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Manual versions

This manual describes the Flasher device. For further information on topics or routines not yet specified, please contact us.

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5.02	0	150807	RE	New commands #FLIST and #MKDIR in ASCII command interface

About this document

Assumptions

This document assumes that you already have a solid knowledge of the following:

- The software tools used for building your application (assembler, linker, C compiler).
- The C programming language.
- The target processor.
- DOS command line.

If you feel that your knowledge of C is not sufficient, we recommend *The C Programming Language* by Kernighan and Richie (ISBN 0-13-1103628), which describes the standard in C programming and, in newer editions, also covers the ANSI C standard.

How to use this manual

This manual explains all the functions and macros that the product offers. It assumes you have a working knowledge of the C language. Knowledge of 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.
Sample comment	Comments in program examples.
Reference	Reference to chapters, sections, tables and figures or other documents.
GUI Element	Buttons, dialog boxes, menu names, menu commands.
Emphasis	Very important sections.

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Chapter 1

Introduction

This chapter gives a short overview about the different models of the Flasher family and their features.

1.1 Flasher overview

Flasher is a programming tool for microcontrollers with on-chip or external flash memory. Flasher is designed for programming flash targets with the J-Flash software or stand-alone. In addition to that Flasher can also be used as a regular J-Link. For more information about J-Link in general, please refer to the *J-Link / J-Trace User Guide* which can be downloaded at <http://www.segger.com>.

Flasher connects to a PC using the USB/Ethernet/RS232 interface (what host interfaces are available depends on the Flasher model), running Microsoft Windows 2000, Windows XP, Windows 2003, Windows Vista, Windows 7 or Windows 8. In stand-alone mode, Flasher can be driven by the start/stop button, or via the RS232 interface (handshake control or ASCII interface). Flasher always has a 20-pin connector, which target interfaces are supported depends on the Flasher model:

- Flasher ARM: JTAG and SWD are supported.
- Flasher RX: JTAG is supported. Flasher comes with additional 14-pin RX adapter
- Flasher PPC: JTAG is supported. Flasher comes with additional 14-pin PPC adapter.
- Flasher PRO: JTAG and SWD are supported.

1.1.1 Features of the Flasher ATE

- Supports up to 10 individual channels
- Stand-alone JTAG/SWD programmer (Once set up, Flasher can be controlled without the use of PC program)
- Flexible power supply (USB, DC)
- 128 MB memory for storage of target program on each module
- Data files can updated via the integrated FTP server

Flasher model	Supported cores	Supported target interfaces	Flash programming speed (depending on target hardware)
Flasher ATE	ARM7/ARM9/Cortex-M Renesas RX610, RX621, RX62N, RX62T Power PC e200z0	JTAG, SWD	between 30-300 Kbytes/ second

1.1.2 Features of Flasher ARM/PPC/RX/PRO

- Three boot modes: J-Link mode, stand-alone mode, MSD mode
- Stand-alone JTAG/SWD programmer (Once set up, Flasher can be controlled without the use of PC program)
- No power supply required, powered through USB
- Supports internal and external flash devices
- 128 MB memory for storage of target program
- Can be used as J-Link (emulator) with a download speed of up to 720 Kbytes/second
- Data files can updated via USB/Ethernet (using the J-Flash software), via FTP, via RS232 or via the MSD functionality of Flasher

Flasher model	Supported cores	Supported target interfaces	Flash programming speed (depending on target hardware)
Flasher ARM	ARM7/ARM9/Cortex-M	JTAG, SWD	between 170 and 300 Kbytes/second
Flasher RX	Renesas RX610, RX621, RX62N, RX62T	JTAG	between 30-300 Kbytes/second
Flasher PPC	Power PC e200z0	JTAG	up to 138 Kbytes/second
Flasher PRO	RM7/ARM9/Cortex-M Renesas RX610, RX621, RX62N, RX62T Power PC e200z0	JTAG, SWD	between 30-300 Kbytes/ second

1.1.3 Features of Flasher Portable/Flasher Portable PLUS

- Stand-alone in-circuit-programmer (Once set up, Flasher can be controlled without the use of a PC program)
- Powered by an internal rechargeable battery (standard batteries for Flasher Portable), no Laptop or external power supply required.
- Multiple firmware images can be stored on Flasher
- 128 MB memory for storage of target program
- Easy selection of image to be programmed, via button
- Supported CPUs: ARM Cortex, Legacy ARM7/9, Renesas RX, Freescale PowerPC
- Supports internal and external flash
- Free software updates*, 1 year of support
- Data files can be updated via the MSD functionality or via J-Flash
- Programming speed between 30-300 Kbytes/second (actual speed depends on target hardware)

Note

Ethernet and RS232 as host interface are not available for Flasher Portable

Note

*As a legitimate owner of a SEGGER Flasher, you can always download the latest software free of charge. Though not planned and not likely, we reserve the right to change this policy. Note that older models may not be supported by newer versions of the software. Typically, we support older models with new software at least 3 years after end of life

Supported cores	Supported target interfaces	Flash programming speed (depending on target hardware)
ARM7/ARM9/Cortex-M	JTAG, SWD	between 30-300 Kbytes/second
Renesas RX610, RX621, RX62N, RX62T	JTAG	between 170 and 300 Kbytes/second
Power PC e200z0	JTAG	up to 138 Kbytes/second

1.1.4 Working environment

General

The Flasher can operate from a PC with an appropriate software like J-Flash or in stand-alone mode.

Host System

IBM PC/AT or compatible CPU: 486 (or better) with at least 128MB of RAM, running Microsoft Windows 2000, Windows XP, Windows 2003, Windows Vista, Windows 7 or Windows 8. It needs to have a USB, Ethernet or RS232 interface available for communication with Flasher.

Power supply

Flasher Portable: 3x standard AAA batteries or 5V DC, min. 100 mA via USB connector.

Flasher Portable PLUS: internal rechargeable 680mAh Li-Ion battery, min. 100 mA via USB connector.

Other Flashers: 5V DC, min. 100 mA via USB connector.

Installing Flasher PC-software (J-Flash)

The latest version of the J-Flash software, which is part of the J-Link software and documentation package, can always be downloaded from our website:

<https://www.segger.com/jlink-software.html> For more information about using J-Flash please refer to [UM08003_JFlashARM.pdf](#) (J-Flash user guide) which is also available for download on our website.

1.2 Specifications

1.2.1 Specifications for Flasher ATE

General	
Supported OS	Microsoft Windows 2000 Microsoft Windows XP Microsoft Windows XP x64 Microsoft Windows 2003 Microsoft Windows 2003 x64 Microsoft Windows Vista Microsoft Windows Vista x64 Microsoft Windows 7 Microsoft Windows 7 x64 Microsoft Windows 8 Microsoft Windows 8 x64 Microsoft Windows 10 Microsoft Windows 10 x64
Operating Temperature	+5 °C ... +60 °C
Storage Temperature	-20 °C ... +60 °C
Relative Humidity (non-condensing)	<90% rH
Mechanical mainboard	
Size (without cables)	108mm x 56mm x 20mm
Weight (without cables)	47g
Mechanical module	
Size (without cables)	108mm x 35mm x 20mm
Weight (without cables)	24g
Available interfaces	
USB Host interface	USB 2.0, hi speed
Ethernet Host interface	10/100 MBit
RS232 Host interface	RS232 9-pin
Target interface (module)	JTAG 20-pin (adapters available)
JTAG Interface, Electrical	
Power Supply	USB powered or via external power supply (5V), max. 3A using 10 modules
Target interface voltage (VIF)	1.2 ... 5V
Target supply voltage	3 - 15V (5V with no additional supply.)
Target supply current	100 mA (VCC5V - 5V) 400 mA (VTGT - 3 ... 15V)
Reset Type	Open drain. Can be pulled low or tristated
Reset low level output voltage (VOL)	$VOL \leq 10\%$ of VIF
For the whole target voltage range ($1.8V \leq VIF \leq 5V$)	
LOW level input voltage (VIL)	$VIL \leq 40\%$ of VIF
HIGH level input voltage (VIH)	$VIH \geq 60\%$ of VIF
For $1.8V \leq VIF \leq 3.6V$	
LOW level output voltage (VOL) with a load of 10 kOhm	$VOL \leq 10\%$ of VIF
HIGH level output voltage (VOH) with a load of 10 kOhm	$VOH \geq 90\%$ of VIF

For $3.6 \leq VIF \leq 5V$	
LOW level output voltage (VOL) with a load of 10 kOhm	$VOL \leq 20\%$ of VIF
HIGH level output voltage (VOH) with a load of 10 kOhm	$VOH \geq 80\%$ of VIF
JTAG Interface, Timing	
Max. JTAG speed	up to 12MHz
Data input rise time (Trdi)	$Trdi \leq 20ns$
Data input fall time (Tfdi)	$Tfdi \leq 20ns$
Data output rise time (Trdo)	$Trdo \leq 10ns$
Data output fall time (Tfdo)	$Tfdo \leq 10ns$
Clock rise time (Trc)	$Trc \leq 10ns$
Clock fall time (Tfc)	$Tfc \leq 10ns$

1.2.1.1 Supported CPU cores

The Flasher ATE supports the following CPU cores:

ARM Cortex

- Cortex-M0
- Cortex-M0+
- Cortex-M1
- Cortex-M3
- Cortex-M4

ARM (legacy cores)

- ARM720T
- ARM7TDMI
- ARM7TDMI-S
- ARM920T
- ARM922T
- ARM926EJ-S
- ARM946E-S
- ARM966E-S
- ARM1136JF-S
- ARM1136J-S
- ARM1156T2-S
- ARM1156T2F-S
- ARM1176JZ-S
- ARM1176JZF
- ARM1176JZF-S

Renesas RX

- RX610
- RX621
- RX62G
- RX62N
- RX62T

Freescal Power PC

- e200z0

1.2.1.2 Supported Target interfaces

The Flasher ATE supports the following target interfaces:

- JTAG
- SWD
- FINE
- SPD

1.2.1.3 Flasher ATE download speed

The following table lists the Flasher ATE performance values for writing to memory (RAM) via the JTAG interface:

Hardware	ARM7 memory download
Flasher ARM	720 Kbytes/s (12MHz JTAG)

Note

The actual speed depends on various factors, such as JTAG, clock speed, host CPU core etc.

1.2.2 Specifications for Flasher ARM

General	
Supported OS	Microsoft Windows 2000 Microsoft Windows XP Microsoft Windows XP x64 Microsoft Windows 2003 Microsoft Windows 2003 x64 Microsoft Windows Vista Microsoft Windows Vista x64 Microsoft Windows 7 Microsoft Windows 7 x64 Microsoft Windows 8 Microsoft Windows 8 x64
Operating Temperature	+5 °C ... +60 °C
Storage Temperature	-20 °C ... +60 °C
Relative Humidity (non-condensing)	<90% rH
Mechanical	
Size (without cables)	121mm x 66mm x 30mm
Weight (without cables)	119g
Available interfaces	
USB Host interface	USB 2.0, full speed
Ethernet Host interface	10/100 MBit
RS232 Host interface	RS232 9-pin
Target interface	JTAG 20-pin (14-pin adapter available)
JTAG Interface, Electrical	
Power Supply	USB powered, 100mA for Flasher ARM. 500 mA if target is powered by Flasher ARM
Target interface voltage (VIF)	1.2 ... 5V
Target supply voltage	Supply voltage is 5V, max.
Target supply current	max. 400mA
Reset Type	Open drain. Can be pulled low or tristated
Reset low level output voltage (VOL)	$VOL \leq 10\%$ of VIF
For the whole target voltage range ($1.8V \leq VIF \leq 5V$)	
LOW level input voltage (VIL)	$VIL \leq 40\%$ of VIF
HIGH level input voltage (VIH)	$VIH \geq 60\%$ of VIF
For $1.8V \leq VIF \leq 3.6V$	
LOW level output voltage (VOL) with a load of 10 kOhm	$VOL \leq 10\%$ of VIF
HIGH level output voltage (VOH) with a load of 10 kOhm	$VOH \geq 90\%$ of VIF
For $3.6 \leq VIF \leq 5V$	
LOW level output voltage (VOL) with a load of 10 kOhm	$VOL \leq 20\%$ of VIF
HIGH level output voltage (VOH) with a load of 10 kOhm	$VOH \geq 80\%$ of VIF
JTAG Interface, Timing	
Max. JTAG speed	up to 12MHz

Data input rise time (Trdi)	Trdi ≤ 20ns
Data input fall time (Tfdi)	Tfdi ≤ 20ns
Data output rise time (Trdo)	Trdo ≤ 10ns
Data output fall time (Tfdo)	Tfdo ≤ 10ns
Clock rise time (Trc)	Trc ≤ 10ns
Clock fall time (Tfc)	Tfc ≤ 10ns

1.2.2.1 Flasher ARM download speed

The following table lists the Flasher ARM performance values for writing to memory (RAM) via the JTAG interface:

Hardware	ARM7 memory download
Flasher ARM	720 Kbytes/s (12MHz JTAG)

Note

The actual speed depends on various factors, such as JTAG, clock speed, host CPU core etc.

1.2.3 Specifications for Flasher RX

General	
Supported OS	Microsoft Windows 2000 Microsoft Windows XP Microsoft Windows XP x64 Microsoft Windows 2003 Microsoft Windows 2003 x64 Microsoft Windows Vista Microsoft Windows Vista x64 Microsoft Windows 7 Microsoft Windows 7 x64 Microsoft Windows 8 Microsoft Windows 8 x64
Operating Temperature	+5 °C ... +60 °C
Storage Temperature	-20 °C ... +60 °C
Relative Humidity (non-condensing)	<90% rH
Mechanical	
Size (without cables)	121mm x 66mm x 30mm
Weight (without cables)	119g
Available interfaces	
USB Host interface	USB 2.0, full speed
Ethernet Host interface	10/100 MBit
RS232 Host interface	RS232 9-pin
Target interface	JTAG 20-pin (shipped with 14-pin adapter for Renesas RX)
JTAG Interface, Electrical	
Power Supply	USB powered, 100mA for Flasher RX. 500 mA if target is powered by Flasher RX
Target interface voltage (VIF)	1.2 ... 5V
Target supply voltage	Supply voltage is 5V, max. (on the J-Link RX 14-pin adapter, the target supply voltage can be switched between 3.3V and 5V)
Target supply current	max. 400mA
Reset Type	Open drain. Can be pulled low or tristated
Reset low level output voltage (VOL)	$VOL \leq 10\%$ of VIF
For the whole target voltage range ($1.8V \leq VIF \leq 5V$)	
LOW level input voltage (VIL)	$VIL \leq 40\%$ of VIF
HIGH level input voltage (VIH)	$VIH \geq 60\%$ of VIF
For $1.8V \leq VIF \leq 3.6V$	
LOW level output voltage (VOL) with a load of 10 kOhm	$VOL \leq 10\%$ of VIF
HIGH level output voltage (VOH) with a load of 10 kOhm	$VOH \geq 90\%$ of VIF
For $3.6 \leq VIF \leq 5V$	
LOW level output voltage (VOL) with a load of 10 kOhm	$VOL \leq 20\%$ of VIF
HIGH level output voltage (VOH) with a load of 10 kOhm	$VOH \geq 80\%$ of VIF

JTAG Interface, Timing	
Max. JTAG speed	up to 12MHz
Data input rise time (Trdi)	Trdi ≤ 20ns
Data input fall time (Tfdi)	Tfdi ≤ 20ns
Data output rise time (Trdo)	Trdo ≤ 10ns
Data output fall time (Tfdo)	Tfdo ≤ 10ns
Clock rise time (Trc)	Trc ≤ 10ns
Clock fall time (Tfc)	Tfc ≤ 10ns

1.2.3.1 Flasher RX download speed

The following table lists the Flasher RX performance values for writing to memory (RAM) via the JTAG interface:

Hardware	Flasher RX600 series memory download
Flasher RX	720 Kbytes/s (12MHz JTAG)

Note

The actual speed depends on various factors, such as JTAG, clock speed, host CPU core etc.

1.2.4 Specifications for Flasher PPC

General	
Supported OS	Microsoft Windows 2000 Microsoft Windows XP Microsoft Windows XP x64 Microsoft Windows 2003 Microsoft Windows 2003 x64 Microsoft Windows Vista Microsoft Windows Vista x64 Microsoft Windows 7 Microsoft Windows 7 x64 Microsoft Windows 8 Microsoft Windows 8 x64
Operating Temperature	+5 °C ... +60 °C
Storage Temperature	-20 °C ... +60 °C
Relative Humidity (non-condensing)	<90% rH
Mechanical	
Size (without cables)	121mm x 66mm x 30mm
Weight (without cables)	119g
Available interfaces	
USB Host interface	USB 2.0, full speed
Ethernet Host interface	10/100 MBit
RS232 Host interface	RS232 9-pin
Target interface	JTAG 20-pin (shipped with 14-pin adapter for Renesas PPC)
JTAG Interface, Electrical	
Power Supply	USB powered, 100mA for Flasher PPC. 500 mA if target is powered by Flasher PPC
Target interface voltage (VIF)	1.2 ... 5V
Target supply voltage	Supply voltage is 5V, max.
Target supply current	max. 400mA
Reset Type	Open drain. Can be pulled low or tristated
Reset low level output voltage (VOL)	$VOL \leq 10\%$ of VIF
For the whole target voltage range ($1.8V \leq VIF \leq 5V$)	
LOW level input voltage (VIL)	$VIL \leq 40\%$ of VIF
HIGH level input voltage (VIH)	$VIH \geq 60\%$ of VIF
For $1.8V \leq VIF \leq 3.6V$	
LOW level output voltage (VOL) with a load of 10 kOhm	$VOL \leq 10\%$ of VIF
HIGH level output voltage (VOH) with a load of 10 kOhm	$VOH \geq 90\%$ of VIF
For $3.6 \leq VIF \leq 5V$	
LOW level output voltage (VOL) with a load of 10 kOhm	$VOL \leq 20\%$ of VIF
HIGH level output voltage (VOH) with a load of 10 kOhm	$VOH \geq 80\%$ of VIF
JTAG Interface, Timing	
Max. JTAG speed	up to 12MHz

Data input rise time (Trdi)	Trdi ≤ 20ns
Data input fall time (Tfdi)	Tfdi ≤ 20ns
Data output rise time (Trdo)	Trdo ≤ 10ns
Data output fall time (Tfdo)	Tfdo ≤ 10ns
Clock rise time (Trc)	Trc ≤ 10ns
Clock fall time (Tfc)	Tfc ≤ 10ns

1.2.4.1 Flasher RX download speed

The following table lists the Flasher PPC performance values for writing to memory (RAM) via the JTAG interface:

Hardware	Memory download
Flasher PPC	530 Kbytes/s (8 MHz JTAG)

Note

The actual speed depends on various factors, such as JTAG, clock speed, host CPU core etc.

1.2.5 Specifications for Flasher PRO

General	
Supported OS	Microsoft Windows 2000 Microsoft Windows XP Microsoft Windows XP x64 Microsoft Windows 2003 Microsoft Windows 2003 x64 Microsoft Windows Vista Microsoft Windows Vista x64 Microsoft Windows 7 Microsoft Windows 7 x64 Microsoft Windows 8 Microsoft Windows 8 x64
Operating Temperature	+5 °C ... +60 °C
Storage Temperature	-20 °C ... +60 °C
Relative Humidity (non-condensing)	<90% rH
Mechanical	
Size (without cables)	121mm x 66mm x 30mm
Weight (without cables)	119g
Available interfaces	
USB Host interface	USB 2.0, full speed
Ethernet Host interface	10/100 MBit
RS232 Host interface	RS232 9-pin
Target interface	JTAG 20-pin (14-pin adapter available)
JTAG Interface, Electrical	
Power Supply	USB powered, 100mA for Flasher PRO. 500 mA if target is powered by Flasher PRO
Target interface voltage (VIF)	1.2 ... 5V
Target supply voltage	Supply voltage is 5V, max.
Target supply current	max. 400mA
Reset Type	Open drain. Can be pulled low or tristated
Reset low level output voltage (VOL)	$VOL \leq 10\%$ of VIF
For the whole target voltage range ($1.8V \leq VIF \leq 5V$)	
LOW level input voltage (VIL)	$VIL \leq 40\%$ of VIF
HIGH level input voltage (VIH)	$VIH \geq 60\%$ of VIF
For $1.8V \leq VIF \leq 3.6V$	
LOW level output voltage (VOL) with a load of 10 kOhm	$VOL \leq 10\%$ of VIF
HIGH level output voltage (VOH) with a load of 10 kOhm	$VOH \geq 90\%$ of VIF
For $3.6 \leq VIF \leq 5V$	
LOW level output voltage (VOL) with a load of 10 kOhm	$VOL \leq 20\%$ of VIF
HIGH level output voltage (VOH) with a load of 10 kOhm	$VOH \geq 80\%$ of VIF
JTAG Interface, Timing	
Max. JTAG speed	up to 12MHz
Data input rise time (Trdi)	$Trdi \leq 20ns$

Data input fall time (Tfdi)	Tfdi ≤ 20ns
Data output rise time (Trdo)	Trdo ≤ 10ns
Data output fall time (Tfdo)	Tfdo ≤ 10ns
Clock rise time (Trc)	Trc ≤ 10ns
Clock fall time (Tfc)	Tfc ≤ 10ns

1.2.5.1 Supported CPU cores

The Flasher PRO supports the following CPU cores:

ARM Cortex

- Cortex-A5
- Cortex-A8
- Cortex-A9
- Cortex-R4
- Cortex-R5
- Cortex-M0
- Cortex-M0+
- Cortex-M1
- Cortex-M3
- Cortex-M4

ARM (legacy cores)

- ARM720T
- ARM7TDMI
- ARM7TDMI-S
- ARM920T
- ARM922T
- ARM926EJ-S
- ARM946E-S
- ARM966E-S
- ARM1136JF-S
- ARM1136J-S
- ARM1156T2-S
- ARM1156T2F-S
- ARM1176JZ-S
- ARM1176JZF
- ARM1176JZF-S

Renesas RX

- RX111
- RX210
- RX220
- RX21A
- RX610
- RX621
- RX62G
- RX62N
- RX62T
- RX630
- RX631
- RX63N
- RX63T

Freescale Power PC

- e200z0

1.2.5.2 Supported Target interfaces

The Flasher PRO supports the following target interfaces:

- JTAG
- SWD
- FINE
- SPD

1.2.5.3 Flasher PRO download speed

The following table lists the Flasher PRO performance values for writing to memory (RAM) via the JTAG interface:

Hardware	ARM7 memory download
Flasher PRO	720 Kbytes/s (12MHz JTAG)

Note

The actual speed depends on various factors, such as JTAG, clock speed, host CPU core etc.