

WT-EDKSOM6ULX Kernel Compilation Method

Revise history:

Version	Date	Log
V1.0	2019/07/08	Create
V1.1	2019/09/20	Add part 4

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1 . Construction of Development Environment

Create a work directory:

```
mkdir /home/industio_work  
cd /home/industio_work
```

1.1、Get source file

- Download uboot source:

Download link: `git clone http://git.freescale.com/git/cgit.cgi/imx/uboot-imx.git`

After download, enter the source directory "uboot-imx":

```
cd uboot-imx
```

Checkout v2016 branch:

```
git checkout imx_v2016.03_4.1.15_2.0.0_ga
```

Download uboot patch:

```
wget https://github.com/industio/WT-EDKSOM6ULX-Linux/raw/master/UBOOT-PATCH/0001-evk-board-first-commit.patch
```

```
wget https://github.com/industio/WT-EDKSOM6ULX-Linux/raw/master/UBOOT-PATCH/0002-update-CONFIG\_ENV\_OFFSET.patch
```

```
wget https://github.com/industio/WT-EDKSOM6ULX-Linux/raw/master/UBOOT-PATCH/0003-add-512M-ddr-cfg-and-config.patch
```

```
wget https://github.com/industio/WT-EDKSOM6ULX-Linux/raw/master/UBOOT-PATCH/0004-update-fec-and-bootdelay.patch
```

```
wget https://github.com/industio/WT-EDKSOM6ULX-Linux/raw/master/UBOOT-PATCH/0005-add-power-on-from-onoff-key-select-lcd-resolution.patch
```

```
wget https://github.com/industio/WT-EDKSOM6ULX-Linux/raw/master/UBOOT-PATCH/0006-update-boot\_evk.dtb-boot\_edk.dtb-boot\_evk.img-boot\_e.patch
```

```
wget https://github.com/industio/WT-EDKSOM6ULX-Linux/raw/master/UBOOT-PATCH/0007-imx6ull-14x14-evk.dtb-to-imx6ull-14x14-edk.dtb.patch
```

Merge patch: use command "**git am -s**"

```
git am -s 0001-evk-board-first-commit.patch
```

```
git am -s 0002-update-CONFIG_ENV_OFFSET.patch
```

```
...
```

```
git am -s 0007-imx6ull-14x14-evk.dtb-to-imx6ull-14x14-edk.dtb.patch
```

- Download kernel source file

```
git clone http://git.freescale.com/git/cgit.cgi/imx/linux-imx.git
```

Enter kernel directory : linux-imx

```
cd linux-imx
```

Checkout branch:

```
git checkout imx_4.1.15_2.0.0_ga
```

Download kernel patch:

```
wget https://github.com/industio/WT-EDKSOM6ULX-Linux/raw/master/KERNEL-PATCH/0001-edk-board-first-commit.patch
```

Merge patch:

```
git am -s 0001-edk-board-first-commit.patch
```

1.2、Get the development SDK

Enter the work directory:

```
cd /home/industio_work
```

Download the SDK :

Download link: https://releases.linaro.org/components/toolchain/binaries/4.9-2017.01/arm-linux-gnueabi/gcc-linaro-4.9.4-2017.01-i686_arm-linux-gnueabi.tar.xz

Decompression:

```
sudo tar xvf gcc-linaro-4.9.4-2017.01-i686_arm-linux-gnueabi.tar.xz -C /opt/industio
```

Add environment variables to PATH:

Method 1:

Configure environment variables and edit configuration scripts,

```
#vi environment-setup_hf
```

```
GCC_PATH=/opt/industio/gcc-linaro-4.9.4-2017.01-i686_arm-linux-gnueabi
```

```
GCC_CC=arm-linux-gnueabi
```

```
export ARCH=arm
```

```
export CROSS_COMPILE=$GCC_CC-
```

```
export PATH=$GCC_PATH/bin:$GCC_PATH/bin/$GCC_CC:$PATH
```

Run: `source environment-setup_hf`

Method 2: add the environment variables to profile

eg:

```
vi .profile add the following contents to the end of the file.
```

```
export PATH=$PATH:/opt/industio/gcc-linaro-4.9.4-2017.01-i686_arm-linux-gnueabi/bin
```

```
export ARCH=arm
```

```
export CROSS_COMPILE= arm-linux-gnueabi
```

Note: If this method is used to compile QTs through qmake, make, it is necessary to ensure that the current system does not have qmake.

Check whether the environment is in effect:

```
which arm-linux-gnueabi-gcc
```

2. Compile u-boot and kernel

2.1、 compile u-boot

Enter uboot-imx:

```
cd /home/industio_work/uboot-imx
```

- For Nandflash version:

```
make mx6ull_14x14_evk_nand_defconfig
```

```
make
```

Final Generation: **u-boot.imx**

Note: If you want to compile the generated files into a directory, the method is as follows (for example, to generate the current "build" directory), here take Nand version as an example:

```
make mx6ull_14x14_evk_nand_defconfig O=build
```

```
make O=build
```

2.2、 Compile kernel

```
cd /home/industio_work/linux-imx
```

```
make wt_edksom6ull_defconfig
```

```
make -j4
```

 (J4 represents multithreaded compilation, and 4 is the number of host kernels)

Final Generation : **zImage** and **dtb**

zImage directory: **arch/arm/boot/zImage**

nand version dtb file directory: **arch/arm/boot/dts/imx6ull-14x14-evk-gpmi-weim.dtb**

emmc version dtb file directory: **arch/arm/boot/dts/imx6ull-14x14-evk-emmc.dtb**

Note: If you want to compile the generated files into a directory, the method is as follows (for example, to generate the current "build" directory),

```
make wt_edksom6ull_defconfig O=build
```

```
make O=build
```

3. Update u-boot and kernel

3.1 update u-boot

Firstly, put the u-boot.imx file generated at 2.1 placed to the SD card root directory, insert the SD card into the EVK board and mounted. Mount to the /mnt directory for example.

Enter the /mnt directory and then execute the following commands:

3.1.1 For Nandflash version

```
mount -t debugfs debugfs /sys/kernel/debug
flash_erase /dev/mtd0 0 0
kobs-ng init -x -v --chip_0_device_path=/dev/mtd0 u-boot.imx
```

3.2 update kernel

3.2.1 For Nandflash version:

After Kernel compilation is completed, executing `make Zi` generates `boot_edk.img` and `boot_edk.dtb` files in the `/home/industio_work/linux-imx` directory. Put these two files in the root directory of TF card, insert it into the EVK board, and power on, kernel files will be automatically updated.

3.3 Use mfgtools

We can also use “mfgtools” to update u-boot and kernel, but “uuu” is not supported. For the usage of “mfgtool”, please refer to the online materials.

4. Write to NandFlash

First copy the `u-boot.imx`, `ubifs.img`, `zImage` and `dtb` files to the SD card, then boot the system from the SD card.

4.1 write u-boot to NandFlash

Run:

```
mount -t debugfs debugfs /sys/kernel/debug
flash_erase /dev/mtd0 0 0
kobs-ng init -x -v --chip_0_device_path=/dev/mtd0 u-boot.imx
```

4.2 write filesystem to NandFlash

Run:

```
flash_erase /dev/mtd3 0 0
nandwrite -pk /dev/mtd3 ubifs.img
```

4.2 write kernel to NandFlash

Run:

```
flash_erase /dev/mtd1 0 0
```

```
nandwrite -p /dev/mtd1 zImage
```

```
flash_erase /dev/mtd2 0 0
```

```
nandwrite -p /dev/mtd2 imx6ull-14x14-evk-gpmi-weim.dtb
```

tips: Replace imx6ull-14x14-evk-gpmi-weim.dtb with the actual dtb file name.