Application Note : Telink IDE User Guide

AN-IDEUG-E1

Ver 1.0

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Brief:

This document is the user guide for Telink Integrated Development Environment (IDE).

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Bldg 3, 1500 Zuchongzhi Rd, Zhangjiang Hi-Tech Park, Shanghai, China

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For further information on the technology, product and business term, please contact Telink Semiconductor Company (<u>www.telink-semi.com</u>).

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For sales or technical support, please send email to the address of:

telinkcnsales@telink-semi.com

telinkcnsupport@telink-semi.com



Revision History

Version	Major Changes	Date	Author			
1.0	Initial release	2014/5	Cynthia			



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1 Introduction

1.1 Applicable users

This guide is applicable to all engineers who develop wireless or embedded applications based on Telink RF SoC or Telink MCUs using the Telink Integrated Development Environment (IDE).

The Telink IDE is built on top of the Eclipse IDE with additions of the Telink toolchains.

1.2 Summary of Content

This guide mainly introduces fast installation and interface of Telink IDE, and gives an example of project development process beginning from project import/creation to firmware burning. Some common problems and solutions are listed for reference.

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2 Fast Installation and IDE Interface

2.1 Fast installation

Double click Telink SDK setup file.



Figure 1 Installation interface 1

In the installation interface of Figure 1, click the "Next" button.



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TelinkSDK 1.3 - Excelsior Installer	
Destination folder Select destination folder	
The installer will install TelinkSDK 1.3 components to the following	ng folder.
To install to this folder, dick Next.	
To install to a different folder, click Browse and choose another	folder.
Destination folder	
C:\	Browse
Space required on C:	548568 K
Space available on C:	22000196 K
Install < Back	Next > Cancel

Figure 2 Installation interface 2

In the installation interface of Figure 2, click the "Browse" button to select destination folder, then click the "Next" button.

'	Program folder Select program folder	
	The installer will add program icons to the program folder listed below. You may typ folder name or select one from the list of existing folders. To continue, click Next.	e a new
	Telink-Semi\TelinkSDK 1.3	
	360安全中心	
	Administrative Tools	=
	Adobe LiveCycle ES2 Games	
	LibreOffice 4.1	
	Maintenance Microsoft Office	
	Microsoft Office 2013	-

Figure 3 Installation interface 3



Click the "Next" button in the installation interface of Figure 3.

📅 TelinkSDK 1.3 - Excelsior Installer	
Start installation View current settings	
The installer is ready to install TelinkSDK 1.3 on your compu installation or Back to change the current settings listed be Current settings:	iter. Click Next to begin the ow.
Destination folder: C:\ Program folder: Telink-Semi\TelinkSDK 1.3	
< Back	Install Cancel

Figure 4 Installation interface 4

Click the "Install" button in the installation interface of Figure 4.

Automatic default installation can be adopted via directly clicking the "Install" button in the installation interface of Figure 1



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Figure 5 Installation completed prompt interface

Click the "Finish" button in the interface of Figure 5, Telink IDE, Telink Console and Telink Programmer shortcut icons will be available on the desktop.



Double click the icon

to start Telink IDE.

When it's the first time to start Telink IDE, a "Workspace Unavailable" interface as shown in Figure 6 will indicate a different workspace should be selected.



Figure 6 "Workspace Unavailable" interface

Click the "OK" button.

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Workspace	Launcher	
Select a wo	rkspace	
Eclipse store Choose a wo	s your projects in a folder called a workspace. orkspace folder to use for this session.	
Workspace:	C:\TelinkSDK1.3\Telink test	▼ Browse
_		
V Use this a	s the default and do not ask again	
		OK Cancel

Figure 7 Workspace selection interface

In the interface of Figure 7, choose a different workspace folder using the "Browse" button, then click the "OK" button.

Figure 8 shows the welcome interface.







Click the icon 📓 to get an overview of Telink IDE;

Click the icon 🔛 to learn about new update of Telink IDE;

Click the icon 😫 to try out samples;

Click the icon 🖾 to get tutorials;

Click the icon 🖆 to enter workbench interface.

Note: After Telink IDE installation was done, environment variables of "Make" command and "tc32-elf-size" command should be configured via system setting to point to the bin folder under the IDE installation directory. If command missing problem occurs during subsequent compiling process, the relevant environment variable may not be configured properly and should be checked first.

2.2 IDE interface

Telink IDE is Telink-built integrated development environment based on Eclipse platform. Its interface is shown as Figure 9.







Telink IDE interface mainly contains menu bar and tool bar. Icons in the tool bar are shortcuts of common operations in the menu bar.

Other visible windows including C/C++ Projects, Console, Include Browser, Make Target, Navigator, Outline, Problems, Project Explorer, Properties, Search, Task List, Tasks can be freely opened/closed via pull-down menu "Show View" of "Window".

2.2.1 Menu bar

The menu bar contains 11 main menus.

- File menu: Pull-down menus including New/Open File/Close/Save/Import/Export (Project), Switch Workspace, etc.
- Edit menu: Pull-down menus including (source) Copy, Cut, Paste, Delete, Select All, etc.
- Source menu: Pull-down menus including Toggle Comment, Add Block Comment, Remove Block Comment, Shift Right, Shift Left, Correct Indentation, Format, etc.
- > Refactor menu: Pull-down menus including Rename, etc.
- Navigate menu: Pull-down menus including Go Into, Go To, etc.
- Search menu: Pull-down menus including C/C++, File, Text. etc.
- Run menu: Pull-down menus including Run, Debug, Breakpoint operation, etc.
- Project menu: Pull-down menus including Build All, Build Configurations, etc.
- Telink Tools menu;
- Window menu: Pull-down menus including Show View, etc.
- > Help menu: Pull-down menus including Welcom, etc.

For usage of all menus other than "Telink Tools" menu, please refer to Eclipse User Guide which are available from website of http://www.eclipse.org/documentation/.

This document mainly introduces the "Telink Tools" menu. The "Telink Tools" menu contains two options: Telink Loader, Telink Debugger.

Click the "Telink Loader" option to directly burn firmware to target board via EVB.



Click the "Telink Debugger" option to open the Telink Wtcdb tool interface. For guide on the Wtcdb tool, please refer to the document "Telink Wtcdb User Guide" or "Telink Programmer User Guide" in the Appendix.

2.2.2 Tool bar

File operation icons: New, Save, Save All, Print, New C/C++ Project, New C/C++ Source Folder, New C/C++ Source File, New C++ Class.



Compiling operation icons: Build All, Build the active configurations of selected projects, Management configurations for the current project.



Run and debug operation icons: Debug, Run, External Tools.



 Cursor location switch icons: Next Annotation, Previous Annotation, Last Edit Location, Back, Forward.

🐓 🔹 🖓 🔹 🏷 🗸 🕹 🔹

 Other icons: Upload binary, Telink Debugger, Open Element, Open Task, Search, Toggle Mark Occurrences, Automatically Fold Uninteresting Elements, Toggle
 Block Selection Mode, Show Whitespace Characters, Open Perspective, Debug
 Perspective, C/C++ Perspective.





3 Example Project

3.1 Import project

•	/C++ - Eclipse															
File	Edit Source Refactor Nav	vigate Search	Run Project	🏶 Telink 1	Tools Wir	ndow Hel	р									
	New	Alt+Shift+N ►	🖉 🐺 🗄 👩	- 🚳 - [<u>c</u> - G -	- 🚳 -	S - 13	🆗 - 🔘	- 🤷 -	· 🔌 🖉) 🛷 🗸	1		😭 🏇 Deb	ug 🗄	0 C/
	Open File														_	
	Close	Ctrl+W										- 8	() M	🗐 T 🍡		
	Close All	Ctrl+Shift+W											1			69
	Save	Ctrl+S											An out	line is not a	availab	le.
	Save As															
C	Save All	Ctrl+Shift+S														
	Revert															
	Move															
	Rename	F2														
8	Refresh	F5														
	Convert Line Delimiters To	+														
Ð	Print	Ctrl+P														
	Switch Workspace	•														
	Restart															
è	Import)													
4	Export		1													
	Properties	Alt+Enter														
	1 New Teels															
	I New Task															
	Exit]													
L .																
		🖹 Probl	ems 🙆 Task	s 📮 Conso	le 🛛 🚺	Propertie	es				<u>୍ୟ</u> () 🔄 📰	a: 🕞	🛃 🗐 🗸	1	
		C-Build [[L_SDK]													
	>) 💌	1
		-													<u> </u>	-

Figure 10 Import project: Menu

As shown in Figure 10, click the pull-down menu "Import" of "File".



Application Note: Telink IDE User Guide

Import	
Select	
Create new projects from an archive file or directory.	
Select an import source:	
type filter text	
🗁 General	
🕼 Archive File	
🖆 Existing Projects into Workspace	
🗀 File System	
Preferences	
⊖ C/C++	
🗁 CVS	
🔁 Run/Debug	
🗁 SVN	
🔁 Tasks	
🔁 Team	
(?) < Back Next > Fin	nish Cancel

Figure 11 Import project: Source Selection

As shown in Figure 11, select "Existing Projects into Workspace" contained by the "General" folder, then double click the left button of mouse or click the "Next" button.



Application Note: Telink IDE User Guide

Import	
Import Projects Select a directory to search for existing Eclipse proj	jects.
Select root directory: D:\Cynthia\8568 SDK\TLSE Select archive file:	DK Browse Browse
Projects:	Select All Deselect All Refresh
Copy projects into workspace Working sets Add project to working sets Working sets:	Select
Reck Next >	Finish Cancel

Figure 12 Import project: Search existing project

As shown in Figure 12, click the "Browse" button, select the project "TLSDK" to be imported, finally click the "Finish" button to complete import. As shown in marker 1 of Figure 13, imported project "TL_SDK" can be found in the left window "Project Explorer".

3.2 Compile project

Select the project to be compiled.

Click any branch under the **S** icon (as shown in marker 2 of Figure 13), e.g. 1 telink1, to carry out automatic compiling for corresponding firmware branch. Click the **icon** (as shown in marker 3 of Figure 13) to carry out automatic compiling for overall firmware.

Information "Finished building: sizedummy" (as shown in marker 4 of Figure 13) AN-IDEUG-E1 16 Ver 1.0



is available in the "Console" window to indicate successful compiling of 1 telink1 branch, and a "telink1" folder (as shown in marker 5 of Figure 13) containing a bin file is also available in the "Project Explorer" window (as shown in marker 6 of Figure





Figure 13 Successful compiling : Console output

If firmware compiling fails, relevant problem indication will be available in the "Console" window.

3.3 Connect hardware

Before firmware burning, the hardware boards should be connected properly.

Firmware burning supports two methods: directly burn firmware to EVB board;

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burn firmware to EVB board via EVK board. Corresponding hardware connection methods are as shown in Figure 14 and Figure 15, respectively.

Hardware connection method for direct burning method: Connect miniUSB interface of EVB with USB interface of PC via an USB cable.



Figure 14 Hardware connection method for direct burning

Hardware connection method for burning method via EVK: Connect miniUSB interface of EVK with USB interface of PC via an USB cable; connect USB host interface of EVK with miniUSB interface of EVB via another USB cable.



Figure 15 Hardware connection method for burning through EVK



3.4 Burn firmware

After hardware connection was done, use the "Telink Programmer" tool to burn firmware. Appendix gives the user guide for Telink Programmer.

- Directly burn EVB
 - Select "5332" (the category the currently used RF SoC or MCU belongs) in the chip select drop-down box.
 - (2) Click the "BIN" button and select the directory, e.g. "D:\Cynthia\8568 SDK\TLSDK\tlsdk\telink1", containing the bin file to be downloaded.
 - (3) In the left window of Figure 16, double click the bin file "boot.bin" to burn it into EVB via USB.

💘 wtcdb		• ×
🔮 Telink Tools Help		
D:\Cynthia\8568 SDK\TLSDK\tlsdk\telink1	BIN	Open
E:\3520_TLSDK_20130830\tlsdk\version.h	DEF	Ini
5332 OTP Program		
bootbin		
TRACE: name size ns Firware Download File: Size: Ns: USB SRAM SWB UART T Clear OutPut LOG	Ini File:	
ts 4K 33 UART H Uart Size: 63 M S R	wtcdb2.in	ni 👻
Start VCD View Uart H Option: Hexadecimal ✓ M S R: 8 2 4 SWB Speed		
CmdWnd ming32 TIDE CmdWnd CmdWnd CmdWnd CmdWnd	Close W	/indow
Tcdb: wf0-s 64k-e Start	Tcdb	CTRL_C
Ready Idle: 250		



Burn EVB via EVK

(1) EVK board is used as the adapter board for firmware download. Make sure AN-IDEUG-E1 19 Ver 1.0



latest EVK.bin file was burned before using the EVK board. Generally the EVK board has the latest EVK firmware already. For EVK update, please refer to EVB direct burning method.

- (2) Select "5332" in the chip select drop-down box.
- (3) To burn Flash-edition firmware (for debugging), click the "BIN" button and select the directory containing the bin file to be downloaded. Double click the bin file in the left window to burn it into EVB Flash via USB.
- (4) To burn OTP-edition firmware (for small batch test), click the "BIN" button and select the directory containing the bin file to be downloaded. Double click the bin file in the left window, and click the "OTP Program" button to burn the firmware into EVB OTP.



4 FAQs

Q: Code jump fails after updating project name, i.e. xxx symbol can't be found in the index?

A: Select Window > Preferences > C/C++ > Indexer, choose the options including "Index source files not included in the build" in the interface of Figure 17 and click the "OK" button. Refresh or open the file.

Preferences									
type filter text	Indexer		↓ ↓ ↓ ↓						
⊳ General									
⊳ Ant	✓ Enable indexer								
▲ C/C++	Indexer Options								
Appearance	Index source files not included in the build	Index course files not included in the build							
Autotools	Index upused beaders								
Build	Allow bouristic resolution of includes								
Code Style	Allow neursuc resolution of includes								
▷ Debug	Skip files larger than 8 MB								
Editor	Skip all references (Call Hierarchy and Search w	(ill not work)							
File Types	Skip implicit references (e.g. overloaded opera	tors)							
Indexer Language Mappings	Skip type and macro references (Search for the	se references will po	t work)						
New CDT Project Wiz	Solp type and macro references (Search for the	se references will no							
Property Pages Settin	Files to index up-front:								
Task Tags	cstdarg, stdarg.h, stddef.h, sys/resource.h, ctime,	sys/types.h, signal.h,	cstdio						
Template Default Valu									
⊳ Help	Indexing strategy								
▷ Install/Update	Automatically update the index								
⊳ Java	Update index immediately after every file-save								
Remote Systems									
Run/Debug	Build configuration for the indexer								
⊳ Tasks	O Use active build configuration								
⊳ Team	Output Use the build configuration specified in the projection	ect's indexer settings							
▷ Telink Tools									
Terminal	Cache limits								
Usage Data Collector	Index database cache:								
Vimplugin	Limit relative to the maximum heap size:	10	%						
	Absolute Limit: 64 MB								
	Header file cache (used by refactoring):								
	Absolute Limit:	64	MB						
< >			Restore Defaults Apply						
OK Cancel									

Figure 17 Indexer option

Q: Wrong code execution result due to improper code optimization level selection during compiling process?

A: Click the "Properties" drop-down menu of "File" to open the Properties option, and select proper optimization level in the drop-down box of C/C++



Application Note: Telink IDE User Guide

Build > Settings > Optimization.

Properties for TL_SDK				
type filter text	Settings			↓ ↓ ↓ ↓ ↓
Resource Builders				
C/C++ Build	Configuration: telink1 [Active]			▼ Manage Configurations
Build Variables Discovery Options				
Environment	🛞 Tool Settings 🎤 Build Steps 👾 E	Build Artifact 🗟 Binary Pa	rsers 🔇 Error Parsers	
Settings	Additional Tools in Toolchain	Optimization Level	Moderate Optimizations (-O2)	
Tool Chain Editor	B General	Pack structs (-fpack-str	ruct)	
C/C++ General Project References	Paths	Other Optimization Flags	-finline-small-functions	
Run/Debug Settings	Debugging No TC32 Compiler	other optimization mags		
Task Repository Telink Tools	Directories			
WikiText	🖉 Symbols			
	🖉 Debugging			
	Optimization			
	Miscellaneous			
	🛞 TC32 C Linker			
	🖉 General 🖄 Libraries			
	🖉 Objects			
	TC32 Create Extended Listing			
	TC32 Create Flash image			
	🖉 General			
	👸 Print Size			
			Re	estore Defaults Apply
?			[OK Cancel

Figure 18 Optimization level option

Q: Updated header file fails to take effect?

A: Right click the project, click the "Clean Project" option, and recompile the project.



C/C++	- Ecl	lipse										X
File Edi	t So	ource Refactor Navigate Search R	un Project 🏶 Te	ink Tools	Window Hel	р						
1 📬 🕶		a 🗅 🗟 🕖 🎘 🔯 🕶 🖸 🕶 🖸	8 - 6 - 🚳 -	🛞 🕶 🕏	þ: • 🜔 • 🤇	🎍 🔹 🖉) 🖨 🔗 🤊	1 2 -	- 🖓 - K	þ	😭 🏇 Debug 🏻	C/C »
🔁 Proje	ct Exp	plorer 🕱 🗖 🗖						 		- 0	🗄 O 🛱 🔲 T 🏋	- 0
												 €9 ▽
🔺 🚰 T		New	•	1							An outline is not availa	able.
▷ 🕉		Go Into										
		Open in New Window										
Þ 🕞		Сору	Ctrl+C									
▶ 🗿	Ê	Paste	Ctrl+V									
	×	Delete	Delete									
	<u>.</u>	Remove from Context Ctr	l+Alt+Shift+Down									
		Move										
		Rename	F2									
	2	Import								4		
	4	Export										
0		Build Project										
		Clean Project										
	8	Refresh	F5									
		Close Project										
		Close Unrelated Projects										
		Build Configurations	۱.									
		Make Targets	+									
		Index	•									
		Show in Remote Systems view										
		Convert To										
		Run As	÷.									
		Debug As	+									
		Profile As	+	nsole 🛛	🔲 Propertie	es					📑 🗉 🔻 📑	
		Team	•	me.								
		Compare With	+									
		Restore from Local History										
	۲	Telink Loader	F									
		Properties	Alt+Enter									
	_								4			
₽	8	[₽] TL_SDK										

Figure 19 Clean project option

- Q: When opening program, there is a prompt that indicates Java failed in loading?
 - A: The system has installed and used other java editions. Put JRE path of IDE into

the system path.

- Q: Project fails to be imported due to duplicate name?
 - A: Edit the .project file to rename the project.



Appendix: User Guide of Debugging Tools

1 User Guide of Telink Programmer (A.K.A Wtcdb)



Double click the

icon on the desktop to start Telink Programmer.

Telink Programmer is a tool used to burn firmware; its interface is shown as Figure

20.

🙀 Wtcdb	
🔮 Telink Tools Help	
E:\Bin�◆ 2	BIN Open
E:\3520_TLSDK_20130830\tlsdk\version.h 7	DEF Ini
OTPID_ee OTP Program 8	
	1
3	C N
6.	
X	
TRACE: name size ns	
File: Size: Ns: USB SRAM SW	B UART T Clear ♥ OutPut LOG Save Ini File: 4
ee 4k 33 UARTH Uart Size:	64 M S R wtcdb.ini +
Start VCD View Uart H Option: Hexa	decimal MSR: 3240 SWB Speed
5 Tdebug CmdWnd EraseF Readl	D ming32 PktCap ReadF Close Window
Tedb	- Start Todb CTPL C
6	
Ready	Idle: 185



TRACE bar

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TRACE: name size ns						
File:	Size: Ns:					
ee	4k	33				
Start	VCD	View				

The TRACE bar serves to draw timing diagram during debugging. File: timing diagram name; Size: the length of packet before processing; Ns: system clock cycles with unit of ns; Click the "Start" button to start drawing; Click the "VCD" to convert to the diagram to VCD format; Click the "View" button to show the timing diagram.

Firmware Download bar

Firware Download							
USB	SRAM	SWB	UART T				
UART H Uart Size: 64							
Uart H O	ption:	Hexadec	imal 👻				

The Firmware Download bar mainly serves to select download method and print information during debugging. USB: Download via USB; SWB: Download via Single Wire; SRAM: Download into SRAM; UART T: Print ASCII code; UART H: Print binary or hexadecimal (selectable via the drop-down box below Uart H option); Uart Size: length before printing.

Log bar



The Log bar serves to process the Log window, as shown in marker 1 of Figure 20. Click the "Clear" button to clear the Log window; Click the "Save" button to save information in the Log window.





The M S R bar serves to set Single Wire rate. M: Frequency dividing factor of SWM; S:



Frequency dividing factor of SWS. Click the "SWB Speed" button to confirm the setting.

Firmware burning

As shown in marker 2 of Figure 20, click the "BIN" button and select the directory containing the BIN file to be downloaded. All BIN files within the directory will be available in the left window, as shown in marker 3 of Figure 20.

To download firmware into Flash, select the BIN file to be downloaded; click the "SWB" button of "Firmware Download" bar to burn firmware via Single Wire; click the "USB" button or double click the BIN file to burn firmware via USB. The downloaded content can be checked by clicking the "ReadF" button shown in Marker 5 of Figure 20.

To burn firmware into the OTP, select the BIN file and click the "OTP Program" button as shown in marker 8 of Figure 20.

The firmware in Flash memory can be erased by clicking the "EraseF" button shown in Marker 5 of Figure 20.

Other Functions

The Telink Programmer tools also supports customized interface configuration, packet capture tool launching, command window launch. For details on how to use the associated tools, please refer to their respective guides. This section only gives a brief description.

Interface reconfiguration: As shown in marker 4 of Figure 20, the "Ini File" option serves to select configuration script. Button layout in marker 5 of Figure 20 varies when different InI script is selected. By default, "wtcdb.ini" is used.

Launch other Telink tools: Click the "Tdebug" button to start the Tdebug tool for program monitoring and debugging; click the "CmdWnd" button to open command line; click the "ReadID" button to read device ID; click the "ming32" button to open non-graphical compiling and editing environment; click the "PktCap" button to start the PktCap tool for packet capturing; click the "Close Window" button to close



Programmer interface.

TCDB Tool: As shown in the marker 6 of Figure 20, different command can be passed to the Tcdb tool for execution. After entering the command, click the "Start Tcdb" button to start executing Tcdb command; click the "CTRL_C" button to stop executing current Tcdb command.

As shown in marker 7 of Figure 20, the bar serves to select the header file needed for debugging to analyze.

2 User Guide of Telink RF Scanner

Telink RF Scanner tool (contained by the directory TelinkSDK1.3\opt\tc32\tools) can be used to scan and measure frequency spectrum in the 2400MHz~2480MHz band. Its interface is shown as below:



Figure 21 Telink RF Scanner Interface

Generally users only need to set the parameter as shown in red mark of Figure 21 to use Telink RF Scanner. For example, parameter "S2400_80_S05" indicates that



starting frequency is 2400MHz (S2400), upper limit of scanning band is (starting frequency + 80 * 1MHz) = 2480MHz, and scanning step is 5MHz (S05).

3 User Guide of Telink Console



Double click the **Console 13** icon on the desktop to start Telink Console.

Telink EVK Console is used for command line tool based debugging. The tool can be used to read/write digital registers, analog registers, some address in memory as well as flash and OTP via inputting command line. Its interface is as below:



Figure 22 Telink EVK Console interface

Command line format:

tcdb [cmd] [Address]

-i[file name] -o[file name]

-s[size]

-b

-u

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-е

There are four groups of formats for cmd in all.

- (1) wf/rf: read/write FLASH;
- (2) wc/rc: read/write chip core, including memory and digital registers;
- (3) wo/ro: read/write OTP;
- (4) wa/ra: read/write analog registers.
- ♦ Address: indicates address for some register, memory, FLASH or OTP.

- → -b: indicates reading/writing format is binary;
- -u: indicates reading/writing is conducted via USB; if it's default in command line,
 it means reading/writing is conducted via Single Wire.

Note: -i, -o and -b are optional commands, while -b generally combines with -i and -o for use.