade GPU to 4.6.9 p12 version
- VPU integrate firmware 2.3.10
- i.MX 6Dual/6Quad disable the double line fill feature of PL310

3.2 Supported Power Management Features

No new feature added into this release.

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.

- ENGR00275391 i.mx6d/q: disable the double linefill feature of PL310
- ENGR00255073 crypto: kernel dump when do crypto module speed test in single mode
- ENGR00271977-1 imx6_defconfig: enable PL310_ERRATA_769419
- ENGR00271718 ASoC: Fix check for symmetric rate enforcement
- ENGR00264650 VPU can not playback after driver reload

4 BSP Supported Features

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

Table 5. 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	
Machine Specific Layer		
ARM Core	Yes	Supports Cortex-A9. Supports reboot and power-off.
Memory	Yes	2G

Table continues on the next page...

Table 5. Supported Features (continued)

		The user/kernel space is split 2G/2G.
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		
MXC UART	Yes	Console support via internal Debug UART4.
Graphic Drivers		
Frame Buffer Driver	Yes	MXC Frame buffer driver for IPU V3.
VDOA	Yes	Supports Video Data Order Adapter.
LVDS	Yes	Supports HannStar LVDS panel. It's the default display if no other video option is setup.
HDMI	Yes	Supports the on-chip DesignWare HDMI hardware module.
WVGA panel	Yes	Supports SEIKO WVGA panel.
MIPI Display	Yes	Supports MIPI DSI driver through MIPI daughter card.
GPU	Yes	GC2000, GC355 and GC320.
Multimedia Drivers		
IPU V3 driver	Yes	Provides the interfaces to access IPU V3 modules.
V4L2 Output	Yes	The V4L2 output driver uses the IPU post-processing functions for video output.
V4L2 Capture	Yes	Supports dual camera.
VPU	Yes	MPEG4/H263/H264/VC1/MPEG2/AVS/MJPEG/VP8 decode and H263/MPEG4/H264/MJPEG encoder.
CSI Camera	Yes	Supports OV5640 camera sensor.
MIPI-CSI	Yes	Supports OV5640 camera sensor.
Power Management Drivers		
Anatop Regulator	Yes	Supports Anatop regulator management.
Lower Power mode	Yes	Supports standby mode (map to SoC stop mode).
CPUFreq	Yes	CPUFreq can be used for CPU frequency adjustment. The Interactive governor is added and enabled by default.
Bus scaling	Yes	
Battery charging	Yes	
Sound Drivers		
S/PDIF	No	
WM8962/SSI	Yes	
ASRC	Yes	Supports ASRC module for sample rate conversion.
HDMI Audio	Yes	
Input Device Drivers		
Touch panel	Yes	Supports eGalax capacitive touch screen driver.

Table continues on the next page...

Table 5. Supported Features (continued)

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	Supports SPI-NOR flash.
SATA	Yes	
Networking Drivers		
ENET	Yes	Supports AR8031 PHY.
IEEE 1588	Yes	Works for TO1.2 and subsequent releases.
PCIe	Yes	Tested PCIe Device (GEN1 and GEN2 modes). <ul style="list-style-type: none"> • Intel gigabit CT network standard PCIE GEN1 X1 card. • PCIE to USB 3.0 standard PCIE GEN2 X1 card. • iwl5100/6300 WiFi mini-PCIE GEN1 X1 cards.
USB Drivers		
USB Host	Yes	Supports USB HOST1 and USB OTG host.
USB Device	Yes	Supports USBOTG device mode.
Security Drivers		
Security drivers(CAAM)	Yes	
General drivers		
SNVS RTC	Yes	Low power section only.
uSDHC	Yes	- Supports SDHC2, SDHC3,SDIN5C2-8G via SDHC4. - SD2.0 - eMMC 1bit/4bit/8bit SDR/DDR mode.
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.
Accelerometer	Yes	Supports MMA8451 driver.
Ambient Light Sensor	Yes	Supports ISL29023 driver.
Magnetometer Sensor	Yes	Supports MAG3110 driver.
WiFi	Yes	Supports AR6003 WiFi.

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 6. 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."
root	The location of the root file system.	root=/dev/nfs or root=/dev/mmcblk1p2	Used in "boot from tftp/NFS" (that is, root=/dev/nfs); Used in "boot from SD" (that is, root=/dev/mmcblk1p2). eMMC will be recognized as mmcblk0 on SABRE-SD board.
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.
maxcpus	[SMP] Maximum number of processors that SMP kernel should use.	maxcpus=1	maxcpus=n : n >= 0 limits the kernel to using 'n' processors. n=0 is a special case. It is equivalent to "nosmp".
ldb=<x>	Tells the kernel/driver which ldb mode will be used.	1. ldb=sin0/1 2. ldb=spl0/1 3. ldb=dul0/1 4. ldb=sep0/1	<ol style="list-style-type: none"> 1. Used when an LVDS use single mode on display port0/1. 2. Used when an LVDS use split mode on display port0/1. 3. Used when two LVDS use dual mode on display port0/1. 4. Used when two LVDS use separate mode on display port0/1. <p>There are two LVDS channels, LVDS0 and LVDS1, which can transfer video data. These two channels can be used as split/dual/single/separate mode. The source for LVDS channel data is the IPUv3 display interfaces, DI0, or DI1. Split mode means display data from DI0 or DI1 will be sent to both channels LVDS0 and LVDS1. Dual mode means display data from DI0 or DI1 will be duplicated on LVDS0 and LVDS1. That</p>

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Table 6. Kernel Boot Parameters (continued)

			is, LVDS0 and LVDS1 will display the same content. Single mode means that only DI0->LVDS0 or DI1->LVDS1 will be active at once. Separate mode means that DI0->LVDS0 and DI1->LVDS1 may be simultaneously active. It is suggested to use ldb=sep1 mode, which is the default kernel settings to support multi display devices better.
video	<p>Tells kernel/driver which resolution/depth and refresh rate should be used for display port 0 or 1.</p> <p>See the parameter information under Documentation/fb/modedb.txt</p> <p>Tells the kernel/driver which IPU display interface format should be used.</p>	<ol style="list-style-type: none"> 1. video=mxcfb0:dev=hdmi, 1920x1080M@60,if=RGB24 video=mxcfb1:dev=ldb,LDB-XGA,if=RGB666 2. video=mxcfb0:dev=ldb,LDB-XGA,if=RGB666 video=mxcfb1:dev=hdmi, 1920x1080M@60,if=RGB24 3. video=mxcfb0:dev=lcd,CLAA-WVGA,if=RGB666 	<ol style="list-style-type: none"> 1. Used when primarily displaying on hdmi with 1080P60 mode. Secondly displaying on LVDS with XGA mode. 2. Used when primarily displaying on LVDS with XGA mode. Secondly displaying on hdmi with 1080P60 mode. 3. Used when primarily displaying on Boundary Devices WVGA RGB display. <p>NOTE: GBR24/RGB565/YUV444 etc represents the display HW interface format. Typical values for certain different display devices are shown below:</p> <p>TVOUT: YUV444 VGA: GBR24 HDMI&DVI: RGB24 CLAA WVGA LCD: RGB565</p> <p>Typical values for dev= are shown below:</p> <p>lcd: LCD interface ldb: LVDS hdmi: HDMI on chip or sii902x dvi: DVI port vga: VGA through TVE tve: TVOUT</p>
dmfc	Tells the kernel/driver how to set the IPU DMFC segment size.	<p>None</p> <p>Or</p> <p>dmfc=3</p>	<p>"dmfc=1" means DMFC_HIGH_RESOLUTION_DC.</p> <p>"dmfc=2" means DMFC_HIGH_RESOLUTION_DP.</p> <p>"dmfc=3" means DMFC_HIGH_RESOLUTION_ONLY_DP.</p> <p>Note: DMFC_HIGH_RESOLUTION_ONLY_DP can only be set by the command</p>

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Table 6. Kernel Boot Parameters (continued)

			line. It is recommended to be set when no IPU connects the two panels. When it is set, each IPU can only connect one panel.
fec_mac	Tells the Ethernet Mac address.	fec_mac=xx: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. Please see the wait mode issue on the Known Issues/Limitations chapter.
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. The frequency that user set by the command line can't exceed the max CPU frequency that the speed_grading fuse specified.
ldo_active	Enable/disable LDO bypass.	ldo_active=on ldo_active=off	By default, LDO bypass is enabled. If you want to use internal LDO, please specify "ldo_active=on" to the kernel command line. LDO bypass can only be enabled on the board that mounted with external PMIC to supply VDDARM_IN/VDDSOC_IN power rail. LDO bypass is not supported on the chips with 1.2Ghz max CPU frequency
caam	Enable/disable CAAM module.	caam	By default, CAAM is disabled. If you want to use CAAM module, please specify "caam" to the kernel command line. CAAM uses ALT7 mode of pad GPIO_0, which conflicts with any other module that using pad GPIO_0 on the board. On this board, CAAM conflicts with audio codec (WM8962) and camera(ov5642) module.

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 7. Known Issues and Workarounds

Feature	Category	Description	Resolution/Workaround
SATA Boot	Hardware	System can't boot from SATA on RevB board.	Remove R7
Boot	Hardware	System can't boot sometimes when it is first powered on RevB board.	Add 2.2Mohm resistor to 24M OSC.

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Table 7. Known Issues and Workarounds (continued)

Suspend/Resume	Hardware/Software	Suspend/Resume failure if board rework "Add 2.2Mohm resistor to 24M OSC".	Remove rework
SPI NOR boot	Hardware	SPI NOR boot is not supported by Smart Device Board.	Current SD board uses KEY relative PINs as SPI interface. However, this set of PINs are not supported by ROM. Therefore, SPI NOR boot is not supported by Smart Device Board.
USB	Hardware	USB does not function well on SD RevB board.	Hardware rework is required. After removing U12, USB functions well.
ARM	Software	smp_wmb performance is very low.	This is the common side-effect of SMP. No fix plan.
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.
CPU hotplug	Software	System hangs after conducting CPU hot plug many times during heavy interrupt.	Known ARM linux limitation. No workaround as of yet. Please refer to the link for more details: http://thread.gmane.org/gmane.linux.ports.arm.omap/68798/focus=68801
USB remote wakeup	Hardware	System can't enter suspend status if USB remote wakeup is enabled on RevB board.	Hardware rework: <ul style="list-style-type: none"> • Change R598 1 <-> SMT to A <-> SMT. • Change R35 to 6.8K. • Change R34 to 3.9K. • Fly a wire between R598.PIN1 and C605.NVCC_PLL_OUT.
VPU	Software	Cannot support "-x 1" option for unit test program mxc_vpu_test.out because IPU library is removed.	To avoid this issue, do not use "-x 1", since "-x 1" means enable for IPU library.
IPU	Software	IPU library is removed from i.MX 6.	Should not use IPU library interfaces in i.MX 6 SW.
IPU	Software	Framebuffer driver and v4l2 output driver share the same fb device. For example, /dev/video16 also uses the /dev/fb0 to do video playback.	fb operations should be banned during video playback on the same fb device.
vfat	Software	vfat file system hangs if udisk is unplugged during data transfer.	No.
USB OTG	Software	OTG can't work normally sometimes if unplug & plug OTG cable when system enters suspend state and disables USB remote wakeup.	Enable USB remote wake up.
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.
dmesg	Software	After using aplay/arecord (version 1.0.24) software, dmesg command can't output the full kernel message.	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.

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Table 7. Known Issues and Workarounds (continued)

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.
SDHC	Software	Occasionally, MMC will complain timeout during transferring.	No.
SDHC	Software	MMC will timeout during suspend/resume when transferring files with WiFi.	No.
ENET	Hardware	The limitations of rx bandwidth more than 200 Mbps to use switches with pause-frame enable System: Ethernet MAC generates RX FIFO overruns	In userspace change MTU size: <code>echo 512 > /sys/class/net/eth0/mtu</code> or: <code>ifconfig eth0 mtu 512</code>
PCIe	Hardware/ Software	PCIe doesn't support Hot Plug and Power Management.	No.
Wait mode	Software	System will not boot up successfully on the pre-production chip such as the TO1.1/TO1.0 chip.	Freescall decided to drop the pre-production(TO1.1/TO1.0) chip support. You can the production chip.
USB OTG	Software	Do not use module dependency for loadable OTG driver module solution.	When building all the three USB drivers to modules (otg, host, and device), you must load and unload the three modules together and in the correct sequence, because there is no module dependency while function dependency exists. The loading sequence is: <code>fsl_otg_arc > ehci_hcd > arcotg_udc</code> , and unloading sequence is: <code>arcotg_udc > ehci_hcd > arcotg_udc</code> . Meanwhile, if a gadget module, such as <code>g_mass_storage</code> , needs to be installed and be removed from the fly, all USB modules need to be installed or removed.

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