AT Command Specification

Revision 185da073, October 25, 2023: Network Controller

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Introduction

This reference manual provides information on the commands and features for Microchip products that utilize the Wi-Fi radio module command set. The Wi-Fi radio module is a complete, stand-alone embedded wireless LAN access device. The device has an on-board TCP/IP and TLS stack, and in the simplest hardware configuration, requires only four pins: Power, TX, RX, and Ground. Once the initial configuration has been performed, the device may access a Wi-Fi network and send/receive serial data.

Definitions

In this document, the following naming conventions are used:

- DCE (Data Communications Equipment): the Wi-Fi module.
- DTE (Data Terminal Equipment): the terminal that issues commands to the Wi-Fi module.

The DCE interfaces operates in one of two modes:

- Terminal mode: the DCE waits for AT commands and interprets all received characters as commands to execute. All commands must be terminated with a literal <CR><LF> and these characters must not appear anywhere else in the command/parameter input stream. Parameters may be exchanged in one of two forms to accommodate binary data or infrequently-used ASCII control characters.
- Raw mode: the DTE transfers and accepts data "as is", i.e. in binary format with no post- or preprocessing.

Asynchronous Event Codes

In most cases any output from the DCE will be in response to the receipt of a command from the DTE. There are cases, however, where an asynchronous event occurs that the DTE will need informing of (e.g. disconnection from the network). The DCE uses Asynchronous Event Codes (AEC) to convey such events; AECs use the same format conventions as regular responses with an initial <CR> to clearly identify the start of the AEC:

```
<CR>+AECNAME:INFO<CR><LF>
```

To avoid confusion at the DTE, AECs will not be sent during the execution of a command. However the DTE must be prepared to receive AECs at any time as it is possible for the DCE to send ACEs resulting from a previous command or condition while the DTE is transmitting a new command.

Commands and Responses

Command execution starts when the command line has been completed (<CR><LF>) and ends when the result code for the command is sent consisting of either a success or error response.

The formatting of these responses depends on the current verbosity level set by the ATV command. All responses consist of the format <RESPONSE><CR><LF>.

Level	Success Response Format	Error Response Format
0	0	1
1	0	1:<STATUS_CODE>
2	OK	ERROR
3	OK	ERROR:<STATUS_CODE>
4	OK	ERROR:<STATUS_MSG> ERROR:<STATUS_CODE> (if no message defined)
5	OK	ERROR:<STATUS_CODE>[,<STATUS_MSG>]

Field	Type	Description
<STATUS_CODE>	Integer	Numeric status code, see Status Response Codes
<STATUS_MSG>	String	Descriptive text detailing the error

If a command requires longer to process the request, then the success response will be used to indicate that the command was accepted. Command processing continues asynchronously, further responses are indicated via AECs.

If an error occurs during asynchronous processing of a command the response will either be a command specific AEC or a generic error AEC of the format:

```
<CR>+CMDNAME:ERRORRSP<CR><LF>
```

Where CNDNAME is the name of the command issued and encountering the error and ERRORRSP is an error response formatted as detailed in the table above. For example:

```
<CR>+SOCKBR:ERROR:4<CR><LF>
```

Numeric Mode

To simplify command/response interactions with automated systems where it may be more problematic to generate and parse string content, the DCE supports a numeric mode. In this mode commands and responses can be represented in number strings of fixed format.

Each command, response and AEC has a two part ID: a module ID and a command/AEC ID. These two numbers are combined in the form:

```
MM:NN
```

Where MM is the hexadecimal representation of the module ID and NN is the hexadecimal representation of the command/AEC ID.

Commands can thus be issued as:

```
AT+MM.NN=
```

Responses and AECs will be formatted as:

```
+MM.NN:
```

While in numeric mode the DCE will still accept full command name strings as well as numeric format, but all responses and AECs will be in just numeric mode.

Numeric mode does not apply to the success or error responses returned by the DCE. If the DTE also wishes to use simplified formatting for these responses the command ATV can be used with either a parameter of 0 or 1 to replace 'OK' and 'ERROR' with '0' and '1'

Overview

Parameter Types

The definition of each command specifies the data types used for any associated parameters. The data types are as follows:

- Integer
- String
- Labels - may be used in place of some integer parameters and fields
- Binary - used only in commands for sending data and receiving data where the DTE either specifies a length or puts the DCE into raw mode.

Integers

Integers are used for numeric parameter values and may be specified in base 10 (decimal), or base 16 (hexadecimal). They are therefore composed only of characters '0' through '9', 'A' through 'F' (case insensitive) with an 'X' being used to identify hexadecimal values. To allow for negative decimal values, a leading '-' character is supported.

Examples:

99 A value of ninety-nine.

-128 A value of negative one hundred and twenty-eight.

0x1000 A value of 4096.

Positive integers are limited to 0 to 4,294,967,295 (i.e. 32 bits) Negative integers are limited to -1 to -2,147,483,648.

Fractional Integers:

Some parameters and responses support fractional integers, these are base 10 (decimal) only. They are composed of two integers with a period '.' separator, the second integer must be positive.

Examples:

1.1

5.2

-10.3

Fractional integers are limited to -16384.0 to +16383.9999.

Strings

Strings may be given in one of two formats.

- ASCII with the facility for special characters (e.g. tab, carriage return, line feed) to be specified via escape sequences. ASCII strings must be enclosed in double quotes (").
- Hexadecimal string, a stream of two-digit hexadecimal values. Hexadecimal strings must be enclosed within square brackets ([ ]). Please note that each 'byte' being transferred must be specified using two digits - for instance the byte value '2' would be represented '02'.

In the case of an ASCII string, the following characters will be escaped:

Horizontal Tab	\t
Backslash	\\
Double Quotes	\"
Carriage Return	\r
Linefeed	\n
Terminal Bell	\a
Backspace	\b
Vertical Tab	\v
Form feed	\f
Escape	\e

Examples:

"hello" ASCII string representation of hello

"\r\nNew line" ASCII string representation of <CR><LF>New line

[68656c6c6f] Hex string representation of hello

An empty string will be represented as either an empty ASCII string ("") or an empty hexadecimal string ([]). Both representations are valid and equivalent for input, for output only the ([]) form will be used.

Labels

Labels are textual representations of integer values. They are alphanumeric sequences (which must not start with a number) which can be used in some parameters and fields in place of an integer value.

Some common labels are:

- ON/OFF = 1/0
- TRUE/FALSE = 1/0
- YES/NO = 1/0

Labels differ from strings in that strings must be constrained within quotes or square brackets, labels are not but must not contain white space or other non-alphanumeric characters, escaped or otherwise.

Examples:

```
AT+SOMECOMMAND=YES  equivalent to AT+SOMECOMMAND=1
```

When replacing fractional integers, labels use a colon ':' separator with integer fraction.

```
AT+SUMCMD=ALABEL:5  equivalent to 1.5 if ALABEL were equivalent to 1.
```

Raw Binary

Raw binary can be useful for transferring data that is either transmitted or received over the network. Only a limited number of commands support this format. Binary transfers are achieved by the DCE leaving terminal mode and remaining in raw mode until one of the following conditions is met:

1. A pre-specified number of bytes has been exchanged between DTE and DCE
2. An 'escape sequence' of three consecutive '+' characters has been sent from the DTE to the DCE

Note: The 'escape sequence' method for returning to terminal mode relies not only on receipt of the '+++' sequence, but also the absence of any further input for a period of time. By default this is 1 second.

Raw Binary - From DCE to DTE

For retrieval of data in binary mode the DTE must either specify the number of bytes it wishes to receive or specify zero to request a persistent exit from terminal mode. On leaving terminal mode, the DCE will output a single '#' character, it will then transmit data in raw binary format.

The DCE will return to terminal mode if either of the following occurs:

1. The +++ escape sequence is received from the DTE
2. The number of bytes requested by the DTE has been sent
3. All available data has been sent to the DTE (e.g. DTE asks for 10 bytes but only 5 are available for reading)

On returning to terminal mode, the DCE will return the result of the command which initiated the transfer.

Raw Binary - From DTE to DCE

For transmission of data in binary mode the DTE must either specify the number of bytes it wishes to send to the DCE or specify zero to request a persistent exit from terminal mode. On leaving terminal mode, the DCE will accept binary format data until such time as:

1. The +++ escape sequence is received from the DTE
2. The number of bytes requested by the DTE has been sent

When operating in non-terminal mode, the DCE will periodically flush (i.e. transmit) the accumulated data. Generally, this means writing the data to an associated socket. The time period for the automatic flush of data is configurable (please see the XXX command).

Command Input

Commands consist of the following:

- Must start with 'AT'
- Zero or more basic commands
- Zero or one extended commands
- Terminate with <CR><LF>

Basic Commands:

Basic commands are single alphabetic characters which may be preceded by a single '&' character. An optional single numeric argument may then follow.

Extended Commands:

Extended commands begin with a single '+' character followed by a command name. If the command requires parameters, the command name is followed by a single '=' character with each parameter separated from the next by a comma. Parameters must follow the formatting rules for Integers, String or Labels.

Examples:

ATL<CR><LF>	Basic command 'L'
ATJ0<CR><LF>	Basic command 'J' with argument '0'
ATLJ0<CR><LF>	Basic command 'L' and 'J'
AT+CMD<CR><LF>	Extended command 'CMD'
AT+CMD=0<CR><LF>	Extended command 'CMD' with single parameter '0'
AT+CMD=0,1<CR><LF>	Extended command 'CMD' with two parameters '0' and '1'
ATJ0+CMD=0,1<CR><LF>	Combination of basic and extended commands

Output

Before transmitting token/parameter data to the DTE, the DCE will inspect each element to determine if any of the bytes would render inconsistently on a terminal display. In such cases, the element will be returned in hexadecimal format. This allows, for example, UTF-8 formatted SSIDs to be sent to a DTE in a fashion suitable for re-use, i.e. a human using a terminal application can copy this data and use it as a parameter in a command. Where multiple pieces of information are being returned, the DCE will comma separate each token.

Examples:

```
A<CR><LF>B"C\D<TAB>E            "A\r\nB\"C\\D\tE"
A©B                             [41C2A942]
```

Configuration Commands

Certain commands are used to configure or query parts of the DCE. These commands allow the DTE to set new parameter values and get existing parameter values. The commands can query all parameter values, query a single parameter ID, or set a single parameter ID.

Each configuration parameter will consist of an ID and a value. ID's can be either integer values or labels.

Commands can have preceding arguments which are specific to that particular command, but the ID and value arguments will be the last arguments.

For example:

```
AT+SOMECFGCMD=<CMD_SPEC_ARG>                - Get all parameters
AT+SOMECFGCMD=<CMD_SPEC_ARG>,<ID>           - Get single parameter
AT+SOMECFGCMD=<CMD_SPEC_ARG>,<ID>,<VALUE>   - Set single parameter
```

Single Value Parameters:

These parameters may have only one value and are accessed using the parameter ID.

Multiple Value Parameters:

These parameters may have more than one value.

When reading all values, the parameter ID can be used, however when accessing a single value within the set of all values the command will use a fractional integer form of the ID consisting of <ID>.<INDEX>

To read all parameter values:

```
>AT+CMD=5
+CMD:5.0,"value1"
+CMD:5.1,"value2"
+CMD:5.2,"value3"
OK
```

To read a single value:

```
>AT+CMD=5.1
+CMD:5.1,"value2"
OK
```

When writing a value, the behaviour will depend on the implementation of the command, however often writing a value to the parameter <ID> will cause an additional value to be appended to the set of parameter values, writing to the fractional <ID>.<INDEX> will cause that parameter index to be

updated.

To set an additional value:

```
>AT+CMD=5
+CMD:5.0,"value1"
OK
>AT+CMD=5,"newvalue"
OK
>AT+CMD=5
+CMD:5.0,"value1"
+CMD:5.1,"newvalue"
```

To replace an existing value:

```
>AT+CMD=5
+CMD:5.0,"value1"
+CMD:5.1,"value2"
OK
>AT+CMD=5.0,"newvalue"
OK
>AT+CMD=5
+CMD:5.0,"newvalue"
+CMD:5.1,"value2"
```

Query Response Elements:

Standard configuration parameter queries return a simple <ID>,<VALUE> pair. For single value parameters the <ID> will be an integer, for multiple value parametes the <ID> will be a fractional integer in the form <ID>.0, <ID>.1 etc for each value.

```
>AT+CMD=5
+CMD:5.0,"simple1"
+CMD:5.1,"simple2"
```

Complex Value Elements:

When queried some configuration parameters will return a more complex value in place of the <VALUE> element of the response. A complex value is more than one comma separated value.

```
>AT+CMD=5
+CMD:5.0,"complex11","complex12","complex12"
+CMD:5.1,"complex21","complex22","complex22"
```

Security Model

Security is based around a combination of privilege levels and profiles. Various elements in the system are assigned a security descriptor which describes the minimum privilege level required to access the element for a given profile.

Profiles

Up to four profiles can be defined in the system. Each profile defines a set of functionality which is accessible for a given access path.

For example, one profile may be assigned to all accesses via a local physical interface (UART, I2C, SPI etc) while a second profile is assigned to all accesses via a remote interface (Sockets). This allows different privilege requirements to be specified depending on how the system is accessed, locally vs remotely.

Privilege Level

There are four defined privilege levels:

- Guest
- User
- Super-user
- Root

Guest having the lowest privilege while Root has the highest. Any element can be accessed by a user with a privilege level of 'at least' what is specified in its security descriptor for the current access profile.

Security Descriptor

Elements in the system are assigned a security descriptor, this consists of a minimum user privilege level for each of the four profiles. In this documentation these descriptors are shown as four characters, each character can be either `G`(uest), `U`(ser), `S`(uper-user) or `R`(oot).

For example, the descriptor `GSRG` means:

- Profile 1 - Guest
- Profile 2 - Super-user
- Profile 3 - Root
- Profile 4 - Guest

Status Response Codes

COMMON Status Codes (Module ID = 1)

Status Code	Description
1,0	Wi-Fi Request Failed
1,1	STA Not Connected
1,2	Network Error
1,3	File System Error

DNS Status Codes (Module ID = 5)

Status Code	Description
5,0	DNS Type Not Supported
5,1	DNS Query Timeout
5,2	DNS Error

FS Status Codes (Module ID = 7)

Status Code	Description
7,0	Unsupported File Transfer Protocol
7,1	File Exists
7,2	File Not Found
7,3	Invalid File Type

MQTT Status Codes (Module ID = 8)

Status Code	Description
8,0	MQTT Error

PING Status Codes (Module ID = 11)

Status Code	Description
11,0	Ping Failed

SOCKET Status Codes (Module ID = 14)

Status Code	Description
14,0	Socket ID Not Found
14,1	Length Mismatch
14,2	No Free Sockets
14,3	Invalid Socket Protocol
14,4	Socket Close Failed
14,5	Socket Bind Failed
14,6	Socket TLS Failed
14,7	Socket Connect Failed
14,8	Socket Send Failed
14,9	Socket Set Option Failed
14,10	Socket Destination Not Set
14,11	Multicast Error
14,12	Socket Not Ready

TIME Status Codes (Module ID = 16)

Status Code	Description
16,0	Time Error

WAP Status Codes (Module ID = 18)

Status Code	Description
18,0	Soft AP Stop Not Permitted
18,1	Soft AP Stop Failed
18,2	Soft AP Start Not Permitted
18,3	Soft AP Start Failed
18,4	Unsupported Security Type

WSTA Status Codes (Module ID = 20)

Status Code	Description
20,0	STA Disconnect Not Permitted
20,1	STA Disconnect Failed
20,2	STA Connection Not Permitted
20,3	STA Connection Failed

MDNS Status Codes (Module ID = 21)

Status Code	Description
21,0	Service Started
21,1	Service Stopped
21,2	Service Conflict

ASSOC Status Codes (Module ID = 22)

Status Code	Description
22,0	Association Not Found

ECC Status Codes (Module ID = 26)

Status Code	Description
26,0	Certificate Type Invalid
26,1	No Data to read
26,2	Input Buffer Error

AZURE Status Codes (Module ID = 29)

Status Code	Description
29,0	Azure Error

IOMGR Status Codes (Module ID = 30)

Status Code	Description
30,0	Pin configuration error
30,1	Pin configuration type not supported
30,2	Error configuring ADC
30,3	Error configuring PWM
30,4	Error reading pin
30,5	Error with PWM output
30,6	Error with stopping PWM
30,7	Error with starting PWM
30,8	Invalid Channel
30,9	Invalid Pin
30,10	Invalid Direction
30,11	Invalid Value
30,12	Invalid Module for PWM
30,13	Invalid value for Period
30,14	Invalid value for Duty Cycle
30,15	ADC currently in use by another Channel

SP Status Codes (Module ID = 80)

Status Code	Description
80,0	PC Out of Bounds

Serial Interface

Basic Commands

E

Description

This command controls if characters received from the DTE are echoed back to the DTE.

Command Syntax:

Command	Description
ATE<N>	Set value

Command Parameter Syntax:

Parameter Name	Type	Description
<N>	Integer	Echo control 0 Turn off character echo 1 Turn on character echo

L

Description

This command controls if labels will be displayed instead of integers for those commands that support them.

Command Syntax:

Command	Description
ATL<N>	Set value

Command Parameter Syntax:

Parameter Name	Type	Description
<N>	Integer	Label substitution 0 Turn off label substitution 1 Turn on label substitution

M

Description

This command controls the command/response mode.

Command Syntax:

Command	Description
ATM<N>	Set value

Command Parameter Syntax:

Parameter Name	Type	Description
<N>	Integer	Command mode 0 Verbose string mode 1 Numeric mode

N

Description

This command controls the number system for displaying unsigned integers.

Command Syntax:

Command	Description
ATN<N>	Set value

Command Parameter Syntax:

Parameter Name	Type	Description
<N>	Integer	Number system 10 Decimal system 16 Hexadecimal system

V

Description

This command controls the level of verbosity used when display command responses. The response to this command will be in the new verbosity format specified.

Command Syntax:

Command	Description
ATV<N>	Set value

Command Parameter Syntax:

Parameter Name	Type	Description
<N>	Integer	Verbosity level 0 Just 0 or 1 1 0 for success, 1:<STATUS_CODE> for error 2 Just OK or ERROR 3 OK for success, ERROR:<STATUS_CODE> for error 4 OK for success, either ERROR:<STATUS_MSG> or ERROR:<STATUS_CODE> for error 5 OK for success, ERROR:<STATUS_CODE>[,<STATUS_MSG>] for error

&K

Description

This command controls is used to select the local flow control method.

Command Syntax:

Command	Description
AT&K<N>	Set value

Command Parameter Syntax:

Parameter Name	Type	Description
<N>	Integer	Flow control 0 All flow control is disabled 1 RTS/CTS flow control is enabled

INTERNAL (Module ID = 2)

Command Reference:

+GMI

Description

This command requests manufacturer identification.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+GMI	Query the manufacturers ID/name	GGGG

Response Syntax

Response	Description
+GMI:<MAN_ID>	Information Response

Response Element Syntax

Element Name	Type	Description
<MAN_ID>	String	Manufacturers ID/name

+GMM

Description

This command requests model identification.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+GMM	Query the model information	GGGG

Response Syntax

Response	Description
+GMM:<MODEL_ID>	Information Response

Response Element Syntax

Element Name	Type	Description
<MODEL_ID>	String	Model information

+GMR

Description

This command requests revision identification.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+GMR	Query the revision information	GGGG

Response Syntax

Response	Description
+GMR:<VERSION_INFO>	Information Response

Response Element Syntax

Element Name	Type	Description
<VERSION_INFO>	String	Version information

+IPR

Description

This command sets the DTE serial port baud rate.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+IPR	Query the current baud rate	GGGG
AT+IPR=<BAUD_RATE>	Set the serial baud rate	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<BAUD_RATE>	Integer	Baud rate Positive unsigned 32-bit value

Response Syntax

Response	Description
+IPR:<BAUD_RATE>	Information Response

Response Element Syntax

Element Name	Type	Description
<BAUD_RATE>	Integer	Baud rate Positive unsigned 32-bit value

CFG (Module ID = 3)

Command Reference:

+CFG

Description

This command is used to read or set the system configuration.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+CFG	Query all configuration elements	GGGG
AT+CFG=<ID>	Query a single element	GGGG
AT+CFG=<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+CFG:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<DEVICE_NAME>	String	The device name Maximum length is 32	GGGG

DHCP (Module ID = 4)

Command Reference:

+DHCPSC

Description

This command is used to read or set the DHCP server configuration.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+DHCPSC	Query pool list	GGGG
AT+DHCPSC=<IDX>	Query all configuration elements	GGGG
AT+DHCPSC=<IDX>,<ID>	Query a single element	GGGG
AT+DHCPSC=<IDX>,<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<IDX>	Integer	Pool index Value is 0
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+DHCPSC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<ENABLED>	Bool	DCE's internal DHCP Server 0 Disabled 1 Enabled	GGGG
2	<POOL_START>	IPv4 Address	Start address of DHCP server pool Unsigned 32-bit value Format is 'a.b.c.d'	GGGG
3	<POOL_END>	IPv4 Address (Read Only)	End address of DHCP server pool Unsigned 32-bit value Format is 'a.b.c.d'	GGGG
4	<POOL_LEASES>	Integer (Read Only)	Number of leases Unsigned 16-bit value	GGGG
5	<NETIF_IDX>	Integer	Network interface index Valid range is 0 to 1	GGGG
10	<GATEWAY>	IPv4 Address	The address of the default gateway Unsigned 32-bit value Format is 'a.b.c.d'	GGGG
11	<DNS_SVR>	IPv4 Address	The IP address of the DNS Server Unsigned 32-bit value Format is 'a.b.c.d'	GGGG

DNS (Module ID = 5)

Command Reference:

+DNSC

Description

This command is used to read or set the DNS configuration.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+DNSC	Query all configuration elements	GGGG
AT+DNSC=<ID>	Query a single element	GGGG
AT+DNSC=<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+DNSC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<DNS_SVR>	IPv4 Address	DNS server IP address Unsigned 32-bit value Format is 'a.b.c.d' This is a multiple value parameter with an ID range 1.0 to 1.1	GGGG

+DNSRESOLV

Description

This command is used to resolve domain names via DNS.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+DNSRESOLV=<TYPE>,<DOMAIN_NAME>		GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<TYPE>	Integer Label	Type of record 1 A 28 AAAA
<DOMAIN_NAME>	String	Domain name to resolve

AEC Reference:

+DNSRESOLV

Description

Resolve results.

AEC Syntax

AEC	Description
+DNSRESOLV:<TYPE>,<DOMAIN_NAME>,<QUERY_RESP>	Resolve success

AEC Element Syntax

Element Name	Type	Description
<TYPE>	Integer	Type of record 1 A record 28 AAAA record
<DOMAIN_NAME>	String	Original domain name requested
<QUERY_RESP>	String	Query response received

+DNSERR

Description

Resolve failure.

AEC Syntax

AEC	Description
+DNSERR:<ERROR_CODE>	Resolve failure

AEC Element Syntax

Element Name	Type	Description
<ERROR_CODE>	Integer	Error code

INFO (Module ID = 6)

Command Reference:

+INFO

Description

This command is used to report system information.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+INFO=<TYPE>	Request information	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<TYPE>	Integer	Type of information 1 Task Report

AEC Reference:

+INFO

Description

Information report.

AEC Syntax

AEC	Description
+INFO:<NAME>,<STACK_WATERMARK>,<STATE>	RTOS task report

AEC Element Syntax

Element Name	Type	Description
<NAME>	String	Task name
<STACK_WATERMARK>	Integer	Stack high watermark
<STATE>	Integer	Task state

FS (Module ID = 7)

Command Reference:

+FS

Description

This command performs a filesystem operation.

The filesystem operation command is split into several sub-commands:

- Load
- List
- Delete
- Info

Load Sub-Command:

The load sub-command initiates a file transfer from the DTE to the DCE.

List Sub-Command:

The list sub-command produces a list of files present in the filesystem based on the file type specified.

Delete Sub-Command:

The delete sub-command deletes a single file object of the type specified from the filesystem.

Info Sub-Command:

The info sub-command returns information on the filesystem.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+FS=<OP>	Operate on filesystem	GGGG
AT+FS=<OP>,<FILETYPE>	Operate on file types	GGGG
AT+FS=<OP>,<FILETYPE>,<FILENAME>	Operate on files	GGGG
AT+FS=<OP>,<FILETYPE>,<TSFRPROT>,<FILENAME>,<FILELENGTH>	Load file (single)	GGGG
AT+FS=<OP>,<FILETYPE>,<TSFRPROT>	Load file (batch)	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<OP>	Integer Label	Operation 1/LOAD Load 2/LIST List 3/DEL Delete 4/INFO Information
<FILETYPE>	Integer Label	File type 1/CERT Certificate 2/PRIKEY Private Key
<FILENAME>	String	The name of the file
<TSFRPROT>	Integer	Transfer protocol 1 X Modem + checksum 2 X Modem + CRC16 3 X Modem 1K 4 Y Modem
<FILELENGTH>	Integer Label	File length Positive unsigned 16-bit value

Response Syntax

Response	Description
+FS:<OP>,<FILETYPE>,<FILENAME>	List operation response
+FS:<OP>,<FREESPACE>,<HANDLES>	Information operation response

Response Element Syntax

Element Name	Type	Description
<OP>	Integer Label	Operation 2/LIST List 4/INFO Information
<FILETYPE>	Integer Label	File type 1/CERT Certificate 2/PRIKEY Private Key
<FILENAME>	String	The name of the file
<FREESPACE>	Integer	Free space Positive unsigned 16-bit value
<HANDLES>	Integer	Free file handles Positive unsigned 16-bit value

Examples:

Example Command Sequence 1: File transfer using XModem+CRC with +FS

→	AT+FS=1,1,2,"ISRGRootX1",1391	Load 1391 byte certificate using XModem+CRC
←	#	Raw binary mode indicator
←	CC	Initial handshake, repeating C meaning CRC
→	SOH 01 FE DATA[128] CRC CRC	First 128 byte data frame
←	ACK	Receiver acknowledge
→	SOH 02 FD DATA[128] CRC CRC	
←	ACK	
→	SOH 03 FC DATA[128] CRC CRC	
←	ACK	
→	SOH 04 FB DATA[128] CRC CRC	
←	ACK	
→	SOH 05 FA DATA[128] CRC CRC	
←	ACK	
→	SOH 06 F9 DATA[128] CRC CRC	
←	ACK	
→	SOH 07 F8 DATA[128] CRC CRC	
←	ACK	
→	SOH 08 F7 DATA[128] CRC CRC	
←	ACK	
→	SOH 09 F6 DATA[128] CRC CRC	
←	ACK	
→	SOH 0A F5 DATA[128] CRC CRC	
←	ACK	
→	SOH 0B F4 DATA[128] CRC CRC	
←	ACK	
→	EOT	End of transmission
←	ACK	
→	OK	AT Command completion

MQTT (Module ID = 8)

Command Reference:

+MQTTC

Description

This command is used to read or set the MQTT configuration.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MQTTC	Query all configuration elements	GGGG
AT+MQTTC=<ID>	Query a single element	GGGG
AT+MQTTC=<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+MQTTC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<BROKER_ADDR>	String	Broker domain name or IPv4 address Maximum length is 64	GGGG
2	<BROKER_PORT>	Integer	Broker listening TCP port Unsigned 16-bit value	GGGG
3	<CLIENT_ID>	String	MQTT client ID Maximum length is 64	GGGG
4	<USERNAME>	String	Username Maximum length is 128	GGGG
5	<PASSWORD>	String	Password Maximum length is 256	GGGG
6	<KEEP_ALIVE>	Integer	Keep alive time (in seconds) Valid range is 0 to 32767	GGGG
7	<TLS_CONF>	Integer	TLS configuration index (see +TLSC) Valid range is 0 to 1	GGGG
8	<PROTO_VER>	Unsigned Integer	MQTT protocol version, either 3 or 5 3 V3.1.1 5 V5	GGGG
9	<READ_THRESHOLD>	Unsigned Integer	Subscription read threshold Unsigned 16-bit value	GGGG
10	<SERVER_SELECT>	Unsigned Integer	Select server 0 Other 1 Azure	GGGG

+MQTTCONN

Description

This is used to connect to an MQTT broker.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MQTTCONN	Query current connection status	GGGG
AT+MQTTCONN=<CLEAN>	Start a new connection	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<CLEAN>	Integer	Clean Session 0 Use existing session, if available 1 Use new session

+MQTTSUB

Description

This is used to subscribe to an MQTT topic.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MQTTSUB=<TOPIC_NAME>,<MAX_QOS>	Subscribe to a topic	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<TOPIC_NAME>	String	Topic Name
<MAX_QOS>	Integer	Maximum QoS 0 QoS 0 1 QoS 1 2 QoS 2

+MQTTSUBLST

Description

This is used to list MQTT topic subscriptions.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MQTTSUBLST	List subscriptions	GGGG

Response Syntax

Response	Description
+MQTTSUBLST:<TOPIC_NAME>,<QOS>	Subscription report

Response Element Syntax

Element Name	Type	Description
<TOPIC_NAME>	String	Topic Name
<QOS>	Integer	QoS 0 QoS 0 1 QoS 1 2 QoS 2

+MQTTSUBRD

Description

This is used receive data from subscriptions.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MQTTSUBRD=<TOPIC_NAME>,<MSG_ID>,<LENGTH>	Receive data from a topic	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<TOPIC_NAME>	String	Topic Name
<MSG_ID>	Integer	Message Identifier Unsigned 16-bit value
<LENGTH>	Integer	The number of bytes to receive Unsigned 16-bit value

Response Syntax

Response	Description
+MQTTSUBRD:<MSG_ID>,<MSG_LENGTH>,<TOPIC_PAYLOAD>	Read subscribed data

Response Element Syntax

Element Name	Type	Description
<MSG_ID>	Integer	Message ID
<MSG_LENGTH>	Integer	Length of message
<TOPIC_PAYLOAD>	String	Topic Payload

+MQTTUNSUB

Description

This is used to unsubscribe from an MQTT topic.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MQTTUNSUB=<TOPIC_NAME>	Unsubscribe from a topic	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<TOPIC_NAME>	String	Topic Name

+MQTTPUB

Description

This is used to publish a message.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MQTTPUB=<DUP>,<QOS>,<RETAIN>,<TOPIC_NAME>,<TOPIC_PAYLOAD>	Publish to a topic	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<DUP>	Integer	Duplicate Message 0 New message 1 Duplicate message
<QOS>	Integer	QoS 0 QoS 0 1 QoS 1 2 QoS 2
<RETAIN>	Integer	Retain Message 0 Not retained on the server 1 Retained on the server
<TOPIC_NAME>	String	Topic Name
<TOPIC_PAYLOAD>	String	Topic Payload

+MQTTLWT

Description

This is used to define a last will message.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MQTTLWT=<QOS>,<RETAIN>,<TOPIC_NAME>,<TOPIC_PAYLOAD>	Specific an LWT	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<QOS>	Integer	QoS 0 QoS 0 1 QoS 1 2 QoS 2
<RETAIN>	Integer	Retain Message 0 Not retained on the server 1 Retained on the server
<TOPIC_NAME>	String	Topic Name
<TOPIC_PAYLOAD>	String	Topic Payload

+MQTTDISCONN

Description

This is used to disconnect from a broker.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MQTTDISCONN	Disconnect	GGGG
AT+MQTTDISCONN=<REASON_CODE>	Disconnect with a reason	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<REASON_CODE>	Integer	Reason Code Unsigned 8-bit value

+MQTTPROPTX

Description

This command is used to read or set the MQTT transmit properties.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Any defined and selected properties are added to transmitted MQTT packets. Only properties applicable to the MQTT packet type are added. Properties must be selected via the +MQTTPROPTXS command before they are included.

Note: Not all properties listed below may be available in any implementation of this command set.

User property (38) supports multiple entries in the form of key/value pairs. If a key/value pair is specified for the command it will be added, if only a key is specified it will be removed.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MQTTPROPTX	Query all configuration elements	GGGG
AT+MQTTPROPTX=<ID>	Query a single element	GGGG
AT+MQTTPROPTX=<ID>,<VAL>	Set a single element	GGGG
AT+MQTTPROPTX=<ID>,<KEY>,<VALS>	Set a single key/value pair	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value
<KEY>	String	Parameter key
<VALS>	String	Parameter value

Response Syntax

Response	Description
+MQTTPROPTX:<ID>,<VAL>	Read response
+MQTTPROPTX:<ID>,<KEY>,<VALS>	Read response (key/value)

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value
<KEY>	String	Parameter key
<VALS>	String	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
17	<SESSION_EXPIRY_INTERVAL>	Integer	Session Expiry Interval	GGGG
38	<USER_PROP>	Byte Array	User Property This is a multiple value parameter with an ID range 38.0 to 38.9	GGGG

+MQTTPROPRX

Description

This command is used to read the MQTT receive properties.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Any defined properties are added to transmitted MQTT packets. Only properties applicable to the MQTT packet type are added.

Any properties received are added to the list of available receive properties which can be queried by this command. Updates to the received properties are announced using the +MQTTPROPRX AEC and can be read via this command.

Note: Not all properties listed below may be available in any implementation of this command set.

User property (38) supports multiple entries in the form of key/value pairs.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MQTTPROPRX	Query all configuration elements	GGGG
AT+MQTTPROPRX=<ID>	Query a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value

Response Syntax

Response	Description
+MQTTPROPRX:<ID>,<VAL>	Read response
+MQTTPROPRX:<ID>,<KEY>,<VALS>	Read response (key/value)

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value
<KEY>	String	Parameter key
<VALS>	String	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
17	<SESSION_EXPIRY_INTERVAL>	Integer (Read Only)	Session Expiry Interval	GGGG
34	<TOPIC_ALIAS_MAX>	Integer (Read Only)	Topic Alias Max	GGGG
38	<USER_PROP>	Byte Array (Read Only)	User Property This is a multiple value parameter with an ID range 38.0 to 38.9	GGGG

+MQTTPROPTXS

Description

This is used to define which transmit properties are selected.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MQTTPROPTXS	Query all IDs	GGGG
AT+MQTTPROPTXS=<PROP_ID>	Query a single ID	GGGG
AT+MQTTPROPTXS=<PROP_ID>,<PROP_SEL>	Set a single ID	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<PROP_ID>	Integer	Property Identifier
<PROP_SEL>	Integer	Property Selected 0 Property not selected 1 Property is selected

Response Syntax

Response	Description
+MQTTPROPTXS:<PROP_ID>,<PROP_SEL>	Read response

Response Element Syntax

Element Name	Type	Description
<PROP_ID>	Integer	Property Identifier
<PROP_SEL>	Integer	Property Selected 0 Property not selected 1 Property is selected

AEC Reference:

+MQTTCONN

Description

Connection state.

AEC Syntax

AEC	Description
+MQTTCONN:<CONN_STATE>	Connection state

AEC Element Syntax

Element Name	Type	Description
<CONN_STATE>	Integer	MQTT connected state 0 Not connected 1 Connected

+MQTTCONNACK

Description

Connection acknowledge.

AEC Syntax

AEC	Description
+MQTTCONNACK:<CONNACK_FLAGS>,<RETURN_CODE>	Connection state

AEC Element Syntax

Element Name	Type	Description
<CONNACK_FLAGS>	Integer	Connect acknowledge flags
<RETURN_CODE>	Integer	Connect return code 0 Success 128 Unspecified error 129 Malformed packet 130 Protocol error 131 Implementation specific error 132 Unsupported protocol version 133 Client identifier not valid 134 Bad username or password 135 Not authorized 136 Server unavailable 137 Server busy 138 Banned 140 Bad authentication method 144 Topic name invalid 149 Packet too large 151 Quota exceeded 153 Payload format invalid 154 Retain not supported 155 QoS not supported 156 Use another server 156 Server moved 159 Connection rate exceeded

+MQTTPUBACK

Description

Publish acknowledge.

AEC Syntax

AEC	Description
+MQTTPUBACK	Publish acknowledge

+MQTTPUBCOMP

Description

Publish complete.

AEC Syntax

AEC	Description
+MQTTPUBCOMP	Publish complete

+MQTTPUBERR

Description

Publish error.

AEC Syntax

AEC	Description
+MQTTPUBERR	Publish error

+MQTTSUB

Description

Subscribe response.

AEC Syntax

AEC	Description
+MQTTSUB:<REASON_CODE>	Subscribe response

AEC Element Syntax

Element Name	Type	Description
<REASON_CODE>	Integer	SUBACK return code 0 Granted QoS 0 1 Granted QoS 1 2 Granted QoS 2 128 Unspecified error 131 Implementation specific error 135 Not authorized 143 Topic filter invalid 145 Packet identifier in use 151 Quota exceeded 158 Shared Subscriptions not supported 161 Subscription identifiers not supported 162 Wildcard subscriptions not supported

+MQTTUNSUB

Description

Unsubscribe response.

AEC Syntax

AEC	Description
+MQTTUNSUB:<RESULT>	Unsubscribe response

AEC Element Syntax

Element Name	Type	Description
<RESULT>	Integer	Result of unsubscribe request 0 Success 15 No subscription existed 128 Unspecified error 131 Implementation specific error 135 Not authorized 143 Topic filter invalid 145 Packet identifier in use

+MQTTSUBRX

Description

Receive subscribed data.

AEC Syntax

AEC	Description
+MQTTSUBRX:<DUP>,<QOS>,<RETAIN>,<TOPIC_NAME>,<TOPIC_PAYLOAD>	Received subscribed data
+MQTTSUBRX:<DUP>,<QOS>,<RETAIN>,<TOPIC_NAME>,<MSG_ID>,<MSG_LENGTH>	Received subscribed data notification

AEC Element Syntax

Element Name	Type	Description
<DUP>	Integer	Duplicate Message 0 New message 1 Duplicate message
<QOS>	Integer	QoS 0 QoS 0 1 QoS 1 2 QoS 2
<RETAIN>	Integer	Retain Message 0 Not retained on the server 1 Retained on the server
<TOPIC_NAME>	String	Topic Name
<TOPIC_PAYLOAD>	String	Topic Payload
<MSG_ID>	Integer	Message ID
<MSG_LENGTH>	Integer	Length of message

+MQTTPROPRX

Description

Indicates property has been updated.

AEC Syntax

AEC	Description
+MQTTPROPRX:<PROP_ID>	Property ID updated

AEC Element Syntax

Element Name	Type	Description
<PROP_ID>	Integer	Property Identifier

NETIF (Module ID = 9)

Command Reference:

+NETIFC

Description

This command is used to read or set the network interface configuration.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+NETIFC	Query interface list	GGGG
AT+NETIFC=<IF>	Query all configuration elements	GGGG
AT+NETIFC=<IF>,<ID>	Query a single element	GGGG
AT+NETIFC=<IF>,<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<IF>	Integer	Interface number Valid range is 0 to 1
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+NETIFC:<IF>,<IF>	List response
+NETIFC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<IF>	Integer	Interface number Valid range is 0 to 1
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<NAME>	String (Read Only)	Network interface name Maximum length is 16	GGGG
2	<ETHER>	MAC Address (Read Only)	Ethernet MAC address of interface	GGGG
3	<HOSTNAME>	String	Name of this interface Maximum length is 16	GGGG
10	<DHCPC_EN>	Bool	DHCP client enable 0 Disabled - use static configuration 1 Enabled - use automatic settings	GGGG
11	<DHCPC_LEASE_START>	UTC Time (Read Only)	DHCP lease start time, displayed in system time format	GGGG
12	<DHCPC_LEASE_ENDS>	UTC Time (Read Only)	DHCP lease end time, displayed in system time format	GGGG
13	<DHCPC_SRV_ADDR>	IPv4 Address (Read Only)	IP address of DHCP server Unsigned 32-bit value Format is 'a.b.c.d'	GGGG
40	<IP_MASK>	IPv4 Address	IP address and net mask Format is 'a.b.c.d/m'	GGGG
41	<GATEWAY>	IPv4 Address	IP address of gateway Format is 'a.b.c.d'	GGGG
60	<IPV6_GLO_ADDR>	IPv6 Address	IPv6 global address Format is 'a:b:c:d::e:f/m' This is a multiple value parameter with an ID range 60.0 to 60.1	GGGG
61	<IPV6_LL_ADDR>	IPv6 Address (Read Only)	IPv6 link-local address Format is 'a:b:c:d::e:f/m'	GGGG
62	<IPV6_GATEWAY>	IPv6 Address	IPv6 gateway address Format is 'a:b:c:d::e:f'	GGGG

PING (Module ID = 11)

Command Reference:

+PING

Description

This command sends a ping (ICMP Echo Request) to the target address.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+PING=<TARGET_ADDR>	Ping a target address	GGGG
AT+PING=<TARGET_ADDR>,<PROTOCOL_VERSION>	Ping a target address (specifying IP protocol)	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<TARGET_ADDR>	String	IP address or host name of target
<PROTOCOL_VERSION>	Integer Label	IP protocol version 4 IPv4 6 IPv6

AEC Reference:

+PING

Description

Successful ping.

AEC Syntax

AEC	Description
+PING:<IP_ADDRESS>,<RTT>	Ping success response

AEC Element Syntax

Element Name	Type	Description
<IP_ADDRESS>	String	IP address of the target
<RTT>	Integer	Round trip time (in milliseconds)

+PINGERR

Description

Error.

AEC Syntax

AEC	Description
+PINGERR:<ERROR_CODE>	Ping error

AEC Element Syntax

Element Name	Type	Description
<ERROR_CODE>	Integer	Error code

RST (Module ID = 12)

Command Reference:

+RST

Description

This command is used to reset the DCE.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+RST	Reset target	GGGG

SNTP (Module ID = 13)

Command Reference:

+SNTPC

Description

This command is used to read or set the SNTP configuration.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SNTPC	Query all configuration elements	GGGG
AT+SNTPC=<ID>	Query a single element	GGGG
AT+SNTPC=<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+SNTPC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<NTP_ENABLED>	Bool	Network Time (NTP) client function 0 Disabled 1 Enabled	GGGG
2	<NTP_STATIC>	Bool	NTP configuration mode 0 DHCP - can be set via DHCP 1 Static - cannot be set by DHCP	GGGG
3	<NTP_SVR>	String	The address/name of NTP server Unsigned 32-bit value Maximum length is 128	GGGG

SOCKET (Module ID = 14)

Command Reference:

+SOCKO

Description

This command is used to open a new socket.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SOCKO=<PROTOCOL>	Open a socket	GGGG
AT+SOCKO=<PROTOCOL>,<PROTOCOL_VERSION>	Open a socket (specifying IP protocol)	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<PROTOCOL>	Integer	The protocol to use 1 UDP 2 TCP
<PROTOCOL_VERSION>	Integer Label	IP protocol version 4 IPv4 6 IPv6

Response Syntax

Response	Description
+SOCKO:<SOCK_ID>	Socket open response

Response Element Syntax

Element Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value

+SOCKBL

Description

This command is used to bind a socket to a local port.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SOCKBL=<SOCK_ID>,<LCL_PORT>	Bind to a local port	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<LCL_PORT>	Integer	The local port number to use Positive unsigned 16-bit value

+SOCKBR

Description

This command is used to bind a socket to a remote address.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SOCKBR=<SOCK_ID>,<RMT_ADDR>,<RMT_PORT>	Bind to a remote port	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<RMT_ADDR>	Integer String Byte Array	The address of the remote device
<RMT_PORT>	Integer	The port number on the remote device Positive unsigned 16-bit value

+SOCKBM

Description

This command is used to bind a socket to a multicast group.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SOCKBM=<SOCK_ID>,<MCAST_ADDR>,<MCAST_PORT>	Bind to a multicast port	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<MCAST_ADDR>	String	The address of the multicast group
<MCAST_PORT>	Integer	The port number of the multicast group Positive unsigned 16-bit value

+SOCKTLS

Description

This command is used to enable TLS on a socket.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SOCKTLS=<SOCK_ID>,<TLS_CONF>	Apply TLS configuration	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<TLS_CONF>	Integer	TLS certificate configuration Valid range is 1 to 2

Response Syntax

Response	Description
+SOCKTLS:<SOCK_ID>	TLS succeed

Response Element Syntax

Element Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value

+SOCKWR

Description

This command is used to send data over a socket that is bound to a remote address and port number.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SOCKWR=<SOCK_ID>,<LENGTH>,<DATA>	Socket write with data	GGGG
AT+SOCKWR=<SOCK_ID>,<LENGTH>	Socket write, data to follow	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<LENGTH>	Integer	The length of the data to send Valid range is 0 to 1460
<DATA>	String Byte Array	The data to send in either ASCII or hexadecimal string format. If omitted the DCE will enter raw binary mode and will remain in that mode until the specified length of binary data has been received from the DTE

+SOCKWRTO

Description

This command is used to send data to an arbitrary destination using the connectionless UDP protocol.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SOCKWRTO=<SOCK_ID>,<RMT_ADDR>,<RMT_PORT>,<LENGTH>,<DATA>	Socket write to socket with data	GGGG
AT+SOCKWRTO=<SOCK_ID>,<RMT_ADDR>,<RMT_PORT>,<LENGTH>	Socket write to socket, data to follow	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<RMT_ADDR>	Integer String Byte Array	The address of the remote device
<RMT_PORT>	Integer	The port number on the remote device Positive unsigned 16-bit value
<LENGTH>	Integer	The length of the data to send Valid range is 0 to 1460
<DATA>	String Byte Array	The data to send in either ASCII or hexadecimal string format. If omitted the DCE will enter raw binary mode and will remain in that mode until the specified length of binary data has been received from the DTE

+SOCKRD

Description

This command is used to read data from a socket.

Two AECs present notification of data received by the DCE:

- +SOCKRXU indicates UDP data has been received.
- +SOCKRXT indicates TCP data has been received.

The DTE is responsible for retrieving the datagram/stream data via the +SOCKRD command.

For TCP sockets the DCE will indicate, via +SOCKRXT, the number of bytes of data which are currently available for reading via the +SOCKRD command. The DCE may issue multiple +SOCKRXT AECs as data is received. When requesting data via the +SOCKRD command the DTE may receive less data than request, the number of bytes provided by the DCE will be declared in the +SOCKRD response before the data is presented. The DTE may request less data than that declared by the +SOCKRXT AEC as being available, the remaining data will be available for subsequent reading.

For UDP sockets the DCE will indicate, via +SOCKRXU, the number of bytes of data which were received in the oldest datagram received by the DCE. Only a single +SOCKRXU will be issued by the DCE even if subsequent UDP datagrams are received. Reading data from the UDP socket via the +SOCKRD command will read and discard the current datagram, if less data is requested than was indicated by the +SOCKRXU AEC the remaining unread data in the datagram will be discarded.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SOCKRD=<SOCK_ID>,<OUTPUT_MODE>,<LENGTH>	Socket read	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<OUTPUT_MODE>	Integer	The format the DTE wishes to receive the data 1 ASCII or hex string 2 Binary
<LENGTH>	Integer	The number of bytes the DTE wishes to read

Response Syntax

Response	Description
+SOCKRD:<SOCK_ID>,<LENGTH>,<DATA>	Socket read response

Response Element Syntax

Element Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<LENGTH>	Integer	Number of bytes
<DATA>	Byte Array	The data in the format requested

+SOCKRDBUF

Description

This command is used to read data from a socket buffer.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SOCKRDBUF=<SOCK_ID>,<OUTPUT_MODE>,<LENGTH>	Socket read	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<OUTPUT_MODE>	Integer	The format the DTE wishes to receive the data 1 ASCII or hex string 2 Binary
<LENGTH>	Integer	The number of bytes the DTE wishes to read

+SOCKCL

Description

This command is used to close a socket.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SOCKCL=<SOCK_ID>	Close socket	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value

Response Syntax

Response	Description
+SOCKCL:<SOCK_ID>	Socket close response

Response Element Syntax

Element Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value

+SOCKLST

Description

This command is used to present a list of the DCE's open sockets/connections.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SOCKLST	List all sockets	GGGG
AT+SOCKLST=<SOCK_ID>	List socket	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value

Response Syntax

Response	Description
+SOCKLST:<SOCK_ID>,<PROTOCOL>,<RMT_ADDR>,<RMT_PORT>,<LCL_PORT>	Socket list response

Response Element Syntax

Element Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<PROTOCOL>	Integer	The protocol in use 1 UDP 2 TCP
<RMT_ADDR>	String	Remote address
<RMT_PORT>	Integer	Remote port Positive unsigned 16-bit value
<LCL_PORT>	Integer	Local port Positive unsigned 16-bit value

+SOCKC

Description

This command is used to read or set the socket configuration.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SOCKC	Query range of SOCK_ID	GGGG
AT+SOCKC=<SOCK_ID>	Query all configuration elements	GGGG
AT+SOCKC=<SOCK_ID>,<ID>	Query a single element	GGGG
AT+SOCKC=<SOCK_ID>,<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+SOCKC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<SO_LINGER>	Bool	Socket linger enable/disable (TCP) 0 Disable 1 Enable	GGGG
2	<SO_NODELAY>	Bool	Socket no delay (TCP) 0 Disable 1 Enable	GGGG
3	<SO_KEEPALIVE>	Unsigned Integer	Socket keep alive timeout (TCP) Unsigned 16-bit value	GGGG
4	<SO_RCVBUF>	Unsigned Integer	Socket receive buffer size (TCP) Valid range is 1460 to 11680	GGGG
32	<IP_TOS>	Unsigned Integer	Socket Type of Service (TCP/UDP) 0x00 Normal 0x04 Reliability 0x08 Throughput 0x10 Low delay	GGGG

AEC Reference:

+SOCKIND

Description

Socket established.

AEC Syntax

AEC	Description
+SOCKIND:<SOCK_ID>,<LCL_ADDR>,<LCL_PORT>,<RMT_ADDR>,<RMT_PORT>	TCP connection established

AEC Element Syntax

Element Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<LCL_ADDR>	String	Local address
<LCL_PORT>	Integer	Local port Positive unsigned 16-bit value
<RMT_ADDR>	String	Remote address
<RMT_PORT>	Integer	Remote port Positive unsigned 16-bit value

+SOCKRXT

Description

TCP receive.

AEC Syntax

AEC	Description
+SOCKRXT:<SOCK_ID>,<LENGTH>	TCP receive

AEC Element Syntax

Element Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<LENGTH>	Integer	Number of bytes

+SOCKRXU

Description

UDP receive.

AEC Syntax

AEC	Description
+SOCKRXU:<SOCK_ID>,<RMT_ADDR>,<RMT_PORT>,<LENGTH>	UDP receive

AEC Element Syntax

Element Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<RMT_ADDR>	String	Remote address
<RMT_PORT>	Integer	Remote port Positive unsigned 16-bit value
<LENGTH>	Integer	Number of bytes

+SOCKCL

Description

Socket close.

AEC Syntax

AEC	Description
+SOCKCL:<SOCK_ID>	Socket close response

AEC Element Syntax

Element Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value

+SOCKTLS

Description

TLS success.

AEC Syntax

AEC	Description
+SOCKTLS:<SOCK_ID>	TLS succeed

AEC Element Syntax

Element Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value

+SOCKERR

Description

Socket error.

AEC Syntax

AEC	Description
+SOCKERR:<SOCK_ID>,<ERROR_CODE>	TCP bind failed

AEC Element Syntax

Element Name	Type	Description
<SOCK_ID>	Integer	The socket ID Positive unsigned 16-bit value
<ERROR_CODE>	Integer	Error code

Examples:

Example Command Sequence 2: Opening a TCP server socket

→	`AT+SOCKO=2`	Open a TCP socket
←	`+SOCKO:5`	Socket ID 5 created
←	`OK`	
→	`AT+SOCKBL=5,5678`	Bind socket to local port 5678
←	`OK`	
←	`+SOCKIND:6,"1.2.3.4",5678,"11.22.33.44",12345`	New socket connection on port 5678

SWFW (Module ID = 15)

Command Reference:

+SWFW

Description

This command switches the inactive and active firmware images.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SWFW	TBD	GGGG

TIME (Module ID = 16)

Command Reference:

+TIME

Description

This command is used to set or query the system time.

Three formats of time are supported, two are in UTC seconds and one is a string based on RFC3339 / ISO-8601 format:

1. UNIX timestamp - UTC seconds since 1st January 1970
2. NTP time - UTC seconds since 1st January 1900
3. RFC3339 / ISO-8601 - String representation of date/time

RFC3338 / ISO-8601 format represents the time as:

```
YYYY-MM-DDTHH:MM:SS.ssZ
```

For example:

```
2019-02-31T12:34:56.01Z - 31st February 2019, 12:34 PM 56.01 seconds (UTC+0)
```

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+TIME	Time query in current format	GGGG
AT+TIME=<FORMAT>	Time query in specified format	GGGG
AT+TIME=<FORMAT>,<UTC_SEC>	Time set in UTC seconds	GGGG
AT+TIME=<FORMAT>,<DATE_TIME>	Time set in RFC3339/ISO-8601 format	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<FORMAT>	Integer	Format of time 1 UTC seconds (epoch 01/01/1970 - UNIX timestamp) 2 UTC seconds (epoch 01/01/1900 - NTP time) 3 RFC3339 / ISO-8601 format
<UTC_SEC>	Integer	UTC seconds Unsigned 32-bit value
<DATE_TIME>	String	Date/time in format YYYY-MM-DDTHH:MM:SS.00Z

AEC Reference:

+TIME

Description

Time report.

AEC Syntax

AEC	Description
+TIME:<TIME>	Time report

AEC Element Syntax

Element Name	Type	Description
<TIME>	Integer String Byte Array	Current time

TLS (Module ID = 17)

Command Reference:

+TLSC

Description

This command is used to read or set the TLS configuration.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+TLSC	Query configuration list	GGGG
AT+TLSC=<CONF>	Query all configuration elements	GGGG
AT+TLSC=<CONF>,<ID>	Query a single element	GGGG
AT+TLSC=<CONF>,<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<CONF>	Integer	Configuration number Valid range is 0 to 1
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+TLSC:<CONF>,<CONF>	List response
+TLSC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<CONF>	Integer	Configuration number Valid range is 0 to 1
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<CA_CERT_NAME>	String	CA certificate name Maximum length is 32	GGGG
2	<CERT_NAME>	String	Certificate name Maximum length is 32	GGGG
3	<PRI_KEY_NAME>	String	Private key name Maximum length is 32	GGGG
4	<PRI_KEY_PASSWORD>	String	Private key password Maximum length is 32	GGGG
5	<SERVER_NAME>	String	Server name Maximum length is 64	GGGG
6	<DOMAIN_NAME>	String	Domain name Maximum length is 32	GGGG
7	<CIPHER_SUITES_IDX>	Integer	Cipher suite index Valid range is 1 to 2	GGGG
8	<USE_ECC_DEV>	Bool	ECC Device usage	GGGG

+TLSCSC

Description

This command is used to read or set the TLS cipher suite configuration.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+TLSCSC	Query configuration list	GGGG
AT+TLSCSC=<CSL_IDX>	Query all configuration elements	GGGG
AT+TLSCSC=<CSL_IDX>,<ID>	Query a single element	GGGG
AT+TLSCSC=<CSL_IDX>,<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<CSL_IDX>	Integer	Cipher suite list index Valid range is 1 to 2
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+TLSCSC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<CIPHER_SUITES>	Unsigned Integer	Cipher Suites Positive unsigned 16-bit value This is a multiple value parameter with an ID range 1.0 to 1.31	GGGG

WAP (Module ID = 18)

Command Reference:

+WAPC

Description

This command is used to read or set the DCE's hotspot access point configuration.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+WAPC	Query all configuration elements	GGGG
AT+WAPC=<ID>	Query a single element	GGGG
AT+WAPC=<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+WAPC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<SSID>	String	Network Name Maximum length is 32	GGGG
2	<SEC_TYPE>	Integer	Security Type 0 Open 2 WPA2 Personal Mixed Mode 3 WPA2 Personal 4 WPA3 Personal Transition Mode 5 WPA3 Personal	GGGG
3	<CREDENTIALS>	String	Credentials required for connecting to the network of the security type specified Maximum length is 128	GGGG
4	<CHANNEL>	Integer	The channel on which to set up the network Valid range is 1 to 13	GGGG
5	<HIDDEN>	Bool	Visibility of the network 0 Not hidden, SSID is broadcast in beacons 1 Hidden, SSID is not broadcast	GGGG
7	<L2ONLY>	Bool	Layer 2 only flag 0 Layer 3 active 1 Layer 3 not active	GGGG
8	<NETIF_IDX>	Unsigned Integer	Network interface index Valid range is 0 to 1	GGGG

+WAP

Description

This command is used to enable the DCE's hotspot access point functionality.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+WAP	Read status of AP function	GGGG
AT+WAP=<STATE>	Set state of AP function	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<STATE>	Integer	State of the hotspot feature 0 Disable 1 Enable

Response Syntax

Response	Description
+WAP:<STATE>	Query state (disconnected)

Response Element Syntax

Element Name	Type	Description
<STATE>	Integer	Connected state 0 Disabled 1 Enabled

AEC Reference:

+WAPAIP

Description

STA IP address assignment.

AEC Syntax

AEC	Description
+WAPAIP:<ASSOC_ID>,<IP_ADDRESS>	Assignment of STA IP address

AEC Element Syntax

Element Name	Type	Description
<ASSOC_ID>	Integer	Association ID
<IP_ADDRESS>	String	IP address assigned

+WAPSC

Description

STA connected.

AEC Syntax

AEC	Description
+WAPSC:<ASSOC_ID>,<MAC_ADDRESS>	Station connect

AEC Element Syntax

Element Name	Type	Description
<ASSOC_ID>	Integer	Association ID
<MAC_ADDRESS>	String	MAC address of the STA

+WAPSD

Description

STA disconnected.

AEC Syntax

AEC	Description
+WAPSD:<ASSOC_ID>,<MAC_ADDRESS>	Station disconnect

AEC Element Syntax

Element Name	Type	Description
<ASSOC_ID>	Integer	Association ID
<MAC_ADDRESS>	String	MAC address of the STA

WSCN (Module ID = 19)

Command Reference:

+WSCNC

Description

This command is used to modify or query the behavior of the active scanning function.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+WSCNC	Query all configuration elements	GGGG
AT+WSCNC=<ID>	Query a single element	GGGG
AT+WSCNC=<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+WSCNC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<CHANNEL>	Unsigned Integer	Channel to scan (or 0 for all channels) Valid range is 1 to 13	GGGG
2	<ACT_SLOT_TIME>	Unsigned Integer	The time in milliseconds to wait for probe responses Unsigned 16-bit value	GGGG
3	<PASV_SLOT_TIME>	Unsigned Integer	The time in milliseconds to wait for beacons Unsigned 16-bit value	GGGG
4	<NUM_SLOTS>	Unsigned Integer	Number of scan slots Unsigned 8-bit value	GGGG
5	<PROBES_PER_SLOT>	Unsigned Integer	Number of probes sent per active slot Unsigned 8-bit value	GGGG
6	<RSSI_THRESH>	Integer	RSSI threshold (or 0 for none) Signed 8-bit value	GGGG
7	<SEC_FILTER>	Unsigned Integer	Security filter, bitmask of: 0x01 Personal 0x02 Enterprise 0x04 Open 0x08 WEP 0x10 WPA 0x20 WPA2 0x40 WPA3	GGGG
8	<ASYNC_NOTIFY>	Bool	Asynchronous notification 0 No scan indication AECs are generated 1 Indication AECs are generated	GGGG
10	<FILT_LIST>	Byte Array	SSID filter list This is a multiple value parameter with an ID range 10.0 to 10.3	GGGG
20	<SCAN_RESULTS>	Complex Value[1] (Read Only)	Top scan results from previous scan, ordered by RSSI This is a multiple value parameter with an ID range 20.0 to 20.7	GGGG

Complex Value Syntax

No	Complex Value	Description
1	<RSSI>,<SEC_TYPE>,<CHANNEL>,<BSSID>,<SSID>	Scan indicator

Complex Value Element Syntax

Element Name	Type	Description
<RSSI>	Integer	Received signal strength
<SEC_TYPE>	Integer	Recommended security type to use when connecting to this AP -1 Unknown or unsupported 0 Open 2 WPA2-Personal Mixed Mode 3 WPA2-Personal 4 WPA3-Personal Transition Mode 5 WPA3-Personal 6 WPA2-Enterprise Mixed Mode 7 WPA2-Enterprise 8 WPA3-Enterprise Transition Mode 9 WPA3-Enterprise
<CHANNEL>	Integer	The channel number of the detected device
<BSSID>	String	The BSSID of detected device
<SSID>	String	SSID of detected device

+WSCN

Description

This command is used to scan for infrastructure networks in range of the DCE.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+WSCN=<ACT_PASV>	Scan	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ACT_PASV>	Integer	Flag indicating active or passive scanning 0 Passive scanning 1 Active scanning

AEC Reference:

+WSCNIND

Description

Scan results.

AEC Syntax

AEC	Description
+WSCNIND:<RSSI>,<SEC_TYPE>,<CHANNEL>,<BSSID>,<SSID>	Scan indicator

AEC Element Syntax

Element Name	Type	Description
<RSSI>	Integer	Received signal strength
<SEC_TYPE>	Integer	Recommended security type to use when connecting to this AP -1 Unknown or unsupported 0 Open 2 WPA2-Personal Mixed Mode 3 WPA2-Personal 4 WPA3-Personal Transition Mode 5 WPA3-Personal 6 WPA2-Enterprise Mixed Mode 7 WPA2-Enterprise 8 WPA3-Enterprise Transition Mode 9 WPA3-Enterprise
<CHANNEL>	Integer	The channel number of the detected device
<BSSID>	String	The BSSID of detected device
<SSID>	String	SSID of detected device

+WSCNDONE

Description

Scan completed.

AEC Syntax

AEC	Description
+WSCNDONE	Scan complete

Examples:

Example Command Sequence 3: Setting SSID filter with +WSCNC

→	`AT+WSCNC=10,"SSID1"`	Add SSID1 to filter list
←	`OK`	
→	`AT+WSCNC=10,"SSID2"`	Add SSID2 to filter list
←	`OK`	
→	`AT+WSCNC=10,"SSID3"`	Add SSID3 to filter list
←	`OK`	
→	`AT+WSCNC=10`	List all filters
←	`+WSCNC:10.0,"SSID1"`	
←	`+WSCNC:10.1,"SSID2"`	
←	`+WSCNC:10.2,"SSID3"`	
←	`OK`	
→	`AT+WSCNC=10.1,""`	Remove second filter entry (SSID2)
←	`OK`	
→	`AT+WSCNC=10`	List all filters
←	`+WSCNC:10.0,"SSID1"`	
←	`+WSCNC:10.1,"SSID3"`	
←	`OK`	
→	`AT+WSCNC=10,""`	Remove all filters
←	`OK`	

WSTA (Module ID = 20)

Command Reference:

+WSTAC

Description

This command is used to read or set the DCE's Wi-Fi station mode configuration.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Enterprise Connection

The TLS configuration index (and other TLS parameters) will not be visible to read until it is set to a valid TLS configuration index (see +TLSC). Once set <TLS_CONF> and other TLS configuration parameters will be visible for change.

The <TLS_MSCHAP_V2_UN> and <TLS_MSCHAP_V2_PW> parameters will not be visible to read until the <TLS_EAP_METHOD> is set to EAP-TTLS/MSCHAPV2.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+WSTAC	Query all configuration elements	GGGG
AT+WSTAC=<ID>	Query a single element	GGGG
AT+WSTAC=<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+WSTAC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<SSID>	String	Network name Maximum length is 32	GGGG
2	<SEC_TYPE>	Integer	Security type 0 Open 2 WPA2-Personal Mixed Mode 3 WPA2-Personal 4 WPA3-Personal Transition Mode 5 WPA3-Personal 6 WPA2-Enterprise Mixed Mode 7 WPA2-Enterprise 8 WPA3-Enterprise Transition Mode 9 WPA3-Enterprise	GGGG
3	<CREDENTIALS>	String	Credentials for connecting to the network Maximum length is 128	GGGG
4	<CHANNEL>	Integer	The channel the network must reside on (or 0 for any) Valid range is 0 to 13	GGGG
5	<BSSID>	MAC Address	The BSSID of the network to connect to	GGGG
7	<CONN_TIMEOUT>	Integer	Connection timeout in milliseconds Valid range is 0 to 2147483647	GGGG
8	<NETIF_IDX>	Unsigned Integer	Network interface index Valid range is 0 to 1	GGGG
20	<TLS_CONF>	Integer	TLS certificate configuration index to use (see +TLSC) Valid range is 0 to 1	GGGG
21	<TLS_EAP_METHOD>	Integer	EAP method 1 EAP-TLS 2 EAP-TTLS/MSCHAPV2	GGGG
22	<TLS_IDENT>	String	EAP identity Maximum length is 256	GGGG
25	<TLS_MSCHV2_UN>	String	MSChapV2 username Maximum length is 256	GGGG
26	<TLS_MSCHV2_PW>	String	MSChapV2 password Maximum length is 256	GGGG

+WSTA

Description

This command is used to control or query the DCE's station mode functionality.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+WSTA	Read status of STA function	GGGG
AT+WSTA=<STATE>	Set state of STA function	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<STATE>	Integer	State of the Wi-Fi station feature 0 Disable 1 Use configuration from +WSTAC command

Response Syntax

Response	Description
+WSTA:<ASSOC_ID>,<STATE>	State

Response Element Syntax

Element Name	Type	Description
<ASSOC_ID>	Integer	Association ID
<STATE>	Integer	Connected state 0 Not connected 1 Connected

AEC Reference:

+WSTAAIP

Description

Indication of STA automatic address assignment.

AEC Syntax

AEC	Description
+WSTAAIP:<ASSOC_ID>,<IP_ADDRESS>	Assignment of IP address to association

AEC Element Syntax

Element Name	Type	Description
<ASSOC_ID>	Integer	Association ID
<IP_ADDRESS>	String	IP address assigned

+WSTALD

Description

Link lost.

AEC Syntax

AEC	Description
+WSTALD:<ASSOC_ID>	Link down

AEC Element Syntax

Element Name	Type	Description
<ASSOC_ID>	Integer	Association ID

+WSTAERR

Description

Connection error.

AEC Syntax

AEC	Description
+WSTAERR:<ERROR_CODE>	Link error

AEC Element Syntax

Element Name	Type	Description
<ERROR_CODE>	Integer	Error code

+WSTALU

Description

Link established.

AEC Syntax

AEC	Description
+WSTALU:<ASSOC_ID>,<BSSID>,<CHANNEL>	Link up

AEC Element Syntax

Element Name	Type	Description
<ASSOC_ID>	Integer	Association ID
<BSSID>	String	The BSSID of the Access Point the DCE has connected to
<CHANNEL>	Integer	The channel number of network

Examples:

Example Command Sequence 4: Connection with +WSTA and +WSTAC

→	`AT+WSTAC=1,"MyAP"`	Configure AP connection parameters
←	`OK`	
→	`AT+WSTAC=2,1`	
←	`OK`	
→	`AT+WSTAC=3,"MyAPPSK"`	
←	`OK`	
→	`AT+WSTA=1`	Connect to AP
←	`OK`	
←	`+WSTALU:1,"00:01:02:03:04:05",6`	Link up: connected on channel 6
←	`+WSTAAIP:1,"192.168.0.20"`	IP address received via auto configuration (DHCP/SLAAC)
→	`AT+WSTA`	
←	`+WSTA:1`	
←	`OK`	
←	`+WSTALD`	Link down

MDNS (Module ID = 21)

Command Reference:

+MDNSC

Description

This command is used to read or set the mDNS configuration.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+MDNSC	Query configuration list	GGGG
AT+MDNSC=<CONF>	Query all configuration elements	GGGG
AT+MDNSC=<CONF>,<ID>	Query a single element	GGGG
AT+MDNSC=<CONF>,<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<CONF>	Integer	Configuration number Value is 1
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+MDNSC:<CONF>,<CONF>	List response
+MDNSC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<CONF>	Integer	Configuration number Value is 1
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<ENABLED>	Bool	Is service enabled	GGGG
2	<STARTED>	Bool (Read Only)	Has service started	GGGG
3	<NAME>	String	Service name Maximum length is 32	GGGG
4	<TYPE>	String	Service type Maximum length is 32	GGGG
5	<PORT>	Unsigned Integer	Service port	GGGG
6	<TXT>	String	Service TXT field Maximum length is 128	GGGG

AEC Reference:

+MDNSSRV

Description

Service status response.

AEC Syntax

AEC	Description
+MDNSSRV:<ERROR_CODE>	Service status

AEC Element Syntax

Element Name	Type	Description
<ERROR_CODE>	Integer	Error code

ASSOC (Module ID = 22)

Command Reference:

+ASSOC

Description

This command is used to query current WiFi associations.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+ASSOC	Query all associations	GGGG
AT+ASSOC=<ASSOC_ID>	Query specific association ID	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ASSOC_ID>	Integer	Association ID Positive unsigned 16-bit value

AEC Reference:

+ASSOC

Description

WiFi association report.

AEC Syntax

AEC	Description
+ASSOC:<ASSOC_ID>,<AP_STA>,<BSSID>,<RSSI>	WiFi association report

AEC Element Syntax

Element Name	Type	Description
<ASSOC_ID>	Integer	Association ID Positive unsigned 16-bit value
<AP_STA>	Integer String Byte Array	AP or STA 0 AP 1 STA
<BSSID>	String	The BSSID of association peer
<RSSI>	Integer	RSSI

SI (Module ID = 23)

Command Reference:

+SI

Description

This command is used to query system information.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SI	Request system information	GGGG
AT+SI=<FILTER>	Request filtered system information	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<FILTER>	Integer	System information filter bitmask 0x01 WiFi memory allocation stats 0x02 WiFi packet stats

Response Syntax

Response	Description
+SI:<UPTIME>	Response

Response Element Syntax

Element Name	Type	Description
<UPTIME>	Integer	System uptime in seconds

AEC Reference:

+SIMSTAT

Description

WiFi memory statistics for each type of memory pool.

AEC Syntax

AEC	Description
+SIMSTAT:<TYPE>,<ALLOC>,<FREE>,<ALLOC_SZ>,<FREE_SZ>	WiFi memory statistic

AEC Element Syntax

Element Name	Type	Description
<TYPE>	Integer	Type 0 Memory 1 Config 2 High priority TX 3 High priority RX 4 Normal priority TX 5 Normal priority RX
<ALLOC>	Integer	Number of memory allocations made
<FREE>	Integer	Number of memory frees
<ALLOC_SZ>	Integer	Total bytes allocated
<FREE_SZ>	Integer	Total bytes freed

+SIMERR

Description

WiFi Memory errors.

AEC Syntax

AEC	Description
+SIMERR:<ALLOC_ERR>	WiFi memory errors

AEC Element Syntax

Element Name	Type	Description
<ALLOC_ERR>	Integer	Memory allocation errors

+SIWPKTS

Description

WiFi packets statistics.

AEC Syntax

AEC	Description
+SIWPKTS:<TX>,<RX>	WiFi packets

AEC Element Syntax

Element Name	Type	Description
<TX>	Integer	WiFi packets transmitted
<RX>	Integer	WiFi packets received

WID (Module ID = 24)

Command Reference:

+WID

Description

This command sends a WID to the WiFi firmware.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+WID=<ID>,<DATA>	Send WID data	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ID>	Integer	WID ID
<DATA>	Integer String Byte Array	WID data

WPROV (Module ID = 25)

Command Reference:

+WPROVC

Description

This command is used to read or set the provisioning service configuration (To be supported in future release).

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+WPROVC	Query all configuration elements (To be supported in future release)	GGGG
AT+WPROVC=<ID>	Query a single element (To be supported in future release)	GGGG
AT+WPROVC=<ID>,<VAL>	Set a single element (To be supported in future release)	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+WPROVC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

Configuration Parameters

ID	Name	Type	Description	Sec
1	<PORT>	Unsigned Integer	Service listening port Positive unsigned 16-bit value	GGGG
2	<ASCII>	Bool (Read Only)	ASCII or binary protocol 0 Binary protocol 1 ASCII protocol	GGGG

+WPROV

Description

This command is used to control or query the provisioning service (To be supported in future release).

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+WPROV	Read status of provisioning service (To be supported in future release)	GGGG
AT+WPROV=<STATE>	Set state of provisioning service (To be supported in future release)	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<STATE>	Integer	State of the provisioning service 0 Disable 1 Use configuration from +WPROVC command

AEC Reference:

+WPROVAT

Description

Indication of client attach to provisioning service (To be supported in future release).

AEC Syntax

AEC	Description
+WPROVAT:<ID>,<IP_ADDRESS>,<PORT>	Attachment of client to provisioning service (To be supported in future release)

AEC Element Syntax

Element Name	Type	Description
<ID>	Integer	Client ID
<IP_ADDRESS>	String	IP address assigned
<PORT>	Integer	Port

+WPROVDT

Description

Indication of client detach from provisioning service (To be supported in future release).

AEC Syntax

AEC	Description
+WPROVDT:<ID>	Detachment of client from provisioning service (To be supported in future release)

AEC Element Syntax

Element Name	Type	Description
<ID>	Integer	Client ID

ECC (Module ID = 26)

Command Reference:

+ECCRDCERT

Description

This command is used to read certificate from ECC device.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+ECCRDCERT=<CERTIFICATE>,<LENGTH>	Certificate Read	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<CERTIFICATE>	Integer	The certificate type 1 Device 2 Signer 3 Root
<LENGTH>	Integer	The number of bytes the DTE wishes to read

Response Syntax

Response	Description
+ECCRDCERT:<TOTLENGTH>,<LENGTH>,<DATA>	Certificate read response

Response Element Syntax

Element Name	Type	Description
<TOTLENGTH>	Integer	Total Number of bytes
<LENGTH>	Integer	Number of bytes remaining
<DATA>	Byte Array	The certificate in PEM format (root cert is read in DER format)

+ECCRDSER

Description

This command is used to read serial number of ECC device.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+ECCRDSER	ECC Serial Number	GGGG

Response Syntax

Response	Description
+ECCRDSER:<SERNUM>	ECC Serial Number response

Response Element Syntax

Element Name	Type	Description
<SERNUM>	Byte Array	ECC Serial Number

+ECCWRDEVTYPE

Description

This command is used to set the ECC device - TrustNGo or TrustFlex.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+ECCWRDEVTYPE=<ECCDEVTYPE>	ECC device type	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ECCDEVTYPE>	Integer	ECC device type 1 TrustNGo 2 TrustFlex

+ECCWRSLOT

Description

This command is used to write data to a ECC device slot.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+ECCWRSLOT=<ECCZONETYPE>,<SLOT>,<OFFSET>,<LENGTH>,<DATA>	ECC Slot Write	GGGG
AT+ECCWRSLOT=<SLOT>,<OFFSET>,<LENGTH>,<DATA>	ECC Slot Write	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ECCZONETYPE>	Integer	ECC zone type 0 Config 1 OTP 2 Data
<SLOT>	Integer	The Slot number in the ECC device Valid range is 0 to 15
<OFFSET>	Integer	Byte Offset from where to read/ write
<LENGTH>	Integer	The number of bytes the DTE wishes to write
<DATA>	String Byte Array	Data to be read/ written

+ECCRDSLOT

Description

This command is used to read data from a ECC device slot.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+ECCRDSLOT=<ECCZONETYPE>,<SLOT>,<OFFSET>,<LENGTH>	ECC Slot Read	GGGG
AT+ECCRDSLOT=<SLOT>,<OFFSET>,<LENGTH>	ECC Slot Read	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ECCZONETYPE>	Integer	ECC zone type 0 Config 1 OTP 2 Data
<SLOT>	Integer	The Slot number in the ECC device Valid range is 0 to 15
<OFFSET>	Integer	Byte Offset from where to read/ write
<LENGTH>	Integer	The number of bytes the DTE wishes to write

Response Syntax

Response	Description
+ECCRDSLOT:<DATA>	ECC device read slot response

Response Element Syntax

Element Name	Type	Description
<DATA>	Byte Array	Data read from the slot

Examples:

Example Command Sequence 5: Reading Serial Number from ECCdevice

→	`AT+ECCRDSER`	Read Serial Number
←	`+ECCRDSER:18,"0123BB7259B5335712"`	Serial Number read
←	`OK`	
→	`AT+ECCRDSLOT=8,0,16`	Reading 16 Bytes from Slot 8 with offset 0
←	`+ECCRDCERT:16,"Hello Microchip\0"`	Bytes read from the Slot 8
←	`OK`	

TBL (Module ID = 27)

Command Reference:

+TBL

Description

This command is used to reset the DCE to bootloader.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+TBL	Reset target to bootloader	GGGG

READAPPIMAGE (Module ID = 28)

Command Reference:

+READAPPIMAGE

Description

This command is used to read the DCE flash image contents. The DTE receives the data in raw binary format.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+READAPPIMAGE=<INT_FLASH_ADDR>,<DATA_LEN>	read internal flash application image	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<INT_FLASH_ADDR>	Integer String Byte Array	The address of internal flash (range from 0x90000000 - 0x90100000)
<DATA_LEN>	Integer String Byte Array	The length of data read

AZURE (Module ID = 29)

Command Reference:

+AZUREC

Description

This command is used to give configurations needed to connect to IoT hub.

This command is a configuration command which supports setting and getting parameter values. The behaviour of configuration commands is described in general in the Configuration Commands section.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+AZUREC	Query configuration list (all options)	GGGG
AT+AZUREC=<ID>	Query a single element	GGGG
AT+AZUREC=<ID>,<AZURE_MODELID>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<AZURE_MODELID>	Integer String Byte Array Label	Unique identifier for device template

Configuration Parameters

ID	Name	Type	Description	Sec
1	<MODEL_ID>	String	Model ID of the device model Maximum length is 64	GGGG

Examples:

Example Command Sequence 6: Example of using +AZUREC

→	`AT+AZUREC=1,"dtmi:com:Microchip:WFI32_IoT_WM;2"`	Passing device template
←	`OK`	

IOMGR (Module ID = 30)

Command Reference:

+IOCFG

Description

This command is used to configure a pin as an ADC, PWM, or Digital IO with direction.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+IOCFG=<PIN>,<TYPE>	Configure pin as ADC or PWM	GGGG
AT+IOCFG=<PIN>,<TYPE>,<DIR>	Configure pin as Digital IO	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<PIN>	Integer Label	Pin/Channel to be used
<TYPE>	Integer	Pin type 0 Configure as Digital IO 1 Configure as ADC 2 Configure as PWM
<DIR>	Integer	Configure pin as Output or Input 0 Configure as Output 1 Configure as Input

+DIGPU

Description

This command is used to enable or disable pull up for a Digital IO Pin.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+DIGPU=<PIN>,<PULL>	Enable or Disable Digital IO pin Pull Up	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<PIN>	Integer Label	Pin/Channel to be used
<PULL>	Integer	Enable or Disable Pull Up/Pull Down 0 Disable Pull Up/Pull Down 1 Enable Pull Up/Pull Down

+DIGPD

Description

This command is used to enable or disable pull down for a Digital IO Pin.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+DIGPD=<PIN>,<PULL>	Enable or Disable Digital IO pin Pull Down	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<PIN>	Integer Label	Pin/Channel to be used
<PULL>	Integer	Enable or Disable Pull Up/Pull Down 0 Disable Pull Up/Pull Down 1 Enable Pull Up/Pull Down

+DIGRD

Description

This command is used to read the value from the specified Digital IO Pin.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+DIGRD=<PIN>	Read Digital IO pin	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<PIN>	Integer Label	Pin/Channel to be used

Response Syntax

Response	Description
+DIGRD:<DIGRDPIN>,<DIGRDVAL>	DIGRD Value

Response Element Syntax

Element Name	Type	Description
<DIGRDPIN>	Integer Label	PIN used in the I/O READ CMD
<DIGRDVAL>	Integer	Result value of Digital IO Read Command

+DIGWR

Description

This command is used to write a value to the specified Digital IO Pin.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+DIGWR=<PIN>,<VALUE>	Write Digital IO pin	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<PIN>	Integer Label	Pin/Channel to be used
<VALUE>	Integer	Value for Digital IO Write Operation

+ADCRD

Description

This command is used to read the ADC value of the specified channel.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+ADCRD=<PIN>	Read ADC Value for specified pin/channel	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<PIN>	Integer Label	Pin/Channel to be used

+PWMCFG

Description

This command is used to configure a PWM module using the provided period value.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+PWMCFG=<PWM MOD>,<PRD>	Configure period for the specified PWM module	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<PWM MOD>	Integer	Module to used for PWM 1 Use Output Compare Module 1 2 Use Output Compare Module 2 3 Use Output Compare Module 3 4 Use Output Compare Module 4
<PRD>	Integer	Period value for PWM Configuration

+PWMSTART

Description

This command is used to start driving the PWM for the specified module.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+PWMSTART=<PWM MOD>,<DC>	Configure DC and Start PWM for specified module	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<PWM MOD>	Integer	Module to used for PWM 1 Use Output Compare Module 1 2 Use Output Compare Module 2 3 Use Output Compare Module 3 4 Use Output Compare Module 4
<DC>	Integer	Duty Cycle value for PWM Configuration

+PWMSTOP

Description

This command is used to stop driving the PWM for the specified module.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+PWMSTOP=<PWM MOD>	Stop PWM for specified module	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<PWM MOD>	Integer	Module to used for PWM 1 Use Output Compare Module 1 2 Use Output Compare Module 2 3 Use Output Compare Module 3 4 Use Output Compare Module 4

AEC Reference:

+ADCRDVAL

Description

Read ADC Value.

AEC Syntax

AEC	Description
+ADCRDVAL:<ADCRDVAL>,<ADDCH>	ADCRD Value

AEC Element Syntax

Element Name	Type	Description
<ADCRDVAL>	Integer	Resulting value of ADC Read Command
<ADDCH>	Integer	Channel of ADC Read Command

SP (Module ID = 80)

Command Reference:

+SPE

Description

This command executes a stored procedure.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SPE=<VM_ID>	Query a stored procedure state	GGGG
AT+SPE=<VM_ID>,<VM_STATE>	Set a stored procedure state	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<VM_ID>	Integer	Virtual machine ID Value is 0
<VM_STATE>	Integer	Virtual machine state 0 Terminate 1 Execute 2 Stop

+SPC

Description

This command configures a stored procedure virtual machine.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+SPC	Query virtual machine list	GGGG
AT+SPC=<VM_ID>	Query all configuration elements for a specific virtual machine	GGGG
AT+SPC=<VM_ID>,<ID>	Query a single element	GGGG
AT+SPC=<VM_ID>,<ID>,<VAL>	Set a single element	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<VM_ID>	Integer	Virtual machine ID Value is 0
<ID>	Integer Label	Parameter ID number Positive unsigned 8-bit value
<VAL>	Integer String Byte Array Label	Parameter value

Response Syntax

Response	Description
+SPC:<ID>,<VAL>	Read response

Response Element Syntax

Element Name	Type	Description
<ID>	Integer Label	Parameter ID number
<VAL>	Any	Parameter value

AEC Reference:

+SPSTATUS

Description

Stored procedure status.

AEC Syntax

AEC	Description
+SPSTATUS:<VM_ID>,<SP_NAME>,<ERROR_CODE>	Stored procedure status response

AEC Element Syntax

Element Name	Type	Description
<VM_ID>	Integer	Virtual machine ID Value is 0
<SP_NAME>	String	Stored procedure name
<ERROR_CODE>	Integer	Error code

DBG (Module ID = 98)

Command Reference:

+DBGMWR

Description

This command writes a block of memory.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+DBGMWR=<MEM_ADDR>,<MEMORY>	Write a block of memory	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<MEM_ADDR>	Integer	Memory address Unsigned 32-bit value
<MEMORY>	String Byte Array	Block of memory

+DBGMRD

Description

This command reads a block of memory.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+DBGMRD=<MEM_ADDR>,<LENGTH>	Read a block of memory	GGGG
AT+DBGMRD=<MEM_ADDR>,<LENGTH>,<POLL_INT>	Read a block of memory repeatedly	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<MEM_ADDR>	Integer	Memory address Unsigned 32-bit value
<LENGTH>	Integer	Length of memory Unsigned 32-bit value
<POLL_INT>	Integer	Polling interval in milliseconds Unsigned 32-bit value

+DBGRWR

Description

This command writes a register.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+DBGRWR=<REG_ADDR>,<REG_VALUE>	Write a register	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<REG_ADDR>	Integer	Register address Unsigned 32-bit value
<REG_VALUE>	Integer	Register value Unsigned 32-bit value

+DBGRRD

Description

This command reads a register.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+DBGRRD=<REG_ADDR>	Read a register	GGGG
AT+DBGRRD=<REG_ADDR>,<POLL_INT>	Read a register repeatedly	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<REG_ADDR>	Integer	Register address Unsigned 32-bit value
<POLL_INT>	Integer	Polling interval in milliseconds Unsigned 32-bit value

+DBGRTG

Description

This command toggles bits in a register.

Security

Default security for the command is: GGGG

Command Syntax

Command	Description	Sec
AT+DBGRTG=<REG_ADDR>,<BIT_MASK>	Toggles bits in a register	GGGG

Command Parameter Syntax

Parameter Name	Type	Description
<REG_ADDR>	Integer	Register address Unsigned 32-bit value
<BIT_MASK>	Integer	Bit mask Unsigned 32-bit value

AEC Reference:

+DBGMRD

Description

Memory read.

AEC Syntax

AEC	Description
+DBGMRD:<MEM_ADDR>,<MEMORY>	Memory read

AEC Element Syntax

Element Name	Type	Description
<MEM_ADDR>	Integer	Memory address Unsigned 32-bit value
<MEMORY>	String Byte Array	Block of memory

+DBGRRD

Description

Register read.

AEC Syntax

AEC	Description
+DBGRRD:<REG_ADDR>,<REG_VALUE>	Register read

AEC Element Syntax

Element Name	Type	Description
<REG_ADDR>	Integer	Register address Unsigned 32-bit value
<REG_VALUE>	Integer	Register value Unsigned 32-bit value

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