

About MX53 NAND BOOT

This README lists necessary information to enable NAND boot in MX53 Linux platform:

TOOL

MFG tool is used to program images to NAND device in MX53 platform.

Because MX53 ROM requires FCB/DBBT structure support for nand boot, you must use kobs-ng tool to flash U-Boot with this boot structure instead of common nand boot command.

Meanwhile, MX53 TO1 ROM doesn't support bi swap solution, however kernel enables bi swap solution, you must enable "ignore bad block" option when flashing U-Boot. The example is as following:

```
echo 1 > /sys/devices/platform/mxc_nandv2_flash.0/ignorebad
kobs-ng init --chip_0_device_path=/dev/mtd2 u-boot.bin
echo 0 > /sys/devices/platform/mxc_nandv2_flash.0/ignorebad
```

Or you can refer to MFG tool ucl.xml under "Profiles\MX53 Linux Update\OS Firmware" folder, List "MX53EVK-NAND(JFFS2)-PDK" for the details.

/sys/devices/platform/mxc_nandv2_flash.0/ provides two attributes:

- disable_bi_swap:
 - 1: disable bi swap for NAND operations
 - 0: enable bi swap for NAND operations. Default value.
- ignorebad:
 - 1: ignore bad block check and force NAND operations
 - 0: check bad block for NAND operations. Default value.

Please use above attributes to program images rightly per your software and detailed request. When you meet some bad blocks which are caused by the software, not real bad block, please enable "ignorebad" to force erase wrong bad block information. Another method is to use "nand scrub" command into U-Boot for force erase. For the details, type "help nand" in U-Boot console.

Kobs-ng tool can be built from LTIB. In LTIB, select "kobs-ng" in package lists. It's enabled in MX5 FSL gnome-mobile and MFG profiles by default.

U-Boot

To add NAND support in U-Boot, you can refer to the following patches:

1. 0170-ENGR00132617-MX53-add-NAND-support.patch:
 - a) Enables MX53 NAND support in U-Boot.
 - b) Support a new NAND device "MT29F16G08ABACA".

2. 0171-ENGR00132709-MX53-add-clk-nfc-command-support.patch and 0173-ENGR00132758-correct-NFC_CLK-definition.patch
 - a) Add "clk nfc" command support
 - b) Limit NFC MAX clock as 34MHZ to be compatible with some old NAND devices. The user can change it for dedicate NAND device.
3. 0174-ENGR00132759-MX53-use-32K-CLK-as-GPT-source.patch: bug fix.
 - a) MT29F16G08MAA NAND flash was failed on MX53 ARD/RevB board, but it can work well in RevA board. After check, it's found that udelay is not accurate on MX53 ARD/RevB board because GPT uses IPG peripheral clock and assume it is 50MHZ. However IPG peripheral clock is not 50MHZ in MX53 ARD/RevB board. So it causes udelay is not accurate. This patch changes GPT clk source as 32K to make udelay accurate.

MX53 default configurations set MMC/SD as the environment storage. U-Boot uses get_mmc_env_devno (Read SBMR register BOOT_CFG3[5:4]) to get MMC/SD slot information. When booting from NAND, BOOT_CFG3[5:4] is 0x1. So U-Boot will treat the second slot as environment storage. You must insert SD card to bottom SD slot to get/store environment if you are using NAND boot on MX53 EVK with default U-Boot image.

If you want to use NAND as the environment storage, you can change default configurations. For example:

```

--- a/include/configs/mx53_evk.h
+++ b/include/configs/mx53_evk.h
@@ -263,7 +263,7 @@
#define CONFIG_SYS_NO_FLASH

/* Monitor at beginning of flash */
-#define CONFIG_FSL_ENV_IN_MMC
+#define CONFIG_FSL_ENV_IN_NAND

#define CONFIG_ENV_SECT_SIZE (128 * 1024)
#define CONFIG_ENV_SIZE CONFIG_ENV_SECT_SIZE

```

Regarding U-Boot NAND boot configurations, See user guide for the details. The example is like:

```

MX53-EVK U-Boot > setenv ethaddr 00:04:9f:01:32:e0
MX53-EVK U-Boot > setenv bootargs_base 'setenv bootargs console=ttymxc0,115200'
MX53-EVK U-Boot > setenv bootargs_nand 'setenv bootargs ${bootargs}
root=/dev/mtdblock4 rootfstype=jffs2 rw ip=dhcp'
MX53-EVK U-Boot > setenv bootcmd_nand 'run bootargs_base bootargs_nand;nand read
${loadaddr} 0x1000000 0x300000;bootm'
MX53-EVK U-Boot > setenv bootcmd 'run bootcmd_nand'

MX53-EVK U-Boot > saveenv

MX53-EVK U-Boot > run bootcmd

```

Kernel

MX53 ROM requires the boot FCB/DBBT support which need more space to store such info on NAND boot partition. Minim Requirement is "4 search blocks for FCB and 4 blocks for DBBT". So you must enlarge boot partitions size to meet ROM requirement. Currently the boot-loader partition is reserved as 16M size. See 0304-ENGR00132551-NAND-Adjust-the-boot-partition-size-fo.patch for the details.

In 2010_10 version, the addition 2 patches are added:

1. 0291-ENGR00132430-1-MX53-change-max-frequency-of-clocks.patch: Fix MX53 NFC clock issue
2. 0292-ENGR00132430-2-mxc-nand-add-ignore-bad-block-supp.patch: add "ignore bad block" attribute support to enable force erase.

Boot dip settings

You must set right boot config PINS to enable NAND boot per your NAND device. See MX53_EVK_Boot_mode_switch_settings.xls for the detailed descriptions about NAND boot dips.

For example, if you are using NAND 29F32G080AA NAND chip on MX53 EVK, you can set boot dips as the following for NAND boot: SW3: dip 7, 8 on; SW2: dip 3,5 on; SW1: dip 4,7,8 on. Other dips are off.

For MX53 ARD, you must mount R231 for NAND boot since Linux SW uses 16-bit ECC and then set dips as the following if using MT29F16G08ABACA: dip 1, 2, 4,5,6,9,0 ON; others are off. With HW rework, SD/MMC boot is changed as slot2 which is located on the backside of main board).