

User Guide

GEEHY-LINK

Version: V1.3

© 珠海极海半导体有限公司



1 Introduction

This document provides a brief description of the basic parameters, functions, and usage methods of GEEHY-LINK.



Content

1	Introduction	1
2	Product Overview	3
3	Port Description	4
4	Performance Characteristics	5
5	Electrical Parameters	6
6	Operation Steps	7
6.1	GEEHY-LINK(HID)	7
6.2	GEEHY-LINK (WinUSB)	9
7	Q&A	15
8	Revision History	16



2 **Product Overview**

GEEHY-LINK (as shown in Figure 1) is an integrated development tool for debuggers and programmers, which can be used for online debugging and simulation of the entire series of APM32 MCU products in integrated development environments such as Keil. Support various debugging methods such as full speed operation, single step debugging, and breakpoint setting.





Due to the existence of HID device version and WinUSB device version in GEEHY-LINK, their firmware is based on CMSIS-DAP V1/2 respectively, with some slight differences in application.

Note: The HID device/WinUSB device here is only used to express GEEHY-LINK under different firmware. The outer packaging is the same. The GEEHY-LINK (WinUSB) in the following text refers to GEEHY-LINK that runs the WinUSB firmware based on CMSIS-DAP V2; GEEHY-LINK (HID) refers to GEEHY-LINK that runs the HID firmware based on CMSIS-DAP V1.



3 **Port Description**

GEEHY-LINK provides a 20PIN port for customers to use. Customers can connect to the target board through a port to complete the corresponding operation. The number and definition of the 20PIN port are shown in Figure 2.

	Figure 2	
TVCC	1 •• 2	TVCC
TRST	3 • • 4	UART-RX
TDI	5 • • 6	UART-TX
TMS/SWIO	7 • • 8	NC
TCK/SWCLK	9 10	NC
NC	11 • • 12	GND
TDO	13 • • 14	NC
RESET	15 • • 16	NC
NC	17 • • 18	GND
NC	19 • • 20	GND

Note: NC indicates that the pin is undefined and does not mean that the pin is short circuited to GND.



4 **Performance Characteristics**

- Supports Windows 7/8/10, plug-and-play ^[1]
- Supports code programming for APM32 MCU series
- Supports programming through SWD and JTAG methods
- Supports UART data transmission and reception ^[2], with a maximum baud rate of 115200
- The operation buttons can provide power to the target board
- USB high-speed communication interface, providing power supply

Note:

- (1) Plug-and-play is only supported for GEEHY-LINK (HID) devices. GEEHY-LINK (WinUSB) devices do not support plug-and-play on Windows 7. Please refer to the subsequent content for specific driver installation steps.
- (2) UART data transmission and reception are only used by GEEHY-LINK (WinUSB) devices and not supported by GEEHY-LINK (HID) devices.



5 **Electrical Parameters**

When the input voltage is 5V, the input current \geq 500mA.

When the output voltage is 3.3V, the output current \leq 350mA.



6 **Operation Steps**

The following describes the GEEHY-LINK (HID) version and GEEHY-LINK (WinUSB) version respectively.

6.1 GEEHY-LINK(HID)

This firmware is based on CMSIS-DAP V1 and will be enumerated using USB as a HID and MSC device.

After successfully connecting to the computer using a USB cable, the device manager will display Geehy DAP USB Device, as shown in Figure 3.

Figure 3
📇 Device Manager
File Action View Help
(= =) 📰 🖺 🖬 🖳 💺 🗶 🖲
> 💻 Computer
🗸 🚃 Disk drives
🕳 Geehy DAP USB Device
🕳 VMware, VMware Virtual S SCSI Disk Device
> 🏣 Display adapters
> 🚇 DVD/CD-ROM drives

The power supply of the target board can be controlled through the buttons on the tool, and it is not powered by default; Long-press the button for 3 seconds to turn on the red light and supply power to the target board; Long-press the button for another 3 seconds to turn off the red light and stop the power supply.

Configure the Keil software to use either SW mode or JTAG mode.

Click "Options for Target" , select "Debug" in the open interface, and then select "CMSIS-DAP Debugger", as shown in Figure 4:



Figure 4

evice laiget	output Listing oser c/c// Asi	a Linker 50	ous othities
	r <u>with restrictions</u> Settings	(Use: CMS	IS-DAP Debugger 👻 Setting
Limit Speed to	o Real-Time	ULIN	K Pro Cortex Debugger
Load Application File:	tion at Startup 🔽 Run to main()	Load A J-LIN Initializatio Mode	IS-DAP Debugger main() K J-TRACE Cortex els Cortex-M Debugger ink Debugger
	Lectrice.	I NULI	nk Debugger
		Pemi	cro Debugger
Restore Debug	Session Settings	Restore SiLat	cro Debugger os UDA Debugger
Restore Debug	session Settings Ints 🔽 Toolbox	Restore SiLat	cro Debugger os UDA Debugger a Blaster Cortex Debugger
Restore Debug	nts Iv Toolbox ndows & Performance Analyzer	Restore SiLat SiLat Bre Altera TIXD Watch W	cro Debugger os UDA Debugger a Blaster Cortex Debugger IS Debugger Indows I Tracepoints
Restore Debug Breakpoir Watch Wit Memory D	y Session Settings Ints I Toolbox Indows & Performance Analyzer Display I System Viewer	Restore SiLat F Bre Altera TIXD Watch W	cro Debugger os UDA Debugger Blaster Cottex Debugger IS Debugger indows IV Tracepoints Display V System Viewer
Restore Debug	y Session Settings nts ▼ Toolbox ndows & Performance Analyzer Display ▼ System Viewer Parameter:	Restore SiLat F Bre Alters TIXD Watch W Memory Driver DLL:	cro Debugger so UDA Debugger a Blaster Cortex Debugger IS Debugger indows V Tracepoints Display V System Viewer Parameter.
Restore Debug Breakpoir Watch Wir Memory D CPU DLL: SARMCM3.DLL	session Settings Ints Toolbox Indows & Performance Analyzer Display System Viewer Parameter: -REMAP	Restore SiLat SILat TIXD Watch W Memory Driver DLL: SARMCM3.DLL	Cro Debugger so UDA Debugger a Blaster Cortex Debugger IS Debugger indows V Tracepoints Display V System Viewer Parameter.
Restore Debug Breakpoir Watch Wii Memory D CPU DLL: SARMCM3.DLL Dialog DLL:	session Settings nts Toolbox ndows & Performance Analyzer Display System Viewer Parameter: -REMAP Parameter:	Restore Permit F Bre Altern F Bre Altern TIXD Watch W Priver DLL: SARMCM3 DLL Dialog DLL:	Cro Debugger so UDA Debugger a Blaster Cortex Debugger IS Debugger indows V Tracepoints Display V System Viewer Parameter. Parameter:
Restore Debug Breakpoir Watch Wii Watch Wii CPU DLL: SARMCM3.DLL Dialog DLL: DCM.DLL	session Settings nts Toolbox ndows & Performance Analyzer Display System Viewer Parameter: -REMAP Parameter: -pCM3	Restore Permit F Bre Altern F Bre Altern TIXD Watch W F Memory Driver DLL: SARMCM3 DLL Dialog DLL: TCM.DLL	Parameter. Parameter. -pCM3
Restore Debug F Breakpoir Watch Wii Memory D CPU DLL: SARMCM3.DLL Dialog DLL: DCM.DLL Warn if outdat	s Session Settings hts ☐ Toolbox ndows & Performance Analyzer Display ☐ System Viewer ☐ -REMAP Parameter: -pCM3 ted Executable is loaded	Restore Permin F Bre Altern F Bre Altern T ND Watch W F Memory Driver DLL: SARMCM3 DLL Dialog DLL: TCM.DLL	Cro Debugger so UDA Debugger a Blaster Cortex Debugger IS Debugger indows V Tracepoints Display V System Viewer Parameter: Parameter:

Click the "Settings" button to enter the settings interface, select SWD or JTAG mode and frequency, as shown in Figures 5 and 6:

- A: Debugger Name
- B: Debugger serial number
- C: Debugger firmware version
- D: SWD and JTAG mode selection (JTAG is only supported in Keil versions V5.22 and above)
- E: Maximum frequency: 10M
- F: IDCODE displayed after successfully connecting to the target board

ebug Trace Flash Download	1			
CMSIS-DAP - JTAG/SW Adapter-	JTAG Device Chain			
Geehy CMSIS-DAP	F IDCODE	Device Name		Move
Sorial No: ES-00008803	TDO 0x4BA004	77 ARM CoreSight JTAG	DP	Up
Firmware Version: 1.2	TDI	Unknown 3 TAG device	5	Down
SWJD Port JTAG	Automatic Detection Automatic Configuration	on ID CODE:		
E Max Clock: 1MHz	Add Delete	Update IR len:	AP: 0x00	_
Debug		Cache Options	- Download Options -	
Connect Normal V F	Reset Autodetect 👻	Cache Code	Verify Code Down	load
Reset after Connect	Stop after Reset	Cache Memory	Download to Flash	h

Figure 5





ebug Trace Flash Download -CMSIS-DAP - JTAG/SW Adapter	SW Device			
Geehy CMSIS-DAP	IDCODE	Device Name	M	ove
Serial No: ES-0008803	SWDIO Ox2BA01477	ARM CoreSight SW-DP		Up
				own
Firmware Version: 1.2				
SWJ Port SW -	Automatic Detection	ID CODE:		
Max Clock: 1MHz	C Manual Configuration	Device Name:		
	Add Delete	Update	AP: 0x00	
Debug		Cooke Options	Download Optiona	
Connect Normal Res	et Autodetect	Cache Options	Verify Code Downlos	d
Reset after Connect		Cache Memory	Download to Flash	
	Ston after Reset			

Enter the "Flash Download" interface, select "Programming Algorithm", click the "Add" button, and add the corresponding Flash, as shown in Figure 7:

Figure 7

CMSIS-DAP Cortex-M Target Driver Setup	×
Debug Trace Flash Download	
Download Function C Erase Full Chip Image: Program Image: C Erase Sectors Image: Verify Start 0x20000000 Size: 0x00001000 Image: C Do not Erase Image: Reset and Run Image: Reset and Run Start 0x20000000 Size: 0x00001000	
Programming Augurithm Description Device Size Device Type Address Range APM32F10x High-density 512k On-chip Flash 08000000H - 0807FFFFH	
Start Size:	
Add Remove	
OK Cancel Help	

6.2 GEEHY-LINK (WinUSB)

This firmware is based on CMSIS-DAP V2 and will use USB enumeration to form a WinUSB and CDC device. WinUSB is used for data flow interaction in CMSIS-DAP, and CDC is used for UART data transmission and reception interaction on GEEHY-LINK.

6.2.1 Used on Windows 7 System

Due to the lack of a WinUSB device driver in the Windows 7 system, the Zadig tool needs to be used for installation, along with the installation of the CMSIS-DAP driver.



Official download address for Zadig: https://zadig.akeo.ie/#

CMSIS-DAP (WinUSB) driver: GEEHY-LINK(WinUSB)_Windows7.inf (This driver is not digitally signed and requires disabling system digital signature verification).

The installation steps are as follows:

(1) Insert the GEEHY-LINK (WinUSB) into the host, and the Windows 7 system will prompt that the device driver software was not successfully installed.

Figure 8



The device manager will prompt a yellow exclamation mark.



- (2) Open the Zadig software and install the relevant drivers.
- Install the CDC driver. Select the "Geehy Serial Port (Interface 0)" device, then select "USB Serial (CDC)" and click "Install Driver" to install.







(4) Install the WinUSB driver. Select the "Geehy CMSIS-DAP WinUSB (Interface 3)" device, then select "WinUSB (v1.6.7xxx)" and click "Install Driver" to install. Note: (v1.6.7xxx) generally refers to the WinUSB driver version number, which may be different due to different Zadig software versions.

evice	Options Help		
Geehy (CMSIS-DAP WinUSB (Inte	rface 3)	
	(NONE)	WinUSB (v6.1.7600.16385)	More Information
Driver	(NONE)		
Driver	(NONE)		WinUSB (libusb)
Driver USB ID	314B 0101 03		WinUSB (libusb) libusb-win32 libusbK

Figure 11

(5) Check the Device Manager. After successful installation, the corresponding devices will be displayed in the Device Manager, such as:

Geehy Serial Port (Interface 0) (COM3)

Geehy CMSIS-DAP WinUSB (Interface 3)





(6) Modify the driver to the CMSIS-DAP driver. Right-click on "Geehy CMISI-DAP WinUSB (interface 3)" and select "Properties".



(7) Select "Update Driver".



Figure 14

Seehy CMSIS-DAP WinUSB	(Interface 3) Properties	X
General Driver Details		
Geehy CMSIS-E	DAP WinUSB (Interface 3)	
Driver Provider:	libwdi	
Driver Date:	2012/6/2	
Driver Version:	6.1.7600.16385	
Digital Signer:	USB\VID_314B&PID_0101&MI_03 (libwdi autogenerated)	
Driver Details	To view details about the driver files.	
Update Driver	To update the driver software for this device.	

(8) Choose to install the driver file from your local machine (my GEEHY-LINK(WinUSB)_Windows7.inf is saved on "C:\Users\Geehy\Desktop", please pay attention to your own file path).



How do you want to search for driver software?	Browse for driver software on your computer
Search automatically for updated driver software Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.	Search for driver software in this location: C\Users\Geehy\Desktop Browse Include subfolders
Browse my computer for driver software Locate and install driver software manually.	Let me pick from a list of device drivers on my computer This list will show installed driver software compatible with the device, and all driver software in the same category as the device.
	ancel Next Cancel



9	have a disk that contains the driver you want to inst	re device and then click Next. If you all, click Have Disk.
/ Sho	ow compatible hardware	
Mode	el	
🙀 Ge	ehy CMSIS-DAP WinUSB (Interface 3)	
= T	his driver has an Authenticode/tm)	Have Disk

(9) Select the saved driver folder, click on the displayed "GEEHY-LINK CMSIS DAP (WinUSB)", and then click "Next".



Figure 17

-	Insert the manufacturer's installation disk, and then make sure that the correct drive is selected below.	OK Cancel	Select the device driver you want to install for the select the manufacturer and model of your hardware have a disk that contains the driver you want to install the select the	t <mark>his hardware.</mark> e device and then click Next. If you II, click Have Disk.
	Copy manufacturer's files from:	Browse	Model GEEHY-LINK CMSIS-DAP (WinUSB)	
			This driver is not digitally signed! Tell me why driver signing is important	Have Disk

(10) Click "Yes" and "Install this driver software any way" in the pop-up prompt window.

Figure 18



6.2.2 Used on Windows 8 and above systems

Windows 8 and above systems come with WinUSB/CDC device drivers, which are automatically installed when GEEHY-LINK (WinUSB) is inserted into the PC.



After the driver installation is completed, it can be seen in the Device Manager.



Figure 20

>	P	Network adapters
\mathbf{v}	Ψ,	Ports (COM & LPT)
		USB Serial Device (COM3)
>		Print queues
>		Processors
>	•	Software devices
>	4	Sound, video and game controllers
>		Storage controllers
>		System devices
>	Ŷ	Universal Serial Bus controllers
\mathbf{v}	Ű,	Universal Serial Bus devices
	-	Geehy CMSIS-DAP WinUSB

6.2.3 Use of Keil MDK

According to the official documentation of Keil MDK, if you are using an older version of Keil MDK (lower than 5.29), you may experience some inconvenience when using GEEHY-LINK WinUSB. The documentation link for reference is: https://developer.arm.com/documentation/ka003663/latest

Note: The usage of GEEHY-LINK (WinUSB) on Keil MDK is consistent with GEEHY-LINK (HID), please refer to section 6.1 for details.

6.2.4 Use of UART-RX/TX

GEEHY-LINK (WinUSB) supports the use of UART-RX/TX and can be plugged into GEEHY-LINK (WinUSB). Open the serial port assistant and select the corresponding COM port to use, such as COM3.



7 **Q&A**

Q1: How to distinguish between GEEHY-LINK (HID) and GEEHY-LINK (WinUSB)?

A1: It is different in USB device enumeration, GEEHY-LINK (WinUSB) will be enumerated as a WinUSB, VCP composite device. Customers can distinguish based on this.

Q2: How to upgrade GEEHY-LINK (HID) to GEEHY-LINK (WinUSB)?

A2: The upgrade method is quite complex. If you have any needs, it is recommended to contact our official support <u>FAE@geehy.com</u>. We will provide relevant technical support.

Q3: How does GEEHY-LINK (WinUSB) work on Linux/Mac systems?

A3: GEEHY-LINK WinUSB is a device based on CMSIS-DAP V2. It is recommended that you refer to the instructions for using other devices based on CMSIS-DAP V2.

Q4: Does GEEHY-LINK (HID/WinUSB) support SWO?

A4: Due to hardware design limitations, GEEHY-LINK (HID/WinUSB) does not support SWO.



8 **Revision History**

Date	Version	Change History
September 25, 2020	1.0	New
October 22, 2021	1.1	Modify description
March 15, 2022	1.2	Modify the debugger name
November 17, 2023	1.3	Modify port definition, and add WinUSB firmware description

Table 1	Document Revision History
	Document revision mistory

Statement

This document is formulated and published by Geehy Semiconductor Co., Ltd. (hereinafter referred to as "Geehy"). The contents in this document are protected by laws and regulations of trademark, copyright and software copyright. Geehy reserves the right to make corrections and modifications to this document at any time. Please read this document carefully before using Geehy products. Once you use the Geehy product, it means that you (hereinafter referred to as the "users") have known and accepted all the contents of this document. Users shall use the Geehy product in accordance with relevant laws and regulations and the requirements of this document.

1. Ownership

This document can only be used in connection with the corresponding chip products or software products provided by Geehy. Without the prior permission of Geehy, no unit or individual may copy, transcribe, modify, edit or disseminate all or part of the contents of this document for any reason or in any form.

The "极海" or "Geehy" words or graphics with "®" or "TM" in this document are trademarks of Geehy. Other product or service names displayed on Geehy products are the property of their respective owners.

2. No Intellectual Property License

Geehy owns all rights, ownership and intellectual property rights involved in this document.

Geehy shall not be deemed to grant the license or right of any intellectual property to users explicitly or implicitly due to the sale or distribution of Geehy products or this document.

If any third party's products, services or intellectual property are involved in this document, it shall not be deemed that Geehy authorizes users to use the aforesaid third party's products, services or intellectual property, unless otherwise agreed in sales order or sales contract.

3. Version Update

Users can obtain the latest document of the corresponding models when ordering Geehy products.

If the contents in this document are inconsistent with Geehy products, the agreement in thesales order or the sales contract shall prevail.

4. Information Reliability

The relevant data in this document are obtained from batch test by Geehy Laboratory or cooperative third-party testing organization. However, clerical errors in correction or errors caused by differences in testing environment may occur inevitably. Therefore, users should understand that Geehy does not bear any responsibility for such errors that may occur in this document. The relevant data in this document are



only used to guide users as performance parameter reference and do not constitute Geehy's guarantee for any product performance.

Users shall select appropriate Geehy products according to their own needs, and effectively verify and test the applicability of Geehy products to confirm that Geehy products meet their own needs, corresponding standards, safety or other reliability requirements. If loses are caused to users due to the user's failure to fully verify and test Geehy products, Geehy will not bear any responsibility.

5. Legality

USERS SHALL ABIDE BY ALL APPLICABLE LOCAL LAWS AND REGULATIONS WHEN USING THIS DOCUMENT AND THE MATCHING GEEHY PRODUCTS. USERS SHALL UNDERSTAND THAT THE PRODUCTS MAY BE RESTRICTED BY THE EXPORT, RE-EXPORT OR OTHER LAWS OF THE COUNTIRIES OF THE PRODUCTS SUPPLIERS, GEEHY, GEEHY DISTRIBUTORS AND USERS. USERS (ON BEHALF OR ITSELF, SUBSIDIARIES AND AFFILIATED ENTERPRISES) SHALL AGREE AND PROMISE TO ABIDE BY ALL APPLICABLE LAWS AND REGULATIONS ON THE EXPORT AND RE-EXPORT OF GEEHY PRODUCTS AND/OR TECHNOLOGIES AND DIRECT PRODUCTS.

6. Disclaimer of Warranty

THIS DOCUMENT IS PROVIDED BY GEEHY "AS IS" AND THERE IS NO WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, TO THE EXTENT PERMITTED BY APPLICABLE LAW.

GEEHY WILL BEAR NO RESPONSIBILITY FOR ANY DISPUTES ARISING FROM THE SUBSEQUENT DESIGN OR USE BY USERS.

7. Limitation of Liability

IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL GEEHY OR ANY OTHER PARTY WHO PROVIDE THE DOCUMENT "AS IS", BE LIABLE FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, DIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE DOCUMENT (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY USERS OR THIRD PARTIES).

8. Scope of Application

The information in this document replaces the information provided in all previous versions of the document.

© 2022 Geehy Semiconductor Co., Ltd. - All Rights Reserved

Geehy Semiconductor Co.,Ltd.

O Bldg.1, No.83 Guangwan Street, Zhuhai, Guangdong, China