Bootstrap Loader (BSL) Scripter 2.0

User's Guide

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Revision Information

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1 Introduction

The BSL Scripter is a command line tool to communicate with the Bootstrap Loader (BSL) on a MSP430® and MSP432®.

The application serves as a device programmer, a starting point for a custom BSL application (source code is included) and as a reference on how to use the BSL protocol (as TX/RX data can be observed via the verbose mode).

⚠ The BSL Scripter does not support BSLs of the 1xx/2xx and 4xx device family. To communicate with these devices use the 'BSLDEMO2.exe' command line tool found in the 'Deprecated' folder.

1.1 Script File Format

The script file is a ASCII text file. The BSL Scripter reads this text file to parse the BSL commands. Each line must contain a single BSL command with no preceding spaces. Empty lines are allowed. Some commands may have optional parameters and some may have mandatory parameters. Please be sure and check the section below for details on the BSL scripting language. Parameters in curly brackets need to be substituted by the corresponding value. Lines can be commented out using C-style '//' as first two characters.

1.2 BSL Scripter Usage

The BSL Scripter can be started from the command line by typing the application name then typing the name of the file to read. Note: The file and any other used files must be in the same directory as the scripter application or referenced by absolute or relative paths.

```
BSL_Scripter.exe <script_name.txt>
```

2 BSL Scripting Language

The following subsections describe the available commands.

2.1 MODE

Command
MODE {FAMILY} {PROTOCOL} {BAUDRATE} {COM}

Description
Initializes the selected communication channel for a BSL session and invokes the BSL. This command also tells the PC side engine which communication protocol should be used. Additionally, if a MSP432Pxx device is used the initial UART baud rate can be selected. (For all other devices use the CHANGE_BAUD_RATE command to select a different UART baud rate.)

Parameters
FAMILY *[mandatory]*:

- 543x_family: Indicates communication with a BSL on the following devices:
  - MSP430F5418 / MSP430F5419
  - MSP430F5435 / MSP430F5436
  - MSP430F5437 / MSP430F5438
  - NOTE: 54xxA devices are handled as '5xx'
- 5xx: Indicates communication with all other 5xx devices
- 6xx: Currently identical to '5xx' and can be used interchangeably
- FRxx: Indicates communication with FRAM devices
- P4xx: Indicates communication with MSP432P4xx devices

PROTOCOL *[mandatory]*:

- UART: standard communication on most MSP430 devices, default baud rate: 9600 baud
- I2C: default baud rate: 100000 bit/s
- SPI: default baud rare: 125000 Hz
- NOTE: Due to downwards compatibility UART protocol is chosen if no protocol is given

BAUDRATE *[optional - MSP432P4xx only]*

- for UART:
  - 1200
  - 2400
  - 4800
  - 9600
  - 19200
  - 38400
  - 57600
  - 115200

- for I2C:
  - 100000
  - 400000
- for SPI:
  - 125000
  - 250000
  - 1000000

COM *[mandatory]*:

- COM{x}: Indicates the PC COM port that is used, i.e. COM42
- USB: Indicates that communication will be done via USB

Examples

- MODE 543x_family COM42
- MODE 5xx UART COM42
- MODE 6xx USB
- MODE FRxx I2C COM42
- MODE P4xx SPI 250000 COM42
- MODE P4xx UART 115200 COM42

2.2 CHANGE_BAUD_RATE

Command
CHANGE_BAUD_RATE {SPEED}

Description
Changes the baud rate of the UART communication.

Parameters
SPEED *[mandatory]*: A new baud rate, one of the following values

- UART
  - 1200
  - 2400
  - 4800
  - 9600 (default)
  - 19200
  - 38400
  - 57600
  - 115200
- I2C
  - 100000 (default)
  - 400000
- SPI
  - 125000 (default)
  - 250000
  - 1000000
- NOTE: Please see individual BSL descriptions in the User's Guide for information on supported baud rates and protocols.

Examples

- CHANGE_BAUD_RATE 115200
- CHANGE_BAUD_RATE 9600

2.3 CRC_CHECK

Command
CRC_CHECK {ADDRESS} {LENGTH} {EXPECTED}

Description
Performs a CRC check starting at the given address over the number of bytes given by length. This command will simply output the result of the CRC operation or compare the result to a supplied value and report whether there is a match or mismatch.

Parameters
ADDRESS *[mandatory]*: The address at which the CRC will begin (hex format)

LENGTH *[mandatory]*: The number of bytes to include to CRC (hex format)

EXPECTED *[optional]*: The value to compare the CRC result with

Examples

- CRC_CHECK 0x8000 0x1000 0xCFB8
- CRC_CHECK 0x8000 0x10

2.4 CRC_CHECK_32

Command
CRC_CHECK_32 {ADDRESS} {LENGTH} {EXPECTED}

Description
Identical to CRC_CHECK except that the memory is 32-byte addressed. This command works on MSP432P4xx devices only.

Parameters
ADDRESS *[mandatory]*: The address at which the CRC will begin (hex format)

LENGTH *[mandatory]*: The number of bytes to include to CRC (hex format)

EXPECTED *[optional]*: The value to compare the CRC result with

Example

- CRC_CHECK_32 0x8000 0x1000 0xCFB8
- CRC_CHECK_32 0x12345678 0x1010 0xFF31

2.5 DELAY

Command
DELAY {MS}

Description
Causes a delay of MS milliseconds.

Parameters
MS *[mandatory]*: The number of milliseconds to wait before proceeding

Example

- DELAY 1000

2.6 ERASE_SEGMENT

Command
ERASE_SEGMENT {ADDRESS}

Description
Causes the BSL to erase the segment containing the supplied address.

Parameters
ADDRESS *[mandatory]*: An address in hex format within MSP430/MSP432 flash. The segment which contains this address will be erased.

Examples

- ERASE_SEGMENT 0x10000
- ERASE_SEGMENT 0x8000

2.7 ERASE_SEGMENT_32

Command
ERASE_SEGMENT_32 {ADDRESS}

Description
Identical to ERASE_SEGMENT except that the memory is 32-byte addressed. This command is working on MSP432 only.

Parameters
ADDRESS *[mandatory]*: An address in hex format within MSP432 flash, the segment which contains this address will be erased.

Examples

- ERASE_SEGMENT_32 0x10000
- ERASE_SEGMENT_32 0x8000

2.8 SET_PC

Command
SET_PC {ADDRESS}

Description
Sets the program counter to the given address. NOTE: This functions performs a function call to this address, so it can be returned form the call via BSL action function.

Parameters
ADDRESS *[mandatory]*: An address to which the MSP430/MSP432's Program Counter will be set and begin the program execution

Example

- SET_PC 0x2504

2.9 SET_PC_32

Command
SET_PC_32 {ADDRESS}

Description
Identical to SET_PC except that the address will be 32-byte addressed. This command only works on MSP432 devices.

Parameters
ADDRESS *[mandatory]*: An address to which the MSP432's Program Counter will be set and begin the program execution.

Example

- SET_PC_32 0x1FF16540

2.10 MASS_ERASE

Command
MASS_ERASE

Description
Causes the BSL to perform a Mass Erase.

Parameters
NONE

Example

- MASS_ERASE

2.11 REBOOT_RESET

Command
REBOOT_RESET

Description
Causes the BSL to perform a Reboot Reset. This command is only working on MSP432 devices.

Parameters
NONE

Example

- REBOOT_RESET

2.12 RX_DATA_BLOCK

Command
RX_DATA_BLOCK {FILENAME}

Description
Causes the BSL to read the supplied TI TXT file and download all data contained in this file to the MSP430/MSP432.

Parameters
FILENAME *[mandatory]*: The name of the TI TXT file to read (relative path)

Example

- RX_DATA_BLOCK Big_File.txt

2.13 RX_DATA_BLOCK_32

Command
RX_DATA_BLOCK_32 {FILENAME}

Description
Causes the BSL to read the supplied TI TXT file and download all data contained in this file to the MSP432. The command supports full 32-bit address space and works only on MSP432.

Parameters
FILENAME *[mandatory]*: The name of the TI TXT file to read (relative path)

Example

- RX_DATA_BLOCK_32 Big_File.txt

2.14 RX_DATA_BLOCK_FAST

Command
RX_DATA_BLOCK_FAST {FILENAME}

Description
Identical to RX_DATA_BLOCK except no verification of programming is returned from the BSL. This is useful for USB programming only, the BSL Scripter can only confirm that the file was sent. This command works on MSP430 and MSP432 but covers only 24-bit address space.

Parameters
FILENAME *[mandatory]*: The name of the TI TXT file to read (relative path)

Example

- RX_DATA_BLOCK_FAST RAM_BSL.00.05.04.34.txt

2.15 RX_PASSWORD

Command
RX_PASSWORD {FILENAME}

Description
Causes the BSL to read the supplied TI TXT file and submit this data to the BSL as a password to unlock the device if the password is correct. If the password is wrong, a mass erase will be done. NOTE: Although the same command is used to supply the password for the 543x family and other 5xx devices, the password file needs to be handled differently for these devices due to smaller password size in the 543x family. For more details, please see the Bootstrap Loader User's Guide. Note: For USB BSL (on the device, not the full-featured RAM BSL for USB) without built in MASS ERASE command, this command can be used with an incorrect password to trigger a mass erase.

Parameters
FILENAME *[optional]*: The name of the TI TXT file to read. If no value is supplied, the default password of 32 times 0xFF will be used.

Examples

- RX_PASSWORD
- RX_PASSWORD app_pass.txt

2.16 RX_PASSWORD_32

Command
RX_PASSWORD_32 {FILENAME}

Description
Identical to RX_PASSWORD except that the default password has a length of 256 byte and can only be used for MSP432Pxx devices. The memory is 32 byte addressed.

Parameters
FILENAME *[optional]*: The name of the TI TXT file to read. If no value is supplied, the default password of 256 times 0xFF will be used.

Example

- RX_PASSWORD_32
- RX_PASSWORD_32 app_pass_32.txt

2.17 TOGGLE_INFO

Command
TOGGLE_INFO

Description
This command causes the INFO_A lock to toggle to either protect or unlock the INFO_A segment on MSP430F5xx and MSP430F6xx devices. For more detail on this lock please see the corresponding User's Guide (SLAU208).

Parameters
NONE

Example

- TOGGLE_INFO

2.18 TX_DATA_BLOCK

Command
TX_DATA_BLOCK {ADDRESS} {LENGTH} {FILENAME}

Description
Writes a block of data in TI TXT format to given file.

Parameters
ADDRESS[mandatory]: The address at which the read should begin (hex format).

LENGTH[mandatory]: The number of bytes to read (hex format).

FILENAME[mandatory]: The file to which the read bytes will be written.

Example

- TX_DATA_BLOCK 0x8000 0x1000 Data_Read.txt

2.19 TX_DATA_BLOCK_32

Command
TX_DATA_BLOCK_32 {ADDRESS} {LENGTH} {FILENAME}

Description
Identical to TX_DATA_BLOCK except that memory accessed by 32-byte addresses. This command works on MSP432 devices only.

Parameters
ADDRESS *[mandatory]*: The address at which the read should begin (hex format).

LENGTH *[mandatory]*: The number of bytes to read (hex format).

FILENAME *[mandatory]*: The file to which the read bytes will be written.

Example

- TX_DATA_BLOCK_32 0x120000 0x1000 Data_Read.txt

2.20 TX_BSL_VERSION

Command
TX_BSL_VERSION

Description
Returns the BSL version of the MSP430 device.
`Vendor:[xx],CI:[xx],API:[xx],PI:[xx]`

Parameters
NONE

Example

- TX_BSL_VERSION

2.21 TX_BSL_VERSION_32

Command
TX_BSL_VERSION_32

Description
Returns the BSL version of the MSP432 device.
`Vendor:[xxxx],CI:[xxxx],API:[xxxx],PI:[xxxx],BID:[xxxx]`

Parameters
NONE

Example

- TX_BSL_VERSION_32

2.22 TX_BUFFERSIZE

Command
TX_BUFFERSIZE

Description
The BSL transmits a value that represents the number of bytes available in its data buffer for sending or receives BSL core data packets. NOTE: This command is not supported with MSP432 devices.

Parameters
NONE

Example

- TX_BUFFERSIZE

2.23 VERBOSE

Command
VERBOSE

Description
Causes the PC application to toggle output for all transmitted and received bytes on or off.

Parameters
NONE

Example

- VERBOSE

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