GigaDevice Semiconductor Inc.

在 SEGGER Embedded Studio IDE 中开发 GD32VW553 系列 MCU

应用笔记 AN186

1.0 版本

(2024年1月)



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	一日你心开床仔妈~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	•



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1. 前言

GD32VW553 系列 MCU 是基于 Nuclei N307 处理器的 32 位通用微控制器,其中 N307 处理器基于 RISC-V 架构指令集。

本应用笔记旨在帮助用户通过 SEGGER Embedded Studio for RISC-V(SES) IDE 进行基于 GD32VW553 系列 MCU 的软件工程构建和开发。



2. 开发环境

- 开发板: GD32VW553H-EVAL-V1.1
- 硬件调试器: J-Link V11 / V12
- IDE: SEGGER Embedded Studio for RISC-V V7.32a
- 操作系统: WIN10 64-bit OS



3. 工程开发

3.1. 设备支持包安装

可通过 SES 实现设备支持包的在线或离线安装(离线包可通过 https://gd32mcu.com 官网获 取),参考<u>图 3-1.设备支持包安装选项</u>。打开 SES 软件,通过 "Package Manager..."可进行 在线包安装,参考图 3-2.设备支持包在线安装;通过 "Manually Install Packages..."选择离线 包进行安装,参考图 3-3.设备支持包离线安装。

图 3-1.设备支持包安装选项

Hello - SEGGER Embedded Studio for RISC-V V7.32	a (64-bit) - Non-Commercial	License			- 🗆 X
File Edit View Search Navigate Project E	uild Debug Target T	Tools Window Help			_
Project Explorer	main.c 🗘	Options	Alt+,		🔁 💿 🗙
🛟 Debug 🔹 🗖 🖨 🔂 🚸		License Manager			
Project Items Code Data+RO	1	Package Manager			
Solution 'Hello'	ß	Show Installed Packages		and the second second	
Setup 1 file		Manually Install Packages		reteres	
Source 1 file, modified op	5	New File Comparison	Ctrl+K, F	•	
E main.c		New Binary File Comparison			
		Browser	· Emb	addad St	udio
		Terminal Emulator		euueu st	uulo
		Admin			
	-		Check for Updates		
	SEGGER Em	bedded Studio for		Projects 🖻	Open existing Create new
	RISC-V is up	o to date			
				Today	
				🗅 Hello	
			Check for Packages		
	All packages	are up to date	Ó		
	Output				🖾 ×
	Show: Transcript	🔻 🍢 Tasks	•		0
	Prenaring solution 'He	ello'			^
	Completed				
	Restoring state from p Completed	previous session			
	SEGGER Embedded Sta Completed	udio is ready to use			

图 3-2.设备支持包在线安装

SEGGER Embedded	d Studio for RISC-V V7.32a - Pack	age Manager			?	×
🕒 Select Packa	iges					
GD32VW55x	٢				÷	ø
Title	^	Version	Туре	Status	Action	
GigaDevice GD32VW55x CPU Sup	port Package	1.00 -	CPU Support	Installed	No Action	
Package Informat	tion					^
Description	This package contains project te	molates and system files for the	GigaDevice GD	32WW55x		
Installed Version	1.00	implates and system mes for the	olgaberice ob			
Author	SEGGER Microcontroller GmbH					
						*
				Back	Cance	el 🛛



图 3-3.设备支持包离线安装

						~
Install Target Support Packages						×
A A A A A A A A A A A A A A A A A	- 1490 × 6446256	GD32VW55x_Add	on	√ Ū	搜索"GD32VW55x_Addon"	P
组织 ▼ 新建文件夹					8EE 💌 🎹	?
▲ 名称	修改日期	类型	大小			
🖻 GD32VW55x - 1.00.emPackage	2023/11/9 15:01	SEGGER Embed	443 KB			
	- 1.00 emPackage			~	Support Package Files (* er	
XIHL(N). 003277733X	- noolemirackage				Install III III	
					40/Fi	

3.2. 基于模板新建工程

Nam

ocation:

Project D:\GD32VW553

基于模板新建工程步骤如下:

步骤 1: 打开 SES 软件,在 "File->New Project"下通过选择 "A C/C++ executable for GigaDevice GD32VW55x"并设置工程名和位置来新建工程,参考<u>图 3-4. 基于模板新建工程</u>。

Select new project template	GD32VW55
$\dot{\nu}$ Don't see your device or board? Use the <u>Package Manager</u> to insta	ll packages
Description	Manufacturer

步骤 2: 点击 "Next",进入通用工程设置界面,包括芯片选型,编译器类型选择,链接输出文件类型选择,预定义宏设置,头文件包含路径设置,输入/输出支持选择,栈大小配置,参考<u>图</u>

 \times

0

Board

Generic GD32VW55x Generic GD32VW55x Generic GD32VW55x Generic GD32VW55x

Browse

Back Cancel



<u>3-5. 基于模板的通用工程设置</u>。

图 3-5. 基于模板的通用工程设置

SEGGER Embedded Studio for RISC-V V7.32a - New Project X								
G Choose common project	Choose common project settings							
Properties:								
Option	Value							
Build		1						
 Target Processor 	GD32VW553HMQ7							
Compiler		1						
Compiler	SEGGER							
Debugger								
 ISA Extensions Debug 	None							
Linker								
 Additional Output Format 	None							
Preprocessor								
 Preprocessor Definitions 								
 User Include Directories 								
Printf/Scanf								
 Printf Floating Point Supported 	No							
Printf Integer Support	int							
 Printf Width/Precision Supported 	No							
 Scanf Classes Supported 	No							
 Scanf Floating Point Supported 	No							
 Scanf Integer Support 	int							
Runtime Memory Area								
 Stack Size 	2,048 bytes							
Target Processor		1						
Select a set of target options								
	Back Next Cancel							
	Duck Here Concer							

步骤 3: 点击 "Next",进入工程文件选择界面,需使用默认选择项,参考<u>图 3-6. 基于模板的</u> <u>工程文件选择</u>。

图 3-6. 基于模板的工程文件选择

SEGGER Embedded Studio for RISC-V V7.32a - New Project	×
Select files to add to project	
Select files to add to project	
✓ Import all files and package files	Back Next Cancel



步骤 4: 点击"Next",进入工程配置选择界面,参考图 3-7. 基于模板的工程配置。

图 3-7. 基于模板的工程配置

SEGGER Embedded Studio for RISC-V V7.32a - New Project	×
G Select configurations to add to project	
Configurations	
✓ Debug ✓ Release	
Back Finish Cancel	

步骤 5: 点击 "Finish",进入工程界面,用户可以基于此模板工程进行二次开发,参考<u>图</u> 3-8. 基于模板的新工程。

图 3-8. 基于模板的新工程

Project - SEGGER Embedded Studio for RISC-V V7.3	a (64-bit) - Non-Commercial License	- 🗆 ×
File Edit View Search Navigate Project B	ld Debug Target Tools Window Help	
Project Explorer	Dashboard	🔁 💿 🗙
🛟 Debug 🔹 🔄 💼 💼 🔂 🚸		^
Project Items Code Data+RO		
Solution 'Project'		
Project 'Project'	E. MITTE	
Device Files 32 files		
Source Files 1 file, modifi		
System Files 2 files		
	SEGGER Embedded Studio	
	SEGGER Embedded Studio for RISC-V is up to date	Check for Updates
		-
	All packages are up to date	Check for Packages
	Projects	
		~
	Output	🖸 🗙
	Show Transcript	0
		~
_	🗍 Disconnected (J-Link) 🛛 😜 Built (OK INS (No editor)

3.3. 基于标准固件库新建工程

基于标准固件库新建工程步骤如下:



步骤 1: 打开 SES 软件,在 "File->New Project"下通过选择 "A C/C++ executable for GigaDevice GD32VW55x"并设置工程名和位置来新建工程,参考<u>图 3-9. 基于标准固件库新</u> <u>建工程</u>。

图 3-9. 基于标准固件库新建工程

SEGGER Embedded Studio for RISC-V V7.32a - New Project			×
G Select new project template	GD32VW55×		۵
$\dot{\psi}$ Don't see your device or board? Use the <u>Package Manager</u> to install packages			
Description	Manufacturer	Board	^
GigaDevice	GigaDevice	Generic GD32VW55x	
An assembly code only executable for GigaDevice GD32VW55x. An externally built executable for GigaDevice GD32VW55x. A library for GigaDevice GD32VW55x.	GigaDevice GigaDevice GigaDevice GigaDevice	Generic GD32VW55x Generic GD32VW55x Generic GD32VW55x	~
Name: Project			
Location: D:\GD32VW55x_Firmware_Library\Template\SES_project		Brow	se
	Back	Next Canc	el

步骤 2: 点击 "Next",进入通用工程设置界面,包括芯片选型,编译器类型选择,链接输出文件类型选择,预定义宏设置,头文件包含路径设置,输入/输出支持选择,栈大小配置,参考<u>图</u> 3-10. 基于标准固件库的通用工程设置。



图 3-10. 基于标准固件库的通用工程设置

Choose common project settings Properties: Option Value Build Target Processor Option Option Value Build Target Processor Option Value SEGGER Obsugger Value Va	SEGGER Embedded Studio for RIS	-V V7.32a - New Project				×
Properties: Option Value Build • • Target Processor GD32VW553HMQ7 • Compiler SEGGER • Compiler SEGGER • Debugger • • Additional Output Format None Linker • • Additional Output Format None Preprocessor • • Preprocessor Definitions • • Use Include Directories • • Printf/Scanf • • Printf Processor Supported No • Scanf Floating Point Supported No • Stack Size 2,048 bytes	Choose common project	settings				
Properties: Option Value Build	•					
Option Value Build	Properties:					
Build • Target Processor GD32VW553HMQ7 •• Compiler • Compiler SEGGER • • Compiler SEGGER • • • ISA Extensions Debug None • • • Inter • • • • • Preprocessor • • • • • Preprocessor Definitions • • • • • User Include Directories • • • • • Print/Scarf • • • • • • Print/Wolth/Precision Supported No • • • • • Print/Wolth/Precision Supported No • • • • • • Scarf Floating Point Supported No • <td>Option</td> <td>Value</td> <td></td> <td></td> <td></td> <td></td>	Option	Value				
Target Processor GD32VW553HMQ7 Compiler Compiler SEGGER Debugger SEGGER Debugger SA Extensions Debug None Linker Additional Output Format None Preprocessor Definitions User Include Directories Printf Noting Point Supported No Printf Nears Supported No Scarf Classes Supported Stack Size Sta	Build					
Compiler SEGGER Obbugger ISA Extensions Debug None Linker Image: Compiler Comp	Target Processor	GD32VW553HMQ7				•••
Compiler SEGGER Debugger I SA Extensions Debug None Linker Additional Output Format None Preprocessor Preprocessor Definitions User Include Directories Printf/Scaf Printf/Scaf Printf/Scaf Printf/Scaf Scarf Floating Point Supported No Scarf Floating Point Supported	Compiler					
Debugger • ISA Extensions Debug None Linker • Additional Output Format None • Additional Output Format None • Preprocessor • • • • Preprocessor Definitions • • • • User Include Directories • • • • Printf Inotaing Point Supported No • • • Printf Width/Precision Supported No • • • Scarf Classes Supported No • • • Stack Size 2,048 bytes • • Target Processor • Select a set of target options • Back Next Cancel • •	Compiler	SEGGER				
ISA Extensions Debug None Linker Additional Output Format None Preprocessor Preprocessor Printf/Scanf Printf/Scanf Printf Indeger Supported No Scanf Floating Point Supported No Scanf Integer Support int Runtime Memory Area Stack Size 2,048 bytes Back Next Cancel	Debugger					
Linker Additional Output Format None Preprocessor Preprocessor Verificanf Printf/Scanf Printf/Scanf Printf/Scanf Printf/Scanf Scanf Classes Supported No Scanf Floating Point Supported Scanf Edges Stack Size Scanf Scanf Scanf No Scanf Floating Point Supported Scanf Scanf Scanf No Scanf Floating Point Supported Scanf Sca	 ISA Extensions Debug 	None				
Additional Output Format None Preprocessor Preprocessor Definitions • User Include Directories • Printf Inotaing Point Supported No • Printf Width/Precision Supported No • Scarf Classes Supported No • Stack Size 2,048 bytes Back Next	Linker					
Preprocessor Preprocessor User Include Directories Printf/Scanf Printf Ploating Point Supported No Printf Integer Support No Scanf Classes Supported No Scanf Floating Point Supported No Scanf Floating Point Supported No Scanf Integer Support No Stack Size 2,048 bytes Stack Size <l< td=""><td> Additional Output Format </td><td>None</td><td></td><td></td><td></td><td></td></l<>	 Additional Output Format 	None				
	Preprocessor					
Vier Include Directories Printf//Scanf Printf/Scanf Printf/Inotaing Point Supported No Printf Integer Supported No Scanf Classes Supported No Scanf Classes Supported No Scanf Integer Support int Runtime Memory Area Stack Size 2,048 bytes Target Processor Select a set of target options Back Next Cancel	 Preprocessor Definitions 					
Printf/Scanf Printf Roating Point Supported No Printf Width/Precision Supported Scanf Classes Supported Scanf Integer Support No Scanf Integer Support int Runtime Memory Area Stack Size 2,048 bytes Stack Size Scanf Clarget options Back Next Cancel 	 User Include Directories 					
Printf Floating Point Supported No Printf Integer Support No Scanf Floating Point Supported No Scanf Floating Point Supported No Scanf Floating Point Supported No Scanf Integer Support Int Runtime Memory Area Stack Size Z,048 bytes Target Processor Select a set of target options Back Next Cancel	Printf/Scanf					
Printf Integer Support int Printf Width/Precision Supported No Scarf Classes Supported No Scarf Classes Supported No Scarf Integer Support int Runtime Memory Area Stack Size 2,048 bytes Target Processor Select a set of target options Back Next Cancel	 Printf Floating Point Supported 	No				
Printf Width/Precision Supported No Scarf Classes Supported No Scarf Integer Supported No Scarf Integer Support int Runtime Memory Area Stack Size 2,048 bytes Target Processor Select a set of target options Back Next Cancel	 Printf Integer Support 	int				
Scanf Classes Supported No Scanf Floating Point Supported No Scanf Indegr Support int Runtime Memory Area Stack Size 2,048 bytes Target Processor Select a set of target options Back Next Cancel	Printf Width/Precision Supported	No				
Scanf Floating Point Supported No Scanf Integer Support int Runtime Memory Area Stack Size 2,048 bytes Target Processor Select a set of target options Back Next Cancel	 Scanf Classes Supported 	No				
Scanf Integer Support int Runtime Memory Area Stack Size 2,048 bytes Target Processor Select a set of target options Back Next Cancel	 Scanf Floating Point Supported 	No				
Runtime Memory Area • Stack Size 2,048 bytes Target Processor Select a set of target options Back Next Cancel	 Scanf Integer Support 	int				
Stack Size 2,048 bytes Target Processor Select a set of target options Back Next Cancel	Runtime Memory Area					
Target Processor Select a set of target options Back Next Cancel	 Stack Size 	2,048 bytes				
Target Processor Select a set of target options Back Next Cancel						
Target Processor Select a set of target options Back Next Cancel						
Target Processor Select a set of target options Back Next Cancel						
Select a set of target options Back Next Cancel	Target Processor					
Select a set of target options Back Next Cancel						
Back Next Cancel	Select a set of target options					
Back Next Cancel						
Back Next Cancel			-			
				Back	Next	Cancel

步骤 3: 点击 "Next",进入工程文件选择界面,全部取消勾选默认配置项,参考<u>图 3-11.</u> <u>基于标准固件库的工程文件选择</u>。

图 3-11.基于标准固件库的工程文件选择

SEGGER Embedded Studio for RISC-V V7.32a - New Project		×
G Select files to add to project		
File:		
✓ Import all files and package files		
	Back Next Cancel	

步骤 4: 点击 "Next",进入工程配置选择界面,参考图 3-12. 基于标准固件库的工程配置界



<u></u>.

图 3-12. 基于标准固件库的工程配置界面

SEGGER Embedded Studio for RISC-V V7.30 - New Project	×
G Select configurations to add to project	
Configurations:	
□ Debug ☑ Release	
Back	Finish Cancel

步骤 5: 点击"Finish",进入工程界面,用户可以基于此空工程进行二次开发,参考图 3-13. 空工程。

图 3-13. 空工程

· · · · · · · · · · · · · · · · · · ·			
 project - SEGGER Embedded Studio for RISC-V V7.3. 	a (04-bit) - Non-Commercial License	- 0 ×	È
File Edit View Search Navigate Project Bu	ld Debug Target Tools Window Help		_
Project Explorer	Dashboard	🔁 🖬 🤉	×
🕄 Release 🔹 💿 💼 🗃 💿 🚸			^
Project Items Code Data+RO			
B Solution 'project'			
Project 'project'	E. WITH		
	- Alter		
	CECCED Employed dod Studio		
	SEGGER Empedded Sludio		
	SEGGER Embedded Studio for RISC-V is up to date	Check for Updates	
		Check for Packages	
	All packages are up to date	Ŏ.	
	i open existing		~
	Output	M 7	×
		-	
	Show: Transcript Tasks T	¢	2
			1
project.emProject saved	🗇 Disconnected (J-Link) 🗳 Built OK 🛛	NS (No editor)	

步骤 6: 将固件库文件按照如下结构进行组织,参考<u>图 3-14. 工程文件结构</u>。具体文件结构,参考固件库模板例程。



图 3-14. 工程文件结构

Project - SEGGER Embedded Studio for RISC-V V7.3 ile Edit View Search Navigate Project B	2a (64-bit) - Non-Commercial License uild Debug Target Tools Window Help	- 🗆 ×
roject Explorer	main.c gd32vw553h_eval.c gd32vw55x_gpio.c	📑 🔹 🗙
🕽 Release 🔹 💿 💼 😭 🗘 🛷		^
oject Items Code Data+RO		
Johnson Project Proj	SEGGER Embedded Studio	
▷ Source 28 files ► System_gdd3/ws5x.c ■ RISCV 20 files □ ■ drivers 14 files □ ■ Grivers 56 files ■ ■ Script Files 110 files	SEGGER Embedded Studio for RISC-V is up to date	Check for Updates
i obsZVW55x_larget.js ▲ (11) Utilities 1 file (12) gd32vw553h_eval.c	All packages are up to date	Check for Packages
	Projects 🕞 Open existing Create new	
	Comput Show: Transcript • Y, Y, Tasks •	⊠ × ¢
	🗇 Disconnected (GDB Server) 🛛 🗳 Built OK	INS (No editor)

步骤 7:点击"Project->Options",进入工程配置界面,配置用户头文件包含路径,参考<u>图 3-15.</u> *用户包含路径配置*。



SEGGER Embedded Studio for RISC-V	V7.32a - Options		×	
Project 'Project ' Option	ns			
↑ ↓ 🛱 Release 🔹 user	include	Show Modified	Options Only	
⊿ Code	Option	Value	A	
Assembler Build	Code Analyzer		SEGGER Embedded Studio for RISC-V V7.32a - Property Editor	×
Code Analyzer	Analyze Command	None		
Code Generation Compiler	🖌 📕 External Build		Set User Include Directories	
Compiler Warning	Assemble Command	None	Derivet Derivet	
External Build	C Compile Command	None	Project: Project	
File	C++ Compile Command	None	Configuration: Release	
Library	4 Dibrana		User Include Directories:	
Linker	a librar//O	None medified		
Preprocessor	* Elotaty vo	None mouned		
Printl/Scant Rustime Memory Area	A Preprocessor		_\\Utilities	
Section	User Include Directories	:\\:\\Utilities:\\\\Firmware\\GD32VW55x standard peripl	heral:	
Source Code	 User Include Directories Assembler Only 		_\Firmware\\UUS2VWSSx_standard_peripheral\include	
User Build Step	User Include Directories C Compiler Only			
⊿ Debug	User Include Directories			
Debugger GDB Server	Specifies the user include path. This property will have macro	o expansion applied to it.		
J-Link				
Loader				
Simulator			Macros:	 Image: Second sec
Target Script				
			OK Car	ncel
		ОК	Cancel Specifies the user include path. This property will have macro expansion appli	ed to it.

步骤 8: 点击 "Project->Options",进入工程配置界面,配置脚本文件,参考<u>图 3-16. 脚本配</u> <u>2</u>。



图 3-16. 脚本配置

SEGGER Embedded Studio for RI	SC-V V7.32a - Options		×		
Project 'Project ' Op	tions				
↑ ↓ tit Release -	Search Options	Show Modified Options Or	nly		
⊿ Code	Option	Value			
Build Code Analyzer Code Generation Compiler	Target Script Debug Begin Script Debug End Script Load Begin Script	None None None			
Compiler Warning	Load End Script Reset Script	None Reset0 modified	0	SEGGER Embedded Studio for RISC-V V7.32a - Property Editor	×
File Library Linker	Target Script File	\\Firmware\RISCV\env SES\GD32VW55x Taraet.is		Set Target Script File	
Preprocessor Brintf/Sconf			Pr	oject: Project	
Runtime Memory Area			Co	onfiguration: Release	
Section			Ta	irget Script File:	
User Build Step				\\Firmware\RISCV\env_SES\GD32VW55x_Target.js	Browse
⊿ Debug	Target Script File		M	acros:	\odot
Debugger GDB Server	The target script file, the contents of this file an	e prepended to script project properties before they are executed.			
Loader					
Simulator Target Script				ОК	Cancel
		OK Cance	el Tł	he target script file, the contents of this file are prepended to script project p efore they are executed.	roperties



4. IDE 界面介绍

4.1. 工程配置选项

用户可以通过右键点击 "Project Items" 栏下对应 Solution / Project / 文件夹 / 文件,选择 "Options..." 进行配置选项设置。

图 4-1. 工程配置选项

Project - SEGGER Embedded Studio for RISC-V V7.32a (64-bit) - No	n-Commercial License			- 🗆 ×
File Edit View Search Navigate Project Build Debug	Target Tools Window Help			
Project Explorer X	main.c			×
🗘 Release 🔹 🖬 🖬 😳 🛷 👘 🝸 🖸	$\leftarrow \rightarrow$			• ¥
Project Items Code Data+RO	2 \file main.c			<u>^</u>
Solution "Project"	SEGGER Embedded Studio for R	ISC-V V7.32a - Options		
A Application 3 files		-		
島」gd32vw55c_it.c 島」 main.c 島」 systick.c	Project 'Project ' Op	otions		
Doc 1 file	↑ ↓ ‡Release -	Search Options	Show Modified Options Only	
a 🗃 Peripheral 29 files	/ Code	Option	Value	
Source (28 files)	Assembler		· · · · · · · · · · · · · · · · · · ·	
system_gdszvwsst.c	Code Analyzer	Assembler Assembler	000	
drivers (14 files)	Code Generation	Additional Assembler Options		
env_SES 6 files	Compiler Compiler Warping	Additional Assembler Options From File Run Preprocessor	Ves	
GD32VW55x.Target.is	External Build			
4 🔄 Utilities (1 file)	File	a Build	No	
gd32vw553h_eval.c	Library	Project Type	Executable inherits	
	Preprocessor	 Project Directory 	None (modified)	
	Printf/Scanf	Output Directory Intermediate Directory	Output/S(Configuration)/Exe Output/S(Configuration)/Obi/S(ProjectName)	
	Runtime Memory Area	Executable File Name	\$(OutDir)/\$(ProjectName)\$(EXE)	
	Section Source Code	Object File Name Project Macros	\$(IntDir)/\$(InputName)\$(OBJ)	
	User Build Step	- Higher micros	v	
	a Debug			
	Debugger CDR Server			
	GDB Server			
	Loader			
	Simulator			
	< larget Script			> 🛉
	Output			E X
			OK Cancel	
	Show:			. · · · ·
			C Disconnected (GDB Security	a Built OK INS (No editor)
			U Disconnected (ODB Server.	V puint ork into (ivo editor)



4.1.1. 芯片选型

图 4-2. 芯片选型

SEGGER Embedded Studio for RI	SC-V V7.32a - Options	×
Project 'Project ' Op	otions	
↑ ↓ 🕄 Release 👻	target processor	Show Modified Options Only
 Code Assembler Build 	Option	Value
Code Analyzer	Target Processor	GD32VW553HMQ7 (inherits)
Compiler	🔺 🔳 External Build	
Compiler Warning	 Assemble Command 	None
External Build	C Compile Command	None
Library Linker Preprocessor Printf/Scanf Runtime Memory Area Section Source Code User Build Step		
 Debugger GDB Server J-Link Loader Simulator Target Script 	Select a set of target options • property rv_architecture=rv • property rv_abi=ilp32d • property target_device_nam • property debug_register_de • property linker_memory_m	¹² gc == GD32VW553HMQ7 inition_file=\$(PackagesDiri)/GD32VW55x/XML/GD32VW553x_Registers.xml p_file=\$(PackagesDiri)/GD32VW55x/XML/GD32VW553HMQ7_MemoryMap.xml
		OK Cancel



4.1.2. 汇编器/编译器配置

图 4-3. 汇编器配置

SEGGER Embedded Studio for RIS	SC-V V7.32a - Options	×
Project 'Project ' Op	tions	
↑ ↓ 🕄 Release 👻	assembler	Show Modified Options Only
⊿ Code	Option	Value
Assembler		
Build	▲ Assembler	
Code Analyzer	Assembler	gcc 🔹
Code Generation	 Additional Assembler Options 	gcc
Compiler	 Additional Assembler Options From File 	SEGGER
Compiler Warning		SEGGER Assembler
External Build		
File		
Library		
Linker		
Preprocessor		
Printf/Scanf		
Runtime Memory Area		
Section		
Source Code		
User Build Step		
Debug	Assembler	
Debugger	Specifies which assembler to use, SEGGER Assembler: Tech	nology preview - For test purposes only.
GDB Server		norogy prenent i or test parposes only.
J-Link		
Loader		
Simulator		
Target Script		
][
		OK Cancel

图 4-4. 编译器配置

roject 'Project ' Ol	otions		
🗘 🤃 Release 🗸	compiler	0	Show Modified Options On
a Code	Option	Value	
Assembler			
Build	Compiler		
Code Analyzer	Compiler	SEGGER (inherits)	-
Code Generation	Use Compiler Driver	gcc	
Compiler	Keep Assembly Source	SEGGER	
Compiler Warning	Keep Preprocessor Output	טאו	
External Build	 Supply Absolute File Path 	Yes	
File	 Enable All Warnings C Compiler Only Command Line Options 		
Library	 Enable All Warnings C++ Compiler Only Command Line Option 	s	
Library	 Enable All Warnings Command Line Options 		
Linker	 Enforce ANSI Checking C Command Line Options 		
Preprocessor	 Enforce ANSI Checking C++ Command Line Options 		
Printf/Scanf	 Enforce ANSI Checking Command Line Options 		
Runtime Memory Area	 Additional C/C++ Compiler Options 		
Section	 Additional C/C++ Compiler Options From File 	None	
Source Code	 Additional C Compiler Only Options 		
User Build Step	Additional C Compiler Only Ontions From File	None	
Debug	Compiler		
Debugger			
GDR Server	Specifies which compiler to use.		
L ink	Inherits		
2 EIIK			
Loader	"SEGGER" from project in Common configuration		
Simulator			



4.1.3. 链接脚本及链接输出格式配置

图 4-5. 链接脚本及输出格式配置

🗅 \downarrow 🕄 Release 🗸 🗸	Search Options		Show Modified Options C
⊿ Code	Option	Value	
Assembler			
Build	▲ Linker		
Code Analyzer	Linker	SEGGER inherits	
Code Generation	Linker Script File	\$(PackagesDir)/GD32VW55x/Scr	ipts/GD32VW55x_Flash.icf (inl
Compiler	Memory Map File	\$(PackagesDir)/GD32VW55x/XM	IL/GD32VW553HMQ7_Memory
Compiler Warning	Memory Map Macros		
External Build	Memory Segments	None	
File	Supply Memory Segments To Linker [segger-Id]	Yes	
Library	Generate Log File (segger-Id)	NO	
Linker	Generate Map File [segger-Id]	Standard	
Preprocessor	Additional Output Format	Nene	
Printf/Scanf	Additional Output Format	Ver	
Runtime Memony Area	Additional Input Files	165	
Section .	Linker Symbol Definitions		
Section Section	Entry Point	Reset Handler inherits	
Source Code	Keep Symbols		
User Build Step			
a Debug	Additional Output Format		
Debugger	The format used when creating an additional linked output file	The options are:	
GDB Server			
J-Link	 None do not create an additional output file. 		
Loader	bin create a binary file.		
Simulator	srec create a Motorola S-Record file.		
Target Script	· nex create an inter riek file.		

4.1.4. 输入/输出库配置

图 4-6. I/O 库配置

roject 'Project ' O	ptions	
Code Assembler	VO Option	Value
Build	▲ Library	
Code Analyzer Code Generation Compiler Verter Warning External Build File Library Linker Preprocessor Printf/Scanf Runtime Memory Area Section	• Library I/O	None modified RT RT SEMIHOST SEMIHOST (host-formatted) None None
Source Code User Build Step		
Debug Debugger GDB Server J-Link Loader Simulator Target Script	Library I/O Specifies how the library does I/O. Options are: • SRTT: Use SEGGER Real-Time Trans • SEMIHOST: Format output and w • SEMIHOST: Insoft-formatted): Ha • None: Do not include I/O implem	fer for I/O operations without halting the system. Recommended for maximum speed. Ite to RAM buffer. Halt CPU for I/O operation. Provides hosted file I/O. t CPU for I/O operation. Recommended for minimum size. entation. Use user-supplied I/O Mechanism.

当选择为 None 时,用户可通过修改"SEGGER_RTL_PRINOPS_UART_Unbuffered.c" 文件



中的宏 USART_PRINT 指定打印串口,参考图 4-7. 硬件串口配置。

图 4-7. 硬件串口配置

SEG	GER_R1	TL_PRINOPS_UART_Unbuffered.c
←	\rightarrow	
	16	*
	17	**************
	18	*/
	19	-
	20	<pre>#include " SEGGER RTL Int.h"</pre>
	21	#include "gd32vw55x.h"
	22	#include "stdio.h"
	23	
	24	#define USART PRINT USARTØ
	~ ~	

4.1.5. 输入/输出格式支持配置

图 4-8. 输入/输出格式支持配置

v € Release v	Search Ontions		Show Modified Options On
Code Assembler Build	Option	Value	
Code Analyzer Code Generation Compiler Compiler Warning External Build File Library Linker Preprocessor Printf/Scanf Runtime Memory Area Section Source Code	Printf Floating Point Supported Printf Integer Support Printf Integer Support Scanf Classes Supported Scanf Floating Point Supported Scanf Integer Support Wide Characters Supported	Float modified int Yes modified No int Yes modified	
User Build Step • Debug Debugger GDB Server J-Link Loader Simulator Target Script	Printf Floating Point Supported Are floating point numbers supported by the printf fun	ction group.	



4.1.6. 预处理配置

图 4-9. 预处理配置

Project 'Project ' Op	ISC-V V7.32a - Options		
► 🗸 🕄 Release 🗸 🗸	Search Options	Show Modified	Options Onl
⊿ Code	Option	Value	
Assembler	a rreprocessor		
Build	Ignore Includes	No	
Code Analyzer	Include Files		
Code Generation	 Include Files Assembler Only 		
Compiler	 Include Files C Compiler Only 		
Compiler	 Include Files C++ Compiler Only 		
Compiler Warning	Preprocessor Definitions	inherits	
External Build	 Preprocessor Definitions Assembler Only 		
File	 Preprocessor Definitions C Compiler Only 		
Library	 Preprocessor Definitions C++ Compiler Only 		
Linker	 Preprocessor Undefinitions 		
Preprocessor	 Preprocessor Undefinitions Assembler Only 		
Printf/Scanf	 Preprocessor Undefinitions C Compiler Only 		
Runtime Memony Area	 Preprocessor Undefinitions C++ Compiler Only 		
Section	 System Include Directories 		
Section Course Coulo	 Undefine All Preprocessor Definitions 	No	
Source Code	 User Include Directories 	.;\\;\\\\Utilities;\\\\Firmware\\GD32VW55x_star	ndard_p…
User Build Step			
Debug	User Include Directories		
Debugger	Specifies the user include path. This property will have macro e	expansion applied to it.	
GDB Server			
J-Link			
Loader			
Simulator			
T			
I arout Scrupt			

4.1.7. 优化等级配置

图 4-10. 优化等级配置

SEGGER Embedded Studio for RISC	C-V V7.32a - Options	×			
Project 'Project ' Opt	ions				
↑ ↓ 🕄 Release 🔹	ptimization	Show Modified Options Only			
⊿ Code	Option	Value			
Assembler					
Build	Code Generation				
Code Analyzer	Disable Function Inlining	No			
Code Generation	 Keep Link Time Optimization Intermediate Files 	No			
Compiler	 Link Time Optimization 	No			
Compiler Warning	 Link Time Optimization Additional Options 				
External Build	 Machine Outliner [segger-cc] 	None None (modified)			
File	Optimization Level				
Library					
Linker	▲ Library				
Preprocessor	Library Optimization	Level 1			
Printf/Scanf		Level 2 for speed			
Runtime Memory Area	▲ Linker	Level 2 balanced Level 2 for size			
Section	 Enable Outline Optimization [segger-Id] 				
Source Code	Ontimization Level	Level 3 for more speed			
User Build Step	Optimization Level				
A Debug	Specifies the optimization level to use. The options are:				
Debugger					
GDB Server	 None - don't specify an optimization level Level 0 - no optimization fastest compilation and be 	st debug evperience			
la link	Level 0 - no optimization, fastest compliation and be Level 1 - optimize minimally.	st debug experience.			
Lorder	Level 2 for speed				
Cinculater	Level 2 balanced				
Transf Cariat	Level 2 for size				
larget Script	 Level 3 for more speed - optimize even more, will tak 	e longer to compile and may produce much larger code.			
		OK Cancel			



4.1.8. 栈配置

图 4-11. 栈配置

🗸 🧅 🕻 Release 🗸 🗸	stack	Show Modified Options C
Code	Option	Value
Assembler		
Build	Code Generation	
Code Analyzer	Stack Sizes	No
Code Generation		
Compiler	Debugger	
Compiler Warning	Starting Stack Pointer Value	stack_end (inherits)
External Build		
File	▲ Linker	
Library	 Suppress Warning on Executable Stack 	No
Linker		
Preprocessor	Kuntime Memory Area	
Printf/Scanf	Stack Size	2,048 bytes inherits
Section		
Section		
Source Code		
Debug		
Debugger		
GDB Server		
I-Link		
Loader		
Simulator		
Target Script		

4.1.9. 调试器配置

用户可以选择 J-Link 或 GDB Server 的方式进行工程的下载和调试操作,参考<u>图 4-12. 调试</u> <u>器</u>。

↓ 🕄 Release 👻	Search Options		Show Modified Options O
Code	Option	Value	
Assembler Build	A Debugger		
Code Analyzer	Target Connection	Inlink (modified)	-
Code Generation	Run To Control	Simulator	
Compiler	* Run To	Simulator	
Compiler Warning	Startup Completion Point	GDR Server	
Compiler warning	Start From Entry Point Symbol	Yes inherits	
External Build	Leave Target Running	No	
File	CPU Register File	\$(StudioDir)/targets/cpu_register	s riscy.xml
Library	Register Definition File	\$(PackagesDir)/GD32VW55x/XML	/GD32VW553x Registers.xml
Linker	Debug Terminal Log File	None	·
Preprocessor	Threads Script File	None	
Printf/Scanf	Thread Maximum	25	
Runtime Memory Area	 Working Directory 	\$(ProjectDir)	
Section	 Command Arguments 	\$(ProiectName)\$(EXE)	
Source Code	Target Connection		
User Build Step	larger connection		
Debug	Specifies the target to connect to for debugging action	15.	
Debugger			
GDR Server			
U Link			
J-Link			
Loader			
Simulator			
Target Script			

图 4-12. 调试器配置



当选择 J-Link 方式进行工程开发时,参考图 4-13. J-Link 配置。

图 4-13. J-Link 配置

SEGGER Embedded Studio for RISC	-V V7.32a - Options		×
Project 'Project ' Opti	ons		
↑ ↓ Ct Release - Se	earch Options		Show Modified Options Only
Code Assembler Build	Option	Value	^
Code Anabara			
Code Analyzer	Host Connection	USB	
Code Generation	Plarget Interface Type	JIAG (inherits)	
Compiler	JTAG Instruction Register Size Before Target	Auto Detect	
Compiler Warning	Final Number Of Devices Before Target Final Adoptive Clocking	Auto Detect	
External Build	Speed	4 000 kHz	
File	Supply Power	No	
Library	Show Log Messages In Output Window	Ves	
Linker	Log File	None	
Preprocessor	Script File	None	
Printf/Scanf	Exclude Flash Cache Range	None	
Runtime Memory Area	Additional J-Link Options		
Section	Target Has Cycle Counter	No	¥
Source Code	Target Interface Type		
User Build Step	anger merioce type		
4 Debug	Specifies the type of interface the target has. The options are		
Debugger	• ITAG - Line ITAG interferen		
GDB Server	SWD - Lice SWD interface		
Link	cITAG - Use cITAG interface		
JELINK	Sinte escente interface		
Loader	Inherits		
Simulator	"ITAC" from encient in Common configuration		
larget Script	JIAG from project in common configuration		
			OK Cancel
			Cancer

当选择 GDB Sever 方式进行工程开发时,按照需求选择合适的 GDB Server,参考<u>图 4-14.</u> GDB Server 配置。

图 4-14. GDB Server 配置

SEGGER Embedded Studio for R	ISC-V V7.32a - Options		
Project 'Project ' Op	otions		
↑ ↓ 🕄 Release 🔹	Search Options	Show Modified	Options Only
⊿ Code	Option	Value	^
Assembler			
Build	GDB Server		
Code Analyzer	Host	localhost	
Code Generation	• Type	J-Link (modified)	-
Compiler	 GDB Server Command Line 	"\$(JLinkDir)/JLinkGDBServerCL" -device "\$(DeviceNa	me)" -siler
Compiler Warning	 Auto Start GDB Server 	Yes modified	
External Build	Port	2,331 modified	
File	 Reset and Stop Command 	reset modified	
Library	Ignore Checksum Errors	No modified	
Linker	Allow Memory Access During Execution	Yes modified	
Droprocessor	Register Access	Individual Only modified	_
Drintf/Sconf	Breakpoint Types	Hardware and Software	
Printi/Scant	Log File Target VML File	None	
Kuntime Memory Area	arget AVIL File Connect Timeout	5 seconds	
Section	Connect nineout	10 Seconds	
Source Code	Туре		
User Build Step	Specifies the type of GDB server being connected to U-Link	OpenOCD_ST-LINK and pvOCD add server implementations are	currently
Debug	supported.	, openado, ar enverand pyaco guo server implementations are	contentry
Debugger			
GDB Server			
J-Link			
Loader			
Simulator			
Target Script			
	/[
		OK	Cance
		UK UK	Cancel



4.2. 工程编译选项

通过点击菜单栏的"Build"选项,可对 Project / Solution 进行清除,编译和重编译操作;并可 对当前活跃工程执行编译后运行或调试操作,参考<u>图 4-15. 工程编译选项</u>。

图 4-15. 工程编译选项



4.3. 工程调试选项

通过点击菜单栏的"Debug"选项,可对目标芯片进行调试,断点设置等操作,参考<u>图 4-16.</u> <u>工程调试选项和图 4-17. 工程调试界面</u>。

图 4-16. 工程调试选项



AN186 在 SEGGER Embedded Studio IDE 中开发 GD32VW553 系列 MCU

Project - SEGGER Embedded Studio for RIS	SC-V	V7.32a	(64	4-bit)	- No	n-Comm	ercial Lic	ense	
File Edit View Search Navigate Pro	oject	Build	d	Deb	oug	Target	Tools	Window	Help
Project Explorer				•	Go			F5	
	-		_	н.	Break	c		Ctrl+.	
🖏 Release 🔹 💌 🔝 📑	Ð		1	н.	Stop			Shift+F	5
Project Items		Code		+	Resta	rt		Ctrl+Sh	ift+F5
Solution 'Project'		10.5	V	μî,	Togg	le Breakp	oint	F9	
Application 3 files		12.0	ĸ	0	Break	cooints			•
Doc 1 file				_					
Peripheral 29 files				93 	Step	Into		F11	
RISCV 20 files				ĻΞ	Step	Over		F10	
Script Files 1 file				ςΞ	Step	Out		Shift+F	11
Utilities 1 file				⇒≣	Run 1	To Cursor		Ctrl+F1	D
				気団	Auto	Step			
					Instru	uction Ste	p Into	Alt+F11	
				₫	Show	/ Next Stat	tement	Alt+*	
				ŶĪ	Set N	lext Stater	ment	Shift+F	10
					Swite	h Debug	Mode	Ctrl+F1	1
				00	Quic	k Watch		Shift+F)
				R	Debu	ig With O	zone	Alt+F5	
					Optic	ons			+

图 4-17. 工程调试界面





4.4. 目标芯片操作选项

通过点击菜单栏的"Target"选项,可对目标芯片执行连接,断开,附着,下载和验证等操作,参考<u>图 4-18. 目标芯片操作</u>。

图 4-18. 目标芯片操作

Project - SEGGER Embedded Studio for RISC-V V7.32a (64-bit) - Nor	n-Cor	nmercial License	
File Edit View Search Navigate Project Build	d Debug	Targ	get Tools Windov	v Help
Project Explorer		1	Connect J-Link	Ctrl+T, C
		X	Disconnect	Ctrl+T, D
Co Co	*E	S.	Reconnect	Ctrl+T, E
Project Items	Code	<mark>i</mark> ≣	Attach Debugger	Ctrl+T, H
Solution 'Project'		II.	Peret	Ctrl+T_S
Project 'Project' Application 3 files	12.5K	- - -	Download GD22\/0\/55v	Ctrl+T, 5
Doc 1 file		*=	Varify CD22WW55v	Ctrl+T, L
Peripheral 29 files		~=	Verily 0D52VVV55X	Cui+1, V
RISCV 20 files			Erase All	Ctrl+T, K
Script Files 1 file			Upload Range	
Utilities 1 file			Download File	•
			Vorify Eilo	,
			veniy nie	•
		₽ <u>₹</u>	Start Cycle Counter	
		2	Pause Cycle Counter	
		Z	Zero Cycle Counter	Ctrl+T, Z
			Switch Project	•
		P	Target Connection Pro	perties



5.

版本历史

表 5-1. 版本历史

版本号.	说明	日期
1.0	首次发布	2024年1月15日



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