FS-64 USER MANUAL

Embarc Information Technology Co. Pvt. Ltd

Thank you for purchasing FindnSecure FS-64 Vehicle Unit. Please read all Instructions carefully before operation, to ensure your complete understanding and to obtain the best possible performance from the unit.

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1. Introduction to FS-64 Protocol

This document describes the protocol of the FS-64 devices. Embarc information technology proprietary messaging protocol is used for all communications between the base and the device. This protocol incorporates error checking, message sequencing with full acknowledgement of received messages on request. The base station sends messages to the device and waits for an acknowledgement message from the device to indicate the status of the request. So this guide covers all protocol information you need to design and set up server applications incorporating the FS-64 devices.

2. Version History

GSM	Version	Whay's new	Firmware Version Required	Hardware Version Required
2009.02.27	1.0	First Release		
2009.03.10	1.0.1	Modify Message ID Table		
		Modify Asynchronous Position Message ASCII Format		
	1.0.2	Add analog values for each position message		
2009.04.03	1.0.3	Modify AT$GETPDS Example		
		Modify PDSR Min.Time interval		
		Add <Heading change> to PDSR command		
		Modify AT$RESET and add AT$REBOOT command		
		Remove AT&F and AT&W command		
		Add AT$VERSION command		
		Add AT$QUST command		
		Add AT$IMEI command		
2009.05.13	1.0.4	Modify AT$PDSR parameter sort		
		Modify AT$REPORT <Input Event> message		
2009.05.25	1.0.5	Modify AT$REBOOT command description		
2009.06.23	1.0.6	Add <Port> parameter to AT$HOSTS	1.07	
		Remove AT$PORT command		
		Add <Mileage> to ASCII Position Message Format		
		Add $ST+OPDL command		
2009.09.17	1.0.7	Modify AT$GETPDS	2.09	
		Modify maximum sizes of <Min. Time> and <Time		
		Multiplier> in AT$PDSR command		
		Add AT$PDSR <Heading Change> Note		
		Add new formats in GP<n>		
		Add AT$FUEL command		
		Add AT$BAND command		
		Add AT$REPORT <Force Connection> parameter		
		Add AT$GFSP command		
		Add AT$HOSTS <FQDN> parameter	2.10	
		Add AT$DNS command		
		Add AT$URL command		
2009.11.29	1.0.8	Add AT$NETCFG <Reduce SMS> parameter	2.11	
		Add AT$HB <Force> parameter		
		Add AT$FUEL Note		

		Modify AT$AREPORT and add parameters		
		Add AT$SMSVIP command (Domestic Use Only)		
		Add AT$PWAMP command		
		Add AT$CELLID command		
7		Add AT$VOICE command		
		Add AT$CALL command (Domestic Use Only)		
		Add AT$ALARM command (Domestic Use Only)		
		Add new report IDs		
2010.01.25	2.0.0	Modify Asynchronous Text Message Format.	2.1	
		Add AT$IMPEN command parameters.	2.15rev04	
		Modify AT Command Request/Response		
		Delete Error Response format.		
		Modify AT$REPORT <Force Connection> parameter.		
		FS-64 Version Form 2.0.0 start		
2010.01.28	2.0.1	Modify AT$SPEED,AT$GFSP speed units		
2010.03.05	2.0.2	Modify AT$GETPDS Example and Value	2.17 Rev00	
		New add AT$QUST <Network Registration>		
		New add AT$IMPEN <Report Mode>		
		New add AT$IDLE <Engine Status Detection Method> Item 3 –Engine & Ignition Status "on"		
		Modify Command Example ACK responds. AT$QUST,AT$GPSPT,AT$VEXT,AT$VBAT, AT$VERSION,AT$IMEI,AT$URL,AT$SNDT XT,AT$IGN,AT$REPORT		
2010.03.17	2.0.3	New add [(Kilometer per Hour)/0.36] in the AT$SPEED and AT$GFSP command and AT$FILTER	2.18 Rev00	A
		New add specification (This function can't be used with audio box at the same time.)		
		New add 194 message ID		
		Modified AT$AREPORT Voltage unit. (milli-voltage)		

3. Scope of the Document

This document presents the AT Command Set for the FS-64 devices.

3.1 Document conventions

Convention	Description
< >	AT Request/Response Parameters are shown within the less than and greater than symbols.
[ ]	Optional parameters are shown between brackets. If optional parameters are not present, default values are used.
{ }	Represents a group of parameters defined elsewhere.
,,,	Arguments omitted by consecutive comments are equivalent to a parameter not being specified, indicating that the default value be used.

3.2 AT Command Request/Response

Each AT Command sent to the device shall be followed by a device response that may simply be the text "$OK：：command", "$ERROR：：command", or other response as specified in this requirements document.

3.3 Request and Response Transitions

Each AT command request send by the server to the device, there shall have a response from the device to the server. See the next section for the detailed message format.

Each Asynchronous message sent by the device to the host server via GPRS shall be followed by a binary acknowledgement as defined in the Message type section.

Each Asynchronous message sent by the device the SMS destination shall not be followed by an acknowledgement.

Server   Device

| AT Command Request → |
| ← AT Command Response |
| ← Asynchronous Position Message |
| Acknowledgement → |
| ← Asynchronous Text Message |
| Acknowledgement → |
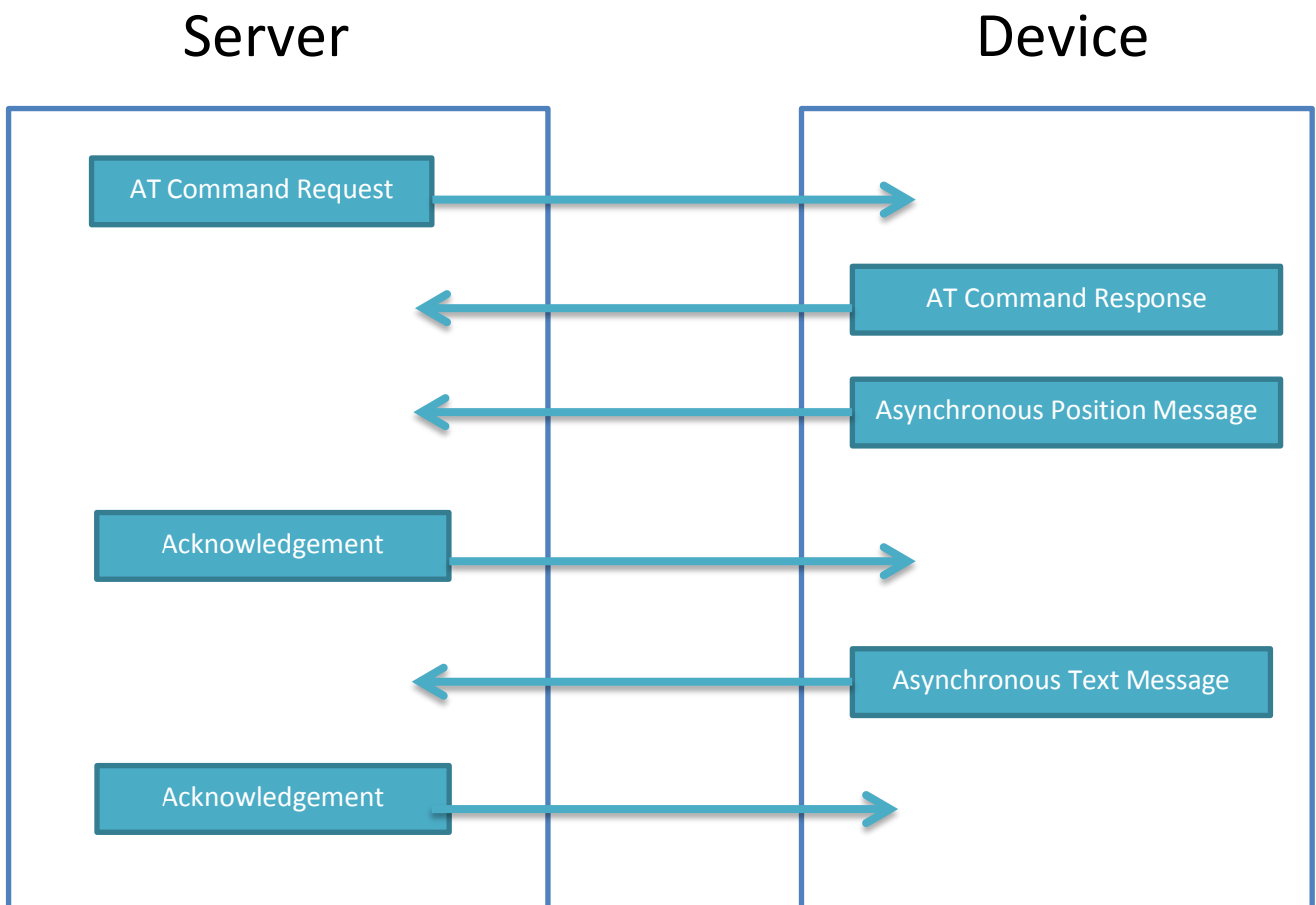
3.4 Message Format

The request and response message format are different according to the AT$FORMAT command setting. The AT$FORMAT command can specify ASCII or Binary format for all messages. Please note that all binary message formats are described as **Big-endian**.

AT Command Request Message Format

ASCII Format
Send AT command data directly without other information.

Binary Format

Byte	Name	Size	Type	Description
0	Transaction ID	2	Unsigned Integer	16-bit transaction ID
2	Message Encoding	1	Unsigned Integer	0x01 – AT Command
3	Message Type	1	Unsigned Integer	0x00 – Request
4	Data Length	2	Unsigned Integer	Message data length
6	Message Data	Variable	Character String	AT Command Data

AT Command Response Message Format

ASCII Format
Response AT Response Date directly without other information.

Binary Format

Byte	Name	Size	Type	Description
0	Transaction ID	2	Unsigned Integer	16-bit transaction ID
2	Message Encoding	1	Unsigned Integer	0x01 – AT Command
3	Message Type	1	Unsigned Integer	0x00 – Response
4	Data Length	2	Unsigned Integer	Message data length
6	Message Data	Variable	Character String	AT Response Data

Asynchronous Position Message Format

ASCII Format

<Modem_ID>, <GPS_DateTime>,<Longitude>,<Latitude>,<Speed>,<Direction>,<Altitude>,

<Satellites>,<Message ID>,<Input Status>,<Output Status>,<Analog Input1>,<Analog

Input2>,<RTC_DateTime>,<Mileage>

Parameter	Format	Description
<Modem ID>		Modem ID (See AT$MODID command)
<GPS Date Time>	YYYYMMDDhhmmss	The latest valid GPS date and time YYYY : Year position was received. MM : Month position was received. DD : Day position was received. Hh : Hour position was received. Mm : Minute position was received. Ss : Second position was received.
<Longitude>		Longitude in decimal degrees
<Latitude>		Latitude in decimal degrees
<Speed>		Speed in decimal kilometer per hour
<Direction>		Direction in decimal degrees
<Altitude>		Altitude in meters
<Satellite>		Number of Satellites
<Message ID>		See Message ID Table
<Input Status>		Decimal value of Input Status (See I/O StatusTable Bit0..Bit7)
<Output Status>		Decimal value of Output Status (See I/O StatusTable Bit8..Bit15)
<Analog Input1>		Analog input 1 voltage
<Analog Input2>		Analog input 2 voltage
<RTC Date Time>	YYYYMMDDhhmmss	The RTC (Real Time Clock) date and time YYYY : Year position was received. MM : Month position was received. DD : Day position was received. Hh : Hour position was received. Mm : L Minute position was received. Ss : Second position was received.
<Mileage>		Mileage accumulation

Binary Format

Byte	Name	Size	Type	Description
0	Transaction ID	2	Unsigned Integer	16-bit transaction ID
2	Message Encoding	1	Unsigned Integer	0x00 – Binary Position Data
3	Message Type	1	Unsigned Integer	0x02 – Asynchronous
4	Modem ID	8	Unsigned Integer	Modem ID or IMEI (64Bits)
12	Message Data	2	Unsigned Integer	See Message ID Table
14	Data Length	2	Unsigned Integer	16-bit data length
16	GPS Hour	1	Unsigned Integer	0 to 23
17	GPS Minute	1	Unsigned Integer	0 to 59
18	GPS Seconds	1	Unsigned Integer	0 to 59
19	GPS Year	1	Unsigned Integer	0 to 99
20	GPS Month	1	Unsigned Integer	1 to 12
21	GPS Day	1	Unsigned Integer	1 to 31
22	Latitude	4	Signed Integer	0.00001 degree units
26	Longitude	4	Signed Integer	0.00001 degree units
30	Altitude	3	Signed Integer	Meters
33	Speed	2	Unsigned Integer	0.1 meters per second units
35	Direction	2	Unsigned Integer	0.1 degree units
37	Odometer	4	Unsigned Integer	Meters (See AT$ODO command)
41	HDOP	1	Unsigned Integer	0.1 units
42	Satellites	1	Unsigned Integer	Number of Satellites Used
43	I/O Status	2	Unsigned Integer	See I/O StatusTable
45	Vehicle Status	1	Bit Mask	See Vehicle StatusTable
46	Analog Input1	2	Unsigned Integer	0.001 voltage units
48	Analog Input2	2	Unsigned Integer	0.001 voltage units
50	RTC Hour	1	Unsigned Integer	0 to 23
51	RTC Minute	1	Unsigned Integer	0 to 59
52	RTC Seconds	1	Unsigned Integer	0 to 59
53	RTC Year	1	Unsigned Integer	0 to 99
54	RTC Month	1	Unsigned Integer	1 to 12
55	RTC Day	1	Unsigned Integer	1 to 31
56	Pos Sending Hour	1	Unsigned Integer	0 to 23

57	Pos Sending Minute	1	Unsigned Integer	0 to 59
58	Pos Sending Seconds	1	Unsigned Integer	0 to 59
59	Pos Sending Year	1	Unsigned Integer	0 to 99
60	Pos Sending Month	1	Unsigned Integer	1 to 12
61	Pos Sending Day	1	Unsigned Integer	1 to 31

Acknowledgement

The acknowledge message for both ASCII and Binary format is identical.

Byte	Name	Size	Type	Description
0	Transaction ID	2	Unsigned Integer	16-bit transaction ID
2	Message Encoding	1	Unsigned Integer	0x00 – Binary Data
3	Message Type	1	Unsigned Integer	0x03 – Acknowledge
4	Status Code	2	Unsigned Integer	0x0000 – Success 0x0000– Error

Asynchronous Text Message Format
ASCII Format

Text data only without any other information.

Binary Format

Byte	Name	Size	Type	Description
0	Transaction ID	2	Unsigned Integer	16-bit transaction ID
2	Message Encoding	1	Unsigned Integer	0x02 – Text , 0x00 – Binary
3	Message Type	1	Unsigned Integer	Data
4	Data Length	2	Unsigned Integer	0x02 – Asynchronous
6	Message Data(Size: N)	Variable	Character String	16-bit data length
N+1	RTC Hour	1	Unsigned Integer	Text Message Data
N+2	RTC Minute	1	Unsigned Integer	0 to 23
N+3	RTC Seconds	1	Unsigned Integer	0 to 59
N+4	RTC Year	1	Unsigned Integer	0 to 59
N+5	RTC Month	1	Unsigned Integer	0 to 99
N+6	RTC Day	1	Unsigned Integer	1 to 12
N+7	Pos Sending Hour	1	Unsigned Integer	1 to 31
N+8	Pos Sending Minute	1	Unsigned Integer	0 to 23
N+9	Pos Sending Seconds	1	Unsigned Integer	0 to 59
N+10	Pos Sending Year	1	Unsigned Integer	0 to 59
N+11	Pos Sending Month	1	Unsigned Integer	0 to 99
N+12	Pos Sending Day	1	Unsigned Integer	1 to 12

IO Status Table

ASCII Format

Input Status

Bit	Description
0	Ignition Status
1	Input 1 Status
2	Input 2 Status
3	Input 3 Status
4	Input 4 Status
5	Input 5 Status (For FS-66 Only)
6	Input 6 Status (For FS-66 Only)
7	Input 7 Status (For FS-66 Only)

Output Status

Bit	Description
0	Output 1 Status
1	Output 2 Status
2	Output 3 Status
3	Output 4 Status (For FS-66 Only)
4	Output 5 Status (For FS-66 Only)
5	Output 6 Status (For FS-66 Only)
6	Output 7 Status (For FS-66 Only)
7	Output 8 Status (For FS-66 Only)

Binary Format

Bit	Description
0	Ignition Status
1	Input 1 Status
2	Input 2 Status
3	Input 3 Status
4	Input 4 Status
5	Input 5 Status (For FS-66 Only)
6	Input 6 Status (For FS-66 Only)
7	Input 7 Status (For FS-66 Only)
8	Output 1 Status
9	Output 2 Status
10	Output 3 Status
11	Output 4 Status (For FS-66 Only)

12	Output 5 Status (For FS-66 Only)
13	Output 6 Status (For FS-66 Only)
14	Output 7 Status (For FS-66 Only)
15	Output 8 Status (For FS-66 Only)

Vehicle Status Table

Bit	I/O Description
0	Engine
1	Motion

Heartbeat Message

ASCII Format

Byte	Name	Size	Type	Description
0	Header1	1	Unsigned Integer	0xFA
1	Header2	1	Unsigned Integer	0xF8
2	Sequence ID	2	Unsigned Integer	0 to 65535
4	Modem ID	4	Unsigned Integer	See AT$MODID command

Binary Format

Byte	Name	Size	Type	Description
0	Transaction ID	2	Unsigned Integer	16-bit transaction ID
2	Message Encoding	1	Unsigned Integer	0x00 – Binary Position Data
3	Message Type	1	Unsigned Integer	0x02 – Asynchronous
4	Modem ID	8	Unsigned Integer	Modem ID or IMEI (64Bits)
12	Message ID	2	Unsigned Integer	0XAB (Heartbeat Message ID)
14	Data Length	2	Unsigned Integer	16 – bit data length (6)
16	RTC Hour	1	Unsigned Integer	0 to 23
17	RTC Minute	1	Unsigned Integer	0 to 59
18	RTC Seconds	1	Unsigned Integer	0 to 59
19	RTC Year	1	Unsigned Integer	0 to 99

20	RTC Month	1	Unsigned Integer	1 to 12
21	RTC Day	1	Unsigned Integer	1 to 31

4. AT Commands

The following shows all Embarc Information Technology proprietary AT command for FS-64 devices. Please note that all parameters will be saved into the non-volatile memory of the device after issue any command.

4.1 Network Communication Configuration

AT$MODID	Modem ID
Description	This command sets the Modem ID of the device. If the Modem ID is not set, the default Modem ID is IMEI number.
Syntax	**Write** Command: AT$MODID=<Modem ID> **Read** Command: AT$MODID?
Parameters	<Modem ID> Up to 20 digit modem ID. This number must be resolvable to a 64 bit unsigned integer. It can be specified as either a decimal number or hexadecimal number. If specified as a hexadecimal number, the hexadecimal digits shall be prefixed with "0x" indicating that the following digits are hexadecimal.
Return Value	**Write** Command: OK:MODID **Read** Command: $MODID=<Modem ID OK : MODID **Error** Response: ER:MODID
Example	AT$MODID=1010000001 OK:MODID AT$MODID? $MODID=1010000001 OK
Note	

AT$HOSTS	Host IP addresses used for GPRS communications
Description	Up to 10 host IP addresses may be defined for TCP/UDP connection. The server host with the lowest index number is of highest priority for establishing a TCP/UDP connection. The host connection will be changed to the next host index when GPRS fail to send messages after each retry. (Refer AT$RETRY command)
Syntax	**Write** Command: AT$HOSTS=<Index>,<FQDN>,<Host Address>,<Port> **Read** Command: AT$HOSTS?

Parameters	<Index> Index of Host in List
	
	<FQDN> Specify if the Host Address is in IP or FQDN format
	0 – Specify IP address as the Host Address
	1 – Specify FQDN (e.q. track.findnsecure.com) as the Host Address
	<Host Address>
	           IP address of the host
	<Port>
	           TCP/UDP port (0~65535)

Return Value	**Write** Command OK HOSTS **Read** Command: $HOSTS=1,<FQDN>,<Host Address>,<Port> . . . $HOSTS=10,<FQDN>,<Host Address>,<Port> OK HOSTS **Error** Response: ERROR HOSTS
Example	AT$HOSTS=1,0,123.45.67.89,5000 O HOSTS AT$ HOSTS? $HOSTS=1,0,123.45.67.89,5000 $HOSTS=2,1, track.findnsecure.com,6000 $HOSTS=3,0.0.0.0,0 $HOSTS=4,0.0.0.0,0 $HOSTS=5,0.0.0.0,0 $HOSTS=6,0.0.0.0,0 $HOSTS=7,0.0.0.0,0 $HOSTS=8,0.0.0.0,0 $HOSTS=9,0.0.0.0,0 $HOSTS=10,0.0.0.0,0 OK HOSTS
Note	Please make sure the AT$DNS is set for the use of FQDN. If the AT$DNS is not set, the device will not be able to connect to the server and cause the GSM modem to reboot, or connect to other hosts that are specified in IP.

AT$DNS	Set the DNS IP address(es)
Description	This command is used to set the DNS address(es) when using FQDN as the Host Address.
Syntax	**Write** Command: AT$DNS=<Primary DNS IP>,<Secondary DNS IP> **Read** Command: AT$DNS?
Parameters	<Primary DNS IP> Set the IP address for primary DNS <Secondary DNS IP> Set the IP address for secondary DNS
Return Value	**Write** Command: OK : DNS **Read** Command: $DNS=<Primary DNS IP>,<Secondary DNS IP> OK DNS **Error** Response: ERROR : DNS
Example	AT$DNS=168.95.1.1,168.95.192.1 OK : DNS

AT$IPTYPE	GPRS TCP/UDP packet type selection
Description	This command specifies the GPRS IP type used for host communication. The <Acknowledge> parameter is used to determine whether or not to wait acknowledge for not workable for current firmware version.
Syntax	**Write** Command: AT$IPTYPE=<Type>, *<Acknowledge>* **Read** Command: AT$IPTYPE?
Parameters	<Type> 0 _ UDP 1_TCP *<Acknowledge> 0_ Device no need acknowledge for each asynchronous message (Default)* * 1_ Device need acknowledge for each asynchronous message*
Return Value	**Write** Command: OK : IPTYPE **Read** Command: $IPTYPE=<Type>, *<Acknowledge>* OK : IPTYPE **Error** Response: ERROR : IPTYPE
Example	AT$IPTYPE=1 OK : IPTYPE AT$IPTYPE? $IPTYPE=1 OK : IPTYPE
Note	

AT$PIN	Set SIM PIN code
Description	This command is used to set PIN code for the SIM card. When the device start to register to the cellular network, the device will send this PIN code to unlock the SIM card and start to register to the cellular network.
Syntax	**Write** Command: AT$PIN=<PIN Code> **Read** Command: AT$PIN?
Parameters	<PIN Code> PIN code for the SIM Card.
Return Value	Write Command: OK : PIN Read Command: $PIN=<PIN Code> OK : PIN Error Response: ER : PIN
Example	AT$PIN=0000 OK : PIN
Note	

AT$BAND	Initial frequency band connection attempt
Description	This command is used to set the initial trying frequency band.
Syntax	**Write** Command: AT$BAND=<Band Option> **Read** Command: AT$BAND?

Parameters	<BAND Option> 0 – GSM Modem Auto Search
	                       1 – 850/1900 ad first searched band
	                       2 – 900/1800 as first searched band

Return Value	**Write** Command: OK : BAND **Read** Command: $BAND=<Band Option> OK : BAND Error Response: ERROR : BAND
Example	AT$BAND=2 OK : BAND

AT$RETRY	Retry setting for communication with host server
Description	This command defines the number of retries and time between each retry when sending a message to a Host Server. The device shall wait for the appropriate acknowledgement/response from the host after sending a message.
Syntax	**Write** Command: AT$RETRY=<Max Retries>,<Retry Interval> **Read** Command: AT$RETRY?
Parameters	< Max Retries > Maximum number of retries for each server. <Retry Interval> Time in second between each retry.
Return Value	**Write** Command: OK : RETRY **Read** Command: $RETRY=<Max Retries>,<Retry Interval> OK : RETRY **Error** Response: ERROR : RETRY
Example	AT$RETRY=5,10 OK : RETRY AT$RETRY? $RETRY=5,10 OK : RETRY
Note	

AT$NETMON	Network monitor
Description	This command determines whether or not the network is monitored and how long the network must remain unavailable before the modem is reset.
Syntax	**Write** Command: AT$NETMON=<Net Timeout> **Read** Command: AT$NETMON?
Parameters	<Net Timeout > Amount of time in minutes that must elapse without network connectivity prior to resetting the modem. A value of zero indicates that the network is not monitored.
Return Value	**Write** Command: OK : NETMON **Read** Command: $NETMON=<Net Timeout> OK : NETMON **Error** Response: ERROR : NETMON
Example	AT$NETMON=5 OK : NETMON AT$NETMON? $NETMON=5 OK : NETMON
Note	

AT$NETCFG	Network configuration
Description	This command is used to set/query specific property of the communication network.
Syntax	**Write** Command: AT$NETCFG=\<Roaming Allowed\>,\<SMS/GPRS Auto switch\>,\<Reduce SMS\> **Read** Command: AT$NETCFG?

Parameters	\<Roaming Allowed\> 0 – All communication allowed under roaming mode
	                            1 – Only SMS allowed under roaming mode
	                            2 – Only GPRS allowed under roaming mode
	                            3 – No communication allowed under roaming mode
	
	\<SMS/GPRS Auto switch\> 0 – Disable auto switch
	                            1 – Auto switch between SMS and GPRS reporting when GPRS network is available or not.
	\<Reduce SMS\> 0 - Disable
	                            1 ~ 255 – Time multiplier
	                            When switched to SMS, the real time tracking report will follow the time interval of PDSR times \<Reduce SMS\>.

Return Value	**Write** Command: OK : NETCFG **Read** Command: $NETCFG=\<Roaming Allowed\>,\<SMS/GPRS Auto switch\>,\<Reduce SMS\> OK : NETCFG **Error** Response: ERROR : NETCFG
Example	AT$NETCFG=1, 1, 10 OK : NETCFG
Note	

AT$GPRSEN	GPRS connection enable
Description	This command determines whether or not to use GPRS or SMS when transmitting asynchronous alert messages. If GPRSEN is set to 0, then only SMS will be used. If GPRSEN is set to 1, then only GPRS will be used.
Syntax	**Write** Command: AT$GPRSEN=<Option> **Read** Command: AT$GPRSEN?
Parameters	<Option> 0 – SMS 1 – GPRS
Return Value	**Write** Command: OK : GPRSEN **Read** Command: $GPRSEN=<Option> OK : GPRSEN **Error** Response: ERROR : GPRSEN
Example	AT$GPRSEN=1 OK : GPRSEN AT$GPRSEN? $GPRSEN=1 OK : GPRSEN
Note	

AT$HB	Heartbeat settings
Description	This command is used to enable/disable Heartbeat message to help maintain the GPRS session between the device and the server. The heart message format is different according to the AT$FORMAT command setting. Please refer to Heartbeat Message Format for detailed message format.
Syntax	**Write** Command: AT$HB=<Period>,<Force> **Read** Command: AT$HB?
Parameters	<Period> — Time Period in seconds between Heartbeats transmits. Setting the Period to 0 disables the Heartbeat. First heartbeat will be sent when the time after the last communications from the device exceeds the specified period of time.(0 – 65535) **<Forced>** — **0 – Heart beat response is NOT required.** **1 – Heart beat response from server is REQUIRED.**
Return Value	**Write** Command: OK : HB **Read** Command: $HB=<Period>,<Forced> OK : HB **Error** Response: ERROR : HB
Example	AT$HB=60, 1 OK : HB
Note	

AT$FORMAT	Message format setting
Description	This command is used to set all communication message formats. Please refer to Message Format for detailed ASCII and Binary message format.
Syntax	**Write** Command: AT$FORMAT=<Format> **Read** Command: AT$FORMAT?
Parameters	<Index> 0 – ASCII format < Authorized Address > 1 – Binary format
Return Value	**Write** Command: OK : FORMAT **Read** Command: $FORMAT=<Format> OK : FORMAT **Error** Response: ERROR : FORMAT
Example	AT$FORMAT=0 OK : FORMAT
Note	

AT$IP	Device IP query
Description	This command is used to query the device for its local IP address. This IP address is valid when GPRS connection is established.
Syntax	**Write** Command: AT$IP?
Parameters	<Local IP> IP Address assigned to the device.
Return Value	**Read** Command: $IP=<Local IP> OK : IP
Example	AT$IP? $IP=10.2.16.250 OK : IP
Note	

AT$APN	Access point name configuration
Description	This command is used to set or query the device for its APN (Access Point Name) and authorization information for GPRS connection. These information are provided by GPRS service operator.
Syntax	**Write** Command: AT$APN=<APN>,<User Name>,<Password> **Read** Command: AT$APN?
Parameters	<APN> Access Point Name <User Name> GPRS login user name <Password> GPRS login password
Return Value	**Write** Command: OK : APN **Read** Command: $APN=<APN>,<User Name>,<Password> OK **Error** Response: ERROR : APN
Example	AT$APN=gprs.internet.com,user,pass OK : APN AT$APN? $APN=gprs.internet.com,user,pass OK : APN
Note	

AT$SMSLST	List of SMS number
Description	This command is used to set or query up to 10 SMS addresses for sending commands to the device. The devices only accept SMS command which coming from the phone numbers in this list. If this list is not set, the device will accept all incoming SMS command from any phone number.
Syntax	**Write** Command: AT$SMSLST=<Index>,<Address> **Read** Command: AT$SMSLST?
Parameters	<Index> Index of SMS Address (1 to 10) <Address> Phone Number or SMS short code
Return Value	**Write** Command: OK : SMSLST **Read** Command: $SMSLST=<Index>,<Address> OK : SMSLST **Error** Response: ERROR : SMSLST
Example	AT$SMSLST=1,+91123456789 OK SMSLST AT$SMSLST? $SMSLST=1,+91123456789 OK : SMSLST

AT$SMSDST	SMS destination address
Description	This command specifies the SMS Destination Address that shall be used to sent alert data from the device via SMS.
Syntax	**Write** Command: AT$SMSDST=<Address> **Read** Command: AT$SMSDST?
Parameters	<Address> Phone number or SMS short code
Return Value	**Write** Command: OK : SMSDST **Read** Command: $SMSDST=< Address> OK : SMSDST **Error** Response: ERROR : SMSDST
Example	AT$SMSDST=1,+91123456789 OK SMSDST AT$SMSDST? $SMSDST=1,+91123456789 OK : SMSDST

AT$PACKAGE	Put multiple GPRS packets into one
Description	This command is used to put multiple GPRS packets into one to save GPRS cost.
Syntax	**Write** Command: AT$PACKAGE=<Number of Packets>,<Exclusive Reports> **Read** Command: AT$PACKAGE?

Parameters	<Number of Packets> 0 – Disable
	                                  N – 1 ~ 20
	<Exclusive Reports> Bit0 - Log Data
	                                  Bit1 - Tracking Data
	                                  Bit2 - All Others

Return Value	**Write** Command: OK : PACKAGE **Read** Command: $PACKAGE=<Number of Packets>,<Exclusive Reports> OK : PACKAGE **Error** Response: ERROR : PACKAGE
Example	AT$PACKAGE=6,4 OK : PACKAGE
Note	When Exclusive Reports is set, the device will send out the excluded report with queued reports even if the number of reports in the queue has not reached to the defined number.

4.2 System Configurations

AT$DST	Daylight saving time configuration
Description	Daylight saving time start and end time and dates may be defined on a yearly basis. The DST settings will affect schedules operation. For detailed schedules settings, please refer to AT$SCHED command
Syntax	**Write** Command: AT$DST=<Enable>,[<Start Month>,<Start Week>,<Start Day>,<Start Hour>, <End Month>,<End Week>,<End Day>,<End Hour>] **Read** Command: AT$DST?

Parameters	<Enable> 0 – Disable
	      1 – Enable
	      (Default – 0)
	
	<Start Month> Month at which DST will start
	      (1 to 12)
	      (Default – 3)
	
	<Start Week> Week of month at which DST will start
	      (1 to 5)
	      (Default – 2)
	
	<Start Day> Day at which DST will start
	      (1- Sunday, 2- Monday, 3- Tuesday, 4- Wednesday, 5-Thursday, 6- Friday, 7-Saturday)
	      (Default – 1)
	
	<Start Hour> Hour at which DST will start
	      (0 to 23)
	      (Default – 7)
	
	<End Month> Month at which DST will end
	      (1 to 12)
	      (Default – 11)
	
	<End Week> Week of month at which DST will end
	      (1 to 5)
	      (Default – 1)
	
	<End Day> Day at which DST will end
	      (1- Sunday, 2- Monday, 3- Tuesday, 4- Wednesday, 5-Thursday, 6- Friday, 7-Saturday)
	      (Default – 1)
	
	<End Hour> Hour at which DST will end
	      (0 to 23)
	      (Default – 7)

Return Value	**Write** Command: OK DST **Read** Command: $DST=<Enable>,[<Start Month>,<Start Week>,<Start Day>,<Start Hour>, <End Month>,<End Week>,<End Day>,<End Hour>] OK : DST **Error** Response: ERROR : DST
Example	AT$DST=1,3,2,1,7,11,1,1,7 OK : DST

AT$CHED	Schedule configuration
Description	Up to 8 schedules may be defined on a device. The scheduled time indicates when the function associated with the schedule will be enabled. All times outside the schedule indicated that an associated function will be disabled. Please note that all times specified in schedules are GMT based.
Syntax	**Write** Command: AT$SCHED=<Index>,<Start Time>,<Duration>,<Days> **Read** Command: AT$SCHED? Or AT$SCHED=<Index>

Parameters	<Index> Schedule Index (1 – 8)
	<Start Time> Start Time of the schedule in minutes from midnight.
	                        (0 is midnight)
	<Duration> Duration of schedule in minutes
	                        (0 means no schedule configured)
	<Days> 0 – All days
	                        Bit 0 – Monday
	                        Bit 1 – Tuesday
	                        Bit 2 – Wednesday
	                        Bit 3 – Thursday
	                        Bit 4 – Friday
	                        Bit 5 – Saturday
	                        Bit 6 – Sunday
	                        Bit 7 – Reserved

Return Value	**Write** Command: OK SCHED **Read** Command: $SCHED=<Index>,<Start Time><Duration>,<Days> OK : SCHED Or $SCHED=<1>,<Start Time><Duration>,<Days> . . . $SCHED=<8>,<Start Time><Duration>,<Days> OK : SCHED **Error** Response: ERROR : SCHED
Example	Ex: Setting schedule1 start from every Tuesday PM 18:00 to Wednesday AM 6:00. AT$SCHED=1,1080,720,2 OK SCHED

AT$BAUD	RS232 serial port configuration
Description	This command is used to set or query baud rate setting of serial ports
Syntax	**Write** Command: AT$BAUD=<Port ID>,<Baud Rate> **Read** Command: AT$BAUD?

Parameters	<Port ID> 1 – Serial Port 1
	                2 – Serial Port 2 (For FS-66 Only)
	                3 – Serial Port 3 (For FS-66 Only)
	<Baud Rate> 0 – Disable
	                1 – 9600 bps
	                2 – 19200 bps
	                3 – 38400 bps
	                4 – 57600 bps
	                5 – 115200 bps

Return Value	**Write** Command: OK : BAUD **Read** Command: $BAUD=1,<Baud Rate> $BAUD=2,<Baud Rate> $BAUD=3,<Baud Rate> OK : BAUD **Error** Response: ERROR : BAUD
Example	AT$BAUD=1,4 OK : BAUD AT$BAUD? $BAUD=1,4 $BAUD=2,0 $BAUD=3,0 OK : BAUD
Note	

AT$REBOOT	Reboot device
Description	This command is use to restart the device. The device will be reboot after receiving the AT$REBOOT command for 10 seconds to allow time to acknowledge the request. The parameter settings will not be erased after this reboot.
Syntax	**Write** Command: AT$REBOOT
Parameters	None
Return Value	**Write** Command: OK : REBOOT **Error** Response: ERROR : REBOOT
Example	AT$REBOOT OK : REBOOT

AT$RESET	Reset device
Description	This command is use to reset all parameters to manufactory default settings.
Syntax	**Write** Command: AT$RESET=<Option>
Parameters	<Option> 0 – Reset all parameters to manufactory default and clear all data queue. 1 – Reset all parameters to manufactory default without clear all data queue
Return Value	**Write** Command: OK : RESET **Error** Response: ERROR : RESET
Example	AT$RESET=0 OK : RESET

AT$GPSPT	GPS pass-through
Description	This command is used to enable/disable GPS NMEA strings output.
Syntax	**Write** Command: AT$GPSPT=<NMEA>,<Duration> **Read** Command: AT$GPSPT?
Parameters	<NMEA> — Bit mask used to determine what NMEA commands are sent through the serial port. Setting NMEA to 0 exits the Pass-through mode. <table><tr><th>Bit</th><th>NMEA Message</th></tr><tr><td>0</td><td>GLL</td></tr><tr><td>1</td><td>GGA</td></tr><tr><td>2</td><td>GSA</td></tr><tr><td>3</td><td>GSV</td></tr><tr><td>4</td><td>VYG</td></tr><tr><td>5</td><td>RMC</td></tr><tr><td>6</td><td>ZDA</td></tr><tr><td>7</td><td>Reserved</td></tr></table> Duration — Time in seconds between NMEA samples
Return Value	**Write** Command: OK : GPSPT **Read** Command: $GPSPT=<NMEA>,<Duration> OK : GPSST **Error** Response: ER:PWD
Example	AT$GPSPT=225,1 OK:GPSPT

AT$FILTER	GPS data filtering settings
Description	This command is used to minimize erroneous GPS points and events. The AT$FILTER command does not filter out "event" notifications that do not depend on GPS data such as ignition on/off alerts. If at the time of the event there is no GPS data available, then the event will send the Invalid GPS encoding format (zero for all values).
Syntax	**Write** Command: AT$FILTER=<Min Satellites>,<Max speed>,<Max Derived>,<Max Errant Points> **Read** Command: AT$FILTER?
Parameters	<Min Satellites> Minimum number of satellites required for a valid GPS position. If the satellite count for a position fix is less than this threshold, the GPS point is considered invalid. <Max Speed> Maximum speed (in 0.1 meters/second units) expected. Any speed received that is greater than this threshold is invalidated. [(Kilometer per Hour) / 0.36] <Max Derived Speed> Maximum calculated speed (in 0.1 meters/second units). If the speed calculated by the current position and the last valid position is greater than this threshold, the current position is invalidated (Unless the Max Errant Points threshold is met) [(Kilometer per Hour) / 0.36] <Max Errant Points> Maximum number of errant points that may be detected. If this threshold is exceeded, the next position is considered valid.
Return Value	**Write** Command: OK FILTER **Read** Command: $FILTER=<Min Satellites>,<Max Speed>,<Max Derived Speed>, <Max Errant Points> OK FILTER **Error** Response: ERROR : FILTER
Example	AT$FILTER=4,450,450,5 OK : FILTER

AT$MSGQ	Message queue read
Description	This command is used to query the number of current message buffer.
Syntax	**Read** Command: AT$MSGQ?
Parameters	<Reserved> Reserved for further use <Number of Messages> Number of messages pending in the message queue.
Return Value	**Read** Command: $MSGQ=<Reserved>,<Number of Messages> OK : MSGQ **Error** Response: ERROR : MSGQ
Example	

AT$MSGQCL	Message queue clear
Description	This command is used to clear all messages in buffer.
Syntax	**Write** Command: AT$MSGQCL?
Return Value	**Write** Command: OK : MSGQCL **Error** Response: ERROR : MSGQCL

AT$ODO	GPS odometer read and setting
Description	This command is used to set or query odometer value. The GPS odometer is only calculate and accumulate when IGN status is ON.
Syntax	**Write** Command: AT$ODO=[<Odometer Value>,<IGN Reset>, <EGN Reset>] **Read** Command: AT$ODO?
Parameters	<Odometer Value> Odometer value in meters. (Default – No change in odometer value) <IGN Reset> 0 – Disable 1 – Enable reset of odometer when ignition status transitions from off to on. (Default - 0) <EGN Reset> 0 – Disable 1 – Enable reset of odometer when engine status transitions from off to on. (Default - 0)
Return Value	**Write** Command: OK : ODO **Read** Command: $ODO=<Odometer Value>,<IGN Reset>, <EGN Reset> OK : ODO **Error** Response: ERROR : ODO
Example	AT$ODO=0,1,1 OK ODO AT$ODO? $ODO=1235,1,1 OK ODO
Note	*The odometer is calculated by using GPS positioning. The odometer accuracy will be affected by different GPS positioning environment.*

AT$PWRM	Power management settings
Description	This command is used to set/query power management settings.
Syntax	**Write** Command: AT$PWRM=<Ignition Inactive Duration>,<No Motion Duration>,<No Comm Duration>[, <Low Wake Duration>,<Low On Duration>, <Low Transition Duration>, <VLow Wake Duration>,<VLow On Duration>] **Read** Command: AT$PWRM?
Parameters	<Ignition Inactive Duration> — Duration in minutes that must have elapsed after Ignition and Engine status are Off, prior to transitioning to low power. <No Motion Duration> — Duration in minutes that must have elapsed after no motion is detected prior to transitioning to low power. <No Comm Duration> — Duration in minutes that must have elapsed after no communication is detected prior to transitioning to low power. <Low Wake Duration> — Duration in minutes for waking up when in low power mode. (Default is 0 indicating direct transition to Low On) <Low On Duration> — Duration in minutes that device goes to full power when waking up in low power mode. (Default is 0 indicating always in Low On or Idle mode when in Low Power Mode) <Low Transition Duration> — Duration in minutes that must elapse to transition from low power to very low power mode. (Default is 0 indicating no transition to very Low Power Mode) <VLow Wake Duration> — Duration in hours for waking up when in very low power mode. (Default is 0 indicating direct transition to VLow On) <VLow On Duration> — Duration in minutes that device goes to full power when waking up in very low power mode. (Default is 0 indicating allows in VLow on when in Very Low Power Mode)
Return Value	**Write** Command: OK : PWRM **Read** Command: $PWRM=<Ignition Inactive Duration>,<No Motion Duration>,<No Comm Duration>, <Low Wake Duration>,<Low On Duration>, <Low Transition Duration>, <VLow Wake Duration>,<VLow On Duration> OK : PWRM **Error** Response: ERROR : PWRM
Example	AT$PWRM=2,2,2,5,1,15,1,5 OK : PWRM

AT$PWAMP	Shut down amplifier power when in low power mode
Description	This command is used to shutdown audio amplifier power when entering into low power
Syntax	**Write** Command: AT$PWAMP=<Enable>
Parameters	<Enable> 0 – Disabled 1 – Turn amplifier power OFF when ACC OFF; Turn amplifier power ON when ACC ON
Return Value	**Write** Command: OK : PWAMP **Read** Command: $PWAMP=<Enable> **Error** Response: ERROR : PWAMP
Example	AT$PWAMP=1 OK : PWAMP

AT$PWAMP	Shut down GPS power when in low power mode
Description	This command is used to shutdown the GPS power when entering low power mode.
Syntax	**Write** Command: AT$PWGPS=<Enable>
Parameters	<Enable> 0 – Disabled 1 – Turn GPS power OFF in 3 minutes after ACC OFF and No Motion; Turn GPS power ON when ACC ON
Return Value	**Write** Command: OK : PWGPS **Read** Command: $PWGPS=<Enable> **Error** Response: ERROR : PWGPS
Example	AT$PWGPS=1 OK : PWGPS
Note	when the one of following is occurred, device will be in full power for 5 minutes: Input triggered Motion detected Incoming call Incoming SM Incoming GPRS command

AT$VEXT	External or main power voltage read
Description	This command is used to read current external power voltage.
Syntax	**Read** Command: AT$VEXT?
Parameters	<External Voltage> External voltage reading in millivolts
Return Value	**Read** Command: $VEXT=<External Voltage> OK : VEXT **Error** Response: ERROR : VEXT
Example	AT$VEXT? $VEXT=12995 OK : VEXT
Note	

AT$VBAT	Battery voltage read
Description	This command is used to read current internal battery voltage.
Syntax	**Read** Command: AT$VBAT?
Parameters	<Battery Voltage> Battery voltage reading in millivolts
Return Value	**Read** Command: $VBAT=<Battery Voltage> OK : VBAT **Error** Response: ERROR : VBAT
Example	AT$VBAT? $VBAT=4152 OK : VBAT
Note	

AT$BBCTRL	Backup battery ON/OFF control
Description	This command is used to turn ON/OFF the internal backup battery.
Syntax	**Write** Command: AT$BBCTRL=<Battery Control> **Read** Command: AT$BBCTRL?

Parameters	<Battery Control> 0 – Turn OFF backup battery
	                           1 – Turn ON backup battery
	                          (Default - 0)

Return Value	**Write** Command: OK : BBCTRL **Read** Command: $BBCTRL=<Battery Control> OK : BBCTRL **Error** Response: ERROR : BBCTRL
Example	AT$BBCTRL=1 OK : BBCTRL AT$BBCTRL? $BBCTRL=1 OK : BBCTRL
Note	Use AT&W command to save this parameter after AT$BBCTRL command issued.

AT$VERSION	Get the firmware version of the unit.
Description	Execute this command to query firmware version of the unit.
Syntax	**Read** Command: AT$VERSION
Parameters	None
Return Value	$VERSION=<FW Version>,<HW Version>,<GSM Version>
Example	AT$VERSION $VERSION=1.05 Rev.00,B,1604B $OK : VERSION

AT$QUST	Query communication status
Description	Execute this command to query GSM/GPRS connection status.
Syntax	**Read** Command: AT$QUST
Parameters	None

Return Value	Read Command:
	$QUST=<GSM Network Operator Name>,<CSQ>,<GPRS connection state>,<Network Registration>
	
	GPRS connection state: 1 Connected
	                                   0 Disconnected
	Network Registration state 0 Not registered.
	                                   1 Registered.
	                                   2 Not registered, but searching a new operator to register
	                                   3 Registration denied.
	                                   4 Unknown.
	                                   5 Registered, roaming

Example	AT$QUST $VQUST="Pacific GSM 1800",28,1,1 $OK : QUST

AT$IMEI	Read device IMEI number
Description	Execute this command to read the IMEI (International Mobile station Equipment Identity) of the unit.
Syntax	**Read** Command: AT$IMEI
Parameters	None
Return Value	**Read** Command: $IMEI=<IMEI>
Example	AT$IMEI OK : IMEI $IMEI=355117003358879

AT$CELLID	Query 6 neighboring cell IDs
Description	This command is used to query connected and 6 neighboring cell IDs.
Syntax	**Read** Command: AT$CELLID?
Parameters	<arfcn — absolute radio frequency channel number <rxl> — receive level <rxq> — receive quality <mcc> — mobile country code <mnc> — mobile network code <bsic> — base station identity code <cellid> — cell id <rla> — receive level access minimum <txp> — transmit power maximum CCCH
Return Value	**Read** Command: $CELLID=<arfcn>,<rxl>,<rxq>,<mcc>,<mnc>,<bsic>,<cellid>,<rla>,<txp>,<arfcn>,<rxl>,<bsic>,<arfcn>,<rxl>,<bsic>,<arfcn>,<rxl>,<bsic>,<arfcn>,<rxl>,<bsic>,<arfcn>,<rxl>,<bsic> OK CELLID **Error** Response:
Example	$CELLID=0703,56,0,466,97,31,3758,03,000708,41,56,65535,157,255,65535,255,255,0697,31, 30,65535,157,255,0689,25,56 OK CELLID

AT$RFLC	RF learning code
Description	This command is used to set the RF learning code for 6 RFTX & 1 RF dialer
Syntax	**Writer** Command: AT$RFLC=<Index>,<RF Code> **Read** Command: AT$RFLC?
Parameters	<Index> 0 – RF Dialer 1 ~ 6 - RFTX <RF Code> 4 Bytes hexadecimal value
Return Value	**Write** Command: OK RFLC **Read** Command: $RFLC=<Index>,<RF Code> … OK RFLC **Error** Response: ERROR : RFLC
Example	AT$RFLC=406E7404 OK : RFLC

4.3 Position and Device Status Reporting

AT$PDSR	Position and Device Status Reporting Settings
Description	Position and data shall be reported when the device is moving. Reporting shall be based upon satisfying a minimum time requirement and minimum distance requirement
Syntax	**Write** Command: AT$PDSR=<Mode>,<Min. Time>,<Min. Distance>,<Heading Change>, [<Destination>,<Schedule>, <Delay>,<Time Multiplier>,<IgnoreGPS>] **Read** Command: AT$PDSR?
Parameters	<Mode> 0 – Disable Bit 0 – Time Mode Bit 1 – Distance Mode Bit 2 – Ignition ON Mode Bit 3 – Heading change Mode <Min. Time> Minimum Time in seconds that must elapse before reporting next position. (1 – 255) <Min. Distance> Minimum Distance in meters that must be traveled before reporting next position. (25 – 50000) <Heading Change> Minimum heading in degree that be changed before reporting next position. (5 – 180) <Destination> Bit 0 – Log to Data Queue Bit 1 – Transmit GPRS Bit 2 – Serial Port Bit 3 – Transmit SMS <Schedule> 0 – indicates use no schedule/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 (Default is 0) <Delay> Reserve for future used. <Time Multiplier> 1 – The PDSR Log and GPRS messages will be sent according to the <Min. Time> setting. n – The PDSR Log messages will be performed according to the <Min. Time> setting, the PDSR GPRS messages will be sent according to <Min. Time> times n. (2 – 65535) <Ignore GPS> 0 – Continuously tracking regardless of GPS signal. 1 – Ignore no GPS signal tracking report.
Return Value	**Write** Command OK:PDSR **Read** Command: $PDSR=<Mode>,<Min. Time>,<Min. Distance>,<Heading Change x 10>,[<Destination>,<Schedule>,<Delay>,<Time Multiplier>,<IgnoreGPS>] OK : PDSR

	Error Response: ERROR : PDSR
Example	Tracking every 30 seconds through GPRS AT$PDSR=1,30,0,20,2,0,0,1,0 OK : PDSR Tracking every 60 seconds through GPRS and Logging every 15 seconds AT$PDSR=1,15,0,20,3,0,0,4,0 OK : PDSR
Note	If <Mode> is 3 and both <Min. Time> and <Min. Distance> parameters are set, the position and data are only reported if both the minimum amount of time has elapsed and the minimum distance has been traveled. **Heading Changed degree is in 0.1 unit when in query response.**

AT$GETPDS	Get Position and Device Status
Description	This command is used to get current position or history log data.
Syntax	**Write** Command: AT$GETPDS=<Duration>[<Year>,<Month>,<Day>,<Hour>,<Minute>]
Parameters	<Duration> Duration in minutes of points to retrieve. If no date and time is specified, points retrieved should be for the last duration of time. If time and date is specified, then the duration beginning at the specified date and time should be retrieved. (0 to 10000) <Year> Year at which to retrieve position and device status. (0 to 99) <Month> Month at which to retrieve position and device status. (1 to12) <Day> Day at which to retrieve position and device status. (1 to 31) <Hour> Hour at which to retrieve position and device status. (0 to 23) <Minute> Minute at which to retrieve position and device status. (0 to 59)
Return Value	**Write** Command: Asynchronous Position Message **Error** Response: ERROR : GETPDS
Example	AT$GETPDS 101000001,20100304075605,121.64547,25.06200,0,0,61,7,2,1,0,0.054,0.000,20100304075606,0 OK GETPDS AT$GETPDS=5 OK GETPDS 101000001,20100304075545,121.64547,25.06200,0,0,61,7,2,1,0,0.046,0.000,20100304075546,0 101000001,20100304075555,121.64547,25.06200,0,0,61,7,2,1,0,0.046,0.000,20100304075556,0 101000001,20100304075605,121.64547,25.06200,0,0,61,7,2,1,0,0.054,0.000,20100304075606,0
Note	

GP<n>	Short command for get current position
Description	This command is used for get current position by using SMS. It is ease to command by using cellular phone.
Syntax	**Writer** Command: GP<n>
Parameters	<n> 1 – Text SMS Format 2 – Google Map Link Format 3 – Wap Push Format (Returning format is defined by AT$URL) 4 – Gamin™ Peer to peer Format 5~8 – Reserved for further use 9 – Standard Asynchroneous Position Message Format
Example	GP1
Note	Text SMS Format: Date:<Date> Time:<Time> Lon:<Longitude> Lat:<Latitude> Speed:<Speed in km/hr> Heading:<Heading degree> SatUsed:<Satellite Numbers>

AT$URL	Customed URL string for SMS GP3
Description	This command is used for responding the GP3 command.
Syntax	**Write** Command: AT$URL=<String> **Read** Command: AT$URL?
Parameters	<String> The string will be the heading string followed by ",GPSDateTime,Longitude,Latitude,SatelliteNumbers,Altitude" without quotes.
Example	AT$URL=http://www.findnsecure.com/? OK URL Example returning string: http://www.findnsecure.com/?,20091001065457,121.64612,7,0

4.4 Application Configuration

AT$OUT	Output control
Description	This command is used to set control for each output.
Syntax	**Write** Command: AT$OUT=<Index>, <New Value>[,<First Value Duration>,<Next Value Duration>,<Repeat Count>,<Schedule>] **Read** Command: AT$OUT=<Index>
Parameters	<Index> Output ID (1 to 3 for FS-64 model) (1 to 8 for FS-66 model) <New Value> New Value for the output. 0 – Off 1 – On <First Value Duration> Duration in milliseconds to set output to the New Value Setting. A value of 0 indicates indefinitely or Constant at New Value. (Default – 0) <Next Value Duration> Duration in milliseconds to set output to the absolute value of 1 minus the New Value. A Value of zero indicates the Next Value is not set (Default – 0) <Repeat Cycle> Number of times to repeat the output setting.. (0 to 1000) (Default – 0) <Schedule> 0 – indicates use no schedule/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 (Default is 0)
Return Value	**Write** Command: OK OUT **Read** Command: $OUT=<Index>,<New Value>,<First Value Duration>,<Next Value Duration>, <Repeat Count>,<Schedule> OK OUT or $OUT=1,<New Value>,<First Value Duration>,<Next Value Duration>, <Repeat Count>,<Schedule> . . . $OUT=n,<New Value>,<First Value Duration>,<Next Value Duration>, <Repeat Count>,<Schedule>

OK : OUT

(n is the maximum number of output for each A-series model)
Error Response:
ERROR : OUT

Example	
Note	

AT$VOICE	Voice calling control
Description	This command is used to set the control of voice call function.
Syntax	**Write** Command: AT$VOICE=<Voice Answer Mode>,<Input trigger mode>,<Dial In Ctrl>,<Dial Out Ctrl>,<AcceptIn1>,<AcceptIn2>,<AcceptIn3>,<AcceptIn4>,<AcceptOut1>,<AcceptOut2>,<AcceptOut3>,<AcceptOut4> Read Command: AT$VOICE?

Parameters	<Voice Answer Mode> 0 - Manual answer incoming voice call
	  1~10 - Auto answer delay in seconds for incoming voice call(This function
	
	<Input trigger mode> 0 - Disable
	  1~8 - Input ID for manual answer
	<Dial In Ctrl> 0 - Disable Can not answer any incoming calls
	  1 - Enable Can answer any incoming calls
	  2 - Limited Only answer 4 incoming calls at most
	<Dial Out Ctrl> 0 - Disable Can not dial out any outgoing calls.
	  1 - Enable Can dial out any outgoing calls.
	  2 - Limited Only dial out 4 outgoing calls at most.
	  3 - Enable Input trigger voice dial out control mode.
	<AcceptIn1> Acceptable 1st incoming call phone number
	<AcceptIn2> Acceptable 2nd incoming call phone number
	<AcceptIn3> Acceptable 3rd incoming call phone number
	<AcceptIn4> Acceptable 4th incoming call phone number
	<AcceptOut1> Acceptable 1st outgoing call phone numbers
	<AcceptOut2> Acceptable 2nd outgoing call phone numbers
	<AcceptOut3> Acceptable 3rd outgoing call phone numbers
	<AcceptOut4> Acceptable 4th outgoing call phone numbers

Return Value	**Write** Command: OK : VOICE **Read** Command: $VOICE=<Voice Answer Mode>,<Input trigger mode>,<Dial In Ctrl>,<Dial Out Ctrl>,<AcceptIn1>,<AcceptIn2>,<AcceptIn3>,<AcceptIn4>,<AcceptOut1>,<AcceptOut2>,<AcceptOut3>,<AcceptOut4> OK : VOICE **Error** Response:

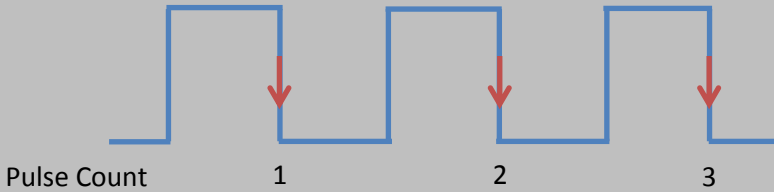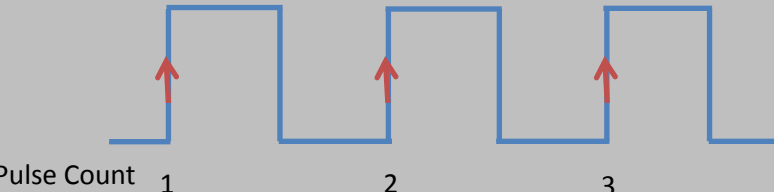|	ERROR : VOICE
Example	Auto-answer in 3 seconds for incoming call from 0226981599; Use input 4 to make a call to 0975123456. AT$VOICE=3,0,2,3,0226981599,,,,0975123456,,, OK : VOICE No call limits; Use input 2 to answer call. AT$VOICE=0,4,1,1,,,,,,,, OK : VOICE

AT$WIRETAP	Voice wiretapping
Description	This command is used to establish voice wiretap connection from device to a specific phone number.
Syntax	**Write** Command: AT$WIRETAP=<Phone number>
Parameters	<Phone number> Voice phone number
Return Value	**Write** Command: OK WIRETAP **Error** Response: ERROR WIRETAP
Example	AT$WIRETAP=123456789 OK : WIRETAP

AT$MIC	Adjust microphone sensitivity
Description	This command is used to adjust microphone sensitivity level.
Syntax	**Write** Command: AT$MIC=<Level>
Parameters	<Level> Microphone sensitivity level. Range from 0 ~ 15
Return Value	**Write** Command: OK : MIC **Read** Command: $MIC=<Level> **Error** Response: ERROR : MIC
Example	AT$MIC=12 OK : MIC

AT$SPK	Adjust speaker volume
Description	This command is used to adjust speaker volume.
Syntax	**Write** Command: AT$SPK=<Volume>
Parameters	<Volume> Speaker volume level. Range from 0 ~ 100
Return Value	**Write** Command: OK : SPK **Read** Command: $SPK=<Volume> **Error** Response: ERROR : SPK
Example	AT$SPK=80 OK : SPK

AT$SPKMUTE	Mute speaker volume
Description	This command is used to mute the speaker.
Syntax	**Write** Command: AT$SPKMUTE=<Mute>
Parameters	<Mute> 0 – Un-mute 1 – Mute
Return Value	**Write** Command: OK : SPKMUTE **Read** Command: $SPKMUTE=<Mute> **Error** Response: ERROR : SPKMUTE
Example	AT$SPKMUTE=1 OK : SPKMUTE

AT$RFIDC	RFID control
Description	This command is used to set/query RFID control configuration. Once the RFID reader senses the tag, the <Output ID> will be ON for <Delay Time>. If Input 1 (Ignition) is ON within <Delay Time>, the <Output ID> will keep ON until Input (Ignition) OFF for <Delay Time>.
Syntax	**Write** Command: AT$RFIDC=<Action>[,<Output ID>,<Delay Time>]
Parameters	<Action> 1 – Logging When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval. 2 – Polling When the alert condition is true, send the latest GPS position to the remote base station. 4 – Output Control When the RFID sense the tag, the specific output port would be enabled. <Output ID> Output ID 1 – Output 1 2 – Output 2 3 – Output 3 4 – Output 4 5 – Output 5 6 – Output 6 7 – Output 7 8 – Output 8 <Delay Time> Delay time in 100ms for Output control
Return Value	**Write** Command: OK : RFIDC **Error** Response: ERROR : RFIDC
Example	AT$RFIDC =3,1,10 OK : RFIDC
Note	RFID Report Format: Asynchronous Position Message + <RFID Data>

AT$INPULSE	Input pulse counter configuration
Description	This command is used to set/query pulse counter value for an input.
Syntax	**Write** Command: AT$INPULSE=<Input ID>,<Trigger Mode>,<Initial Value> **Read** Command: AT$INPULSE?

Parameters	<Input ID> 0 – Disable
	                              1 – Input 1
	                              2 – Input 2
	                              3 – Input 3
	                              4 – Input 4
	                              5 – Input 5(For FS-66 only)
	                              6 – Input 6(For FS-66 only)
	                              7 – Input 7(For FS-66 only)
	                              8 – Input 8(For FS-66 only)
	
	<Output ID> 0 – Falling edge trigger
	
	Pulse Count 1 2 3
	
	1 – Rising edge trigger
	
	Pulse Count 1 2 3

Return Value	**Write** Command: OK : INPULSE **Read** Command: $INPULSE=<Input ID>,<Trigger Mode>,<Initial Value>,<Current Value> OK : INPULSE **Error** Response: ERROR : INPULSE
Example	AT$INPULSE=1,1,0 OK : INPULSE
Note	

AT$SNDTXT	Send text message
Description	This command is used to send text message from device to server.
Syntax	**Write** Command: AT$SNDTXT=<Text>
Parameters	<Text> Message Text
Return Value	**Write** Command: OK : SNDTXT **Error** Response: ERROR : SNDTXT
Example	AT$SNDTXT=This is a text message OK : SNDTXT

AT$CODE	Send barcode reader data
Description	This command is used for sending barcode reader data. The barcode reader device shall be added "AT$CODE=" header before data output stream.
Syntax	**Write** Command: AT$CODE=<Data>
Parameters	<Data> The data should be any alphabet and data length should be less than 20 characters.
Return Value	**Write** Command: OK : CODE **Error** Response: ERROR : CODE
Example	AT$CODE=4781527114712 OK : CODE
Note	Barcode Report Format: Asynchronous Position Message + <Barcode Data>

AT$FUEL	Enable fuel sensor data reading
Description	This command is used to read the Vepamon fuel sensor output and send it with tracking command.
Syntax	**Write** Command: AT$FUEL=<Option>
Parameters	<Option> 0 – Disable 1 - Enable
Return Value	**Write** Command: OK : FUEL **Error** Response: ERROR : CODE
Example	AT$FUEL=1 OK : FUEL
Note	Must enable PDSR in order to get the fuel sensor data. Fuel Level Report Format: Asynchronous Position Message + <Fuel Data> Example: 1010000001,20090327090108,121.646143,25.062475,0,12,1,4,2,0,0,357,26,588 The fuel level is the last field which needs to be divided into 1024 levels. Therefore, the fuel level is calculated as 588/1024 * 100% = 57.42%

4.5 Alerts Configuration

AT$IGN	Ignition alert setting
Description	This command is used to set or query ignition alert settings.
Syntax	**Write** Command: AT$IGN=<Debounce Time> **Read** Command: AT$IGN?
Parameters	<Debounce Time> Amount of time in seconds that must elapse before an Ignition state change is accepted. <Status> Current ignition status 0 – Ignition Off 1 – Ignition On
Return Value	**Write** Command: OK : IGN **Read** Command: $IGN=<Debounce Time>,<Status> OK IGN **Error** Response: ERROR : IGN
Example	AT$IGN=2 OK : IGN AT$IGN? $IGN=2,1 OK : IGN
Note	

AT$IGNEN	Ignition alert enable
Description	This command is used to set or query ignition alert enable.
Syntax	**Write** Command: AT$IGNEN=<Option>,<Action>[,<Schedule>,<Force Connection>] **Read** Command: AT$IGNEN?
Parameters	<Option> 0 – Disable 1 – Enable <Action> 1 – Logging When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval. 2 – Polling When the alert condition is true, send the latest GPS position to the remote base station. 3 – Logging + polling When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station. <Schedule> 0 – indicates use no schedule/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 (Default is 0) <Force Connection> 0 – Disable Bit 0 – Create new GPRS session, but honor $GPRSEN. Bit 1 – Send SMS Report Bit 2 – Send via serial port (Default is 0)
Return Value	**Write** Command: OK : IGNEN **Read** Command: $IGNEN=<Option>,<Action>,<Schedule>,<Force Connection> OK : IGNEN **Error** Response: ERROR : IGNEN
Example	AT$IGNEN=1,2,0,0 OK : IGNEN

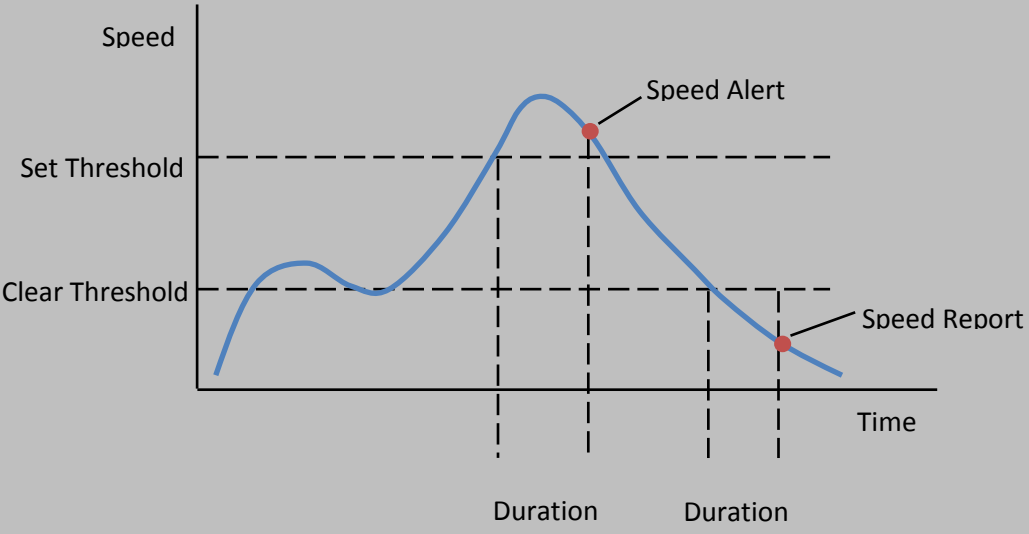| AT$EGN	Engine alert setting
Description	This command is used to set or query engine alert settings.
Syntax	**Write** Command: AT$EGN=<Sample Rate>,<Evaluation Period>,<Sample Count>, <Minimum Voltage>,<Delta Voltage> **Read** Command: AT$EGN?
Parameters	<Sample Rate> Period in seconds between external voltage samples collected. <Evaluation Period> Period in seconds between evaluations of external voltage for engine status. <Sample Count> Number of voltage samples used to calculate average voltage. <Minimum Voltage> Minimum Voltage (in millivolts) for detecting engine on state. <Delta Voltage> Voltage Drop or rise (in millivolts) that results in an engine status transition. <Status> 0 – Engine Off 1 – Engine On
Return Value	**Write** Command: OK : EGN **Read** Command: $EGN=<Sample Rate>,<Evaluation Period>,<Sample Count>, <Minimum Voltage>,<Delta Voltage>,<Status> OK : EGN **Error** Response: ERROR : EGN
Example	AT$EGN=1,0,5,12500,2000 OK : EGN

AT$EGNEN	Engine alert enable
Description	This command is used to set or query engine alert enable.
Syntax	**Write** Command: AT$EGNEN=<Option>,<Action>[,<Schedule>,<Force Connection>] **Read** Command: AT$EGNEN?
Parameters	<Option> 0 – Disable 1 – Enable <Action> 1 – Logging When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval. 2 – Polling When the alert condition is true, send the latest GPS position to the remote base station. 3 – Logging + polling When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station. <Schedule> 0 – indicates use no schedule/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 (Default is 0) <Force Connection> 0 – Disable Bit 0 – Create new GPRS session, but honor $GPRSEN. Bit 1 – Send SMS Report Bit 2 – Send via serial port (Default is 0)
Return Value	**Write** Command: OK : EGNEN **Read** Command: $EGNEN=<Option>,<Action>,<Schedule>,<Force Connection> OK : EGNEN **Error** Response: ERROR : EGNEN
Example	AT$EGNEN=1,2,0,0 OK : EGNEN
Note	Engine Alert Format: Asynchronous Position Message + <Ext Voltage> **ASCII Format:** <table><tr><td>Parameter</td><td>Format</td><td>Description</td></tr><tr><td>Ext Voltage</td><td>####</td><td>External Voltage in Millivolts</td></tr></table>

ASCII Format:

Name	Size	Type	Description
Ext Voltage	2	Unsigned Integer	External Voltage in Millivolts

AT$IN1	Input 1 alert settings
Description	This command is used to set or query input 1 alert settings.
Syntax	**Write** Command: AT$IN1=<Debounce Time> **Read** Command: AT$IN1?

Parameters	<Debounce Time> Amount of time in seconds that must elapse before an input 1 state change is accepted.
	<Status> Current input 1 status
	     0 – Input 1 Off
	     1 – Input 1 On

Return Value	**Write** Command: OK : IN1 **Read** Command: $IN1=<Debounce Time>,<Status> OK : IN1 **Error** Response: ERROR : IN1
Example	AT$IN1=2 OK : IN1 AT$IN1? $IN1=2,0
Note	For the input 2 to input 8 alert settings, Please use AT$IN2 to AT$IN8 command instead of AT$IN1. The parameters are identical.

AT$IN1EN	Input 1 alert enable
Description	This command is used to set or query input 1 alert enable.
Syntax	**Write** Command: AT$IN1EN=<Option>,<Action>[,<Schedule>,<Force Connection>] **Read** Command: AT$IN1EN?
Parameters	<Option> 0 – Disable 1 – Enable <Action> 1 – Logging When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval. 2 – Polling When the alert condition is true, send the latest GPS position to the remote base station. 3 – Logging + Polling When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station. <Schedule> 0 – indicates use no schedule/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 (Default is 0) <Force Connection> 0 – Disable Bit 0 – Create new GPRS session, but honor $GPRSEN. Bit 1 – Send SMS Report Bit 2 – Send via serial port (Default is 0)
Return Value	**Write** Command: OK IN1EN **Read** Command: $IN1EN=<Option>,<Action>,<Schedule>,<Force Connection> OK : IN1EN **Error** Response: ERROR : IN1EN
Example	AT$IN1EN=1,2,0,0 OK : IN1EN
Note	For the input 2 to input 8 alerts enable settings, Please use AT$IN2EN to AT$IN8EN command instead of AT$IN1EN. The parameters are identical.

AT$SPEED	High speed alert settings
Description	This command is used to set/query speeding alert.
Syntax	**Write** Command: AT$SPEED=<Set Threshold>,<Clear Threshold>,<Duration> **Read** Command: AT$SPEED?
Parameters	<Set Threshold> Speed Threshold in 0.1 meters per second that must be exceeded to trigger a high speed alert. [(Kilometer per Hour) / 0.36] <Clear Threshold> Speed Threshold in 0.1 meters per second that device must fall below before clearing a high speed alert condition. [(Kilometer per Hour) / 0.36] <Duration> Duration in seconds at which either of the speeds thresholds must be met prior to changing the high speed status.
Return Value	**Write** Command: OK : SPEED **Read** Command: $SPEED=<Set Threshold>,<Clear Threshold>,<Duration> OK : SPEED **Error** Response: ERROR : SPEED
Example	Example for the Set threshold 70km/h and Clear threshold 36km/h AT$SPEED=194,100,5 OK : SPEED
Note	

AT$SPEEDEN	High speed alert enable
Description	This command is used to enable/disable speeding alert and speeding report. There are two notifications associated with each speeding event. The first notification occurs when the device has triggered the start of the speeding event, and the second notification occurs when the device has triggered the end of the speeding event. The first notification is the speeding alert notification and is transmitted after a device has exceeded the \<Set Threshold\> speed for a period of time => \<Duration\> seconds. This notification will contain the time, location, and speed values that were collected when the device FIRST exceeded the \<Set Threshold\> speed, not after the \<Duration\> time had been satisfied. The second notification is the speeding report notification and is transmitted as soon as the device has fallen below the \<Clear Threshold\> speed for a time period >= \<Duration\>. The report notification will send the time, location, and speed values as well as max. speed and average speed that were collected when the device FIRST fell below the \<Set Threshold\> speed, not after the \<Duration\> time had been satisfied
Syntax	**Write** Command: AT$SPEEDEN=\<Option\>,\<Action\>[,\<Schedule\>,\<Force Connection\>] **Read** Command: AT$SPEEDEN?

Parameters	\<Option\> 0 – Disable
	                 1 – Enable
	\<Action\> 1 – Logging
	      When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval.
	      2 – Polling
	      When the alert condition is true, send the latest GPS position to the remote base station.
	      3 – Logging + polling
	      When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station.
	\<Schedule\> 0 – indicates use no schedule/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
	      (Default is 0)
	\<Force Connection\> 0 – Disable
	      Bit 0 – Create new GPRS session, but honor $GPRSEN.
	      Bit 1 – Send SMS Report
	      Bit 2 – Send via serial port
	      (Default is 0)

Return Value	**Write** Command: OK : SPEEDEN **Read** Command: $SPEEDEN=\<Option\>,\<Action\>,\<Schedule\>,\<Force Connection\> OK : SPEEDEN

	Error Response: ERROR : SPEEDEN
Note	Speeding Report Format: Asynchronous Position Message + <Maximum_Speed> + <Average_Speed> + <Duration> **ASCII Format:** {TABLE1} **Binary Format:** {TABLE2}

ASCII Format:

Parameter	Format	Description
Maximum Speed	###.#	Meters per second units
Average Speed	###.#	Meters per second units
Duration	#####	Duration device exceeded speed threshold in second.

Binary Format:

Name	Size	Type	Description
Maximum Speed	2	Unsigned Integer	Meters per second units
Average Speed	2	Unsigned Integer	Meters per second units
Duration	2	Unsigned Integer	Duration device exceeded speed threshold in second.

AT$OPDL	Output delay
Description	This command is to set the output to be enabled when the vehicle speed from GPS signal is lower than a preset value for duration of time.
Syntax	**Write** Command: AT$OPDL=<Output Mask>,<GPS Speed Limit>,<Duration> **Read** Command: AT$OPDL?

Parameters	<Output Mask> 0 – Disable (Default)
	                        1 – Output 1
	                        2 – Output 2
	                        4 – Output 3
	
	<GPS Speed Limit> Speed calculated from GPS signal as the threshold Value range 5 ~ 65535 in meters/second
	<Duration> Duration of time that must elapse after speed is lower than GPS Speed Limit before change the output state.
	Value range 0 ~ 255 in seconds

Return Value	**Write** Command: OK : OPDL **Read** Command: $OPDL=<Output Mask>,<GPS Speed Limit>,<Duration> OK : OPDL **Error** Response: ERROR : OPDL
Example	Enable output 1 when speed is lower than 10 meters/sec for 12 seconds: AT$OPDL=1,10,12 OK OPDL
Note	

AT$GF	Geo-fence alert settings
Description	This command is used to set/query GeoFence settings.
Syntax	**Write** Command: AT$GF=<Index>,<Type>, {GeoFence Parameters depend upon Type} For Circular GeoFence: AT$GF=<Index>,0,<Latitude>,<Longitude>,<Entry Radius>,<Exit Radius>, <Minimum Movement>,<Delay> For Rectangular GeoFence: AT$GF=<Index>,1,<Latitude1>,<Longitude1>,<Latitude2>,<Longitude2>, <Minimum Movement>,<Delay> **Read** Command: AT$GF? Reads all GeoFence Settings AT$GF=<Index> Reads selected GeoFence Setting

Parameters	<Index> Index of GeoFence. (Range is 1 to 50)
	<Type> Type of GeoFence:
	                                     0 – Circle
	                                     1 – Rectangular
	<Latitude> Latitude of Circular GeoFence center
	<Longitude> Longitude of Circular GeoFence center
	<Entry Radius> Radius of circle in meters used to detect entry of the device into the GeoFence.
	<Exit Radius> Radius of circle in meters used to detect exit of the device from the GeoFence.
	<Latitude1> Latitude of upper left corner of Rectangular GeoFence
	<Longitude1> Longitude of upper left corner of Rectangular GeoFence
	<Latitude2> Latitude of lower right corner of Rectangular GeoFence
	<Longitude2> Longitude of lower right corner of Rectangular GeoFence
	<Minimum Movement> Qualifying distance in meters. Distance that a device must move before accepting the new location as being a valid location.
	<Delay> Qualifying delay in seconds. Duration of time that must elapse after transitioning state before accepting the new state.

Return Value	**Write** Command: OK : GF **Read** Command: $GF=<Index>,<Type>,{GeoFence Parameters for Index 1} OK : GF Or $GF=1,<Type>, {GeoFence Parameters for Index 1} . . . $GF=50, <Type>, {GeoFence Parameters for Index 50} OK : GF **Error** Response: ERROR : GF

AT$GFEN	Geo-fence alert enable
Description	This command is used to set/query GeoFence enable settings.
Syntax	**Write** Command: AT$GFEN=<Index>,<Option>,<Action>[,<Schedule>,<Force Connection>] **Read** Command: AT$GFEN? Reads all GeoFence Alert Enable Settings AT$GFEN=<Index> Reads selected GeoFence Alert Enable Setting

Parameters	<Index> Index of GeoFence. Range is 1 to 50.
	
	<Option> 0 – Disable
	          1 – Entry and Exit
	          2 – Entry Only
	          3 – Exit Only
	
	<Action> 1 – Logging
	When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval.
	2 – Polling
	When the alert condition is true, send the latest GPS position to the remote base station.
	3 – Logging + polling
	When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station.
	<Schedule> 0 – indicates use no schedule/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
	          (Default is 0)
	
	<Force Connection> 0 – Disable
	          Bit 0 – Create new GPRS session, but honor $GPRSEN.
	          Bit 1 – Send SMS Report
	          Bit 2 – Send via serial port
	          (Default is 0)

Return Value	**Write** Command: OK : GFEN **Read** Command: $GFEN=<Index>,< Option >,<Schedule>,<Force Connection> OK : GFEN Or $GFEN=1,< Option >,<Schedule>,<Force Connection> $GFEN=2,< Option >,<Schedule>,<Force Connection> … OK : GFEN

	Error Response: ERROR : GFEN
Note	Geo Fence Report Format: Asynchronous Position Message + <GeoFence Index> **ASCII Format:** 	Parameter	Format	Description
---	---	---
GeoFence Index	##	1 to 50 | **Binary Format:** | Name	Size	Type	Description
---	---	---	---
GeoFence Index	1	Unsigned Integer	1 to 50	

AT$GFDEL	Geo-fence settings delete
Description	This command is used to delete GeoFence setting
Syntax	**Write** Command: AT$GFDEL=<Index>
Parameters	<Index> Index of GeoFence. Range is 1 to 50.
Return Value	**Write** Command: OK : GFDEL **Error** Response: ERROR : GFDEL

AT$GFSP	Geo-fence speed alert setting
Description	This command is used to set speed alert in each defined Geo-Fence zone.
Syntax	**Write** Command: AT$GFSP=<Index>,<Enable>,<Speed Limit> **Read** Command: AT$GFSP?

Parameters	<Index> Index of Geo-Fence (1 to 50)
	
	<Enable> Enable Geo-Fence Speed Alert
	                                          0 – Disable
	                                          1 - Enable
	<Speed Limit> Speed limit in 0.1 meters/second
	                                          [(Kilometer per Hour) / 0.36]

Return Value	**Write** Command: OK : GFSP **Read** Command: $GFSP=1,1,28 OK : GFSP **Error** Response: ERROR : GFSP
Example	AT$GFSP=1,1,28 OK GFSP

AT$HOME	Configuration home security zone
Description	This command is used to set/query the home security zone settings.
Syntax	**Write** Command: AT$HOME=<Type>,{Home Fence Parameters depend upon Type},<Delay> <Sustained Motion> For Circular Home Fence: AT$HOME=0,<Latitude>,<Longitude><Radius>,<Delay>,<Sustained Motion> For Rectangular Home Fence: AT$HOME=1,<Latitude1>,<Longitude1><Latitude2>,<Longitude2>,<Delay>, <Sustained Motion> **Read** Command: AT$HOME?
Parameters	<Type> — Type of GeoFence 0 – Circle 1 – Rectangular <Latitude> — Latitude of Home Fence. A value of 0 indicates last known latitude is to be used. <Longitude> — Longitude of Home Fence. A value of 0 indicates that last know longitude is to be used. <Radius> — Radius of circle used to detect exit from Home Fence. <Latitude1> — Latitude of upper left corner of Rectangular Home Fence <Longitude1> — Longitude of upper left corner of Rectangular Home Fence <Latitude2> — Latitude of lower right corner of Rectangular Home Fence <Longitude2> — Longitude of lower right corner of Rectangular Home Fence <Delay> — Qualifying delay in seconds. Duration of time that must elapsed after transitioning out of zone before accepting an out of zone state change and causing an alert. <Sustained Motion> — Duration of sustained motion in seconds that shall trigger an alarm. (0to 3600) 0 indicates the feature is disabled. (Default is 0)
Return Value	**Write** Command: OK : HOME **Read** Command: $HOME=<Type>,{Home Fence Parameters},<Delay>,<Sustained Motion> OK : HOME **Error** Response: ERROR : HOME
Example	
Note	

AT$HOMEEN	Home alert enable
Description	This command is used to set/query home security zone enable settings.
Syntax	**Write** Command: AT$HOMEEN=<Option>,<Action>[,<Schedule>,<Force Connection>] **Read** Command: AT$HOMEEN?
Parameters	<Option> 0 – Disable 1 – Enable <Action> 1 – Logging When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval. 2 – Polling When the alert condition is true, send the latest GPS position to the remote base station. 3 – Logging + polling When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station. <Schedule> 0 – indicates use no schedule/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 (Default is 0) <Force Connection> 0 – Disable Bit 0 – Create new GPRS session, but honor $GPRSEN. Bit 1 – Send SMS Report Bit 2 – Send via serial port (Default is 0)
Return Value	**Write** Command: OK : HOMEEN **Read** Command: $HOMEEN=<Option>,<Action>,<Schedule>,<Force Connection> OK : HOMEEN **Error** Response: ERROR : HOMEEN
Example	
Note	

AT$TOW	Configure tow information
Description	This command is used to set/query vehicle tow function. The tow alert is designed to recognize when a vehicle is being towed. The tow alert will only be activated when there is no ignition status indicated
Syntax	**Write** Command: AT$TOW=<Distance>,<Time>,<Count> **Read** Command: AT$TOW?
Parameters	<Distance> — Distance in meters that a device must travel between GPS samples to indicate movement. This GPS sample is not filtered by the PDSR time and distance parameters. Example: 10 (meters) (Required: 1 to 1000) <Time> — Time in seconds in which the device must move the distance <Distance> in order to be considered being towed. (Required: 5 to 1000) <Schedule> — The number of consecutive GPS samples that must meet the <Distance> and <Time> requirements before the vehicle is considered to be in a towing state. Example: 3 (Required: 1 to 50)
Return Value	**Write** Command: OK : TOW **Read** Command: $TOW=<Distance>,<Time>,<Count>,<Schedule>,<Force Connection> OK : TOW **Error** Response: ERROR : TOW
Example	
Note	

AT$TOWEN	Tow alert enable
Description	This command is use to enable/disable vehicle tow alert.
Syntax	**Write** Command: AT$TOWEN=<Option>,<Action>[,<Schedule>,<Force Connection>] **Read** Command: AT$TOWEN?
Parameters	<Option> 0 – Disable 1 – Enable <Action> 1 – Logging When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval. 2 – Polling When the alert condition is true, send the latest GPS position to the remote base station. 3 – Logging + polling When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station. <Schedule> 0 – indicates use no schedule/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 (Default is 0) <Force Connection> 0 – Disable Bit 0 – Create new GPRS session, but honor $GPRSEN. Bit 1 – Send SMS Report Bit 2 – Send via serial port (Default is 0)
Return Value	**Write** Command: OK : TOWEN **Read** Command: $TOWEN=<Option>,<Schedule>,<Schedule>,<Force Connection> OK : TOWEN **Error** Response: ERROR : TOWEN
Example	
Note	

AT$POWER	Power status alert settings
Description	This command is used to configure the voltage thresholds for the power status alerts.
Syntax	**Write** Command: AT$POWER=<Main Power Full>,<Main Power Low>,<Main Power Fail>,<Battery Full>,<Battery Low>,<Battery Fail>,<Duration>,<LED Off> **Read** Command: AT$POWER?
Parameters	<Main Power Full> Voltage threshold in millivolts above which main power is considered fully charged and power restored. <Main Power Low> Voltage threshold in millivolts below which low main power is detected. <Main Power Fail> Voltage threshold in millivolts below which main power failure is detected. <Battery Full> Voltage threshold in millivolts above which battery is considered fully charged and power restored. <Battery Low> Voltage threshold in millivolts below which low battery is detected. <Battery Fail> Voltage threshold in millivolts below which battery failure is detected. <Duration> Duration in seconds at which the voltage thresholds must be met prior to changing the power status. <LED Off> 0 – Disable 1 – Turn all LEDs to be off while main power is in failure state. (GPS LED and GSM LED OFF)
Return Value	**Write** Command: OK : POWER **Read** Command: $POWER=<Main Power Low>,<Main Power Fail>,<Battery Low>,<Battery Fail>,<Duration>, <LED OFF> OK : POWER **Error** Response: ERROR : POWER
Example	AT$POWER=13800,10000,7000,4100,3500,2500,5,0 OK : POWER
Note	

AT$POWEREN	Power alert enable
Description	This command is used to enable/disable the power status alerts.
Syntax	**Write** Command: AT$POWEREN=<Option>,<Power On Enable>,<Action>[,<Schedule>, <Force Connection>] **Read** Command: AT$POWEREN?

Parameters	<Option> 0 – Disable
	                      1 – Enable
	<Power On Enable> 0 – Do not Send Power On Alert
	                      1 – Send Power On Alert
	                      (Default is 0)
	<Action> 1 – Logging
	When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval.
	                      2 – Polling
	When the alert condition is true, send the latest GPS position to the remote base station.
	                      3 – Logging + polling
	When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station.
	                      0 – indicates use no schedule/always on
	<Schedule> 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
	                      (Default is 0)
	<Force Connection> 0 – Disable
	                      Bit 0 – Create new GPRS session, but honor $GPRSEN.
	                      Bit 1 – Send SMS Report
	                      Bit 2 – Send via serial port
	                      (Default is 0)

Return Value	**Write** Command: OK : POWEREN **Read** Command: $POWEREN=<Option>,<Power On Enable>,<Action>,<Schedule>,<Force Connection> OK : **Error** Response: ERROR : POWEREN
Example	AT$POWEREN=1,1,2,0,0 OK : POWEREN
Note	Power Status Report Format: Asynchronous Position Message + <Main/Ext Voltage> ,<Battery Voltage>

ASCII Format:

Parameter	Format	Description
Main/Ext Voltage	#####	Main or External voltage in millivolts
Battery Voltage	####	Internal Battery Voltage

Binary Format:

Name	Size	Type	Description
Main/Ext Voltage	2	Unsigned Integer	External Voltage in millivolts
Battery Voltage	2	Unsigned Integer	Battery Voltage in millivolts
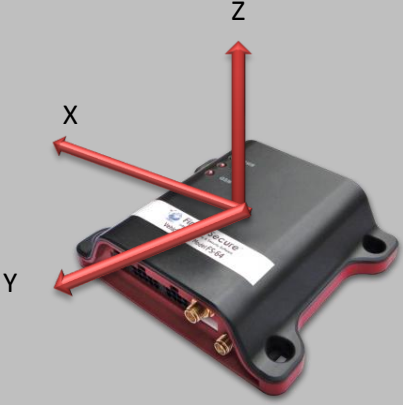
AT$MSGQEN	Message queue alert enable
Description	This command is used to enable/disable message queue full alert.
Syntax	**Write** Command: AT$MSGQEN=\<Option>,\<Action> **Read** Command: AT$MSGQEN?
Parameters	\<Option> 0 – Disable 1 – Enable \<Action> 1 – Logging When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval. 2 – Polling When the alert condition is true, send the latest GPS position to the remote base station. 3 – Logging + polling When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station.
Return Value	**Write** Command: OK : MSGQEN **Read** Command: $MSGQEN=\<Option> OK : MSGQEN **Error** Response: ERROR : MSGQEN

AT$GPSMON	GPS monitor
Description	This command is used to monitor GPS receiver status. The GPS will be restarted if GPS acquisition timeout.
Syntax	**Write** Command: AT$GPSMON=\<GPS Timeout\> **Read** Command: AT$GPSMON?
Parameters	\<GPS Timeout\> Time period in minutes that must elapse with no GPS lock indicating a GPS failure.
Return Value	**Write** Command: OK : GPSMON **Read** Command: AT$GPSMON=\<GPS Timeout\> OK : GPSMON **Error** Response: ERROR : GPSMON
Example	AT$GPSMON=10 OK : GPSMON
Note	

AT$GPSALEN	GPS alert enable
Description	This command is use to enable/disable GPS timeout alert.
Syntax	**Write** Command: AT$GPSALEN=<Option>,<Action>[,<Schedule>,<Force Connection>] **Read** Command: AT$GPSALEN?
Parameters	<table><tr><td><Option></td><td>0 – Disable 1 – Enable</td></tr><tr><td><Action></td><td>1 – Logging When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval. 2 – Polling When the alert condition is true, send the latest GPS position to the remote base station. 3 – Logging + polling When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station.</td></tr><tr><td><Schedule></td><td>0 – indicates use no schedule/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 (Default is 0)</td></tr><tr><td><Force Connection></td><td>0 – Disable Bit 0 – Create new GPRS session, but honor $GPRSEN. Bit 1 – Send SMS Report Bit 2 – Send via serial port (Default is 0)</td></tr></table>
Return Value	**Write** Command: OK : GPSALEN **Read** Command: $GPSALEN=<Option>,<Action>,<Schedule>,<Force Connection> OK : GPSALEN **Error** Response: ERROR : GPSALEN
Example	AT$GPSALEN=1,2,0,0 OK : GPSALEN
Note	

AT$ MOTDET	Motion detection settings
Description	This command is used to set/query motion threshold settings. Motion is described as normal movement of a device as determined by a G sensor.
Syntax	**Write** Command: AT$MOTDET=<Motion Detection Threshold Setting>,<Motion Debounce Time>,<Motion Detect Duration>,<No Motion Detect Duration> **Read** Command: AT$MOTDET?
Parameters	<Motion Detection Threshold Setting> The g-force threshold setting that must be exceeded in order to be considered in motion. (0-127) where force is equal to N * 72mG. <Motion Debounce Time> Duration of physical impact that must be sustained in order to be considered a motion impact. (0-255) where time is N * 10ms. <Motion Detect Duration> Duration at which motion must be sustained to indicate motion has been detected. (0-255) seconds <No Motion Detect Duration> Duration at which no motion must be sustained to indicate device is no longer in motion. (0-255) seconds.
Return Value	**Write** Command: OK : MOTDET **Read** Command: $MOTDET=<Motion Detection Threshold Setting>,<Motion Debounce Time>, <Motion Detect Duration>, <No Motion Detect Duration> OK : MOTDET **Error** Response: ERROR : MOTDET
Example	AT$MOTDET=4,1,5,10 OK : MOTDET
Note	

AT$ MOTEN	Motion detection alert enable
Description	This command is used to enable/disable motion detect alert.
Syntax	**Write** Command: AT$MOTEN=<Option>,<Action>[,<Schedule>,<Force Connection>] **Read** Command: AT$MOTEN?
Parameters	<Option> 0 – Disable 1 – Enable <Action> 1 – Logging When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval. 2 – Polling When the alert condition is true, send the latest GPS position to the remote base station. 3 – Logging + polling When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station. <Schedule> 0 – indicates use no schedule/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 (Default is 0) <Force Connection> 0 – Disable Bit 0 – Create new GPRS session, but honor $GPRSEN. Bit 1 – Send SMS Report Bit 2 – Send via serial port (Default is 0)
Return Value	**Write** Command: OK : MOTEN **Read** Command: $MOTEN=<Option>,<Action>,<Schedule>,<Force Connection> OK : MOTEN **Error** Response: ERROR : MOTEN
Example	AT$MOTEN=1,2,0,0 OK : MOTEN
Note	

AT$ IMPDET	Impact detection settings
Description	This command is used to set/query impact threshold settings. Impact is described as an abrupt change in velocity as might be experienced during a wreck.
Syntax	**Write** Command: AT$IMPDET=<Impact Detection Threshold Setting>,<Impact Detect Duration> **Read** Command: AT$IMPDET?
Parameters	< Impact Detection Threshold Setting > The g-force threshold setting that must be exceeded in order to be considered an impact. (0-127) where force is equal to N * 72mG. < Impact Detect Duration > Duration at which impact must be sustained to indicate impact has been detected. (0-255) where time is N * 10ms.
Return Value	**Write** Command: OK : IMPDET **Read** Command: $IMPDET=<Impact Detection Threshold Setting>,<Impact Detect Duration> OK : IMPDET **Error** Response: ERROR : IMPDET
Example	AT$IMPDET=15,1 OK : IMPDET
Note	The device used 3-Axis G-Force sensor to detect vehicle motion and impacts. The X, Y and Z axis definition will be affected by device installation location.

AT$ IMPEN	Impact detected alert enable
Description	This command is used to enable/disable impact detect alert.
Syntax	**Write** Command: AT$IMPEN=<Option>,<Action>[,<Schedule>,<Force Connection>,<Report Mode>] **Read** Command: AT$IMPEN?
Parameters	<Option> 0 – Disable 1 – Enable <Action> 1 – Logging When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval. 2 – Polling When the alert condition is true, send the latest GPS position to the remote base station. 3 – Logging + polling When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station. <Schedule> 0 – indicates use no schedule/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 (Default is 0) <Force Connection> 0 – Disable Bit 0 – Create new GPRS session, but honor $GPRSEN. Bit 1 – Send SMS Report Bit 2 – Send via serial port (Default is 0) <Report Mode> 0 – Send Pre-impact data alert(Report ID:181) and Post-impact data alert(Report ID:182) to server. (Default) 1 – Not send Pre-impact data alert(Report ID:181) and Post-impact data alert(Report ID:182) to server.
Return Value	**Write** Command: OK : IMPEN **Read** Command: $IMPEN=<Option>,<Action>,<Schedule>,<Force Connection> OK : IMPEN **Error** Response: ERROR : IMPEN
Example	AT$IMPEN=1,2,0,0 OK : IMPEN
Note	Impact Alert Report Format: Asynchronous Position Message + <X-Axis Value>,<Y-Axis Value>,<Z-Axis Value>

ASCII Format:

Parameter	Format	Description
X- Axis Value	(-)###	-127 to 127 (* 72mG for G force)
Y- Axis Value	(-)###	-127 to 127 (* 72mG for G force)
Z- Axis Value	(-)####	-127 to 127 (* 72mG for G force)

Binary Format:

Name	Size	Type	Description
X- Axis Value	2	Signed Byte	-127 to 127 (* 72mG for G force)
Y- Axis Value	2	Signed Byte	-127 to 127 (* 72mG for G force)
Z- Axis Value	2	Signed Byte	-127 to 127 (* 72mG for G force)

AT$ IDLE	Configure idle alerts
Description	This command is used to set/query vehicle idle condition. The IDLE state is triggered when a device has not moved at least a certain distance in a specified amount of time while the engine is determined to be "on". The idle alert message (see below) is sent as soon as the idle state is triggered. The idle report is sent once the idle state has ended.
Syntax	**Write** Command: AT$IDLE=<Minimum Distance>,<Maximum Time>[,<Engine Status Detection Method> **Read** Command: AT$IDLE?
Parameters	< Minimum Distance > The distance in meters that must be travelled in the specified time in order to NOT trigger the idle alert. (0 to 500 meters) No Default < Maximum Time > The time in minutes that a device has to travel at least the specified distance in meters in order to NOT trigger the idle alert. (0 to 254 minutes) No Default < Engine Status Detection Method > Method to use to determine if the engine is running: 0 – Either or both Engine and Ignition Status. (In this case, either the engine or ignition status being "on" is sufficient to consider the engine to be on. However, both statuses must be "off" to consider the engine off.) 1 – Engine Status only 2 – Ignition Status only 3 – Engine & Ignition Status "on" (Default is 0)
Return Value	**Write** Command: OK : IDLE **Read** Command: $IDLE=<Minimum Distance>,<Maximum Time>,<Engine Status Detection Method>, OK : IDLE **Error** Response: ERROR : IDLE

AT$ IDLEEN	Idle alert/report enable
Description	This command is used to enable/disable vehicle idle alert.
Syntax	**Write** Command: AT$IDLEEN=<Option>,<Action>[,<Schedule>,<Force Connection>] **Read** Command: AT$IDLEEN?
Parameters	<Option> 0 – Disable 1 – Enable <Action> 1 – Logging When the alert condition is true, log the most recent GPS position to non-volatile flash memory for future retrieval. 2 – Polling When the alert condition is true, send the latest GPS position to the remote base station. 3 – Logging + polling When the alert condition is true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station. <Schedule> 0 – indicates use no schedule/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 (Default is 0) <Force Connection> 0 – Disable Bit 0 – Create new GPRS session, but honor $GPRSEN. Bit 1 – Send SMS Report Bit 2 – Send via serial port (Default is 0)
Return Value	**Write** Command: OK : IDLEEN **Read** Command: $IDLEEN=<Option>,<Action>,<Schedule>,<Force Connection> OK : IDLEEN **Error** Response: ERROR : IDLEEN
Example	
Note	Idle Alert Report Format: Asynchronous Position Message + <Idle Duration> **ASCII Format:**

Parameter	Format	Description
<Idle Duration>	#####	Duration vehicle was idle in second

Binary Format:

Name	Size	Type	Description
<Idle Duration>	2	Unsigned	Duration vehicle was idle in second

4.6 User Defined Report

AT$AREPORT	Analog input report configuration
Description	This command is used to set/query counter value for an input.
Syntax	**Write** Command: AT$AREPORT=<Analog Input ID>,<Trigger Mode>,<Action>,<Min Value>,<Max Value>,<Duration>,<Output ID>,<Output Control>,<Step> **Read** Command: AT$AREPORT?

Parameters	< Analog Input ID > 1 – Analog Input 1
	                         2 – Analog Input 2
	< Trigger Mode> 0 – Disable
	                         1 – Inside range of <Min Value> and <Max Value>
	                         2 – Outside range of <Min Value> and <Max Value>
	                         3 – Step Mode
	<Action> 1 – Logging:
	When all defined report conditions are true, log the most recent GPS position to non-volatile flash memory for future retrieval.
	2 – Polling:
	When all defined report conditions are true, send the latest GPS position to the remote base station.
	4 – Set Output:
	When all defined conditions are true, it set the state of the assigned output port number. When any defined condition becomes false, the assigned output port number backs to the original state.
	<Min Value> The minimum milli-voltage of the effective detecting range. (0..30)
	<Max Value> The maximum milli-voltage of the effective detecting range. (0..30)
	<Duration> Duration in seconds which analog input be triggered inside/outside the specific range.
	<Output ID> The unit hardware output number. Outputs are numbered 1 through 8. (For model FS-64: Output ID = 1~3)
	<Output Control> 0 – Set output inactive.
	                         1 – Set output active.
	<Step> Voltage difference between each steps. Min=1mv, Max=10mv

Return Value	**Write** Command: OK : AREPORT **Read** Command: $AREPORT=<Analog Input ID>,<Trigger Mode>,<Action>,<Min Value>,<Max Value>, <Duration>,<Output ID>,<Output Control> OK : AREPORT **Error** Response: ERROR : AREPORT
Example	AT$AREPORT=1,1,7,10,15,5,1,1 OK : AREPORT

AT$REPORT	User defined report configuration
Description	This command is used to set/query user defined report configuration.
Syntax	**Write** Command: AT$REPORT=<User Report ID>,<Enable>[,<Input Event>,<Input Event State>,<GF Index>,<GF Option>,<Output ID>,<Output State>,<Action>,<Action Output ID>,<Action Output State>,<Action Output Duration>,<Action Output Toggle>,<Schedule>,<Force Connect>] **Read** Command: AT$REPORT?

Parameters	<User Report ID> User defined message ID (100 .. 150).
	
	<Enable> 0 – Disable
	     1 – Enable
	<Input Event> This is a 4-bytes value for event bits.
	     1 – Igition (ACC)
	     2 – Input 1
	     4 – Input 2
	     8 – Input 3
	     16 – Input 4
	     32 – Input 5 (For FS-66 only)
	     64 – Input 6 (For FS-66 only)
	     128 – Input 7 (For FS-66 only)
	     256 – Engine Event
	     512 – Speed Event
	     1024 – Tow Event
	     2048 – Main Power Low Event
	     4096 – Main Power Failure Event
	     8192 – Battery Power Low Event
	     16384 – Battery Power Failure Event
	     32768 – Main Power Restored Event
	     65536 – Battery Power Restored Event
	     131072 – Motion Event
	     262144 – Impact Event
	     524288 – Idle Event
	     1048576 – TX Panic
	<Input Event State> This is a 4-bytes event state bits
	     Input State
	     0 – From High signal to Low signal.
	     1 – From Low signal to High signal.
	     Event State
	     0 – Event Inactive
	     1 – Event Active
	<GF Index> GeoFence setting index (0 .. 50)
	     0 – Disable
	<GF Option> GeoFence condition
	     0 – Inside geofence
	     1 – Outside geofence
	<Output ID> Output ID bitwise for report condition
	     0 – Disable
	     1 – Output 1
	     2 – Output 2
	     4 – Output 3
	     8 – Output 4 (For FS-66 Only)
	     16 – Output 5 (For FS-66 Only)

		32 – Output 6 (For FS-66 Only)
		64 – Output 7 (For FS-66 Only)
		128 – Output 8 (For FS-66 Only)
	<Output State>	Output State bitwise for report condition
		0 – Output OFF
		1 – Output ON
	<Action>	This parameter defines the actions to be taken once the report is in an active state. One or more actions can be specified on any report. The following list defines all available action types:
		1 – Logging
		When all defined report conditions are true, log the most recent GPS position to non-volatile flash memory for future retrieval.
		2 – Polling
		When all defined report conditions are true, send the latest
		GPS position to the remote base station.
		4 – Set Output
		When all defined report conditions are true, set the output relay.
	<Action Output ID>	Output control ID
		0 – Disable
		1 – Output 1
		2 – Output 2
		4 – Output 3
		8 – Output 4 (For FS-66 Only)
		16 – Output 5 (For FS-66 Only)
		32 – Output 6 (For FS-66 Only)
		64 – Output 7 (For FS-66 Only)
		128 – Output 8 (For FS-66 Only)
	<Action Output State>	Output control state
		0 – Output OFF
		1 – Output ON
	<Action Output Duration>	Output duration in millisecond. (0 .. 65535)
	<Action Output Toggle>	The times from its current state to its alternate state and back again.
	<Schedule>	0 – indicates use no schedule/always on (Default)
		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
	<Force Connection>	0 – Disable
		Bit 0 – Create new GPRS session, but honor $GPRSEN.
		Bit 1 – Send SMS Report to number defined in AT$SMSDST
		Bit 2 – Send SMS to SMSLST numbers 1
		Bit 3 – Send SMS to SMSLST numbers 2
		Bit 4 – Send SMS to SMSLST numbers 3
		Bit 5 – Send SMS to SMSLST numbers 4
		(Default is 0)

Return Value	**Write** Command: OK : REPORT **Read** Command: $REPORT=<User Report ID>,<Enable>,<Input Event>,<Input Event State>, <GF Index>,<GF Option>,<Output ID>,<Output State>,<Action>,<Action Output ID>, <Action Output State>,<Action Output Duration>,<Action Output Toggle>,<Schedule>,<Force Connection> OK : REPORT **Error** Response: ERROR : REPORT
Note	This <Force Connection> parameter Send SMS defined in SMSLST.

1. Firmware Upgrade OTA Commands

The FS-64 devices provide a functionality of upgrade firmware through direct serial communication and GPRS network. Embarc will provide firmware data file (*.stf, *.stg) for unit firmware upgrade. The firmware data file (*.stf, *.stg) is a ASCII text file and each line has two ending characters 0x0d 0x0a. The first line of the file is for AT$FWUG command used and the others are sending binary data. When all binary data have been sent, send AT$FWDC command to the unit for complete firmware download processing.

5.1 Upgrade process example

For example, the firmware data file like below:

00014D00,11 (Total Data Length, Total Data Checksum)

(Segment Base Address, Segment Data Length, Segment Data, Segment Data Checksum)

00000000,0100,EDDBE81416218C2AEC7835BD4335982BEC7835BD433598,79

00000040,0100,EC7835BD43335BD4335982BEDDE35F64321982BEC7893B,9A

00000080,0100,EC7895BDEE358DE4096EC7E1DD2E655C79095691DB187F,EE

000000C0,0100,B92D2065DBAD00303E71E5A8AD532C88B658A0CA19F7AE,47

00000100,0100,7BEFA2A7582F83BD7B4532588B0AE69E5B0B54B3D90AE79,83

00000140,0100,79EDA0A55B2D80BE55B2D80BE79EDA0A55B2D80BE79EDA,00

00000180,0100,79EDA0A55B2D80BEE70BE79EDA0A5BE86EDA0A55BD280B,00

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(1) Send **AT$FWUG**=00014D00,11

(2) Wait for OK response

(3) Send **Segment Data** (First line)

(4) Wait for OK response

(5) Send **Segment Data** (Second line)

(6) Wait for OK response

(7) ………………………………….

(8) Send **Segment Data** (Last line)

(9) Wait for OK response

(10)Send AT$FWDC

(11)Wait for OK response (Finish firmware download process)

5.2 Segment Data Format

Byte	Name	Size	Type	Description
0	Transaction ID	2	Unsigned Integer	16-bit transaction ID
2	Message Encoding	1	Unsigned Integer	0x00 – OTA Command
3	Message Type	1	Unsigned Integer	0x00 – Request
4	Data Length	2	Unsigned Integer	16-bit data length
6	Segment Base Address	4	Unsigned Integer	Starting address for this segment
10	Segment Data Length	2	Unsigned Integer	Data Length for this segment
12	Segment Data Checksum	1	Unsigned Integer	Data checksum for this segment
13	Segment Data	Variable	Unsigned Integer	Segment Data

5. Appendices

6.1 Message ID Description

Message ID (Heximal)	Message ID (Decimal)	Description	Remark
0x0000	0	Get position	
0x0001	1	Log position	
0x0002	2	Tracking position	
0x000B	11	Ignition (ACC) status Alert	
0x000C	12	Accessory input 1 Status Alert	
0x000D	13	Accessory input 2 Status Alert	
0x000E	14	Accessory input 3 Status Alert	
0x000F	15	Accessory input 4 Status Alert	
0x0010	16	Accessory input 5 Status Alert	FS-66 Only
0x0011	17	Accessory input 6 Status Alert	FS-66 Only
0x0012	18	Accessory input 7 Status Alert	FS-66 Only
0x0015	21	RFID Report	
0x0023	35	Barcode Report	
0x0032	50	IGN from OFF to ON	AT$ALARM
0x0033	51	Input 1 from OFF to ON	AT$ALARM
0x0034	52	Input 2 from OFF to ON	AT$ALARM
0x0035	53	Input 3 from OFF to ON	AT$ALARM
0x0036	54	Input 4 from OFF to ON	AT$ALARM
0x0064~0x0095	100~149	User Define Report	
0x00A0	160	Power-Up Alert	
0x00A1	161	Engine Status Alert	
0x00A2	162	High Speed Alert	
0x00A3	163	High Speed Report	
0x00A4	164	GeoFence Entry Alert	
0x00A5	165	GeoFence Exit Alert	
0x00A6	166	Main Power Low Alert	
0x00A7	167	Main Power Failure Alert	
0x00A8	168	Battery Power Low Alert	
0x00A9	169	Battery Power Failure Alert	
0x00AB	171	Heartbeat (Binary Format)	
0x00AC	172	GPS Failure Alert (No GPS lock)	
0x00AD	173	GPS Antenna Failure Alert	
0x00AE	174	Home Alert	
0x00AF	175	Main Power Restored Alert	
0x00B0	176	Battery Power Restored	

0x00B1	177	Tow Alert	
0x00B2	178	GPS Module Failure Alert	
0x00B3	179	Motion Detection Alert	
0x00B4	180	Impact Detection Alert	
0x00B5	181	Pre-impact data alert.	
0x00B6	182	Post-impact data alert.	
0x00B7	183	Idle Alert	
0x00B8	184	Idle Alert Report	
0x00B9	185	Analog Input 1 Report	FS-66 Only
0x00BA	186	Analog Input 2 Report	
0x00C1	193	Entering Low Power Mode Report	
0x00C2	194	Wake-up from Very Low Power Mode Report	
0x0100	256	CCD/CMOS Camera Data	

6.2 CME Errors Description

Error Code	Description
0	Phone failure
3	Operation not allowed
4	Operation not supported
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK 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
26	Dial string too long
27	Invalid characters in dial string
30	No network service
31	Network timeout
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
46	Corporate personalization PIN required
47	Corporate personalization PUK required
100	Unknown
100..255	Reserved

6.3 CMS Errors Description

Error Code	Description
1	Unassigned (unallocated) number
8	Operator determined barring
10	Call barred
21	Short message transfer rejected
27	Destination out of service
28	Unidentified subscriber
29	Facility rejected
30	Unknown subscriber
38	Network out of order
41	Temporary failure
42	Congestion
47	Resources unavailable, unspecified
50	Requested facility not subscribed
69	Requested facility not implemented
81	Invalid short message transfer reference value
95	Invalid message, unspecified
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message not compatible with short message protocol state
99	Information element non-existent or not implemented
111	Protocol error, unspecified
127	Interworking, unspecified
128	Telematic interworking not supported
129	Short message Type 0 not supported
130	Cannot replace short message
143	Unspecified TP-PID error
144	Data coding scheme (alphabet) not supported
145	Message class not supported
159	Unspecified TP-DCS error
160	Command cannot be actioned
161	Command unsupported
175	Unspecified TP-Command error
176	TPDU not supported
192	SC busy
193	No SC subscription
194	SC system failure
195	Invalid SME address
196	Destination SME barred
197	SM Rejected-Duplicate SM
198	TP-VPF not supported
199	TP-VP not supported
208	D0 SIM SMS storage full
209	No SMS storage capability in SIM
210	Error in MS
211	Memory Capacity Exceeded
212	SIM Application Toolkit Busy
213	SIM data download error
255	Unspecified error cause
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 timeout
340	NO +CNMA ACK EXPECTED
500	Unknown error or SMS collision
512	User abort
513	unable to store

6.4 LED Indications

Power Mode	GPS Status	GPS LED
Power Off	N/A	Off
Low Power	N/A	Off
Full Power	Acquiring	Flash Red (once/second)
Full Power	Tracking	Solid Red
Full Power	GPS Error (Antenna Failure)	Flash Red (once/pause/repeat)
Full Power	GPS Error (Acquisition Timeout)	Flash Red (twice/pause/repeat)

Power Mode	GSM/GPRS Status	GSM LED
Power Off	N/A	Off
Low Power	N/A	Off
Full Power	Acquiring	Flash Red (once/second)
Full Power	Registered	Solid Red
Full Power	Registered* Weak Antenna Signal	Flash Red (twice/second)
Full Power	GSM SIM Card Error	Flash Red (three/pause/repeat)
Full Power	GSM Registration Error	Flash Red (four/pause/repeat)
Full Power	GPRS Connection Error	Flash Red (five times/pause/repeat)
Full Power	Host Connection Error	Flash Red (six times/pause/repeat)