

i.MX 6Solo/6DualLite SABRE-SDP 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.

1	Release Contents.....	1
1.1	Contents.....	1
1.2	License.....	3
2	System Requirements.....	3
2.1	Linux Host Server.....	3
2.2	MFG Tool.....	3
2.3	SABRE Platform for Smart Devices (MCIMX6DL-SDP) Components.....	3
3	What's New?.....	3
3.1	New Features.....	4
3.2	Supported Power Management Features.....	4
3.3	Defect Fixes.....	4
4	BSP Supported Features.....	4
5	Kernel Boot Parameters.....	7
6	Known Issues/Limitations.....	10

Release Contents

This release is also referred to as the GA release for i.MX 6Solo/6DualLite.

Tables below list the contents included in each package:

Table 1. Release Metadata

SoC	Kernel Version	Boards Supported
i.MX 6Solo/6DualLite	3.0.35	SABRE Platform for Smart Devices (MCIMX6DL-SDP)

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

File	Description
u-boot-mx6dl-sabresd.bin	U-Boot bootloader for the SABRE Platform for Smart Devices (MCIMX6DL-SDP).
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_MX6DL_UPDATER.tar.gz` package contains the image downloading tool.

2.3 SABRE Platform for Smart Devices (MCIMX6DL-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?fsp=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

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.

- 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	<ul style="list-style-type: none"> • U-Boot delivery is based on U-Boot version 200908. • Supports DDR3 400MHz@64bit, ENET, UART, MMC/SD, eMMC4.3/4.4/4.41, SPI-NOR, OTP Fuse, Clock, Anapop regulator, and splash screen via LVDS.
Machine Specific Layer		
ARM Core	Yes	Supports Cortex-A9. CPUFREQ freq of up to 1GHz is supported 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.
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. - Support for dithering.
GPU	Yes	GC880, GC320. OpenGL ES2.0, OpenGL ES1.1
Multimedia Drivers		

Table continues on the next page...

Table 5. Supported Features (continued)

IPU V3 driver	Yes	Provides the interfaces to access IPU V3 modules.
PxP	Yes	Enables PxP driver for EPDC.
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. 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). Supports mem mode (map to SoC DSM 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.
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 M25P32 SPI-NOR flash.
Networking Drivers		
ENET	Yes	Supports AR8031 PHY.
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	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		
Security drivers(CAAM)	Yes	

Table continues on the next page...

Table 5. Supported Features (continued)

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=ttymx0,115200	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/mmcbk1p2	Used in "boot from tftp/NFS" (that is, root=/dev/nfs); Used in "boot from SD" (that is, root=/dev/mmcbk1p2). eMMC will be recognized as mmcbk0 on SABRE-SD board.

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Table 6. Kernel Boot Parameters (continued)

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".
epdc	Enable EPDC	epdc video=mxcepdcfb:E060SCM,bpp=16	Add to kernel options only if E Ink is the primary display panel. If other display panel is primary, this option may result in a pixel clock conflict and improper display function.
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.
ldb=<x>	Tells the kernel/driver which ldb mode will be used.	<ol style="list-style-type: none"> 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 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.</p>

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Table 6. Kernel Boot Parameters (continued)

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 2. video=mxcfb0:dev=ldb,LDB-XGA,if=RGB666, None or ldb=sin0 3. ldb=sep1 4. video=mxcfb0:dev=lcd,SEIKO-WVGA,if=RGB24 5. video=mxcfb0:dev=lcd,CLAA-WVGA,if=RGB565 6. video=mxcfb0:dev=lcd,CLAA-WVGA,if=RGB666 ldb=sin0 7. video=mxcfb0:dev=hdmi, 1920x1080M@60,if=RGB24 ldb=sep1 8. To enable dual LVDS panels, there is no need for any options. 	<ol style="list-style-type: none"> 1. Used when primary displaying on hdmi with 1080P60 mode. 2. Used when primary displaying on the HannStar LVDS0. 3. Used when primary displaying on the HannStar LVDS1. 4. Used when primary displaying on the SEIKO WVGA panel. 5. Used when primary displaying on the CLAA WVGA panel. 6. Used when enabling HDMI 1080P60 mode and LVDS0. To enable second display, run "echo 0 > /sys/class/graphics/fb2/blank" 7. Used when enabling HDMI 1080P60 mode and LVDS1. To enable second display, run "echo 0 > /sys/class/graphics/fb2/blank" <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</p> <p>VGA: GBR24</p> <p>HDMI&DVI: RGB24</p> <p>CLAA WVGA LCD: RGB565</p> <p>Typical values for dev= are shown below:</p> <p>ldb: LVDS</p> <p>hdmi: HDMI on chip or sii902x</p> <p>dvi: DVI port</p> <p>vga: VGA through TVE</p> <p>tve: TVOUT</p>
dmfc	<p>Tells the kernel/driver how to set the IPU DMFC segment size.</p>	<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 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.</p>

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Table 6. Kernel Boot Parameters (continued)

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
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.

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Table 7. Known Issues and Workarounds (continued)

PMIC	Hardware	i.MX 6DualLite SD board depopulates the resistor R30 which takes away the ability of the processor to turn off the PMIC in hardware.	i.MX 6DualLite TO1.1 will use dumb mode by default.
EPDC	Hardware	The PINs of EPDC are in conflict with other modules.	To enable EPDC, add "epdc" command option into boot command line.
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.
EPDC	Hardware	ENGR00178495 3 boards cannot boot with EPDC DC2 attached while they boot normally without DC2 daughter cards. 100%.	This is because the SW3 (KEYPAD_LOCK) switcher on EBOOK DC2 board was switched "ON" which affects the boot bin "EIM_DA7" (BT_CFG1_7). You need to set SW3 in DC2 board to "OFF."
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.
uSDHC	Hardware	SD3.0: U-Boot can't boot with SDR50 and SDR104.	Fixed in TO1.1.
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.

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Table 7. Known Issues and Workarounds (continued)

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.
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: echo 512 > /sys/class/net/eth0/mtu or: ifconfig eth0 mtu 512
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 TO1.0 chip.	Freescle decided to drop the pre-production TO1.0 chip support. You can use 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: fsl_otg_arc > ehci_hcd > arcotg_udc, and unloading sequence is: arcotg_udc > ehci_hcd > arcotg_udc). Meanwhile, if a gadget module, such as g_mass_storage, needs to be installed and be removed from the fly, all USB modules need to be installed or removed.

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