All Places > STM32 MCUs Forum > Documents

Log in to create and rate content, and to follow, bookmark, and share content with other members.

How to use the SWO on STM32H7 devices?

Document created by Amel N 47 on Jun 21, 2018 • Last modified by Amel N 47 on Jun 22, 2018
Version 8

Я

Like •	3	Comment • 8	K
~~			_

This tutorial is based on Keil Cortex[™]-M3 Hands-On LAB featuring Serial Wire Viewer (Version 4.04 May, 2008)

The configuration of the SWV needs to be done for each project you use whenever ITM output is required. It will be saved when you close a project or μ Vision.

There are two main parts to be considered in this setup:

- Select the Serial Wire Debug Port instead of the JTAG port (step 6 below)
- Configure the Serial Wire Output (steps 4 and 7)

Steps:



1- Select your project and make sure the correct processor is selected. (Project/Open Project).

2- Open the Debug setup menu. This can be accessed three ways:

- Click on Flash/Configure Flash Tools and select the Debug tab.
- Click on Project/Options for target "STM32H743ZI". Select the Debug tab.
- Click on Options For Target icon on main µVision toolbar . Select the Debug tab.

The third option is probably the easiest to use, but whichever one you use, Figure 1 opens up:

evice Taiger	Output Listing User C/C++ Asm	Linker Debug	Utilities		
○ Use <u>S</u> imulator	r with restrictions Settings		nk Debugger 💽 Settings		
 Load Applicat Initialization File: 	tion at Startup 🔽 Run to main()	Load Applica	ation at Startup 🔽 Run to main()		
	Edit	.\STM32H743x	x_swo.ini Edit		
-Restore Debug	Session Settings	Restore Debug Session Settings Image: Breakpoints Image: Breakpoints			
✓ Breakpoin	ts 🔽 Toolbox				
Watch W	indows & Performance Analyzer				
Memory D	lisplay 🔽 System Viewer				
CPU DLL:	Parameter:	Driver DLL:	Parameter:		
SARMCM3.DLL	-REMAP -MPU	SARMCM3.DLL	. [-мро		
Dialog DLL:	Parameter:	Dialog DLL:	Parameter:		
DOM DU	I-pCM7	TCM.DLL PCM7			

Figure 1 : Option for Target

3- Select ST-Link Debugger

4- The attached file STM32H743xx_swo.ini can be located in the the project directory. It configures the SWV ports.In the box Initialization File: select the file STM32H743xx_swo.ini as shown in Figure 1.

You can rename and/or relocate this file if you prefer. It will not hurt if this is enabled for every exercise.

5- Click on Settings to configure the ST-Link. Figure 2 opens up.

Debug Adapter	SW Dev	rice		
Unit: ST-LINK/V2-1	SWDIO	IDCODE 0x6BA02477	Device Name ARM CoreSight SW-DP	Move Up
Serial Number:				Down
0672FF525750877267032536	€ Auto	omatic Detection	ID CODE:	
Version: FW: V2J28M17 HW: V2-1	C Mar	nual Configuration	Device Name:	
-	Add	Delete II	Indate IB len:	AP· 0
Target Com Port: SW Clock Req: 4 MHz Selected: 4 MHz	Add	DeleteU	Ipdate IR len:	AP: 0

Figure 2 : Target Driver Setup

6- Select the SWJ box and set Port: to SW as shown in Figure 2. This must not be set to JTAG.

SWV operates only through the Serial Wire debug port (SW). Max clock @ 4 MHz is correct.

7- Select the Trace tab and Figure 3 opens up to configure the SWV trace:

Trace Port Serial Wire Output - UART/NRZ SWO Clock Prescaler: 200 Image: Autodetect SWO Clock: 2.000000 MHz ITM Stimulus Ports Enable: 0x0000001 Privilege: 0x0000001 Port	Timestamps Image: Enable Prescaler: 1 ✓ PC Sampling Prescaler: 1024*16 ✓ Prescaler: 1024*16 ✓ Periodic Period: Clisabled> On Data R/W Sample Port 24 23 Port 16 15 Port 24 Port 2316 Port	Trace Events CPI: Cycles per Instruction EXC: Exception overhead SLEEP: Sleep Cycles LSU: Load Store Unit Cycles FOLD: Folded Instructions FOLD: Folded Instructions FOT 8 Port 0 FOT 7 Port 7
Ignore packets with no S Overwrite CYCCNT	YNC	

Figure 3 : Trace Setup

8- Important Step: Set the Core Clock to 400 MHz and check the Trace Enable box. Ensure in the ITM Stimulus Ports that at least Port 0 and Port 7..0 are selected. The rest are Don't Care for this exercise.

9- Click on OK twice. The Serial Wire Viewer Trace is now configured and ready to use !

10- Click on File/Save to save these settings.

Δ

- 1. When in the debugger mode, if the SWV windows do not update when the program is running and only do when you stop the program execution, make sure View/Periodic Window Update is activated.
- 2. If Core Clock is different of 400 MHz, pay attention to set correct divisor value in initialization file (In following example of .ini file, refer to line 16 to calculate the new value and line 17 to set it)

Example of Initialization file:

```
FUNC void DebugSetup (void) {
  WWORD(0x5C001004,0x00700000);
  //UNLOCK FUNNEL
  WWORD(0x5C004FB0,0xC5ACCE55);
  WWORD(0x5C003FB0,0xC5ACCE55);
  //SWO current output divisor register
  //This divisor value (0x000000C6) corresponds to 400Mhz
  //To change it, you can use the following rule
  // value = (CPU Freq/2000)-1
  WWORD(0x5C003010,(( RWORD(0x5C003010) & 0xfffff000) | 0x00000C7))
  //SWO selected pin protocol register
  WWORD(0x5C0030F0, 0x0000002);
  //Enable ITM input of SWO trace funnel
  WWORD(0x5C004000, ( RWORD(0x5C004000) | 0x0000001));
  //RCC AHB4ENR enable GPIOB clock
  WWORD(0x580244E0, ( RWORD(0x580244E0) | 0x0000002));
  // Configure GPIOB pin 3 as AF \,
  WWORD(0x58020400,(( RWORD(0x58020400) & 0xffffff3f) | 0x0000080))
  // Configure GPIOB pin 3 Speed
  WWORD(0x58020408, ( RWORD(0x58020408) | 0x0000080));
  // Force AF0 for GPIOB pin 3
  WWORD(0x58020420, ( RWORD(0x58020420) & 0xFFFF0FFF));
}
DebugSetup();
                                   // Debugger Setup
FUNC void OnResetExec (void) {
                                      // executes upon software RESE
  DebugSetup();
                                     // call the initialization func
}
```

4 people found this helpful

STM32H743xx_SWO.ini.zip (i) 736 bytes

OUTCOMES

Helpful(2)

Visibility: ③ STM32 MCUs Forum • 207 Views Last modified on Jun 22, 2018 2:53 PM

Tags:stm32h7itm swo trace

0

8 Comments



Clive Two.Zero Jun 21, 2018 6:28 PM

Amel N Thanks, that seems to be working at 400 MHz, didn't seem to at 200 MHZ, but might need to tweak the settings.

EACTASTM82Cube/Reposit	tory/STM32Cube FW H7 VL2.0/Projects/STM32H743ZI-	Nucleo	EST-00%/MDK-68M/Project.uveroix - uVision	
File Edit View Project	Flash Debug Peripherals Tools SVCS Window	Help	en an anna san agus agus agus agus agus agus agus agus	
00000	3 9 0 + - P 8 8 8 3 3 3	11: 11	🙆 HAL, MMC, ReadExTCSD 🖵 🗟 🛷 🞯 😐 🔿 🔗 🏩 💼 🔹	
# 30000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		×-	
Disassembly				a 😰
0x08002624 253D	DCW 0x253D			
0x08002626 3830	DCW 0x3830			-
0x0800262A 0000	DCW 0x0000			
350: CPU_CACH	E_Enable();			
351: 552. /* STV02	W7ee W57 1(beaus initialization)			
353: - C	onfigure the Systick to generate an i	nterr	ot each 1 msec	
354: - 5	et NVIC Group Priority to 4			LB.
356: 4/	ow Level Initialization			
Ox0800262C F7FDFFC	6 BL.W CPU_CACHE_Enable (0x	000080	56)	
357: HAL_Init	0:			
359: /* Confi	gure the system clock to 400 MHz */			
0x08002630 F7FEF98	C BL.W HAL_Init (0x0800094C)		+
4	ore Continuit			
Registers		•] main.c 📋 stm32h7xx_hal_gpio.h 🌒 stm32h7xx_hal_gpio_ex.h 🔄 startup_stm32h743xxxs 📋 stm32h7xx_hal.c	📑 stm32h7.oc_hal_rec.c 📋 stm32h7.oc_it.c 📋 sww.ini 🔹 🗙
Register	Value		341 * Sretval None	×
Core	5/08002620		342 - */ 343 int main(void)	
R1	0-20001508		344 🗐 (
R2	0x0000000		345 🖯 /* This project template calls firstly CPU_CACHE_Enable() function in order e	nable the CPU Cache.
- R4	GK08002794		347 */	Arose wi una abbracacion.
R5	Bx08002794		348	
R6 R7	0x0000000	D	349 /* Enable the CPU Cache */ 350 CPU CACHE Enable();	
RB	Gx00000000		351	
R9	0x0000000		352 C /* STM32H7xx HAL library initialization:	and the second sec
R10	Gx0000000		353 - Configure the Systick to generate an interrupt each 1 mbec 354 - Set NVIC Group Priority to 4	G ClearTerminal
R12	Gk0000000		355 - Low Level Initialization	File Edit View Settings Connection Plugins Tools Tran
R13 (SP) R14 (LP)	6x20000508 0x08000029		356 * */ 357 HAL Init():	ClearConney: Start Abead Finish
R15(PC)	0x0800262C		358	Cicar Connicx. Gtart Aneua. 1 mish 7
ID RPSR	0x61000000		359 /* Configure the system clock to 400 MHz */	Nucleo H743ZI
8 Banked 19 System			361 Systemerson Configure	
🕀 Internal			362 USARI3_Init();	Core=400000000, 400 MHz
Mode	Thread		363 364 DutString("Nucleo HT432I\r\n");	CPUID 411FC271 DEVID 450 REVID 1003
Stack	MSP		365	STM32H7xx
States	1826		<pre>366 printf("\n\nCore=%d, %d MHz\n", SystemCoreClock, SystemCoreClock / 1000000); 367 CONFCEASE();</pre>	C0000018 20000438 0000000
(I) FPU	0.0000457		368 IDCODECheck();	FPU-D Single-precision and Double-precision
		-	369 FPUCheck();	HCLK-20000000
E Project Registers				APB1=100000000 APB2=100000000
Command			🗧 📴 Debug (printf) Viewer	
// Tanan 380 Man /	TOD HIS 3		^ Core=400000000, 400 MHz	
WWORD (0x58020420,	(_RWORD(0x58020420) & 0xFFFF0FFF));		CPUID 411FC271 DEVID 450 REVID 1003 Cortex M7 ripi	
3	-		STM32H7xx	
DebugSetup () :	// Debugger Setur		C0000018 20000438 00000000	
	,,		FPU-D Single-precision and Double-precision	
FUNC void OnResetExe	<pre>ic (void) { // executes upon s</pre>	Oftwa	e RESET; Use the function name as 1 HCLK-20000000	
}	// the inclus		EP51=10000000	
		_		
>		_		
ASSIGN BreakDisable	BreakEnable BreakKill BreakList Break	Set E	eakAccess COVERAGE DEFINE DIR	
			Trace: Running ST-Link Debugger	
0670 20000680 65536	/TRILO/	_		
			Helpful Not Helpful	
ase		_	1 11 1	
				COM46: 115200-8-N-1

Actions

Like • 1



Dear Clive Two.Zero,

I think you have prescaler value issue. I think you have used .ini file as it is. If you look at the line 13 in the .ini file:

//SWO current output divisor register
//This divisor value (0x00000C6) corresponds to 400Mhz
//To change it, you can use the following rule
// value = (CPU Freq/2000)-1
_WWORD(0x5C003010,((_RWORD(0x5C003010) & 0xffff000) | 0x00000C6));

The divisor you are using corresponds to 400MHz. So please replace 0x000000C6 by 0x00000064 for 200MHz.

Best Regards, STM32

Actions

۲ Like • 0



Clive Two.Zero @ STM 32 on Jun 21, 2018 7:04 PM

>>The divisor you are using corresponds to 400MHz. So please replace 0x000000C6 by 0x0000064 for 200MHz.

For the math and the formulas to be coherent here

400 -> 200-1 -> 0x0C7 200 -> 100-1 -> 0x063

You used the 0x0C7 value here https://community.st.com/message/203009re-stm32h7-swo-printf-not-working?commentID=203009#comment-203009

Actions

STM 32 🖛 @ Clive Two.Zero on Jun 21, 2018 7:10 PM

Sorry for the typo .. Yes the right value is 0xC7 for 400MHz. 0x63 corresponds to 200MHz.

B.R. STM32

Actions

Like • 0

(_____) Like • 0



Clive Two.Zero @ Clive Two.Zero on Jun 21, 2018 7:12 PM

Seems to be tolerant of 0x0C7 or 0x0C6 in Keil when running core at 400 MHz, 0x063 works for a 200 MHz SYSCLK

8 of 11

Both 200 and 400 MHz clocking schemes AHB clock (and FLASH) at 200 MHz

Actions

Like • 0



Clive Two.Zero @ Clive Two.Zero on Jun 21, 2018 7:20 PM

The script Amel posted above uses the 0xC6 value, it does appear to work, and I've confirmed that Keil/ST-LINK doesn't change the SWV settings (computes 200 divisor in the debug dialog).

Printing out the register application side I see 0x000000C6 set by the script.

Actions

Like • 0



Amel N 57 @ Clive Two.Zero on Jun 22, 2018 2:57 PM

Good catch Clive! I updated the .ini file to put the correct value (0xC7) calculated based on the formula although 0x0C6 is working for 400 MHz.

-Amel

Actions

Like • 0



Clive Two.Zero @ Clive Two.Zero on Jun 21, 2018 7:36 PM

Takes a licking and keeps on ticking...

Core=50000000, 500 MHz CPUID 411FC271 DEVID 450 REVID 1003 Cortex M7 r1p1 STM32H7xx C0000018 20000438 00000000 10110221 12000011 00000040 FPU-D Single-precision and Double-precision HCLK=25000000 APB1=125000000 APB2=125000000 0x5C003010 -> 000000F9

1 person found this helpful

Actions

Like • 2

Related Content

Wireless Programming and Debugging with STM32 and RPi

FAQ: Register Protection of SPC560Dxx

How to run&debug from RAM without flashing flash STM32 devices (Keil)

HAL_labs.pdf

How to create an open STM32 Project

Recommended Content

STM32H7 CubeMX FatFs + uSD + DMA + RTOS Success

STEVAL-FCU001V1 - BLE app for smartphone

First prototype of frame 3D printed

FAQ for FCU (STEVAL-FCU001V1)

Smart Ball using STM32 IoT node and Node-Red

Incoming Links

Re: No traceswo output on stm32H7xx

Re: STM32H743 NUCLEO SWO printf debug issue

Re: STM32H7 SWO printf not working



Exercise your Privacy Rights

Home | Top of page | Help