How to configure KEIL ARM-MDK and STMicroelectronics firmware examples to work with the STM32F3DISCOVERY board



STEP 1: Install the ST-LINK/V2 USB driver for Windows 7

First install the ST-LINK/V2 USB driver for Windows 7 for the **ST-LINK/V2 in-circuit debugger and programmer** located on the STM32F3DISCOVERY board from STMicroelectronics. Use the How to install the ST-LINK/V2 USB driver for Windows 7 to use with the STM32F3DISCOVERY board from STMicroelectronics and KEIL ARM-MDK document to complete this step. Only proceed to step 2 if the driver installation was successful. Ask your lecturer for assistance if you have problems with step 1.

STEP 2: <u>Download</u> the latest firmware written by STMicroelectronics from website.

Related Tools and Software

Related Tools and Software	
Part Number	Description
STSW-STM32118	STM32F3 Discovery kit firmware package, including 28 examples and preconfigured projects for 4 different IDEs

STEP 3: Unzip the STM32F3 Discovery kit firmware package to a folder of your preference.

I will create and use folder C:\Temp\F3DISC The unzipped files will be located in folder C:\Temp\F3DISC\

🛛 🌗 🕨 Computer 🕨 Sy	vstem (C:) ▶ Temp ▶ F3DISC ▶			
t View Tools Help				
e 🔻 🗦 Open 🛛 In	clude in library 👻 Share with 👻 Burn	New folder		
prites	Name	Date modified	Туре	Size
usic	STM32F3-Discovery_FW_V1.1.0	2013/08/01 12:08	File folder	
esktop				

The folder name may be different as shown above due to a later firmware version. This is firmware version 1.1.0

STEP 4: For simplification deletes all the folders that will not be used by the KEIL ARM-MDK

🚱 🔍 🗣 🐌 🕨 Computer 🕨	System (C:) + Temp + F3D	SC • STM32F3-Discovery_FW_V1.1.0 • Pr	oject > Demonstration	•						
File Edit View Tools Help	p									
Organize 🔻 Include in libra	ry 🔻 Share with 💌 B	urn New folder								
🔆 Favorites	Name	Date modified	Туре	Size	🕒 🗢 📕 🕨 Computer 🕨 S	ystem (C:) 🕨 Temp 🕨 F3D	ISC 🕨 STM32F3-Disco	very_FW_V1.1.0 > Pro	oject 🕨 Master_Wor	kspace 🕨
👌 Music	Binary	2013/08/01 12:07	File folder		File Edit View Tools Help					
🧮 Desktop	U EWARM	2013/08/01 12:07	File folder		Organize T Include in libran	Share with T	urn New folder			
🐞 Downloads	MDK-ARM	2013/08/01 12:07	File folder		organize in initial		and Henrolder			
Recent Places	J TASKING	2013/08/01 12:07	File folder		🔆 Favorites	Name		Date modified	Туре	Size
	🔋 TrueSTUDIO	2013/08/01 12:07	File folder		J Music	EWARM		2013/08/01 12:07	File folder	
🥽 Libraries	in the stand	2012/09/26 04:00	C File	11 KB	Deskton	MDK-ARM		2013/08/01 12:07	File folder	
Documents	hw_config.h	Tumer C File	H File	3 KB				2023/00/02 22:07 11	riterotaei	

STEP 5: Remove the "Read-only" file properties of all the files in the folders

File Edit View Tools Help				
Organize 👻 Include in library	▼ Share with ▼ Burn Ne	w fold	er	
🔆 Favorites	Name		Date modified	Туре
👌 Music	STM32F3-Discovery_FW_V1.1.0		2012/09/01 12:09	Eila faldar
🧮 Desktop			View	•
Downloads			Sort by	+
Recent Places			Group by	۱.
_			Refresh	
🥽 Libraries			Customics this folder	
Documents			Customize this folder	
A Music			Paste	
Pictures			Paste shortcut	
Videos			Undo Delete	Ctrl+Z
			Share with	+
💻 Computer		\$	WinMerge	
🏭 System (C:)		S	Shared Folder Synchroni	zation +
🙀 ElecEngineering\$ (\\gondor				
🙀 fadlam\$ (\\gondor.nmmu.a			New	•
🙀 apps\$ (\\gondor.nmmu.ac.:		6	Properties	
ElecEngStudents\$ (\\ccomir		_		

Double click inside the ORANGE circle to remove the "Read-only" file properties of the files.



Double click on the "Apply" button after the "Read-only" attributes has been removed.



Double click on the "OK" button to confirm the changes.

STEP 6: Open the "Demo" STM32F3DISCOVERY board project



Double click filename in the ORANGE circle to open the "Demo" STM32F3DISCOVERY board project in the KEIL μ Vision IDE.



ST-Link Depreciated Version is wrong for the STM32F3DISCOVERY board.

STEP 7: Changing µVision project properties for the ST-LINK/V2 and STM32F3DISCOVERY board

The project opened in µVision IDE shows that the ST-Link(Depreciated Version) is selected. This setting is wrong because the ST-LINK/V2 and not the ST-Link(Depreciated Version) is located on the STM32F3DISCOVERY board. Open "Options for Target 'Demo'" project options.

Cartemp(F3DI3C(STW32F3-Discovery_FW_V1.1.0(Fr0ject/Demonstration/WDK-AKW/Demo.uvpr0j - pvision4	
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help	Device Target Output Listing User C/C++ Asm Linker Debug Utilities
Image: Solution of the second seco	STMicroelectronics STM32F303VC Xtal (MHz): Qperating system: None System-Viewer File (.Sfr):
Add Group Remove Item Manage Components Open File Open List File Open Map File	Read/Only Memory Areas Read/Write Memory Areas default off-chip Start Start Size Start Size ROM1: C ROM2: C ROM3: C
Image: Stop build F7 Image: Stop build Image: Stop build Image: Very Show Include File Dependencies Image: Stop build	on-chip on-chip on-chip IROM1: 0x800000 0x40000 IRAM1: 0x2000000 0x8000 IROM2: IROM2: </th

V Options for Target 'Demo'	💟 Options for Target 'Demo'	
Options for Target 'Demo' Device Target 'Output Listing User C/C++ Asm Linker Debug Utilities Select Folder for Objects Name of Executable: Demo Create Executable: \Demo\Demo Debug Information Create HEX File Rowse Information Create Library: \Demo\Demo lib	CPU DLL: Parameter: Cutous guild of the second se	Lpton Decogy Utilities Use: ST-Link Debugger Use: ST-Link Debug Session Settings Breakpoints Breakpoints Breakpoints Dower DLL: Parameter: SARMCM3.DLL Dialog DLL: Parameter:
OK Cancel Defaults Help	DARMSTM.DLL OK Car	TARMSTM.DLL

V Options for Target 'Demo'	
Device Target Output Listing User C/C++ Asm Linker Debug Utilities C Use Simulator Settings If Guse ST-Link Debugger Settings	Cortex-M Target Driver Setup
Limit Speed to Real-Time	Debug Trace Flash Download
Cortex-M Target Driver Setup	Download Function
Debug Trace Rash Download button to open this window	Configuration Contrast Full Chip (♥ Program Contrast Contrast Co
Unit: ST-LINK/V2 SWDID DV2RA011477 ABM CresSint SW.DP U	Programming Algorithm
Serial Number: N/A Up HW Version: V2 Down	Description Device Size Device Type Address Range
Firmware Version: V2J17S0 Port: SW Max Clock: IMHz Add Delete Update IR len:	
Connect & Reset Options Connect & Reset Options Download Options	Start: Size:
Connect: Normal Reset: Autodetect Cache Code Verify Code Download Verify Code Download Download to Rash	this button to Add Remove select a
	programming _algorithm for
OK Cancel Apply	FLASH memory OK Cancel Apply

Description	Flash Size	Device Type	Origin	<u>^</u>	C Erase Full Chip Erase Sectors	I✔ Program I✔ Verify	Start:	0x20000000 Size: 0x0800
TM32F2ox Flash	1M	On-chip Flash	MDK Core		C Do not Erase	Reset and F	Run	
TM32F2ox Flash Options	168	Un-chip Flash	MDK Core		- Programming Algorithm			
TM22E2 Electr	328B	On-chip Flash	MDK Core					
IN SZHOW HAS	206K	On-chip Flash	MDK Core		Description	Device Size	Device Type	Address Range
TM22Eday Elash	1M	On obin Flash	MDK Core		STM32F3xx Flash	256k	On-chip Flash	08000000H - 0803FFFFH
TM32Edvx 2MB Elaeb	2M	On-chip Flash	MDK Core					
TM32Edvor Flash Ontions	168	On-chip Flash	MDK Core					
TM32F4xx Flash OTP	528B	On-chip Flash	MDK Core					
TM32I 15x Low Power Flash	128k	On-chip Flash	MDK Core					
TM32L15x Data EEPBOM	4k	On-chip Flash	MDK Core					
TM32I 15x Flash Options	16B	On-chip Flash	MDK Core				Start	0x08000000 Size: 0x00040000
TM32L1xx Med-density Flash	128k	On-chip Flash	MDK Core				oran. j	0.00000000
TM32L1xx Mid-density Opti	16B	On-chip Flash	MDK Core				_	-1
TM32L1xx Med+-density Fl	256k	On-chip Flash	MDK Core			Add	Remove	
TM32L1xx Mid+density On	16B	On-chip Flash	MDK Core	-				

Options for Target 'Demo'	X
Device Target Output Listing User C/C++ Asm Linker Debug Utilities	
Configure Flash Menu Command	
Use Target Driver for Rash Programming Use Debug Driver	
ST-Link (Deprecated Version) 💌 Settings 🔽 Update Target before Debugging	
Init File: Edit	
C Use External Tool for Flash Programming	
Command:	
Arguments:	=
Run Independent	
OK Carcel Defaults	Help

STEP 8: Open main.c source code file and re-build complete "Demo" project



There should be no errors. For now please ignore the two warnings.

STEP 9: Download program in machine language format to the FLASHROM of the STM32F303VCT6 microcontroller located on the STM32F3DISCOVERY board.



We have used the ST-LINK/V2 in-circuit debugger and programmer purely as a programmer during this step.

STEP 10: Enter debug mode to RUN, STOP and RESET of the "Demo" program on the STM32F3DISCOVERY board.

C:\Temp\F3DISC\STM32F3-Discovery_FW_V1.1.0\Project\Demonstration\MDK-ARM\Demo.uvproj - µVision4
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
□ ☞ 🖬 🕼 🖄 🔤 🕲 🕐 (← →) 🥙 🥸 🦄 🦉 🦆 推 🎼 🞯 🛛 🕞 🗟 🗳 🍭 ● ○ 🔗 🌒 🗐 🔧
😵 🕮 😂 🤐 🙀 Demo 🕞 🔊 📥 🗟 🚸 🎰
Project 🛛 📱 main.c
 Demo MDK-ARM MDK-ARM STM32 USB-F: Gauthor MCD Application Team STM32F3-Disc Gauthor MCD Application Team Gauthor MCD Application Team Gauthor MCD Application Team Gauthor MCD Application Team Gedate 20-September-2012 Gebrief Main program body
🔣 C:\Temp\F3DISC\STM32F3-Discovery_FW_V1.1.0\Project\Demonstration\MDK-ARM\Demo.uvproj - µVision4
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
D 🚰 🛃 🕼 X 🛍 🛍 ウ (P) (+ ->) 🥐 (X 🎘 (X 🛊 車 /// /// // // // // // // // // // //
Registers Run (F5) mbly
Register Start code execution 74: {
R0 R0 R1 R2 R3 Into_t 1 = 0; rs: unito_t 1 = 0; rs: /* SysTick end of count event each 10ms */ R1 Imain.c Imain.c istartup_stm32f30x.s
R4 68 ⊟/** R5 69 * @brief Main program. R6 70 * 0
C:\Temp\F3DISC\STM32F3-Discovery_FW_V1.1.0\Project\Demonstration\MDK-ARM\Demo.uvproj - µVision4
The stars and th
Hegister → → 0x08000C98 6811 LDR r1, [r0, #0x04]
R0 0x08000C9A 2900 CMP r1, #0x00 R1
R3 main.c istartup_stm32f30x.s
701 * @retval None 702 */

In the circle are the debugging functions like: RUN, STOP, RESET, STEP, STEP OVER, STEP OUT, RUN TO CURSOR LINE.

STEP 10: This is where we take a rest and you start working. Enjoy.