DT50-M
AT Command Set
Reference Guide
V1.1

43 Broad Street
Unit C103
Hudson, MA 01749
USA

Tel: (866) 837-1931
Tel: (978) 461-1140
FAX: (978) 461-1146

http://www.diamondt.com/

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Revision History

Version	Date	Description
1.0	8/5/2020	Original Version
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Contents

1 Introduction

2 Data Mode and AT Mode

The DT50 can be in two different modes AT mode and data mode. It starts in data mode and can be requested to move to AT mode by sending an escape sequence. The default escape sequence consists of three consecutive "/" (///). The escape sequence character can be changed using the ATS2 command. In AT mode the DT50 will respond to AT programming commands.

Note: If the module is restored to factory default settings, the escape sequence will be reset to three consecutive "+" (+++). To ensure compatibility across device revisions you will need to reconfigure the DT50 using the following command sequence

ATS2=47

AT+UMSM=1

AT&W

AT+CPWROFF

The following criteria must be met for the DT50 to interpret the sequence as a valid escape sequence:

Before the escape sequence there must be silence for 1 second.

After the escape sequence there must be silence for 1 second.

The entire escape sequence must be sent within 200 ms.

To move from AT mode to data mode, use the "ATO1" command

3 Default Serial Settings

The DT50 does not support auto baud rate. The baud rate is set using the "Write RS232 Settings" (AT+UMRS) command. The default RS232 settings are 115200 bits/s, 8 data bits, no parity, 1 stop bit, and CTS/RTS flow control.

4 AT Commands Over Bluetooth

It is possible to configure and control a remote DT50 via Bluetooth using AT commands. Criteria for using AT commands over Bluetooth:

A Bluetooth connection to the remote device (the device to configure) must exist. The Bluetooth connection can e.g. be established using another DT50, a device with a PC-card/compact flash or a device with embedded Bluetooth support. The remote DT50 must have turned on the support for configuration over Bluetooth, for more information see the "Write Allow Configuration Over Bluetooth" command. Once the connection has been established, the escape sequence must be sent over the Bluetooth connection to the remote DT50 to move it into AT mode.

The same escape sequence rules apply to AT over Bluetooth as for AT over cable, for more information see the section about Data Mode and AT Mode.

Note that the same escape sequence is used for cable and Bluetooth. Therefore, if you are using two DT50s one of the DT50s must have its escape sequence changed using the ATS2 command. This is to keep the first DT50 to enter AT mode instead of the remote DT50.

5 Syntax

5.1 Command Line Format

Each command line sent from the DTE to the DT50 is made up of a prefix, body and terminator. As prefix for the DT50 AT commands, only "AT" (ASCII 065, 084) and "at" (ASCII 097, 116) can be used. There is no distinction between upper and lower case characters. The body is a string of characters in the range ASCII 032-255. Control characters other than <CR> (carriage return; ASCII 013) and <BS> (back space; ASCII 008) in a command line are ignored. The terminator is <CR>. Commands denoted with a "+" character are extended

AT commands, i.e. DT50 specific AT commands. Multiple commands in the same command line are not supported. Each command has to be terminated by a <CR> before a new command can be sent. A command must not be larger than 300 characters. A command can either be:

- Read commands without parameters: AT<command>?<CR>
- Write commands without parameters: AT<command><CR>
- Read and write commands with parameters: AT<command>=<parameter1>, parameter2>,...<parameterN><CR>

Responses are sent back to the host and can be any of the following:

- Successful final message: <CR><LF>OK<CR><LF>
- Successful intermediate/final message with parameters follows an OK message in some commands. In these cases the OK message works as a confirm message only. <CR><LF><result_response>:<parameter1>, parameter2>, ...<parameterN>
- Error message:<CR><LF>ERROR<CR><LF>

5.2 Data Types

The definition of each command specifies the data types used for values associated with the command. There are four data types:

- String
- Integer
- Enumerator
- Bluetooth Device Address
- Byte Array

5.2.1 String

A string shall consist of a sequence of displayable characters from the ISO 8859-1 (8-bit ASCII) character set, except for characters "\" and """ and characters below 32 (space). A string constant shall be delimited by two double-quote (""") characters, e.g. "Donald Duck". If the double-quote character (""") is to be used within a string, e.g. "My friend "Bono" is a singer", they have to be represented as "\22". If the back-slash character ("\") is to be used within a string constant, it has to be represented as "\5C". An empty string is represented by two adjacent delimiters, "".

5.2.2 Integer

An integer value consists of a sequence of characters all in the range {0..9}. Numeric constants are expressed in decimal format only.

5.2.3 Enumerator

An enumerator value is actually an integer, where all its possible values are specified in each case. Only the defined values are accepted for the command in question.

5.2.4 Bd_Addr

This type is used to represent the Bluetooth Device Address. The type is composed of six fields, each representing a hexadecimal value using two characters. For example, the Bluetooth Device Address 0x112233AABBCC is represented as 112233AABBCC or 112233aabbcc. Note that the Bluetooth Device Address is **not** delimited with by two double-quote (""") characters.

5.2.5 Byte Array

This type is used to represent a byte array such as e.g. a UUID. For example, the AT*ADUUID configures a 128 bits UUID as 00112233445566778899AABBCCDDEEFF

6 AT Commands Reference

6.1 General AT Commands

6.1.1 Attention AT

AT Command	Description
AT	Attention command determining the presence of the DT50.
Response	Description
OK	Successful response.
ERROR	Error response.

6.1.2 Store current configuration &W

AT Command	Description
AT&W[<profile>]	Commits all the settings to be stored in start up database. The parameters are written to non-volatile memory when +CPWROFF is issued.
Response	Description
OK	Successful response.
ERROR	Error response if <profile> is invalid.
Parameter	**Description**
Profile	0: Only valid value.

6.1.3 Set to default configuration Z

AT Command	Description
ATZ[<profile>]	Resets the profile to the last stored configuration. Any settings committed with AT&W will be discarded. The restored settings will be used after a reboot.
Response	Description
OK	Successful response.
ERROR	Error response if <profile> is invalid.
Parameter	**Description**
Profile	0: Only valid value.

6.1.4 Set to factory defined configuration +UFACTORY

AT Command	Description
AT+UFACTORY	Reset to factory defined defaults. A reboot is required before using the new settings.
Response	Description
OK	Successful response.

6.1.5 Circuit 108/2 (DTR) behavior &D

AT Command	Description
AT&D[<value>]	Controls the behavior of RS232 circuit 108/2 - Data Terminal Ready (DTR) - on changes between ASSERTED (logical 0 on UART_DSR signal) and DEASSERTED (logical 1 on UART_DSR signal) states. The DTR line is connected to the DSR pin on the module.
Response	Description
OK	Successful response.
ERROR	Error response if <value> is invalid.
Parameter	**Description**
value	0: DTR line is ignored. 1: (default and factory default value): Upon an ASSERTED to DEASSERTED transition of the DTR line, in data mode, the DCE enters the command mode and issues an OK result code. 2: Upon an ASSERTED to DEASSERTED transition of the DTR line, in data mode, the DCE performs an orderly disconnect of all the radio links and peer connections. No new connections will be established while the DTR line remains DEASSERTED.

6.1.6 DSR Override &S

AT Command	Description
AT&S[<value>]	Selects how the module will control RS232 circuit 107 - Data Set Ready (DSR) between ASSERTED (logical 0 on signal UART_DTR) and DEASSERTED (logical 1 on signal UART_DTR) states. The DSR line is connected to the DTR pin on the module.

Response	Description
OK	Successful response.
ERROR	Error response if <value> is invalid.
Parameter	Description
value	0: ASSERT DSR 1(default and factory default value): ASSERT DSR line in data mode and DEASSERT the DSR line in command mode 2: ASSERT the DSR line when at least one remote peer is connected and DEASSERT DSR line when no remote peers are connected. See Connect Peer +UDCP and Default remote peer +UDDRP for definition of the remote peer. This applies to both incoming and outgoing connections.

6.1.7 Echo On/Off E

AT Command	Description
ATE[<echo_on>]	This command configures whether or not the unit echoes the characters received from the DTE in Command Mode. If <echo_on> is omitted, it turns off the echoing.
ATE?	Reads current echo setting.
Response	Description
echo_on OK	Successful read response.
OK	Successful response.
ERROR	Error response if <profile> is invalid.
Parameter	Description
echo_on	0: Unit does not echo the characters in command mode 1(factory default): Unit echoes the characters in command mode.

6.1.8 Escape character S2

AT Command	Description
ATS2=<esc_char>	Configures the escape character used to switch the unit from data mode to command mode.
ATS2?	Reads escape character.
Response	Description
esc_char OK	Successful read response.

OK	Successful response.
ERROR	Error response.
Parameter	Description
esc_char	0...255
	The escape sequence is the sequence that forces the module to switch from the data mode to command mode, or to enter configuration mode over the air. To enter configuration mode over the air, this must be enabled on the specific server or peer, and all three escape characters must be transmitted in a single frame. Upon successful transition to the command mode, the DCE will transmit an OK response. Factory default: 43, the "+" character.

6.1.9 Command line termination character S3

AT Command	Description
ATS3=<line_term>	Writes command line termination character. This setting changes the decimal value of the character recognized by the DCE from the DTE to terminate an incoming command line. It is also generated by the DCE as part of the header, trailer, and terminator for result codes and information text along with the S4 parameter. The previous value of S3 is used to determine the command line termination character for entry of the command line containing the S3 setting command. However, the result code issued shall use the value of S3 as set during the processing of the command line. For example, if S3 was previously set to 13 and the command line "ATS3=30" is issued, the command line shall be terminated with a CR, character (13), but the result code issued will use the character with the ordinal value 30 instead of the CR.
ATS3?	Reads command line termination character.
Response	Description
line_term OK	Successful read response.
OK	Successful response.
ERROR	Error response.
Parameter	Description
esc_char	0...127 Factory default: 13

6.1.10 Response formatting character S4

AT Command	Description
ATS4=<term>	Writes response formatting character. This setting changes the decimal value of the character generated by the DCE as part of the header, trailer, and terminator for result codes and information text, along with the S3 parameter. If the value of S4 is changed in a command line, the result code issued in response to that command line will use the new value of S4.
ATS4?	Reads response formatting character.
Response	Description
term OK	Successful read response.
OK	Successful response.
ERROR	Error response.
Parameter	Description
esc_char	0...127 Factory default: 10

6.1.11 Backspace character S5

AT Command	Description
ATS5=<backspace>	Writes backspace character. This setting changes the decimal value of the character recognized by the DCE as a request to delete from the command line, the immediately preceding character.
ATS5?	Reads backspace character.
Response	Description
<backspace> OK	Successful read response.
OK	Successful response.
ERROR	Error response.
Parameter	Description
esc_char	0...127 Factory default: 8

6.1.12 Module switch off +CPWROFF

AT Command	Description

AT+CPWROFF	Reboot the DCE. During shutdown, the settings marked for storing to start up the database by &W are written in the non-volatile memory of the module.
Response	Description
OK	Successful response.

6.1.13 Module start mode +UMSM

AT Command	Description
AT+UMSM=<start_mode>	Writes start mode
AT+UMSM?	Reads start mode
Response	Description
+UMSM:<start_mode> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.
Parameter	Description
start_mode	0 (factory default): Command mode 1: Data mode 2: Extended data mode. 3: PPP mode.

6.1.14 Local address +UMLA

AT Command	Description
AT+UMLA=<interface_id>	Reads the local address of the interface id.
AT+UMLA=<interface_id>, <address>	Sets the local address of the interface id. A DCE reboot is required before an address change takes effect.
Response	Description
+UMLA:<address> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.
Parameter	Description
interface_id	1: Bluetooth 2: Wi-Fi 3: Ethernet
address	MAC address of the interface id. If the address is set to 000000000000, the local address will be restored to factory-programmed value.

	The least significant bit of the first octet of the <address> must be 0; that is, the <address> must be a unicast address.

6.1.15 System status +UMSTAT

AT Command	Description
AT+UMSTAT[=<status_id>]	Reads current status of the system. If <status_id> is omitted, all applicable ids will be listed.
Response	Description
+UMSTAT:<status_id>,<status_val> OK	Successful read response.
ERROR	Error message.
Parameter	Description
status_id	0:<status_val>is the uptime in seconds. That is, the seconds since last reboot 1:<status_val>is the current status of the settings • 0:Not saved. That is, there are some changes since the last stored command • 1:Saved
address	MAC address of the interface id. If the address is set to 000000000000, the local address will be restored to factory-programmed value. The least significant bit of the first octet of the <address> must be 0; that is, the <address> must be a unicast address.

6.1.16 RS232 Settings +UMRS

AT Command	Description
AT+UMRS?	Reads current RS232 settings from the module.
AT+UMRS[=<baud_rate>[,<flow_ control>[,<data_bits>[, <stop_ bits>[,<parity>[,<change_after_ confirm>]]]]]]	Applies new RS232 settings. If <change_after_confirm> is 0, the new settings will be applied after reset (if stored to the profile).
Response	Description
+UMRS:<baud_rate>, <flow_control>, <data_bits>, <stop_bits>, <parity> OK	Successful read response.
OK	Successful write response. After receiving the OK response, the DTE shall wait for at least 40 before issuing a new AT command, to guarantee a proper baudrate reconfiguration.
ERROR	Error message.

Parameter	Description
baud_rate	Factory default value: 115200 19200 - 5250000. The module will set a baud rate as close as possible to the requested baud rate. Recommended baud rates: 9600, 14400, 19200, 28800, 38400, 57600, 76800, 115200, 230400, 250000, 460800, 921600, 3000000.
flow_control	1 (factory default): CTS/RTS used for flow control 2: CTS/RTS not used.
data_bits	Factory-programmed value:8
stop_bits	1 (factory default): 1 stop bit 2: 2 stop bits.
parity	1 (factory default): no parity 2: odd parity. 3: even parity.
change_after_confirm	0: Do not change; it must be stored and reset before applying the new setting 1 (default): Change after OK. The DTE should wait at least 40 ms before sending a new command. When operating in the extended data mode, the change_after_confirm has no direct effect. Settings must be stored to the profile and the module must be rebooted before applying the settings.

7 Data Mode

7.1 Data Mode AT Commands

7.1.1 Enter data mode O

AT Command	Description
ATO[<mode>]	Requests the module to move to the new mode.
Response	Description
OK	Successful response.
ERROR	Error response.
Parameter	Description
mode	0: Command mode 1: Data mode (default) 2: Extended data mode (EDM): 3: PPP mode

7.1.2 Connect peer +UDCP

AT Command	Description

AT+UDCP=<url>	Connects to an enabled service on a remote device. When the host connects to a service on a remote device, it implicitly registers to receive the "Connection Closed" event.
Response	Description
+UDCP:<peer_handle> OK	Successful response.
ERROR	Error response.
Parameter	Description
url	URL to the service on the remote peer. <scheme>://<domain>[:<port>]/[?<query_string>] Supported schemes: sps: • <domain> specifies Bluetooth address <Bd_Addr> of the remote device; port is ignored. • <query_string> can define "bt_name", "role" and "escseq" o "bt_name" defines the Bluetooth name to which the device shall connect o "role" defines the role of the remote device; if the local device is configured as Bluetooth low energy Simultaneous Peripheral or Central. o "escseq" defines allowed "escseq"; if the "escseq" is 1, the remote device can put the local device in AT command mode (see AT+UDSF command). spp/dun: • <domain> specifies Bluetooth address <Bd_Addr> of the remote device and port specifies RFCOMM channel • <query_string> can define "bt_name", "uuid", "qos" and "escseq" o "bt_name" defines the Bluetooth name to which the device shall connect in spp o "uuid" defines the uuid of the remote service o "qos=1" enables Bluetooth Quality of service (see AT+UBTCFG command). o "escseq=1" enables escape sequence detection (see AT+UDSF command). tcp: • <domain> specifies either IPv4 <IPv4_Addr> or IPv6 <IPv6_Addr> address or domain name. • <query_string> can define "local_port" • <query_string> "flush_tx" defines if a flush should be done after each write o 0(default): disabled

	o 1: enabled • <query_string> "keepAlive" is used to configure the tcp keepalive settings. It includes keepIdle, keepInterval, and keepCount separated by a "+" o keepIdle: time in milliseconds (ms) between keepalive packets o keepInterval: time in milliseconds between two successive keepalive retransmissions o keepCount: the number of retransmissions to be sent before disconnecting the remote end • <query_string> "ca" defines the certificate authority • <query_string> "cert" defines the client certificate • <query_string> "privKey" defines the private key udp: • <domain> specifies either IPv4 <IPv4_Addr> or IPv6 <IPv6_Addr> address or domain name • <query_string> can define "local_port" • <query_string> "flags=1" enables reception from a unicast address when peer is configured to a multicast address. mqtt: Establishes a TCP or TLS connection to an MQTT Broker.
peer_handle	The peer handle identifies the connection and is used when closing the connection.

7.1.3 Close peer connection +UDCPC

AT Command	Description
AT+UDCPC=<peer_handle>	Closes an existing peer connection.
Response	Description
OK	Successful response.
ERROR	Error response.
Parameter	Description
peer_handle	The peer handle identifies the connection.

7.1.4 Default remote peer +UDDRP

AT Command	Description
AT+UDDRP[=<peer_id>]	This command reads the default remote peer (peer id).
AT+UDDRP=<peer_id>,<url>, <connect_scheme>	This command writes the default remote peer (peer id).

Response	Description
+UDDRP:<peer_id>,<url>, <connect_scheme>	Successful read response.
OK	Successful write response.
ERROR	Error response.
Parameter	Description
peer_id	The peer ID can be 0-6.
url	URL to the service on the remote peer. See Connect Peer +UDCP for more details and examples of valid URLs. Writing an empty url "" will reset the connect_scheme.
connect_scheme	This parameter is a bit field. At least one bit needs to be set. Bit 0 is the least significant bit. Each bit is defined as shown below: • Bit 0: Reserved. Do not use. • Bit 1: Always connected - Keep the peer connected when not in command mode. That is, on errors and remote disconnect, the peer will automatically try to reconnect. The reconnect timeout interval can optionally be selected by setting the parameter "ac-to" to the query string; Example: "spp://0012f3000001/?ac-to=10000,2" • Bit 2: External connect - Trigger connection to peer on external signal connect event. The connect event is generated when the signal SWITCH_0 is kept low for at least 200 ms but not more than 1000 ms while the device is in the data mode.

7.1.5 Peer list +UDLP

AT Command	Description
AT+UDLP?	This command reads the connected peers (peer handle).
Response	Description
+UDLP:<peer_handle>,<protocol>, <local_address>,<remote_address> OK	Successful read response.
ERROR	Error response.
Parameter	Description
peer_handle	The peer handle identifies the connection.
protocol	Protocol of the connection.
local_address	Local address.

remote_address	Remote address if available. Empty string if there is no remote address.

7.1.6 Server configuration +UDSC

AT Command	Description
AT+UDSC=<id>,<type>[,<option1>[,<option2>][,<option3>]] or AT+UDSC=<id>,<url>	Writes server configuration.
AT+UDSC[=<id>]	Reads server configuration.
Response	Description
+UDSC:<id>,<type>[,<option1>[,<option2>]] OK	Successful read response.
OK	Successful write response.
ERROR	Error response.
Parameter	Description
id	0-6, the server ID to configure. Disable an active server first before changing. By default, the following servers are enabled on id 0: • SPP server A DCE reboot is required before any Bluetooth related server configuration takes effect.
url	URL to the service on the remote peer.<scheme>://<domain>[:<port>]/[?<query_string>] Supported scheme: tcp: • <query_string> "keepAlive" is used to configure the tcp keepalive settings. It includes keepIdle, keepInterval, and keepCount separated by a "+" o keepIdle: time in milliseconds (ms) between keepalive packets o keepInterval: time in milliseconds between two successive keepalive retransmissions o keepCount: the number
type	0: Server disabled 1: TCP 2: UDP 3: SPP 4: DUN

	5: UUID 6: SPS 7: Reserved 8: ATP
option1	For TCP and UDP, <option1> specifies the listening port. Valid values are 1 - 65535. For SPP, DUN, and UUID, <option1> specifies the service name. The service name can be maximum 15 characters. If an empty string is provided, the default service name is used ("SPP", "DUN", "UUID"). For ATP, <option1> specifies the interface on which the AT-service is started, values are identical to the <type> parameter above.
option2	For UDP,<option2> specifies the behavior of incoming data. • 0 (default): No connect. This will trigger an +UUDPC URC immediately (with broadcast as remote_ip and 0 as remote port); but this will not cause any new +UUDPC when the data is received. So, it will not be possible to extract the data source. This is typically used together with the data mode. • 1: Auto connect. This will spawn a new peer and trigger a +UUDPC URC so that the host can respond to the sender. Further incoming data from the same source will be received on the newly created peer. The originally created server will still be active to listen for new data. This is typically used together with the Extended data mode. For UUID,<option2> specifies the 128-bit UUID identifier. For ATP, <option2> specifies the listening port if the AT-service is started on a TCP or UDP interface For TCP, <option2> specifies if there should be an immediate flush after a write. • 0 (default): Disabled • 1: Enable
option3	For UDP, <option3> specifies IP version of the started service.

	• 0 (default): IPv4 connections are accepted • 1: IPv6 connections are accepted

7.1.7 Server flags +UDSF

Bit 0, remote configuration: When the remote configuration bit is set, the module will look for the escape sequence over the air (see S2 command). When the escape sequence is detected, the channel will enter command mode and parse AT commands. The command mode is exited by sending an ATO to the module (see O command).

AT Command	Description
AT+UDSF=<id>,<flags>	Writes flags to a server.
AT+UDSF=<id>	Reads flags from a server.
Response	Description
+UDSF:<id>,<flags> OK	Successful read response.
OK	Successful write response.
Parameter	Description
id	Id as given by AT+UDSC
flags	Bit 0: Allow remote configuration • 0: Disabled (default) • 1: Enabled

7.1.8 Watchdog settings +UDWS

The data watchdog functionality is active only in the data or extended data mode. Additionally, the power mode must also be set to online or sleep mode.

AT Command	Description
AT+UDWS[=<type>]	Reads current watchdog settings.
AT+UDWS=<type>,<value>	Writes watchdog parameters.
Response	Description
+UDWS:<type>,<value> OK	Successful read response.
OK	Successful write response.
Error	Error message
Parameter	Description
type	0: SPP (and all SPP based protocols like DUN) write timeout: <value>is the time in milliseconds before DCE disconnects if a write is not acknowledged. • 0: Disabled • > 0: Timeout in milliseconds (factory default value: 10000 ms)

	1:inactivity timeout: <value> is the time in milliseconds before DCE disconnects all links when no data activity in the system is detected. • 0 (factory default): Disabled • > 0: Timeout in milliseconds 2: Bluetooth disconnect reset: <value> defines if the DCE shall reset on any dropped Bluetooth connection (not on an actively closed connection) • 0 (factory default): Disabled • 1: Enabled 3: Wi-Fi Station disconnect reset: <value> defines if the DCE shall reset on dropped Wi-Fi Station connection (not on actively closed connection) • 0 (factory default): Disabled • 1: Enabled 5: Wi-Fi connect timeout: <param_val1> is the time, in seconds, that an ongoing connection attempt, for a station, will proceed before a Wi-Fi recovery is done. Note that after the recovery, the connection attempt will continue and there is no need for additional user activity. Recommended value is 30s and it should not be set lower than 20s. The default value is 0, which means that the watchdog is disabled. 6: Net Up timeout: <param_val1> is the time, in seconds, allowed between a +UUWLE (link connected) event and a +UUNU (net up) event. If the +UUNU is not received within the set time, the link is automatically disconnected and connected again shortly. Typically, this watchdog is set to ensure that active Bluetooth links get enough air time to avoid link loss. The watchdog is disabled by default, value 0, and an enabled recommended value is 3 seconds. Also, the link supervision time for the Bluetooth links should be increased from the default value of 2s (see the parameter tag 7 in +UBTCFG for more information).

7.1.9 Configuration +UDCFG

AT Command	Description
AT+UDCFG[=<param_tag>]	Reads peer configuration.
AT+UDCFG=<param_tag>,<param_val>	Writes peer configuration.
Response	Description
+UDCFG:<param_tag>,<param_val>	Sent for each applicable param_tag.
OK	Successful write response

ERROR	Error response.
Parameter	Description
param_tag	0: Keep remote peer in the command mode • 0: Disconnect peers when entering the command mode • 1 (default): Keep connections when entering the command mode 1: The module will be reset to factory default settings if it detects the following sequence on the DTR line: 1 second silence, 5 transfers from DEASSERTED to ASSERTED within 1 second, and 1 second silence. AT&D settings does not affect this. • 0: Disabled • 1 (default): Enabled 2: Number of allowed TCP links. • 1-8: Default is 2. 3: DSR activation bit mask. Defines the condition when the DSR line is asserted. The default value for the bit mask corresponds to the previous behavior of the &S2 AT command. • Bit 0: Activate DSR if any data peer is connected (old behavior) • Bit 1: Activate DSR if a Bluetooth LE bonded device is connected • Bit 2: Activate DSR on any Bluetooth LE GAP connection 4: Always connected reconnect time out • 100-60000 milliseconds before trying to reconnect a default remote peer with always connected bit set (Default is 10000) 5: TCP out of sequence queue length • 0-15: Queue length for TCP packets arriving out of sequence (Default is 3). If multiple TCP links are used, this should be low.

7.1.10 Peer connected +UUDPC

	Description
+UUDPC	Unsolicited response code for data mode.
Unsolicited response code(URC)	Description
+UUDPC:<peer_handle>,<type>, <profile>,<address>,<frame_size>	A Bluetooth peer has been connected.
+UUDPC:<peer_handle>,<type>,	An IP peer has been connected

<protocol>,<local_address>,<local_port><remote_address>,<remote_port>	
Parameter	Description
peer_handle	The peer handle identifies the connection.
type	1: Bluetooth 2: IPv4 3: IPv6
profile	1: SPP 2: DUN 3: UUID 4: SPS 5: Reserved
protocol	0: TCP 1: UDP
address	Bluetooth address.
local_address (IPv4_Addr or IPv6_Addr)	Local IP address associated to the peer (TCP connection only).
local_port	Local port associated to the peer.
remote_address (IPv4_Addr or IPv6_Addr)	Remote IP address associated to the peer.
remote_port	Remote port associated to the peer.
frame_size	GAP data length.

7.1.11 Peer disconnected +UUDPD

	Description
+UUDPD	Unsolicited response code for data mode.
Unsolicited response code(URC)	Description
+UUDPD:<peer_handle>	A connection to a remote peer has been disconnected.
Parameter	Description
peer_handle	The peer handle identifies the connection.

7.1.12 Read data in AT command Mode +UDATR

Generic read command that can be used for any peer connection created with a url-scheme starting with "at-" (see +UDCP).

AT Command	Description
AT+UDATR=<peer_handle>>,<data_format>,<max_data_length>	Read received data from peer.
Response	Description
+UDATR:<data_length> <data>	When data format is 2 (binary). The carriage return and linefeed ending the AT-response is sent after data_length parameter, followed by that actual data.
+UDATR:<data_length>,<hex_data>	When data format is 1 (hexadecimal).
OK	Successful response.
ERROR	Error Response
Parameter	Description
peer_handle	The peer handle identifies the connection.
max_data_length	Maximum amount of data bytes to read. Set this to 0 to check available data without reading.
data_format	0: Reserved 1: Hexadecimal (Byte Array) 2: Binary
data_length	Actual amount of data bytes to read
data	Received raw data.
hex_data	Received data in hexadecimal form.

Example

The following example sets up an outgoing Bluetooth SPP connection that can be used for reading data in AT command mode. In this example, 5 bytes of data is read on peer handle 1 each time.

AT+UDCP=at-spp://04D3B0285423p

+UDCP:1

OK

+UUDCP:1,1,1,04D3B0285423p,1011

We try to read 5 bytes before something has been sent from remote side and see that we get +UDATR response that 0 bytes where read followed by +UUDATA event that tells us that 0 bytes are in the incoming buffer.

+UDATR:0

OK

+UUDATA:1,0

Now the remote side send 9 bytes of data and we get an event to indicate that there are 9 bytes to be read.

+UUDATA:1,9

Now we read 5 bytes of data in binary format

AT+UDATR=1,2,5

+UDATR:5 12345

OK

We get an event that indicates that 4 bytes are still left in buffer to be read.

+UUDATA:1,4

Now we try to read 5 bytes of data in hex format, but only receive 4 bytes since buffer is empty after that.

AT+UDATR=1,1,5

+UDATR:4,36373839

OK Now we get event that indicate that there are no more bytes to read.

+UUDATA:1,0

7.1.13 Write Data in AT Command Mode +UDATW

Generic write command that can be used for any peer connection created with a url-scheme starting with “at-” (see +UDCP)

AT Command	Description
AT+UDATW=<peer_handle>, <data_format>,<data>	Send data o peer, where data_format is 0 or 1 (string or hexidecimal)
AT+UDATW=<peer_handle>,<data_format>,<data_length>	Send data to peer, where data_format is 2 (binary). The command response is first a data

	prompt. After data prompt is received by the host it should send data_length number of bytes. Ok response is given after data_length of bytes has been received.
Response	Description
>	Prompt to start sending data, when data format is 2 (binary). Binary data will not be echoed.
OK	Successful response.
ERROR	Error Response. These are the situations resulting in error: • There is currently no room for the data in transmit buffer. Wait some time and retry. • There was too long idle period in data reception in binary mode. The timeout value can be set with +UDCFG command. • Invalid parameter. • Peer connection URL does not start with “at-”.
Parameter	Description
peer_handle	The peer handle identifies the connection.
data_format	0: String 1: Hexadecimal (Byte Array) 2: Binary
data	Data to send, String in text case, Byte Array in hexadecimal case.
data_length	Number of Bytes to send. Minimum 1, maximum 2000.

Example

The following example sets up an outgoing Bluetooth SPP connection that can be used for sending data in AT command mode. In this example, data in text format is sent on peer handle 1.

AT+UDCP=at-spp://04D3B0285423p

+UDCP:1

OK

+UUDCP:1,1,1,04D3B0285423p,1011

AT+UDATW=1,0,"Some Text"

OK

7.1.14 Data Available +UUDATA

Unsolicited response code (URC) notifying that there are data available to read from peer connection.

Unsolicited Response Code	Description
+UUDATA:<peer_handle>,<data_length>	Data from remote peer is available.
Parameter	Description
peer_handle	The connection handle identifies the connection.
data_length	Minimum number of bytes available for reading with +UDATR. command.

This URC will only be issued from peer connections creating with url scheme starting with :at-"/ issues after every +UDATR command, even when receive buffer is empty (data_length=0).

There can be more data in the receive pipeline than indicated by this URC, held back by flow control mechanisms. This data will become available after reading data.

Example

+UUDATA:1,123

8 Bluetooth

8.1 Bluetooth Mode AT Commands

8.1.1 Discoverability mode +UBTDM

AT Command	Description
AT+UBTDM?	Reads the GAP discoverability mode.
AT+UBTDM=<discoverability_mode>	Writes the GAP discoverability mode.
Response	Description
+UBTDM:<discoverability_mode> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.

Parameter	Description
discoverability_mode	1: GAP non-discoverable mode 2: GAP limited discoverable mode 3 (factory default): GAP general discoverable mode

8.1.2 Connectability mode +UBTCM

AT Command	Description
AT+UBTCM?	Reads the GAP connectability mode.
AT+UBTCM=<connectability_mode>	Writes the GAP connectability mode.
Response	Description
+UBTCM:<connectability_mode> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.
Parameter	Description
connectability_mode	1: GAP non-connectable mode 2 (factory default): GAP connectable mode

8.1.3 Pairing mode +UBTPM

AT Command	Description
AT+UBTPM?	Reads the pairing mode.
AT+UBTPM=<pairing_mode>	Writes the pairing mode.
Response	Description
+UBTPM:<pairing_mode> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.
Parameter	Description
pairing_mode	1: GAP non-pairing mode 2(factory default): GAP pairing mode

8.1.4 Security mode +UBTSM

AT Command	Description
AT+UBTSM?	Reads the security mode.
AT+UBTSM=<security_mode>[,<security_mode_BT2.0>[,<fixed_pin>]]	Writes the security mode.

Response	Description
+UBTSM:<security_mode>, <security_mode_BT2.0> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.
Parameter	Description
security_mode	1 (factory default): Security Disabled. Should not be used in real life application. - Auto accept (No man-in-the-middle attack protection, encryption enabled) 2: Security Enabled - Just Works - Auto accept (no man-in-the-middle attack protection, encryption enabled). This security mode is intended for pairing in safe environments. When this mode is set, pairability (see +UBTPM) is automatically disabled. In AT mode, use AT+UBTPM to enable pairing. 3: Security Enabled - Display Only* - Service level authentication and encryption enabled. User interaction is required. This security mode is used when the local device has a display where the user can see a passkey that can be entered on the remote device. 4: Security Enabled - Display Yes/No* - Service level authentication and encryption enabled. User interaction is required for bonding. This security mode is used when the device has a display, where the user can see a passkey that can be verified and confirmed with the remote device. 5: Security Enabled - Keyboard Only* - Service level authentication and encryption enabled. User interaction is required. This security mode is used when the device has a keyboard where the user can enter a passkey to verify the passkey that is presented on the remote device. * - For the security modes - 3, 4, and 5, the DCE must be in Command or Extended Data mode to be able to bond because user interaction might be required.
security_mode_BT2.0	0 (factory default): Disabled, no pairing is allowed with Bluetooth 2.0 devices. 1: Enabled. Pairing is allowed with Bluetooth 2.0 devices using the fixed_pin. When enabling also, the parameter fixed_pin must be set.
fixed_pin	The BT 2.0 fixed_pin is a string of one to sixteen alphanumerical characters.

	It is recommended to use a pin code of at least eight characters of mixed type, for example, "12w35tg7". Factory default is "0". This is used together with the parameter security_mode_BT2.

8.1.5 Security type +UBTST

AT Command	Description
AT+UBTST?	Reads the security type for Bluetooth pairing.
AT+UBTST=<security_type>	Writes the security type for Bluetooth pairing.
Parameter	Description
security_type	0 (factory default): Secure Simple Pairing mode. The legacy mode used for pairing Bluetooth LE. 1: Secure Connections Mode The P-256 Elliptic curve is used for pairing and AES-CCM is used for encryption of the Bluetooth LE link. The secure simple pairing will be used if there is no support from the remote side. 2: FIPS mode Strictly uses Secure Connections. Pairing requests will be rejected if the remote device does not support this mode. Enabling P-256 Elliptical curve based encryption is memory intensive. Hence, when enabled, the memory reserved for other functionalities will be affected.

For the settings to take effect, use the commands - &W and +CPWROFF to store the configuration to start up database and reboot the module.

8.1.6 User confirmation +UBTUC

AT Command	Description
AT+UBTUC=<bd_addr>,<yes_no>	The user confirmation is used together with the security mode 4 - "Display Yes/No" to respond on a user confirmation request (+UUBTUC). The command shall be used only after +UUBTUC has been received.
Response	Description
OK	Successful response.
ERROR	Error message.
Parameter	Description
bd_addr	The remote Bluetooth device address.
yes_no	0: No. The remote and local numeric values are different or the user cancels.

	1: Yes. The remote and local values are the same.

8.1.7 Inquiry (BR/EDR) +UBTI

AT Command	Description
AT+UBTI[=<inquiry_type>,<inquiry_ length>]]	Performs an inquiry procedure to find any discoverable devices in the vicinity.
Response	Description
+UBTI:<bd_addr>,<rssi>,<cod>, <device_name>	This response is sent for every found device.
OK	Successful response.
ERROR	Error message.
Parameter	Description
bd_addr	Bluetooth device address of a found device
cod	See Local COD command (8.1.13)
Inquiry_type	1 (default): General extended inquiry 2: Limited extended inquiry
Inquiry_length	Timeout measured in milliseconds Time range: 10 ms - 40 s, default 5000 ms
device_name	Name of the discovered device. *Names of the discovered devices are returned only by the devices supporting Bluetooth 2.1 or later.
rssi	Received signal strength in dBm.

8.1.8 Discovery (Low Energy) +UBTD

AT Command	Description
AT+UBTD[=<discovery_type>[, <mode>[,<discovery_length>]]]	Performs an inquiry procedure to find any discoverable devices in the vicinity.
Response	Description
+UBTD:<bd_addr>,<rssi>,<device_ name>,<data_type>,<data>	This response is sent for every found device. If no name is found, <device_name> is an empty string. If <mode> is set to Active, both Scan responses and Advertisements will be shown.
OK	Successful response.
ERROR	Error message.
Parameter	Description
bd_addr	Bluetooth device address of a found device
discovery_type	1: All. Displays all found devices; each device is displayed only once. 2 (default): General inquiry. Displays devices in General or Limited discoverability mode; each device is displayed only once.

	The discovery_type 1 and 2 will give the same result. 1 is kept for backward compatibility. 3: Limited inquiry. Displays devices in the Limited discoverability mode; each device is displayed only once. 4: All with no filter. Displays all found devices; devices can be displayed multiple times. The filter that displays each device only once can hold only a limited number of devices. If more devices than the limit are found, the devices can be displayed more than once.
mode	1 (default): Active 2: Passive, no scan response data will be received
discovery_length	Timeout measured in milliseconds Time range: 10 ms - 40 s, default 5000 ms
device_name	Name of the discovered device.
rssi	Received signal strength in dBm.
data_type	1: Scan response data 2: Advertise data
data	Complete advertisement / scan response data received from the remote device.

8.1.9 Bond +UBTB

AT Command	Description
AT+UBTB=<bd_addr>[,<mode>]	Performs a GAP bond procedure with another Bluetooth device. For some security modes, user interaction is required during the bonding procedure. The procedure to use is determined by the security mode. For user interaction during bonding, see User Confirmation +UBTUC and User Passkey Entry +UBTUPE commands and User Confirmation +UUBTUC and User Passkey Entry +UUBTUPE events. To perform the bonding, the remote device must be in a pairable and connectable mode. When the bond is complete, a Bond Event +UUBTB is generated.
Response	Description
OK	Successful response.
ERROR	Error message.
Parameter	Description
bd_addr	Bluetooth device address of the device to bond with.
mode	0 (default): Bluetooth BR/EDR 1: Bluetooth low energy

8.1.10 Unbond +UBTUB

AT Command	Description

AT+UBTUB=<bd_addr>	Removes a previously bonded device.
Response	Description
OK	Successful response.
ERROR	Error message.
Parameter	Description
bd_addr	Bluetooth device address of the device subject to unbond. The address FFFFFFFFFFFF will remove all the bonded devices.

8.1.11 Read bonded devices +UBTBD

AT Command	Description
AT+UBTBD[=<mode>]	Reads the bonded devices.
Response	Description
+UBTBD:<bd_addr>,<device_ mode>	This response is sent for every found device.
OK	Successful response.
ERROR	Error message.
Parameter	Description
mode	0: Bluetooth BR/EDR 1: Bluetooth low energy 2 (default): Bluetooth BR/EDR and low energy.
bd_addr	Bluetooth device address of the device from which to retrieve the name.
device_mode	0: The bonded device is in the BR/EDR mode. 1: The bonded device is in the low energy mode.

8.1.12 Local name +UBTLN

AT Command	Description
AT+UBTLN?	Reads the local Bluetooth device name.
AT+UBTLN=<device_name>	Writes the local Bluetooth device name.
Response	Description
+UBTLN:<device_name>	Successful read response.
OK	Successful write response.
ERROR	Error message.
Parameter	Description
device_name	Maximum 31 characters. The default name is "Bluetooth Device".

8.1.13 Local COD +UBTLC

AT Command	Description

AT+UBTLC?	Reads the Local Class of Device code.
AT+UBTLC=<cod>	Writes the Local Class of Device code.
Response	Description
+UBTLC:<cod>	Successful read response.
OK	Successful write response.
ERROR	Error message.
Parameter	Description
cod	Valid values for this parameter are specified in the Bluetooth Assigned Numbers Document, www.bluetooth.com. The parameter has been divided into three segments, a service class segment, a major device class segment, and a minor device class segment (bits 2-7). Extract from the Bluetooth Assigned Numbers document: Service class (bit mask, bits 13-23): Bit 16: Positioning (Location identification) Bit 17: Networking (LAN, Ad hoc, etc) Bit 18: Rendering (Printing, Speaker, etc) Bit 19: Capturing (Scanner, Microphone, etc) Bit 20: Object Transfer (v-Inbox, v-Folder, etc) Bit 21: Audio (Speaker, Microphone, Headset service, etc) Bit 22: Telephony (Cordless telephony, Modem, Headset service) Bit 23: Information (WEB-server, WAP-server, etc) Major device class (number, bits 12-8): 00000: Miscellaneous 00001: Computer (desktop, notebook, PDA, etc) 00010: Phone (cellular, cordless, modem, etc) 00011: LAN/Network Access point 00100: Audio/Video (headset, speaker, stereo, video display, VCR) 00101: Peripheral (mouse, joystick, keyboards) 00110: Imaging (printing, scanner, camera, etc) 11111: Uncategorized, specific device code not specified The default value is 0.

8.1.14 Master slave role +UBTMSR

AT Command	Description
AT+UBTMSR=<bd_addr>	Read the local master-slave role of a Bluetooth BR/EDR ACL connection. Returns the local role for a specific connection identified by the remote device address.
Response	Description

+UBTMSR:<role> OK	Successful response.
ERROR	Error message.
Parameter	Description
role	0: Master 1: Slave
bd_addr	Address of the remote device.

8.1.15 Master slave role policy +UBTMSP

AT Command	Description
AT+UBTMSP?	Reads the role policy of the device.
AT+UBTMSP=<role_policy>	Writes the role policy of the device.
Response	Description
+UBTMSP:<role_policy> OK	Successful read response.
OK	Successful write response.
ERROR	Error message.
Parameter	Description
role_policy	0: Always attempt to become master on incoming connections. 1 (default): Always let the connecting device select master/slave role on incoming connections.