



# AirPrime XP2210

## AT Command Reference Guide



**SIERRA**  
WIRELESS®

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## Revision History

Revision number	Release date	Changes
1.0	March 04, 2020	Creation
2.0	April 01, 2020	<p>Added Boot-up Message</p> <p>Removed +GNSSUMODE</p> <p>Removed AT+GNSSLOWP</p> <p>Updated AT+GNSSUTC:</p> <ul style="list-style-type: none"> <li>Removed Write command</li> <li>Changed Read response</li> <li>Revised &lt;year&gt;</li> <li>Removed &lt;date&gt; and &lt;time&gt;</li> <li>Revised note</li> <li>Remove Write example</li> </ul> <p>Updated AT+GNSSPVTL:</p> <ul style="list-style-type: none"> <li>Added &lt;log size&gt; parameter</li> <li>Revised Get PVT Log data example</li> </ul> <p>Updated AT+GNSSSENL:</p> <ul style="list-style-type: none"> <li>Added &lt;log size&gt; parameter</li> <li>Edited AT+GNSSSENL</li> </ul> <p>Updated AT+GNSSLLE:</p> <ul style="list-style-type: none"> <li>Revised Write (&lt;action&gt; = 3)</li> <li>Revised Read response</li> <li>Added &lt;lle_select&gt; parameter</li> <li>Revised Examples</li> </ul>
3.0	September 25, 2020	<p>Changed AT+GNSSPVTL sample Get PVT Log</p> <p>Revised error codes in AT+GNSSLLE</p> <p>Added <a href="#">PVT Log Table</a></p> <p>Added <a href="#">Sensor Log Table</a></p> <p>Updated AT+GNSSUTC</p> <ul style="list-style-type: none"> <li>Revised the description</li> </ul> <p>Updated AT+GNSSHSUDR</p> <ul style="list-style-type: none"> <li>Revised the note</li> </ul> <p>Added AT+GNSSBUP</p> <p>Added AT+GNSSURST</p>
4.0	December 2020	<p>Updated AT+GNSSCONFIG</p> <ul style="list-style-type: none"> <li>Revised the description</li> </ul>

# >> Contents

<b>About This Guide</b> .....	<b>7</b>
Introduction .....	7
Command timing .....	7
Interval timing .....	7
Boot-up Message .....	7
Escape sequence .....	7
Result codes .....	7
Response formats .....	7
References .....	8
Abbreviations and Terms Used .....	8
Document structure .....	8
<b>General Commands</b> .....	<b>11</b>
Introduction .....	11
Command summary .....	11
<b>Other Commands</b> .....	<b>24</b>
Introduction .....	24
Command summary .....	24
<b>AGNSS Commands</b> .....	<b>36</b>
Introduction .....	36
Command Summary .....	36
Command References .....	37
<b>System Commands</b> .....	<b>40</b>
Introduction .....	40
Command summary .....	40
Command reference .....	41

<b>Customized NMEA Sentences</b> .....	<b>44</b>
Introduction .....	44
Command summary.....	44
Command reference .....	45
\$PSWIVELW Details .....	45
\$PSWIRAW Details .....	46
\$PSWIEPE Details .....	47
\$PSWIUSEN Details .....	48
<b>Error Codes</b> .....	<b>49</b>
<b>Abbreviations</b> .....	<b>50</b>
<b>PVT Log Table</b> .....	<b>52</b>
<b>Sensor Log Table</b> .....	<b>54</b>

# >> 1: About This Guide

## Introduction

This document describes proprietary AT commands available for Sierra Wireless' AirPrime® XP2210 modules. These commands are intended for use by OEMs.

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*Note: For questions or concerns relating to command implementation, please contact your Sierra Wireless account representative.*

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## Command timing

### Interval timing

Some commands require time to process before additional commands are entered. When building automated test scripts, ensure that sufficient delays are embedded, where necessary, to avoid these errors.

### Boot-up Message

When the XP2210 module initializes, the following message is shown:

```
+SWIXP2210,READY*20<CR><LF>
```

### Escape sequence

The AT sequence “+++” can be used to exit the +GNSSLLE injection data mode.

## Result codes

The result code OK is typically returned when the command has been executed. An ERROR code may be returned if parameters are out of range. It is also returned if the command is not recognized or is not permitted in the current state or condition of the module.

## Response formats

Response formats shown in this document are intended to accurately describe the command query and it requires "\r\n" at the end.

A module response usually places "\*<CRC>\r\n" at the end.

For example:

```
AT+GNSSSTART=0<CR><LF>
```

```
+GNSSSTART,0,OK*7D<CR><LF>
```

## References

For additional product-specific documentation, refer to [source.sierrawireless.com](http://source.sierrawireless.com).

## Abbreviations and Terms Used

This document makes use of abbreviations and terms that are in common use in data communications and GNSS technology.

For details, see [Acronyms and Definitions](#) under [Abbreviations](#)

## Document structure

This document describes the proprietary commands found in the chapters listed below.

General AT Commands — Commonly about commonly used functions

**Table 1-1: General Commands (Summary)**

Command	Description	Page
AT+GNSSSTOP	Stop positioning and enter standby states	12
AT+GNSSSTART	Execute GNSS startup process	12
AT+GNSSSATE	Configure and query GNSS search mode	13
AT+GNSSSLP	Transfer receiver into sleep states	14
AT+GNSSUTC	Configure and acquire current UTC time	15
AT+GNSSUTCOR	Acquire the UTC time correction information	16
AT+GNSSGPST	Acquire current GPS Time	17
AT+GNSSPOS	Set position information into receiver	18
AT+GNSSCONFIG	Recover configuration and change it to factory default	18
AT+GNSSNMEA	Configure and acquire general NMEA sentence output types	19
AT+GNSSPPS	Configure and query output time in one pulse-per-second (1PPS) function	21
AT+GNSSHSUDR	Configure the NMEA output in 10 Hz	22

## Other Commands — Advanced functions

**Table 1-2: Other Commands (Summary)**

Command	Description	Page
AT+GNSSTHRES	Configure and query the GNSS threshold	25
AT+GNSSTRAW	Acquire specific data from the GNSS receiver	27
AT+GNSSTUSEN	Acquire sensor raw measurement and enable / disable sensor raw measurement NMEA output	28
AT+GNSSTSEPE	Configure and query the horizontal and vertical Estimated Position Error (EPE) based on HDOP and VDOP	29
AT+GNSSTVELWARN	Configure and query GNSS speed warning feature	30
AT+GNSSTPRTL	Configure and query the log and configuration of PVT log in flash	31
AT+GNSSTSEN	Configure and query the log and configuration of the sensor log in flash	33
AT+GNSSTBUP	Configure and acquire UDR backup data	35
AT+GNSSTURST	Clear UDR data (orientation, last location, and attitude data)	35

## AGNSS Commands — Assisted Global Positioning System related commands

**Table 1-3: AGNSS Commands (Summary)**

Command	Description	Page
AT+GNSSTLLE	Configure connecting AGNSS function and acquire the status	37

## System Commands — System information related commands

**Table 1-4: System Commands (Summary)**

Command	Description	Page
AT+GNSSTFER	Erase the currently saved firmware	41
AT+GNSSTFSN	Acquire the serial number of the GNSS module	41
AT+GNSSTVERS	Acquire the SWIR-defined firmware version number	41
AT+GNSSTRTC	Get CPU time and the elapsed time since system startup	42
AT+GNSSTBRATE	Set the baud rate of communication interface	42
AT+GNSSTRTCXO	Acquire TCXO offset value	43
AT+GNSSTREBOOT	Reboot module	43
AT+GNSSTSTACK	Get a size of unused stack	43

Custom NMEA Sentences — Normal output sentences developed by Sierra Wireless

**Table 1-5: Further Commands (Summary)**

<b>Command</b>	<b>Description</b>	<b>Page</b>
<b>\$PSWIVELW</b>	<a href="#">\$PSWIVELW Details</a>	<a href="#">45</a>
<b>\$PSWIRAW</b>	<a href="#">\$PSWIRAW Details</a>	<a href="#">46</a>
<b>\$PSWIEPE</b>	<a href="#">\$PSWIEPE Details</a>	<a href="#">47</a>
<b>\$PSWIUSEN</b>	<a href="#">\$PSWIUSEN Details</a>	<a href="#">48</a>

## >> 2: General Commands

### Introduction

This chapter describes general AT commands.

### Command summary

The following table lists the commands described in this chapter.

**Table 2-1: General AT Commands (Summary)**

Command	Description	Page
<b>AT+GNSSSTOP</b>	Stop positioning and enter standby states	12
<b>AT+GNSSSTART</b>	Execute GNSS startup process	12
<b>AT+GNSSSATE</b>	Configure and query GNSS search mode	13
<b>AT+GNSSSLP</b>	Transfer receiver into sleep states	14
<b>AT+GNSSUTC</b>	Configure and acquire current UTC time	15
<b>AT+GNSSUTCOR</b>	Acquire the UTC time correction information	16
<b>AT+GNSSGPST</b>	Acquire current GPS Time	17
<b>AT+GNSSPOS</b>	Set position information into receiver	18
<b>AT+GNSSCONFIG</b>	Recover configuration and change it to factory default	18
<b>AT+GNSSNMEA</b>	Configure and acquire general NMEA sentence output types	19
<b>AT+GNSSPPS</b>	Configure and query output time in one pulse-per-second (1PPS) function	21
<b>AT+GNSSHSUDR</b>	Configure the NMEA output in 10 Hz	22

## Command reference

Table 2-2: General Commands (Detail)

Command	Description
<b>AT+GNSSTOP</b>	<p><b>Stop positioning and enter standby states</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>Execute: <b>AT+GNSSTOP</b> Response: +GNSSTOP,OK or +GNSSTOP,&lt;error code&gt; Purpose: Configure module into standby mode.</li> </ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>Stop positioning: AT+GNSSTOP&lt;CR&gt;&lt;LF&gt; +GNSSTOP,OK*39&lt;CR&gt;&lt;LF&gt;</li> </ul>
<b>AT+GNSSTART</b>	<p><b>Execute GNSS startup process</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>Write: <b>AT+GNSSTART=&lt;mode&gt;</b> Response: +GNSSTART,&lt;mode&gt;,OK or +GNSSTART,&lt;error code&gt; Purpose: Configure module to restart by specified mode.</li> </ul> <p><b>Parameters:</b></p> <p>&lt;mode&gt; (Restart mode)</p> <ul style="list-style-type: none"> <li>0—Cold Start</li> <li>1—Warm Start</li> <li>2—Hot Start</li> </ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>Cold Start: AT+GNSSTART=0&lt;CR&gt;&lt;LF&gt; +GNSSTART,0,OK*7D&lt;CR&gt;&lt;LF&gt;</li> <li>Hot Start: AT+GNSSTART=2&lt;CR&gt;&lt;LF&gt; +GNSSTART,2,OK*7F&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 2-2: General Commands (Detail) (Continued)

Command	Description
<b>AT+GNSSSATE</b>	<p data-bbox="440 310 1003 342"><b>Configure and query GNSS search mode</b></p> <hr/> <p data-bbox="440 390 1159 415"><i>Note: Confirm which search modes are supported by your firmware.</i></p> <hr/> <p data-bbox="440 474 516 499"><b>Usage:</b></p> <ul data-bbox="440 510 1382 762" style="list-style-type: none"> <li>• Write: <b>AT+GNSSSATE=&lt;GP&gt;,&lt;GL&gt;,&lt;GA&gt;,&lt;Reserved&gt;,&lt;BD&gt;,&lt;QZ&gt;,&lt;SBAS&gt;</b>  Response: <b>+GNSSSATE,&lt;GP&gt;,&lt;GL&gt;,&lt;GA&gt;,&lt;Reserved&gt;,&lt;BD&gt;,&lt;QZ&gt;,&lt;SBAS&gt;,OK</b>  or <b>+GNSSSATE,&lt;error code&gt;</b>  Purpose: Configure module to use specified satellite.</li> <li>• Read: <b>AT+GNSSSATE?</b>  Response: <b>+GNSSSATE,&lt;GP&gt;,&lt;GL&gt;,&lt;GA&gt;,&lt;Reserved&gt;,&lt;BD&gt;,&lt;QZ&gt;,&lt;SBAS&gt;,OK</b>  or <b>+GNSSSATE,&lt;error code&gt;</b>  Purpose: Acquire current satellite system used for positioning.</li> </ul> <p data-bbox="440 772 570 798"><b>Parameters:</b></p> <p data-bbox="440 808 1292 833">&lt;GP&gt; (GPS configuration). Note that the GPS is mandatory, it is always enabled.</p> <ul data-bbox="472 840 626 865" style="list-style-type: none"> <li>• 1—Enable</li> </ul> <p data-bbox="440 877 781 903">&lt;GL&gt; (GLONASS configuration)</p> <ul data-bbox="472 909 721 963" style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable (default)</li> </ul> <p data-bbox="440 978 743 1003">&lt;GA&gt; (Galileo configuration)</p> <ul data-bbox="472 1010 634 1035" style="list-style-type: none"> <li>• 0—Disable</li> </ul> <p data-bbox="440 1050 743 1075">&lt;Reserved&gt; (Reserved field)</p> <ul data-bbox="472 1081 597 1106" style="list-style-type: none"> <li>• Value: 0</li> </ul> <p data-bbox="440 1121 743 1146">&lt;BD&gt; (BeiDou configuration)</p> <ul data-bbox="472 1152 634 1178" style="list-style-type: none"> <li>• 0—Disable</li> </ul> <p data-bbox="440 1192 732 1218">&lt;QZ&gt; (QZSS configuration)</p> <ul data-bbox="472 1224 721 1278" style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable (default)</li> </ul> <p data-bbox="440 1293 760 1318">&lt;SBAS&gt; (SBAS configuration)</p> <ul data-bbox="472 1325 634 1350" style="list-style-type: none"> <li>• 0—Disable</li> </ul> <hr/> <p data-bbox="440 1388 1013 1413"><i>Note: XP2210 only supports GPS+GLONASS+QZSS.</i></p> <hr/> <p data-bbox="440 1472 558 1497"><b>Examples:</b></p> <ul data-bbox="472 1507 1036 1690" style="list-style-type: none"> <li>• Change search mode to GPS+GLONASS+QZSS:  <b>AT+GNSSSATE=1,1,0,0,0,1,0&lt;CR&gt;&lt;LF&gt;</b>  <b>+GNSSSATE,1,1,0,0,0,1,0,OK*3F&lt;CR&gt;&lt;LF&gt;</b></li> <li>• Read search mode:  <b>AT+GNSSSATE?&lt;CR&gt;&lt;LF&gt;</b>  <b>+GNSSSATE,1,1,0,0,0,1,0,OK*3F&lt;CR&gt;&lt;LF&gt;</b></li> </ul>

**Table 2-2: General Commands (Detail) (Continued)**

Command	Description
<b>AT+GNSSSLP</b>	<p><b>Transfer receiver into sleep states</b></p> <hr/> <p><i>Note: When sleep 0 mode is enabled, wake up will get <b>+GNSSSLP,WAKEUP,OK*5F</b></i></p> <hr/> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>Write: <b>AT+GNSSSLP=&lt;mode&gt;,&lt;period&gt;</b></li> <li>Response: <b>+GNSSSLP,&lt;mode&gt;,&lt;period&gt;,OK</b> or <b>+GNSSSLP,&lt;error code&gt;</b></li> <li>Purpose: Configure module into sleep mode with specified period.</li> </ul> <p><b>Parameters:</b></p> <p>&lt;mode&gt; (Sleep mode)</p> <ul style="list-style-type: none"> <li>0—Sleep 0 mode</li> <li>1—Sleep 1 mode</li> </ul> <p>&lt;period&gt; (Sleep time)</p> <ul style="list-style-type: none"> <li>Unit: second</li> <li>1-604800 s—Sleep period</li> </ul> <p>Note: For details on sleep states, see <a href="#">Table 2-3</a></p> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>Set module to sleep 0 mode and automatically hot start after sleeping for 3 seconds:  <pre>AT+GNSSSLP=0,3&lt;CR&gt;&lt;LF&gt; +GNSSSLP,0,3,OK*6D&lt;CR&gt;&lt;LF&gt; +GNSSSLP,WAKEUP,OK*5F&lt;CR&gt;&lt;LF&gt;</pre> </li> <li>Set module to sleep 1 mode and automatically reboot after sleeping for 3 seconds:  <pre>AT+GNSSSLP=1,3&lt;CR&gt;&lt;LF&gt; +GNSSSLP,1,3,OK&lt;CR&gt;&lt;LF&gt;</pre> </li> <li>Set module to sleep 0 mode and sleep for 5 seconds:  <pre>AT+GNSSSLP=0,5&lt;CR&gt;&lt;LF&gt; +GNSSSLP,0,5,OK*6B&lt;CR&gt;&lt;LF&gt; +GNSSSLP,WAKEUP,OK*5F&lt;CR&gt;&lt;LF&gt;</pre> </li> </ul>

Table 2-2: General Commands (Detail) (Continued)

Command	Description
<b>AT+GNSSUTC</b>	<p data-bbox="440 310 992 342"><b>Configure and acquire current UTC time</b></p> <hr/> <p data-bbox="440 390 1406 478"><i>Note: Use UTC±0. Do not use local time, which has a time-zone offset. The accuracy of the reference UTC would be better and faster if it is less than 60 seconds. If the accuracy of the reference UTC is over 60 seconds, TTFF will be longer.</i></p> <hr/> <p data-bbox="440 537 516 562"><b>Usage:</b></p> <ul data-bbox="440 573 1425 825" style="list-style-type: none"> <li>• Write: <b>AT+GNSSUTC=&lt;year&gt;,&lt;month&gt;,&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;sec&gt;,&lt;usec&gt;,OK</b>  Response: +GNSSUTC,&lt;year&gt;,&lt;month&gt;,&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;sec&gt;,&lt;usec&gt;,OK  or +GNSSUTC,&lt;error code&gt;  Purpose: Configure the UTC time into the module.</li> <li>• Read: <b>AT+GNSSUTC?</b>  Response: +GNSSUTC,&lt;year&gt;,&lt;month&gt;,&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;sec&gt;,&lt;usec&gt;,OK  or +GNSSUTC,&lt;error code&gt;  Purpose: Get the UTC time from the module.</li> </ul> <p data-bbox="440 842 570 867"><b>Parameters:</b></p> <p data-bbox="440 877 708 926">&lt;year&gt; (UTC Year)  • Range: 1999-2037</p> <p data-bbox="440 947 675 995">&lt;month&gt; (UTC Month)  • Range: 1-12</p> <p data-bbox="440 1016 643 1064">&lt;day&gt; (UTC Day)  • Range: 1-31</p> <p data-bbox="440 1085 643 1134">&lt;hour&gt; (UTC Hour)  • Range: 0-23</p> <p data-bbox="440 1155 659 1203">&lt;min&gt; (UTC Minute)  • Range: 0-59</p> <p data-bbox="440 1224 659 1272">&lt;sec&gt; (UTC Second)  • Range: 0-59</p> <p data-bbox="440 1293 732 1341">&lt;usec&gt; (UTC Microsecond)  • Range: 0-999999</p> <hr/> <p data-bbox="440 1392 1382 1446"><i>Note: The starting UTC time is from 1999.1.1 0:0:0.00  UTC format: yyyy,mm,dd,hh,mm.fffff (Year,Month,Day,Hour,Minute,Second.Microsecond)</i></p> <hr/> <p data-bbox="440 1488 553 1514"><b>Examples:</b></p> <ul data-bbox="472 1524 1195 1703" style="list-style-type: none"> <li>• Configure the UTC time into the module.:  AT+GNSSUTC=2020,6,23,17,50,55,724000&lt;CR&gt;&lt;LF&gt;  +GNSSUTC,2020,06,23,17,50,55.724000,OK*48&lt;CR&gt;&lt;LF&gt;</li> <li>• Acquire GNSS UTC Time:  AT+GNSSUTC?&lt;CR&gt;&lt;LF&gt;  +GNSSUTC,2013,07,02,03,38,07.221606,OK*46&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 2-2: General Commands (Detail) (Continued)

Command	Description
AT+GNSSUTCOR	<p data-bbox="440 310 1057 342"><b>Acquire the UTC time correction information</b></p> <hr data-bbox="440 373 1463 380"/> <p data-bbox="440 390 1243 417"><i>Note: You must receive the full ephemeris before you can get the valid data.</i></p> <hr data-bbox="440 436 1463 443"/> <p data-bbox="440 474 516 501"><b>Usage:</b></p> <ul data-bbox="440 508 1256 661" style="list-style-type: none"> <li data-bbox="440 508 1256 598">• Read: <b>AT+GNSSUTCOR?</b> Response: +GNSSUTCOR,&lt;Valid&gt;,&lt;A0&gt;,&lt;A1&gt;,&lt;dtLS&gt;,&lt;Tot&gt;,&lt;Wnt&gt;,&lt;WNlfsf&gt;,&lt;Dn&gt;,&lt;DTlfsf&gt;,OK or +GNSSUTCOR,&lt;error code&gt;</li> <li data-bbox="440 636 1076 661">• Purpose: Get UTC time correction data from module.</li> </ul> <p data-bbox="440 674 570 701"><b>Parameters:</b></p> <p data-bbox="440 711 948 793">&lt;Valid&gt; (Correction data)</p> <ul data-bbox="472 737 948 793" style="list-style-type: none"> <li data-bbox="472 737 948 764">• 0—UTC correction data are not available</li> <li data-bbox="472 768 948 793">• 1—UTC correction data are available</li> </ul> <p data-bbox="440 810 753 865">&lt;A0&gt; (UTC parameter A0)</p> <ul data-bbox="472 840 753 865" style="list-style-type: none"> <li data-bbox="472 840 753 865">• Unit: (seconds)/(2<sup>^</sup>-30)</li> </ul> <p data-bbox="440 882 837 936">&lt;A1&gt; (UTC parameter A1)</p> <ul data-bbox="472 911 837 936" style="list-style-type: none"> <li data-bbox="472 911 837 936">• Unit: (seconds/second)/(2<sup>^</sup>-50)</li> </ul> <p data-bbox="440 953 1157 1003">&lt;dtLS&gt; (UTC time difference due to leap seconds before the event.)</p> <ul data-bbox="472 978 656 1003" style="list-style-type: none"> <li data-bbox="472 978 656 1003">• Unit: seconds</li> </ul> <p data-bbox="440 1020 859 1068">&lt;Tot&gt; (UTC reference time of the week)</p> <ul data-bbox="472 1047 656 1068" style="list-style-type: none"> <li data-bbox="472 1047 656 1068">• Unit: seconds</li> </ul> <p data-bbox="440 1085 849 1140">&lt;Wnt&gt; (UTC reference week number.)</p> <ul data-bbox="472 1115 634 1140" style="list-style-type: none"> <li data-bbox="472 1115 634 1140">• Unit: weeks</li> </ul> <p data-bbox="440 1157 1192 1211">&lt;WNlfsf&gt; (UTC week number when the next leap second event occurs.)</p> <ul data-bbox="472 1186 634 1211" style="list-style-type: none"> <li data-bbox="472 1186 634 1211">• Unit: weeks</li> </ul> <p data-bbox="440 1228 1183 1278">&lt;Dn&gt; (UTC day of the week when the next leap second event occurs.)</p> <ul data-bbox="472 1262 618 1278" style="list-style-type: none"> <li data-bbox="472 1262 618 1278">• Unit: days</li> </ul> <p data-bbox="440 1295 1105 1350">&lt;DTlfsf&gt; (UTC time difference due to leap seconds after event.)</p> <ul data-bbox="472 1325 656 1350" style="list-style-type: none"> <li data-bbox="472 1325 656 1350">• Unit: seconds</li> </ul> <p data-bbox="440 1362 553 1390"><b>Examples:</b></p> <ul data-bbox="472 1396 1252 1577" style="list-style-type: none"> <li data-bbox="472 1396 1252 1478">• Read available UTC correction data: AT+GNSSUTCOR?&lt;CR&gt;&lt;LF&gt; +GNSSUTCOR,1,0,0,18,319488,21,137,7,18,OK*2E&lt;CR&gt;&lt;LF&gt;</li> <li data-bbox="472 1486 1252 1577">• Read not available UTC correction data: AT+GNSSUTCOR?&lt;CR&gt;&lt;LF&gt; +GNSSUTCOR,-5&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 2-2: General Commands (Detail) (Continued)

Command	Description
<b>ATGNSSGPST</b>	<p><b>Acquire current GPS Time</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Read: <b>AT+GNSSGPST?</b></li> </ul> <p>Response: +GNSSGPST,&lt;date&gt;,&lt;time&gt;,OK or +GNSSGPST,&lt;error code&gt;</p> <p>Purpose: Get GPS time from module.</p> <p><b>Parameters:</b></p> <p>&lt;date&gt; (GPS Date)</p> <ul style="list-style-type: none"> <li>• Format: "yyyymmdd" (YearMonthDay)</li> </ul> <p>&lt;time&gt; (GPS Time)</p> <ul style="list-style-type: none"> <li>• Format: "hhmmss" (HourMinuteSecond)</li> </ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Acquire GNSS GPS Time: AT+GNSSGPST?&lt;CR&gt;&lt;LF&gt; +GNSSGPST,20190806,032526,OK&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 2-2: General Commands (Detail) (Continued)

Command	Description
<b>AT+GNSSPOS</b>	<p><b>Set position information into receiver</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Write: <b>AT+GNSSPOS=&lt;lat&gt;,&lt;lon&gt;,&lt;alt&gt;</b>  Response: +GNSSPOS,&lt;lat&gt;,&lt;lon&gt;,&lt;alt&gt;,OK  or +GNSSPOS,&lt;error code&gt;  Purpose: Configure the position data into the module.</li> <li>• Read: <b>AT+GNSSPOS?</b>  Response: +GNSSPOS,&lt;lat&gt;,&lt;lon&gt;,&lt;alt&gt;,OK  or +GNSSPOS,&lt;error code&gt;  Purpose: Get the position data from module.</li> </ul> <p><b>Parameters:</b></p> <p>&lt;lat&gt; (Latitude)</p> <ul style="list-style-type: none"> <li>• Unit: degree</li> <li>• Maximum decimal precision: 6</li> <li>• North: positive (+)</li> <li>• South: negative (-)</li> <li>• Range: -90.0 - 90.0</li> </ul> <p>&lt;lon&gt; (Longitude) (unit: degree)</p> <ul style="list-style-type: none"> <li>• Unit: degree</li> <li>• Maximum decimal precision: 6</li> <li>• East: positive (+)</li> <li>• West: negative (-)</li> <li>• Range: -180.0 - 180.0</li> </ul> <p>&lt;alt&gt; (Altitude)</p> <ul style="list-style-type: none"> <li>• Unit: meter</li> <li>• Maximum decimal precision: 3</li> <li>• Range: -500.0 - 20000.0</li> </ul> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>• Write position (latitude: 23.09615, longitude: 120.2837, altitude: 17.2) to module.  AT+GNSSPOS=23.09615,120.2837,17.2&lt;CR&gt;&lt;LF&gt;  +GNSSPOS,23.096150,120.283700,17.200,OK*6C&lt;CR&gt;&lt;LF&gt;</li> <li>• Read the position of module.  AT+GNSSPOS?&lt;CR&gt;&lt;LF&gt;  +GNSSPOS,25.033328,121.750005,-21.479,OK*40&lt;CR&gt;&lt;LF&gt;</li> </ul>
<b>AT+GNSSCONFIG</b>	<p><b>Recover configuration and change it to factory default</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Execute: <b>AT+GNSSCONFIG</b>  Response: +GNSSCONFIG,OK  or +GNSSCONFIG,&lt;error code&gt;  Purpose: Reset all user configuration to default.</li> </ul> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>• Reset all configuration:  AT+GNSSCONFIG&lt;CR&gt;&lt;LF&gt;  +GNSSCONFIG,OK*2B&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 2-2: General Commands (Detail) (Continued)

Command	Description
<b>AT+GNSSNMEA</b>	<p><b>Configure and acquire general NMEA sentence output types</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Write: (<code>&lt;action&gt; = 3</code>)  <b>AT+GNSSNMEA=&lt;action&gt;,&lt;NMEA_type&gt;,&lt;state&gt;</b>  Response: +GNSSNMEA,&lt;action&gt;,&lt;NMEA_type&gt;,&lt;state&gt;,OK  or +GNSSNMEA,&lt;error code&gt;  Purpose: Configure specified NMEA type output or not.</li> <li>• Write: (<code>&lt;action&gt; = 2</code>)  <b>AT+GNSSNMEA=&lt;action&gt;,&lt;NMEA_type&gt;</b>  Response: +GNSSNMEA,&lt;action&gt;,&lt;NMEA_type&gt;,OK  or +GNSSNMEA,&lt;error code&gt;  Purpose: Configure specified NMEA type outputting state to default.</li> <li>• Read: <b>AT+GNSSNMEA?</b>  Response: +GNSSNMEA,&lt;GGA&gt;,&lt;GLL&gt;,&lt;GSA&gt;,&lt;GSV&gt;,&lt;GNS&gt;,&lt;RMC&gt;,&lt;VTG&gt;,&lt;ZDA&gt;,&lt;SIX_DEC&gt;,OK  or +GNSSNMEA,&lt;error code&gt;  Purpose: Get the state of all NMEA type.</li> </ul> <p><b>Parameters:</b></p> <p><code>&lt;action&gt;</code></p> <ul style="list-style-type: none"> <li>• 2—Set the specified NMEA type to default configuration.</li> <li>• 3—Set the specified NMEA type outputting state.</li> </ul> <p><code>&lt;NMEA_type&gt;</code> (Type of general NMEA)</p> <ul style="list-style-type: none"> <li>• 0—Erase all (Only available in <code>&lt;mode=2&gt;</code>)</li> <li>• 1—GGA</li> <li>• 2—GLL</li> <li>• 3—GSA</li> <li>• 4—GSV</li> <li>• 5—GNS</li> <li>• 6—RMC</li> <li>• 7—VTG</li> <li>• 8—ZDA</li> <li>• 9—Six Decimals</li> </ul> <p><code>&lt;state&gt;</code> (Enable/disable regular output)</p> <ul style="list-style-type: none"> <li>• In <code>&lt;mode=1~8&gt;</code>: <ul style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable</li> </ul> </li> <li>• In <code>&lt;mode=9&gt;</code>: <ul style="list-style-type: none"> <li>• 0—four decimals</li> <li>• 1—six decimals</li> </ul> </li> </ul> <p><code>&lt;GGA&gt;</code> (Global positioning system fix data)</p> <ul style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable (default)</li> </ul> <p><code>&lt;GLL&gt;</code> (Geographic position—Latitude / Longitude)</p> <ul style="list-style-type: none"> <li>• 0—Disable (default)</li> <li>• 1—Enable</li> </ul> <p>(Continued on next page)</p>

**Table 2-2: General Commands (Detail) (Continued)**

Command	Description
	<p>&lt;GSA&gt; (GNSS DOP and active satellites)</p> <ul style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable (default)</li> </ul> <p>&lt;GSV&gt; (GNSS satellites in view)</p> <ul style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable (default)</li> </ul> <p>&lt;GNS&gt; (GNSS fix data)</p> <ul style="list-style-type: none"> <li>• 0—Disable (default)</li> <li>• 1—Enable</li> </ul> <p>&lt;RMC&gt; (Recommended minimum specific GNSS data)</p> <ul style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable (default)</li> </ul> <p>&lt;VTG&gt; (Course over ground and ground speed)</p> <ul style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable (default)</li> </ul> <p>&lt;ZDA&gt; (Time and data)</p> <ul style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable (default)</li> </ul> <p>&lt;SIX_DEC&gt;</p> <ul style="list-style-type: none"> <li>• 0—Four decimals (default)</li> <li>• 1—Six decimals</li> </ul> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>• Enable GNSS NMEA Output GSV on:  AT+GNSSNMEA=3,4,1&lt;CR&gt;&lt;LF&gt;  +GNSSNMEA,3,4,1,OK*3C&lt;CR&gt;&lt;LF&gt;</li> <li>• Disable GNSS NMEA Output GLL:  AT+GNSSNMEA=3,2,0&lt;CR&gt;&lt;LF&gt;  +GNSSNMEA,3,2,0,OK*3B&lt;CR&gt;&lt;LF&gt;</li> <li>• Set GNSS NMEA Output GGA to default:  AT+GNSSNMEA,2,1&lt;CR&gt;&lt;LF&gt;  +GNSSNMEA,2,1,OK*25&lt;CR&gt;&lt;LF&gt;</li> <li>• Acquire GNSS NMEA Output (with GGA, GSA, GSV, RMC and six decimals on):  AT+GNSSNMEA?&lt;CR&gt;&lt;LF&gt;  +GNSSNMEA,1,0,1,1,0,1,0,0,1,OK*3B&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 2-2: General Commands (Detail) (Continued)

Command	Description
AT+GNSSPPS	<p><b>Configure and query output time in one pulse-per-second (1PPS) function</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Write (&lt;mode&gt; = 0): <ul style="list-style-type: none"> <li><b>AT+GNSSPPS=&lt;mode&gt;</b></li> <li>Response: +GNSSPPS,0,OK or +GNSSPPS,&lt;error code&gt;</li> <li>Purpose: Disable 1 PPS output.</li> </ul> </li> <li>• Write (&lt;mode&gt; = 1,2,3) : <ul style="list-style-type: none"> <li><b>AT+GNSSPPS=&lt;mode&gt;,&lt;pulse_width&gt;</b></li> <li>Response: +GNSSPPS,&lt;mode&gt;,&lt;pulse_width&gt;,OK or +GNSSPPS,&lt;error code&gt;</li> <li>Purpose: Set the 1PPS mode output.</li> </ul> </li> <li>• Read: <b>AT+GNSSPPS?</b> <ul style="list-style-type: none"> <li>Response: +GNSSPPS,&lt;mode=1, 2, 3&gt;,&lt;pulse_width&gt;,OK or +GNSSPPS,&lt;mode=0&gt;,OK or +GNSSPPS,&lt;error code&gt;</li> <li>Purpose: Get all 1PPS mode output.</li> </ul> </li> </ul> <p><b>Parameters:</b></p> <p>&lt;mode&gt; (1PPS mode)</p> <ul style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—PPS output mode 1 (Only outputs PPS when time is adjusted)</li> <li>• 2—PPS output mode 2 (Always outputs PPS)</li> <li>• 3—PPS output mode 3 (Only outputs PPS when position is fixed and also the default mode)</li> </ul> <p>Note: For details on the 1PPS output types, see <a href="#">Figure 2-1</a> on page 23.</p> <p>&lt;pulse_width&gt; (1PPS pulse width)</p> <ul style="list-style-type: none"> <li>• Unit: ms (millisecond)</li> <li>• Default: 125</li> <li>• Currently supports 125, 250, and 500 ms</li> </ul> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>• Disable PPS output: <pre>AT+GNSSPPS=0&lt;CR&gt;&lt;LF&gt; +GNSSPPS,0,OK*6E&lt;CR&gt;&lt;LF&gt;</pre> </li> <li>• Enable PPS output mode 3 and pulse width is 125 ms: <pre>AT+GNSSPPS=3,125&lt;CR&gt;&lt;LF&gt; +GNSSPPS,3,125,OK*72&lt;CR&gt;&lt;LF&gt;</pre> </li> </ul>

Table 2-2: General Commands (Detail) (Continued)

Command	Description
AT+GNSSHSUDR	<p data-bbox="440 310 943 342"><b>Configure the NMEA output in 10 Hz</b></p> <hr data-bbox="440 373 1463 380"/> <p data-bbox="440 390 1382 449"><i>Note: If 10 Hz is enabled, it would only be executed after the 3D fix. Only RMC and GGA currently supports 10 Hz.</i></p> <hr data-bbox="440 468 1463 474"/> <p data-bbox="440 506 516 533"><b>Usage:</b></p> <ul data-bbox="440 541 959 800" style="list-style-type: none"> <li data-bbox="440 541 959 663">• Write:        <b>AT+GNSSHSUDR=&lt;action&gt;</b>  Response:    +GNSSHSUDR,&lt;action&gt;,OK                or    +GNSSHSUDR,&lt;error code&gt;  Purpose:     Enable / Disable 10 Hz function.</li> <li data-bbox="440 674 959 800">• Read:        <b>AT+GNSSHSUDR?</b>  Response:    +GNSSHSUDR,&lt;action&gt;,OK                or    +GNSSHSUDR,&lt;error code&gt;  Purpose:     Get the current settings.</li> </ul> <p data-bbox="440 810 578 837"><b>Parameters:</b></p> <p data-bbox="440 848 532 875">&lt;action&gt;</p> <ul data-bbox="472 875 727 932" style="list-style-type: none"> <li data-bbox="472 875 727 903">• 0—Disable (Default)</li> <li data-bbox="472 905 727 932">• 1—Enable</li> </ul> <p data-bbox="440 942 540 970"><b>Example:</b></p> <ul data-bbox="472 974 943 1062" style="list-style-type: none"> <li data-bbox="472 974 943 1062">• Disable 10 Hz function:            AT+GNSSHSUDR=0&lt;CR&gt;&lt;LF&gt;            +GNSSHSUDR,0,OK*6E&lt;CR&gt;&lt;LF&gt;</li> </ul>

**Table 2-3: Sleep States**

State	Main RAM	Backup RAM	RTC	After waking up
Sleep 0	Retained	Retained	Operation	Re-start with previous setting (Hot Start)
Sleep 1	Off	Retained	Operation	Reboot

Set module to sleep 1 mode:

AT+GNSSSLP=1,0<CR><LF>

+GNSSSLP,1,0,OK<CR><LF>

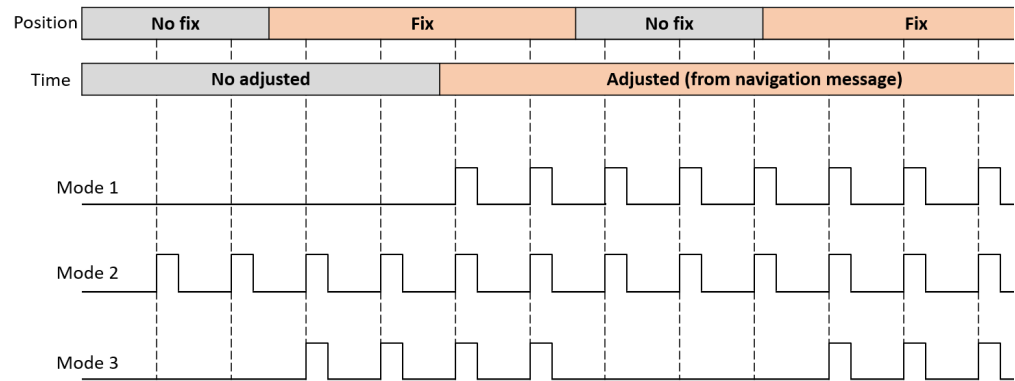


Figure 2-1: 1PPS Output Types

## >> 3: Other Commands

### Introduction

This chapter describes other types of AT commands.

### Command summary

The following table lists the commands described in this chapter.

**Table 3-1: Other Commands (Summary)**

Command	Description	Page
<b>AT+GNSSTHRES</b>	Configure and query the GNSS threshold	25
<b>AT+GNSSRAW</b>	Acquire specific data from the GNSS receiver	27
<b>AT+GNSSUSEN</b>	Acquire sensor raw measurement and enable / disable sensor raw measurement NMEA output	28
<b>AT+GNSSEPE</b>	Configure and query the horizontal and vertical Estimated Position Error (EPE) based on HDOP and VDOP	29
<b>AT+GNSSVELWARN</b>	Configure and query GNSS speed warning feature	30
<b>AT+GNSSPVTL</b>	Configure and query the log and configuration of PVT log in flash	31
<b>AT+GNSSSENL</b>	Configure and query the log and configuration of the sensor log in flash	33
<b>AT+GNSSBUP</b>	Configure and acquire UDR backup data	35
<b>AT+GNSSURST</b>	Clear UDR data (orientation, last location, and attitude data)	35

## Command reference

Table 3-2: Other Commands (Detail)

Command	Description
<b>AT+GNSSTHRES</b>	<p><b>Configure and query the GNSS threshold</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>Write (&lt;action&gt; = 2):           <p style="margin-left: 20px;"><b>AT+GNSSTHRES=&lt;action&gt;,&lt;ID&gt;</b></p> <p style="margin-left: 20px;">Response: +GNSSTHRES,&lt; action &gt;,&lt;ID&gt;,OK or +GNSSTHRES,&lt;error code&gt;</p> <p style="margin-left: 20px;">Purpose: Set the default threshold value for positioning.</p> </li> <li>Write (&lt;action&gt; = 3):           <p style="margin-left: 20px;"><b>AT+GNSSTHRES=&lt;action&gt;,&lt;threshold_mode&gt;,&lt;value&gt;</b></p> <p style="margin-left: 20px;">Response: +GNSSTHRES,&lt;action&gt;,&lt;threshold_mode&gt;,&lt;value&gt;,OK or +GNSSTHRES,&lt;error code&gt;</p> <p style="margin-left: 20px;">Purpose: Set the threshold for positioning.</p> </li> <li>Read: <b>AT+GNSSTHRES?</b> <p style="margin-left: 20px;">Response: +GNSSTHRES,&lt;CNR&gt;,&lt;elevation&gt;,&lt;reserved&gt;&lt;horizontal&gt;,&lt;HDOP&gt;,&lt;static_states&gt;,&lt;height&gt;,OK or +GNSSTHRES,&lt;error code&gt;</p> <p style="margin-left: 20px;">Purpose: Get all threshold values.</p> </li> </ul> <p><b>Parameters:</b></p> <p>&lt;action&gt; (Status of configuring threshold)</p> <ul style="list-style-type: none"> <li>2—Erase</li> <li>3—Set</li> </ul> <p>&lt;threshold_mode&gt; (The mode of threshold)</p> <ul style="list-style-type: none"> <li>0—All threshold</li> <li>1—CNR</li> <li>2—Elevation</li> <li>3—Used satellite</li> <li>4—Horizontal accuracy</li> <li>5—HDOP</li> <li>6—Static states</li> <li>7—Height</li> </ul> <p>&lt;CNR&gt; (Minimum C/N value of the satellite to be used for positioning)</p> <ul style="list-style-type: none"> <li>Unit: dB-Hz</li> <li>Default: 0</li> <li>0-50—Range of valid values</li> </ul> <p>&lt;elevation&gt; (The minimum elevation of the satellite to be used for positioning)</p> <ul style="list-style-type: none"> <li>Unit: degree</li> <li>Default: 5</li> <li>0-90—Range of valid values</li> </ul> <p>(Continued on next page)</p>

**Table 3-2: Other Commands (Detail) (Continued)**

Command	Description
	<p>&lt;horizontal&gt; (The maximum value of horizontal positioning accuracy that can be outputted)</p> <ul style="list-style-type: none"> <li>• Unit: meter</li> <li>• Default: 0</li> <li>• 0-300—Range of valid values</li> </ul> <p>&lt;HDOP&gt; (The maximum value of horizontal dilution of precision)</p> <ul style="list-style-type: none"> <li>• Does not use a unit of measurement</li> <li>• Default: -1.0</li> <li>• -1.0-3.0—Range of valid values</li> </ul> <p>&lt;static_states&gt; (The maximum velocity) (unit: meter per second)</p> <ul style="list-style-type: none"> <li>• Unit: meter per second</li> <li>• Default: 0</li> <li>• 0.0-3.0—Range of valid values</li> </ul> <p>&lt;height&gt; (Height limitation) (unit: meter)</p> <ul style="list-style-type: none"> <li>• Unit: meter</li> <li>• Default: 15000</li> <li>• 0-18000—Range of valid values</li> </ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Write the following to set the CNR threshold to 5 dB-Hz:  AT+GNSSTHRES=3,1,5&lt;CR&gt;&lt;LF&gt;  +GNSSTHRES,3,1,5,OK*62&lt;CR&gt;&lt;LF&gt;</li> <li>• Write the following to set all threshold to default:  AT+GNSSTHRES=2,0&lt;CR&gt;&lt;LF&gt;  +GNSSTHRES,2,0,OK*7B&lt;CR&gt;&lt;LF&gt;</li> <li>• Read setting for all threshold:  AT+GNSSTHRES?&lt;CR&gt;&lt;LF&gt;  +GNSSTHRES,0,5,0,0.0,-1.0,0.0,15000,OK*56&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 3-2: Other Commands (Detail) (Continued)

Command	Description
<b>AT+GNSSRAW</b>	<p><b>Acquire specific data from the GNSS receiver</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Write:       <b>AT+GNSSRAW=&lt;status&gt;</b>  Response: +GNSSRAW,&lt;status&gt;,OK  or +GNSSRAW,&lt;error code&gt;  Purpose:     Configure the output mode for \$PSWIRAW.</li> <li>• Read:       <b>AT+GNSSRAW?</b>  Response: +GNSSRAW,&lt;status&gt;,OK  or +GNSSRAW,&lt;error code&gt;  Purpose:     Get the output mode status for \$PSWIRAW.</li> </ul> <p><b>Parameters:</b></p> <p>&lt;status&gt; \$PSWIRAW outputting mode</p> <ul style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable</li> </ul> <p>Note: See <a href="#">\$PSWIRAW Details</a> on page 46 for the format of PSWIRAW</p> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Disable \$PSWIRAW output:  AT+GNSSRAW=0&lt;CR&gt;&lt;LF&gt;  +GNSSRAW,0,OK*79&lt;CR&gt;&lt;LF&gt;</li> <li>• Read the status of \$PSWIRAW outputting:  AT+GNSSRAW?&lt;CR&gt;&lt;LF&gt;  +GNSSRAW,0,OK*79&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 3-2: Other Commands (Detail) (Continued)

Command	Description
<b>AT+GNSSUSEN</b>	<p><b>Acquire sensor raw measurement and enable / disable sensor raw measurement NMEA output</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Write:       <b>AT+GNSSUSEN=&lt;action&gt;</b>  Response:    +GNSSUSEN,&lt;action&gt;,OK                    or    +GNSSUSEN,&lt;error code&gt;  Purpose:      Configure the output mode for \$PSWIUSEN.</li> <li>• Read:       <b>AT+GNSSUSEN?</b>  Response:    +GNSSUSEN,&lt;action&gt;,OK                    or    +GNSSUSEN,&lt;error code&gt;  Purpose:      Get the UDR sensor measurement.</li> </ul> <p><b>Parameters:</b></p> <p>&lt;action&gt; \$PSWIUSEN outputting mode</p> <ul style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable</li> </ul> <p>Note: See <a href="#">\$PSWIUSEN Details</a> on page 48 for the format of \$PSWIUSEN.</p> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Disable \$PSWIUSEN output:  AT+GNSSUSEN=0&lt;CR&gt;&lt;LF&gt;  +GNSSUSEN,0,OK*79&lt;CR&gt;&lt;LF&gt;</li> <li>• Read the UDR sensor status:  AT+GNSSUSEN?&lt;CR&gt;&lt;LF&gt;  +GNSSUSEN,0,OK*30&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 3-2: Other Commands (Detail) (Continued)

Command	Description
AT+GNSSEPE	<p><b>Configure and query the horizontal and vertical Estimated Position Error (EPE) based on HDOP and VDOP</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Write:       <b>AT+GNSSEPE=&lt;status&gt;</b>  Response:    +GNSSEPE,&lt;status&gt;,OK                    or    +GNSSEPE,&lt;error code&gt;  Purpose:      Configure the output mode for \$PSWIEPE.</li> <li>• Read:       <b>AT+GNSSEPE?</b>  Response:    +GNSSEPE,&lt;status&gt;,&lt;3D&gt;,&lt;2D&gt;,&lt;lat&gt;,&lt;lon&gt;,&lt;height&gt;,OK                    or    +GNSSEPE,&lt;error code&gt;  Purpose:      Get the output mode status for \$PSWIEPE.</li> </ul> <p><b>Parameters:</b></p> <p>&lt;status&gt; \$PSWIEPE outputting mode</p> <ul style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable</li> </ul> <p>Note: See <a href="#">\$PSWIEPE Details</a> on page 47 for the format of \$PSWIEPE.</p> <p>&lt;3D&gt; 3D EPE</p> <ul style="list-style-type: none"> <li>• Unit: meter</li> </ul> <p>&lt;2D&gt; 2D EPE</p> <ul style="list-style-type: none"> <li>• Unit: meter</li> </ul> <p>&lt;lat&gt; Latitude EPE</p> <ul style="list-style-type: none"> <li>• Unit: meter</li> </ul> <p>&lt;lon&gt; Longitude EPE</p> <ul style="list-style-type: none"> <li>• Unit: meter</li> </ul> <p>&lt;height&gt; Altitude EPE</p> <ul style="list-style-type: none"> <li>• Unit: meter</li> </ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Enable \$PSWIEPE output:  AT+GNSSEPE=1&lt;CR&gt;&lt;LF&gt;  +GNSSEPE,1,OK*6C&lt;CR&gt;&lt;LF&gt;</li> <li>• Read the status of \$PSWIEPE outputting:  AT+GNSSEPE?&lt;CR&gt;&lt;LF&gt;  +GNSSEPE,1,20.8,14.6,9.9,10.7,14.9,OK*6D&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 3-2: Other Commands (Detail) (Continued)

Command	Description
<b>AT+GNSSVELWARN</b>	<p><b>Configure and query GNSS speed warning feature</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Write (&lt;action&gt; = 0, 1): <ul style="list-style-type: none"> <li>or <b>AT+GNSSVELWARN=&lt;action&gt;</b></li> </ul> </li> </ul> <p>Response: +GNSSVELWARN,&lt;action&gt;,OK or +GNSSVELWARN,&lt;error code&gt;</p> <p>Purpose: After setting enable / disable, the \$PSWIVELW sentence will be set to output or not. or After erasing the velocity threshold, the value becomes 0.</p> <ul style="list-style-type: none"> <li>• Write (&lt;action&gt; = 3): <ul style="list-style-type: none"> <li>or <b>AT+GNSSVELWARN=&lt;action&gt;,&lt;velocity&gt;</b></li> </ul> </li> </ul> <p>Response: +GNSSVELWARN,&lt;action&gt;,&lt;velocity&gt;,OK or +GNSSVELWARN,&lt;error code&gt;</p> <p>Purpose: Set the velocity threshold.</p> <ul style="list-style-type: none"> <li>• Read: <b>AT+GNSSVELWARN?</b></li> </ul> <p>Response: +GNSSVELWARN,&lt;action&gt;,&lt;velocity&gt;,&lt;GPS_velocity&gt;,&lt;status&gt;,OK or +GNSSVELWARN,&lt;error code&gt;</p> <p>Purpose: Get speed warning configuration.</p> <p><b>Parameters:</b></p> <p>&lt;action&gt;</p> <ul style="list-style-type: none"> <li>• 0—Disable \$PSWIVELW sentence</li> <li>• 1—Enable \$PSWIVELW sentence</li> <li>• 2—Erase velocity threshold</li> <li>• 3—Set velocity threshold</li> </ul> <p>Note: See <a href="#">\$PSWIVELW Details</a> on page 45 for the format of \$PSWIVELW.</p> <p>&lt;velocity&gt; (Threshold of velocity)</p> <ul style="list-style-type: none"> <li>• Unit: m/s (meter/second)</li> <li>• 5 m/s—Default setting</li> <li>• 0-100—Range</li> </ul> <p>&lt;GPS_velocity&gt; (Current velocity)</p> <ul style="list-style-type: none"> <li>• Unit: m/s (meter/second)</li> </ul> <p>&lt;status&gt; (Overspeed status)</p> <ul style="list-style-type: none"> <li>• 0—Underspeed criteria</li> <li>• 1—Overspeed criteria</li> </ul> <hr/> <p><i>Note: 5 m/s is the default velocity setting.</i></p> <hr/>

Table 3-2: Other Commands (Detail) (Continued)

Command	Description
	<p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Write configuration for enabling \$PSWIVELW output: AT+GNSSVELWARN=1&lt;CR&gt;&lt;LF&gt; +GNSSVELWARN,1,OK*69&lt;CR&gt;&lt;LF&gt;</li> <li>• Write configuration for setting velocity to 10 m/s: AT+GNSSVELWARN=3,10&lt;CR&gt;&lt;LF&gt; +GNSSVELWARN,3,10,OK*46&lt;CR&gt;&lt;LF&gt;</li> <li>• Read the speed warning status of the module (The module is not overspeeding and does not output \$PSWIVELW): AT+GNSSVELWARN?&lt;CR&gt;&lt;LF&gt; +GNSSVELWARN,0,10,0.0,0,OK*5B&lt;CR&gt;&lt;LF&gt;</li> </ul>
<b>AT+GNSSPVTL</b>	<p><b>Configure and query the log and configuration of PVT log in flash</b></p> <p><b>Steps:</b></p> <ol style="list-style-type: none"> <li>1. Enable PVT log function.</li> <li>2. Disable PVT log function.</li> <li>3. Get PVT log function.</li> </ol> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Write (&lt;action&gt; = 0, 1, 2): or <b>AT+GNSSPVTL=&lt;action&gt;</b> Response: +GNSSPVTL,&lt;action&gt;,OK or +GNSSPVTL,&lt;error code&gt; Purpose: Disable / Enable / Erase PVT log.</li> <li>• Write (&lt;action&gt; = 3): or <b>AT+GNSSPVTL=&lt;action&gt;,&lt;override_mode&gt;,&lt;cycle&gt;</b> Response: +GNSSPVTL,&lt;action&gt;,&lt;override_mode&gt;,&lt;cycle&gt;,OK or +GNSSPVTL,&lt;error code&gt; Purpose: Configure the record mode for recording PVT log. or Disable recording the PVT log.</li> <li>• Execute: <b>AT+GNSSPVTL</b> Response: +GNSSPVTL,&lt;log size&gt;,OK +GNSSPVTL,&lt;sector&gt;,&lt;log_data&gt;,&lt;log_data&gt;,&lt;log_data&gt;,&lt;log_data&gt;,&lt;log_data&gt;,OK or +GNSSPVTL,&lt;error code&gt; Purpose: Get PVT log data Requirement: Disable recording the PVT log.</li> <li>• Read: <b>AT+GNSSPVTL?</b> Response: +GNSSPVTL,&lt;action&gt;,&lt;log_size&gt;,&lt;override_mode&gt;,&lt;cycle&gt;,OK or +GNSSPVTL,&lt;error code&gt; Purpose: Get PVT log mode configuration.</li> </ul> <p>(Continued on next page)</p>

Table 3-2: Other Commands (Detail) (Continued)

Command	Description
	<p><b>Parameters:</b></p> <p>&lt;action&gt; (PVT log mode)</p> <ul style="list-style-type: none"> <li>• 0—Disable (default)</li> <li>• 1—Enable</li> <li>• 2—Erase</li> <li>• 3—Set recording mode</li> </ul> <p>&lt;override_mode&gt; (PVT log override mode)</p> <ul style="list-style-type: none"> <li>• 0—Stop recording data (default)</li> <li>• 1—Override data from the beginning</li> <li>• 2—Only override the last record and keep the other data</li> </ul> <p>&lt;cycle&gt; (PVT Log recording cycle) (unit: second)</p> <ul style="list-style-type: none"> <li>• Range: 1-3600</li> <li>• Default: 15 second</li> </ul> <p>&lt;sector&gt; (Calculate the PVT Log sentences)</p> <ul style="list-style-type: none"> <li>• 48—Maximum value</li> </ul> <p>&lt;log size&gt; (PVT log size)</p> <ul style="list-style-type: none"> <li>• Unit: byte</li> </ul> <p>&lt;log_data&gt; (The binary data of PVT Log)</p> <hr/> <p><i>Note: Enter the execute disable comment (=0) before reading or executing the erase and write parameters.</i></p> <hr/> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Enable PVT log:  AT+GNSSPVTL=1&lt;CR&gt;&lt;LF&gt;  +GNSSPVTL,1,OK*22&lt;CR&gt;&lt;LF&gt;</li> <li>• Set override mode to stop recording data and cycle to 5 seconds:  AT+GNSSPVTL=3,0,5&lt;CR&gt;&lt;LF&gt;  +GNSSPVTL,3,0,5,OK*25&lt;CR&gt;&lt;LF&gt;</li> <li>• Get PVT Log data:  AT+GNSSPVTL&lt;CR&gt;&lt;LF&gt;  +GNSSPVTL,80,OK*1B&lt;CR&gt;&lt;LF&gt;  +GNSSPVTL,01,90000064DC040080271B00040080007A0A54235C,  41010064A801008047180004000000420C54235C,  370000645C03008027190004000000240E54235C,  B841BF6368050080471A0004000000821054235C,  OK*62&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 3-2: Other Commands (Detail) (Continued)

Command	Description
<b>AT+GNSSSEN</b>	<p><b>Configure and query the log and configuration of the sensor log in flash</b></p> <p><b>Steps:</b></p> <ol style="list-style-type: none"> <li>1. Enable sensor log function.</li> <li>2. Disable sensor log function.</li> <li>3. Get sensor log function or erase sensor log function.</li> </ol> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Write (&lt;action&gt; = 0, 1, 2):  or <b>AT+GNSSSEN=&lt;action&gt;</b>  Response: +GNSSSEN,&lt;mode&gt;,OK  or +GNSSSEN,&lt;error code&gt;  Purpose: Disable / Enable / Erase sensor log.</li> <li>• Write (&lt;action&gt; = 3):  or <b>AT+GNSSSEN=&lt;action&gt;,&lt;override_mode&gt;,&lt;cycle&gt;</b>  Response: +GNSSSEN,&lt;action&gt;,&lt;override_mode&gt;,&lt;cycle&gt;,OK  or +GNSSSEN,&lt;error code&gt;  Purpose: Configure the record mode for recording sensor log.  or Disable recording the sensor log.</li> <li>• Execute: <b>AT+GNSSSEN</b>  Response: +GNSSSEN,&lt;log size&gt;,OK  +GNSSSEN,&lt;sector&gt;,&lt;log_data&gt;,&lt;log_data&gt;,&lt;log_data&gt;,&lt;log_data&gt;,&lt;log_data&gt;,OK  or +GNSSSEN,&lt;error code&gt;  or Disable recording the sensor log.  Purpose: Get sensor log data</li> <li>• Read: <b>AT+GNSSSEN?</b>  Response: +GNSSSEN,&lt;action&gt;,&lt;log_size&gt;,&lt;override_mode&gt;,&lt;cycle&gt;,OK  or +GNSSSEN,&lt;error code&gt;  Purpose: Get sensor log mode configuration.</li> </ul> <p>(Continued on next page)</p>

Table 3-2: Other Commands (Detail) (Continued)

Command	Description
	<p><b>Parameters:</b></p> <p>&lt;action&gt; (Sensor log mode)</p> <ul style="list-style-type: none"> <li>• 0—Disable</li> <li>• 1—Enable</li> <li>• 2—Erase</li> <li>• 3—Set recording mode</li> </ul> <p>&lt;override_mode&gt; (Sensor log override mode)</p> <ul style="list-style-type: none"> <li>• 0—Stop recording data</li> <li>• 1—Override data from the beginning</li> <li>• 2—Only override the last record and keep the other data</li> </ul> <p>&lt;cycle&gt; (Sensor log recording cycle) (unit: second)</p> <ul style="list-style-type: none"> <li>• Range: 1-3600</li> <li>• Default: 15 second</li> </ul> <p>&lt;sector&gt; (Calculate the sensor log sentences)</p> <ul style="list-style-type: none"> <li>• 48— Maximum value</li> </ul> <p>&lt;log size&gt; (Sensor log size)</p> <ul style="list-style-type: none"> <li>• Unit: byte</li> </ul> <p>&lt;log_data&gt; (The binary data of sensor log)</p> <hr/> <p><i>Note: Before proceeding to read(?) or execute(=) the erase(2) and write(3) commands, you should first enter the execute disable command(=0).</i></p> <hr/> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Enable sensor log:  AT+GNSSSENL=1&lt;CR&gt;&lt;LF&gt;  +GNSSSENL,1,OK*22&lt;CR&gt;&lt;LF&gt;</li> <li>• Set override mode to stop recording data and cycle to 5 seconds:  AT+GNSSSENL=3,0,5&lt;CR&gt;&lt;LF&gt;  +GNSSSENL,3,0,5,OK*25&lt;CR&gt;&lt;LF&gt;</li> <li>• Get sensor log data:  AT+GNSSSENL&lt;CR&gt;&lt;LF&gt;  +GNSSSENL,100,OK*28  +GNSSSENL,01,C28C0D60E0130020000200000000A81463432903,  C48C0D60E0130020000200000000081863432903,  C88C0D60A0130020000200000000081C63432903,  CF8C0D60E0130020000200000000082063432903,  C98C0D60A0130020000200000000902763432903,  OK*43</li> </ul>

Table 3-2: Other Commands (Detail) (Continued)

Command	Description
<b>AT+GNSSBUP</b>	<p><b>Configure and acquire UDR backup data</b></p> <hr/> <p><i>Note:</i>            Calibrate the calibration status to 6 before backing up the UDR calibration data into the flash. Do not move the module during power off. After powering on, the module will automatically load the UDR calibration data into the flash.</p> <p><i>The UDR calibration status would be on 5, after powering on, if the UDR calibration data was saved to flash and the module position did not change. Calibrate it to status 6 for better trajectory.</i></p> <hr/> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Write:       <b>AT+GNSSBUP</b>                Response: +GNSSBUP,OK                        or +GNSSBUP,&lt;error code&gt;                Purpose:   Saves the UDR calibration data in the flash.</li> <li>• Read:       <b>AT+GNSSBUP?</b>                Response: +GNSSBUP,&lt;udr_data&gt;,OK                        or +GNSSBUP,&lt;error code&gt;                Purpose:   Get the UDR calibration data in the flash.</li> </ul> <p><b>Parameters:</b>            &lt;udr_data&gt; (UDR calibration data in the flash)</p> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Save UDR calibration data in the flash:                AT+GNSSBUP&lt;CR&gt;&lt;LF&gt;                +GNSSBUP,OK*66&lt;CR&gt;&lt;LF&gt;</li> <li>• Acquire the UDR calibration data in the backup RAM:                AT+GNSSBUP?&lt;CR&gt;&lt;LF&gt;                +GNSSBUP,1,6.128760,6.453239,3.028870,1,24.983393,121.458031,                14.562307,149.701819,-0.502673,-6.053615,OK*5B&lt;CR&gt;&lt;LF&gt;</li> </ul>
<b>AT+GNSSURST</b>	<p><b>Clear UDR data (orientation, last location, and attitude data)</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Write:       <b>AT+GNSSURST</b>                Response: +GNSSURST,OK                        or +GNSSURST,&lt;error code&gt;                Purpose:   Clear current UDR data.</li> </ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Clear current UDR data:                AT+GNSSURST&lt;CR&gt;&lt;LF&gt;                +GNSSURST,OK*21&lt;CR&gt;&lt;LF&gt;</li> </ul>

## >> 4: AGNSS Commands

### Introduction

This chapter describes AGNSS related AT commands.

### Command Summary

The following table lists the commands described in this chapter.

**Table 4-1: AGNSS Commands (Summary)**

Command	Description	Page
<b>AT+GNSSLLE</b>	<a href="#">Configure connecting AGNSS function and acquire the status</a>	37

## Command References

Table 4-2: AGNSS Commands (Detail)

Command	Description
AT+GNSSLLE	<p><b>Configure connecting AGNSS function and acquire the status</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>• Write (&lt;action&gt; = 0, 1, 2):  <div style="margin-left: 40px;"><b>AT+GNSSLLE=&lt;action&gt;</b></div> </li> </ul> <p>Response: +GNSSLLE,&lt; action &gt;,OK  or +GNSSLLE,&lt;error code&gt;</p> <p>Purpose: Set LLE function to enabling, disabling, or erasing.</p> <hr style="border: 1px solid red;"/> <p><i>Note: The module returns either of the following error codes:</i></p> <p>-5 — <i>This error code indicates that the LLE is enabled or disabled and the module does not have an LLE data.</i></p> <p>-1 — <i>This error code indicates that the module does not have an LLE data.</i></p> <hr style="border: 1px solid red;"/>

Table 4-2: AGNSS Commands (Detail) (Continued)

Command	Description
<b>AT+GNSSLLE</b>	<ul style="list-style-type: none"> <li>• Write (&lt;action&gt; = 3):               <ul style="list-style-type: none"> <li><b>AT+GNSSLLE=&lt;action&gt;,&lt;packet_num&gt;</b></li> <li>Response: +GNSSLLE,&lt;packet_num&gt;,CONNECT +GNSSLLE,&lt;packet_num&gt;,&lt;packet_size&gt;,OK</li> <li>or +GNSSLLE,&lt;error code&gt;</li> <li>Purpose: Set the LLE data into flash.</li> </ul> </li> <li>• Write (&lt;action&gt; = 4):               <ul style="list-style-type: none"> <li><b>AT+GNSSLLE=&lt;action&gt;</b></li> <li>Response: +GNSSLLE,&lt; action &gt;,OK</li> <li>or +GNSSLLE,&lt;error code&gt;</li> <li>Purpose: Check the integrity of the injected LLE data.</li> </ul> </li> <li>• Read: <b>AT+GNSSLLE?</b> <ul style="list-style-type: none"> <li>Response: +GNSSLLE,&lt;lle_select&gt;,&lt;lle_satellite_GPS&gt;,&lt;age_GPS&gt;,&lt;start_time_GPS&gt;,OK</li> <li>or +GNSSLLE,&lt;error code&gt;</li> <li>Purpose: Get the valid date of the LLE.</li> </ul> </li> </ul> <p><b>Parameters:</b></p> <p>&lt;action&gt;</p> <ul style="list-style-type: none"> <li>• 0—Disable LLE function</li> <li>• 1—Enable LLE function</li> <li>• 2—Erase LLE data in flash</li> <li>• 3—Set LLE data saved into flash</li> <li>• 4—Check the integrity of the injected LLE data in flash</li> </ul> <p>&lt;packet_num&gt; (Packet number)</p> <p>&lt;lle_satellite_xxx&gt;</p> <ul style="list-style-type: none"> <li>• xxx: GPS—0</li> </ul> <p>&lt;age_xxx&gt; (Life of saved LLE data of the xxx satellite system)</p> <ul style="list-style-type: none"> <li>• Availability: 14 days</li> <li>• xxx: GPS</li> </ul> <p>&lt;start_time_xxx&gt; (start time of the LLE of the xxx satellite system)</p> <ul style="list-style-type: none"> <li>• Format: YYYYMMDD (YearMonthDay)</li> </ul> <p>&lt;packet_size&gt; (Single packet size)</p> <p>&lt;lle_select&gt;</p> <ul style="list-style-type: none"> <li>• 0— LLE function is disable</li> <li>• 1— LLE function is enable</li> </ul>

Table 4-2: AGNSS Commands (Detail) (Continued)

Command	Description
	<p><b>Example:</b></p> <ul style="list-style-type: none"> <li>• Enable LLE function:  AT+GNSSLLE=1&lt;CR&gt;&lt;LF&gt;  +GNSSLLE,1,OK*69&lt;CR&gt;&lt;LF&gt;</li> <li>• Write configuration for setting LLE data to flash:  AT+GNSSLLE=3,0&lt;CR&gt;&lt;LF&gt;  +GNSSLLE,0,CONNECT*22&lt;CR&gt;&lt;LF&gt;  .(Inject LLE data)</li> </ul> <p>·</p> <p>·</p> <p>+++ (exit data mode)  +GNSSLLE,0,2048,OK*5A&lt;CR&gt;&lt;LF&gt;</p> <ul style="list-style-type: none"> <li>• Read the configuration of LLE:  AT+GNSSLLE?&lt;CR&gt;&lt;LF&gt;  +GNSSLLE,0,0,14,20200331,OK*60&lt;CR&gt;&lt;LF&gt;</li> </ul>

## >> 5: System Commands

### Introduction

This chapter describes system AT commands.

### Command summary

The following table lists the commands described in this chapter.

**Table 5-1: System Commands (Summary)**

Command	Description	Page
<b>AT+GNSSFER</b>	Erase the currently saved firmware	41
<b>AT+GNSSFSN</b>	Acquire the serial number of the GNSS module	41
<b>AT+GNSSVERS</b>	Acquire the SWIR-defined firmware version number	41
<b>AT+GNSSRTC</b>	Get CPU time and the elapsed time since system startup	42
<b>AT+GNSSBRATE</b>	Set the baud rate of communication interface	42
<b>AT+GNSSRTCXO</b>	Acquire TCXO offset value	43
<b>AT+GNSSREBOOT</b>	Reboot module	43
<b>AT+GNSSSTACK</b>	Get a size of unused stack	43

## Command reference

Table 5-2: System Commands (Detail)

Command	Description
<b>AT+GNSSFER</b>	<p><b>Erase the currently saved firmware</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>Exec: <b>AT+GNSSFER</b> Response: +GNSSFER,OK or +GNSSFER,&lt;error code&gt;</li> </ul> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>Erase the current firmware: AT+GNSSFER&lt;CR&gt;&lt;LF&gt; +GNSSFER,OK*59&lt;CR&gt;&lt;LF&gt;</li> </ul>
<b>AT+GNSSFSN</b>	<p><b>Acquire the serial number of the GNSS module</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>Read: <b>AT+GNSSFSN?</b> Response: +GNSSFSN,&lt;fsn&gt;,OK or +GNSSFSN&lt;error code&gt;</li> </ul> <p><b>Parameters:</b> &lt;fsn&gt; (Serial number)</p> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>Read the serial number of the module: AT+GNSSFSN?&lt;CR&gt;&lt;LF&gt; +GNSSFSN,03891419444620,OK*59&lt;CR&gt;&lt;LF&gt;</li> </ul>
<b>AT+GNSSVERS</b>	<p><b>Acquire the SWIR-defined firmware version number</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>Read: <b>AT+GNSSVERS?</b> Response: +GNSSVERS,&lt;ver&gt;,OK or +GNSSVERS,&lt;error code&gt;</li> </ul> <p><b>Parameters:</b> &lt;ver&gt; (Firmware version)</p> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>Read the SWIR-defined firmware version: AT+GNSSVERS?&lt;CR&gt;&lt;LF&gt; +GNSSVERS,SWI5608XP_GLU.18897.02,OK*6D&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 5-2: System Commands (Detail) (Continued)

Command	Description
<b>AT+GSSRTC</b>	<p><b>Get CPU time and the elapsed time since system startup</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>Read: <b>AT+GSSRTC?</b> Response: +GSSRTC,&lt;rtc_time&gt;,OK or +GSSRTC,&lt;error code&gt;</li> </ul> <p><b>Parameters:</b></p> <p>&lt;rtc_time&gt; (RTC Time)</p> <ul style="list-style-type: none"> <li>Unit: microsecond</li> <li>Format: hex</li> </ul> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>Read the elapsed time since system startup: AT+GSSRTC?&lt;CR&gt;&lt;LF&gt; +GSSRTC,0,OK*78 &lt;CR&gt;&lt;LF&gt;</li> </ul>
<b>AT+GSSBRATE</b>	<p><b>Set the baud rate of communication interface</b></p> <hr/> <p><i>Note: The module will reboot after the baud rate is set.</i></p> <hr/> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>Write: <b>AT+GSSBRATE=&lt;baud_rate&gt;</b> Response: +GSSBRATE,&lt;baud_rate&gt;,OK or +GSSBRATE,&lt;error code&gt; Purpose: Configure baud rate of module.</li> <li>Read: <b>AT+GSSBRATE?</b> Response: +GSSBRATE,&lt;baud_rate&gt;,OK or +GSSBRATE,&lt;error code&gt;</li> </ul> <p><b>Parameters:</b></p> <p>&lt;baud_rate&gt; (Baud Rate)</p> <ul style="list-style-type: none"> <li>0—115200 (Default)</li> <li>1—460800</li> </ul> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>Changed baud rate to 115200: AT+GSSBRATE=0&lt;CR&gt;&lt;LF&gt; +GSSBRATE,0,OK*7D&lt;CR&gt;&lt;LF&gt;</li> <li>Changed baud rate to 460800: AT+GSSBRATE=1&lt;CR&gt;&lt;LF&gt; +GSSBRATE,1,OK*7C&lt;CR&gt;&lt;LF&gt;</li> </ul>

Table 5-2: System Commands (Detail) (Continued)

Command	Description
<b>AT+GNSSTCXO</b>	<p><b>Acquire TCXO offset value</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>Read: <b>AT+GNSSTCXO?</b> Response: +GNSSTCXO,&lt;TCXO&gt;,OK or +GNSSTCXO,&lt;error code&gt; Purpose: Get TCXO offset.</li> </ul> <p><b>Parameters:</b> &lt;TCXO&gt; (TCXO offset)</p> <ul style="list-style-type: none"> <li>Unit is in Hz.</li> </ul> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>Read the TCXO value: AT+GNSSTCXO?&lt;CR&gt;&lt;LF&gt; +GNSSTCXO,-292,OK*19&lt;CR&gt;&lt;LF&gt;</li> </ul>
<b>AT+GNSREBOOT</b>	<p><b>Reboot module</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>Exec: <b>AT+GNSREBOOT</b> Response: +GNSREBOOT,OK or +GNSREBOOT,&lt;error code&gt; Purpose: Reboot module.</li> </ul> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>Reboot module: AT+GNSREBOOT&lt;CR&gt;&lt;LF&gt; +GNSREBOOT,OK*19&lt;CR&gt;&lt;LF&gt;</li> </ul>
<b>AT+GNSSTACK</b>	<p><b>Get a size of unused stack</b></p> <p><b>Usage:</b></p> <ul style="list-style-type: none"> <li>Read: <b>AT+GNSSTACK?</b> Response: +GNSSTACK,&lt;size&gt;,OK or +GNSSTACK,&lt;error code&gt; Purpose: Get a size of unused stack.</li> </ul> <p><b>Parameters:</b> &lt;size&gt; (unused stack size)</p> <ul style="list-style-type: none"> <li>Unit: byte</li> </ul> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>Get a size of unused stack: AT+GNSSTACK?&lt;CR&gt;&lt;LF&gt; +GNSSTACK,256,OK*19&lt;CR&gt;&lt;LF&gt;</li> </ul>

## >> 6: Customized NMEA Sentences

### Introduction

This chapter describes the normal output sentences developed by Sierra Wireless. These sentences outputs with NMEA when user enables them by command.

### Command summary

The following table lists the commands described in this chapter.

**Table 6-1: Further Commands (Summary)**

Command	Description	Page
<b>\$PSWIVELW</b>	<a href="#">\$PSWIVELW Details</a>	45
<b>\$PSWIRAW</b>	<a href="#">\$PSWIRAW Details</a>	46
<b>\$PSWIEPE</b>	<a href="#">\$PSWIEPE Details</a>	47
<b>\$PSWIUSEN</b>	<a href="#">\$PSWIUSEN Details</a>	48

## Command reference

### \$PSWIVELW Details

Speed warn allows users to set the maximum velocity that will be seen as safe. If the speed is over this value, speed warn will be activated.

The following table explains the \$PSWIVELW sentence format:

```
$PSWIVELW,20190905,055601.00,1*27
```

**Table 6-2: \$PSWIVELW Data Format**

Name	Example	Description
Message ID	\$PSWIVELW	\$PSWIVELW header
UTC Date	20190904	Coordinated Universal Date Format: yyymmdd
UTC Time	095849.00	Coordinated Universal Time Format: hhmmss.ss
Status	1	The status of overspeed
Checksum	56	
Termination	<CR><LF>	End of message termination

## \$PSWIRAW Details

Raw measurement brings more information for analysis, for the production line, and for application. The information should output as a NMEA sentence. The output frequency is the same as NMEA sentences.

The following table explains the \$PSWIRAW sentence format:

```
$PSWIRAW,20190904,095849.00,1,015,37.13,21442795.307,695888.540,-1813.7,18,-12247689.878,9952300.944,21086004.996,-64,8946,5.429,2*56
```

**Table 6-3: \$PSWIRAW Data Format**

Name	Example	Units	Description
Message ID	\$PSWIRAW		\$PSWIRAW header
UTC Date	20190904		Coordinated Universal Date Format: yyyymmdd
UTC Time	095849.00		Coordinated Universal Time Format: hhmmss.ss
System ID	1		1—GPS 2—GLONASS 3—Galileo (Not Available) 4—BeiDou (Not Available) 5—QZSS
Satellite ID	015		Identifies the number of each satellite
CNR	37.13	dB-Hz	Quality of received signals
Pseudo range	21442795.307	meter	Raw GNSS measurement
Time sync carrier phase	695888.540	cycle	Carrier phase measurement synchronized to the GPS time
Doppler frequency	-1813.7	Hz	Raw GNSS measurement
Cycle slip flag	1		Index for cycle slip in carrier phase measurement
Satellite position (X)	-12247689.878		X coordinate in ECEF system
Satellite position (Y)	9952300.944		Y coordinate in ECEF system
Satellite position (Z)	21086004.996		Z coordinate in ECEF system
Frequency channel	-64		Frequency channel for GLONASS
Age of ephemeris	8946		Age of ephemeris for each satellite systems
Ionosphere correction	5.429	meter	Ionosphere correction
Sync status	2		G+B data sync status
Checksum	56		
Termination	<CR><LF>		End of message termination

## \$PSWIEPE Details

EPE is the horizontal and vertical Estimated Position Error based on HDOP and VDOP.

The following table explains the \$PSWIEPE sentence format:

\$PSWIEPE,20190905,060310.00,10.5,7.6,4.6,6.0,7.3\*56

**Table 6-4: \$PSWIEPE Data Format**

Name	Example	Units	Description
Message ID	\$PSWIEPE		\$PSWIEPE header
UTC Date	20190904		Coordinated Universal Date Format: yyyymmdd
UTC Time	060310.00		Coordinated Universal Time Format: hhmmss.ss
3D EPE	10.5	meter	
2D EPE	7.6	meter	
Latitude EPE	4.6	meter	
Longitude EPE	6.0	meter	
Height EPE	7.3	meter	
Checksum	56		
Termination	<CR><LF>		End of message termination

## \$PSWIUSEN Details

Raw measurement brings more information for analysis, for the production line, and for applications. The information should output as a NMEA sentence. The output frequency is same as NMEA sentences.

The following table explains the \$PSWIUSEN sentence format:

```
$PSWIUSEN,20190904,081118.731,28.75,0.017377,0.001222,0.970140,-
0.045241,0.005482,0.004122,0.003678,0.000000,0.000000,85.485977,6,OK*79
<CR><LF>
```

**Table 6-5: \$PSWIUSEN Data Format**

Name	Example	Units	Description
Message ID	\$PSWIUSEN		\$PSWIUSEN header
UTC Date	20190904		Coordinated Universal Date Format: yyyymmdd
UTC Time	081118.731		Coordinated Universal Time Format: hhmmss.ss
Temperature	28.75		Current temperature of MEMS sensor
Acceleration for X-axis	0.001222	g	Acceleration for X-axis in navigation frame. Always outputs.
Acceleration for Y-axis	0.970140	g	Acceleration for Y-axis in navigation frame. Always outputs.
Acceleration for Z-axis	-0.045241	g	Acceleration for Z-axis in navigation frame. Always outputs.
Rotation rate for X-axis	0.005482	Rad/s	Rotation rate for X-axis in navigation frame. Always outputs.
Rotation rate for Y-axis	0.004122	Rad/s	Rotation rate for Y-axis in navigation frame. Always outputs.
Rotation rate for Z-axis	0.003678	Rad/s	Rotation rate for Z-axis in navigation frame. Always outputs.
Roll	0.000000	Degree	Roll in navigation frame. 0 before the first 3D fix
Pitch	0.000000	Degree	Pitch in navigation frame. 0 before the first 3D fix
Heading	85.485977	Degree	Heading in navigation frame. 0 before the first 3D fix
Status	6	NA	UDR calibration status—1 to 6
Checksum	56		
Termination	<CR><LF>		End of message termination

## >> A: Error Codes

When communication has failed, the module will show an error code. The following table describes the definition of the error code.

**Table A-1: Error Codes**

Error Code	Error Name	Description
-1	GRECO_AT_COMMAND_RESPONSE_EXECUTION_FAIL	Function executes with wrong result.
-2	GRECO_AT_COMMAND_RESPONSE_NOT_ATCMD	Unsupportable command.
-3	GRECO_AT_COMMAND_RESPONSE_WRONG_PARAMETER	Unsupportable parameter.
-4	GRECO_AT_COMMAND_RESPONSE_WRONG_TYPE	Unsupportable AT command type.
-5	GRECO_AT_COMMAND_RESPONSE_NO_DATA	Data is not ready, cannot be reached.
-6	GRECO_AT_COMMAND_RESPONSE_WRONG_PARAMETER_LENGTH	Incorrect length of command argument.
-7	GRECO_AT_COMMAND_RESPONSE_BACKUPRAM_FAIL	Backup function is failed.

## >> B: Abbreviations

Table B-1: Acronyms and Definitions

Abbreviation	Meaning	Definition
AGNSS	Assisted Global Navigation Satellite System	While using a GPS / GNSS receiver in an inadequate signaling situation, for example, the module is applied in a building where only a weak signal can be received, it may depend on periodically receiving the orbital information of the target satellite from a calculating source other than the GPS satellite itself. The data received is known as assisted GNSS data.
BeiDou		This is a satellite navigation system operated by China.
EPE	Estimated Position Error	EPE is a statistical level of confidence generated for each position. It is measured by horizontal position error in feet or meters based upon a variety of factors including Dilution of Precision (DOP) and satellite signal quality. However, this is not an error message. It is only a reference to inform users how accurate the position of the GPS is displaying at that time. Furthermore, a wide range of factors can have impacts on this reference, such as multipath, number of satellites, SNR, satellites elevations and period of time GPS unit is switched on prior to recording and how long users stay in one location to record the position.
Geofencing		Geofencing defines a geographic boundary. For example, if this "virtual barrier" is established in the module, the further application is able to use triggers that send a text message, email alert, or app notification when an objective enters/ leaves the specified area.
GLONASS		This is a satellite positioning system operated by Russia.
GNSS	Global Navigation Satellite System	A generic standard term for satellite navigation systems that provide autonomous geo-spatial positioning with global coverage.
GPS	Global Positioning System	This is a satellite positioning system operated by USA.
HDOP	Horizontal Dilution of Precision	This measures the geometric quality of a GPS satellite configuration in the sky. HDOP is a factor that determines the relative accuracy of a horizontal position.
LLE	Long Life Ephemeris	Predicts satellite orbit information (ephemeris), with high accuracy, by offering satellite information from outside for one day or more

Table B-1: Acronyms and Definitions (Continued)

Abbreviation	Meaning	Definition
NMEA	The National Marine Electronics Association	This is a standard data format supported by all GPS manufacturers. The output definition consists of latitude, longitude, time, etc.
PPS	pulse-per-second	This is an electrical signal that has a width of less than one second, with edges that sharply increases or abruptly decreases and repeats accurately and precisely once per second. In this application, PPS signals are output by GPS receivers.
PVT	Position, Velocity, Time	A GPS receiver is an L-Band radio processor capable of addressing navigation equations that decide the user's position, velocity, and precise time by dealing with the signal broadcasted by GPS satellites.
QZSS	Quasi-Zenith Satellite System	This is a four-satellite regional time transfer system and a satellite-based augmentation system development operated by Japan.
RTC	Real-Time Clock	This is present in almost any electronic device that needs to have an accurate time.
SBAS	Satellite-based Augmentation Systems	The accuracy and reliability of GNSS information are improved by SBAS via correcting signal measurement errors and via providing information about the accuracy, integrity, continuity and availability of its signals. These systems also support wide-area or regional augmentation by applying the additional satellite-broadcast messages. Correction messages are created and sent to one or more satellites for broadcast from the ground stations used measurements to end users as differential signal.
TCXO	Temperature Compensate X'tal (crystal) Oscillator	A TCXO adjusts the frequency of the oscillator to compensate for the changes that will occur because of temperature changes.
TTFF	Time to First Fix	
VDOP	Vertical Dilution of Precision	This measures the geometric quality of a GPS satellite configuration in the sky. VDOP is a factor that determines the relative accuracy of a vertical position.

## >> C: PVT Log Table

**Table C-1: PVT Log Payload**

Bit	Definition	Parameters
0-19	Latitude	Latitude (decimal places of minutes)
20-25		Latitude (minutes)
26-32		Latitude (degrees)
33		Latitude symbol 0: Plus (north latitude) 1: Minus (south latitude)
34-53	Longitude	Longitude (decimal places of minutes)
54-59		Longitude (minutes)
60-67		Longitude (degrees)
68		Longitude symbol 0: Plus (east longitude) 1: Minus (west longitude)
69-72	Altitude	Altitude (decimal places)
73-89		Altitude (integer) Unit: [m]
90		Altitude symbol 0: Plus 1: Minus
91-94	Horizontal speed	Horizontal speed (decimal places)
95-101		Horizontal speed (integer) Unit: [m/s]
102-105	Vertical speed	Vertical speed (decimal places)
106-110		Vertical speed (integer) Unit: [m]
111		Vertical speed symbol 0: Plus 1: Minus
112-120	Bearing	Integer 0 - 359 Unit: Degree
121-124	Time (UTC)	msec
125-130		Seconds
131-136		Minutes
137-141		Hours

**Table C-1: PVT Log Payload (Continued)**

Bit	Definition		Parameters
142-148	Date (UTC)	Year	
149-153		Day	
154-157		Month	
158-159	Positioning mode	Mode	0: No fixed 1: Fixed 2: Assisted GPS 3: Dead Recording

## >> D: Sensor Log Table

**Table D-1: Sensor Log Data**

Bit	Definition		Parameters	
0-6	Thermal information		Decimal places	2 digits
7-12			Integer	2 digits
13			Sign	
14-20	Acceleration	X Axis	Decimal places	2 digits
21-24			Integer	1 digit
25			Sign	
26-32	Acceleration	Y Axis	Decimal places	2 digits
33-36			Integer	1 digit
37			Sign	
38-44	Acceleration	Z Axis	Decimal places	2 digits
45-48			Integer	1 digit
49			Sign	
50-56	Angular rate	X Axis	Decimal places	2 digits
57-60			Integer	1 digit
61			Sign	
62-68	Angular rate	Y Axis	Decimal places	2 digits
69-72			Integer	1 digit
73			Sign	
74-80	Angular rate	Z Axis	Decimal places	2 digits
81-84			Integer	1 digit
85			Sign	
86-92	Altitude	Roll	Decimal places	2 digits
93-96			Integer	1 digit
97			Sign	
98-104	Altitude	Pitch	Decimal places	2 digits
105-108			Integer	1 digit
109			Sign	
110-114	Reserved			

**Table D-1: Sensor Log Data (Continued)**

Bit	Definition	Parameters
115-121	Time (UTC)	msec
122-127		Seconds
128-133		Minutes
134-138		Hours
139	Reserved	
140-146	Date (UTC)	Year
147-151		Day
152-155		Month

# >> Index (AT Commands)

## A

AT+GNSSBRATE, Set the baud rate of communication interface 42

AT+GNSSBUP, Configure and acquire UDR backup data 35

AT+GNSSCONFIG, Recover configuration and change it to factory default 18

AT+GNSSSEN, Configure and query the log and configuration of the sensor log in flash 33

AT+GNSSSEPE, Configure and query the horizontal and vertical Estimated Position Error (EPE) based on HDOP and VDOP 29

AT+GNSSFER, Erase the currently saved firmware 41

AT+GNSSFSN, Acquire the serial number of the GNSS module 41

ATGNSSGPST, Acquire current GPS Time 17

AT+GNSSHSUDR, Configure the NMEA output in 10 Hz 22

AT+GNSSLLE, Configure connecting AGNSS function and acquire the status 37

AT+GNSSNMEA, Configure and acquire general NMEA sentence output types 19

AT+GNSSPOS, Set position information into receiver 18

AT+GNSSPPS, Configure and query output time in one pulse-per-second (1PPS) function 21

AT+GNSSPVT, Configure and query the log and configuration of PVT log in flash 31

AT+GNSSRAW, Acquire specific data from the GNSS receiver 27

AT+GNSSREBOOT, Reboot module 43

AT+GNSSRTC, Get CPU time and the elapsed time since system startup 42

AT+GNSSSATE, Configure and query GNSS search mode 13

AT+GNSSSLP, Transfer receiver into sleep states 14

AT+GNSSSTACK, Get a size of unused stack 43

AT+GNSSSTART, Execute GNSS startup process 12

AT+GNSSSTOP, Stop positioning and enter standby states 12

AT+GNSSTCXO, Acquire TCXO offset value 43

AT+GNSSTHRES, Configure and query the GNSS threshold 25

AT+GNSSURST, Clear UDR data (orientation, last location, and attitude data) 35

AT+GNSSUSEN, Acquire sensor raw measurement and enable / disable sensor raw measurement NMEA output 28

AT+GNSSUTC, Configure and acquire current UTC time 15

AT+GNSSUTCOR, Acquire the UTC time correction information 16

AT+GNSSVELWARN, Configure and query GNSS speed warning feature 30

AT+GNSSVERS, Acquire the SWIR-defined firmware version number 41

## P

\$PSWIEPE, Details 44

\$PSWIRAW, Details 44

\$PSWIUSEN, Details 44

\$PSWIVELW, Details 44