



MT2523 Flash Tool Console Mode on Linux User's Guide

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1. Introduction

MediaTek MT2523 Flash Tool provides a console mode to download applications (CODA) designed for LinkIt for RTOS development platform. CODA is a flexible device-flashing tool for application development on MediaTek LinkIt™ 2523 HDK by SAC. It primarily supports downloading, formatting and reading back the binary from a target device. The CODA provides high-speed downloads and supports the USB 2.0 high-speed serial bus.

This document guides you through:

- Setting up the environment to run CODA.
- Installing CODA.
- Using CODA and troubleshooting.

2. Environment

CODA can be used on Linux operating systems, more specifically, Ubuntu 14.04 LTS (64 bit).

2.1. Installing the CODA

To install the CODA, simply copy the package folder to your computer. There are three main components included in the CODA package, CODA, DownloadLib and Download Agent (DA) files.

2.1.1. CODA

This file launches the command-line interface (CLI) program for CODA. The CLI requires a dynamic-link library (DownloadLib) to perform firmware update operations.

2.1.2. DownloadLib

DownloadLib is the kernel library for CODA, to perform Boot ROM (BROM) and DA handshaking operations.

2.1.3. Download Agent

The CODA downloads the software binary named DA to target device's internal SRAM and executes it on the target. The DA handshakes with DownloadLib to perform download, readback and format operations using a USB connector.

2.2. Configuring the Linux environment

Apply the following configurations before using CODA:

- 1) Set the path to the shared library.
The shared library `libDownloadLib.so*` has to be searchable. You can set the environmental variable `LD_LIBRARY_PATH` before executing CODA. You could also set the variable in the batch file "`coda.sh`".

- 2) Configure the serial port permissions for a given user.

```
/dev/ttyACM0, owner: root, group: dialout
```

- a) Add the account "`example_user`" to the group.

```
sudo usermod -a -G dialout example_user
```

- b) Define device manager rules using Udev rules.

```
cp -f mtk-usb.rules /etc/udev/rules.d/mtk-usb.rules
```

- c) Sign back in or reboot the computer to enable the **Udev** rules.

4. Using CODA

5.1. Command-Line Arguments

To show the usage of CODA, you can execute it without any argument. The result is as follows.

```
CODA - Console Download Application    v0.1.0
Usage: coda [--ini) INI file] [--cfg) CFG file] [options]
[--ini) INI file]
    Apply the settings in the argument INI file to download, format and readback.
    The arguments in the INI file also enable optional advanced configuration.
    Please refer to the file "coda_example.ini".
    "--ini" can be omitted when the filename extension is ".INI".

[--cfg) CFG file]
    Set the configuration (CFG) file path. The CFG file describes the layout of ROM
    images. It is required for some operations, such as download and readback.
    "--cfg" can be omitted when the filename extension is ".CFG".

[options]
  -a, --autoDetectUSB      Identify the new USB COM port when a target device
                           is connected with a USB cable.
  --UART [COM name]        Set the COM port name when the target device is
                           connected through a UART cable. In Windows, the COM port
                           name has the format "COMn", while in Linux the name is
                           the absolute path to the COM port device, such as
                           "/dev/ttyUSB0".
  -d, --download           Download the ROM files defined in the CFG file.
  -f, --format             Complete format of the main module.
  -r, --readback [path]    Readback all ROM files to a specific folder path
                           provided in the CFG file.
  --stdin                  Input INI file from STDIN stream. Please input "<END>\n"
                           to end the stream.
  --reset                  Reset the target at the end of the operation.

NOTE:
  1. The options along with the arguments in the INI file, are all inclusive.
  2. When -d, -f, and -r are set, the execution order is as follows.
     [format] --> [download] --> [readback]

Windows Example:
  coda.exe X:\xxx\xxx.INI X:\xxx\xxx.CFG -a -r X:\xxx\readback\
  coda.exe X:\xxx\xxx.CFG --UART COM0 -f -d

Linux Example:
  coda /home/xxx/xxx.INI /home/xxx/xxx.CFG -a -r /home/xxx/xxx/readback/
  coda /home/xxx/xxx.CFG --UART /dev/ttyUSB0 -f -d
```

5.1.1. INI file

Apply the settings in the INI file to download, format or readback. The arguments in the INI file also enable advanced options based on need. The CODA command option "--ini" can be omitted when the filename extension is ".INI". The INI file includes eight sections — **INI**, **Settings**, **ComPortSwitch**, **Info**, **Download**, **Format**, **Readback** and **OTP**.

5.1.1.1. INI section

A mandatory section in the INI file with a version included as a parameter (see Table 1).

Table 1. [INI] section parameter

| Parameter | Value | Description |
|-----------|----------------|--------------------------|
| Version | Version string | Version of the INI file. |

5.1.1.2. Settings section

A mandatory section in the INI file. The parameters in the **Settings** section are described in Table 2.

Table 2. [Settings] section parameters

| Parameter | Value | Description |
|----------------------------|--------------------|---|
| autoDetectUSB | enable/disable | Enable or disable the binary download through the USB port. |
| uartComPort | COM port (String) | Set the COM port name corresponding to the UART, such as /dev/ttyUSB0 (Linux). Do not set or enable autoDetectUSB option, if the uartComPort option is used. |
| downloadWithoutBattery | enable/disable | Enable or disable the binary download without a battery. |
| configFilePath | File path (String) | Configuration file path. |
| debugLog | enable/disable | Enable or disable the DownloadLib logging. |
| debugLogFilePath | File path (String) | Debug log file path. |
| daLoggingChannel | enable/disable | Enable or disable the DA logging. |
| USB2.0 | enable/disable | Enable or disable the USB 2.0 connectivity support. |
| longPressPowerKey | enable/disable | Enable or disable the PWR key function on the HDK during the CODA operations. |
| downloadAgentFilePath | File path (String) | DA path |
| resetTargetAfterDisconnect | enable/disable | Set this parameter to "enable" to reset the target after CODA usage. |

5.1.1.3. ComPortSwitch section

This section is optional in the INI file. It is used to send a USB switch command to switch the USB COM port for CODA download. USB switch command is used to switch from COM port of the target boot up to COM port of CODA usage. The parameters are given in Table 3.

Table 3. [ComPortSwitch] section parameters

| Parameter | Value | Description |
|------------------------|-----------------|----------------------------------|
| comPortVidOfSwitchFrom | Integer (int16) | The COM port VID of switch tool. |

| Parameter | Value | Description |
|------------------------|-----------------|----------------------------------|
| comPortPidOfSwitchFrom | Integer (int16) | The COM port PID of switch tool. |
| comPortVidOfSwitchTo | Integer (int16) | The COM port VID of CODA. |
| comPortPidOfSwitchTo | Integer (int16) | The COM port PID of CODA. |
| switchCommand | Command string | Switch command of switch tool. |

5.1.1.4. Info section

A mandatory section in the INI file with parameter description provided in Table 4.

Table 4. [Info] section parameters

| Parameter | Value | Description |
|-------------------|----------------|---|
| ComPorts | enable/disable | If enabled, CODA prints out the COM port information. |
| DownloadLib | enable/disable | If enabled, CODA prints out the DownloadLib information. |
| ConfigFile | enable/disable | If enabled, CODA prints out the configuration file information. |
| DownloadAgentFile | enable/disable | If enabled, CODA prints out the DA file information. |
| Chip | enable/disable | If enabled, CODA prints out the chip information. |

5.1.1.5. Download section

This section is optional in the INI file. The parameters of the **Download** section are described in Table 5.

Table 5. [Download] section parameters

| Parameter | Value | Description |
|-----------|------------|--|
| indexList | Index list | The parameter range depends on the number of files specified in the configuration (CFG) file. Define a range, such as "indexList=0:2" ($0 \leq x < 2$) or "indexList=0,1". 0:-1 process all files from CFG, if -1, no more files to process (-1 --> end). |
| nameList | Name list | It's possible to use nameList instead of indexList, such as "nameList=flash.bin,gNSS_firmware.bin". |

5.1.1.6. Format section

This section is optional in the INI file. The parameters of the **Format** section are described in Table 6. **Format** section configuration is shown in Figure 1

```
[Format]
module=Main
# Main or GNSS
formatType>manual
# total or manual
addressType=logical
# logical or physical
beginAddress=0x0
length=0x400
```

Figure 1. Format section configuration example

Table 6. [Format] section parameters

| Parameter | Value | Description |
|--------------|------------------|--|
| module | Main/GNSS | The targets to format are specified under module type, Main , such as MT2523 chipset and GNSS , such as GNSS chipset. |
| formatType | total/manual | To format the whole flash automatically, set this parameter to total . If manual format type is set, the CODA will format the flash according to the user-defined settings (address type, begin address and length). |
| addressType | Logical/physical | The logical address starts at 0x00000000. The physical address of the MT2523 starts at 0x08000000. |
| beginAddress | Address value | Format start address |
| length | length value | Format length |

5.1.1.7. Readback section

This section is optional in the INI file. The **Readback** section is in two parts, [Readback] and [Readback%(number)]. The [Readback] section defines the module ready for readback. If the module is set to **All**, the user cannot have [Readback%(number)] section (see Figure 2). For any other settings of the module (**Main** or **GNSS**), configure the settings of the [Readback%(number)] section. The parameters of the [Readback] and [Readback%(number)] sections are listed in Table 7 and Table 8, respectively.

```
[Readback]
module=Main
# All, Main, or GNSS
;folderPath=./Readback
[Readback%0]
addressType=logical
# logical or physical
beginAddress=0x0
length=0x50000
filePath=./Readback/ROM.bin
```

Figure 2. Readback section configuration example

Table 7. [Readback] section parameters

| Parameter | Value | Description |
|------------|--------------------|--|
| module | All/Main/GNSS | The targets to readback are specified under module, All , means read all files described in configuration file, Main is to readback the MT2523 chipset data and GNSS is to readback the GNSS chipset data. |
| folderPath | Folder path string | If module is set to All , provide a folder path to save the readback file and skip the section [Readback%(number)]. |

Table 8. [Readback%(number)] section parameters

| Parameter | Value | Description |
|-----------|-------|-------------|
|-----------|-------|-------------|

| Parameter | Value | Description |
|--------------|------------------|--|
| addressType | logical/physical | The logical address starts at 0x00000000. The physical address of the MT2523 starts at 0x08000000. |
| beginAddress | Address value | Readback start address. |
| length | length value | Readback length. |
| filePath | File path string | This file path is used to save the read flash result. |

5.1.1.8. OTP section

This section is optional in the INI file. The parameters of the One-Time Program (**OTP**) section are described in Table 9.

Table 9. [OTP] section parameters

| Parameter | Value | Description |
|--------------|------------------|---|
| operation | read/write/lock | The OTP operation mode (read, write, lock). If you select "lock", the particular OTP flash will be read-only. |
| beginAddress | Address value | Read/write start address. |
| length | Length value | Read/write length. |
| filePath | File path string | This file is used to save the read OTP result or write OTP file to target. |

5.1.2. CFG file

The CFG file can be set by a command-line argument or INI file. The CFG file is used to describe the layout of ROM images. It is necessary for some operations such as download and readback. Omit the argument "--cfg", if the filename extension is ".CFG".

5.1.3. Options

Some simple options are provided to do some basic functions as the usage message.

5.2. Flow

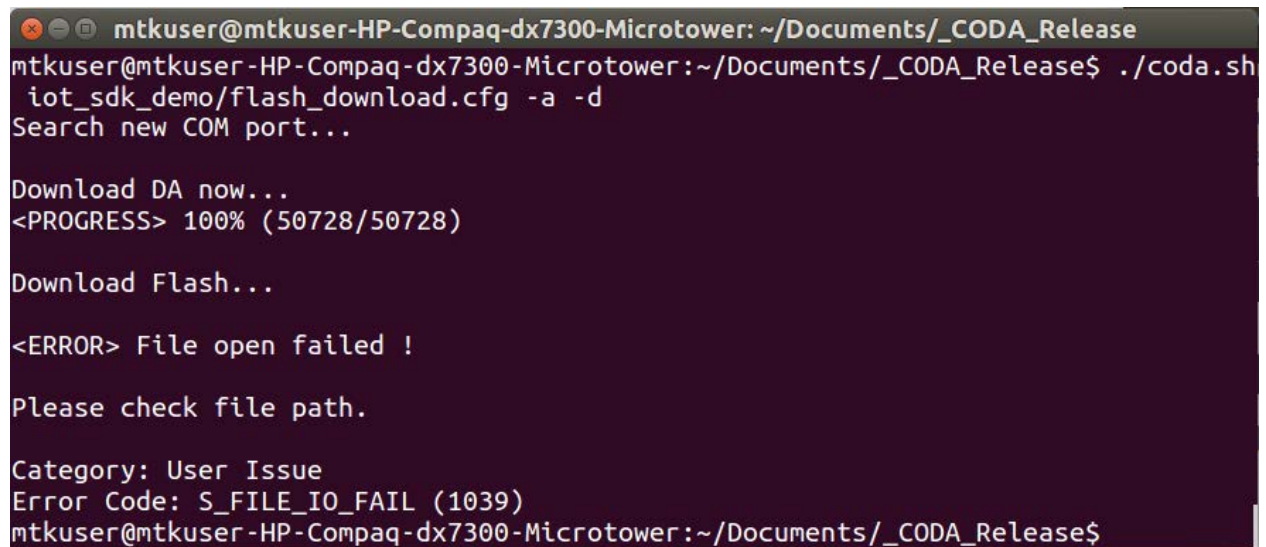
The order of the operations, like power ON/OFF the target and plug in the cable, is very important. You must operate as follows.

Table 10. CODA operation flow

| Step | USB | UART |
|------|-----------------------|------------------------|
| 1 | Power off the target | |
| 2 | - | Plug in the UART cable |
| 3 | Execute CODA | |
| 4 | Power on the target | |
| 5 | Plug in the USB cable | - |

6. Troubleshooting

Errors and warnings will be printed out on the CODA console with a recommended solution, as shown in Figure 3.



```
mtkuser@mtkuser-HP-Compaq-dx7300-Microtower: ~/Documents/_CODA_Release
mtkuser@mtkuser-HP-Compaq-dx7300-Microtower:~/Documents/_CODA_Release$ ./codas.sh
iot_sdk_demo/flash_download.cfg -a -d
Search new COM port...

Download DA now...
<PROGRESS> 100% (50728/50728)

Download Flash...

<ERROR> File open failed !

Please check file path.

Category: User Issue
Error Code: S_FILE_IO_FAIL (1039)
mtkuser@mtkuser-HP-Compaq-dx7300-Microtower:~/Documents/_CODA_Release$
```

Figure 3. Error message of CODA