Build Bootloader

0. Configure Build Server

전체적인 내용은 **240.04.2**에서 확인 됨
Ubuntu-24.04.2 설치 (Ubuntu-20.04 이상 가능 - 패키지 미세 조정 필요)

아래 패키지 설치(24.04)
apt install build-essential gcc-aarch64-linux-gnu bison flex libssl-dev libncurses-dev unzip uuid uuid-dev device-tree-compiler gettext pkgconf swig libyaml-dev

아래 패키지 설치(20.04)
apt install build-essential gcc-aarch64-linux-gnu bison flex libssl-dev libncurses5 libncurses5-dev unzip uuid uuid-dev device-tree-compiler gettext pkgconf swig libyaml-dev

1. Create Directory

lssnow@lss:~$ mkdir bootloader
lssnow@lss:~$ cd bootloader

아래 위치 참고
https://github.com/mtk-openwrt/u-boot

lssnow@lss:~/bootloader$ git clone https://github.com/mtk-openwrt/u-boot.git

```
Cloning into 'u-boot'...
remote: Enumerating objects: 1047707, done.
remote: Counting objects: 100% (4/4), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 1047707 (delta 1), reused 1 (delta 1), pack-reused 1047703 (from 1)
Receiving objects: 100% (1047707/1047707), 286.48 MiB | 20.46 MiB/s, done.
Resolving deltas: 100% (832463/832463), done.
Updating files: 100% (35984/35984), done.
```

하지만, 이건 **RTL8370MB Switch** 드라이버가 포팅되지 않아 사용하지 않음

2. Download ATF

아래 위치 참고
https://github.com/mtk-openwrt/arm-trusted-firmware-mtk

lssnow@lss:~/bootloader$ git clone https://github.com/mtk-openwrt/arm-trusted-firmware-mtk.git

```
Cloning into 'arm-trusted-firmware-mtk'...
remote: Enumerating objects: 147292, done.
remote: Counting objects: 100% (23774/23774), done.
remote: Compressing objects: 100% (2093/2093), done.
remote: Total 147292 (delta 22144), reused 21681 (delta 21681), pack-reused 123518 (from 1)
Receiving objects: 100% (147292/147292), 44.42 MiB | 20.22 MiB/s, done.
Resolving deltas: 100% (98340/98340), done.
```

3. Build U-boot

lssnow@lss:~/bootloader$ cp ~/images/uboot-mtk-20220606.rtl8370mb.tar.gz .
lssnow@lss:~/bootloader$ tar zxvf uboot-mtk-20220606.rtl8370mb.tar.gz

lssnow@lss:~/bootloader$ cd uboot-mtk-20220606

make V=1 CROSS_COMPILE=/usr/bin/aarch64-linux-gnu- mt7981_spim_nand_rfb_with_rtl8370mb_defconfig

make V=1 CROSS_COMPILE=/usr/bin/aarch64-linux-gnu-

....

```
 /usr/bin/aarch64-linux-gnu-objdump -t u-boot > u-boot.sym
  ./tools/mkimage -T mtk_image -a 0x41e00000 -e 0x41e00000 -n "media=snand;nandinfo=2k+64" -d
u-boot.bin u-boot-mtk.bin >/dev/null  && cat /dev/null
```

4. Build ATF

lssnow@lss:~/bootloader$ cd arm-trusted-firmware-mtk/

한줄로 모두 입력

BL33 option 위치 명확하게 설정

make -f ./Makefile PLAT="mt7981" CROSS_COMPILE="/usr/bin/aarch64-linux-gnu-" BOOT_DEVICE="spim-nand" NMBM=1 NAND_TYPE="spim:2k+64" DRAM_USE_DDR4=0 DDR3_FREQ_2133=1 BOARD_BGA=1 LOG_LEVEL=20 BL33="../uboot-mtk-20220606/u-boot.bin" all fip

....

....

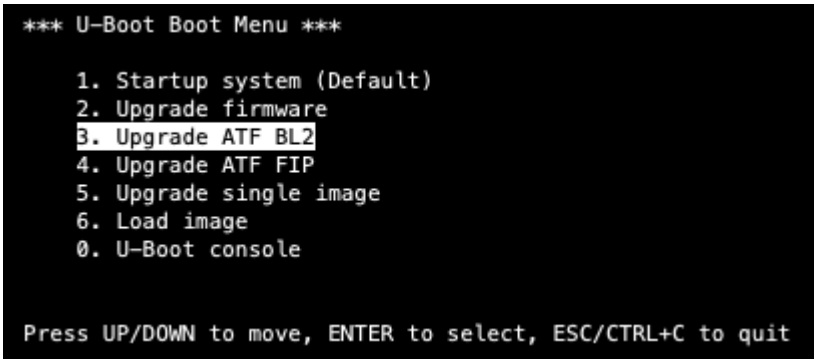
```
Built /home/lssnow/bootloader/arm-trusted-firmware-mtk/build/mt7981/release/fip.bin
successfully
```

lssnow@lss:~/bootloader/arm-trusted-firmware-mtk/build/mt7981/release$ la

total 1696

```
drwxrwxr-x 8 lssnow lssnow    4096 Apr 10 12:31 .
drwxrwxr-x 3 lssnow lssnow    4096 Apr 10 12:31 ..
drwxrwxr-x 3 lssnow lssnow    4096 Apr 10 12:31 bl2
drwxrwxr-x 3 lssnow lssnow   12288 Apr 10 12:31 bl31
drwxrwxr-x 2 lssnow lssnow    4096 Apr 10 12:31 fdts
drwxrwxr-x 2 lssnow lssnow    4096 Apr 10 12:31 lib
drwxrwxr-x 2 lssnow lssnow    4096 Apr 10 12:31 libc
drwxrwxr-x 2 lssnow lssnow    4096 Apr 10 12:31 libfdt
-rwxrwxr-x 1 lssnow lssnow  239677 Apr 10 12:31 bl2.bin
-rw-rw-r-- 1 lssnow lssnow  242528 Apr 10 12:31 bl2.img
-rwxrwxr-x 1 lssnow lssnow   37529 Apr 10 12:31 bl31.bin
-rw-rw-r-- 1 lssnow lssnow 1163641 Apr 10 12:31 fip.bin
```

5. Upgrade BL2 & FIP



bl2.img 사용

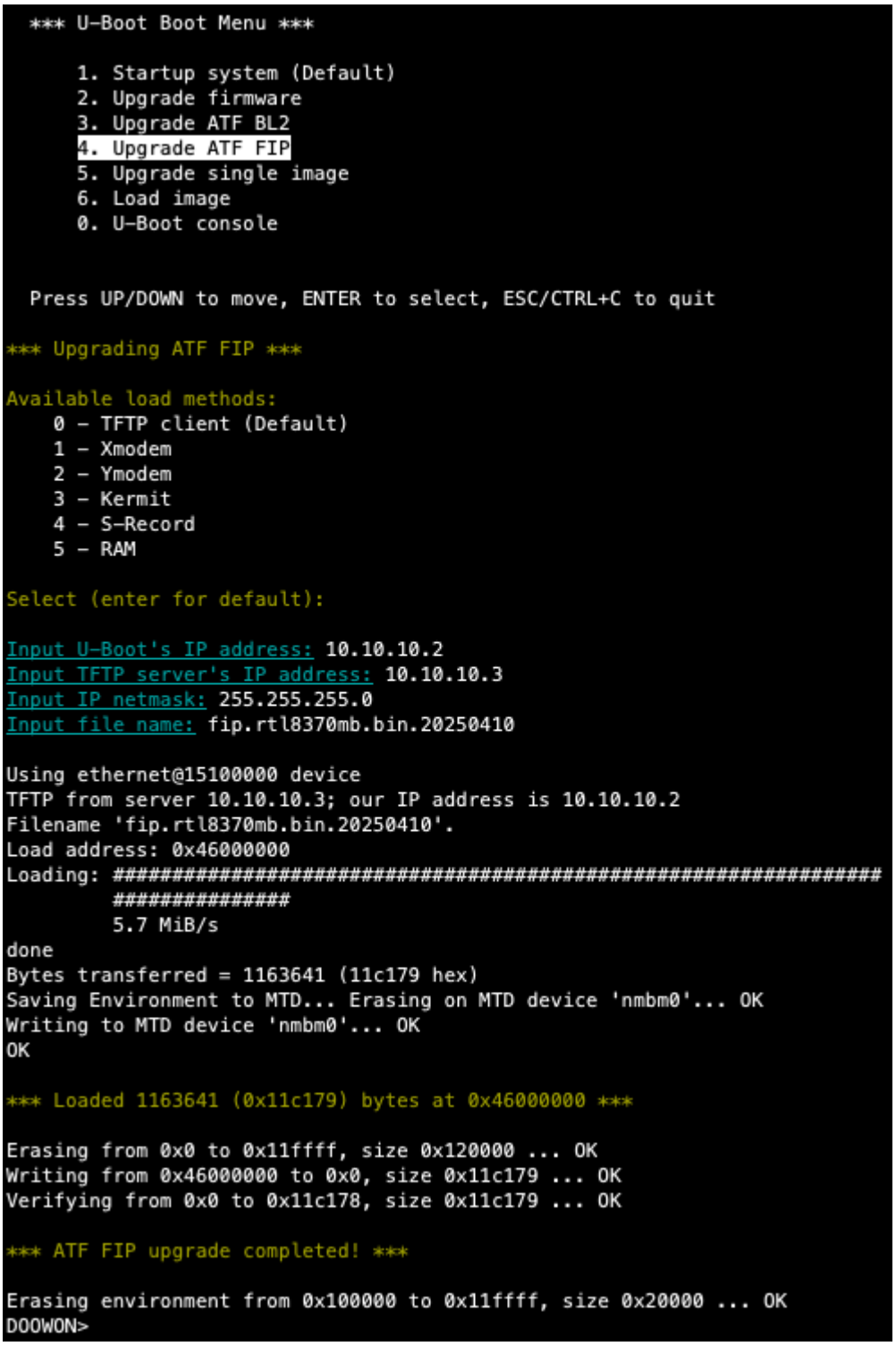
```
*** U-Boot Boot Menu ***

    1. Startup system (Default)
    2. Upgrade firmware
    3. Upgrade ATF BL2
    4. Upgrade ATF FIP
    5. Upgrade single image
    6. Load image
    0. U-Boot console


 Press UP/DOWN to move, ENTER to select, ESC/CTRL+C to quit
```

fip.bin 사용

6. Example Test

```
  *** U-Boot Boot Menu ***

      1. Startup system (Default)
      2. Upgrade firmware
      3. Upgrade ATF BL2
      4. Upgrade ATF FIP
      5. Upgrade single image
      6. Load image
      0. U-Boot console


  Press UP/DOWN to move, ENTER to select, ESC/CTRL+C to quit

*** Upgrading ATF BL2 ***

Available load methods:
    0 - TFTP client (Default)
    1 - Xmodem
    2 - Ymodem
    3 - Kermit
    4 - S-Record
    5 - RAM

Select (enter for default):

Input U-Boot's IP address: 10.10.10.2
Input TFTP server's IP address: 10.10.10.3
Input IP netmask: 255.255.255.0
Input file name: bl2.img.20250410

Using ethernet@15100000 device
TFTP from server 10.10.10.3; our IP address is 10.10.10.2
Filename 'bl2.img.20250410'.
Load address: 0x46000000
Loading: #################
         3.4 MiB/s
done
Bytes transferred = 242528 (3b360 hex)
Saving Environment to MTD... Erasing on MTD device 'nmbm0'... OK
Writing to MTD device 'nmbm0'... OK
OK

*** Loaded 242528 (0x3b360) bytes at 0x46000000 ***

Erasing from 0x0 to 0x3ffff, size 0x40000 ... OK
Writing from 0x46000000 to 0x0, size 0x3b360 ... OK
Verifying from 0x0 to 0x3b35f, size 0x3b360 ... OK

*** ATF BL2 upgrade completed! ***
DOOWON> bootmenu
```

bootmenu



reset