AIROHA

IoT Flash Tool Console Mode on Windows User's guide

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Document Revision History

Revision	Date	Description
1.0	13 January 2017	Initial release.
1.1	5 May 2017	Changed name from MT2523 Flash Tool to IoT Flash Tool.

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Lists of tables and figures

1. Introduction

Airoha IOT Flash Tool provides a console mode to download applications (CODA) designed for Airoha IOT SDK for RTOS development platform. CODA is a flexible device-flashing tool for application development on MediaTek LinkIt™ 2523/7686/7682 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 any edition of Microsoft Windows XP, Vista, 7, 8 and 10.

Mediatek LinkIt 2523 HDK has a USB connector and the IoT Flash Tool operates through the USB. MediaTek LinkIt 7686 and 7682 HDKs provide USB to UART connector and the IoT Flash Tool operates through the UART.

Before using the IoT Flash Tool, install the corresponding driver, (section 2.2, "Driver"

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 (`DonwloadLib`) 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. Driver To install the MTK USB Port driver for USB port on the HDK:

1) Install the MTK USB Port driver from MS_USB_ComPort_Driver folder located under the Flash Tool's release folder.

2) Connect the **USB** connector on the LinkIt 2523 HDK to your computer's USB port with a USB cable.

To determine the COM port number corresponding to your device:

1) Open Windows **Control Panel** and click **System** then:

   a) On Windows 7, 8 and 10, click **Device Manager**.

   b) On Windows XP, click the **Hardware** tab and then **Device Manager**.

2) In **Device Manager**, navigate to **Ports (COM & LPT)** and locate **MTK USB Port** (**COMx**), as shown in Figure 1.

Note, the driver version must be **1.1032.0** or later; an older driver doesn't guarantee successful download and operation.

Figure 1. Installing the USB driver

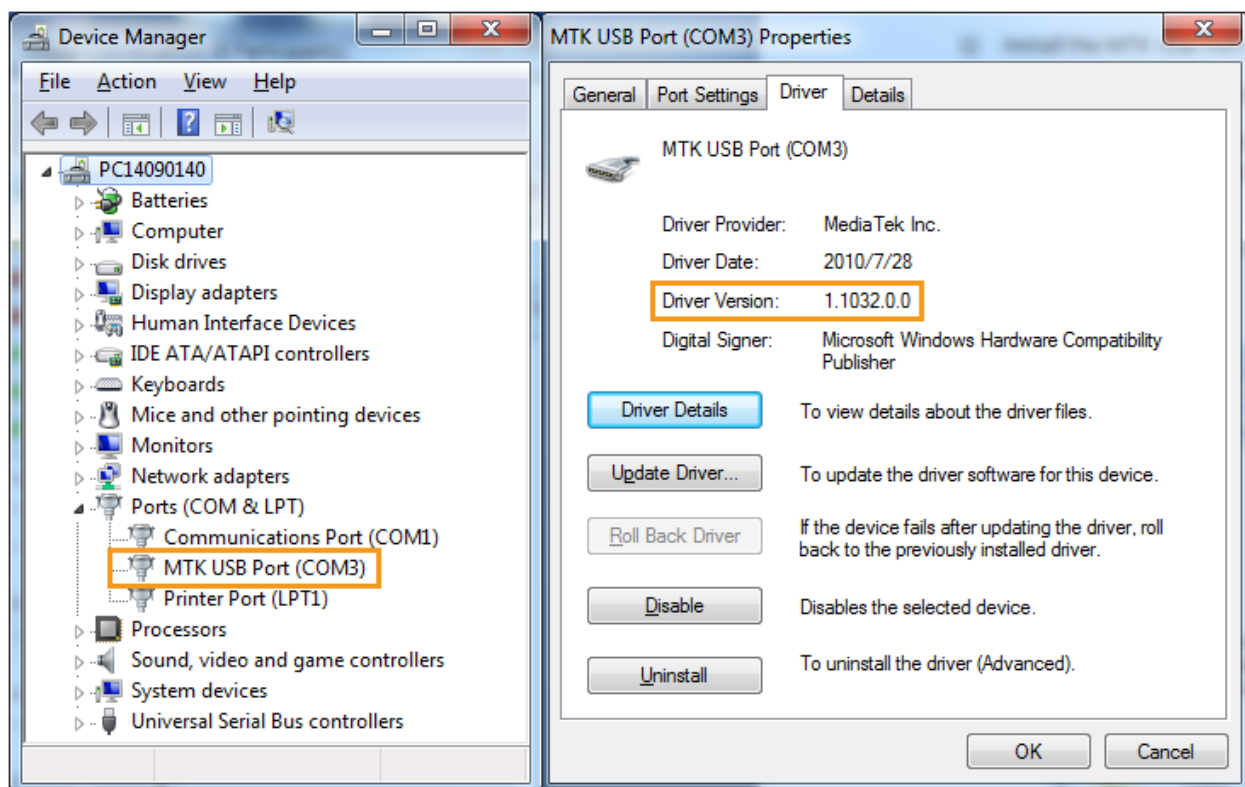To install the MTK UART Port driver for **UART** port on LinkIt 7686 and 7682 HDKs:

1) Install the UART Port driver from UART_Port_Driver folder located under the Flash Tool's release folder.

2) Connect the **USB to UART** connector on the LinkIt 7686/7682 HDK to your computer's USB port with a USB cable.

To determine the COM port number corresponding to your device:

3) Open Windows **Control Panel** and click **System** then

    a) On Windows 7 and 8, click **Device Manager**.

    b) On Windows XP, click the **Hardware** tab and then **Device Manager**.

4) In **Device Manager**, navigate to **Ports (COM & LPT)** and locate **Mbed Virtual Serial Port** (**COMx**), as shown in Figure 2.
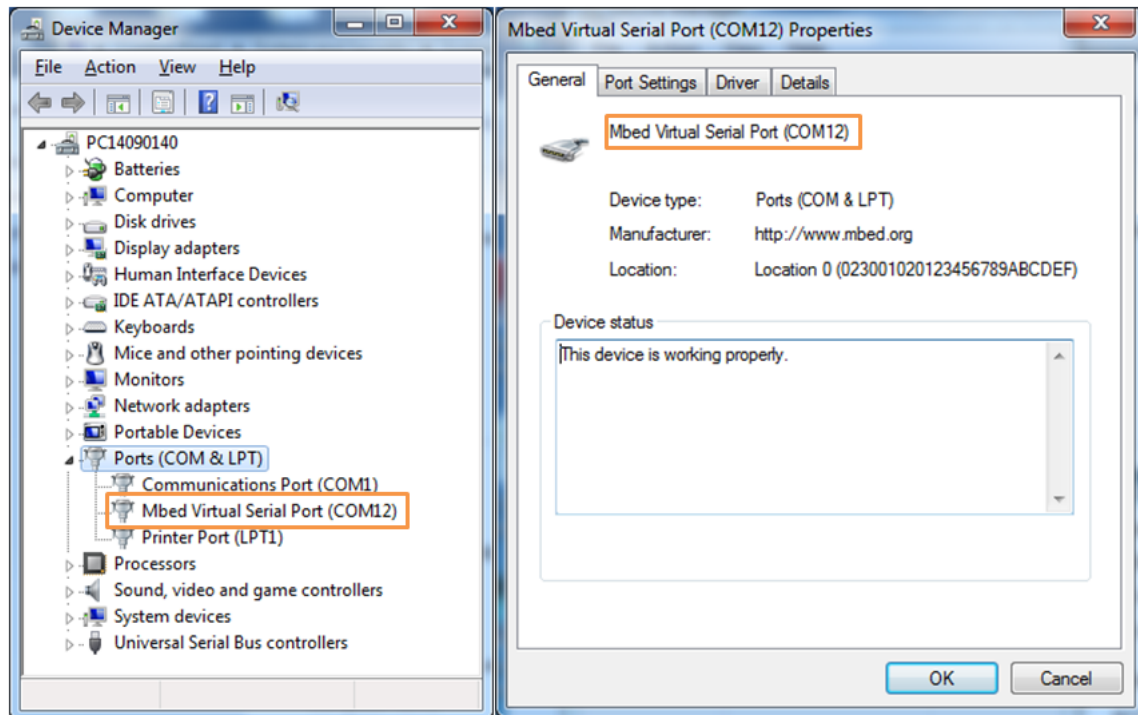
Figure 2. Installing the UART driver

3. Using CODA

3.1. Command-line arguments

To show the usage of CODA, you can execute CODA.exe 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
```

3.1.1. 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 contains eight sections — **INI**, **Settings**, **ComPortSwitch**, **Info**, **Download**, **Format**, **Readback** and **OTP**.

3.1.1.1.   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 INI file

3.1.1.2.   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 this 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.

3.1.1.3.   ComPortSwitch section

An optional section 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 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.
comPortPidOfSwitchFrom	Integer (int16)	The COM port PID of switch tool.
comPortVidOfSwitchTo	Integer (int16)	The COM port VID of CODA.

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

3.1.1.4. 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.

3.1.1.5. Download section

An optional section 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 ≤ 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".

3.1.1.6. Format section

An optional section in the INI file. The parameters of the **Format** section are described in Table 6. **Format** section configuration is shown in Figure 3.


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

Figure 3. 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/MT7686/MT7682 starts at 0x08000000.
beginAddress	Address value	Format start address
length	length value	Format length

3.1.1.7. Readback section

An optional section 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 4). 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 4. 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 not set the [Readback%(number)] sections

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

Parameter	Value	Description
addressType	logical/physical	The logical address starts at 0x00000000. The physical address of the MT2523/MT7686/MT7682 starts at 0x08000000.

Parameter	Value	Description
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.

3.1.1.8. OTP section

An optional section 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.

3.1.2. CFG file

The CFG file can be set by a command-line argument or INI file. The CFG file describes 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".

3.1.3. Options

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

3.2. 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.
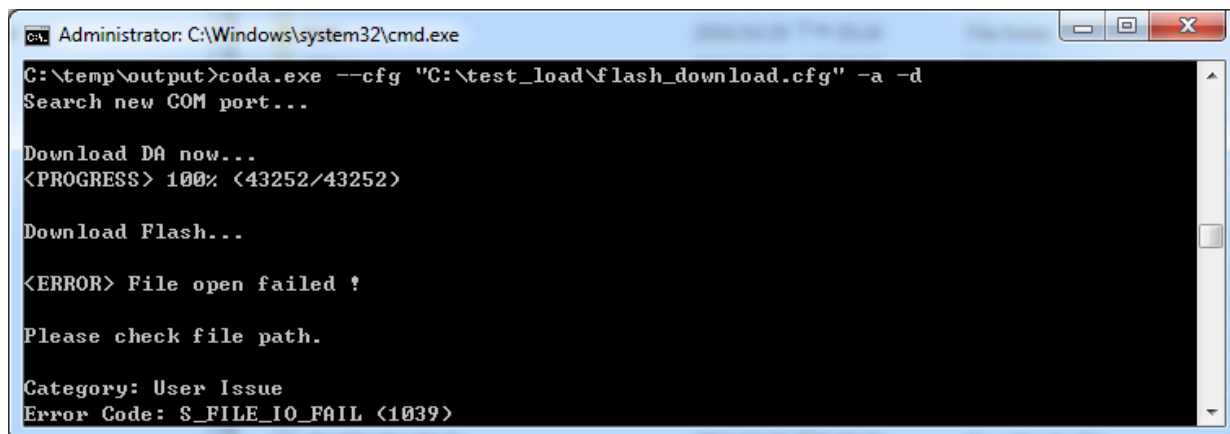
Table 10. CODA operation flow

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	-

4. Troubleshooting

Errors and warnings will be printed out on the CODA console with a recommended solution, as shown in Figure 5.

Figure 5. Error message of CODA