SMR Evaluation Kit Quickstart Guide

Necessary software packages

0. History

Document revision	Date	Change log	Author
1	20-2-2017	first release	BL

1. Software packages overview

- ST-LINK USB Driver
- SW4STM32 IDE
- STM32Cubemx
- GUI

2. Downloading

2.1. ST-LINK USB Driver

The driver for STM32F401RE board can be downloaded here: <u>http://www.st.com/en/embedded-software/stsw-link009.html</u>

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Descri	iption						Verbi	011	5126
DB269	94: USB	driver for ST-LINK/V2	and ST-LINK	N2-1			2.0		115 KB
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About STMicroele	ectronics	Media	Center		Investor Relati	ons		s	ustainability
Who We Are Management		Newsr Backg	oom rounders		Investor Relati Calendar & Pre	ons Home esentations			T Approach to Sustaina ustainability Reports

Note: ST-LINK USB Driver is also integrated in the GUI installer!

2.2. SW4STM32 IDE

To download the software, go to <u>http://www.openstm32.org/HomePage</u> and then go to "download area"



> Users may have to register for an account in order to download the software

	OpenSTM32 Community The STM33	DC6 Systems Resource								
Home - Wiki - Blogs -	FAQs • Forums • Documentation • Service •	Log in 👻 🧠 in: Entire Site 💌 Advanced: 🛄								
Location: OpenSTM32 Community S	Location: OpenSTM32 Community Site									
Menu	Please log in Domission denied	Newest Forum Posts								
Home System Workbench for STM32 Contact Us My user details → My login details Wild → Blogs → Forums → File Galleries → FAOs →	Log In Usemane: Password Remember me (ket month) Log in Log in I log in I log in I log in Register	 Easily acquire holp for mail without any thoule, by Adde A addis, or 41 How can immediately approach to Yahoo technical helpfane fail free number by Adde A addis, or 32 Problem white installing updates by \$n, 38, 2017 Add 2 or 30 and 30 and 30 diablob3, 2017 Add 31 and 31 diablob3, 2017 Add 31 diablob3, 2017 Add								

After creating an account, choose an appropriate version corresponding to operating system and download (e.g. Windows 64bit).



2.3. STM32Cubemx

STM32Cubemx is a graphical software configuration tool used for setting STM32 microcontroller board and generating corresponding C code.

To download the software, go to

http://www.st.com/en/development-tools/stm32cubemx.html

Scroll down and click on "Get Software"

QUICK VIE	w	DESIGN	GET SO	FTWARE	
Part Number	Manufacturer	Description		¢	
STSW-STM32095	ST	STM32CubeMX E generation	lipse plug in for STM32 configuration	and initialization C code	
GET SOFTWARE					
Part Number	Software Version	Marketing St	atus 🌵 Supplier	Order from ST	
STM32CubeMX	4.19.0	Active	ST 🕻	Get Software	
About STMicroelectronics	Media	Center	Investor Relations	Sustainability	Careers
Who We Are Management Blog	Newsro Backgr Media Media	oom rounders Contacts Subscription	Investor Relations Home Calendar & Presentations Quarterly Results Corporate Governance Contact Information	ST Approach to Sustainab Sustainability Reports ST Foundation	Job Search Our Mission & Vision Our Culture & Values Internships/Thesis Your Career at ST

> Accept license agreement and download the software.

Note: user may need to create an account in order to download the software.

2.4. GUI

A simple GUI for visualizing can be found in provided download link for software under the name "SMR-EvalKitGUI.exe".



Note: ST-LINK USB Driver is also integrated in the GUI installer!

3. Installation

In order to have a proper hardware installation, please follow the instructions below:

- In the delivered packet the SMR-module board and STM32 microcontroller board should be already connected together, however it is also possible to disassemble the two boards.
- When the two boards are separated and need to be assembled, then connect them as in the following picture. *Note:* before connecting the two boards please make sure the power supply to the STM32F401RE board (via USB cable) is disconnected in order to prevent any damage to the system due to wrong connection and the connection should be checked again before applying the power supply.
- Jumpers on microcontroller board should be left unchanged.

3.1. Software Installation

The packet comes with a download link containing the source code for the system and a simple GUI for visualizing receive signals. Besides the following software packages are also required in order to modify and run the source code (namely: ST-LINK USB driver, SW4STM32 IDE, STM32Cubemx).

3.1.1. ST-LINK USB Driver

After downloading driver packet, proceed installing process.

Device Driver Installation Wizard					
	Completing the Device Driver Installation Wizard				
	The drivers were success	fully installed on this computer.			
	You can now connect your device to this computer. If your device of with instructions, please read them first.				
	Driver Name	Status			
	✓ STMicroelectronic	Ready to use			
	STMicroelectronic	Ready to use			
	< Zu	rrück Fertig stellen Abbrechen			

3.1.2. SW4STM32 IDE

The SW4STM32 (System Workbench for STM32) IDE is used for programming and uploading the source code onto the STM32 microcontroller board. To install the SW4STM32 software, please follow instructions below:

After downloading the software, proceed installing process. Note: If JavaRE is required, it can be downloaded here:

http://www.oracle.com/technetwork/java/javase/downloads/jre7-downloads-1880261.html

😳 Installation of	SystemWorkbench
	Please read the following information: About System Workbench for STM32
Open M32 Tools System Workbench	System Workbench for STM32 - Bare Metal Edition Eclipse integrated IDE. It provides a software platform for your STM32 board. The IDE helps quickly create a C embedded project for your ta It also integrates a complete code editor, comp (compiler, assembler, linker) tools and rema- tools.
	The following features are included in System for STM32 - Bare Metal Edition : - STM32 Devices database and libraries - Source code editor
	Next Quit

3.1. STM32Cubemx

After downloading, proceed to installing process.

STM32CubeMX In	stallation Wizard	
Welcome to the Inst	allation of STM32CubeMX 4.19.0	
ile.augmented	Starting STM32CubeMX 4.19.0 installation	
STM32* Cube	The homepage is at: http://www.st.com/stm32cube	
STMicroelectronics		Next Quit

3.2. GUI

After downloading, proceed installing process.

🔂 Setup - SMR-EvalKitGUI	
Select Additional Tasks Which additional tasks should be performed?	
Select the additional tasks you would like Setup to perform while inst SMR-EvalKitGUI, then click Next.	alling
Additional shortcuts:	
Create a desktop shortcut	
Next >	Cancel

4. Quick Start

4.1. Hardware Plug-in

Connect SMR-EvalKit to PC via mini-USB cable and wait until STM drivers are successfully installed. *Note: ST-LINK USB Driver needs to be installed before plugging SMR-EvalKit onto PC.*

4.2. Uploading of source code onto Microcontroller board

- a) Create a workspace folder for the project e.g: "C:\SMR_EvaluationKit_WS"
- b) Run SW4STM32 software and select the created workspace

Select a workspace	
Eclipse stores your projects in a folder called a workspace.	
Choose a workspace folder to use for this session.	
Workspace: C:\SMR_EvaluationKit_WS	▼ Browse
Use this as the default and do not ack again	

c) Go to workbench



d) Import the project containing the source code into the workspace. Under Project Explorer tab -> Right Click -> Import -> General -> Existing Projects into Workspace -> Select root directory -> Brower -> "select directory where the source code project located" -> OK -> Finish

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Select Create new projects from an archive file or directory.	Import Project	s y to search for existing Eclipse projects.	Select root directory of the projects to import	
Select an import source: type filter text Existing Projects into Workspace Proferences P C/C++ > Git > Git > Git > Git > Git > Git > Git > Git > Git > Git > Git > Git > Git > Git > Git > Git > Git	Select root dir Select archive Projects:	ectory: Brow		
(Back Next > Finish Cancel	Options Search for ne Copy projects Hide projects Working sets Working sets	sted projects into workspace that already exist in the workspace to working sets •]	Ordner: SMR_FoxMit	OK Abbrechen
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Options Search for nested projects Copy projects into workspace Hide projects that already exist in the workspace Working sets Add project to working sets Working sets Working sets	Select		Problems Taska Console II Properties No consoles to display at this time.	d 0 + 0 • ∩ 0
C < Back Next > Finish	Cancel	0 items selected		

e) Build the project: Right click on project folder -> Clean Project. Right click on project folder
 -> Refresh. Right click on project folder -> Build Project.

⊖ c/c	C/C++ - SMR_EvalKit/Src/main.c - Eclipse									
File E	File Edit Source Refactor Navigate Search Project Run Window Help									
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Ľ——	6.6	Convert to C++				-				

 f) Upload the source code onto microcontroller board. Right click on project folder (or left click on debug arrow button) -> Debug As -> Ac6 STM32 C/C++ Application



g) Run application. Click on "Run" button.

Debug - SMR_EvalKit/Src/main.c - Eclipse							
File Edit Source Re <u>fa</u> ctor Navigate Search Project Run Window Help							
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SMR_EvalKit.elf [Ac6 STM32 Debugging]	🍐 🦛 🖂 🦉 😫 🖻 💆 🔻						
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 P Thread #1 (Suspended : Breakpoint) 							
main() at main.c:75 0x8003e2c							
openocd							
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34 #include "main.h" 35 #include "stm22f4vy bal b"	stm32f4xx_hal.h						
36 [©] //#include "arm math.h"	■ adc.h =						
<pre>37 //#include "arm_const_structs.h"</pre>	dma.h						
38 30 Marchada Hada bil	spi.n						
39 #include "dma b"	um.n						
41 #include "spi.h"							
42 #include "tim.h"	v system clock.h v						
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h) After successfully uploading and run, the source code will be stored in microcontroller board and will be loaded when microcontroller is powered on.

4.3. Signal Visualization

The SMR-EvalKit is a plug-and-play device. The system will run with current configuration when it's supplied power via USB cable and receive signals can be visualized using the GUI.

To visualize receive signals:

- First open the installed GUI
- Then select corresponding Comport of STM-Evalkit
- Click Connect/Disconnect button to connect or disconnect to STM-Evalkit Comport

On the GUI, the upper half shows raw receive signals on I- and Q-channel and its magnitudes are scaled in digit values. The lower half of the GUI shows the corresponding FFT of raw receive signals and is displayed in logarithmic scale (dB).



Note: When starting SMR-Evalkit, it may take a few seconds to perform initial frequency calibration and there is no data being transmitted to PC during this duration, therefore there is no signal being displayed on the GUI during this time.

InnoSenT GmbH Am Roedertor 30

97499 Donnersdorf GERMANY Tel.: +49 95289518-0 E-Mail: info@innosent.de www.innosent.de