
IntelliTrac X Series



Protocol Document

Version: 3.05
Date: June 21, 2006
Status: Preliminary

General notes

With respect to any damages arising in operation with the described product or this document, S&T shall be liable according to the General Conditions on which the delivery of the described product and this document are based. This product is not intended for use in life support appliances, devices or systems where a malfunction of the product can reasonably be expected to result in personal injury. S&T customers using or selling this product for use in such applications do so at their own risk and agree to fully indemnify S&T for any damages resulting from illegal use or resale.

Information in this document is subject to change without notice at any time.

Copyright notice

Copying of this document and giving it to others and the use or communication of the contents thereof, are forbidden without express authority. Offenders are liable to the payment of damages.

Copyright © Systems & Technology Corp. 2003. All rights reserved

Table Of Contents

1	Introduction to IntelliTrac X Series Protocol.....	1
2	Version History	1
3	Scope of the Documents.....	1
	3.1 Related Documents	1
	3.2 ST Command Syntax.....	1
	3.3 Entering Successive ST Commands on Separate Lines.....	2
4	ST Commands.....	4
	4.1 Set Unit Parameters Commands	4
	4.2 Tracking/Logging Commands	24
	4.3 Output Control Commands	35
	4.4 User Report Commands	39
	4.5 Handset and MDT Commands	55
	4.6 Unit Diagnostic Commands	59
5	Appendices	61
	5.1 Report ID Description.....	61
	5.2 STD Errors Description	61
	5.3 CME Errors Description	62
	5.4 CMS Errors Description	63
	5.5 LED Indicators Function.....	65
	5.6 About Systems & Technology Corporation	66

1 Introduction to IntelliTrac X Series Protocol

This document describes the protocol of the IntelliTrac X Series devices. The S&T 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 AVL applications incorporating the IntelliTrac X Series devices.

2 Version History

Version	What's new	Firmware version required	Hardware version required
300	Commands description	1.535 or above	ST2002_N
301	Modified \$ST+REPORT command Modified \$ST+GGAS command	1.538 or above	ST2002_N
302	Modified Report ID Description	1.538 or above	ST2002_N
303	Modified \$ST+PMGR command	1.543 or above	ST2002_N
304	Added error message "STD,12" Added \$ST+IDLE command	1.554 or above 1.557 or above	ST2002_N ST2002_N
305	Modified \$ST+AREPORT command Added range limitation on the Duration of \$ST+OUTS command Modified \$ST+PMGR command	1.561 or above	ST2002_N

3 Scope of the Documents

This document presents the ST Command Set for the IntelliTrac X Series devices.

3.1 Related Documents

- IntelliTrac X Series Hardware Installation Guide
- IntelliTrac Tracer Software User Manual
- IntelliTrac InstallWizard User Manual
- IntelliTrac ZoneManager User Manual

3.2 ST Command Syntax

The "\$ST" or "\$st" prefix must be set at the beginning of each command line. To terminate a command line enter <CR>.

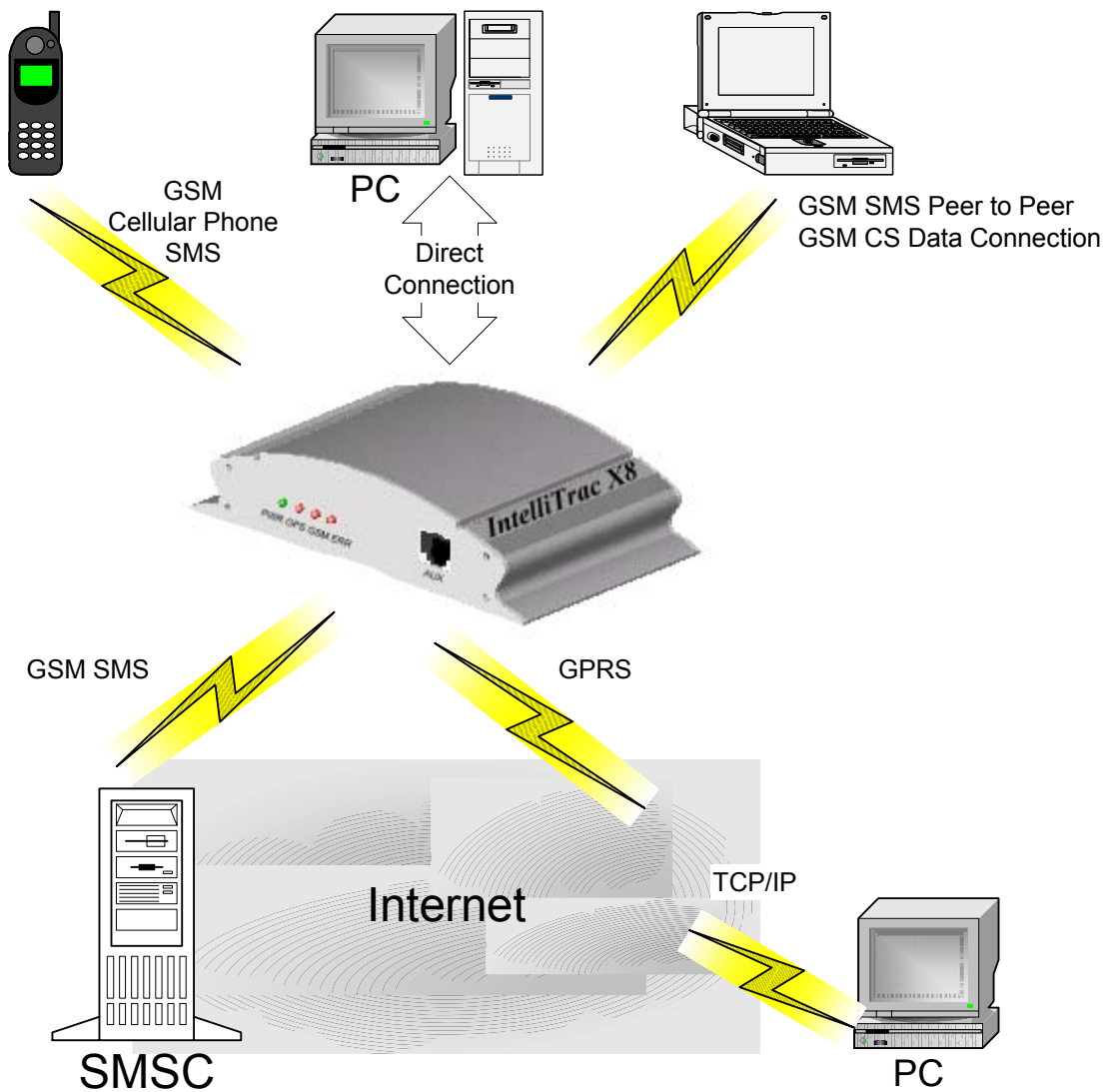
Commands are usually followed by a response that includes <response><CR><LF>

Throughout this document, only the responses are presented, <CR><LF> are omitted intentionally.

Communications

The IntelliTrac X Series protocol could be transmitted to the IntelliTrac unit by several communication methods. Such as :

- Direct connection (Baud Rate : 57600bps)
- GSM CS Data connection (Baud Rate : 9600bps)
- GSM SMS messages (Peer to peer and TCP/IP network)
- GPRS TCP/IP, UDP/IP connection



For more detail GSM CS Data, SMS, TCP/IP information, please refer to GSM related documents.

4 ST Commands

4.1 Set Unit Parameters Commands

Command	Description
\$ST+UNID	This command is used to change the unit identification number.
\$ST+SBAS	This command is used to set base station and VIP SMS phone number.
\$ST+CPAS	This command is used to change access password of the unit.
\$ST+VERSION	This command is used to get the revised software version.
\$ST+TZOS	This command is used to adjust time zone offset from GMT.
\$ST+PMGR	This command is used to set power management parameters.
\$ST+SINP	This command is used to set inputs delay parameters.
\$ST+VOICE	This command is used to set voice call parameters.
\$ST+SPIN	This command is used to set PIN code of SIM.
\$ST+GPRS	This command is used to set GPRS connection parameters.
\$ST+BAUD	This command is used to set baud rate of serial port.
\$ST+HEAD	This command is used to set report position header.
\$ST+RQLC	This command is used to set the life cycle of each report in the report queue buffer.
\$ST+CLRQ	This command is used to clear current report queue buffer.
\$ST+GGAS	This command is used to set GSM and GPRS auto switching.
\$ST+BSVR	This command is used to set the backup server address in the GPRS environment.

\$ST+UNID Set unit identification number					
Description	Execute this command to set or query the unit ID. Unit ID is a 10 digits number. The first 2 digits must be 10. The remaining 8 digits range from 00000001 to 99999999 could be chosen by users. The manufactory default unit ID is 1010000001. This identification number would not be changed to manufactory default even hardware/software reset.				
Syntax	Write Command: \$ST+UNID=[Password], [Unit ID] Read Command: \$ST+UNID=[Password], ?				
Parameters	<table border="1"> <tr> <td>Password</td> <td>The password of the unit..</td> </tr> <tr> <td>Unit ID</td> <td>The new ID of the unit. The default unit ID is 1010000001.</td> </tr> </table>	Password	The password of the unit..	Unit ID	The new ID of the unit. The default unit ID is 1010000001.
Password	The password of the unit..				
Unit ID	The new ID of the unit. The default unit ID is 1010000001.				
Return Value	Write Command Response: \$OK:UNID Read Command Response: \$UNID=10xxxxxxx				
Example	<pre>\$ST+UNID=0000,1010000001 \$OK:UNID \$ST+UNID=0000,? \$UNID=1010000001</pre>				

\$ST+SBAS Set base phone number and VIP SMS phone numbers													
Description	Execute this command to setup or query control center phone number. The first 4 parameters (Password, Incoming Check, SMS Service Center, SMS Base Phone Number) must be setup. VIP1~ VIP7 are optional. You can setup at most 7 phone numbers for unit to sends information by SMS to these phone numbers.												
Syntax	<p>Write Command: \$ST+SBAS=[Password],[Connect Type],[Incoming Check],[SMS Service Center],[SMS Base Phone Number],[VIP1], [VIP2], [VIP3],[VIP4], [VIP5], [VIP6], [VIP7]</p> <p>Read Command: \$ST+SBAS=[Password], ?</p>												
Parameters	<table border="1"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Connect Type</td> <td>1:GSM CS Data 2:GSM SMS</td> </tr> <tr> <td>Incoming Check</td> <td>0. Accept commands from any base phone numbers. 1. Only accepts commands from the base phone number.</td> </tr> <tr> <td>SMS Service Center</td> <td>SMS service center phone number. Max length is 20 digits. If this field is empty, the unit will read this number from SIM automatically. (This number should be added the international prefix).</td> </tr> <tr> <td>SMS Base Phone Number</td> <td>Control center phone number. Max length is 25 digits. (This number could be added international prefix or not).</td> </tr> <tr> <td>VIP1, VIP2...VIP7</td> <td>VIP phone numbers. (This number could be added international prefix or not).</td> </tr> </table>	Password	The password of the unit.	Connect Type	1:GSM CS Data 2:GSM SMS	Incoming Check	0. Accept commands from any base phone numbers. 1. Only accepts commands from the base phone number.	SMS Service Center	SMS service center phone number. Max length is 20 digits. If this field is empty, the unit will read this number from SIM automatically. (This number should be added the international prefix).	SMS Base Phone Number	Control center phone number. Max length is 25 digits. (This number could be added international prefix or not).	VIP1, VIP2...VIP7	VIP phone numbers. (This number could be added international prefix or not).
Password	The password of the unit.												
Connect Type	1:GSM CS Data 2:GSM SMS												
Incoming Check	0. Accept commands from any base phone numbers. 1. Only accepts commands from the base phone number.												
SMS Service Center	SMS service center phone number. Max length is 20 digits. If this field is empty, the unit will read this number from SIM automatically. (This number should be added the international prefix).												
SMS Base Phone Number	Control center phone number. Max length is 25 digits. (This number could be added international prefix or not).												
VIP1, VIP2...VIP7	VIP phone numbers. (This number could be added international prefix or not).												
Return Value	<p>Write Command Response: \$OK:SBAS</p> <p>Read Command Response: \$SBAS= [Connect Type], [Incoming Check], [SMS Service Center],[SMS Base Phone Number], [VIP1], [VIP2]...[VIP7]</p>												
Example	<pre>\$ST+SBAS=0000,1,0,+886932400821,0933942201, 0933942202, 0933942203, 0933942204, 0933942205, 0933942206, 0933942207, 0933942208 \$OK:SBAS \$ST+SBAS=0000,? \$SBAS=1,0,+886932400821,0933942201, 0933942202, 0933942203, 0933942204, 0933942205, 0933942206, 0933942207, 0933942208</pre>												

\$ST+CPAS Change the password of the unit.					
Description	Execute this command to change the password of unit. After executing this command to the unit, the new password will replace the original password immediately. Therefore, in subsequent ST command, if including password parameter, you must use new password value. The default password is 0000.				
Syntax	\$ST+CPAS=[Password], [New Password]				
Parameters	<table border="1"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>New Password</td> <td>The new password of the unit. Max length is 10 characters.</td> </tr> </table>	Password	The password of the unit.	New Password	The new password of the unit. Max length is 10 characters.
Password	The password of the unit.				
New Password	The new password of the unit. Max length is 10 characters.				
Return Value	\$OK:CPAS				
Example	<pre>\$ST+CPAS=0000,1111 \$OK:CPAS \$ST+CPAS=0000,abc930746 \$OK:CPAS</pre>				

\$ST+VERSION Get the firmware version of the unit.	
Description	Execute this command to query firmware version of the unit.
Syntax	\$ST+VERSION
Parameters	None
Return Value	\$VERSION=x.xxx
Example	<pre>\$ST+VERSION \$VERSION=1.330</pre>

\$ST+TZOS Set the time zone of the unit.									
Description	Execute this command to setup or query appropriate time zone for local area for the unit. The unit will calculate local time automatically according to the setting.								
Syntax	<p>Write Command: \$ST+TZOS=[Password], [Sign], [Hour], [Min]</p> <p>Read Command: \$ST+TZOS=[Password], ?</p>								
Parameters	<table border="0"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Sign</td> <td>+, -</td> </tr> <tr> <td>Hour</td> <td>The hour offset. The range is from <u>00</u> to 13.</td> </tr> <tr> <td>Min</td> <td>The minute offset. The range is from <u>00</u> to 59.</td> </tr> </table>	Password	The password of the unit.	Sign	+, -	Hour	The hour offset. The range is from <u>00</u> to 13.	Min	The minute offset. The range is from <u>00</u> to 59.
Password	The password of the unit.								
Sign	+, -								
Hour	The hour offset. The range is from <u>00</u> to 13.								
Min	The minute offset. The range is from <u>00</u> to 59.								
Return Value	<p>Write Command Response: \$OK:TZOS</p> <p>Read Command Response: \$TZOS=[Sign], [Hour], [Min]</p>								
Example	<pre>\$ST+TZOS=0000,+,08,00 \$OK:TZOS \$ST+TZOS=0000,? \$TZOS=+,08,00</pre>								

\$ST+PMGR Set power management parameters of the unit.

Description	<p>Execute this command to set up 2 functions:</p> <ol style="list-style-type: none"> 1. The value of voltage level to trigger low power alarm. If the voltage of X8 power source is lower than the voltage level we have defined, the unit sends an alarm message to the control center. The default voltage value is 12.00 volts. 2. To set up the parameters for sleeping mode feature. 	
Syntax	<p>Write Command: \$ST+PMGR=[Password], [Low Voltage], [SleepMode], [Power Down Delay], [Power Up Duration],[Power Down Duration],[Sleep Priority], [EnableShockSensor]</p> <p>Read Command: \$ST+PMGR = [Password], ?</p>	
Parameters	<p>Password</p> <p>Low Voltage</p> <p>SleepMode</p> <p>Power Down Delay</p> <p>Power Up Duration</p> <p>Power Down Duration</p> <p>Sleep Priority</p>	<p>The password of the unit.</p> <p>The lowest acceptable power of the unit. (8~30 volts)</p> <p><u>0</u>: Disable</p> <p>1: GPS: Off GSM: Off</p> <p>2: GPS: Off GSM: On</p> <p>After ACC off for the delay time, the unit goes into power saving mode.</p> <p><u>0</u>..65535 seconds. (For “Sleeping Priority” sets to ‘0’) 180..65535 seconds (For “Sleeping Priority” sets to ‘1’)</p> <p>Full power duration.</p> <p><u>0</u>..65535 seconds. (For “Sleeping Priority” sets to ‘0’) 180..65535 seconds (For “Sleeping Priority” sets to ‘1’)</p> <p>Periodical wake up timeout.</p> <p><u>0</u>..65535 seconds.</p> <p>Enable/Disable priority for sleeping mode.</p> <p><u>0</u>: Disable: - Unit will finish executing the tracking command such as number of tracking times, then goes to sleeping mode.</p> <p>1: Enable: - Unit will stop executing the tracking command and goes to sleeping mode after ACC turns off according to the “Power Down Delay” parameter.</p> <p>- The “Power Down Delay” and “Power Up Duration” must set to 180 seconds or above.</p>

\$ST+SINP Set inputs delay time of the unit.																			
Description	Execute this command to setup or query input delay time of the unit. Measurement of delay time is 100 milliseconds. The default value is 7. (700 milliseconds)																		
Syntax	<p>Write Command: \$ST+SINP=[Password], [Input1Param], [Input2Param], [Input3Param], [Input4Param], [Input5Param], [Input6Param], [Input7Param], [Input8Param]</p> <p>Read Command: \$ST+SINP=[Password], ?</p>																		
Parameters	<table border="0"> <tr> <td style="padding-right: 20px;">Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Input1Param</td> <td>Input1 delay time of the unit. The range is from 0 to 255.</td> </tr> <tr> <td>Input2Param</td> <td>Input2 delay time of the unit. The range is from 0 to 255.</td> </tr> <tr> <td>Input3Param</td> <td>Input3 delay time of the unit. The range is from 0 to 255.</td> </tr> <tr> <td>Input4Param</td> <td>Input4 delay time of the unit. The range is from 0 to 255.</td> </tr> <tr> <td>Input5Param</td> <td>Input5 delay time of the unit. The range is from 0 to 255.</td> </tr> <tr> <td>Input6Param</td> <td>Input6 delay time of the unit. The range is from 0 to 255.</td> </tr> <tr> <td>Input7Param</td> <td>Input7 delay time of the unit. The range is from 0 to 255.</td> </tr> <tr> <td>Input8Param</td> <td>Input8 delay time of the unit. The range is from 0 to 255.</td> </tr> </table>	Password	The password of the unit.	Input1Param	Input1 delay time of the unit. The range is from 0 to 255.	Input2Param	Input2 delay time of the unit. The range is from 0 to 255.	Input3Param	Input3 delay time of the unit. The range is from 0 to 255.	Input4Param	Input4 delay time of the unit. The range is from 0 to 255.	Input5Param	Input5 delay time of the unit. The range is from 0 to 255.	Input6Param	Input6 delay time of the unit. The range is from 0 to 255.	Input7Param	Input7 delay time of the unit. The range is from 0 to 255.	Input8Param	Input8 delay time of the unit. The range is from 0 to 255.
Password	The password of the unit.																		
Input1Param	Input1 delay time of the unit. The range is from 0 to 255.																		
Input2Param	Input2 delay time of the unit. The range is from 0 to 255.																		
Input3Param	Input3 delay time of the unit. The range is from 0 to 255.																		
Input4Param	Input4 delay time of the unit. The range is from 0 to 255.																		
Input5Param	Input5 delay time of the unit. The range is from 0 to 255.																		
Input6Param	Input6 delay time of the unit. The range is from 0 to 255.																		
Input7Param	Input7 delay time of the unit. The range is from 0 to 255.																		
Input8Param	Input8 delay time of the unit. The range is from 0 to 255.																		
Return Value	<p>Write Command Response: \$OK:SINP</p> <p>Read Command Response: \$SINP=[Input1Param], [Input2Param], [Input3Param], [Input4Param], [Input5Param], [Input6Param], [Input7Param], [Input8Param]</p>																		
Example	<pre> \$ST+SINP=0000,10,10,10,10,10,10,10,10 \$OK:SINP \$ST+SINP=0000,? \$SINP=10,10,10,10,10,10,10,10,10 </pre>																		

\$ST+VOICE Set voice call parameters of the unit.													
Description	Execute this command to setup or query auto answer mode or manual answer mode and incoming and outgoing calls limitation.												
Syntax	<p>Write Command: \$ST+VOICE=[Password], [Voice Answer Mode], [Dial In Ctrl], [Dial Out Ctrl], [AcceptIn1], [AcceptIn2], [AcceptIn3], [AcceptOut1], [AcceptOut2], [AcceptOut3]</p> <p>Read Command: \$ST+VOICE=[Password], ?</p>												
Parameters	<table border="0"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Voice Answer Mode</td> <td> <u>0</u>: Manual answer for incoming voice call. 1: Auto answer for incoming voice call. </td> </tr> <tr> <td>Dial In Ctrl</td> <td> 0: Disable Can not answer any incoming calls. <u>1</u>: Enable Can answer any incoming calls. 2: Limited Only answer 3 incoming calls at most. </td> </tr> <tr> <td>Dial Out Ctrl</td> <td> 0: Disable Can not dial out any outgoing calls. <u>1</u>: Enable Can dial out any outgoing calls. 2: Limited Only dial out 3 outgoing calls at most. </td> </tr> <tr> <td>AcceptIn1~ AcceptIn3</td> <td>Acceptable 3 incoming calls phone numbers. The max. length of each phone number is 25 digits.</td> </tr> <tr> <td>AcceptOut1~ AcceptOut3</td> <td>Acceptable 3 outgoing calls phone numbers. The max. length of each phone number is 25 digits.</td> </tr> </table>	Password	The password of the unit.	Voice Answer Mode	<u>0</u> : Manual answer for incoming voice call. 1: Auto answer for incoming voice call.	Dial In Ctrl	0: Disable Can not answer any incoming calls. <u>1</u> : Enable Can answer any incoming calls. 2: Limited Only answer 3 incoming calls at most.	Dial Out Ctrl	0: Disable Can not dial out any outgoing calls. <u>1</u> : Enable Can dial out any outgoing calls. 2: Limited Only dial out 3 outgoing calls at most.	AcceptIn1~ AcceptIn3	Acceptable 3 incoming calls phone numbers. The max. length of each phone number is 25 digits.	AcceptOut1~ AcceptOut3	Acceptable 3 outgoing calls phone numbers. The max. length of each phone number is 25 digits.
Password	The password of the unit.												
Voice Answer Mode	<u>0</u> : Manual answer for incoming voice call. 1: Auto answer for incoming voice call.												
Dial In Ctrl	0: Disable Can not answer any incoming calls. <u>1</u> : Enable Can answer any incoming calls. 2: Limited Only answer 3 incoming calls at most.												
Dial Out Ctrl	0: Disable Can not dial out any outgoing calls. <u>1</u> : Enable Can dial out any outgoing calls. 2: Limited Only dial out 3 outgoing calls at most.												
AcceptIn1~ AcceptIn3	Acceptable 3 incoming calls phone numbers. The max. length of each phone number is 25 digits.												
AcceptOut1~ AcceptOut3	Acceptable 3 outgoing calls phone numbers. The max. length of each phone number is 25 digits.												
Return Value	<p>Write Command Response: \$OK:VOICE</p> <p>Read Command Response: \$VOICE=[Voice Answer Mode], [Dial In Ctrl], [Dial Out Ctrl], [AcceptIn1], [AcceptIn2], [AcceptIn3], [AcceptOut1], [AcceptOut2], [AcceptOut3]</p>												
Example	<pre>\$ST+VOICE=0000,0,2,0,0933942206,0933942208,0918230863,, \$OK:VOICE \$ST+VOICE=0000,? \$VOICE=0,2,0,0933942206,0933942208,0918230863,,</pre>												

\$ST+SPIN Set PIN code of SIM.					
Description	Execute this command to store the PIN code into the unit.				
Syntax	<p>Write Command: \$ST+SPIN=[Password], [PINCode]</p> <p>Read Command: \$ST+SPIN=[Password], ?</p>				
Parameters	<table border="0"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>PINCode</td> <td>The PIN code of the SIM.</td> </tr> </table>	Password	The password of the unit.	PINCode	The PIN code of the SIM.
Password	The password of the unit.				
PINCode	The PIN code of the SIM.				
Disable	<p>Write Command: \$ST+SPIN=0000,</p>				
Return Value	<p>Write Command Response: \$OK:SPIN</p> <p>Read Command Response: \$SPIN=[PINCode]</p>				
Example	<p>\$ST+SPIN=0000,1234 \$OK:SPIN</p> <p>\$ST+SPIN=0000,? \$SPIN=1234</p>				

\$ST+GPRS GPRS Function Configuration

Description	Execute this command to set GPRS function parameters	
Syntax	<p>Write Command: \$ST+GPRS=[Password],[Enable],[Dial Up Number],[APN],[Username],[Login Password],[IP Type],[Host IP Address/F.Q.D.Name],[Host Port],[Sync Interval],[Domain Name Server IP]</p> <p>Read Command: \$ST+GPRS=[Password], ?</p>	
Parameters	Parameter	Description
	Password	The password of the unit.
	Enable	Enable GPRS function 0: Disable 1: Enable
	Dial Up Number	GPRS dialup phone number (please inquire your GPRS service provider. In most countries is *99***1#)
	APN	Set APN (Access Point Name): (Please inquire your GPRS service provider)
	Username	The user name for GPRS connection (Please inquire your GPRS service provider) (Usually empty)
	Login Password	The password for GPRS connection (Please inquire your GPRS service provider) (Usually empty)
	IP Type	Package format 0: UDP/IP 1: TCP/IP
	Host IP Address/FQD Name	- The IP address of your base station (Must be a fixed IP address, please see the notes below) Or - Registered FQD (Fully Qualified Domain).
	Host Port	The port number of the UDP/TCP (Please note that do not conflict with Well Known Ports)
	Sync Interval	Setting the synchronization messages sending interval. (The unit is 100 millisecond)
	Domain Name Server IP	This parameter is used when FQD Name is entered in the "Host IP Address/F.Q.D. Name" parameter field. The default IP is 168.95.1.1 (one of the DNS IP in Taiwan)

Return Value	<p>Write Command Response: \$OK:GPRS</p> <p>Read Command Response: \$GPRS=[Enable],[Dial Up Number],[APN],[Username],[Log in Password],[IP Type],[Host IP Address/F.Q.D.Name],[Host Port],[Sync Interval],[Domain Name Server IP] .</p>
Example	<p><u>Type 1:</u></p> <p>GPRS Dial Up phone number is *99***1# APN name is "Internet" Login username and password are empty Base station IP address/F.Q.D. Name is www.systemech.com.tw UDP port is 8060 Synchronization messages sending interval is 30 seconds Domain Name Server IP: 168.95.1.1 \$st+gprs=0000,1,*99***1#,Internet,,1,www.systemech.com.tw,8060,300,168.95.1.1</p> <p><u>Type 2:</u></p> <p>GPRS Dial Up phone number is *99***1# APN name is "Internet" Login username and password are empty Base station IP address is 61.222.251.230 UDP port is 8060 Synchronization messages sending interval is 30 seconds Domain Name Server IP: 168.95.1.1 \$st+gprs=0000,1,*99***1#,Internet,,1,61.222.251.230,8060,300,168.95.1.1</p>
Notes	<p>(1) You have to contact your telecom provider to enable the GPRS service on your SIM card in advance then starting to use GPRS function.</p> <p>(2) Synchronization message format</p> <pre>typedef struct { WORD SyncHeader; WORD SyncID; DWORD UnitID; } SyncStruct;</pre> <p>SyncHeader is always 0xf8fa SyncID is a message sequence number UnitID is the unit identification number</p> <p>For example, received message is</p> <p><u>0xFA 0xF8 0x1B 0x01 0x81 0x60 0x33 0x3C</u></p> <p>SyncHeader = 0xF8 0xFA SyncID = 0x01 0x1B (Decimal = 283) UnitID = 0x3C 0x33 0x60 0x81 (Decimal = 101000001)</p>

(3) When you develop your own socket base station software, remember to echo the same Synchronization message to the IntelliTrac unit when the base station software received Synchronization message from the IntelliTrac unit. If the IntelliTrac units have not received the echo Synchronization Message more than 3 times, the IntelliTrac unit will disconnect GPRS communication and retry to connect to the GPRS network again.

(4) The base station PC must have a static Internet IP address. You have to enable the specific port number if the base station PC has firewall protection.

(5) If the base station is set inside the Intranet, you have to setup the router and assign a specific port to a specific Intranet IP address. Please refer to SUA (Single User Access) or Virtual Server function of your router user manual. And also, the HostIPAddress parameter should be set to this router IP address.

(6) Please reboot the unit after uploading configuration under "direct connection".

(7) The unit will reboot automatically when \$ST+GPRS command is sent remotely.

\$ST+BAUD Set baud rate of serial port									
Description	Execute this command to set baud rate of Serial and AUX ports.								
Syntax	<p>Write Command: \$ST+BAUD=[Password],[Port ID],[Baud Rate]</p> <p>Read Command: \$ST+BAUD=[Password], [Port ID],?</p>								
Parameters	<table border="1"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Port ID</td> <td>1 : Serial Port 2 : AUX Port</td> </tr> <tr> <td>Baud Rate</td> <td>Baud rate (1200/2400/4800/9600/19200/38400/57600bps)</td> </tr> <tr> <td></td> <td> Default Baud Rate - Serial Port : 57600bps - AUX Port : 9600bps </td> </tr> </table>	Password	The password of the unit.	Port ID	1 : Serial Port 2 : AUX Port	Baud Rate	Baud rate (1200/2400/4800/9600/19200/38400/57600bps)		Default Baud Rate - Serial Port : 57600bps - AUX Port : 9600bps
Password	The password of the unit.								
Port ID	1 : Serial Port 2 : AUX Port								
Baud Rate	Baud rate (1200/2400/4800/9600/19200/38400/57600bps)								
	Default Baud Rate - Serial Port : 57600bps - AUX Port : 9600bps								
Return Value	<p>Write Command Response: \$OK:BAUD</p> <p>Read Command Response: \$BAUD=[Port ID],[Baud Rate]</p>								
Example	<p>Set the Serial port as 19200bps \$ST+BAUD=0000,1,19200 \$OK:BAUD</p> <p>\$ST+BAUD=0000,1,? \$BAUD=1,19200</p>								
Notes	<p>(1) NEMA output feature does not work with baud rate 1200 bps.</p> <p>(2) If the AUX port connects to HandsFree set, it must set to 9600bps</p>								

\$ST+HEAD Set report position header					
Description	Execute this command to set header for each report position.				
Syntax	<p>Write Command: \$ST+HEAD=[Password],[Header]</p> <p>Read Command: \$ST+HEAD=[Password],?</p>				
Parameters	<table border="0"> <tr> <td style="padding-right: 20px;">Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Header</td> <td>An identification string</td> </tr> </table>	Password	The password of the unit.	Header	An identification string
Password	The password of the unit.				
Header	An identification string				
Disable	<p>Write Command: \$ST+Head=0000,</p>				
Return Value	<p>Write Command Response: \$OK:HEAD</p> <p>Read Command Response: \$HEAD=[Header]</p>				
Example	<p>Set report position header as "Chicago"</p> <pre>\$ST+HEAD=0000,Chicago \$OK:HEAD \$ST+HEAD=0000,? \$HEAD=Chicago \$ST+GETPOSITION=0000 Chicago,1010000001,20040402084717,121.645997,25.061475,0,223,121,6,0,0,0, 0.093,0.000 \$ST+GETPOSITION=0000 Chicago,1010000001,20040402084730,121.645997,25.061475,0,223,121,6,0,0,0, 0.103,0.000</pre>				

\$ST+RQLC Set the life cycle of each report in the report queue buffer											
Description	Execute this command to set the life cycle of each report (according to the Report ID) in the report queue buffer. When the units trigger reports in a non GSM coverage area, the outgoing reports will be stored in a temporary report queue buffer, once the units attach to the GSM network, all reports would be pull out of the buffer and send to the control center.										
Syntax	<p>Write Command: \$ST+RQLC=[Password], [Report0~2 Life Time], [Report3~10 Life Time], [Report11~99 Life Time], [Report100~199 Life Time]</p> <p>Note: This command is used according to Report ID. Please refer to section 4.7 of appendices for definition of Report ID</p> <p>Read Command: \$ST+RQLC=[Password],?</p>										
Parameters	<table border="0"> <tr> <td style="padding-right: 20px;">Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Report0~2 Life Time</td> <td>Set up the life time in the report queue buffer for Report ID 0~2. The range of Life Time is from 0~65535 minutes.</td> </tr> <tr> <td>Report3~10 Life Time</td> <td>Set up the life time in the report queue buffer for Report ID 3~10. The range of Life Time is from 0~65535 minutes.</td> </tr> <tr> <td>Report11~99 Life Time</td> <td>Set up the life time in the report queue buffer for Report ID 11~99. The range of Life Time is from 0~65535 minutes.</td> </tr> <tr> <td>Report100~199 Life Time</td> <td>Set up the life time in the report queue buffer for Report ID 100~199. The range of Life Time is from 0~65535 minutes.</td> </tr> </table>	Password	The password of the unit.	Report0~2 Life Time	Set up the life time in the report queue buffer for Report ID 0~2. The range of Life Time is from 0~65535 minutes.	Report3~10 Life Time	Set up the life time in the report queue buffer for Report ID 3~10. The range of Life Time is from 0~65535 minutes.	Report11~99 Life Time	Set up the life time in the report queue buffer for Report ID 11~99. The range of Life Time is from 0~65535 minutes.	Report100~199 Life Time	Set up the life time in the report queue buffer for Report ID 100~199. The range of Life Time is from 0~65535 minutes.
Password	The password of the unit.										
Report0~2 Life Time	Set up the life time in the report queue buffer for Report ID 0~2. The range of Life Time is from 0~65535 minutes.										
Report3~10 Life Time	Set up the life time in the report queue buffer for Report ID 3~10. The range of Life Time is from 0~65535 minutes.										
Report11~99 Life Time	Set up the life time in the report queue buffer for Report ID 11~99. The range of Life Time is from 0~65535 minutes.										
Report100~199 Life Time	Set up the life time in the report queue buffer for Report ID 100~199. The range of Life Time is from 0~65535 minutes.										
Disable	\$ST+RQLC=0000, The unable sending report will be queued in the queue buffer until the queue buffer is full then they will be erased.										
Return Value	<p>Write Command Response: \$OK:RQLC</p> <p>Read Command Response: \$RQLC=[Report0~2 LifeTime], [Report3~10 LifeTime], [Report11~99 LifeTime], [Report100~199 LifeTime]</p>										
Example	<pre>\$ST+RQLC=0000,50,50,50,50 \$OK:RQLC \$ST+RQLC=0000,? \$RQLC=50,50,50,50</pre>										

\$ST+CLRQ This command is used to clear current report queue buffer

Description	Execute this command to clear all report queues in the queue buffer.
Syntax	Write Command: \$ST+CLRQ=[Password]
Parameters	Password The password of the unit.
Return Value	\$OK:CLRQ
Example	\$ST+CLRQ=0000 \$OK:CLRQ

\$ST+GGAS This command is used to set GSM and GPRS autoswitching.

Description	Execute this command to switch the communication from GPRS network to GSM network automatically when the unit loses GPRS connectivity. When the unit loses GPRS connectivity, the unit will try a number of times to reconnect to the GPRS network according to the value of parameter "Reconnect". If the GPRS network still can not be reconnected, the unit will switch to GSM network, and stay in GSM network in the certain time period according to the parameter "GSM duration" then try to reconnect to GPRS network again. The unit repeats this cycle until the GPRS connectivity has established.	
Syntax	<p>Write Command: \$ST+GGAS=[Password], [Reconnect], [GSM Duration], [Enable Switch Report], [Disable GSM Mode Send Switch Report],[Enable SMS Tracking]</p> <p>Read Command: \$ST+GGAS=[Password], ?</p>	
Parameters	Password	The password of the unit.
	Reconnect	<p>The value indicates the number of times that try to connect to GPRS network. If the number of reconnecting times reaches the value we entered and the GPRS still can not be successfully reconnected, the unit will temporarily stay in GSM network according to the parameter – [GSM duration]. Then repeat the cycle until the GRPS connection is established.</p> <p>The range is between 1~255 times.</p>
	GSM Duration	<p>The time interval for the unit to reconnect to GPRS network. During the time period, user may use pre-configure GSM SMS or GSM CS DATA setting to communicate with the unit.</p> <p>The range is between 60~65535 seconds.</p>
	Enable Switch Report	<p>1: Enable :</p> <ul style="list-style-type: none"> - Report ID 31 indicates the unit has switched to GSM mode. - Report ID 32 indicates the unit has switched to GPRS mode. <p>0: Disable</p>
	Disable GSM Mode Sending Switch Report	<p>1: the Report ID 31 & 32 will be sent over GPRS network only.</p> <p>0: the "Report ID 31" will be sent over GSM network and the Report ID 32" will be sent over GPRS if the unit reconnects to GPRS network.</p>
		<p>Note: This parameter is used when "Enable Switch Report" is enabled.</p>

	<p>Enable SMS Tracking</p> <p>1: The tracking command will be continued executing after switch to GSM network.</p> <p>0: The tracking command will not be continued executing after switch to GSM, but it will be continued after switch back to GPRS network.</p> <div data-bbox="526 470 1356 828"> <p style="text-align: center;">Number of reconnecting times for GPRS [Reconnect]</p> <p style="text-align: center;">GPRS connection has established</p> <p style="text-align: center;">Repeat this cycle until establish the GPRS connection</p> </div>
<p>Disable</p>	<p>\$ST+GGAS=0000,</p>
<p>Return Value</p>	<p>Write Command Response: \$OK:GGAS</p> <p>Read Command Response: \$GGAS=[Reconnect], [GSM Duration], [Enable Switch Report], [Disable GSM Mode Send Switch Report],[Enable SMS Tracking]</p>
<p>Example</p>	<p><u>SET the following parameters:</u> [Reconnect]:2 – reconnect to GRRS for 2 times for each try. [GSM Duration]: 1000 seconds. [Enable Switch Report]:1 [Disable GSM Mode Send Switch Report]: 0 [Enable SMS Tracking]: 0</p> <p>\$ST+GGAS=0000,2,1000,1,0,0 \$OK:GGAS</p> <p><u>Query parameter:</u> \$ST+GGAS=0000,? \$GGAS=2,1000,1,0,0</p> <p><u>Disable \$ST+GGAS function:</u> \$ST+GGAS=0000,0 \$OK:GGAS</p>

Notes

- (1) This command can not be set if GSM base phone number is not configured.
- (2) If the “Enable SMS Tracking” is set to 1:
 - If time interval of tracking command is executed less than 15 seconds in GPRS network, the time interval will be switched to 15 seconds automatically after switching to the GSM mode. Once the unit reconnects to GPRS network, the time interval will be stayed in the 15 second time interval.
 - If time interval of tracking command is executed equal or greater than 15 seconds over GPRS network, the time interval will be kept after switch to GSM network and when the GPRS communication has been recovered.

\$ST+BSVR This command is used to set the backup server address in the GPRS environment									
Description	Execute this command to return all messages back to the second IP address in addition to the main server.								
Syntax	<p>Write Command: \$ST+BSVR=[Password],[Enable],[HostIPAddress],[HostPort]</p> <p>Read Command: \$ST+BSVR=[Password],?</p>								
Parameters	<table border="0"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Enable</td> <td> <u>0</u>: Disable 1: Enable </td> </tr> <tr> <td>Host IP Address</td> <td>The IP address of your base station (Must be a fixed IP address, please see the notes below)</td> </tr> <tr> <td>Host Port</td> <td>The port number of the UDP/TCP (Please note that do not conflict with Well Known Ports)</td> </tr> </table>	Password	The password of the unit.	Enable	<u>0</u> : Disable 1: Enable	Host IP Address	The IP address of your base station (Must be a fixed IP address, please see the notes below)	Host Port	The port number of the UDP/TCP (Please note that do not conflict with Well Known Ports)
Password	The password of the unit.								
Enable	<u>0</u> : Disable 1: Enable								
Host IP Address	The IP address of your base station (Must be a fixed IP address, please see the notes below)								
Host Port	The port number of the UDP/TCP (Please note that do not conflict with Well Known Ports)								
Disable	\$ST+BSVR=[Password],0								
Return Value	<p>Write Command Response: \$OK:BSVR</p> <p>Read Command Response: \$BSVR=[Enable],[HostIPAddress],[HostPort]</p>								
Example	<pre>\$ST+BSVR=0000,1,61.222.251.230,5050 \$OK:BSVR \$ST+BSVR=0000,? \$BSVR=1,61.222.251.230,5050</pre>								
Notes	<ol style="list-style-type: none"> 1. The backup base server is fixed under GPRS UDP mode. The main server can use either GRPS UDP or TCP/IP communication. For instance, if the main server uses GPRS TCP/IP communication between server and unit, the backup server would be still communicated with unit by GRPS UDP. 2. The backup server can ONLY receive the data from the unit, but it is not able to issue any command. 3. If the main server configure as GPRS TCP/IP communication and issue \$ST+GETLOG command, the backup base server will not be able to receive the logs from the unit. 								

4.2 Tracking/Logging Commands

Command	Description
<u>\$ST+GPOS</u>	This command is used to get the latest position of the unit. (For Cellular phone)
<u>\$ST+GETPOSITION</u>	This command is used to get the latest position of the unit. (For Base station)
<u>\$ST+TRAC</u>	This command is used to start tracking the unit. (For Cellular phone)
<u>\$ST+STOP</u>	This command is used to stop tracking the unit. (For Cellular phone)
<u>\$ST+TRACKING</u>	This command is used to start tracking the unit. (For Base station)
<u>\$ST+STOPTRACKING</u>	This command is used to stop tracking the unit. (For Base station)
<u>\$ST+STARTLOG</u>	This command is used to start logging function.
<u>\$ST+STOPLOG</u>	This command is used to stop logging function.
<u>\$ST+CLEARLOG</u>	This command is used to clear all log data in the unit.
<u>\$ST+CANCELLOG</u>	This command is used to cancel the GETLOG or GETLOGSEL process.
<u>\$ST+GETLOG</u>	This command is used to download all log data to PC.
<u>\$ST+GETLOGSEL</u>	This command is used to download part of log data to PC.

\$ST+GPOS Get current position from the unit. (For cell phone)			
Description	Execute this command to ask the unit to report back current GPS positional information to the cell phone.		
Syntax	\$ST+GPOS=[Password]		
Parameters	<table border="0"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> </table>	Password	The password of the unit.
Password	The password of the unit.		
Return Value	Date: XXXX/XX/XX Time: XX:XX:XX Lon: XXX.XXXXXXX Lat: XX.XXXXXXX Speed: XXXkm/h Heading: XXX Altitude: XXXXXm Satellites: X		
Example	\$ST+GPOS=0000(Send this command to the unit by using cell phone) Date: 2003/01/24 Time: 01:14:16 Lon: 121.551598 Lat: 25.152325 Speed: 55km/h Heading: 227 Altitude: 39m Satellites: 8		
Notes	This command will NOT be executed if the communication type of the unit is set to "GSM CS DATA", "GPRS UDP", or "GPRS TCP/IP".		

\$ST+ GETPOSITION Get current position from the unit. (For control center)	
Description	Execute this command to ask the unit to report back current GPS positional information to the control center.
Syntax	\$ST+GETPOSITION=[Password]
Parameters	<p>Password The password of the unit.</p>
Return Value	<p>Unit ID, DateTime, Longitude, Latitude, Speed, Heading, Altitude, Satellite, Report ID, Inputs, Outputs, Analog 9, Analog 10</p> <p>Unit ID: The ID of the unit. DateTime: YYYYMMDDhhmmss Longitude: WGS-84 Longitude/Latitude coordinate system Latitude: WGS-84 Longitude/Latitude coordinate system Speed: 0~65535 km/h Heading: 0~360 degrees Altitude: 0~65535 meters Satellite: 0~12 Report ID:xxx (Please refer to appendix for more detailed information) Inputs: Bitwise operation For example: When Inputs=11(decimal) =0x0b(hexadecimal) =00001011(binary), then Input1 = ON Input2 = ON Input3 = OFF Input4 = ON Input5 = OFF Input6 = OFF Input7 = OFF Input8 = OFF</p> <p>Outputs: Bitwise operation For example: When Outputs=15(decimal) =0x0f(hexadecimal) =00001111(binary), then Output1 = ON Output2 = ON Output3 = ON Output4 = ON Output5 = OFF Output6 = OFF Output7 = OFF Output8 = OFF</p> <p>Analog Input 9: input voltage range: 0~30 V with 3 decimal digits. Analog Input 10: input voltage range: 0~30V with 3 decimal digits.</p>

Example

```
$ST+GETPOSITION=0000  
1010000002,20030217132813,121.646060,25.061725,20,157,133,7,0,11,15,0.096,0.000  
  
Unit ID = 1010000002  
Year = 2003  
Month = 02  
Day = 17  
Hour = 13  
Minute = 28  
Second = 13  
Longitude = 121.646060  
Latitude = 25.061725  
Speed = 20 km/h  
Heading = 157 degrees  
Altitude = 133 meters  
Satellites = 7  
Report ID = 0  
Input1 = ON  
Input2 = ON  
Input3 = OFF  
Input4 = ON  
Input5 = OFF  
Input6 = OFF  
Input7 = OFF  
Input8 = OFF  
Output1 = ON  
Output2 = ON  
Output3 = ON  
Output4 = ON  
Output5 = OFF  
Output6 = OFF  
Output7 = OFF  
Output8 = OFF  
Input 9 = 0.096V  
Input 10 = 0.000V
```

\$ST+TRAC Track position from the unit. (For cell phone)							
Description	Execute this command to ask the unit to report back current GPS positional information to the cell phone by SMS every a period of time.						
Syntax	\$ST+TRAC=[Password], [TimeInterval], [Times]						
Parameters	<table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">Password</td> <td>The password of the unit.</td> </tr> <tr> <td>TimeInterval</td> <td>Specify elapsed time. The time specified is in seconds and can be any number from 15 to 65535 seconds. Only whole numbers can be used.</td> </tr> <tr> <td>Times</td> <td>Frequency.</td> </tr> </table>	Password	The password of the unit.	TimeInterval	Specify elapsed time. The time specified is in seconds and can be any number from 15 to 65535 seconds. Only whole numbers can be used.	Times	Frequency.
Password	The password of the unit.						
TimeInterval	Specify elapsed time. The time specified is in seconds and can be any number from 15 to 65535 seconds. Only whole numbers can be used.						
Times	Frequency.						
Return Value	\$OK:TRAC Date: XXXX/XX/XX Time: XX:XX:XX Lon: XXX.XXXXXX Lat: XX.XXXXXX Speed: XXXkm/h Heading: XXX Altitude: XXXXXm Satellites: X						
Example	<pre> \$ST+TRAC=0000,20,3 \$OK:TRAC Date: 2003/01/24 Date: 2003/01/24 Date: 2003/01/24 Time: 01:14:15 Time: 01:14:35 Time: 01:14:55 Lon: 121.651598 Lon: 121.646348 Lon: 121.653781 Lat: 25.052325 Lat: 25.061537 Lat: 25.051225 Speed: 55km/h Speed: 49km/h Speed: 51km/h Heading: 227 Heading: 227 Heading: 227 Altitude: 39m Altitude: 39m Altitude: 39m Satellites: 4 Satellites: 4 Satellites: 4 </pre>						
Notes	This command will NOT be executed if the communication type of the unit is set to "GSM CS DATA", "GPRS UDP", or "GPRS TCP/IP".						

\$ST+STOP Stop tracking position from the unit. (For cell phone)	
Description	Execute this command to ask the unit to stop reporting information to the cell phone.
Syntax	<code>\$ST+STOP=[Password]</code>
Parameters	Password The password of the unit.
Return Value	<code>\$OK:STOP</code>
Example	<code>\$ST+STOP=0000</code> <code>\$OK:STOP</code>
Notes	This command will be invalid if the communication type is set to "GSM CS DATA", "GPRS UDP", or "GPRS TCP/IP".

\$ST+TRACKING Track position from the unit. (For control center)		
Description	Execute this command to ask the unit to report back current GPS positional information to the control center according to the "Mode" parameter.	
Syntax	\$ST+TRACKING=[Password], [Mode], [Time], [Distance], [Times], [Persist Tracking]	
Parameters	Password	The password of the unit.
	Mode	<p>1 = Time mode A positional record is sent to the application when the time elapsed since the last position sent is greater than or equal to the time specified in parameter Time.</p> <p>2 = Distance mode A positional record is sent to the application when the distance between the current GPS position and the last position sent is greater than or equal to the distance specified in parameter Distance.</p> <p>3 = IntelliTrac mode A positional record is sent to the application as determined by proprietary algorithms. These algorithms attempt to minimize the amount of data sent back to the application while maintaining a high degree of map replay accuracy.</p> <p>5 = Time mode + ACC checking: If ACC is off, the tracking function will be stopped.</p> <p>6 = Distance mode + ACC checking If ACC is off, the tracking function will be stopped.</p> <p>7 = IntelliTrac mode + ACC checking If ACC is off, the tracking function will be stopped.</p>
	Time	Specify elapsed time. The time specified is in seconds and can be any number from 0 to 65535 seconds. Only whole numbers can be used. The minimum time interval in SMS mode is 15 seconds, and CSD/GPRS mode is 5 seconds.
	Distance	Specify elapsed distance. The distance specified is in meters and can be any number from 0 to 65535 meters. Only whole numbers can be used. The minimum distance interval in SMS mode is 300 meters, and CSD/GPRS mode is 100 meters. The minimum distance interval for CSD/GPRS mode is 10 meters and 100 meters for GSM SMS communication.
	Times	Frequency. The range is from 0 to 65535. If Times=0, it means forever tracking.
	Persist Tracking	<p>0: The unit stops reporting position back to the server continuously if there is no GPS.</p> <p>1: The unit reports position back to the server continuously if there is no GPS reception (the position will be the last valid position).</p>

Return Value	<p>\$OK:TRACKING Unit ID, DateTime, Longitude, Latitude, Speed, Heading, Altitude, Satellite, Report ID, Inputs, Outputs</p> <p><i>Please refer to section \$ST+GETPOSITION for detail description.</i></p>
Example	<pre>\$ST+TRACKING=0000,1,15,0,5,0 \$OK:TRACKING 1010000002,20030217144230,121.646102,25.061398,0,0,139,0,0,0,0,0.093,0.000 1010000002,20030217144245,121.646102,25.061398,0,0,139,0,0,0,0,0.103,0.000 1010000002,20030217144300,121.646102,25.061398,0,0,139,0,0,0,0,0.109,0.000 1010000002,20030217144315,121.646102,25.061398,0,0,139,0,0,0,0,0.111,0.002 1010000002,20030217144330,121.646102,25.061398,0,0,139,0,0,0,0,0.106,0.000</pre>
Notes:	<p>(1) If the Tracking command is issued via RS232 port, the command will be disabled automatically after unit reboot.</p>

\$ST+STOPTRACKING Stop tracking position (For control center)	
Description	Execute this command to ask the unit to stop reporting information to the control center.
Syntax	\$ST+STOPTRACKING=[Password]
Parameters	<p>Password The password of the unit.</p>
Return Value	\$OK:STOPTRACKING
Example	<pre>\$ST+STOPTRACKING=0000 \$OK:STOPTRACKING</pre>

\$ST+STARTLOG Logging mode setting													
Description	Execute this command to setup unit to start recording current GPS positional information to the flash memory of the unit according to the "Mode" parameter.												
Syntax	\$ST+STARTLOG=[Password], [Mode], [Time], [Distance], [Times],[Persist logging]												
Parameters	<table border="0"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Mode</td> <td> <p>1 = Time mode A positional record is sent to the application when the time elapsed since the last position sent is greater than or equal to the time specified in parameter Time.</p> <p>2 = Distance mode A positional record is sent to the application when the distance between the current GPS position and the last position sent is greater than or equal to the distance specified in parameter Distance.</p> <p>3 = IntelliTrac mode A positional record is sent to the application as determined by proprietary algorithms. These algorithms attempt to minimize the amount of data sent back to the application while maintaining a high degree of map replay accuracy.</p> <p>5 = Time mode + ACC checking: If ACC is off, the tracking function will be stopped.</p> <p>6 = Distance mode + ACC checking If ACC is off, the tracking function will be stopped.</p> <p>7 = IntelliTrac mode + ACC checking If ACC is off, the tracking function will be stopped.</p> </td> </tr> <tr> <td>Time</td> <td>Specify elapsed time. The time specified is in seconds and can be any number from 1 to 65535 seconds. Only whole numbers can be used.</td> </tr> <tr> <td>Distance</td> <td>Specify elapsed distance. The distance specified is in meters and can be any number from 15 to 65535 meters. Only whole numbers can be used. The minimum distance interval is 10 meters.</td> </tr> <tr> <td>Times</td> <td>Frequency. The range is from 0 to 65535. If Times=0, it means forever logging.</td> </tr> <tr> <td>Persist logging</td> <td> <p>0: The unit stop logging position into the flash memory if there is no GPS.</p> <p>1: The unit continues logging position into the flash memory if there is no GPS reception (the position will be the last valid position).</p> </td> </tr> </table>	Password	The password of the unit.	Mode	<p>1 = Time mode A positional record is sent to the application when the time elapsed since the last position sent is greater than or equal to the time specified in parameter Time.</p> <p>2 = Distance mode A positional record is sent to the application when the distance between the current GPS position and the last position sent is greater than or equal to the distance specified in parameter Distance.</p> <p>3 = IntelliTrac mode A positional record is sent to the application as determined by proprietary algorithms. These algorithms attempt to minimize the amount of data sent back to the application while maintaining a high degree of map replay accuracy.</p> <p>5 = Time mode + ACC checking: If ACC is off, the tracking function will be stopped.</p> <p>6 = Distance mode + ACC checking If ACC is off, the tracking function will be stopped.</p> <p>7 = IntelliTrac mode + ACC checking If ACC is off, the tracking function will be stopped.</p>	Time	Specify elapsed time. The time specified is in seconds and can be any number from 1 to 65535 seconds. Only whole numbers can be used.	Distance	Specify elapsed distance. The distance specified is in meters and can be any number from 15 to 65535 meters. Only whole numbers can be used. The minimum distance interval is 10 meters.	Times	Frequency. The range is from 0 to 65535. If Times=0, it means forever logging.	Persist logging	<p>0: The unit stop logging position into the flash memory if there is no GPS.</p> <p>1: The unit continues logging position into the flash memory if there is no GPS reception (the position will be the last valid position).</p>
Password	The password of the unit.												
Mode	<p>1 = Time mode A positional record is sent to the application when the time elapsed since the last position sent is greater than or equal to the time specified in parameter Time.</p> <p>2 = Distance mode A positional record is sent to the application when the distance between the current GPS position and the last position sent is greater than or equal to the distance specified in parameter Distance.</p> <p>3 = IntelliTrac mode A positional record is sent to the application as determined by proprietary algorithms. These algorithms attempt to minimize the amount of data sent back to the application while maintaining a high degree of map replay accuracy.</p> <p>5 = Time mode + ACC checking: If ACC is off, the tracking function will be stopped.</p> <p>6 = Distance mode + ACC checking If ACC is off, the tracking function will be stopped.</p> <p>7 = IntelliTrac mode + ACC checking If ACC is off, the tracking function will be stopped.</p>												
Time	Specify elapsed time. The time specified is in seconds and can be any number from 1 to 65535 seconds. Only whole numbers can be used.												
Distance	Specify elapsed distance. The distance specified is in meters and can be any number from 15 to 65535 meters. Only whole numbers can be used. The minimum distance interval is 10 meters.												
Times	Frequency. The range is from 0 to 65535. If Times=0, it means forever logging.												
Persist logging	<p>0: The unit stop logging position into the flash memory if there is no GPS.</p> <p>1: The unit continues logging position into the flash memory if there is no GPS reception (the position will be the last valid position).</p>												
Return Value	\$OK:STARTLOG												
Example	\$ST+STARTLOG=0000,1,20,0,5,0 \$OK:STARTLOG												

\$ST+STOPLOG Stop logging data	
Description	Execute this command to setup unit to stop recording.
Syntax	\$ST+STOPLOG=[Password]
Parameters	Password The password of the unit.
Return Value	\$OK:STOPLOG
Example	\$ST+STOPLOG=0000 \$OK:STOPLOG

\$ST+CLEARLOG Clear logged data of the unit	
Description	Execute this command to clear logged data in the memory of the unit.
Syntax	\$ST+CLEARLOG=[Password]
Parameters	Password The password of the unit.
Return Value	\$OK:CLEARLOG
Example	\$ST+CLEARLOG=0000 \$OK:CLEARLOG

\$ST+CANCELLOG Stop downloading logged data from the unit.	
Description	Execute this command to stop downloading log data from the unit.
Syntax	\$ST+CANCELLOG=[Password]
Parameters	Password The password of the unit.
Return Value	\$OK:CANCELLOG
Example	\$ST+CANCELLOG=0000 \$OK:CANCELLOG

\$ST+GETLOG Downloading logged data from the unit.	
Description	Execute this command to download all of the logged data from the unit.
Syntax	\$ST+GETLOG=[Password]
Parameters	Password The password of the unit.
Return Value	\$OK:GETLOG Unit ID, Datetime, Longitude, Latitude, Speed, Heading, Altitude, Satellite, Report ID, Inputs, Outputs, Analog 9, Analog 10 \$MSG:Download Completed
Example	<pre> \$ST+GETLOG=0000 \$OK:GETLOG 1010000004,20050513153524,121.646075,25.063675,0,166,50,6,1,0,0,0.118,0.000 1010000004,20050513153525,121.646075,25.063675,0,166,50,6,1,0,0,0.098,0.215 1010000004,20050513153526,121.646075,25.063675,0,166,50,6,1,0,0,0.116,0.454 1010000004,20050513153527,121.646075,25.063675,0,166,50,6,1,0,0,0.118,0.000 1010000004,20050513153528,121.646075,25.063675,0,166,50,6,1,0,0,0.106,0.006 1010000004,20050513153529,121.646075,25.063675,0,166,50,6,1,0,0,0.118,0.000 1010000004,20050513153530,121.646075,25.063675,0,166,50,6,1,0,0,0.099,0.449 \$MSG:Download Completed </pre>
Note:	(1) The downloading process would be interrupted if the unit received any commands or sending any reports.

4.3 Output Control Commands

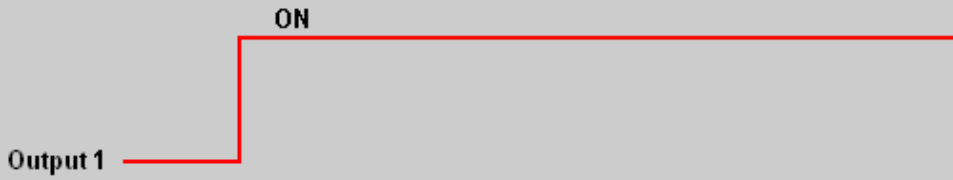
Command	Description
\$ST+OUTS	This command is used to set outputs control.
\$ST+RESET	This command is used to reset the unit.
\$ST+REBOOT	This command is used to restart the unit.
\$ST+VMON	This command is used to wiretap inside vehicle remotely.
\$ST+BBCTRL	This command is used to turn ON or turn OFF the backup battery function.
\$ST+NMEA	This command is used to output GPS NMEA strings through the serial port.

\$ST+OUTS Set outputs state


Description	Execute this command to set the state of the output relays.	
Syntax	\$ST+OUTS=[Password], [Output ID], [State], [Duration], [Toggle Times]	
Parameters	<p>Password The password of the unit.</p> <p>Output ID The unit hardware output number. Outputs are numbered 1 through 8. Note that the Output8 is only for immobilizer used.</p> <p>State <u>0</u> Set output inactive <u>1</u> Set output active</p> <p>Duration Unit of duration is 100 milliseconds. Ex: if want to setup duration for 2 seconds, you have to give a 20 value. The range of the duration is between 0~255 milliseconds.</p> <p>Toggle Times The times from its current state to its alternate state and back again.</p>	
Return Value	\$OK:OUTS	

Example

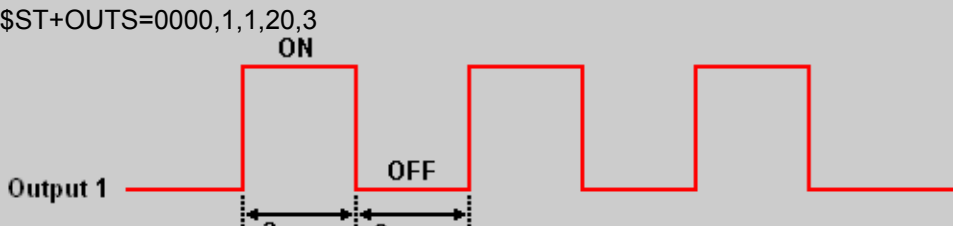
\$ST+OUTS=0000,1,1, 0,0



\$ST+OUTS=0000,1,1, 8,0



\$ST+OUTS=0000,1,1,20,3



\$ST+RESET Reset all parameters to manufactory default	
Description	Execute this command to reset the unit. After resetting the unit, the previous upload parameters will be cleared. Include phone numbers, user reports, zones, logging data...etc.
Syntax	\$ST+RESET=[Password]
Parameters	Password The password of the unit.
Return Value	\$OK: RESET
Example	\$ST+RESET=0000 \$OK: RESET
Notes	(1) The unit identification number would not be set to factory default by using this command. (2) This command is only available under "Direct Connection".

\$ST+REBOOT Reboot the unit	
Description	Execute this command to reboot the unit.
Syntax	\$ST+REBOOT=[Password]
Parameters	Password The password of the unit.
Return Value	\$OK:REBOOT
Example	\$ST+REBOOT=0000 \$OK:REBOOT

\$ST+VMON Voice wiretap					
Description	Execute this command to wiretap the voice conversation inside the car. When the unit receives this command, the unit will call out to the specific phone number automatically.				
Syntax	\$ST+VMON=[Password], [Phone Number]				
Parameters	<table border="0"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Phone Number</td> <td>The specific phone number.</td> </tr> </table>	Password	The password of the unit.	Phone Number	The specific phone number.
Password	The password of the unit.				
Phone Number	The specific phone number.				
Return Value	\$OK:VMON				
Example	\$ST+VMON=0000,0933942206 \$OK:VMON				

\$ST+BBCTRL Backup battery control									
Description	Execute this command to turn on or turn off backup battery.								
Syntax	\$ST+BBCTRL=[Password],[Enable]								
Parameters	<table border="0"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Enable</td> <td> <table border="0"> <tr> <td>0:</td> <td>Turn Off</td> </tr> <tr> <td>1:</td> <td>Turn On</td> </tr> </table> </td> </tr> </table>	Password	The password of the unit.	Enable	<table border="0"> <tr> <td>0:</td> <td>Turn Off</td> </tr> <tr> <td>1:</td> <td>Turn On</td> </tr> </table>	0:	Turn Off	1:	Turn On
Password	The password of the unit.								
Enable	<table border="0"> <tr> <td>0:</td> <td>Turn Off</td> </tr> <tr> <td>1:</td> <td>Turn On</td> </tr> </table>	0:	Turn Off	1:	Turn On				
0:	Turn Off								
1:	Turn On								
Return Value	\$OK:BBCTRL								
Example	\$ST+BBCTRL=0000,1 \$OK:BBCTRL								

\$ST+NMEA GPS NMEA-0183 strings output					
Description	Execute this command to output GPS NMEA-0183 version 2.20 strings for external devices. This command is only available for direct connection.				
Syntax	\$ST+NMEA=[Enabled],[NMEAOutputPort]				
Parameters	<table border="0"> <tr> <td>Enable</td> <td>0: Turn Off 1: Turn On</td> </tr> <tr> <td>NMEAOutputPort</td> <td>0: Current Port 1: Serial Port 2: Aux Port</td> </tr> </table>	Enable	0: Turn Off 1: Turn On	NMEAOutputPort	0: Current Port 1: Serial Port 2: Aux Port
Enable	0: Turn Off 1: Turn On				
NMEAOutputPort	0: Current Port 1: Serial Port 2: Aux Port				
Return Value	\$OK:NMEA				
Example	<pre> \$ST+NMEA=1,0 \$OK:NMEA \$GPRMC,095644.112,V,0000.0000,N,00000.0000,E,0.0,,080503,,*3C \$GPVTG,T,M,0.0,N,0.0,K*4E \$GPGGA,095645.112,0000.0000,N,00000.0000,E,0,03,17.7,0.0,M,,,0000*35 \$GPRMC,095645.112,V,0000.0000,N,00000.0000,E,0.0,,080503,,*3D \$GPVTG,T,M,0.0,N,0.0,K*4E \$GPGGA,095646.112,0000.0000,N,00000.0000,E,0,03,17.7,0.0,M,,,0000*36 \$GPRMC,095646.112,V,0000.0000,N,00000.0000,E,0.0,,080503,,*3E \$GPVTG,T,M,0.0,N,0.0,K*4E \$GPGGA,095647.112,0000.0000,N,00000.0000,E,0,03,17.7,0.0,M,,,0000*37 \$GPRMC,095647.112,V,0000.0000,N,00000.0000,E,0.0,,080503,,*3F \$GPVTG,T,M,0.0,N,0.0,K*4E \$GPGGA,095648.112,0000.0000,N,00000.0000,E,0,03,17.7,0.0,M,,,0000*38 \$GPRMC,095648.112,V,0000.0000,N,00000.0000,E,0.0,,080503,,*30 \$GPVTG,T,M,0.0,N,0.0,K*4E \$GPGGA,095649.112,0000.0000,N,00000.0000,E,0,03,17.6,0.0,M,,,0000*38 \$GPGSA,A,1,09,17,10,,,,,,,,,20.3,17.6,10.0*0E \$ST+NMEA=0,0 \$OK:NMEA </pre>				

4.4 User Report Commands

Command	Description
\$ST+TIMER	This command is used to set a daily report.
\$ST+REPORT	This command is used to set user defined reports.
\$ST+CLEARREPORT	This command is used to clear user defined reports.
\$ST+ZONE	This command is used to set user defined zone areas.
\$ST+CLEARZONE	This command is used to clear user defined zone areas.
\$ST+SCHEDULE	This command is used to set user defined schedule.
\$ST+CLEARSCCHEDULE	This command is used to clear the user defined schedules
\$ST+SPEEDING	This command is used to set speeding report.
\$ST+MILEAGE	This command is used to calculate the total mileage.
\$ST+IDLE	This command is used to calculate the total idle time
\$ST+AREPORT	This command is used to setup Analog 9 & 10

\$ST+TIMER Set the timer report							
Description	Execute this command to setup or query unit to report back positional information automatically at a preset time every day.						
Syntax	<p>Write Command: \$ST+TIMER=[Password], [Enable], [Preset Time]</p> <p>Read Command: \$ST+TIMER=[Password], ?</p>						
Parameters	<table border="0"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Enable</td> <td>0: Off Disable this function. 1: On Enable this function.</td> </tr> <tr> <td>Preset Time</td> <td>The time for report. The format is hour, minute and second.</td> </tr> </table>	Password	The password of the unit.	Enable	0: Off Disable this function. 1: On Enable this function.	Preset Time	The time for report. The format is hour, minute and second.
Password	The password of the unit.						
Enable	0: Off Disable this function. 1: On Enable this function.						
Preset Time	The time for report. The format is hour, minute and second.						
Return Value	<p>Write Command Response: \$OK:TIMER</p> <p>Read Command Response: \$TIMER=[Enable], [Preset Time]</p>						
Example	<pre>\$ST+TIMER=0000,1,213050 \$OK:TIMER \$ST+TIMER=0000,? \$TIMER=1,213050</pre>						

\$ST+REPORT Set user define reports		
Description	Execute this command to set user defined reports.	
Syntax	<p>Write Command: \$ST+REPORT=[Password],[ReportID],[InputMask],[InputControl],[ZoneID],[ZoneControl],[MainPowerReportID],[MainPowerControl],[ReportAction],[OutputID],[OutputState],[VIPSMSPhoneSet],[VoicePhoneSet],[ReportText],[ScheduleID],[ScheduleControl]</p> <p>Read Command: \$ST+REPORT=[Password],[ReportID],?</p>	
Parameters	Password	The password of the unit.
	ReportID	The report's numeric identifier. This number is defined by programmer and can be any number from 100 through 199.
	InputMask	This parameter defines which inputs to be the condition. One or more inputs can be specified in this parameter.
	InputControl	Defines how the inputs specified in parameter InputMask are considered during processing. The bit value of 0 means OFF and 1 means ON.
	ZoneID	The numeric identifier from 1 to 100 of a pre-defined zone. Use this parameter if you wish to include zones in report processing. A value of 0 is ignored zone processing.
	ZoneControl	<p>Defines how the geographic zone specified in parameter ZoneID is considered during report processing.</p> <p>1:Entering the Zone The report initiates defined actions when the current (valid) GPS position transitions from outside the zone to inside of the zone boundaries.</p> <p>2:Exiting the Zone The report initiates defined actions when the current (valid) GPS position transitions from inside the zone to outside of the zone boundaries.</p> <p>3:Inside the Zone The report initiates defined actions when the current (valid) GPS position is within the specified zone boundaries.</p> <p>4:Outside the Zone The report initiates defined actions when the current (valid) GPS is outside of the specified zone boundaries.</p>

MainPowerReportID	<p>This parameter defines which main power status will be considered in the report processing.</p>
	<p>40:Main Power Low The main power battery voltage is lower than LowVoltage. <i>Please refer to the \$ST+PMGR command for setting the LowVoltage parameter.</i></p>
	<p>41:Main Power Lose The main power source has been cut off.</p>
MainPowerControl	<p>Defines how the main power status specified in parameter MainPowerReportID is considered during report processing.</p>
	<p>0:Deactivated The report initiates when the MainPowerReport be inactive.</p>
	<p>1:Activated The report initiates when the MainPowerReport be active.</p>
ReportAction	<p>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:</p>
	<p>1:Logging When all defined report conditions are true, log the most recent GPS position to non-volatile flash memory for future retrieval.</p>
	<p>2:Polling When all defined report conditions are true, send the latest GPS position to the remote base station.</p>
	<p>4:Set Output When all defined report conditions are true, set the output relay.</p>
	<p>8:Send VIP SMS When all defined report conditions are true, send the ReportText SMS to the cellular phones which defined in VIPSMSPhoneSet and VIP1..VIP7. <i>Please refer to \$ST+SBAS command for cellular phone numbers setting.</i></p>
	<p>16:Initiate a voice call When all defined report conditions are true, initiate a voice call to a preset phone number which defined in VoicePhoneSet and VIP1..VIP7. <i>Please refer to \$ST+SBAS command for the phone number setting.</i></p>
OutputID	<p>The outputs are numbered through 1 to 8. This parameter is used in conjunction with parameter ReportAction=4(Set Output). 0: means ignore output control.</p>
OutputState	<p>Defines how the output specified in parameter OutputID is controlled while the report is active. 0:OFF 1:ON</p>

	<p>VIPSMSPhoneSet</p> <p>VoicePhoneSet</p> <p>ReportText</p> <p>ScheduleID</p> <p>ScheduleControl</p>	<p>This parameter is used in conjunction with ReportAction=8. Defines a set of cellular phone numbers that VIP SMS be sent. BasePhoneNumber = 1 (Do not use this one for VIPSMS) VIP1 = 2 VIP2 = 4 VIP3 = 8 VIP4 = 16 VIP5 = 32 VIP6 = 64 VIP7 = 128</p> <p>This parameter is used in conjunction with ReportAction=16. Defines a voice phone number that will be called. BasePhoneNumber = 1 (Do not use this one for VIPPhone) VIP1 = 2 VIP2 = 4 VIP3 = 8 VIP4 = 16 VIP5 = 32 VIP6 = 64 VIP7 = 128</p> <p>This text parameter is used for the report description. Only support English alphabets.</p> <p>The numeric identifier from 1 to 100 of a pre-defined schedule. Use this parameter if you wish to include schedule in report processing. A value of 0 is ignored schedule processing.</p> <p>Defines how the schedule specified in parameter ScheduleID is considered during report processing.</p> <p>1:Entering the Schedule The report initiates defined actions when the current local time transitions from outside the schedule to inside of the schedule boundaries.</p> <p>2:Exiting the Schedule The report initiates defined actions when the current local time transitions from inside the schedule to outside of the schedule boundaries.</p> <p>3:Inside the Schedule The report initiates defined actions when the current local time is within the specified schedule boundaries.</p> <p>4:Outside the Schedule The report initiates defined actions when the current local time is outside of the specified schedule boundaries.</p>
<p>Return Value</p>	<p>Write Command Response: \$OK:REPORT</p> <p>Read Command Response: \$REPORT=[ReportID],[InputMask],[InputControl],[ZoneID], [ZoneControl],[MainPowerReportID],[MainPowerControl], [ReportAction],[OutputID],[OutputState],[VIPSMSPhoneSet], [VoicePhoneSet],[ReportText],[ScheduleID],[ScheduleControl]</p>	

<p>Example</p>	<p>(1) When Input1 and Input2 are ON, send VIP SMS to the cellular phone VIP2 an VIP3 \$ST+REPORT=0000,100,3,3,0,0,0,0,8,0,0,12,0,Alarm,0,0 \$OK:REPORT</p> <p>(2) When main power lose, send VIPSMS to VIP2 and set output 7 ON. \$ST+REPORT=0000,101,0,0,0,0,41,1,12,7,1,4,0,Power Lose,0,0 \$OK:REPORT</p> <p>(3) When Input3 is ON and entering Zone1 area, logging and polling to base station \$ST+REPORT=0000,102,4,4,1,1,0,0,3,0,0,0,0,EnterZone1,0,0 \$OK:REPORT</p> <p>(4) Query ReportID 101 \$ST+REPORT=0000,101,? \$REPORT=101,0,0,0,0,41,1,12,7,1,0,0,Power Lose,0,0</p>
<p>Note</p>	<p>(1) Behavior of the Main Power Low control parameter: -Deactivated: When the vehicle voltage is lower than the value we entered in the voltage setup page, it does not report. It does the predefined action(s) we selected in the report setting after 2 hours if the vehicle voltage is higher than the value we setup. - Active: When the unit voltage is lower than the value we entered in the voltage setup page, it will report according the action we selected after 5 minutes.</p> <p>(2) Behavior of the Main Power Lost Control Parameter: - Deactivated: When the unit loses main power, it will not report. It will report when the main power has been reconnected. - Active: When the unit loses main power, it will report. It will not report when the main power reconnects to the unit.</p> <p>(3) "Dial Voice Call" function does not support the report condition of "Entering Schedule" and "Existing the Schedule".</p>

\$ST+CLEARREPORT Clear the user defined reports					
<p>Description</p>	<p>Execute this command to clear the user defined reports.</p>				
<p>Syntax</p>	<p>\$ST+CLEARREPORT=[Password],[ReportID]</p>				
<p>Parameters</p>	<table border="0"> <tr> <td data-bbox="406 1467 678 1527"> <p>Password</p> </td> <td data-bbox="678 1467 1450 1527"> <p>The password of the unit.</p> </td> </tr> <tr> <td data-bbox="406 1527 678 1697"> <p>ReportID</p> </td> <td data-bbox="678 1527 1450 1697"> <p>The report's numeric identifier. This number is defined by programmer and can be any number from 100 through 199. Note: use Report ID "255" to clear all user defined reports.</p> </td> </tr> </table>	<p>Password</p>	<p>The password of the unit.</p>	<p>ReportID</p>	<p>The report's numeric identifier. This number is defined by programmer and can be any number from 100 through 199. Note: use Report ID "255" to clear all user defined reports.</p>
<p>Password</p>	<p>The password of the unit.</p>				
<p>ReportID</p>	<p>The report's numeric identifier. This number is defined by programmer and can be any number from 100 through 199. Note: use Report ID "255" to clear all user defined reports.</p>				
<p>Return Value</p>	<p>\$OK:CLEARREPORT</p>				
<p>Example</p>	<p>\$ST+CLEARREPORT=0000,100 \$OK:CLEARREPORT</p> <p>\$ST+CLEARREPORT=0000,255 \$OK:CLEARREPORT</p>				

\$ST+ZONE Set user defined zones

Description	Execute this command to set user defined zones.	
Syntax	<p>Write Command:</p> <p>(1) Circular Zone \$ST+ZONE=[Password],[ZoneID],[Longitude],[Latitude],[Tolerance] (2) Polygon Zone \$ST+ZONE=[Password],[ZoneID],[ZonePoints]</p> <p>Read Command: \$ST+ZONE=[Password],[ZoneID],?</p>	
Parameters	<p>Password</p> <p>ZoneID</p> <p>Longitude</p> <p>Latitude</p> <p>Tolerance</p> <p>ZonePoints</p>	<p>The password of the unit.</p> <p>The zone's numeric identifier. The number is defined by programmer and can be any number from 1 to 100.</p> <p>The longitude of the circle zone.</p> <p>The latitude of the circle zone.</p> <p>The radius of the circle zone in meters.</p> <p>The encrypted polygon zone points. Please refer to Encrypt polygon zone points sample code</p>

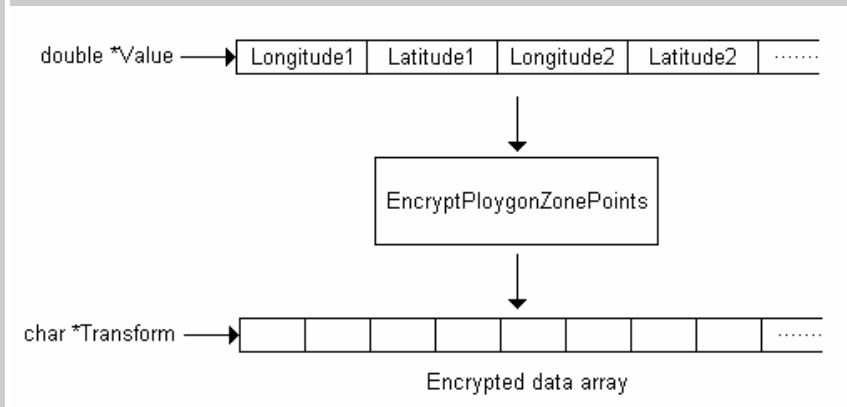
```
char EncryptPolygonZonePoints(double* Value, char* Transform, char n);
```

Input parameters :

Value : A source pointer of the zone points array.

Transform : A destination pointer of the output data array.

n : A numbers of zone points multiply by 2.



For example : A five points of polygon zone. (n = 10)

Point1 : Longitude1=121.64429, Latitude1=25.06125

Point2 : Longitude2=121.64569, Latitude2=25.05905

Point3 : Longitude3=121.64936, Latitude3=25.05931

Point4 : Longitude4=121.64953, Latitude4=25.06078

Point5 : Longitude5=121.64845, Latitude5=25.06244

Encrypted zone points string will be like below :

"ycw-9 /m0 !, !|4 "o0 :0 10 !3\$ IO !F"

The ST command will be like below :

\$ST+ZONE=0000,1,ycw-9 /m0 !, !|4 "o0 :0 10 !3\$ IO !F

Return Value

Write Command Response:

\$OK:ZONE

Read Command Response:

(1) Circular Zone

\$ZONE=[ZoneID],[Longitude],[Latitude],[Tolerance]

(2) Polygon Zone

\$ZONE=[ZoneID],[ZonePoints]

Example

\$ST+ZONE=0000,1,121.234567,25.123456,500

\$OK:ZONE

(1) Circular Zone

\$ST+ZONE=0000,1,?

\$ZONE=1,121.234567,25.123456,500

(2) Ploygon Zone

\$ST+ZONE=0000,1,?

\$ZONE=1,ycw-9 /m0 !, !|4 "o0 :0 10 !3\$ IO !F

\$ST+CLEARZONE Clear the user defined zones					
Description	Execute this command to clear user defined zone.				
Syntax	\$ST+CLEARZONE=[Password],[Zone ID]				
Parameters	<table border="1"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Zone ID</td> <td>The zone's numeric identifier. This number is defined by programmer and can be any number from 1 through 100.</td> </tr> </table>	Password	The password of the unit.	Zone ID	The zone's numeric identifier. This number is defined by programmer and can be any number from 1 through 100.
Password	The password of the unit.				
Zone ID	The zone's numeric identifier. This number is defined by programmer and can be any number from 1 through 100.				
Return Value	\$OK: CLEARZONE				
Example	<pre>\$ST+CLEARZONE=0000,1 \$OK: CLEARZONE</pre>				

\$ST+SCHEDULE Set user defined schedules																									
Description	Execute this command to set user defined schedule.																								
Syntax	<p>Write Command: \$ST+SCHEDULE=[Password],[ScheduleID],[DaysOfWeek],[StartTime],[EndTime]</p> <p>Read Command: \$ST+SCHEDULE=[Password],[ScheduleID],?</p>																								
Parameters	<table border="0"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>ScheduleID</td> <td>The schedule's numeric identifier. The number is defined by programmer and can be any number from 1 to 100.</td> </tr> <tr> <td>DaysOfWeek</td> <td> <p>A flag indicates the day of the week. This parameter is used in conjunction with the StartTime and EndTime parameters that follow. Use this parameter to specify a relative timeframe. The decimal values for each day of the week are specified in the table below. To specify multiple days simple add the values for each specific day together and pass them as the DaysOfWeek value. For instance, Monday and Friday would be 2 + 32 = 34.</p> <table border="1"> <tr><td>Sunday</td><td>1</td></tr> <tr><td>Monday</td><td>2</td></tr> <tr><td>Tuesday</td><td>4</td></tr> <tr><td>Wednesday</td><td>8</td></tr> <tr><td>Thursday</td><td>16</td></tr> <tr><td>Friday</td><td>32</td></tr> <tr><td>Saturday</td><td>64</td></tr> </table> </td> </tr> <tr> <td>StartTime</td> <td> <p>The start time of the schedule. The format is hhmmss.</p> <p>hh : 00 – 23 (Hour) mm : 00 – 59 (Minute) ss : 00 – 59 (Second)</p> </td> </tr> <tr> <td>EndTime</td> <td> <p>The end time of the schedule. The format is hhmmss.</p> <p>hh : 00 – 23 (Hour) mm : 00 – 59 (Minute) ss : 00 – 59 (Second)</p> </td> </tr> </table>	Password	The password of the unit.	ScheduleID	The schedule's numeric identifier. The number is defined by programmer and can be any number from 1 to 100.	DaysOfWeek	<p>A flag indicates the day of the week. This parameter is used in conjunction with the StartTime and EndTime parameters that follow. Use this parameter to specify a relative timeframe. The decimal values for each day of the week are specified in the table below. To specify multiple days simple add the values for each specific day together and pass them as the DaysOfWeek value. For instance, Monday and Friday would be 2 + 32 = 34.</p> <table border="1"> <tr><td>Sunday</td><td>1</td></tr> <tr><td>Monday</td><td>2</td></tr> <tr><td>Tuesday</td><td>4</td></tr> <tr><td>Wednesday</td><td>8</td></tr> <tr><td>Thursday</td><td>16</td></tr> <tr><td>Friday</td><td>32</td></tr> <tr><td>Saturday</td><td>64</td></tr> </table>	Sunday	1	Monday	2	Tuesday	4	Wednesday	8	Thursday	16	Friday	32	Saturday	64	StartTime	<p>The start time of the schedule. The format is hhmmss.</p> <p>hh : 00 – 23 (Hour) mm : 00 – 59 (Minute) ss : 00 – 59 (Second)</p>	EndTime	<p>The end time of the schedule. The format is hhmmss.</p> <p>hh : 00 – 23 (Hour) mm : 00 – 59 (Minute) ss : 00 – 59 (Second)</p>
Password	The password of the unit.																								
ScheduleID	The schedule's numeric identifier. The number is defined by programmer and can be any number from 1 to 100.																								
DaysOfWeek	<p>A flag indicates the day of the week. This parameter is used in conjunction with the StartTime and EndTime parameters that follow. Use this parameter to specify a relative timeframe. The decimal values for each day of the week are specified in the table below. To specify multiple days simple add the values for each specific day together and pass them as the DaysOfWeek value. For instance, Monday and Friday would be 2 + 32 = 34.</p> <table border="1"> <tr><td>Sunday</td><td>1</td></tr> <tr><td>Monday</td><td>2</td></tr> <tr><td>Tuesday</td><td>4</td></tr> <tr><td>Wednesday</td><td>8</td></tr> <tr><td>Thursday</td><td>16</td></tr> <tr><td>Friday</td><td>32</td></tr> <tr><td>Saturday</td><td>64</td></tr> </table>	Sunday	1	Monday	2	Tuesday	4	Wednesday	8	Thursday	16	Friday	32	Saturday	64										
Sunday	1																								
Monday	2																								
Tuesday	4																								
Wednesday	8																								
Thursday	16																								
Friday	32																								
Saturday	64																								
StartTime	<p>The start time of the schedule. The format is hhmmss.</p> <p>hh : 00 – 23 (Hour) mm : 00 – 59 (Minute) ss : 00 – 59 (Second)</p>																								
EndTime	<p>The end time of the schedule. The format is hhmmss.</p> <p>hh : 00 – 23 (Hour) mm : 00 – 59 (Minute) ss : 00 – 59 (Second)</p>																								
Return Value	<p>Write Command Response: \$OK:SCHEDULE</p> <p>Read Command Response: \$SCHEDULE=[ScheduleID],[DaysOfWeek],[StartTime],[EndTime]</p>																								
Example	<pre>\$ST+SCHEDULE=0000,1,127,093000,185000 \$OK:SCHEDULE \$ST+SCHEDULE=0000,1,? \$SCHEDULE=1, 127,093000,185000</pre>																								

\$ST+CLEARSCCHEDULE Clear the user defined schedules					
Description	Execute this command to clear user defined schedules.				
Syntax	\$ST+CLEARSCCHEDULE=[Password],[Schedule ID]				
Parameters	<table border="1"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Schedule ID</td> <td>The schedule's numeric identifier. This number is defined by programmer and can be any number from 1 through 100.</td> </tr> </table>	Password	The password of the unit.	Schedule ID	The schedule's numeric identifier. This number is defined by programmer and can be any number from 1 through 100.
Password	The password of the unit.				
Schedule ID	The schedule's numeric identifier. This number is defined by programmer and can be any number from 1 through 100.				
Return Value	\$OK:CLEARSCCHEDULE				
Example	<pre>\$ST+CLEARSCCHEDULE=0000,20 \$OK:CLEARSCCHEDULE</pre>				

\$ST+SPEEDING Set the speeding report							
Description	Execute this command to set the speeding report						
Syntax	<p>Write Command: \$ST+SPEEDING==[Password],[Enable],[ReportAction],[MinSpeed],[MaxSpeed],[Duration],[OutputID],[OutputControl]</p> <p>Read Command: \$ST+SPEEDING=[Password], ?</p>						
Parameters	<table border="0"> <tr> <td style="vertical-align: top; padding-right: 10px;">Password</td> <td>The password of the unit.</td> </tr> <tr> <td style="vertical-align: top; padding-right: 10px;">Enable</td> <td> Enable speeding report 0: Disable 1: Enable </td> </tr> <tr> <td style="vertical-align: top; padding-right: 10px;">ReportAction</td> <td> This parameter defines the actions to be taken once the speeding report is in an active state. One or more actions can be specified on this report. The following list defines all available action types: <p>1:Logging When all defined report conditions are true, log the most recent GPS position to non-volatile flash memory for future retrieval.</p> <p>2:Polling When all defined report conditions are true, send the latest GPS position to the remote base station.</p> <p>3:Logging and Polling: When all defined report conditions are true, the unit will do following:</p> <ol style="list-style-type: none"> 1. Log the most recent GPS position to non-volatile flash memory for future retrieval. 2. Send the latest GPS position to the remote base station. <p>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.</p> <p>5. Logging + Set Output: When all defined conditions are true, log the most recent GPS position to non-volatile flash memory and 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.</p> <p>6. Polling + Set Output: When all defined conditions are true, send the latest GPS position to the remote base station 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.</p> </td> </tr> </table>	Password	The password of the unit.	Enable	Enable speeding report 0: Disable 1: Enable	ReportAction	This parameter defines the actions to be taken once the speeding report is in an active state. One or more actions can be specified on this report. The following list defines all available action types: <p>1:Logging When all defined report conditions are true, log the most recent GPS position to non-volatile flash memory for future retrieval.</p> <p>2:Polling When all defined report conditions are true, send the latest GPS position to the remote base station.</p> <p>3:Logging and Polling: When all defined report conditions are true, the unit will do following:</p> <ol style="list-style-type: none"> 1. Log the most recent GPS position to non-volatile flash memory for future retrieval. 2. Send the latest GPS position to the remote base station. <p>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.</p> <p>5. Logging + Set Output: When all defined conditions are true, log the most recent GPS position to non-volatile flash memory and 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.</p> <p>6. Polling + Set Output: When all defined conditions are true, send the latest GPS position to the remote base station 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.</p>
Password	The password of the unit.						
Enable	Enable speeding report 0: Disable 1: Enable						
ReportAction	This parameter defines the actions to be taken once the speeding report is in an active state. One or more actions can be specified on this report. The following list defines all available action types: <p>1:Logging When all defined report conditions are true, log the most recent GPS position to non-volatile flash memory for future retrieval.</p> <p>2:Polling When all defined report conditions are true, send the latest GPS position to the remote base station.</p> <p>3:Logging and Polling: When all defined report conditions are true, the unit will do following:</p> <ol style="list-style-type: none"> 1. Log the most recent GPS position to non-volatile flash memory for future retrieval. 2. Send the latest GPS position to the remote base station. <p>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.</p> <p>5. Logging + Set Output: When all defined conditions are true, log the most recent GPS position to non-volatile flash memory and 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.</p> <p>6. Polling + Set Output: When all defined conditions are true, send the latest GPS position to the remote base station 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.</p>						

	<p>MinSpeed</p> <p>MaxSpeed</p> <p>Duration</p> <p>Output ID</p> <p>Output Control</p>	<p>7. Logging + Polling + Set Output: When all defined conditions are true, log the most recent GPS position to non-volatile flash memory, send the most recent GPS position to the remote base station, and 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.</p> <p>The minimum speed of speed range (0 – 255 km/h)</p> <p>The maximum speed of speed range (0 – 255 km/h)</p> <p>This parameter defines the speeding report will be activated once the speed range is satisfied for a time duration. Valid value for logging and polling is following: Logging: 1~65535 seconds Polling: 15~65535 seconds Logging + Polling: 15~65535 seconds.</p> <p>The unit hardware output number. Outputs are numbered 1 through 8. Note that the Output8 is only for immobilizer used.</p> <p>0 Set output inactive. 1 Set output active.</p>
Return Value	<p>Write Command: \$OK:SPEEDING</p> <p>Read Command: \$SPEEDING=[Enable],[ReportAction],[MinSpeed],[MaxSpeed],[Duration],[OutputID],[OutputControl]</p>	
Example	<p>(1) Set a speeding report with 100km/h or above for 30seconds then polling and set the output 3 to inactive state. \$ST+SPEEDING=0000,1,2,100,255,30,3,0 \$OK:SPEEDING</p> <p>(2) Set a speeding report with the vehicle stop more than 5 minutes then logging, and set the output 2 to active state. \$ST+SPEEDING=0000,1,1,0,5,300,2,1 \$OK:SPEEDING</p>	

\$ST+MILEAGE Calculate the total mileage	
Description	Execute this command to query the total mileage. Note: the unit is "Km"
Syntax	Write Command: \$ST+MILEAGE=[Password],[Mileage] Read Command: \$ST+MILEAGE=[Password], ?
Parameters	Password The password of the unit.
Reset	\$ST+MILEAGE=0000,0
Return Value	Write Command Response: \$OK:MILEAGE Read Command Response: \$MILEAGE= [Mileage]
Example	\$ST+MILEAGE=0000,? \$MILEAGE=3.6 \$ST+MILEAGE=0000,0 \$OK:MILEAGE

\$ST+IDLE Calculate the idle time.											
Description	Execute this command to accumulate the total Idle time in which the ACC is on but the GPS speed is a pre-defined interval for a certain time. The "Report ID 50" & the "Report ID 51" will be the used for this command: Report ID 50: The idle status ends. Report ID 51: The idle status starts. The time difference of the "Time of report ID 50" and the "time of the ID 51" is the time period of the IDLE event. The total idle time for a trip could be obtained by accumulating the total number of the Idle time period.										
Syntax	Write Command: \$ST+IDLE=[Password],[Enable],[Report Mode],[Idle Speed],[Duration] Read Command: \$ST+IDLE=[Password], ?										
Parameters	<table border="0"> <tr> <td style="padding-right: 20px;">Password</td> <td>The password of the unit.</td> </tr> <tr> <td>Enable</td> <td>0: Disable 1:Enable</td> </tr> <tr> <td>Report Mode</td> <td>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. 3:Logging and Polling: When all defined report conditions are true, the unit will do following: a. Log the most recent GPS position to non-volatile flash memory for future retrieval. b. Send the latest GPS position to the remote base station.</td> </tr> <tr> <td>Idle Speed</td> <td>Idle speed (0-65535 km/hr)</td> </tr> <tr> <td>Duration</td> <td>the duration of idle time (1-65535 min)</td> </tr> </table>	Password	The password of the unit.	Enable	0: Disable 1:Enable	Report Mode	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. 3:Logging and Polling: When all defined report conditions are true, the unit will do following: a. Log the most recent GPS position to non-volatile flash memory for future retrieval. b. Send the latest GPS position to the remote base station.	Idle Speed	Idle speed (0-65535 km/hr)	Duration	the duration of idle time (1-65535 min)
Password	The password of the unit.										
Enable	0: Disable 1:Enable										
Report Mode	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. 3:Logging and Polling: When all defined report conditions are true, the unit will do following: a. Log the most recent GPS position to non-volatile flash memory for future retrieval. b. Send the latest GPS position to the remote base station.										
Idle Speed	Idle speed (0-65535 km/hr)										
Duration	the duration of idle time (1-65535 min)										
Return Value	Write Command Response: \$OK:IDLE Read Command Response: \$ST+IDLE=[Enable],[Report Mode],[Idle Speed],[Duration]										
Example	\$ST+IDLE=0000,1,3,10,15 \$OK:IDLE \$ST+IDLE=0000,0 \$OK:IDLE										
Notes	<ol style="list-style-type: none"> The ACC off event will trigger the "Idle end" event (Report ID 50). Once the \$ST+IDLE command is enabled, the default input 2 triggered report (Report ID 12) will be invalid. If the ACC off report is needed, the ACC on/off report can be configured in the "User Defined Report". To operate the Idle command, the number of satellites requires more than 3 in order to function correctly. 										

\$ST+AREPORT Analog inputs report setting up		
Description	Execute this command to setup analog input 9 or analog input 10	
Syntax	<p>Write Command: \$ST+AREPORT=[Password],[AnalogInputID], [Mode], [ReportAction], [MinValue],[MaxValue],[Duration],[Output ID],[OutputCtrl]</p> <p>Read Command: \$ST+AREPORT=[Password],[AnalogInputID],?</p>	
Parameters	<p>Password</p> <p>AnalogInputID</p> <p>Mode</p> <p>ReportAction</p>	<p>The password of the unit.</p> <p>1: Input 9 (Report ID -> 200) 2: Input 10(Report ID ->201)</p> <p>0: Disable</p> <p>1: Input triggered condition: if the voltage level of the analog input is in the range between [MinValue] and [MaxValue] 2: Input triggered condition: if the voltage level of the analog input is not in the range between [MinValue] and [MaxValue]</p> <p>1: Logging: When all defined report conditions are true, log the most recent GPS position to non-volatile flash memory for future retrieval.</p> <p>2:Polling: When all defined report conditions are true, send the latest GPS position to the remote base station.</p> <p>3:Logging and Polling: When all defined report conditions are true, the unit will do following: a. Log the most recent GPS position to non-volatile flash memory for future retrieval. b. Send the latest GPS position to the remote base station.</p> <p>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.</p> <p>5: Logging +Set Output: When all defined conditions are true, log the most recent GPS position to non-volatile flash memory and 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.</p>

	<p>6. Polling + Set Output: When all defined conditions are true, send the latest GPS position to the remote base station 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.</p> <p>7. Logging + Polling + Set Output: When all defined conditions are true, log the most recent GPS position to non-volatile flash memory, send the most recent GPS position to the remote base station, and 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.</p> <p>MinValue The minimum voltage of the effective detecting range. Range: 0..30V</p> <p>MaxValue The maximum voltage of the effective detecting range. Range: 0..30V</p> <p>Duration This parameter defines the analog report that will be activated once the duration interval is reached. Range: 0~65535 Seconds.</p> <p>Output ID The unit hardware output number. Outputs are numbered 1 through 8.</p> <p>Note: The output8 is only for immobilizer used.</p> <p>OutputCtrl 0: Set output inactive. 1 :Set output active.</p> <p>Note: The output state will go back to original state when the triggered condition becomes false.</p>
Return Value	<p>Write Command response: \$OK:AREPORT</p> <p>Read Command Response: \$AREPORT=[AnalogInputID], [Mode], [ReportAction], [MinValue], [MaxValue], [Duration], [Output ID],[OutputCtrl]</p>
Example	<pre>\$ST+AREPORT=0000,1,1,7,10,15,5,1,1 \$OK:AREPORT \$ST+AREPORT=0000,1,? \$AREPORT=1,1,1,10.000,15.000,5,1,1</pre>
Notes	<p>(1) Output state (output ID) will remain the current state when \$ST+AREPORT is disabled after the output has been triggered already. The particular output port state needs to switch back to original state manually.</p>

4.5 Handset and MDT Commands

Command	Description
\$ST+HMSG	This command is used to send text messages to the other cellular phone.
\$ST+MMSG	This command is used to send MDT output messages to the base station.
\$ST+TMSG	This command is used to send messages from the base station to the MDT.
\$ST+CALL	This command is used to dial a voice call through the unit.
\$ST+KILL	This command is used to hang up current voice call.
\$ST+EXT	This command is used to dial extension number when voice call is established.
\$ST+ANSWER	This command is used to answer an incoming voice call
\$ST+HCTRL	This command is used to set handset or handsfree mode

\$ST+HMSG Send text SMS to cellular phone							
Description	Execute this command to send text messages to the other cellular phone.						
Syntax	\$ST+HMSG=[PhoneNumber],[Format],[Message]						
Parameters	<table border="0"> <tr> <td>PhoneNumber</td> <td>Destination phone number.</td> </tr> <tr> <td>Format</td> <td>1 : English(1 Byte) 2 : UCS2 (2 Bytes)</td> </tr> <tr> <td>Message</td> <td>The message string. (Hexadecimal ASCII/Binary code)</td> </tr> </table>	PhoneNumber	Destination phone number.	Format	1 : English(1 Byte) 2 : UCS2 (2 Bytes)	Message	The message string. (Hexadecimal ASCII/Binary code)
PhoneNumber	Destination phone number.						
Format	1 : English(1 Byte) 2 : UCS2 (2 Bytes)						
Message	The message string. (Hexadecimal ASCII/Binary code)						
Return Value	\$OK:HMSG						
Example	<p>(English format) Sending "Hello, Jack!" message to cellular phone 0910123456 \$ST+HMSG=0910123456,1,48656C6C6F2C204A61636B21</p> <p>(UCS2 format) Sending "中文 ABC" message to 0910123456 \$ST+HMSG=0910123456,2,4E2D6587004100420043</p> <p>Receive incoming text SMS \$HMSG=[SenderPhoneNumber],[Format],[Message]</p>						

\$ST+MMSG Send MDT message to the base station			
Description	Execute this command to send MDT output messages to the base station.		
Syntax	\$ST+MMSG=[Message]		
Parameters	<table border="0"> <tr> <td>Message</td> <td>The message string</td> </tr> </table>	Message	The message string
Message	The message string		
Return Value	\$OK:MMSG		
Example	\$ST+MMSG=Goods delivered		

\$ST+TMSG Send messages from the base station to the MDT

Description	Execute this command to send messages from the base station to the MDT.	
Syntax	\$ST+TMSG=[Password],[Message]	
Parameters	Password	The password of the unit.
	Message	The message string
Return Value	\$OK:TMSG	
Example	\$ST+TMSG=0000,Please go to No.100, 203th Ave NE, Bellevue, WA.	

\$ST+CALL Initiate a voice call (For handset device only)

Description	Execute this command to let driver use handset device to dial out a phone number.	
Syntax	\$ST+CALL=[Phone Number] (For handset device only)	
Parameters	Phone Number	The number to dial out.
Return Value	\$OK:CALL	
	\$OK:KILL (The message will show when the other side hang up the phone)	
Example	\$ST+CALL=0910138078	
	\$OK:CALL	
	\$OK:KILL (The message will show when the other side hang up the phone)	

\$ST+KILL Hang up voice call. (For handset device only)	
Description	Execute this command to let driver use handset device to hand up the incoming call.
Syntax	\$ST+KILL
Parameters	None
Return Value	\$OK:KILL
Example	\$ST+KILL \$OK:KILL

\$ST+EXT Dial extension number. (For handset device only)	
Description	Execute this command to let driver use handset device to dial out a number with a extension number.
Syntax	\$ST+EXT=[0..9*#]
Parameters	Acceptable character: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, *, #
Return Value	\$OK:EXT
Example	If you dial a 132 extension number, you need to execute the following command: \$ST+EXT=1 \$ST+EXT=3 \$ST+EXT=2 Please note this command only accepts 1 parameter. Therefore, in above example, you must execute this command three times.

\$ST+ANSWER Answer an incoming voice call. (For handset device only)	
Description	Execute this command to let driver use handset device to pickup the incoming voice call.
Syntax	\$ST+ANSWER
Parameters	None
Return Value	\$OK:ANSWER
Example	\$ST+ANSWER \$OK:ANSWER

\$ST+HCTRL Set handset or handsfree mode	
Description	Execute this command to set handset or handsfree mode
Syntax	\$ST+HCTRL=[Mode]
Parameters	Mode 1:Handset Mode 2:Handsfree Mode
Return Value	\$OK:HCTRL
Example	\$ST+HCTRL=2 \$OK:HCTRL

4.6 Unit Diagnostic Commands

Command	Description
\$ST+TEST	This command is used to start hardware diagnose.
\$ST+QUST	This command is used to query unit status.
\$ST+IMEI	This command is used to query the IMEI number of units.

\$ST+TEST Hardware diagnosis	
Description	Execute this command unit self-test which includes GPS, EEPROM, and Flash devices tests. This command is only available under "Direct Connection"
Syntax	\$ST+TEST
Parameters	None
Return Value	\$GPS=OK \$GSM=OK \$EEPROM=OK \$FLASH=OK \$SERIAL=OK \$BUTTON=OK \$BURNTEST=OK or \$BURNTEST=FAILED, 0
Example	\$ST+TEST \$GPS=OK \$GSM=OK \$EEPROM=OK \$FLASH=OK \$SERIAL=OK \$BUTTON=OK \$BURNTEST=OK
Notes	<p>(1) This command is only available under "Direct Connection" communication.</p> <p>(2) The "Burntest" only will be doing by S&T before delivering the shipment.</p> <p>(3) The return parameter of \$BURNTEST indicates whether the unit has passed 480 minutes continuous operating test before delivery. The meaning of the parameters is following:</p> <ul style="list-style-type: none"> - "OK" indicated the unit passes the test. - "FAILED" indicated the unit did not complete the continuous operating test, and the number following by the "FAILED" indicating the completed operating test time period (minutes). <p>(4) If the unit has passed the "Burntest" before delivery, the result will appears "BURNTEST=OK". The \$ST+RESET command or firmware upgrading will not change the result.</p>

\$ST+QUST Query Unit Status											
Description	Execute this command to query unit status include power source voltage level, GPS signal, communication signal strength and Input/Output states.										
Syntax	Read Command: \$ST+QUST=[Password]										
Parameters	<table border="0"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> </table>	Password	The password of the unit.								
Password	The password of the unit.										
Return Value	<p>\$QUST=[Voltage],[Modem Signal],[SatUsed],[Input Status],[Output Status]</p> <table border="0"> <tr> <td>Voltage</td> <td>Voltage level of vehicle battery</td> </tr> <tr> <td>ModemSignal</td> <td> The GSM signal quality. - < 5 means bad quality. - 6...31 means good quality. - 99 means unknown or not detectable. </td> </tr> <tr> <td>SatUsed</td> <td>Number of satellites received.</td> </tr> <tr> <td>InputStatus</td> <td>All digital Inputs states</td> </tr> <tr> <td>OutputStatus</td> <td>All digital Outputs states.</td> </tr> </table>	Voltage	Voltage level of vehicle battery	ModemSignal	The GSM signal quality. - < 5 means bad quality. - 6...31 means good quality. - 99 means unknown or not detectable.	SatUsed	Number of satellites received.	InputStatus	All digital Inputs states	OutputStatus	All digital Outputs states.
Voltage	Voltage level of vehicle battery										
ModemSignal	The GSM signal quality. - < 5 means bad quality. - 6...31 means good quality. - 99 means unknown or not detectable.										
SatUsed	Number of satellites received.										
InputStatus	All digital Inputs states										
OutputStatus	All digital Outputs states.										
Example	<pre>\$ST+QUST=0000 \$QUST=12.78,23,3,0,0</pre>										

\$ST+IMEI Hardware diagnosis			
Description	Execute this command to query the IMEI number of the unit.		
Syntax	\$ST+IMEI=[Password],?		
Parameters	<table border="0"> <tr> <td>Password</td> <td>The password of the unit.</td> </tr> </table>	Password	The password of the unit.
Password	The password of the unit.		
Return Value	\$IMEI=[IMEI number]		
Example	<pre>\$ST+IMEI=0000,? \$IMEI=350452410271448</pre>		

5 Appendices

5.1 Report ID Description

Report ID	Description	Remark
0	Position	
1	Log position	
2	Track / Tracking position	
3	Timer report position	
4	Mileage report position	For TA,BT,NS version firmware
5	Wrong password access report position	
6	ACC Off report position	N/A
7	Immobilized report position	N/A
8	Speeding report position	
9	Towed report position	For TA,BT,NS version firmware
11	Input1 changed report position	
12	Input2 changed report position	
13	Input3 changed report position	
14	Input4 changed report position	
15	Input5 changed report position	
16	Input6 changed report position	
17	Input7 changed report position	
18	Input8 changed report position	
21	RFID report position	
31	Communication switch to GSM mode report position	For \$ST+GGAS command
32	Communication switch to GPRS mode report position	For \$ST+GGAS command
40	Main power low report position	
41	Main power lose report position	
50	Idle start time	For \$ST+IDLE command
51	Idle end time	For \$ST+IDLE command
100..199	User defined report position	
200,201	Analog input report position	

5.2 STD Errors Description

Error Code	Description
0	Unknown error
1	Base phone number not set
2	Unacceptable Incoming message
3	Unsupported DCS format
4	Outgoing voice call limited
5	Voice call busy
6	Voice call not connected
7	No Incoming voice call
8	Unsupported Report action
9	GPRS configuration error
10	Base station network error or GPRS communication error
11	GPRS TCP resend failure or TCP package error
12	Fail to write parameters to flash memory

5.3 CME Errors Description

Error Code	Description
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
48	PH-SIM PUK required
100	Unknown
103	Illegal MS
106	Illegal ME
107	GPRS services not allowed
111	PLMN not allowed
112	Location area not allowed
113	Roaming not allowed in this location area
132	Service option not supported
133	Requested service option not subscribed
134	Service option temporarily out of order
148	Unspecified GPRS error
149	PDP authentication failure
150	Invalid mobile class
256	Operation temporary not allowed
257	Call barred
258	Phone is busy
259	User abort
260	Invalid dial string
262	SIM blocked

5.4 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
514	invalid status
515	invalid character in address string
516	invalid length
517	invalid character in pdu
518	invalid parameter
519	invalid length or character
520	invalid character in text
521	timer expired
522	Operation temporary not allowed

5.5 LED Indicators Function

PWR LED Status	Function
Off	Power off
90 ms On / 2 secs Off	The device is running in power saving mode.
500ms On / 500ms Off	Reset procedure is in progress
On	Power on

GPS LED Status	Function
Off	The GPS is off or running in power saving mode.
1 sec On / 1 sec Off	No GPS satellites signal received
On	GPS Ready

GSM LED Status	Function
Off	The device is off or running in power saving mode.
600 ms On / 600ms Off	No SIM card inserted or no PIN entered, or network searching in progress, or network logging in progress.
90 ms On / 3 secs Off	Logged to network. No call in progress.
90 ms blinking 2 times / 3secs Off	GPRS Network connected
On	Voice/Data call connected

ERR LED Status	Function
Off	The device is ready
On	- The device is not ready - If the other 3 LEDs (PWR, GPS, GSM) are off indicates that the main power source is lower than the working range.
Blinking	Please contact S&T technical support team.

5.6 About Systems & Technology Corporation

IntelliTrac X Series AVL device is produced by Systems & Technology Corporation. The company is a key developer and supplier of advanced systems in the Automatic Vehicle Location (AVL), Digital Map and Car Navigation Systems.

If you need information on other maps solutions or products, please contact us at the phone and fax numbers listed below, or visit our web sites.

Contact Information for System & Technology Corp.



S&T Web Site	http://www.systech.com.tw
Technical Support Hotline	886-2-26981599
Technical Support E-mail	AVL@ms.systech.com.tw
Main Phone	886-2-26981599
Main Fax	886-2-26981211