ATrack
Protocol Document

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1. Notification

1.1. Disclaimer

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1.3. Warning

Connecting the wire inputs can be hazardous to both the installer and your vehicle’s electrical system if not done by an experienced installer. This document assumes you are aware of the inherent dangers of working in and around a vehicle and have a working understanding of electricity.

1.4. Document Amendments

Note: For the F/W Version column with specific firmware number, it means the modification(s) on the Comments column is done on this corresponding firmware version (and the versions thereafter). Please make sure you upgrade the firmware to the specified version before applying any changes made in this protocol.

Revision	Date	Comments	F/W Version
1.3.6	December 21, 2012	Change %CE size from U16 to U32	All
1.3.5	December 5, 2012	Remove incorrect statement in AT$BAUD description Add bit 5 and bit 6 to <Action> in AT$DVID Add unauthorized DVID report (ID=23) (AT1 only) Separate On/Off debounce times from AT$INPT (AT1 only) Add %VC (Call Connected) in AT$REPT (AT5 only) Add speed limit in AT$OUTC (AT5 only) Add analog change event AT$ACHG and %AG1 in AT$REPT Update Command Quick Reference Table <"Server IP address"> in AT$FOTA changed to string(32) Add %SM and %CI in AT$FORM for AX5	AT1 - 1.40 AT1Pro - 2.07 AT5 - 1.49 AX5 – 1.08
1.3.4	July 16, 2012	Restore PMGR <Sleep Mode> operation bits Correct TRAC response string Add <Index> to SPED and %SD1~%SD10 to REPT Add AT$OBDS (manual OBD protocol setting) Add get pending DTC option to AT$GDTC	AT1Pro - 2.06 AT5 - 1.48 AX5 - 1.05
1.3.3	June 25, 2012	Modify AT$HACE, AT$HBKE and AT$HCOR commands. Add <Schedule ID> to AT$STRA command	AT1 - 1.38
1.3.2	Mar. 31, 2012	Add 1-Wire® model descriptions for iButton and temperature sensor. Change %TP to %TR in <Custom Info> in AT$FORM Correct AT$FUEL command example Add %GL (Google Link variable) to AT$TEXT Add %VR (Voice Call Ringing) and %VA (Voice Call Authorized) to AT$REPT Add SMS numbers to AT$RACT <Destination>	AT1 - 1.37 AT1Pro - 2.05 AT3 - 1.31 AT5 - 1.47 AU5 - 1.17 AY5 - 1.04

		Add AT1Pro to all list Add %AV1, %NC, and %SM to AT$FORM	
1.3.1	Mar. 28, 2012	Correct example in AT$TEXT Modify description in AT$BCTL Add filter option bit in AT$ODOM for all models Modify <Timeout> to 5 in AT$FULS Add %CI to show <Custom Info> string in AT$FORM Add bit 2 in <Restrict Mode> in AT$ROAM Modify <Motion Threshold> to 50 in AT$MOTD Remove driver behavior reports from AX5 Modify description in AT$GSMS Correct example in AT$PMGR Correct default <Output ID> to 1 in AT$RACT	AT5 - 1.43 AU5 - 1.15 AX5 - 1.04
1.3.0	Dec. 21, 2011	Add AX5 supported commands and functionalities AT$AGPS, AT$OBDE, AT$GDTC Add new features for command Add new <Output ID> of AT$OUTC command for AX5 Add new default Report ID Modify AT$PMGR behavior Modify AT$PLOW behavior Modify AT$ODOM description Modify AT$GPOS command Modify AT$MOTD command	AX5 – 1.01
1.2.1	Dec. 08, 2011	Add restriction statement in AT$PMGR command Modify example in AT$WNET command Remove VSTP incorrect description Add more strings to <Custom Info> in AT$FORM command Modify <Driver ID> description Add CANBus option to AT$ODOM command	AT1(E) - 1.30
1.2.0	Oct. 28, 2011	Modify G-Sensor calibration bit to 7 in AT$REST Add restricted character 0x08 to AT$UNID remark section Output DVID report to serial port (Bit 4 in DVID action) Add DLOG download log completed report ID 21	AT5(i) - 1.42 AT3(E) - 1.25 AT1(E) - 1.29
1.1.9	Oct. 05, 2011	Add <Timeout> to AT$FULS command. Add description and example to show WPA-PSK/WPA2-PSK encryption key setting.	AT5(i) - 1.36 AT3(E) - 1.22 AT1(E) - 1.27 AU5(i) - 1.10 AY5(i) - 1.02

1.1.8	Aug. 24, 2011	Add output n event to AT$REPT command Add <Keep-Alive> note in AT$GPRS command	AT5(i) - 1.36 AT3(E) - 1.22 AT1(E) - 1.27 AU5(i) - 1.10
1.1.7	Aug. 08, 2011	Modify threshold and duration units for harsh driving events (acceleration, braking, and cornering)	AT5(i) - 1.33 AU5(i) - 1.08
1.1.6	Aug. 02, 2011	Add AY5(i) commands Add Command Quick Reference Table Remove model blocks in commands Add option for calibrating G sensor in AT$REST command Modify AT$TEPS command structure. Add Blacklist in WIFI command Add WPA security mode into WIFI command	AT5(i) - 1.32 AY5(i) - 1.02 AU5(i) - 1.07 AT3(E) - 1.19 AT1(E) - 1.25
1.1.5	Jun. 20, 2011	Add Backup Battery low string (%BL) in AT$REPT command Add description to Logical operation in AT$TRAC and AT$TRAX command	AT5(i) - 1.31 AT3(E) - 1.18 AT1(E) - 1.24
1.1.4	Apr. 22, 2011	Add description in Keep-Alive for TCP and UDP in AT$GPRS Change <Keep-Alive> in AT$GPRS from U8 to U16 Correct AT$GPRS response string Add <Custom Info> in AT$FORM for additional info Add AT$TRAX for event-driven tracking control Add Bit 3 to AT$RACT for tracking control Add %PF(Preferred Network) and %RO(Roaming status) to AT$REPT <Event String> Remove Maximum option in AT$ACFG <Mode> and add <Sampling Time> Replace AT$MICG with AT$VOLM Add AT$TEXT command for custom SMS text and <Text ID> in AT$REPT for reference to AT$TEXT Add Incoming SMS Number in AT$GPOS <Destination> Add Query Neighbor Cell Info in AT$GPOS <Destination> Add AT$PULS for pulse counting Add description to AT$DLOG for adding 0xB1 Add AT1(E) Error Code Table	AT5(i) - 1.27 AT3(E) - 1.14 AT1(E) - 1.20
1.1.3	Mar. 09, 2011	Added more description in Driver ID and Text Message fields in Message Format	AT5(i) - 1.26 AT3(E) - 1.13 AT1(E) - 1.18

1.1.2	Feb. 25, 2011	Added SMS recipient option in AT$GPOS Extended AT$ROAM <Provider Code> list to 50 sets Extended AT$DVID <Accepted ID> list to 10 sets	AT5(i) - 1.25 AT3(E) - 1.12 AT1(E) - 1.17
1.1.1	Feb. 09, 2011	Added RTC data into AT$POST simple position format	AT5(i) - 1.23 AT3(E) - 1.10 AT1(E) - 1.15
1.1.0	Dec. 31, 2010	Added HDOP Filter to AT$GPSS Added secondary IP address in AT$GPRS for server failover Added optional UDP fix port in AT$GPRS Added Bit 9 in AT$TRAC for using a unique report ID for distance tracking mode. Added <Collector Number> for collecting tracking messages into one bulk TCP/UDP packet. Added reporting actions for voice calls in AT$VOIC Added default report ID 4, 16, and 17. Modified <Format> options in AT$POST for quotations Modified <Format> options in AT$SMSG for quotations Corrected AT$ODOM <Current Value> unit Moved AT$PMGR <Power OFF Detect> Bit 6 and 7 to <Sleep Mode> Corrected wording in AT$RPME response. Changed Backup Battery size to U16 in AT$INFO Modified <Debounce Time> to U16 for AT$INPT	AT5(i) - 1.22 AT3(E) - 1.09 AT1(E) - 1.14
1.0.9	Dec. 08, 2010	Corrected AT$POST <Text Message> size to 500 Bytes. Add Motion Status and Reset Tracking Timer bits into AT$TRAC <Mode> Increase AT$PMGR Duration A, B, and C to U16 Add scheduled tracking command AT$STRA Change durations for output to U16 Change output repeat times 255 to be continuously repeating Change default values to 1 for <Preference Mode> and <Not Preference Mode> in AT$ROAM Add ignore power lost and motion event bits in AT$PMGR <Mode> Add <Format> parameter to AT$GPOS command Correct RPMC description and RPME parameter Removed AT$POST Hex string format option Change default <Accepted number1> in AT$VMON to 0's	AT5 - 1.18 AT3 - 1.05 AT1 - 1.10

1.0.8	Oct. 07, 2010	Modify first field in AT$FULS command Remove report ID 15 for fuel event Added Model AT3	AT5 – 1.13 AT3 – 1.00 AT1 – 1.04
1.0.7	Sept. 20, 2010	Add Engine Status bit into AT$TRAC <Mode> Modify SMS operation in AT$GSMS command Add AT$FORW for SMS/USSD forwarding function Add AT$MICG for adjusting microphone gain	AT5 - 1.13 AT1 - 1.04
1.0.6	Aug. 04, 2010	Add numbered box to indicate command compatibility with models Add AT$HBKE, AT$HACE, and AT$HCOR commands Add <ACC OFF Time> for ACC OFF tracking in AT$TRAC command Modified <Outgoing Control> to use any of the specified input Add AT$JAMM command Add GSM Jamming Detected event into AT$REPT command Add AT$RPMC and AT$RPME for engine over-revving event Add RPM Over-revving event into AT$REPT command	1.12
1.0.5	May 31, 2010	Add <Time Format> and Note to AT$FORM command Add "Logic Operation" bit to AT$TRAC <Mode> parameter Add Command Error Code 108 Add "multiple of 100" description in AT$TRAC and AT$SLOG in <Distance> parameter Add AT$FULS, AT$TEPS, and AT$VSTP commands Add GSM Jamming Detected into AT$REPT Add Report ACK Option in AT$GPRS	1.09
1.0.4	Apr. 03, 2010	Modify default for AT$SPED command Modify parameter for AT$GGAS command Modify AT$VSSC equation and add example Correct AT$FOTA example Add CMD Error 106 and 107 Modify AT$ACFG index to 1 Add USSD Position Data Format and command description Add note: "ASCII format only" in SMS communication Add note to AT$POST limitation when sent via SMS Remove "OK" message at the end of G sensor data acquisition for impact	1.08
1.0.3	Mar. 09, 2010	Correct input assignments for AT$VSSC command.	

1.0.2	Mar. 02, 2010	Modify GPS Longitude and Latitude default value for position format. Add AT$INFO <GPS Antenna Status> description. Add AT$FORM <Header Prefix> notice. Add AT$ODOM notice. Add AT$VSSC notice. Modify AT$INPT index from 1~8 to 0~7 for bit representation. Remove AT$PULS command Correct input assignments for various commands.	
1.0.1	Feb. 17, 2010	Internal Release	
1.0.0	Feb. 16, 2010	Creation	

1.5. ATrack Command Quick Reference Table

Command	Command Description	AT1	AT1Pro	AT3	AT5	AU5	AY5	AX5
System Configuration								
AT$UNID	Query or set the device identification number	●	●	●	●	○	●	●
AT$INFO	Query device status information	●	●	●	●	●	○	●
AT$FORM	Query or set the position report format	●	●	●	●	○	●	●
AT$BAUD	Query or set the baud rate of serial ports	●	●	●	●	●	●	
AT$REST	Reset or reboot the device	●	●	●	●	●	●	●
AT$NMEA	Enable GPS NMEA sentence output	●	●	●	●	●	●	●
AT$ODOM	Query or set the vehicle odometer settings	●	●	●	●	●	●	●
AT$BCTL	Query or set backup battery ON/OFF control	●	●	●	●	●	●	
AT$PMGR	Query or set the power management property	●	●	●	●	●	●	●
AT$DLST	Query or set daylight saving time configuration	●	●	●	●	●	●	●
AT$SCHD	Query or set the schedules configurations	●	●	●	●	●	●	●
AT$ACFG	Query or set the analog inputs configurations		○		●	●	●	
AT$VSSC	Query or set vehicle speed sensor configuration	●	○	●	●	●	●	
AT$RPMC	Query or set engine RPM calibration setting		○		●	●	●	
AT$VOLM	Query or set audio gain				●	●		
AT$PULS	Query or set pulse count value	●	○	●	●	●	●	
AT$FUEL	Query or set the vehicle fuel used settings							●
AT$AGPS	Query or set the AGPS settings							●
AT$OBDS	Query or set the OBD protocol							●
Security Configuration								
AT$SPIN	Query or set access PIN code of the SIM card	●	●	●	●	●		●
AT$PASS	Command password setting	●	●	●	●	●	●	●
AT$ENCP	Query or set encrypt key for position data encryption				●	●	●	
Communication Configuration								
AT$GPRS	Query or set the GPRS/UMTS communication	●	●	●	●	●		●
AT$GSMS	Query or set the GSM/SMS communication	●	●	●	●	●		●
AT$USSD	Query or set the USSD communication properties	●	●	●	●	●		●
AT$ROAM	Query or set the GSM roaming properties	●	●	●	●	●		●
AT$GGAS	Query or set the GPRS SMS auto switch properties	●	●	●	●	●		●
AT$WIFI	Query or set the WiFi communication properties						●	
AT$WNET	Query or set the WiFi network properties						●	

Command	Command Description	AT1	AT1Pro	AT3	AT5	AU5	AY5	AX5
Report Configuration								
AT$GPOS	Get current GPS position	●	●	●	●	●	●	●
AT$TRAC	Query or set the GPS tracking properties	●	●	●	●	●	●	●
AT$TRAX	Query or set the GPS tracking by event properties	●	●	●	●	●	●	●
AT$STRA	Query or set scheduled tracking reports	●	●	●	●	●	●	●
AT$SLOG	Query or set the GPS logging properties	●	●	●	●	●	●	●
AT$DLOG	Download GPS logging data	●	●	●	●	●	●	●
AT$GDAT	Get the last impact of g sensor data		●		●	●	●	●
AT$GDTC	Get OBD-II diagnostic trouble code from vehicle							●
Event Configuration								
AT$INPT	Query or set the Inputs event behavior	●	●	●	●	●	●	
AT$EGNS	Query or set the engine event behavior	●	●	●	●	●	●	●
AT$SPED	Query or set the speeding event behavior	●	●	●	●	●	●	●
AT$IDLE	Query or set the vehicle idle event behavior	●	●	●	●	●	●	●
AT$VTOW	Query or set the vehicle tow event behavior	●	●	●	●	●	●	●
AT$MOTD	Query or set the vehicle motion event behavior	●	●	●	●	●	●	●
AT$IMPD	Query or set the vehicle impact event behavior		●		●	●	●	●
AT$PLOW	Query or set the main power low behavior	●	●	●	●	●	●	●
AT$PLOS	Query or set the main power lost behavior	●	●	●	●	●	●	
AT$AINT	Query or set the analog input event behavior		○		●	●	●	
AT$ACHG	Query or set the analog change event behavior				●	●	●	
AT$GPSS	Query or set the GPS status event behavior	●	●	●	●	●	●	●
AT$GFEN	Query or set the Geofence event behavior	●	●	●	●	●	●	●
AT$FULS	Query or set the Fuel Sensor’s event behavior				●	●	●	
AT$TEPS	Query or set Temperature Sensor’s event behavior				●	●	●	
AT$VSTP	Query or set the Vehicle Stop’s event behavior	●	●	●	●	●	●	●
AT$HBKE	Query or set the Harsh Brake event behavior	○	●	○	●	●	●	○
AT$HACE	Query or set the Harsh Acceleration event behavior	○	●	○	●	●	●	○
AT$HCOR	Query or set the Harsh Cornering event behavior	○	●		●	●	●	○
AT$JAMM	Query or set GSM Jamming Detection		●	●	●	●		●
AT$RPME	Query or set RPM Over-Revving Detection		○		●	●	●	●
AT$OBDE	Query or set OBD-II data event behavior							●
User Define Report								
AT$REPT	Query or set the user defined report	●	●	●	●	●	●	●
AT$RACT	Query or set the user defined report action settings	●	●	●	●	●	●	●

Command	Command Description	AT1	AT1Pro	AT3	AT5	AU5	AY5	AX5
AT$TEXT	Query or set the user define SMS text	●	●	●	●	●		●
Control Command								
AT$OUTC	Output Control	●	●	●	●	●	●	●
AT$VMON	Voice monitoring				●	●		
Messaging Command								
AT$POST	Post a text message to server	●	●	●	●	●	●	
AT$SMSG	Send a text message to serial port of the device	●	●	●	●	●	●	
AT$FORW	Send SMS/USSD message to device for forwarding	●	●	●	●	●		●
Application Command								
AT$DVID	Driver ID Authorization	●	●	●	●	●	●	
AT$VOIC	Query or set the voice call properties				●	●		
CANBus Kit	Refer to CANBus Kit Protocol document	●	●	●	●	●	●	
Garmin FMI	Refer to Garmin FMI Protocol document	●	●	●	●	●	●	
Firmware Upgrade								
AT$FWDL	Start firmware upgrade by serial port	●	●	●	●	●	●	●
AT$FOTA	Firmware upgrade by OTA (Over The Air)	●	●	●	●	●	●	●

Notations: ● - Function supported in this model

○ - Function supported with restrictions/partially in this model

empty - Function not supported in this model

2. Introduction

2.1. Command Syntax

Syntax:

Write Command:

AT$<Command>[+Tag]=[Password,]<Parameter 1>, … ,<Parameter N>

Write Command Response:

$OK[+Tag]

Read Command:

AT$<Command>[+Tag]=[Password,]?

Read Command Response:

$<Command>[+Tag]=<Parameter 1>, … ,<Parameter N>

Error Response:

$ERROR[+Tag]=<Error Code>

The "[ ]" bracket means the parameter is optional depending on user's application. For the serial port and GPRS communications, it is mandatory to terminate a command line using <CR><LF>. For the SMS communication, the <CR><LF> is not needed. The commands are followed by a response that includes <CR><LF>. The optional [Tag] field is used for recognizing response from the device for each command. The maximum [tag] length is 5 characters. The optional [Password] field is used for verifying the authorized user to access the device. Please refer to AT$PASS command to enable/disable the command password function.

2.2. Position Format

For each position message, it includes a message header and data. The Header Prefix and Message Format are user defined by using AT$FORM command. The CRC is calculated from <Length> to the end of <Data> in binary format. For ASCII format, the CRC calculation is including the comma between <CRC> and <Length>. The CRC calculation is using CRC-16 standard. The packet Length is from <Seq. ID> to the end of <Data>, including the comma between <Length> and <ID> in ASCII format. The Seq. ID is managed and increased by the device. The Unit ID is set by using AT$UNID command.

2.2.1. Binary Position Format

In Binary format, each field is declared for a specific size, except the Text Message field. The Text Message length varies depending on the actual texts.
The Text Message is terminated by 0x00. If there is no text message included in the position, there will only be 0x00.

Single Position:

Header					Data
Prefix	**CRC**	**Length**	**Seq. ID**	**Unit ID**	**Position data**
2 Bytes	2 Bytes	2 Bytes	2 Bytes	8 Bytes	Varied Length
			←---------- Calculated Length ----------→		
		←---------- Included for CRC calculation ----------→			

Multiple Positions:

Header					Data	Data	Data
.							
		←---------- Calculated Length ----------→					
		←---------- Included for CRC calculation ----------→					

For the Header fields, please refer to section "AT$FORM" command description.
In the following table, all the fields in a position Data is described. The field sequence is as it is listed in the table. For the Data Type, please refer to section "Data Type Definition".

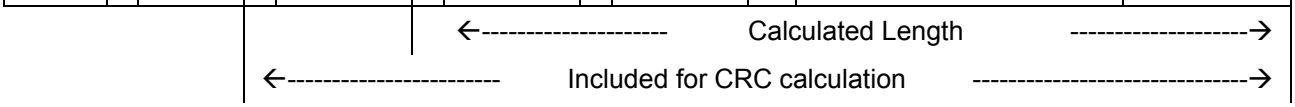
Field Description	Data Type	Default Value / Unit
GPS Date Time	Varied length	Please refer to AT$FORM
RTC Date Time	Varied length	Please refer to AT$FORM
Position Sending Date Time	Varied length	Please refer to AT$FORM
Longitude	S32	0.000001 unit
Latitude	S32	0.000001 unit
Heading	U16	Degrees (0..359)
Report ID	U8	See Default Report ID
Odometer	U32	0.1 km
GPS HDOP	U16	0.1 unit
All Input Status	U8	8 bits status for up to 8 inputs
GPS/VSS Vehicle Speed	U16	1 km/hr
All Output Status	U8	8 bits status for up to 8 outputs
Analog Input Value	U16	0.001 Volt
Driver ID	Varied length. Size: String (1) to String (16)	When no ID is presented, a 0x00 character will be placed in this field. When ID is presented, 0x00 will be the ID string terminator.
First Temperature Sensor Value	S16	2000 in 0.1 ˚C
Second Temperature Sensor Value	S16	2000 in 0.1 ˚C
Text message	String(500)	End with 0x00

2.2.2. ASCII Position Format

For the ASCII format, each field is delimited by a single comma ‘,’. When it comes to the multiple positions in one packet, each data is delimited by <CR><LF> character (0x0D 0x0A).
The Text Message is terminated by the Trailer <SUB> (0x1A). If there is no text message included in the position, the position data will end as ",<SUB>".

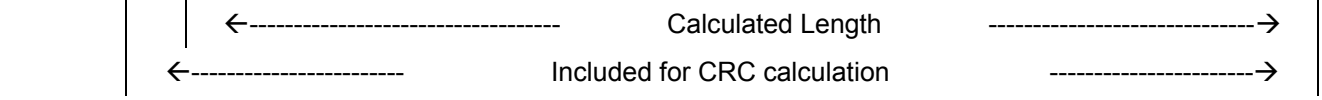
Single Position:

Header												Data	Trailer
Prefix	,	CRC	,	Length	,	Seq. ID	,	Unit ID	,			Position data	<CR><LF>



Multiple Positions:

Header					Data	Trailer	Data	Trailer	Data	Trailer
						<CR><LF>		<CR><LF>		<CR><LF>



For the Header fields, please refer to section "AT$FORM" command description.
In the following table, all the fields in a position Data is described. The field sequence is as it is listed in the table separated by a comma in between.

< GPS Date Time>, <RTC Date Time>,< Position Sending Date Time>, <Longitude>, <Latitude>, <Heading>, <Report ID>, <Odometer>, <GPS HDOP>, <Input Status>, <GPS/VSS Vehicle Speed>, <Output Status>, <Analog Input Value>, <Driver ID>, <First Temperature Sensor Value>, <Second Temperature Sensor Value>, <Text message>

Field	Description
GPS Date Time	GPS date time in varied length. Please refer to AT$FORM.
RTC Date Time	RTC date time in varied length. Please refer to AT$FORM.
Position Sending Date Time	Position sending date time in varied length. Please refer to AT$FORM.
Longitude	0.000001 unit
Latitude	0.000001 unit
Heading	Degrees (0..359)
Report ID	See Default Report ID

Odometer	0.1 km
GPS HDOP	0.1 unit
All Input Status	Decimal string represents a binary number, where each bit represents the status of each input. The Least Significant Bit represents input 0.
GPS/VSS Vehicle Speed	1 km/hr
All Output Status	Decimal string represents a binary number, where each bit represents the status of each output. The Least Significant Bit represents output 0.
Analog Input Value	0.001 Volt
Driver ID	
First Temperature Sensor Value	0.1 ˚C (Default=2000 when disconnected)
Second Temperature Sensor Value	0.1 ˚C (Default=2000 when disconnected)
Text message	When there is no text message, a 0x1A will be placed in this field. If text message is presented, the string ends with 0x1A.

2.2.3. USSD Position Format

The USSD (Unstructured Supplementary Service Data) service is provided by GSM system provider. The AT1/AT5 device will send position report by using USSD if the USSD communication is specified by each report destination. The server software can get the position data through the USSD gateway which is provided by GSM service provider. The USSD position data format is shown on the following table:

The fields in the position data are defined as fixed length.

Field Description	Number of Digits	Example
Header Prefix	2	00
GPS Date Time	varied length	Please refer to AT$FORM
RTC Date Time	varied length	Please refer to AT$FORM
EW	1	0 – East 1 – West
Longitude	9	121573135 in 0.000001 unit
NS	1	0 – North 1 – South
Latitude	8	45078916 in 0.000001 unit
Heading	3	0 ~ 359
Report ID	3	001 ~ 164
GPS HDOP	3	021 in 0.1 unit (2.1)

All Input Status	3	8 bits status for up to 8 inputs
GPS/VSS Vehicle Speed	3	1 km/hr
All Output Status	3	8 bits status for up to 8 outputs
Odometer	8	12345678 in km
Analog Input Value	5	12500 in 0.001 Volt (12.5Volts)
First Temperature Sensor Sign	1	0 – Positive 1 – Negative
First Temperature Sensor Value	4	425 in 0.1 ˚C (Default=2000 when disconnected)
Second Temperature Sensor Sign	1	0 – Positive 1 – Negative
Second Temperature Sensor Value	4	258 in 0.1 ˚C (Default=2000 when disconnected)
Main Power Voltage	3	137 in 0.1 Volt
Backup Battery Voltage	2	47 in 0.1 Volt

2.3. Acknowledge/Keep Alive Message Format

The acknowledge message is used to response to the device when server receives a position or keep alive message from the device. The <ACK Header> is a two bytes data that always 0xFE and 0x02. The <Sequence ID> of acknowledge and position/keep alive message shall be identical to what is received by the server.

BYTE	Name	Size	Type	Description
0	ACK Header	2	Unsigned Integer	0xFE 0x02
2	Unit ID	8	Unsigned Integer	Unit or IMEI
10	Sequence ID	2	Unsigned Integer	Seq ID

2.4. Command Remark Reference Table

Each command description includes a table in the remark. The table is intended as a reference to indicate the following functions:

Table field	Description
☒**MEMO**	If this box is checked, the command parameters will be saved to the memory of the device after command issued.
☒**SERIAL**	If this box is checked, the command can be sent through the serial port of the device.
☒**SMS**	If this box is checked, the command can be sent through the SMS message.
☒**GPRS**	If this box is checked, the command can be sent through GPRS network.

2.5. Data Type Definition

For each parameter of each command has its own data type. Refer to the following table for data type description.

Data Type	Description	Minimum and Maximum
U8	1 byte unsigned char.	0 to 255
S8	1 byte signed char.	–128 to 127
U16	2 bytes unsigned char.	0 to 65535
S16	2 byte signed char.	–32768 to 32767
U32	4 bytes unsigned char.	0 to 4294967295
S32	4 bytes signed char.	–2147483648 to 2147483647
U64	8 bytes unsigned char.	0 to 18446744073709551615
String(n)	A sequence of characters data. For the string type parameter input shall be put in quotes.	Max. length is n.

3. System Configuration

3.1. AT$UNID Query or set the device identification number

Command Description			
This command is used to set or query the device identification number. The factory default is the International Mobile Equipment Identity (IMEI) number (MAC address for AY5(i)). Write <Unit ID> to 0 indicates the <Unit ID> is using current IMEI number (MAC address in AY5(i)). For AU5(i), the default unit ID is 0 due to its limitation. Please refer to remark section below for more detail.			
Syntax			
Write Command	AT$UNID=<Unit ID>		
Response	$OK		
Read Command	AT$UNID=?		
Response	$UNID=<Unit ID>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Unit ID>	Unit identification number or IMEI number.	U64	IMEI number (MAC address)
Example			
Change the unit ID to 10011011001 AT$UNID=10011011001			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS** **For AU5(i), the unit ID cannot contain 0x1A, 0x1B, or 0x08 after converting the Unit ID into Hex representation. For example, the unit ID cannot be set to 78770753051, because it contains 0x1A and 0x1B after converting to hex (0x12571A4E1B).**			

3.2. AT$INFO Query device status information

Command Description			
This command is used to query the device status in real time.			
Syntax			
Read Command	AT$INFO=?		
Response	$INFO=<Unit ID>,<Model Name>,<Firmware Version>,<IMEI>,<IMSI>,<CID>, <Main Voltage>, <Battery Voltage>,<GPS Status>,<GSM Status>,<GSM Signal>, <Connection Status>,< GPS Antenna Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Unit ID>	Unit identification number	U64	
<Model Name >	Device Model Name	String(10)	
<Firmware Version>	Device firmware version information	String(10)	
<IMEI>	International Mobile Equipment Identity number (Not available in AY5(i); 0 is shown)	U64	
<IMSI>	International Mobile Subscriber Identity (Not available in AY5(i); 0 is shown)	U64	
<CID>	Card identification number of SIM card (Not available in AY5(i); 0 is shown)	U64	
<Main Voltage>	Main power voltage in 0.1 volt	U16	
<Battery Voltage>	Backup battery voltage in 0.1 volt	U16	
<GPS Status>	Numbers of GPS satellite currently used	U8	
<GSM Status>	GSM Network registration status (Not available in AY5(i); 0 is shown) 0: Network not registered 1: Registered to home network 2: Searching for available network 3: Registration denied 4: Unknown 5: Registered, roaming	U8	

<GSM Signal>	GSM received signal strength (Not available in AY5(i); 0 is shown) 0: -113dBm or less 1: -111dBm 2..30: -109… -53 dBm 31: -51 dBm or greater 99: not known or not detectable	U8	
<Connection Status>	Device Connection status 0: Device is not connected to the server 1: Device is connected to the server	U8	
<GPS Antenna Status>	GPS antenna status Bit 0: 0→ GPS antenna connected 1→ GPS antenna disconnected Bit 1: 0→ GPS antenna cable OK 1→ GPS antenna cable short circuit Bit 2: 0→ GPS signal reception OK 1→ GPS signal reception timeout	U8	

Example

Query status of the device

AT$INFO=?

Remark

☐**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

3.3. AT$FORM Query or set the position report format

Command Description			
This command is used to set or query the position report data format. They can be either ASCII string or binary data format. Each data field will be separated by " , " character in the ASCII string data format. The big endian representation format is used in the binary data format. When SMS is used to send the reports, it will be in ASCII format ONLY. For AU5(i), only ASCI format is available.			
Syntax			
Write Command	AT$FORM=<Position Format>,<Header Prefix>,<Time Format>,<Custom Info>		
Response	$OK		
Read Command	AT$FORM=?		
Response	$FORM =<Position Format>,<Header Prefix>,<Time Format>,<Custom Info>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Position Format>	Position report data format 0: ASCII string data format 1: Binary data format (not available in AU5)	U8	1
<Header Prefix>	Configurable prefix 2 characters of the position data. Type 0x prefix for hexadecimal characters. Note that the 0x0D0A, 0xFE02, and 0x00 are not allowed for header prefix.	String(2)	@P (SMS/GPRS) 00 (USSD)
<Time Format>	Specify Time format in Unix Timestamp or Readable (See Note 1) 0: Unix Timestamp (seconds accumulated from1970/01/01 00:00:00) 1: Readable (20100203183558)	U8	0
<Custom Info>	For appending additional data field to the tail of the standard position format. See Note 2. for available data field description. Please be aware that all message queue and logging data will be erased when <Custom Info> has changed.	String(100)	""
Example			
AT$FORM=0,@P,0,"%MV%BV" AT$FORM=1,0x0203,1,""			

Remark

☒MEMO ☒SERIAL ☒SMS ☒GPRS

Note 1

When using Unix Timestamp (<Time Format>=0), the total length is 10 Bytes in ASCII format, and U32 in Binary format (e.g. 1272874966). When <Time Format>=1, the total length is 14 Bytes in ASCII format. For Binary format, it is divided into U16 for year and U8 for rest of the info as the following table:

Field Description	Data Type
Year	U16
Month	U8
Day	U8
Hour	U8
Minute	U8
Second	U8

Note 2

Available data field for <Custom Info> setting:

These data fields may not support all model of ATrack product. Please see the notation of each data field.

For extra event/status also can be added to the report position. Please refer to <EventString> description of AT$REPT command

Data Field	Size	Descriptions	AT1	AT1Pro	AT3	AT5	AU5	AY5	AX5
%SA	U8	GPS Satellite Used	●	●	●	●	●	●	●
%MV	U16	Main power voltage in 0.1V	●	●	●	●	●	●	●
%BV	U16	Backup battery voltage in 0.1V	●	●	●	●	●	●	
%GQ	U8	GSM signal quality	●	●	●	●	●		●
%CE	U32	Current Cell ID	●	●	●	●	●		●
%LC	U16	Current Cell LAC	●	●	●	●	●		●
%CN	U32	Current MCC + MNC	●	●	●	●	●		●
%RL	U8	Current RXLEV	●	●	●	●	●		●
%PC	U32	Pulse count value	●	●	●	●	●	●	
%AT	U32	GPS Altitude	●	●	●	●	●	●	●
%RP	U16	* Engine RPM reading	●	●	●	●	●	●	●

%GS	U8	GSM status (table below)	●	●	●	●	●		●
%DT	U8	0-Real time report; 1-log	●	●	●	●	●	●	●
%VN	String(19)	VIN number							●
%MF	U16	* Mass Air Flow Rate in 0.01grams/sec							●
%EL	U8	* Engine Load (%)							●
%TR	U8	* Throttle position (%)							●
%ET	S16	Engine Coolant Temperature (℃)							●
%FL	U8	Fuel Level (%)							●
%ML	U8	MIL (Malfunction Indicator Lamp) status							●
%FC	U32	Fuel Used in 0.1 liter							●
%CI	String(180)	<Custom Info> string of AT$FORM command	●	●	●	●	●	●	●
%AV1	U16	Analog voltage reading		●		●			
%NC	String	GSM neighbor cell info				●			
%SM	U16	* Maximum speed between two reports	●	●	●	●	●	●	●

** indicates the data is a maximum hold value for the period of tracking interval*

%GS GSM Status

Code	Descriptions	Cod	Descriptions
0	GSM_OFF	7	GPRS_ACTIVATED
1	GSM_ON	8	GPRS_HOST_CONNECTING
2	GSM_INIT	9	GPRS_HOST_CONNECTED
3	GSM_READY	10	GPRS_FOTA_CONNECTING
4	GPRS_DISCONNECTING	11	GPRS_FOTA_CONNECTED
5	GPRS_DEACTIVA	12	GPRS_FOTA_TIMEOUT
6	GPRS_CONNECTING	13	GPRS_FOTA_CHECK

3.4. AT$BAUD Query or set the baud rate of serial ports

Command Description			
This command is used to set or query the baud rate of the RS-232 serial port. The minimum baud rate is 1200bps and maximum baud rate is 115200bps. The serial interface shall be used with 8 data bits, no parity check and 1 stop bit.			
Syntax			
Write Command	AT$BAUD=<Port ID>,<Baud Rate>		
Response	$OK		
Read Command	AT$BAUD=?		
Response	$BAUD=<Port ID>,<Baud Rate>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Port ID>	Serial port ID.	U8	1
<Baud Rate>	Baud rate 1200: 1200bps 2400: 2400bps 4800: 4800bps 9600: 9600bps 19200: 19200bps 38400: 38400bps 57600: 57600bps 115200: 115200bps	U32	57600
Example			
Change serial port baud rate to 9600bps AT$BAUD=1,9600			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

3.5. AT$REST Reset or reboot the device

Command Description			
This command is used to reset, reboot or clear message queue of the device.			
Syntax			
Write Command	AT$REST=<Action>,<Reset Option>		
Response	$OK		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Action>	Reset action parameter is in conjunction with the following bit settings: Bit 0: Reboot Bit 1: Clear message queue Bit 2: Reset all parameters to factory default Bit 3: Clear Log queue Bit 4, 5, and 6: Reserved Bit 7: Calibrate (reset) G sensor	U8	
<Reset Option>	Reset option parameter is in conjunction with the following bit settings: Bit 0: Maintain command password setting Bit 1: Maintain SIM PIN code setting Bit 2: Maintain communication settings (AT$GPRS, AT$GSMS, AT$USSD, AT$WIFI, AT$WNET)	U8	
Example			
Reset all parameters to factory and reboot the device without clear message queue. AT$REST=5,0			
Remark			
☐**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

3.6. AT$NMEA Enable GPS NMEA sentence output

Command Description			
This command is used to enable or disable GPS NMEA sentence output through RS-232 serial port. The GPS NMEA output sentence is according to the NMEA-0183 v3.0 standard. Each GPS NMEA sentence can be enabled individually. NOTE: DO NOT ENABLE ALL NMEA SENTENCES WHEN AT$BAUD IS BELOW 19200bps.			
Syntax			
Write Command	AT$NMEA=<Enable sentence>		
Response	$OK		
Read Command	AT$NMEA=?		
Response	$NMEA=<Enable sentence>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Enable sentence>	This parameter is in conjunction with the following bit: Bit 0: $GPGGA Bit 1: $GPGLL Bit 2: $GPGSA Bit 3: $GPRMC Bit 4: $GPVTG Bit 5: $GPGSV Bit 6: Reserved Bit 7: Reserved	U8	0
Example			
Enable $GPGGA and $GPRMC sentences only AT$NMEA=9			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

3.7. AT$ODOM Query or set the vehicle odometer settings

Command Description			
This command is used to query or set the vehicle odometer settings. The vehicle odometer is calculated by accumulating of each GPS movement or direct sensing from VSS (Vehicle speed sensor). If GPS signal <Source> is selected, there will have some tolerance by GPS reception and vehicle environment. If <Source> = 1 is selected, the AT$VSSC command should be enabled in advance.			
Syntax			
Write Command	AT$ODOM=<Source>,< Value>,<Option>,<Reset Option>		
Response	$OK		
Read Command	AT$ODOM=?		
Response	$ODOM=<Source>,< Value>,<Option>,<Reset Option>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Source>	Odometer signal source 0: GPS signal 1: Vehicle VSS signal 2. OBD-II/CAN Bus signal (calculated by device)	U8	0
< Value>	Odometer value in 0.1Kilometers. For write command, this value can be set as initial value. For read command, this value will be the current odometer value.	U32	0
<Option>	Following option can change behavior of odometer calculation: Bit 0: Filter out odometer accumulation when ACC is OFF Bit 1: Use CAN Bus kit "Total Distance" value	U8	0
<Reset Option>	Reset odometer value to zero with the following condition: Bit 0: ACC status transit from OFF to ON Bit 1: Engine status transit from OFF to ON	U8	0
Example			
Enable GPS odometer calculation with initial value 500.0 kilometer and ignore accumulation when ACC is OFF AT$ODOM=0,5000,1,0			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

3.8. AT$BCTL Query or set backup battery ON/OFF control

Command Description			
This command is used to query or switch ON/OFF the internal backup battery. The manufactory default is OFF to prevent exhausting from the backup battery before device installation. When the backup battery is under 3.5V for 30 seconds, the device will turn it off to prevent over-draining the backup battery. **Note: this command will only change the battery state once.**			
Syntax			
Write Command	AT$BCTL=<Control Mode>,<New battery State>,<Delay time>		
Response	$OK		
Read Command	AT$BCTL=?		
Response	$BCTRL=<Control Mode>,<New battery State>,<Delay time>,<Current status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Control Mode>	Control mode parameter is in conjunction with the following bit. The parameter is set to 0 means control manually. When bit is marked and set, the battery will enter to the <New Battery State>. Bit 0: ACC ON control Bit 1: GPS First fix control	U8	0
<New Battery State>	Switch to the new state of the backup battery. 0: Backup battery OFF 1: Backup battery ON	U8	0
<Delay time>	Auto switch delay time in minutes when <Control Mode> is not set to manual control.	U8	1
<Current status>	This parameter will show the current backup battery switch state. 0: Backup battery OFF 1: Backup battery ON	U8	
Example			
Set the battery on after the ACC is turned ON for 3 minutes AT$BCTL=1,1,3			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

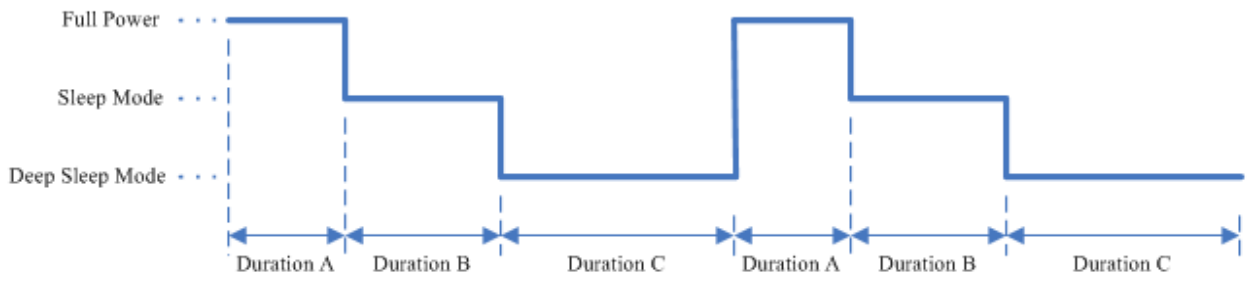
3.9. AT$PMGR Query or set the power management property

Command Description			
This command is used to query or set the power management property. The device can be entered into sleep/deep sleep mode according to <Power OFF Detection> conditions and can be waked up by various conditions such as ACC-ON, Engine-ON, Motion-ON and User defined report that used any of inputs, impact, or main power lost events. Note that by default, the device will not enter into sleep/deep sleep mode when the main power is disconnected.			
Syntax			
Write Command	AT$PMGR=<Sleep Mode>,<Power OFF Detect >,<Sleep mode control>,<Duration A>, <Duration B>,<Duration C>		
Response	$OK		
Read Command	AT$PMGR=?		
Response	$PMGR=<Sleep Mode>,<Power OFF Detect >,<Sleep mode control>,<Duration A>, <Duration B>,<Duration C>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Sleep Mode>	Sleep mode parameter is in conjunction with the following bit. Zero means disable power management function. Bit 0: Enable sleep mode (Not available in AY5(i)) Bit 1: Enable deep sleep mode Bit 2: Enable periodical wake up mode (Must combine with Bit0 or/and Bit1) Bit 3 ~ 5: Reserved for further use Bit 6: Ignore power lost detection Bit 7: Ignore motion detection	U8	0
<Power OFF Detect >	Power OFF detect parameter is in conjunction with the following condition bit. Bit 0: ACC OFF Bit 1: Engine OFF Bit 2: Motion OFF Bit 3: Communication transaction OFF **Note: When Bit3 (Communication Transaction OFF) bit is marked, the Duration A in this command must be smaller than the Keep-Alive interval in the AT$GPRS. If AT$GPRS Keep-Alive is smaller or equal to**	U8	0

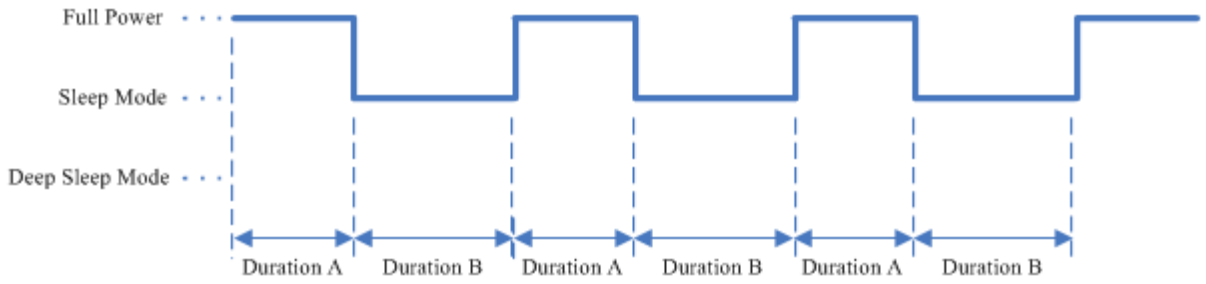
	the Duration A, the device will not be able to enter sleep mode.		
<Sleep mode control>	Set the power state for GPRS and/or RS-232 in the sleep mode. The default sleep mode control is 0 which means the GPS power off, RS-232 interface disabled, and SMS communication only. The optional control mode are shown below: Bit 0: GPRS Keep alive Bit 1: RS-232 Interface enable **Note that the power consumption will be higher than default sleep mode if Bit0/Bit1 is enabled.**	U8	0
<Duration A>	Duration in minutes to wait after <Power OFF Detect> conditions are all detected, then enter into sleep mode. **Note that if AT$DVID has been set for a Output Delay time and is larger than the Duration A, then the device will wait until the Output Delay time expires.**	U16	1
<Duration B>	Duration in minutes for the device to stay in the sleep mode.	U16	1
<Duration C>	Duration in minutes for the device to stay in the deep sleep mode.	U16	1

Example

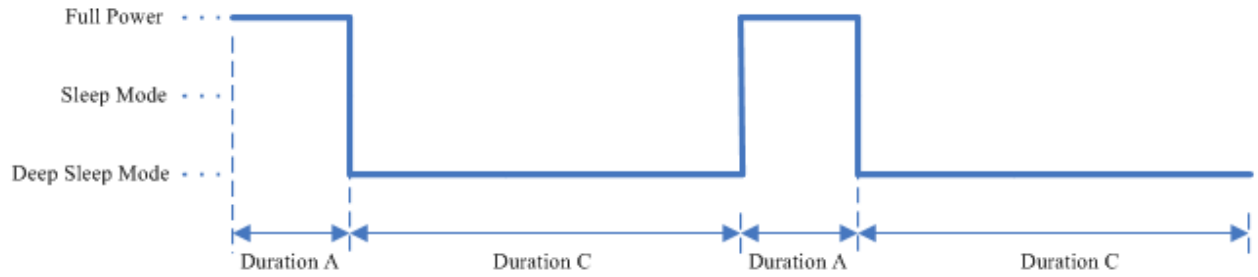
Example 1: Power management with enable sleep mode and deep sleep mode. (With periodical wake up mode)



Example 2: Power management with enable sleep mode only. (With periodical wake up mode)



Example 3: Power management with enable deep sleep mode only. (With periodical wake up mode)



Example 4: Enter into sleep mode after ACC off for 5 minutes, stay in sleep mode for 25 minutes then transit to deep sleep mode. Wake up every 60 minutes.

AT$PMGR=7,1,0,5,25,60

Remark

☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

3.10. AT$DLST Query or set daylight saving time configuration

Command Description	
This command is used to query or set the daylight saving time configuration for the all report with schedule condition.	
Syntax	
Write Command	AT$ DLST=<Enable>,[<Start Month>,<Start Week>,<Start Day>,<Start Hour>,<End Month>,<End Week>,<End Day>,<End Hour>]
Response	$OK
Read Command	AT$DLST=?
Response	$DLST=<Enable>,<Start Month>,<Start Week>,<Start Day>,<Start Hour>,<End Month>,<End Week>,<End Day>,<End Hour>

Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Enable>	Enable daylight saving time 0: Disable 1: Enable	U8	0
<Start Month>	Month at which DST will start (1..12)	U8	3
<Start Week>	Week of month at which DST will start (1..5)	U8	2
<Start Day>	Day at which DST will start 1: Sunday 2: Monday 3: Tuesday 4: Wednesday 5: Thursday 6: Friday 7: Saturday	U8	1
<Start Hour>	Hour at which DST will start (0..23)	U8	7
<End Month>	Month at which DST will end (1..12)	U8	11
<End Week>	Week of month at which DST will end (1..5)	U8	1

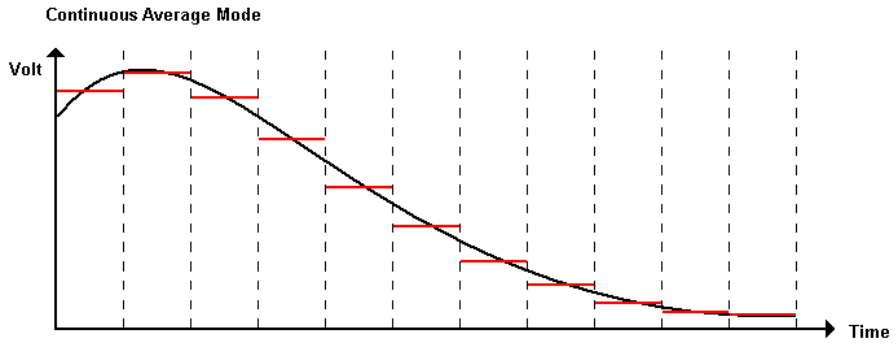
<End Day>	Day at which DST will end 1: Sunday 2: Monday 3: Tuesday 4: Wednesday 5: Thursday 6: Friday 7: Saturday	U8	1
<End Hour>	Hour at which DST will end (0..23)	U8	7
Example			
UK Daylight Saving Time starts on Sunday, 25 March and ends on Sunday, 28 October for 2012. AT$DLST=1,3,5,1,1,10,5,1,2			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

3.11. AT$SCHD Query or set the schedules configurations

Command Description			
This command is used to query or set the schedules configurations. All time specified in schedules are GMT time based. If your country has daylight saving time period, all schedules will be adjusted automatically when AT$DLST is configured. Refer to AT$DLST command for detailed configuration.			
Syntax			
Write Command	AT$SCHD=<Index>,<Start Time>,<Duration>,<Days>		
Response	$OK		
Read Command	AT$SCHD=<Index>,?		
Response	$SCHD=<Index>,<Start Time>,<Duration>,<Days>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Index>	Schedule index (1..8)	U8	0
<Start Time>	Start Time of the schedule in minutes from midnight 12:00. (0..1439)	U16	0
<Duration>	Duration of schedule in minutes (1..1440). Zero means no schedule configured.	U16	0
<Days>	0: Disable Bit 0: Monday Bit 1: Tuesday Bit 2: Wednesday Bit 3: Thursday Bit 4: Friday Bit 5: Saturday Bit 6: Sunday	U8	0
<Status>	Current status of this schedule 0: Outside schedule 1: Inside schedule.	U8	
Example			
Set schedule 1 starts from 5am to 6pm on Mondays and Thursdays: AT$SCHD=1,300,780,9			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

3.12. AT$ACFG Query or set the analog inputs configurations

Command Description			
This command is used to query or set the analog input measurement configurations. The default sample rate for each analog input channel is 100Hz. This function is not available in AT1 and AT3.			
Syntax			
Write Command	AT$ACFG=<Index>,<Mode>,<Sampling Time>		
Response	$OK		
Read Command	AT$ACFG=< Index >,?		
Response	$ ACFG =< Index >,<Mode>,<Sampling Time>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Index>	Analog input index (1)	U8	
<Mode>	Analog signal measurement mode. 1: Continuous average mode	U8	1
<Sampling Time>	Sample duration for analog input in seconds. Value: 1 ~ 30	U8	1
Example			



Set data sampling time to 5 seconds:

AT$ACFG=1,1,5

Remark
☒MEMO ☒SERIAL ☒SMS ☒GPRS

3.13. AT$VSSC Query or set vehicle speed sensor configuration

Command Description			
This command is used to query or set the VSS (Vehicle speed Sensor) configuration. The default VSS signal input is Input 2 (Input 1 for AT1 and AT3). The device will be calibrated by using GPS speed automatically when the device is first installed. Once the calibration is completed, the <VSS Value> will be written to the device memory and can be fine tuned by writing this command. The VSS auto-calibration condition is when vehicle speed is greater than 40km/h for 10 seconds with well GPS signal reception (Satellite number > 7). Note that if <Enable> = 0 is selected, the AT$ODOM <Source> shall be set to 0 in advance.			
Syntax			
Write Command	AT$VSSC=<Enable>,<VSS Value>		
Response	$OK		
Read Command	AT$VSSC=?		
Response	$VSSC=<Enable>,<VSS Value>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Enable>	VSS function enable. Please note that if VSS is enabled, the GPS speed and odometer will be replaced by VSS speed.	U8	0
<VSS Value>	VSS value is total pulses for 1 kilometer. The different brand of vehicle has different value. Use the following equation for adjust a new <VSS Value> for improve VSS accuracy. $\text{<New VSS Value>} = \frac{\text{<Current VSS Value>} * \text{<Measured Mileage>}}{\text{<Actual Mileage>}}$	U16	0
Example			
[Old VSSC Value] = 2498 [Measured Mileage] = 37.4 km [Actual Mileage] = 36.3 km New VSS Value = (2498 * 37.4) / 36.3 = 2574 **Note:** The Measured Mileage is read from the device report, while the Actual Mileage is read from the vehicle odometer (the trip function in the odometer is suggested for improving the accuracy).			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

3.14. AT$RPMC Query or set engine RPM calibration setting

Command Description			
This command is used to query or set the RPM calibration setting. The default RPM signal input is Input 3. The device will calculate the pulse counts of RPM signal when engine RPM is 2000rpm. This function is not available in At1 and AT3.			
Syntax			
Write Command	AT$RPMC=<Enable>,<RPM Value>		
Response	$OK		
Read Command	AT$RPMC=?		
Response	$RPMC=<Enable>,<RPM Value>,<Current RPM reading>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Enable>	Enable or disable RPM function	U8	0
<RPM Value>	RPM value for each pulse.	U16	0
Example			
Calibration procedure： Start the engine and step on the acceleration pedal to make the RPM stays on 2000rpm. Then, issue AT$RPMC=1,0 to set the device to capture the pulse count. Once the $OK is returned, the <RPM Value> parameter will be set automatically. AT$RPMC=1,0 … delay for 1 second… $OK			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

3.15. AT$VOLM Query or set audio gain

Command Description			
This command is used to query or set the audio gain. This function is only available in AT5 and AU5.			
Syntax			
Write Command	AT$VOLM=<Microphone Gain>,<Speaker Volume>,<Ringer Volume>		
Response	$OK		
Read Command	AT$VOLM=?		
Response	$VOLM=<Microphone Gain>,<Speaker Volume>,<Ringer Volume>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Microphone Gain>	0: Initial Gain Level 1 ~ 4: As the number increased, the gain will be higher.	U8	0
<Speaker Volume>	Speaker volume, range 0 ~ 14	U8	0
<Ringer Volume>	Ringer volume 0: Ringer off 1: Low volume 2: Mid volume 3: High volume 4: Progressive	U8	1
Example			
AT$VOLM=3,10,2 OK			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

3.16. AT$PULS Query or set pulse count value

Command Description			
This command is used to query or set the pulse count function. The default pulse signal input is Input 2 (Input 1 for AT1 and AT3).			
Syntax			
Write Command	AT$PULS=<Enable>,<Reset Option>		
Response	$OK		
Read Command	AT$PULS=?		
Response	$PULS=<Enable>,<Reset Option>,<Current Pulse Count>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Enable>	0: Disable pulse counting function 1: Enable pulse counting function	U8	0
<Reset Option>	Set to reset the pulse count value when Bit 0: ACC ON Bit 1: Engine ON	U8	0
<Current Pulse Count>	This field shows current pulse count value	U32	0
Example			
Reset pulse count value when ACC is turned ON. AT$PULS=1,1 $OK			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

3.17. AT$FUEL Query or set the vehicle fuel used settings

Command Description			
This command is used to query or set the vehicle fuel used settings. The vehicle fuel used data is accumulated by calculation which data coming from OBD-II port. Be aware of that not all vehicles support this function. Use AXTool software to make sure this function is working properly before using this function.			
Syntax			
Write Command	AT$FUEL=< Value>,<Reset Option>		
Response	$OK		
Read Command	AT$FUEL=?		
Response	$FUEL=< Value>,<Reset Option>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
< Value>	Fuel used value in 0.1 Liters. For write command, this value can be set as initial value. For read command, this value will be the current fuel used value.	U32	0
<Reset Option>	Reset fuel used value to zero with the following condition: Bit 0: ACC status transit from OFF to ON Bit 1: Engine status transit from OFF to ON	U8	0
Example			
Enable fuel used calculation with initial value 0.0 liter and reset value for each detection of engine ON AT$FUEL=0,2			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

3.18. AT$AGPS Query or set the AGPS settings

Command Description			
This command is used to query or set the AGPS settings. The AGPS (Assisted GPS) accelerates calculation of position by delivering satellite data such as Ephemeris, Almanac, accurate time and satellite status to the GPS receiver via GPRS. This aiding data enables a GPS receiver to compute a position within seconds, even under poor signal conditions. If AT$AGPS is enabled, the device will download GPS aiding data from u-blox AssistNow server automatically when GPS power on under a poor signal environment. Be aware of that will have extra GPRS communication charge once enable this function.			
Syntax			
Write Command	AT$AGPS=<Enable>,<Longitude>,<Latitude>		
Response	$OK		
Read Command	AT$AGPS=?		
Response	$AGPS=<Enable>,<Longitude>,<Latitude>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
< Enable>	Enable AGPS function 0: Disable 1: Enable	U32	0
< Longitude >	Approximate user position in longitude in 0.000001 units of degrees.	S32	0
<Latitude>	Approximate user position in latitude in 0.000001 units of degrees.	S32	0
Example			
Enable AGPS function with approximate position Lon=121.123456 and Lat=25.123456 AT$AGPS=1,121123456,25123456			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

3.19. AT$OBDS Query or set the OBD protocol

Command Description			
This command is used to query or set the OBD protocol. In most cases, there is no need to set it as manual, as the AX5 will auto search for the protocol. In some rare cases, it is necessary to set it manually.			
Syntax			
Write Command	AT$OBDS=<Set Protocol>		
Response	$OK		
Read Command	AT$OBDS=?		
Response	$OBDS=<Set Protocol>,<Current Protocol>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Set Protocol>	0 - Auto-Search 1 - SAE J1850 PWM (41.6 Kbaud) 2 - SAE J1850 VPW (10.4 Kbaud) 3 - ISO 9141-2 (5 baud init, 10.4 Kbaud) 4 - ISO 14230-4 KWP (5 baud init, 10.4Kbaud) 5 - ISO 14230-4 KWP (fast init, 10.4 Kbaud) 6 - ISO 15765-4 CAN (11 bit ID, 500 Kbaud) 7 - ISO 15765-4 CAN (29 bit ID, 500 Kbaud) 8 - ISO 15765-4 CAN (11 bit ID, 250 Kbaud) 9 - ISO 15765-4 CAN (29 bit ID, 250 Kbaud)	U8	0
<Current Protocol>	Same as <Set Protocol>, except 0 means no OBD protocol found when set auto search, or not matched when the protocol is manually set.	U8	0
Example			
● Set the OBD protocol to ISO 15765-4 CAN (11 bit ID, 500 KBaud) AT$OBDS=6 $OK ● Query the current found protocol AT$OBDS=? $OBDS=0,7			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

4. Security Configuration

4.1. AT$SPIN Query or set access PIN code of the SIM card

Command Description			
This command is used to query or set access PIN code of the SIM card. If the SIM card is installed with PIN code protection, use this command to set PIN code for the device to access the SIM. This command will not modify or erase the PIN code of the SIM card. This function is not available in AY5. ***Note:*** In the case of SIM PIN Error, the device will check the AT$SPIN every 10 minutes and try to access the SIM again. If the PIN is not corrected within 3 times of checking, including the first inserting time, the SIM card will be locked. Once the SIM is locked, you need to contact your GSM carrier for the PUK to unlock the SIM card on a cellular phone.			
Syntax			
Write Command	AT$SPIN=<"PIN Code">		
Response	$OK		
Read Command	AT$SPIN=?		
Response	$SPIN=<"PIN Code">		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<"PIN Code">	SIM PIN code.	String(6)	""
Example			
Set PIN code 1234 to access the SIM card. AT$SPIN="1234"			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

4.2. AT$PASS Command password setting

Command Description			
This command is used to set the access password for each command. Please note that all commands shall be combined with the password field after AT$PASS is set. If you forget the device password, please visit GDAP page of ATrack website.			
Syntax			
Write Command	AT$PASS=<"Command Password">		
Response	$OK		
Read Command	AT$PASS=?		
Response	$PASS =<"Command Password">		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<"Command Password">	Command password string	String(6)	""
Example			

(1) Setting command password to 1234

AT$PASS="1234"

(2) After setting the command password, all of commands shall be combined with password field. Like below:

AT$UNID=1234,123456789012345

(3) Modify command password from 1234 to 5678

AT$PASS=1234,"5678"

(4) Query command password setting

AT$PASS=5678,?

$PASS="5678"

(5) Disable command password

AT$PASS=5678,""

Remark
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

4.3. AT$ENCP Query or set encrypt key for position data encryption

Command Description			
This command is used to query or set the encryption key for report position data encryption. The encryption algorithm is using AES 128bits.			
Syntax			
Write Command	AT$ENCP=<Enable>,<Encryption Key>		
Response	$OK		
Read Command	AT$ENCP=?		
Response	$ENVP=<Enable>,<Encryption Key>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Enable>	Enable AES 128bits data encryption 0: Disable 1: Enable	U8	0
<Encryption Key>	128bits (16Bytes) hexadecimal ASCII string	String(32)	""
Example			
Enter encryption key in binary 0xEDEF25C32A5D4FC7 AT$ENCP=1, EDEF25C32A5D4FC7 Enter encryption key in ASCII string "AES-128-KEY" AT$ENCP=1, "AES-128-KEY"			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

5. Communication Configuration

5.1. AT$GPRS Query or set the GPRS/UMTS communication

Command Description			
This command is used to query the GPRS communication properties. Please note that the device will restart automatically after received this command by SMS/GPRS. This function is not available in AY5.			
Syntax			
Write Command	AT$GPRS=<Enable>,<"APN">,<"User Name">,<"Password">,<"Host IP Address/Domain name">,<Host Port>,<Socket Type>,<Retry>,<Timeout>,<Keep Alive>,<Report ACK>,<"Secondary Host IP Address/Domain name">,<UDP Local Port>		
Response	$OK		
Read Command	AT$GPRS=?		
Response	$GPRS=<Enable>,<"APN">,<"User Name">,<"Password">,<"Host IP Address/Domain name">,<Host Port>,<Socket Type>,<Retry>,<Timeout>,<Keep Alive>,<Report ACK>,<"Secondary Host IP Address/Domain name">,<UDP Local Port>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Enable>	Enable GPRS/UMTS connection 0: Disable 1: Enable	U8	0
<"APN">	Access Point Name is a string which is a logical name that is used to select GGSN network for GPRS/UMTS connection.	String(32)	""
<"User Name">	The GPRS/UMTS user name	String(32)	""
<"Password">	The GPRS/UMTS password	String(32)	""
<"Host address">	Address of remote host. This parameter can be either IP address "xxx.xxx.xxx.xxx" or domain name of host server. When the domain name is specified, the DNS server is used the default DNS from the carrier.	String(32)	"0.0.0.0"
<Host Port>	Port number of the remote host server.	U16	0
<Socket Type>	Communication protocol 0: TCP 1: UDP	U8	0

<Retry>	The maximum number of socket connection attempts or data re-sending in case of failure.	U8	0
<Timeout>	Timeout in seconds for each <Retry>. Value range: 2~255.	U8	10
<Keep Alive>	Keep TCP/UDP IP connection alive forever. The device will send a "Keep alive" message to the server for maintain the GPRS connection. When using **TCP**: 0: Disable Keep alive 1..255: Period in **minutes** for TCP connection to send the "Keep-Alive" message. When using **UDP**: 10..65535: Period in **seconds** to send the "Keep-Alive" message. Refer to Section 2.3 for the keep alive message format. Note: Even if this field is set to 0, the device will always send one keep-alive message when connection is established.	U16	0
<Report Ack>	Specify if an Acknowledge is required or not. If the ACK is required, device will wait for the ACK and then send next report. If no ACK is received within <TimeOut> value for three times, the device will reset GSM module and try the steps again. 0: ACK is not required 1: ACK is required	U8	1
<"Secondary Host IP Address">	Address of remote backup host. The port number is the same as that specified previously.	String(32)	"0.0.0.0"
<Local Port>	Specify a fix local port number on demand for UDP connection.	U16	54088
Example			
AT$GPRS=1,"apn.internet.net","user","password","123.23.34.45",6000,0,3,30,1,1 AT$GPRS=1,"apn.internet.net","","","myhost.dyndns.org",6000,0,3,30,1,0			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

5.2. AT$GSMS Query or set the GSM SMS communication properties

Command Description			
This command is used to query or set the GSM SMS communication properties. All SMS report messages will send to the <Base SMS number>. The report will be in ASCII format disregarding to what is set in AT$FORM command. If no number, or only <Base SMS Number> is set, the device will accept all incoming commands and send the command status to the command sending number. If one of the authorized numbers is set, the device will only accept SMS commands from <Base SMS number > or <Authorized SMS numbers> and reply to the command sending number. This function is not available in AY5.			
Syntax			
Write Command	AT$GSMS=<"Base SMS number">,<"Authorized SMS number 1">, <" Authorized SMS number 2">,< "Authorized SMS number 3">		
Response	$OK		
Read Command	AT$GSMS=?		
Response	$GSMS=<"Base SMS number">,<"Authorized SMS number 1">, < "Authorized SMS number 2">,< "Authorized SMS number 3">		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<"Base SMS number">	SMS destination number	String(25)	""
<"Authorized SMS number 1">	Accepted SMS command source number 1.	String(25)	""
<"Authorized SMS number 2">	Accepted SMS command source number 2.	String(25)	""
<"Authorized SMS number 3">	Accepted SMS command source number 3.	String(25)	""
Example			
AT$GSMS="+886921801920","0926550846","886975503680"			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

5.3. AT$USSD Query or set the USSD communication properties

Command Description			
This command is used to query or set the GSM USSD communication properties. All USSD messages will send to the USSD server of telecom according to the USSD command prefix. Note that the USSD position message is not effected by AT$FORM command. For the USSD communication, the GSM system provider will assign a USSD service code for the service and it shall be set to the <Command Prefix> parameter of the AT$USSD command. For example, the USSD service code is *101*12*<Position Data>#, the "*101*12*" string shall be set to the <Command Prefix> parameter. Refer to USSD Position Format for detail USSD receiving format description. This function is not available in AY5.			
Syntax			
Write Command	AT$USSD=<"Command Prefix">		
Response	$OK		
Read Command	AT$USSD=?		
Response	$USSD=<"Command Prefix">		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<"Command Prefix">	The USSD command prefix string	String(20)	""
Example			
AT$USSD="*141*21*" USSD command string will be *141*21*<Position Data>#			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

5.4. AT$ROAM Query or set the GSM roaming properties

Command Description	
This command is used to query or set the GSM roaming properties. This function is not available in AY5.	
Syntax	
Write Command	AT$ROAM=<Restrict Mode>,<Preference Mode>,<Not Preference Mode>,<SMS Instead>,<"Provider code 1">, <"Provider code 2">,...,<"Provider code 49">,<"Provider code 50">
Response	$OK
Read Command	AT$ROAM=?
Response	$ROAM=<Restrict Mode>,<Preference Mode>,<Not Preference Mode>,<SMS Instead>, <"Provider code 1">,<"Provider code 2">,...,<"Provider code 49">,<"Provider code 50">

Parameter Description

Parameters	Description	Data Type	Default
<Restrict Mode>	Restrict communication while in roaming condition. Set <Restrict Mode> to zero for allow all GSM roaming condition. Bit 0: Stop SMS message sending while GSM roaming Bit 1: Stop GPRS/UMTS connection while GSM roaming Bit 2: Keep GPRS/UMTS connection while roaming to the provider(s) specified in the provider code(s)	U8	0
<Preference Mode>	Specify the tracking behavior when roaming to the preference operators which defined in the <Service Provider code> list. 0: Stop sending tracking position messages. 1: AT$TRAC tracking interval using standard property. 2~255: AT$TRAC tracking interval multiplier.	U8	1
<Not Preference Mode>	Specify the tracking behavior when roaming to the operators which not defined in the <Service Provider code> list. 0: Stop sending tracking position messages 1: AT$TRAC tracking interval using standard property. 2~255: AT$TRAC tracking interval multiplier.	U8	1
<SMS Instead>	Use SMS instead of GPRS/UMTS while GSM roaming. 0: Disable 1: Enable	U8	0
<"Provider code 1"> ~ <"Provider code 50">	Preference service provider code 1 ~ 50. Refer to Appendix for worldwide GSM server provider codes.	String(5) in each	""

Example
When the device is in roaming state, set tracking to 5 times of TRAC setting when registered to preferred networks with code 25110 and 46692. When register to others, stop sending tracking reports. AT$ROAM=0,5,0,0,"25110","46692"
Remark
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

5.5. AT$GGAS Query or set the GPRS SMS auto switch properties

Command Description			
This command is used to query or set the GPRS(UMTS) and SMS auto switch properties. Once the GPRS network is not available at specific location, this command is allowed for sending position reports use SMS instead. This function is not available in AY5.			
Syntax			
Write Command	AT$GGAS=<Enable>,<GPRS Network Timeout>,<Report option>		
Response	$OK		
Read Command	AT$GGAS=?		
Response	$GGAS=<Enable>,< GPRS Network Timeout >,<Report option>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Enable>	Enable/Disable GPRS SMS auto switch function. 0: Disable 1: Enable	U8	0
< GPRS Network Timeout >	Timeout in minutes when GPRS network is not available in this period of time. The position report will send by SMS instead of GPRS.	U8	10
<Report option>	This parameter is used to determine whether reports to be switched. Bit 0: User defined report only Bit 1: Tracking report only	U8	1
Example			
When GPRS is unavailable for more than 10 minutes, switch to SMS and send user defined reports only. AT$GGAS=1,10,1			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

5.6. AT$WIFI Query or set the WiFi communication properties

Command Description			
This command is used to set or query the WiFi communication properties. This function is only available in AY5.			
Syntax			
Write Command	AT$WIFI=<Index>,<SSID>,<Channel>,<Encryption Type>,<"Encryption Key">, <"Blacklist SSID 1">,...,<"Blacklist SSID 10">		
Response	$OK		
Read Command	AT$WIFI=<Index>,?		
Response	$WIFI=<Index>,<SSID>,<Channel>,<Encryption Type>,<Encryption Key>, <"Blacklist SSID 1">,...,<"Blacklist SSID 10">		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Index>	SSID Index. (Only one SSID is supported for current release firmware)	U8	0
<"SSID">	Set the SSID of the WIFI access point with which the device will associate.	String(32)	""
<Channel>	Set the 802.11b/g channel to use. channel = 1 to 13.	U8	0
<Encryption Type>	Set the encryption type (Please refer to AY5i user manual) 0: Open 1: WEP40 (64-bit) 2: WEP104 (128-bit) 3: WPA (including WPA-1 and WPA-2)	U8	0
<"Encryption Key">	Set key of the WEP encryption. The key is using hexadecimal representation and separated by space character for each byte. For WPA key, please use it directly in text.	String(100)	""
<"Blacklist SSID n">	Blacklist to avoid connection, compared by keyword.	String(32)	""
Example			
Set WiFi parameters with SSID=atrack and WEP104 key=atrack.com.tw AT$WIFI=0,"atrack",1,2,"61 74 72 61 63 6B 2E 63 6F 6D 2E 74 77" Set WiFi parameters with SSID=atrack and WPA2 key=atrack.com.tw AT$WIFI=0,"atrack",1,3,"atrack.com.tw"			
Remark			
☒**MEMO** ☒**SERIAL** ☒**WiFi**			

5.7. AT$WNET Query or set the WiFi network properties

Command Description			
This command is used to set or query the WiFi network properties. Only TCP connection is available. This function is only available in AY5.			
Syntax			
Write Command	AT$WNET=<"Host IP">,<Host Port>,<"Local IP">,<"Subnet mask">,<"Gateway">,<"DNS">,<Keep Alive>		
Response	$OK		
Read Command	AT$WNET=?		
Response	$WNET=<"Host IP">,<Host Port>,<"Local IP">,<"Subnet mask">,<"Gateway">,<"DNS">,<Keep Alive>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<"Host IP">	Address of remote host. This parameter can be either IP address "xxx.xxx.xxx.xxx" or domain name of host server.	String(15)	""
<Host Port>	Port number of the remote host server.	U16	0
<"Local IP">	WiFi device IP address. The DHCP mode will be enabled when "0.0.0.0" parameter is set.	String(15)	"0.0.0.0"
<"Subnet mask">	WiFi device subnet mask. When DHCP mode is enabled, this parameter will be ignored.	String(15)	"0.0.0.0"
<"Gateway">	WiFi device gateway. When DHCP mode is enabled, this parameter will be ignored.	String(15)	"0.0.0.0"
<"DNS">	WiFi device DNS. When DHCP mode is enabled, this parameter will be ignored.	String(15)	"0.0.0.0"
<Keep Alive>	Keep TCP/IP connection alive forever. The device will send a "Keep alive" message to the server for maintain the WiFi connection. 0: Disable Keep alive 1..255: Period in **minutes** for TCP/IP connection to send the "Keep-Alive" message.	U16	0
Example			
Using DHCP mode for WiFi device and establish TCP/IP connection to 61.219.1.123 port 7000. AT$WNET="61.219.1.123",7000,,,,,1			
Remark			
☒**MEMO** ☒**SERIAL** ☒**WiFi**			

6. Report Configuration

6.1. AT$GPOS Get current GPS position

Command Description			
This command is used to get current GPS position. The position messages will response to specific communication type.			
Syntax			
Write Command	AT$GPOS=[<Destination>,<Format>]		
Response	GPS position message which is defined by AT$FORM command.		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Destination>	The parameter is in conjunction with the following bits: 0: Default communication type. (i.e. Command issuer) Bit 0: SMS Base Number Bit 1: GPRS Bit 2: USSD Bit 3: Authorized SMS Number 1 (Set by AT$GSMS Command) Bit 4: Authorized SMS Number 2 (Set by AT$GSMS Command) Bit 5: Authorized SMS Number 3 (Set by AT$GSMS Command) Bit 6: Incoming SMS Number (Can only be issued from SMS) Bit 7: Query Neighbor Cell Info (Only via Console or GPRS) Neighbor info will be inserted into the text message field of the standard position format. The Cell Info represent as below: (1-serving cell + 6-neighbor cells) "<Serving Cell LAC>:<Serving Cell ID>:<Serving RXLEV>- <LAC1>:<Neighbor Cell1 ID>:<RXLEV1>- <LAC2>:< Neighbor Cell2 ID >:<RXLEV2>- … <LAC6>:< Neighbor Cell6 ID >:<RXLEV6>" For the Cell Info query, the default Report ID is 18.	U8	0
<Format>	1: Google Map Link with Date and Time	U8	0

Example
AT$GPOS=1,1 On the GSMS base number, it will receive: 2010/11/12-12:33:23 http://maps.google.com/maps?q=
Remark
☐**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

6.2. AT$TRAC Query or set the GPS tracking properties

Command Description	
This command is used to query or set the GPS tracking properties. When power management function (AT$PMGR) is enabled, the tracking function will wake up the device and send the tracking report on <Mode> bit 1 enabled.	
Syntax	
Write Command	AT$TRAC=<Mode>,<Time>[,<Distance>,<Heading>,<Min. Speed>, <Times>, <Destination>,<Schedule>,<ACC OFF Time>,<Collect Number>]
Response	$OK
Read Command	AT$TRAC=?
Response	$TRAC=<Mode>,<Time>,<Distance>,<Heading>,<Min. Speed>, <Times>,<Destination>, <Schedule>,<ACC OFF Time>,<Collect Number>

Parameter Description

Parameters	Description	Data Type	Default
<Mode>	The GPS tracking <Mode> parameter can be in conjunction with the following bits: Bit 0: Time mode Bit 1: Distance mode Bit 2: ACC status (Must combine with Bit 0 or Bit 1) Bit 3: Heading change condition Bit 4: Minimum speed (Must combine with Bit 0 or Bit 1) Bit 5: Engine status = ON. (Must combine with Bit 0 or Bit 1) Bit 6: Motion status = ON. (Must combine with Bit 0 or Bit 1) Bit 7: Logical Operation Mode (0=AND; 1=OR; Default=0) This mode only works when combining Time, Distance, and/or Heading change. Bit 8: Reset tracking timer when event report is sent Bit 9: Report with unique ID when in Distance Mode (Must combine with Bit 1)	U16	0
<Time>	Minimum time in seconds that must elapse before reporting next position. (Min. 1 seconds)	U16	30
<Distance>	Minimum distance in multiple of 10 meters that must be traveled before reporting next position. (Min. 20 meters)	U16	20
<Heading>	Minimum heading in degree that must be changed before reporting next position. (15..180)	U8	15

<Min. Speed>	Minimum speed in km/h that must be achieved before reporting next position.	U16	0
<Times>	Specify tracking times. <Times>=0 means forever tracking.	U8	0
<Destination>	Specify the destination for tracking report position The parameter is in conjunction with the following bits: 0: Default communication type. (i.e. Command issuer) Bit 0: SMS Bit 1: GPRS (This is the only option for AY5) Bit 2: USSD Bit 3: Serial	U8	0
<Schedule>	Specify the schedule for the report. The parameter is in conjunction with the following bits: 0 – indicates use no schedule (i.e. always on) Bit 0 – Schedule 1 Bit 1 – Schedule 2 Bit 2 – Schedule 3 Bit 3 – Schedule 4 Bit 4 – Schedule 5 Bit 5 – Schedule 6 Bit 6 – Schedule 7 Bit 7 – Schedule 8	U8	0
<ACC OFF Time >	Minimum time in seconds that must elapse before reporting next position while the ACC is in Off status. ACC status in <Mode> must be set in order to use this time interval. (Min. 1 seconds)	U16	0
<Collector Number>	Number of position to be put into one TCP/UDP packet	U8	0

Example

Tracking in time AND distance modes with reports sent via GPRS (both time and distance have to be met):

AT$TRAC=3,180,10000,15,0,0,2,0,0

Tracking in time OR distance modes with reports sent via GPRS (either time or distance is met):

AT$TRAC=131,180,10000,15,0,0,2,0,0

Tracking reports are sent in 500-meters when ACC ON and sent in 3600-seconds when ACC is OFF.

AT$TRAC=6,30,500,15,0,0,2,0,3600

Tracking in Time AND Engine status with reports sent via GPRS (both Time and Engine Status = ON have to be met):

AT$TRAC=33,30,100,15,0,0,2,0,0

For detecting the engine status, please refer to AT$EGNS command.

Remark

☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

6.3. AT$TRAX Query or set the GPS tracking by event properties

Command Description			
This command is used to query or set the GPS tracking by event properties. Note that this tracking setting is referred by AT$RACT command, and once it is applied, the tracking setting will not change back to original ones. When power management function (AT$PMGR) is enabled, the tracking function will wake up the device and send the tracking report only on tracking <Mode> = 1.			
Syntax			
Write Command	AT$TRAX=<Index>,<Mode>,<Time>[,<Distance>,<Heading>,<Min. Speed>, <Times>, <Destination>,<Schedule>,<ACC OFF Time>,<Collect Number>]		
Response	$OK		
Read Command	AT$TRAX=<Index>,?		
Response	$TRAX=<Index>,<Mode>,<Time>,<Distance>,<Heading>,<Min. Speed>, <Times>,<Destination>, <Schedule>,<ACC OFF Time>,<Collect Number>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Index>	Index referred by Report Action (AT$RACT) Value= 1 ~ 10		
<Mode>	The GPS tracking <Mode> parameter can be in conjunction with the following bits: Bit 0: Time mode Bit 1: Distance mode Bit 2: ACC status (Must combine with Bit 0 or Bit 1) Bit 3: Heading change condition Bit 4: Minimum speed (Must combine with Bit 0 or Bit 1) Bit 5: Engine status = ON. (Must combine with Bit 0 or Bit 1) Bit 6: Motion status = ON. (Must combine with Bit 0 or Bit 1) Bit 7: Logical Operation Mode (0=AND; 1=OR; Default=0) This mode only works when combining Time, Distance, and/or Heading change. Bit 8: Reset tracking timer when event report is sent Bit 9: Report with unique ID when in Distance Mode (Must combine with Bit 1)	U16	0
<Time>	Minimum time in seconds that must elapse before reporting next position. (Min. 1 seconds)	U16	30
<Distance>	Minimum distance in multiple of 10 meters that must be	U16	20

	traveled before reporting next position. (Min. 20 meters)		
<Heading>	Minimum heading in degree that must be changed before reporting next position. (15..180)	U8	15
<Min. Speed>	Minimum speed in km/h that must be achieved before reporting next position.	U16	0
<Times>	Specify tracking times. <Times>=0 means forever tracking.	U8	0
<Destination>	Specify the destination for tracking report position The parameter is in conjunction with the following bits: 0: Default communication type. (i.e. Command issuer) Bit 0: SMS Bit 1: GPRS (This is the only option for AY5) Bit 2: USSD Bit 3: Serial	U8	0
<Schedule>	Specify the schedule for the report. The parameter is in conjunction with the following bits: 0 – indicates use no schedule (i.e. always on) Bit 0 – Schedule 1 Bit 1 – Schedule 2 Bit 2 – Schedule 3 Bit 3 – Schedule 4 Bit 4 – Schedule 5 Bit 5 – Schedule 6 Bit 6 – Schedule 7 Bit 7 – Schedule 8	U8	0
<ACC OFF Time >	Minimum time in seconds that must elapse before reporting next position while the ACC is in Off status. ACC status in <Mode> must be set in order to use this time interval. (Min. 1 seconds)	U16	0
<Collector Number>	Number of position to be put into one TCP/UDP packet	U8	0

Example

Create a tracking setting with index 2 for AT$RACT to refer to. Tracking changed to Time mode with 30-second interval.

AT$TRAX=2,1,30,,,,,2

Remark

☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

6.4. AT$STRA Query or set scheduled tracking reports

Command Description			
This command is used to query or set scheduled tracking reports. Once it is set, device will wake up and send position reports at specified time every day.			
Syntax			
Write Command	AT$STRA= <Enable>,<MidnightMins_1>,<MidnightMins_2>,<MidnightMins_3>,<Schedule ID>		
Response	$OK		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Enable>	To enable scheduled tracking report	U8	0
<MidnightMins_1>	Minutes from mid night in UTC (0 ~ 1440; 0: disable this scheduled time; 1440: midnight)	U16	0
<MidnightMins_2>	Minutes from mid night in UTC (0 ~ 1440; 0: disable this scheduled time; 1440: midnight)	U16	0
<MidnightMins_3>	Minutes from mid night in UTC (0 ~ 1440; 0: disable this scheduled time; 1440: midnight)	U16	0
<Schedule ID>	Reference to AT$SCHD for specific schedule(s)	U8	0
Example			
Schedule the reports being sent at 21:00, 0:30, and 3:45 every day. AT$STRA=1,1260,30,225 $OK			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

6.5. AT$SLOG Query or set the GPS logging properties

Command Description			
This command is used to query or set the GPS logging properties. The GPS data logging is continuously and the oldest data will be overwritten by the latest data once the data storage is full. Set <Mode> to 255 to make the tracking and logging simultaneously by using AT$TRAC parameters. When power management function (AT$PMGR) is enabled, the logging will be stopped at sleep or deep sleep mode.			
Syntax			
Write Command	AT$SLOG=<Mode>,<Time>[,<Distance>,<Heading>,<Min. Speed>,<Schedule>]		
Response	$OK		
Read Command	AT$SLOG=?		
Response	$SLOG=<Mode>,<Time>,<Distance>,<Heading>,<Min. Speed>,<Schedule>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Mode>	The GPS tracking <Mode> parameter can be in conjunction with the following bits: Bit 0: Time mode Bit 1: Distance mode Bit 2: ACC ON (Must combine with Bit 0 or Bit 1) Bit 3: Heading change condition Bit 4: Minimum speed (Must combine with Bit 0 or Bit 1) <Mode>=255 means GPS logging mode will use the AT$TRAC instead and the others parameters will be omitted.	U8	0
<Time>	Minimum time in seconds that must elapse before reporting next position.	U16	30
<Distance>	Minimum distance in multiple of 10 meters that must be traveled before reporting next position. (Min. 20 meters)	U16	20
<Heading>	Minimum heading in degree that must be changed before reporting next position. (15..180)	U8	15
<Min. Speed>	Minimum speed in km/h that must be achieved before reporting next position.	U16	0

<Schedule>	Specify the schedule for the report. The parameter is in conjunction with the following bits: 0 – indicates use no schedule (i.e. always on) Bit 0 – Schedule 1 Bit 1 – Schedule 2 Bit 2 – Schedule 3 Bit 3 – Schedule 4 Bit 4 – Schedule 5 Bit 5 – Schedule 6 Bit 6 – Schedule 7 Bit 7 – Schedule 8	U8	0

Example

Log set to follow tracking settings

AT$SLOG=255

Remark

☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

6.6. AT$DLOG Download GPS logging data

Command Description			
This command is used to download GPS logging data from the storage of the device. Use AT$DLOG command to set GPS logging interval and conditions. Note that the command cannot be issued using SMS. Time format is in "YYMMDDhhmmss". For user define reports, the logged data will have **0xB1** in the Text Message field to distinguish between the logged data and real time data. When download completes, a report with ID 21 will be sent.			
Syntax			
Write Command	AT$DLOG=<"Start Date Time">,<"End Date Time">[,<Message ID Filter>]		
Response	$OK		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<"Start Date Time">	Download log from start date time.	String(12)	"090101000000"
<"End Date Time">	Download log to the end date time.	String(12)	"990101000000"
<Message ID Filter>	Specify a message ID to download log from storage.	U8	0
Example			
Download log from 2011/01/20 0:00:00 ~ 2011/02/02 23:59:59 AT$DLOG="110120000000","110202235959"			
Remark			
☐**MEMO** ☒**SERIAL** ☐**SMS** ☒**GPRS**			

6.7. AT$GDAT Get the last impact of g sensor data

Command Description	
This command is used to download the last impact of g sensor data. Use AT$IMPD command to set the impact threshold for the impact condition. The g sensor data will consist of all x, y, z g-Force information. The full duration of data available will be 500ms prior to impact and 500ms following impact. The sampling rate is 400Hz. The g sensor data is not using AT$FORM user define format. There will be a total of 8 packets for all the G-Sensor data. Please note, the impact reports are only available with GPRS and serial connection.	
Syntax	
Write Command	AT$GDAT
Response	$OK
Data Format	

The g-Force data is 400 records in total and will be divided into 8 packages to send to the server. For each package contain 50 records and used the following format:

Header	Position Data	Packet ID	Impact g-Force data (Record 1..50)

X1	Y1	Z1	X2	Y2	Z2	……	X50	Y50	Z50

Remark
☐**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

6.8. AT$GDTC Get OBD-II Diagnostic Trouble Code from vehicle

Command Description			
This command is used to get OBD-II diagnostic trouble code when MIL (Malfunction Indicator Lamp) status is ON. The MIL status can be shown on the %ML of position format or can be triggered by %ML event. When AT$GDTC command is issued, the device will response a ReportID=22 position report. The DTC code will be translated to a readable string and added into the message field of position format. When MIL is not on, there might be some pending DTC codes. Use this command to get the pending DTC codes.			
Syntax			
Write Command	AT$GDTC=<Option>		
Response	Position report with ReportID=22 when <Option> = 0 Position report with ReportID=23 when <Option> = 1		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Option>	0: Get DTC code 1: Get Pending DTC code	U8	0
Example			
When %ML=1, the AT$GDTC command gets 2 DTC code P0101 and P0100 from vehicle. AT$GDTC=0 @P,539B,164,0,354660048725066,1324605739,1324605739,1324605739,121585530,25079636,195,22,4,25,1,13,0,0, ,0,0,P0101 P0100 ,			
Remark			
☐**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7. Event Configuration

7.1. AT$INPT Query or set the Inputs event behavior

Command Description			
This command is used to query or set the input event behavior for each input. The Input 0 is a general purpose input as well as an ACC (Ignition) input.			
Syntax			
Write Command	AT$INPT=<Index>,<On Debounce Time>[,<Off Debounce Time>]		
Response	$OK		
Read Command	AT$INPT=<Index>,?		
Response	$INPT=<Index>,<Debounce Time>,<Off Debounce Time>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Index>	Digital input index. (0..3 for AT5; 0..1 for AT1 and AT3)	U8	
<On Debounce Time>	Amount of time in 0.1 seconds that must elapse when the input state change from Off to On. If <Off Debounce Time> is set to 0, this <On Debounce Time> will be used for both detecting On and Off.	U16	7
<Off Debounce Time>	Amount of time in 0.1 seconds that must elapse when the input state changes from On to Off. (AT1 Only) 0: Use <On Debounce Time> for detection	U16	0
<Status>	Current status of input event 0: Input OFF 1: Input ON	U8	
Example			
Set input 1 debounce time to 5 second AT$INPT=1,50			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.2. AT$EGNS Query or set the engine event behavior

Command Description	
This command is used to query or set the engine event behavior. The engine status detection is using battery voltage measurement method. When engine is ON, the battery voltage will be higher because of alternator is running.	
Syntax	
Write Command	AT$EGNS=<Engine ON Threshold>,<ON duration>,<Engine OFF Threshold>, <OFF duration>
Response	$OK
Read Command	AT$EGNS=?
Response	$EGNS=<Engine ON Threshold>,<ON duration>,<Engine OFF Threshold>,<OFF duration>, <Status>

Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Engine ON Threshold>	Voltage in 0.1 volts for detecting engine ON state.	U16	140
<ON duration>	Duration in seconds that must elapse before engine state change is accepted.	U8	30
<Engine OFF Threshold>	Voltage in 0.1 volts for detecting engine OFF state.	U16	125
<OFF duration>	Duration in seconds that must elapse before engine state change is accepted.	U8	30
<Status>	Current status of engine event 0: Engine OFF 1: Engine ON	U8	

Example
AT$EGNS=138,10,128,10

Remark
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

7.3. AT$SPED Query or set the speeding event behavior

Command Description			
This command is used to query or set the speeding event behavior.			
Syntax			
Write Command	AT$SPED=[<Index>,]<Speeding ON Threshold>,<ON duration>,<Speeding OFF Threshold>, <OFF duration>		
Response	$OK		
Read Command	AT$SPED=?		
Response	$SPED=[<Index>,]<Speeding ON Threshold>,<ON duration>,<Speeding OFF Threshold>,<OFF duration>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Speeding ON Threshold>	Speed in km/h for detecting speeding ON state.	U16	100
<ON duration>	Duration in seconds that must elapse before speeding state change is accepted.	U8	10
<Speeding OFF Threshold>	Speed in km/h for detecting speeding OFF state.	U16	90
<OFF duration>	Duration in seconds that must elapse before speeding state change is accepted.	U8	10
<Status>	Current status of speeding event 0: Speeding OFF 1: Speeding ON	U8	
Example			
AT$SPED=105,5,95,5			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.4. AT$IDLE Query or set the vehicle idle event behavior

Command Description			
This command is used to query or set the vehicle idle event behavior. The IDLE state is triggered when a vehicle has not moved in a specified amount of time while the engine is determined to be ON.			
Syntax			
Write Command	AT$IDLE=<Condition>,<Idle Speed>,<Duration>		
Response	$OK		
Read Command	AT$IDLE=?		
Response	$IDLE=<Condition>,<Idle Speed>,<Duration>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Condition>	Method to use to determine if the engine is running: 0: Either engine or ACC (Ignition) Status. 1: Engine Status only. 2: ACC (Ignition) Status only.	U8	0
<Idle Speed>	Speed in km/h.	U16	10
<Duration>	Duration in minutes.	U8	10
<Status>	Current status of vehicle idle event 0: Idle OFF 1: Idle ON	U8	
Example			
Idle status becomes true when speed is lower than 5 km/hr for 5 minutes when ACC is ON AT$IDLE=2,5,5			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.5. AT$VTOW Query or set the vehicle tow event behavior

Command Description			
This command is used to query or set the vehicle tow event behavior. The vehicle tow state is triggered when a vehicle has moved in a specified amount of time while the engine is determined to be OFF.			
Syntax			
Write Command	AT$VTOW=<Condition>,<Tow Speed>,<Duration>		
Response	$OK		
Read Command	AT$VTOW=?		
Response	$VTOW=<Condition>,<Tow Speed>,<Duration>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Condition>	Method to use to determine if the engine is OFF: 0: Both engine and ACC (Ignition) Status. 1: Engine Status only. 2: ACC (Ignition) Status only.	U8	0
<Tow Speed>	Speed in km/h.	U16	30
<Duration>	Duration in minutes.	U8	3
<Status>	Current status of vehicle tow event 0: Tow OFF 1: Tow ON	U8	
Example			
Identified being towed when speed is above 15 km/hr for 3 minutes and ACC is off AT$VTOW=2,15,3			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.6. AT$MOTD Query or set the vehicle motion event behavior

Command Description			
This command is used to query or set the vehicle motion event behavior. The vehicle motion state is triggered when shock is detected by g sensor.			
Syntax			
Write Command	AT$MOTD=<Motion Threshold>,<Debounce delay>		
Response	$OK		
Read Command	AT$MOTD=?		
Response	$MOTD=<Motion Threshold>,<Debounce delay>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Motion Threshold>	The motion threshold g force in mg for motion detection. Valid threshold value range is from 50 to 16000mg.	U16	50
<Debounce delay>	Motion debounce delay in second. (Min. 5 seconds)	U8	5
<Status>	Current status of motion event 0: Motion OFF 1: Motion ON	U8	
Example			
When motion is larger than 500mg for more than 30 seconds, set the motion event becomes true: AT$MOTD=500,30			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.7. AT$IMPD Query or set the vehicle impact event behavior

Command Description			
This command is used to query or set the vehicle impact event behavior. The vehicle impact state is triggered when impact is detected by g sensor.			
Syntax			
Write Command	AT$IMPD=<Impact Threshold>,<Debounce Delay>		
Response	$OK		
Read Command	AT$IMPD=?		
Response	$IMPD=< Impact Threshold >,<Debounce Delay>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Impact Threshold>	The impact threshold g force in mg for impact detection. Valid threshold value range is from 600 to 16000mg.	U16	10000
<Debounce Delay>	Debounce time delay in second for the first impact detection to the next detection.	U8	5
<Status>	Current status of impact event 0: Impact OFF 1: Impact ON The impact event status is cleared by reading g sensor data (Refer to AT$GDAT command) or reset the AT$IMPD command.	U8	
Example			
Set the impact event becomes true when the detected g-force is larger than 12g for more than 2 seconds AT$IMPD=12000,2			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.8. AT$PLOW Query or set the main power low behavior

Command Description			
This command is used to query or set the main power low event behavior. The main power low state is triggered when main power voltage is under specific voltage in a specified amount of time. When AT$PMGR is enabled and device is under sleep or deep sleep mode, the device will wake up and check the main power voltage periodically. (Default is 10 seconds.)			
Syntax			
Write Command	AT$PLOW=<Power Low Voltage>,<Duration>		
Response	$OK		
Read Command	AT$PLOW=?		
Response	$PLOW=<Power Low Voltage>,<Duration>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Power Low Voltage>	Power low voltage in 0.1volt	U16	110
<Duration>	Duration in seconds	U16	3
<Status>	Current status of main power low event 0: Main power low OFF 1: Main power low ON	U8	
Example			
When the voltage detected from the power cable is lower than 11.5V for 10 seconds, set the power low event to be true AT$PLOW=115,10			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.9. AT$PLOS Query or set the main power lost behavior

Command Description			
This command is used to query or set the main power lost event behavior. The main power lost state is triggered when main power is disconnected for a specified amount of time.			
Syntax			
Write Command	AT$PLOS=<Duration>		
Response	$OK		
Read Command	AT$PLOS=?		
Response	$PLOS=<Duration>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Duration>	Duration in seconds that the device cannot detect any external power supplied.	U16	10
<Status>	Current status of main power lost event 0: Main power lost OFF 1: Main power lost ON	U8	
Example			
When there is no power detected from the power cable for more than 30 seconds, set power lost event to be true AT$PLOS=30			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.10. AT$AINT Query or set the analog input event behavior

Command Description			
This command is used to query or set the analog input event behavior. The analog input ON state is triggered when the analog input voltage is out of specific range (i.e. between <High Threshold> and <Low Threshold>) in a specified amount of time. When AT$PMGR is enabled and device is under sleep or deep sleep mode, the device will wake up and check the analog input voltage periodically. (Default 30mins.) This function is not available in AT1 and AT3.			
Syntax			
Write Command	AT$AINT=<Index>,<High Threshold>,<High duration>,<Low Threshold>,<Low duration>		
Response	$OK		
Read Command	AT$AINT=<Index>,?		
Response	$AINT=<Index>,<High Threshold>,<High duration>,<Low Threshold>,<Low duration>,<Value>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Index>	Analog input index.	U8	1
<High Threshold>	Voltage in 0.001 volts for setting the maximum voltage of the normal condition.	U16	10000
<High duration>	Duration in seconds that must elapse before greater than high voltage state is accepted.	U8	30
<Low Threshold>	Voltage in 0.001 volts for setting the minimum voltage of the normal condition.	U16	5000
<Low duration>	Duration in seconds that must elapse before less than low voltage state is accepted.	U8	30
<Value>	Current analog input value in 0.001 volts	U16	
<Status>	Current status of analog input event 0: Analog input event OFF (i.e. Normal condition) 1: Analog input event ON (i.e. Input value out of range)	U8	
Example			
When the voltage detected from the analog input is not within the range from 2.3V ~ 1.8V for more than 10 seconds, set the analog event to be true AT$AINT=1,2300,10,1800,10			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.11. AT$ACHG Query or set the analog change event behavior

Command Description			
This command is used to query or set the analog input change event behavior. This event will be triggered if the voltage variation is larger than <Voltage Threshold> within <Threshold Duration>. This function is not available in AT1 and AT3.			
Syntax			
Write Command	AT$ACHG=<Analog Index>,<Voltage Threshold>,<Threshold Duration>		
Response	$OK		
Read Command	AT$ACHG=<Index>,?		
Response	$ACHG=<Analog Index>,<Voltage Threshold>,<Threshold Duration>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Index>	Analog input index.	U8	1
<Voltage Threshold>	Voltage in 0.001 volts for setting the voltage variation threshold. Range 1 ~ 65535	U16	10000
<Threshold duration>	Duration in seconds that the voltage variation exceeds the threshold within this period. Range 1 ~ 255	U8	30
<Status>	Current status of analog change event 0: Analog change event OFF (i.e. Normal condition) 1: Analog change event ON (i.e. Input value out of range)	U8	
Example			
When the voltage detected from the analog input changes more than 200mV in 60 seconds, event triggers. AT$ACHG=1,200,60			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.12. AT$GPSS Query or set the GPS status event behavior

Command Description			
This command is used to query or set the GPS status event behavior. The GPS status event is triggered when the GPS state is changed in a specified amount of time.			
Syntax			
Write Command	AT$GPSS=<Connect Debounce>,<Short Debounce >,<Timeout>[,<HDOP Filter>]		
Response	$OK		
Read Command	AT$GPSS=?		
Response	$GPSS=<Connect Debounce>,<Short Debounce >,<Timeout>,<HDOP Filter>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Connect Debounce>	Debounce time in seconds that must elapse before GPS antenna connection state change is accepted.	U8	10
<Short Debounce >	Debounce time in seconds that must elapse before GPS antenna short circuit state change is accepted.	U8	10
<Timeout>	GPS signal reception timeout in minutes.	U8	5
<HDOP Filter>	Threshold value in 0.1 to filter out the GPS data that has higher HDOP than this threshold. 0: Disable filter function 1 ~ 990: HDOP filter value	U16	100
<Status>	Current status of GPS status event Bit 0: 0→ GPS antenna connected 1→ GPS antenna disconnected Bit 1: 0→ GPS antenna cable OK 1→ GPS antenna cable short circuit Bit 2: 0→ GPS signal reception OK 1→ GPS signal reception timeout	U8	
Example			
If antenna is not connected for 30 seconds, enable bit 0; if antenna is short for 20 seconds, enable bit 1; if no valid GPS signal for 10 minutes, enable bit 2; filter out coordinates with HDOP larger than 13.5: AT$GPSS=30,20,10,135			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.13. AT$GFEN Query or set the Geofence event behavior

Command Description			
This command is used to query or set the geofence event behavior. The geofence event is triggered when the vehicle is driving in/out the specific zone. The polygon <Type> of geofence is not supported for SMS command.			
Syntax			
Write Command	AT$GFEN=<Index>,<Type>,<Radius/Points>,<Longitude1>,<Latitude1>, … , <Longitude20>,<Latitude20>		
Response	$OK		
Read Command	AT$GFEN=<Index>,?		
Response	$GFEN=<Index>,<Type>,<Radius/Points>,<Longitude 1>,<Latitude 1>, … , <Longitude 20>,<Latitude 20>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Index>	Index of geofence (1..64 for AT5; 1..32 for AT1 and AT3)	U8	
<Type>	Type of geofence 0: Disable this geofence 1: Circle 2: Rectangle 3: Polygon [5]	U8	0
<Radius/Points>	The radius in meters of the circle for <Type> = 1 (Circle) The <Radius/Points> = 2 for <Type> = 2 (Rectangle) The number of points for <Type> = 3 (Polygon) max. 20	U16	0
<Longitude n>	The longitude in 0.000001 degree of the point n.	S32	0
<Latitude n>	The latitude in 0.000001 degree of the point n.	S32	0
<Status>	Current status of a geofence event 0: Outside of the geofence 1: Inside of the geofence	U8	
Example			
Set circular zone with radius of 25 meters centered at long=121.554685 and lat=25.231124 AT$GFEN=1,1,25,121554685,25231124			

Set rectangular zone with two diagonal points AT$GFEN=2,2,2,121565093,25078703,121565607,25079051 Set a polygonal zone with 10 points AT$GFEN=3,3,10,121565399,25078802,121565359,25078707,121565423,25078688,121565375,25078562,121565520,25078504,121565576,25078595,121565842,25078478,121565953,25078660,121565622,25078801,121565584,25078756
Remark
☒**MEMO** ☒**SERIAL** ☐**SMS** ☒**GPRS**

7.14. AT$FULS Query or set the Fuel Sensor's event behavior

Command Description			
This command is used to query or set the fuel sensor's event behavior. This Fuel Sensor's event is triggered when the fuel level is changed more than the scale difference set by user in a short period of time. Then it will send out its corresponding fuel status. If the User Define Report has fuel event, the fuel sensor data will be included in the event report when Scale Changed value exceeded.			
Syntax			
Write Command	AT$FULS=<Enable>,<Scale Changed>,<Check Duration>,<Timeout>		
Response	$OK		
Read Command	AT$FULS=?		
Response	$FULS=<Enable>,<Scale Changed>,<Check Duration>,<Timeout>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Enable>	Enable or disable this function. The data will be attached to the Position Message as in text field. 0: Disable fuel sensor report. 1: Enable fuel sensor report.	U8	0
<Scale Changed>	It represents the fuel scale changed in one <Check Duration> time. (Its default value is 200 scales changed out of total maximum scale 1024. User can set the maximum scale on sensor up to 4095 only.)	U16	200
<Check Duration>	The device will check out the fuel level after a <Check Duration> time, and send out its corresponding response. It is in minute unit. 0: Disable to check fuel sensor.	U8	2
<Timeout>	The timeout that the device should reset the fuel data to 0 when there is no data received from the serial port for <Timeout> seconds.	U16	5
<Status>	Current status about the fuel condition. 0: Fuel level is in normal condition. 1: Fuel level is in abnormal condition.	U8	0

Example
To trigger fuel event when the fuel is changed for at least 200 scales: AT$FULS=1,200,2 The fuel information is included in <Text Message> field as "FULS:F=03FF t=1B N=01A5": @P,3833,115,88,357460030390061,1280306236,1280306235,1280306235,121572693,25079476,211,2,50,12,0,0,0,0,, 0,0,FULS:F=03FF t=1B N=01A5
Remark
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

7.15. AT$TEPS Query or set Temperature Sensor's event behavior

Command Description	
This command is used to query or set the 1-Wire® temperature sensor's (Model DS18B20) event behavior. The Temperature Sensor's event is triggered whenever the freezer on the vehicle is not running in the setting temperature range. Notice that it is dealing with Celsius (℃) unit only.	
Syntax	
Write Command	AT$TEPS=<Sensor Index>,<Min Temp Range>,<Max Temp Range>,<Holding Duration>, <Sensor Internal ID>
Response	$OK
Read Command 1	AT$TEPS=?
Response 1	$TEPS=<Sensor Internal ID A>,<Current temperature A>,<Sensor Internal ID B>, <Current temperature B>
Read Command 2	AT$TEPS=<Sensor Index>,?
Response 2	$TEPS=<Sensor Index>,<Min Temp Range>,<Max Temp Range>,<Holding Duration>, <Sensor Internal ID>,<Status>

Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Sensor Internal ID A>	The sensor ID corresponding to temperature A		
<Current temperature A>	The temperature reading from sensor ID A		
<Sensor Internal ID B>	The sensor ID corresponding to temperature B		
<Current temperature B>	The temperature reading from sensor ID B		
<Sensor Index>	The connected port number where the Temperature Sensor connected with by different user. 1: First detected sensor 2: Second detected sensor	U8	
<Min Temp Range>	Minimum temperature value, and is in 0.1 Celsius unit.	S16	0
<Max Temp Range>	Maximum temperature value, and is in 0.1 Celsius unit	S16	0
<Holding Duration>	A temperature holding time, and is in minute unit.	U8	5
<Sensor Internal ID>	Temperature sensor ID. This temperature sensor can be set to be index 1 or 2 by specifying the ID in this field.		
<Status>	Current status of Temperature status 0: Detected temperature is inside the setting range. 1: Detected temperature is outside the setting range.	U8	0

Example
Request to set the temperature range between 4℃~7℃, duration in 2 minutes with first detected temperature sensor. The alarm will be triggered when the temperature is not between 4℃~7℃ after 5 minutes. AT$TEPS=1,? $TEPS=1,0,0,5,0 Set MinTempRange = 4℃, MaxTempRange=7℃, HoldingDuration=2min, and connected with first detected temperature sensor AT$TEPS=1,40,70,2 If current temperature is 3℃, the query response will show as below after 2 minutes AT$TEPS=1,40,70,2,1 Request the information for the temperature sensor and its event setting AT$TEPS=1,? Request for both temperature sensors and the current temperature readings AT$TEPS=?
Remark
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

7.16. AT$VSTP Query or set the Vehicle Stop's event behavior

Command Description			
This command is used to query or set the vehicle stop event behavior. The Vehicle Stop's even is triggered when the vehicle stopped for a long term.			
Syntax			
Write Command	AT$VSTP=<Stop Duration>		
Response	$OK		
Read Command	AT$VSTP=?		
Response	$VSTP=<Stop Duration>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Stop Duration>	A vehicle stopping duration is in minute unit. The default value is 1440 min. = 1 day.	U16	1440
<Status>	0: The Vehicle is not at stop mode. 1: The Vehicle is at stop mode.	U8	0
Example			
Request to set the stop duration in 3.5 hours (210 minutes.) It will be triggered when the vehicle stop in one place more than 3.5 hours. It will set its status to be 1 if the car is at stop condition after 210 minutes. AT$VSTP=210			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.17. AT$HBKE Query or set the Harsh Braking event behavior

Command Description			
This command is used to query or set the harsh braking event behavior. The Hash Braking event is triggered when the vehicle's negative acceleration g force is over the specific G-force threshold. The harsh braking behavior can be detected by using GPS or G-force sensor. For the model AT1/AT1E, the GPS is only the option of the <Source>. When GPS source is used, the harsh braking event will be ignored when GPS speed is under 20km/h. Please refer to the device User Manual for detailed installation guideline when G-force sensor is being used for this functionality.			
Syntax			
Write Command	AT$HBKE=<Source>,<G-force Threshold>,<Duration>		
Response	$OK		
Read Command	AT$HBKE=?		
Response	$HBKE=<Source>,<G-force Threshold>,<Duration>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Source>	Select the driving data source 1: Using GPS/VSS information. 2: Using G-sensor data	U8	1
< G-force Threshold >	The harsh braking g-force threshold in mg.	U16	225
<Duration>	Duration in 0.1 seconds that must elapse before harsh braking state change is accepted.	U8	0
<Status>	0: Harsh braking event is not triggered 1: Harsh braking event is triggered	U8	
Example			
(1) Request to set the harsh braking event when the vehicle has a negative G-force more than 250mg by using GPS data source. *AT$HBKE=1,250,0* (2) Request to set the harsh braking event when the vehicle has a negative G-force more than 250mg for 1 second by using G-sensor data source. *AT$HBKE=2,250,10*			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.18. AT$HACE Query or set the Harsh Acceleration event behavior

Command Description			
This command is used to query or set the harsh acceleration event behavior. The Hash Acceleration event is triggered when the vehicle's acceleration g force is over the specific G-force threshold. The harsh acceleration behavior can be detected by using GPS or G-force sensor. For the model AT1/AT1E, the GPS is only the option of the <Source>. Please refer to the device User Manual for detailed installation guideline when G-force sensor is being used for this functionality.			
Syntax			
Write Command	AT$HACE=<Source>,<G-force Threshold>,<Duration>		
Response	$OK		
Read Command	AT$HACE=?		
Response	$HACE=<Source>,<G-force Threshold>,<Duration>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Source>	Select the driving data source 1: Using GPS/VSS information. 2: Using G-sensor data	U8	1
< G-force Threshold >	The harsh acceleration g-force threshold in mg.	U16	200
<Duration>	Duration in 0.1 seconds that must elapse before harsh acceleration state change is accepted.	U8	10
<Status>	0: Harsh acceleration event is not triggered 1: Harsh acceleration event is triggered	U8	
Example			
(1) Request to set the harsh acceleration event when the vehicle has a G-force more than 250mg for 1 second by using GPS data source. *AT$HACE=1,250,10* (2) Request to set the harsh acceleration event when the vehicle has a G-force more than 250mg for 500ms by using G-Sensor data source. *AT$HACE=2,250,5*			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.19. AT$HCOR Query or set the Harsh Cornering event behavior

Command Description			
This command is used to query or set the harsh cornering event behavior. The Hash Cornering event is triggered when the vehicle's centrifugal g-force is over the specific G-force threshold. The harsh cornering behavior can be detected by using GPS or G-force sensor. For the model AT1/AT1E, the GPS is only the option of the <Source>. When GPS source is used, the harsh corning event will be ignored when GPS speed is under 40km/h. Please refer to the device User Manual for detailed installation guideline when G-force sensor is being used for this functionality.			
Syntax			
Write Command	AT$HCOR=<Source>,<G-force Threshold>,<Duration>		
Response	$OK		
Read Command	AT$HCOR=?		
Response	$HCOR=<Source>,<G-force Threshold>,<Duration>,<Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Source>	Select the driving data source 1: Using GPS/VSS information. 2: Using G-sensor data	U8	1
< G-force Threshold >	The harsh cornering centrifugal g-force threshold in mg.	U16	200
<Duration>	Duration in 0.1 seconds that must elapse before harsh cornering state change is accepted. Note that if <Source>=1, this value shall be filled in default value.	U8	10
<Status>	0: Harsh cornering event is not triggered 1: Harsh cornering event is triggered	U8	
Example			
(1) Request to set the harsh cornering event when the vehicle has a centrifugal G-force more than 250mg for 1 second by using GPS data source. *AT$HCOR=1,250,10* (2) Request to set the harsh cornering event when the vehicle has a centrifugal G-force more than 325mg for 500 ms by using G-sensor data source *AT$HCOR=2,325,5*			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.20. AT$JAMM Query or set GSM Jamming Detection

Command Description			
This command is used to query or set the status of GSM jamming detection. The jamming duration parameter can be set to avoid false jamming report.			
Syntax			
Write Command	AT$JAMM=<Mode>,<Jamming Duration>		
Response	$OK		
Read Command	AT$JAMM=?		
Response	$JAMM=<Mode>,<Jamming Duration>,<Jamming Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Mode>	The parameter is set the enable or disable the send the event report: 0: Do not send the jamming report 1: Send the jamming report Jamming report ID = 13	U8	0
<Jamming Duration>	The time duration in seconds that must elapse to be identified as GSM network being jammed.	U16	300
<Status>	0: GSM network is not jammed 1: GSM network is jammed	U8	
Example			
Send a Jamming Report when the GSM network has been jammed for 300 seconds. AT$JAMM=1,300			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.21. AT$RPME Query or set RPM Over-Revving Detection

Command Description			
This command is used to query or set the RPM (Engine over-revving) event behavior. Note that the AT$RPMC should be enabled before using this command.			
Syntax			
Write Command	AT$RPME=<RPM ON Threshold>,<ON duration>,<RPM OFF Threshold>, <OFF duration>		
Response	$OK		
Read Command	AT$RPME=?		
Response	$RPME=<RPM ON Threshold>,<ON duration>,<RPM OFF Threshold>, <OFF duration>, <Status>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<RPM ON Threshold>	RPM for detecting RPM (Engine over-revving) ON state.	U16	5000
<ON duration>	Duration in seconds that must elapse before RPM (Engine over-revving) state change is accepted.	U8	5
<RPM OFF Threshold>	RPM for detecting RPM (Engine over-revving) OFF state.	U16	2000
<OFF duration>	Duration in seconds that must elapse before RPM (Engine over-revving) state change is accepted.	U8	5
<Status>	Current status of RPM over-revving event 0: RPM (Engine over-revving) OFF 1: RPM (Engine over-revving) ON	U8	
Example			
Set RPM event to be true when RPM exceeds 4500rpm for 5 seconds, and set event to be false when RPM is lower than 2500rpm for 10 seconds AT$RPME=4500,5,2500,10			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

7.22. AT$OBDE Query or set OBD-II data event behaviors

Command Description				
This command is used to query or set various data event behavior from OBD-II of vehicle.				
Syntax				
Write Command	AT$OBDE=<OBD Data>,<Parameter1>,<Parameter2>			
Response	$OK			
Read Command	AT$OBDE=<OBD Data>,?			
Response	$OBDE=<OBD Data>,<Parameter1>,<Parameter2>			
Parameter Description				
Parameters	**Description**		**Data Type**	**Default**
<OBD Data>	Specify which OBD data to be queried or set 1: Throttle position 2: Fuel used 3: Engine coolant temperature 4: Engine Load		U8	
<Parameter1>	For each <OBD data> type has its definition for <Parameter1>. See the following definition:			
	<OBD Data>	**<Parameter1>**	**Data Type**	**Default**
	1	Throttle position threshold in percent (%)	U8	75
	2	Fuel used threshold in 0.1Liter	U32	0
	3	Engine temperature threshold (℃)	S16	100
	4	Engine load threshold in percent (%)	U8	75
<Parameter2>	For each <OBD data> type has its definition for <Parameter2>. See the following definition:			
	<OBD Data>	**<Parameter1>**	**Data Type**	**Default**
	1	Duration in second	U8	10
	2	N/A		
	3	Duration in minute	U8	3
	4	Duration in second	U8	30
Example				
Setting a over engine temperature event for 110℃,30seconds AT$OBDE=3,110,30				
Remark				
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**				

8. User Define Report

8.1. AT$REPT Query or set the user defined report

Command Description			
This command is used to query or set the user defined report settings.			
Syntax			
Write Command	AT$REPT=<Report ID>,<Enable>,<"Event String" >,<"Trigger control">,<Schedule>, <Action ID>,<Text ID>		
Response	$OK		
Read Command	AT$ REPT=<Report ID>,?		
Response	$REPT =<Report ID>,<Enable>,<"Event String">,<"Trigger control">,<Schedule>, <Action ID>,<Text ID>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Report ID>	User define Report ID 101..164 (101..132 for AT1)	U8	
<Enable>	Enable the user report 0: Disable 1: Enable	U8	0
<"Event String">	The event string can be in conjunction with event/status parameters. See the following Note for available event/status parameters.	String(50)	""
<"Trigger Control">	Event trigger condition 0: OFF 1: ON	String(20)	""
<Schedule>	Schedule ID	U8	0
<Action ID>	Action ID (Action defined by AT$RACT)	U8	0
<Text ID>	Reference to AT$TEXT ID for Custom SMS text	U8	0

Example

(1) Create a user define report ID=101 for monitoring the event of ACC=ON. When the condition is met, processing RACT=1 for action.

AT$REPT=101,1,"%IN0","1",0,1

(2) Create a user define report ID=102 for monitoring the event of input 1 ON and engine OFF. When both conditions are met, processing RACT=2 for action.

AT$REPT=102,1,"%IN1%EG","10",0,2

(3) Create a user define report ID=103 for monitoring the event of ACC=ON and over speeding inside the geofence #1 area. When all conditions are met, processing RACT=2 for action.

AT$REPT=103,1,"%IN0%SD%GF1","111",0,2

Note

Available event/status parameters for <Event String>

These event/status parameters may not support all model of ATrack product. Please see the notation of each data field.

Event	Descriptions	AT1	AT1Pro	AT3	AT5	AU5	AY5	AX5
%INn	Input n event status (%IN0..%INn)	●	●	●	●	●	●	●
%EG	Engine event status	●	●	●	●	●	●	●
%SD	Speeding event status	●	●	●	●	●	●	●
%DL	Vehicle idle event status	●	●	●	●	●	●	●
%TW	Vehicle towed event status	●	●	●	●	●	●	●
%MT	Vehicle motion event status	●	●	●	●	●	●	●
%IP	Impact event status		●		●	●	●	●
%PL	Main power low event status	●	●	●	●	●	●	●
%PS	Main power lose event status	●	●	●	●	●	●	●
%SS	GPS antenna event status	●	●	●	●	●	●	●
%ANn	Analog input event status (%AN1)		●		●	●	●	
%AGn	Analog change event status (%AG1)				●	●	●	
%GFn	Geofence event status (%GF1..%GFn)	●	●	●	●	●	●	●
%FU	Fuel sensor event status		●		●	●	●	
%TPn	Temperature sensor event status (%TP1..%TPn)		●		●	●	●	
%SP	Vehicle stop event status	●	●	●	●	●	●	●
%HA	Vehicle harsh acceleration event status	●	●	●	●	●	●	●
%HB	Vehicle harsh brake event status	●	●	●	●	●	●	●

%HC	Vehicle harsh cornering event status				●	●	●	●
%JD	GSM signal jammed event status		●	●	●	●	●	●
%RP	Engine over RPM event status		●		●	●	●	●
%PF	Preferred Network status	●	●	●	●	●	●	●
%RO	Roaming status	●	●	●	●	●	●	●
%CR	GSM registration status 1: Registered to home network 0: Others	●	●	●	●	●	●	●
%BL	Backup battery low status 0: Backup battery normal 1: Backup battery voltage < 3.7V	●	●	●	●	●	●	
%OPn	Output status (%OP1..%OPn)	●	●	●	●	●	●	
%EL	Engine load event status							●
%ML	MIL (Malfunction Indicator Lamp) status							●
%TR	Throttle position event status							●
%ET	Engine Coolant Temperature event status							●
%FC	Fuel Used event status							●
%OC	OBD-II connect status							●
%SF	GPS fix status							●
%VR	Voice Call Ringing	●	●					
%VA	Voice Call Authorized	●	●					
%VC	Voice Call Connected				●			

Remark

☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

8.2. AT$RACT Query or set the user defined report action settings

Command Description	
This command is used to query or set the user defined report action settings.	
Syntax	
Write Command	AT$RACT=<Index>,<Action>,<Destination>,<Output ID>,<New State>, <New State Duration>, <Opposite Duration>,<Repeat Times >,<Track ID>
Response	$OK
Read Command	AT$RACT=<Index>,?
Response	$RACT =<Index>,<Action>,<Destination>,<Output ID>,<New State>, <New State Duration>, <Opposite Duration>,<Repeat Times >,<Track ID>

Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Index>	User define Report action index (1..10)	U8	
<Action>	The <Action> parameter can be in conjunction with the following bits: Bit 0: Logging Bit 1: Reporting Bit 2: Output Control Bit 3: Tracking Control	U8	0
<Destination>	Reporting destination The <Destination> parameter shall be defined when reporting <Action> is set. The parameter is in conjunction with the following bits: Bit 0: SMS Bit 1: GPRS Bit 2: USSD Bit 3: Serial Bit 4: Authorized SMS Number 1 (N/A in AT5, AX5) Bit 5: Authorized SMS Number 2 (N/A in AT5, AX5) Bit 6: Authorized SMS Number 3 (N/A in AT5, AX5) Bit 7: Incoming Calling Number (N/A in AT5, AX5)	U8	0
<Output ID>	Output ID for the output action 1 ~ 3: Digital output ID (1 ~ 2 for AT1 and AT3) 9: Buzzer output (not available on AT1 and AT3)	U8	1

<New State>	New output state 0: OFF 1: ON	U8	0
<New State Duration>	New state duration in 0.1 seconds.	U16	0
<Opposite Duration>	Opposite state duration in 0.1 seconds.	U16	0
<Repeat Times>	Repeat times. (0 ~ 255, where 255 means continuous repeating)	U8	0
<Track ID>	Reference to AT$TRAX index (1 ~ 10)	U8	0

Example

Set report action 1 as when referred, log the current report and send one copy to the server via GPRS:

AT$RACT=1,3,2

Set report action 2 as when referred, report to the SMS Base Number and set output 2 to be ON:

AT$RACT=2,6,1,2,1

Remark

☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

8.3. AT$TEXT Query or set the user define SMS text

Command Description			
This command is used to query or set the user defined SMS text when report event is triggered. The report action has to be defined to use SMS in order for it to work. Please use AT$REPT to refer to the text desired. Please note that the maximum SMS size is 160 Bytes.			
Syntax			
Write Command	AT$TEXT=<Index>,<Type>,<"Alert String">,<"User Define Format">		
Response	$OK		
Read Command	AT$TEXT=<Index>,?		
Response	$TEXT =<Index>,<Type>,<"Alert String">,<"User Define Format">		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Index>	User define SMS text string index (1..10)	U8	
<Type>	Reserved for further use	U8	0
<"Alert String">	User define string. It can be any strings except double quotes (").	String(100)	""
<"User Define Format">	Customizable format in addition to the event strings defined in AT$REPT. %GT GPS Date Time %RT RTC Date Time %ST Position Sending Date Time %LA Latitude %LG Longitude %HD Heading %AT Altitude %SA Satellite Used %RD Report ID %OD Odometer %HP GPS HDOP %VS GPS/VSS Vehicle Speed %OP All Output Status %MV Main power Voltage %BV Backup battery voltage %AIn Analog input n value (n=1)	String(100)	""

	%GS GSM Status %GQ GSM signal quality %TPn Temperature sensor n value(n=1,2) %IN All Input Status %CE Cell ID %LC Cell LAC %CN Combination of MNC and MCC %RL RXLEV(GSM Received Signal Level) %UI Unit ID %PC Pulse count value %GL Google Link (N/A in AX5)		

Example

AT$TEXT=1,0,"Unauthorized door open alert - ","%RT%LA%LG%IN"

$OK

When text is received on the cell phone, the string will look like

Unauthorized door open alert - 20110410112533,121565696,25078761,1

Remark

☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

9. Control Command

9.1. AT$OUTC Output Control

Command Description			
This command is used to control each output of the device.			
Syntax			
Write Command	AT$OUTC=<Output ID>,<New State>,<New State Duration>, <Opposite Duration>, <Repeat Times>,<Speed Limit>		
Response	$OK		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Output ID>	Output ID for the output action 1..3: Digital output ID (1..2 for AT1 and AT3) 9: Buzzer output (For AT5 and AX5 Only) 10: Wireless Relay (For AX5 Only)	U8	
<New State>	New output state 0: OFF 1: ON	U8	
<New State Duration>	New state duration in 0.1 seconds.	U16	
<Opposite Duration>	Opposite state duration in 0.1 seconds.	U16	
<Repeat Times>	Additional repeat times. (0 ~ 255, where 255 means continuous repeating)	U8	
<Speed Limit>	Speed has to be lower than <Speed Limit> in order for the output to change its state. Speed specified in km/hr.	U8	
Example			
Set the output 1 to be on 3 seconds, off 2 seconds, for 5 times. AT$OUTC=1,1,30,20,4			
Remark			
☐**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

9.2. AT$VMON Voice monitoring

Command Description			
This command is used to establish a voice call to specific phone number for voice monitoring. If the <Dial out number> is specified, the device will establish a voice call to <Dial out number> after receive the command. If the <Dial out number> is empty, the device will not establish voice call and will start to wait for the incoming call. If the incoming call number is one of the numbers in the <Accepted number> list, the device will answer the call and enter monitoring mode automatically.			
Syntax			
Write Command	AT$VMON=<"Dial out number">,<"Accepted number1">,<"Accepted number2">, <"Accepted number3">		
Response	$OK		
Read Command	AT$VMON=?		
Response	$VMON=,<"Accepted number1">,<"Accepted number2">,<"Accepted number3">		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<"Dial out number">	The phone number for a voice call monitoring	String(25)	""
<"Accepted number1">	The phone number that will be answer automatically for remote voice monitoring.	String(25)	Filled with 0's
<"Accepted number2">	The phone number that will be answer automatically for remote voice monitoring.	String(25)	""
<"Accepted number3">	The phone number that will be answer automatically for remote voice monitoring.	String(25)	""
Example			
Activate the voice monitoring by asking device to call out to 1234567890 AT$VMON="1234567890" Set 2222333322 and 1122334455 as the numbers when calling to device, entering into voice monitoring mode AT$VMON=,"2222333322","1122334455"			
Remark			
☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

10. Messaging Command

10.1. AT$POST Post a text message to server

Command Description			
This command is used to post a text message from external peripheral of the device to the server. Note: When the default communication channel is SMS, the <TextMessage> length is 10 bytes due to the SMS length limitation.			
Syntax			
Write Command	AT$POST=<Mode>,<Format>,<"Text Message">		
Response	$OK		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Mode>	Post message mode: 0: Use device queue buffer. The device will response $OK to the peripheral immediately when command is issued to the device. 1: Do not use device queue buffer. For GPRS communication: The device will response $OK to the peripheral until the message has been received by GPRS server. The default server acknowledgement timeout is 10 seconds. The $ERROR message will be response when timeout is reached. For SMS communication: The device will response $OK to the peripheral until SMS has been sent.	U8	
<Format>	Specify message format. Bit 0: ASCII format (only ASCII available) 0 - ASCII 1 - Binary Bit 1: Unquoted Message mode 0 - With quotes 1 - Without quotes	U8	

	Bit 2: Simple Position format mode 0 - Position with text message 1 - Only header with RTC and text message		
<"Text message">	Text message. Please refer to AT$FORM command for enable message on the position report. Message will be included in the defined format as a position report.	String(500) via GPRS or String(10) via SMS	

Example

Send "This is a message" to the server by entering the message with double quotes

AT$POST=1,0,"This is a message"

Send "This is a message" to the server by entering the message without double quotes

AT$POST=1,2,This is a message

Remark

☐**MEMO** ☒**SERIAL** ☐**SMS** ☐**GPRS**

10.2. AT$SMSG Send a text message to serial port of the device

Command Description			
This command is used to send a text message from server to external peripheral of the device			
Syntax			
Write Command	AT$SMSG=<Port ID>,<Format>,<"Text Message">		
Response	$OK (See Remark below)		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Port ID>	Serial port ID of the device 1: Serial port 1	U8	1
<Format>	Specify message format. Bit 0: 0 for ASCII format and 1 for Hexadecimal ASCII string Bit 1: Simple format mode (Output message will not include Header "$SMSG" in serial port.)	U8	
<"Text message">	Text message.	String(500)	
Example			
AT$SMSG=1,0,"This is a message" Output on device's serial port: $SMSG="This is a message" AT$SMSG=1,1,"5468697320697320612061206D657373616765" Output on device's serial port: $SMSG="5468697320697320612061206D657373616765" AT$SMSG=1,2,"This is a message" Output on device's serial port: This is a message			
Remark			
When the server is issuing the AT$SMSG command, the device serial port will be prompted the following message: $SMSG{+Tag}=<"Text Message"><CR><LF> The AT$SACK{+Tag} must be send to the device when server needs $OK response message.			
☐**MEMO** ☐**SERIAL** ☒**SMS** ☒**GPRS**			

10.3. AT$FORW Send SMS/USSD message to device for forwarding

Command Description			
This command is used to send SMS/USSD message to the device for forwarding. When the device receives the command from server via GPRS, it will forward to specified channel (SMS/USSD) with the message. For response from USSD, it will be forward back to server. No response from SMS will be forwarded. Please see the example for more detail.			
Syntax			
Write Command	AT$FORW=<Type>,<"SMS Number / USSD Command Prefix">,<"SMS Message">		
Response	$OK		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Type>	1: Forward to SMS 2: Forward to USSD	U8	
<"SMS Number / USSD Command Prefix">	<Type> = 1: This parameter is used to specify the SMS forwarding destination of the SIM phone number. <Type> = 2: This parameter is used to specify the USSD string (i.e. *147). The ending sharp sign (#) will be added automatically.	String(25)	""
<"SMS Message">	This parameter is used to specify what message should be forward to as the SMS to the phone number specified in the second parameter when <type>=1.	String(160)	""
Example			
Forward USSD to query SIM balance, and forward reply to the server: Server --- (AT$FORW=2,"*147" command via GPRS) ---> Device Device receive USSD reply from Telecom --- Send reply via GPRS ---> Server Forward SMS to a phone number: AT$FORW=1,"0988168168","This is a message using forwarding function!" On the phone number 0988168168, the message "This is a message using forwarding function!" will be received.			
Remark			
☐**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**			

11. Application Command

11.1. AT$DVID Driver ID Authorization

Command Description			
This command is used to query and set the parameters for driver ID authorization properties. The driver ID is coming from external RFID device or 1-Wire® i-Button (Model DS1990A) device. If <"Accepted ID1"> ~ <"Accepted ID10"> are empty, that means all IDs are accepted. When valid driver ID is read, the specific output will turn ON. If ACC is not ON within this <Output Delay>, the output will be changed back to OFF. If ACC is ON within <Output delay>, the output will keep ON state until <Output Delay> time elapsed after ACC OFF.			
Syntax			
Write Command	AT$DVID=<Action>,<Output ID>,<Output Delay>,<"Accepted ID 1">,<"Accepted ID 2">,... <"Accepted ID 9">,<"Accepted ID 10">		
Response	$OK		
Read Command	AT$DVID=?		
Response	$DVID=<Action>,<Output ID>,<Output Delay>,<"Accepted ID 1">,<"Accepted ID 2">,... <"Accepted ID 9">,<"Accepted ID 10">		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Action>	The <Action> parameter can be in conjunction with the following bits: Bit 0: Logging Bit 1: Reporting on authorized ID scan Bit 2: Digital Output Control Bit 3: Buzzer Output Control (Not available on AT1 and AT3) Bit 2 and Bit 3 cannot be used at the same time. Bit 4: Report to serial port Bit 5: Reverse Digital Output Control Bit 6: Reporting on unauthorized ID scan (AT1 only)	U8	0
<Output ID>	Output ID for the output action 1..3: Digital output ID (1..2 for AT1 and AT3) for Digital Output Control. 9: Buzzer Output ID for Buzzer Output Control. (Not available on AT1 and AT3)	U8	0

<Output Delay>	Duration in seconds that output will back to the OFF state when ACC is from ON to OFF or when ACC is not turned on. Value 0 will not cause the output be turned off.	U8	10
<"Accepted ID1"> ~ <"Accepted ID10">	Driver ID1 ~ 10 in hexadecimal ASCII string that is authorized for this function.	String(16) in each	""

Example

Enable output 3 to be one for 10 seconds when receiving ID as BC12FC000000 or B11DFC000000.

AT$DVID=4,3,10,"BC12FC000000","B11DFC000000"

Remark

☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

11.2. AT$VOIC Query or set the voice call properties

Command Description
This command is used to query and set the parameters for incoming and outgoing voice calls. If <Outgoing Control> is enabled to use one of the inputs, the specified input will be the control key for voice control. This input can be use to select dial out voice call, hang up the call and manually answer the call. The dial out call number is rotated one by one when the input is pushed. When selecting "Accepted Out Call 1", you will hear a short beep through buzzer output. Within 3 seconds after the short beep, pushing the input button again will select the "Accepted Out Call 2" with two short beeps. If the call number is desired, leave the input untouched, and a long beep will be sounded. The device will remember the last selected "Accepted Out Call" number. **When Bit 4 or Bit 5 is set in the Action, a position report will be sent to the destination. Please note, calling function and reporting function cannot be used simultaneously.** **Note:** The "Accepted Number" in AT$VMON command has to be set before using VOIC command, due to all the incoming calls will be filtered by VMON before entering into VOIC process. If VMON does not have at least one "Accepted Number" set, all incoming call will be in voice monitoring mode.

Syntax	
Write Command	AT$VOIC=<Incoming Mode>,<Incoming Control>,<Outgoing Mode>,<Outgoing Control>,<Action>,<"Accepted In Call 1">,<"Accepted In Call 2">,<"Accepted In Call 3">, <"Accepted Out Call 1">,<"Accepted Out Call 2">,<"Accepted Out Call 3">
Response	$OK
Read Command	AT$VOIC=?
Response	$VOIC=<Incoming Mode>,<Incoming Control>,<Outgoing Mode>,<Outgoing Control>,<Action>,<"Accepted In Call 1">,<"Accepted In Call 2">,<"Accepted In Call 3">, <"Accepted Out Call 1">,<"Accepted Out Call 2">,<"Accepted Out Call 3">

Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Incoming Mode>	0: Disable any incoming call 1: Accept any incoming call 2: Incoming call limitation for only 3 phone numbers	U8	0
<Incoming Control>	0: Manual answer 1: Auto answer	U8	0
<Outgoing Mode>	0: Disable any outgoing call 1: Reserved for future use 2: Outgoing call limitation for only 3 phone numbers	U8	0

<Outgoing Control>	Use one of the Inputs to establish voice call and answer 0: Disable input trigger mode 1: Enable input trigger mode using input 1 2: Enable input trigger mode using input 2 3: Enable input trigger mode using input 3	U8	0
<Action>	This <Action> will be activated when <Outgoing Control> is not 0 and input trigger to establish a voice call. The <Action> parameter can be in conjunction with the following bits: Bit 0: Logging Bit 1: Reporting Bit 2 ~ 3: Reserved Bit 4: Send a position report to server when call received Bit 5: Send a position report to the phone call issuer Bit 6 ~ 7: Reserved	U8	0
<"Accepted In Call 1">	An incoming phone number that is accepted for answering	String(25)	""
<"Accepted In Call 2">	An incoming phone number that is accepted for answering	String(25)	""
<"Accepted In Call 3">	An incoming phone number that is accepted for answering	String(25)	""
<"Accepted Out Call 1">	A outgoing phone number for dial out	String(25)	""
<"Accepted Out Call 2">	A outgoing phone number for dial out	String(25)	""
<"Accepted Out Call 3">	A outgoing phone number for dial out	String(25)	""

Example

Set the device to auto pickup incoming call from any number but does not allow calling out

AT$VOIC=1,1,0

Set the device to auto pickup 1234567890 and 2244554422, allow dial to 5464648800 when input 1 triggered, and report when voice call is received/made

AT$VOIC=2,1,2,1,2,"1234567890","2244554422",,"5464648800"

Remark

☒**MEMO** ☒**SERIAL** ☒**SMS** ☒**GPRS**

11.3. CANBus Kit (AC1/AC2/AC3) Functions

Due to the various commands for CANBus Kit, please refer to **CANBus Kit Protocol Document** for its commands.

11.4. Garmin FMI Functions

Due to the various commands for Garmin FMI functions, please refer to **Garmin FMI Protocol Document** for more detail.

12. Firmware Upgrade

12.1. AT$FWDL Start firmware upgrade by serial port

Command Description	
This command is used to start firmware upgrade by using YModem transmission protocol of HyperTerminal. It is only for upgrade firmware by serial port.	
Syntax	
Write Command	AT$FWDL
Response	$OK
Remark	
Please refer to ATrack product User Manual for detailed firmware upgrade instruction.	
☐**MEMO** ☒**SERIAL** ☐**SMS** ☐**GPRS**	

12.2. AT$FOTA Firmware upgrade by OTA (Over The Air)

Command Description			
This command is used to upgrade firmware by GPRS. The device is using FTP (File Transfer Protocol) connect to specific FTP server and upgrade firmware automatically. Note that the AT$GPRS command shall be enabled and necessary GPRS parameters shall be set before AT$FOTA command is issued. After the AT$FOTA command is issued, the device will restart and start doing firmware upgrade automatically. The FOTA report (Report ID=12) will be sent when the new firmware upgrade process is completed. For AY5(i), the standard Y-Modem protocol over TCP is used. After the AT$FOTA command is issued, the device will establish a connection to the specified server and port. The server has to send the file using Y-Modem protocol over TCP connection.			
Syntax			
Write Command	AT$FOTA=<Upgrade Mode>,<"Server IP address">,<Port>,<"User name">,<"Password">, <"Firmware Filename">,<FTP mode>		
Response	$OK		
Read Command	AT$FOTA=?		
Response	$FOTA=<Upgrade Mode>,<"Server IP address">,<"User name">,<"Password">, <"Firmware Filename">,<FTP mode>		
Parameter Description			
Parameters	**Description**	**Data Type**	**Default**
<Upgrade Mode>	0: Disable 1: Enable	U8	0
<"Server IP address">	Specify FTP server IP address for firmware file transfer.	String(32)	""
<Port>	Specify FTP server port for firmware file transfer. The default FTP port is 21.	U16	21
<"User name">	FTP server login user name	String(16)	""
<"Password">	FTP server login password.	String(16)	""
<"Firmware Filename>	Specify firmware filename on the FTP server logon directory.	String(16)	""
<FTP mode>	0: Passive Mode 1: Active Mode [35]	U8	0
Example			
AT$FOTA=1,"112.223.0.1",,"user","pass","AT5_100.dat" $OK			
Remark			
☒**MEMO** ☐**SERIAL** ☒**SMS** ☒**GPRS**			

13. Appendix

13.1. Default Report ID

Report ID	Related Command	Description	Default Communication Type
0	AT$GPOS	Get current position	Depend on command
1	AT$SLOG/ AT$DLOG	Download log	Depend on command
2	AT$TRAC	Tracking	Depend on command
3	AT$POST	Post a text message	*GPRS > SMS
4	AT$TRAC	Tracking report in Distance Mode	Depend on command
10	AT$DVID	Driver ID authorization report	*GPRS > SMS
11	AT$VOIC	Voice service report	*GPRS > SMS
12	AT$FOTA	FOTA completed	*GPRS > SMS
13	GSM Jammed Detect	GSM jammed detect report	*GPRS > SMS
14	AT$GDAT	G-Sensor data for impact detected	Not available for SMS
16	AT$FOTA	FOTA failure report	*GPRS > SMS
17	AT$VOIC	Sending position by calling	Depend on command
18	AT$GPOS	Cell ID report	*GPRS > SMS
21	AT$DLOG	Download log completed	Depend on command
22	AT$GDTC	Get OBD-II DTC Trouble Code	*GPRS > SMS
23	AT$DVID	Driver ID unauthorization report	*GPRS > SMS
101..164	AT$REPT	User defined report	Depend on command

*GPRS > SMS：If AT$GPRS is enabled, the report will be sent to GPRS server. Otherwise, send SMS message.

13.2. World Wide GSM Service Provider Code

Country	Operator	MCC	MNC	Provider Code (MCC+MNC)
Albania	Albanian Mobile Comms	276	01	27601
Algeria	Algerian Mobile Network	603	01	60301
Andorra	S.T.A. MobilAnd	213	03	21303
Armenia	ArmenTel	283	01	28301
Australia	Telstra Mobile Comms	505	01	50501
Australia	Cable + Wireless Optus	505	02	50502
Australia	Vodafone	505	03	50503
Austria	MobilKom Austria A1	232	01	23201
Austria	max.mobil.Telekoms Service	232	03	23203
Austria	Connect Austria One	232	05	23205
Azerbaijan	Azercell Telekom B.M.	400	01	40001
Azerbaijan	J.V.Bakcell GSM 2000	400	02	40002
Bahrain	Batelco	426	01	42601
Bangladesh	Grameen Phone	470	01	47001
Bangladesh	Sheba Telecom	470	19	47019
Belgium	Belgacom Mobile Proximus	206	01	20601
Belgium	Mobistar	206	10	20610
Bosnia Herzegovina	Cronet	218	01	21801
Bosnia Herzegovina	PTT Bosnia	218	19	21819
Bosnia Herzegovina	PE PTT BIH	218	90	21890
Botswana	Mascom Wireless	652	01	65201
Brunei Darussalam	Jabatan Telekom	528	01	52801
Brunei Darussalam	DST Communications	528	11	52811
Bulgaria	MobilTel AD	284	01	28401
Cambodia	CamGSM	456	01	45601
Cambodia	Cambodia Samart Comms	456	02	45602
Cameroon	PTT Cameroon Cellnet	624	01	62401
Canada	Microcell Connexions Inc	302	37	30237
Cape Verde	Cabo Verde Telecom	625	01	62501
Chile	Entel Telefonia Movil	730	01	73001
Chile	Entel PCS Telecom.	730	10	73010
China	China Telecom GSM	460	00	46000

Country	Operator	MCC	MNC	Provider Code (MCC+MNC)
China	China Unicom GSM	460	01	46001
China	Liaoning PPTA	460	02	46002
Cote d'Ivoire	Comstar Cellular Network	612	01	61201
Cote d'Ivoire	Telecel	612	02	61202
Cote d'Ivoire	S.I.M Ivoiris	612	03	61203
Cote d'Ivoire	Loteny Telecom Telecel	612	05	61205
Croatia	Croatian Telecoms Cronet	219	01	21901
Cyprus	Cyprus Telecoms Authority	280	01	28001
Czech Republic	RadioMobil	230	01	23001
Czech Republic	EuroTel Praha	230	02	23002
Czech Republic	SPT Telecom	230	03	23003
Denmark	Tele-Danmark Mobil	238	01	23801
Denmark	Sonofon	238	02	23802
Denmark	Telia Denmark	238	20	23820
Denmark	Mobilix	238	30	23830
Egypt	MobiNil	602	01	60201
Egypt	Misrfone Telecom. Click	602	02	60202
Estonia	Estonian Mobile Telephone	248	01	24801
Estonia	Radiolinja Eesti	248	02	24802
Estonia	Q GSM	248	03	24803
Ethiopia	Ethiopian Telecoms Auth.	636	01	63601
Fiji	Vodafone Fiji	542	01	54201
Finland	Telia Finland	244	03	24403
Finland	Radiolinja	244	05	24405
Finland	Alands Mobiltelefon	244	05	24405
Finland	Finnet Group	244	09	24409
Finland	Sonera Corporation	244	91	24491
France	France Telecom Itineris	208	01	20801
France	SFR	208	10	20810
France	Bouygues Telecom	208	20	20820
French Polynesia	Tikiphone	547	20	54720
French West Indies	France Caraibe Ameris	340	01	34001
Georgia	Geocell Limited	282	01	28201
Georgia	Magti GSM	282	02	28202
Germany	D1 DeTe Mobil	262	01	26201
Germany	D2 Mannesmann Mobilfunk	262	02	26202

Country	Operator	MCC	MNC	Provider Code (MCC+MNC)
Germany	E-Plus Mobilfunk	262	03	26203
Germany	Viag Interkom	262	07	26207
Ghana	ScanCom	620	01	62001
Gibraltar	Gibraltar Telecoms Gibtel	266	01	26601
Greece	Cosmote	202	01	20201
Greece	Panafon	202	05	20205
Greece	Telestet	202	10	20210
Greenland	Tele Greenland	290	01	29001
Guinea	Sotelgui Lagui	611	02	61102
Hong Kong	Hong Kong Telecom CSL	454	00	45400
Hong Kong	Hutchison Telecom	454	04	45404
Hong Kong	SmarTone Mobile Comms	454	06	45406
Hong Kong	New World PCS	454	10	45410
Hong Kong	Peoples Telephone	454	12	45412
Hong Kong	Mandarin Com. Sunday	454	16	45416
Hong Kong	Pacific Link	454	18	45418
Hong Kong	P Plus Comm	454	22	45422
Hungary	Pannon GSM	216	01	21601
Hungary	Westel 900 GSM Mobile	216	30	21630
Iceland	Iceland Telecom Siminn	274	01	27401
Iceland	TAL hf	274	02	27402
India	TATA Cellular	404	07	40407
India	Bharti Cellular Telecom Airtel	404	10	40410
India	Sterling Cellular Essar	404	11	40411
India	Escotel Mobile Comms	404	12	40412
India	Modi Telstra Modicom	404	14	40414
India	Aircel Digilink Essar Cellph.	404	15	40415
India	Hutchison Max Touch	404	20	40420
India	BPL Mobile	404	21	40421
India	BPL USWest Cellular	404	27	40427
India	Usha Martin Tel. Command	404	30	40430
India	Mobilenet	404	31	40431
India	SkyCell Communications	404	40	40440
India	RPG MAA	404	41	40441
India	Srinivas Cellcom	404	42	40442
Indonesia	PT. Satelindo	510	01	51001

Country	Operator	MCC	MNC	Provider Code (MCC+MNC)
Indonesia	Telkomsel	510	10	51010
Indonesia	PT. Excelcomindo Excelcom	510	11	51011
Iran	TCI	432	11	43211
Iraq	Iraq Telecom	418	01	41801
Ireland	Eircell	272	01	27201
Ireland	Esat Digifone	272	02	27202
Ireland	Meteor	272	03	27203
Israel	Partner Communications	425	01	42501
Italy	Telecom Italia Mobile TIM	222	01	22201
Italy	Omnitel Pronto	222	10	22210
Italy	Wind Telecomunicazioni	222	88	22288
Jordan	J.M.T.S Fastlink	416	01	41601
Kuwait	Mobile Telecoms MTCNet	419	02	41902
Kyrgyz Republic	Bitel	437	01	43701
Lao	Lao Shinawatra Telecom	457	01	45701
Latvia	Latvian Mobile Tel.	247	01	24701
Latvia	BALTCOM GSM	247	02	24702
Lebanon	FTML Cellis	415	01	41501
Lebanon	LibanCell	415	03	41503
Lesotho	Vodacom	651	01	65101
Liberia	Omega Communications	618	01	61801
Lithuania	Omnitel	246	01	24601
Lithuania	UAB Bite GSM	246	02	24602
Luxembourg	P+T LUXGSM	270	01	27001
Luxembourg	Millicom Tango GSM	270	77	27077
Macau	C.T.M. TELEMOVEL+	455	01	45501
Macedonia	Macedonian Tel. MobiMak	294	01	29401
Madagascar	Madacom	646	01	64601
Madagascar	SMM Antaris	646	02	64602
Madagascar	Sacel	646	03	64603
Malawi	Telekom Network Callpoint	650	01	65001
Malaysia	My BSB	502	02	50202
Malaysia	Binariang	502	03	50203
Malaysia	Binariang Comms. Maxis	502	12	50212
Malaysia	Telekom Cellular TM Touch	502	13	50213
Malaysia	DiGi Telecommunications	502	16	50216

Country	Operator	MCC	MNC	Provider Code (MCC+MNC)
Malaysia	Time Wireless Adam	502	17	50217
Malaysia	Celcom	502	19	50219
Malta	Vodafone	278	01	27801
Mauritius	Cellplus Mobile Comms	617	01	61701
Moldova	Voxtel	259	01	25901
Morocco	Itissalat Al-Maghrib IAM	604	01	60401
Mozambique	Telecom de Mocambique	634	01	63401
Namibia	MTC	649	01	64901
Netherlands	Libertel	204	04	20404
Netherlands	KPN Telecom	204	08	20408
Netherlands	Telfort	204	12	20412
Netherlands	Ben	204	16	20416
Netherlands	Dutchtone	204	20	20420
New Caledonia	OPT Mobilis	546	01	54601
New Zealand	Vodafone	530	01	53001
New Zealand	Telecom NZ	530	03	53003
New Zealand	Telstra	530	04	53004
Norway	Telenor Mobil	242	01	24201
Norway	NetCom GSM	242	02	24202
Oman	General Telecoms	422	02	42202
Pakistan	Mobilink	410	01	41001
Papua New Guinea	Pacific Mobile Comms	310	01	31001
Philippines	Isla Comms	515	01	51501
Philippines	Globe Telecom	515	02	51502
Philippines	Smart Communications	515	03	51503
Poland	Polkomtel PLUS GSM	260	01	26001
Poland	ERA GSM	260	02	26002
Poland	IDEA Centertel	260	03	26003
Portugal	Telecel Communicacoes	268	01	26801
Portugal	Optimus Telecom.	268	03	26803
Portugal	Telecom Moveis Nac. TMN	268	06	26806
Qatar	Q-Tel QATARNET	427	01	42701
Reunion	Societe Reunionnaise SRR	647	10	64710
Romania	MobiFon CONNEX GSM	226	01	22601
Romania	Mobil Rom DIALOG	226	10	22610
Russia	MTS Moscow	250	01	25001

Country	Operator	MCC	MNC	Provider Code (MCC+MNC)
Russia	North-West GSM	250	02	25002
Russia	Siberian Cellular	250	05	25005
Russia	Zao Smarts	250	07	25007
Russia	Don Telecom	250	10	25010
Russia	New Telephone Company	250	12	25012
Russia	Far-Eastern Cellular	250	12	25012
Russia	Kuban GSM	250	13	25013
Russia	Uratel	250	39	25039
Russia	North Caucasian GSM	250	44	25044
Russia	KB Impuls BeeLine	250	99	25099
Rwanda	Rwandacell	635	10	63510
Saudi Arabia	Ministry of PTT Al Jawal	420	01	42001
Saudi Arabia	Electronics App' Est. EAE	420	07	42007
Senegal	Sonatel ALIZE	608	01	60801
Seychelles	Seychelles Cellular Services	633	01	63301
Seychelles	Telecom AIRTEL	633	10	63310
Singapore	Singapore Tel. GSM 900	525	01	52501
Singapore	Singapore Tel. GSM 1800	525	02	52502
Singapore	MobileOne Asia	525	03	52503
Slovak Republic	Globtel GSM	231	01	23101
Slovak Republic	EuroTel GSM	231	02	23102
Slovenia	Si.mobil	293	40	29340
Slovenia	Mobitel	293	41	29341
South Africa	Vodacom	655	01	65501
South Africa	MTN	655	10	65510
Spain	Airtel Movil	214	01	21401
Spain	Retevision Movil Amena	214	03	21403
Spain	Telefonica Moviles Movistar	214	07	21407
Sri Lanka	MTN Networks Dialog GSM	413	02	41302
Sudan	Mobile Telephone Company	634	01	63401
Sweden	Telia Mobitel	240	01	24001
Sweden	Comviq GSM	240	07	24007
Sweden	Europolitan	240	08	24008
Switzerland	Swisscom NATEL	228	01	22801
Switzerland	diAx Mobile	228	02	22802
Switzerland	Orange	228	03	22803

Country	Operator	MCC	MNC	Provider Code (MCC+MNC)
Syria	Syrian Telecom Est. MOBILE	417	09	41709
Taiwan	Far EasTone Telecoms	466	01	46601
Taiwan	TUNTEX Telecom	466	06	46606
Taiwan	KG Telecom	466	88	46688
Taiwan	Chunghwa Telecom	466	92	46692
Taiwan	Mobitai Communications	466	93	46693
Taiwan	Pacific Cellular TWNGSM	466	97	46697
Taiwan	TransAsia Telecoms	466	99	46699
Tanzania	Tritel	640	01	64001
Thailand	Advanced Info Service AIS	520	01	52001
Thailand	WCS IQ	520	10	52010
Thailand	Total Access Worldphone	520	18	52018
Thailand	Digital Phone HELLO	520	23	52023
Togo	Togo Telecom TOGO CELL	615	01	61501
Tunisia	Tunisie Telecom Tunicell	605	02	60502
Turkey	Turk Telekom Turkcell	286	01	28601
Turkey	TELSIM Mobil Telekom.	286	02	28602
U.S.A.	APC Sprint Spectrum	310	02	31002
U.S.A.	Wireless 2000 Telephone	310	11	31011
U.S.A.	BellSouth Mobility DCS	310	15	31015
U.S.A.	Omnipoint Communications	310	16	31016
U.S.A.	Pacific Bell Wireless	310	17	31017
U.S.A.	Western Wireless Voicestream	310	26	31026
U.S.A.	Powertel	310	27	31027
U.S.A.	Aerial Communications	310	31	31031
U.S.A.	Iowa Wireless Services	310	77	31077
Uganda	Celtel Cellular	641	01	64101
Uganda	MTN Uganda	641	10	64110
Ukraine	Ukrainian Mobile Comms	255	01	25501
Ukraine	Ukrainian Radio Systems	255	02	25502
Ukraine	Kyivstar GSM	255	03	25503
Ukraine	Golden Telecom	255	05	25505
United Arab Emirates	UAE ETISALAT-G1	424	01	42401
United Arab Emirates	UAE ETISALAT-G2	424	02	42402
United Kingdom	Cellnet	234	10	23410
United Kingdom	Vodafone	234	15	23415

Country	Operator	MCC	MNC	Provider Code (MCC+MNC)
United Kingdom	One 2 One	234	30	23430
United Kingdom	Orange	234	33	23433
United Kingdom	Jersey Telecom GSM	234	50	23450
United Kingdom	Guernsey Telecoms GSM	234	55	23455
United Kingdom	Manx Telecom Pronto GSM	234	58	23458
Uzbekistan	Buztel	434	01	43401
Uzbekistan	Daewoo Unitel	434	04	43404
Uzbekistan	Coscom	434	05	43405
Venezuela	Infonet	734	01	73401
Vietnam	MTSC	452	01	45201
Vietnam	DGPT	452	02	45202
Yugoslavia	MOBTEL	220	01	22001
Yugoslavia	ProMonte GSM	220	02	22002
Zambia	Zamcell	645	01	64501
Zimbabwe	NET*ONE	648	01	64801
Zimbabwe	Telecel	648	03	64803

13.3. AT Command ERROR Codes

ERROR Code	Description
101	Invalid command
102	Invalid command parameters
103	Invalid command tag format
104	Invalid command password
105	Invalid SIM PIN code
106	No log data available
107	No impact G sensor data available
108	SMS Not Supported

13.4. AT1(E) ERROR Codes

ERROR Code	Description
300	Parameters Error
301	Does not connect to GPRS network
302	Socket opening error
304	Port or IP address error
305	Fail to connect to this socket (server)

13.5. $CME ERROR Codes

CME Code No.	Description
0	Phone Failure
1	No Connection To Phone
2	Phone-Adaptor Link Reserved
3	Operation Not Allowed
4	Operation Not Supported
5	PH-SIM PIN Required
10	SIM Not Inserted
11	SIM PIN Required
12	SIM PUK Required
13	SIM Failure
14	SIM Busy
15	SIM Wrong
16	Incorrect Password
17	SIM PIN2 Required
18	SIM PUK2 Required
20	Memory Full
21	Invalid Index
22	Not Found
23	Memory Failure
24	Text String Too Long
25	Invalid Characters In Text String
26	Dial String Too Long
27	Invalid Characters In Dial String
30	No Network Service
31	Network Time-Out
32	Network Not Allowed - Emergency Calls Only
40	Network Personalization PIN Required
41	Network Personalization PUK Required
42	Network Subset Personalization PIN Required
43	Network Subset Personalization PUK Required
44	Service Provider Personalization PIN Required
45	Service Provider Personalization PUK Required

CME Code No.	Description
46	Corporate Personalization PIN Required
47	Corporate Personalization PUK Required
100	Unknown
103	Illegal MS
106	Illegal ME
107	GPRS Service Not Allowed
111	PLMN Not Allowed
112	Location Area Not Allowed
113	Roaming Not Allowed In This Location Area
132	Service Option Not Supported
133	Requested Service Option Not Subscribed
134	Service Option Temporarily Out Of Order
148	Unspecified GPRS Error
149	PDP Authentication Failure
150	Invalid Mobile Class
550	Generic Undocumented Error
551	Wrong State
552	Wrong Mode
553	Context Already Activated
554	Stack Already Active
555	Activation Failed
556	Context Not Opened
557	Cannot Setup Socket
558	Cannot Resolve DN
559	Time-Out In Opening Socket
560	Cannot Open Socket
561	Remote Disconnected Or Time-Out
562	Connection Failed
563	Tx Error
564	Already Listening
566	Cannot Resume Socket
567	Wrong APN
568	Wrong PDP
569	Service Not Support
570	QOS Not Accepted
571	NSAPI Already Used

CME Code No.	Description
572	LLC Or SNDCP Failure
573	Network Reject
606	FTP Connection failed
657	Network Survey Error [No Carrier]
658	Network Survey Error [Busy]
659	Network Survey Error [Wrong Request]
660	Network Survey Error [Aborted]
731	Unspecified
732	Activation Command Is Busy
733	Activation Started With CMUX Off
734	Activation Started On Invalid CMUX
736	Remote SIM Already Active
737	Invalid Parameter

13.6. $CMS ERROR Codes

CMS Code No.	Description
0..127	GSM 04.11 Annex E-2 values
128..255	GSM 03.40 sub clause 9.2.3.22 values
300	ME Failure
301	SMS Service Of ME Reserved
302	Operation Not Allowed
303	Operation Not Supported
304	Invalid PDU Mode Parameter
305	Invalid Text Mode Parameter
310	SIM Not Inserted
311	SIM PIN Required
312	PH-SIM PIN Required
313	SIM Failure
314	SIM Busy
315	SIM Wrong
316	SIM PUK Required
317	SIM PIN2 Required
318	SIM PUK2 Required
320	Memory Failure
321	Invalid Memory Index
322	Memory Full
330	Smsc Address Unknown
331	No Network Service
332	Network Time-Out
500	Unknown