GigaDevice Semiconductor Inc.

GD32VW553 AT Command User Guide

Application Notes
AN151

Revision 1.1

(Jul.2024)

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1. AT command formats

1.1. Command types

Table 1-1. Command types

Type	Format	Description
Help command	AT+<x>=?	View command parameters and value ranges
Query command	AT+<x>?	Query the current parameter value of the specified target
Execution command	AT+<x> or AT+<x>=<…>	Run command Set the specified target parameter value

1.2. Command formats

Table 1-2. Command formats

Field	Description
AT	Command prefix
<CMD>	Command string
[ ]	Optional part
<>	Mandatory part. For specific commands, some parameters are mandatory to be entered
[p1],[p2],[p3],…	Parameters, which support both strings and numbers. Enter the IP address in the string format "x.x.x.x" String: Must be enclosed in double quotation marks Number: Both decimal and hexadecimal numbers are supported

Note: AT [+<CMD>] [=] [p1],[p2],[p3],

1.3. Response formats

Table 1-3. Response formats

Output type	Description
[+<CMD>:<MSG>]	Output result or error prompt
<RSP>	OK: success ERROR: failure

Note: The Chinese characters in the response format are only explanations of the command response and are not actually displayed.

2. List of AT commands

Table 2-1. AT commands

Command	Description
AT	Enter AT command mode
ATQ	Exit AT command mode
AT+HELP	Query all AT commands
AT+RST	Module reset
AT+GMR	Query version information
AT+TASK	Query all tasks of the current operating system
AT+HEAP	Query the free HEAP of the current operating system
AT+SYSRAM	Query the current free SRAM space
AT+UART	Set the LOG UART parameter or read the current parameter
AT+TRANSINTVL	Query or set the data transmission interval in passthrough mode
AT+CWMODE_CUR	Query or set the current WiFi operating mode: SoftAP or STA
AT+CWJAP_CUR	Connect to AP
AT+CWLAP	Scan and display the AP list
AT+CWSTATUS	Query the current WiFi operating mode and status
AT+CWQAP	Disconnect from AP
AT+CWSAP_CUR	Start the SoftAP mode
AT+CWLIF	Query information about all STAs connected to SoftAP
AT+CWAUTOCONN	Set whether to automatically connect to the AP after power-on
AT+PING	Ping function
AT+CIPSTA	Query or set the IP address of the local STA
AT+CIPSTART	Create TCP connection or UDP transfer
AT+CIPSEND	Send data
AT+CIPSERVER	Start the TCP server
AT+CIPCLOSE	Close TCP connection or UDP transfer
AT+CIPSTATUS	Query network connection information
AT+CIFSR	Query local IP address information
AT+CIPMODE	Query or set the Transmission mode

3. AT basic command set

3.1. AT

Table 3-1. Entering AT command mode

Command	Parameters	Response
Execution command AT		Execution result
Example: AT Correct response: OK		

3.2. ATQ

Table 3-2. Exiting AT command mode

Command	Parameters	Response
Execution command ATQ		Execution result
Example: ATQ Correct response: OK		

3.3. AT+HELP

Table 3-3. Querying all AT commands

Command	Parameters	Response
Execution command AT+HELP		Display the list of all AT commands
Example: AT+HELP Correct response: AT COMMAND LIST: ========== ATQ AT+HELP …… OK		

3.4. AT+RST

Table 3-4. Module reset command

Command	Parameters	Response
Execution command AT+RST		Restart message
Example: AT+RST Correct response: ALW: MBL: First print. ALW: MBL: Boot from Image 0. ALW: MBL: Validate Image 0 OK. ALW: MBL: Jump to Main Image (0x800a000). Build date: 2023/07/06 17:34:18 === RF initialization finished === === WiFi version: v1.0.0 === PHY initialization finished ===		

3.5. AT+GMR

Table 3-5. Querying version information

Command	Parameters	Response (similar format information)
Execution command AT+GMR		Related version information
Example: AT+GMR Correct response: ========== SDK revision: v1.0.0 SDK git revision: 0.1.0-487-gb2937736-b2937736b33393b3 SDK build date: 2023/07/03 15:23:20 OK		

3.6. AT+TASK

Table 3-6. Querying all tasks of the current operating system

Command	Parameters	Response (similar format information)
Execution command AT+TASK		Current task information list

Command	Parameters	Response (similar format information)
Example: AT+TASK Correct response: ATCMD X 20 383 2 0x200198a0 … RX B 18 383 4 0x2001af78 OK		

3.7. AT+HEAP

Table 3-7. Querying the free HEAP of the current operating system

Command	Parameters	Response (similar format information)
Execution command AT+HEAP		HEAP usage
Example: AT+HEAP Correct response: ========== Total free heap size = 113784 Total min free heap size = 109480 OK		

3.8. AT+SYSRAM

Table 3-8. Querying the current free SRAM space

Command	Parameters	Response (similar format information)
Execution command AT+SYSRAM		Remaining SRAM space
Example: AT+SYSRAM Correct response: ========== Free SRAM size = 108472 OK		

3.9. AT+UART

Table 3-9. Querying or setting serial port parameters

Command	Parameters	Response
Help command AT+UART=?		+UART=<baudrate>,<databits>,<stopbits>,<parity>,<flow control>
Query command AT+UART?		Current serial port parameter
Execution command AT+UART=<baudrate>,<databits>,<stopbits>,<parity>,<flow control>	<baudrate>: UART baud rate <databits>: Data bit 8: 8 bit <stopbits>: Stop bit 1: 1 bit 2: 1.5 bit 3: 2 bit <parity>: parity bit 0: None 1: Odd 2: Even <flow control>: Flow control 0: Disable flow control 1: Enable RTS 2: Enable CTS 3: Enable both RTS and CTS	Execution result
Example: Query current serial port parameter AT+UART=115200,8,1,0,0 Correct response: +UART: 115200, 8, 1, 0, 0 OK		

3.10. AT+TRANSINTVL

Table 3-10. Querying or setting the Data Transmission Interval in passthrough mode

Command	Parameters	Response
Help command AT+TRANSINTVL=?		+TRANSINTVL=<interval>
Query command AT+TRANSINTVL?		Current Transmission Interval +TRANSINTVL:<interval>
Execution command AT+TRANSINTVL =<interval>	<interval>：Data transmission interval. Unit: milliseconds. Default value: 20.	Execution result

Command	Parameters	Response
Example: AT+TRANSINTVL=800 Correct Resonse: OK		

4. AT WiFi command set

4.1. AT+CWMODE_CUR

Table 4-1. Querying or setting the current WiFi operating mode

Command	Parameters	Response
Help command AT+CWMODE_CUR=?		+CWMODE_CUR: <mode:0-2>
Query command AT+CWMODE_CUR?		Current operating mode +CWMODE_CUR: <mode>
Execution command AT+CWMODE_CUR=<mode>	<mode>: 0: MONITOR mode 1: STA mode 2: Soft AP mode	Execution result
Example: AT+CWMODE_CUR=2 Correct response: OK		

4.2. AT+CWJAP_CUR

Table 4-2. Querying the information of connected AP or connecting to AP

Command	Parameters	Response
Help command AT+CWJAP_CUR=?		+CWJAP_CUR=<ssid>,<pwd>
Query command AT+CWJAP_CUR?		+CWJAP_CUR: <ssid>,<mac>,<channel>,<rssi>
Execution command AT+CWJAP_CUR=<ssid>, <pwd>	<ssid>: String parameter <pwd>: String parameter	Execution result
Example 1: AT+CWJAP_CUR="totolink","12345678" Correct response 1: Connect Successful: Aid 9 Got IP 192.168.2.3 OK Example 2: AT+CWJAP_CUR="tplink","" Correct response 2:		

Command	Parameters	Response
Connect Successful: Aid 1 Got IP 192.168.3.26 OK		

4.3. AT+CWLAP

Table 4-3. Scanning and listing surrounding AP information

Command	Parameters	Response
Help command AT+CWLAP=?		+CWLAP: [ssid]
Execution command AT+ CWLAP[=<ssid>]	<ssid>: String parameter	Scan results +CWLAP: <ssid>,<rssi>,<mac>,<channel>,<encrypt>
Example 1: AT+CWLAP Correct response 1: +CWLAP: iQOO Neo5, -44, d6:4f:86:cb:c8:d0, 1, WPA2 CCMP; +CWLAP: GD-guest, -43, 08:3a:38:cc:2f:d1, 1, OPEN ; +CWLAP: OpenWrt, -33, c4:70:ab:d9:bd:11, 1, OPEN ; +CWLAP: GD-internet, -44, 08:3a:38:cc:2f:d0, 1, OPEN ; +CWLAP: Redmi K40, -56, ba:fa:07:50:63:f6, 1, WPA2 CCMP; +CWLAP: D-Link_DIR-822, -30, 1c:5f:2b:fd:be:60, 1, WPA2 CCMP; +CWLAP: iPhone 24 Pro Max Ultr, -48, fa:da:47:72:f0:b3, 2, WPA2 CCMP; +CWLAP: TP-LINK_8659, -20, 68:77:24:bd:86:59, 4, WPA2/WPA3 CCMP; OK Example 2: AT+CWLAP= "xiaomi_4a" Correct response 2: +CWLAP: xiaomi_4a, -55, 88:c3:97:0d:c3:70, 1, OPEN OK		

Note: If the parameter ssid is provided, only the corresponding AP information is displayed.

4.4. AT+CWSTATUS

Table 4-4. Querying WiFi status, STA, SoftAP, or MONITOR

Command	Parameters	Response
Execution command AT+CWSTATUS		+CWSTATUS: STA, connected, <ssid>,<channel>,<mac>

Command	Parameters	Response
		Or +CWSTATUS: STA, disconnected Or +CWSTATUS: MONITOR, <channel>, <mac> Or +CWSTATUS: SoftAP, <ssid>, <password>, <channel>
Example: AT+CWSTATUS Correct response: +CWSTATUS: STA, connected, xiaomi_4a, 1, 76:ba:ed:20:22:a2 OK		

4.5. AT+CWQAP

Table 4-5. Disconnecting from AP

Command	Parameters	Response
Execution command AT+CWQAP		Disconnection result
Example: AT+CWQAP Correct response: OK WIFI_MGMT: disconnect with ap xiaomi_4a		

4.6. AT+CWSAP_CUR

Table 4-6. Starting SoftAP

Command	Parameters	Response
Help command AT+CWSAP_CUR=?		+CWSAP_CUR: <ssid>,<pwd>,<chl:1-13>,<hidden:0-1>
Execution command AT+CWSAP_CUR=<ssid>, <pwd>,<chl>,<hidden>	<ssid>: String parameter <pwd>: String parameter <chl>: 1, 13 <hidden>: 0: SSID Broadcast 1: Hidden SSID	Execution result
Example: AT+CWSAP_CUR="test_ap","12345678",6,0 Correct response:		

Command	Parameters	Response
OK		

4.7. AT+CWLIF

Table 4-7. Viewing clients connected to SoftAP

Command	Parameters	Response
Execution command AT+CWLIF		+CWLIF: [0] <mac1> +CWLIF: [1] <mac2> ……
Example: AT+CWLIF Correct response: +CWLIF: [0] e0:2b:e9:8a:46:ac OK		

4.8. AT+CWAUTOCONN

Table 4-8. Setting whether to automatically connect to the AP after power-on

Command	Parameters	Response
Help command AT+CWAUTOCONN=?		+CWAUTOCONN:(0-1)
Query command AT+CWAUTOCONN?		+CWAUTOCONN: <enable>
Execution command AT+CWAUTOCONN=<enable>	<enable>: 0-1 0: disable auto connect 1: enable auto connect	Execution result
Example: AT+CWAUTOCONN=1 Correct response: OK		
Additional description: After +CWAUTOCONN is set to 1, if the AP is successfully connected, the AP information will be saved in FLASH. After restarting, the AP will be automatically connected according to the AP information stored in FLASH.		

5. AT TCPIP command set

5.1. AT+PING

Table 5-1. Ping function

Command	Parameters	Response
Help command AT+PING=?		+PING: <ip or domain name>
Execution command AT+PING=<ip or domain>	<ip>: string, which can be an IP address or domain name	+<delay_time> +<delay_time> ……
Example 1: AT+PING="192.168.0.1" Correct response 1: +80 +47 +49 +55 +53 OK Example 2 Note: When using the URL, the Internet must be connected; otherwise, it will fail. AT+PING="www.baidu.com" Correct response 2: +149 +47 +51 +47 +112 OK		

5.2. AT+CIPSTA

Table 5-2. Querying or setting the IP address of the local STA

Command	Parameters	Response
Help command AT+CIPSTA=?		+CIPSTA: <ip>,<mask>,<gw>
Query command AT+CIPSTA?		+CIPSTA:<ip> +CIPSTA:<mask> +CIPSTA:<gw>
Execution command AT+CIPSTA=<ip>,<netmas	<ip>: String parameter <netmask>: String parameter	Execution result

Command	Parameters	Response
k>,<gw>	<gw>: String parameter	
Example 1: AT+CIPSTA? Correct response 1: +CIPSTA: 192.168.185.43 +CIPSTA: 255.255.255.0 +CIPSTA: 192.168.185.1 OK Example 2: AT+CIPSTA="192.168.185.45","255.255.255.0","192.168.185.1" Correct response 2: OK		

5.3. AT+CIPSTART

Table 5-3. Creating TCP connection or UDP transfer

Command	Parameters	Response
Help command AT+CIPSTART=?		+CIPSTART: <type:TCP or UDP>,<remote ip>, <remote port>,[tcp keep alive:0-1]
Execution command AT+CIPSTART=<type>,<remote ip>,<remote port>, [tcp keep alive]	<type>: "TCP", string parameter <remote ip>: Server IP, string parameter <remote port>: Server Port, integer [tcp keep alive]: 0 or 1, integer	Execution result
Execution command AT+CIPSTART=<type>,<remote ip>,<remote port>,[udp local port]	<type>: "UDP", string parameter <remote ip>: Server IP, string parameter <remote port>: Server Port, integer [udp local port]: UDP local port number	Execution result
Example 1: AT+CIPSTART="TCP","192.168.0.2",2001,1 Correct response 1: TCP: create socket 8. OK Example 2:		

AT+CIPSTART="UDP", "192.168.0.2",5001,0 Correct response 2: UDP: create socket 7. OK Example 3: UDP with local port number 8888 specified AT+CIPSTART="UDP", "192.168.0.2",5001,8888 Correct response 3: UDP: create socket 2. OK Note: In this test, the tester needs to run the sokit or other network test tool on the test machine.

5.4. AT+CIPSEND

Table 5-4. Sending data

Command	Parameters	Response
Help command AT+CIPSEND=?		+CIPSEND: <fd:0-4>,<len>,[remote ip],[remote port]
Execution command in Normal transmission mode AT+CIPSEND=<fd>,<len>,[remote ip], [remote port]	<fd>: 0-4, network connection ID, integer <len>: < =2048, length of sent data, integer [remote ip]: Remote IP address, string parameter [remote port]: Remote port, integer	><input from keyboard> SEND OK
Execution command in WiFi passthrough transmission mode AT+CIPSEND		OK ><input from keyboard>
Example 1: AT+CIPSEND=0,10 Correct response 1: AT+CIPSEND=7,5 >SEND OK Example 2: AT+CIPSEND=1,20,"192.168.0.2",5001 Correct response 2: AT+CIPSEND=7,5		

>SEND OK

Example 3: UART WiFi passthrough transmission when the GD32VW553 works as a TCP client in single connection

Connect to the router.
AT+CWJAP=”test_ap”,”1234567890”

Query the device’s IP address, take 192.168.1.27 for example.
AT+CIPSTA?

Connect the PC to the same router which GD32VW553 is connected to. Use a network tool on the PC to create a TCP Server. For Example, the TCP Server on PC is 192.168.1.2, and the port is 5678. Connect the GD32VW553 to the TCP server as a TCP client over TCP.
AT+CIPSTART="TCP","192.168.1.2",5678,0

Enable the UART WiFi passthrough mode, passthrough receive is started.
AT+CIPMODE=1

Send data by passthrough mode
AT+CIPSEND
OK
>

Stop Sending data. When receiving a packet that contains only +++, the UART WiFi passthrough transmission process will be stopped. Then please wait at least 1 second before sending the next AT command.
+++

Exit the UART WiFi passthrough mode, normal receive is started.
AT+CIPMODE=0

Close TCP connection.
AT+CIPCLOSE

Note:
Enter the WiFi passthrough mode, the GD32VW553 can receive 8129 bytes and send 2920 bytes at most each time. If the data received by GD32VW553 reaches or exceeds 2920 bytes, the data will be immediately sent in chunks of 2910 bytes. Otherwise, it will wait for 20 milliseconds (You can configure this interval using AT+TRANSINTVL command) before being sent. When a single packet containing +++ is received, the GD32VW553 will exit the data sending mode under the WiFi passthrough mode. Please wait at least on second before sending the next AT command.
WiFi passthrough mode can only be used for single connection in the WiFi passthrough mode. For UDP WiFi passthrough, the UDP’s remote server, remote port and local port must be specified.
In the Example 3, the tester needs to run the sokit or other network test tool on the test machine.

5.5. AT+CIPSERVER

Table 5-5. Starting the TCP server

Command	Parameters	Response
Help command		+CIPSERVER:<mode:0-1>,[port]

AT+CIPSERVER=?		
Execution command AT+CIPSERVER=<mode>, [port]	<mode>: 0: Close the server 1: Create a server [port]: Optional parameters, integer	Execution result
Example: AT+CIPSERVER=1,3001 Correct response: OK		

5.6. AT+CIPCLOSE

Table 5-6. Closing TCP connection or UDP transfer

Command	Parameters	Response
Help command AT+CIPCLOSE=?		+CIPCLOSE: <fd>
Execution command AT+CIPCLOSE=<fd>	<fd>: 0-7, network connection ID, integer	close <fd>
Example: AT+CIPCLOSE=8 Correct response close 8 OK		

5.7. AT+CIPSTATUS

Table 5-7. Querying network connection information

Command	Parameters	Response
Execution command AT+CIPSTATUS		STATUS: 5
Example: AT+CIPSTATUS Correct response: STATUS: 2 OK		
Additional description: STATUS 2: STA has been connected to the AP and obtained an IP address. 3: STA has been connected to the AP and created TCP connection or UDP transfer clients. 4: The dhcp process is ongoing. 5: Other connection status.		

5.8. AT+CIFSR

Table 5-8. Querying local IP address information

Command	Parameters	Response
Execution command AT+CIFSR		+CIFSR:APIP,<ip> +CIFSR:APMAC,<mac> Or +CIFSR:STAIP,<ip> +CIFSR:STAMAC,<mac>
Example: AT+CIFSR Correct response: +CIFSR:STAIP,192.168.2.3 +CIFSR:STAMAC,76:ba:ed:20:22:a2 OK		

5.9. AT+CIPMODE

Table 5-9. Querying or Setting the Transmission Mode

Command	Parameters	Response
Help command AT+CIPMODE=?		+CIPMODE=<mode:0-1>
Query command AT+CIPMODE?		Current Transmission Mode +CIPMODE:<mode>
Execution command AT+CIPMODE =<mode>	<mode>:Transmission Mode 0: normal transmission mode 1: WiFi passthrough mode	Execution result OK or Error
Example: AT+CIPMODE=1 Correct response: OK Note: WiFi passthrough mode can only be enabled in TCP single connection mode, UDP mode when the remote host, remote port and local port are specified. The maximum receive length is 2920 Bytes each time in WiFi passthrough mode.		

6. Revision history

Table 6-1. Revision history

Revision No.	Description	Date
1.0	Initial release.	Nov.24.2023
1.1	Add new Command: AT+TRANSINTVL and AT+CIPMODE, and extend AT+CIPSEND command to support passthrough transmission mode.	Jul.16.2024

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