



SP3200 AT Command Set
SP3200-AT001

SP3200

AT Commands Set

Revision 3.0

02/01/2016

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Document Title	Skypatrol Command Set
Version	3.0
Date	02/01/2016
Status	For Revision
Document Control ID	SP3200-AT001

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Revision History

Revision	Date	Author (s)	Description of change
1.0	12/11/2014	Renato Motta	Initial revision.
2.0	02/16/2015	Ramiro Sanchez	Changed the document name from "Orion - Orion Protocol, Commands & Parameters" to "SP3201-AT001 Skypatrol AT Commands Set" Formatted the document
3.0	02/01/2016	Ramiro Sanchez	Added support for new remote commands GETSPEEDINGINFO and CLEARSPPEEDINGINFO Added set parameter VWD Added Fleet changes Added OUTPUT command Changed definition for Orion events Removed UPG parameter

Introduction

This document describes the SKYLTE protocol, which is used to interface and communicate with Skypatrol SP3200 cellular-GPS tracking and fleet management devices. These Skypatrol devices are installed with firmware and software designed to operate stand-alone with no intervention, or can be communicated with via over-the-air (OTA) commands and updates.

Scope

This document is a technical reference and describes the SKYLTE communication protocol which is used by the Skypatrol SP3200 Tracking Product to communicate with a central server.

It shall assist an implementer or operator of a backend server system to integrate the Skypatrol SKYLTE protocol.

Some Skypatrol Tracking Products may have additional functions or features implemented which are documented in their relevant manual.

This document only includes functions that are common to all Skypatrol's SKYLTE products.

Skypatrol-Orion Communication

The standard communication to and from Orion and fleet management devices is via UDP messages using a GSM/CDMA cellular connection. Hardware limits the maximum packet size to 512 Bytes. UDP communication to the module is dependent on the carrier and APN settings.

Most network modules are in a private network behind a NAT firewall/router. Network provider firewalls will expire UDP forwarding to the device from within minutes and up to hours. To restart communication, all commands should be transmitted via SMS.

The basic protocol is human readable allowing for easier use with standard terminal software. Also platform dependence like byte order does not matter. [Encryption not supported in Orion/Fleet]

The communication to and from the devices can be completely executed via SMS. Command syntax and response formats are identical in both modes. Incoming commands are handled equally; whether they are sent via UDP, TCP or SMS. **Most commands which initiate a response will have options to select which response channel to use.** It is also possible to change the default response channel at run-time (DDC). The device is always capable of receiving SMS commands, **UDP listening starts after the first sent message.**

The format and syntax of all commands and responses are identical whether they are sent and received using SMS, UDP or TCP.

Protocol Frame

Either in text mode or in binary mode, the communication is based on a single line command. A line is terminated by LF or CRLF. (CR is ignored). One line can contain multiple commands; the unit will send an ACK / NACK response for every line.

The format is:

CMD

Multi-Command:

Command1; [Command2;].....

Command with parameters:

<CMD> [<spc> <param1>[,<param2>.....]]

For a detailed description of all commands and their mandatory and optional parameters, see section "Command Summary"

Commands received via UDP are acknowledged.

The server is required to send acknowledgments to every message received via UDP.

SP3200-SKYLTE Command set

Below is a list of all of the commands that can be sent through the Skypatrol-SKYLTE protocol.

All commands are case sensitive and are uppercase only. Lowercase characters will cause a syntax error.

Command Summary

This is an overview of all supported commands. The exact use and possible parameters are described in the following chapter.

Applicable

Not Applicable

#	Command	Comment	SP3201	Fleet
1	DIAG	Retrieve Diagnostic	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	SDIAG SMS	Diagnostic Info over SMS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	SHOWALL	Retrieve current settings	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	SET	Modify configuration variables that are part of second configuration set which resides on EEPROM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	CFENCEADD	Add a circular geo- fence	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	PFENCEADD	Add a polygon geo-fence	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	FENCEDEL	Delete geo-fence	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8	FENCEDELALL	Delete all geo-fences	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

9	FENCELSTALL	List all geo-fences	☑	☑
10	BUZZWARN	Trigger Relay Driver	☑	☑
11	STARTERDIS	Disable the engine starter is toggled ON	☑	☑
12	STARTERENA	Disables the engine starter is toggled OFF	☑	☑
13	REPOENA	Repo mode is toggled ON	☑	☑
14	REPODIS	Repo mode is toggled OFF	☑	☑
15	LOCATE	Returns the current location of a device	☑	☑
16	ACK	ACK with a parameter that has sequence number of previous message.	☑	☑
17	UPDATE	OTA firmware update to a new version	☑	☑
18	GETIOSTATUS	Returns the current status of IO	☑	☑
19	EMERGENCYENA	Enables Emergency Starter Override.	☑	☑
20	CARALARMENA	Sets INP3 to detect car alarms	☒	☑
21	CARALARMDIS	Resets INP3 to normal behavior	☒	☑
22	MODO	Set the Odometer	☑	☑
23	PRINT	Print the data on the UART interface	☒	☑

Table 1: Command Summary

Commands

The format and syntax of all commands and responses are identical whether they are sent or received using SMS or UDP.

The SKYLTE protocol is used to communicate and interface with Skypatrol SP3200 cellular-GPS tracking and fleet management devices. The following rules apply to all remote commands:

- All commands are in ASCII-text form and do not need a special termination character for the command string.
- Commands to be issued in uppercase only (commands given in lowercase will be ignored/no answer).
- When commands are sent from the server to the device, the device will ACK/NACK received commands.
- Valid commands are ACKed. An ACKnowledge message is in the form:
<ESN>,ACK,<command text>
- Invalid commands are NACKed. A negative Acknowledge is in the form:
<ESN>,NACK,<command text>
- The general command (CMD) format is:
CMD<space><optional parameters separated by Comma>; (semicolon termination optional)
- Commands can come via three modes: (Serial, SMS or Server). The ACK shall use the same communication mode (Serial, SMS, Server) as the original message.

DIAG: Diagnostics

DIAG	Diagnostics
Command Function	To retrieve the current device status (Software Version, Bootloader Version, Hardware version, ICCID, IMEI , APN, GSM signal Strength, network registration information, Car battery voltage, Ignition voltage, Backup battery voltage, firmware version, ESN, Engine immobilization state, Logged packets information, latest location information):
Query Format	DIAG
Response	<esn>, ACK NACK,<command>
Parameter Values	
command	Command sent to the device (DIAG)
<esn>	Device unique serial number. This is used to identify and to address a device.
SW	Device Firmware version currently installed.
HW	Device Hardware version.
BL	Device Boot-Loader Version.
IMEI	IMEI or MEID number of the modem
ISDN	Phone number of the activated CDMA modem
APN	(Access Point Name). Provider specific name of an internet service access point for GPRS. (Will be NA for CDMA)
CSIG	Signal strength (0-31) converted into a dbm -value. Range: (-113dbm(0) to -53dbm(31)). Invalid if signal strength is 85
CREG	Registration Status. 0= not registered, modem is not looking for a network. 1=registered to home-network; provider's home-network. 2=not registered, modem is currently trying to find a network to logon to. 3= registration denied; Device is not allowed to register on this network. 4=unknown;

	5=registered at foreign network. (roaming)
IP	IP address of the cell modem.
Asrv	Destination Server IP address and port.
IOStatus	<p>Status of the GPIO's represented in 2 digit hexadecimal value. Each bit represents the state of a specific I/O as follow:</p> <p>Bit8 = <IGN STATE> Bit7 = <INP1> Bit6 = <INP2> Bit5 = <INP3> Bit4 = <OUT1> Bit3 = <OUT2> Bit2 = <OUT3> Bit1 = <OUT4></p> <p>If bit value is 0 = Low If bit value is 1 = High</p>
Vbat	Supply Voltage (Car Battery)
Vign	<p>Ignition Voltage (Pin5 on the connector): Ignition State: 0 Volt is OFF; 12 Volt is ON .</p>
Vana	Analog ADC1 Voltage (Pin3 on the connector).
Afix	GPS fix type.
dop	Dilution of Precision
lat	Latitude
long	Longitude
Uptime	Number of seconds from last device reboot.
Repo	Repo Mode status. 1 if Repo mode is enabled, 0 if the Repo mode is disabled
LatePayment	Late payment mode. 1 if Late payment is enabled and 0 if it is disabled
StarterDis	<p>Starter disabled status. It is reported as 2digit hexadecimal string. It is a bitwise field. Here is the how this bitwise definition of this status:</p> <p>Bit0 (lsb) : Starter disable Flag. 1, if Starter is disabled mode, 0 if Starter is in enabled</p>

	<p>Bit 1 : Emergency enable override status. 1, Emergency enabled is active, 0 – Emergency enable is deactivate</p> <p>Bit 2 : Manual Starter Override status. 1, MSO is active, 0 – MSO is deactivate</p> <p>Bit 7-3 : Override hours count. Number of hours override (either MSO or emergency) remaining</p>
FPkts	Number of Packets in flash waiting to be sent.
SPkts	Number of sent packets.
Notes	The DIAG response may vary from product to product.
Example CDMA	<p>ESN:6361743140021, SW:ORGB_1.2.2, HW:3.0, BL:0.6</p> <p>IMEI:, ISDN:, APN:m2mdata</p> <p>CSIG:85, CREG:0, IP:0.0.0.0</p> <p>Asrv:50.201.95.55,1721</p> <p>IOStatus:0x00 Vbat:11.84, Vign:0.00, Vana:0.00</p> <p>Afix:0, dop:0.00, lat:0.00000, long:0.00000</p> <p>Uptime:9 Repo:0 LatePayment:0 StarterDis:0x00 FPkts:1</p> <p>SPkts:0</p>

SDIAGQ: Short Diagnostic

SDIAGQ	Short Diagnostic
Command Function	To retrieve minimal diagnostic information over SMS:
Query Format	SDIAGQ SMS [<phone number>]
Response	<esn>, ACK NACK,<command>
Parameter Values	
<esn>	Device unique serial number. This is used to identify and to address a device.
command	Command sent to the device (SDIAGQ)
SW	
APN	Device Firmware version currently installed.

Asrv	(Access Point Name). Provider specific name of an internet service access point for GPRS. (Will be NA for CDMA)
Vbat	Destination Server IP address and port.
CGREG	Supply Voltage (Car Battery)
IP	Registration Status. 0= not registered, modem is not looking for a network. 1=registered to home-network; provider's home-network. 2=not registered, modem is currently trying to find a network to logon to. 3= registration denied; Device is not allowed to register on this network. 4=unknown; 5=registered at foreign network. (roaming)
IOStatus	IP address of the cell modem.
Vign	Status of the GPIO's represented in 2 digit hexadecimal value. Each bit represents the state of a specific I/O as follow: Bit8 = <IGN STATE> Bit7 = <INP1> Bit6 = <INP2> Bit5 = <INP3> Bit4 = <OUT1> Bit3 = <OUT2> Bit2 = <OUT3> Bit1 = <OUT4> If bit value is 0 = Low If bit value is 1 = High
Vana	Ignition Voltage (Pin5 on the connector): Ignition State: 0 Volt is OFF; 12 Volt is ON .
Afix	Analog ADC1 Voltage (Pin3 on the connector).
dop	GPS fix type.
lat	Dilution of Precision
long	Latitude
Uptime	Longitude

Repo	Number of seconds from last device reboot.
LatePayment	Repo Mode status. 1 if Repo mode is enabled, 0 if the Repo mode is disabled
StarterDis	Late payment mode. 1 if Late payment is enabled and 0 if it is disabled
FPkts	<p>Starter disabled status. It is reported as 2digit hexadecimal string. It is a bitwise field. Here is the how this bitwise definition of this status:</p> <p>Bit0 (lsb) : Starter disable Flag. 1, if Starter is disabled mode, 0 if Starter is in enabled</p> <p>Bit 1 : Emergency enable override status. 1, Emergency enabled is active, 0 – Emergency enable is deactivate</p> <p>Bit 2 : Manual Starter Override status. 1, MSO is active, 0 – MSO is deactivate</p> <p>Bit 7-3 : Override hours count. Number of hours override (either MSO or emergency) remaining</p>
SPkts	Number of Packets in flash waiting to be sent.
Notes	Number of sent packets.
Example CDMA	The DIAG response may vary from product to product.
	<p><ESN>,<SDIAG>,<software Version>,<APN Name>,<Active Data Server IP>,<Active data server UDP Port>,<Vehicle Battery Voltage>,<CGREG>,<Number of Flash Packets Stored>,<Device Uptime in Seconds>,<Cell Modem Uptime from last Modem Reset>,<Number of Cell Modem Resets>,<Device IP Address>,<I/O Status>,<GPS Status>,<Afix>,<DOP>,<Lat>,<Long>,0x00</p>

SHOWALL: List all SET configurations

SHOWALL	List all SET configuration
Command Function	Displays all configuration parameters, retrieve the currently set configuration
Query Format	SHOWALL
Response	<esn>, ACK NACK,<command>

Parameter Values	
<esn>	Device unique serial number. This is used to identify and to address a device.
command	Command sent to the device (SHOWALL)
Notes	For description of parameter see section SET Configuration Parameters
Example CDMA	<pre> 6361743140021,SHOWALL APN="skypatrol.vf.com" APU="(null)" APP="(null)" IPD="192.168.0.11" DSP=1790 IPU="192.168.0.14" USP=9498 IPM="192.168.0.12" MSP=1710 DDC=2 EES="HPVNGISTY" FMT="80.81.61.10.21.40.51.25.26.60.30" HDR=1 AKR=5 AKT=20 AKP=5 PHN="" PHS="" HBI=25 PMF=1 PMN=0 PRN=6 PRF=1 SFR=5 SFT=60 GPA=60 SXD=5 SXV=240 SPM=10 VIT=600 VID=10 VPT=1 ATN=800 ATF=800 AMT=5 AMD=60 ALM=1 GPN=4 SCN=60 SCO=60 SCP=160 GFN=3 GFO=10 GDN=8 GDF=5 LGF=239 AEE=0 AET=10 AES=500 OUA=0 MSO=2 BWP=30 UPE=0 UPC=10 UPT=20 UPG=21 VAA=65535 VAR=65535 VAI=65535 IVJ=50 IGM=1 VOW=117 VWD=1 OTA=0 PMR=24 </pre>

SET

SET	Set parameters
Command Function	Set configuration parameters
Write Format	SET <parameter>=<value>[,Parameter1=<value2>.....;]
Response	<esn>,ACK NACK,<command>
Parameter Values	
<esn>	Device unique serial number. This is used to identify and to address a device.
Command	Command sent to the device.
<parameter>	Parameter to be set
<value>	Values assigned to the parameter
Notes	<p>For description of parameters to be set, see section SET Configuration Parameters</p> <p>“RESET E” command will restore all set configuration parameters to factory default values.</p> <p>It is possible to set multiple parameters in one command string, but the total string must not exceed 126 characters</p> <p>For multiples parameters each ones are separated by “,” (comma) and the whole string is terminated by a “;” (semicolon).</p>
Example	SET APN=m2m.t-mobile.com

RESET Command

RESET	Reset the device
Command Function	Displays all configuration parameters, retrieve the currently set configuration
Execute Format	RESET [<option>]
Response	<esn>,ACK NACK,<command>
Parameter Values	

<esn>	Device unique serial number. This is used to identify and to address a device.
command	Command sent to the device.
<option>	Reset type to be executed in the device. Empty - The device will reboot. G - Restart the GPS receiver E - erase all non-volatile configurations (SET parameter, GeoFence configurations and Odometer) C - Restart the Cell modem H - All the logged/stored event messages will be cleared
Notes	It is recommended to Reset the unit using "RESET" command after performing a "RESET E".

User Geo Fences

The SKYLTE firmware supports user geo-fences. These are circular and polygon fences. Circular fences are represented with radius and center location. Polygon fences are represented with vertices. Entering or leaving a user fence causes an event or alert that can be transmitted. The device supports a maximum of 5 circular and a maximum of 5 polygon fences. Fences are stored in persistent memory, thus they are only reset, when the module receives a “RESET E” command, but not on a power cycle.

The device also supports one additional circular fence called “System Fence” that is used for Towing events.

Whenever device enters or leaves a “Geo-fence”, the device reports GEOFENCE_ENTRY or GEOFENCE_EXIT, depending on which direction the fence is crossed.

CFENCEADD: Add Circular Fences

CFENCEADD	Add Circular Fence
Command Function	Add a new circular fence
Write Format	CFENCEADD <ID>,<Delay>,<EVENTS>,<CENTER>,<RADIUS>
Response	<esn>,ACK NACK,<command>
Parameter Values	
<esn>	Device unique serial number. This is used to identify and to address a device.
command	Command sent to the device.
<ID>	Unique fence Identifier (0 to 65535)
<Delay>	Time (in seconds) that a vehicle has to be inside or outside of a fence for an event to be triggered.
<EVENTS>	Send events on entry and/or exit from fence 1 - Event on entry 2 - Event on exit 3 – Event on both entry and exit
<CENTER>	Fence center position Latitude and longitude in degree (float)

<RADIUS>	Radius of circular geo-fence in 10 meters units.
Example	To add a circular fence at 42.34676,-83.94323 and 1Km radius CFENCEADD 1001,5,3,42.34676,-83.94323,100

PFENCEADD: Add Polygon Fence

PFENCEADD	Add Polygon Fence
Command Function	Add a new circular fence
Write Format	PFENCEADD <ID>,<DELAY>,<EVENTS>,<NUM_VERTICES>,<Vertex1>,<Vertex2>, ...<VertexN>
Response	<esn>,ACK NACK,<command>
Parameter Values	
<esn>	Device unique serial number. This is used to identify and to address a device.
command	Command sent to the device.
<ID>	Unique fence Identifier (0 to 65535)
<Delay>	Time (in seconds) that a vehicle has to be inside or outside of a fence for an event to be triggered.
<EVENTS>	Send events on entry and/or exit from fence 1 - Event on entry 2 - Event on exit 3 - Event on both entry and exit
<NUM_VERTICES>	Number of vertices of the polygon. A minimum of 3 and a maximum of 10 vertices are supported.
<VERTEX n>	Location of vertex n of polygon. Vertex is a combination of <LAT, LONG> and it the location of vertex n
Notes	Note that circular fence id and polygon fence id should not be the same.
Example	To add a polygon fence of 4 vertices

	PFENCEADD 1002,5,3,4,42.95466,-83.69831,42.95743,-83.55927,42.87546,-83.56579,42.87345,-83.65334
--	--

FENCEDEL: Delete a User Fences

FENCEDEL	Delete a user fence
Command Function	Delete a user fence
Write Format	FENCEDEL <ID>
Response	<esn>,ACK NACK,<command>
Parameter Values	
<esn>	Device unique serial number. This is used to identify and to address a device.
command	Command sent to the device.
<ID>	Fence Identified as given with CFENCEADD or PFENCEADD Unique fence Identifier (0 to 65535)
Notes	
Example	

FENCEDELALL: Delete all user fences:

FENCEDELALL	Delete a user fence
Command Function	Delete a user fence
Write Format	FENCEDELALL
Response	<esn>,ACK NACK,<command>
Parameter Values	
<esn>	Device unique serial number. This is used to identify and to address a device.
command	Command sent to the device.
Notes	

FENCELSTAL: List all user fences

FENCELSTAL	List all use fences
Command Function	Send all the user fences to the Data server via UDP
Query Format	FENCELSTAL
Response	<p><esn>,ACK NACK,<command></p> <p>ALLFENCES <number of Fences> <Page number></p> <p>[1,<ID>,<TYPE>,<DELAY>,<EVENTS>,<CENTER>,<RADIUS></p> <p>[2,<ID>,<TYPE>,<DELAY>,<EVENTS>,<CENTER>,<RADIUS></p> <p>[3,<ID>,<TYPE>,<DELAY>,<EVENTS>,<CENTER>,<RADIUS></p> <p>[4,<ID>,<TYPE>,<DELAY>,<EVENTS>,<CENTER>,<RADIUS></p> <p>[5,<ID>,<TYPE>,<DELAY>,<EVENTS>,<CENTER>,<RADIUS></p> <p>ALLFENCES <number of Fences> <Page number></p> <p>[6,<ID>,<TYPE>,<DELAY>,<EVENTS>,<NUM_VERTEX>,<VERTEX_1>,...<VERTE X_N></p> <p>[7,<ID>,<TYPE>,<DELAY>,<EVENTS>,<NUM_VERTEX>,<VERTEX_1>,...<VERTE X_N></p> <p>[8,<ID>,<TYPE>,<DELAY>,<EVENTS>,<NUM_VERTEX>,<VERTEX_1>,...<VERTE X_N></p> <p>[9,<ID>,<TYPE>,<DELAY>,<EVENTS>,<NUM_VERTEX>,<VERTEX_1>,...<VERTE X_N></p> <p>[10,<ID>,<TYPE>,<DELAY>,<EVENTS>,<NUM_VERTEX>,<VERTEX_1>,...<VERT EX_N></p>
Parameter Values	
<ID>	Unique ID to the device representing fence ID Range: 1 - 65535
<TYPE>	Fence type 1 – Circular 2 - Polygon
<DELAY>	Fence Event Entry/Exit delay in seconds Range: 1- 240
<EVENTS>	Fence event type 1 – Fence Exit

	2 – Fence Enter 3- Both Fence Exit and Fence Enter
<Center>	Center position (Latitude and longitude) of the Circular fence (lat,long)
<Radius>	Radius of the Circular Fence units 10m Range: 1 - 10000
<Num_Vertex>	Number of vertices of the polygon Range: 3 -10
<Vertex X>	Latitude and Longitude of Vertex X (lat,long)
Notes	A Center or a Vertex is a location represented as combination of Latitude and Longitude separated by a comma “,”
Example	

BUZZWARN: Late payment warning

BUZZWARN	Late payment warning
Command Function	Enable or disable the Late payment warning
Execute Format	BUZZWARN <state>
Response	
Parameter Values	
<state>	State of the alarm 0 – Disable 1 - Enable
Notes	Device will trigger event to indicate a late payment warning: Ignition cycle will also trigger an event Output signal to external noisemaker (Piezo electric) Signal will be periodic: On for 1 second Off for 1 second It is active for BWP period Device will notify server Late payment was triggered.
Example	

STARTERENA: Starter enable

STARTERENA	Starter enabled
Command Function	Re-enables the engine starter
Execute Format	STARTERENA
Response	
Parameter Values	
Notes	Ignition should be connected to use this functionality
Example	

STARTERDIS: Starter disable

STARTERDIS	Starter disable
Command Function	Disable the engine starter
Execute Format	STARTERDIS
Response	
Parameter Values	
Notes	Ignition should be connected to use this functionality
Example	

REPOENA: Repo mode enable

REPOENA	Enable repo mode
Command Function	Enable repo mode
Execute Format	REPOENA
Response	
Parameter Values	
Notes	In REPO mode the device will send more frequent location updates. The periodicity of the location updates is defined by set parameters PRN and PRF based on Ignition On or Ignition OFF respectively.
Example	

REPODIS: Repo mode disable

REPODIS	Disable repo mode
Command Function	Disable repo mode
Execute Format	REPODIS
Response	
Parameter Values	
Notes	Ignition should be connected to use this functionality
Example	

LOCATE: Query current position

LOCATE	Query current position
Command Function	Request the current position
Execute Format	LOCATE [SMS [<number>]]
Response	
Parameter Values	
<number>	Phone number where the current location will be sent
Notes	<p>The following command will return the current location of a device as a comma-separated variable ASCII string.</p> <p>“LOCATE” without parameters will send LOCATE event to UDP or SMS based on DDC configuration</p> <p>“LOCATE SMS” will send LOCATE event via SMS to a default phone number specified in (PHN)</p> <p>LOCATE SMS, 2345556789” Will send SMS to phone number 2345556789.</p>
Example	LOCATE SMS 2345556789

ACK

ACK	Messages confirmation
Command Function	The server will acknowledge all the messages that are received from the device. The ACK
Execute Format	ACK <sequence number>
Response	
Parameter Values	
<sequence number>	The sequence number of the data received being acknowledge
Notes	
Example	

UPDATE

UPDATE	Update Firmware upgrade by air
Command Function	Star the firmware updaters by OTA
Execute Format	Update <version>
Response	
Parameter Values	
<version>	Firmware version that needs to be downloaded. This could be Filename as well but that depends on the OTA update server implementation.
Notes	
Example	

GETIOSTATUS

GETIOSTATUS	Get IO status
Command Function	Request the status of the IOs

Query Format	GETIOSTATUS
Response	ESN,IOSTATUS,<IOSTATUS>,<ADC1>,<ADC2>,<ADC3>
Parameter Values	
<ESN>	Serial number.
<IOSTATUS>	IO status Bit8 = <IGN STATE> Bit7 = <INP1> Bit6 = <INP2> Bit5 = <INP3> Bit4 = <OUT1> Bit3 = <OUT2> Bit2 = <OUT3> Bit1 = <OUT4> If bit value is 0 = Low If bit value is 1 = High
<ADC1>	Analog input 1
<ADC2>	Analog input 2
<ADC3>	Analog input 3
Notes	
Example	GETIOSTATUS 6361743140021,IOSTATUS,0x00,0.00

EMERGENCYENA

EMERGENCYENA	Enable emergency starter
Command Function	This command will override the starter disable feature for 24 hours
Execute Format	EMERGENCYENA
Response	
Parameter Values	
Notes	
Example	

CARALARMENA

CARALARMENA	Enable car alarm
Command Function	Enable car alarm
Execute Format	CARALARMENA
Response	
Parameter Values	
Notes	Sets INP3 to detect car alarms. (Special state to detect car alarms). The Generic Car Alarm Detection feature will trigger an event when the device detects that a car alarm connected to INP3 has entered panic mode and when it exits panic mode. The device INP3 will be connected to the output of the car alarm, normally the siren output. When the device enters panic mode the siren output will pulse high-low or low-high. The device then detects these pulse transitions and generates an event report, if it detects the siren output pulsing longer than a pre-set time. When the siren outputs stops (remains at a fixed state) it means it has exited the panic mode. It's also possible to set a mode in which it will only detect a change in the state of the input, so if the input was originally low and then turns high for a certain period of time it will generate the event report or vice versa.
Example	

CARALARMDIS

CARALARMENA	Disable car alarm
Command Function	Disable car alarm
Execute Format	CARALARMDIS
Response	
Parameter Values	
Notes	Resets INP3 to normal behavior. (Default)
Example	

MODO

MODO	Setup odometer value
Command Function	Modify the Odometer value
Execute Format	MODO <odometer>
Response	<esn>,ACK NACK,<command>
Parameter Values	
<odometer>	Odometer value in meters
<esn>	Device unique serial number. This is used to identify and to address a device.
<command>	Command sent to the device.
Notes	
Example	

GETSPEEDINGINFO

GETSPEEDININFO	Get speeding information
Command Function	This command will report the Speeding information records to the server. Speeding information records are the records that will be collected by the device whenever SPEEDING or SPEEDING_END events occur.
Execute Format	GETSPPEEDINGINFO
Response	<esn>,ACK NACK,<command> <ESN>,SPEEDINFO,<number_records>, EVENT_COUNT_1, EVENT_UTC_1, SPEED_1, EVENT_COUNT_2, EVENT_UTC_2, SPEED_2, ... EVENT_COUNT_N, EVENT_UTC_N, SPEED_N\r\n
Parameter Values	
<esn>	Device unique serial number. This is used to identify and to address a device.
<command>	Command sent to the device.

<number_records>	Number of records included in the response
<EVENT_COUNT_x>	Number of the event
<EVENT_UTC_x>	UTC when the speed alert event happened
<SPEED_x>	Speed
Notes	A Speeding Information record consists of Event Count associated with the event, UTC timestamp associated with the event and actual GPS speed at the time of event.
Example	

CLEARSPPEEDINFO

CLEARSPPEEDINGO	Clear speeding information
Command Function	This command will clear the speeding information records that were reported to the server
Execute Format	CLEARSPPEEDINFO
Response	<esn>,ACK NACK,<command>
Parameter Values	
<esn>	Device unique serial number. This is used to identify and to address a device.
<command>	Command sent to the device.
Notes	
Example	

PRINT

PRINT	Send data to UART
Command Function	This command will print the data on the UART interface
Execute Format	PRINT <data>
Response	<esn>,ACK NACK,<command>
Parameter Values	

<data>	Information will be sent to the device and sent/print on the UART interface
<esn>	Device unique serial number. This is used to identify and to address a device.
<command>	Command sent to the device.
Notes	
Example	

OUTPUT

OUTPUT	Send data to UART
Command Function	This command is used to drive the digital output A (for both Orion & Fleet) and C & D (for Fleet only)
Execute Format	OUTPUT <output#> <data1> <data2> <data3>
Response	<esn>,ACK NACK,<command>
Parameter Values	
<output#>	Number of output. Valid output values are '1', '2', '3', '4'. *Trying to use '2' will be ignored. '1' corresponds with 'A', '3' with 'C' and '4' with 'D'.
<data1>	Both mode 0 & 1 uses this data. For mode 0: 0 = Low, 1 = High, 2 = Toggle For mode 1: HI_TIME in 100mSec increments, range 2 – 255
<data2>	Only used in mode 1: LO_TIME in 100mSec increments, range 2 – 255
<data3>	Only used in mode 1: # of cycles to pulse, range 1 – 65535
<esn>	Device unique serial number. This is used to identify and to address a device.
<command>	Command sent to the device.

<p>Notes</p>	<p>Support of the different modes selected with the OUA (or OUC, OUD) settings</p> <p>Mode 0: Low, High or Toggle. In this mode, an output can be driven low, high or toggled.</p> <p>Mode 1: Pulse. In this mode, the digital output can be pulsed with the high & low time selectable in 100mSec resolution and the number of pulse cycles selectable.</p> <p>Mode 2: Buzzer. In this mode, the 'BUZZWARN' command & 'LatePayment' mode controls the digital output.</p> <p>Mode 3: Relay. Currently, only supports digital output 'B', which is used for ignition shutoff.</p> <p>The following table shows which digital outputs support which modes:</p> <table border="1" data-bbox="553 884 1271 1167"> <thead> <tr> <th>Mode</th> <th>OUA (1)</th> <th>OUB (2)</th> <th>OUC (3)</th> <th>OUD (4)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>X</td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>1</td> <td>X</td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>2</td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td></td> <td>X</td> <td></td> <td></td> </tr> </tbody> </table>	Mode	OUA (1)	OUB (2)	OUC (3)	OUD (4)	0	X		X	X	1	X		X	X	2	X				3		X		
Mode	OUA (1)	OUB (2)	OUC (3)	OUD (4)																						
0	X		X	X																						
1	X		X	X																						
2	X																									
3		X																								
<p>Example</p>	<p>Select output 1, mode 0, default state low operation:</p> <p style="padding-left: 40px;">set OUA=0 ← select mode 0, default state low</p> <p>Set digital output 1 to a high level:</p> <p style="padding-left: 40px;">OUTPUT 1 1</p> <p>Toggle digital output 1 (to flip the state level, if it was a low, it will go high, if it was high, it will go low):</p> <p style="padding-left: 40px;">OUTPUT 1 2</p> <p>To pulse digital output D 10 times with a 30% duty cycle of 300mSec high, 700mSec low and leave digital output in a high state:</p> <p style="padding-left: 40px;">set OUD=1 ← select mode 1, default state high, output goes high if needed</p>																									

	<p>OUTPUT 4 3 7 10 ←when executed, first, the output goes low for the 700mSec before going high for the 300mSec time.</p>
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Skypatrol-Orion Events

An SP3200 tracking device can capture and report various events to the server. Each event type is assigned an enable code according to the table below.

Parameter EES defines which events actually cause the unit to report a "standard data report". Missing codes are disabled. Only LOCATE is always enabled.

Example:

SET EES=PNAIG

Default EES is PNVAESIGX

- Applicable
- Not Applicable

Event code	Event Name	Enable Cfg value	Comment	Orion	Fleet
0	HEARTBEAT	EEL: 1 *	This is a periodic report sent to the server once every 25hours	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
1	LOCATE	EEL: 2 *	The event is sent when the device receives LOCATE command	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	REPO_ENABLE	EEL:4 *	This event is sent when the device receives REPOENA command	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	REPO_DISABLE	EEL: 8 *	This event is sent when the device receives the REPODIS command	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	PERIODIC	EEL: 16	Periodic (time or position based)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	POWER_UP	EEL: 32	This event is sent when system powers on	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	BATT_WARN	EEL: 64	This event is sent when the Vehicle battery voltage less than VOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	DISCONNECT	EEL: 128	This event is sent when the device is disconnected from the vehicle	<input type="checkbox"/>	<input checked="" type="checkbox"/>

8	SHUTDOWN	EEL: 256	This event is sent when the device is running on internal battery and internal battery running low	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	IGNITION_OFF	EEL: 512	This event is sent when the device ignition is turned off	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10	IGNITION_ON	EEL: 1024	This event is sent when the device ignition is turned on	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
11	GEOFENCE_ENTRY:<N>	EEL: 2048	This event is sent when vehicle has entered a fence with fence ID "N"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
12	GEOFENCE_EXIT:<N>	EEL: 4096	This event is sent when vehicle has left a fence with fence ID "N"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
13	PARKING	EEL: 8192	This event is sent when the vehicle ignition is turned off for more than VPT (Vehicle Parking time)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
14	IDLING	EEL: 16384	This event is sent when ignition on and vehicle is not moving. Idling event will be triggered whenever vehicle GPS speed is less than 2 Km/hr. for a sum duration of VID (Vehicle Idle Delay) and VIT (Vehicle Threshold Time).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
15	IDLING_END	EEL: 32768	This event is sent when moving again or ignition off. Idling End event will be triggered whenever vehicle GPS speed goes beyond SPM (Speed for Motion) after Idling event is triggered. Ignition off after an Idling event will also trigger an Idling end event.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
16	SPEEDING_END	EEM: 1	This event is sent when vehicle speed is below threshold. Speeding End is triggered whenever GPS speed goes below SXV (Speed Exceed Velocity) for SXD (Speed Exceed delay) time after a SPEEDING event. Ignition off after a SPEEDING event will also trigger SPEEDING_END event.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
17	SPEEDING	EEM: 2	This event is sent when the vehicle speed is exceeding a threshold. SPEEDING event is triggered when GPS speed exceeds the SXV (Speed Exceed Velocity) threshold for SXD (Speed Exceed Delay) time	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

18	GIMPACT_DETECTED	EEM: 4	This event is sent when a high impact force has been detected during Ignition on state. The G force has exceeded a threshold defined by set parameter ATN	<input type="checkbox"/>	<input checked="" type="checkbox"/>
19	GIMPACT_DETECTED_LOW	EEM: 8	This event is sent when an impact force has been detected during ignition off state. The G force has exceeded a threshold defined by set parameter ATF	<input type="checkbox"/>	<input checked="" type="checkbox"/>
20	TOWING	EEM: 16	This event is sent when Towing is detected	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
21	RS232_DATA	EEM: 32	The event is reported whenever data is received on RS232 interface	<input type="checkbox"/>	<input checked="" type="checkbox"/>
22	EXTERNAL_SENSOR	EEM: 64	This event is sent when a change on external inputs data is detected	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
23	ANALOG_SENSOR	EEM: 128	This event is sent when a change on ADC inputs is detected	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
24	STARTER_DISABLE_OVERRIDE	EEM: 256	This event is sent whenever started key override happens (manual starter override)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
25	EMERGENCY_ENABLED	EEM: 512	This event is sent when the EMERGENCYENA command is activated.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
26	EMERGENCY_DISABLED	EEM: 1024	This event is sent when the EMERGENCYENA command has "timed out" after 24 hours	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
27	STARTER_DISABLED	EEM: 2048	This event is sent when the starter is disabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
28	STARTER_ENABLED	EEM: 4096	This event is sent when the device receives the enable starter command STARTERENA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
29	STARTER_DISABLE	EEM: 8192	This event is sent when the device receives the disable starter command STARTERDIS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
30	LATE_PAYMENT_ENABLE	EEM: 16384	This event is sent when the device receives the command to enable late payment mode BUZZWARN	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
31	LATE_PAYMENT_DISABLE	EEM: 32768	This event is sent when the device receives the command to disable late payment mode BUZZWARN	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
32	BUZZ_WARN	EEN: 1	This event is sent every time Buzzer warn is activated	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

33	FW_UPDATE	EEN: 2	This event is sent when firmware is successfully updated	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
34	FW_UPDATE_FAIL	EEN: 4	This event is sent when firmware is not successfully updated	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
35	IPUPDATE	EEN: 8	This event is sent whenever IP address of the modem is changed from the last report.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
36	FLASH_FULL_WARN	EEN: 16	This event is sent whenever logging data is more than 75% of the capacity	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
37	ENTERING_SLEEP_MODE	EEN: 32	This event is sent whenever device enters in to low power mode (sleep mode)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
38	CAR_ALARM_PANIC	EEN: 64	This event is sent when the device detects that a car alarm has entered panic mode. Will report if CARALARMENA is set and according to the CAT and CAR parameter.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
39	CAR_ALARM_DEACTIVATED	EEN: 128	This Event is sent when the device detects that the car alarm has exited panic mode. Device detects the pulses stopped or it changed transited back to the original state, depending on the CAM configuration	<input type="checkbox"/>	<input checked="" type="checkbox"/>
40	PANIC	EEN: 256	Device has detected an Panic event form a input pin Note: Need to define the PANIC/EMERGENCY event	<input type="checkbox"/>	<input checked="" type="checkbox"/>
41	STARTED_DISABLE_OVERRIDE_DISABLED	EEN: 512	This event is sent after Starter disabled override expired after 24hours	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
42	ALREADY_IN_EFFECT	EEN: 1024	This event is sent if an event is already in effect Currently this event is supported for EMERGENCYENA command.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
43	ANALOG_OUT_OF_RANGE	EEN: 2048	This event is sent when a change is observed in external Analog inputs (2 and 3). This events are triggered when the inputs change observed in range to out of range or from out of range to in range	<input type="checkbox"/>	<input checked="" type="checkbox"/>
44	N/A	NA	Reserved	<input type="checkbox"/>	<input checked="" type="checkbox"/>

45	SPEEDING2	EEN: 8192	<p>This event is sent when the vehicle speed exceeds the 2nd configured threshold.</p> <p>SPEEDING event is triggered when GPS speed exceeds the threshold set in configuration SXW for SXD (Speed Exceed Delay) time.</p> <p>Note that if the vehicle speed exceeds multiple thresholds simultaneously (SXV, SXW, SXX), only the highest event will be sent (SPEEDING3 > SPEEDING2 > SPEEDING). However, all relevant SPEEDING[2,3]_END events will be sent once vehicle speed drops below the corresponding thresholds.</p>	☑	☑
46	SPEEDING3	EEN: 16384	<p>This event is sent when the vehicle speed exceeds the 3rd configured threshold.</p> <p>SPEEDING event is triggered when GPS speed exceeds the threshold set in configuration SXX for SXD (Speed Exceed Delay) time</p> <p>Note that if the vehicle speed exceeds multiple thresholds simultaneously (SXV, SXW, SXX), only the highest event will be sent (SPEEDING3 > SPEEDING2 > SPEEDING). However, all relevant SPEEDING[2,3]_END events will be sent once vehicle speed drops below the corresponding thresholds.</p>	☑	☑
47	SPEEDING2_END	EEN: 32768	<p>This event is sent when vehicle speed is below threshold.</p> <p>Speeding2 End is triggered whenever GPS speed goes below the threshold configured in SXW for SXD (Speed Exceed delay) time after a SPEEDING2 event.</p>	☑	☑
48	SPEEDING3_END	EEO: 1 (always enable)	<p>This event is sent when vehicle speed is below threshold.</p> <p>Speeding3 End is triggered whenever GPS speed goes below the threshold configured in SXX for SXD (Speed Exceed delay) time after a SPEEDING3 event.</p>	☑	☑

49	RESET	EEO:2 (always enable)	This is the event send when the device received remote STEL command "RESET"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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* Always enabled

Table 2: Skypatrol-Orion Events

Calculating Event Bit Mask Values

The following table can be used to calculate the bit mask values for EEx (with x equal to 'L', 'M', 'N' or 'O'). Each event is mapped to a unique bit location. A bit value of '1' means the event reporting is enabled while a bit value of '0' means the event reporting is disabled. This allows each event to be enabled or disabled individually without grouping events together.

For example, from the EEL list we want to only enable events 'IGNITION_ON', 'IGNITION_OFF' & 'PERIODIC', I would add the following values together (from the 'Add' column) to come up with a value for EEL:

$$16 \text{ (Periodic)} + 512 \text{ (Ignition_off)} + 1,024 \text{ (Ignition_on)} = 1,552$$

Setting EEL to 1,552 would enable these events while disabling the other listed events.

Note: Events 'HEARBEAT', 'LOCATE', 'REPO_ENABLE' & 'REPO_DISABLE' are always enabled no matter the value for EEL.

EEL

Bit Location																EVENT NAME	Add
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
															->	IDLING_END	32,768 (2 ¹⁵)
														-	->	IDLING	16,384 (2 ¹⁴)
													-	-	->	PARKING	8,192 (2 ¹³)
												-	-	-	->	GEOFENCE_EXIT	4,096 (2 ¹²)
											-	-	-	-	->	GEOFENCE_ENTRY	2,048 (2 ¹¹)
										-	-	-	-	-	->	IGNITION_ON	1,024 (2 ¹⁰)
									-	-	-	-	-	-	->	IGNITION_OFF	512 (2 ⁹)
								-	-	-	-	-	-	-	->	SHUTDOWN	256 (2 ⁸)
							-	-	-	-	-	-	-	-	->	DISCONNECT	128 (2 ⁷)
						-	-	-	-	-	-	-	-	-	->	BATT_WARN	64 (2 ⁶)
					-	-	-	-	-	-	-	-	-	-	->	POWER_UP	32 (2 ⁵)
				-	-	-	-	-	-	-	-	-	-	-	->	PERIODIC	16 (2 ⁴)
			-	-	-	-	-	-	-	-	-	-	-	-	->	REPO_DISABLE	8 (2 ³)
		-	-	-	-	-	-	-	-	-	-	-	-	-	->	REPO_ENABLE	4 (2 ²)
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	->	LOCATE	2 (2 ¹)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	->	HEARTBEAT	1 (2 ⁰)

EEM

Bit Location																EVENT NAME	Add
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
															->	LATE_PAYMENT_DISABLE	32,768 (2 ¹⁵)
														-	->	LATE_PAYMENT_ENABLE	16,384 (2 ¹⁴)
													-	-	->	STARTER_DISABLE	8,192 (2 ¹³)
												-	-	-	->	STARTER_ENABLED	4,096 (2 ¹²)
											-	-	-	-	->	STARTER_DISABLED	2,048 (2 ¹¹)
										-	-	-	-	-	->	EMERGENCY_DISABLED	1,024 (2 ¹⁰)
									-	-	-	-	-	-	->	EMERGENCY_ENABLED	512 (2 ⁹)
								-	-	-	-	-	-	-	->	STARTER_DISABLE_OVERRIDE	256 (2 ⁸)
							-	-	-	-	-	-	-	-	->	ANALOG_SENSOR	128 (2 ⁷)
						-	-	-	-	-	-	-	-	-	->	EXTERNAL_SENSOR	64 (2 ⁶)
					-	-	-	-	-	-	-	-	-	-	->	RS232_DATA	32 (2 ⁵)
				-	-	-	-	-	-	-	-	-	-	-	->	TOWING	16 (2 ⁴)
			-	-	-	-	-	-	-	-	-	-	-	-	->	GIMPACT_DETECTED_LOW	8 (2 ³)
		-	-	-	-	-	-	-	-	-	-	-	-	-	->	GIMPACT_DETECTED	4 (2 ²)
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	->	SPEEDING	2 (2 ¹)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	->	SPEEDING_END	1 (2 ⁰)

EEN

Bit Location																EVENT NAME	Add
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
															->	SPEEDING2_END	32,768 (2 ¹⁵)
														-	->	SPEEDING3	16,384 (2 ¹⁴)
													-	-	->	SPEEDING2	8,192 (2 ¹³)
												-	-	-	->	UNUSED	4,096 (2 ¹²)
											-	-	-	-	->	ANALOG_OUT_OF_RANGE	2,048 (2 ¹¹)
										-	-	-	-	-	->	ALREADY_IN_EFFECT	1,024 (2 ¹⁰)
									-	-	-	-	-	-	->	STARTED_DISABLE_OVERRIDE_DISABLE	512 (2 ⁹)
								-	-	-	-	-	-	-	->	PANIC	256 (2 ⁸)
							-	-	-	-	-	-	-	-	->	CAR_ALARM_DEACTIVATED	128 (2 ⁷)
						-	-	-	-	-	-	-	-	-	->	CAR_ALARM_PANIC	64 (2 ⁶)
					-	-	-	-	-	-	-	-	-	-	->	ENTERING_SLEEP_MODE	32 (2 ⁵)
				-	-	-	-	-	-	-	-	-	-	-	->	FLASH_FULL_WARN	16 (2 ⁴)
			-	-	-	-	-	-	-	-	-	-	-	-	->	IPUPDATE	8 (2 ³)
		-	-	-	-	-	-	-	-	-	-	-	-	-	->	FW_UPDATE_FAIL	4 (2 ²)
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	->	FW_UPDATE	2 (2 ¹)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	->	BUZZ_WARN	1 (2 ⁰)

EEO

Bit Location															EVENT NAME	Add	
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
															->	UNUSED	32,768 (2 ¹⁵)
														-	->	UNUSED	16,384 (2 ¹⁴)
													-	-	->	UNUSED	8,192 (2 ¹³)
												-	-	-	->	UNUSED	4,096 (2 ¹²)
											-	-	-	-	->	UNUSED	2,048 (2 ¹¹)
										-	-	-	-	-	->	UNUSED	1,024 (2 ¹⁰)
									-	-	-	-	-	-	->	UNUSED	512 (2 ⁹)
								-	-	-	-	-	-	-	->	UNUSED	256 (2 ⁸)
							-	-	-	-	-	-	-	-	->	UNUSED	128 (2 ⁷)
						-	-	-	-	-	-	-	-	-	->	UNUSED	64 (2 ⁶)
					-	-	-	-	-	-	-	-	-	-	->	UNUSED	32 (2 ⁵)
				-	-	-	-	-	-	-	-	-	-	-	->	UNUSED	16 (2 ⁴)
			-	-	-	-	-	-	-	-	-	-	-	-	->	UNUSED	8 (2 ³)
		-	-	-	-	-	-	-	-	-	-	-	-	-	->	UNUSED	4 (2 ²)
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	->	RESET	2 (2 ¹)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	->	SPEEDING3_END	1 (2 ⁰)

Data Items in standard report

The following data items can be reported based on the FMT setting

Applicable

Not Applicable

#	Descriptive Name	Numeric Value	Size (bytes)	Binary format	Comment	Orion	Fleet
1	ESN	1 (always incl.)	16 (max)	Numeric	Device identifying ESN (13 char)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	EVENTNAME	2 (always incl.)	1	integer	Name the causing event (there is always an event connected with every report) Add an event code instead of the name	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	EVENTCOUNT	3 (always incl.)	2	integer	Event count of the message. Counter of send messages (not 0)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	EVENTUTC	10	4	integer	UTC (GPS) Time of event in seconds since 1/1/2000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	POSITION_DEG	21	8	<lat><long> lat and long represent a 5 digit fixed point integer	Latitude & Longitude in 0.00001 accurate up to 5 decimal places.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	GPSAGE	24	2	integer	Time in minutes since the last fix	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	GPSSATNUM	25	1	integer	Number of satellites in last GPS fix	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8	GPSDOP	26	2	2 digit fixed point integer	XDOP value (normally hDOP) or 99.9 for no GPS fix	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9	IGNITIONSTATE	30	1	integer	IGN_ON/IGN_OFF ignition state 0 = Off, 1 = On	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10	IGNITIONTIME	31	2	integer	Time since last ignition off to on transition in [min] (integer)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

11	SPEED_KMH	40	2	1 digit fixed point integer ex: 123 is 12.3kmph	GPS Speed at last FPS fix (float)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
12	HEADING_DEG	51	2	1 digit fixed point integer	GPS Direction in degrees (float)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
13	ODOMETER_KM	60	4	3 digits fixed point integer ex: 12345 is 12.345km	Odometer in km (float)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
14	VEHICLE_BATT	61	2	2 digit fixed point integer	Vehicle Battery Voltage. Ex: 12.45	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
15	BACKUP_BATT	62	1	integer	Backup Battery percentage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
16	TEMPERATURE	63	1	integer	Device temperature in Celsius	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17	IOSTATUS	80	1	integer	A byte value and each bit represents the state of a specific I/O as follows Bit8 = <IGN STATE> Bit7 = <INP1> Bit6 = <INP2> Bit5 = <INP3> Bit4 = <OUT1> Bit3 = <OUT2> Bit2 = <OUT3> Bit1 = <OUT4> If bit value is 0 = Low If bit value is 1 = High In ASCII mode it is represented a integer.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
18	ADC1	81	2	2 digit fixed point integer	Analog ADC input in volts	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
19	ADC2	82	2	2 digit fixed point integer	Analog ADC input volts	<input type="checkbox"/>	<input checked="" type="checkbox"/>
20	ADC3	83	2	2 digit fixed point integer	Analog ADC input volts	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Table 3: Report Data Items

The standard report data is run-time configurable via the FMT setting. The FMT string contains a dot ('.') separated list of numeric items, which represent the data points. If the HDR is set to 1, then the report data will be headed by a line with the FMT value, so that the receiver knows which values follow. Normally HDR is null, since the receiver should know the setting by database query.

ASCII Data Format

The Report format is:

<ESN>,Mode,<Data>

Parameter	Description
ESN	Electronic serial number of the device
Mode	If Mode = 0x41 → 'A' → Data is represented in ASCII format Mode = 0x42 → 'B' → Data is represented in Binary format
Data	The data is either represented in ASCII data format or Binary data format. It's the data fields defined by the FMT parameter

	<p>ASCII vs Binary are two separate firmware packages. Device will be loaded with one or the other during device build. The device will not support ASCII and Binary simultaneously. Device can be switched to other mode via OTA update.</p>
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The <Data> is represented in ASCII characters and will be in the following format:

<Event Code>,<Sequence Number>,[<FMT=x.x.x...x.x>],<FMT Field1>,<FMT Field2>,<FMT Field3>,...,<FMT Field n-1>,<FMT Field n>,[OPT=<Optional Data>]

Every data item is separated by a comma ",".

[OPT=<Optional Data>] is currently defined for:

Event type	Description
Geo-fence Entry and Exit events	Optional Data is the Geo-fence ID.
RS232_Data events	Optional data is the RS232 data.
EXTERNAL_SENSOR event	Optional data is 1byte, where in the most-significant 4 bits indicate digital input number. The least significant bits are mapped as following 0xX0 = Digital input X is at logic level 0 0xXF = Digital input X is at logic level 1
ANALOG_OUT_OF_RANGE event	Optional data is 1 byte data, where the most-significant 4 bits indicate the analog input number. The least significant bits are mapped as following 0xX0 = Analog below threshold 0xX8 = Analog no longer outside thresholds 0xXF = Analog above threshold

Example: If FMT is set to “21.40.30.60.10” and HDR=1. Sample report message in ASCII mode will be as following:

63615722800027,A,11,24,FMT=21.40.30.60.10,12.99758,-77.67116,30.5,1,6379.553,418818705,OPT=1001

ASCII decoding:

- 63615722800027 → ESN
- A → ASCII Protocol
- 11 → Event Code: Geo-Fence Exit event
- 24 → Sequence Number
- FMT=21.40.30.60.10 → FMT Data Items
- 12.99758 → Latitude 12.99758° N
- 77.67116 → Longitude 77.67116° W
- 30.5 → 30.5 Km/h
- 1 → Ignition ON
- 6379.553 → Odometer in Km
- 418818705 → Event UTC in seconds since 1/1/2000
- OPT=1001 → Fence ID 1001

Binary data format

The Report format is:

<ESN>,Mode,<Data>

Parameter	Description
ESN	Electronic serial number of the device
Mode	If Mode = 0x41 → 'A' → Data is represented in ASCII format Mode = 0x42 → 'B' → Data is represented in Binary format
Data	The data is either represented in ASCII data format or Binary data format. It's the data fields defined by the FMT parameter



ASCII vs Binary are two separate firmware packages. Device will be loaded with one or the other during device build. The device will not support ASCII and Binary simultaneously. Device can be switched to other mode via OTA update.

The <Data> is represented in binary and will be in the following format:

<Data Size><Event Code><Sequence Number><FMT Size>[[<FMT Item1><FMT Item2><FMT Item3>...<FMT ItemN-1><FMT ItemN>][<FMT Field1><FMT Field2><FMT Field3>...<FMT FieldN-1><FMT FieldN>][<Optional Data Size><Optional Data>]

Parameter	Description
{<Data Size>}	A 2-byte field representing the total number of bytes after this field. This field is always included on event reports.
{<Event Code>}	A 1-byte field representing the event code that triggered the report. This field is always included on event reports. (See Event Codes section)
{<Sequence Number>}	A 2-byte field representing the sequence number of the report. This field is always included on event reports.

<p>{<FMT Size>}</p>	<p>A 1-byte field representing the size of the <FMT Items> field. This is the number of FMT Items, if this is 0 then <FMT Items> are not included. This field is always included on event reports, even if its zero.</p>
<p>[<FMT ItemX>]</p>	<p>Each is 1-byte representing the numeric value or ID of the data in <FMT FieldX>. Each byte represents one data item configured by the FMT parameter. (See Data Items in Event Reports section)</p>
<p><FMT FieldX></p>	<p>It's the data of the <FMT FieldX>. The size of this field will depend on the data it represents. (See Data Items in Event Reports section)</p>
<p>[<Optional Data Size>]</p>	<p>A 2-byte field which denotes the length of <Optional data></p>
<p>[<Optional Data>]</p>	<p>This data is dependent of the event code. It is currently defined for:</p> <ul style="list-style-type: none"> • Geo-fence Entry and Exit events: Optional Data is the Geo-fence ID. • RS232_Data events: Optional data is the RS232 data. • External_Sensor event: Optional data is 1byte, where in the most-significant 4 bits indicate digital input number. The least significant bits are mapped as following <ul style="list-style-type: none"> 0xX0 = Digital input X is at logic level 0 0xXF = Digital input X is at logic level 1 • Analog_Out_of_Range event: Optional data is 1 byte data, where the most-significant 4 bits indicate the analog input number. The least significant bits are mapped as following <ul style="list-style-type: none"> 0xX0 = Analog below threshold 0xX8 = Analog no longer outside thresholds 0xXF = Analog above threshold • FW_UPDATE and FW_UPDATE_FAIL event: Option data is Firmware version string.

	<p>Example: Optional data will be like ORCB_1.3.2 or ORGB_1.3.2 or FLGB_1.2, where 4 digit prefix is defined as following</p> <p>OR implies Orion and FL implies Fleet</p> <p>C for CDMA and G for GSM modems</p> <p>B for Binary STEL protocol mode</p> <p>Firmware version number can be of denoted as following format</p> <p><Major number>.<minor number>.<internal number></p> <p>For internal releases <internal number> is specified. For external releases it will be typically of the form</p> <p><major>.<minor></p> <p>For example for geo-fence ID data, the [<Optional Data Size>] and [<Optional Data>] would look something like:</p> <p><0x0002><0001></p> <p>Similarly for RS232 serial data, if the RS232 data size is 128 bytes (0x80 bytes), then [<Optional Data Size>] and [<Optional Data>] would look like: <0x0080><RS232 data of length 128 bytes></p>

Example: If FMT is set to "21.40.30.60.10" and HDR=1.
 Sample packet in binary mode will be as following:

**636157722800027,B,<0x0020> <0x0B> <0x0005> <0x05> <0x15> <0x28> <0x1E>
 <0x3C> <0x0A> <0x0076FF14> <-0x02C719C8> <0x0131> <0x01> <0x0061 5821>
 <0x18F6 AA91> <0x0002> <0x03E9>**

Binary decoding:

- 636157722800027 → ESN
- B → Binary
- 0x0020 → data size 32 bytes
- 0x0B → Geo-Fence Exit event
- 0x0005 → Event count

0x05 → FMT_size
 <0x15> <0x28> <0x1E> <0x3C> <0x0A> → FMT data format is "21.40.30.60.10"
 0x0076FF14 → (0x0076FF14 / 60 / 10000) = Latitude 12.99758° N
 -0x02C719C8 → (-0x02C719C8 / 60 / 10000) = Longitude 77.67116° W
 0x0131 → 30.5 Kmph
 0x01 → Ignition ON
 0x00615821 → Odometer in Km = 6379.553Km
 0x18F6 AA91 → Event UTC
 0x0002 → Optional Geo-Fence data size
 0x03E9 → Geo-Fence ID 1001

	<p>Binary over SMS: Not every binary character is supported over SMS. So, for supporting binary reports over SMS, binary data will be encoded with Base64 encoding and then sent over SMS. On the SMS gateway upon receiving the base64 encoded binary data, it should be first decoded with base64 decoder</p>
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	<p>In binary mode every field that is more than one byte is represented in little endian format</p>
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LGF

LGF is a debug enabled flag. This variable allows the user to enable/disable the following:

GPS debugging, mirror data. It is an 8 bit value where in each bit is used to enable/disable the respective feature.

A bit value of "0" enables and "1" disables the respective feature.

LGF							
0 ==> Enable ; 1==> Disable							
0/1	0/1	0/1	0/1	1	1	1	1
not used	not used	Debug Verbosity	Mirror Data	Internal Debug purpose	Internal Debug purpose	Internal Debug purpose	Internal Debug purpose

OTA firmware upgrade

Device supports a feature to upgrade the firmware over the air, which can be done using the "UPDATE" command. Other dependent parameters for OTA firmware upgrade are IPU (IP address of the update server), APN, and OTA. UPDATE command can be issued via SMS/UDP by mentioning the intended firmware version number.

Example:

SET IPU=<IP address of update server>

SET OTA=1

UPDATE <firmware version>

On UPDATE command, device downloads the firmware from the specified server and boots up with the new firmware. In case the update process stops in between due to server going down while the update is in progress or due to unavailability of cellular connection; devices will boot up with a factory programmed fail-safe firmware.

SET Configuration Parameters

Configuration Parameters labeled Private are not to be configurable by the customers

* Parameters which can be deactivated with a "0" value.

- Applicable
 Not Applicable

SIM Card Configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
APN	Access Point Name	string	N/A	N/A	TBD	The name of the APN. Any changes to this item will reflect only after issuing a RESET. Applies only to GSM devices	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
APP	APN Password	string	N/A	N/A	TBD	The password for APN Applies only to GSM devices	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
APU	APN Username	string	N/A	N/A	TBD	The username for APN Applies only to GSM devices	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Server Configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
IPD	IP of the Data Server	x.x.x.x, string	N/A	N/A	192.168.0.21	IP address of the server for regular data transfer.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DSP	Data Server Port	word	1	65535	1710	Port number of the server. Any changes to this item will reflect only after issuing a RESET.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IPU	IP of the OTA Update server	x.x.x.x, string	N/A	N/A	192.168.0.14	IP address of the update server	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
USP	OTA Update Server Port	word	1	65535	9498	OTA update server port number	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IPM	IP address of the mirror server	x.x.x.x, string,	N/A	N/A	TBD	IP address for server to mirror data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MSP	Mirror Server Port	word	1	65535	9495	Debug Mirror server port number	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OTA	Over-the Air Update enable flag	Byte	0	1	0	Over-the Air update enable flag	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Orion protocol Configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
DDC	Default Data Channel	byte	1	3	2	Default transport protocol. 1=SMS, 2=UDP, 3=TCP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
EEL	Event enable bit mask "L"	Word	0	65535	65535	Events enable. This bit mask enables or disables events. If an event bit is cleared (zero), it is disabled, then there will be no notification sent. The event still effects the behavior of the module.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
EEM	Event enable bit mask "M"	Word	0	65535	65535	Events enable. This bit mask enables or disables events. If an event bit is cleared (zero), it is disabled, then there will be no notification sent. The event still effects the behavior of the module.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
EEN	Event enable bit mask "N"	Word	0	65535	65535	Events enable. This bit mask enables or disables events. If an event bit is cleared (zero), it is disabled, then there will be no notification sent. The event still effects the behavior of the module.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
EEO	Event enable bit mask "O"	Word	0	65535	3	Events enable. This bit mask enables or disables events. If an event bit is cleared (zero), it is disabled, then there will be no notification sent. The event still effects the behavior of the module.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FMT	Orion report Format Specified	string	N/A	N/A	80.81.61.10. 21.40.51.25. 26.60	Standard response format definition.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
HDR *	Report Header	byte	0	1	1	If 0 then the header row is omitted from data reports, if 1 then header row is sent with all data reports.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AKR	ACK timeout, report retry attempts	number, byte	0	4	5	Command for # of retries until we get acknowledgement from the server	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AKT	ACK Retransmit Timeout	seconds, byte	4	240	20	The number of seconds to wait before retrying to retransmit		
AKP	ACK timeout, Periodic retry period	minutes, byte	1	240	5	Report retry period.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

PMR*	Periodic Modem Reset	hours, byte	1	240	24	Unconditional periodic reset of the cell modem 0 will disable 1 to 240 will the periodic cell modem reset interval to 1hour to 240hours respectively	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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SMS, Voice Gateway configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
PHN	phone number	number, string	N/A	N/A	3059006910	Default phone number for SMS transmission	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PHS	Approved SMS gateway phone number	number, string	N/A	N/A	3059006910	Approved SMS gateway Phone number	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PHV	Approved Voice Phone Number	number, string	N/A	N/A	N/A	Approved Voice Phone number	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Periodic Events Configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
HBI*	Heartbeat report Interval	[1 hour], byte	1	48	25	If HBT = 25 then device will send heart beat events every 25 hours.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PMF *	Periodic Message during ignition OFF	[10sec], word	1	65000	0 for Orion, 720 (2 hours) for Fleet	Periodic Position Reporting during Ignition Off. PMF = 0 to 65000 (Range: 1 = 10sec to 180hours) PMF = 0 implies Periodic data disable Example. PMF =10secs; 6=60secs etc.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PMN *	Periodic Message during ignition ON	[10sec], word	1	65000	0 for Orion, 12 (2 minutes) for Fleet	Periodic Position Reporting during Ignition On. PMN = 0 to 65000 seconds (Range: 10sec to 180hours) PMN = 0 implies Periodic data disable Example. PMN=4 is 40 sec interval.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

PRN	Periodic Messages in Repo mode during Ignition ON	[10 sec], byte	1	240	6	Frequency of periodic messages in Repo mode during ignition ON. For example: if PMR = 18 In repo mode the location info is generated for every $18 * 10 = 180$ sec = 3mins	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PRF	Periodic Message in Repo mode during Ignition OFF	[5 mins], byte	1	240	1	Frequency of periodic messages in Repo mode during ignition OFF. For example: if PMR = 24 In repo mode the location info is generated for every $24 * 5\text{mins} = 120$ mins = 2hours	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PRB	Periodic Messages in when running on Backup Battery mode	[1 mins], word	1	65000	15	Frequency of periodic messages in Backup Battery mode. For example if PMR=15 When the device is running on internal Backup Battery, the periodic location messages will be sent every 15mins	<input type="checkbox"/>	<input checked="" type="checkbox"/>
RET*	Repo Enabled Timeout	[1hour], byte	1	240	24	Repo mode enable timeout. If RET is set to 24 then the Repo mode will be automatically be disable after 24hours after activating REPO mode. If RET is set to 0 then this feature is disabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PKA*	Periodic Keepalive interval	[1hour], byte	0	48	0	If PKR is set to 12 then device will send a keepalive packet to that Server every time the device did not send any data to the server for more than 12hours. The Keepalive report consists of just ESN number, doesn't require a ACK . If PKA is set to 0 this feature will be disabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

System Fence configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
SFR	System fence Radius	[10m], byte	10	240	5	The radius of the system fence.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SFT	system fence timing	[1 sec], byte	1	240	60	Time the vehicle must remain outside the radius of system fence before the alarm is tripped (1-240).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

						System fence is also invoked with parking.		
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Speeding Event configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
SXD	Minimum Speed exceeded duration	[1 sec], Word	5	240	5	The minimum duration before tripping excessive speed event	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SXV	Speed exceed value for Speeding event	[1 km/h], byte	5	240	240	Threshold for excessive speed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SXW	Speed exceed value for Speeding2 event	[1 km/h], byte	5	240	240	2 nd Threshold for excessive speed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SXX	Speed exceed value for Speeding3 event	[1 km/h], byte	5	240	240	3 rd Threshold for excessive speed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Idling and Parking Event configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
SPM	Speed for Idling end	[1 km/h], byte	5	240	5	The minimum speed for the Orion to sense that it is moving.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
VID	Vehicle Idle detect duration	[1sec], word	1	65000	10	Number of seconds to determine if the vehicle is idle Example VID=20 implies Vehicle idle delay is 20 seconds	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
VIT	Vehicle idle threshold	[1 sec], word	1	65000	600	Vehicle idle threshold to trigger event Example VIT=600 implies Idle event will be sent after 600sec	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
VPT	Vehicle Parking Time	[5 mins], Byte	1	240	12	The duration the vehicle needs to be stationary for a parking event to occur. For example: if STM=12 Implies Parking event is generated only after 12 * 5 = 60 mins	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Accelerometer and Towing Configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
ATN *	Accelerometer Threshold for impact detection (in Normal power mode / IGN ON)	[10 mg], word	1	800	800 for Orion, 200 for Fleet	Sets the threshold to detect high impact force as a crash event in Ignition ON state.(multiply by 10 and then divide by 1000 = g force)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ATF *	Accelerometer Threshold for impact detection (in IGN OFF)	[10 mg], word	1	800	800 for Orion, 50 for Fleet	Sets the threshold to impact force in Ignition OFF state.(multiply by 10 and then divide by 1000 = g force)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
AMT	Accelerometer motion detection threshold (private)	[10 mg], word	1	800	2	Sets the motion detection threshold during ignition OFF for towing detection	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AMD	Accelerometer Motion detection duration for towing event generation	[1 sec], byte	1	240	60	To detect towing the accelerometer should be more than AMT for AMD duration	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ADM	Accelerometer Data collection Mode	byte	0	1	0	Sets the Accelerometer to data collection or Impact detection mode. 0 = Impact detection mode 1 = Data collection mode	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Analog and Digital Monitoring

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
AEE	Analog and Digital inputs Monitoring Enable	Byte	0	1	0	Analog and Digital inputs monitoring. This parameter is a bit wise field. The description of each bit in this parameter is defined in next Table (AEE set configuration parameter).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

GPIO, Starter, Buzzer Warning Configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
BWP *	Buzzer Warning Duration	[1 sec], byte	0	240	30	Buzz warning duration	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MSO	Manual Starter Override	number, byte	0	2	2	Number of Manual Starter Override allowed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OUA	Output A	byte	0	1	0	Setting digital Output 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OUC	Output C	byte	0	1	0	Setting digital Output 3	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ODU	Output D	byte	0	1	0	Setting digital Output 4	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DFD	Digital Input 1 Debounce	[10 milli seconds], word	50	6500	100	Digital input 1 de-bounces duration. For example: if DFD=120 then the debounce duration is 1200milli seconds or 1.2 seconds	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DSD	Digital Input 2 Debounce	[10 milli seconds], word	50	6500	100	Digital input 2 de-bounces duration. For example: if DSD=120 then the debounce duration is 1200milli seconds or 1.2 seconds	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DTD	Digital Input 3 Debounce	[10 milli seconds], word	50	6500	100	Digital input 3 de-bounces duration. For example: if DTD=120 then the debounce duration is 1200milli seconds or 1.2 seconds	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Car Alarm Configuration

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
CAT	Car Alarm Threshold	[1 sec], byte	10	240	30	The threshold time in seconds the device must be detecting on input pin (INP3) a pulse or the state of the input must remain changed in order to generate the car alarm event report CAR_ALARM_PANIC (The mode will be defined by "CAM") and the device is now in alarm panic mode. After the first report CAR_ALARM_PANIC, if the device detects that the pulses stops or the input changed back to the original state for this threshold time, it will then send event CAR_ALARM_DEACTIVATED and the alarm is no longer in panic mode.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

CAR	Car Alarm Periodic resend	[1 sec], byte	0	255	0	Aggressive mode. Periodic report time in seconds the device will keep resending the car alarm event report (CAR_ALARM_PANIC) after the threshold time defined by "CAT" has expired and the alarm is still in panic mode. 0 means send only the first time.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CAM	Car Alarm Mode	byte	0	1	0	Mode to detect. 0 : Detect pulses. (Default) 1 : Detect input transitions from one state to another and remain at that state for the time threshold set time.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CAP	Car Alarm Pulses threshold	byte	0	240	5	This parameter only applies to CAM=0 mode. Defines the maximum time in seconds to wait for a pulse. The device must detect at least 1 pulse in each CAP interval until the CAT interval expires for the event to trigger. Example, if "CAP = 5" and "CAT = 60", then, the device must detect at least 1 pulse every 5 seconds during 60 seconds to trigger the event CAR_ALARM_PANIC report.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Ignition detection configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
IGM *	Ignition detection mode	byte	0	2	0	0 – automatic selection of detection method 1 - Ignition detection by voltage 2 - ignition detection using the ignition wire	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IVJ	Ignition detection voltage jump. (Laird Private)	[0.01v], byte	10	240	50	Ignition detection voltage jump	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IGA	Virtual Ignition On To Off Accelerometer Idling duration	[1min], byte	1	240	5	In Virtual ignition mode (IGM = 1), this is the duration that accelerometer must show no motion before ignition detection will override voltage jump	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

IGB	Virtual Ignition Off to ON Accelerometer motion duration	[1second],byte	5	240	5	In Virtual ignition mode (IGM = 1), this is the duration that accelerometer must show motion before ignition detection will override voltage jump	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IGC	Virtual Ignition On to Off Idling Speed duration	[1min],byte	1	240	5	In Virtual ignition mode (IGM = 1), this is the duration that GPS Speed must be below IGE threshold before ignition detection will override voltage jump	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IGD	Virtual Ignition Off to On Motion Speed duration	[1 second], byte	5	240	5	In Virtual ignition mode (IGM = 1), this is the duration that GPS Speed must be above IGF threshold before ignition detection will override voltage jump	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IGE	Virtual Ignition On to Off Idling Speed	[1kmph],byte	5	240	10	In Virtual ignition mode (IGM = 1), It is the GPS speed that must be above this threshold for ignition detection timer (IGC) to increment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IGF	Virtual Ignition Off to On Motion Speed	[1kmph], byte	15	240	15	In Virtual ignition mode (IGM = 1), It is the GPS speed that must be below this threshold for ignition detection timer (IGD) to increment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Battery Voltage configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
VOW	Vehicle Battery Warning level	[0.1v], byte	50	240	117	The voltage at which the unit sends a warning that the battery is low (100mV).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
VWD	Vehicle Battery Warning duration	[10s],byte	0	240	1	The vehicle battery voltage warning level duration. It is the duration for which the vehicle battery voltage should be lower than VOW to generate vehicle battery warning event	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Analog Voltage configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
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VAR	VBATT input analog voltage reference adjustment (Private)	[0.01v], word	0	500	0xFFFF	VBatt input analog reference voltage adjustment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
VAI	Ignition input analog voltage reference adjustment (Private)	[0.01v], word	0	500	0xFFFF	Ignition input analog reference voltage adjustment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
VAA	Analog Input 1 analog voltage reference adjustment (Private)	[0.01v], word	0	500	0xFFFF	Analog input 1 analog voltage reference adjustment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AEE	Analog and Digital inputs Monitoring Enable	Byte	0	1	0	Analog and Digital inputs monitoring. This parameter is a bit wise field. The description of each bit in this parameter is defined in next Table (AEE set configuration parameter).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AET	Analog Event Threshold	[1%], Byte	0	100	10	Sets this value to report Analog sensor events when the value on Analog input1 is changed beyond AET %. Example if this value is set to 10, then the analog sensor event is generated when the voltage on Analog input 1 is changed more than +/- 10%	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AES	Analog input 1Event Set point	[0.01v], word	0	1600	500	The initial Analog input set value during boot up. The AES config is not intended to be written to by the customer, it is where the current set point of the algorithm is stored so that it can be saved in NVM		
ABD	Analog input 2 reading duration	Seconds, byte	1	240	2	Duration threshold for generating ANALOG_OUT_OF_RANGE event on Analog input 2 For Example: if ABD=2, ABN=510 and ABX=820. Device will generate ANALOG_OUT_OF_RANGE event when the Analog input 2 is within	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

						or outside of the range specified by ABN and ABX, i.e. 5.10 volts to 8.20 volts for more than ABD i.e., 2 seconds		
ACD	Analog input 3 reading duration	Seconds, byte	1	240	2	Duration threshold for generating ANALOG_OUT_OF_RANGE event on Analog input 3 For Example: if ACD=2, ACN=610 and ACX=860. Device will generate ANALOG_OUT_OF_RANGE event when the Analog input 3 is within or outside of the range specified by ABN and ABX, i.e. 6.10 volts to 8.60 volts for more than ACD i.e., 2 seconds	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ABN	Analog input 2 Lower Voltage threshold	[0.01volt], word	1	1600	200	Lower limit threshold on Analog input 2. For example : if ABN=510 then Lower limit is 5.1volt	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ACN	Analog input 2 Lower voltage threshold	[0.01volt], word	1	1600	200	Lower limit threshold on Analog input 3. For example : if ACN=610 then Lower limit is 5.1volt	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ABX	Analog input 2 Higher Voltage threshold	[0.01volt], word	1	1600	800	Upper limit threshold on Analog input 2. For example : if ABX=820 then Lower limit is 8.2 volt	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ACX	Analog input 3 Higher voltage threshold	[0.01volt], word	1	1600	800	Upper limit threshold on Analog input 3. For example : if ACX=860 then Lower limit is 8.6 volt	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Voice Call configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
PHV	Approved incoming Voice Phone Number	[Number 1. number2. number3, string	N/A	N/A	N/A	Approved Voice Phone number. We can add 3 approved phone numbers separated by dot "." For Example: To add phone numbers (123) 000-6789, (456) 000-1234 and 678-000-3456	<input type="checkbox"/>	<input checked="" type="checkbox"/>

						Set PHV=1230006789.4560001234.67 80003456 If an incoming call comes from either (123) 000-6789 or (456) 000-1234 or 678-000-3456 then the call will be automatically accepted and connected. Any incoming call coming from any other number will be rejected.		
PHO	Default Outgoing Voice call number	Number, string	N/A	N/A	N/A	The default voice call phone number that will be called when a push button connected to digital input 3 is pushed. For example: if PHO=12340005678, a push button is connected to analog input 3 and AEE is set to 24. When a user press bush button then a voice call will be placed to phone number (123) 000-5678		
PHL	Default voice call number	Number, string	N/A	N/A	N/A	The default stealth mode voice call phone number that will be called when a SETALHCALL remote command is received from the server. For example: if PHL is set to 1230005678, and the device received remote command "STEALTHCALL". Then the device will place a voice call to (123) 000-5678. The device will disable speaker during this call. This call will be active for a maximum period of 60mins and that the device will disconnect the voice call.		
PHE	Speaker Volume level	Number, byte	0	14	12	The speaker volume level. 0 - Low and 14 - High		

GPS validation configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
GPA *	GPS max age	[1 sec], word	30	65000	60	Use position fix up to N seconds old when centering alarm (useful if vehicle is parked in garage).		

SCN *	Speed max change ignition ON (Private)	byte	0	60	60	Maximum speed change for ignition on. This is used for validating GPS data samples from GPs chipset.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SCO *	Speed max change during ignition OFF. (Private)	[kmph], byte	0	60	60	Maximum speed change for ignition off. This is used for validating GPS data samples from GPs chipset.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LGF	Logging flag. (Laird Private)	Byte	0	255	0xFF	Logging flag	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SCP	GPS validating Speed Cap	[1kmph], byte	160	240	160	The maximum GPS speed change allowed between two successive before value it as valid position	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GFN	GPS validation 3D Fixes during Ignition On	Number,byte	1	240	3	During ignition ON, Number of 3D fixes to be observed before value it as valid position	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GFO	GPS validation 3D Fixes during Ignition Off	Number,byte	1	240	10	During ignition OFF, Number of 3D fixes to be observed before value it as valid position	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GDN	GPS validation max DOP during ignition ON	Number, word	1	240	8	During ignition ON, maximum DOP value to value it as valid position	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GDF	GPS validation max DOP during ignition OFF	Number, word	1	240	5	During ignition OFF, maximum DOP value to value it as valid position	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Uart Pass-through configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
UPE	Uart Pass through Enable	Number,byte	0	1	0	Uart/RS232 pass-through mode 0 – Disable 1 – Enable If UPE=1, then Uart pass through mode is enabled and all the data that is coming on the serial input will be packetized and sent to	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

						server in RS232_DATA event reports		
UPC	Uart passthrough terminating character	ASCII Character, byte	0	255	10 ('\n')	ASCII character to trigger immediate end of the packet. If UPC=10 , ASCII char for 10 is '\n' new line character. The device buffers the data receiving on uart interface, when the device receives the new line character then the device will encapsulate the buffered data in a RS232_DATA event report.		
UPT	Uart passthrough timeout	Seconds, byte	1	240	20	If UPT=20 then the device will send any RS232 data that is buffer, if the device did not receive any UPC character for more than UPT duration. I.e. The device will upload the buffered data either a UPC terminating character is received or a timeout of 20 seconds.		

Backup Battery configurations

Mnemonic	Description	Unit	Min	Max	default	Comment	Orion	Fleet
BCL	Backup Battery Charging Temperature Low	[subtract 100], byte	0	240	100	Permitted Lower temperature for Backup battery Charging. For example BCL=80 The internal backup battery will be ins charging state only If the operating temperature is above $80 - 100 = -20$ degree Celsius		
BCH	Backup Battery Charging Temperature High	[subtract 100], byte	0	240	140	Permitted Higher temperature for Backup battery Charging. For example BCH=160 The internal backup battery will be ins charging state only If the operating temperature is below $160 - 100 = 60$ degree Celsius		
LGV	Last Gasp Voltage	[0.01Volts], word	300	400	380	The internal backup battery voltage threshold where in the device sends Last Gasp message which is SHUTDOWN message For Example: If LGV=380 and running on Battery mode then the device		

						will send last gasp message when the internal backup battery voltage goes below 3.8 volts		
ELV	End Of Life Voltage	[0.01Volts], word	300	400	370	The internal backup battery voltage threshold where in the device powers off. For Example: If LGV=380 and running on Battery mode then the device will send last gasp message when the internal backup battery voltage goes below 3.8 volts		

Table 4: SET configuration Parameters

AEE Configuration Parameters

AEE set parameter: It is a bit wise field and the description of each bit is as following.

Bit number of AEE	Input Pin	Configuration
Bit 0 (LSB)	Analog Input 1	Enable/Disable Analog input 1 change monitoring. 0 - disable, 1 – enable
Bit 1	Analog Input 2	Enable/Disable Analog input 2 change monitoring. 0 – disable, 1 – enable
Bit 2	Analog Input 3	Enable/Disable Analog input 3 change monitoring. 0 – disable, 1 – enable
Bit 3	x	Unused
Bit 4	Digital Input 1	Enable/Disable Digital input 1 change monitoring. 0 – disable, 1 – enable
Bit 5	Digital Input 2	Enable/Disable Digital input 2 change monitoring. 0 – disable, 1 – enable
Bit 6	Digital Input 3	Enable/Disable Digital input 3 change monitoring. 0 – Digital input 3 acts as push button input for voice call, 1 – Enable Digital input 3 change monitoring.
Bit 7 (MSB)	x	Unused