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APPLICATION NOTE

FlashToolCLI User Guide_V4.0.0

EigenCOMM Wireless Microcontroller

Document Description

FlashToolCLI is a tool suite for flashing system files or other files

Function Description

Contents

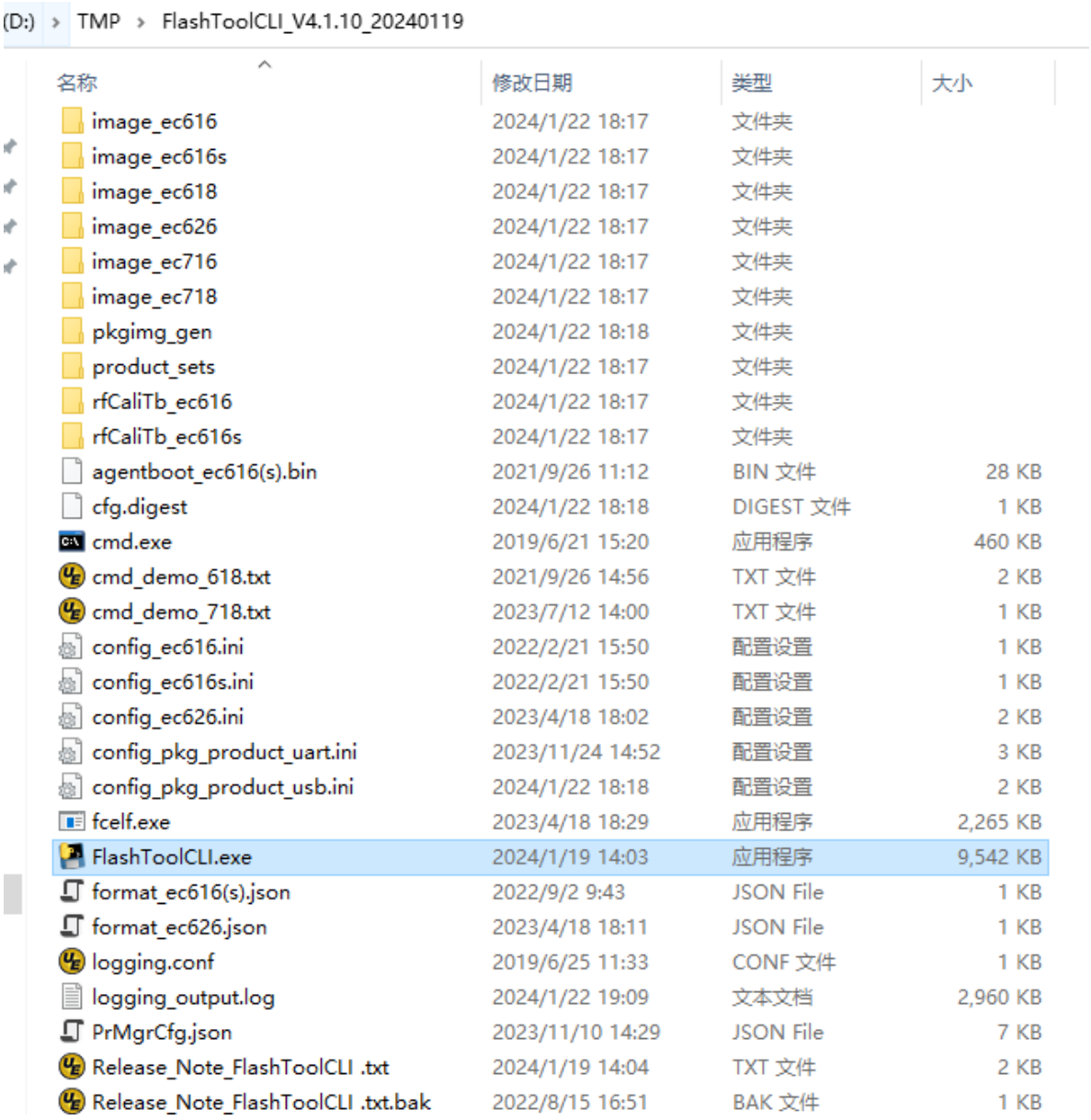
1. Summary

FlashToolCLI is used to flash files to UE and read data from UE.

2. Install

2.1 Start

FlashToolCLI is green software, It can be directly used after decompression without installation. Run FlashToolCLI.exe in command line.



```
D:\TMP\FlashToolCLI_V4.1.10_20240119\cmd.exe
2024-01-22 19:09:41,034 DEBUG    [FlashTop]    lib svn rev: LIB_SVN_REVISION:  00000517,build time-2024-01-19 13:56:40
2024-01-22 19:09:41,036 INFO     [FlashTop]    init
usage: FlashToolCLI [-h] [--port PORT] [--verbose VERBOSE] [--cfgfile CFGFILE]
                    [--skipconnect SKIPCONNECT] [--lineid LINEID]
                    {list_com,burn,burnone,burnbatch,burn_pkgflxs,probe,list_flashinfo,flasherase,flashread,termode,runtmcfg,rst2dldboot,sysreset,pkg2img,chkpkgimg}
                    ...

FlashToolCLI v4.1.10

positional arguments:
  {list_com,burn,burnone,burnbatch,burn_pkgflxs,probe,list_flashinfo,flasherase,flashread,termode,runtmcfg,rst2dldboot,sysreset,pkg2img,chkpkgimg}
                        Run flash -h for additional help
    list_com            list all useful com ports.
    burn                burn the binary file "bootloader" and "system" to
                        flash memory
    burnone             burn one binary file "flexfile" to flash memory
    burnbatch           burn batch files to flash memory
    burn_pkgflxs        burn pkgflx files to flash memory
    probe               download the agentboot file and connect
    list_flashinfo      list flash info
    flasherase          erase flash data
    flashread           read flash data
    termode             terminate mode setting
    runtmcfg            runtime parameter config, send chip/board parameters
                        to ue, config or verify
    rst2dldboot         reset ue use second assist com port and enter download
                        boot
    sysreset            reset the device
    pkg2img             extract seperate images from package
    chkpkgimg           check wether images target match to package

optional arguments:
  -h, --help            show this help message and exit
  --port PORT, -p PORT  Serial port device
  --verbose VERBOSE, -v VERBOSE
                        verbose mode
  --cfgfile CFGFILE     the file set as cfg file
  --skipconnect SKIPCONNECT
                        skip agentboot download, forward to command
  --lineid LINEID       specify line number to download
```

3. Download mode introduction

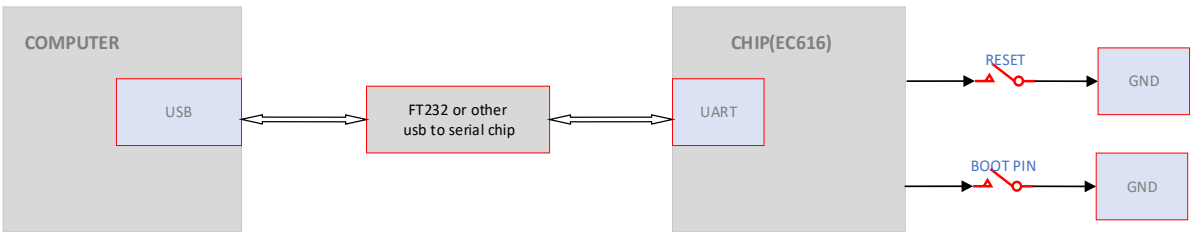
FlashToolCLI supports normal download mode and detect download mode. Users should select right mode from these to download image for specific chip type, otherwise FlashToolCLI may download error.

3.1 Download mode for chips

3.1.1 Download mode for EC616

The EC616 chip supports normal download mode.

The hardware connection for EC616 chip download show as below picture. The Uart interface of EC616 chip connect to USB/serial converter device such as FT232 And The USB/serial converter connect to USB interface of computer. PCB board for EC616 chip should connect RESET PIN to switch key pulldown to GND, and connect BOOT PIN to switch key pull down to GND.



Steps for EC616 normal download mode:

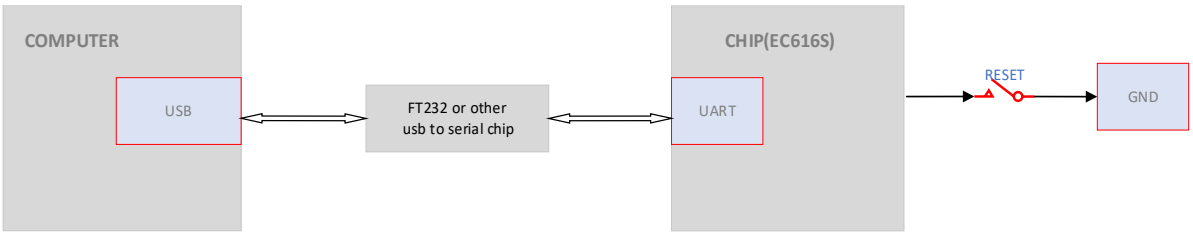
1. Switch on RESET key and BOOT key, hold for a while
2. Switch off RESET key, now the chip is under download mode.

3. Run FlashToolCLI like ‘ FlashToolCLI.exe --cfgfile config_ec616.ini --port="COM34" probe.
4. Wait FlashToolCLI probe command success.
5. Run FlashToolCLI with para --skipconnect 1’ and command to finish more operations.
   To erase whole chip ,run command like ‘ FlashToolCLI.exe --cfgfile config_ec616.ini --port="COM34" --skipconnect 1 flasherase 0x0 0x400000 to erase’.
   To burn images, run command like ‘FlashToolCli.exe --cfgfile config_ec616.ini --port="COM34" --skipconnect 1 burnbatch --imglist bootloader system flexfile0 flexfile1’.

3.1.2 Download mode for EC616s

The EC616s chip supports detect download mode.

The hardware connection for EC616s chip download show as below picture. The Uart interface of EC616s chip connect to USB/serial converter device such as FT232 And The USB/serial converter connect to USB interface of computer. PCB board for EC616 chip should connect RESET PIN to switch key pulldown to GND.



Steps for EC616s detect download mode:

1. Power off the chip or hold the chip by switching on RESET key.
2. Run FlashToolCLI like ‘ FlashToolCLI.exe --cfgfile config_ec616s.ini --port="COM34" probe.
3. Wait a little time to untile see the log ‘BootPreemptDet start’ , normally the wait time is less than 300ms,
4. Power on the chip or switching off RESET key, let the chip boot.
5. Wait FlashToolCLI probe command success.
6. Run FlashToolCLI with para ‘--skipconnect 1’ and command to finish more operations.
   To erase whole chip ,run command like ‘ FlashToolCLI.exe --cfgfile config_ec616s.ini --port="COM34" --skipconnect 1 flasherase 0x0 0x400000 to erase’.
   To burn images, run command like ‘FlashToolCli.exe --cfgfile config_ec616s.ini --port="COM34" --skipconnect 1 burnbatch --imglist bootloader system flexfile0 flexfile1’.

Log tips for step 3.

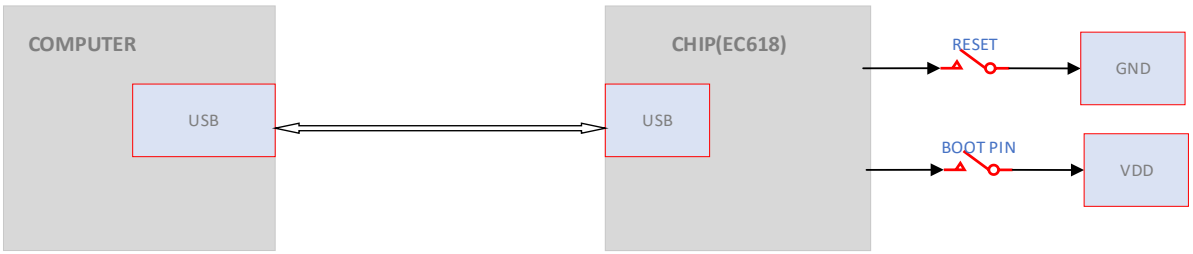
```
2021-09-22 16:10:35,425 [Process-16248] INFO     [FlashTop]    do_main: cmd burnag, Thread0[2728]
2021-09-22 16:10:35,425 [Process-16248] INFO     [Thread0]    ProcessStart[2728]
2021-09-22 16:10:35,426 [Process-16248] INFO     [Thread0]    DtrConditionAssign  0
2021-09-22 16:10:35,426 [Process-16248] INFO     [Thread0]    RtsConditionAssign  0
2021-09-22 16:10:35,444 [Process-16248] INFO     [Thread0]    DtrConditionAssign  1
2021-09-22 16:10:35,552 [Process-16248] INFO     [Thread0]    DtrConditionAssign  0
2021-09-22 16:10:35,555 [Process-16248] INFO     [FlashTop]    ResetBoard(Reset Pin) finish
2021-09-22 16:10:35,557 [Process-16248] INFO     [Thread0]    ResetBoard(Reset Pin) ser stay open
2021-09-22 16:10:35,559 [Process-16248] INFO     [Thread0]    DtrConditionAssign  0
2021-09-22 16:10:35,561 [Process-16248] INFO     [Thread0]    RtsConditionAssign  0
2021-09-22 16:10:35,563 [Process-16248] INFO     [Thread0]    BootSyncDetLoop 0
2021-09-22 16:10:35,564 [Process-16248] INFO     [Thread0]    BootSyncDetATReset args.atreset empty, cancel atreset
2021-09-22 16:10:35,567 [Process-16248] INFO     [BootDetect]    BootDetectProc start
2021-09-22 16:10:35,571 [Process-16248] INFO     [BootDetect]    BootPreemptDet start
2021-09-22 16:10:37,936 [Process-16248] INFO     [BootDetect]    BootPreemptDet success
2021-09-22 16:10:38,071 [Process-16248] INFO     [BootDetect]    BootDetVagueEstProc start
```

3.1.3 Download mode for EC618

The EC618 chip supports both normal download mode and detect download mode.

3.1.3.1 Normal download mode for EC618

The hardware connection for EC618 chip normal download mode show as below picture. The USB interface of EC618 chip connect directly to USB interface of computer. PCB board for EC618 chip should connect RESET PIN to switch key pulldown to GND, and connect BOOT PIN to switch key pull down to VDD.

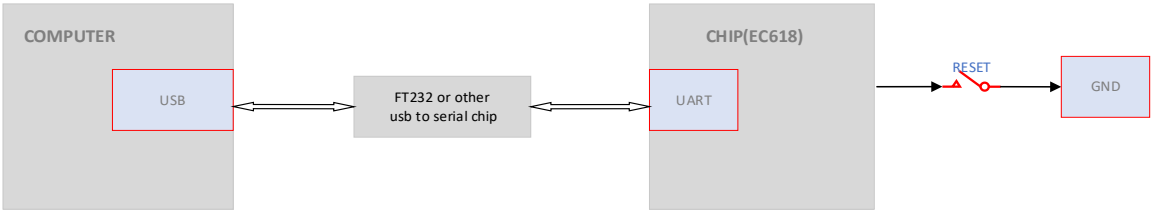


Steps for EC618 normal download mode:

1. Switch on RESET key and BOOT key, hold for a while
2. Switch off RESET key, now the chip is under download mode.
3. Run FlashToolCLI like ‘ FlashToolCLI.exe --cfgfile config_ec618_usb.ini --port="COM34" probe’.
   Users should run FlashToolCLI command to connect chip in no more than 16 seconds after step2, otherwise the chip will exit download mode after 16 seconds timeout.
4. Wait FlashToolCLI probe command success.
5. Run FlashToolCLI with para ‘--skipconnect 1’ and command to finish more operations.
   To erase whole chip ,run command like ‘ FlashToolCLI.exe --cfgfile config_ec618_usb.ini --port="COM34" --skipconnect 1 flasherase 0x0 0x400000 to erase’.
   To burn images, run command like ‘FlashToolCli.exe --cfgfile config_ec618_usb.ini --port="COM34" --skipconnect 1 burnbatch --imglist bootloader system flexfile0 flexfile1’.

3.1.3.2 Detect download mode for EC618

The hardware connection for EC618 chip normal download mode show as below picture. The Uart interface of EC68 chip connect to USB/serial converter device such as FT232 And The USB/serial converter connect to USB interface of computer. PCB board for EC618 chip should connect RESET PIN to switch key pulldown to GND.



Steps for EC618 detect download mode:

1. Power off the chip or hold the chip by switching on RESET key.
2. Run FlashToolCLI like ‘ FlashToolCLI.exe --cfgfile config_ec618_uart.ini --port="COM34" probe.
3. Wait a little time to untile see the log ‘BootPreemptDet start’ , normally the wait time is less than 300ms,
4. Power on the chip or switching off RESET key, let the chip boot.
5. Wait FlashToolCLI probe command success.
6. Run FlashToolCLI with para ‘--skipconnect 1’ and command to finish more operations.
   To erase whole chip ,run command like ‘ FlashToolCLI.exe --cfgfile config_ec618_uart.ini --port="COM34" --skipconnect 1 flasherase 0x0 0x400000 to erase’.
   To burn images, run command like ‘FlashToolCli.exe --cfgfile config_ec618_uart.ini --port="COM34" --skipconnect 1 burnbatch --imglist bootloader system flexfile0 flexfile1’.

Log tips for step 3.

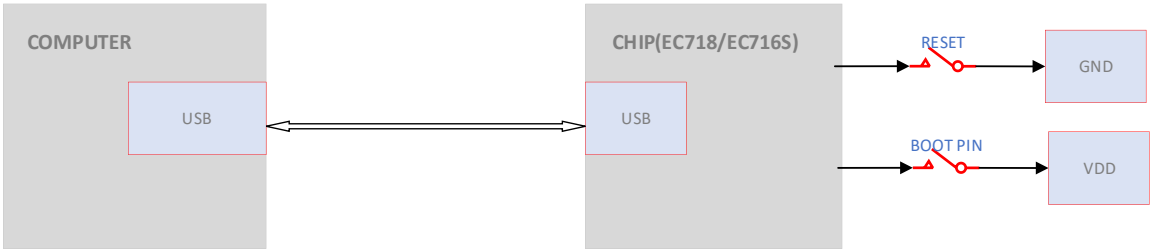
```
2021-09-22 16:10:35,425 [Process-16248] INFO     [FlashTop]    do_main: cmd burnag, Thread0[2728]
2021-09-22 16:10:35,425 [Process-16248] INFO     [Thread0]    ProcessStart[2728]
2021-09-22 16:10:35,426 [Process-16248] INFO     [Thread0]    DtrConditionAssign  0
2021-09-22 16:10:35,426 [Process-16248] INFO     [Thread0]    RtsConditionAssign  0
2021-09-22 16:10:35,444 [Process-16248] INFO     [Thread0]    DtrConditionAssign  1
2021-09-22 16:10:35,552 [Process-16248] INFO     [Thread0]    DtrConditionAssign  0
2021-09-22 16:10:35,555 [Process-16248] INFO     [FlashTop]    ResetBoard(Reset Pin) finish
2021-09-22 16:10:35,557 [Process-16248] INFO     [Thread0]    ResetBoard(Reset Pin) ser stay open
2021-09-22 16:10:35,559 [Process-16248] INFO     [Thread0]    DtrConditionAssign  0
2021-09-22 16:10:35,561 [Process-16248] INFO     [Thread0]    RtsConditionAssign  0
2021-09-22 16:10:35,563 [Process-16248] INFO     [Thread0]    BootSyncDetLoop 0
2021-09-22 16:10:35,564 [Process-16248] INFO     [Thread0]    BootSyncDetATReset args.atreset empty, cancel atreset
2021-09-22 16:10:35,567 [Process-16248] INFO     [BootDetect]    BootDetectProc start
2021-09-22 16:10:35,571 [Process-16248] INFO     [BootDetect]    BootPreemptDet start
2021-09-22 16:10:37,936 [Process-16248] INFO     [BootDetect]    BootPreemptDet success
2021-09-22 16:10:38,071 [Process-16248] INFO     [BootDetect]    BootDetVagueEstProc start
```

3.1.4 Download mode for EC718/EC716S

The EC718/EC716S chips support both normal download mode and detect download mode.

3.1.4.1 Normal download mode for EC718/EC716

The hardware connection for EC718/EC716S chip normal download mode show as below picture. The USB interface of EC718/EC716S chip connect directly to USB interface of computer. PCB board for EC718/EC716S chip should connect RESET PIN to switch key pulldown to GND, and connect BOOT PIN to switch key pull down to VDD.



Steps for EC718/EC716S normal download mode:

1. Configure the arg_pkg_path_val in config_pkg_product_usb.ini
   For EC718 chips, there are some sub chip types include EC718P/EC718S, etc.
   For sub type EC718P:
   Set arg_pkg_path_val as
   arg_pkg_path_val =.\image_ec718\named_product\ec718p\pkgdir\at_command.binpkg

   For sub type EC718S:
   Set arg_pkg_path_val as
   arg_pkg_path_val =.\image_ec718\named_product\ec718s\pkgdir\at_command.binpkg

   For EC716S chips:
   Set arg_pkg_path_val as
   arg_pkg_path_val = .\image_ec716\pkgdir\at_command.binpkg

2. Run FlashToolCLI like ‘ FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini pkg2img’.
3. Switch on RESET key and BOOT key, hold for a while
4. Switch off RESET key, now the chip is under download mode.
5. Run FlashToolCLI like ‘ FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" probe’.
   Users should run FlashToolCLI command to connect chip in no more than 16 seconds after step4, otherwise the chip will exit download mode after 16 seconds timeout.
6. Wait FlashToolCLI probe command success.
7. Run FlashToolCLI with para ‘--skipconnect 1’ and command to finish more operations.

   To erase whole AP FLASH if exist and AP Flash size is 0x400000 bytes,
   run command like ‘ FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" --skipconnect 1 flasherase 0x0 0x400000 to erase’.
   To erase whole CP FLASH if exist and CP Flash size is 0x200000 bytes ,run command like
   ‘ FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" --skipconnect 1 flasherase 0x0

0x200000 –stor_type cp_flash to erase'.

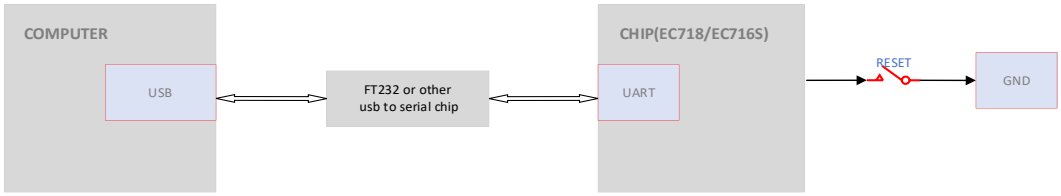
Sometimes, the storage information is configured matching chip type and chip sub type, no need to exactly known the flash type and flash size, use --stor_type "intrinsic_flash" parameter when flash erase, the FlashToolCLI will erase all internal flashs.

FlashToolCLI.exe --skipconnect 1 --cfgfile config_pkg_product_usb.ini --port COM25 flasherase 0 0 --stor_type "intrinsic_flash"

To burn images, run command like 'FlashToolCli.exe --cfgfile config_ pkg_product_usb.ini --port="COM34" --skipconnect 1 burnbatch --imglist bootloader system flexfile0 flexfile1'.

3.1.4.2 Detect download mode for EC718/EC716S

The hardware connection for EC718/EC716S chip normal download mode show as below picture. The Uart interface of EC718/EC716S chip connect to USB/serial converter device such as FT232 And The USB/serial converter connect to USB interface of computer. PCB board for EC718 chip should connect RESET PIN to switch key pulldown to GND.



Steps for EC718/EC716S detect download mode:

1. Configure the arg_pkg_path_val in config_pkg_product_usb.ini
   For EC718 chips, there are some sub chip types include EC718P/EC718S, etc.
   For sub type EC718P:
   Set arg_pkg_path_val as
   arg_pkg_path_val =.\image_ec718\named_product\ec718p\pkgdir\at_command.binpkg

   For sub type EC718S:
   Set arg_pkg_path_val as
   arg_pkg_path_val =.\image_ec718\named_product\ec718s\pkgdir\at_command.binpkg

   For EC716S chips:
   Set arg_pkg_path_val as
   arg_pkg_path_val = .\image_ec716\pkgdir\at_command.binpkg

2. Run FlashToolCLI like ' FlashToolCLI.exe --cfgfile config_pkg_product_uart.ini pkg2img'.

3. Power off the chip or hold the chip by switching on RESET key.
4. Run FlashToolCLI like ‘ FlashToolCLI.exe --cfgfile config_pkg_product_uart.ini --port="COM34" probe.
5. Wait a little time to untile see the log ‘BootPreemptDet start’ , normally the wait time is less than 300ms,
6. Power on the chip or switching off RESET key, let the chip boot.
7. Wait FlashToolCLI probe command success.
8. Run FlashToolCLI with para ‘--skipconnect 1’ and command to finish more operations.
   To erase whole AP FLASH if exist and AP Flash size is 0x400000 bytes,
   run command like ‘ FlashToolCLI.exe --cfgfile config_pkg_product_uart.ini --port="COM34" --skipconnect 1 flasherase 0x0 0x400000 to erase’.
   To erase whole CP FLASH if exist and CP Flash size is 0x200000 bytes ,run command like
   ‘ FlashToolCLI.exe --cfgfile config_pkg_product_uart.ini --port="COM34" --skipconnect 1 flasherase 0x0 0x200000 –stor_type cp_flash to erase’.

   Sometimes, the storage information is configured matching chip type and chip sub type, no need to exactly known the flash type and flash size, use --stor_type "intrinsic_flash" parameter when flash erase, the FlashToolCLI will erase all internal flashs.

   FlashToolCLI.exe --skipconnect 1 --cfgfile config_pkg_product_uart.ini --port COM25 flasherase 0 0 --stor_type "intrinsic_flash"

   To burn images, run command like ‘FlashToolCli.exe --cfgfile config_pkg_product_uart.ini --port="COM34" --skipconnect 1 burnbatch --imglist bootloader system flexfile0 flexfile1’.

3.2 Download mode for FlashToolCLI

3.2.1 FlashTools normal download mode

The EC616/EC618/EC718/EC716S chips support normal download mode.

3.2.1.1 Configuration for EC616

config_ec616.ini

```
[config]
line_0_com = COM59
agbaud = 921600

[agentboot]
tool_basedir = 1
agpath =.\agentboot_ec616(s).bin

[storage_cfg]
opt_storage_list=""
format_path=format_ec616(s).json

;bootloader.bin file infomation
[bootloader]
blpath = .\image_ec616\bootloader.bin
blloadskip = 0

;system.bin file infomation
[system]
syspath = .\image_ec616\app-demo-flash.bin
sysloadskip = 0

;control such as reset before download
[control]
msg_waittime = 2
max_preamble_cnt = 8
lpc_recover_en = 0


[flexfile0]
filepath = .\rfCaliTb_ec616\MergeRfTable.bin
burnaddr = 0x3A4000

[flexfile1]
```

3.2.1.2 Configuration for EC618

config_ec618_usb.ini

```
[config]
line_0_com = COM9
agbaud=921600

[package_info]
pkgflag = 1
pkg_extract_exe = .\fcelf.exe
arg_pkg_path_val =.\image_ec618\pkgdir\merge.binpkg

;agentboot.bin file infomation
[agentboot]
tool_basedir = 1
agpath =.\image_ec618\agentboot_usb\agentboot.bin

[storage_cfg]
opt_storage_list="cp_flash"
format_path=format_ec618.json

;bootloader.bin file infomation
[bootloader]
blpath = .\image_ec618\ap_bootloader.bin
blloadskip = 0

;system.bin file infomation
[system]
syspath =.\image_ec618\ap_demo-flash.bin
sysloadskip = 0
burnaddr = 0x24000

[cp_system]
cp_syspath = .\image_ec618\cp-demo-flash.bin
cp_sysloadskip = 0

;control such as reset before download
[control]
prempt_detect_time = 6
msg_waittime = 2
max_preamble_cnt = 8
lpc_recover_en = 0
pullup_qspi =1

[flexfile0]
filepath = .\rfCaliTb_ec618\MergeRfTable.bin
burnaddr = 0xe7000
storage_type=cp_flash

[flexfile1]
filepath = .\rfCaliTb_ec618\MergeRfTable.bin
burnaddr = 0xce000
```

3.2.1.3 Configuration for EC718/EC716S

The configurations for EC718/EC716S are similar, except the arg_pkg_path_val.

config_pkg_product_usb.ini

```
[config]
line_0_com = COM9
agbaud = 921600
filter_embedusb = 0
filter_externcom = 1

[package_info]
pkgflag = 1
pkg_extract_exe = .\fcelf.exe
pkg_bins_regen_targetdir = .\pkgimg_gen
arg_pkg_path_val =.\image_ec718\named_product\ec718p\pkgdir\at_command.binpkg

;1.When select_product_support is set 1, this file is a common configuration file,
;  so it can be used for differnt products include EC618_OLDPKG_DEFAULT, EC718P_PRD, EC718S_PRD, EC716S_PRD, etc

;2 pkg_inicfg_regened_state,selected_product,selected_base_inicfg_rec,selected_xpk_prmgrcfg_rec are parameters
;  record the current extraced parameter, they will be updated after FlashToolCLI run pkg2img

;3 selected_base_inicfg_type specific the download port type for this configuratio file,
;  uart for serial com port download, usb for embeded usb por download

;4 sections [agentboot][storage_cfg][bootloader][system][control][flexfile0][flexfile1]...[flexfilen]
; [pkgflx0][pkgflx1]...[pkgflxn] will also be updated after FlashToolCLI run pkg2img

comment_inicfg_regened_state = "initial_no_change,backward_restored,forward_regened"
pkg_inicfg_regened_state = forward_regened
backward_cfg_restore_en = 1
select_product_support = 1
old_package_defined_product = EC618_OLDPKG_DEFAULT
selected_product = EC716S_PRD
selected_base_inicfg_type = usb
selected_base_inicfg_rec =
selected_xpk_prmgrcfg_rec = @hash:@SelPrd:
```

3.2.1.4 The normal download step for chips

See 3.1.1, 3.1.3.1，3.1.4.1.

3.2.2 FlashTools detect download mode

The EC616s/EC618//EC718/EC716S chips support detect download mode. The chips will print log at UART0 port with baudrate 115200 like this:

```
[17:06:14.711] ^boot.rom╔'v** ╔'!\n
```

3.2.2.1 Configuration for EC616s

config_ec616s.ini

```
[config]
line_0_com = COM29
agbaud=921600

;agentboot.bin file infomation
[agentboot]
tool_basedir = 1
agpath =.\agentboot_ec616(s).bin

;agloadskip = 0
[storage_cfg]
opt_storage_list=""
format_path=format_ec616(s).json

;bootloader.bin file infomation
[bootloader]
blpath = .\image_ec616s\bootloader.bin
blloadskip = 0

;system.bin file infomation
[system]
syspath =.\image_ec616s\app-demo-flash.bin
sysloadskip = 0

;control such as reset before download
[control]
detect = 2
prempt_detect_time = 6
msg_waittime = 2
max_preamble_cnt = 8
lpc_recover_en = 0
;cfg reset to 2, skip reset pin
pullup_qspi =1

[flexfile0]
filepath = .\rfCaliTb_ec616s\MergeRfTable.bin
burnaddr = 0x3A4000

[flexfile1]
filepath = .\rfCaliTb_ec616s\MergeRfTable.bin
burnaddr = 0x16000
```

3.2.2.2 Configuration for EC618

config_ec618_uart.ini

```
[package_info]
pkgflag = 1
pkg_extract_exe = .\fcelf.exe
arg_pkg_path_val =.\image_ec618\pkgdir\at_command.binpkg


;agentboot.bin file infomation
[agentboot]
tool_basedir = 1
agpath =.\image_ec618\agentboot_uart\agentboot.bin

[storage_cfg]
opt_storage_list="cp_flash"
format_path=format_ec618.json

;bootloader.bin file infomation
[bootloader]
blpath = .\image_ec618\ap_bootloader.bin
blloadskip = 0

;system.bin file infomation
[system]
syspath =.\image_ec618\ap_demo-flash.bin
sysloadskip = 0
burnaddr = 0x24000

[cp_system]
cp_syspath = .\image_ec618\cp-demo-flash.bin
cp_sysloadskip = 0

;control such as reset before download
[control]
detect = 2
atbaud=115200

prempt_detect_time = 6
msg_waittime = 2
max_preamble_cnt = 8
lpc_recover_en = 0
;cfg reset to 2, skip reset pin
pullup_qspi =1

[flexfile0]
filepath = .\rfCaliTb_ec618\MergeRfTable.bin
burnaddr = 0xe7000
storage_type=cp_flash


[flexfile1]
filepath = .\rfCaliTb_ec618\MergeRfTable.bin
burnaddr = 0xce000
storage_type=cp_flash
```

3.2.2.3 Configuration for EC718/EC716S

The configurations for EC718/EC716S are similar, except the arg_pkg_path_val.

config_pkg_product_usb.ini

```
[config]
line_0_com = COM9
agbaud = 921600
filter_embedusb = 0
filter_externcom = 1

[package_info]
pkgflag = 1
pkg_extract_exe = .\fcelf.exe
pkg_bins_regen_targetdir = .\pkgimg_gen
arg_pkg_path_val =.\image_ec718\named_product\ec718p\pkgdir\at_command.binpkg

;1.When select_product_support is set 1, this file is a common configuration file,
;  so it can be used for differnt products include EC618_OLDPKG_DEFAULT, EC718P_PRD, EC718S_PRD, EC716S_PRD, etc

;2 pkg_inicfg_regened_state,selected_product,selected_base_inicfg_rec,selected_xpk_prmgrcfg_rec are parameters
;  record the current extraced parameter, they will be updated after FlashToolCLI run pkg2img

;3 selected_base_inicfg_type specific the download port type for this configuratio file,
;  uart for serial com port download, usb for embeded usb por download

;4 sections [agentboot][storage_cfg][bootloader][system][control][flexfile0][flexfile1]...[flexfilen]
; [pkgflx0][pkgflx1]...[pkgflxn] will also be updated after FlashToolCLI run pkg2img

comment_inicfg_regened_state = "initial_no_change,backward_restored,forward_regened"
pkg_inicfg_regened_state = forward_regened
backward_cfg_restore_en = 1
select_product_support = 1
old_package_defined_product = EC618_OLDPKG_DEFAULT
selected_product = EC716S_PRD
selected_base_inicfg_type = uart
selected_base_inicfg_rec =
selected_xpk_prmgrcfg_rec = @hash:@SelPrd:
```

3.2.2.4 The detect download step for chips

See 3.1.2, 3.1.3.2，3.1.4.2.

4. FlashToolCLI Config parameters

4.1 Project ini configuration file types

Before FlashToolCLI V4.1.X, such as FlashToolCLI V3.X.X, FlashToolCLI V4.0.X, there is only one project ini configureation file type for these FlashToolCLI versions. , Here defines type as legacy project ini configuration file.

The FlashToolCLI V4.1.X bring in a new project ini configuration file type to support different named products such as EC718P_PRD, EC718S_PRD, EC716S_PRD, here defines the type as named project ini configuration ini file.

4.2 Legacy project ini configuration file

A legacy project ini configuration file has many config sections, and each section has many parameters, the FlashToolCLI use it to select download mode , download image path or package mode and some control parameters. Users can find config file such as config_ec616.ini, config_ec616s.ini,config_ec618_uart.ini, config_ec618_usb.ini at the FlashToolCLI directory. The right one prj ini file should be selected before download for EC616/EC16s/EC618 chips .

A demo config file config_ec618_uart.ini for EC618 shows as this figure.

config_ec618_uart.ini

```
[package_info]
pkgflag = 1
pkg_extract_exe = .\fcelf.exe
arg_pkg_path_val =.\image_ec618\pkgdir\at_command.binpkg


;agentboot.bin file infomation
[agentboot]
tool_basedir = 1
agpath =.\image_ec618\agentboot_uart\agentboot.bin

[storage_cfg]
opt_storage_list="cp_flash"
format_path=format_ec618.json

;bootloader.bin file infomation
[bootloader]
blpath = .\image_ec618\ap_bootloader.bin
blloadskip = 0

;system.bin file infomation
[system]
syspath =.\image_ec618\ap_demo-flash.bin
sysloadskip = 0
burnaddr = 0x24000

[cp_system]
cp_syspath = .\image_ec618\cp-demo-flash.bin
cp_sysloadskip = 0

;control such as reset before download
[control]
detect = 2
atbaud=115200

prempt_detect_time = 6
msg_waittime = 2
max_preamble_cnt = 8
lpc_recover_en = 0
;cfg reset to 2, skip reset pin
pullup_qspi =1

[flexfile0]
filepath = .\rfCaliTb_ec618\MergeRfTable.bin
burnaddr = 0xe7000
storage_type=cp_flash


[flexfile1]
filepath = .\rfCaliTb_ec618\MergeRfTable.bin
burnaddr = 0xce000
storage_type=cp_flash
```

4.2.1 Config item[Config]

Line_0_Com: FlashTools config the serial port used for download 。

Agbaud:Default is 921600 bps, download baudrate.

4.2.2 Config item[Package_info]

Pkgflag:

0 , for EC616/EC616s seperate burn, the source image bins built by the SDK are not merged, each has a single bin file. If no config item packge_info is present in the '.ini' config file, 0 the is default value.

1, for EC618 package burn, the source image bins build by the SDK are merge to a ".binpkg" file, these image bins will be extracted from the ".binpkg" package file, and checked before download.

pkg_extract_exe: the path of excute file used to extract the sdk package.

arg_pkg_path_val: the path of the sdk package.

4.2.3 Config item[agentboot]

Agpath: used to config the agentboot.bin path, the agentboot.bin is downloaded to bootrom for further download and burn.

4.2.4 Config item [Storage_config]

Opt_storage_list: option storage for chips.

"" for EC616/EC616s, cp_flash is not supported.

"cp_flash" for EC618

format_path: a file with address info for erase, download,readback,calcuation

4.2.5 Config item[bootloader]

Blpath:config bootloader.bin file path.

Headpath:config bootloader_head.bin file path， used for secure boot, default not config.

Blloadskip:default 0, if config 1, the download of bootloader will skip。

4.2.6 Config item [system]

Syspath: config system.bin(app-demo-flash.bin) file path

Headpath: config system_head.bin(app-demo-flash_head.bin) file path, used for secure boot, default not config.

Sysloadskip: default 0, if config 1, the download of system will skip。

4.2.7 Config item [cp_system]

cp_syspath: config cp_system.bin(cp-demo-flash.bin) file path

Cp_sysloadskip: default 0, if config 1, the download of cp_system will skip。

4.2.8 Config item[control]

Config para for control such as time wait count.

Detect: detect mode config

0: default for normal download mode.

1: passive detect download mode, normally not used for FlashToolCLI.

2:preempt detect mode, the detect mode mainly used for FlashToolCLI.

Msg_waittime:config serial port recv/send wait time [2,5] seconds.

Max_preamble_cnt:config serial port max retransmit counts [8,16] of sync message to the chip when try connect.

Lpc_recover_en: link recovery enable para, default 0.

pullup_qspi : Pull up pad for flash.

Rom_version : verify whether the rom version match for the UE chip rom id,

Set 0000000101000001 for EC616 ,

0000000101020000 for EC616S,

0000000102000000 for EC618.

If Rom_version not exists, no rom version verify flow.

4.2.9 Config item[flexfile0-19]

Filepath: file path of flexfile binary image.

Burnaddr: config the flash burn address of the flexfile binary image.

storage_type:

"ap_flash": burn the binary image file to ap_flash. If not configured, the default storage_type is ap_flash

"cp_flash": burn the binary image file to cp_flash

4.3 Named project ini configuration file

A named project ini configuration file has a basic config section '[package_info]', and all other sections will be updated sections from FlashToolCLI's configuration data or binpkg file after running FlashToolCLI pkg2img command, the FlashToolCLI use [package_info] to select download mode, download package path. Users can find config file such as config_pkg_product_uart.ini, config_ pkg_product_usb.ini at the FlashToolCLI directory. The right one config_pkg_product_uart.ini, config_ pkg_product_usb.ini ini file should be selected before download for EC718P/EC718S/EC716S chips .

A demo config file config_ pkg_product_usb.ini ini for EC718P/EC718S/EC716S with the basic config section '[package_info]' shows as this figure.

config_pkg_product_usb.ini

```
[config]
line_0_com = COM9
agbaud = 921600
filter_embedusb = 0
filter_externcom = 1

[package_info]
pkgflag = 1
pkg_extract_exe = .\fcelf.exe
pkg_bins_regen_targetdir = .\pkgimg_gen
arg_pkg_path_val =.\image_ec718\named_product\ec718p\pkgdir\at_command.binpkg

;1.When select_product_support is set 1, this file is a common configuration file,
;  so it can be used for differnt products include EC618_OLDPKG_DEFAULT, EC718P_PRD, EC718S_PRD, EC716S_PRD, etc

;2 pkg_inicfg_regened_state,selected_product,selected_base_inicfg_rec,selected_xpk_prmgrcfg_rec are parameters
;  record the current extraced parameter, they will be updated after FlashToolCLI run pkg2img

;3 selected_base_inicfg_type specific the download port type for this configuratio file,
;  uart for serial com port download, usb for embeded usb por download

;4 sections [agentboot][storage_cfg][bootloader][system][control][flexfile0][flexfile1]...[flexfilen]
; [pkgflx0][pkgflx1]...[pkgflxn] will also be updated after FlashToolCLI run pkg2img

comment_inicfg_regened_state = "initial_no_change,backward_restored,forward_regened"
pkg_inicfg_regened_state = forward_regened
backward_cfg_restore_en = 1
select_product_support = 1
old_package_defined_product = EC618_OLDPKG_DEFAULT
selected_product = EC716S_PRD
selected_base_inicfg_type = uart
selected_base_inicfg_rec =
selected_xpk_prmgrcfg_rec = @hash:@SelPrd:
```

A demo config file config_ pkg_product_usb.ini ini for EC718P/EC718S/EC716S with the basic config section '[package_info]' and after running pkg2img command shows as this figure. The red sections are updated from FlashToolCLI's configuration data or binpkg file after running FlashToolCLI pkg2img command.

config_pkg_product_usb.ini | config_pkg_product_usb.ini

```
[config]
line_0_com = COM9
agbaud = 921600
filter_embedusb = 0
filter_externcom = 1

[package_info]
pkgflag = 1
pkg_extract_exe = .\fcelf.exe
pkg_bins_regen_targetdir = .\pkgimg_gen
arg_pkg_path_val = .\image_ec716\pkgdir\at_command.binpkg
comment_inicfg_regened_state = "initial_no_change,backward_restored,forward_regened"
pkg_inicfg_regened_state = forward_regened
backward_cfg_restore_en = 1
select_product_support = 1
old_package_defined_product = EC618_OLDPKG_DEFAULT
selected_product = EC716S_PRD
selected_base_inicfg_type = usb
selected_base_inicfg_rec =
selected_xpk_prmgrcfg_rec = @hash:@SelPrd:

[agentboot]
tool_basedir = 1
agpath = .\product_sets\ec716_products\common_data\agentboot_usb\agentboot.bin

[storage_cfg]
format_path =

[bootloader]
blpath =
blloadskip = 0
burnaddr = 0x3000

[system]
syspath =
sysloadskip = 0
burnaddr = 0x72000

[control]
prempt_detect_time = 6
msg_waittime = 2
max_preamble_cnt = 8
lpc_recover_en = 0
pullup_qspi = 1
rom_version = 0000000103010000
trc_ser = 1

[flexfile0]
filepath = .\product_sets\ec716_products\ec716s\rfCaliTb\MergeRfTable.bin
burnaddr = 0x1f3000
```

Basic section

4.3.1 Basic Config item[package_info]

Pkgflag:

1, for EC718P/EC718S/EC716S package burn, the source image bins build by the SDK are merge to a ".binpkg" file, these image bins will be extracted from the ".binpkg" package file, and checked before download.

pkg_extract_exe: the path of excute file used to extract the sdk package.

arg_pkg_path_val: the path of the sdk package.

pkg_bins_regen_targetdir: the target files path after package extracted and file synchronized.

comment_inicfg_regened_state: the state to support convert legacy binpkg and name binpkg using same ini configuration file.

backward_cfg_restore_en:

0: not allow to support a legacy binpkg if the ini configuration file was already used to extract a named binpkg

1: allow to support a legacy binpkg if the ini configuration file was already used to extract a named binpkg

old_package_defined_product: define the legacy ec618 binpkg product name, normally configured as EC618_OLDPKG_DEFAULT

selected_product: the current selected product name updated after running pkg2img command

selected_base_inicfg_type: the selected download port for this configuration file, uart for serial com port, usb for embeded usb port

selected_base_inicfg_rec: record the base ini file, other sections are updated from this file after running pkg2img command

selected_xpk_prmgrcfg_rec:record prmgrcfg, json file path when xpkg mode is used for binpkg and the prmgrcfg.json file is built in binpkg

5. Commands usage

5.1 Legacy product usage

FlashToolCLI V4.1.X is compatible with old FlashToolCLI V4.0.X version to support ec616/ec616s/ec618 images, the usage compatible to FlashToolCLI V4.0.X is defined as legacy product usage in this chapter.

5.1.1 SDK images extract

5.1.1.1 SDK Images for ec616/ec616s

The EC616/EC616s's SDK build out separate image bins such as bootloader, app-demo-flash.bin.

The files path are specified by config_ec616.ini/config_ec616s.ini by blpath, syspath, copy app-demo-flash.bin and bootloader.bin to be downloaded to these path. Please overwrite them if the files exist.

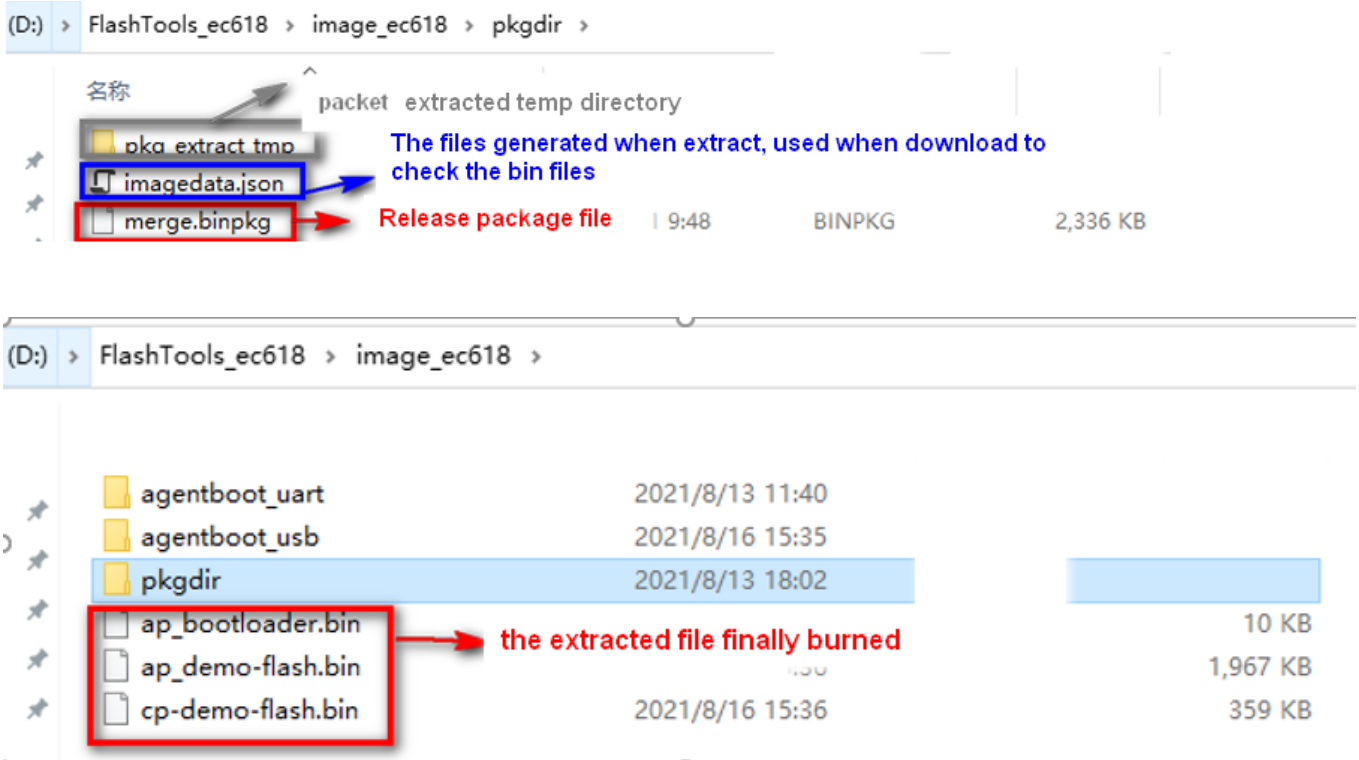
5.1.1.2 SDK Images for ec618

The EC618's SDK build out seprate image bins also, but these bins were merged to a single package file named with postfix '.binpkg', the FlashToolCLI will use configured pkg_extract_exe = .\fcelf.exe to check data integirity and extract separate images include bootloader, system, cp_system from the '.binpkg' file.

Run the pkg2img command to extract separate images.The extract file will temporary extracted to the directory pkg_extract_tmp, the pkg2img command will then synchronize the bin files to the path specified by blpath,syspath, cp_syspath.

'FlashToolCLI.exe --cfgfile config_ec618_uart.ini pkg2img'.

Each time pkg2img command is excuted, it will check the image files specified by bl path,syspath,cp_syspath configured in 'config_ec618_uart.ini' , it checks whether the images exist, the file size not changed, file hash digest not changed. If check result failed, the pkg2img will extract them. If check result success, the extract is not needed, because the images were already extracted and matched to the original released SDK package '.binpkg'



config_ec618_uart.ini

```
[config]
line_0_com = COM9
agbaud=921600

;filter com config
filter_embedusb=1
filter_externcom=0
filter_explicitcom0 = 19D1
filter_explicitcom1 = 1366

[package_info]
pkgflag = 1
pkg_extract_exe = .\fcelf.exe
arg_pkg_path_val =.\image_ec618\pkgdir\merge.binpkg

;agentboot.bin file infomation
[agentboot]
;agpath =.\image_ec618\agentboot\agentboot_normal.bin
agpath =.\image_ec618\agentboot_uart\agentboot.bin

[storage_cfg]
opt_storage_list="cp_flash"
format_path=format_ec618.json

;bootloader.bin file infomation
[bootloader]
blpath = .\image_ec618\ap-bootloader.bin
blloadskip = 0

;system.bin file infomation
[system]
syspath =.\image_ec618\app-demo-flash.bin
sysloadskip = 0
burnaddr = 0x24000

[cp_system]
cp_syspath = .\image_ec618\cp-demo-flash.bin
cp_sysloadskip = 0
```

Package burn mode

The package path to be burned

Synchronized bin file

Synchronized bin file

Synchronized bin file

5.1.2 Download bootloader and system image

To burn bootloader and system, run the cmd FlashToolCLI.exe --cfgfile config_ec616.ini --port="COM34" burn

```
C:\Users\ivan\Documents\others\test\FlashToolCLI>FlashToolCLI.exe --cfgfile config_ec616.ini --port COM34 burn
2021-05-25 15:08:56,439 INFO     [FlashTop]    init
[Process-30008] [FlashTop]    do_main: cmd loadpara
[Process-30008] [Para]    exe path: C:\Users\ivan\Documents\others\test\FlashToolCLI
[Process-30008] [Para]    update digest file :C:\Users\ivan\Documents\others\test\FlashToolCLI\cfg.digest, digest:b'\xe0\x33\xaa\xba\xaa\x09\xa0\xfd\xc
x8c\x8d'
[Process-30008] [Para]    LoadPara from cfgfile(C:\Users\ivan\Documents\others\test\FlashToolCLI\config_ec616.ini)
[Process-30008] [Para]    Load para curdigest b'\xe0\x33\xaa\xba\xaa\x09\xa0\xfd\xc5\x97\x76\xd5\xce\x72\xf7\x45\x17\x77\x23\xb7\x06\xde\x6e\x17\x3d\x0
[Process-30008] [FlashTop]    Load para sync success
[Process-30008] [FlashTop]    do_main: cmd burn, Thread0[31920]
[Process-30008] [Thread0]    ProcessStart[31920]
[Process-30008] [Thread0]    ResetBoard(Normal Mod) finish
[Process-30008] [Thread0]    args.ser.port :COM34
[Process-30008] [Image]    SetBaud 921600
[Process-30008] [Thread0]    TryDownload C:\Users\ivan\Documents\others\test\FlashToolCLI\agentboot.bin start
[Process-30008] [Thread0]    image size=28568, hdsize=272
[Process-30008] [Thread0]    Preamble Send
[Process-30008] [Thread0]    Preamble Received Rsp
[Process-30008] [Thread0]    Preamble Send
[Process-30008] [Thread0]    Preamble Received Rsp
[Process-30008] [Thread0]    TryDownload agentboot success
[Process-30008] [Thread0]    agbaud: 921600
[Process-30008] [Thread0]    agbaud: 921600
[Process-30008] [Thread0]    LPC Preamble Send
[Process-30008] [Thread0]    LPC Preamble Received Rsp
[Process-30008] [Thread0]    LPCSetSyncStat(1)
[Process-30008] [Thread0]    LPCSyncDetect: success
[Process-30008] [Thread0]    TryDownload:headpath=, bodypath=C:\Users\ivan\Documents\others\test\FlashToolCLI\.\image_ec616\bootloader.bin
[Process-30008] [Thread0]    LPCBurnOneTrig start                              ******
[Process-30008] [Thread0]    LPCBurnOneTrig success
[Process-30008] [Thread0]    DLDPreSync Preamble Send
[Process-30008] [Thread0]    DLDPreSync Preamble Received Rsp
[Process-30008] [Thread0]    image size=46580, hdsize=272
[Process-30008] [Thread0]
[Process-30008] [Thread0]    imginfo.size=46580, RemainLen=46580, Offset=0
[Process-30008] [Thread0]    {bootloader.bin-percent files transferred   0%}
[Process-30008] [Thread0]
[Process-30008] [Thread0]    Preamble Send
[Process-30008] [Thread0]    Preamble Received Rsp
[Process-30008] [Thread0]    imginfo.size=46580, RemainLen=46308, Offset=272
[Process-30008] [Thread0]    {bootloader.bin-percent files transferred   0%}
[Process-30008] [Thread0]
[Process-30008] [Thread0]    Preamble Send
[Process-30008] [Thread0]    Preamble Received Rsp
[Process-30008] [Thread0]    imginfo.size=46580, RemainLen=0, Offset=272
[Process-30008] [Thread0]    {bootloader.bin-percent files transferred   100%}
[Process-30008] [Thread0]
[Process-30008] [Thread0]    TryDownload finish
[Process-30008] [Thread0]    TryDownload success:headpath=, bodypath=C:\Users\ivan\Documents\others\test\FlashToolCLI\.\image_ec616\bootloader.bin
[Process-30008] [Thread0]    TryDownload:headpath=, bodypath=C:\Users\ivan\Documents\others\test\FlashToolCLI\.\image_ec616\app-demo-flash.bin
[Process-30008] [Thread0]    LPCBurnOneTrig start                              ******
[Process-30008] [Thread0]    LPCBurnOneTrig success
[Process-30008] [Thread0]    DLDPreSync Preamble Send
[Process-30008] [Thread0]    DLDPreSync Preamble Received Rsp
[Process-30008] [Thread0]    image size=1593264, hdsize=272
[Process-30008] [Thread0]
```

```
[Process-30008] [Thread0]    {app-demo-flash.bin-percent files transferred   94%}
[Process-30008] [Thread0]
[Process-30008] [Thread0]    Preamble Send
[Process-30008] [Thread0]    Preamble Received Rsp
[Process-30008] [Thread0]    imginfo.size=1593264, RemainLen=20128, Offset=1573136
[Process-30008] [Thread0]    {app-demo-flash.bin-percent files transferred   98%}
[Process-30008] [Thread0]
[Process-30008] [Thread0]    Preamble Send
[Process-30008] [Thread0]    Preamble Received Rsp
[Process-30008] [Thread0]    imginfo.size=1593264, RemainLen=0, Offset=1573136
[Process-30008] [Thread0]    {app-demo-flash.bin-percent files transferred   100%}
[Process-30008] [Thread0]
[Process-30008] [Thread0]    TryDownload finish
[Process-30008] [Thread0]    TryDownload success:headpath=, bodypath=C:\Users\ivan\Documents\others\test\FlashToolCLI\.\image_ec616\app-demo-flash.bin
[Process-30008] [Thread0]    Burn OK!
[Process-30008] [Thread0]    ProcessEnd[31920]
```

If log print "Burn OK", then result of bootloader and system image burn is success.

The burn command will burn ‘bootloader, system’ for ec616/ec616s chips with config file config_ec616.ini config_ec616s.ini , ‘bootloader,system,cp_system’ for ec618 chips with config_ec618_uart.ini config_ec618_usb.ini.

5.1.3 Download seperate bootloader system cp_system image

To burn seperate bootloader

run the cmd FlashToolCLI.exe --cfgfile config_ec616.ini --port="COM34" burnone bootloader

To burn seperate system

run the cmd FlashToolCLI.exe --cfgfile config_ec616.ini --port="COM34" burnone system

To burn seperate cp_system for ec618.

run the cmd FlashToolCLI.exe --cfgfile config_ec618_uart.ini --port="COM34" burnone cp_system

5.1.4 Download images batch burn

For ec616 or ec616s, to burn bootloader system flexfile0 flexfile1 use burnbatch command like this:

FlashToolCli.exe burnbatch –imglist bootloader system flexfile0 flexfile1

For ec618, to burn bootloader system cp_system flexfile0 flexfile1 use burnbatch command like this:

FlashToolCli.exe burnbatch –imglist bootloader system cp_system flexfile0 flexfile1

5.1.5 Download flexfile image

To burn flexfile0(flexfile0~flexfile19), run the cmd FlashToolCLI.exe --cfgfile config_ec616.ini --port="COM34" burnone flexfile0

```
C:\Users\ivan\Documents\others\test\FlashTool1CLI>FlashTool1CLI.exe --cfgfile config_ec616.ini --port COM34 burnone flexfile0
2021-05-25 15:10:18,311 INFO     [FlashTop]    init
[Process-30268] [FlashTop]    do_main: cmd loadpara
[Process-30268] [Para]    exe path: C:\Users\ivan\Documents\others\test\FlashTool1CLI
[Process-30268] [Para]    update digest file :C:\Users\ivan\Documents\others\test\FlashTool1CLI\cfg.digest, digest:b'\xe0\x33\xaa\xba\xaa
x8c\x8d'
[Process-30268] [Para]    LoadPara from cfgfile(C:\Users\ivan\Documents\others\test\FlashTool1CLI\config_ec616.ini)
[Process-30268] [Para]    Load para curdigest b'\xe0\x33\xaa\xba\xaa\x09\xa0\xfd\xc5\x97\x76\xd5\xce\x72\xf7\x45\x17\x77\x23\xb7\x06\xde
[Process-30268] [FlashTop]    Load para sync success
[Process-30268] [FlashTop]    do_main: cmd burnone, Thread0[30896]
[Process-30268] [Thread0]    ProcessStart[30896]
[Process-30268] [Thread0]    ResetBoard(Normal Mod) finish
[Process-30268] [Thread0]    args.ser.port :COM34
[Process-30268] [Image]    SetBaud 921600
[Process-30268] [Thread0]    TryDownload C:\Users\ivan\Documents\others\test\FlashTool1CLI\agentboot.bin start
[Process-30268] [Thread0]    image size=28568, hdsize=272
[Process-30268] [Thread0]    Preamble Send
[Process-30268] [Thread0]    Preamble Received Rsp
[Process-30268] [Thread0]    Preamble Send
[Process-30268] [Thread0]    Preamble Received Rsp
[Process-30268] [Thread0]    TryDownload agentboot success
[Process-30268] [Thread0]    agbaud: 921600
[Process-30268] [Thread0]    agbaud: 921600
[Process-30268] [Thread0]    LPC Preamble Send
[Process-30268] [Thread0]    LPC Preamble Received Rsp
[Process-30268] [Thread0]    LPCSetSyncStat(1)
[Process-30268] [Thread0]    LPCSyncDetect: success
[Process-30268] [Thread0]    DownloadBurnOne imgtype(flexfile0)
[Process-30268] [Thread0]    DownloadBurnOne imgtype(flexfile0), burnaddr(0x3a4000), imgid(0x464c5849)
[Process-30268] [Thread0]    DownloadBurnOne file C:\Users\ivan\Documents\others\test\FlashTool1CLI\.\rfCaliTb_ec616\MergeRfTable.bin
[Process-30268] [Thread0]    TryDownload C:\Users\ivan\Documents\others\test\FlashTool1CLI\.\rfCaliTb_ec616\MergeRfTable.bin start
[Process-30268] [Thread0]    LPCBurnOneTrig start                                    ******
[Process-30268] [Thread0]    LPCBurnOneTrig success
[Process-30268] [Thread0]    DLDPreSync Preamble Send
[Process-30268] [Thread0]    DLDPreSync Preamble Received Rsp
[Process-30268] [Thread0]    image size=24848, hdsize=272
[Process-30268] [Thread0]
[Process-30268] [Thread0]    imginfo.size=24848, RemainLen=24848, Offset=0
[Process-30268] [Thread0]    {MergeRfTable.bin-percent files transferred   0%}
[Process-30268] [Thread0]
[Process-30268] [Thread0]    Preamble Send
[Process-30268] [Thread0]    Preamble Received Rsp
[Process-30268] [Thread0]    imginfo.size=24848, RemainLen=24576, Offset=272
[Process-30268] [Thread0]    {MergeRfTable.bin-percent files transferred   1%}
[Process-30268] [Thread0]
[Process-30268] [Thread0]    Preamble Send
[Process-30268] [Thread0]    Preamble Received Rsp
[Process-30268] [Thread0]    imginfo.size=24848, RemainLen=0, Offset=272
[Process-30268] [Thread0]    {MergeRfTable.bin-percent files transferred   100%}
[Process-30268] [Thread0]
[Process-30268] [Thread0]    TryDownload success
[Process-30268] [Thread0]    Burn OK!
[Process-30268] [Thread0]    ProcessEnd[30896]
```

5.1.6 Flash Erase

FlashToolCLI.exe --cfgfile config_ec616.ini --port="COM34" flasherase memaddr memlen

Parameter constraints：

memaddr ([0,0x400000]，align to 4KB)，

memlen ([0, 0x400000])

```
[Process-19796] [Thread0]    Preamble Send
[Process-19796] [Thread0]    Preamble Received Rsp
[Process-19796] [Thread0]    Preamble Send
[Process-19796] [Thread0]    Preamble Received Rsp
[Process-19796] [Thread0]    TryDownload agentboot success
[Process-19796] [Thread0]    agbaud: 921600
[Process-19796] [Thread0]    agbaud: 921600
[Process-19796] [Thread0]    LPC Preamble Send
[Process-19796] [Thread0]    LPC Preamble Received Rsp
[Process-19796] [Thread0]    LPCSetSyncStat(1)
[Process-19796] [Thread0]    Erase start, mem addr:0x350000, mem len:0x10000
[Process-19796] [Thread0]    Erase success, mem addr:0x350000, mem len:0x10000
[Process-19796] [Thread0]    Erase start, mem addr:0x360000, mem len:0x10000
[Process-19796] [Thread0]    Erase success, mem addr:0x360000, mem len:0x10000
[Process-19796] [Thread0]    Erase start, mem addr:0x370000, mem len:0x10000
[Process-19796] [Thread0]    Erase success, mem addr:0x370000, mem len:0x10000
[Process-19796] [Thread0]    Erase start, mem addr:0x380000, mem len:0x10000
[Process-19796] [Thread0]    Erase success, mem addr:0x380000, mem len:0x10000
[Process-19796] [Thread0]    Erase start, mem addr:0x390000, mem len:0x10000
[Process-19796] [Thread0]    Erase success, mem addr:0x390000, mem len:0x10000
[Process-19796] [Thread0]    Erase start, mem addr:0x3a0000, mem len:0x4000
[Process-19796] [Thread0]    Erase success, mem addr:0x3a0000, mem len:0x4000
[Process-19796] [Thread0]    Erase OK, [0x350000, 0x54000]
[Process-19796] [FlashTop]    flasherase finish, Thread0[6748]
[Process-19796] [Thread0]    ProcessEnd[6748]
```

To erase the whole flash, run the command FlashToolCLI.exe --port="COMn" flasherase 0x0 0x400000

For ec618 chip add para '--stor_type=ap_flash' or '--stor_type=cp_flash' to select flash to erase

FlashToolCLI.exe --cfgfile config_ec618_uart.ini --port="COM34" flasherase memaddr memlen --stor_type=ap_flash

FlashToolCLI.exe --cfgfile config_ec618_uart.ini --port="COM34" flasherase memaddr memlen --stor_type=cp_flash

To erase whole cp flash run the command

FlashToolCLI.exe --cfgfile config_ec618_uart.ini --port="COM34" flasherase 0x0 0x100000 --stor_type=cp_flash

5.1.7 Flash read

FlashToolCLI.exe --cfgfile config_ec616.ini --port="COM34" flashread memaddr memlen --memrbf flash_addr_len.bin

Parameter constraints：

memaddr ([0,0x400000])，

memlen ([0, 0x400000])

To read whole flash data, run the command FlashToolCLI.exe --cfgfile config_ec616.ini --port="COMn" flashread 0x0 0x400000 --memrbf flash_0x0_0x400000.bin

For ec618 chip add para '--stor_type=ap_flash' or '--stor_type=cp_flash' to select flash to read

FlashToolCLI.exe --cfgfile config_ec618_uart.ini --port="COM34" flashread memaddr memlen --memrbf flash_addr_len.bin --stor_type=ap_flash

FlashToolCLI.exe --cfgfile config_ec618_uart.ini --port="COM34" flashread memaddr memlen --memrbf flash_addr_len.bin --stor_type=cp_flash

5.1.8 Reset the chip

After burn finished the chip is in download connect status, if the chip need restart for some other reason, run the command FlashToolCLI.exe --cfgfile config_ec616.ini --skipconnect 1 --port="COM34" sysreset

```
C:\Users\ivan\Documents\others\test\FlashTool1CLI>FlashTool1CLI.exe  --cfgfile config_ec616.ini --skipconnect 1 --port="COM34" sysreset
2021-05-25 15:17:24,354 INFO     [FlashTop]    init
[Process-30320] [FlashTop]    do_main: cmd loadpara
[Process-30320] [Para]    exe path: C:\Users\ivan\Documents\others\test\FlashTool1CLI
[Process-30320] [Para]    update digest file :C:\Users\ivan\Documents\others\test\FlashTool1CLI\cfg.digest, digest:b'\xe0\x33\xaa\xba\xaa\x09\xa0\xfd\x
x8c\x8d'
[Process-30320] [Para]    LoadPara from cfgfile(C:\Users\ivan\Documents\others\test\FlashTool1CLI\config_ec616.ini)
[Process-30320] [Para]    Load para curdigest b'\xe0\x33\xaa\xba\xaa\x09\xa0\xfd\xc5\x97\x76\xd5\xce\x72\xf7\x45\x17\x77\x23\xb7\x06\xde\x6e\x17\x3d\x
[Process-30320] [FlashTop]    Load para sync success
[Process-30320] [FlashTop]    do_main: cmd sysreset, Thread0[31096]
[Process-30320] [Thread0]    ProcessStart[31096]
[Process-30320] [Thread0]    ResetBoard skip for straight download
[Process-30320] [Thread0]    args.ser.port :COM34
[Process-30320] [Thread0]    TryDownload agentboot skip
[Process-30320] [Thread0]    agbaud: 921600
[Process-30320] [Thread0]    LPC Preamble Send
[Process-30320] [Thread0]    LPC Preamble Received Rsp
[Process-30320] [Thread0]    LPCSetSyncStat(1)
[Process-30320] [Thread0]    FixSysResetRspLen, start
[Process-30320] [Thread0]    ResetSyncStat
[Process-30320] [FlashTop]    sysreset finish, Thread0[31096]
[Process-30320] [Thread0]    ProcessEnd[31096]
```

5.1.9 Link detect

To check the connect link of serial ports between PC and chip, run the command FlashToolCLI.exe --cfgfile config_ec616.ini --port="COM34" probe

```
C:\Users\ivan\Documents\others\test\FlashTool1CLI>FlashTool1CLI.exe  --cfgfile config_ec616.ini --skipconnect 1 --port="COM34" probe
2021-05-25 15:18:08,979 INFO     [FlashTop]    init
[Process-20396] [FlashTop]    do_main: cmd loadpara
[Process-20396] [Para]    exe path: C:\Users\ivan\Documents\others\test\FlashTool1CLI
[Process-20396] [Para]    update digest file :C:\Users\ivan\Documents\others\test\FlashTool1CLI\cfg.digest, digest:b'\xe0\x33\xaa\xba\xaa\
x8c\x8d'
[Process-20396] [Para]    LoadPara from cfgfile(C:\Users\ivan\Documents\others\test\FlashTool1CLI\config_ec616.ini)
[Process-20396] [Para]    Load para curdigest b'\xe0\x33\xaa\xba\xaa\x09\xa0\xfd\xc5\x97\x76\xd5\xce\x72\xf7\x45\x17\x77\x23\xb7\x06\xde\
[Process-20396] [FlashTop]    Load para sync success
[Process-20396] [FlashTop]    do_main: cmd burnag, Thread0[25876]
[Process-20396] [Thread0]    ProcessStart[25876]
[Process-20396] [Thread0]    ResetBoard(Normal Mod) finish
[Process-20396] [Thread0]    args.ser.port :COM34
[Process-20396] [Thread0]    TryDownload agentboot skip
[Process-20396] [Thread0]    Burn OK!
[Process-20396] [Thread0]    ProcessEnd[25876]
```

5.1.10 List com ports

FlashToolCLI.exe --port="COM34" list_com。

```
C:\Users\ivan\Documents\others\test\FlashTool1CLI>FlashTool1CLI.exe list_com
2019-10-24 14:49:51,939 INFO     [FlashTop]    init
list_com
2019-10-24 14:49:51,943 INFO     [FlashTop]    ----- useful serial port list -----------------------
2019-10-24 14:49:51,962 INFO     [FlashTop]    - Port : COM41
2019-10-24 14:49:52,084 INFO     [FlashTop]    - Port : COM59
2019-10-24 14:49:52,086 INFO     [FlashTop]    - Port : COM7, busy
2019-10-24 14:49:52,103 INFO     [FlashTop]    - Port : COM38
2019-10-24 14:49:52,239 INFO     [FlashTop]    - Port : COM39
2019-10-24 14:49:52,368 INFO     [FlashTop]    - Port : COM40
2019-10-24 14:49:52,484 INFO     [FlashTop]
```

5.2 named product usage

FlashToolCLI V4.1.X also supports different named binpkg for different products such as EC718P_PRD, EC718S_PRD, EC716S_PRD, the usage for binpkg of these product is defined as named product usage in this chapter.

5.2.1 SDK images extract

5.2.1.1 SDK Images for ec718/ec716

The EC718 and EC716's SDK build out a single package file named with postfix '.binpkg', but also add pkgmode 1，banoldtool 1，productname parameters when calling fcelf to merge serperate bins to .binpkg file, the merged binpkg with pkgmode 1，banoldtool 1，productname parameters is called named product binpkg.

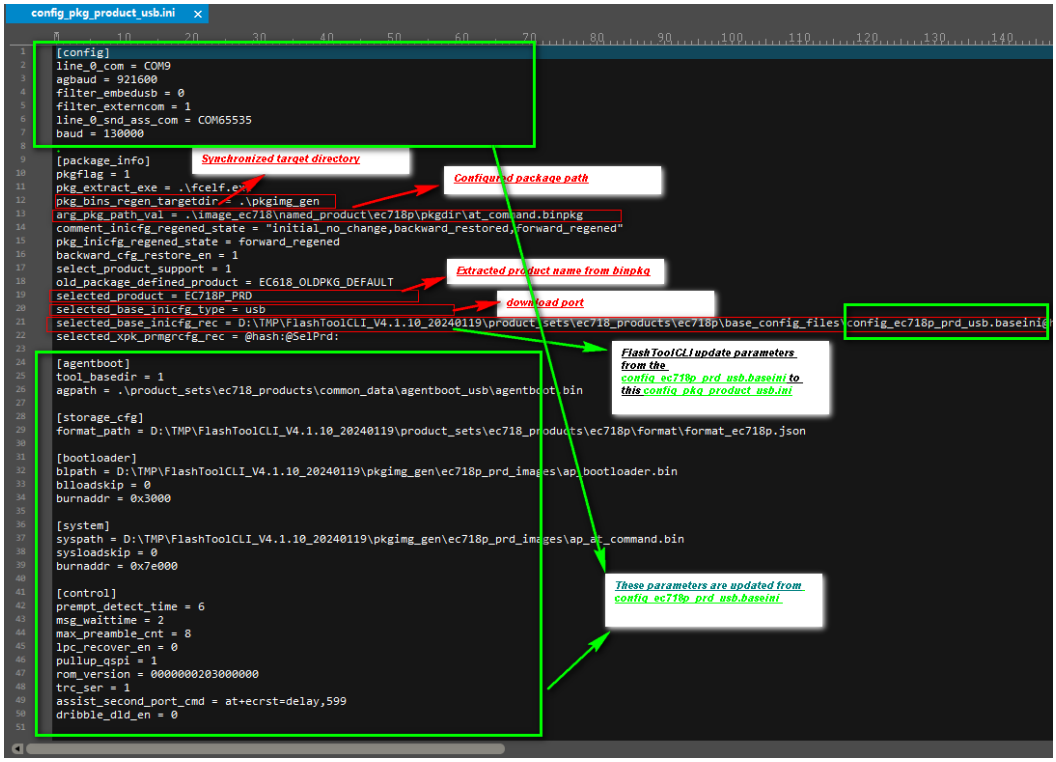
The FlashToolCLI will use configured pkg_extract_exe = .\fcelf.exe to check data integirity and extract separate images include bootloader, system, cp_system and pkgflx0-pkgflxn from the '.binpkg' file sepecified by parameter arg_pkg_path_val.

Run the pkg2img command to extract separate images.The extract file will temporary extracted to the directory pkg_extract_tmp, the pkg2img command will then synchronize the bin files to the directory specified by parameter pkg_bins_regen_targetdir . When pkgflx images are built in binpkg, the pkgflx0-pkgflxn will also be extracted and synchronize.

'FlashToolCLI.exe --cfgfile config_pkg_product_uart.ini pkg2img'. For serial com port download

'FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini pkg2img'. For usb com port download

Each time pkg2img command is excuted, it will check whether some data need to be updated. If updated needed, the pkg2img will update images and data.



5.2.2 Download seperate bootloader system cp_system image

After running pkg2img command, the images are updated and ready for burn.

To burn seperate bootloader

run the cmd FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" burnone bootloader

To burn seperate system

run the cmd FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" burnone system

To burn seperate cp_system

run the cmd FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" burnone cp_system

5.2.3 Download seperate flexfile image

After running pkg2img command, the images are updated and ready for burn.

To burn seperate flexfile0

run the cmd FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" burnone flexfile0

To burn seperate flexfile1

run the cmd FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" burnone flexfile1

5.2.4 Download seperate pkgflx0-pkgflxn image

After running pkg2img command, the images are updated and ready for burn.

If pkgflxn images are built in .binpkg file, burn seperate pkgflxn like this, n is 0-49

run the cmd FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" burnone pkgflxn

5.2.5 Download images batch burn

After running pkg2img command, the images are updated and ready for burn.

To burn bootloader system flexfile0 flexfile1 pkgflx0-pkgflxn use burnbatch command like this:

FlashToolCli.exe --cfgfile config_pkg_product_usb.ini burnbatch –imglist bootloader system cp_system flexfile0 flexfile1 allpkgflx

5.2.6 Flash earse

After running pkg2img command, the parameters are updated and ready for erase.

To erase whole AP FLASH if exist and AP Flash size is 0x400000 bytes,
run command like ‘ FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" --skipconnect 1 flasherase 0x0 0x400000 to erase’.

To erase whole CP FLASH if exist and CP Flash size is 0x200000 bytes ,run command like
‘ FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" --skipconnect 1 flasherase 0x0 0x200000 –stor_type cp_flash to erase’.

Sometimes, the storage information is configured matching chip type and chip sub type, no need to exactly known the flash type and flash size, use --stor_type "intrinsic_flash" parameter when flash erase, the FlashToolCLI will erase all internal flashs.

FlashToolCLI.exe --skipconnect 1 --cfgfile config_pkg_product_usb.ini --port COM25 flasherase 0 0 --stor_type "intrinsic_flash"

5.2.7 Flash read

After running pkg2img command, the parameters are updated and ready for read.

For ec618 chip add para '--stor_type=ap_flash' or '--stor_type=cp_flash' to select flash to read

FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" flashread memaddr memlen --memrbf flash_addr_len.bin --stor_type=ap_flash

FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" flashread memaddr memlen --memrbf flash_addr_len.bin --stor_type=cp_flash

5.2.8 Reset the chip

After burn finished the chip is in download connect status, if the chip need restart for some other reason, run the command FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --skipconnect 1 --port="COM34" sysreset

5.2.9 Link detect

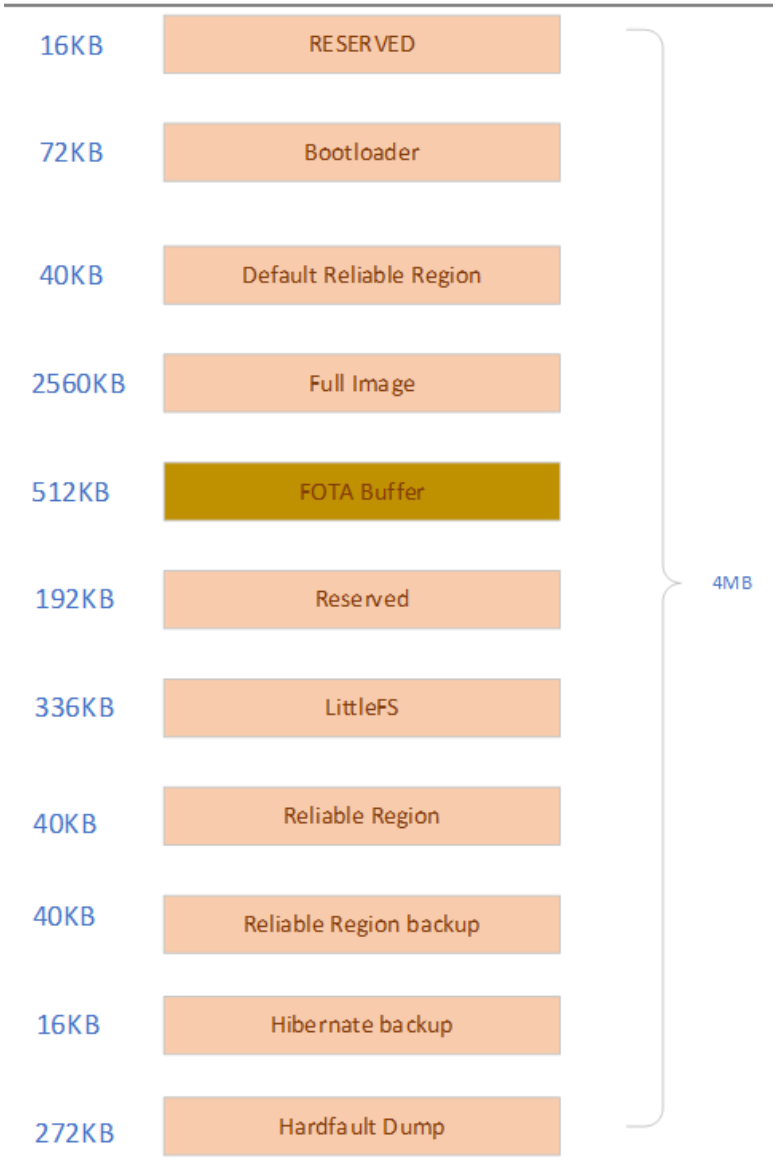
After running pkg2img command, the parameters are updated and ready for probe.

To check the connect link of serial ports between PC and chip, run the command FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini --port="COM34" probe

6. Factory Burn

6.1 Flash Map

The flash map of ec616/ec616s is shown in this figure:



6.2 Images to be burned

For ec616/ec616s:

Bootloader , system and calibration binary images need to be burned in factory mode.

The bootloader binary image need to be burned to the "bootloader" location in the flash map.

The system binary image need to be burned to the "Full Image" location in the flash map.

The calibration binary image need to be burned to the "Default reliable" region and "Reliable regions" location in the flash map.

User should update the Bootloader , system and calibration binary images to the location configured in config.ini.

If the binary image's path or name is changed, user need to update the config parameters in the config.ini.

6.3 Skipconnect parameter

Skipconnect parameter: After the first burn step, the agentboot is downloaded to chip, and the connection is established between the chip and FlashToolCLI. If more burn steps are needed, specify the para "—skipconnect 1" means no need to download agentboot again , thus reduce connect time and directly pass to download the image。

Example: run burn at start, then run burn one flexfile0,flexfile1with para "—skipconnect 1"

FlashToolCLI.exe --port="COM34" burn

FlashToolCLI.exe --skipconnect 1 --port="COM34" burnone flexfile0

FlashToolCLI.exe --skipconnect 1 --port="COM34" burnone flexfile1

6.4 Burn method

6.4.1 Step burn

Run FlashToolCli.exe to burn a single binary image each time, run more times to finish all binary images.

For ec616/ec616s:

FlashToolCli.exe probe

FlashToolCli.exe --skipconnect 1 flasherase 0x0 0x400000

FlashToolCli.exe --skipconnect 1 burnone bootloader

FlashToolCli.exe --skipconnect 1 burnone system

FlashToolCli.exe --skipconnect 1 burnone flexfile0

FlashToolCli.exe --skipconnect 1 burnone flexfile1

For ec618:

FlashToolCli.exe probe

FlashToolCli.exe --skipconnect 1 flasherase 0x0 0x400000

FlashToolCli.exe --skipconnect 1 burnone bootloader

FlashToolCli.exe --skipconnect 1 burnone system

FlashToolCli.exe --skipconnect 1 burnone cp_system

FlashToolCli.exe --skipconnect 1 burnone flexfile0

FlashToolCli.exe --skipconnect 1 burnone flexfile1

For ec718p/ec718s/ec716s:

FlashToolCli.exe probe

FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini pkg2img
FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini -port COM25 probe

FlashToolCLI.exe --skipconnect 1 --cfgfile config_pkg_product_usb.ini --port COM25 flasherase 0 0 --stor_type "intrinsic_flash"
FlashToolCLI.exe --skipconnect 1 --cfgfile config_pkg_product_usb.ini --port COM25 burnone bootloader
FlashToolCLI.exe --skipconnect 1 --cfgfile config_pkg_product_usb.ini --port COM25 burnone system
FlashToolCLI.exe --skipconnect 1 --cfgfile config_pkg_product_usb.ini --port COM25 burnone cp_system
FlashToolCLI.exe --skipconnect 1 --cfgfile config_pkg_product_usb.ini --port COM25 burnone flexfile

6.4.2 Batch burn

Use burnbatch command to burn all the binary images , merge the image list to the para imglist of the burnbatch command, the default imglist is bootloader system flexfile0 flexfile1, user can specify own image list if needed.

For ec616/ec616s:

FlashToolCli.exe probe

FlashToolCli.exe --skipconnect 1 flasherase 0x0 0x400000

FlashToolCli.exe --skipconnect 1 burnbatch –imglist bootloader system flexfile0 flexfile1

For ec618

FlashToolCli.exe probe

FlashToolCli.exe --skipconnect 1 flasherase 0x0 0x400000 –stor_type ap_flash

FlashToolCli.exe --skipconnect 1 flasherase 0x0 0x100000 –stor_type cp_flash

FlashToolCli.exe --skipconnect 1 burnbatch –imglist bootloader system cp_system flexfile0 flexfile1

For ec718p/ec718s/ec716s:

FlashToolCli.exe probe

FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini pkg2img
FlashToolCLI.exe --cfgfile config_pkg_product_usb.ini -port COM25 probe
FlashToolCLI.exe --skipconnect 1 --cfgfile config_pkg_product_usb.ini --port COM25 flasherase 0 0 --stor_type "intrinsic_flash"

FlashToolCLI.exe --skipconnect 1 --cfgfile config_pkg_product_usb.ini --port COM25 burnbatch –imglist bootloader system cp_system flexfile0

7. References

7.1 Abbreviations and Acronyms

Table 1: Abbreviations and Acronyms

Acronym	Description
NBIOT	Narrow Band Internet of Things
UE	User Equipment
UART	Universal Asynchronous Receiver/Transmitter
COM	Cluster Communication Port
PC	Personal Computer

8. Version

Version	Date	Comments
1.0	2019-12-1	Draft
1.01	2020-06-05	Modify screenshot
2.00	2021-05-25	Update to version 2.00, support detect mode for chip ec616s.

9. About US

Shanghai EigenCOMM Technology Co.,Ltd is established in Feb 2017 in Zhangjiang Hi-Tech, Shanghai China (www.eigencomm.com) . EigenCOMM focuses on cellular based IoT chipset and solution. The founders and most of the core team, about 50 members in all, come from Marvell mobile team. With accumulation of experience over the years in algorithm, L1/L2/L3 protocol, SoC, RF as well as the communication architecture and system, team makes its way to IoT industry and starts with NB-IoT SoC as the first business. As the most significant technology branch of LPWA, The emerging of NB-IoT will enable massive applications from Smart City to Smart Agriculture, from industry to daily life. The co-system grows fast to a huge scale since freeze of the standard. Along with the path, Eigencomm technologies will extend the product line to LTE-M and other cellular technologies, around IoT and focus on IoT.

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