**WondeX VT 300**

**Protocol Document**

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Status: Preliminary

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1. Introduction to WondeX VT300 Protocol Document:

This document describes the protocol of the WondeX VT300 devices. This document is used for all communications information between the base station/controller center and the VT 200 devices. The document includes command syntax with full acknowledgement of sending/receiving messages upon request, also the features/functionalities of each command. Hence, this document covers all information which you need to design/build application/software that uses the VT300 as the devices.

2. Version History:

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
<th>Supported Firmware Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.01</td>
<td>Initial commands</td>
<td>V200_1.001 or above</td>
</tr>
</tbody>
</table>
3. Syntax of “$WP” Commands:

- In order to successfully communicate with VT300 device, the “$WP” or “$wp” prefix is required when issuing command and the <CR> is required for terminating the command line. Throughout this document, the <CR> char is omitted intentionally.
- The response of the command is usually followed by the <CR><LF> in the end of responding message. Throughout this document, the <CR><LF> chars are omitted intentionally.
- There are two types of the commands and responses will be seen through this documents as following:

1. Three types of command acknowledgement:
   - Ex 1: Issuing commands (configure the parameters for a command):
     - **Issuing command:**
       - $WP+<Command>+<Tag>=<Password>,<Para>,<Para>,<Para>,....<CR><LF>
     - **Returning acknowledgement:**
       - $OK:<Command>+<Tag>=<Para>,<Para>,<Para>,....<CR><LF>
   
   - Ex 2: Querying command parameters (read command parameters):
     - **Issuing command:**
       - $WP+<Command>+<Tag>=<Password>,?<CR><LF>
     - **Returning acknowledgement:**
       - $OK:<Command>+<Tag>=<Para>,<Para>,<Para>,<Para>....<CR><LF>
   
   - Ex3: Query the information (rather than parameters)
     - **Issuing command:**
       - $WP+<Command>+<Tag>=<Password>
     - **Returning message:**
       - $MSG:<Command>=<Para>,<Para>

2. Ask for positioning information:
   - The returning positioning string (for $WP+GETLOCATION or $WP+TRACK) will **NOT** include the “+<command>+<Tag>” in the beginning of the string message. The positioning data will be displayed as described in the chapter 6.

**Please note:**
All characters of returning acknowledgement will be in upper case.
Entering a series of $WP$ commands on Separate Lines:

In order to successfully enter series commands through separate lines, a “pause” is suggested to add between each command (preceding and following commands) until the final responses appears such as “$OK:<Command>”.

This action will avoid sending too many $WP$ commands at the same time but without receiving the responses for each issuing command to ensure the device receives all command correctly and successfully.

- Default parameters for each command are underlined in this document for reference.
- There are two types of data transmission formats
  - Hex format:
    - For GPRS_keep_Alive packet.
  - ASCII format:
    - For all data transmission except the “GPRS Keep_Alive message”.
4. Supported Communication Types:

The VT300 device supports GSM frequency of 850MHz, 900MHz, 1800MHz, and 1900MHz. The device could be communicated with the base station via several communication ways such as following:

- **Direct connection**
  - USB communication: Auto-adjustable baud rate.
  - Serial Port: Adjustable baud rate.
- **GSM SMS messages**
- **GSM CS Data (GSM Circuited Switch Data). (Reserved)**
- **GPRS UDP**: Static IP address is required for controller center software.
- **GPRS TCP/IP**: Static IP address is required for controller center software

**Please note:**

VT300 currently does not support CDMA communication protocol.
5. Parameter Format for Returning Messages:

The returning position string includes a series parameters indicating as following:
(RP Header), Device ID, DateTime, Longitude, Latitude, Speed, Heading, Altitude, Satellite, Event ID, (Mileage), Input status, Analog port 1 status(input 1), Analog port 2 status (input 2), Output status, RFID TAG identification ,

Parameter format for returning string:

(RP Header): Header for returning message
Device ID: The ID of the device. (Maximum length is 10 digits)
DateTime: YYYYMMDDhhmmss (GMT)
Longitude: WGS-84 coordinate system
Latitude: WGS-84 coordinate system
Speed: 0~65535 km/h
Heading: 0~360 degrees
Altitude: Parameter column Reserved (currently showing ‘0’) 
Satellite: 0~12  
Event ID: xxx. Different event ID indicates different meaning of each returning message, Please refer to appendix 8.1 for detailed description.

Mileage: the mileage value in kilometer

Input status: Input status indication (bitwise), the returning value is in “decimal” format. Please convert it to “binary” mode to read the input status:
Ex:
If returning value is 28 (decimal) \( \leftrightarrow \) 11100 (Binary):

<table>
<thead>
<tr>
<th>Input port</th>
<th>IG/ACC</th>
<th>Input 4</th>
<th>Input 3</th>
<th>Input 2</th>
<th>Input 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binary code</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Status</td>
<td>On</td>
<td>On</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
</tr>
</tbody>
</table>

Voltage level of Analog 1: 0.00~30.00 V
Voltage level of Analog 2: 0.00~30.00 V
**Output Status**: Output status indication (bitwise), the returning value is in “decimal” format. Please convert it to “binary” mode to read the input status:

Ex:

If returning value is 2 (decimal) ⇒ 0010

**Corresponding table:**

<table>
<thead>
<tr>
<th>Output port</th>
<th>Output 4</th>
<th>Output 3</th>
<th>Output 2</th>
<th>Output 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binary code</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Status</td>
<td>Off</td>
<td>Off</td>
<td>On</td>
<td>off</td>
</tr>
</tbody>
</table>

**Please Note:**

- The above information is only for the returning string with “Event ID” parameter.

(Text message): Reserved for future used such as RFID or Barcode message.
6. Command List of WP Commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$WP+UNCFG</td>
<td>Set/Read device ID, Password, PIN Code of the SIM card and input delay time interval</td>
</tr>
<tr>
<td>$WP+COMMTYPE</td>
<td>Set/Read device communication type and its parameters</td>
</tr>
<tr>
<td>$WP+ROAMING</td>
<td>Enable/Disable GPRS roaming function</td>
</tr>
<tr>
<td>$WP+GETLOCATION</td>
<td>Get current position of the device</td>
</tr>
<tr>
<td>$WP+TRACK</td>
<td>Enable/disable/read tracking function to the device</td>
</tr>
<tr>
<td>$WP+REC</td>
<td>Enable/disable/read logging function to the device</td>
</tr>
<tr>
<td>$WP+CLREC</td>
<td>Erase all logging data from the memory of the device</td>
</tr>
<tr>
<td>$WP+DLREC</td>
<td>Download entire/selective logging data from the memory of the device</td>
</tr>
<tr>
<td>$WP+SPDLREC</td>
<td>Stop downloading logging data from the device.</td>
</tr>
<tr>
<td>$WP+REBOOT</td>
<td>Restart up the device</td>
</tr>
<tr>
<td>$WP+RESET</td>
<td>Reset all parameters to the manufactory default settings</td>
</tr>
<tr>
<td>$WP+PSM</td>
<td>Enable/disable “Power Saving Mode”</td>
</tr>
<tr>
<td>$WP+SETDR</td>
<td>Set default event for input, main power low/lost, and voltage level of internal battery</td>
</tr>
<tr>
<td>$WP+SETEVT</td>
<td>Enable (set)/disable/read user defined Geo-fencing /Input triggering/ Output Control event(s)</td>
</tr>
<tr>
<td>$WP+SETVIP</td>
<td>Set up to 5 different SMS phone number for user defined event.</td>
</tr>
<tr>
<td>$WP+SACC</td>
<td>Using Voltage level changing to detect ACC on/off event</td>
</tr>
<tr>
<td>$WP+SETAE</td>
<td>Set the analog event</td>
</tr>
<tr>
<td>$WP+AVL</td>
<td>Alignment the voltage reading of the device</td>
</tr>
<tr>
<td>$WP+DISEV</td>
<td>Enable/Disable sending message with event ID information</td>
</tr>
<tr>
<td>$WP+CLEV</td>
<td>Clear the user defined Geo-Fencing event(s)</td>
</tr>
<tr>
<td>$WP+QBCLR</td>
<td>Clear the queue buffer of the device.</td>
</tr>
<tr>
<td>$WP+IMEI</td>
<td>Query the IMEI number of the internal GSM module</td>
</tr>
<tr>
<td>$WP+SIMID</td>
<td>Query the identification of the SIM card</td>
</tr>
<tr>
<td>$WP+GSMINFO</td>
<td>Query the information about the GSM communication information</td>
</tr>
<tr>
<td>$WP+GBLAC</td>
<td>Enable/disable/query GSM BTS information</td>
</tr>
<tr>
<td>$WP+MBLAC</td>
<td>Execute this command to query GSM BTS location information</td>
</tr>
<tr>
<td>(Available for Cinterion BG2 GSM module)</td>
<td></td>
</tr>
<tr>
<td>$WP+SETBR</td>
<td>Execute this command to set the baud rate for the serial port or GPS port</td>
</tr>
<tr>
<td>$WP+VWT</td>
<td>Activate Voice monitoring function</td>
</tr>
<tr>
<td>$WP+VER</td>
<td>Query the current firmware version</td>
</tr>
<tr>
<td>$WP+NMEA</td>
<td>Enable/disable outputting GPS strings via serial port (NMEA-0183 format)</td>
</tr>
<tr>
<td>$WP+SPD</td>
<td>Enable/disable/read over-speed event</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>$WP+OUTC</td>
<td>Set output state/behavior.</td>
</tr>
<tr>
<td>$WP+BATC</td>
<td>Enable/disable backup battery function</td>
</tr>
<tr>
<td>$WP+SETTOW</td>
<td>Enable/disable the tow alert.</td>
</tr>
<tr>
<td>$WP+SETMILE</td>
<td>Set/Reset/Query mileage information</td>
</tr>
<tr>
<td>$WP+TMRR</td>
<td>Set up to reporting position for a certain time up to 3 times a day</td>
</tr>
<tr>
<td>$WP+DCMSG</td>
<td>Send a message from the device to control center</td>
</tr>
<tr>
<td>$WP+CDMSG</td>
<td>Send a message from the control center to device.</td>
</tr>
<tr>
<td>$WP+SETTZ</td>
<td>Set the time zone information</td>
</tr>
<tr>
<td>$WP+RPHEAD</td>
<td>Enable/Disable to carry the header in returning message.</td>
</tr>
</tbody>
</table>
7. Command Description:

<table>
<thead>
<tr>
<th>$WP$+UNCFG</th>
<th><strong>Description</strong></th>
<th>Execute this command to configure the device ID, device password, PIN code of the SIM card, and the delay time for input ports (input 1~4).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Format</strong></td>
<td><strong>Write</strong></td>
<td>$WP$+UNCFG+$[Tag]$=[Password],[Device ID],[New Password],[PIN code],[Input 1 delay time interval],[Input 2 delay time interval],[Input 3 delay time interval],[Input 4 delay time interval]</td>
</tr>
<tr>
<td></td>
<td><strong>Read</strong></td>
<td>$WP$+UNCFG+$[Tag]$=[Password],?</td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>$OK$:UNCFG+$[Tag]$= [Device ID],[New Password],[PIN code],[Input 1 delay time interval],[Input 2 delay time interval],[Input 3 delay time interval],[Input 4 delay time interval]</td>
<td></td>
</tr>
<tr>
<td><strong>Error Response</strong></td>
<td>$ERR$:UNCFG+$[Tag]$=[Error Code]</td>
<td></td>
</tr>
<tr>
<td><strong>Parameters</strong></td>
<td><strong>Tag</strong></td>
<td>The tag could consist of number or character string which can be defined by user. The returning message will include the same tag and it is helpful to recognize the acknowledgements with corresponding issued commands. This tag could be left as empty if it is not used. (Max. 5 characters)</td>
</tr>
<tr>
<td></td>
<td><strong>Password</strong></td>
<td>Password of the device. Only correct password can access the device and change the configuration. The minimum length of character is 4 digits; maximum length of character is 10 digits. It supports numerical characters only. Default password is “0000”</td>
</tr>
<tr>
<td></td>
<td><strong>Device ID</strong></td>
<td>Device identification number. The maximum length is 10 digits. Only integer can be used. Default device ID is 2000000001</td>
</tr>
<tr>
<td></td>
<td><strong>New Password</strong></td>
<td>New password of the device. Default is “0000”</td>
</tr>
<tr>
<td></td>
<td><strong>PIN Code</strong></td>
<td>The PIN Code of the SIM card. The maximum length is 8 digits.</td>
</tr>
</tbody>
</table>

*Note:* Please refer to appendix 8.2 for detailed error code descriptions.

*Note:* The most left digit is reserved in which must be ‘2’. Please use “” to clear parameter.
### Example

1. Issue command:
   
   ```
   $WP+UNCFG=0000,2000000002,0000,,10,10,10,10
   ```

2. Response:
   
   ```
   $OK:UNCFG=2000000002,0000,,10,10,10,10
   ```

### Notes

1. The SIM card will be locked by the TELCO if enter incorrect PIN code for 3 times then the PUK code is required. Please contact the local TELCO to unlock the SIM card. Please use the Culler phone to unlock the PUK once the card is locked.

2. The “Input Delay” status changing detection might not be able to be detected if the status changing happens in the “Input Delay” interval after precious state changing. (for both “on” and “off”)

   For example:
   
   If we set an event when input 1 status changing to “ON” state with delay interval of 4 seconds. Once the input 1 event triggers, the next “Input 1 on event” can be detected after 4 seconds in “Off” state. Please refer to the illustration as below:

   ![Diagram](image-url)
<table>
<thead>
<tr>
<th><strong>$WP+COMMTYPE</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Execute this command to set the primary communication type and its related parameters.</td>
</tr>
<tr>
<td><strong>Format</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Write</strong></td>
<td>$WP+COMMTYPE+[Tag]=[Password],[CommSelect], [SMS Base Phone No.],[CSD Base Phone No.],[GPRS_APN], [GPRS_Username],[GPRS_Password],[GPRS_Server_IP_Address],[GPRS_Server_Port],[GPRS_Keep_Alive Packet_Interval], [GPRS_DNS IP address]</td>
</tr>
<tr>
<td><strong>Read</strong></td>
<td>$WP+COMMTYPE+[Tag]=[Password],?</td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>$OK:COMMTYPE=[CommSelect],[SMS Base Phone No.],[CSD Base Phone No.], [GPRS_APN],[GPRS_Username],[GPRS_Password],[GPRS_Server_IP_Address], [GPRS_Server_Port],[GPRS_Keep_Alive Packet_Interval],[GPRS_DNS IP address]</td>
</tr>
</tbody>
</table>
| **Error Response** | $ERR:COMMTYPE+[Tag]=[Error Code]  
*Please refer to appendix 8.2 for detailed error code descriptions.* |
| **Parameters** |  |
| **Tag** | The tag could consist of number or character string which can be defined by user. The returning message will include the same tag and it is helpful to recognize the acknowledgements with corresponding issued commands. This tag could be left as empty if it is not used. (Max. 5 characters) |
| **Password** | Password of the device. Only correct password can access the device and change the configuration. The minimum length of character is 4 digits; maximum length of character is 10 digits. It supports numerical characters only. Default password is “0000” |
| **CommSelect** | Set primary communication type:  
0. Serial Port communication (8 pin connector)  
1. GSM SMS communication  
2. CSD: Circuit Switched Data communication  
(Reserved, currently not support)  
3. GPRS UDP communication  
4. GPRS TCP/IP communication  
5. USB port communication  
*Note:*  
Support COM numbers: COM 1~ COM 199 auto detection. |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SMS Base Phone No.</strong></td>
<td>Base phone number for the GSM SMS base station. Maximum length is 16 digits (could be ignored if uses GPRS communication).</td>
<td></td>
</tr>
<tr>
<td><strong>CSD Base Phone No.</strong></td>
<td>Base phone number for the GSM Circuit Switched Data communication. Maximum length is 16 digits (could be ignored if uses GPRS communication).</td>
<td></td>
</tr>
<tr>
<td>(Reserved)</td>
<td></td>
<td>Please use &quot;&quot; to clear the parameter.</td>
</tr>
<tr>
<td><strong>GPRS_APN</strong></td>
<td>Access Point Name for GPRS service (required for GPRS communication) The maximum length is 40 characters.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Please use &quot;&quot; to clear the parameter.</td>
</tr>
<tr>
<td><strong>GPRS_Username</strong></td>
<td>User name for GPRS service if applicable. The maximum length is 20 characters.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Please use &quot;&quot; to clear the parameter.</td>
</tr>
<tr>
<td><strong>GPRS_Password</strong></td>
<td>Password for GPRS service if applicable. The maximum length is 20 characters.</td>
<td></td>
</tr>
<tr>
<td><strong>GPRS_Server_IP_Address</strong></td>
<td>Default setting: 0.0.0.0&lt;br&gt;1. Static IP address: format xxx.xxx.xxx.xxx (Please do not use virtual IP address) &lt;br&gt;2. Host/Domain Name (GPRS_DNS server must be defined) for the base station. The maximum length is 40 characters.</td>
<td></td>
</tr>
<tr>
<td><strong>GPRS_Server_Port</strong></td>
<td>The port IP of the computer which the control center software is operating. The available range is from 1000~65535. Default setting: 1000</td>
<td></td>
</tr>
<tr>
<td><strong>GPRS_Keep_Alive Packet Interval</strong></td>
<td>GPRS Keep_Alive Packet is used to establish the GPRS connection and maintain the GPRS connectivity between the device and the base station. The range is between 0~65535 seconds. Default setting: 30 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Set to ‘0’ to disable sending GPRS Keep_Alive Packet. This parameter will not send any Keep_Alive Packet to the control center.</td>
</tr>
</tbody>
</table>
### GPRS_DNS Server

Domain Name System IP address. Please contact local ISP for the IP address of DNS server. Please use the xxx.xxx.xxx.xxx as the format for this parameter.

Default setting: 168.95.1.1

### Example

**Ex1:** GPRS TCP/IP with static IP address

Issue command:

```
$WP+COMMTYPE=0000,4,,,internet,,60.210.45.68,1050,30,168.95.1.1
```

Response:

```
$OK:COMMTYPE=4,,,internet,,,60.210.45.68,1050,30,168.95.1.1
```

**Ex2:** If the control center use DNS name (Domain Name System) server

Issue command:

```
$WP+COMMTYPE=0000,4,,,internet,,serverDNSNAME,6080,30,168.95.1.1
```

Response:

```
$OK:COMMTYPE=4,,,internet,,,serverDNSNAME,6080,30,168.95.1.1
```

### Notes

1) If primary communication is GPRS then both parameters “SMSPhone No.” and “CSD Phone No.” are not required.

2) The port number of GPRS_Server_Port parameter must be opened for the control center software and not conflict with others port which is occupied by OS or other software.

3) Please enable the GPRS service for the SIM card before start GPRS configuration.

   Also, please obtain related information such as “Access Point Name” (APN), user name (if applicable), and password (if applicable) for GPRS configuration ($WP+COMMTYPE command).

4) The Static IP address is required for the GPRS communication. Sometimes the failure of GPRS connection is caused by the firewall setting enabled.

5) The software developer must implement the function in the control center software in which must echo back exact GPRS Keep_Alive packet back to the device once the base station receives the GPRS Keep_Alive packet which was sent from the device to confirm the GPRS connection.

6) The performance of the GPRS connectivity might be affected by the Keep_Alive packet interval due to the TELCO policy for the dynamic IP address source control. The optimized Keep_Alive Packet interval needs to be tested in the local area in order to obtain the optimized interval (cost effective).
7) **Keep_Alive** message format (Data transmission by Hex format)

    typedef struct
    {
        unsigned short Keep_Alive_Header;
        unsigned short Keep_Alive_ID;
        unsigned long Keep_Alive_Device_ID;
    } Keep_AliveStruct;

    Keep_Alive_Header is **always** 0xD7D0

    Keep_Alive_ID is the sequence number for the Keep_Alive message

    Keep_Alive_Device_ID is the device identification number. The base station could use this information to recognize the current holding dynamic IP for each device.

    Ex., received Synchronization message following:

    0xD0 0xD7 0x1A 0x01 0xC7 0x54 0x44 0x3C

    Keep_Alive_Header = 0xD7 0xD0

    Keep_Alive_ID = 0x01 0x1A (Decimal = 282)

    Keep_Device_ID = 0x3C 0x44 0x54 0xC7 (Decimal = 101111111)

8) If the control center software is installed in a computer which is located in the “Intranet” then the parameter “GPRS_Server_IP” address should be the external one which connects to the router and the parameter “GPRS_Server_Port” should be the port number of the computer which is assigned by the router. If the parameter “GPRS_Server_IP” address is using “Virtual IP address” in the intranet then it will lead to the GPRS connection failure.

9) If the device is configured under GPRS mode (GPRS UDP/TCP), the device will send the acknowledgement for the receiving command or returning message back to the GMS SMS base phone number once the device receives the command from a GSM SMS phone number other than GSM SMS base phone number. If the GSM SMS base phone number is not set then the device will take the parameters but will not returning any message back to GSM SMS base phone number or GPRS server.
10) Please be aware that if the GSM base phone number is not set, the device has following behaviors:

- If the device receives any valid incoming command via GSM SMS, the device will execute the command, but all acknowledgements or returning message will **NOT** be sent and will be ignored.

- If the device is configured under GPRS mode (GSM base phone number is set), if the device receives any valid incoming GSM command from a phone number other than GSM base phone number then the device will execute this command and return all acknowledgements and returning messages back to the GSM base phone number.

11) If this command is issued over GSM SMS, please be aware the text length limitation of the GSM message.
**$WP+ROAMING**

**Description**
Execute this command to enable/disable GPRS roaming function. This command does not affect GSM SMS roaming service. If GPRS roaming function is disabled, the device will automatically close the GPRS session and all undelivered messages would be stored in the queue buffer. Those undelivered messages would be sent out whenever the device returns the non-GPRS roaming network.

**Format**
Write: $WP+ROAMING+[Tag]=[Password],[Enable/Disable]
Read: $WP+ROAMING+[Tag]=[Password],?

**Response**
$OK:ROAMING+[Tag]=[Enable/Disable]

**Error Response**
$ERR:ROAMING+[Tag]=[Error Code]
*Please refer to appendix 8.2 for detailed error code descriptions.*

**Parameters**
- **Tag**
  The tag could consist of number or character string which can be defined by user. The returning message will include the same tag and it is helpful to recognize the acknowledgements with corresponding issued commands. This tag could be left as empty if it is not used. (Max. 5 characters)
- **Password**
  Password of the device. Only correct password can access the device and change the configuration. The minimum length of character is 4 digits; maximum length of character is 10 digits. It supports numerical characters only. Default password is “0000”
- **[Enable/Disable]**
  0. Disable GPRS roaming function
  1. Enable GPRS roaming function

**Example**
Ex:
Issue command:
$WP+ROAMING=0000,1
Response:
$OK:ROAMING=1
<table>
<thead>
<tr>
<th><strong>Description</strong></th>
<th>Execute this command to get current position of the device</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Format</strong></td>
<td>Write $WP+$GETLOCATION+[Tag]=[Password]</td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>Device ID, DateTime, Longitude, Latitude, Speed, Heading, Altitude, Satellite, Event ID, Mileage, Input status, (Analog input 1), (Analog input 2), Output status</td>
</tr>
</tbody>
</table>
| **Error Response** | $ERR:GETLOCATION+[Tag]=[Error Code]  
*Please refer to appendix 8.2 for detailed error code descriptions.* |

**Parameters**
- **Tag**
  The tag could consist of number or character string which can be defined by user. The returning message will include the same tag and it is helpful to recognize the acknowledgements with corresponding issued commands. This tag could be left as empty if it is not used. (Max. 5 characters)
- **Password**
  Password of the device. Only correct password can access the device and change the configuration. The minimum length of character is 4 digits; maximum length of character is 10 digits. It supports numerical characters only. Default password is “0000”

**Example**
- **Ex:**
  - Issue command:
    - $WP+$GETLOCATION=0000
  - Response:
    - 2100000001,20070313170020,121.123456,12.654321,45,233,0,9,0,0,0,0.00,0.00,5

**Note**
- **1)** The device returns the last valid GPS information upon request regardless the GPS reception. The parameter of “Number of Satellites” is ‘0’ if there is no GPS reception or GPS is not fixed. Thus the parameter of “number of satellite” could be a reference to check whether there is GPS reception or not.
### $WP+TRACK

<table>
<thead>
<tr>
<th>Description</th>
<th>Execute this command to enable automatically reporting current position to the base station according to the parameter “mode” and related conditions.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Format</strong></td>
<td><strong>Write</strong> $WP+TRACK+[Tag]=[Password],[Mode],[Time],[Distance],[Number of Tracking Times],[Track basis],[CommSelect],[Heading]</td>
</tr>
<tr>
<td></td>
<td><strong>Read</strong> $WP+TRACK+[Tag]=[Password],?</td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td><strong>$OK:TRACK+[Tag]=[Mode],[Time],[Distance],[Number of Tracking Times],[Track basis],[CommSelect],[Heading]</strong></td>
</tr>
</tbody>
</table>
| **Error Response** | **$ERR:TRACK+[Tag]=[Error Code]**  
*Please refer to appendix 8.2 for detailed error code descriptions.*  |

<table>
<thead>
<tr>
<th>Parameters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tag</strong></td>
<td>The tag could consist of number or character string which can be defined by user. The returning message will include the same tag and it is helpful to recognize the acknowledgements with corresponding issued commands. This tag could be left as empty if it is not used. (Max. 5 characters)</td>
</tr>
<tr>
<td><strong>Password</strong></td>
<td>Password of the device. Only correct password can access the device and change the configuration. The minimum length of character is 4 digits; maximum length of character is 10 digits. It supports numerical characters only. Default password is “0000”</td>
</tr>
</tbody>
</table>
| **Mode** | 0. Disable (Stop tracking)  
1. **Time mode:**  
The position information is sent to the base station according to the required time interval, only whole number can be used.  
Effective range for different communication types:  
   - **Direct Connection:** 1~65535 seconds.  
   - **GSM SMS:** 15~65535 seconds  
   - **GSM CSD:** 5~65535 seconds  
   - **GPRS UDP/TCP/IP:** 5~65535 seconds.  
2. **Distance mode:**  
The position information is sent to the base station according to the required distance interval, only whole number can be used.  
Effective range for different communication types:  
   - **Direct Connection:** 25~65535 meters.  
   - **GSM SMS:** 300~65535 meters.  
   - **GSM CSD:** 100~65535 meters.  
   - **GPRS UDP/TCP/IP:** 100~65535 meters.  |
### 3. Time AND Distance:
The position information is sent back to the base station when following BOTH conditions are satisfied:
- “Time Interval” is reached.
- “Distance Interval” is reached.

### 4. Time OR Distance
The position information is sent to the base station when one of the following condition is satisfied:
- “Time Interval” is reached.
- “Distance Interval” is reached.

### 5. Heading mode:
The position information is sent when the “Heading (direction)” parameter is changed beyond the assigned degrees. Please enter the required value in the “Heading” column.

### 6. Heading OR Time
The position information is sent back to the base station when one of the following condition is satisfied:
- “Heading (direction)” parameter is changed beyond the assigned degrees
- Required “Time Interval” is reached.

### 7. Heading OR Distance
The position information is sent whenever one of the following condition is satisfied:
- “Heading (direction)” parameter is changed beyond assigned degrees
- Required “Distance Interval” is reached.

### 8. Heading OR (Time AND Distance)
The position information is sent back to the base station when one of the following condition is satisfied:
- “Heading (direction)” parameter is changed beyond assigned degrees
- Required BOTH “Time AND Distance Interval” are satisfied.
<table>
<thead>
<tr>
<th>Time Interval</th>
<th>Specify elapsed time interval to report current position. Default value is ‘0’. The effective range, please refer to the “mode” parameters option ‘1’ =&gt; “Time mode”.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance Interval</td>
<td>Specify elapsed distance interval to report current position. Default value is ‘0’. The effective range, please refer to the “mode” parameters option ‘2’ =&gt; “Distance mode”.</td>
</tr>
</tbody>
</table>
| Number of Tracking Times | Frequency (number of times the report needs to be sent). Effective range is from 0~65535. Set ‘0’ indicating “Continuously tracking.”
Note: The counter of “Times” will be displayed how many times left while the command is executing when we query the command parameters. |
| Track Basis | 0. Tracking report is sent ONLY IF GPS is fixed.
1. Tracking report is sent regardless the GPS signal reception
2. Track report is sent when ACC is on and GPS is fixed
3. Track report is sent when ACC is on regardless whether the GPS signal is fixed or not. |
| CommSelect | Set the output communication channel:
0. Serial port communication
1. GSM SMS communication
2. CSD: Circuit Switched Data communication (Reserved, currently not support)
3. GPRS UDP communication
4. GPRS TCP/IP communication
5. USB port
Note: Support COM numbers: COM 1~ COM 199 auto detectable. |

9. **Heading OR Time OR Distance**
   The position information is sent whenever one of the following condition is satisfied:
   a. When the “Heading (direction)” parameter is changed beyond assigned degrees.
   b. Required “Time Interval” is reached.
   c. Required “Distance Interval” is reached.
### Example

<table>
<thead>
<tr>
<th>Heading</th>
<th>The effective value is from 10°~90 degrees.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex:</td>
<td></td>
</tr>
<tr>
<td>Issue command:</td>
<td></td>
</tr>
<tr>
<td>$WP+TRACK=0000,1,5,0,5,0,4,15</td>
<td></td>
</tr>
<tr>
<td>Response:</td>
<td></td>
</tr>
<tr>
<td>$OK:TRACK=1,5,0,5,0,4,15</td>
<td></td>
</tr>
<tr>
<td>210000001,20070313170020,121.123456,12.654321,o,233,0,9,2,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0</td>
<td></td>
</tr>
<tr>
<td>210000001,20070313170025,121.123456,12.654321,o,233,0,9,2,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0</td>
<td></td>
</tr>
<tr>
<td>210000001,20070313170030,121.123456,12.654321,o,233,0,9,2,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0</td>
<td></td>
</tr>
<tr>
<td>210000001,20070313170035,121.123456,12.654321,o,233,0,9,2,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0</td>
<td></td>
</tr>
<tr>
<td>210000001,20070313170040,121.123456,12.654321,o,233,0,9,2,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0</td>
<td></td>
</tr>
</tbody>
</table>

### Notes

1) The mode 2, 3, 5, 7, and 8 require the GPS reception. If the GPS reception is not stable then the accuracy will be decreased.

2) “Track basis” can be set to 1 or 3 when mode is set to 1, 4, 6, or 9.
### Description
Execute this command to enable automatically logging current position into the memory of the device according to the parameter “Mode” and corresponding conditions.

### Format

#### Write
$$WP+REC+[Tag]=\text{[Password]},\text{[Mode]},\text{[Time]},\text{[Distance]},\text{[Number of Times]},\text{[Record Basis]},\text{[Heading]}$$

#### Read
$$WP+REC+[Tag]=\text{[Password]},?$$

### Response
$$OK:REC+[Tag]=\text{[Mode]},\text{[Time]},\text{[Distance]},\text{[Number of Times]},\text{[Record basis]},\text{[Heading]}$$

### Error Response:
$$ERR:REC+[Tag]=\text{[Error Code]}$$

*Please refer to appendix 8.2 for detailed error code descriptions.*

### Parameters

| Tag | The tag could consist of number or character string which can be defined by user. The returning message will include the same tag and it is helpful to recognize the acknowledgements with corresponding issued commands. This tag could be left as empty if it is not used. (Max. 5 characters) |
| Password | Password of the device. Only correct password can access the device and change the configuration. The minimum length of character is 4 digits; maximum length of character is 10 digits. It supports numerical characters only. Default password is “0000” |

<table>
<thead>
<tr>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>0. Disable (Stop storing position data into flash memory)</td>
</tr>
<tr>
<td>1. Time mode:</td>
</tr>
<tr>
<td>The position information is logged into the memory of the device according to the required time interval, only integer can be used. Effective parameters:</td>
</tr>
<tr>
<td>Range: 1~65535 seconds.</td>
</tr>
<tr>
<td>2. Distance mode:</td>
</tr>
<tr>
<td>The position information is logged into the memory of the device according to the required distance interval, only integer can be used. Range: 25~65535 meters.</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
</tr>
<tr>
<td>For vehicle application, suggest to set 50 meters or above for better performance.</td>
</tr>
</tbody>
</table>
3. **Time AND Distance:**
   The position information is logged into the memory of the device according to the required “Time interval” AND “Distance interval”; the position information is not logged if one of the “Time interval” and “Distance interval” does not satisfy.

4. **Time OR Distance**
   The position information is logged when one of the following condition is satisfied:
   a. “Time Interval” is reached.
   b. “Distance Interval” is reached.

5. **Heading mode:**
   The position information is logged when the “Heading (direction)” parameter is changed beyond the assigned degrees. Please enter the required value in the “Heading” column.

6. **Heading OR Time**
   The position information is logged when one of the following condition is satisfied:
   a. “Heading (direction)” parameter is changed beyond the assigned degrees
   b. Required “Time Interval” is reached.

7. **Heading OR Distance**
   The position information is logged whenever one of the following condition is satisfied:
   a. “Heading (direction)” parameter is changed beyond assigned degrees
   b. Required “Distance Interval” is reached.

8. **Heading OR (Time AND Distance)**
   The position information is logged when one of the following condition is satisfied:
   a. “Heading (direction)” parameter is changed beyond assigned degrees
   b. Required BOTH “Time AND Distance Interval” are satisfied.
9. **Heading OR Time OR Distance**
   The position information is logged whenever one of the following condition is reached:
   a. When the “Heading (direction)” parameter is changed beyond assigned degrees.
   b. Required “Time Interval” is reached.
   c. Required “Distance Interval” is reached.

| Time Interval | Specify elapsed time interval to report current position. Default value is ‘0’. The effective range, please refer to the “mode” parameters option 1 “Time mode”.
|-----------------|--------------------------------------------------------------------------------------------------|
| Distance Interval | Specify elapsed distance interval to report current position. Default value is ‘0’. The effective range, please refer to the “mode” parameters option 2 “Distance mode”.
| Number of Times | Frequency (number of times the report needs to be sent). Effective range is from 0~65535. Set ‘0’ indicating “Continuously logging”.
| Record Basis | 0. Logging function is executed ONLY IF GPS is fixed.
| 1. Logging function is executed regardless the GPS signal reception.
| 2. Logging function is executed when ACC is on and GPS is fixed.
| 3. Logging function is executed when ACC is on regardless whether the GPS signal is fixed or not.
| Heading | The effective value is from 10~90 degrees.

### Example

**Ex:**

Issue command:

```plaintext
$WP+REC=0000,1,5,0,0,0,15
```

Response:

```plaintext
$OK:REC=1,5,0,0,0,0,15
```

### Notes

1) This function follows the FIFO (first in first out algorithm) algorithm.
2) The mode 2,3,5,7, and 8 require the GPS reception. If the GPS reception is not stable then the accuracy will be decreased.
3) “Record Basis” parameter can be set to 1 or 3 when mode is set to 1,4,6, or 9.