WM-SG-SM-42/46 Update Preloaded AT Command FW Application Note

Version: 1.4

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Document release by WSS2/WP1/SW	Date.	2018/03/21	Page	2
Description	WM-SG-SM-42/46 Update Preloaded AT Command FW Application Note			

Contents

1. Preparation

This document is for introduce how to update the firmware of WM-SG-SM-42 based on WM-SG-SM-42 EVB on windows PC. Please ensure the following items is on your hand or installed already.

1) **Windows PC for running the update tool.**

The FW update tool is a windows console mode program, so we need a windows PC for running the update tool.

2) **The WM-SG-SM-42 module/EVB.**

The module/EVB needed to be updated.

3) **The WM-SG-SM-42 FW update package.**

The FW update package is a zip file which contains a custom openocd program and a custom hex file, so all the WM-SG-SM-42 firmware only can be updated by the custom openocd program. The file structure would be as the below:
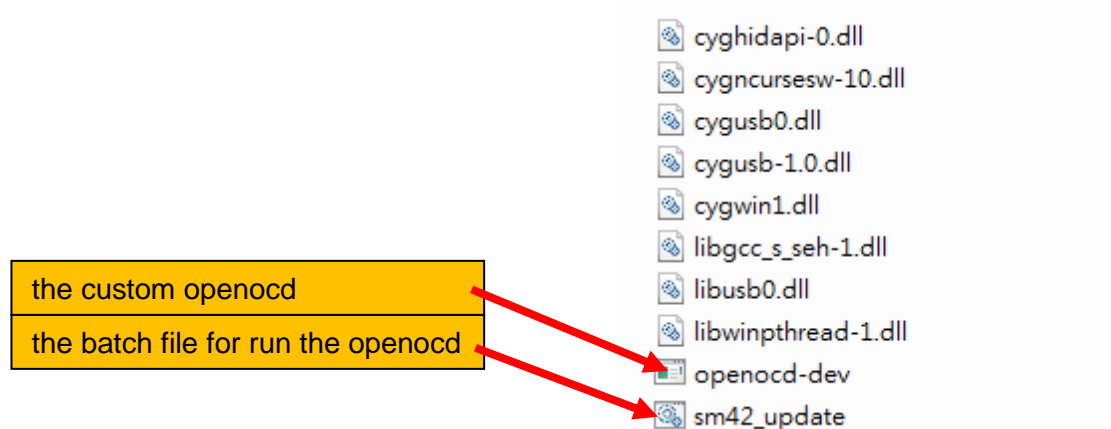
4) **FTDI VCP driver.**

The PC may need the FTDI VCP driver when the micro USB of WM-SG-SM-42 EVB connected on the PC, so the FTDI VCP driver can be downloaded from the web page below:

http://www.ftdichip.com/Drivers/VCP.htm

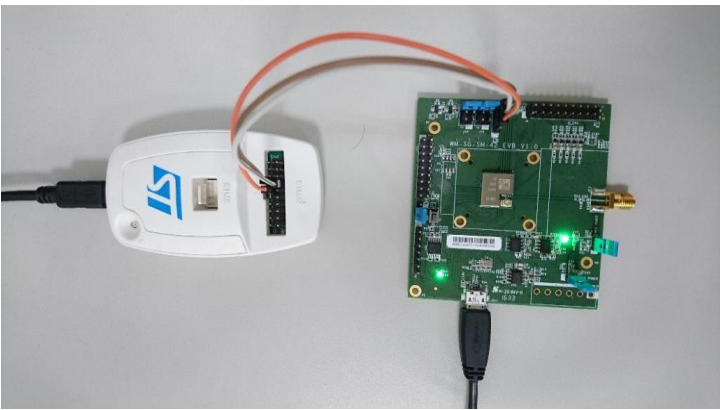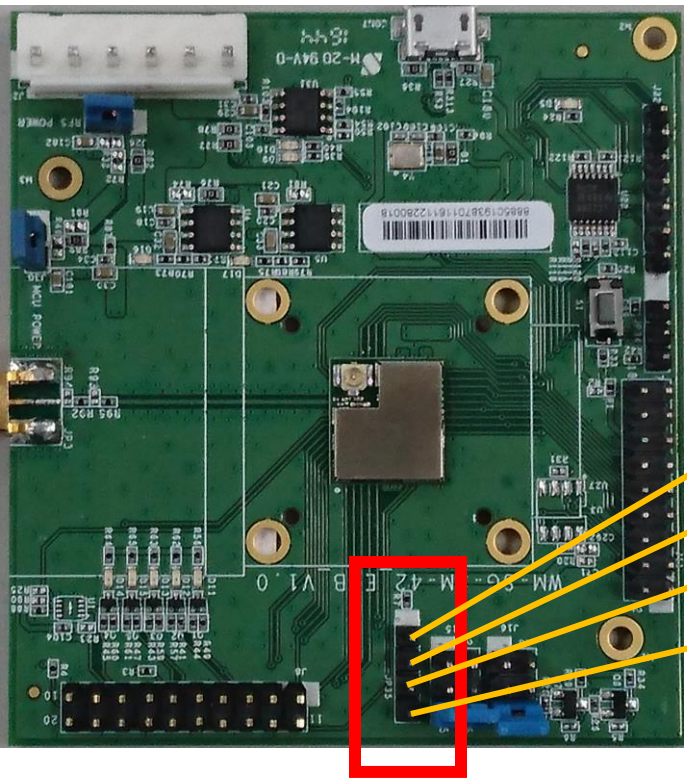5) **ST-LINK/V2-1 Programmer and ST-LINK Utility tool.**

The ST-LINK utility tool can be downloaded from the web page below:

http://www.st.com/content/st_com/en/products/embedded-software/development-tool-software/stsw-link004.html

2. SWD interface connection on WM-SG-SM-42 EVB

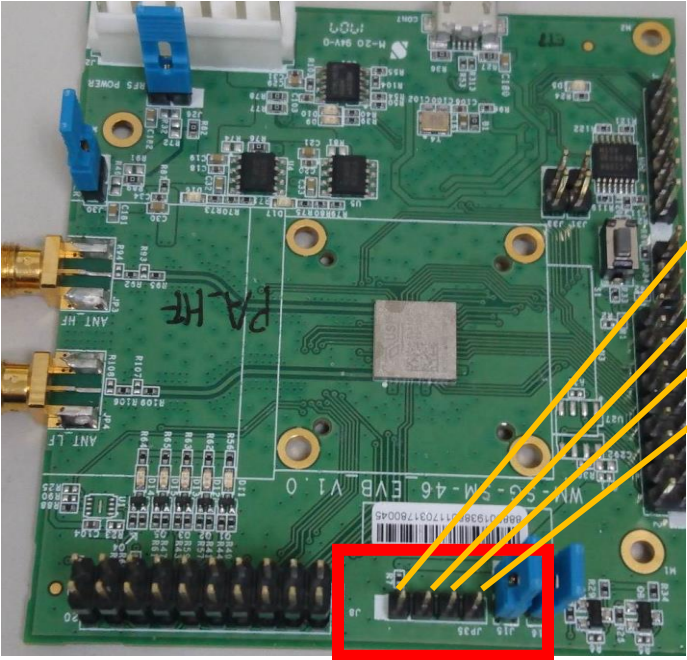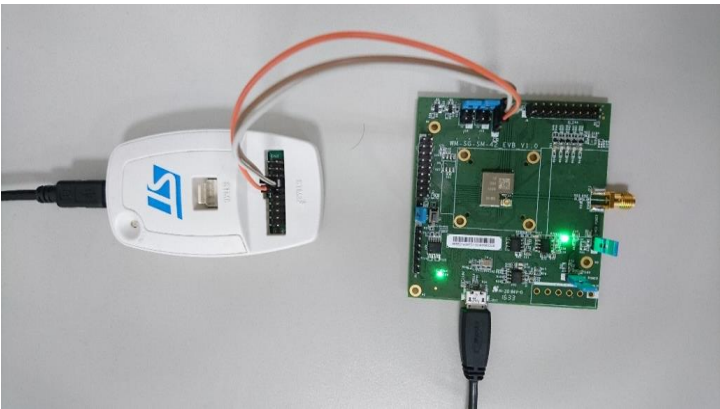The following shows how to connect the SWD of WM-SG-SM-42 EVB to ST-LINK/v2-1 programmer.

PIN NAME	ST-LINK/V2 PIN No.	WM-SG-BM-42 EVB PIN No.
VCC	JTAG/SWD-P1	JP35-P1
SWCLK	JTAG/SWD-P9	JP35-P2
GND	JTAG/SWD-P8	JP35-P3
SWDIO	JTAG/SWD-P7	JP35-P4

3. SWD interface connection on WM-SG-SM-46 EVB

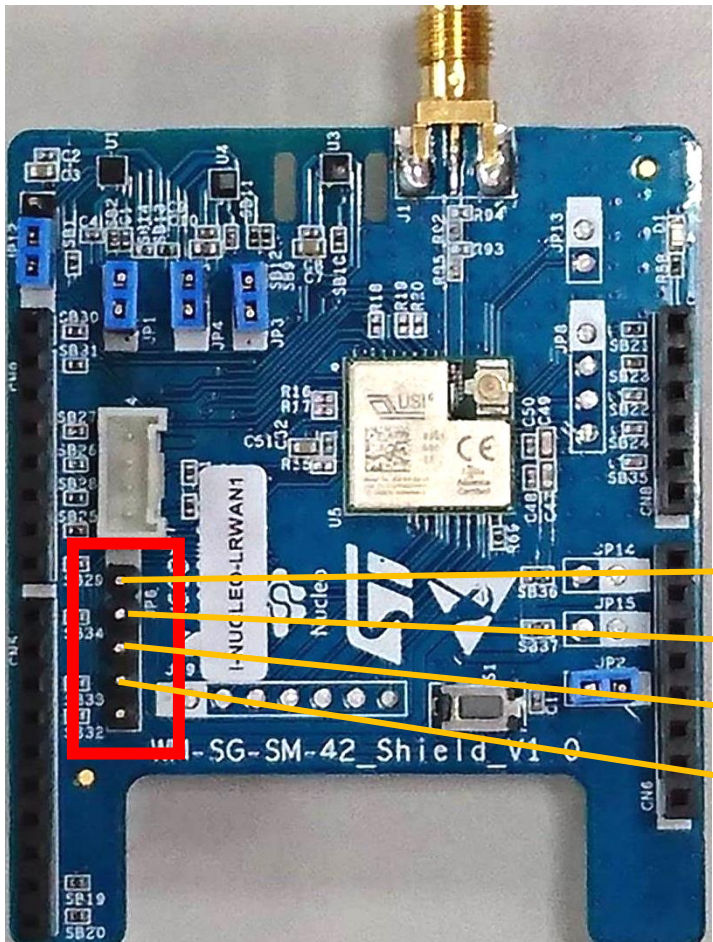The following shows how to connect the SWD of WM-SG-SM-46 EVB to ST-LINK/v2-1 programmer.

PIN NAME	ST-LINK/V2 PIN No.	WM-SG-BM-46 EVB PIN No.
VCC	JTAG/SWD-P1	JP35-P1
SWCLK	JTAG/SWD-P9	JP35-P2
GND	JTAG/SWD-P8	JP35-P3
SWDIO	JTAG/SWD-P7	JP35-P4

4. SWD interface connection on WM-SG-SM-42 Shield

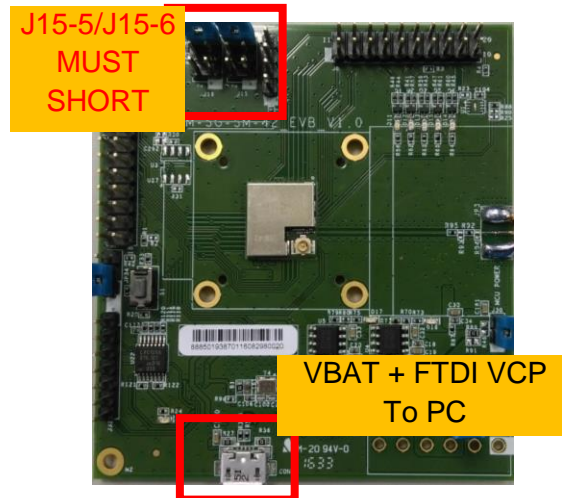The following shows how to connect the SWD of WM-SG-SM-42 Shield to ST-LINK/v2-1 programmer.

PIN NAME	ST-LINK/V2 PIN No.	WM-SG-BM-42 EVB PIN No.
VCC	JTAG/SWD-P1	JP6-P1
SWCLK	JTAG/SWD-P9	JP6-P2
GND	JTAG/SWD-P8	JP6-P3
SWDIO	JTAG/SWD-P7	JP6-P4

5. UART interface connection on WM-SG-SM-42 EVB

1) The following shows the UART setting and how to connect UART of WM-SG-SM-42 EVB to PC.

2) After connect WM-SG-SM-42 EVB to Windows PC, there are two continued serial port number would appear on the window of device manager as the following picture, the higher serial port number is connected to the UART of WM-SG-SM-42, please specify the higher serial port number at the command line of openocd.
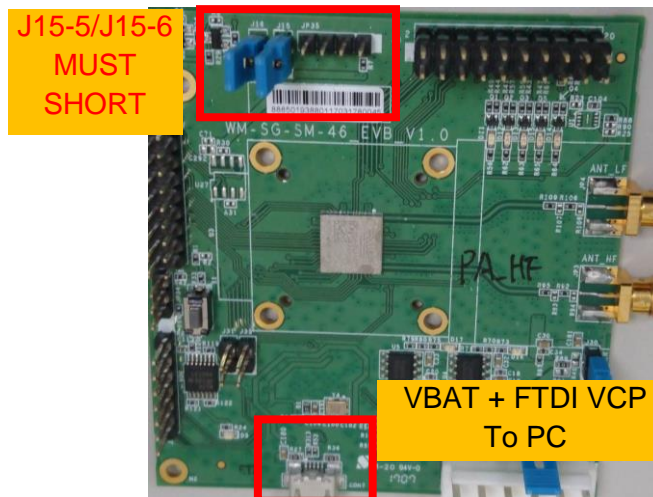
6. UART interface connection on WM-SG-SM-46 EVB

3) The following shows the UART setting and how to connect UART of WM-SG-SM-46 EVB to PC.

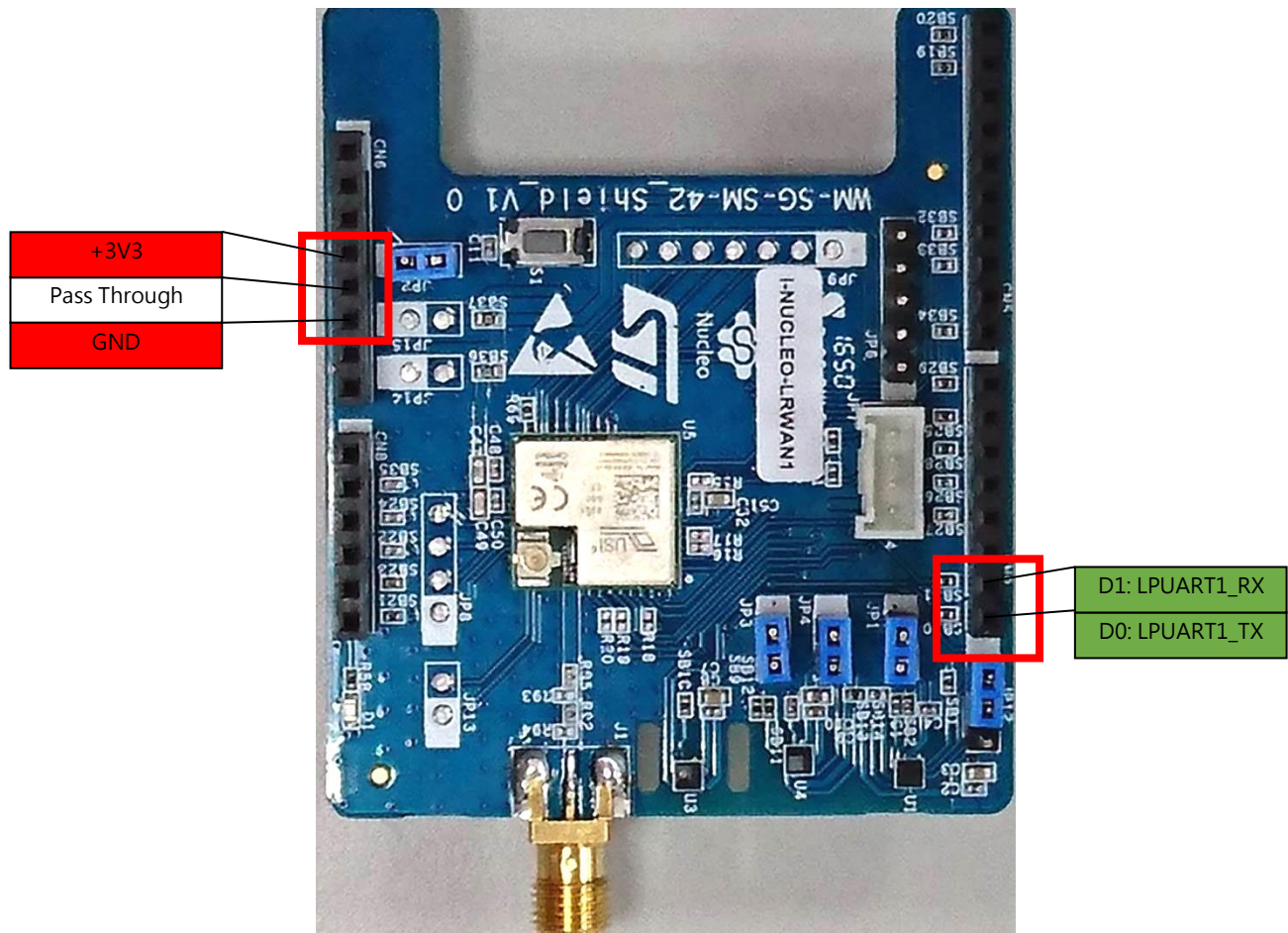4) After connect WM-SG-SM-46 EVB to Windows PC, there are two continued serial port number would appear on the window of device manager as the following picture, the higher serial port number is connected to the UART of WM-SG-SM-46, please specify the higher serial port number at the command line of openocd.

7. UART interface connection on WM-SG-SM-42 Shield

1) The following shows the UART setting and how to connect UART of WM-SG-SM-42 shield to PC.

8. STLINK/V2-1 Connection

Please ensure that 'STMicroelectronics STLink dongle' appears on the window of device manager before run the openocd program.

9. The update procedure

9.1 Backup NV data

Since the nv data inside the module will be destroyed during the update, so please back up the NV data of module to local disk using 'sm42_backup.bat' before programming the preloaded AT command software or before programming your customize software. The backup NV file cannot be restored to other module and the filename is named with the device EUI. the preload AT command software provides an AT command 'AT+EUI' for EUI inquiry.

8 is the number of uart shown in the device manager

Select the programmer type

backup the backup file to other path, and past the backup file here for restore the preloaded firmware. the backup file can not restore to other module, this number will be the same with the response of 'AT+EUI' command.

9.2 Update the preloaded firmware

Normally, the update tool will back up the nv data at first, and will restore the back up nv data automatically after programming the firmware.

```
E:\sm42_fw_update_v1_0\sm42_fw_update_tool_v1.1\bin>sm42_update.bat 8 wm-sg-sm-42_firmware_v3.2.hex
"0) stlink-v1"
"1) stlink_v2"
"2) stlink_v2-1"
select a profile no. from above? 1
going to run using 'stlink_v2'
Open On-Chip Debugger 0.9.0-dev-v1   (2017-02-27-12:14)
Licensed under GNU GPL v2
For bug reports, read
        http://openocd.org/doc/doxygen/bugs.html
Info : starting to backup nvm ...
........................................................................
........................................................
Info : backup nvm is valid
Info : current fw version in module:  3.500000
Info : found eui: 3438343384368308
Info : finish nvm backup.
Info : auto-selecting first available session transport "hla_swd". To override use 'transport select <transport>'.
adapter speed: 300 kHz
adapter_nsrst_delay: 100
Info : The selected transport took over low-level target control. The results might differ compared to plain JTAG/SWD
none separate
Info : Unable to match requested speed 300 kHz, using 240 kHz
Info : Unable to match requested speed 300 kHz, using 240 kHz
Info : clock speed 240 kHz
Info : STLINK v2 JTAG v30 API v2 SWIM v7 VID 0x0483 PID 0x3748
Info : using stlink api v2
Info : Target voltage: 3.209941
Info : stm32l0.cpu: hardware has 4 breakpoints, 2 watchpoints
Info : STM32L flash size is 64kb, base address is 0x8000000
Info : found unique device id = 3438343384368308
Info : nvm was backup in '3438343384368308.bak'
Info : stm32lx_write_rdp RDP=aa...
Info : stm32lx_write_rdp OBL_LAUNCH...
STM32Lx unlocked, wait 1 sec.
Info : Unable to match requested speed 300 kHz, using 240 kHz
Info : Unable to match requested speed 300 kHz, using 240 kHz
adapter speed: 240 kHz
Info : Unable to match requested speed 300 kHz, using 240 kHz
Info : Unable to match requested speed 300 kHz, using 240 kHz
adapter speed: 240 kHz
target state: halted
target halted due to debug-request, current mode: Thread
xPSR: 0xf0000000 pc: 00000000 msp: 00000000
STM32L0: Enabling HSI16
Info : Unable to match requested speed 2500 kHz, using 1800 kHz
Info : Unable to match requested speed 2500 kHz, using 1800 kHz
adapter speed: 1800 kHz
** Programming Started **
auto erase enabled
Info : loading file 'wm-sg-sm-42_firmware_v3.2.hex' ...
Info : loaded 175392 of 175392
found fw version 0 in 'wm-sg-sm-42_firmware_v3.2.hex'
Info : going erase & flash ...
Warn : couldn't use loader, falling back to page memory writes
wrote 65536 bytes from file wm-sg-sm-42_firmware_v3.2.hex in 12.158696s (5.264 KiB/s)
Info : stm32lx_write_rdp RDP=0...
Info : stm32lx_write_rdp OBL_LAUNCH...
driver protected
Info : Unable to match requested speed 300 kHz, using 240 kHz
Info : Unable to match requested speed 300 kHz, using 240 kHz
adapter speed: 240 kHz
** Programming Finished **
** Resetting Target **
Info : Unable to match requested speed 300 kHz, using 240 kHz
Info : Unable to match requested speed 300 kHz, using 240 kHz
adapter speed: 240 kHz
shutdown command invoked
Info : backup nvm is valid

NOTE!! nvm must be restored ...
DO NOT TERMINATE the process or the window.
to ensure target is in running state, please unplug SWD wire and REPOWER target

then please hit ENTER key while ready to continue ....

Info : restoring nvm ...
........................................................................
........................................................
fw updated successfully!please takes a reset for effect the new fw.
```

8 is the number of uart shown in the device manager

Select the programmer type

Please remove SWD wire and re-plug the power on the target when you see message.

Please restart your module when you see message.

Universal Scientific Industrial Co., Ltd.	Doc No.		Rev	1.2
Document release by WSS2/WP1/SW	Date.	2017/05/09	Page	15
Description	WM-SG-SM-42 Update Preloaded AT Command FW Application Note			

9.3 Update the preloaded firmware with backup file

Please place the backup NV file in the same folder with update tool before run 'sm42_update.bat' if you want to programming the preloaded AT command software into the module from your customize firmware, or retry from the fail update. the example of update please also refer to the section 7.2.

10 The usage of sm42_backup.bat

Since the nv data inside the module will be destroyed during the update procedure, so please back up the nv data of module to local disk by using sm42_backup.bat.

The syntax of sm42_backup.bat:

sm42_backup.bat <serial_port_number>

<serial_port_number> this is the serial port connected to the UART of WM-SG-SM-42, the serial port number will be the higher serial port number in the two continued serial port which appear on the window of device manager.

But the serial port number may need to reconfigure within 1 to 50, because the update tool is running in cygwin environment, the available serial port number only can be from 1 to 50.

The backup filename will be shown in the output message here.

Universal Scientific Industrial Co., Ltd.	Doc No.		Rev	1.2
Document release by WSS2/WP1/SW	Date.	2017/05/09	Page	18
Description	WM-SG-SM-42 Update Preloaded AT Command FW Application Note			

The following command scheme also can be used for backup the nvm if need to run the backup using non-stlink programmer

Syntax:

openocd-dev -B -S ${com_port_num} -s ..\scripts -f interface\${cfg_file_name} -f target\stm32l0.cfg -c "init" -c "reset" -c "write_bin dummy reset exit"

${com_port_num}   the com port number, for example: please input 3 if COM3

${cfg_file_name}   the cfg_file for your programmer, you can find all supported cfg files from the path: ../scripts/interface/

11 The usage of sm42_update.bat

sm42_update.bat is used for programming preload AT command software to the module, since the nv data inside the module will be destroyed during the update procedure, so it will back up the nv data of module to local disk by the uart of module before beginning of the update normally if the corresponding back NV file dose not in the same folder.

Please refer to the example of update in section 7.2.

The syntax of sm42_update.bat:

sm42_update.bat <serial_port_number> <hex_file>

<serial_port_number> this is the serial port connected to the UART of WM-SG-SM-42, the serial port number will be the higher serial port number in the two continued serial port which appear on the window of device manager.

But the serial port number may need to reconfigure within 1 to 50, because the update tool is running in cygwin environment, the available serial port number only can be from 1 to 50.

<hex_file> this is the hex file name to be updated into the module. It can be a file name with full path or related path. But please use '/' as the separate character of path instead.

The following command scheme also can be used for the programming if need to run by non-stlink programmer

Syntax:

openocd-dev -S ${com_port_num} -s ..\scripts -f interface\${cfg_file_name} -f target\stm32l0.cfg -c "init" -c "stm32lx unlock 0" -c "reset" -c "write_bin ${hex_file} reset exit"

${com_port_num}   the com port number, for example: please input 3 if COM3

${cfg_file_name}   the cfg_file for your programmer, you can find all supported cfg files from the path: ../scripts/interface/

${hex_file}   the hex file you want to programming

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