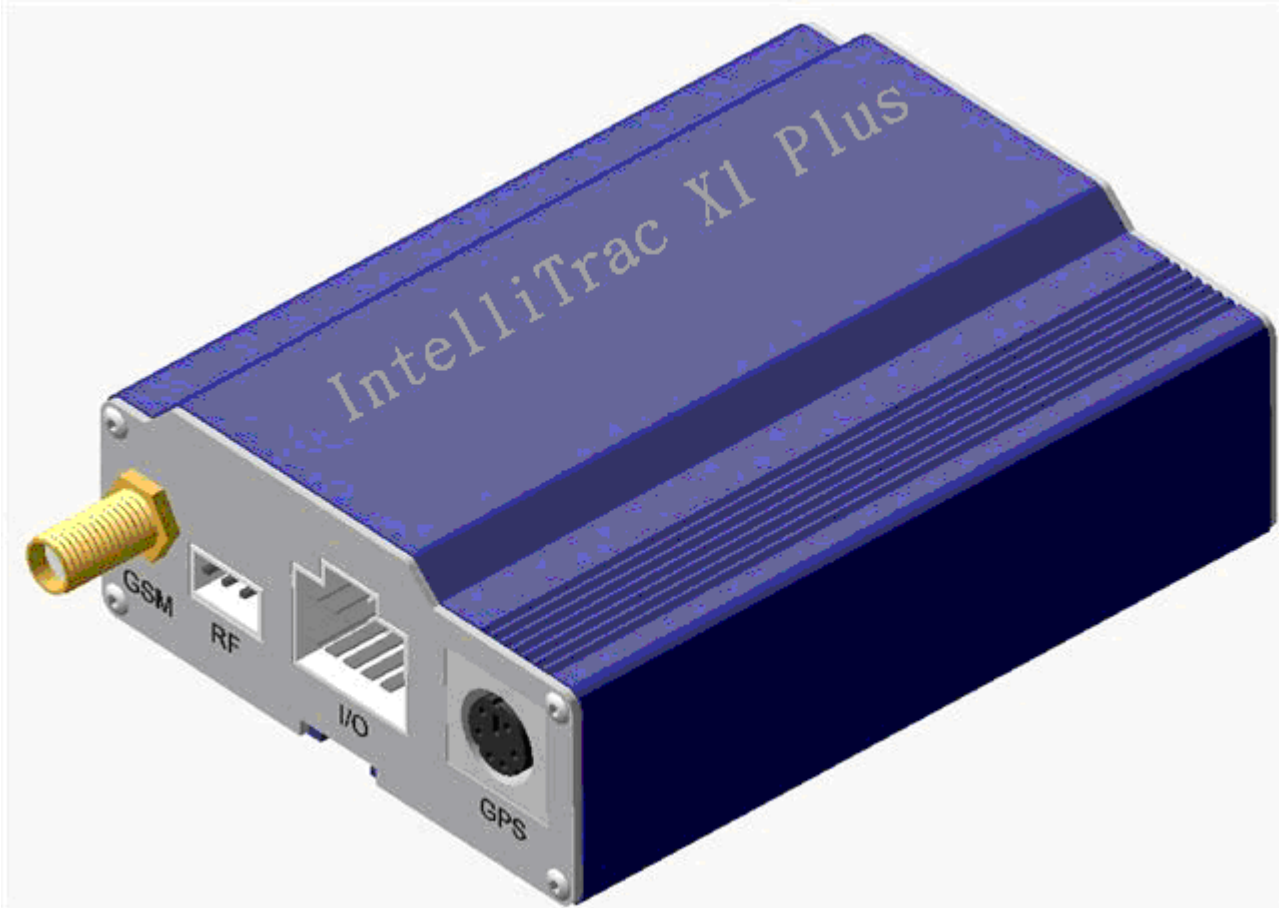# IntelliTrac X1 Plus



# Protocol Document

Version:    1.0.5
Date:       Dec. 11, 2008
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.

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# Table Of Contents

# 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 indicates 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

| Date | Version | What's new | Firmware Version required | Hardware Version required |
|------|---------|-----------|---------------------------|---------------------------|
| 2007.07.02 | 1.0.1 | New release | V1.106 | Rev.E |
| 2008.02.19 | 1.0.2 | Add "$ST+IDLE" Command | V1.116 or above | Rev.E |
| 2008.03.13 | 1.0.3 | Modify Tracking command typo | V1.116 or above | Rev.E |

# 3 Scope of the Document

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

**Related Documents**

IntelliTrac X1 Plus Hardware Installation Guide

**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.

Types of ST commands and responses :

Read command. This command returns the currently set value of the parameter or parameters

Test command $ST+XXXX=<…>,?<CR><LF>

Returns $XXXX=<…>,<…>,<…>, …<CR><LF>

Write command. This command sets user-definable parameter values.

Test command $ST+XXX=<…>,?<CR><LF>

Returns $OK:XXXX<CR><LF>

Default parameters are underlined throughout this document.

**Entering Successive ST Commands on Separate Lines**

When you enter a series of ST commands on separate lines, leave a pause between the preceding and the following command until the final response (for example $OK:XXXX ) appears. This avoids sending too many ST commands at a time without waiting for a response for each.

## 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
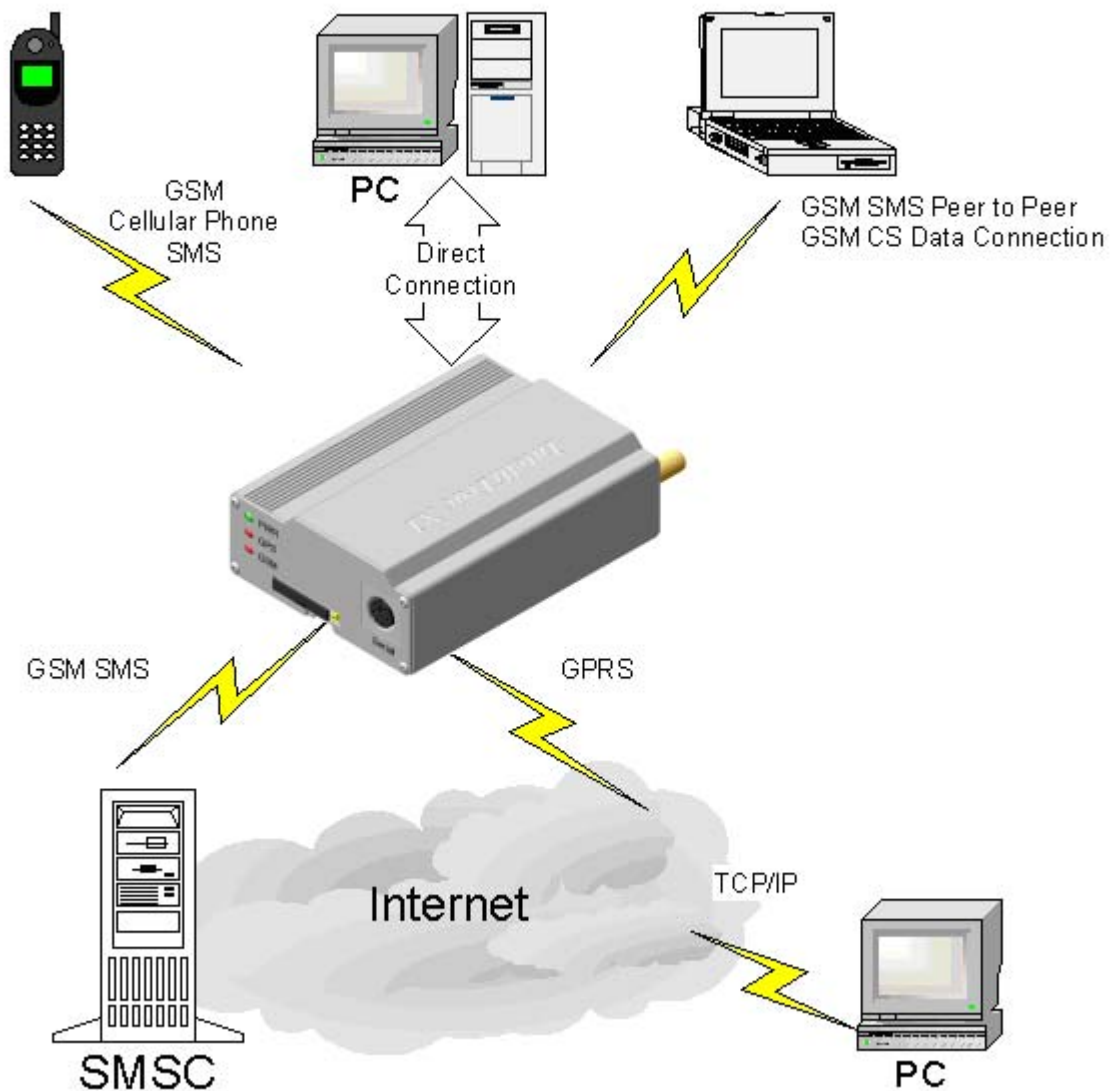


For more detail GSM CS Data, SMS, TCP/IP information, please refer to GSM related documents.

# 4 ST Commands

| Command | Description |
| --- | --- |
| **$ST+UNPM** | Set/Read unit parameters |
| **$ST+COMM** | Set/Read unit communication parameters |
| **$ST+GETPOSITION** | Get current vehicle location |
| **$ST+TRACKING** | Tracking the unit continuously |
| **$ST+STOPTRACKING** | Stop tracking the unit |
| **$ST+STARTLOG** | Set/Read default logging parameters |
| **$ST+STOPLOG** | Stop default logging function |
| **$ST+CLEARLOG** | Clear all default logging data |
| **$ST+GETLOG** | Download logging data from the unit. |
| **$ST+GETLOGSEL** | Selective download logging data from the unit. |
| **$ST+CANCELLOG** | Stop download logging data from the unit. |
| **$ST+BBCTRL** | Set/Read backup battery parameters |
| **$ST+OUTS** | Set outputs state |
| **$ST+REBOOT** | Reboot the unit |
| **$ST+RESET** | Reset all parameters to the manufactory default |
| **$ST+RMSK** | Set/Read default report mask |
| **$ST+REPORT** | Set/Read user defined report |
| **$ST+CLRP** | Clear the user defined reports |
| **$ST+PMGR** | Set/Read power management parameters |
| **$ST+IMEI** | Read GSM IMEI number |
| **$ST+VMON** | Voice wiretap / monitoring |
| **$ST+TOW** | Set/Read vehicle towed parameters |
| **$ST+MILE** | Set/Read mileage accumulator function |
| **$ST+TEST** | Unit hardware diagnostic |
| **$ST+VERSION** | This command is used to get the revised firmware version. |
| **$ST+BAUD** | Set/Read baud rate of serial port |
| **$ST+NMEA** | Enable/Disable GPS NMEA string output |
| **$ST+SPEED** | Set the speeding report |
| **$ST+MMSG** | Send MDT messages to the base station |
| **$ST+TMSG** | Send messages from the base station to the MDT |
| **$ST+SMID** | Query ID of sim card |
| **$ST+QUST** | Query GPRS connection state |
| **$ST+HALT** | Enable/Disable report ID message polling |
| **$ST+TIMER** | Set the timer report |
| **$ST+GLAC** | Get the location area code |
| **$ST+CONT** | Counter record |
| **$ST+IDLE** | Calculate the idle time |
| **$ST+IDCHECK** | RFID + Immobilizer functions |
| **$ST+VOICE** | Set voice call parameters of the unit |
| **$ST+GPRSPACKET** | Send many tracking messages at one time |
| **$ST+SMSTRACK** | Auto-switch between GPRS and SMS |

| $ST+UNPM | Set/Read unit parameters |
|---|---|
| **Description** | Execute this command to set or query unit parameters. |
| **Syntax** | **Write** Command:<br>$ST+UNPM+[Tag] = [Password], [ UnitID], [NewPassword], [PINCODE], [Input1Delay], [Input2Delay],[Input3Delay],[Input4Delay],[DisableGPRSRoaming], **[TrackingOnHeadingChanged]**<br><br>**Read** Command:<br>$ST+UNPM+[Tag]=[Password],? |
| **Parameters** | Tag |

| | | |
|---|---|---|
| **Parameters** | Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
| | Password | The password of the unit. The default password is 0000 |
| | UnitID | The identification number of the unit. The default unit ID is 1010000001. |
| | NewPassword | The new password of the unit. (Max. 4 characters) |
| | PINCODE | The PIN code of the GSM/GPRS SIM card. (Max. 4 digits) |
| | Input1Delay | The de-bounce delay for positive Input 1. Default is 7 (700ms).<br>Max. 255 (25500ms). |
| | Input2Delay | The de-bounce delay for positive Input 2. Default is 7 (700ms).<br>Max. 255 (25500ms). |
| | Input3Delay | The de-bounce delay for negative Input 3. Default is 7 (700ms).<br>Max. 255 (25500ms). |
| | Input4Delay | The de-bounce delay for negative Input 4. Default is 7 (700ms).<br>Max. 255 (25500ms). |
| | Disconnect GPRS Roaming | 0: Default<br>1: When X1 Plus enters roaming status and GPRS is online, it will cut GPRS connection automatically. |
| | **TrackingOnHeadingChanged** | **The angle value for activating heading reports; Integer value. Min. Value: 5°, Max. Value: 359°** |

| Return Value | **Write** Command:<br>$OK:UNPM+[Tag]<br><br>**Read** Command:<br>$QR:UNPM+[Tag]=[UnitID],[NewPassword],[PINCODE],[Input1Delay],[Input2Delay],<br>[Input3Delay],[Input4Delay] ,[DisconnectGPRSRoaming], **[TrackingOnHeadingChanged]**<br><br>**Error** Response:<br>$ER:UNPM+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
|---|---|
| Example | $ST+UNPM=0000,1010000002,0000,,7,7,7,7,0,**20**<br>$OK:UNPM |
| Note | (1) If the Pin-Code does not enabled in the SIM card, the value in the Pin-Code column will not take effect.<br>(2) **The parameter of [TrackingOnHeadingChanged] is related to command of "$ST+TRACKING"; It can not work along without setting interval value of "Time" or "Distance" of Tracking command. Please refer to $ST+TRACKING**<br>**For example:**<br>$ST+UNPM=0000,1010000002,0000,,7,7,7,7,0,**100**<br> $OK:UNPM<br><br> $ST+TRACKING=0000,1,15,0,5,0,3<br> $OK:TRACKING<br> 1.-->1010000002,20030217144230,121.646102,25.061398,15,345,0,7,2,0,0<br> 2.-->1010000002,20030217144245,121.646102,25.061398,25,307,0,6,2,0,0<br> 3.-->1010000002,20030217144300,121.646102,25.061398,27,258,0,7,2,0,0<br> **4.-->1010000002,20030217144312,121.646102,25.061398,25,124,0,7,2,0,0**<br> 5.-->1010000002,20030217144315,121.646102,25.061398,32,188,0,8,2,0,0<br><br>**If there is no angle changing more than pre-set value within a duration of interval of $ST+TRACKING command, there is only normal tracking polling process; as message of 1,2,3 and 5**<br><br>**If there is an angle changing more than pre-set value within a duration of interval of $ST+TRACKING command, there is a real-time polling message back to server, as message of 4** |

| $ST+COMM | Set/Read unit communication parameters |
|---|---|
| **Description** | Execute this command to set or query unit communication parameters. |
| **Syntax** | **Write** Command:<br>$ST+COMM+[Tag]=[Password],[CommType],[SMSBaseNumber],[CSDBaseNumber], [GPRS_APN],[GPRS_Username],[GPRS_Password],[GPRS_IPType], [GPRS_HostAddress],[GPRS_HostPort],[GPRS_SyncInterval],[GPRS_DNS]<br><br>**Read** Command:<br>$ST+COMM+[Tag]=[Password],? |
| **Parameters** | |

| Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
|---|---|
| Password | The password of the unit. The default password is 0000 |
| CommType | Set the primary communication type.<br>0: Serial (Direct connect mode)<br>1: *Reserved for CSD (Circuit Switched Data) communication*<br>2: SMS communication<br>3: GPRS communication |
| SMSBaseNumber | SMS base phone number (Max. 16 digits) |
| CSDBaseNumber | CSD base phone number (Max. 16 digits) |
| GPRS_APN | GPRS Access Point Name. (Max. 35 characters) |
| GPRS_Username | GPRS login user name (Max. 15 characters) |
| GPRS_Password | GPRS login password (Max. 15 characters) |
| GPRS_IPType | GPRS package format<br>0: UDP<br>1:TCP |
| GPRS_HostAddress | The base station static WAN IP/DNS address.<br>(Max. 30 characters) |
| GPRS_HostPort | The base station application port number of the UDP/TCP<br>(Please note that do not conflict with Well Known Ports) |
| GPRS_SyncInterval | Synchronization message sending interval in seconds.<br>(10 ~ 65535 seconds)<br>0: Only one sync message be transmitted when the unit connected to the server. |
| GPRS_DNS | DNS IP address. |

| Return Value | **Write** Command:<br>$OK:COMM+[Tag]<br><br>**Read** Command:<br>$QR:COMM+[Tag]=[CommType],[SMSBaseNumber],[CSDBaseNumber],<br>[GPRS_APN],[GPRS_Username],[GPRS_Password],[GPRS_IPType],<br>[GPRS_HostAddress],[GPRS_HostPort],[GPRS_SyncInterval],[GPRS_DNS]<br><br>**Error** Response:<br>$ER:COMM+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
|---|---|
| **Example** | GPRS TCP with static WAN IP address<br>$ST+COMM=0000,3,,,Internet,,,1,60.243.21.20,6080,0.0.0.0<br>$OK:COMM<br><br>GPRS TCP with dynamic domain name service<br>$ST+COMM=0000,3,,,Internet,,,1,myserver.dns.com,6080,168.95.1.1<br>$OK:COMM |

| Notes: | (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. |
| --- | --- |
| | (2) Synchronization message format<br><br>typedef struct<br>{<br>  WORD     SyncHeader;<br>  WORD     SyncID;<br>  DWORD   UnitID;<br>} SyncStruct;<br><br>SyncHeader is always 0xf8fa<br>SyncID is a message sequence number<br>UnitID is the unit identification number<br><br>For example, received message is<br><br><u>0xFA 0xF8 0x1B 0x01 0x81 0x60 0x33 0x3C</u><br><br>SyncHeader = 0xF8 0xFA<br>SyncID = 0x01 0x1B (Decimal = 283)<br>UnitID = 0x3C 0x33 0x60 0x81 (Decimal = 1010000001) |
| | (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+COMM command is sent remotely. |

| $ST+GETPOSITION | Get current vehicle location |
|---|---|
| **Description** | Execute this command to ask the unit to report back current GPS positional information to the base station. |
| **Syntax** | **Write** Command:<br>$ST+GETPOSITION+[Tag]=[Password] |

| **Parameters** | Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
|---|---|---|
| | Password | The password of the unit. The default password is 0000 |

| **Return Value** | **Write** Command:<br>*Command without Tag :*<br>Unit ID, DateTime, Longitude, Latitude, Speed, Heading, Altitude, Satellite, Report ID, Inputs, Outputs<br><br>*Command with Tag :*<br>$RP:Tag,Unit ID, DateTime, Longitude, Latitude, Speed, Heading, Altitude, Satellite, Report ID, Inputs, Outputs<br><br><br>Unit ID: The ID of the unit.<br>DateTime: YYYYMMDDhhmmss (GMT Date and Time)<br>Longitude: WGS-84 Longitude/Latitude coordinate system<br>Latitude: WGS-84 Longitude/Latitude coordinate system<br>Speed: 0~65535 km/h<br>Heading: 0~360 degrees<br>Altitude: Always 0<br>Satellite: 0~12<br>Report ID:xxx (*Please refer to appendix for detailed description*)<br>Inputs: Bitwise operation<br>For example: When Inputs=11(decimal) =0x0b(hexadecimal) =00001011(binary), then<br>      Input1 = ON<br>      Input2 = ON<br>      Input3 = OFF<br>      Input4 = ON<br><br>Outputs: Bitwise operation<br>For example: When Outputs=15(decimal) =0x0f(hexadecimal) =00001111(binary), then<br>      Output1 = ON<br>      Output2 = ON<br>      Output3 = ON<br>      Output4 = ON |
|---|---|

| Example | *Command without Tag :*<br>$ST+GETPOSITION=0000<br>1010000002,20030217132813,121.646060,25.061725,20,157,0,7,0,11,15<br><br>*Command with Tag :*<br>$ST+GETPOSITION+12345=0000<br>$RP:12345,1010000002,20030217132813,121.646060,25.061725,20,157,0,7,0,11,15<br><br>Unit ID = 1010000002          Altitude = 0 meters<br>Year = 2003                 Satellites = 7<br>Month = 02                 Report ID = 0<br>Day = 17                   Input1 = ON<br>Hour = 13                  Input2 = ON<br>Minute = 28               Input3 = OFF<br>Second = 13               Input4 = ON<br>Longitude = 121.646060   Output1 = ON<br>Latitude = 25.061725      Output2 = ON<br>Speed = 20 km/h         Output3 = ON<br>Heading = 157 degrees    Output4 = ON |
|---|---|

| $ST+TRACKING | Tracking the unit continuously |
|---|---|
| Description | Execute this command to ask the unit to report back current GPS positional information to the control center according to the tracking mode parameter. |
| Syntax | **Write** Command:<br>$ST+TRACKING+[Tag]=[Password],[Mode],[Time],[Distance],[Times],[Basis], [CommType]<br><br>**Read** Command:<br>$ST+TRACKING +[Tag]=[Password],? |
| Parameters | Tag      This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password      The password of the unit. The default password is 0000<br><br>Mode      **1:Time mode**<br>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.<br>**2:Distance mode**<br>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.<br>**3:IntelliTrac mode**<br>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.<br>**5: Time + ACC ON mode**<br>If ACC is off, the tracking function will be stopped.<br>**6: Distance + ACC ON mode**<br>If ACC is off, the tracking function will be stopped.<br>**7: IntelliTrac + ACC ON mode**<br>If ACC is off, the tracking function will be stopped.<br><br>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, CSD/GPRS mode is 5 seconds, and Direct Connection is 1 second.<br><br>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, CSD/GPRS mode is 100 meters, and Direct Connection is 15 meters.<br><br>Times      Specify total tracking times. The range is from 0 to 65535. If Times=0, it means forever tracking.<br><br>Basis      0: Ignore no GPS signal tracking report.<br>1: Continuously tracking regardless of GPS signal.<br><br>CommType      0: Serial Port<br>1: CS Data<br>2: SMS<br>3: GPRS |

| Return Value | **Write** Command:<br>$OK:TRACKING +[Tag]<br><br>**Read** Command:<br>$QR:TRACKING+[Tag]= [Password],[Mode],[Time],[Distance],[Times],[Basis],<br>[CommType]<br><br>**Error** Response:<br>$ER:TRACKING+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
|---|---|
| Example | Tracking through serial port<br><br>$ST+TRACKING=0000,1,15,0,5,0,0<br>$OK:TRACKING<br>1010000002,20030217144230,121.646102,25.061398,0,0,0,7,2,0,0<br>1010000002,20030217144245,121.646102,25.061398,0,0,0,6,2,0,0<br>1010000002,20030217144300,121.646102,25.061398,0,0,0,7,2,0,0<br>1010000002,20030217144315,121.646102,25.061398,0,0,0,8,2,0,0<br>1010000002,20030217144330,121.646102,25.061398,0,0,0,7,2,0,0<br><br>Tracking through GPRS<br><br>$ST+TRACKING=0000,1,15,0,5,0,3<br>$OK:TRACKING<br>1010000002,20030217144230,121.646102,25.061398,0,0,0,7,2,0,0<br>1010000002,20030217144245,121.646102,25.061398,0,0,0,6,2,0,0<br>1010000002,20030217144300,121.646102,25.061398,0,0,0,7,2,0,0<br>1010000002,20030217144315,121.646102,25.061398,0,0,0,8,2,0,0<br>1010000002,20030217144330,121.646102,25.061398,0,0,0,7,2,0,0<br><br>Command with Tag :<br><br>$ST+TRACKING+12345=0000,1,15,0,5,0,3<br>$OK:TRACKING+12345<br>$RP:12345,1010000002,20030217144230,121.646102,25.061398,0,0,0,7,2,0,0<br>$RP:12345,1010000002,20030217144245,121.646102,25.061398,0,0,0,6,2,0,0<br>$RP:12345,1010000002,20030217144300,121.646102,25.061398,0,0,0,7,2,0,0<br>$RP:12345,1010000002,20030217144315,121.646102,25.061398,0,0,0,8,2,0,0<br>$RP:12345,1010000002,20030217144330,121.646102,25.061398,0,0,0,7,2,0,0 |
| Notes | 1. If the "CommType" sets to "GSM SMS" or "GSM CS DATA", the "SMSBaseNumber" or "CSDBaseNumber" must be entered respectively before using this function.<br>2. If the GPS antenna is disconnected from the X1 Plus, the Tracking function will not work until the GPS antenna is re-connected to the X1 Plus. |

| $ST+STOPTRACKING | Stop tracking the unit | |
|---|---|---|
| Description | Execute this command to ask the unit stop reporting tracking positions to the base station. | |
| Syntax | **Write** Command:<br>$ST+STOPTRACKING+[Tag]=[Password] | |
| Parameters | Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
| | Password | The password of the unit. The default password is 0000 |
| Return Value | **Write** Command:<br>$OK:STOPTRACKING+[Tag]<br><br>**Error** Response:<br>$ER:STOPTRACKING+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* | |
| Example | $ST+STOPTRACKING=0000<br>$OK:STOPTRACKING | |

| **$ST+STARTLOG** | Set/Read default logging parameters |
|---|---|
| **Description** | Execute this command to start recording current GPS positional information to the non-volatile memory of the unit according to the logging mode parameter. |
| **Syntax** | **Write** Command:<br>$ST+STARTLOG+[Tag]=[Password],[Mode],[Time],[Distance],[Times],[Basis]<br><br>**Read** Command:<br>$ST+STARTLOG +[Tag]=[Password],? |
| **Parameters** | Tag — This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password — The password of the unit. The default password is 0000<br><br>Mode<br>**1: Time mode**<br>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 Min 1 seconds; Max. 65535 seconds.<br><br>**2: Distance mode**<br>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. Max. 15 meters; Max. 65535 meters.<br><br>**3: IntelliTrac mode**<br>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.<br><br>**5: Time + ACC ON mode**<br>If ACC is off, the logging function will be stopped.<br><br>**6: Distance + ACC ON mode**<br>If ACC is off, the logging function will be stopped.<br><br>**7: IntelliTrac + ACC ON mode**<br>If ACC is off, the logging function will be stopped.<br><br>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.<br><br>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.<br><br>Times — Specify total Logging times. The range is from 0 to 65535. If Times=0, it means forever logging. |

| | Basis | 0: Ignore no GPS signal logging report. <br> 1: Continuously logging regardless of GPS signal. |
|---|---|---|
| **Return Value** | **Write** Command: <br> $OK:STARTLOG+[Tag] <br><br> **Read** Command: <br> $QR:STARTLOG+[Tag]= [Mode],[Time],[Distance],[Times],[Basis] <br><br> **Error** Response: <br> $ER:STARTLOG+[Tag]=[ErrorCode] <br> *Please refer to appendix for detailed error code descriptions.* | |
| **Example** | $ST+STARTLOG=0000,1,5,0,0,0 <br> $OK:STARTLOG | |

| **$ST+STOPLOG** | Stop default logging function | |
|---|---|---|
| Description | Execute this command to stop default logging. | |
| Syntax | **Write** Command:<br>$ST+STOPLOG+[Tag]=[Password] | |
| Parameters | Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
| | Password | The password of the unit. The default password is 0000 |
| Return Value | **Write** Command:<br>$OK:STOPLOG+[Tag]<br><br>**Error** Response:<br>$ER:STOPLOG+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* | |
| Example | $ST+STOPLOG=0000<br>$OK:STOPLOG | |


| **$ST+CLEARLOG** | Clear all default logging data | |
|---|---|---|
| Description | Execute this command to clear all default logging data. | |
| Syntax | **Write** Command:<br>$ST+CLEARLOG+[Tag]=[Password] | |
| Parameters | Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
| | Password | The password of the unit. The default password is 0000 |
| Return Value | **Write** Command:<br>$OK:CLEARLOG+[Tag]<br><br>**Error** Response:<br>$ER:CLEARLOG+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* | |
| Example | $ST+CLEARLOG=0000<br>$OK:CLEARLOG | |

| $ST+GETLOG | Download logging data from the unit. |
|---|---|
| **Description** | Execute this command to download all logging data from the unit. |
| **Syntax** | **Write** Command:<br>$ST+GETLOG+[Tag]=[Password] |
| **Parameters** | Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
| | Password | The password of the unit. The default password is 0000 |
| **Return Value** | **Write** Command:<br>$OK:GETLOG+[Tag]<br>Unit ID , Datetime, Longitude, Latitude, Speed, Heading, Altitude, Satellite, Report ID, Inputs, Outputs<br><br>$MSG:Download Completed<br><br>**Error** Response:<br>$ER:GETLOG+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| **Example** | $ST+GETLOG=0000<br>$OK:GETLOG<br>1010000001, 20030105092129, 121.651598, 25.052325, 0, 0, 33, 0, 1, 0, 0<br>1010000001, 20030105092130, 121.651598, 25.052325, 0, 0, 33, 0, 1, 0, 0<br>1010000001, 20030105092131, 121.651598, 25.052325, 0, 0, 33, 0, 1, 0, 0<br>1010000001, 20030105092132, 121.651598, 25.052325, 0, 0, 33, 0, 1, 0, 0<br>1010000001, 20030105092133, 121.651598, 25.052325, 0, 0, 33, 0, 1, 0, 0<br>1010000001, 20030105092134, 121.651598, 25.052325, 0, 0, 33, 0, 1, 0, 0<br>$MSG:Download Completed |
| **Notes** | 1. The report triggering would interrupt the process of remotely download logs and the unit would send a "$ER:STD 8" back to the server.<br>2. The $ST+GETLOG command does not support "resuming broken downloads" function. |

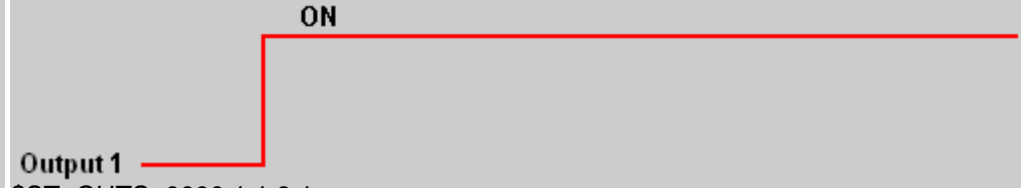| **$ST+GETLOGSEL** | Selective download logging data from the unit. | |
|---|---|---|
| **Description** | Execute this command to download all logging data from the unit. | |
| **Syntax** | **Write** Command:<br>$ST+GETLOGSEL+[Tag]=[Password],[StartDateTime],[EndDateTime] | |
| **Parameters** | Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
| | Password | The password of the unit. The default password is 0000 |
| | StartDateTime | The year, month, day, hour, minute and second of the starting date time in GMT. |
| | EndDateTime | The year, month, day, hour, minute and second of the ending date time in GMT. |
| **Return Value** | **Write** Command:<br>$OK:GETLOGSEL+[Tag]<br>Unit ID , Datetime, Longitude, Latitude, Speed, Heading, Altitude, Satellite, Report ID, Inputs, Outputs<br><br>$MSG:Download Completed<br><br>**Error** Response:<br>$ER:GETLOGSEL+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* | |
| **Example** | $ST+GETLOGSEL=0000,20030112103050,20030115142015<br>$OK:GETLOGSEL<br>1010000001, 20030112103050, 121.651598, 25.052325, 0, 0, 33, 0, 1, 0, 0<br>1010000001, 20030112103051, 121.651598, 25.052325, 0, 0, 33, 0, 1, 0, 0<br>1010000001, 20030112103052, 121.651598, 25.052325, 0, 0, 33, 0, 1, 0, 0<br>………………………………………………………………………………..<br>………………………………………………………………………………..<br>………………………………………………………………………………..<br>1010000001, 20030115142013, 121.651598, 25.052325, 0, 0, 33, 0, 1, 0, 0<br>1010000001, 20030115142014, 121.651598, 25.052325, 0, 0, 33, 0, 1, 0, 0<br>1010000001, 20030115142015, 121.651598, 25.052325, 0, 0, 33, 0, 1, 0, 0<br>$MSG:Download Completed | |

| **$ST+CANCELLOG** Stop download logging data from the unit. | |
|---|---|
| **Description** | Execute this command to stop download all logging data from the unit. |
| **Syntax** | **Write** Command:<br>$ST+CANCELLOG+[Tag]=[Password] |
| **Parameters** | Tag      This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password      The password of the unit. The default password is 0000 |
| **Return Value** | **Write** Command:<br>$OK:CANCELLOG+[Tag]<br><br>**Error** Response:<br>$ER:CANCELLOG+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| **Example** | $ST+CANCELLOG=0000<br>$OK:CANCELLOG |

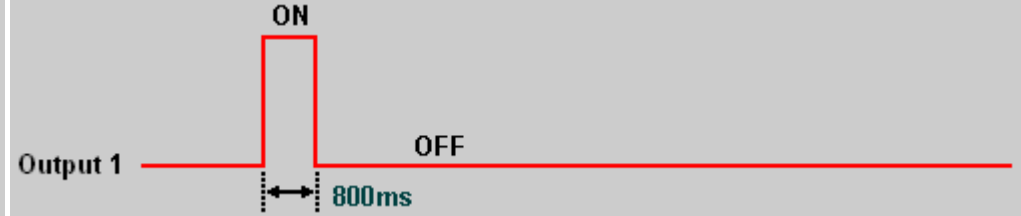| $ST+BBCTRL | Set/Read backup battery parameters |
|---|---|
| **Description** | Execute this command to set or query backup battery status. When backup battery voltage is lower than 3.7V, a backup battery low report will be sent to the base station. When backup battery voltage is lower than 3.4V, the unit will be shut down automatically to avoid battery over discharge. |
| **Syntax** | **Write** Command:<br>$ST+BBCTRL+[Tag]=[Password],[Enable]<br><br>**Read** Command:<br>$ST+BBCTRL+[Tag]=[Password],? |
| **Parameters** | Tag — This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password — The password of the unit. The default password is 0000<br><br>Enable — 0: Turn off backup battery<br>1: Turn on backup battery |
| **Return Value** | **Write** Command:<br>$OK:BBCTRL+[Tag]<br><br>**Read** Command:<br>$QR:BBCTRL+[Tag]=[Enable]<br><br>**Error** Response:<br>$ER:BBCTRL+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| **Example** | $ST+BBCTRL=0000,1<br>$OK:BBCTRL |

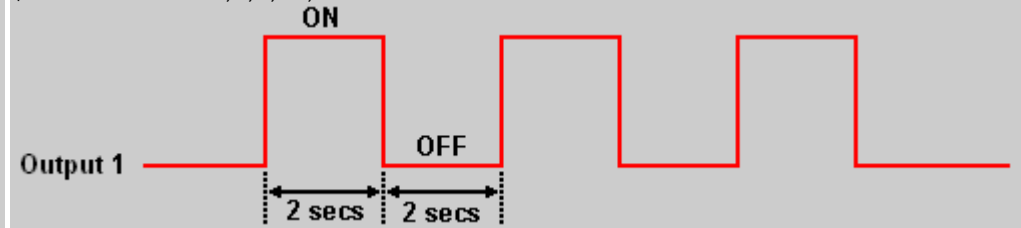| $ST+OUTS | Set outputs state |
|---|---|
| **Description** | Execute this command to set outputs state. |
| **Syntax** | **Write** Command:<br>$ST+OUTS+[Tag]=[Password],[OutputID],[OutputControl],[Duration],[ToggleTimes] |
| **Parameters** | Tag — This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
| | Password — The password of the unit. The default password is 0000 |
| | OutputID — The unit hardware output number. Outputs are numbered 1 though 4. |
| | OutputControl — 0: Set output inactive<br>1: Set output active |
| | Duration — Unit of duration is 100 milliseconds. Ex: if want to setup duration for 2 seconds, you have to give a 20 value. (Min. 1= 0.1 second; Max. 255 = 25.5 seconds) |
| | ToggleTimes — The times from its current state to its alternate state and back again. Min. 1 times; Max. 255 times |
| **Return Value** | **Write** Command:<br>$OK:OUTS+[Tag]<br><br>**Error** Response:<br>$ER:OUTS+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| **Note** | 1. "Duration" and "Toggle time" must be used at the same time. Otherwise, both of them must be '0'. |

| Example | $ST+OUTS=0000,1,1,0,0 |
|---------|----------------------|
| |  |
| | $ST+OUTS=0000,1,1,8,1 |
| |  |
| | $ST+OUTS=0000,1,1,20,3 |
| |  |

| $ST+REBOOT | Reboot the unit |
|---|---|
| **Description** | Execute this command to reboot the unit |
| **Syntax** | **Write** Command:<br>$ST+REBOOT+[Tag]=[Password] |

| **Parameters** | Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
|---|---|---|
| | Password | The password of the unit. The default password is 0000 |

| **Return Value** | **Write** Command:<br>$OK:REBOOT+[Tag]<br><br>**Error** Response:<br>$ER:REBOOT+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
|---|---|
| **Example** | $ST+REBOOT=0000<br>$OK:REBOOT |

| $ST+RESET | Reset all parameters to the manufactory default |
|---|---|
| **Description** | Execute this command to reset the unit. After resetting the unit, the previous upload parameters will be cleared. Include phone numbers, user reports and logging data…etc. |
| **Syntax** | **Write** Command:<br>$ST+RESET+[Tag]=[Password],[Band] |

| **Parameters** | Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
|---|---|---|
| | Password | The following two numbers would be accepted by the unit:<br>1. The unit password, which is setup in the "$ST+UNPM" command.<br>2. The last 4 digit numbers of the IMEI NO. |
| | Band | Reset the unit to the specific mobile frequency band<br><u>0</u>: EGSM/DCS (900/1800MHz)<br>1: EGSM/PCS (900/1900MHz) |

| **Return Value** | **Write** Command:<br>$OK:RESET+[Tag]<br><br>**Error** Response:<br>$ER:RESET+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
|---|---|

| **Example** | $ST+RESET=0630<br>$OK:RESET<br><br>$ST+RESET=0000<br>$OK:RESET<br><br>Reset the unit to 900/1900MHz band<br>$ST+RESET=0000,1<br>$OK:RESET |
|---|---|

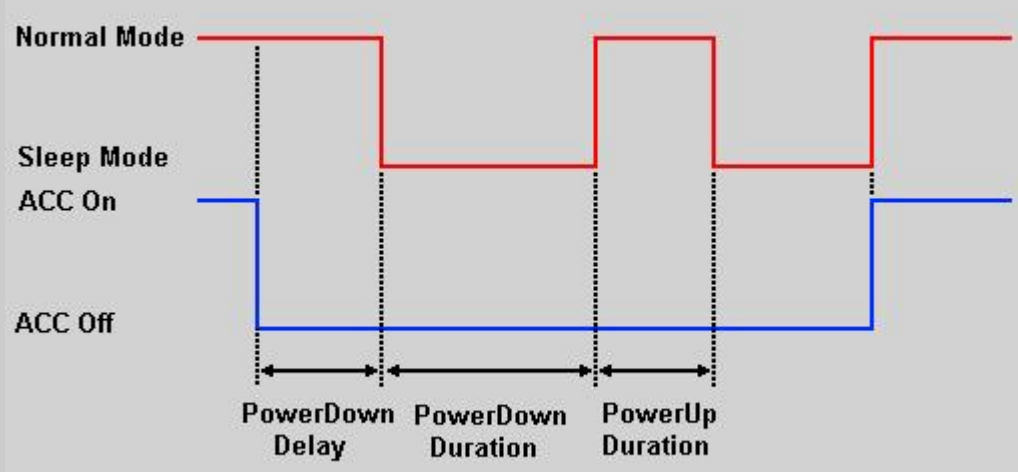| $ST+RMSK | Set/Read default report mask |
|---|---|
| Description | Execute this command to set or query default report mask. |
| Syntax | **Write** Command:<br>$ST+RMSK+[Tag]=[Password],[Report Polling Mask],[Report Logging Mask]<br>**Read** Command:<br>$ST+RMSK+[Tag]=[Password],? |
| Parameters | Tag      This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password      The password of the unit. The default password is 0000<br>Report Polling Mask      Specify which default report will be used for real time reporting. Default is all reports will be used. (Report Polling Mask=255)<br><br>Bitwise operation (0: Off, 1: On)<br>Bit0: Input1 state changed report<br>Bit1: Input2 state changed report<br>Bit2: Input3 state changed report<br>Bit3: Input4 state changed report<br>Bit4: Main power low report<br>Bit5: Main power destroyed report<br>Bit6: Backup battery low report<br>Bit7: GPS destroyed report<br><br>Report Logging Mask      Specify which default report will be used for logging report. Default is all reports will be used. (Report Logging Mask=255)<br><br>Bitwise operation (0: Off, 1: On)<br>Bit0: Input1 state changed report<br>Bit1: Input2 state changed report<br>Bit2: Input3 state changed report<br>Bit3: Input4 state changed report<br>Bit4: Main power low report<br>Bit5: Main power destroyed report<br>Bit6: Backup battery low report<br>Bit7: GPS destroyed report |
| Return Value | **Write** Command:<br>$OK:RMSK+[Tag]<br><br>**Read** Command:<br>$QR:RMSK+[Tag]= [Report Polling Mask],[Report Logging Mask]<br>**Error** Response:<br>$ER:RMSK+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| Example | Turn off Input1~Input4 state changed reports for real time reports and logging.<br><br>$ST+RMSK=0000,240,240<br>$OK:RMSK |
| Note | (1) The "GPS destroyed report" can not be used when the GPS state set to '0'. |

| $ST+REPORT | Set/Read user defined report |
|---|---|
| **Description** | Execute this command to set or query user defined report parameters. |
| **Syntax** | **Write** Command:<br>$ST+REPORT+[Tag]=[Password],[ReportID],[Enable],[InputMask],[InputControl],[Longitude],[Latitude],[ZoneTolerence],[ZoneControl],[ReportAction],[OutputID],[OutputControl] ,[**OutputDuration**],[**ToggleTimes**]<br><br>**Read** Command:<br>$ST+REPORT=[Password],[ReportID],? |
| **Parameters** | Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
| | Password | The password of the unit. The default password is 0000 |
| | ReportID | The report's numeric identifier. This number is defined by Programmer and can be any number from 100 through 109 |
| | Enable | 0: Disable<br>1: Enable |
| | 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. |
| | Longitude | The longitude of the circle zone. If zone condition is not used, left this field empty. |
| | Latitude | The latitude of the circle zone. If zone condition is not used, left this field empty. |
| | ZoneTolerence | The radius of the circle zone in meters. If zone condition is not used, left this field empty. (50..65535) meters |

| | ZoneControl | Defines how the geographic zone specified in parameter ZoneID is considered during report processing. If zone condition is not used, left this field empty. |
|---|---|---|
| | | **0: Disable zone** |
| | | **1: Entering the Zone**<br>The report initiates defined actions when the current (valid) GPS position transitions from outside the zone to inside of the zone boundaries. |
| | | **2: Exiting the Zone**<br>The report initiates defined actions when the current (valid) GPS position transitions from inside the zone to outside of the zone boundaries. |
| | | **3: Inside the Zone**<br>The report initiates defined actions when the current (valid) GPS position is within the specified zone boundaries. |
| | | **4: Outside the Zone**<br>The report initiates defined actions when the current (valid) GPS is outside of the specified zone boundaries |
| | ReportAction | This parameter defines the actions to be taken once the report is in an active state. One or more actions can be specified on any report. The following list defines all available action types: |
| | | **1: Logging**<br>When all defined report conditions are true, log the most recent GPS position to non-volatile flash memory for future retrieval. |
| | | **2: Polling**<br>When all defined report conditions are true, send the latest GPS position to the remote base station. |
| | | **3:Logging + polling**<br>When all defined report conditions are true, log the most recent GPS position to non-volatile flash memory and send the latest GPS position to the remote base station. |
| | | **4: Set Output**<br>When all defined report conditions are true, set the output relay. |
| | | **5: Logging + Set output**<br>When all defined conditions are true, log the most recent GPS position to non-volatile flash memory and set the output relay. |
| | | **6. Polling + Set Output**<br>When all defined conditions are true, send the latest GPS position to the remote base station and set the output relay. |
| | | **7. Logging + Polling + Set Output**<br>When all defined conditions are true, log the most recent GPS position to non-volatile flash memory, send the latest GPS position to the remote base station, and set the output relay |

| | | |
|---|---|---|
| | OutputID | The outputs are numbered through 1 to 4. This parameter is used in conjunction with parameter ReportAction=4(Set Output). A value 0 means ignore output control. |
| | OutputControl | Defines how the output specified in parameter OutputID is controlled while the report is active. 0:OFF 1:ON |
| | **Output Duration** | **Unit of duration is 100 milliseconds. Ex: if want to setup duration for 2 seconds, you have to give a 20 value. (Min. 1=0.1 second; Max. 255 = 25.5 seconds)** |
| | **Toggle Times** | **The times from its current state to its alternate state and back again. Min. 1 times; Max. 255 times** |
| **Return Value** | **Write** Command:<br>$OK:REPORT+[Tag]<br><br>**Read** Command:<br>$QR:REPORT+[Tag]= [ReportID],[Enable],[InputMask],[InputControl], [Longitude],[Latitude],[ZoneTolerence],[ZoneControl],[ReportAction],[OutputID], [OutputControl] ,[**OutputDuration**],[**ToggleTimes**]<br><br>**Error** Response:<br>$ER:REPORT+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* | |
| **Example** | (1) Entering specific zone polling and output 1 with 3 toggle times and 2 seconds duration<br> $ST+REPORT=0000,100,1,0,0,121.123956,25.065321,200,1,6,1,1,20,3<br><br>(2) Input1 & Input3 ON polling<br> $ST+REPORT=0000,101,1,5,5,0,0,0,0,2,0,0,0,0<br><br>(3) Read command<br> $ST+REPORT=0000,100,?<br> $QR:REPORT=100,1,0,0,121.123956,25.065321,200,1,6,1,1,20,3 | |
| **Notes** | **1. "OutputDuration" and "Toggle time" must be used at the same time. Otherwise, both of them must be '0'.** | |

| $ST+CLRP | Clear the user defined reports |
|---|---|
| **Description** | Execute this command to clear all of the user defined reports. |
| **Syntax** | **Write** Command:<br>$ST+CLRP+[Tag]=[Password] |

| **Parameters** | Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
|---|---|---|
| | Password | The password of the unit. The default password is 0000 |

| **Return Value** | **Write** Command:<br>$OK:CLRP+[Tag]<br><br>**Error** Response:<br>$ER:CLRP+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
|---|---|
| **Example** | $ST+CLRP=0000<br>$OK:CLRP |
| **Notes** | This command is only for clearing all of the user defined reports. If you want to clear single report, you can use ST+REPORT command to set [Enable] field to 0. |

| **$ST+PMGR** | Set/Read power management parameters of the unit. |
|---|---|
| Description | Execute this command to setup or query the power management parameters of the unit. If the power saving mode is enabled, all the power saving features will be triggered by ACC (Input1). |
| Syntax | Write Command:<br>$ST+PMGR+[Tag]=[Password],[Enable],[Low Voltage],[GSM State],[GPS State], [Power Down Delay],[Power Up Duration], [Power Down Duration],[Sleep Priority]<br><br>Read Command:<br>$ST+PMGR+[Tag]=[Password],? |
| Parameters | Tag      This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password      The password of the unit. The default password is 0000<br><br>Enable      Enable power saving mode.<br>0: Disable<br>1: Enable<br><br>Low Voltage      If the vehicle battery voltage is below the Low Voltage, unit will send a alarm message to the control center. The default voltage value is 12.0 volts.<br><br>GSM State      Set GSM status when unit enter power saving mode.<br>0: GSM OFF<br>1: GSM ON<br><br>GPS State      Set GPS status when unit enter power saving mode.<br>0: GPS OFF<br>1: GPS ON<br><br>Power Down Delay      After ACC off for the delay time, the unit will go into power saving mode. (0..65535 seconds)<br>When Sleep Priority = 1, the minimum value of Power Down Delay is 180.<br>When Sleep Priority = 0, the minimum value of Power Down Delay is 0.<br><br>Power Up Duration      Full power duration after alarm triggered. (180..65535 seconds)<br>**Power Down Duration**      **Periodical wake up timeout. ( 0..65535 seconds)**<br>Sleep Priority      Enable priority sleep mode.<br>0: Disable<br>Unit will finish executing the tracking command such as number of tracking times, then goes to sleeping mode.<br><br>1: Enable<br>Unit will be forced to enter sleep mode regardless of any tracking command in progress. |

| | |
|---|---|
| **Return Value** | Write Command:<br>$OK:PMGR+[Tag]<br><br>Read Command:<br> $QR:PMGR+[Tag]=[Enable],[Low Voltage],[GSM State],[GPS State],[Power Down Delay], [Power Up Duration], [Power Down Duration], [Sleep Priority]<br><br>Error Response:<br>$ER:PMGR+[Tag]=[ErrorCode]<br>Please refer to appendix for detailed error code descriptions. |
| **Example** | Turn off GPS when enter power saving mode<br><br>$ST+PMGR=0000,1,12.00,1,0,30,180,60,0<br>$OK:PMGR<br><br>$ST+PMGR=0000,1,12.00,1,0,180,180,60,1<br>$OK:PMGR |
| **Notes** | 1. When the unit wakes up by report triggering or receiving commands (GSM on while sleeping mode), it goes to sleep mode again when the "Power Up Duration" period is reached.<br><br><br><br>2. If there is nothing happening, the unit remains in "Power Down" state once it accesses the sleeping mode until report/input triggering.<br>3. In sleep mode, if GSM on, the unit will wake up after receiving command through remote access.<br>4. While power down delay and power up duration time period, if any other more event trigger, time period of power down delay and power up duration will be recounted. |

| $ST+IMEI | Read telephone IMEI number |
|---|---|
| **Description** | Execute this command to read the IMEI (International Mobile station Equipment Identity) of the unit. |
| **Syntax** | **Read** Command:<br>$ST+IMEI+[Tag]=[Password] |
| **Parameters** | Tag       This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password     The password of the unit. The default password is 0000 |
| **Return Value** | **Read** Command:<br>$QR:IMEI+[Tag]=[IMEI]<br><br>**Error** Response:<br>$ER:IMEI+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| **Example** | $ST+IMEI=0000<br>$QR:IMEI=355117003358879 |

| $ST+VMON | Voice wiretap / monitoring |
|---|---|
| **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** | **Write** Command: <br> $ST+VMON+[Tag]=[Password], [PhoneNumber] |
| **Parameters** | Tag — This command tag number/character string can be defined by user application program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) <br><br> Password — The password of the unit. The default password is 0000 <br><br> PhoneNumber — The specific phone number for unit to dial up. |
| **Return Value** | **Write** Command: <br> $OK:VMON+[Tag] <br><br> **Error** Response: <br> $ER:VMON+[Tag]=[ErrorCode] <br> *Please refer to appendix for detailed error code descriptions.* |
| **Example** | $ST+VMON=0000,0933123456 <br> $OK:VMON |
| **Note** | 1. This command is temporarily not available until the "Communication Kit" available. |

| $ST+TOW | Enable/Disable vehicle towed function |
|---|---|
| **Description** | Execute this command set/read vehicle towed parameters. The vehicle towed report will be sent to the base station when ACC (Input1) OFF and vehicle speed between MinSpeed and MaxSpeed for a Duration time. |
| **Syntax** | **Write** Command:<br>$ST+TOW+[Tag]=[Password],[Enable],[SatelliteUsed],[MinSpeed],[MaxSpeed],<br>[Duration]<br><br>**Read** Command:<br>$ST+TOW+[Tag]=[Password],? |
| **Parameters** | Tag       This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password       The password of the unit. The default password is 0000<br><br>Enable/Disable       Enable vehicle towed function<br>0: Disable<br>1: Enable<br><br>SatelliteUsed       Minimum GPS satellites reception. (0..16)<br><br>MinSpeed       Minimum vehicle speed. (0..65535) Km/h<br><br>MaxSpeed       Maximum vehicle speed. (0..65535) Km/h<br><br>Duration       The time duration after satelliteUsed, MinSpeed and MaxSpeed conditions are true. (0..65535 seconds) |
| **Return Value** | **Write** Command:<br>$OK:TOW+[Tag]<br><br>**Read** Command:<br>$QR:TOW+[Tag]=[Enable],[SatelliteUsed],[MinSpeed],[MaxSpeed],[Duration]<br><br>**Error** Response:<br>$ER:TOW+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.*<br><br>When the vehicle towed condition is true, the unit will send a report position with ReportID=9 to the base station. |
| **Example** | $ST+TOW=0000,1,3,10,255,30<br>$OK:TOW |

| $ST+MILE | Enable/Disable mileage accumulator function |
|---|---|
| **Description** | Execute this command set/read mileage accumulator function. |
| **Syntax** | **Write** Command:<br>$ST+MILE+[Tag]=[Password],[Enable],[InitialMileage], [Mileage with ACC]<br><br>**Read** Command:<br>$ST+MILE+[Tag]=[Password],? |
| **Parameters** | Tag     This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password     The password of the unit. The default password is 0000<br><br>Enable     Enable mileage accumulator function. If mileage function is enabled, the current mileage will be added to the end of each report position.<br>0: Disable<br>1: Enable<br><br>InitialMileage     Set initial mileage (0.0 ~ 4294967.0) Km<br><br>Mileage with ACC     0: Default<br>1: Mileage will be calculated only when input 1 connects to ACC and status of ACC must be on. |
| **Return Value** | **Write** Command:<br>$OK:MILE+[Tag]<br><br>**Read** Command:<br>$QR:MILE+[Tag]=[Enable],[CurrentMileage],[Mileage with ACC]<br><br>**Error** Response:<br>$ER:MILE+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| **Example** | $ST+MILE=0000,1,21520.3<br>$OK:MILE |
| **Note** | (1) If the mileage reaches the max. number, the mileage resets to '0' then start accumulation from '0'<br>(2) If "mileage with ACC" is 1 but no connect ACC, mileage will never be calculated. |

| $ST+TEST | Unit hardware diagnostic |
|---|---|
| Description | Execute this command to process unit hardware diagnostic. |
| Syntax | **Read** Command:<br>$ST+TEST+[Tag]=[Password] |
| Parameters | Tag    This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password    The password of the unit. The default password is 0000 |
| Return Value | **Read** Command:<br>$OK:TEST+[Tag]=[Result],[MainPowerVoltage],[BatteryVoltage],[SystemCode]<br><br>Result: The test result code is a decimal value.<br>0: No Error<br>1: GPS Failed<br>2: GSM Failed<br>4: EEPLUSM Failed<br>8: SRAM Failed<br>16: Backup battery failed<br>64: Modem failed<br>128: Burn-in test failed<br><br>MainPowerVoltage:<br>This field indicates main power source voltage.<br><br>BatteryVoltage:<br>This field indicates backup battery voltage. The backup battery must be turned ON (*Refer to $ST+BBCTRL command*) before excute this command. If the backup battery voltage is lower than 3.6V, it means the backup battery is empty or damage.<br><br>SystemCode: The system current status code. This system code is only for manufactory reference purpose.<br><br>**Error** Response:<br>$ER:TEST+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| Example | $ST+TEST=0000<br>$OK:TEST=3,13.45,4.18,0x0005083f<br>(The Result code 3 means GPS & GSM Failed) |

| $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 | $ST+VERSION<br>$VERSION=1.033 |

| **$ST+BAUD** | Set/Read baudrate of serial port |
|---|---|
| **Description** | Execute this command to set/read the baudrate parameter of the serial port. This command only supported for serial configuration. |
| **Syntax** | **Write** Command:<br>$ST+BAUD+[Tag]=[Password],[PortID],[BaudRateID]<br><br>**Read** Command:<br>$ST+BAUD+[Tag]=[Password],[PortID],? |
| **Parameters** | Tag       This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password       The password of the unit. The default password is 0000<br><br>PortID       Serial Port ID number<br>1: Serial port<br>2: *(Reserved for specific purpose)*<br><br>BaudRateID       Serial port baudrate ID<br>0: 1200bps<br>1: 2400bps<br>2: 4800bps<br>3: 9600bps<br>4: 19200bps<br>5: 38400bps<br>6: 57600bps (Serial port default) |
| **Return Value** | **Write** Command:<br>$OK:BAUD+[Tag]<br><br>**Read** Command:<br>$QR:BAUD+[Tag]=[PortID],[BaudRateID]<br><br>**Error** Response:<br>$ER:BAUD+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| **Example** | Set serial port to 9600bps<br>$ST+BAUD=0000,1,3<br>$OK:BAUD |

| $ST+NMEA | Enable/Disable GPS NMEA string output |
|---|---|
| **Description** | Execute this command to enable or disable GPS NMEA string output. Currently, this function only supported $GPRMC string output and serial port baud rate must be 2400bps at least. |
| **Syntax** | **Write** Command:<br>$ST+NMEA+[Tag]=[Enable] |
| **Parameters** | Tag      This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Enable      <u>0</u>: Disable<br>                 1: Enable |
| **Return Value** | **Write** Command:<br>$OK:NMEA+[Tag]<br><br>**Error** Response:<br>$ER:NMEA+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| **Example** | Enable GPS NMEA output<br>$ST+NMEA=1<br>$OK:NMEA |

| $ST+SPEED | Set the speeding report |
|---|---|
| Description | Execute this command to set the speeding report |
| Syntax | **Write** Command:<br>$ST+SPEED+[Tag]=[Password],[Enable],[ReportAction],[MinSpeed],[MaxSpeed],[Duration],[OutputID],[OutputControl]<br><br>**Read** Command:<br>$ST+SPEED+[Tag]=[Password], ? |

| Parameters | Tag | This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters) |
|---|---|---|
| | Password | The password of the unit. |
| | Enable | Enable speeding report<br><u>0</u>: Disable<br>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:<br><br>**1:Logging**<br>When all defined report conditions are true, log the most recent GPS position to non-volatile flash memory for future retrieval.<br><br>**2:Polling**<br>When all defined report conditions are true, send the latest GPS position to the remote base station.<br><br>**3:Logging and Polling:**<br>When all defined report conditions are true, the unit will do following:<br>A.    Log the most recent GPS position to non-volatile flash memory for future retrieval.<br>B.    Send the latest GPS position to the remote base station.<br><br>**4. Set Output:**<br>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.<br><br>**5. Logging + Set Output:**<br>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. |

| | | |
|---|---|---|
| | | **6. Polling + Set Output:**<br>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. |
| | | **7. Logging + Polling + Set Output:**<br>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. |
| | MinSpeed | The minimum speed of speed range<br>(0 – 255 km/h) |
| | MaxSpeed | The maximum speed of speed range<br>(0 – 255 km/h) |
| | Duration | his parameter defines the speeding report will be actived once the speed range is satisfied for a time duration. Valid value for logging and polling is following:<br>Logging: 1~65535 seconds<br>Polling: 15~65535 seconds<br>Logging + Polling: 15~65535 seconds. |
| | Output ID | The unit hardware output number. Outputs are numbered 1 through 4. |
| | Output Control | 0 Set output inactive.<br>1 Set output active. |
| **Return Value** | **Write** Command:<br>$OK:SPEED<br>**Read** Command:<br>$SPEED=[Enable],[ReportAction],[MinSpeed],[MaxSpeed],[Duration],<br>[OutputID],[OutputControl] | |
| **Example** | (1) Set a speeding report with 100km/h or above for 30seconds then polling and set the<br>output 3 to inactive state.<br>$ST+SPEED=0000,1,6,100,255,30,3,0<br>$OK:SPEED<br>(2) Set a speeding report with the vehicle stop more than 5 minutes then logging, and set<br>the output 2 to active state.<br>$ST+SPEED=0000,1,5,0,5,300,2,1<br>$OK:SPEED | |

| $ST+MMSG | Send MDT messages to the base station |
|---|---|
| Description | Execute this command through serial port to send MDT messages to the base station via preset communication type. |
| Syntax | **Write** Command:<br>$ST+MMSG=[Message] |
| Parameters | Message          The message string. (The max length is 145 characters) |
| Return Value | **Write** Command:<br>$OK:MMSG<br><br>**Error** Response:<br>$ER:MMSG=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| Example | $ST+MMSG=Goods delivered<br>$OK:MMSG<br>Base station will receive：$QR:MMSG=20070612092856,Goods delivered<br><br>$ST+MMSG=中文<br>$OK:MMSG<br>Base station will receive：$QR:MMSG=20070612092856,中文 |

| $ST+TMSG | Send messages from the base station to the MDT |
|---|---|
| Description | Execute this command to send messages from the base station to the MDT. |
| Syntax | **Write** Command:<br>$ST+TMSG+[Tag]=[Password],[Message] |
| Parameters | Tag          This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password       The password of the unit. The default password is 0000<br><br>Message       The message string. (The max length is 145 characters) |
| Return Value | **Write** Command:<br>$OK:TMSG+[Tag]<br><br>**Error** Response:<br>$ER:TMSG+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| Example | Send "Please go to No.100, 203th Ave NE, Bellevue, WA" message to the MDT<br>$ST+TMSG=0000, Please go to No.100, 203th Ave NE, Bellevue, WA<br>$OK:TMSG<br><br>MDT will receive: $MMSG=Please go to No.100, 203th Ave NE, Bellevue, WA |

| $ST+SMID | Query ID of sim card |
|---|---|
| **Description** | Execute this command to query ID of sim card. |
| **Syntax** | **Read** Command:<br>$ST+SMID+[Tag]=[Password],? |
| **Parameters** | Tag     This command tag number/character string can be defined by user application Program. The return message will include the same tag and helpful to application Program to recognize. This tag could be left it empty if it is not used. (Max. 5 characters)<br><br>Password     The password of the unit. The default password is 0000 |
| **Return Value** | **Read** Command:<br>QR:SMID+[Tag]=SMID<br><br>**Error** Response:<br>$ER:SMID+[Tag]=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| **Example** | $ST+SMID=0000,?<br>QR:SMID=89886970312087400033 |

<br>

| $ST+QUST | Query GPRS connection state |
|---|---|
| **Description** | Execute this command to query GPRS connection state. |
| **Syntax** | **Read** Command:<br>$ST+QUST=[Password] |
| **Parameters** | Password     The password of the unit. The default password is 0000 |
| **Return Value** | **Read** Command:<br>$QR:QUST="GSM Network Operator Name",[CSQ],[GPRS connection state]<br>GPRS connection state: 1 → Connected<br>                         0 → Disconnected<br><br>**Error** Response:<br>$ER: QUST=[ErrorCode]<br>*Please refer to appendix for detailed error code descriptions.* |
| **Example** | $ST+QUST=0000<br>$QR:QUST="Pacific GSM 1800",28,1 |

| $ST+HALT | Enable/Disable report ID message polling |
|---|---|
| **Description** | Execute this command to enable/disable report ID message polling. |
| **Syntax** | Write Command:<br>$ST+HALT=[Password],[HaltPolling]<br><br>Read Command:<br>$ST+HALT=[Password], ? |
| **Parameters** | Password           The password of the unit. The default password is 0000<br><br>HaltPolling        0: Default<br>                      1: Stop polling report ID message |
| **Return Value** | **Write** Command:<br>$OK:HALT<br><br>**Read** Command:<br>$QR:HALT=[HaltPolling] |
| **Example** | $ST+HALT=0000,1<br>$OK:HALT<br><br>$ST+HALT=0000,?<br>$QR:HALT=1 |

| $ST+TIMER | Set the timer report |
|---|---|
| **Description** | Execute this command to setup or query unit to report back positional information automatically at a preset time every day. |
| **Syntax** | **Write** Command：<br>$ST+TIMER=[Password], [Enable], [Preset Time]<br>**Read** Command：<br>$ST+TIMER=[Password], ? |
| **Parameters** | Password           The password of the unit.<br>Enable               0: Off Disable this function.<br>                      1: On Enable this function.<br>Preset Time        The time for report. The format is hour, minute and second. |
| **Return Value** | **Write** Command Response：<br>$OK:TIMER<br>**Read** Command Response：<br>$TIMER=[Enable], [Preset Time] |
| **Example** | $ST+TIMER=0000,1,213050<br>$OK:TIMER<br>$ST+TIMER=0000,?<br>$QR:TIMER=1,213050 |
| **Notes** | Report ID 3 |

| **$ST+GLAC** | Get the location area code |
|---|---|
| **Description** | Execute this command to query Location information. |
| **Syntax** | $ST+GLAC=[Password] |
| **Parameters** | None |
| **Return Value** | $QR:GLAC= [ DateTime ] ,[ Lac ] , [ Cell ID ]<br>　　　DateTime:　　YYYYMMDDhhmmss (GMT Date and Time) .<br>　　　Lac:　　　　　Location area code .<br>　　　Cell ID:　　　Cell ID . |
| **Example** | $ST+GLAC=0000<br>$QR:GLAC=20070620075642,319D,3758 |

| **$ST+CONT** | Counter record |
|---|---|
| **Description** | Execute this command to query four counter. One for the number of reboot, one for the total number of GPRS connection attempt, one for the number of GPRS connection failed, one for the total number of GPRS connection with the server. |
| **Syntax** | Write Command：<br>$ST+CONT=[Password],[Reset]<br>Read Command：<br>$ST+CONT=[Password] |
| **Parameters** | Password　　　　　　　The password of the unit. The default password is 0000<br><br>Reset　　　　　　　　0: No Reset<br>　　　　　　　　　　　1: Reset all counter |
| **Return Value** | $QR:CONT= [ Reboot ] ,[ Attempt ] , [ Success ] , [ Failed ]<br>　　　Reboot:　　　The number of reboot.<br>　　　Attempt:　　　The total number of GPRS connection attempt.<br>　　　Success:　　　The number of GPRS connection Success.<br>　　　Failed:　　　The number of GPRS connection failed. |
| **Example** | Read Command：<br>$ST+ CONT =0000<br>$QR: CONT =8,1822,17,1805<br>Write Command：<br>$ST+ CONT =0000,1<br>$OK: CONT<br>Read Command：<br>$QR: CONT =0,0,0,0 |

| $ST+IDLE | Calculate the idle time. |
|---|---|
| **Description** | Execute this command to accumulate the total Idle time in which the ACC is on but the GPS speed is less than pre-defined interval for a certain time. The "Report ID 60" & the "Report ID 61" will be the used for this command:<br>Report ID 60: The idle starts event.<br>Report ID 61: The idle ends event.<br>The time difference of the "Time of report ID 61" and the "time of the ID 60" is the time period of the IDLE event. The total idle time for a trip could be obtained by accumulating the total number of the Idle time period. |
| **Syntax** | **Write** Command:<br>$ST+IDLE=[Password],[Enable],[Report Mode],[Idle Speed],[Duration]<br>**Read** Command:<br>$ST+IDLE=[Password], ? |
| **Parameters** | Password | The password of the unit. The default password is 0000 |
| | Enable | 0: Disable<br>1: Enable |
| | Report Mode | **1: Logging:**<br>   When all defined report conditions are true, log the most recent GPS position to non-volatile flash memory for future retrieval.<br><br>**2:Polling:**<br>   When all defined report conditions are true, send the latest GPS position to the remote base station.<br><br>**3:Logging and Polling:**<br>   When all defined report conditions are true, the unit will do following:<br>   a. Log the most recent GPS position to non-volatile flash memory for future retrieval.<br>   b. Send the latest GPS position to the remote base station. |
| | Idle Speed | Idle speed (0-65535 km/hr) |
| | Duration | the duration of idle time ( 1-65535 min) |
| **Return Value** | **Write** Command Response:<br>$OK:IDLE<br>**Read** Command Response:<br>$ST+IDLE=[Enable],[Report Mode],[Idle Speed],[Duration] |
| **Example** | $ST+IDLE=0000,1,3,10,15<br>$OK:IDLE<br>$ST+IDLE=0000,0<br>$OK:IDLE |
| **Notes** | 1. The ACC off event will trigger the "Idle end" event (Report ID 61).<br>2. To operate the Idle command, the number of satellites requires more than 3 in order to function correctly. |

| $ST+IDCHECK | RFID + Immobilizer functions |
|---|---|
| **Description** | Execute this command to integrate RFID accessory and immobilizer function. When driver uses RFID tag to contact RFID reader, output of unit will control relay at on or off status during delay time. |
| **Syntax** | **Write** Command:<br>$ST+IDCHECK=[Password],[ReportAction],[Output ID],[Delay Time]<br>**Read** Command:<br>$ST+ IDCHECK =[Password], ? |
| **Parameters** | Password — The password of the unit. The default password is 0000<br><br>ReportAction — **0: Disable the RFID function.**<br>All RFID information will be ignored, no logging, no polling, and not immobilization.<br><br>**1: Logging:**<br>Store the Report 21 string in the flash memory of the unit.<br><br>**2: Polling::**<br>Send the Report 21 string to the server.<br><br>**3:Logging and Polling**<br>Output ID — When the RFID reader senses the tag, the specific output port would be enabled. This output port connects to the NO immobilizer relay<br>Delay Time — The duration of the output port activating.<br>(The unit is 100 millisecond) |
| **Return Value** | **Write** Command Response:<br>$OK:IDCHECK<br>**Read** Command Response:<br>$QR:IDCHECK= [ReportAction],[Output ID],[Delay Time] |
| **Example** | $ST+IDCHECK=0000,3,1,10<br>$OK:IDCHECK<br>$ST+IDCHECK=0000,?<br>$QR:IDCHECK=3,1,10 |
| **Notes** | If we configure the command like $ST+IDCHECK=0000,3,1,10<br>(example: output 1 connects to immobilizer relay)<br><br>1. When the ACC off, the unit output 1 is disable, and cause immobilizer relay backing to Normal Opened circuses automatically.<br><br>2. Once the RFID reader senses the Tag, the output 1 will be triggered to activate Immobilizer Relay as Close Circuses with 10 second duration. The 10 Seconds for driver to start engine..<br><br>3. If ACC is not ON within this duration, the output 1 will be changed back to disable again.<br><br>4. If ACC is ON within this 10 second duration, the output 1 will keep activating state until next ACC OFF condition coming.<br><br>5. If the unit reboots, it will not affect the specific output port status. |

| $ST+VOICE | Set voice call parameters of the unit. |
|---|---|
| Description | Execute this command to setup or query incoming and outgoing calls limitation. |
| Syntax | **Write** Command:<br>$ST+VOICE=[Password],[Dial In Ctrl],[Dial Out Ctrl],[AcceptIn1],[AcceptIn2],<br>       [AcceptIn3],[ AcceptOut1],[ AcceptOut2],[ AcceptOut3]<br>**Read** Command:<br>$ST+ VOICE =[Password], ? |
| Parameters | Password                The password of the unit. The default password is 0000<br><br>Dial In Ctrl          0: Disable Can not answer any incoming calls.<br>                          1: Enable Can answer any incoming calls.<br>                          2: Limited Only answer 3 incoming calls at most.<br><br>Dial Out Ctrl        0: Disable Can not dial out any outgoing calls.<br>                          1: Enable Can dial out any outgoing calls.<br>                          2: Limited Only dial out 3 outgoing calls at most.<br><br>AcceptIn1~ AcceptIn3 Acceptable 3 incoming calls phone numbers. The max.<br>                          length of each phone number is 25 digits.<br><br>AcceptOut1~         Acceptable 3 outgoing calls phone numbers. The max.<br>AcceptOut3          length of each phone number is 25 digits. |
| Return Value | **Write** Command Response:<br>$OK:VOICE<br>**Read** Command Response:<br>$VOICE=[Dial In Ctrl], [Dial Out Ctrl], [AcceptIn1], [AcceptIn2],[AcceptIn3],<br>       [AcceptOut1], [AcceptOut2], [AcceptOut3] |
| Example | $ST+VOICE=0000,2,0,0933942206,0933942208,0918230863,,,<br>$OK:VOICE<br>$ST+VOICE=0000,?<br>$VOICE=2,0,0933942206,0933942208,0918230863,,, |

| $ST+GPRSPACKET | Send many tracking messages at one time |
|---|---|
| Description | Execute this command to get at most 7 tracking messages at one TCP packet |
| Syntax | **Write** Command:<br>$ST+GPRSPACKET=[Password],[Enable],[ The number for one TCP packet],<br>[Report priority]<br>**Read** Command:<br>$ST+ GPRSPACKET=[Password], ? |
| Parameters | Password                The password of the unit. The default password is 0000<br><br>Enable                   0: Disable<br>                          1: Enable<br>The number for one  The number of tracking messages in one TCP packet.<br>TCP packet          Minimum is 1, Maximum is 7<br>Report priority      0-   no report priority = the report are included into the packet<br>                          1-   the packet and the report is sent immediately to the server |

| Return Value | **Write** Command Response:<br>$OK: GPRSPACKET<br>**Read** Command Response:<br>$QR: GPRSPACKET = [Enable],[ The number for one TCP packet],[ Report priority] |
|---|---|
| Example | $ST+ GPRSPACKET =0000,1,5,1<br>$OK: GPRSPACKET<br>$ST+ GPRSPACKET =0000,?<br>$QR: GPRSPACKET =1,5,1 |
| Notes | $ST+TRACKING=0000,1,20,0,0,1,3<br>$ST+GPRSPACKET=0000,1,5,1<br>The first command is to make unit send tracking message every 20 seconds.<br>The second command is to make unit accumulate 5 tracking messages and then send one TCP packet. So after 100 seconds (5x20), server will receive one TCP packet with 5 tracking messages. |

| **$ST+SMSTRACK** | Auto-switch between GPRS and SMS |
|---|---|
| Description | Auto-switch to SMS tracking when GPRS is not available |
| Syntax | **Write** Command:<br>$ST+SMSTRACK=[Password],[Enable],[Mode],[Time],[Distance],[Times],[Basis],[SMS Event Report]<br>**Read** Command:<br>$ST+ SMSTRACK=[Password], ? |
| Parameters | Password — The password of the unit. The default password is 0000<br>Enable — Enable/Disable SMS tracking function<br>0: Disable<br>1: Enable<br>Mode — **1:Time mode**<br>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.<br>**2:Distance mode**<br>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.<br>**3:IntelliTrac mode**<br>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.<br>**5: Time + ACC ON mode**<br>If ACC is off, the tracking function will be stopped.<br>**6: Distance + ACC ON mode**<br>If ACC is off, the tracking function will be stopped.<br>**7: IntelliTrac + ACC ON mode**<br>If ACC is off, the tracking function will be stopped.<br>Time — Specify elapsed time. The time specified is in seconds and can be any number from 15 to 65535 seconds.<br>Distance — Specify elapsed distance. The distance specified is in meters and can be any number from 300 to 65535 meters.<br>Times — Specify total tracking times. The range is from 0 to 65535. If Times=0, it means forever tracking. |

| | | |
|---|---|---|
| | Basis | 0: Ignore no GPS signal tracking report.<br>1: Continuously tracking regardless of GPS signal. |
| | SMS Event Report | Decide whether send event report via GPRS or SMS. |
| **Return Value** | **Write** Command Response:<br>$OK: SMSTRACK<br>**Read** Command Response:<br>$QR: SMSTRACK=[Enable],[Mode],[Time],[Distance],[Times],[Basis],[SMS Event Report] | |
| **Example** | $ST+SMSTRACK=0000,1,1,60,0,0,1,1<br>--> When GPRS unavailable, switch to SMS, SMS tracking message is sent every 60 seconds. During SMS mode, if any event reports happen, these event reports (ex: input trigger) will be sent via SMS immediately.<br><br>$ST+SMSTRACK=0000,1,1,60,0,0,1,0<br>--> When GPRS unavailable, switch to SMS, SMS tracking message is sent every 60 seconds. During SMS mode, if any event reports happen, these event reports (ex: input trigger) will not be sent via SMS. They will be sent via GPRS when GPRS is back. | |

# 5 Firmware Upgrade Commands

The IntelliTrac X1 Plus devices provide a functionality of upgrade firmware through direct serial communication, GSM CSD communication and GPRS network. Currently, GSM SMS communication is not supported. The S&T will provide firmware data file (*.sta) for unit firmware upgrade. The firmware data file (*.sta) is a ASCII text file and each line has two ending characters 0x0d 0x0a. The first line of the file is for $ST+FWUG command used and the others are for $ST+FWDL command. When all $ST+FWDL commands have been sent, send $ST+FWDC command to the unit for complete firmware download processing.

For example, the firmware data file like below:

<div style="color:red">

C880,CF

0000,40,EDDBE81416218C2AEC7835BD4335982BEC7835BD433598,79

0040,40,EC7835BD43335BD4335982BEDDE35F64321982BEC7893B,9A

0080,40,EC7895BDEE358DE4096EC7E1DD2E655C79095691DB187F,EE

00C0,40,B92D2065DBAD00303E71E5A8AD532C88B658A0CA19F7AE,47

0100,40,7BEFA2A7582F83BD7B4532588B0AE69E5B0B54B3D90AE79,83

0140,40,79EDA0A55B2D80BE55B2D80BE79EDA0A55B2D80BE79EDA,00

0180,40,79EDA0A55B2D80BEE70BE79EDA0A5BE86EDA0A55BD280B,00

</div>

(1) Send **$ST+FWUG=0000**,C880,CF

(2) Wait for $OK:FWUG response

(3) Send **$ST+FWDL=0000**,0000,40,EDDBE81416218C2AEC7835BD4335982BEC7835BD433598,79

(4) Wait for $OK:FWDL response

(5) Send **$ST+FWDL=0000**,0040,40,EC7835BD43335BD4335982BEDDE35F64321982BEC7893B,9A

(6) Wait for $OK:FWDL response

(7) Send **$ST+FWDL=0000**,0080,40,EC7895BDEE358DE4096EC7E1DD2E655C79095691DB187F,EE

(8) Wait for $OK:FWDL response

(9) Send **$ST+FWDL=0000**,00C0,40,B92D2065DBAD00303E71E5A8AD532C88B658A0CA19F7AE,47

(10) Wait for $OK:FWDL response

(11) Send **$ST+FWDL=0000**,0100,40,7BEFA2A7582F83BD7B4532588B0AE69E5B0B54B3D90AE79,83

(12) Wait for $OK:FWDL response

(13) Send **$ST+FWDL=0000**,0140,40,79EDA0A55B2D80BE55B2D80BE79EDA0A55B2D80BE79EDA,00

(14) Wait for $OK:FWDL response

(15) Send **$ST+FWDL=0000**,0180,40,79EDA0A55B2D80BEE70BE79EDA0A5BE86EDA0A55BD280B,00

(16) Wait for $OK:FWDL response

(17) Send **$ST+FWDC=0000**

(18) Wait for $OK:FWDC response (Finish firmware download Plusces

# 6 Appendices

**Report ID Description**

| Report ID | Description | Remark |
|-----------|-------------|--------|
| 0 | Position | |
| 1 | Log position | |
| 2 | Track position | |
| 3 | Timer Report | |
| 8 | Speeding report position | |
| 9 | Vehicle towed report | |
| 11 | Input1 changed report position | |
| 12 | Input2 changed report position | |
| 13 | Input3 changed report position | |
| 14 | Input4 changed report position | |
| 21 | RFID report position | |
| 30 | SOS position (Keypad) | |
| 35 | Barcode Scanner (8110) | |
| 40 | Main power low report position | |
| 41 | Main power lose report position | |
| 42 | Backup battery low report position | |
| 43 | GPS destroyed report position | |
| 60 | IDLE starts position | |
| 61 | IDLE ends position | |
| 100..109 | User defined report position | |

**Command Error Description**

| Error Code | Description |
|------------|-------------|
| 0 | Unknown command |
| 1 | Invalid unit password |
| 2 | Invalid command parameters |
| 3 | Invalid command process |
| 4 | Logging data not found |
| 5 | Invalid data checksum |

**STD Errors Description**

| Error Code | Description |
|------------|-------------|
| 0 | Unknown communication error |
| 1 | Base communication phone number or address not set |
| 3 | Unsupported SMS DCS format |
| 4 | No GSM signal |
| 5 | GPRS connection failed |
| 6 | Resend Modem Command Fail |
| 7 | SIM Pincode ERROR |
| 8 | DOWNLOAD_INTERRUPTED |
| 9 | VOICE_CALL_BUSY |
| 10 | I/O Port test failed |

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## CME Errors Description

| Error Code | Description |
|---|---|
| 0 | Phone failure |
| 3 | Operation not allowed |
| 4 | Operation not supported |
| 5 | PH-SIM PIN required |
| 6 | PH-FSIM PIN required |
| 7 | PH-FSIM PUK required |
| 10 | SIM not inserted |
| 11 | SIM PIN required |
| 12 | SIM PUK required |
| 13 | SIM failure |
| 14 | SIM busy |
| 15 | SIM wrong |
| 16 | Incorrect password |
| 17 | SIM PIN2 required |
| 18 | SIM PUK2 required |
| 26 | Dial string too long |
| 27 | Invalid characters in dial string |
| 30 | No network service |
| 31 | Network timeout |
| 32 | Network not allowed     emergency calls only |
| 40 | Network personalization PIN required |
| 41 | Network personalization PUK required |
| 42 | Network subset personalization PIN required |
| 43 | Network subset personalization PUK required |
| 44 | Service provider personalization PIN required |
| 45 | Service provider personalization PUK required |
| 46 | Corporate personalization PIN required |
| 47 | Corporate personalization PUK required |
| 100 | Unknown |
| 100..255 | Reserved |

## 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 |

## LED Indicators Function

| PWR LED Status | Function |
|---|---|
| Off | Power off |
| 20 ms On / 2 secs Off | The device is running in power saving mode. |
| 500ms On / 500ms Off | Reset procedure is in progress |
| 20ms ON / 20ms Off | Upgrade firmware 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 indication for hardware version C**

| GSM LED Status | Function |
|---|---|
| Off | The device is off or running in deep sleep mode. |
| 100 ms On / 1sec Off | No SIM card inserted or no PIN entered, or network search in progress, or network login in progress. |
| 100 ms On / 3 secs Off | Logged to network. |

**GSM LED indication for hardware version D or above**

| GSM LED Status | Function |
|---|---|
| Off | The device is off or running in deep sleep mode. |
| 600 ms On / 600ms Off | No SIM card inserted or no PIN entered, or network search in progress, or network login in progress. |
| 90 ms On / 3 secs Off | Logged to network. |
| 90 ms blinking 2 times /3secs Off | GPRS Network connected |

# 7 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.

| | |
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