



ON Semiconductor RSL10 環境架設說明文件

文件標示	ON Semiconductor RSL10 環境架設說明文件				
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版本歷史

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一. Introduction 介紹

本文主旨在說明如何架設 RSL10 開發環境, RSL10 提供兩種開發環境 eclipse 及 Keil u Vision MDK-Arm,本文主要介紹 Eclipse-base with RSL10 SDK 環境,軟體端透過 CMSIS-Pack 提供 sample code 及更新而不需要重新安裝 IDE。

二.Prerequisites 環境需求

1. Java Runtime Environment (JRE)

64-bit variant of the most recent Java version, choosing the Java Runtime Environment (JRE).

URL: https://java.com/zh_TW/download/





2. Latest version of J-Link.

URL: https://www.segger.com/downloads/jlink



圖 2.2







3. RSL10 Software Development Kit (SDK)

The RSL10 SDK allows for rapid development of ultra-low power Bluetooth Low Energy applications. Convenient abstraction decouples user application code from system code, allowing for simple modular code design. Features such as FOTA (Firmware Over the Air) can easily be added to any application. Advanced debugging features such as support for SEGGER® RTT help developers monitor and debug code.

URL: <u>https://www.onsemi.cn/PowerSolutions/product.do?id=RSL10</u>



圖 2.3

4. CMSIS-Pack

Cortex Microcontroller Software Interface Standard (SMSIS) enables consistent device support and simple software interfaces to the processor and its peripherals, simplifying software reuse, reducing the learning curve for microcontroller developers, and reducing the time to market for new devices.

ON Semiconductor provide two CMSIS-pack for RSL10.

RSL10 SDK CMSIS Pack for Eclipse and Keil for peripheral(UART, I2C, SPI, etc...) Bluetooth IoT Development Kit CMSIS Pack for Bluetooth sample code URL:

https://www.onsemi.com/PowerSolutions/supportDoc.do?type=software&rpn=RSL10





三.Connecting The Hardware 硬體配置

1. 確認 CURRENT 有連接, POWER OPTIONS 選擇 USB, 其餘配置如下圖所示。





一旦配置正確,將開發板透過 micro USB 連接至電腦供電,靠近 USB 接點的 LD1 在第一次供電時 LED 閃爍後轉為恆亮狀態代表開發板狀態正常。





四. Install IDE 安裝 IDE

1. 下載 RSL10 DEVELOPMENT TOOLS。



圖4.1.

- 2. 安裝前如果之前有安裝舊版 RSL10 SDK 請先移除並將 RSL10 資料夾刪除。
- 3. 點擊 MSI 檔案開始安裝,點選 Next。







圖4.3. 勾選 I accept the term in the License Agreement 後點選 Next





4. 點選 Typical 後點選 Next。

🖟 RSL10 Developmen	nt Tools Setup	×
Choose Setup Type Choose the setup	type that best suits your needs	
	<u>Iypical</u> Installs the complete RSL10 Integrated Development Environment in the default location. Recommended for most Custom Allows users to choose where the RSL10 Integrated Development Environment will be installed. Recommended for advanced users.	
	< <u>B</u> ack <u>N</u> ext > Cancel	

圖4.4.

🔀 RSL10 Development Tools Setup	×
Ready to Install	S.
The Setup Wizard is ready to begin the Typical installation	
Click Install to begin the installation. If you want to review or change any of your installation settings, dick Back. Click Cancel to exit the wizard.	
< <u>B</u> ack Install Can	tel

圖4.5. 點選 Install





🖟 RSL10 Development Tools Setup		-		×
RSL10 Development Tools			X	
Please wait while the Setup Wizard instal take several minutes. Status: Validating install	ls RSL 10 Deve	lopment Tools. Th	s may	
	< <u>B</u> ack	<u>N</u> ext >	Cance	el

圖4.6.



圖4.7. 點選 Finish 完成安裝

5. 下載 ONSEMICONDUCTOR. BDK. 1. 5. 1. PACK 及 ONSEMICONDUCTOR. RSL10. 2. 4. 1

<u> ++/</u>	ONSEMICONDUCTOR.BDK.1.5.1.PACK.PACK 類型: PACK 檔案	修改日期: 2019/4/9 下午 12:01 大小: 20.1 MB
I++	ONSEMICONDUCTOR.RSL10.2.4.1.PACK 類型: PACK 檔案	修改日期: 2019/4/9 上午 11:59 大小: 31.5 MB

圖4.8.



6. 開啟 RSL10 SDK , 選擇要放專案的資料夾位置。

大聯大控股

#2

世平集團

World Peace Industrial Group

Eclipse Launcher			Х
Select a directory as workspace			
Eclipse uses the workspace directory to store its preferences and dev	elopment artifacts.		
Workspace: C:\Users\Augustus\eclipse-workspace_RSL10_201904	~	<u>B</u> rowse	
Use this as the default and do not ask again			
<u>R</u> ecent Workspaces			
	Launch	Cancal	
	Launch	Cancel	



7. 當 IDE 開啟後點選 Window → Preferences。

e e	clipse-workspace	_RSL10_2	01904 - E	lipse				
File	Edit Navigate	Search	Project	Run	Window	Help		
	Backs Example	∎ ▼ ! ⊑ amples Σ	3	5	New Edito Appo Shov Persp Navi	Window or earance v View oective gation erences	> > > >	+ : ∰ + ₩ + ☆ ↔ + Only show + escription

圖4.10.



8. 在 Preferences 視窗左側中點選 CMSIS Packs,在 CMSIS Pack root folder 中選擇你要 安裝 CMSIS-Packs 的位置,如 C:\OnSemi,選擇完畢後 點選 Apply and Close。

Preferences					— 🗆 X
type filter text	💠 CMSIS Pack	5			← → ⇒ → →
> General > C/C++ Changel og	CMSIS Pack <u>r</u> oot	folder: C:\Or	nSemi		<u>B</u> rowse
CMSIS Packs Console > Help > Install/Update > Library Hover > MCU > Mylyn > Oomph > Remote Development > Remote Systems > RPM > Run/Debug > Team > Terminal > Tracing Validation > XML	Type CMSIS Pack	Name Keil	URL http://www.keil.com/pack/	index.pidx	Add Edit Delete
	Check for Up Proxy Settings No Proxy (Address: User name:	dates on first la	unch everyday 🔿 SOCKS Proxy	Port: Password:	
? .				Resto Apply an	d Close Cancel

圖4.11.

9. 點選右上角 Open Perspective 圖案後點選 CMSIS Pack Manager 。

	_		×
- 1 D	1=-1 +4 A		
☞: 網 ▼		⇒ ▼	雨茶
rals		nen Pr	erspective
		EÎ	

圖4.12.





Open Perspective	—		×
C/C++ (default) CMSIS Pack Manager CVS Repository Exploring CVS Repository Exploring CVS Repository Exploring CVS Repository Exploring COS Trace Git COS Trace COS Tracing Overview Packs OS Tracing Overview Remote System Explorer Resource COS Resource COS Repository Explorer COS Resource COS Repository Explorer COS Repository Explorer C			
<u>O</u> pen		Cance	el



10. 在 CMSIS pack manager 中的分頁 packs 點選 Import Pack。

eclipse-workspace_RSL10_20190	4 - ble_peripheral_serve	er_bond/bl —	
<u>F</u> ile <u>E</u> dit <u>S</u> ource Refac <u>t</u> or <u>N</u> av	vigate Se <u>a</u> rch <u>P</u> rojec	t <u>R</u> un <u>W</u> indow	<u>H</u> elp
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▋▋▼₿▼や◇マ		Quick Access	🗟 💠 🙆
📕 De 🔀 🗾 Bo 🖳 🗖	Packs 🔀 📑 Exampl	les 🗖 🗖	8 - 0
🕀 🖻 🕐 💥 🔻	E 🛛 🕯	🔻 🖆 🍫 😂 🕈	₽ ₽ 0
type filter text S	earch Pack		~
Device	Pack		type filter

圖4.14.





11. 點選要安裝的的 CMSIS-Pack, 重複前述步驟安裝 ONSEMICONDUCTOR. BDK. 1. 5. 1. PACK 及 ONSEMICONDUCTOR. RSL10. 2. 4. 1。

Import Packs					×
← → ~ 个 🔤 → 本機 →	桌面 → WorkingPr	oject > BLE_RSL10 > install file >	✓ ひ 授尋 i	nstall file	م
組合管理 ▼ 新増資料夾					
e2_studio	* ^	名稱 ^	修改日期	類型	大小
5 軟體	*	nhoto	2019/4/9 下午 03	檔案容判太	
👷 WorkingProject	*	ONSEMICONDUCTOR.BDK.1.5.1.PACK.PACK	2019/4/9 下午 12	PACK 檔案	20,64
BLE_RSL10		ONSEMICONDUCTOR.RSL10.2.4.1.PACK	2019/4/9 上午 11	PACK 檔案	32,29
RSL10 DEVELOPMENT T	OOLS intall ph				
RSL10 SDK DOCUMENT	ATION PACKAG				
SIG					
줄 OneDrive					
💻 本機					
🧊 3D 物件					
🖊 下載					
🔮 文件					
♪ 音樂					
三 桌面		٢			>
		-		et a la	-
個案名構(上		JCTOR.RSL10.2.4.1.PACK	✓ Pack	Files (*.pack)	~
			194 194	<u> </u>	取消

圖4.15.

 RSL10 CMSIS-Pack 至目前為止已安裝置 IDE 中 , 在 Devices 分頁中你可以展開所有 Devices > ONSemiconductor > RSL10 Series 中 RSL10 清單 , 你可以在 Packs 分頁中管 理你安裝的 Packs。

eclipse-workspace_RSL10_2019	904 - ble_p	peripheral_server_bond/ble/source/ble_gap.c	- Eclipse			- 🗆	×
<u>F</u> ile <u>E</u> dit <u>S</u> ource Refac <u>t</u> or <u>N</u>	avigate	Se <u>a</u> rch <u>P</u> roject <u>R</u> un <u>W</u> indow <u>H</u> elp					
	2 1	2 🗁 🔗 🔛 💁 🖛 🌮 🖉 🛀	2 년 - 친 - 1	*5 () •			
				(Quick Access	🛛 🖻 🔤	* 🙆
📕 Devices 🔀 🔢 Boards		🛞 Packs 🙁 📑 Examples			😑 Pack Pro	pert 🔀	
⊞ ⊟ 🧿	× ×	Ē Ē (0 😌 🐸 🦑 🛓	<u>~</u> ~			? ⊽
type filter text		Search Pack			type filter te	xt	
Device	Summa	Pack	Action	Descript	✓ ⊕ ON	Semiconduct	or.RSL1(
🗸 🔧 All Devices	1 Device	 Device Specific 	2 Packs	ONSem		oards	
 ONSemiconductor 	1 Device	ONSemiconductor.BDK	🚸 Up to date	Bluetoo		omponents.	
RSL10 Series	1 Device	1.5.1 (2019-03-27)	💢 Remove	- Added		vamples	
RSL10	ARM Cc	> Previous		ONSem	· · · ·	.xumpica	
		ONSemiconductor.RSL10	Up to date	ON Ser			
		# 2.4.1	🐹 Remove	Eclipse (
		Generic		Software			
<	>	<		>	<		>
📮 Console 🔀 🖷 Progress				B, I		⊒ ▼ 📑 ▼	
CMSIS RTE console [ble_peripheral	server bo	nd]					
		•					\sim
							\sim
<							>

圖4.16.





五.Building Your First Sample Application in Eclipse

在此步驟中我們要點亮開發板上的 LED (DIO6) 透過 ON Semiconductor Example 快速確認環境 安裝正確及了解 example 載入步驟。

 在 CMSIS-Packs Manager 中點選 Examples 分頁 ,根據安裝的 CMSIS-Pack ,此分頁提供 Example project ,使用者可根據自己需求載入 example ,在此步驟點選 blinky ,點選 copy 後即載入至 IDE 中。



圖 5.1.





2. 回到 C/C++ 視窗, 在 Project Explorer 中可看到剛剛載入的 blinky。



圖 5.2.





 點選 Build Project , 則開始執行 build 程序 , 執行結果會在 Console 顯示 , 當顯示 Build Finish 時代表專案無問題。

eclipse-workspace_RSL10_20190	04 - blinky/blinky.rteconfig - Eclips	e					- 🗆 X
<u>File Edit Source Refactor Nav</u>	vigate Se <u>a</u> rch <u>P</u> roject <u>R</u> un	<u>W</u> ind	ow <u>H</u> elp				
📑 – 🖩 🕲 😸 – 🚮 🤇	9 - 📮 🔌 🗈 🗉 🖬 🕅	2. 9	.e 3.7	ి 🐂 🖄 🕶 🕯	🛍 🔻 💽 ·	• 🞯 • 🕸 • 🔘 •	
🖻 🔳 射 🕶 🖓 🕶 🏷 🔶 🕶	-						Quick Access 🔡 🔛 🔤 🎄 🆄
🍋 Project Explorer 🛛 🗖 🗖	🚸 blinky.rteconfig 🔀						- 8
🖻 🔄 😨 🔻	🚸 Components 🗹 Resolve						0
ble_mesh	Software Components	Sel.	Variant	Vendor	Versi	on Description	^
✓ Blinky	RSL10			ONSemicondu	icto	ARM Cortex-M	3 48 MHz, 24 kB RAM, 384 kB ROM
> 🐝 Binaries	> 🚸 BLE		BDK	ONSemicondu	uctoi 1.5.1	RSL10 BLE stack	implementations for BDK based a
> 🔊 Includes	> 🚸 Board Support		BDK-GEVK	ONSemicondu	uctoi 1.5.1	Board Support	package for BDK-GEVK evaluation
> 👝 Debug	> 🚸 Components					Platform indepe	endent drivers for various external (
> 🔁 include	🗸 💠 Device						
> 🏂 RTE	> 🔶 BDK					BDK software co	omponents compatible with all eva
> 🖻 app.c	> 🔶 Bluetooth Profiles						
🚸 blinky.rteconfig	 Libraries 						
readme_blinky.txt	BLE		release	ONSemicondu	uctoi 2.4.1	Bluetooth Stack	(libblelib)
sections.ld	Calibrate		release	ONSemicondu	uctoi 2.4.1	Calibration Libr	ary (libcalibratelib)
i2c_cmsis_driver	Custom Protocol		release	ONSemicondu	ucto 2.4.1	Low Latency Au	dio Streaming Custom Protocol Lik
I2C_master_test	Flash		release	ONSemicondu	icto 2.4.1	Flash Library (lib	flashlib)
sense_ics_firmware_sleep	Fota	Π	release	ONSemicondu	icto 2.4.1	Fota Library (lib	fota)
simple_UART							
	Validation Output			[Description	1	
							7
	Components Device Packs						
	🔚 Outline 💿 Build Targets 🚦	Prob	olems 🧔 Tasks	📃 Console 🕱 [Propert	ies 🛷 Search 🞄 De	bug 🗖 🗖
						🕹 🗘 😫	📑 📑 😑 🍡 📑 🖃 🕶 😁 🕶
< > >	CDT Build Console [blinky]						
	Invoking. Cross Akm	5.00	Frinc Size	: 	1.4.1		^
🛄 Bookmarks 🛛 🖳 🗖	arm-none-eabl-size	- I OP	mat=berkeie	y DIInky.e	11		
-15 €9 ▽	text data t	055	dec	nex Tilena	me		
→i [*] •	3664 100 10	1.	4804	12C4 DIINKY	.eit		
Description	Finished building: 1	011N	Ky.siz				
Description							
			()				
	16:12:57 Build Finish	ned	(took 2s.98	(9ms)			
							*
< >>	<						>

圖 5.3.





4. 點選 debug → Debug Configurations。

			- 🗆 X
elp			
19	👌 🐂 👩 🕶 💕 🔻	🖸 🗖 🖸	* 🔯 * 🕽 * 🚱 * 🂁 * 🖄 🖉 *
			(no launch history) 🔂 🎄 🍪
			Debug As > 🗆 🗖
			Debug Configurations
			Organize Favorites
nt	Vendor	Version	Description
	ONSemiconducto		ARM Cortex-M3 48 MHz, 24 kB RAM, 384 kB ROM
	ONSemiconducto	1.5.1	RSL10 BLE stack implementations for BDK based a
EVK	ONSemiconducto	1.5.1	Board Support package for BDK-GEVK evaluation
			Platform independent drivers for various external of
			BDK software components compatible with all eva
e	ONSemiconducto	2.4.1	Bluetooth Stack (libblelib)
е	ONSemiconducto	2.4.1	Calibration Library (libcalibratelib)
е	ONSemiconducto	2.4.1	Low Latency Audio Streaming Custom Protocol Lik
е	ONSemiconducto	2.4.1	Flash Library (libflashlib)
е	ONSemiconducto	2.4.1	Fota Library (libfota)
			>
	Desc	ription	



5. 在 Debug Configuration 視窗中點選 GDB SEGGER J-Link Debugging 右鍵 → New。



圖 5.5.





6. 確認 Main 分頁中 C/C++ Application 是專案 blinky 所透過 build 產出的 elf 檔案。

Debug Configurations						×
Create, manage, and run configura	tions					Ť.
Image: Second Secon	Name: blinky Debug Main Debugg Project: blinky C/C++ Application: Debug\blinky.elf Build (if required) befor Build Configuration: O Enable auto build O Use workspace setti	er) 🍉 Startup) 🧤 So are launching Select Automatically ngs	urce) 🔲 <u>C</u> ommon) () Dise <u>Config</u>	<u>V</u> ariables able auto build jure Workspace S	Search Project	<u>B</u> rowse V
< >> Filter matched 10 of 16 items					Re <u>v</u> ert	Apply
?					<u>D</u> ebug	Close

圖 5.6.





 切換到 Debugger 在 Device name 欄確認為 RSL10,在 Interface 選項中為 SWD,確認無 誤後點選 debug。

Debug Configurations								×
Create, manage, and run configura	tions						Ŕ	5.
Image: Second Secon	Name: blinky Debug Main ☆ Debugg J-Link GDB Server S Start the J-Link G Executable: Actual executable: Device name: Endianness: Connection: Interface: Initial speed: GDB port: SWO port: Telnet port: Log file:	etup GDB server lc \$(jlink_path C:/Program (to change RSL10 © Little © USB © SWD O Auto 2331 2332 2333	artup 5 Source ocally h}/S(jlink_gdbser n Files (x86)/SEG it use the global O Big IP O JTAG Adaptive	er	mmon Connect to running CV634f//JLinkGDBServert Coace preferences pages c (USB s (USB s 1000 kHz Verify downloads Cocal host only	y target Browse CL.exe or the project proj Supported c serial or IP name/a ⊡ Initialize regis Silent	Variables perties page) device names address) sters on start Browse	
< >> Filter matched 10 of 16 items						Revert	Apply	
?						<u>D</u> ebug	Close	•

圖 5.7.





IDE 會導向 Debugger 模式並暫停在 main 起始位置上 , 點選 Resume [▶] 按鈕開始執行 8.

Example project.



圖 5.8.

此時開發板上 LED1 會開始進行閃爍。 9.



圖 5.9.





六.EmbSysReg

RSL10 IDE 提供 EmbSysReg 插件,可供在 Debug 時暫存器清單介面並可透過手動操作暫存器 進行 Debug。

1. 在 RSL10 IDE 中點選 Window → Preferences。

eclipse-workspace RSL10 201904 - blinkv/app.c - Eclipse					_		×
 eclipse-workspace_RSL10_201904 - blinky/app.c - Eclipse File Edit Source Refactor Navigate Search Project Run 	Window Help New Window Editor Appearance Show View Perspective Navigation Preferences	> > > > > > > > > > > > > > > > > > > >	v O v Q v i Ø ₪ bles ⅔ • Breskpo Ty	& ▼ : ▲ ひ : ♥ ▼ IIII Registers ▲ Modu pe	Quick Access		×
♦ blinky.rteconfig I app.c X C 0xe92							
116 while (1) 117 { 118 /* Refresh the Watchdog timer 119 Sys_Watchdog_Refresh(); 120 121 121 /* Toggle GPIO 6 (if toggling	*/	then w	ait 0.5 seconds	5 */		^	

圖 6.1

 點選 C/C++ → Debug → EmbSys Register View 確認參數設定如下圖所示,參數無誤擇點 選 OK 關閉視窗。

Preferences	
type filter text	EmbSys Register View
> General ^ < C/C++	A Periperal Register View for embedded system
Appearance	Architecture: Chip description
> Build	cortex-m3 V
Code Analysis	Vendor:
> Code Style	ONSemiconductor 🗸
Core Build Toolchains	Chip:
Breakpoint Actions	rsl10 v
Disassembly	Board:
EmbSys Register View Floating Point Memory Renderer	none
> GDB	
Source Lookup Path	
Traditional Memory Rendering	
> Editor	
File Types	

圖 6.2





clipse	lindow Help						-		×
3. C. R	New Window	,	+ () + Q. + i 🍅 👝 /	🛷 🛨 🗾 💿 i 🐙 🛨	¥I - *⊳ ⇔	- ⇒	Ŧ	
	Editor	· >				Ouick Access	11 📩		< 🐼
~	Appearance	>				Quick Access	1:1 📼		r 🗠
× -	Show View	>	bles	Rreakpoints	Alt+Shift+O B	iles 🚡 Perip	her		6
	Perspective	>		Console	Alt+Shift+O_C	1 📩 🎫 🗉	1 🗋	1	8
t)	reispective		*	Debug	Alt+Shirt(Q, C	Value			
~	Navigation	>	₩ ■	Debug Debugger Console		-			
	Preferences		96	Disassembly		L			
_		_	0	Error Log	Alt+Shift+O I				
				Evecutables	Altronitri Q, E				
			66	Expressions				0	
		<		Memory				>	
			6	Memory Browser					
			-	Modules					
			9	Outline	Alt+Shift+O. O			^	
og timer *	/		닢	Peripherals	, , , -				
);	-			Problems	Alt+Shift+O. X				
			1010	Registers					
toggling i	s enabled)	then	÷.	Signals					
== 1)				Tasks					
FD DTO):				Terminal					
/			20	Trace Control					
			(x)=	Variables	Alt+Shift+Q, V			~	
				Other	Alt+Shift+Q, Q			>	
es 🛛 🙀 Debugg	er Console 🛛 📋 1	Vemory			X = X 🔐 🖙 🖵 🖬	- 🖻 🛃	📑 🛨		

3. 在 Debug 視窗下 , 點選 Window → Show View → Other..

圖 6.3

4. 在 Debug 底下 , 點選 EmbSys Registers 後點選 Open。



圖 6.4





 在 Debug 視窗下可看到 EmbSys Registers 視窗,展開 DIO→ DIO→ DIO_DATA,並雙撃 點選 DIO_DATA。

🖨 eclipse-workspace_RSL10_201904 - Eclipse			
File Edit Navigate Search Project Run Window Help			
	i 🎄 🕶 👩 🕶 💁 🕶		- :⊕ - ₩
🙀 🎋 Debug 🛛 🦌 🙀 🖓 🖓 👘	(x)= Variabl 🔀 🔍	Breakp	1919 Regist
🗉 🗸 🖻 blinky Debug [GDB SEGGER J-Link Debugging]			
🚡 🗸 況 blinky.elf	Name		Type
Thread #1 57005 (Suspended : Breakpoint)			
■ main() at app.c:124 0x1003f4			
JLinkoDbServerCL.exe			
Semihosting and SWV			
	<		
	<		
🚟 EmbSys Registers 🐹 🚸 blinky.rteconfig 🗈 app.c 💽 0xe92			
🚜 📄 Arch: cortex-m3 Vendor: ONSemiconductor Chip: rsl10 Board: none			
Register Hex Bin	Reset	Access	Address
S Co DMA			
	0.00003435	DW	0.4000070
	0x0000313F	RW	0x40000700
	0x0000313F	RW	0x4000070
DIO_CEG[3]	0x0000313F	RW	0x4000070
DIO CFG[4]	0x0000313F	RW	0x4000071
> DIO_CFG[5]	0x0000313F	RW	0x4000071
> 💀 DIO_CFG[6]	0x0000313F	RW	0x4000071
> 3 DIO_CFG[7]	0x0000313F	RW	0x4000071
> 🔜 DIO_CFG[8]	0x0000313F	RW	0x4000072
> 🔝 DIO_CFG[9]	0x0000313F	RW	0x4000072
> 💀 DIO_CFG[10]	0x0000313F	RW	0x4000072
> 🔝 DIO_CFG[11]	0x0000313F	RW	0x4000072
> 3 DIO_CFG[12]	0x0000313F	RW	0x4000073
> DIO_CFG[13]	0x0000313F	RW	0x4000073
	0x0000313F	RW	0x4000073
	0x0000313F	RW	0x4000073
	0x0000000	E.V.V	0x4000074
 GPIO (bits 15-0) 			
> III DIO DIR	0x00008000	RW	0x4000074
> DIO MODE	0x00000000	RO	0x4000074
> DIO_INT_CFG[0]	0x00000000	RW	0x4000074
> DIO_INT_CFG[1]	0x0000000	RW	0x4000075
> DIO_INT_CFG[2]	0x0000000	RW	0x4000075
> DIO_INT_CFG[3]	0x0000000	RW	0x4000075
> DIO_INT_DEBOUNCE	0x0000000	RW	0x4000075
> DIO_PCM_SRC	0x00111111	RW	0x4000076
> DIO_SPI_SRC[0]	0x00111111	RW	0x4000076
> DIO_SPI_SRC[1]	0x00111111	RW	0x4000076
> indicute and the second	0x0000011	RW	0x4000076
	0x00001111	RW	0x40000770
	0.0000000000000000000000000000000000000		0.4000077

圖 6.5



 在程式中第 124 行插入中斷點後,點選 Resume,當程式再度停在中斷點時即可發現當執 行後 DIO_DATA 有變化。



圖 6.6



eclipse-workspace RSL10 201904 - Eclipse				_	- 🗆
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c blinky Debug [GDB SEGGER J-Link Debugging]				1 - te	= 4 ■ 4
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main() at app.c:124 0x1003f4					
📕 JLinkGDBServerCL.exe					
着 arm-none-eabi-gdb					
🕌 Semihosting and SWV					0
	<				>
blinky.rteconfig 🖸 app.c 🔽 0xe92 🖾 EmbSys Registers 💥					- 8
Arch: cortex-m3 Vendor: ONSemiconductor Chip: rsl10 Board: none -					
Register Hex Bin	Reset	Access	Address	Description	^
> 🐻 DIO_CFG[11]	0x000031	3F RW	0x4000072c	Digital IO Configuration (ADC fi	unction on
> DIO_CFG[12]	0x000031	3F RW	0x40000730	Digital IO Configuration (ADC fi	unction on
> 🔝 DIO_CFG[13]	0x000031	3F RW	0x40000734	Digital IO Configuration (ADC fi	unction on
> 🔂 DIO_CFG[14]	0x000031	3F RW	0x40000738	Digital IO Configuration (ADC fi	unction on
> DIO CFG[15]	0x000031	3F RW	0x4000073c	Digital IO Configuration (ADC fi	unction on
✓ IDIO_DATA 0x0000F060 000000000000011	111000001 0x000000	00 RW	0x40000740	Digital IOs Data Access Register	r
DIO (bits 15-0) 0xF060 1111000001100000				DIO[15:0] read data	
GPIO (bits 15-0) 0xF060 1111000001100000				GPIO[15:0] write data (updates	output da
	0,000000		0,40000744	Digital los Direction state	
	0x00000	00 RO	0x40000748	Digital IOs Mode State	
	0x00000	00 RW	0x40000746	DIO Interrupt Configuration	
	0x000000	00 RW	0x40000754	DIO Interrupt Configuration	
	0x000000	00 RW	0x40000758	DIO Interrupt Configuration	
	0x000000	00 RW	0x4000075c	DIO Interrupt Button Debounce	Filter Time
DIO PCM SRC	0x001111	11 RW	0x40000760	PCM Input Selection	
DIO_SPI_SRC[0]	0x001111	11 RW	0x40000764	SPI[1:0] Interface Input Selection	n
> DIO_SPI_SRC[1]	0x001111	11 RW	0x40000768	SPI[1:0] Interface Input Selection	n
> DIO_UART_SRC	0x000000	11 RW	0x4000076c	UART Interface Input Selection	
> DIO_I2C_SRC	0x000011	11 RW	0x40000770	I2C Input Selection	
> 🔝 DIO_AUDIOSINK_SRC	0x000000	11 RW	0x40000774	Audio Sink Input Selection	
> 🔜 DIO_NMI_SRC	0x000000	30 RW	0x40000778	NMI Input Selection	
> 🔜 DIO_BB_RX_SRC	0x001212	12 RW	0x4000077c	Baseband Controller RX Data A	nd Clock II
	0.00000	10 014/	0-40000790	Reading of Controllor CDU and the	alection
> DIO_BB_SPI_SRC	0x00000	12 RVV	0,0000780	baseband Controller SPI input S	Belection

圖 6.7

產業首選 · 通路標竿

大聯大控股

#2

世平集團 World Peace Industrial Group





7. 點選 DIO_DATA 的 Bin 欄 , 選擇 Bit6 GPIO 將其改變後點選 Set , 此時 LED 狀態應該會

改變。

eclipse-workspace_RSL10_201904 - Eclipse									×
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🚸 blinky.rteconfig 🛛 🔂 app.c 🛛 🖸	xe92 🛛 🖾 E	mbSys Registers 🐹							
💦 📄 Arch: cortex-m3 Vendor: ONSemico	onductor Chip:	rsl10 Board: none							
Register	Hex	Bin	Reset	Access	Address	Description		^	
> DIO_CFG[11]			0x0000313F	RW	0x4000072c	Digital IO Conf	iguration (ADC fun	iction on	
> DIO_CFG[12]			0x0000313F	RW	0x40000730	Digital IO Conf	iguration (ADC fun	iction on	
> DIO_CFG[13]			0x0000313F	RW	0x40000734	Digital IO Conf	iguration (ADC fun	iction on	
> 🔂 DIO_CFG[14]			0x0000313F	RW	0x40000738	Digital IO Conf	iguration (ADC fun	iction on	
> 🔝 DIO_CFG[15]			0x0000313F	RW	0x4000070	Digital 1D Conf	iguration (ADC fun	iction on	
> 🔝 DIO_DATA	0x0000F020	0000000000000	0000111	1 0 0 0	0 0 0 1 0	0 0 0 0 Set t	a Access Register		
> 🐻 DIO_DIR			0x00008000	RW	0x40 Bit 6:	GPIO al Ds Dire	ction State		
> 🔂 DIO_MODE			0x00000000	RO	0x4 000740	Digital Ds Mo	de State		
> DIO_INT_CFG[0]			0x00000000	RW	0x4000074c	DIO Interrupt C	onfiguration		
> DIO_INT_CFG[1]			0x00000000	RW	0x40000750	DIO Interrupt C	onfiguration		
> DIO_INT_CFG[2]			0x00000000	RW	0x40000754	DIO Interrupt C	onfiguration		
> DIO_INT_CFG[3]			0x00000000	RW	0x40000758	DIO Interrupt C	onfiguration		
> B DIO_INT_DEBOUNCE			0x00000000	RW	0x4000075c	DIO Interrupt B	utton Debounce Fi	ilter Time	
> B DIO_PCM_SRC			0x00111111	RW	0x40000760	PCM Input Sele	ection		
> DIO_SPI_SRC[0]			0x00111111	RVV	0x40000764	SPI[1:0] Interfac	ce Input Selection		
			0x00111111	RVV DW/	0x40000768	SPI[1:0] Interfac	ce input Selection		
DIO_UART_SRC			0x00000011	RVV PW/	0x40000766	UART Interface	tion		
			0x00001111	PW/	0x40000770	Audio Sink Inn	tion		
			0x00000011	RW/	0×40000774	NMU Input Cala	ucselection		
			0x00000030	RW	0x40000776	Baseband Con	troller RY Data And	d Clock I	
			0x00000012	RW	0x40000780	Baseband Con	troller SPI Input Sel	lection	
			0x00121212	RW	0x40000784	RE Front-End S	Pl Input Selection		
			0x12121010	RW	0x40000788	RE Front-End G	PIOs 0-3 Input Sel	ection	
			0-10101012	DIA	0-4000070-	DE Front End G	DIOs 4-7 Input Col.	action Y	1
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圖 6.8