SP Android Fastboot
Customer Document

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Field Code Changed

Document Revision History

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1.6	2015.04.24	Sten Liao	Correct the file path

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1 Introduction

1.1 Software/Hardware Environment

1.1.1 Software Environment

MediaTek do not modify the host tool of fastboot come from Android. MediaTek only implement the target side of fastboot in Little Kernel (LK).

Fastboot is using USB to connect between host and device. It uses the same USB ADB host driver of the phone. User should install the ADB USB driver because using fastboot.

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1.2 Functionality

Fastboot is the default flashing tool of Android. It have two parts, one is the host tool that is used for sending the commands, uploading system image to the target. MediaTek only implements the target side of fastboot in LK for executing those commands receiving from the host side of fastboot.
MediaTek classifies the features of fastboot into 4 catalog.
They are

1. Boot Operation
   The commands about controlling the system booting operation
2. Connection Operation
   The commands about controlling the USB connection operation
3. Flash Operation
   The commands about controlling updating the images to the target
4. Partition Operation
   The commands about controlling erase/format the partitions
5. Misc Operation
   Miscellaneous commands

Table 1 describes the function and commands of fastboot supported in MediaTek Platform. OEM can refer this table to understand which commands will be supported.

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No	Catalog	Commands/Item	Description	Support	Default	Comments
1	Entering Fastboot	Hotkey - Power + "A Key"	Use Power key plus a key for triggering into fastboot mode.	Yes	Disable	If the phone have enough keys. ODM can choose a key with power key to trigger fastboot mode. E.g. Power + Camera key when boot up
2	Entering Fastboot	LK Text Menu	LK Boot Menu	Yes	Enable	Fastboot is an option in the LK text menu that is also triggered from a hot key when system is power up Default: Power + Vol Down
4	CMD:Boot Operation	continue	Continue with autoboot	Yes	Enable	Supported as description
5	CMD:Boot Operation	reboot	Reboot device normally	Yes	Enable	Supported as description
6	CMD:Boot Operation	reboot-bootloader	Reboot device into bootloader	Yes	Enable	Supported as description
7	CMD:Boot Operation	-c	Override kernel commandline	Yes	Enable	Supported as description
8	CMD:Boot Operation	-b	Specify a custom kernel base address	Yes	Enable	Supported as description
9	CMD:Connection Operation	devices	List all connected devices	Yes	Enable	It will list all serial devices connected with PC
10	CMD:Connection Operation	-s	Specify device serial number	Yes	Enable	Supported as description
11	CMD:Connection Operation	-i	Specify a custom USB vendor id	Yes	Enable	Supported as description
12	CMD:Flash Operation	update	Reflash device from update.zip	Yes	Enable	Supported as description
13	CMD:Flash Operation	flashall	Flash boot + recovery + system	Yes	Enable	Supported as description
14	CMD:Flash Operation	flash	Flash recovery partition	Yes	Enable	Supported as description
15	CMD:Flash Operation	flash:raw boot	Create bootimage and flash	Yes	Enable	Supported as description
16	CMD:Flash Operation	boot	Download and boot kernel	Yes	Enable	Supported as description
17	CMD:Flash Operation	-n	Specify the nand page size. Default: 2048	No	NA	The value is prebuilt in LK so do not be supported
18	CMD:Partition Operation	erase	Erase system partition	Yes	Enable	For emmc, it will write "0" to the block of the specific partition For NAND, it will write "0xFF" to to the blcok of the specific partiton
19	CMD:Partition Operation	format	Format a flash partition	Yes	Enable	This only support in JB and it will generate a "fastboot-format.img" for formattin the ext4. For NAND Device, this operation is equal to erase
20	CMD:Partition Operation	-w	erase userdata and cache	Yes	Enable	For emmc, it will write "0" to the block. For NAND, it will write "0xFF" to the block
21	CMD:Misc. Operation	getvar	Display a bootloader variable	Yes	Enable	oem product will return the product name oem kernel will return "lk" oem serialno will retuturn the chip iD
22	CMD:Misc. Operation	-p	Specify product name	Yes	Enable	It can specify the source of the image from which product according the standard Android Directory out/target/product/<Product Name>
23	CMD:Misc. Operation	help	Show the help messages	Yes	Enable	Supported as description

Table 1 Operations support in MediaTek Fastboot

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1.3 Limitation

Fastboot is targeted for the end user or the third party developer. It does not support all the functions as the flashtool of MediaTek did. It only support the functions of fastboot defined in Android. Only BOOTIMG, ANDROID, USERDATA and CACHE partitions can support the flash operation in default. If OEM needs their customers to flash all partitions. OEM should release the flashtool to them according the flashtool license or modify the design of fastboot to change the partition permissions or adding the new OEM commands in fastboot.

1.3.1.1 Partitions

Table 2 is showing which NAND partitions can be updatable in default configuration.
Table 3 is showing which eMMC partitions can be updatable in default configuration. Updatable Partitions means can be doing the flash/partition operation.

OEM can change the source code of fastboot in target side if want to support more partitions for flash/partition operation. OEM should not allow the flash/partition operation in some partitions that cannot be recovered by fastboot. E.g. NVRAM. erasing the data in NVRAM will cause the calibrated data be lost.

Index	NAND Partition	Type	Updatable Partitions
1	PRELOADER	Raw data	N
2	DSP_BL	Raw data	N
3	NVRAM	Raw data	N
4	SECCFG	Raw data	N
5	UBOOT	Raw data	N
6	BOOTIMG	Raw data	Y
7	RECOVERY	Raw data	N
8	SEC_RO	YAFFS2	N
9	MISC	Raw data	N
10	LOGO	Raw data	N
11	EXPDB	Raw data	N
12	ANDROID	YAFFS2	Y
13	CACHE	YAFFS2	Y
14	USRDATA	YAFFS2	Y
15	BMTPOOL	Raw data	N

Table 2 Updatable Partitions in NAND Device

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Index	eMMC Partition	Type	Updatable Partitions
1	PRELOADER	Raw data	N
2	DSP_BL	Raw data	N
3	MBR	Raw data	N
4	EBR1	Raw data	N
5	PMT	Raw data	N
6	NVRAM	Raw data	N
7	SECCFG	Raw data	N
8	UBOOT	Raw data	N
9	BOOTIMG	Raw data	Y
10	RECOVERY	Raw data	N
11	SEC_RO	EXT4	N
12	MISC	Raw data	N
13	LOGO	Raw data	N
14	EXPDB	Raw data	N
15	EBR2	Raw data	N
16	ANDROID	EXT4	Y
17	CACHE	EXT4	Y
18	USRDATA	EXT4	Y
19	FAT	FAT	N
20	OTP	Raw data	N
21	BMTPOOL	Raw data	N

Table 3 Updatable Partitions in eMMC device

1.3.1.2 Image Size

Currently fastboot only supports the image size that is smaller than the system DRAM size. The update will be failure if system image is larger than the system DRAM size.

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2 Customization

2.1.1 Entering fastboot mode

User can choose one of hardware keys combination (E.g. Power + Camera) when system has been boot up or an item in the LK text menu to enter fastboot mode. For detail, refer the customer document about the boot loader please [REF.1].

2.1.2 Partition Permission Configuration

If OEM need to change the operation permission control of fastboot, please change N to Y in the partition table configuration file please, which is called

device/mediatek/build/build/tools/ptgen/{chip ID}/partition_table_{chip ID}.xls

Partition_Name	FastBoot Erase		FastBoot Download	
	eng	user	eng	user
PRELOADER	N		N	
MBR	Y	N	Y	N
PRO_INFO	N		N	
NVRAM	N		N	
PROTECT_F	N		N	
PROTECT_S	N		N	
SECCFG	N		N	
UBOOT	Y	N	Y	N
BOOTIMG	Y		Y	
RECOVERY	Y	N	Y	N
SEC_RO	N		N	
MISC	N		N	
LOGO	Y	N	Y	N
CUSTOM	N		N	
EXPDB	N		N	
ANDROID	Y		Y	
CACHE	Y		Y	
USRDATA	Y		Y	
FAT	N		N	
OTP	N		N	
BMTPOOL	N		N	

Table 4 An example of partition table for fastboot operation permission control

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For MT6575 / MT6577 / MT6589/ MT6582, If OEM need to change the operation permission control of fastboot, please change 0 to 1 in the partition table configuration file please, which is called

device/mediatek/build/build/tools/ptgen/{chip ID}/partition_table_{chip ID}.xls

Index	Partition	Down Load?	FB_Erase?	FB_Download?
1	PRELOADER	1	0	0
2	DSP_BL	1	0	0
3	MBR	1	0	0
4	PMT	0	0	0
5	NVRAM	0	0	0
6	SECCFG	0	0	0
7	UBOOT	1	0	0
8	BOOTIMG	1	1	1
9	RECOVERY	1	0	0
10	SEC_RO	1	0	0
11	MISC	0	0	0
12	LOGO	1	0	0
13	EXPDB	0	0	0
14	ANDROID	1	1	1
15	CACHE	1	1	1
16	USRDATA	1	1	1
17	FAT	0	0	0
18	BMTPOOL	0	0	0
	END	0	0	0

Table 5 An example of partition table for fastboot operation permission control

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For GPT partition supported projects (ex: MT6595, MT6752), besides partition table, OEM need to change “is_support_erase” and “is_support_dl” field to 1 in partition_fastboot.h if the target partition is reuired to change the operation permission control of fastboot.

bootable/bootloader/lk/platform/{chip ID}/include/platform/partition_fastboot.h

denali in bootable/bootloader/lk/platform/{chip ID}/include/platform/partition_setting.c

```
struct part_name_map {
    char fb_name[32];    /*partition name used by fastboot*/
    char r_name[32];     /*real partition name*/
    char *partition_type;    /*partition_type*/
    int partition_idx;  /*partition index*/
    int is_support_erase;    /*partition support erase in fastboot*/
    int is_support_dl;  /*partition support download in fastboot*/
};
```

```
#ifdef USER_BUILD //user build

struct part_name_map g_part_name_map[] = {
    {"preloader",    "preloader",    "raw data", 0,  0,  0},
    {"proinfo", "proinfo",   "raw data", 1,  0,  0},
    {"nvram",   "nvram",     "raw data", 2,  0,  0},
    {"protect1",     "protect1", "ext4", 3,  0,  0},
    {"protect2",     "protect2", "ext4", 4,  0,  0},
    {"persist", "persist",   "ext4", 5,  0,  0},
    {"seccfg",  "seccfg",    "raw data", 6,  0,  0},
    {"lk",   "lk",     "raw data", 7,  0,  0},
    {"boot",    "boot", "raw data", 8,  1,  1},
    {"recovery",     "recovery", "raw data", 9,  0,  0},
    {"secro",   "secro",     "ext4", 10, 0,  0},
    {"para",    "para",  "raw data", 11, 0,  0},
    {"logo",    "logo",  "raw data", 12, 0,  0},
    {"custom",  "custom",    "ext4", 13, 0,  0},
    {"expdb",   "expdb",     "raw data", 14, 0,  0},
    {"teel",    "teel",  "raw data", 15, 0,  0},
    {"tee2",    "tee2",  "raw data", 16, 0,  0},
    {"metadata",     "metadata", "raw data", 17, 0,  0},
    {"system",  "system",    "ext4", 18, 1,  1},
    {"cache",   "cache",     "ext4", 19, 1,  1},
    {"userdata",     "userdata", "ext4", 20, 1,  1},
    {"intsd",   "intsd",     "fat",  21, 0,  0},
};

#else //engineer build

struct part_name_map g_part_name_map[] = {
    {"preloader",    "preloader",    "raw data", 0,  0,  0},
    {"proinfo", "proinfo",   "raw data", 1,  0,  0},
    {"nvram",   "nvram",     "raw data", 2,  0,  0},
    {"protect1",     "protect1", "ext4", 3,  0,  0},
    {"protect2",     "protect2", "ext4", 4,  0,  0},
    {"persist", "persist",   "ext4", 5,  0,  0},
    {"seccfg",  "seccfg",    "raw data", 6,  0,  0},
    {"lk",   "lk",     "raw data", 7,  1,  1},
    {"boot",    "boot", "raw data", 8,  1,  1},
    {"recovery",     "recovery", "raw data", 9,  1,  1},
    {"secro",   "secro",     "ext4", 10, 0,  0},
    {"para",    "para",  "raw data", 11, 0,  0},
    {"logo",    "logo",  "raw data", 12, 1,  1},
    {"custom",  "custom",    "ext4", 13, 0,  0},
    {"expdb",   "expdb",     "raw data", 14, 0,  0},
    {"teel",    "teel",  "raw data", 15, 0,  0},
    {"tee2",    "tee2",  "raw data", 16, 0,  0},
    {"metadata",     "metadata", "raw data", 17, 0,  0},
    {"system",  "system",    "ext4", 18, 1,  1},
    {"cache",   "cache",     "ext4", 19, 1,  1},
    {"userdata",     "userdata", "ext4", 20, 1,  1},
    {"intsd",   "intsd",     "fat",  21, 0,  0},
};

#endif
```

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Table 6 An example of partition table for fastboot operation permission control

2.1.3 Variable and Command Registration

If OEM would like to add new variables or commands in the product, please register the variable by fastboot_publish() and the command by fastboot_register() in the function fastboot_oem_register() in bootable/bootloader/lk/target//<product>/fastboot_oem_commands.c

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3 Build

3.1.1 Fastboot host

Fastboot host will be generated when building the whole system image. Notice that it has Windows and Linux Version.

3.1.2 Fastboot Target

When building LK, fastboot will be prebuilt into it, use the standard command of building LK please. [REF.1]

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4 Reference

[Ref 1.]1. YuSu Bootloader Customer Document_v1.0.docx.

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