



TELINK SEMICONDUCTOR

Application Note : Telink IDE User Guide

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Brief:

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

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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.

2 Fast Installation and IDE Interface

2.1 Fast installation

Double click Telink SDK setup file.

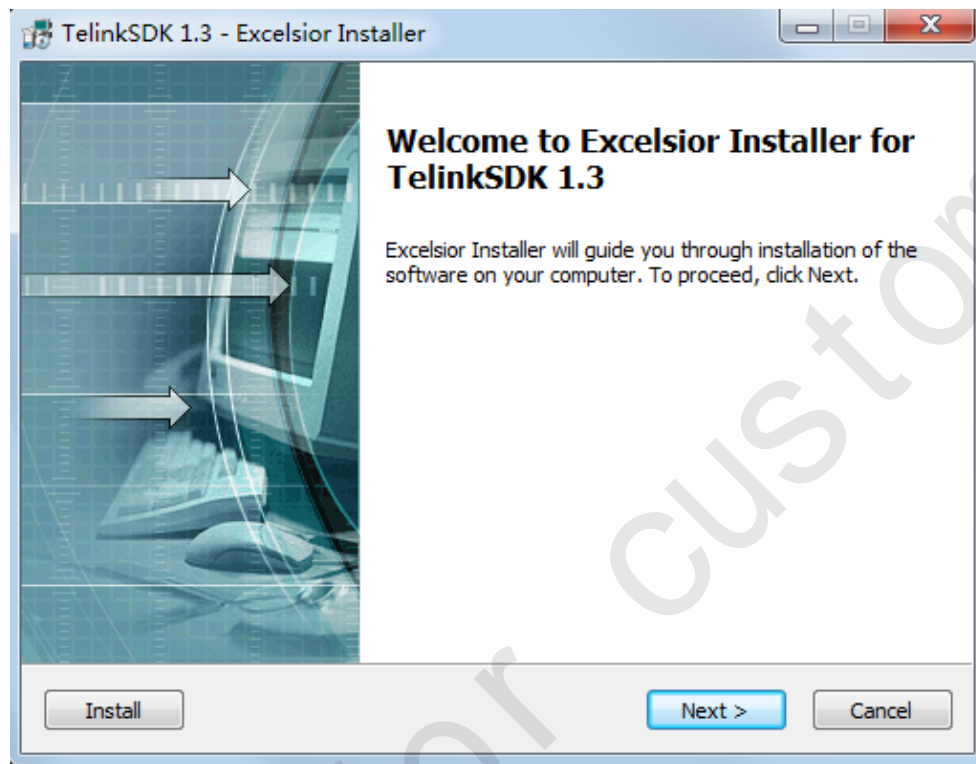


Figure 1 Installation interface 1

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

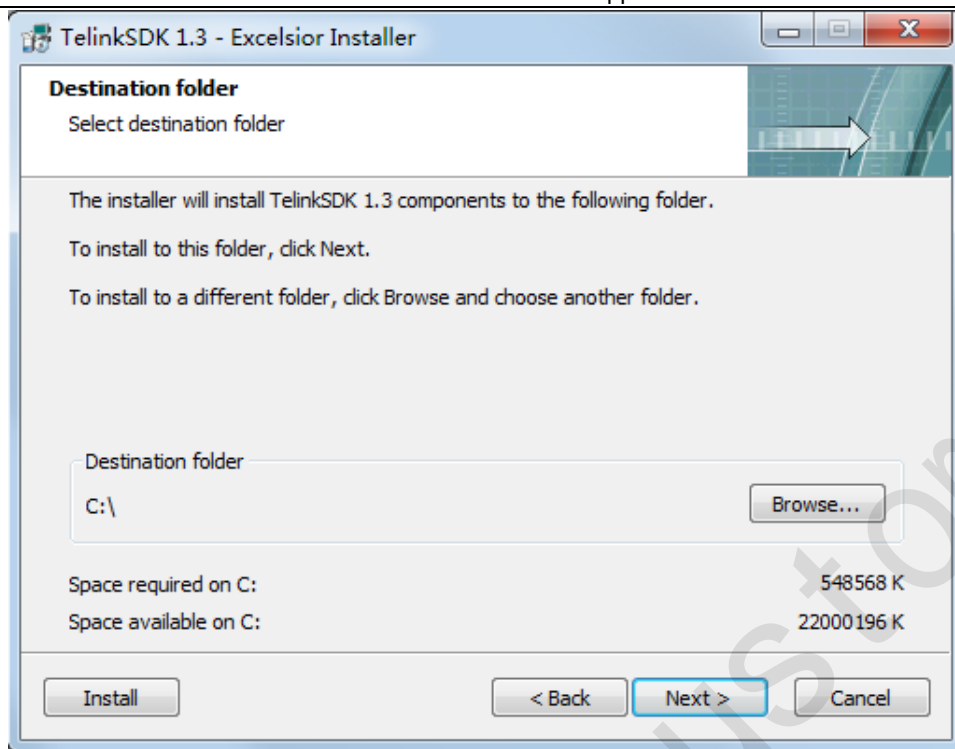


Figure 2 Installation interface 2

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

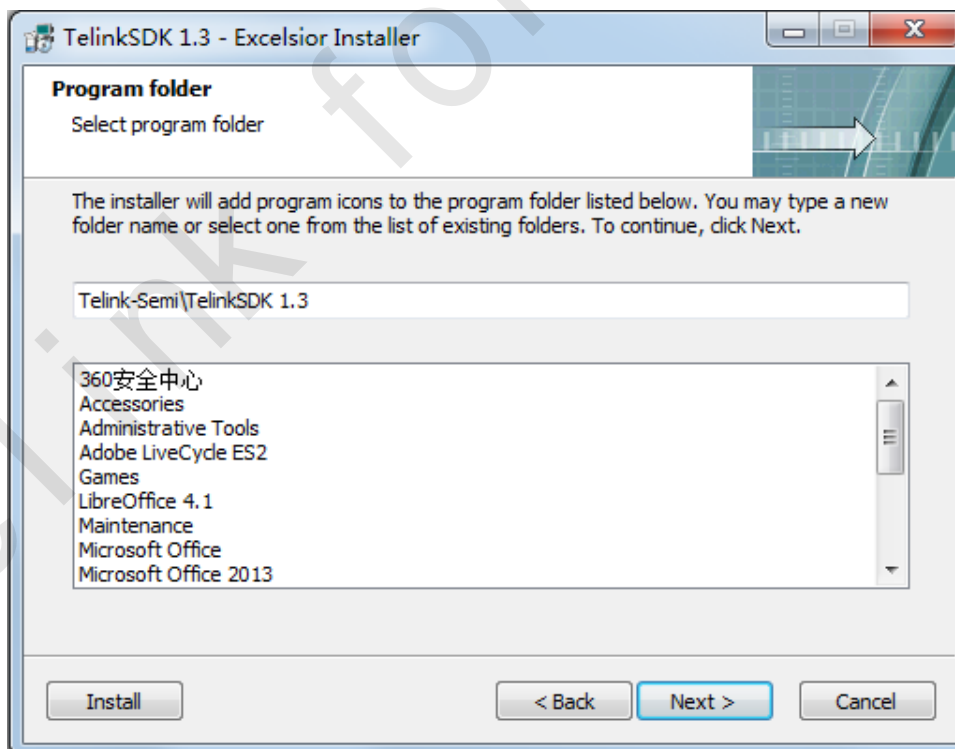


Figure 3 Installation interface 3

Click the “Next” button in the installation interface of Figure 3.

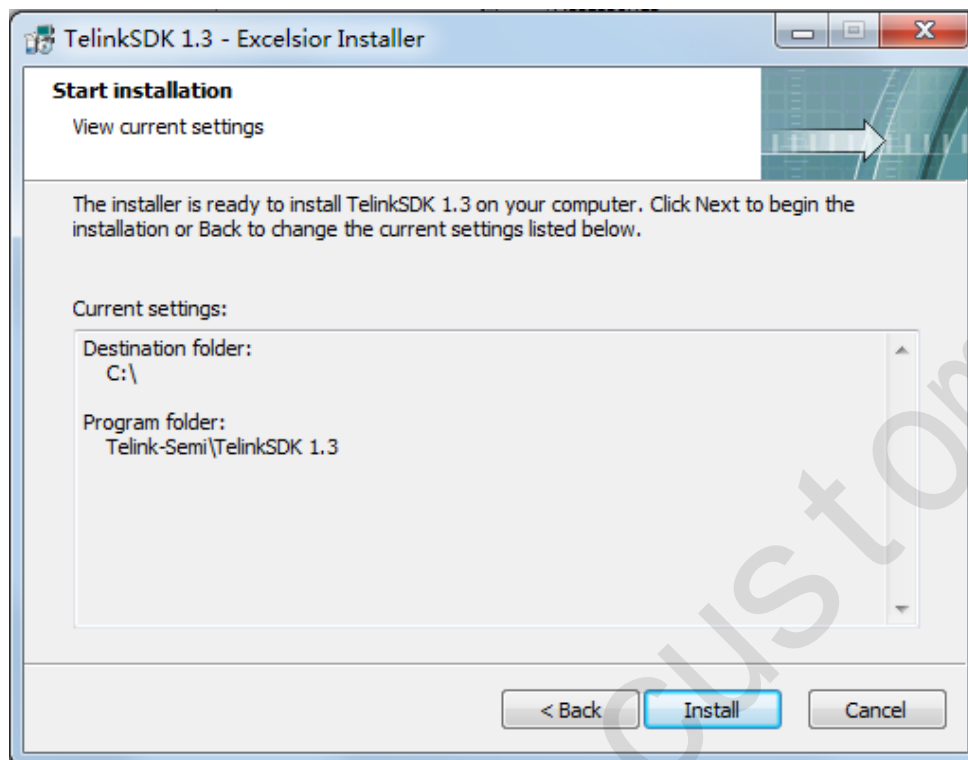


Figure 4 Installation interface 4

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

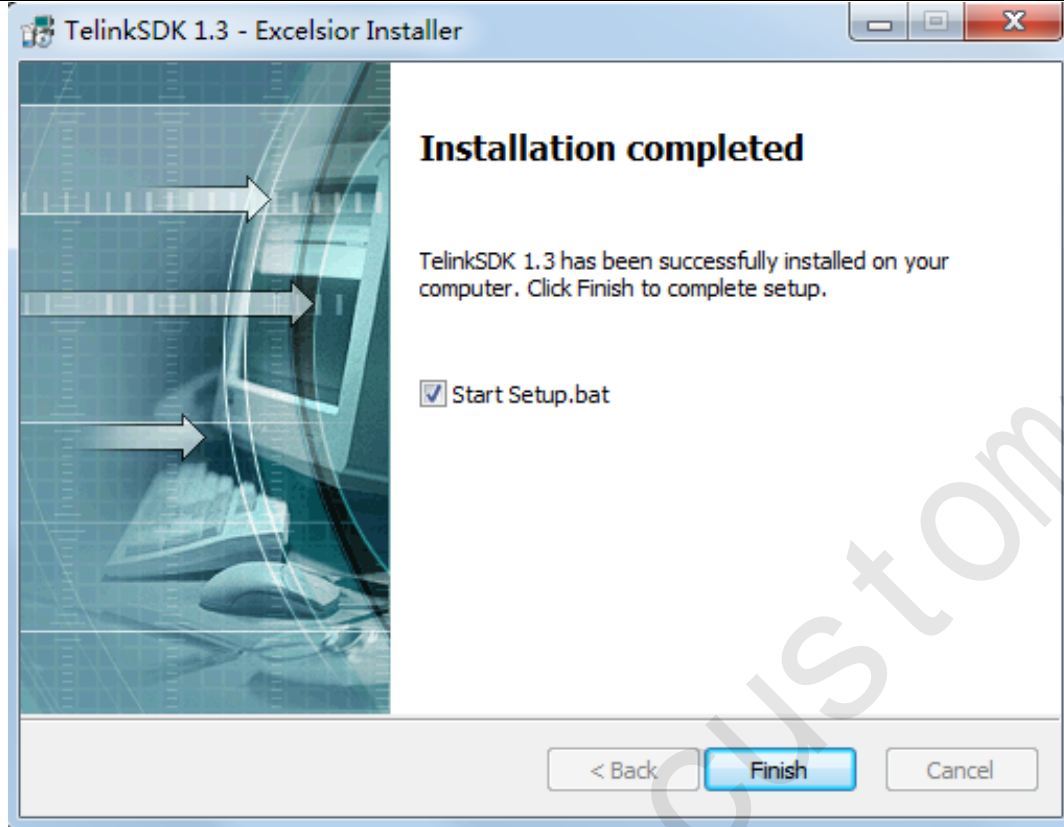


Figure 5 Installation completed prompt interface

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.

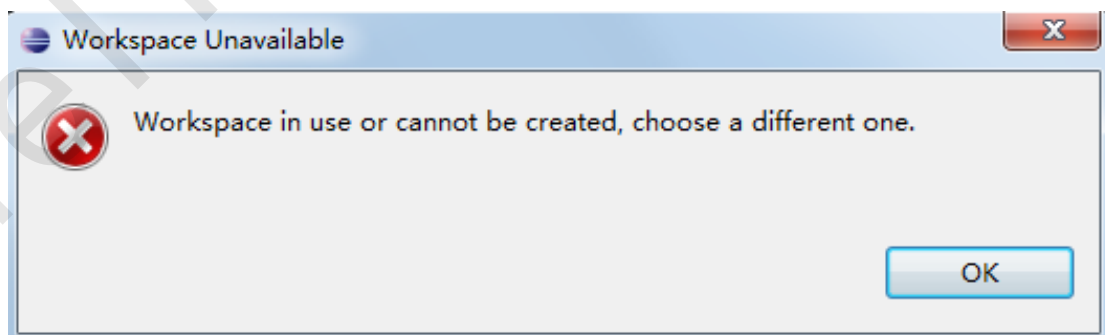


Figure 6 “Workspace Unavailable” interface

Click the “OK” button.

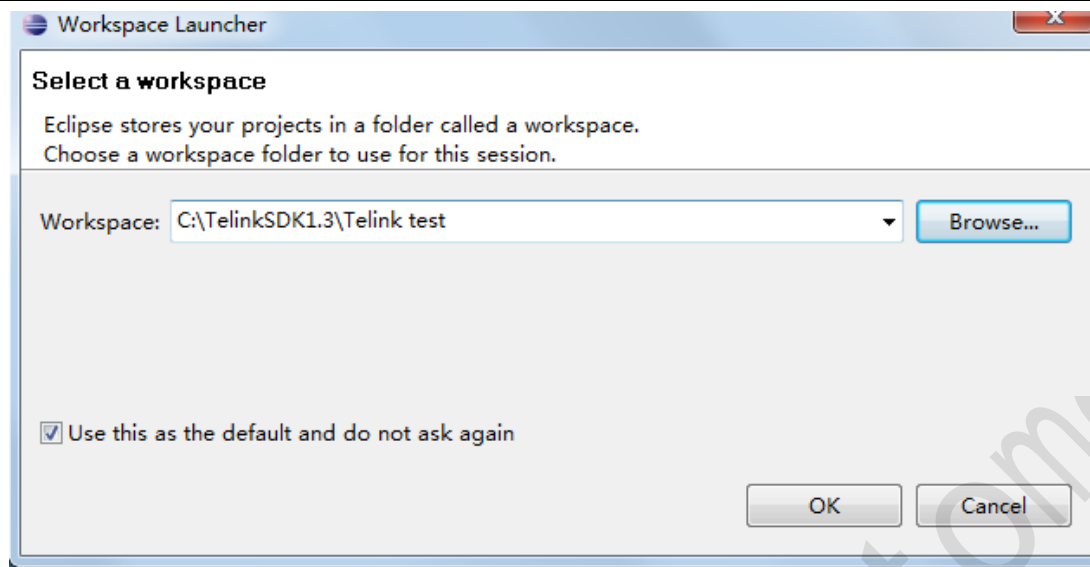



Figure 7 Workspace selection interface


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.




Figure 8 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.

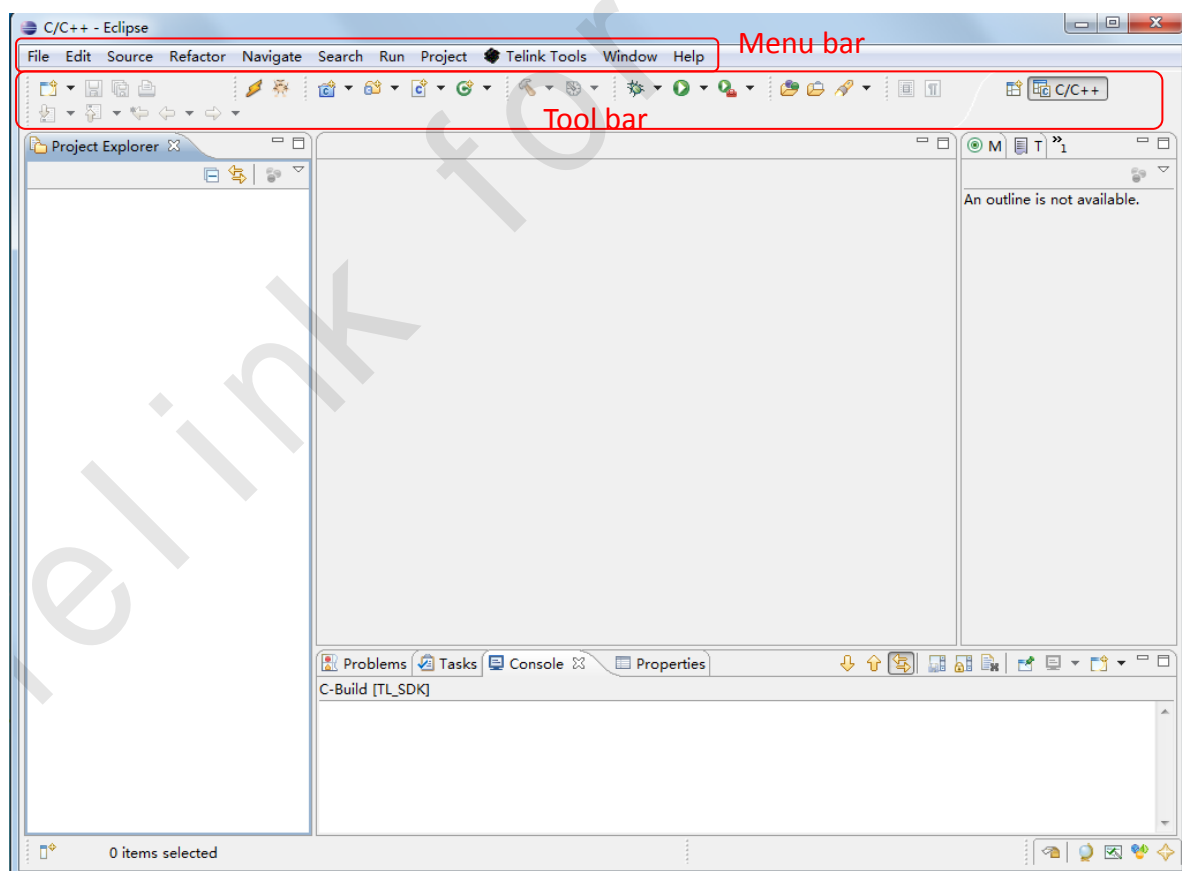


Figure 9 Telink IDE interface

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.

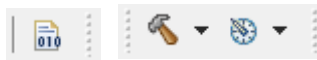
Click the “Telink Debugger” option to open the Telink WtcdB tool interface. For guide on the WtcdB tool, please refer to the document “Telink WtcdB User Guide” or “Telink Programmer User Guide” in the Appendix.

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

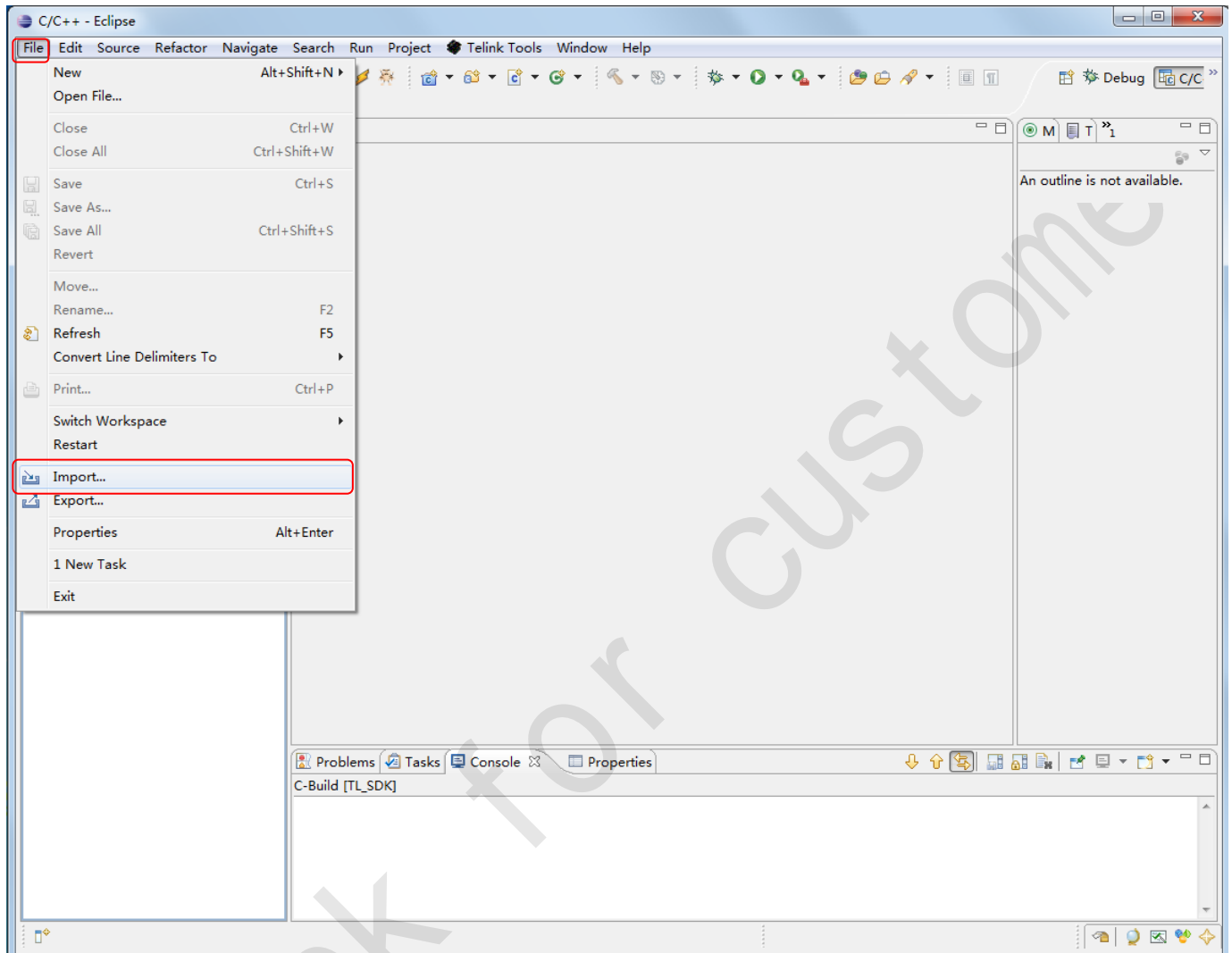


Figure 10 Import project: Menu

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

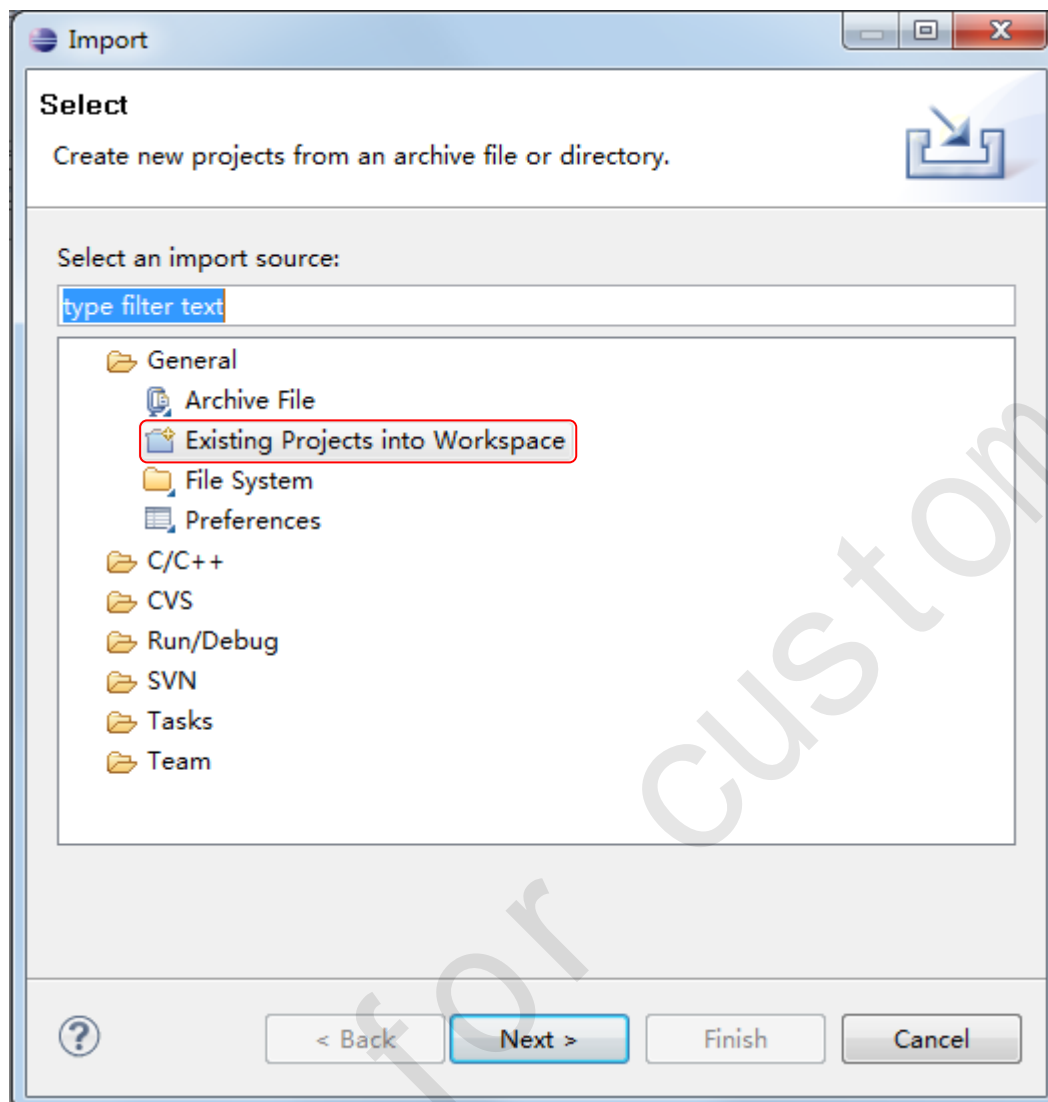


Figure 11 Import project: Source Selection

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.

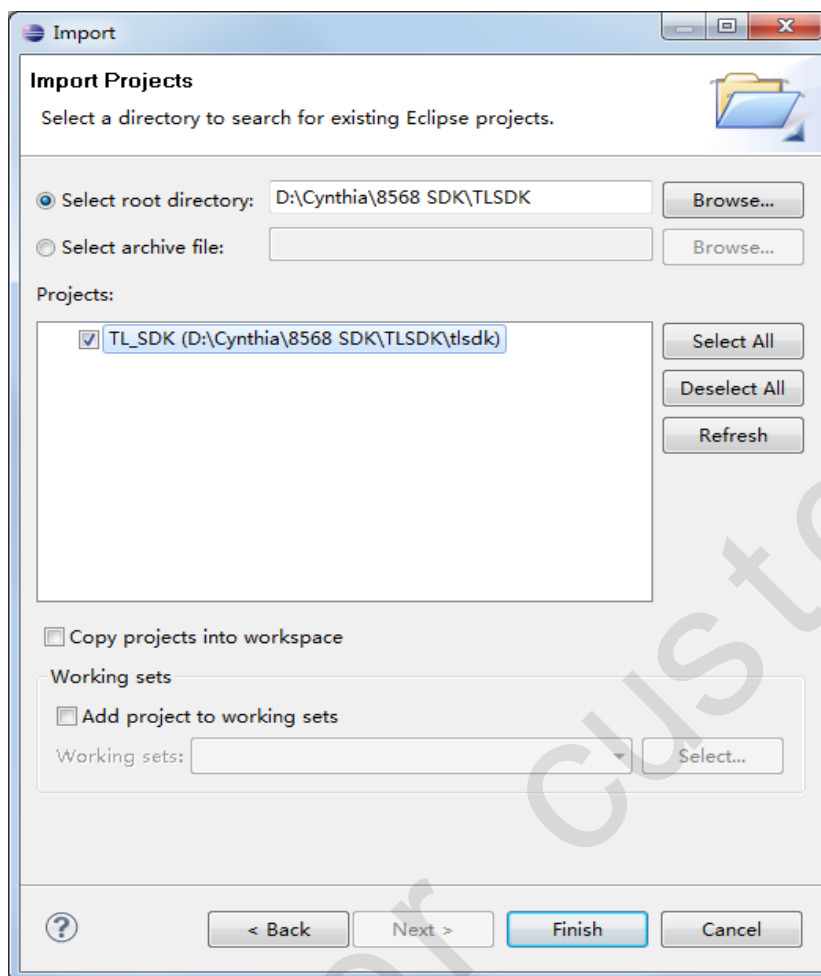




Figure 12 Import project: Search existing project

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  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)

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 13).

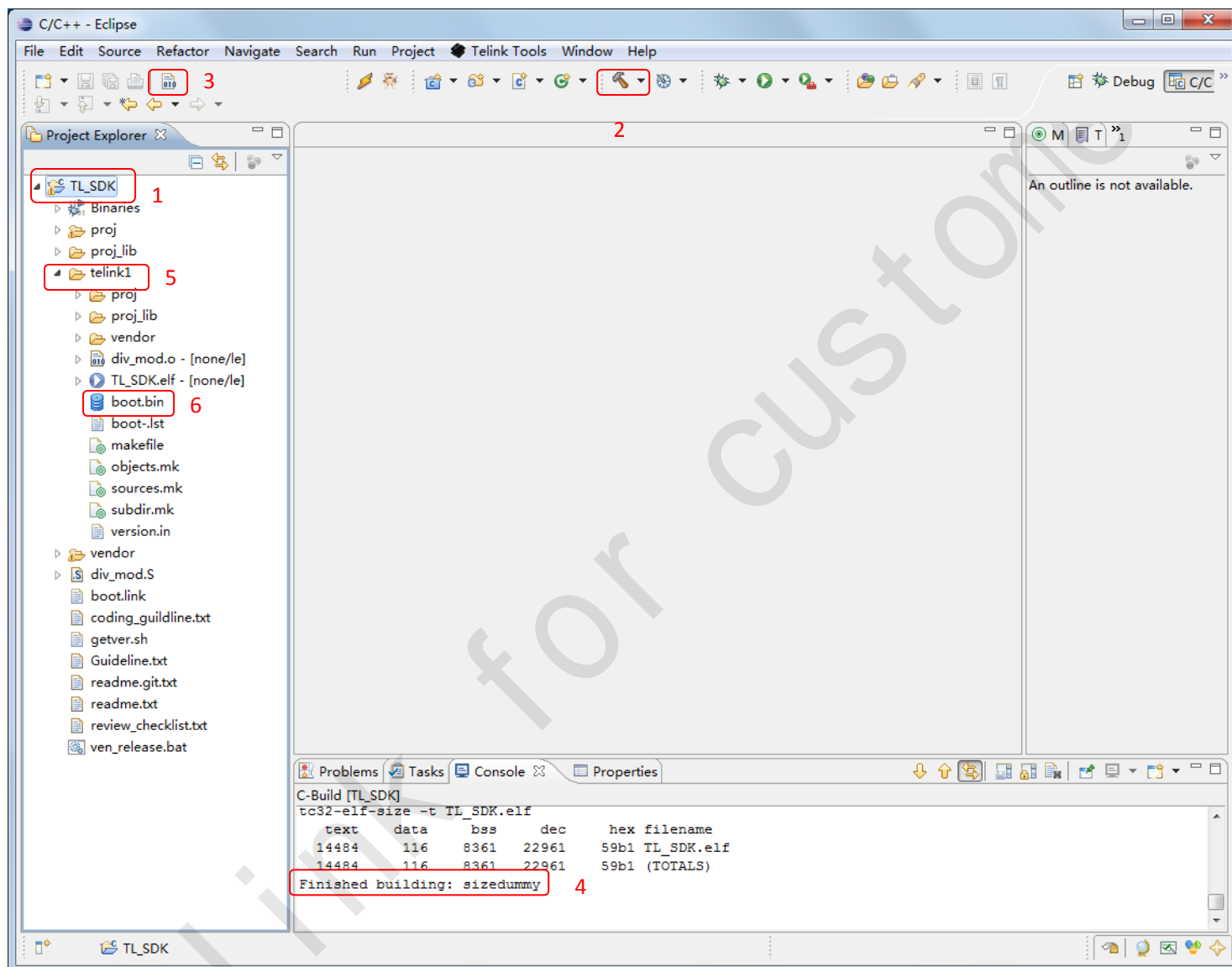


Figure 13 Successful compiling : Console output

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;

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

- (1) 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.

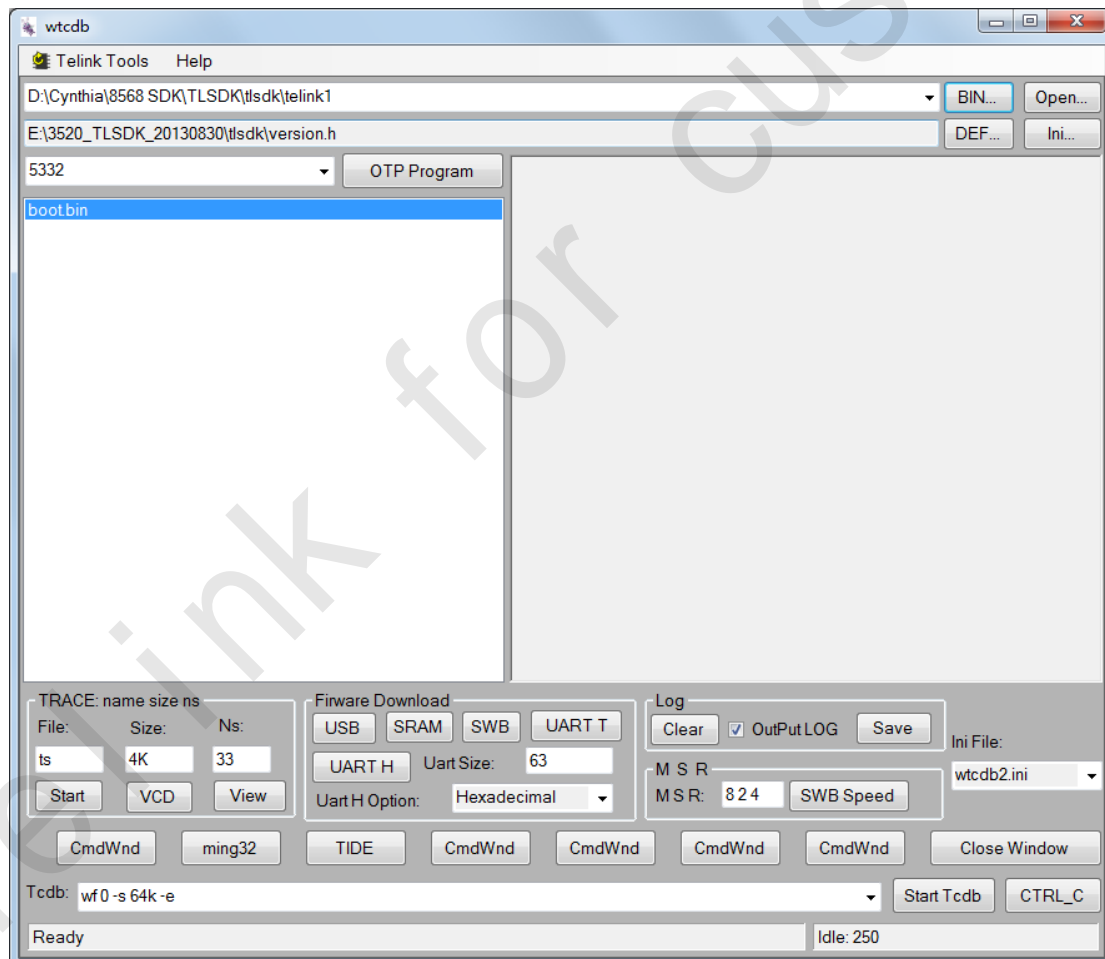


Figure 16 Firmware burning interface

➤ Burn EVB via EVK

- (1) EVK board is used as the adapter board for firmware download. Make sure

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.

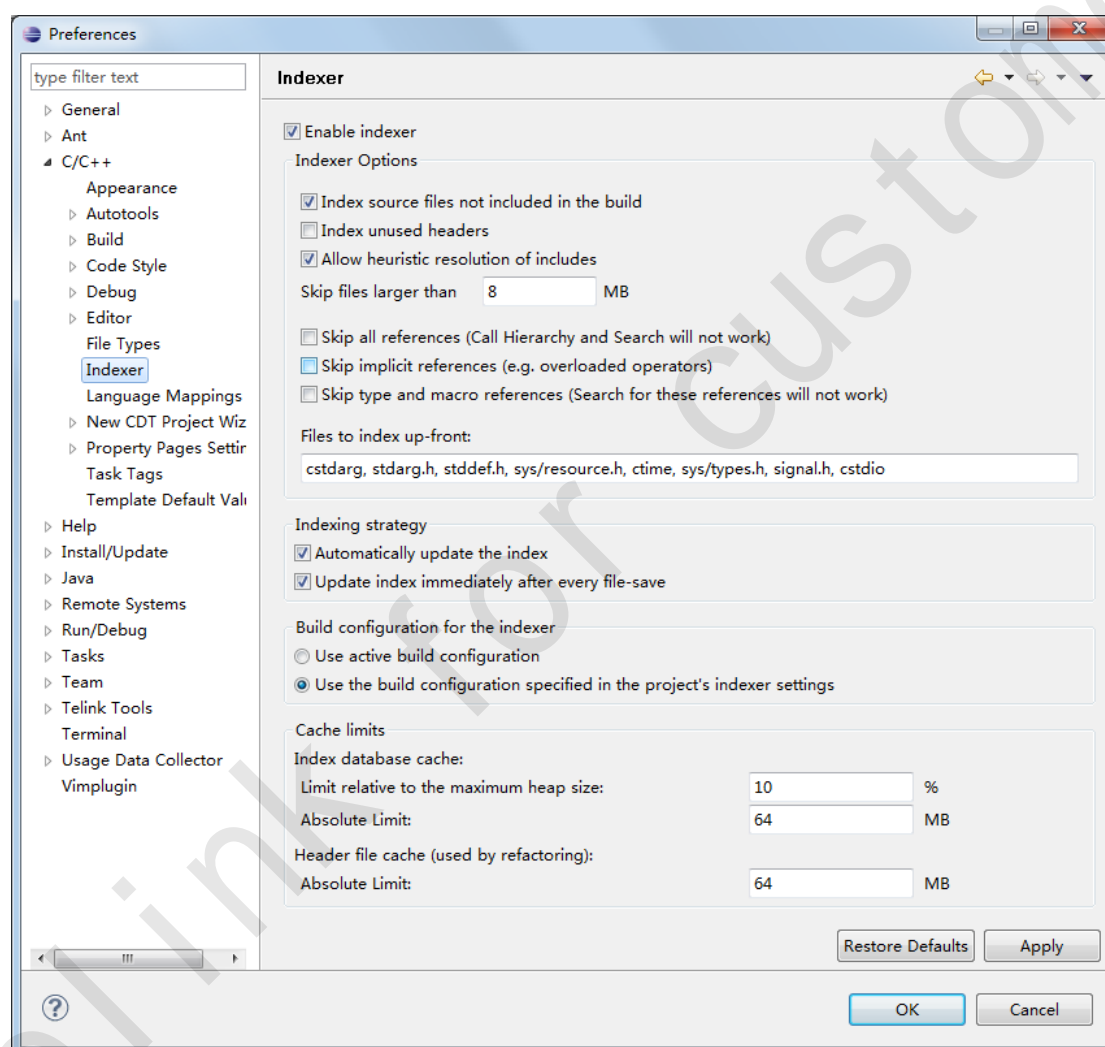


Figure 17 Indexer option

- 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++

Build > Settings > Optimization.

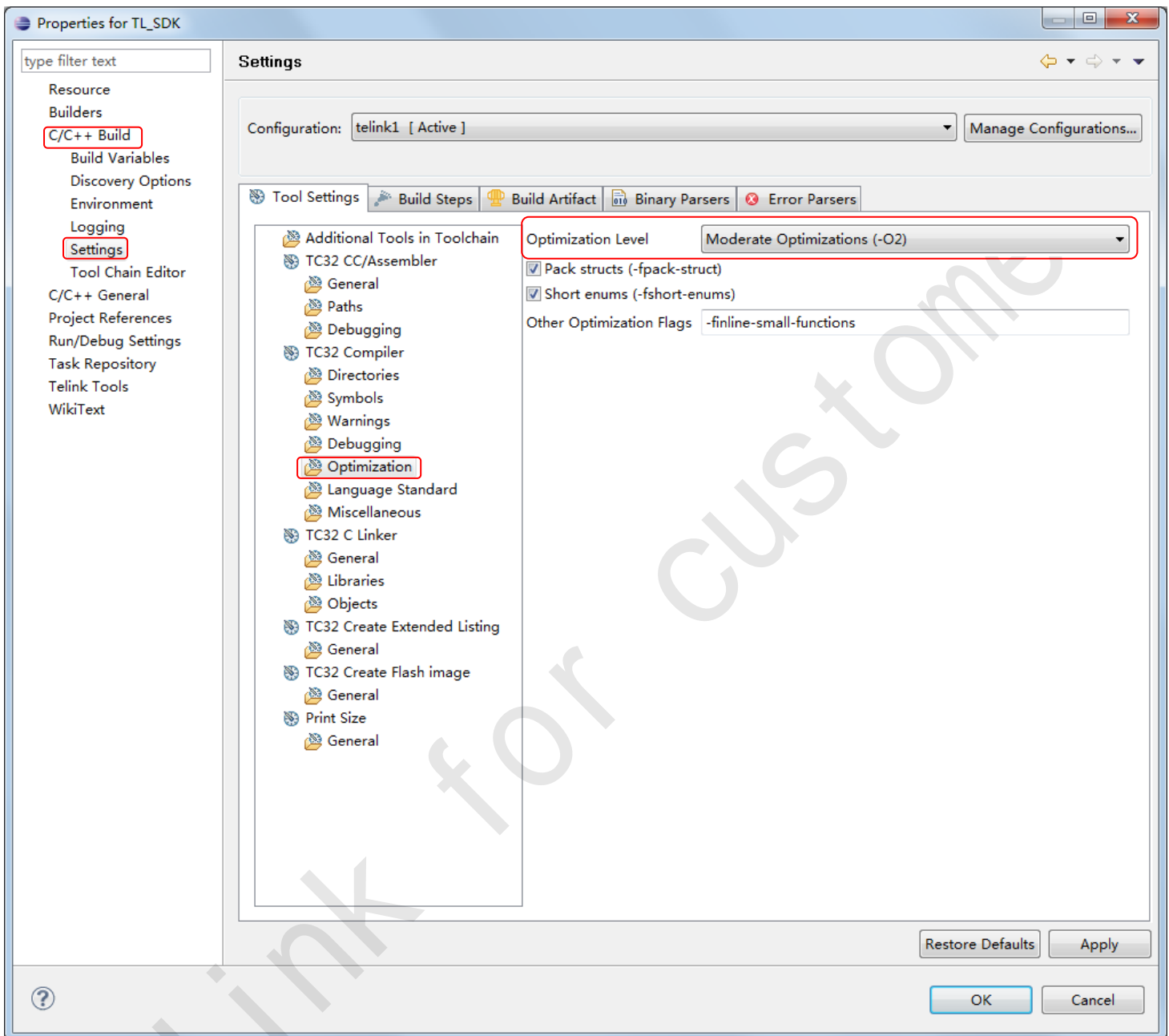


Figure 18 Optimization level option

➤ Q: Updated header file fails to take effect?

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

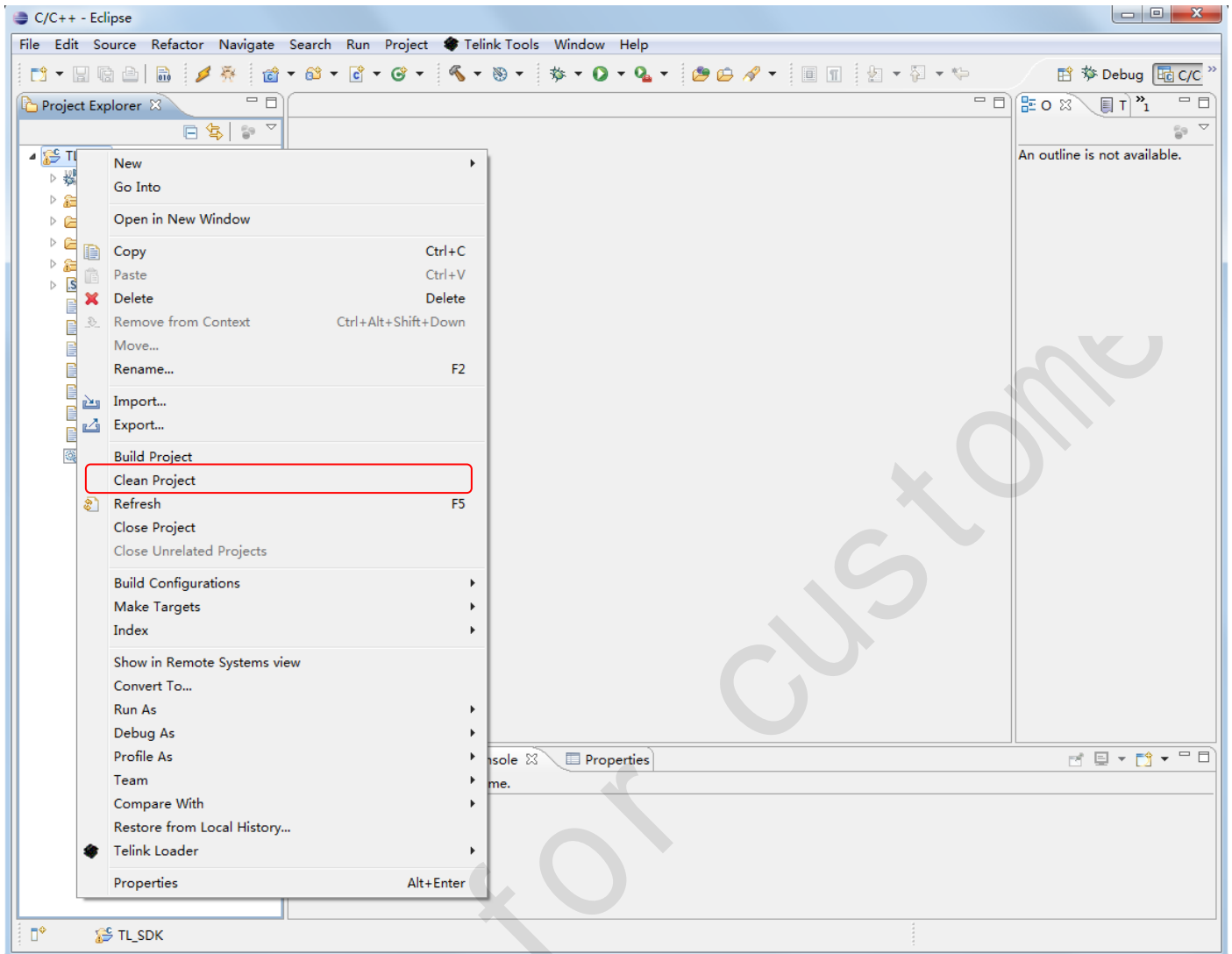
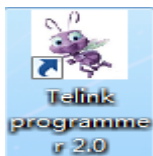


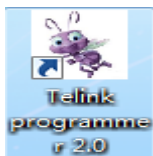
Figure 19 Clean project option

- 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.

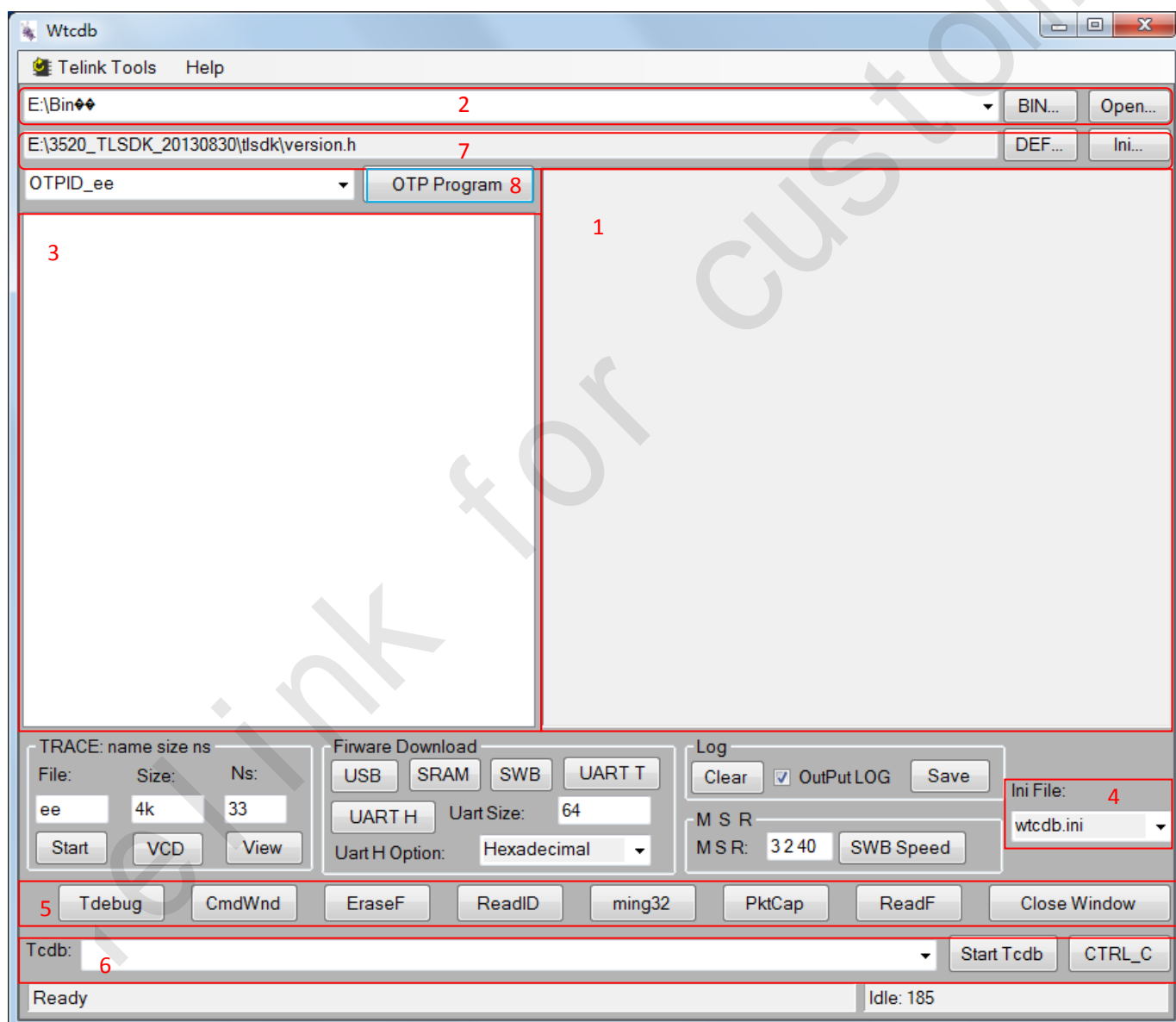
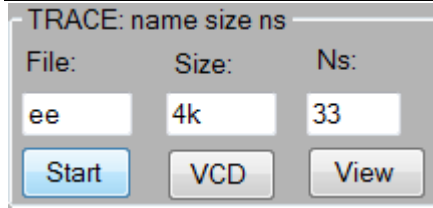


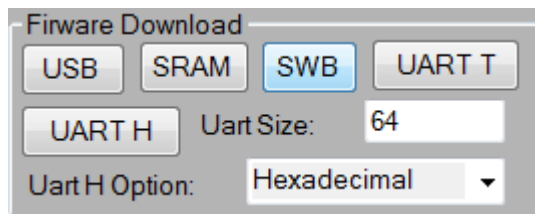
Figure 20 Telink Programmer Tool Interface

➤ TRACE bar



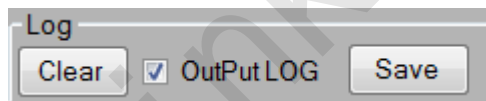
The TRACE bar serves to draw timing diagram during debugging. File: timing diagram name; Size: the length of packet before processing; Ns: system clock cycles with unit of ns; Click the “Start” button to start drawing; Click the “VCD” to convert to the diagram to VCD format; Click the “View” button to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

➤ Firmware Download bar



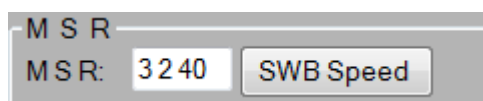
The Firmware Download bar mainly serves to select download method and print information during debugging. USB: Download via USB; SWB: Download via Single Wire; SRAM: Download into SRAM; UART T: Print ASCII code; UART H: Print binary or hexadecimal (selectable via the drop-down box below Uart H option);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

➤ M S R bar



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:

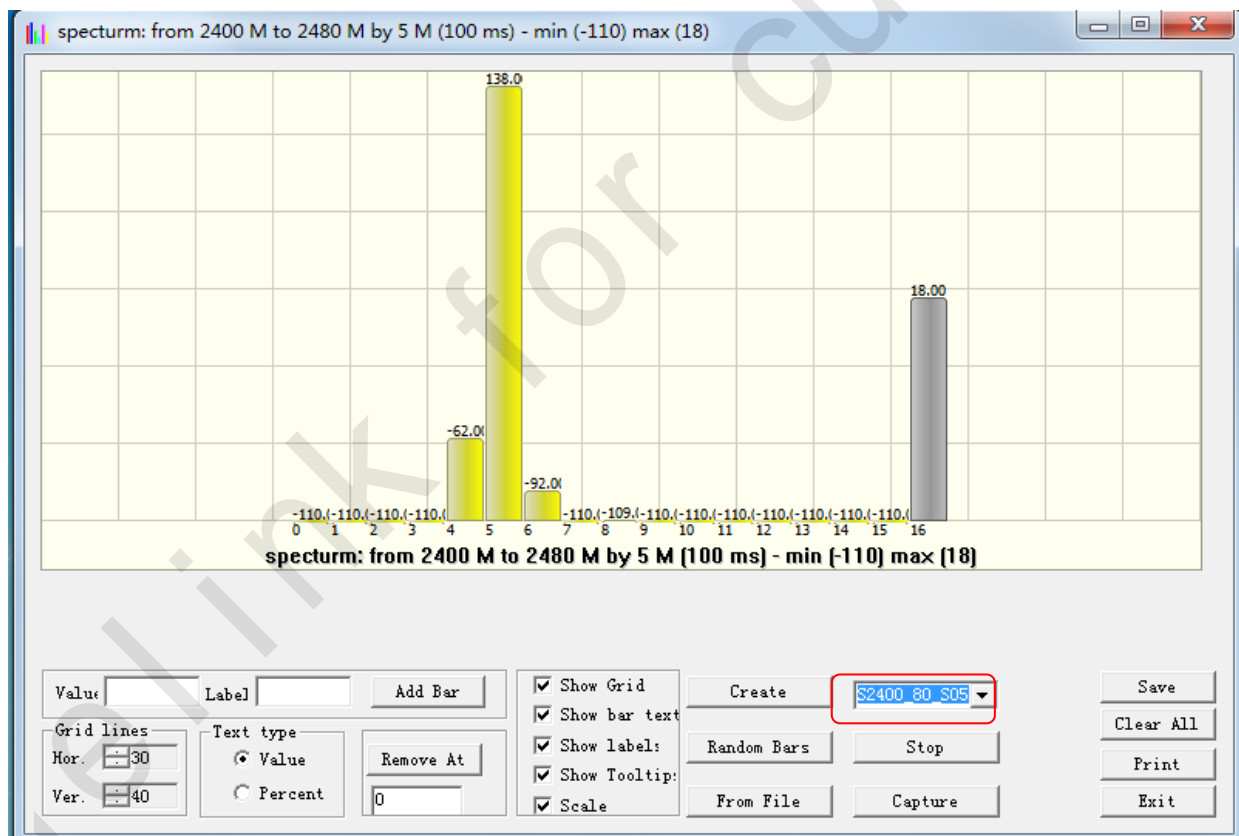



Figure 21 Telink RF Scanner Interface

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  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:

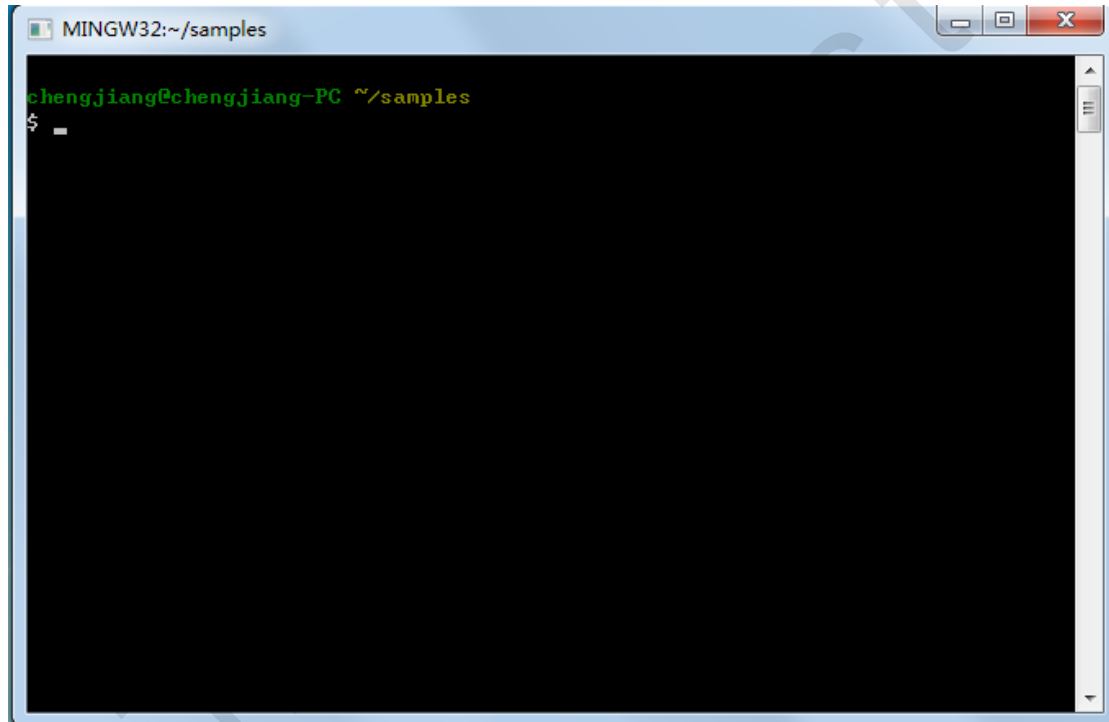


Figure 22 Telink EVK Console interface

Command line format:

tcdb [cmd] [Address]

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

-s[size]

-b

-u

-e

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.
- ✧ **-i:** input file name;
- ✧ **-o:** output file name;
- ✧ **-s:** indicates byte size to be read or written;
- ✧ **-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.
- ✧ **-e:** indicates the end of reading/writing.

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