

UUU (Universal Update Utility)

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REVISION HISTORY

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1 Introduction

Welcome to the UUU (Universal Update Utility). This is an evolution of MFGTools (aka MFGTools v3).

UUU is Freescale/NXP i.MX Chip image deploy tools.

With the time, the need for an update utility portable to Linux and Windows increased. UUU have the same usage on both Windows and Linux. It means the same script works on both OS.

UUU is **command line tools**. look like

```
uuu (universal update utility) for nxp imx chips -- libuuu-1.0.1-gffd9837
```

```
Succues:0          Failure:3          Wait for Known USB Device Appear...
```

```
1:11      5/5 [          ] SDP: jump -f u-boot-dtb.imx - ↵
      ivtinitramf....
```

```
2:1      1/5 [===>    ] SDP: boot -f u-boot-imx7dsabresd_sd. ↵
      imx ....
```

UUU design as common library and UI. So user can easily integrate into their tools with uuu library. UUU also easy run in any scripts.

[PDF](#) of wiki content also is available at release page.

1.1 Running environment

- Windows 10, 64bit, early version(below 1.2.0) need install [vs2017 redistribute package](#)
- Ubuntu 16.14 or above, 64bit

Windows 7 user please read [WIN7-User-Guide](#)

1.2 Typical Usage

Set board boot pin to serial download mode. Generally iMX ROM will fail back to usb serial download mode if boot failure.

Download uboot

```
uuu bootloader
```

Burn uboot into emmc

```
uuu -b emmc bootloader
```

Burn bootimage into QSPI flash

```
uuu -b qspi qspi_bootloader
```

Burn rootfs image into emmc

```
uuu -b emmc_all bootloader rootfs.sdcard
```

Decompress rootfs image and burn into emmc (since 1.1.87)

```
uuu -b emmc_all bootloader rootfs.sdcard.bz2
```

Decompress rootfs image and burn into emmc without bootloader (since 1.4.146 and after 2021 Q4 yocto image)

```
uuu -b emmc_all rootfs.wic.bz2
```

Notes: bootloader means bootable image, which included ROM required header. for imx6/7, it should be uboot.imx generally. for imx8qxp\imx8qm\imx8mm\im8mq, it is flash.bin.

Burn release image into emmc

```
uuu L4.9.123_2.3.0_8mm-ga.zip
```

Note: some release combine multi board into one zip package, you need use uuu release.zip/uuu.auto-<boardname>

More usage please refer [Example](#)

1.3 Typical Script

uuu's script is plain text file

****first line must be**

```
uuu_version 1.0.1
```

version number represent the minimum uuu version that uuu can parse this script.

Then flow uuu commands.

UUU command format as

PROTOCOL: CMD

The below is example to boot uboot for imx6 and imx7.

```
uuu_version 1.0.1
SDP: dcd -f u-boot.imx
SDP: write -f u-boot.imx -ivt 0
SDP: jump -f u-boot.imx -ivt 0
```

more sample scripts see [Sample-script](#)

The below table environment may be used when write uuu script

Table 1: Table Fastboot environment

Variable	Description
fastboot_dev	fastboot flash device, support mmc and sata
fastboot_buffer	fastboot download buffer address
fastboot_bytes	fastboot download file size
emmc_dev	eMMC device number
sd_dev	sd slot device number

1.4 License

uuu is licensed under the BSD license. See LICENSE. The BSD licensed prebuilt Windows binary version of uuu is statically linked with the LGPL libusb library, which remains LGPL.

- bzip2 (BSD license) is from <https://github.com/enthought/bzip2-1.0.6>
- zlib (zlib license) is from <https://github.com/madler/zlib.git>
- libusb (LGPL-2.1) is from <https://github.com/libusb/libusb.git>

1.5 What Firmware Need

What you want	Firmware Need
Download bootloader	N/A
Burn Image to eMMC/SD	u-boot with fastboot enable
Burn Image to qspi/spi/nor	u-boot with fastboot enable
Burn Image into Nand flash	u-boot(1), linux kernel/initramfs/u-boot/dtb
Need linux shell cmd such as fdisk	u-boot(1), linux kernel/initramfs/u-boot/dtb
Boot linux kernel with rootfs already in eMMC	u-boot with fastboot enable
Boot Linux kernel with nfs over USB	u-boot with fastboot enable, initramfs

(1) prefer enable fastboot. If ROM HID support write additional image to DDR place, you can write kernel/dtb/initramfs to ddr before jump to u-boot. Enable fastboot give more flexibility to change kernel command line.

1.6 Setup auto parameter complete

1.6.1 windows

Just power shell support customized auto complete

Powershell: Enjoy auto [tab] command complete by run below command or put into Documents\WindowsPowerShell\Microsoft.PowerS

```
Register-ArgumentCompleter -CommandName uuu -ScriptBlock {param($commandName, ←
    $parameterName, $wordToComplete, $commandAst, $fakeBoundParameter); C:\Users\ ←
    nxa23210\uuu\uuu\x64\Release\lib\uuu.exe -autocomplete $parameterName }
```

1.6.2 linux

Enjoy auto [tab] command complete by put below script into /etc/bash_completion.d/uuu

```
_uuu_autocomplete()
{
    COMPREPLY=( $(/home/lizhi/source/mfgtools/uuu/uuu $1 $2 $3) )
}
complete -o nospace -F _uuu_autocomplete uuu
```

1.7 L4.9.123_2.3.0_8MM GA

It is first official BSP release to support uuu For L4.9.123_2.3.0_8MM GA with i.MX8M Mini, see [?]

2 Syntactic

uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.3.191-1-g7010e4e

uuu [-d -m -v -V] <bootloader|cmdlists|cmd>

```
bootloader  download bootloader to board by usb
cmdlist     run all commands in cmdlist file
            If it is path, search uuu.auto in dir
            If it is zip, search uuu.auto in zip
cmd         Run one command, use -H see detail
```

```

example: SDPS: boot -f flash.bin
-d          Daemon mode, wait for forever.
-v -V      verbose mode, -V enable libusb error\warning info
-dry       Dry run mode, check if script or cmd correct
-m         USBPATH Only monitor these paths.
          -m 1:2 -m 1:3

-t         Timeout second for wait known usb device appeared
-pp        usb polling period in milliseconds
uuu -s     Enter shell mode. uuu.inputlog record all input commands
          you can use "uuu uuu.inputlog" next time to run all commands

uuu -udev  linux: show udev rule to avoid sudo each time
uuu -lsusb List connected know devices
uuu -h -H  show help, -H means detail helps

uuu [-d -m -v] -b[run] <emmc|emmc_all|fat_write|nand|qspi|sd|sd_all|spl> arg...
Run Built-in scripts
emmc      burn boot loader to eMMC boot partition
          arg0: _flash.bin  bootloader
          arg1: _image[Optional]  image burn to emmc, default is the same as ↵
          bootloader
emmc_all  burn whole image to eMMC
          arg0: _flash.bin
          arg1: _rootfs.sdcard
fat_write update one file in fat partition, require uboot fastboot ↵
          running in board
          arg0: _image  image, which cp to fat partition
          arg1: _device  storage device, mmc\sata
          arg2: _filename[Optional]  file name in target fat partition, only ↵
          support rootdir now
          arg3: _partition
nand      burn boot loader to NAND flash
          arg0: _flash.bin  bootloader
          arg1: _image[Optional]  image burn to nand, default is the same as ↵
          bootloader
qspi     burn boot loader to qspi nor flash
          arg0: _flexspi.bin  bootloader
          arg1: _image[Optional]  image burn to flexspi, default is the same ↵
          as bootloader
sd       burn boot loader to sd card
          arg0: _flash.bin  bootloader
          arg1: _image[Optional]  image burn to emmc, default is the same as ↵
          bootloader
sd_all  burn whole image to sd card
          arg0: _flash.bin
          arg1: _rootfs.sdcard
spl     boot spl and uboot
          arg0: _flash.bin

uuu -bshow <emmc|emmc_all|fat_write|nand|qspi|sd|sd_all|spl>
          Show built-in script

```

Notes: Some board supports super speed (USB3.0). USB 3.0 port path is difference USB 2.0. If use -m to filter port, you need add USB 3.0 port number otherwise fastboot will not be detected.

3 Usage Example

3.1 Basic

3.1.1 Download boot loader for imx6\imx7

```
uuu uboot.imx
```

3.1.2 Download boot loader for imx8qxp

```
uuu flash.bin
```

3.1.3 Download SPL and uboot, such as imx8mq.

```
uuu sdp: boot -f flash.bin
uuu sdp: delay 1000
uuu sdp: write -f flash.bin -offset 0x57c00
uuu sdp: jump
```

3.1.4 Burn Android Image to eMMC

```
uuu android.zip (not implement default yet)
```

3.1.5 Burn yocto Image to eMMC

```
uuu L4.9.123_2.3.0_8mm-ga.zip
```

3.2 Built-in script

uuu -b emmc bootloader	Write bootloader to emmc
uuu -b emmc_all bootloader rootfs.sdcard	Write rootfs to emmc
uuu -b emmc_all bootloader rootfs.sdcard.bz2/* rootfs to emmc	Decompress rootfs and write ↔
uuu -b sd bootloader	Write bootloader to sd card
uuu -b sd_all bootloader rootfs.sdcard	Write rootfs to sd card
uuu -b sd_all bootloader rootfs.sdcard.bz2/* rootfs to sd card	Decompress rootfs and write ↔
uuu -b qspi qspi_bootloader	write bootloader to qspi
uuu -b qspi qspi_bootloader m4image	write m4image to qspi
uuu -b spl bootloader	Download SPL and uboot

Notes:

Some boards have many sd slot. built-in script only work uboot environment `#{ sd_dev}` point to slot

Some boards have not emmc chip, emmc build in script does not work for such boards

3.3 multi boards support

3.3.1 For the same boards

```
uuu -d uuu.auto           The same boards connected
```

3.3.2 For the difference boards

```
uuu -d -m 1:1 -m 2:1 boardA_uuu.auto   monitor port 1:1 and 2:1 for ↔
boardsA.
uuu -d -m 1:3 -m 4:1 boardB_uuu.auto   monitor port 1:3 and 4:1 for ↔
boardsB.
```

Note: please avoid monitor the same port by difference uuu instance, which cause unexpected result.

3.4 Talk with fastboot

3.4.1 boot linux kernel

```
uuu FB: ucmd setenv fastboot_buffer ${loadaddr}
uuu FB: download -f Image
uuu FB: ucmd setenv fastboot_buffer ${fdt_addr}
uuu FB: download -f imx8qxp_mek.dtb
uuu FB: acmd booti ${loadaddr} - ${fdt_addr}
```

Notes: Linux/Mac user need add \ before \$ to avoid shell replace environment variable.

Extended environment for fastboot

```
fastboot_buffer      Image download address
fastboot_bytes       reflect previous download image byte size
```

3.4.2 write image to emmc

```
uuu FB: flash -raw2sparse all <image file>
```

3.5 Talk with linux kernel, transfer file between board and pc

```
on board, run \linuxrc&
on pc,      uuu fbk:ucp file t:\file
```

4 Sample scripts

This pages list some examples on scripts to help UUU to make some tasks automatically.

Copy the source code to the file `uuu.auto` and execute the application executable file.

```
# Download spl and uboot for imx8mm and imx8mq
```

```
uuu_version 1.2.39

# This command will be run when i.MX6/7 i.MX8MM, i.MX8MQ
SDP: boot -f _flash.bin

# This command will be run when ROM support stream mode
# i.MX8QXP, i.MX8QM
SDPS: boot -f _flash.bin

# These commands will be run when use SPL and will be skipped if no spl
# SDPU will be deprecated. please use SDPV instead of SDPU
# {
SDPU: delay 1000
SDPU: write -f _flash.bin -offset 0x57c00
SDPU: jump
SDPU: done
# }

# These commands will be run when use SPL and will be skipped if no spl
# if (SPL support SDPV)
# {
SDPV: delay 1000
SDPV: write -f _flash.bin -skipspl
SDPV: jump
SDPV: done
# }

# Burn bootloader to eMMC boot partition

uuu_version 1.2.39

# This command will be run when i.MX6/7 i.MX8MM, i.MX8MQ
SDP: boot -f _flash.bin

# This command will be run when ROM support stream mode
# i.MX8QXP, i.MX8QM
SDPS: boot -f _flash.bin

# These commands will be run when use SPL and will be skipped if no spl
# SDPU will be deprecated. please use SDPV instead of SDPU
# {
SDPU: delay 1000
SDPU: write -f _flash.bin -offset 0x57c00
SDPU: jump
# }

# These commands will be run when use SPL and will be skipped if no spl
# if (SPL support SDPV)
# {
SDPV: delay 1000
SDPV: write -f _flash.bin -skipspl
SDPV: jump
# }

FB: ucmd setenv fastboot_dev mmc
FB: ucmd setenv mmcdev ${emmc_dev}
FB: ucmd mmc dev ${emmc_dev}
```

```
FB: flash bootloader _flash.bin
FB: ucmd mmc partconf ${emmc_dev} 0 1 0
FB: Done
```

Burn android to eMMC

```
uuu_version 1.2.39
```

```
# This command will be run when i.MX6/7 i.MX8MM, i.MX8MQ
SDP: boot -f _flash.bin
```

```
# This command will be run when ROM support stream mode
# i.MX8QXP, i.MX8QM
SDPS: boot -f _flash.bin
```

```
# These commands will be run when use SPL and will be skipped if no spl
# SDPU will be deprecated. please use SDPV instead of SDPU
# {
SDPU: delay 1000
SDPU: write -f _flash.bin -offset 0x57c00
SDPU: jump
# }
```

```
# These commands will be run when use SPL and will be skipped if no spl
# if (SPL support SDPV)
# {
SDPV: delay 1000
SDPV: write -f _flash.bin -skipspl
SDPV: jump
# }
```

```
FB: ucmd setenv fastboot_dev mmc
FB: ucmd setenv mmcdev ${emmc_dev}
FB: ucmd mmc dev ${emmc_dev}
FB: flash gpt partition-table.img
FB: flash boot_a boot-imx8qxp.img
FB: flash system_a system.img
FB: flash vendor_a vendor.img
FB: flash vbmeta_a vbmeta-imx8qxp.img
#FB: ucmd setenv fastboot_buffer ${loadaddr}
#FB: download -f u-boot-imx8qxp.imx
#FB: ucmd setexpr fastboot_blk ${fastboot_bytes}
#FB: ucmd setexpr fastboot_blk ${fastboot_blk} + 0x1FF
#FB: ucmd setexpr fastboot_blk ${fastboot_blk} / 0x200
#FB: ucmd mmc partconf ${emmc_dev} 1 1 1
#FB: ucmd echo ${fastboot_buffer}
#FB: ucmd echo ${fastboot_blk}
#FB: ucmd mmc write ${fastboot_buffer} 0x40 ${fastboot_blk}
FB: flash bootloader u-boot-imx8qxp.imx
FB: ucmd mmc partconf ${emmc_dev} 0 1 0
FB: Done
```

Burn yocto image to eMMC by linux kernel

```
uuu_version 1.2.39
```

```
# This command will be run when i.MX6/7 i.MX8MM, i.MX8MQ
```

```

SDP: boot -f _flash.bin

# This command will be run when ROM support stream mode
# i.MX8QXP, i.MX8QM
SDPS: boot -f _flash.bin

# These commands will be run when use SPL and will be skipped if no spl
# SDPU will be deprecated. please use SDPV instead of SDPU
# {
SDPU: delay 1000
SDPU: write -f _flash.bin -offset 0x57c00
SDPU: jump
# }

# These commands will be run when use SPL and will be skipped if no spl
# if (SPL support SDPV)
# {
SDPV: delay 1000
SDPV: write -f _flash.bin -skipspl
SDPV: jump
# }

FB: ucmd setenv fastboot_buffer ${loadaddr}
FB: download -f _Image
FB: ucmd setenv fastboot_buffer ${fdt_addr}
FB: download -f _board.dtb
FB: ucmd setenv fastboot_buffer ${initrd_addr}
FB: download -f _initramfs.cpio.gz.uboot
FB: ucmd setenv mfgtool_args ${mfgtool_args} mfg_mmcdev=${emmc_dev}
FB: ucmd run mfgtool_args
FB: acmd booti ${loadaddr} ${initrd_addr} ${fdt_addr}

# get mmc dev number from kernel command line
FBK: ucmd cmdline=`cat /proc/cmdline`;cmdline=${cmdline#*mfg_mmcdev=};cmds=( ←
    $cmdline);echo ${cmds[0]}>/tmp/mmcdev
# Wait for mmc
FBK: ucmd mmc=`cat /tmp/mmcdev`; while [ ! -e /dev/mmcblk${mmc} ]; do sleep 1; ←
    echo "wait for /dev/mmcblk${mmc} appear"; done;
# create partition
FBK: ucmd mmc=`cat /tmp/mmcdev`; PARTSTR='$'10M,500M,0c\n600M,,83\n'; echo " ←
    $PARTSTR" | sfdisk --force /dev/mmcblk${mmc}

FBK: ucmd mmc=`cat /tmp/mmcdev`; dd if=/dev/zero of=/dev/mmcblk${mmc} bs=1k seek ←
    =4096 count=1
FBK: ucmd sync
FBK: ucmd mmc=`cat /tmp/mmcdev`; echo 0 > /sys/block/mmcblk${mmc}boot0/force_ro
FBK: ucp _flash.bin t:/tmp
FBK: ucmd mmc=`cat /tmp/mmcdev`; dd if=/tmp/_flash.bin of=/dev/mmc${mmc}boot0 bs=1 ←
    K seek=32
FBK: ucmd mmc=`cat /tmp/mmcdev`; echo 1 > /sys/block/mmcblk${mmc}boot0/force_ro
FBK: ucmd mmc=`cat /tmp/mmcdev`; while [ ! -e /dev/mmcblk${mmc}p1 ]; do sleep 1; ←
    done
FBK: ucmd mmc=`cat /tmp/mmcdev`; mkfs.vfat /dev/mmcblk${mmc}p1
FBK: ucmd mmc=`cat /tmp/mmcdev`; mkdir -p /mnt/fat
FBK: ucmd mmc=`cat /tmp/mmcdev`; mount -t vfat /dev/mmcblk${mmc}p1 /mnt/fat
FBK: ucp _Image t:/mnt/fat
FBK: ucp _board.dtb t:/mnt/fat

```

```

FBK: ucmd umount /mnt/fat
FBK: ucmd mmc=`cat /tmp/mmcdev`; mkfs.ext3 -F -E nodiscard /dev/mmcblk${mmc}p2
FBK: ucmd mkdir -p /mnt/ext3
FBK: ucmd mmc=`cat /tmp/mmcdev`; mount /dev/mmcblk${mmc}p2 /mnt/ext3
FBK: acmd export EXTRACT_UNSAFE_SYMLINKS=1; tar -jx -C /mnt/ext3
FBK: ucp _rootfs.tar.bz2 t:-
FBK: Sync
FBK: ucmd umount /mnt/ext3
FBK: DONE

```

Burn NAND flash by linux kernel

```
uuu_version 1.2.39
```

```

# Please replace below item with actual name
# @_flash_fw.bin          | boot loader firmware, for i.MX8QM/QX, it's ↔
                        | different from _flash.bin, for all other platforms, it's same as _flash.bin
# @_flash.bin            | boot loader file burn to NAND
# @_Image                | linux kernel image, zImage for arm32, Image for ↔
                        | arm64
# @_board.dtb            | board dtb file
# @_initramfs.cpio.gz.uboot | initramfs
# @_tee                  | optee image
# @_rootfs.tar.bz2      | rootfs

```

```

# This command will be run when i.MX6/7 i.MX8MM, i.MX8MQ
SDP: boot -f _flash_fw.bin

```

```

# This command will be run when ROM support stream mode
# i.MX8QXP, i.MX8QM
SDPS: boot -f _flash_fw.bin

```

```

# These commands will be run when use SPL and will be skipped if no spl
# SDPU will be deprecated. please use SDPV instead of SDPU
# {
SDPU: delay 1000
SDPU: write -f _flash_fw.bin -offset 0x57c00
SDPU: jump
# }

```

```

# These commands will be run when use SPL and will be skipped if no spl
# if (SPL support SDPV)
# {
SDPV: delay 1000
SDPV: write -f _flash_fw.bin -skipspl
SDPV: jump
# }

```

```

FB: ucmd setenv fastboot_buffer ${loadaddr}
FB: download -f _Image
FB: ucmd setenv fastboot_buffer ${fdt_addr}
FB: download -f _board.dtb
FB: ucmd setenv fastboot_buffer ${initrd_addr}
FB: download -f _initramfs.cpio.gz.uboot
FB: ucmd setenv bootargs ${bootargs} ${mtdparts}
#FB: ucmd setenv bootargs console=ttyMxc3,115200 ${mtdparts}

```

```

FBK: acmd ${kboot} ${loadaddr} ${initrd_addr} ${fdt_addr}

FBK: ucmd cat /proc/mtd
FBK: ucmd cat /proc/mtd | while read dev size erase name; do mtd=${dev:3}; mtd=${ ←
    mtd%:}; name=${name%\"}; name=${name#\"}; echo export $name=$mtd >> /tmp/mtd.sh ←
    ; done;

FBK: ucmd chmod 777 /tmp/mtd.sh
FBK: ucmd mount -t debugfs debugfs /sys/kernel/debug

# write boot loader
FBK: ucmd source /tmp/mtd.sh; flash_erase /dev/mtd${nandboot} 0 0
FBK: ucp _flash.bin t:/tmp/boot
FBK: ucmd source /tmp/mtd.sh; cd /tmp; if ! [[ `cat /sys/devices/soc0/soc_id` = *\" ←
    MX8Q\"* ]]; then pad=\"-x\"; fi; kobs-ng init $pad -v --chip_0_device_path=/dev/ ←
    mtd${nandboot} /tmp/boot

# burn FIT
FBK: ucmd if [[ `cat /tmp/mtd.sh` = *\"nandfit\"* ]]; then source /tmp/mtd.sh; ←
    flash_erase /dev/mtd${nandfit} 0 0; dd if=/tmp/boot of=/tmp/fit; nandwrite -p / ←
    dev/mtd${nandfit} -p /tmp/fit; fi

# burn kernel
FBK: ucmd source /tmp/mtd.sh; flash_erase /dev/mtd${nandkernel} 0 0
FBK: ucp _Image t:/tmp/img
FBK: ucmd source /tmp/mtd.sh; nandwrite -p /dev/mtd${nandkernel} -p /tmp/img

# burn dtb
FBK: ucmd source /tmp/mtd.sh; flash_erase /dev/mtd${nanddtb} 0 0
FBK: ucp _board.dtb t:/tmp/dtb
FBK: ucmd source /tmp/mtd.sh; nandwrite -p /dev/mtd${nanddtb} -p /tmp/dtb

# burn uTee
FBK: ucmd source /tmp/mtd.sh; flash_erase /dev/mtd${nandtee} 0 0
FBK: ucp _tee t:/tmp/tee
FBK: ucmd source /tmp/mtd.sh; nandwrite -p /dev/mtd${nandtee} -p /tmp/tee

# burn rootfs
FBK: ucmd source /tmp/mtd.sh; flash_erase /dev/mtd${nandrootfs} 0 0
FBK: ucmd source /tmp/mtd.sh; ubiattach /dev/ubi_ctrl -m ${nandrootfs}
FBK: ucmd source /tmp/mtd.sh; ubimkvol /dev/ubi0 -Nnandrootfs -m
FBK: ucmd source /tmp/mtd.sh; mkdir -p /mnt/mtd
FBK: ucmd source /tmp/mtd.sh; mount -t ubifs ubi0:nandrootfs /mnt/mtd
FBK: acmd export EXTRACT_UNSAFE_SYMLINKS=1; tar -jx -C /mnt/mtd
FBK: ucp _rootfs.tar.bz2 t:-
FBK: sync
FBK: ucmd umount /mnt/mtd

FBK: done

## Download kernel and mount nfs by usb ncm

uuu_version 1.2.39

# Please replace below item with actual name
# @_flash.bin | boot loader
# @_Image | linux kernel image, zImage for arm32, Image for ←

```

```

    arm64
# @_board.dtb                | board dtb file
# @_initramfs.cpio.gz.uboot  | initramfs
# @_nfspath                  | rootfs path without ip address, ip address will ←
    auto detect

# This command will be run when i.MX6/7 i.MX8MM, i.MX8MQ
SDP: boot -f _flash.bin

# This command will be run when ROM support stream mode
# i.MX8QXP, i.MX8QM
SDPS: boot -f _flash.bin

# These commands will be run when use SPL and will be skipped if no spl
# SDPU will be deprecated. please use SDPV instead of SDPU
# {
SDPU: delay 1000
SDPU: write -f _flash.bin -offset 0x57c00
SDPU: jump
# }

# These commands will be run when use SPL and will be skipped if no spl
# if (SPL support SDPV)
# {
SDPV: delay 1000
SDPV: write -f _flash.bin -skipspl
SDPV: jump
# }

FB: ucmd setenv fastboot_buffer ${loadaddr}
FB: download -f _Image
FB: ucmd setenv fastboot_buffer ${fdt_addr}
FB: download -f _board.dtb
FB: ucmd setenv fastboot_buffer ${initrd_addr}
FB: download -f _initramfs.cpio.gz.uboot
FB: ucmd setenv nfsroot _nfspath
FB: ucmd setenv bootargs console=${console},${baudrate} nfsroot=${nfsroot} init=/ ←
    linuxrc root=/dev/nfs
#uncomment below line to stop at initramfs
#FB: ucmd setenv bootargs console=${console},${baudrate} nfsroot=${nfsroot}
FB: acmd ${kboot} ${loadaddr} ${initrd_addr} ${fdt_addr}
FB: done

```

5 Supported protocol

UUU is scripted base multi protocol system.

Built in config:

Pctl	Chip	Vid	Pid	BcdVersion
SDPS:	MX8QXP	0x1fc9	0x012f	[0x0002..0xffff]
SDPS:	MX8QM	0x1fc9	0x0129	[0x0002..0xffff]
SDPS:	MX8DXL	0x1fc9	0x0147	
SDPS:	MX28	0x15a2	0x004f	

SDPS:	MX815	0x1fc9	0x013e	
SDPS:	MX865	0x1fc9	0x0146	
SDPS:	MX8ULP	0x1fc9	0x014a	
SDPS:	MX8ULP	0x1fc9	0x014b	
SDPS:	MX93	0x1fc9	0x014e	
SDP:	MX7D	0x15a2	0x0076	
SDP:	MX6Q	0x15a2	0x0054	
SDP:	MX6D	0x15a2	0x0061	
SDP:	MX6SL	0x15a2	0x0063	
SDP:	MX6SX	0x15a2	0x0071	
SDP:	MX6UL	0x15a2	0x007d	
SDP:	MX6ULL	0x15a2	0x0080	
SDP:	MX6SLL	0x1fc9	0x0128	
SDP:	MX7ULP	0x1fc9	0x0126	
SDP:	MXRT106X	0x1fc9	0x0135	
SDP:	MX8MM	0x1fc9	0x0134	
SDP:	MX8MQ	0x1fc9	0x012b	
SDPU:	SPL	0x0525	0xb4a4	[0x0000..0x04ff]
SDPV:	SPL1	0x0525	0xb4a4	[0x0500..0x9998]
SDPV:	SPL1	0x1fc9	0x0151	[0x0500..0x9998]
SDPU:	SPL	0x0525	0xb4a4	[0x9999..0x9999]
SDPU:	SPL	0x3016	0x1001	[0x0000..0x04ff]
SDPV:	SPL1	0x3016	0x1001	[0x0500..0x9998]
FBK:		0x066f	0x9afe	
FBK:		0x066f	0x9bff	
FBK:		0x1fc9	0x0153	
FB:		0x0525	0xa4a5	
FB:		0x18d1	0x0d02	
FB:		0x3016	0x0001	
FB:		0x1fc9	0x0152	

Table 2: Table UUU Protocol to USB lower level Map

UUU Protocol	USB Low level transfer
SDP	HID i.MX6/7, i.MX8 MM, i.MX8M
SDPU\SDPV	HID uboot implement of SDP, SPL download uboot
SDPS	HID i.MX8QXP i.MX8QM
FB	winusb (windows), raw transfer by libusb
FBK	winusb (windows), raw transfer by libusb

5.1 SDP: i.MX6/7 ROM download protocol

5.1.1 Supported command:

Run DCD from image with ivt header

```
dcd -f <filename>
```

write image to address.

```
write -f <filename> [-addr 0x000000] [-ivt 0]
```

ivt 0 means write to the address, which ivt pointer

jump to image with ivt header

```
jump -f <filename> [-ivt 0]
```

boot image, include (dcd, write and jump three commands)

```
boot -f <filename> [-nojump]
```

5.2 HABv4 closed chip support

For boot images not including a DCD table the same image used for SDCard/eMMC boot can be used with UUU tool.

For boot images including a DCD table, the DCD is loaded in OCRAM and must be properly signed.

Since U-Boot v2017.01 a build log containing the U-Boot and DCD addresses and lengths is available just after building U-Boot:

```
$ cat u-boot-dtb.imx.log
Image Type: Freescale IMX Boot Image
Image Ver: 2 (i.MX53/6/7 compatible)
Mode: DCD
Data Size: 602112 Bytes = 588.00 KiB = 0.57 MiB
Load Address: 877ff420
Entry Point: 87800000
HAB Blocks: 877ff400 00000000 0008ec00
DCD Blocks: 00910000 0000002c 000001c4
```

Users can copy the information above to create their CSF Authenticate Data command:

```
Block = 0x877ff400 0x00000000 0x0006DC00 "u-boot-dtb.imx", \
        0x00910000 0x0000002c 0x000001c4 "u-boot-dtb.imx"
```

Alternatively users can also extract the DCD length from the DCD table header:

```
$ od -x -j 0x2c -N 4 --endian=big u-boot-dtb.imx
0000054 d201 c440
0000060
DCD Header: 0xd2, DCD Length: 0x01c4, DCD Version: 0x40
```

For the i.MX devices not supporting the skip DCD command (i.MX6Dual/Quad and i.MX6Sololite) the pointer to the DCD table is cleared in the IVT in order to prevent the HAB library from processing the DCD table again during the authentication process. There is no need to re-initialize memory when it already contains valid data.

Since the IVT is modified when downloading to the target the binary must be signed with a cleared DCD pointer. However, the binary must be provided with a valid DCD pointer to allow the UUU tool to locate the DCD table.

The following script can be used to handle the DCD pointer:

```
#!/bin/bash
# DCD address must be cleared for signature, as UUU will clear it.
if [ "$1" == "clear_dcd_addr" ]; then
    # store the DCD address
    dd if=$2 of=dcd_addr.bin bs=1 count=4 skip=12
    # generate a NULL address for the DCD
    dd if=/dev/zero of=zero.bin bs=1 count=4
    # replace the DCD address with the NULL address
    dd if=zero.bin of=$2 seek=12 bs=1 conv=notrunc
fi
# DCD address must be set for mfgtool to localize the DCD table.
if [ "$1" == "set_dcd_addr" ]; then
    # restore the DCD address with the original address dd
```

```
if=dcd_addr.bin of=$2 seek=12 bs=1 conv=notrunc
rm zero.bin
fi
```

The steps below can be used as an example:

```
$ ./mod_4_mfgtool.sh clear_dcd_addr u-boot-dtb.imx
$ ./cst --i u-boot-csf.txt --o u-boot-csf.bin
$ ./mod_4_mfgtool.sh set_dcd_addr u-boot-dtb.imx
```

For the i.MX devices supporting the skip DCD command (i.MX7D, i.MX6UL/ULL, i.MX8MQ and i.MX7ULP), there is no need to do any modification, UUU tool can download the binary directly.

NOTICE: For i.MX7D only, due to an erratum, the UUU download DCD address (0x00911000) is not aligned with the DCD address in u-boot (0x00910000), there are two options:

- use the command to specify the DCD address, `uuu boot -f u-boot-signed.imx -dcdaddr 0x00911000`
- change the csf DCD address when signing the u-boot: `Blocks = 0x00911000 0x0000002c 0x000001c4 "u-boot-dtb.imx`

5.3 SDPU\SDPV: uboot implement simplified ROM SDP protocol

Uboot implemented i.MX 6/7 ROM SDP protocol. The support command the same as SDP.

SDPV is upgrade version of SDPU, which support `-skipspl` option for write command

See below for uboot requirement [uboot-config-requirement](#)

5.4 SDPS: i.MX8QXP and i.MX8QM ROM download protocol

send image by sdp command.

```
boot -f <filename> [-offset 0x0000]
```

5.5 FB: Android fastboot protocol

refer [fast boot protocol](#)

See below for [uboot requirement](#)

5.5.1 Support command:

```
getvar
ucmd <any uboot command>
acmd <any never returned uboot command, like booti, reboot>

# partition "all" means whole device.
flash [-raw2sparse] <partition> <filename>
download -f <filename>
crc -f <filename> [-format "mmc read $loadaddr"]
                    [-blksz 512] [-crcblock 0x4000000]
                    [-seek 0] [-skip 0] [-nostop]
                    seek          skip block number from storage
                    skip          skips byte from -f
                    nostop       continue check even if found mismatch
```

****Some Uboot command need long time to finish. Default FB timeout is 2s. You can use below method to change timeout value**

```
# time out set to 10000ms
FB[-t 10000]: ucmd <any uboot command>
```

Table 3: Table Fastboot environment

Variable	Description
fastboot_dev	fastboot flash device, support mmc and sata
fastboot_buffer	fastboot download buffer address
fastboot_bytes\filesize	fastboot download file size, new uboot provide filesize environment
emmc_dev	eMMC device number
sd_dev	sd slot device number

5.6 FBK: Android fastboot protocol, implement at initramfs. See project [imx-uuc](#)

5.6.1 Support command:

```
ucmd <any kernel command> and wait for command finish
acmd <any kernel command> don't wait for command finish
sync wait for acmlid processs finish.
ucp <source> <destinate> copy file from/to target
T:<filename> means target board file.
T:- means copy data to target's stdio pipe.
copy image T:/root/image ;download image to path /root/ ↔
image
copy T:/root/image image ;upload /root/image to file ↔
image.....
```

Example for transfer big file

```
acmd tar - ; run tar background and get data from stdio
ucp rootfs.tar.gz T:- ; send to target stdio pipe
sync ; wait for tar process exit.
```

Linux environment:

Each command in separate process so environment can not be affect next command. Use below method to workaround this problem.

```
FBK: ucmd source /tmp/mtd.sh; flash_erase /dev/mtd${nandrootfs} 0 0
```

5.7 Common command for all protocol

Table 4: Table Common command for all protocol

Command	Description
Done	last command for finish whole flow.
Delay	Busy wait for millisecond
SH/SHELL	run external command

Table 4: (continued)

<	stdout as command, such as "< echo ucmd print", which generally used for burn serial number
@	using environment variable, such as "FBK:@ ucmd echo @MSG@" MSG will be replace by OS's environment variable.
error	show error message and exit
if	basic logic check, such as SDPS: if @chip@ == mx8qm then boot -f flash.bin. Only support == and !=. only support one logic check

6 Migration from mfgtool ucl2.xml

**Most case user can use uboot fastboot protocol to finish image program work.

In case you have to load kernel to burn whole image.

The below simple map ucl2.xml to uuu script.

ucl2.xml	uuu
<CMD state="BootStrap" type="boot" body="BootStrap" file="firmware/flash.bin" ifdev="MX8QXPB0">Loading boot image</CMD>	SDPS: boot -f flash.bin
<CMD state="BootStrap" type="boot" body="BootStrap" file="firmware/flash.bin" ifdev="MX8QXPB0">Loading boot image</CMD>	SDPS: boot -f flash.bin
<CMD state="BootStrap" type="boot" body="BootStrap" file="firmware/flash.bin" ifdev="MX8MM">Loading U-boot</CMD>	SDP: boot -f flash.bin SDP: boot -f flash.bin SDPU: write -f flash.bin -offset 0x57c00 SDPU: jump
<CMD state="BootStrap" type="load" file="firmware/Image" address="0x80280000" loadSection="OTH" setSection="OTH" HasFlashHeader="FALSE" ifdev="MX8QXP MX8QM">Loading Kernel.</CMD>	FB: ucmd download -f Image
<CMD state="BootStrap" type="load" file="firmware/initramfs.cpio.gz.uboot" address="0x83800000" loadSection="OTH" setSection="OTH" HasFlashHeader="FALSE" ifdev="MX8QM MX8QXP">Loading Initramfs.</CMD>	FB: ucmd download -f initramfs.cpio.gz.uboot
<CMD state="BootStrap" type="load" file="firmware/fsl-imx8qxp.dtb" address="0x83000000" loadSection="OTH" setSection="OTH" HasFlashHeader="FALSE" ifdev="MX8QXP">Loading device tree.</CMD>	FB: ucmd download -f fsl-imx8qxp.dtb
<CMD state="BootStrap" type="jump" > Jumping to OS image. </CMD>	
<!-- create partition --> <CMD state="Updater" type="push" body="send" file="mksdcard.sh.tar">Sending partition shell</CMD>	FBK: ucp mksdcard.sh.tar t:/tmp
<CMD state="Updater" type="push" body="\$ tar xf \$FILE"> Partitioning... </CMD>	FBK: ucmd tar xf /tmp/mksdcard.sh.tar -d /tmp

<CMD state="Updater" type="push" body="\$ sh mksdcard.sh /dev/mmcblk%mmc%">Partitioning...</CMD>	FBK: ucmd mksdcard.sh /dev/mmcblk0mmc
<!-- burn uboot --> <CMD state="Updater" type="push" body="send" file="files/imx-boot-imx8qxp-sd.bin" ifdev="MX8QXPB0">Sending u-boot.bin</CMD>	FBK: ucp imx-boot-imx8qxp-sd.bin t:/tmp
<CMD state="Updater" type="push" body="\$ dd if=/dev/zero of=/dev/mmcblk0 bs=1k seek=4096 conv=fsync count=8">clear u-boot arg</CMD>	FBK: ucmd dd if=/dev/zero of=/dev/mmcblk0 bs=1k seek=4096 conv=fsync count=8
<CMD state="Updater" type="push" body="\$ dd if=\$FILE of=/dev/mmcblk0 bs=1k seek=33 conv=fsync" ifdev="MX8QM MX8QXP MX8MQ">write u-boot.bin to sd card</CMD>	FBK: ucmd dd if=/tmp/imx-boot-imx8qxp-sd.bin of=/dev/mmcblk0 bs=1k seek=33 conv=fsync
<CMD state="Updater" type="push" body="\$ while [! -e /dev/mmcblk0p1]; do sleep 1; echo waiting...; done ">Waiting for the partition ready</CMD>	FBK: ucmd while [! -e /dev/mmcblk%mmc%p1]; do sleep 1; echo waiting...; done
<CMD state="Updater" type="push" body="\$ mkfs.vfat /dev/mmcblk0p1">Formatting rootfs partition</CMD>	FBK: ucmd mkfs.vfat /dev/mmcblk0p1
<CMD state="Updater" type="push" body="\$ mkdir -p /mnt/mmcblk0p1"/>	FBK: ucmd mkdir -p /mnt/mmcblk0p1
<CMD state="Updater" type="push" body="\$ mount -t vfat /dev/mmcblk0p1 /mnt/mmcblk0p1"/>	FBK: ucmd vfat /dev/mmcblk0p1 /mnt/mmcblk0p1
<!-- burn zImage --> <CMD state="Updater" type="push" body="send" file="files/Image">Sending kernel</CMD>	FBK: ucp Image t:/tmp
<CMD state="Updater" type="push" body="\$ cp \$FILE /mnt/mmcblk0p1/Image">write kernel image to sd card</CMD>	FBK: ucmd /tmp/Image /mnt/mmcblk0p1/Image
<!-- burn dtb --> <CMD state="Updater" type="push" body="send" file="files/fsl-imx8qxp.dtb" ifdev="MX8QXP MX8QXPB0">Sending Device Tree file</CMD>	FBK: ucp fsl-imx8qxp.dtb /tmp
<CMD state="Updater" type="push" body="\$ cp \$FILE /mnt/mmcblk0p1/fsl-imx8qm.dtb" ifdev="MX8QM">write device tree to sd card</CMD>	FBK: ucmd cp /tmp/fsl-imx8qxp.dtb /mnt/mmcblk0p1/
<CMD state="Updater" type="push" body="\$ umount /mnt/mmcblk0p1">Unmounting vfat partition</CMD>	FBK: ucmd umount /mnt/mmcblk0p1
<!-- burn rootfs --> <CMD state="Updater" type="push" body="\$ mkfs.ext3 -F -j /dev/mmcblk0p2">Formatting rootfs partition</CMD>	FBK: ucmd mkfs.ext3 -F -j /dev/mmcblk0p2
<!-- burn rootfs --> <CMD state="Updater" type="push" body="\$ mkfs.ext3 -F -j /dev/mmcblk0p2">Formatting rootfs partition</CMD>	FBK: ucmd mkfs.ext3 -F -j /dev/mmcblk0p2
<CMD state="Updater" type="push" body="\$ mkdir -p /mnt/mmcblk0p2"/>	FBK: ucmd mkdir -p /mnt/mmcblk0p2
<CMD state="Updater" type="push" body="\$ mount -t ext3 /dev/mmcblk0p2 /mnt/mmcblk0p2"/>	FBK: ucmd mount -t ext3 /dev/mmcblk0p2 /mnt/mmcblk0p2
<CMD state="Updater" type="push" body="pipe tar -jxv -C /mnt/mmcblk0p2" file="files/rootfs.tar.bz2">Sending and writing rootfs</CMD>	FBK: acmd tar -jxv -C /mnt/mmcblk0p2 FBK: ucp rootfs.tar.bz2 t:-
<CMD state="Updater" type="push" body="frf">Finishing rootfs write</CMD>	FBK: sync
<CMD state="Updater" type="push" body="\$ umount /mnt/mmcblk0p2">Unmounting rootfs partition</CMD>	FBK: ucmd umount /mnt/mmcblk0p2
<CMD state="Updater" type="push" body="\$ echo Update Complete!">Done</CMD>	done

7 Win 7 User Guide

Win7 user may face some additional one time setup work because original win7 missed a updated .inf file

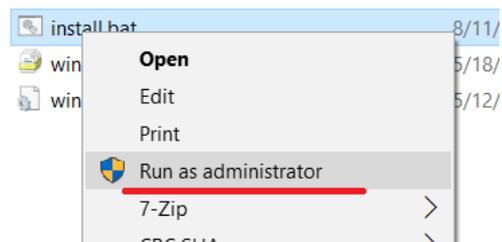
7.1 Back Ground

Win7 ships with correct *winusb.sys* file. but is missing an updated *.inf* that associates with "usb\ms_comp_winusb" devices. Normally if the USB device supports Microsoft OS descriptors, then it will allow Windows to automatically install the WinUSB driver. This mechanism is supported "in-box" for Win8 and newer. For Win7 the mechanism is supported through Windows update. Depending on the update policy for the Win7 machine, the appropriate driver may or may not be already available on the machine. If it is not already on the machine, user can use the following manual procedure to install the driver if necessary. (copy from https://www.silabs.com/community/interface/knowledge-base.entry.html/2017/02/06/manually_installwin-A2Jj)

Some windows update also included updated .inf file. You can try run uuu to see what happen. If windows report "can't install driver", that means your system missed such update file.

7.2 Install updated winusb inf file

- [Download package](#)
- unzip
- run install.bat as administrator permission.



- The below screen show install success

```
C:\Windows\System32\cmd.exe
C:\Windows\system32>echo off
Administrative permission confirmed
===
Microsoft PnP Utility

Processing inf :          winusbcompat.inf
Driver package added successfully.
Published name :          oem8.inf

Total attempted:          1
Number successfully imported: 1

"SUCCESS: WINUSB WCID install"
Hit enter to close_
```

Notes:

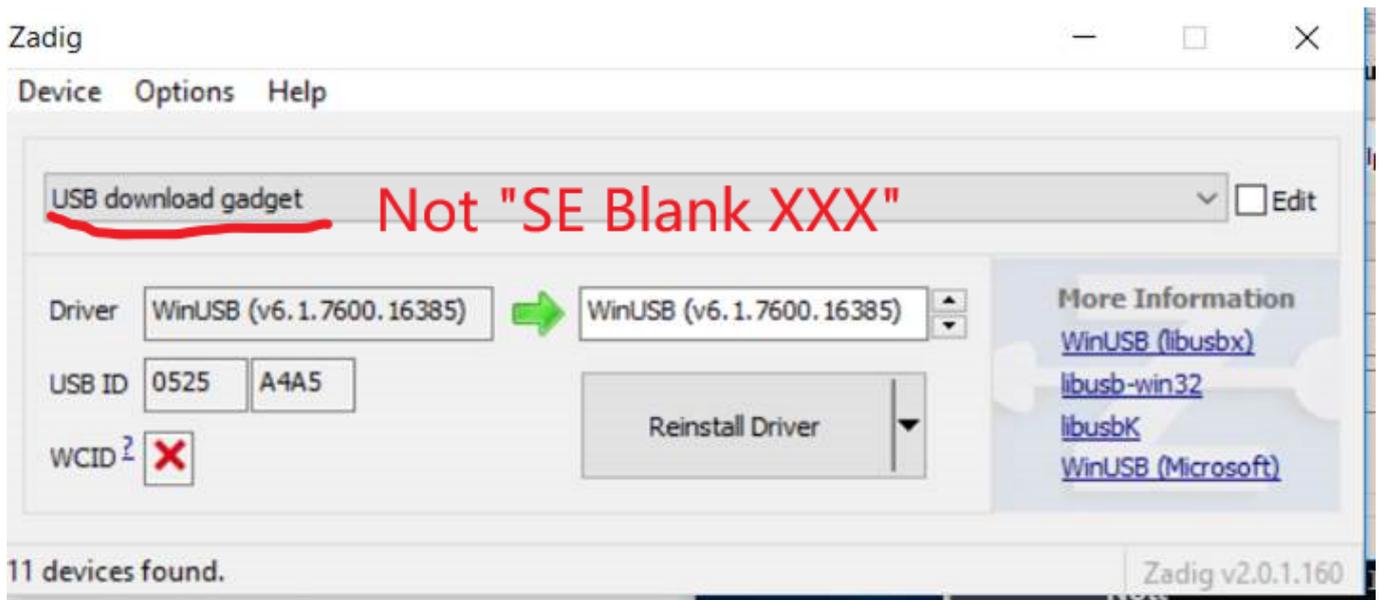
4.9.123 8MM GA and 4.14 beta release missed a patch. Please apply below [patch](#) in uboot

7.3 Use zadig to install winusb driver

Please make sure you success download uboot and uboot auto launch fastboot command. windows find **USB download device**, NOT **SE Blank**

If still fail install winusb driver you can try below method. you can try download zadig from <https://zadig.akeo.ie/>

Choose **USB download device** and click install.



If you already apply patch and still see WCID is red "x", please submit issue.

Notes:

"SE Blank xx" is ROM HID device. PLEASE DON'T CHOOSE IT TO WINUSB. libusb can work well with HID device. Only "Usb download device" need check

8 FAQ

- **Win7 can't found driver**

- Need install winusb driver, you can use <https://zadig.akeo.ie/> to install winusb driver
- see page [WIN7-User-Guide](#)

- **Linux: Open device failure**

```
sudo uuu xxx
```

- **Some iMX8mm(845) chip failure write at linux system**

Need apply ROM patch, contact FAE to get it.

- **How to use absolute path in scripts**

Default all paths in script is related uuu scripts. if you want to use absolute path in scripts ↔

Add ">" in path like

```
>/home/xxx
```

- **uuu exit silence or report missed dll**

Please upgrade to 1.2.x

- **How to avoid sudo in linux**

Put below context into /etc/udev/rules.d/99-uuu.rules (need sudo)

```
SUBSYSTEM=="usb", ATTRS{idVendor}=="1fc9", ATTRS{idProduct}=="012f", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="1fc9", ATTRS{idProduct}=="0129", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="15a2", ATTRS{idProduct}=="0076", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="15a2", ATTRS{idProduct}=="0054", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="15a2", ATTRS{idProduct}=="0061", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="15a2", ATTRS{idProduct}=="0063", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="15a2", ATTRS{idProduct}=="0071", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="15a2", ATTRS{idProduct}=="007d", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="15a2", ATTRS{idProduct}=="0080", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="1fc9", ATTRS{idProduct}=="0128", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="1fc9", ATTRS{idProduct}=="0126", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="1fc9", ATTRS{idProduct}=="0135", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="1fc9", ATTRS{idProduct}=="0134", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="1fc9", ATTRS{idProduct}=="012b", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="0525", ATTRS{idProduct}=="b4a4", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="0525", ATTRS{idProduct}=="a4a5", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="066F", ATTRS{idProduct}=="9BFF", MODE="0666"
```

run sudo udevadm control --reload-rules

uuu -udev can show above help.

- **How to get file in zip without decompress**

Assume there are file name uuu.auto in A.zip file.

```
A.zip/uuu.auto
```

for example:

```
uuu A.zip/uuu.auto
```

- **How to send out uncompress bz2**

Added /* after bz2 file

for example

```
uuu -b emmc_all <bootloader> sdcard.bz2/*
```

• Boot fail after burn > 4G Image

uboot need below patch

```
diff --git a/common/image-sparse.c b/common/image-sparse.c
index ddf5772..86ff5a0 100644
--- a/common/image-sparse.c
+++ b/common/image-sparse.c
@@ -59,7 +59,7 @@ void write_sparse_image(
    uint32_t bytes_written = 0;
    unsigned int chunk;
    unsigned int offset;
-   unsigned int chunk_data_sz;
+   uint64_t chunk_data_sz;
    uint32_t *fill_buf = NULL;
    uint32_t fill_val;
    sparse_header_t *sparse_header;
@@ -130,7 +130,7 @@ void write_sparse_image(
                                   sizeof(chunk_header_t));
    }

-   chunk_data_sz = sparse_header->blk_sz * chunk_header->
 chunk_sz;
+   chunk_data_sz = (uint64_t)sparse_header->blk_sz * (uint64_t)
 chunk_header->chunk_sz;
    blkcnt = chunk_data_sz / info->blksz;
    switch (chunk_header->chunk_type) {
    case CHUNK_TYPE_RAW:
```

• WCID failure load

Apply below uboot patch

```
diff --git a/drivers/usb/gadget/f_fastboot.c b/drivers/usb/gadget/f_fastboot.c
index ae8fe80..cd46ca4 100644
--- a/drivers/usb/gadget/f_fastboot.c
+++ b/drivers/usb/gadget/f_fastboot.c
@@ -2543,10 +2543,10 @@ static int fastboot_bind(struct usb_configuration *c,
 struct usb_function *f)
    f->os_desc_table->if_id = id;
    INIT_LIST_HEAD(&fb_os_desc.ext_prop);
    fb_ext_prop.name_len = strlen(fb_ext_prop.name) * 2 + 2;
-   fb_os_desc.ext_prop_len = 14 + fb_ext_prop.name_len;
+   fb_os_desc.ext_prop_len = 10 + fb_ext_prop.name_len;
    fb_os_desc.ext_prop_count = 1;
-   fb_ext_prop.data_len = strlen(fb_ext_prop.data);
-   fb_os_desc.ext_prop_len += fb_ext_prop.data_len;
+   fb_ext_prop.data_len = strlen(fb_ext_prop.data) * 2 + 2;
+   fb_os_desc.ext_prop_len += fb_ext_prop.data_len + 4;
    list_add_tail(&fb_ext_prop.entry, &fb_os_desc.ext_prop);

    id = usb_string_id(c->cdev);
```

- **out of memory at 64bit system**

If use bz2 or zip file, it is possible out of memory. Please increase swap partition size in linux. increase virtual memory size in windows.

- **How to write emmc to second boot partition**

```
FB: ucmd setenv fastboot_dev mmc
FB: ucmd setenv mmcdev $emmc_dev

FB: ucmd echo flashing first parttion

FB: ucmd setenv fastboot_buffer $loadaddr
FB: download -f imx-boot.bin
FB: ucmd setexpr fastboot_blk $fastboot_bytes
FB: ucmd setexpr fastboot_blk $fastboot_blk + 0x1FF
FB: ucmd setexpr fastboot_blk $fastboot_blk / 0x200
FB: ucmd mmc dev $emmc_dev 1
FB: ucmd echo fastboot_buffer: $fastboot_buffer
FB: ucmd echo fastboot_blk: $fastboot_blk
FB: ucmd mmc write $fastboot_buffer 0 $fastboot_blk

FB: ucmd echo flashing second parttion

FB: download -f imx-boot-ALTERNATE.bin
FB: ucmd setexpr fastboot_blk $fastboot_bytes
FB: ucmd setexpr fastboot_blk $fastboot_blk + 0x1FF
FB: ucmd setexpr fastboot_blk $fastboot_blk / 0x200
FB: ucmd mmc dev $emmc_dev 2
FB: ucmd mmc write $fastboot_buffer 0 $fastboot_blk

FB: ucmd mmc partconf $emmc_dev 1 1 0

FB: Done
```

- **How to use uuu in docker**

libusb need udev event to get new devices appeared.

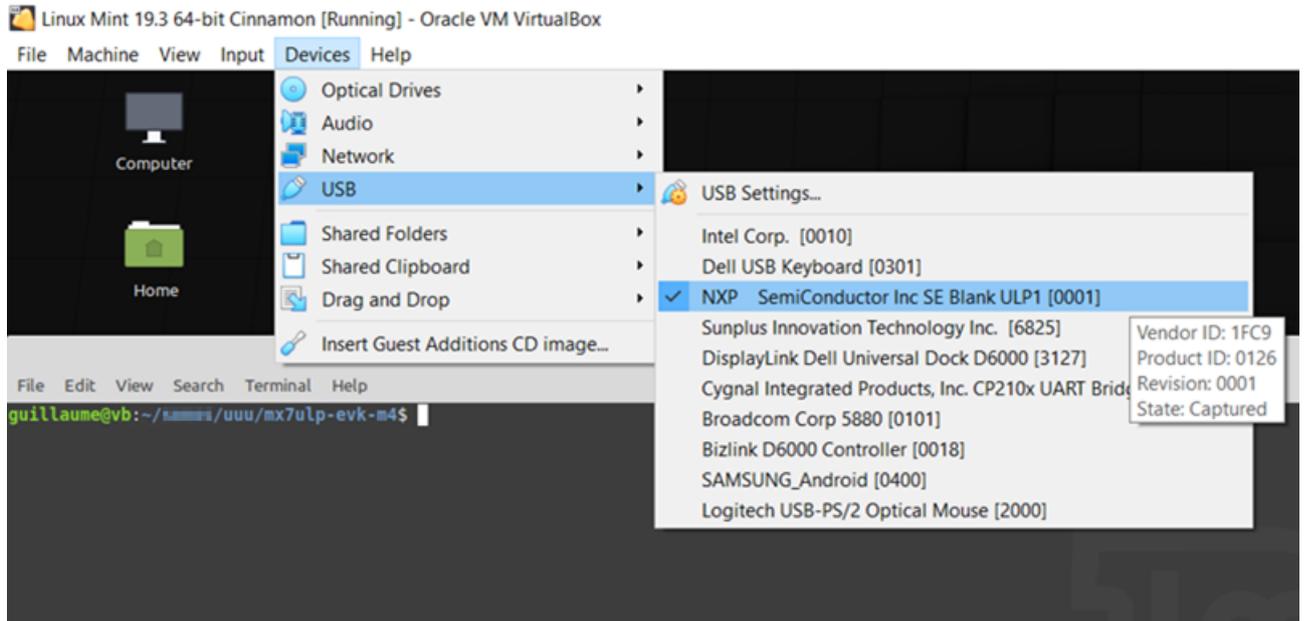
Added option

```
docker run --net=host -v /run/udev/control:/run/udev/control
```

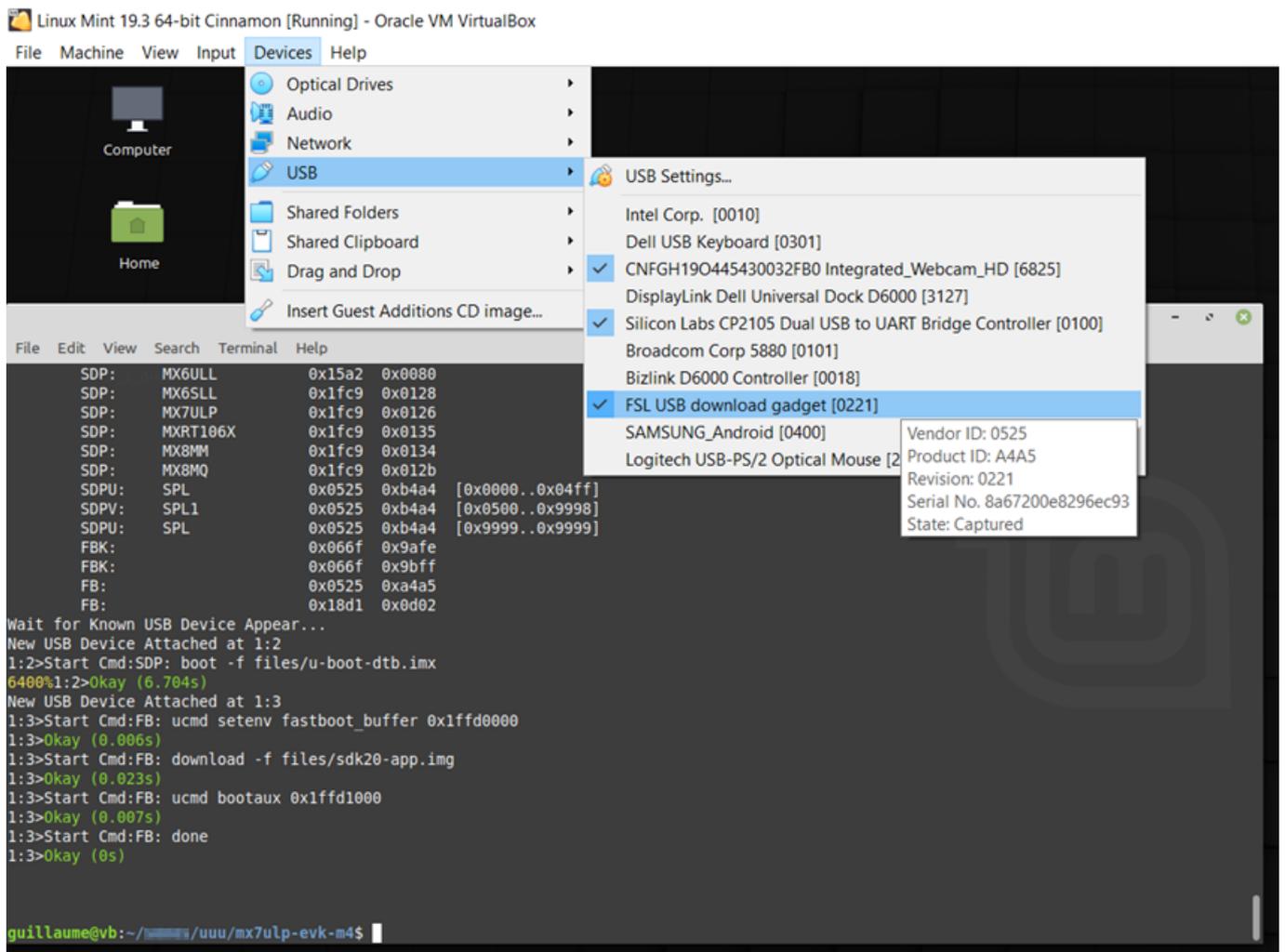
<https://stackoverflow.com/questions/49687378/how-to-get-hosts-udev-events-from-a-docker-container>

- **How to use uuu in virtual machine**

- Map HID device into virtual machine



- Map fastboot device into virtual machine after uboot boot



- You can use uuu burn image in virtual machine

9 Build Steps

9.1 windows

- download visual studio 2017 community version (free)
- git clone <https://github.com/NXPmicro/mfgtools.git>
- cd mfgtools
- git submodule init
- git submodule update
- open msvs/uuu.sln by vs2017
- click build

9.2 linux

- git clone <https://github.com/NXPmicro/mfgtools.git>
- cd mfgtools
- sudo apt-get install libusb-1.0.0-dev libzip-dev libbz2-dev
- cmake .
- make

10 Uboot config requirement

To talk with uuu, uboot need enable fastboot. fastboot need auto run when detect boot from USB.

```
CONFIG_CMD_FASTBOOT=y
CONFIG_USB_FUNCTION_FASTBOOT=y
CONFIG_USB_GADGET=y
CONFIG_USB_GADGET_DOWNLOAD=y
CONFIG_USB_GADGET_MANUFACTURER="FSL"
CONFIG_USB_GADGET_VENDOR_NUM=0x0525
CONFIG_USB_GADGET_PRODUCT_NUM=0xa4a5
CONFIG_CI_UDC=y                               # UDC need change according system, ↔
      some system use CONFIG_USB_DWC3, some use CONFIG_USB_CDNS3
CONFIG_FSL_FASTBOOT=y
CONFIG_FASTBOOT=y
CONFIG_FASTBOOT_BUF_ADDR=0x83800000          # Address need change according ↔
      system, generally it can be the same as ${LOADADDR}
CONFIG_FASTBOOT_BUF_SIZE=0x40000000
CONFIG_FASTBOOT_FLASH=y
CONFIG_FASTBOOT_FLASH_MMC_DEV=1
CONFIG_EFI_PARTITION=y
CONFIG_ANDROID_BOOT_IMAGE=y
```

If use SPL, SDP need be enabled.

```

CONFIG_SPL_USB_HOST_SUPPORT=y
CONFIG_SPL_USB_GADGET_SUPPORT=y
CONFIG_SPL_USB_SDP_SUPPORT=y
CONFIG_SDP_LOADADDR=0x40400000 # Address need change according ↔
    system, choose free memory

```

uuu related patches.

https://source.codeaurora.org/external/imx/uboot-imx/log/?h=imx_v2017.03_4.9.123_imx8mm_ga

About Fastboot enable:

```

719651a MLK-18257-1 Enable fastboot support in qxp mek board
d5226a3 MLK-18257-2: fix fastboot build warning
219c989 MLK-18257-3 run fastboot if initramfs is in validate
09b1876 MLK-18257-4 use another method check if need run bootcmd_mfg
3b1fa9d MLK-18257-5 enhance fastboot uboot cmd
ca96e0b MLK-18406 fastboot support all partition

```

About uboot SDP enable:

```

192a26d MLK-18707-1: SDP: use CONFIG_SDP_LOADADDR as default load address
9764fb2 MLK-18707-2 iMX8M enable fastboot as default
db9a634 MLK-18862 imx8mm uuu can write emmc by fastboot

```

Additional environment need be define

Table 5: Table uuu environment

Variable	Usage	Description
emmc_dev	emmc burn	eMMC device number
sd_dev	burn sd	sd slot device number
kboot	boot kernel\burn nand	kernel boot command, it is booti for arm64, bootz for arm32
weim_uboot	burn weim nor	uboot burn to position of weim nor
weim_base	burn weim nor	weim base address
mtdparts	burn nand	NAND flash partition configuration, such as "mtdparts=8000000.nor:1m(boot),-(rootfs)\;gpmi-nand:64m(nandboot),16m(nandkernel),16m(nandrootfs) "
spi_bus	burn spi (not qspi\fspi)	spi nor flash bus number
spi_uboot	burn spi (not qspi\fspi)	spi nor flash uboot offset

11 kernel config requirement

Some kernel config required

- USB CONFIG FS need be built-in
- One of UDC driver and PHY need be built-in
- Function FS need be enabled

```
Device Drivers
USB support
  USB gadget support (very last entry)
    USB Gadget Drivers (...)
      USB functions configurable through configs
        Mass storage
        Function filesystem (functionFS)
```

12 Release Notes

12.1 1.5.163

12.1.1 New features

- Support yocto bmap file to skip unused block
- Support i.MX95

12.1.2 Bug fixes

- Fixed usb pipe error when download image with FCB

12.2 1.5.125

This is fixes up for 1.5.120

- force use old libusb to run at ubuntu 18.04

12.3 1.5.120

12.3.1 New features

- Add built spinand command support
- parser [-t timeout] for all protocol

12.4 1.5.109

This is fixes up for 1.5.104

- static link c++ library in prebuild linux image
- provide armlinux version image

12.5 1.5.104

12.5.1 New fetaures

- Using github working flow action to do release.
 - Expand upload command, like uploading the value of a specific variable.
-

12.5.2 Bug fixes

- Fix segfault when boot data is zero in SDP.
- Fix issues when m_skip is not zero in fastboot.
- Fix issues when file size isn't divisible by block size in fastboot.
- Fix read uploaded data for FB.

12.6 1.5.21

12.6.1 New features

- Reduce memory usage when burn single board with compressed Image.
- Http(s) prompt request username and passwords when require autherization.

12.6.2 Bug fixes

- fixed android super.img loop download 52byte after some block.
- fix memory leak cause by getaddrinfo.
- fix support of empty environment variables in Windows OS.
- fix crash when environment variable is last word in script

12.7 1.4.243

12.7.1 New features

- Add zstd support
- Add iMX93 support

12.7.2 Bug fixes

- Fixed random crash when download bz2 from http
- Fix crash when download speed slower than decompress speed and need resize buffer

12.8 1.4.193

12.8.1 New features

- Add NXP FB/FBK/SDPV device PID

12.8.2 Bug fixes

- Fixed 314 Corrupt image with larger transfer sizes at sdp(s)
 - Fixed missed true at else branch at built-in fat_write script and nand_burn_loader
 - Fixed invalid progress percentage in verbose mode
 - Fixed QSPI flashing script
 - Fix #297 print error when run quit cmd in shell mode
 - Fix #180 support check getval return value
-

12.9 1.4.165

12.9.1 New features

- Burn wic file(after 2021 Q4 yocto image) directly. `uuu -b emmc_all wic`
- Add *upload* fastboot command support
- Support uboot that use plugin initialize ddr
- Support simple logical check in uuu script

12.9.2 Bug fixes

- fix buildin script bz2 have not replaced with `bz2*` if path included space
- fixed #284: deadlock when using built-in script with filename include `_`
- Fix a potential crash if open usb device 400ms after detect attached
- fix uuu return success even ucp failure

12.10 1.4.139

12.10.1 New features

- Add help option `-IgSerNum` to set windows registry to ignore serial number above too much entry in register when burn many boards.
- Add snap support
- Add 8ulp support
- Deploy mac image

12.10.2 Bug fixes

- Fixed missed last chunk when meet specific android sparse file
- return out of memory when allocate failure
- `-bshow` don't show uuu version information and recover cursor ESC

12.11 1.4.72

12.11.1 New features

- http\https add port support at url
- improve progress show when burn android sparse image

12.11.2 Bug fixes

- Fix the dead loop when flash specific android super.img. There are bug when split big super.img into small sparse file running time. The bug trigger if split point at whole sparse chunk.
-

12.12 1.4.43

12.12.1 New features

- add environment variable support command
- Added support for *FB:reboot* and *FASTBOOT:reboot*
- allow to pass sparse limit from command line
- Update version number support build number > 255
- Mac OS (Catalina) support

12.12.2 Bug fixes

- fix #193 fb:< echo ucmd print failure
- fix fat_write partition parser error

12.13 1.3.191

12.13.1 New features

- Added Boundary Devices fastboot IDs

12.13.2 Bug fixes

- Workaround problem: some data pattern cause timeout at dell docker hub.
- update 7D free memory address, errata e11166 https://www.nxp.com/docs/en/errata/IMX7DS_3N09P.pdf
- Fix can't build from source tarball.

12.14 1.3.154

12.14.1 New features

- ffu image basic support
- add boundary device VID/PID
- Added basic fastboot logical partition support

12.14.2 Bug fixes

- fastboot: fix oem command separator
- Fix crash when download bz2 file

12.15 1.3.134

12.15.1 Bug fixes

- fix qm\qxp download failure if use spl image
-

12.16 1.3.130

12.16.1 New features

- Add android fastboot continue command
- Add i.MX8DXL support
- Add i.MX865 support
- build in script sd, support burn difference uboot
- Add option -pp to set pool time
- sdp: bootcmd: add support for --dcdaddr
- change the default nandbcb command from update to init

12.16.2 Bug fixes

- fix one line miss when exit uuu
- fix show 99% when use bz2 file
- fix miss ucmd at nand built-in script
- fix show time wrong, use system time instead of tick as timesample

12.17 1.3.102

12.17.1 New features

- Support simple https. (experimental).
- -b option support script file
- support >=4G zip file

12.17.2 Bug fixes

- fixed #136 fix decompress failure if use uncompressed method in zip file.
- fixed something wait forever when download bz2 from http
- fix http request failure at some host (use \r\n at http request)

12.18 1.3.82

12.18.1 New features

- add dry-run option to check if all files exist at script
 - Start download before scan whole Bz2 file. Progress only show how many data burned instead of percentage before finish scan.
 - Add NAND built in script to burn boot loader into nand flash, which need uboot support nandbcb command
 - Add --skipfhdr option to skip flexspi header
 - Can use SD card uboot for flexspi, which need uboot support qspihdr command
-

- Add timestamp info for each command. (-v show how many time is consumed for each command).
- Add tar.bz2 support.(experimental).
- Add tar.gz support. (experimental).
- Add http download. (experimental).
- Auto append /* for bz2 file when use built-in script.
- Add -lsusb option to list all connected known devices to help find usb path when do multi boards support

12.18.2 Bug fixes

- Fix SPL download uboot failure if uboot size > 2M
- Upgrade libusb to 1.0.23-rc3 to resolve some windows compatibility problem. such as exit if not usb port under virtual root hub.
- Fix bz2 decompress problem if bz2 created by bzip2 instead of pbzip2.
- Fix missed last chunk data for android sparse image
- fixed #123: implement timeout for wait known usb device appear

12.19 1.2.135

12.19.1 New features

- Support i.MX28
- Add Read\write a memory address for i.MX6/i.MX7
- built-in script emmc support burn difference files
- Support i.MX815

12.19.2 Bug fixes

- fix crash when console width between 47 to 54
- fix crash when use ssh <host> uuu
- fix wrong data by decompress sdcard.bz2/* if enable -O2 build option

12.20 1.2.91

12.20.1 New features

- Auto parameter complete support
 - Add option -udev to help create udev rule to avoid use sudo
 - Remove VT color at win7
 - Fail back to verbose mode at win7
 - Enable uboot shell mode
 - Just print help when run uuu and doesn't scan auto.uuu in current directory.
-

- Added blog command to fetch message from uboot boot log
- Support file path include space. need add "" at file path
- Windows version built-in libusb
- New SDPV support to support -skipsql for uboot, which support auto scan uboot position.

12.20.2 Bug fixes

- Fixed uuu "fb[-t 1000]:" ucmd wait forever problem
- Fixed missed sdpu: done at spl built in script
- Fixed show nothing when wait for usb connection
- Fixed random claim interface failure at windows platform
- Fixed random crash when multi-device download at windows platform
- Fixed memory leak.
- Fixed #79 file all zero when ucp from target to host
- Fixed crash when done is not last cmd

12.21 1.2.0

12.21.1 New features

- Support decompress bz2 file, sdcard.bz2/* means decompress it.
- Support enter shell after run script

12.21.2 Bug fixes

- Fix mx6 boot failure when enable security
- Fix windows version dependent on vs redistribute package

12.22 1.1.81

12.22.1 New features

- Support shell command
- Support shell command generate dynamic uuu command to burn sequence id, like MAC address
- Reduce cpu usage rate at windows platform by increase each bulk transfer size
- Added q(quit) to exit shell at -s mode

12.22.2 Bug fixes

- fixed some typo
 - fixed build script qspi burn failure if file size > 1M
 - fixed file locked by uuu to prevent user update it.
 - fixed crash at special uboot size
-

12.23 1.1.41

12.23.1 New features

- Support SDP protocol (i.MX6x, i.MX7, i.MX8M, i.MX8MM)
- Support SDPS protocol (i.MX8QXP B0, i.MX8QM B0)
- Support SDPU protocol (uboot\SPL implemented SDP protocol)
- Support FB protocol (fastboot with uboot)
- Support FBK protocol (fastboot in kernel, daemon implement at imx-uuc)
- Support multi-device download
- Support built-in script

12.23.2 Bug fixes

- Fix sometime open usb device failure at windows platform.
- Fix protocol case sensitive problem in script
- Fix open zip file failure

13 Known issue

- Some old i.MX8MM board HID can't work in linux system. Need apply ROM patch to fix. Please contact FAE.
 - QXP/QM NAND image can't download by UUU because alignment requirement is difference
 - Bz2 file only support one that is generated by pbbz2. there are problem if use bzip2 generate bz2.
 - i.MX815 only support 3 boards at the same time.
 - Some typeC dell dock USB hub cause transfer timeout if meet some magic data pattern, see branch magic_pattern. Try use differece hub or direct connect to PC usb port if this happen.
-