# 2.1.7:调试器使用教程

## 2.1.7.1 支持的开发环境

- 支持MDK、IAR 免配置直接使用。
- 基于eclipse 框架的IDE

eclipse 框架的IDE 一般编译器配置为 gcc,调试器配置为 pyocd 或者 openocd 的形式,需要 定制厂家对DAPLink 进行支持,或者安装 DAPLINK 的支持插件,典型的IDE 比如 RT-thread Studio 原生支持 DAPLink 的调试。

openocd 使用文档: Documentation (openocd.org)

pyocd 开源地址: <u>pyocd/pyOCD: Open source Python library for programming and</u> <u>debugging Arm Cortex-M microcontrollers (github.com)</u>

:::caution 提示

使用pyocd 或者 openocd 的用户,以及使用eclipse 框架的IDE,请尽可能的使用新版本的驱动和软件,原因在于开源的发展速度相对较快,过时的版本可能支持不完善,或者已经弃用,而避免产生问题。

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## 2.1.7.2 调试环境设置

### 2.1.7.2.1 MDK 调试设置

按照如下的流程,打开项目设置,选择CMSIS-DAP 调试器,如下图所示:

evice   Target	Output   Listing   User   C/C++	Asm Linker Debug Vtilities
C Use Simulato	r with restrictions Settings b Real-Time tion at Startup IV Run to main() Edit Session Settings ts IV Toolbox indows & Performance Analyzer Visolay IV System Viewer	<ul> <li>✓ Lise: CMSIS-DAP Debugger</li> <li>✓ Lise: CMSIS-DAP Debugger</li> <li>✓ Load</li> <li>✓ PowerWriter Debugger</li> <li>✓ Load</li> <li>✓ PowerWriter Debugger</li> <li>✓ Link / J-TRACE Cortex</li> <li>Mitializatid Models Cortex-M Debugger</li> <li>✓ Diffect MSIS-DAP Debugger</li> <li>✓ Diffect MSIS-DAP Debugger</li> <li>✓ Bitabs UDA Debugger</li> <li>✓ Bitabs UDA Debugger</li> <li>✓ Watch Write Ortex Debugger</li> <li>✓ Watch Write Watch Write Weiter</li> <li>✓ Memory Display</li> <li>✓ System Viewer</li> </ul>
CPU DLL:	Parameter:	Driver DLL: Parameter:
	Parameter:	Dialog DLL: Parameter:
Dialog DLL:	-pCM4	TCM.DLL -pCM4

CMSIS-DAP Cortex-M Target Drive	r Setup	×
Debug Trace Flash Download P 选择调试器设备 CMSIS-DAP-JTAG/SW Adapter Any CMSIS-DAP	SWDIO Ox2BA01477 ARM Core Sight SW-DP	love Up Down
Firmware Version: 211 选择协议 ✓ SWJ Pot: SW ▼ Max Clock: 10MHz ▼4 3 勾选SWJ, 如果有	为SW 协议 © Automatic Detection ID CODE: C Manual Configuration Device Name: 调整速度 Add Delete Update AP: 0x00	
Connect & Reset Options Connect: Normal Reset: Reset after Connect Log Debug Accesses Sto	Cache Options Download Options SYSRESETREQ ▼	oad
	OK Cancel H	elp

:::tip

#### SWD/JTAG Communication Failure/ RDDI Error 处理方法:

:::

Flash Download 设置如下,根据实际的项目要求,设置合适的擦除方式,以及Program、Verify、 Reset and Run 选项,并添加当前芯片的flash 算法,如下图所示

CMSIS-DAP Cortex-M Target Driver Setup	×
Debug   Trace Flash Download   Pack	
t. Download Euroction. LORD C Erase Full Chip ⓒ Erase Sectors ⓒ Do not Erase C Program ⓒ Program ⓒ RAM for Algorithm Start: 0x20000000 Size: 0x00001000	
Programming Algorithm	
<u>Description</u> <u>Device Size</u> <u>Device Type</u> <u>Address Range</u> STM32F3xx Flash 256k On-chip Flash 08000000H - 0800FFFFH	
Start: 0x08000000 Size: 0x00010000	
Add Remove	
OK Cancel He	lp

:::tin

- 擦除方式选择:如果需要保留芯片的某些数据,比如设置数据,签名信息,一般选择擦除方式为 Sector Sections
- Reset and Run:在现在固件后要执行复位并运行,需要勾选Reset and Run选项

:::

针对高级用户,可以根据需要调整自定义调试设置,如下所示:

CMSIS-DAP Cortex-M Target Driver Setup	×
Debug   Trace   Flash Download Pack	
Debug Description	
Pack: Keil.STM32F3xx_DFP.2.2.2	
☑ Enable ① {默认开启,调试目定义设置	
Log Sequences: C:\Users\CSHSOFT\Desktop\debug\STM32F301\MDK-ARM\STM32F301_Sequence	
Configuration: .\DebugConfig\STM32F301_STM32F301C8Tx.dbgconf	Edit
2 编辑dbgconf 文件,自定义调试说	23
OK Cancel H	elp

检查Use Debug Driver选项,启用硬件调试器,此选项默认是开启的,如遇到问题,此选项也是重 点需要检查的设置,如下所示

I Options for Target 'STM32F301'	×
Device   Target   Output   Listing   User   C/C++   Asm   Linker   Debug   Utilities	
Configure Flash Menu Command	
Use Target Driver for Flash Programming	
Use Debug Driver Settings	
Init File: Edit	
Use External Tool for Flash Programming Command: Arguments: Bun Independent	
Configure Image File Processing (FCARM):	
Output File: Add Output File to Group:	
Application/MDR-ARM	
Image Files Root Folder:	
OK Cancel Defaults Help	

#### 检查设置之后,即可正常进入调试

The Falls Marrie Brailest File				Tech OF Under Unit
	10.0	l da i		uon giet muow muy 多名意 <i>是在于此版</i> Antoning
25 R 0 P P P	1 / · 1 🍐 🔓	- I I I I I		
Registers	a 🖬	Disass	embly	
- 1 ·	Lu à		64: 4	
Register	Falue		65:	/* USER CODE BEGIN 1 */
- Core	0.000		661	
- 31	0x2000		67:	/* USER CODE END 1 */
- 32	0x2000		68:	
33	0x2000		69:	/* MCU Configuration*/
84	0x0000	- T		
- 86	0x0000			
- 87	0x0000		] startup	_stm32350x8.s /min.x /STM32P301_STM32P301C8fx.dbgconf
- 38	0x00000		59 🖵 /	**
810	0x0000		60	* Gbrief The application entry point.
	0x0000		61	* Gretval int
8.12	0x2000		62 -	
B13 (SP)	0x2000	NN	64 🖂	nt main (vola)
- 315 (PC)	0x0800	P.F.	65	/* USER CODE REGIN 1 */
· xPSR	0x2100		66	, ,
1 Banked			67	/* USER CODE END 1 */
- Totarnal			68	
Mode	Thread		69	/* MCU Configuration*/
Privilege	Frivil		70	
Stark	MSP 1004	L	71	/* Reset of all peripherals, Initializes the Flash interface and the Systick. */
Sec	0.0001		72	HAL_III())
*			74	/* USER CODE REGIN This */
			75	
			76	/* USER CODE END Init */
			77	
			78	/* Configure the system clock */
			79	SystemClock_Config();
			80	
			01	/. OPE CODE DEGIN SAMINE -/
			83	/* USER CODE END SymInit */
			84	
			85	/* Initialize all configured peripherals */
			86	<pre>MX_GPIO_Init();</pre>
			87	/* USER CODE BEGIN 2 */
			88	(* 1998 AND 3 * /
			90	/ - OSER CODE ERD 2 -/
			91	/* Infinite loop */
			92	/* USER CODE BEGIN WHILE */

## 2.1.7.2.2 IAR 调试设置

项目右键,进入 Options 设置,切换到 General Options 标准设置页面,检查Target -> Device 是 否选择正确,如下所示。

sject CMSIS-DAP Tools Window Help A Add Files	metel Dotons atic Analysis mine Checking (C++ Compiler ssembler Julput Converter Julput Converter	Library Options Target Outpu	2 MISR/ At Library Co	A-C:2004	MISRA-C:1998 Library Options 1
Add Group	uild Actions inker	Processor variant	Cortex-M4	~	
Add Project Connection	Simulator CADE	Device	ArteryTek -AT32	F413C8T7	1
Remove	CMSIS DAP GDB Server L-tet/JTAGiet	⊖ CMSIS-Pack	None		
Create New Project Add Existing Project	J-Link/J-Trace TI Stellaris Nu-Link	Endian mode	Floating point	VEPut ringh	a practicion . V
Options Alt+F7 Version Control System	PE micro ST-LINK Third-Party Driver TL MSP-PET TL VDS	O Big O BE32	D registers	16 V	e precision +
		DSP Extension	D (NEON)	TrustZo	one cure ~

进入到Debugger 菜单, Setup 标签页面, 选择 Driver 为: **CMSIS-DAP** 设备, 根据需要可以勾选 Run to main 选项, 如下所示。

Seneral Options Static Analysis Suntime Checking CC++ Compiler Assembler Output Converter Output Converter Output Converter Output Converter Custon Build Build Actore Unker Pelsoper Simulator CADI CMSIS DAP GD8 Server I Stellaris Nu-Link PE micro Device description file ST-L3NK Third-Party Driver I MSP-FET I MSP-FET I MSP-FET I MSP	Category:	Factory Setting:
PE micro     Device description file       ST-LINK <ul> <li>Override default</li> <li>TI MSP-FET</li> <li>STOOLKIT_DIR\$\CONFIG\debugger\ArteryTek\AT32F413x8</li> </ul>	Category General Options Static Analysis Runtime Checking CyC++ Compiler Assembler Output Converter Output Converter Output Converter Output Converter Output Converter Debugger Simulator CADI CMSIS DAP GDB Server I-jet/JTAGjet 3-Link/3-Trace	Setup Download Images Extra Options Multicore Plugins  Driver  CMSIS DAP  Main  Setup macros Use macro file(s)
Third-Party Driver         Override default           TI MSP-FET         STOOLKIT_DIR\$\CONFIG\debugger\ArteryTek\AT32F413x8_           TI XX5         \$TOOLKIT_DIR\$\CONFIG\debugger\ArteryTek\AT32F413x8_	PE micro ST-LINK	Device description file
	Third-Party Driver TI MSP-FET TI XDS	STOOLKIT_DIR\$\CONFIG\debugger\ArteryTek\AT32F413x8

在Debugger -> CMSIS-DAP 的 Interface 标签页中,选择接口为 **SWD**,如下所示

Category:		Factory Setti
General Options Static Analysis Runtime Checking C(C++ Compiler Assembler Output Converter Custom Build Build Actions Uniker Debugger	Setup Interface Probe config (a) Auto (b) From file	Breakpoints Probe configuration file Override default
Simulator	⊖ Explicit	CPU: Select
CMSIS DAP GDB Server 1;et/JTAGet 3;4ink/J-Trace TI Stellens Nu Link PE micro ST-LINK Third-Party Driver TI MSP-FET	Interface JTAG SWD Interface	Explicit probe configuration   Multi-target debug system  Target number (TAP or Multidrop  Target with multiple CPUs  CPU number on  0
TI XD5	Auto detect $\ \lor$	

经过以上的设置就可以进行芯片的调试开发。

## 2.1.7.2.3 RT-thread Studio 调试设置

RT - thread Stduio 下载地址: <u>https://www.rt-thread.org/studio.html</u>

进入SDK Manager ,如下所示:



检查当前芯片支持包,RT-thread 源码,以及Pyocd 是否安装。

#### 🗆 🗉 🗐 🖌

Name	Size	Status	Description	
🕞 📻 RT-Thread_Source_Code			RT-Thread source code releases	
📄 🍘 Chip_Support_Packages	● 根据	项目需要,下载对应	I的 RT-Thread、芯片、c开发板、s,编译器支持包	
🕨 🔲 🚝 Board_Support_Packages			Device vendor Board Support Packages	
🕨 🗆 🐔 ToolChain Support Packages			RT-Thread Studio ToolChain Support Packages	
✓ □ ☆ Debugger_Support_Packages			RT-Thread Studio Debugger Support Packages	
> 🗌 😕 J-Link		Installed		
> 🗍 🐸 ST-LINK_Debugger		Installed		
🗸 🗌 🐸 PyOCD				
0.1.6 (2022-07-29)	96.6 MB	🔵 Installed	Add geehy apm32f4 support	
0.1.4 (2022-05-06)	96.1 MB	Not installed	add geehy apm32f1 support, update pyocd to 0.33.1	
0.1.3 (2021-12-08)	87.8 MB	Installed	2 卜载安装,Pyoco, DAPlink 调试文持驱动	
⊕ 0.1.2 (2020-09-23)	87.2 MB	Not installed	Add Essemi MCU packs	
⊕ 0.1.1 (2020-09-23)	53 MB	Not installed	Add AT32F4xx support	
□ 冊 0.1.0 (2020-07-20)	53 MB	Not installed	PyOCD support debugging with DAP-Link debugger	
> 🗌 😕 QEMU		🔵 Installed		
> 🗌 📂 OpenOCD-Kendryte		Not installed		
> 🗌 📂 WCH-LINK_Debugger		Not installed		
> 🗌 🗁 OpenOCD-Nuvoton		Not installed		
> 🗌 📂 OpenOCD-HPMicro		Not installed		
> 🗌 📂 OpenOCD-Nuclei		Not installed		
> 🗍 📂 OpenOCD-Infineon		Not installed		
> ] \$ ThirdParty_Support_Packages			ThirdParty Support Packages	

#### :::tip

通过DAPLink进行项目调试,必须使用Pyocd 或者 OpenOCD 作为调试器的Adapter,最终通过gdb 连接进行调试。

:::

新建RT-Thread 项目,如下所示:



设置调试器,如下所示:

New Project		
Create RT-Thread I	Project	
Input project name	, choose one mcu.	
Project name: STI	И32F13RH	
Use default loo	ation	
Location: D:\RT-T	nreadStudio\workspace\STM32F13RH	Browse
Base On MCU	⊖ Base On Board	
RT-Thread :	4.0.3	~
Vendor :	STMicroelectronics V Series : STM32F4	~
Subseries	STM32F413 V MCU : STM32F413R	H ~
Console UART :	UART1 ~ TXP : PA9 RXP : PA10	
Adapter :	DAP-LINK V Port : SWD	<u> </u>
	● 选择DAP-LINK , Port 选择为 SWD 模式	t
Suggestions after	mcu based project created:	
The chip use an i	iternal HSI clock. If you need to modify it, please check and modi	ify drv_clk.c
?	< <u>B</u> ack <u>N</u> ext > <u>Finish</u>	Cancel

## 配置完成后,生成项目,即可进行下载和调试,如下:

workspace - STM32F13RH/rt-thread/components/drivers/misc/pin.c - RT-Threa File Edit Source Navigate Project Run Window Help	Studio			- 0		
■ • ■ ■   • • • • • × • • • × • • • • • • • • •	🤋 .£   ± = = , ☆   🕹 <mark>  ↓   ↓ - ↓</mark> + Quick Access					
🐇 Debug 🕄 🛷 Search 🐚 Project Explorer 🙆 🗸 週刊 🐘 😤 🖓 🗖	🕼 dry usart.c 🔉 con 🖳 🏙 🖬 device.c 🕼 dry opio.c 🕼 board.c 🕼 components.c 🕼 pin.c 🔅 📃 🔍 Varia 🔅 👘 Reea 🔅 Expr 🗃					
✓ E STM32F13RH.DAPLink.Debug [GDB PyOCD Debugging] ✓ 2 rtthread.elf	77%int rt_device_pin_register(const char *name, const struct rt_pin_ops *ops, void *user_data) 78 {	Name	Туре	🖆 🥶 🖻 📑 📑 Value		
✓ P Thread #1 1 (HardFault) (Suspended : Signal : SIGSEGV:Segmentation	79 _hw_pin.parent.type = RT_Device_Class_Miscellaneous;	> • name	const char *	0x800bf50 *pin*		
HardFault_Handler() at context_gcc.S:220 0x8000318	80 <u>hw_pin.parent.rx_indicate = KI_NULL;</u>	> . ops	const struct rt pin ops *	0x800ca6c < stm32 pi		
signal handler called>() at 0xffffff9	an	user data	void *	0x0		
rt_exit_critical() at scheduler.c:950 0x8003074	83 #ifdef RT USING DEVICE OPS					
rt_object_init() at object.c:332 0x8002846	84 _hw_pin.parent.ops = &pin_ops;					
rt_device_register() at device.c:59 0x8000b00	85 #else					
rt_device_pin_register() at pin.c:98 0x8006fdc	86 _hw_pin.parent.init = RT_NULL;					
rt_hw_pin_init() at drv_gpio.c:798 0x8009780	87 _hw_pin.parent.open = RT_NULL;					
hw_board_init() at drv_common.c:197 0x8008e46	<pre>88 _nw pin.parent.close = KI_NULL;</pre>					
rt_hw_board_init() at board.c:24 0x8008b7e	by the parent read = _pin_read;					
rtthread_startup() at components.c:223 0x8000aa4	91 hw din-parent control - pin control:					
more frames>	92 #endif	1				
pyocd.exe	93					
🚚 arm-none-eabi-gdb.exe	94 _hw_pin.ops = ops;					
	95 _hw_pin.parent.user_data = user_data;					
	96					
	9/ /* register a character device */					
	oo rc_device_register(&_nw_pin.parent, name, ki_bevice_rtakg_kowk);	1				
	190 return 0:					
	101 }					
	102					
	1030rt err t rt_pin_attach_irg(rt int32 t pin, rt uint32 t mode,					

在SDK-manager 中安装好 Pyocd 或者 Openocd 是必须的,

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# 2.1.7.3 常见问题{#faq}

## 2.1.7.3.1 MDK自动启动无效

程序下载之后发现没运行,需要注意以下几点:

- 检查Debugger设置中的复位模式是否正确;
- Reset and run 是否勾选
- Flash Algorithm 设置是否正确。

## 2.1.7.3.2 断点不生效

请检查编译的设置。如优化级别、debugger 设置、以及本身的代码功能,如是否开启了看门狗等。

## 2.1.7.3.3 只能设置四个硬件断点

断点数量与芯片本身有关系,取决于 MCU 内核版本单元,手册上会列出当前芯片支持的断点数量, 请查看所使用的芯片手册关于调试章节内容

## 2.1.7.3.4 下载时删掉了Bootloader

- IROM 的设置,首选要确保生成的 Image 地址是正确的
- 写入 Flash 的时候注意选择,页面擦除,在 Debugger 页面设置,这样就可以避免整片擦除, 保留了芯片里面的其他数据

# 2.1.7.3.5 Connection refused due to device mismatch!(Not a genuine ST Device! Abort connection){#device\_mismatch}



: i1	ncludes		
DE	BEGIN	Includes	*/





可能购买的芯片不是原装芯片,比如打磨过丝印,或者商家虚假宣传,由于部分热门芯片很多厂家都有类似的芯片,甚至PIN TO PIN 兼容,因此存在这些问题,低版本的MDK 以及 芯片支持包不会检查芯片的IDCODE,所以可能不报错,更换成高版本的MDK和 支持包,则有可能报错,具体可以**核对芯片手册的IDCODE**,来确定真正的芯片型号。

如STM32F1 芯片的IDCODE 为: 0x1B10417。

- SW Device					
	IDCODE	Device Name		Move	
SWDIO	⊙ 0x1BA01477	ARM CoreSight SW-DP		Up	
				Down	
Automatic Detection ID CODE:					
C Manual Configuration Device Name:					
Add Delete Update AP: 0x00					

但是样片却为: 0x2BA01477, 如下图所示:

- SW Device					
	IDCODE	Device Name		Move	
SWDIO	⊙ 0x2BA01477	ARM CoreSight SW-DP		Up	
				Down	
Automatic Detection ID CODE:					
C Manual Configuration Device Name:					
Add Delete Update AP: 0x00				)	

经过查明,此芯片实为: CS32F103C8T6(CKS32F103C8T6)。

TTUE

根据 IDCODE 查找芯片真正的厂商型号,下载对应厂商芯片的 设备包,安装之后,切换成实际芯片

<u>CKS32F103C8 资料下载 (需要安装Keil.CS32F1xx DFP.pack、内有采用STM32F103 库、</u> <u>CKS32F103 库可正常运行Demo)</u>

:::tip 提示

PowerWriter 团队不对真正的芯片型号进行溯源,以上的芯片IDCODE只是说明实际案例,与厂家无关,为销售渠道行为,特此说明。

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## 2.1.7.3.6 No Debug Unit Device found

#### 原因: 没有发现烧录器

CMSIS-DAP Cortex-M Target Driver Setup

Debug Trace Flash Download CMSIS-DAP - JTAG/SW Adapter Serial No:	Pack SW Device Error SWDIO No Debug Unit Device found	Move Up Down	
Firmware Version: ] ✓ SWJ Port: SW ▼ Max Clock: 10MHz ▼	Automatic Detection ID CODE:     Manual Configuration Device Name:     Add Delete Update	AP:	
Debug       Connect & Reset Options       Cache Options       Download Options         Connect:       Normal       ▼       Reset:       SYSRESETREQ       ✓       Cache Code       ✓       Verify Code Download         ✓       Reset after Connect       ✓       Log Debug Accesses       Stop after Reset       ✓       Cache Memory       ✓       Download to Flash			
	OK Cancel	Help	

处理方法: 重新连接烧录器,确保烧录器连接正常,驱动连接正常,详情请看:

驱动异常如何处理

## 2.1.7.3.7 SWD/JTAG Communication Failure(RDDI-DAP Error)

原因: 识别不到芯片

CMSIS-DAP Cortex-M	Target Driver Setup
--------------------	---------------------

SwJ       Port:       Sw       ID       CODE:       ID       ID       CODE:       ID       CODE:       ID       CODE:       ID       I	
Debug Connect & Reset Options	
Connect:       Normal <ul> <li>Reset:</li> <li>SYSRESETREQ</li> <li>Cache Code</li> <li>Verify Code Dow</li> <li>Cache Memory</li> <li>Download to Flass</li> </ul> Log Debug Accesses       Stop after Reset	vnload Ish
OK Cancel	Help

CMSIS-DAP - Cor	tex-M Error AP Error	×
	确定	

#### 解决方法:

确保烧录器和芯片烧录口连接正常,芯片没有开启高级保护或者烧录口被复用了,具体处理方法请 查看:

#### 芯片连接不上如何处理

https://docs.powerwriter.com/docs/faq/powerwriter/base/device\_mismatch)

## 2.1.7.3.8: Flash Timeout. Reset the Target and try it again.

#### 原因: 烧录失败



Copyright ©2017-2020 All Rights Reserved. 创芯工坊科技(深圳)有限公司

μVision	×
Error: Flash Do	wnload failed - "Cortex-M4"
	确定
CMSIS DAD. Cost	
Could no Please ch	t stop Cortex-M device! eck the JTAG cable.
	确定

#### 解决方法:

• 确保芯片没有开启读保护和写保护,去除保护方法参考:

#### 解除读保护

• 程序跑飞时或者芯片复位不成功时会导致烧录不成功,请重新连接芯片并确保调试器设置选项 如下图所示,并且可以尝试将boot0引脚拉高后再进行调试;

CMSIS-DAP Cortex-M Target Driver Debug Trace Flash Download CMSIS-DAP - JTAG/SW Adapter	Setup				×
Any  Serial No: 0123456789ABCD Firmware Version: 1.11	SWDIO Ox	DE 2BA01477	Device Name ARM CoreSight SW	V-DP	Move Up Down
SWJ Port: SW Max Clock: 5MHz	SWJ Port:     SW       Max Clock:     5MHz       Add     Delete       Update				
Debug       Connect & Reset Options       Download Options         Connect:       Normal       ▼       Reset:       SYSRESETREQ       ✓       Cache Options       ✓         ✓       Reset after Connect       ✓       Cache Code       ✓       Verify Code Download to Flash         ✓       Log Debug Accesses       Stop after Reset       ✓       Cache Memory       Download to Flash			ons Download o Flash		
	OK		Cancel		Help

- 更改调试时钟大小
- 以上方法还是无法解决时请尝试使用<u>Power Writer上位机软件</u>进行擦除芯片后再使用keil进行 仿真调试。

## 2.1.7.3.9 Contents mismatch

原因: 烧录成功, 校验失败



All				
ebug   Trace Flash Download				
Download Function       C Erase Full Chip       Image: Program         Image: C Erase Sectors       Image: Program       Start:         Image: C Erase Sectors       Image: Pr				
Description         Device Size         Device Type         Address Range           GD32F30x High-density FMC         512k         On-chip Flash         08000000H - 080FFFFFH				
Start: Size:				
Add Remove				
OK Cancel Help				

## 2.1.7.3.10 调试过程断线

Build Output					
Build target 'fl_cube_test'					
"fl_cube_test\fl_cube_test.axf" - 0 Error(s), 0 Warning(s).					
Build Time Elapsed: 00:00:01					
Load "fl cube test\\fl cube test.axf"					
Erase Done.					
Programming Done.					
Verify OK.					
Application running					
RDDI-DAP Error					
Flash Load finished at 09:46:25					
<					
E Build Output Browser					

如上图所示, MDK 擦除、写入、校验都是通过的。但是在 Application running ... 之后, 突然出 现RDDI-DAP Error!

原因:程序中没有将IO的调试功能打开,比如CubeMX中默认调试功能是关闭的,如果直接生成代 码去调试,就会出现此问题。

解决方法:在CubeMX中,左侧,SYS->Debug中打开 Serial Wire,如下图所示,然后更新代码。

Categories A-22	
System Core 🗸 🗸	Debug No Debug
¢ DMA	Serial Wire 2 Serial Wire
GPIO	JTAG (4 pins) JTAG (5 pins)
NVIC RCC	Trace Asynchronous Sw
SYS SYS SYS	

如果直接在代码中, 调整 调试模式。

```
* Initializes the Global MSP.
61
      */
62
63 void HAL_MspInit(void)
64 🖂 {
     /* USER CODE BEGIN MspInit 0 */
65
66
     /* USER CODE END MspInit 0 */
67
68
       HAL RCC AFIO CLK ENABLE();
69
       HAL RCC PWR CLK ENABLE();
70
71
      /* System interrupt init*/
72
73
74 🖻
     /** NOJTAG: JTAG-DP Disabled and SW-DP Enabled
75
      */
       HAL AFIO REMAP SWJ NOJTAG();
76
77
      /* USER CODE BEGIN MspInit 1 */
78
79
      /* USER CODE END MspInit 1 */
80
81
    }
82
   /* USER CODE BEGIN 1 */
83
84
```

:::tip 提示

其他的品牌和工具,也是类似处理,此类问题,都是因为调试引脚没有配置为调试模式导致。

:::

## 2.1.7.3.11 PowerWriter 正常识别, MDK识别不到目标芯片

此现象原因跟上一个现象一致,由于芯片中有代码运行,禁用了调试口, PowerWriter 响应的效率 比调试器要快一些,存在PowerWriter 能识别,但是MDK 失败的情况。

#### 处理方法:

使用PowerWriter 连接上目标芯片后,执行以下操作擦除所有数据:

✔ 选项字节,恢复默认,然后写入。

✓ 擦除Program Memory 程序空间数据。

执行以上操作后,再去MDK中调试。

## 2.1.7.3.12 Watch 窗口变量不刷新或显示灰色

数据没刷新的情况,是由于没有勾选 **Periodic Window Update**,进入调试状态后,从菜单的 View -> Periodic Window Update 勾选此功能,调试器,Watch 窗口的数据将会实时刷新,如下图所 示:

E:\MainProjects\2021\powerwriter\_for\_production\Source\mcu\_aviplayer\_sam

<u>F</u> ile	<u>E</u> dit	<u>V</u> iev	v <u>P</u> roject	Fl <u>a</u> sh	<u>D</u> ebug	Pe <u>r</u> i	pherals	<u>T</u> ools	<u>s</u> vcs	<u>W</u> indow		
1	<u>i</u>	$\checkmark$	Status Bar				⇒   🥐	1 12	1 12	筆 筆 //		
RST	E.		T <u>o</u> olbars			►			چ - 📖	- 🛃 -		
Registers		E	<u>P</u> roject Window				embly					
Register Core		3	Boo <u>k</u> s Wind	wot			153:	if(	FLASH	LATENCY		
		{}	Functions Window				154:	{	* Drov	www.the		
	RO	0.	Templates <u>V</u>	<u>V</u> indow			0800E0	/ 22A 68	00	LDR		
	R2	20	Source <u>B</u> rov	vser Win	ndow		0800E0	C2C F0	000001	F AND		
	R3 R4	==	Build Outpo	ut Wi <u>n</u> do	w		0800E0	230 28	06	CMP		
	R5	×	Error List W	indow								
	R6 R7		Find In File	s Windo	w		) main	.c 🗋	startup	_stm32h750		
	R8		Commond	A /im al a v v			142	]#if d	lefine	d (DATA		
	R10		<u>C</u> ommand \	vindow			143	IC	) uint	32_t tmp		
	R11	ER,	Disassembly	y Windo	w		144	#endi	.t /* 1	DATA_IN_		
	R12	LIS .	Symbo <u>l</u> s Wi	ndow			146	/*	FPU s	ettings		
	R14		Registers W	/indow			147 🛓	] #if	(F	PU_PRESE		
	R15	<u>وم</u>	Call <u>S</u> tack V	Vindow			148	S	CB->C	PACR  =		
	anked		Watc <u>h</u> Win	dows		►	149	- #en /*	Dagat	the PCC		
li in s	ystem		Memory Wi	ndows		►	151	1.	Reset	the Roo		
	ntern: Mod		Serial Wind	ows		►	152	/*	Incr	easing t		
	Pri		Analysis Wi	ndows		►	153	if(	FLASH	LATENCY		
			Trace			•	154	1	* Pro	gram the		
	Sec		System View	var			156	M	ODIFY	REG (FLA		
+ ···· F	PV	æ	System view	ver		,	157	}	-			
		×	Toolpox Mi	ndow			158	- 1+	C	CTON 544		
	- 0	$\checkmark$	Periodic Wi	ndow <u>U</u>	pdate		160	/* BCC	Set H ->CR	I= RCC C		
		-					161	noc	/ / OR	100_0		
							162	/*	Reset	CFGR re		

变灰色的原因,在于编译器优化级别过高,导致实际生成的调试信息和源码断点位置不完全一致而 出现同步的问题,此时可以通过调整整个项目的优化级别,如改为0级无优化后,源码断点位置和实际变 量的访问完全一致,如下图所示:

	Define: USE_HAL_DRIVER,STM32H/50xx											
	Undefine:											
	Language / Code Generation											
HSI48	Optimization:     -00     ▼     Tum Warnings into Errors     Language C++:     C++11     ▼											
	□ Link-Time ( <default> □ Plain Char is Signed ☑ Short enums/wchar</default>											
	□       Split Load       -01       □       Read-Only Position Independent       □       use RTTI         □       One ELF S       -02       □       Read-Write Position Independent       □       No Auto Includes											
_BIT(												
it st R_LAT	Paths -Oz image size											
	Compiler control string											
-	OK Cancel Defaults Help											

此外,可以单独调整部分源码的优化级别,在MDK 中通过源码文件(.c、.cpp) 右键打开文件属性, 单独设置文件的优化级别,如下图所示:

e dma2d c	150 /* Reset the RCC clock configuration to the default reset state	*/	
	151 152 W Options for File 'mdma.c'	×	
	153 Properties C/C++ (AC6)		
i jpeg.c		L CD	
	155 - Prenmoesen Sumhale		1
🕀 📄 mdma.c	157	- 11	
🖅 🗋 sdmmc.c	158 - Define:		
	159 Undefine:		
stm32h7xx hal msp.c	160 ,		
AVI parser c	Language / Code Generation		
Anniparsence	Language C:   <default> ▼ Language C:   <default> ▼</default></default>		
	163 Optimization: cdefault> Turn Warnings into Errors Language Cat:		
bsp_driver_sd.c		bi	1
	166 IV Link-Time Potential IV Short enums/wchar		
i fatfs_platform.c	167 I Split Load -01 I Read-Only Position Independent I use RTTI		
😑 🗁 Application/User/FATFS/A	168 One ELF \$ 0.03 Read-Write Position Independent IC No Auto Includes		
fatfs.c	169 Ofast	_	
Drivers/STM32H7xx HAL	170 ⊟ Include  -Os balanced		
Drivers/CMSIS			1
system stm32h7xx.c	172 173 Controls		
Middlewares/FatEs	174 - Compiler xc -std=c99 -target=am-am none-eabi -mcpu=cortex-m7 -mfpu=fpv5-d16 -mfloat-abi=hard -c	-	
	175 = control fno-tti funsigned-char fshort-enums fshort-wchar		
	176 sung		
	177		
⊕ ff_gen_drv.c			
🖅 🗋 syscall.c	UK Lancel Defaults Help		
🚣 👝 anns	180 NGC / DECI ON ONOCOCOU,		

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