

emFile

NOR Image Creator

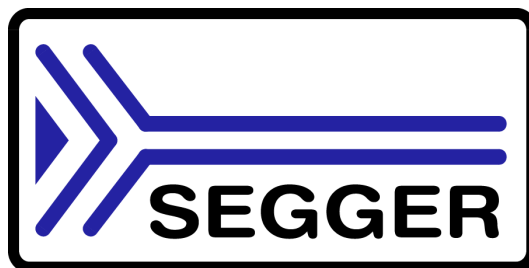
User Guide & Reference Manual

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www.segger.com

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Manual versions

This manual describes the latest software version. If any error occurs, please inform us and we will try to assist you as soon as possible.

For further information on topics or routines not yet specified, please contact us.

Software	Revision	Date	By	Description
1.16	1	180703	MD	Updated company name and copyright years.
1.16	0	170614	MD	Chapter "The NOR image creator" * Added "setlinesize" command. * Added "setrewritesupported" command.
1.15	1	140408	MD	Changes to document format.
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1.14	1	080820	OO	Chapter "The NOR flash image creator" * Added command "addfolder".
1.14	0	080711	OO	Initial version.

About this document

How to use this manual

This manual explains all the functions that the product offers. Knowledge of the C language or assembly programming is not required.

Typographic conventions for syntax

This manual uses the following typographic conventions:

Style	Used for
Body	Body text.
Keyword	Text that you enter at the command-prompt or that appears on the display (that is system functions, file- or pathnames).
Parameter	Parameters in API functions.
Sample	Sample code in program examples.
Reference	Reference to chapters, sections, tables and figures or other documents.
GUIElement	Buttons, dialog boxes, menu names, menu commands.
Emphasis	Very important sections

Table 1.1: Typographic conventions



SEGGER Microcontroller GmbH develops and distributes software development tools and ANSI C software components (middleware) for embedded systems in several industries such as telecom, medical technology, consumer electronics, automotive industry and industrial automation.

SEGGER's intention is to cut software development time for embedded applications by offering compact flexible and easy to use middleware, allowing developers to concentrate on their application.

Our most popular products are emWin, a universal graphic software package for embedded applications, and embOS, a small yet efficient real-time kernel. emWin, written entirely in ANSI C, can easily be used on any CPU and most any display. It is complemented by the available PC tools: Bitmap Converter, Font Converter, Simulator and Viewer. embOS supports most 8/16/32-bit CPUs. Its small memory footprint makes it suitable for single-chip applications.

Apart from its main focus on software tools, SEGGER develops and produces programming tools for flash microcontrollers, as well as J-Link, a JTAG emulator to assist in development, debugging and production, which has rapidly become the industry standard for debug access to ARM cores.

Corporate Office:

<http://www.segger.com>

United States Office:

<http://www.segger-us.com>

EMBEDDED SOFTWARE (Middleware)



emWin

Graphics software and GUI

emWin is designed to provide an efficient, processor- and display controller-independent graphical user interface (GUI) for any application that operates with a graphical display. Starterkits, eval- and trial-versions are available.



embOS

Real Time Operating System

embOS is an RTOS designed to offer the benefits of a complete multitasking system for hard real time applications with minimal resources. The profiling PC tool embOSView is included.



emFile

File system

emFile is an embedded file system with FAT12, FAT16 and FAT32 support. emFile has been optimized for minimum memory consumption in RAM and ROM while maintaining high speed. Various Device drivers, e.g. for NAND and NOR flashes, SD/MMC and CompactFlash cards, are available.



USB-Stack

USB device stack

A USB stack designed to work on any embedded system with a USB client controller. Bulk communication and most standard device classes are supported.

SEGGER TOOLS

Flasher

Flash programmer

Flash Programming tool primarily for microcontrollers.

J-Link

JTAG emulator for ARM cores

USB driven JTAG interface for ARM cores.

J-Trace

JTAG emulator with trace

USB driven JTAG interface for ARM cores with Trace memory. supporting the ARM ETM (Embedded Trace Macrocell).

J-Link / J-Trace Related Software

Add-on software to be used with SEGGER's industry standard JTAG emulator, this includes flash programming software and flash breakpoints.



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Chapter 1

Introduction

This chapter explains the purpose of this manual.

1.1 About this manual

The purpose of this document is to describe the functions and abilities of the emFile NOR image creator.

1.2 What is the purpose of the NOR Image Creator?

The NOR Image Creator has been designed to give the customer the ability to build NOR flash images with preselected files and directories.

1.2.1 How is the image created?

The NOR Image Creator creates a virtual NOR flash device on the PC where files and directories can be stored in the exact same way they are needed on the target device.

1.2.2 How is the NOR flash image transferred to the target?

The image file created by the NOR Image Creator is a standard bin file which can be flashed directly into the NOR flash of the target via third party tools.

Chapter 2

The NOR Image Creator

This chapter describes the NOR Image Creator, its functions and how it is used.

2.1 Interface of the NOR Image Creator

The interface of the NOR Image Creator is used like any other command line based program. For the ease of usage many commands are kept similar to their DOS commands. By entering "?" or just pressing [Enter] an overview of the commands is printed on the screen and should look like the screenshot below:

```

FS NOR Flash Image Creator
NOR Flash Image Creator V1.16a (emFile V4.04d)
(c) 2010-2017 SEGGER Microcontroller GmbH & Co. KG (www.segger.com)
Compiled Jun 14 2017 15:36:16
Press '?' for help
emFile->

Available commands are:
---- Flash image related functions ----
createimage      Creates/Opens a new/existing NOR image file.
                  createimage <FileName> [<DriverType>]
                  DriverType can be 'sm' for the FS_NOR_Driver or
                  'bm' for the FS_NOR_BM_Driver. Default is 'sm'.
addsectorblock   Adds a sector block to a specific NOR flash image.
                  addsectorblock <ImageNo>,<NumBlocks>,<BytesPerBlock>
                  BytesPerBlock must be specified as a hexadecimal value
                  The other parameters must be specified as a decimal values
setsectorsize     Specifies the size of the logical sector.
                  setsectorsize <BytesPerSector>
                  The default is 512 bytes.
setlinesize       Specifies the size of a NOR flash line.
                  setsectorsize <BytesPerLine>, default 4 bytes.
setrewritesupport Specifies if a flash line can be rewritten or not.
                  setrewritesupport <OnOff>
                  OnOff can be 0 (can not rewrite) or 1 (can rewrite).
                  The default is 1 (can rewrite).
showimageinfo     Shows image related information about a specific image.
                  showimageinfo <ImageNo>
init              Initialize the image file and the file system.
---- Standard functions ----
cd                Changes or displays the name of directory.
                  cd [<VolumeName>][<PathToDir>] or '..'
md                Creates a directory (recursively).
                  md [<VolumeName>][<PathToDir>]
rd                Removes (deletes) a directory. The directory must be empty.
                  rd [<VolumeName>][<PathToDir>]
addfile/af        Copies a file from the host to the image.
                  addfile [<PathToFileOnHost>][<FileNameOnHost>]
                  [[<VolumeNameOnImage>][<PathToFileOnImage>][<FileNameOnImage>]]
                  If no filename is specified the name of the file
                  on the host will be used.
addfolder          Copies a directory recursively from the host to the image.
                  addfolder [<PathToDirOnHost>][<DirNameOnHost>]
                  [[<VolumeNameOnImage>][<PathToDirOnImage>][<DirNameOnImage>]
                  [/S]]
                  If no folder name is specified as destination the name of
                  the folder on the host will be used. The option /S
                  suppresses any information about the progress of
                  the operation.
type              Shows the contents of a file.
                  type [<VolumeName>][<PathToFile>][<FileName>]
del               Deletes a file.
                  del [<VolumeName>][<PathToFile>][<FileName>]
dir               Lists the contents of a directory.
                  dir [<VolumeName>][<PathToDir>]
ren               Renames a file or directory.
                  ren [<VolumeName>][<PathToFile>][<FileName>] <NewFileName>
move/mv           Moves a file or directory.
                  move [<SrcVolumeName>][<PathToSrcFile>][<SrcFileName>]
                  [<DestVolumeName>][<PathToDestFile>][<DestFileName>]
attrib            Shows/Changes the file/directory attributes.
                  attrib [<VolumeName>][<PathToFile>][<FileName>] [+/-][ahrs]]
copy              Copies a file.
                  copy [<SrcVolumeName>][<PathToSrcFile>][<SrcFileName>]
                  [<DestVolumeName>][<PathToDestFile>][<DestFileName>]
---- Extended functions ----
formatlow          Low-level-formats a volume.
                  formatlow [<VolumeName>]
format             Formats a volume.
                  format [<VolumeName>]
listvol            Shows available volumes.
df                 Shows the available free space on a volume.
                  df [<VolumeName>]
diskinfo           Shows the disk information of a volume.
                  diskinfo [<VolumeName>]
getdevinfo         Shows the low level disk information of a volume.
                  getdevinfo [<VolumeName>]
checkdisk          Runs checkdisk on a volume.
                  checkdisk [<VolumeName>]
-----
NOTE: Specifying a filename in command line
will start NOR Flash Image Creator in script mode.
emFile->

```

The NOR Image Creator can be started in script mode by starting it with a script file with one command per line. It will then process the commands in the script file and will close gracefully if no errors occurred.

2.1.1 Script file sample

The following sample shows a simple script file which does the following thing:

- Creates a NOR flash image file "C:\flash.bin"
- Adds a sector block of 4 Megabyte (64 x 64 kByte) to the image
- Writes the file system information to the image
- Low-level formats the image
- High-level formats the image

Example script file

```
createimage C:\flash.bin
addsectorblock 0, 64, 10000
init
formatlow
format
addfile C:\Test.txt
addfolder C:\Data\
q
```

2.2 List of commands

The NOR Image Creator can process a NOR flash image by using built in commands. All commands that are usable are listed below.

File(s)	Description
Flash image related functions	
<code>createimage</code>	Creates a new NOR flash image file.
<code>addsectorblock</code>	Adds a sector block to a specific NOR flash image.
<code>setsectorsize</code>	Sets the size of a file system sector.
<code>setlinesize</code>	Sets the line size of the NOR flash device.
<code>setrewritesupported</code>	Sets if the NOR flash device can rewrite data.
<code>init</code>	Initializes the NOR image with the given block information.
<code>showimageinfo</code>	Shows image related information about a specific NOR flash image.
File and directory functions	
<code>cd</code>	Changes the directory or displays the name of the current directory.
<code>md</code>	Recursively creates a directory.
<code>rd</code>	Removes (deletes) a directory.
<code>addfile</code>	Copies a file from the HOST to the image.
<code>addfolder</code>	Copies a folder and its subfolders and files from the HOST to the image.
<code>type</code>	Dumps the content of a file on the screen.
<code>del</code>	Deletes one file.
<code>dir</code>	Shows the content of the directory.
<code>ren</code>	Renames a file or directory.
<code>move</code>	Moves a file or directory.
<code>attrib</code>	Shows/changes the file/directory attributes.
<code>copy</code>	Copies a file to another location.
Image specific functions	
<code>formatlow</code>	Low-level formats a volume.
<code>format</code>	Formats a volume.
<code>listvol</code>	Shows all available volumes.
<code>df</code>	Shows the available free space on a volume.
<code>diskinfo</code>	Shows the disk information about a volume.
<code>getdevinfo</code>	Shows the low level disk information of a volume.
<code>checkdisk</code>	Performs checkdisk operations on a specific volume.

Table 2.1: List of commands

2.3 Flash image related functions

The following section describes functions needed to create a NOR flash image.

2.3.1 createimage

Description

Creates a new NOR flash image file on the HOST.

Syntax

```
createimage <imagefilename>[,<drivertype>]
```

Parameter	Description
<code>imagefilename</code>	Filename of the NOR flash image file that will be created.
<code>drivertype</code>	Optional parameter which specifies the type of NOR driver Permitted values: • "sm" - Sector map driver (FS_NOR_Driver), default • "bm" - Block map driver (FS_NOR_BM_Driver)

Table 2.2: createimage parameter list

Example

```
createimage C:\flash.bin
```

2.3.2 addsectorblock

Description

Adds a new sector block to a specific NOR flash image.

Syntax

```
addsectorblock <ImageNo>, <NumBlocks>, <BlockSize>
```

Parameter	Description
<code>ImageNo</code>	Image number of the created NOR flash image file. Typically 0.
<code>NumBlocks</code>	Number of blocks to add.
<code>BlockSize</code>	Size of each block that is added in hex.

Table 2.3: addsectorblock parameter list

Example

Adding a 4 MByte block.

```
addsectorblock 0, 64, 10000
```

2.3.3 setsectorsize

Description

Specifies the size of the file system (logical) sector.

Syntax

```
setsectorsize <SectorSize>
```

Parameter	Description
<code>SectorSize</code>	Number of bytes in a logical sector (Typ. 2048 bytes, has to be a power of 2 value)

Table 2.4: setsectorsize parameter list

Additional information

This command is optional. It can be used to set the size of the logical sector used by the file system. By default the file system uses a logical sector size of 512 bytes.

Example

This example shows how to set the logical sector size to 2048 bytes.

```
setsectorsize 2048
```

2.3.4 setlinesize

Description

Specifies the line size of the NOR flash device.

Syntax

```
setlinesize <LineSize>
```

Parameter	Description
LineSize	Number of bytes in a NOR flash line (Typ. 1 byte, has to be a power of 2 value)

Table 2.5: setlinesize parameter list

Additional information

This command is optional. It can be used to set the number of bytes in a block (line) that the NOR flash device can write only once. By default the file system uses a line size of 4 bytes.

Example

This example shows how to set the line size to 16 bytes.

```
setlinesize 16
```

2.3.5 setrewritesupported

Description

Specifies if the NOR flash device can rewrite the same data or not.

Syntax

```
setrewritesupported <OnOff>
```

Parameter	Description
OnOff	==1 NOR flash device can rewrite data. ==0 NOR flash device can not rewrite data.

Table 2.6: setrewritesupported parameter list

Additional information

This command is optional. It can be used to specify if the NOR flash can rewrite data as long as 0 bits are preserved. By default the value is set to 1 since most of the external NOR flash devices can rewrite.

Example

This example shows how to specify that the NOR flash can rewrite data.

```
setrewritesupported 1
```

2.3.6 init

Description

Initialize the NOR flash image with the sector block data.

Syntax

```
init
```

Example

```
init
```

2.3.7 showimageinfo

Description

Shows image related information about a specific image.

Syntax

```
showimageinfo <ImageNo>
```

Parameter	Description
ImageNo	Image number of the created NOR flash image file. Typically 0.

Table 2.7: showimageinfo parameter list

Example

```
showimageinfo 0
```

2.4 File and directory functions

The following section describes functions which can be used for file and directory operations.

2.4.1 cd

Description

Changes or displays the name of a directory.

Syntax

```
cd [volume:][path]
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example "nor:0:".
<code>path</code>	Path to change directory to. Can be ".." to change to the parent directory.

Table 2.8: cd parameter list

Example

```
cd Test
cd ..
```


2.4.2 md

Description

Creates recursively a directory.

Syntax

```
md [volume:]<path>
```

Parameter	Description
volume:	Volume of the image, for example "nor:0:".
path	Path of the directory which shall be created.

Table 2.9: md parameter list

Example

```
md Test\Dir\
```

2.4.3 rd

Description

Removes (deletes) a directory.

Syntax

```
rd [volume:]<path>
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example "nor:0:".
<code>path</code>	Path of the directory which shall be deleted.

Table 2.10: rd parameter list

Example

```
rd Test
```

2.4.4 addfile

Description

Copies a file from the HOST to the image.

Syntax

```
addfile <Sourcefile> [volume:][path]filename
```

Parameter	Description
Sourcefile	Source file on the HOST filesystem.
volume:	Volume of the image, for example "nor:0:".
path	Path of the directory where the file is copied to.
filename	Destination filename.

Table 2.11: addfile parameter list

Example

```
addfile C:\Test.txt Test.txt
```

2.4.5 addfolder

Description

Copies a folder and its subfolders and files from the HOST to the image.

Syntax

```
addfolder <Sourcefolder> [volume:] [path] foldername
```

Parameter	Description
Sourcefolder	Source folder on the HOST filesystem.
volume:	Volume of the image, for example "nor:0:".
path	Path of the directory where the files and folders are copied to.
foldername	Destination foldername. If not specified the source folder name will be used.

Table 2.12: addfolder parameter list

Example

```
addfolder C:\Data\ Data\
```

2.4.6 type

Description

Dumps the content of a file.

Syntax

```
type [volume:][path]filename
```

Parameter	Description
volume:	Volume of the image, for example "nor:0:".
path	Path of the directory where the file is located in.
filename	Filename of file which is printed on the screen.

Table 2.13: type parameter list

Example

```
type Test.txt
```

2.4.7 del

Description

Deletes one file.

Syntax

```
del [volume:] [path] filename
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example "nor:0:".
<code>path</code>	Path of the directory where the file is located in.
<code>filename</code>	Filename of file which shall be deleted.

Table 2.14: del parameter list

Example

```
del Test.txt
```

2.4.8 dir

Description

Shows the content of the directory.

Syntax

```
dir [volume:][path]
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example "nor:0:".
<code>path</code>	Path of the directory where the file is located in.

Table 2.15: dir parameter list

Example

```
dir Test\
```

2.4.9 ren

Description

Renames a file or directory.

Syntax

```
ren [volume:] [path] fileordirname newfileordirname
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example "nor:0:".
<code>path</code>	Path of the directory where the file is located in.
<code>fileordirname</code>	File or directory name to rename
<code>newfileordirname</code>	New name for the file or directory.

Table 2.16: ren parameter list

Example

```
ren Test Test2
```


2.4.10 move

Description

Moves a file or directory.

Syntax

```
move [volume:][path]fileordirname [volume:][newpath]newfileordirname
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example "nor:0:".
<code>path</code>	Path of the directory where the file is located in.
<code>fileordirname</code>	File or directory name to rename
<code>newpath</code>	New path where the source files or directory shall be copied to.
<code>newfileordirname</code>	New name for the file or directory.

Table 2.17: move parameter list

Example

```
move Test\Test.txt Test.txt
```

2.4.11 attrib

Description

Shows/Changes the file/directory attributes.

Syntax

```
attrib [volume:] [path] [filename] [+/-] [ahrs]
```

Parameter	Description
volume:	Volume of the image, for example "nor:0:".
path	Path of the directory where the file is located in.
filename	Filename of file which attributes are changed or shown.
Attributes	Adds (+) or removes (-) the following attributes: a: Archive h: Hidden r: Readonly s: System

Table 2.18: attrib parameter list

Example

```
attrib Test.txt -a
```

2.4.12 copy

Description

Copies a file.

Syntax

```
copy [volume:][path0][sourcefilename] [volume:][path1][destinationfilename]
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example "nor:0:".
<code>path0</code>	Path of the directory where the file is located in.
<code>path1</code>	Path of the directory where the file shall be copied to.
<code>sourcefilename</code>	Filename of source file.
<code>destinationfile-name</code>	Filename of destination where the file shall be copied to.

Table 2.19: copy parameter list

Example

```
copy Test.txt Test2.txt
```

2.5 Image specific functions

The following section describes functions which can be used for image editing operations.

2.5.1 listvol

Description

Shows available volumes in the image file.

Syntax

```
listvol
```

Example

```
listvol
```

2.5.2 df

Description

Shows the available free space on a volume.

Syntax

```
df [volume:]
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example "nor:0:".

Table 2.20: df parameter list

Example

```
df nor:0:
```

2.5.3 diskinfo

Description

Shows the disk information of a volume.

Syntax

```
diskinfo [volume:]
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example "nor:0:".

Table 2.21: diskinfo parameter list

Example

```
diskinfo nor:0:
```

2.5.4 getdevinfo

Description

Shows the low level disk information of a volume.

Syntax

```
getdevinfo [volume:]
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example "nor:0:".

Table 2.22: getdevinfo parameter list

Example

```
getdevinfo nor:0:
```

2.5.5 format

Description

Formats a volume.

Syntax

```
format [volume:]
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example " <code>nor:0:</code> ".

Table 2.23: format parameter list

Example

```
format nor:0:
```


2.5.6 formatlow

Description

Low-level formats a volume.

Syntax

```
formatlow [volume:]
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example "nor:0:".

Table 2.24: formatlow parameter list

Example

```
formatlow nor:0:
```

2.5.7 checkdisk

Description

Runs checkdisk on a volume.

Syntax

```
checkdisk [volume:]
```

Parameter	Description
<code>volume:</code>	Volume of the image, for example "nor:0:".

Table 2.25: checkdisk parameter list

Example

```
checkdisk nor:0:
```

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