SP80

Interface Command Document

Release 1.2

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1 Revision History

Track the revision history of the Interface Command Document for the project.

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3 Command description

3.1 Setting commands

3.1.1 ALR,ACK: Acknowledge alarms

$PASHS,ALR,ACK[*cc]

This command acknowledges all the alarms in the receiver.

When this command is issued, all the alarms displayed on the OLED are removed and the command $PASHQ,ALR does not return alarms until a new alarm is raised.

Query command: $PASHQ,ALR

See also:

Example:

Acknowledges the alarms:

```
$PASHS,ALR,ACK
```

3.1.2 ALR,EML: Send alarm by email

$PASHS,ALR,EML,d1[,d2,…,d6][*cc]

This command configures the receiver in order to send email when an alarm is raised.

The command is NAKed if one of the indexes corresponds to an empty entry in the directory.

Parameter	Description	Range
d1	Notification level: 0: no notification 1: standard notification 2: full notification	0-2
d2…d6	Index in email directory See $PASHS,EML,DIR	1-10

*cc	Checksum	

When the notification level is 1 or 2, the receiver sends automatically email when some events happen.

For level 1, the notifications are sent in the following cases:

- The receiver starts up
- The external powers shut down
- A high alarm occurs

For level 2, the notifications are sent in the following cases:

- Receiver start up
- External power failure
- A high or medium alarm occurs

Query command: $PASHQ,ALR,EML

See also: $PASHS,ALR,SMS

Example:

Send email to the first phone number when an alarm is raised:

$PASHS,ALR,EML,1,1

3.1.3 ALR,SMS: Send alarm by SMS

$PASHS,ALR,SMS,d1[,d2,...,d6][*cc]

This command configures the receiver in order to send SMS when an alarm is raised.

The command is NAKed if one of the indexes corresponds to an empty entry in the directory.

Parameter	Description	Range
d1	Notification level:	0-2

	0: no notification 1: standard notification 2: full notification	
d2…d6	Index in phone number directory See $PASHS,PHN,DIR	1-10
*cc	Checksum	

When the notification level is 1 or 2, the receiver sends automatically SMS when some events happen.

For level 1, the notifications are sent in the following cases:

- The receiver starts up
- The external powers shut down
- A high alarm occurs

For level 2, the notifications are sent in the following cases:

- Receiver start up
- External power failure
- A high or medium alarm occurs

Query command: $PASHQ,ALR,SMS

See also: $PASHS,ALR,EML

Example:

Send SMS to the first phone number when an alarm is raised:

$PASHS,ALR,SMS,1,1

3.1.4 ANH: Antenna height

$PASHS,ANH,f1[,c2][*cc]

This command sets the antenna height.

Parameter	Description	Default	Range

f1	Antenna height	0.0	0-6.553m 6.553-99.999m (see comment below)
c2	Type of antenna height (for SP80 only): V: Vertical measurement S: Slant measurement	V	V, S
*cc	Checksum		

When the entered antenna height is greater than 6.553 meters, the antenna height broadcasted in RTCM messages as well as the antenna height recorded in the G-File will be set to 6.553m.

The slant measurement must greater than 10 cm, else the command is NAKed.

Query command: $PASHQ,ANH

See also: $PASHS,ANR; $PASHS,ANT

Example:

Set the antenna height of the rover (vertical) to 2 meters:

$PASHS,ANH,2.000

Set the antenna height of the base (slant) to 1.543 meters:

$PASHS,ANH,1.543,S

3.1.5 ANP,OUT: Reduction raw data to specific antenna name

$PASHS,ANP,OUT[,s1][*cc]

Specify antenna name raw data shall be adjusted to.

Parameter	Description	Range
s1	Name of the antenna OFF or empty=disable the antenna reduction	Up to 31 chars
*cc	Checksum	

By default receiver observables are not corrected for used antenna type. The name of used antenna (OWN antenna) is provided separately to allow performing needed antenna corrections when processing receiver observables.

This command is used to generate all raw (differential) observables matched to desired antenna type (e.g. ADVNULLANTENNA)

If parameter s1 is not found in receiver antenna name database the command is NAKed.

Reduction can be possible only if the name of physical antenna is specified (by $PASHS,ANP,OWN command) and this name of physical antenna is contained in receiver antenna name database (hardcoded and user defined). Otherwise the reduction is not performed.

Reduction is not performed for a Satellite which has not correct elevation. If the reduction is requested, observables for such a Satellite will be not generated until correct elevation available.

Once reduction is performed, receiver reports specified name s1 (e.g. ADVNULLANTENNA) in antenna name message(s) it generates. In this case antenna serial number and setup ID are not generated.

To disable data reduction, one should issue $PASHS,ANP,OUT,OFF without parameter.

Reduction is performed in such a way, that ARP is not changed. If reference position is specified not for ARP, but for L1 phase center, then receiver computes ARP using physical antenna parameters and then re-computes L1 phase center position according to OUT antenna parameters.

This guarantees that reported reference position, antenna name and observables are all in confidence with each other.

Query command: $PASHQ,ANP; $PASHQ,ANP,OUT

See also: $PASHS,ANP,OWN

Example:

Set the antenna name for antenna reduction to ADVNULLANTENNA:

```
$PASHS,ANP,OUT,ADVNULLANTENNA
```

Disable antenna reduction:

```
$PASHS,ANP,OUT,OFF
```

3.1.6 ANP,REF: Antenna name of reference receiver

$PASHS,ANP,REF,s1[*cc]

This command specifies the antenna name of the reference receiver.

The default antenna is UNKNOWN.

Parameter	Description	Default	Range
s1	Name of the antenna	UNKNOWN	Up to 31 chars
*cc	Checksum		

This command is used to tell receiver the name of reference antenna. To be processed adequately, the name must correspond to built-in antenna database. The antenna database is hard-coded. FW is able to extract numerical antenna parameters for entered antenna name.

When receiver serves rover RTK function, it uses numerical values corresponding to s1 to correct reference data appropriately.

The name s1 entered by $PASHS,ANP,REF will be ignored if incoming reference data contain base antenna name (even empty or unknown).

Query command: $PASHQ,ANP; $PASHQ,ANP,REF

See also:

Example:

Set the antenna name of the reference receiver:

```
$PASHS,ANP,REF,ASH802147
```

3.1.7 ANR: Antenna reduction mode

$PASHS,ANR,s1[*cc]

This command sets the antenna reduction mode. It selects the point receiver computed position must be tagged to.

Parameter	Description	Default	Range
s1	Antenna reduction mode: **OFF** or **PC1**: the position is the position of the L1 phase center **ON** or **SPT**: the position is the position of the ground mark **ARP**: the position is the position of the antenna reference point.	OFF	OFF, PC1, ON, SPT, ARP
*cc	Checksum		

Internally, receiver computes position being tagged to L1 phase center (PC1). User can want own position to be tagged to some other points. Internal f/w calculator makes this job.

PC1<->ARP transformations are performed using ANP,OWN/OW2 settings. ARP<->SPT transformations are performed using ANT/ANH settings. On-line changes in ANP,OWN/OW2 and ANT/ANH can result in respective jump in reported position.

Given command equally affects all the computed positions GNSS f/w outputs. Below is the list of messages which are affected:

- All true NMEA messages
- All Ashtech-style NMEA messages
- ATOM,PVT message

ATM,PVT message (block MIS) informs about the point position is tagged to.

On contrary, reference positions receiver generates (static or moving, in raw and differential data) are not affected by this command. This includes:

- ATM,RNX
- All RTCM-3 position messages
- All RTCM-2 position messages

- CMR and CMR+ position messages

On-line change of parameter s1 does not reset PVT engine. User must realize that position (especially altitude) can change noticeably, e.g. by meters.

Query command: $PASHQ,ANR

See also: $PASHS,ANH; $PASHS,ANT

Example:

Set the antenna reduction mode to ON:

```
$PASHS,ANR,ON
```

3.1.8 ANT: Antenna height

$PASHS,ANT,f1,f2,f3[*cc]

This command sets the antenna height.

This command overwrites the values set by the command $PASHS,ANH.

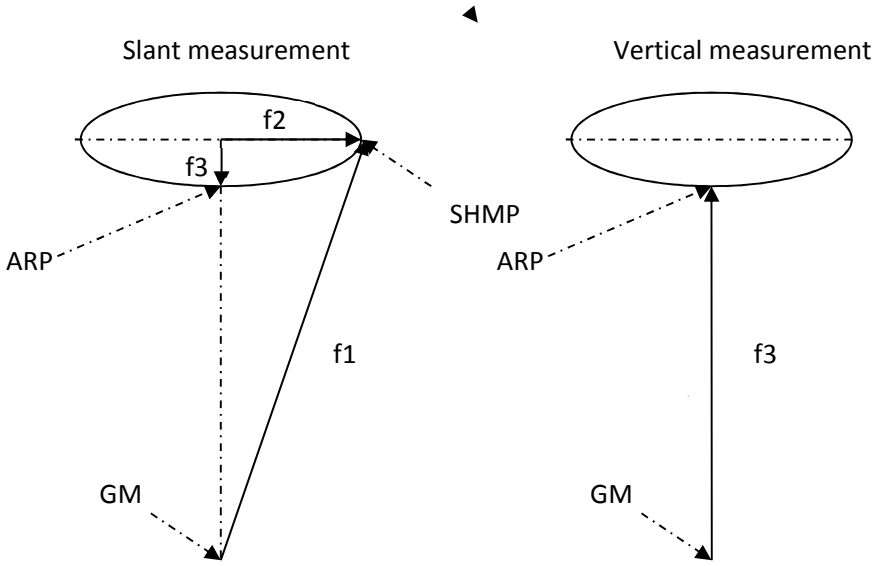
When the receiver is a SP80 and a slant height is entered, the parameter f2 and f3 are ignored and the hardcoded values of the SP80 are used.

Parameter	Description	Range
f1	Antenna slant height: height measured between the ground mark and the SHMP.	0-6.553m 6.553-99.999m (see comment below)
f2	Antenna radius	0-6.553m
f3	Antenna vertical offset: ▪ Difference between the SHMP and the ARP if the slant height and radius are not null ▪ Difference between the ground mark and the ARP if radius or slant are null. (f3≥0)	±0-6.553m 6.553-99.999m (see comment below)
*cc	Checksum	

When the entered antenna height is greater than 6.553 meters, the antenna height broadcasted in RTCM messages as well as the antenna height recorded in the G-File will be set to 6.553m.

The definitions for the different point are:

- ARP: Antenna Reference Point (usually bottom of the antenna)
- SHMP: Slant Height Measurement Point (usually at the hedge of the antenna, above the ARP)
- Ground Mark (GM): above the ARP (same horizontal coordinates)



Query command: $PASHQ,ANT

See also: $PASHS,ANH; $PASHS,ANR

Example:

Set the antenna height of the rover (vertical) to 2 meters:

$PASHS,ANT,0,0,2.000

Set the antenna height of the base (slant) to 1.543 meters with the antenna MAG111406:

$PASHS,ANT,1.543,0.0921,-0.0516

3.1.9 ATH,EML: Anti-theft email address

$PASHS,ATH,EML,d1[,d2…,d5][*cc]

This command sets one or several email addresses for the anti-theft alarm.

The command is NAKed if one of the indexes corresponds to empty entry in the directory.

Parameter	Description	Range
d1…d5	Index in email address directory	1-10

	See $PASHS,EML,DIR	
*cc	Checksum	

$PASHS,ATH,EML,0[*cc]

This command removes all the email for the anti-theft alarm.

Query command: $PASHQ,ATH

See also: $PASHS,ATH,ON; $PASHS,ATH,OFF; $PASHS,ATH,PWD; $PASHS,EML,DIR

Example:

Set the anti-theft emails:

$PASHS,ATH,EML,2,5

3.1.10 ATH,LEN: Anti-theft distance

$PASHS,ATH,LEN,d[*cc]

This command sets the distance which set off the anti-theft alarm.

The main purpose of this command is to reduce the distance when doing a demo.

This command is NAKed when the anti-theft mode is enabled.

Parameter	Description	Default	Range
d	Distance in meter	100m	1-1000m
*cc	Checksum		

Query command: $PASHQ,ATH,LEN

See also: $PASHS,ATH,ON; $PASHS,ATH,OFF; $PASHS,ATH,PHN

Example:

Set the distance to 100m:

$PASHS,ATH,LEN,100

3.1.11 ATH,MSG: Anti-theft alarm message

$PASHS,ATH,MSG,s1,s2,s3[*cc]

This command defines the messages which is displayed on the receiver screen when the anti-theft alarm is raised.

Parameter	Description	Default	Range
s1	First line	ANTI-THEFT	Up to 12 characters
s2	Second line	ALARM	Up to 12 characters
s3	Third line	IS RAISED	Up to 12 characters
*cc	Checksum		

Query command: $PASHQ,ATH

See also: $PASHS,ATH,ON; $PASHS,ATH,OFF; $PASHS,ATH,PWD; $PASHS,PHN,DIR

Example:

Set the anti-theft phone number:

$PASHS,ATH,PHN,2

3.1.12 ATH,OFF: Exit the anti-theft mode

$PASHS,ATH,OFF,s[*cc]

This command exits the anti-theft mode if the password is correct.

Parameter	Description	Default	Range
s	Password	spectra	6 to 64 characters The allowed characters are: 0-9, a-z, A-Z
*cc	Checksum		

If the password is lost, it is possible to send a password computed with the serial number (option code: 307).

Query command: $PASHQ,ATH

See also: $PASHS,ATH,ON; $PASHS,ATH,PWD; $PASHS,ATH,SMS

Example:

Exit the anti-theft mode:

$PASHS,ATH,OFF,kjUyh245hg5hnlk

3.1.13 ATH,ON: Activate the anti-theft mode

$PASHS,ATH,ON[*cc]

Activate the anti-theft mode.

The command is NAKed if the receiver is not computed a position.

When the command is issued, the current position is recorded as the reference position for the anti-theft mode.

When anti-theft mode is active and the distance between the current position and the anti-theft reference position is less than 100m, the receiver operates normally with the following exceptions:

- The following commands are not allowed:
  - $PASHS,ATH,PWD
  - $PASHS,ATH,SMS
  - $PASHS,ATH,EML
  - $PASHS,ATH,LEN
  - $PASHS,PHN,DIR
  - $PASHS,EML,DIR
  - $PASHS,EML,PAR
  - $PASHS,MDM,OFF
  - $PASHS,MDM,PAR
  - $PASHS,PWR,OFF
  - $PASHS,INI
  - $PASHS,RST
- The hardware reset (3 buttons) is not allowed
- The firmware upgrade is not allowed

When the anti-theft mode is active and the receiver does not compute position or the distance between the current position and the anti-theft reference position is greater than 100m (during 10 epochs), then the anti-theft alert is raised.

During the alert, the behavior is the following:

- All the commands are NAKed except the following:
  - $PASHS,ATH,OFF

$PASHQ,RID
$PASHQ,RCP,OWN
$PASHQ,VERION
$PASHS,DBG,XXX
$PASHQ,LOG
$PASHQ,PAR
$PASHQ,ALR
$PASHS,ALR,SET

- All the periodic outputs are stopped
- The hardware reset is not allowed
- The firmware upgrade is not allowed
- It is not possible to power off the receiver
- SMS and/or emails are sent at regular interval with the receiver position
- The buzzer is beeping continuously
- An alert message is displayed on the OLED screen

Query command: $PASHQ,ATH

See also: $PASHS,ATH,OFF; $PASHS,ATH,PWD; $PASHS,ATH,SMS; $PASHS,ATH,EML

Example:

Activate the anti-theft mode:

$PASHS,ATH,ON

3.1.14 ATH,PWD: Anti-theft password

$PASHS,ATH,PWD,s[*cc]

This command sets the anti-theft password.

Parameter	Description	Default	Range
s	Password	spectra	6 to 64 characters The allowed characters are: 0-9, a-z, A-Z
*cc	Checksum		

Query command: $PASHQ,ATH

See also: $PASHS,ATH,ON; $PASHS,ATH,OFF; $PASHS,ATH,PHN

Example:

Set the anti-theft password:

$PASHS,ATH,PWD,kjUyh245hg5hnlk

3.1.15 ATH,SMS: Anti-theft SMS phone number

$PASHS,ATH,SMS,d1[,d2…,d5][*cc]

This command sets one or several phones number for the anti-theft alarm.

The command is NAKed if one of the indexes corresponds to an empty entry in the directory.

Parameter	Description	Range
d1…d5	Index in phone number directory See $PASHS,PHN,DIR	1-10
*cc	Checksum	

$PASHS,ATH,SMS,0[*cc]

This command removes all the phone number for the anti-theft alarm.

Query command: $PASHQ,ATH

See also: $PASHS,ATH,ON; $PASHS,ATH,OFF; $PASHS,ATH,PWD; $PASHS,PHN,DIR

Example:

Set the anti-theft phone SMS:

$PASHS,ATH,SMS,2

3.1.16 ATH,TST: Test anti-theft mode

$PASHS,ATH,TST[*cc]

This command allows testing that the anti-theft is properly configured.

When this command is issued, the following actions are done:

- A SMS is sent to the phone numbers defined by $PASHS,ATH,SMS

- A email is sent to the addresses defined by $PASHS,ATH,EML

- The anti-theft is displayed on the screen during 10 seconds

Query command:

See also: $PASHS,ATH,OFF; $PASHS,ATH,PWD; $PASHS,ATH,SMS; $PASHS,ATH,EML

Example:

Test the anti-theft mode:

$PASHS,ATH,TST

3.1.17 ATL: Debug data recording

$PASHS,ATL,s1[,f3][,SCN,d4][*cc]

This command enables or disables the ATL data (debug data) recording. The ATL file (ATL_yymmdd_hhmmss.log) is recorded on the memory selected by the command $PASHS,MEM.

If the memory is not available, the command answers ACK and the user may see the status with the command $PASHQ,ATL.

This command is NAKed if the ATL is being outputted to any port.

$PASHS,ATL,d2[,f3][SCN,d4][*cc]

This command outputs the ATL messages (debug data) to a specified port.

This command is NAKed if an ATL file is being recorded.

It is possible to customize the data recorded in ATL file. When it is set to ON or AUT, if the receiver finds a file atl.ini in the SD Card then it sends to the commands written in the file atl.ini instead of the default command.

Please note that the last command in the file atl.ini must terminate with a cr/lf in order to be taken into account.

Parameter	Description	Default	Range
s1	ON: enable ATL data recording (no record after power cycle) OFF: disable ATL data recording AUT: enable ATL data recording (still	OFF	ON, OFF, AUT

	record after power cycle)		
d2	Output port Serial port: **A** USB serial port: **B** Bluetooth port : **C** TCP/IP port : **I**		**A**,**B**,**C**,**I**
f3	Output interval in second	1	0.01,0.02,0.05, 0.1, 0.2, 0.5, **1**
d4	Configuration index	0	0-1
*cc	Checksum		

Query command: $PASHQ,ATL

See also: $PASHS,MEM

Example:

Enable the debug data recording:

$PASHS,ATL,ON

3.1.18 ATM: Enable/disable ATOM messages

$PASHS,ATM,s1,c2,s3[,f4][*cc]

$PASHS,ATM,RNX,c2,s3[,f4],&SCN,d5

$PASHS,ATM,s1,c2,s3[,f4],&s7[,s8,]...

The ATM command enables and disables ATOM messages in default configuration.

Parameter	Description	Range
s1	ATOM message type	See table below
c2	Serial port: **A**	SP80: **A,B,C,D,E,I,P,Q,M,S**

	USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q** Internal memory: **M** SD Card: **S**	
s3	Enable/disable	ON, OFF
f4	Output rate for PVT, RNX, SUP messages	0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120, etc integer minute up to 960
f4	Output rate for NAV, ATR and STA messages	1-999s
d5	Scenario for ATOM RNX	See below the list of scenario
s7,s8,…	Sub message	See ATOM manual
*cc	Checksum	

The list of ATOM messages is the following:

Type	ID	Description	Default sub-messages	Default intervals
ALR	0	Receiver alarms	USR	N/A
SUP	1	Supplementary data	CPI	1 second
PVT	3	Positioning results	COO,ERR,LCY,SVS	1 second
ATR	4	Receiver attributes	ANM,RNM,CPB,AOP	30 seconds
NAV	5	Navigation information	EPH,GIT,GFT	300 seconds
DAT	6	Binary data frames	EXT,FRM	N/A
RNX	7	Receiver observables	SCN,4	1 second

STA	13	Receiver status	BLA,DDS,GFN	5 seconds
EVT	14	Receiver event	TTT,PTT	N/A

The default settings for the port M and S (raw data recording) are the following:

Type	ID	Description	Default sub-messages	Default intervals
PVT	3	Positioning result	COO,ERR,LCY	1 second
ATR	4	Receiver attributes	ANM,RNM,AOP,CPB	30 seconds
NAV	5	Navigation information	ALM,EPH,GIT,GFT	300 seconds
RNX	7	Receiver observables	SCN,0	1 second

The list of scenarios for ATOM RNX is the following:

Scenario	Description
0	All available raw data in full presentation, full computed reference position follows each epoch (**this scenario is not recommended as differential protocol**).
1	L1 pseudo range and carrier phase in full presentation, extended fixed position follows each 12 epochs
2	L1 SNR, pseudo range and carrier phase in full presentation, extended fixed position follows each 12 epochs
3	L1&L2 pseudo range and carrier phase in full presentation, extended fixed position follows each 12 epochs
4	L1 &L2 SNR, pseudo range and carrier phase in full presentation, extended fixed position follows each 12 epochs
100	L1&L2 compact pseudo range and full carrier phase, extended fixed position follows each 12 epochs, all the data are decimated in 5 times compared to L1 carrier phase
101	L1&L2 compact pseudo range and compact carrier phase, extended fixed position follows each 12 epochs, all the data are decimated in 5 times compared to L1 carrier phase. **Given scenario cannot be used with moving receiver.**
201	Same as scenario 1, but extended computed reference position follows each epoch
202	Same as scenario 2, but extended computed reference position follows each epoch
203	Same as scenario 3, but extended computed reference position follows each epoch
204	Same as scenario 4, but extended computed reference position follows each epoch
300	Same as scenario 100, but extended computed reference position follows each epoch

The messages ATOM ATR and ATOM RNX (scenario 1 to 300) are used as differential messages to the port A,B,C,D,E,I,P,Q. These messages are not outputted in rover mode ($PASHS,CPD,MOD,ROV). They are outputted only when the receiver is in base mode ($PASHS,CPD,MOD,BAS). However they can be recorded on port M or S in base or rover mode.

Query command: $PASHQ,PAR,ATM

See also: $PASHS,ATM,ALL

Example:

Output raw data to the port A:

```
$PASHS,ATM,RNX,A,ON,1.0,&SCN,0
$PASHS,ATM,NAV,A,ON,&EPH,ALM,GIT,GFT
```

Output raw data to the internal memory:

```
$PASHS,ATM,RNX,M,ON,1.0,&SCN,0
$PASHS,ATM,NAV,M,ON,&EPH,ALM,GIT,GFT
```

Output raw data to the SD card:

```
$PASHS,ATM,RNX,S,ON,1.0,&SCN,0
$PASHS,ATM,NAV,S,ON,&EPH,ALM,GIT,GFT
```

Output differential data (standard) to port A:

```
$PASHS,ATM,RNX,A,ON,1,&SCN,4
$PASHS,ATM,ATR,A,ON,30,&ANM,RNM
```

Output differential data (compact) to port A:

```
$PASHS,ATM,RNX,A,ON,1,&SCN,100
$PASHS,ATM,ATR,A,ON,30,&ANM,RNM
```

Output differential data (super compact) to port A:

```
$PASHS,ATM,RNX,A,ON,1,&SCN,101
$PASHS,ATM,ATR,A,ON,30,&ANM,RNM
```

3.1.19 ATM,ALL: Disable all ATOM messages

$PASHS,ATM,ALL,c1,OFF[*cc]

Disable all the ATOM messages currently sent to the specified port.

Parameter	Description	Range
c1	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q** Internal memory: **M** SD Card: **S**	SP80: **A,B,C,D,E,I,P,Q,M,S**
*cc	Checksum	

Query command: None

See also: $PASHS,ATM

Example:

$PASHS,ATM,ALL,A,OFF

3.1.20 BDS: Enable/disable BEIDOU tracking

$PASHS,BDS,s[*cc]

Switches on/off BEIDOU tracking.

The default is **ON** (if [B] option is enabled). The command is NAKed if option [B] is not installed.

Parameter	Description	Range	Default
s	ON: track and use the BEIDOU satellites OFF: do not track the BEIDOU satellites	ON,OFF	ON
*cc	Checksum		

Query command: $PASHQ,BDS

See also: $PASHS,SBA; $PASHS,GPS; $PASHS,GAL; $PASHS,QZS; $PASHS,GLO

Example:

Enable the BEIDOU:

```
$PASHS,BDS,ON
```

3.1.21 BEEP: Beeper set-up

$PASHS,BEEP,s1[,d2][*cc]

This command enables or disables the audible beeper.

If d2 is not 0, the beeper will automatically stops after d2 second.

Parameter	Description	Default	Range
s1	ON: enable the beeper OFF: disable the beeper	ON	ON,OFF
d2	Timeout in second 0=no timeout	30	0-99
*cc	Checksum		

Query command: $PASHQ,BEEP

Example:

Set the beeper on:

```
$PASHS,BEEP,OFF
```

Set the beeper on:

```
$PASHS,BEEP,ON
```

3.1.22 BKL: Backlight setup

$PASHS,BKL,d1[*cc]

This command set the timeout for the OLED backlight.

After the timeout with pressing any buttons and with new high or medium alarms, the OLED screen is shut down.

Parameter	Description	Default	Range
d1	Timeout in minutes 0=no timeout (the backlight is always on)	10	0-1440
*cc	Checksum		

Query command: $PASHQ,BKL

Example:

Set the timeout to 10 minutes:

```
$PASHS,BKL,10
```

Disable the timeout:

```
$PASHS,BKL,0
```

3.1.23 BTH,NAME: Bluetooth device name

$PASHS,BTH,NAME,s1[*cc]

Set the Bluetooth device name.

This command answers $PASHR,NAK if a Bluetooth communication is active or if the Bluetooth is OFF.

The commands $PASHS,RST and $PASHS,INI do not modify the name.

Parameter	Description	Range
s1	Bluetooth device name	Up to 64 characters
*cc	Checksum	

Query command: $PASHQ,BTH

See also: $PASHS,BTH,PIN

Example:

```
$PASHS,BTH,NAME,my rover
```

3.1.24 BTH,OFF: Disable Bluetooth

$PASHS,BTH,OFF[*cc]

This command disables the Bluetooth module. By default, the Bluetooth module is ON.

Query command: $PASHQ,BTH

See also: $PASHS,BTH,ON; $PASHS,BTH,NAME; $PASHS,BTH,PIN

Example:

```
$PASHS,BTH,OFF
```

3.1.25 BTH,ON: Enable Bluetooth

$PASHS,BTH,ON[*cc]

This command enables the Bluetooth module. By default, the Bluetooth module is ON.

Query command: $PASHQ,BTH

See also: $PASHS,BTH,OFF; $PASHS,BTH,NAME; $PASHS,BTH,PIN

Example:

```
$PASHS,BTH,ON
```

3.1.26 BTH,PIN: Bluetooth PIN code

$PASHS,BTH,PIN,s[*cc]

Set the Bluetooth pin code.

This command answers $PASHR,NAK if a Bluetooth communication is active.

Parameter	Description	Range
s	Bluetooth pin code	Up to 16 digits -1: no pin code
*cc	Checksum	

Query command: $PASHQ,BTH

See also: $PASHS,BTH,NAME

Example:

```
$PASHS,BTH,PIN,1234
```

3.1.27 CMD,LOD: Executes command file

$PASHS,CMD,LOD[,s][*cc]

This command executes the $PASH commands which are written in a file located on the SD Card.

The optional parameter **s** is the file name. If **s** is omitted, the receiver executes the file **autoconfig.cmd**

The command file can contain any $PASHS or $PASHQ commands. If the file contains the commands $PASHS,REC or $PASHS,INI, these commands are executed at the end whatever their position in the file.

If the command file contains the command $PASHS,REC to start a record, the selected memory must be the internal memory ($PASHS,MEM,0). Else the receiver may crash.

All the answers to the commands are written in a log file. The extension of this file is **.log** and the base name is the same as the command file base name. The log file contains the following columns separated by a space:

- Day number in the year (ddd)
- Time (hh:mm:ss)
- Symbol: > for a command $PASHS or $PASHQ (sent to the receiver) or < for the answers
- Command or answer

To insert a wait of several seconds in the script, you can add in the file the specific command $PASHS,CMD,WTI

Parameter	Description	Range	Default
s	File name	Up to 255 characters	autoconfig.cmd
*cc	Checksum		

If you place the file **autoconfig.cmd** on the SD Card, the receiver will automatically detect it at start up or when the SD Card is inserted and it will ask the user if he wants to execute this file.

If you place the file **uploadconfig.cmd** on the SD Card, the receiver will automatically detect it at start up or when the SD Card is inserted and it will execute this file automatically.

Query command:

See also: $PASHS,CMD,WTI

Example:

Executes the file autoconfig.cmd:

```
$PASHS,CMD,LOD
```

Executes the file myconfig.cmd:

```
$PASHS,CMD,LOD,myconfig.cmd
```

Example of log file:

```
314 09:11:07 > $PASHQ,RID

314 09:11:07 < $PASHR,RID,PF,30,S525Gh23,FKSZP---,,200913024*37

314 09:11:07 > $PASHQ,POS

314 09:11:07 <
$PASHR,POS,1,14,091107.80,4717.938167,N,00130.543280,W,86.457,3,0
.0,0.0,-0.0,1.2,0.8,0.9,0.6,Gh23*20

314 09:11:07 > $PASHS,NME,GGA,A,ON

314 09:11:07 < $PASHR,ACK*3D
```

3.1.28 CMD,WTI: Wait in a command file

$PASHS,CMD,WTI,d[*cc]

This command, inserted in a command file, waits for a while before executing the next command.

This command is available only in a command file.

Parameter	Description	Range
d	Wait time in seconds	1-3600
*cc	Checksum	

Query command:

See also: $PASHS,CMD,LOD

Example:

Wait for 10 seconds:

```
$PASHS,CMD,WTI,10
```

3.1.29 CMR: Enable/disable CMR/CMR+ messages

$PASHS,CMR,d1,c2,s3[,f4][*cc]

The CMR command enables and disables continuous CMR/CMR+ messages output.

Parameter	Description	Range
d1	Data message	See table below
c2	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q**	SP80: **A,B,C,D,E,I,P,Q**
s3	Enable/disable (default)	ON, **OFF**
f4	Output interval in seconds. By default set to **1.**	See table below

The list of supported data messages is the following:

Data	Description	f4 range
0	GPS observations	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120 etc integer minute up to 960
1	Reference WGS-84 position (location) tagged to L1 phase center	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999
2	Reference site description (that entered by $PASHS,MSG command)	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999
3	GLO observations	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120 etc integer minute up to 960
10	GPS Observation and position/description scrolling message. It can be requested instead	No need to set interval

	of messages 0, 1 and 2 making thereby CMR+ concept.	

Example:

Set 'default' CMR base configuration:

```
$PASHS,POS,'position'*cc or $PASHS,POS,CUR*51
$PASHS,CMR,0,A,ON,1*68
$PASHS,CMR,1,A,ON,13*5A
$PASHS,CMR,2,A,ON,31*59
$PASHS,CMR,3,A,ON,1*6B
```

Set 'default' CMR+ base configuration:

```
$PASHS,POS,'position'*cc or $PASHS,POS,CUR*51
$PASHS,CMR,10,A,ON*68
$PASHS,CMR,3,A,ON,1*6B
```

3.1.30 CMR,ALL: Disable all CMR data

$PASHS,CMR,ALL,c1,OFF[*cc]

Disable all the CMR messages currently sent to the specified port.

Parameter	Description	Range
c1	Serial port: **A** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q**	SP80: **A,C,D,E,I,P,Q**

See also: $PASHS,CMR

Example:

```
$PASHS,CMR,ALL,A,OFF*4A
```

3.1.31 CPD,BAS: RTK moving base mode

$PASHS,CPD,BAS,d[*cc]

Set the mode of RTK rover working with static/moving base.

Parameter	Description	Range	Default
d	RTK base mode: 0: Assume static base 1: Assume moving base	0-1	0
*cc	Checksum		

As a result, position accuracy in mode d1=1 is primarily defined by accuracy of reference position which is usually not good. In mode d1=1, baseline (and its orientation, e.g. heading) is usually of primary interest, while position cannot be as accurate as it can be in mode d1=0.

Note: Once moving base mode is assumed on rover, conventional DGNSS positions (e,g, those using RTCM-2 MT 1&31) will be not available.

Query command: $PASHQ,CPD,BAS; $PASHQ,PAR

See also:

Example:

Set the rover in moving base mode:
$PASHS,CPD,BAS,1

3.1.32 CPD,MOD: Receiver mode

$PASHS,CPD,MOD,s[*cc]

This command set the receiver mode.

Parameter	Description	Range	Default
s	Receiver mode: - BAS: BASE mode - ROV: ROVER mode - ANY: every mode allowed	SP80: ANY, BAS, ROV	SP80: ROV
*cc	Checksum		

Query command: $PASHQ,CPD,MOD

See also:

Example:

Set receiver to base mode:

```
$PASHS,CPD,MOD,BAS
```

Set receiver to rover mode:

```
$PASHS,CPD,MOD,ROV
```

3.1.33 CPD,NET: RTK network operation mode

$PASHS,CPD,NET,d1[,d2][*cc]

Set the RTK network operation mode. Ignoring Network corrections/data means ignoring MAC or FKP corrections or Network Residual Messages (NRM), while using Master base data only.

Parameter	Description	Range	Default
d1	RTK network operation mode for GPS: Default is **1**. ▪ 0: Ignoring network GPS corrections ▪ **1**: Applying network FKP/MAC/NRM GPS data when available and healthy, and ignoring them if not healthy	0-1	1
d2	RTK network operation mode for GLONASS: Default is **1**. ▪ 0: Ignoring network GLONASS corrections ▪ **1**: Applying network FKP/MAC/NRM GLO data when available and healthy, and ignoring them if not healthy	0-1	1
*cc	Checksum		

Query command: $PASHQ,CPD,NET; $PASHQ,PAR

See also:

Example:

Ignore GPS network corrections:

```
$PASHS,CPD,NET,0
```

3.1.34 CPD,RST: Reset the RTK computation

$PASHS,CPD,RST[*cc]

Reset the RTK computation.

Reset means resetting current estimates of Single Difference (SD) carrier ambiguities for all the processed signals. User must expect position jump, increase of reported RMS and transition to Float just after issuing given command.

Query command: None

See also:

Example:

$PASHS,CPD,RST

3.1.35 CPD,VRS: VRS assumption mode

$PASHS,CPD,VRS,d[*cc]

Set automatic detection or compulsory VRS mode.

Recommended when working with RTCM-2 (and sometimes CMR) protocols which do not indicate VRS.

Parameter	Description	Range	Default
d	VRS assumption mode: ▪ 0: Automatic detection ▪ 1: compulsory VRS mode ▪ 2: Never transit to VRS mode	0-2	0
*cc	Checksum		

Query command: $PASHQ,CPD,VRS; $PASHQ,PAR

See also:

Example:

Set compulsory VRS mode:
$PASHS,CPD,VRS,1

3.1.36 CTS: Hardware handshake

$PASHS,CTS,[c1],s2[*cc]

This command enables or disables the RTS/CTS (handshaking) protocol for the specified port. If the port c1 is not specified, then the RTS/CTS is disabled on the port which receives the command.

Parameter	Description	Default	Range
c1	Port		SP80: **A**
s2	RTS/CTS protocol	OFF	ON, OFF
*cc	Checksum		

Query command: $PASHQ,CTS

See also: $PASHS,PRT;

Example:

Disables the hardware handshaking on the port A

$PASHS,CTS,A,OFF

Disables the hardware handshaking on the current port

$PASHS,CTS,,OFF

3.1.37 DIF,PRT: Port for incoming differential corrections

$PASHS,DIF,PRT,c1[,d2][*cc]

Set port [and protocol] to listen to differential corrections for primary PVT. If s2 is not specified (or s2=ALL), receiver expects any differential protocol from port c1. Specifying protocol (if known a priori) allows saving the throughput of differential decoder by disabling running all other

differential decoders. Both CMR and CMR+ protocols are detected if CMR is specified. While ATM and RT3 use the same transport layer, DIF allows filtering each of them out separately.

$PASHS,DIF,PRT,OFF[*cc]

This command disables all differential decoders for primary PVT.

$PASHS,DIF,PRT,ALL[*cc]

This command enables the differential reception on any port.

Parameter	Description	Range
c1	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q** Virtual port: **Z** (see ATOM DAT EXT)	SP80: **A,B,C,D,E,I,P,Q,Z**
s2	Protocol ALL: any protocol is expected ATM: ATOM CMR: CMR or CMR+ RT2: RTCM v2.3 RT3: RTCM v3.0, 3.1, 3.2	ALL**,** ATM, CMR, RT2, RT3
*cc	Checksum	

Notes:

1. Differential decoder will listen only on specified port and only for specified differential protocol(s).
2. Once specified differential protocol is detected on specified port, corresponding differential messages are decoded and $PASHR,DDM message is output (if requested).

3. If specified differential protocol is detected on specified port, then these corrections feed primary PVT engine. These may be RTK corrections to feed RTK engine, or DGPS corrections, in this case code-differential position will be computed.
4. Differential streams, coming to other ports will be ignored and will not feed primary PVT engine.
5. If other than specified different protocol is detected on specified port, then it is not decoded.

Query command: $PASHQ,DIF,PRT; $PASHQ,PAR

See also:

Example:

Set the rover to receive RTCM3 on port A:
$PASHS,DIF,PRT,A,RT3

3.1.38 DIF,SBA: Source of SBA corrections to use

$PASHS,DIF,SBA,s[*cc]

Specify the source of SBAS (Space Based Augmentation System) which can be used in receiver positioning process.

Parameter	Description	Default	Range
s	Specification of used source: ALL: use all available data OFF: do not use any SBAS corrections	ALL	ALL,OFF
*cc	Checksum		

Given command means the following sources of SBAS coming to receiver from sky:

- Native SBAS including WAAS, EGNOS, MSAS, GAGAN etc, i.e. geostationary Satellites transmitting SBAS corrections via GPS L1 signal with PRNs 120-158
- QZSS L1SAIF signal
- L-band (sky link) correcting services (OmniStar, RTX etc)
- Others which can follow

If s=ALL, then GNSS firmware selects the best [combination of] SBAS correction to use. If s=OFF, GNSS firmware will not use any correcting data even if they are available.

Commands $PASHS,DIF,PRT and $PASHS,DIF,SBA are similar by syntax and describes selecting/blocking way of 2 primary correcting data:

- Data coming to receiver port
- Data coming via GNSS/Lband antenna/RF

Query command: $PASHQ,DIF,SBA; $PASHQ,PAR

See also:

Example:

Use available data:
$PASHS,DIF,SBA,ALL

3.1.39 DIP,OFF: Disconnect a server (Direct IP connection)

$PASHS,DIP,OFF[,c1][*cc]

Disconnect the current server (Direct IP connection).

When c1 is omitted, the port to connect the server is the port defined by the last command $PASHS,DIP,PAR sent.

Parameter	Description	Range
c1	Internet port used to connect the server: **P**: TCP/IP stream 1 **Q**: TCP/IP stream 2	P,Q
*cc	Checksum	

Query command: $PASHQ,DIP

See also: $PASHS,DIP,PAR; $PASHS,DIP,ON

Example:

```
$PASHS,DIP,OFF
```

3.1.40 DIP,ON: Connect a server (Direct IP connection)

$PASHS,DIP,ON[,c1][*cc]

Connect the current TCP/IP server (Direct IP connection).

When c1 is omitted, the port to connect the server is the port defined by the last command $PASHS,DIP,PAR sent.

Parameter	Description	Range
c1	Internet port used to connect the server: **P**: TCP/IP stream 1 **Q**: TCP/IP stream 2	P,Q
*cc	Checksum	

Query command: $PASHQ,DIP

See also: $PASHS,DIP,PAR; $PASHS,DIP,OFF

Example:

```
$PASHS,DIP,ON
```

3.1.41 DIP,PAR: Direct IP parameters

$PASHS,DIP,PAR,ADD,s1,PRT,d2[,LGN,s3,PWD,s4][,IPP,c5][*cc]

Set the parameters to connect an external server (Direct TCP/IP connection).

The optional fields s3 and s4 allow entering a user name and a password when it is required to connect the base. In this case, the receiver sends the command $GPUID,s2,s4 to the base as soon as the IP connection is established.

Parameter	Description	Range
ADD,s1	IP address or host name	Up to 32 characters
PRT,d2	Port number	0-65535
LGN,s3	User name (optional)	Up to 32 characters
PWD,s4	Password (optional)	Up to 32 characters
IPP,c5	Internet port used to connect the server: **P**: TCP/IP stream 1 (default) **Q**: TCP/IP stream 2	P,Q
*cc	Checksum	

The ports P and Q are generic TCP/IP ports. By default, the receiver determines itself which physical port can be used (Modem, WiFi, Ethernet). However it is possible to specify the physical port with the command $PASHS,TCP,RTE.

The last command sent defines the current port (P or Q) for the commands $PASHS,DIP,ON and $PASHS,DIP,OFF.

Query command: $PASHQ,DIP;

See also: $PASHS,DIP,ON; $PASHS,DIP,OFF;

Example:

Set the server parameters (IP address):

```
$PASHS,DIP,PAR,ADD,192.65.54.1,PRT,80
```

Set the server parameters (host name):

```
$PASHS,DIP,PAR,ADD,www.ashtech.com,PRT,8080
```

3.1.42 DRI: Data recording interval

$PASHS,DRI,f[*cc]

Set the recording interval of raw data to the internal memory and external memory.

Parameter	Description	Range	Default
f	Recording interval	0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120, 180, 240, 300, 360, 600, 720, 900, 1200, 1800, 3600 sec	1s
*cc	Checksum		

This command modifies the output rate of the ATOM RNX and PVT messages programmed on the port M and S.

Query command: $PASHQ,DRI

See also: $PASHS,ATM; $PASHS,REC

Example:

Set the recording interval to 5 seconds:

```
$PASHS,DRI,5
```

3.1.43 DSY: Daisy chain

$PASHS,DSY,c1,c2[*cc]

$PASHS,DSY,c1,OFF[*cc]

$PASHS,DSY,OFF[*cc]

Redirects all characters from one serial port to another without interpreting them, where c1 is the source port, and c2 the destination port. Any combination may be chosen. When a port is in daisy chain mode, it can only interpret the DSY commands; all other characters are redirected. The OFF command discontinues the daisy chain mode. Redirection can also be bi-directional (i.e. A to D and D to A at the same time), but a second command is necessary to set the other direction.

Parameter	Description	Range
c1	Source port: Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q**	SP80: **A,B,C,D,E,I,P,Q**
c2	Destination port: Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q**	SP80: **A,B,C,D,E,I,P,Q**
*cc	Checksum	

Query command: None

See also: $PASHS,SPY

Example:

Redirects D to A:

```
$PASHS,DSY,D,A
```

Redirects D to A and A to D:

```
$PASHS,DSY,D,A
$PASHS,DSY,A,D
```

Turns off redirection from A:

```
$PASHS,DSY,A,OFF
```

Turns off daisy chain on all ports:

```
$PASHS,DSY,OFF
```

3.1.44 DYN: Receiver dynamics

$PASHS,DYN,d[*cc]

This command sets rover's dynamic information, where d1 is a code number that best represents the motion of the rover receiver. The default is **8**. If RTK rover is put into moving base mode, it is recommended to use **8**. When adaptive mode is chosen, receiver itself tries to estimate own dynamic and fit it to one of fixed choices from 2 (static) to 7 (unlimited). Fitting to choices 1 (static) and 9 (user defined) is not possible in adaptive dynamic mode.

Parameter	Description	Range	Default
d	Dynamic. One of the following values: ▪ 1: Static ▪ 2: Quasi-static ▪ 3: Walking ▪ 4: Ship ▪ 5: Automobile ▪ 6: Aircraft ▪ 7: Unlimited ▪ 8: Adaptive (default) ▪ 9: User-Defined	1-9	8
*cc	Checksum		

Query command: $PASHQ,DYN; $PASHQ,PAR

See also:

Example:

Set rover dynamic to walking:
```
$PASHS,DYN,3
```

3.1.45 ELM: Elevation mask

$PASHS,ELM,d1[*cc]

This command sets the minimum satellite elevation for the output of raw and differential measurement data. Effects the following data: RT2,RT3,CMR,ATM regardless their usage (as differential protocol or raw data recording)

Parameter	Description	Range	Default
d1	Elevation mask	0-90 degrees	5
*cc	Checksum		

Query command: $PASHQ,ELM

See also: $PASHS,PEM

Example:

Set the elevation mask to 15 degrees:
```
$PASHS,ELM,15
```

3.1.46 EML,DIR: Email address directory

$PASHS,EML,DIR,d1[,s2][*cc]

This command adds an email address in the directory.

If d2 is omitted, the email address is deleted.

Parameter	Description	Default	Range
d1	Index		1-10
s2	Email address		Up to 64 characters
*cc	Checksum		

Query command: $PASHQ,EML,DIR

See also:

Example:

Set a phone number at the index 2:

$PASHS,EML,DIR,2,jean_dupont@trimble.com

3.1.47 EML,PAR: Email parameters

$PASHS,EML,PAR[,SMT,s1][,PRT,d2][,USR,s3][,PWD,s4][,SND,s5][*cc]

Set the email parameters.

Parameter	Description	Range	Default
SMT,s1	SMTP Server address or hostname	Up to 32 characters	smtp.gmail.com
PRT,d2	SMTP Port Number	0-65535	465
USR,s3	Username	Up to 32 characters	spectra.sp80@gmail.com
PWD,s4	Password	Up to 32 characters	spectrapreci
SND,s5	Sender Email address	Up to 64 characters	no-reply@SP80.com
*cc	Checksum		

Query command: $PASHQ,EML

See also: $PASHS,EML,TST; $PASHS,ATH,EML; $PASHS,ALR,EML

Example:

Set the email parameters:
```
$PASHS,EML,PAR,SMT,smtp.gmail.com,PRT,25,USR,gmail,PWD,gmail,SND,no-reply@SP80.com
```

3.1.48 EML,TST: Send a test email

$PASHS,EML,TST,d1[*cc]

Send a test email to the address d1. It allows checking that the settings of the command $PASHS,EML,PAR are valid.

The message in the email is "Test message for email verification".

The command returns $PASHR,ACK immediately if it is correct.

The command returns $PASHR,EML,OK when the email is sent.

The command return $PASHR,EML,FAIL if it fails to send the email.

Parameter	Description	Range
d1	Index in email address directory See $PASHS,EML,DIR	1-10
*cc	Checksum	

Query command: $PASHQ,EML

See also: $PASHS,EML,PAR

Example:

Send a test email :

```
$PASHS,EML,TST,1
```

3.1.49 FIL,DEL: Delete files and directories

$PASHS,FIL,DEL,[d1],[s2],s3[,s4[...,sn]][*cc]

Delete files and directory.

If d1 is omitted, it deletes files on the current memory location specified by $PASHS,MEM

To delete a file or a directory which is located in a sub-directory, the parameter s2 must contain the path. The parameters s3 to sn do not contain path.

It is possible to use pattern with character * in order to delete several files. In this case, the string must between inverted commas (` or "). The possible patterns are '*.*', 'xxx.*', '*.xxx'.

Parameter	Description	Range
d1	Memory location 0: Internal memory (user data partition)	0,1,3

	1: SD Card 3: Internal memory (log file partition)	
s2	Path	Up to 255 characters
s3	File name or directory name	Up to 255 characters
	…	
sn	File name or directory name	Up to 255 characters
*cc	Checksum	

Query command: None

See also: $PASHQ,FIL,LST; $PASHS,MEM

Example:

Delete 1 G-File:

```
$PASHS,FIL,DEL,,,GabcdA09.241
```

Delete 3 G-Files:

```
$PASHS,FIL,DEL,,,GabcdA09.241,GabcdB09.242,GabcdC09.242
```

Delete 1 G-File in a sub-folder of the SD Card:

```
$PASHS,FIL,DEL,1,2009/241,GabcdA09.241
```

Delete 1 directory in a sub-folder of the SD Card:

```
$PASHS,FIL,DEL,1,2009,241
```

Delete all files of the SD Card:

```
$PASHS,FIL,DEL,1,,"*.*"
```

Delete all files recorded day 241 of the SD Card:

```
$PASHS,FIL,DEL,1,,"*.241"
```

3.1.50 FIL,GET: Start file transfer

$PASHS,FIL,GET,s1,[d2],[d3],[d4],[d5][*cc]

Start to download a file through the current port. The maximum size for the file to be transferred is 2 Gb.

Parameter	Description	Default	Range
s1	File name (with path if the file is in a sub-folder)		Up to 255 characters
d2	0: internal memory (user data partition) 1: SD Card 3: internal memory (log file partition)	0	0,1,3
d3	Start position in bytes If empty or 0, the start position is the beginning of the file	0	0-2048 Mb
d4	Total download size in bytes If empty or 0, all the file is transferred	0	0-2048 Mb
d5	Packet size in bytes If empty or 0, the packet size 2048 bytes	2048	0-64 Kb
*cc	Checksum		

The command returns $PASHR,ACK*3D and they it returns several messages in the form below:

$PASHR,FIL,GET,<length><flags><file position><data><checksum><cr><lf>

Parameter	Size	Description
length	2 bytes	Length of the data packet
flags	1 bytes	Bit 0 - 0: this packet is the end of file - 1: this packet is a data packet, not the end of file

File position	4 bytes	Current file position It is the offset from the start of the file of the first data byte in this packet
data	length	Data
checksum	1 byte	Checksum: <length>+<flags>+<file position>+<data> modulo 256

$PASHS,FIL,GET,OFF*cc

This command stops the current file transfer.

If the software which is receiving the $PASHR,FIL,GET messages missed some data, it must stop the transfer and re-start it at the right index.

See also: $PASHQ,FIL,LST;

Example:

```
$PASHS,FIL,GET,GazerA09.123,0,0,0,2048
$PASHR,FIL,GET,<2048><1><0><data><checksum>
$PASHR,FIL,GET,<2048><1><4096><data><checksum>
$PASHR,FIL,GET,<2048><1><6144><data><checksum>
$PASHR,FIL,GET,<1502><0><8192><data><checksum>

$PASHS,FIL,GET,2013/123/GazerA09.123
$PASHR,FIL,GET,<2048><1><0><data><checksum>
$PASHR,FIL,GET,<2048><1><4096><data><checksum>
$PASHR,FIL,GET,<2048><1><6144><data><checksum>
$PASHR,FIL,GET,<1502><0><8192><data><checksum>
```

3.1.51 FMT: Format memory

$PASHS,FMT,d[*cc]

Format the receiver memory or the SD Card.

Parameter	Description	Range
d	0: Internal memory (user partition)	0,1,2

	1: Internal memory (all partitions) 2: SD Card	
*cc	Checksum	

This command causes the restart of the receiver when d is 0 or 1.

The command $PASHS,FMT,0 formats the internal memory where the G-File are stored. All the recorded G-File are lost after issuing this command.

The command $PASHS,FMT,1 formats all the internal memory. All the recorded G-File, the log file and the receiver settings are lost after having issuing this command.

The command $PASHS,FMT,2 formats the SD Card. After issuing this command, only one partition will exists on the SD Card.

Query command:

See also:

Example:

Format the internal memory:

```
$PASHS,FMT,1
```

3.1.52 GAL: Enable/disable GALILEO tracking

$PASHS,GAL,s[*cc]

Switches on/ off GALILEO tracking.

The default is **ON** (if [O] option is enabled). The command is NAKed if option [O] is not installed.

Parameter	Description	Range	Default
s	ON: track and use the GALILEO satellites OFF: do not track the GALILEO satellites	ON,OFF	ON
*cc	Checksum		

Query command: $PASHQ,GAL

See also: $PASHS,SBA; $PASHS,GPS; $PASHS,GLO; $PASHS,QZS; $PASHS,BDS

Example:

Enable GALILEO:

```
$PASHS,GAL,ON
```

3.1.53 GL1/GL2/GL5/GL6: Tracking signals of different bands

$PASHS,GL1,s1[*cc]

$PASHS,GL2,s2[*cc]

$PASHS,GL5,s5[*cc]

$PASHS,GL6,s6[*cc]

Enables/disables supporting tracking all possible signals in respective GNSS RF band. Works similarly to respective option.

Parameter	Description	Range
s1	**ON**: track and use the L1 GNSS signals OFF: do not track the L1 GNSS signals	**ON**,OFF Hardcoded to ON
s2	**ON**: track and use the L2 GNSS signals OFF: do not track the L2 GNSS signals	**ON**,OFF
s5	**ON**: track and use the L3/L5 GNSS signals OFF: do not track the L3/L5 GNSS signals	**ON**,OFF
s6	**ON**: track and use the L6 GNSS signals OFF: do not track the L6 GNSS signals	**ON**,OFF Postponed for future
*cc	Checksum	

The below table shows what actual RF bands behind reported L1/L2/L5/L6 names. GPS actually means GPS+SBAS+QZSS with the only exception that SBAS does not provide L2 signal.

#	RF ID	Conditional name
1	GPS L1 / GAL E1	L1
2	GPS L2	L2
3	GPS L5/ GAL E5a	L5
4	GLO G1	L1
5	GLO G2	L2
6	GLO G3 / GAL E5b / BDS B2	L3 (L5)

7	GAL E6 / BDS B3	L6
8	BDS B1 (phase 2)	L1

Query command: $PASHQ,GL1; $PASHQ,GL2; $PASHQ,GL5; $PASHQ,GL6

See also:

Example:

Enable L5:

```
$PASHS,GL5,ON
```

3.1.54 GLO: Enable/disable GLONASS tracking

$PASHS,GLO,s[*cc]

Switches on/off GLONASS tracking.

The default is **ON** (if option [G] is enabled). The command is NAKed if option [G] is not installed.

Parameter	Description	Range	Default
s	ON: track and use the GLONASS satellites OFF: do not track the GLONASS satellites	ON,OFF	ON
*cc	Checksum		

Query command: $PASHQ,GLO

See also: $PASHS,SBA; $PASHS,GPS; $PASHS,GAL; $PASHS,QZS; $PASHS,BDS

Example:

Enable the GLONASS:

```
$PASHS,GLO,ON
```

3.1.55 GPS: Enable/disable GPS tracking

$PASHS,GPS,s[*cc]

Switches on/off GPS tracking.

The default is **ON** (if option [N] is enabled). The command is NAKed if option [N] is not installed.

Parameter	Description	Range	Default

s	ON: track and use the GPS satellites OFF: do not track the GPS satellites	ON,OFF	ON
*cc	Checksum		

Query command: $PASHQ,GPS

See also: $PASHS,SBA; $PASHS,GLO; $PASHS,GAL; $PASHS,QZS; $PASHS,BDS

Example:

Enable the GPS:

```
$PASHS,GPS,ON
```

3.1.56 INI: Receiver initialization

$PASHS,INI,d1[*cc]

Reset receiver processor and memory.

Parameter	Description	Range
d1	Memory reset code: ▪ 0: No memory reset ▪ 1: Cold start ▪ 2: Cold start + format memory ▪ 3: Warn start + format memory ▪ 4: No memory reset ▪ 5: Warn start	SP80: 0,1,2,3,4,5
*cc	Checksum	

Reset Code	Clear receiver parameters in backup memory	Clear ephemeris	Clear almanac	Clear latest position	Clear RTC time	Reset channels	Restart processor	Clear receiver parameters in RAM	Format internal memory

0						X	X	X	
1	X	X	X	X		X	X	X	
2	X	X	X	X		X	X	X	X
3		X				X	X	X	X
4						X	X	X	
5		X				X	X	X	

Notes:

The SBAS ephemeris are not saved in the receiver so INI,0 and INI,4 clear the SBAS ephemeris.

Query command: None

See also: $PASHS,RST

Example:

Restart the receiver and reset all settings:

$PASHS,INI,1

3.1.57 LCS: Enable/disable local coordinate system

$PASHS,LCS,s[*cc]

Disables or enables the local coordinate system.

Parameter	Description	Range	Default
s	ON: the coordinate system is local if RTCM3.1 messages are available OFF: the coordinate system is WGS84	ON,OFF	ON
*cc	Checksum		

The receiver is able to compute local geographic coordinate system only when it receives the following RTCM3.1 messages: 1021, 1022, 1023, 1025.

Query command: $PASHQ,LCS; $PASHQ,PAR

See also:

Example:

Enable local coordinate system:

```
$PASHS,LCS,ON
```

3.1.58 LCS,OUT: Output RTCM coordinate system messages

$PASHS,LCS,OUT,s1[,c2][*cc]

This command allows outputting the received RTCM3.1 messages 1021/1022/1023/1024/1025/1026/1027/1028 to a specified port.

It is dedicated to Survey Pro which needs to receive such messages to compute local coordinate system.

The RTCM messages are encapsulated with the following form:

$PASHR,VST,<length (2 bytes)><RTCM message><cr><lf>

Parameter	Description	Range	Default
s1	ON: output received RTCM messages OFF: does not output received RTCM messages	ON,OFF	OFF
d2	Output port Serial port: **A** Bluetooth port: **C**	SP80: **A,C**	SP80: **C**
*cc	Checksum		

Query command: $PASHQ,LCS,OUT; $PASHQ,PAR

See also:

Example:

Output the messages on Bluetooth port:

```
$PASHS,LCS,OUT,ON,C
```

3.1.59 LOG,DEL: Delete log files

$PASHS,LOG,DEL,d[*cc]

Delete a log file, where **d** is the log file index defined in the command $PASHQ,LOG,LST.

If **d** is 999 then all the log files are except the log file in use.

Query command: $PASHQ,LOG,LST

See also: $PASHQ,LOG

Example:

Delete all the log files:

```
$PASHS,LOG,DEL,999
```

3.1.60 LOG,PAR: Log file settings

$PASHS,LOG,PAR,s1,d2,d3[*cc]

Set the log files settings.

Parameter	Description	Range	Default
s1	ON: enable log files OFF: disable log files	ON,OFF	ON
d2	Maximum size in MBytes	1-90	1
d3	Duration in days before removing a log file	1-100	10
*cc	Checksum		

Query command: $PASHQ,LOG

See also: $PASHS,LOG,DEL; $PASHQ,LOG,LST

Example:

Set the log file parameters:

```
$PASHS,LOG,PAR,ON,2,10
```

3.1.61 LOG,WRT: Write into log file

$PASHS,LOG,WRT,s

This command is sent by the PVT firmware to the SL firmware in order to write a message in the log file.

Parameter	Description	Range
s	Message	Up to 100 characters
*cc	Checksum	

Query command:

See also:

Example:

Set the log file parameters:

```
$PASHS,LOG,WRT,base ID change
```

3.1.62 MDM,DAL: Dial or hang up

$PASHS,MDM,DAL,d[*cc]

Dial the stored phone number or hang up.

Parameter	Description	Range
d	1: Dial the stored phone number 0: Hang up	0-1
*cc	Checksum	

Query command: $PASHQ,MDM

See also: $PASHS,MDM,PAR

Example:

Dial the phone number set by $PASHS,MDM,PAR:

```
$PASHS,MDM,DAL,1
```

Hang up:

```
$PASHR,MDM,DAL,0
```

3.1.63 MDM,OFF: Power off the internal modem

$PASHS,MDM,OFF[*cc]

Power off the internal modem.

Query command: $PASHQ,MDM

See also: $PASHS,MDM,ON

Example:

```
$PASHS,MDM,OFF
```

3.1.64 MDM,ON: Power on the modem

$PASHS,MDM,ON[*cc]

Power on and initialize the internal modem.

When the command is received, the receiver sends:

$PASHR,ACK

When the modem is on and properly initialized, the receiver sends:

$PASHR,MDM,OK

When the receiver fails to power on and initialize the modem, it sends:

$PASHR,MDM,FAIL

and an alarm is raised. This alarm indicates the cause of the failure.

Query command: $PASHQ,MDM

See also: $PASHS,MDM,OFF

Example:

```
$PASHS,MDM,ON
```

3.1.65 MDM,PAR: Modem parameters

$PASHS,MDM,PAR[,PWR,s1][,PIN,s2][,PTC,d3][,CBS,d4] [,APN,s5] [,LGN,s6] [,PWD,s7][,PHN,s8][,ADL,c9][,RNO,d10][,NET,d11][*cc]

Set the modem parameters.

Parameter	Description	Range	Default
PWR,s1	Power mode: AUT: automatic MAN: manual	AUT,MAN	MAN

PIN,s2	PIN code	4-8 digits	Empty
PTC,d3	Protocol: 0: CSD 1: GPRS (PSD)	0-1	1
CBS,d4	CSD mode: 0: V.32 9600 bauds 1: V.110 9600 bauds ISDN	0-1	0
APN,s5	Access point name (GPRS)	Up to 32 characters	Empty
LGN,s6	Login (GPRS)	Up to 32 characters	Empty
PWD,s7	Password (GPRS)	Up to 32 characters	Empty
PHN,s8	Phone number (CSD)	Up to 20 digits	Empty
ADL,c9	Auto-dial mode	Y,N	Y
RNO,d10	Maximum number of re-dial (for CSD only)	0-15	2
NET,d11	0: Automatic (2G or 3G) 1: Force to 2G	0-1	0
*cc	Checksum		

When the auto-dial mode is Y, at starting up, the receiver automatically dial the last phone number if PTC=0, or automatically connect the last mount point or IP server if PTC=1.

The following parameters are not set to their default values after a $PASHS,RST or $PASHS,INI: PIN, APN, LGN, PWD, NET

Query command: $PASHQ,MDM; $PASHQ,MDM,STS

See also: $PASHS,MDM,DAL; $PASHS,DIP; $PASHS,NTR;

Example:

GPRS configuration:
```
$PASHS,MDM,PAR,PWR,AUT,PIN,1234,PTC,1,APN,orange.fr,LGN,orange,PWD,orang
e
```

GSM data configuration:
```
$PASHS,MDM,PAR,PWR,AUT,PIN,1234,PTC,0,CBS,1,PHN,0228093838,ADL,Y,RNO,5
```

3.1.66 MEM: Memory storage location

$PASHS,MEM,d[*cc]

Set the memory storage location. The default memory is the internal memory.

Parameter	Description	Range	Default
d	0: Internal memory 1: SD Card	0,1	0
*cc	Checksum		

Query command: $PASHQ,MEM

See also: $PASHS,FIL,DEL

Example:

Set the memory location to internal:

```
$PASHS,MEM,0
```

3.1.67 NME: Enable/disable NMEA messages

$PASHS,NME,s1,c2,s3[,f4][*cc]

The NME command enables and disables NMEA messages and Ashtech NMEA-like message.

Parameter	Description	Range
s1	Data message	See table below
c2	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q**	SP80: **A,B,C,D,E,I,P,Q,M,S**

	Internal memory: **M** SD Card: **S**	
s3	Enable/disable	ON, OFF
f4	Output rate in second. By default, set to 1s.	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120, etc integer minute up to 960
*cc	Checksum	

The following NMEA messages are supported:

Data	Description	Supported by SP80	Minimum rate
ALM	GPS almanac data	No	
DTM	Datum Reference	Yes	1 s
GBS	GNSS Satellite Fault Detection	Yes	0.01 s
GGA	Global Positioning System Fix Data	Yes	0.01 s
GLL	Geographic position - Latitude/Longitude	Yes	0.01 s
GMP	GNSS Map Projection Fix Data	Yes	0.01 s
GNS	GNSS Fix Data	Yes	0.01 s
GRS	GNSS Range residual	Yes	0.01 s
GSA	GNSS DOP and Active Satellites	Yes	0.01 s
GST	GNSS Pseudo-range Error Statistics	Yes	0.01 s
GSV	GNSS Satellites in View	Yes	0.01 s
HDT	True Heading	No	0.01 s
RMC	Recommended Minimum Specific GNSS Data	Yes	0.01 s
THS	True heading and status	No	0.01 s
VTG	Course Over Ground and Ground Speed	Yes	0.01 s

XDR	Transducer measurements	No	0.01 s
ZDA	Time and Date	Yes	0.01 s

The following NMEA-like messages are supported:

Data	Description	Supported by SP80	Minimum rate
ALR	Alarms (see $PASHS,NME,ALR)	Yes	No rate
ATT	True heading	No	0.01 s
CAP	Received base antenna (see $PASHQ,ANP,RCV)	Yes	No rate
CPA	Received antenna height (see $PASHQ,CPD,ANT)	Yes	No rate
CPO	Received base position (see $PASHQ,CPD,POS)	Yes	No rate
DDM	Differential decoder message	Yes	1 s
DDS	Differential decoder status	Yes	1 s
LTN	Latency	Yes	0.01 s
MDM	Modem status (see $PASHQ,MDM,STS)	Yes	1 s
MSG	Base message on rover (see $PASHS,NME,MSG)	No	No rate
POS	Position	Yes	0.01 s
PTT	PPS time tag	No	No rate
PWR	Power status (see $PASHQ,PWR)	Yes	1 s
RCS	Recording status	Yes	1 s
SAT	Satellites status (obsolete)	Yes	0.01 s
SBD	BEIDOU satellite status	Yes	0.01 s
SGA	GALILEO satellite status	Yes	0.01 s

SGL	GLONASS satellite status	Yes	0.01 s
SGP	GPS satellite status	Yes	0.01 s
SQZ	QZSS satellite status	Yes	0.01 s
SSB	SBAS satellite status	Yes	0.01 s
TTT	Event marker (see $PASHS,NME,TTT)	No	No rate
USR	User message (see $PASHS,USR,TYP)	No	
VEC	Vector (like MB800)	Yes	0.01 s
VCT	Vector (like ProMark800)	Yes	0.01 s

Query command: $PASHQ,PAR

See also: $PASHS,NME,ALL

Example:

Output the message GGA to Bluetooth port at 1s:

```
$PASHS,NME,GGA,C,ON,1
```

3.1.68 NME,ALL: Disable all NMEA messages

$PASHS,NME,ALL,c1,OFF[*cc]

Disable all the NMEA and NMEA-like messages currently sent to the specified port.

Parameter	Description	Range
c1	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal radio: **D** Modem CSD: **E** TCP/IP stream: **E, P, Q**	SP80: **A,B,C,E,I,P,Q,M,S**

	Internal memory: **M** SD Card: **S**	
*cc	Checksum	

Query command: None

See also: $PASHS,NME

Example:

$PASHS,NME,ALL,A,OFF

3.1.69 NME,ALR: Alarms

$PASHS,NME,ALR,c1,s2[,d3][*cc]

This command requests the automatic output of the alarms on a specified port. The alarm level can be set to filter the alarms.

Parameter	Description	Range
c1	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q** Internal memory: **M** SD Card: **S**	SP80: **A,B,C,D,E,I,P,Q,M,S**
s2	Enable/disable	ON, OFF
d3	Alarm level 0: high, medium and low 1: high and medium only 2: high only	1

*cc	Checksum	

The ALR message is in the form below:

$PASHR,ALR,d1,d2,c3,s4,d5,s6*cc

Parameter	Description	Range
d1	Alarm code	0-255
d2	Alarm sub-code	0-255
c3	Stream ID: Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q** Internal memory: **M** SD Card: **S**	SP80: **A,B,C,D,E,I,P,Q,M,S**
s4	Category	BLUETOOTH INPUT MEMORY MODEM NETWORK OTHER POWER PVT RADIO WIFI
d5	Level 0: low 1: medium 2: high	0-2
s6	Description	
*cc	Checksum	

See also: $PASHS,NME

Example:

```
$PASHS,NME,ALR,C,ON
$PASHR,ALR,45,0,C,GSM,2,”PIN code invalid”*AC
```

3.1.70 NPT: NMEA position type for SBAS differential

$PASHS,NPT,d1,d2[*cc]

Set the position type returned by NMEA-like and NMEA messages for SBAS differential position.

Parameter	Description	Range	Default
d1	For NMEA-like messages (POS, VCT): ▪ 0: Position type is 1 for SBAS differential ▪ 1: Position type is 9 for SBAS differential	0-1	0
d2	For NMEA messages (GGA) : ▪ 0: Position type is 2 for SBAS differential ▪ 1: Position type is 9 for SBAS differential	0-1	0
*cc	Checksum		

Query command: $PASHQ,NPT; $PASHQ,PAR

See also:

Example:

$PASHS,NTP,1,0

3.1.71 NTR,LOD: Load the NTRIP source table

$PASHS,NTR,LOD[,c][*cc]

Load the source table from the NTRIP caster.

The optional parameter **c** indicates the port used to get the source table and the NTRIP parameters associated to this port (see $PASHS,NTR,PAR). When **c** is omitted, the port is last port defined by the command $PASHS,NTR,PAR.

The receiver stores only one source table. This command replaces the previous one.

When the source table is completely loaded, the following command is returned:

$PASHR,NTR,OK*cc

When it is not possible to load the source table, the following command is returned:

$PASHR,NTR,FAIL*12

Parameter	Description	Range
c	Internet port used to connect the caster: **P**: TCP/IP stream 1 **Q**: TCP/IP stream 2	P,Q
*cc	Checksum	

Query command:

See also: $PASHQ,NTR,TBL; $PASHS,NTR,PAR

Example:

Load the source table:

```
$PASHS,NTR,LOD
$PASHR,NTR,OK (answer)
```

3.1.72 NTR,MTP: Connect a NTRIP mount point

$PASHS,NTR,MTP,s1[,c2][*cc]

Connect to a NTRIP caster mount point.

When c2 is omitted, the port to connect the caster is the port defined by the last command $PASHS,NTR,PAR sent.

When the mount point is connected, the following command is returned:

$PASHR,NTR,OK*cc

When it is not possible to connect the mount point, the following command is returned:

$PASHR,NTR,FAIL*12

Parameter	Description	Range
s1	NTRIP mount point If **s1** is OFF, then this command stops the connection to	Up to 100 characters OFF

	the current mount point	
c2	Internet port used to connect the caster: **P**: TCP/IP stream 1 **Q**: TCP/IP stream 2	P,Q
*cc	Checksum	

Query command: None

See also: $PASHQ,NTR,TBL

Example:

Connect the mount point MUWF0:

```
$PASHS,NTR,MTP,MUWF0
$PASHR,NTR,OK (answer)
```

3.1.73 NTR,PAR: NTRIP settings

$PASHS,NTR,PAR[,ADD,s1][,PRT,d2][,LGN,s3][,PWD,s4][,TYP,d5][,IPP,c6][*cc]

Set the NTRIP settings.

Parameter	Description	Range
ADD,s1	IP address or host name of the caster	Up to 32 characters
PRT,d2	Port number of the caster	0-65535
LGN,s3	Login	Up to 32 characters
PWD,s4	Password	Up to 32 characters
TYP,d5	Type 0: Client 1: Server	0-1
IPP,c6	Internet port used to connect the caster: **P**: TCP/IP stream 1 (default)	P,Q

	Q: TCP/IP stream 2	
*cc	Checksum	

The ports P and Q are generic TCP/IP ports. By default, the receiver determines itself which physical port can be used (Modem, WiFi, Ethernet). However it is possible to specify the physical port with the command $PASHS,TCP,RTE.

The caster settings are saved in the configuration independently for each port P and Q so that several NTRIP connections can be used at the same time.

The last command sent defines the current port (P or Q) for the commands $PASHS,NTR,MTP and $PASHS,NTR,LOD.

Query command: $PASHQ,NTR; $PASHQ,PAR

See also: $PASHS,NTR,MTP; $PASHS,NTR,LOD

Example:

```
$PASHS,NTR,PAR,ADD,192.34.76.1,PRT,2100,LGN,Ashtech,PWD,
u6huz8,TYP,0
```

3.1.74 OCC: Occupation

$PASHS,OCC,d1,d2[,s3[,s4]][*cc]

Writes an occupation message in the raw data file.

Parameter	Description	Range
d1	Occupation type: 0: static 1: quasi-static 2: dynamic 3: event 4: kinematic bar of 20cm (obsolete)	0-3
d2	Occupation event: 0: Begin	0-1

	1: End	
s3	Occupation name	Up to 255 characters
s4	Occupation description	Up to 255 characters
*cc	Checksum	

Query command: $PASHQ,OCC

See also: $PASHS,REC; $PASHS,ATM

Example:

Start a static occupation:

```
$PASHS,OCC,0,0,SIT01,description
```

Stop a static occupation:

```
$PASHS,OCC,0,1,SIT01,description
```

3.1.75 OPTION: Options

$PASHS,OPTION,s1,h2[*cc]

Install receiver options.

After having sent one or several options, it is necessary to perform the following actions:

- Restart the receiver

- Send the command $PASHS,RST

Parameter	Description	Range
s1	Option ID. See below.	
h2	Unlock code (password) h2=0 means that you remove the option	Up to 13 characters
*cc	Checksum	

The options available are the followings:

ID	Label	Description
W1	WARRANTY 1 YEAR[1]	Extend the warranty period by 1 year
W2	WARRANTY 2 YEAR[1]	Extend the warranty period by 2 year
@1	GEOFENCING_WW	Allows working worldwide
@2	GEOGENFING_CHINA	Allows working in China
@3	GEOFENCING_JAPAN	Allows working in Japan
@4	GEOFENCING_BRAZIL	Allows working in Brazil
@5	GEOFENCING_N_AMERICA	Allows working in North America
@6	GEOFENCING_L_AMERICA	Allows working in Latin America
@7	GEOFENCING_RUSSIA	Allows working in Russia
@8	GEOFENCING_INDIA	Allows working in India
@9	GEOFENCING_TURKEY	Allows working in Turkey
N	GPS	Allows the tracking of GPS, SBAS and QZSS satellites
G	GLONASS	Allows tracking of GLONASS satellites
O	GALILEO	Allows the tracking of GALILEO satellites
B	BEIDOU	Allows the tracking of BEIDOU satellites
X	L1TRACKING1[2]	Allows the tracking of the following signals: -GPS L1 -GLONASS G1 -GALILEO E1 -BEIDOU B1 (phase 2)
Y	L2TRACKING	Allows the tracking of the following signals: -GPS L2 -GLONASS G2
Q	L5TRACKING	Allows the tracking of the following signals: - GPS L5 - GLONASS L3 - GALILEO E5a - GALILEO E5b - BEIDOU B2
T	L6TRACKING[2]	Allows the tracking of the following signals:

		-GALILEO E6 -BEIDOU B3
2	2HZ	Allows output rate up to 2Hz for position and raw data
W	20HZ	Allows output rate up to 20Hz for position and raw data
Z	100HZ[2]	Allows output rate up to 100Hz for position and raw data
J	RTKROVER	Allows RTK computation [J] option shall allow the receiver to compute a Flying RTK solution, a RTK solution, a RTK with Moving base solution and an External Heading solution
K	RTKBASE	Allows generation of the following differential messages: RTCM2.3/RTCM3.0/CMR/CMR+/ATOM messages Differential messages for Standard DGPS are not linked to this option and must be always enabled
F	FLYINGRTK	Allows Flying RTK computation
I	RAIM	Allows the output of RAIM related messages
M	MODEM	Allows using the GPRS modem
U	WIFI	Allows using the WiFi module
R	RECORD	Allows data recording in memory

(1): The options W1 and W2 modify the expiration date recorded in the receiver. The unlock code (or password) is computed as a 1 month temporary option using the current expiration date as start date.

(2): The X,Z,T and L are reserved only. They have no impact on the receiver. The option Z is equivalent to option W.

The validity duration of one option depends on the unlock code. The possible values are:

- Permanent
- 30 days
- 26 weeks (6 months)
- 15 days
- 13 weeks (3 months)
- 8 days
- 5 weeks (1 month)

Query command: $PASHQ,OPTION; $PASHQ,RID

See also: $PASHQ,RID;

Example:

Enable the option RTK:

```
$PASHS,OPTION,K,878A8877
```

3.1.76 OUT: Suspend/resume periodic messages

$PASHS,OUT,c1,s2[*cc]

This command allows suspending and resuming all the periodic messages on a specified port.

Parameter	Description	Range
c1	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Modem CSD: **E** TCP/IP stream: **I, P, Q** Internal memory: **M** – not needed at product level SD Card: **S** – not needed at product level	SP80: **A,B,C,E,I,P,Q,M,S**
s2	OFF: suspend periodic messages ON: resume periodic messages	ON, OFF
*cc	Checksum	

Query command: $PASHQ,OUT

See also: $PASHS,NME; $PASHS,ATM

Example:

Suspend all periodic messages on port A:

```
$PASHS,OUT,A,OFF
```

Suspend all periodic messages on port A:

```
$PASHS,OUT,A,ON
```

3.1.77 OUT,ALL: Disable all periodic messages

$PASHS,OUT,ALL,c1,OFF[*cc]

This command disables all the periodic messages currently sent to the specified port.

Parameter	Description	Range
c1	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q** Internal memory: **M** SD Card: **S**	SP80: **A,B,C,D,E,I,P,Q,M,S**
*cc	Checksum	

Query command:

See also: $PASHS,NME; $PASHS,ATM

Example:

```
$PASHS,OUT,ALL,A,OFF
```

3.1.78 OUT,DIF,OFF: Disable all differential messages output

$PASHS,OUT,DIF,OFF[*cc]

This command disables all the differential messages output for all ports.

This command is equivalent to the following commands:

```
$PASHS,RT3,ALL,c,OFF
$PASHS,RT2,ALL,c,OFF
```

```
$PASHS,CMR,ALL,c,OFF

$PASHS,ATM,ALL,c,OFF
```

for the following ports: A,B,C,D,E,I,P,Q

Query command:

See also:

Example:

```
$PASHS,OUT,DIF,OFF
```

3.1.79 PEM: Position elevation mask

$PASHS,PEM,d1[*cc]

Sets the elevation mask for position computation, where d1 is the primary position elevation mask.

The default for the primary elevation mask is 5 degrees.

Parameter	Description	Range	Default
d1	Position elevation mask	0-90 degrees	5
*cc	Checksum		

Query command: $PASHQ,PEM; $PASHQ,PAR

See also: $PASHS,ELM

Example:

Set the position elevation mask to 15 degrees:

```
$PASHS,PEM,15
```

3.1.80 PGS: Define Primary GNSS System

$PASHS,PGS,s[*cc]

Set the desired primary GNSS system. Primary GNSS system defines the following:

- Time tag of some messages

- Default position datum (e.g. WGS-84 in case of GPS, PZ-90.02 in case of GLO and CGCS2000 in case of BDS)

- The reference time scale for reported receiver clock estimate

At the same time, setting PSG does not change anything in internal receiver algorithms, e.g. channel tracking assignment and relative weighting observables of one system compared to another when computing PVT solution.

Parameter	Description	Range	Default
s	Primary GNSS System: - GPS: GPS system - GLO: GLONASS system - BDS: BEIDOU system	GPS,GLO,BDS	GPS
*cc	Checksum		

The setting is absolute, does not depend on other receiver configuration parameters, and is applied even if given GNSS is not tracked. In this case, user can expect some possible incorrectness related with using only a priori information about time/datum difference between different GNSS. For example, GPS can be designated as primary, but can be disabled for tracking by $PASHS,GPS,OFF. In this case reported time tag and clock offset parameters will use only a priori information about say GPS-GLO parameters differences.

Note 1: Exact list of messages affected by this command in scope of primary GNSS time tag: ATOM,RNX; ATOM,PVT. NMEA time tags are not affected because they always refer to UTC time.

Note 2: Additional details about receiver clock estimate and clock steering procedures in case of PGS=GLO are available in ATOM Manual v.2 Rev 2.** (Latest) in the section 2.5. Legacy message PBN contains clock receiver clock estimates for in primary GNSS system time scale.

Note 3: Not all differential protocols can be used for PGS,GLO. E.g. CMR which is not symmetric from point of GPS and GLONASS support..

Note 4: Exact list of messages affected by this command in scope of primary GNSS datum: ATOM,RNX; ATOM,PVT; all NMEA messages, all reference positions in all differential messages which are generated for given PGS.

Note 5: When specifying externally receiver position (via POS setting), user must understand which Primary GNSS System it corresponds to.

Note 6: In all the cases, default PGS is GPS. If GPS option is not installed, then it is recommended to issue $PASHS,PGS,GLO. Otherwise raw data cannot be generated because of unknown GPS time.

Query command: $PASHQ,PGS; $PASHQ,PAR

See also:

Example:

$PASHS,PGS,GLO

3.1.81 PHN,DIR: Phone number directory

$PASHS,PHN,DIR,d1[,s2][*cc]

This command adds a phone number in the phone number directory.

If d2 is omitted, the phone number is deleted.

Parameter	Description	Default	Range
d1	Index		1-10
s2	Phone number		Up to 20 digits
*cc	Checksum		

Query command: $PASHQ,PHN,DIR

See also:

Example:

Set a phone number at the index 2:

$PASHS,PHN,DIR,2,0228093800

3.1.82 POP: Internal measurement and PVT update rate

$PASHS,POP,d[*cc]

Set internal measurement and PVT update rate.

The internal rate must be 20Hz when you want to output data at 20Hz with the command $PASHS,NME, $PASHS,ATM.

Once POP with changed parameters is issued, all already specified periods of output messages are set to default. New desired periods must be specified after POP command takes its effect.

Parameter	Description	Default	Range
d	Measurement internal update rate in Hz.	Option [Z]-100Hz: 20 Option [W]-20Hz: 20 Option [2]-2Hz: 2 Else: 1	Option [Z]-100Hz: 1,2,5,10,20,50,100 Option [W]-20Hz: 1,2,5,10,20 Option [2]-2Hz: 1,2 Else: 1

		1	
*cc	Checksum		

Query command: $PASHQ,POP

See also: $PASHS,NME; $PASHS,ATM

Example:

Set internal rate to 20Hz:

```
$PASHS,POP,20
```

3.1.83 POS: Reference position

$PASHS,POS,m1,c2,m3,c4,f5[,s6][*cc]

Sets reference position of the receiver. The coordinate system must correspond to default primary coordinate system (WGS-84 if GPS is primary, and PZ-90.02 if GLO is primary).

If there is no available position computed by the receiver, this command is used to initialize the position of the receiver in order to speed up the satellite tracking. For this goal the entered position can be not accurate (kilometers).

The position entered by $PASHS,POS is NAKed if its difference against internally computed position exceeds some threshold (generally hardware target, used antenna type and firmware version dependent). If internally computed position is not availble at the moment, receiver accepts entered position.

Parameter	Description	Range
m1	Latitude in degrees, decimal minutes (ddmm.mmmmmmm)	0-90
c2	North (N) or South (S)	N,S
m3	Longitudes in degrees, decimal minutes (ddmm.mmmmmmm)	0-180
c4	East (E) or West (W)	E,W
f5	Height in meters	±0-9999.9999
s6	Position attribute: PC1=position referenced to L1 phase center (default) ARP=position referenced to the ARP	PC1,ARP,SPT

	SPT=position referenced to survey point (ground mark)	
*cc	Checksum	

User can enter reference position tagged to each of these points. If OWN antenna name is known, then entered reference position can be internally re-computed in receiver from PC1 to ARP and vice versa. If ANT/ANH parameters are known then entered reference position can be internally re-computed in receiver from SP to ARP or vice versa. When using $PASHS,POS setting, user must understand that different protocols can generate the same reference position tagged to different points (e.g. CMR reference position is required to be tagged to PC1, while RTCM-3 reference position is required to be tagged to ARP).

By default, reference position corresponds to $PASHS,POS,MOV.

Query command: $PASHQ,CPD,POS

See also: $PASHS,ANH; $PASHS,ANR; $PASHS,POS,CUR; $PASHS,POS,MOV

Example:

Set the base position:

```
$PASHS,POS,3722.2912135,N,12159.7998217,W,15.25
```

3.1.84 POS,CUR: Set reference position with current position

$PASHS,POS,CUR[*cc]

Set the reference position with the currently computed position at the moment when this command is issued. After this reference position is kept constant.

Query command: $PASHQ,CPD,POS

See also: $PASHS,POS; $PASHS,POS,MOV

Example:

Set the reference position:

```
$PASHS,POS,CUR
```

3.1.85 POS,MOV: Moving reference position

$PASHS,POS,MOV[*cc]

Set the reference position with the currently computed position. Each time the reference position is equal to receiver computed position and can change arbitrary if receiver is moving. This computed position may be standalone or DGPS position, but never RTK position.

By default, the receiver is in this mode.

Query command: $PASHQ,CPD,POS

See also: $PASHS,POS; $PASHS,POS,CUR

Example:

Set moving reference position:

```
$PASHS,POS,MOV
```

3.1.86 PRT: Serial baud rate

$PASHS,PRT,c1,d2[,s3][*cc]

Set the baud rate of the receiver serial port c1 to d2.

Parameter	Description	Range
c1	Port	SP80: **A,D**
d2	Baud rate	2-12 (see table below)
*cc	Checksum	

The meaning of the code d2 is the following:

Code	Baud rate	Code	Baud rate	Code	Baud rate	Code	Baud rate
2	1200	6	19200	10	230400	13	1428571
3	2400	7	38400	11	460800	14	2500000
4	4800	8	57600	12	921600	15	5000000
5	9600	9	115200				

The range and the default are the following:

	SP80	
	Range	**Default**
Port A	2 - 12	9
Port B	N/A	N/A
Port C	N/A	N/A
Port D	2-9	7

Query command: $PASHQ,PRT

See also: $PASHS,CTS;

Example:

Set the port A to 19200bds:

```
$PASHS,PRT,A,6
```

3.1.87 PWR,OFF: Power off the receiver

$PASHS,PWR,OFF[*cc]

This command powers off the receiver.

Query command: None

See also:

Example:

```
$PASHS,PWR,OFF
```

3.1.88 QZS: Enable/disable QZSS tracking

$PASHS,QZS,s[*cc]

Switches on/off QZSS tracking.

The default is **ON** (if option [N] is enabled). The command is NAKed if option [N] is not installed.

QZSS signal L1 SAIF is not considered as QZSS and should be disabled/enabled by respective SBA,ON/OFF setting

Parameter	Description	Default	Range
s1	ON: track and use QZSS satellites OFF: do not track QZSS satellites	ON	ON, OFF
*cc	Checksum		

Query command: $PASHQ,QZS

See also: $PASHS,SBA; $PASHS,GPS; $PASHS,GLO; $PASHS,GAL; $PASHS,BDS

Example:

Enable QZSS:

```
$PASHS,QZS,ON
```

3.1.89 RCP,REF: Name of reference receiver

$PASHS,RCP,REF,s1[*cc]

This command specifies, at the rover, the name of the receiver which sends the differential data.

Parameter	Description	Default	Range
s1	Name of reference receiver	Empty	Up to 31 chars
*cc	Checksum		

All receiver names are case sensitive.

When providing RTK rover function, the entered REF receiver name (s1) will be ignored if incoming reference data contain base receiver name.

Query command: $PASHQ,RCP,REF; $PASHQ,RCP; $PASHQ,PAR

See also: $PASHS,ANP,REF

Example:

Set the name of the receiver:

```
$PASHS,RCP,REF,ASHTECH
```

3.1.90 RDP,OFF: Power off the internal radio

$PASHS,RDP,OFF[*cc]

Power off the internal radio.

Query command: $PASHQ,RDP,PAR,D

See also: $PASHS,RDP,ON; $PASHS,RDP,PAR

Example:

```
$PASHS,RDP,OFF
```

3.1.91 RDP,ON: Power on the internal radio

$PASHS,RDP,ON[*cc]

Power on the internal radio.

Query command: $PASHQ,RDP,PAR,D

See also: $PASHS,RDP,OFF; $PASHS,RDP,PAR

Example:

```
$PASHS,RDP,ON
```

3.1.92 RDP,PAR: Program the radio settings

$PASHS,RDP,PAR,c1,s2,d3,[s4],[c5],[d6],[s7],[c8],[c9],[s10][*cc]

Programs the radio settings.

Parameter	Description	Range
c1	Serial port	**A,D**
s2	Type of radio: **PDL**: - Pacific Crest **PDL HPB** (Port A)	Port A: PDL, ADL, XDL Port D:

	- Pacific Crest **PDL LPB** (Port A) **ADL**: - Pacific Crest **ADL Vantage** (Port A) - Pacific Crest **ADL Vantage Pro** (Port A) **XDL:** - Pacific Crest **XDL Micro** (Port D) - Pacific Crest **XDL Rover** (Port A)	XDL
d3	Channel	PDL: 0 to 15 ADL: 1 to 32 XDL: 1 to 32
s4	Power management (port D): - AUT: automatic - MAN: manual	AUT, MAN
c5	Protocol for PDL radio only: - 0: transparent - 1: TRIMTALK - 2: DSNP Protocol for ADL radios only: - 0: transparent (w EOT time-out) - 1: TrimTalk 450S - 2: not used - 3: SATEL - 4: TrimMarkII/IIe - 5: TT450S (HW) - 6: TRIMMARK3	0-8

	- 7: Transparent FST - 8: U-Link (available only with specific radio firmware) Protocol for XDL radios only: - 0: transparent (w EOT time-out) - 1: TrimTalk 450S - 2: not used - 3: SATEL - 4: TrimMarkII/IIe - 5: TT450S (HW) - 6: TRIMMARK3 - 7: Transparent FST - 8: U-Link (available only with specific radio firmware)	
d6	Air link speed for PDL(bds): - 4800 (GMSK modulation) - 9600 (GMSK or 4-Level FSK modulation) - 19200 (4-Level FSK modulation) Air link speed for ADL/XDL 12.5KHz (bds): - 4800 (GMSK modulation) - 8000 (GMSK modulation) - 9600 (4FSK modulation) Air link speed for ADL/XDL 25KHz (bds): - 4800 (GMSK modulation) - 9600 (GMSK modulation) - 16000 (GMSK modulation) - 19200 (4FSK modulation)	4800, 8000, 9600, 16000, 19200

s7	Radio sensitivity	LOW, MED, HIG, OFF
c8	Scrambler: - 0: Scrambler off - 1: Scrambler on	0,1
c9	Forward error correction: - 0: FEC off - 1: FEC on	0,1
s10	Output Power for ADL Vantage: - 0: 100mW - 1: 500mW - 2: 1W - 3: 2W - 4: 4W Output Power for ADL Vantage Pro: - 0: Level 1 (2W) - 1: Level 2 - 2: Level 3 - 3: Level 4 - 4: Level 5 See the command $PASHQ,RDP,PWR to see the power in Watt. Output Power for XDL micro: - 0: 500mW - 1: 1W (not supported) - 2: 2W	ADL Vantage: 0-4 ADL Vantage Pro: 0-4 XDL: 0,2

*cc	Checksum	

Note for the Pacific Crest radio (PDL):

The air link speed depends on the type of modulation (GMSK or 4-FSK) and the channel spacing. The table below shows the possible combination.

Modulation	**Channel Spacing**	**25 KHz**					**12.5 KHz**			**FEC**
	Bit rate	**4800**	**8000**	**9600**	**16000**	**19200**	**4800**	**8000**	**9600**	
	Protocol									
GMSK	Transparent			Yes			Yes			FEC 1
	TRIMTALK	Yes		Yes			Yes			No
	DSNP	Yes					Yes			No
4FSK	Transparent					Yes			Yes	FEC 1

Note for ADL radio:

The protocol, air link speed, modulation, channel spacing and FEC are linked. The table below shows the possible combination.

Modulation	**Channel Spacing**	**25 KHz**					**12.5 KHz**			**FEC**
	Bit rate	**4800**	**8000**	**9600**	**16000**	**19200**	**4800**	**8000**	**9600**	
	Protocol									
GMSK	Transparent			Yes			Yes			FEC 1
	TrimTalk 450S	Yes		Yes	Yes		Yes	Yes		No
	TT450S (HW)	Yes		Yes	Yes		Yes	Yes		No
	TrimMark II/IIe	Yes					Yes			No
	TrimMark3					Yes			Yes	No

	U-Link	Yes		Yes			Yes		Yes	No
4FSK	Transparent					Yes			Yes	FEC 1
	SATEL					Yes			Yes	FEC 2
	Transparent FST					Yes			Yes	FEC 2

Query command: $PASHQ,RDP,PAR

See also: $PASHS,RDP,ON; $PASHS,RDP,OFF; $PASHQ,RDP,CHT; $PASHS,RDP,TYP

Example:

Program the internal radio XDL:

```
$PASHS,RDP,PAR,D,XDL,2,AUT,0,9600,LOW,0,0
```

3.1.93 RDP,TYP: Type of radio

$PASHS,RDP,TYP,c1,s2[*cc]

Set the type of the radio connected to the port c1.

Normally, the type of the internal radio (connected to port D) is automatically detected. However, the user may set the type manually with the command $PASHS,RDP,TYP.

Parameter	Description	Range
c1	Serial port	**A**
s2	Type of radio: **NONE**: no radio **PDL**: - Pacific Crest **PDL HPB** (Port A)	Port A: NONE, PDL, ADL, XDL

	- Pacific Crest **PDL LPB** (Port A) **ADL**: - Pacific Crest **ADL Vantage** (Port A) - Pacific Crest **ADL Vantage Pro** (Port A) **XDL:** - Pacific Crest **XDL Rover** (Port A)	
*cc	Checksum	

Query command: $PASHQ,RDP,TYP

See also: $PASHS,RDP,PAR; $PASHS,RDP,ON; $PASHS,RDP,OFF

Example:

Set the external radio as ADL Vantage transmitter:

```
$PASHS,RDP,TYP,A,ADL
```

3.1.94 REC: Raw data recording

$PASHS,REC,c[*cc]

Enables, disables, stops or starts data recording on the selected memory (see $PASHS,MEM).

Yes (Y) enables data recording. The receiver starts recording data and will record data after the next power cycle.

No (N) disables data recording. The receiver stops recording data and won't record data after the next power cycle. This is the default mode.

Stop (S) stops recording data but has no effect on the data recording after the next power cycle.

Restart (R) starts recording data but has no effect on the data recording after the next power cycle.

Parameter	Description	Range
c	Y: Enable data recording	Y, N, S, R

	N: Disable data recording S: Stop data recording R: Restart data recording	
*cc	Checksum	

Notes:

1- The command $PASHS,REC,R is ignored if the recording state is already Y

Query command: $PASHQ,REC

See also: $PASHS,MEM; $PASHS,ATM; $PASHS,NME

Example:

Start recording:

```
$PASHS,REC,Y
```

Stop recording:

```
$PASHS,REC,N
```

3.1.95 RST: Reset receiver to default

$PASHS,RST[*cc]

Reset the receiver parameters to their default values.

The RST command reset all the parameters, except:

- Ephemeris
- Almanac
- Position
- GPS time
- TO BE COMPLETED

Query command: None

See also: $PASHS,INI

Example:

```
$PASHS,RST
```

3.1.96 RT2: Enable/disable RTCM2.3 messages

$PASHS,RT2,d1,c2,s3[,f4][*cc]

The RT2 command enables and disables continuous RTCM2.3 messages output.

Parameter	Description	Range
d1	Data message	See table below
c2	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q**	SP80: **A,B,C,D,E,I,P,Q**
s3	Enable/disable (default)	ON, **OFF**
f4	Output interval in seconds. By default set to **1.**	See table below

The list of supported data messages is the following:

Data	Description	f4 range
1,9	GPS corrections	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999
24	Reference WGS-84 position tagged to ARP	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999
3,22	Reference WGS-84 position tagged to L1 phase center	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999
23	Antenna name	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999
18,19	GPS and GLONASS raw observations	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120 etc integer minute up to 960

20,21	GPS and GLONASS RTK corrections	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120 etc integer minute up to 960
16,36	Text messages (those entered by $PASHS,MSG)	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999
31,34	GLO corrections	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999
32	Reference GLONASS (PZ 90) position	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999

Example: Set 'default' RTCM-2 base configuration:

$PASHS,POS,'position' or $PASHS,POS,CUR*51
$PASHS,RT2,18,A,ON,1*39
$PASHS,RT2,19,A,ON,1*38
$PASHS,RT2,24,A,ON,13*05
$PASHS,RT2,23,A,ON,31*02
[$PASHS,RT2,16,A,ON,59*0A]

For RTCM-2.3 the last message is the only way to tell rover what is base receiver name (provided corresponded $PASHS,MSG is set on base). However, RTCM-2 standard does not allow using the content of MT 16 for automatic processing; the content of this message can be used only for visualization purposes.

Note about DGNSS corrections.

Ashtech receivers generate the same content in messages 3 and 32. This is coordinates entered by $PASHS,POS command. To transform original geodetic position ($PASHS,POS) into Cartesian position (type 3 and 32), WGS-84 or PZ-90.02 ellipsoid is used depending on PGS settings.

Ashtech receiver generate DGNSS corrections (type 1 for GPS and type 31 for GLO) against type 3 (=32) reference position using all GNSS Sats coordinates expressed either in WGS-84 or PZ.90.02 depending on PGS setting.

Ashtech rovers ignore the content of message type 32. Ashtech rovers need type3 reference position to apply Type 1 and/or type 31 corrections in DGNSS positions.

3.1.97 RT2,ALL: Disable all RTCM2.3 data

$PASHS,RT2,ALL,c1,OFF[*cc]

Disable all the RTCM2.3 messages currently sent to the specified port.

Parameter	Description	Range
c1	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q**	SP80: **A,B,C,D,E,I,P,Q**

See also: $PASHS,RT2

Example:

```
$PASHS,RT2,ALL,A,0FF*4A
```

3.1.98 RT3: Enable/disable RTCM3.2 messages

$PASHS,RT3,d1,c2,s3[,f4][*cc]

The RT3 command enables and disables continuous RTCM3.2 messages output.

Parameter	Description	Range
d1	Data message	See table below
c2	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E**	SP80: **A,B,C,D,E,I,P,Q**

	TCP/IP stream: **I, P, Q**	
s3	Enable/disable (default)	ON, **OFF**
f4	Output interval in seconds. By default set to **1.**	See table below

The list of supported data messages is the following:

Data	Description	f4 range
1001-1004	GPS+SBAS raw observations	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120 etc integer minute up to 960
1005-1006	Reference WGS-84 position tagged to ARP	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999
1007-1008	Antenna name	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999
1009-1012	GLONASS raw observations	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120 etc integer minute up to 960
1013	System information	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999
1019	GPS ephemeris	1, 2, 3, 4, 5, etc integer second up to 999
1020	GLO ephemeris	1, 2, 3, 4, 5, etc integer second up to 999
1029	Unicode message (that entered by $PASHS,MSG command)	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to 999
1033	Antenna and receiver name	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, etc integer second up to

		999
1045	GALILEO ephemeris	1, 2, 3, 4, 5, etc integer second up to 999
1071-1077	GPS MSM messages	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120 etc integer minute up to 960
1081-1087	GLONASS MSM messages	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120 etc integer minute up to 960
1091-1097	GALILEO MSM messages	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120 etc integer minute up to 960
1101-1107	SBAS MSM messages	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120 etc integer minute up to 960
1111-1117	QZSS MSM messages	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120 etc integer minute up to 960
1121-1127	BEIDOU MSM messages	0.01,0.02,0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120 etc integer minute up to 960
1230	GLONASS code bias message	1, 2, 3, 4, 5, etc integer second up to 999

Example:
Set 'default' RTCM-3 configuration to serve base mode:

```
$PASHS,POS,'position' or $PASHS,POS,CUR*51
$PASHS,RT3,1004,A,ON,1*34
$PASHS,RT3,1012,A,ON,1*33
$PASHS,RT3,1006,A,ON,13*05
$PASHS,RT3,1033,A,ON,31*03
```

Set 'default' RTCM-3 configuration to serve raw data collection mode:

```
$PASHS,POS,MOV*41
$PASHS,RT3,1004,A,ON,1*34
$PASHS,RT3,1012,A,ON,1*33
$PASHS,RT3,1006,A,ON,1*36
$PASHS,RT3,1013,A,ON,61*04
$PASHS,RT3,1033,A,ON,300*32
$PASHS,RT3,1019,A,ON,600*3F
$PASHS,RT3,1020,A,ON,600*35
```

Set 'default' MSM configuration to serve base mode:

```
$PASHS,RT3,1006,port,ON,13
$PASHS,RT3,1033,port,ON,31
$PASHS,RT3,1230,port,ON,13
$PASHS,RT3,1074,port,ON,1
$PASHS,RT3,1084,port,ON,1
$PASHS,RT3,1094,port,ON,1
$PASHS,RT3,1104,port,ON,1
$PASHS,RT3,1114,port,ON,1
$PASHS,RT3,1124,port,ON,1
```

Set 'default' MSM configuration to serve raw data collection mode:

```
$PASHS,RT3,1006,port,ON,1
$PASHS,RT3,1033,port,ON,31
$PASHS,RT3,1230,port,ON,13
$PASHS,RT3,1013,port,ON,61
$PASHS,RT3,1019,port,ON,300
$PASHS,RT3,1020,port,ON,300
$PASHS,RT3,1045,port,ON,300
$PASHS,RT3,1077,port,ON,1
$PASHS,RT3,1087,port,ON,1
$PASHS,RT3,1097,port,ON,1
$PASHS,RT3,1107,port,ON,1
$PASHS,RT3,1117,port,ON,1
$PASHS,RT3,1127,port,ON,1
```

3.1.99 RT3,ALL: Disable all RTCM3.2 data

$PASHS,RT3,ALL,c1,OFF[*cc]

Disable all the RTCM3.2 messages currently sent to the specified port.

Parameter	Description	Range
c1	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D**	SP80: **A,B,C,D,E,I,P,Q**

	Modem CSD: **E** TCP/IP stream: **I, P, Q**	

See also: $PASHS,RT3

Example:

```
$PASHS,RT3,ALL,A,OFF*4A
```

3.1.100 SBA: Enable/disable SBAS tracking

$PASHS,SBA,s[*cc]

Switches on/off SBAS tracking.

The default is **ON** (if option [N] is enabled). The command is NAKed if option [N] is not installed.

QZSS signal L1 SAIF is considered as SBAS and can be enabled/disabled by given command.

Parameter	Description	Default	Range
s	ON: track and use the SBAS satellites OFF: do not track the SBAS satellites	ON	ON,OFF
*cc	Checksum		

Query command: $PASHQ,SBA

See also: $PASHS,GLO; $PASHS,GPS; $PASHS,QZS;$PASHS,GAL;$PASHS,BDS; $PASHS,DIF,SBA

Example:

Enable SBAS satellites tracking:

```
$PASHS,SBA,ON
```

3.1.101 SIT: Site name

$PASHS,SIT,s[*cc]

Sets the site name where s is the 4 characters site ID. The site name must not contain the following characters: '*','.','/','\'.

The site name is used to identify the raw data file.

The default site name is the last four digits of the receiver serial number.

Query command: $PASHQ,SIT

See also: $PASHS,REC

Example:

```
$PASHS,SIT,ECC1
```

3.1.102 SMS,SND: Send a SMS

$PASHS,SMS,SND,d1,s2[*cc]

Send a SMS to the phone number d1.

The command returns $PASHR,ACK immediately if it is correct.

The command returns $PASHR,SMS,OK when the SMS is sent.

The command return $PASHR,SMS,FAIL if it fails to send the SMS.

Parameter	Description	Range
d1	Index in phone number directory See $PASHS,PHN,DIR	1-10
s2	Message text The message must be under quote or double quote if non-alphanumeric characters are used.	Up to 160 characters
*cc	Checksum	

Query command:

See also:

Example:

Send a test SMS :

```
$PASHS,SMS,SND,1,hello
$PASHS,SMS,SND,2,"what else?"
```

3.1.103 SMS,TST: Send a test SMS

$PASHS,SMS,TST,d1[*cc]

Send a test SMS to the phone number d1.

The message in the email is "Test message for SMS verification".

The command returns $PASHR,ACK immediately if it is correct.

The command returns $PASHR,SMS,OK when the SMS is sent.

The command return $PASHR,SMS,FAIL if it fails to send the SMS.

Parameter	Description	Range
d1	Index in phone number directory See $PASHS,PHN,DIR	1-10
*cc	Checksum	

Query command:

See also:

Example:

Send a test SMS :

```
$PASHS,SMS,TST,1
```

3.1.104 SPD: Serial baud rate

$PASHS,SPD,c1,d2[*cc]

The command is exactly the same as the command $PASHS,PRT. Please see $PASHS,PRT for details.

3.1.105 SPY: Spy mode

$PASHS,SPY,c1,c2[*cc]

$PASHS,SPY,c1,OFF[*cc]

$PASHS,SPY,OFF[*cc]

Redirects all characters from one port to another, where c1 is the source port and c2 the destination port.

The characters are redirected but they are interpreted normally by the firmware.

The OFF command discontinues the spy mode.

Parameter	Description	Range
c1	Source port: Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q**	SP80: **A,B,C,D,E,I,P,Q**
c2	Destination port: Serial port: **A** USB serial port : **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q** Internal memory: **M** SD Card: **S**	SP80: **A,B,C,D,E,I,P,Q,M,S**
*cc	Checksum	

Query command: None

Example:

Redirects D to A:

```
$PASHS,SPY,D,A
```

Turns off spy from D:

```
$PASHS,SPY,D,OFF
```

Turns off spy on all ports:

```
$PASHS,SPY,OFF
```

3.1.106 STI : Reference station ID

$PASHS,STI,d[*cc]

Set the station ID that the receiver broadcasts in the differential data.

When the station ID is greater than 31 and the message type is CMR or CMR+, the station ID written in the CMR/CMR+ messages is 31.

When the station ID is greater than 1023 and the message type is RTCM2.3, the station ID written in the RTCM2.3 messages is 31.

Parameter	Description	Range
d	Station ID	0-4095
*cc	Checksum	NA

Query command: $PASHQ,STI

See also:

Example:

RTCM station ID:

```
$PASHS,STI,1
```

3.1.107 TCP,PAR: TCP/IP server settings

$PASHS,TCP,PAR[,MOD,s1][,LGN,s2][,PWD,s3][,PRT,d4][*cc]

Set the TCP/IP server settings.

When the TCP/IP server is enabled (mode 1 and 2) and the receiver is connected to a network via the Ethernet cable, WiFi or Modem, an external device can open the port d4 (by default: 8888) and communicates with the receiver. In this case, the current port is the port I in the receiver.

When the mode is 1, the receiver does not accept any incoming data or commands until it receives the login and the password (see $PASHS,TCP,UID). However, without this authentication, the receiver outputs the messages programmed to the port I.

The default login is *spectra* and the default password is *password*.

Parameter	Description	Range
MOD,s1	TCP/IP connection mode: ▪ 0: disabled ▪ 1: enabled with authentication ▪ 2: enabled without authentication The default mode is 2.	0-2
LGN,s2	Login	Up to 32 characters
PWD,s3	Password	Up to 32 characters
PRT,d4	Port number. By default, 8888	100-65535
*cc	Checksum	

Query command: $PASHQ,TCP

See also: $PASHS,TCP,UID;

Example:

```
$PASHS,TCP,PAR,MOD,1,LGN,spectra,PWD,password,PRT,2101
```

3.1.108 TCP,RTE: TCP/IP route

$PASHS,TCP,RTE,c1,s2[*cc]

Set the physical port used for the TCP/IP connections.

Parameter	Description	Range
c1	TCP/IP port ALL means that all port (I,P,Q) use the same route.	ALL, I,P,Q (not supported)
s2	Route: AUT: automatique (default)	AUT,MDM,WIF,ETH

	MDM: GPRS modem WIF: Wifi ETH : Ethernet (not supported in SP80)	
*cc	Checksum	

When the automatic mode is set, the receiver tries to use the physical ports in the following order:

1- Ethernet cable (not supported in SP80)

2- Wifi

3- GPRS Modem

Query command: $PASHQ,TCP,RTE

See also:

Example:

```
$PASHS,TCP,RTE,ALL,MDM
```

3.1.109 TCP,UID: TCP/IP authentication

$PASHS,TCP,UID,s1,s2[*cc]

Set the TCP/IP login and password to start a TCP/IP connection.

When an external user is connecting to the receiver via Ethernet and the connection is secure (see $PASHS,TCP), it is necessary to send this command first in order to be able to send commands or data to the receiver.

When the login and password are correct, or the connection is not secure, the receiver answers $PASHR,TCP,OK*cc

When the connection is secured, and the login and password are wrong, the receiver answers $PASHR,TCP,FAIL*cc

Parameter	Description	Range
s1	Login	Up to 32 characters
s2	Password	Up to 32 characters
*cc	Checksum	

Query command:

See also: $PASHS,TCP,PAR;

Example:

Send the login and password:

```
$PASHS,TCP,UID,spectra,password
```

3.1.110 TST,CONFIG,DEL: Delete the receiver configuration

$PASHS,TST,CONFIG,DEL[*cc]

This command deletes the receiver configuration files and reboots the receiver.

It is equivalent to a hard reset when the receiver is switched on with the scroll and record button pressed.

Query command:

Example:

Delete the receiver configuration:

```
$PASHS,TST,CONFIG,DEL
```

3.1.111 UDP: User defined dynamic model parameters

$PASHS,UDP,f1,f2,f3,f4[*cc]

This command sets the user defined parameters for dynamic model.

The user defined mode is activated by the command $PASHS,DYN,9

Parameter	Description	Range	Default
f1	Maximum expected horizontal velocity in m/s.	0-100000	100000

f2	Maximum expected horizontal acceleration in m/s/s.	0-100	100
f3	Maximum expected vertical velocity in m/s.	0-100000	100000
f4	Maximum expected vertical acceleration in m/s/s.	0-100	100
*cc	Checksum		

Query command: $PASHQ,UDP

See also: $PASHS,DYN

Example:

Set dynamic model parameters:

```
$PASHS,UDP,10,1,2,0.5*1D
```

3.1.112 UNT: Unit on display

$PASHS,UNT,s[*cc]

This command sets the unit used to display the coordinates on the SP80.

Parameter	Description	Range	Default
s	Unit. One of the following values: M: Meter F: US Survey Feet IF: International Feet	M,F,IF	M
*cc	Checksum		

Query command: $PASHQ,UNT

See also:

Example:

Set the unit to feet:

```
$PASHS,UNT,F
```

3.1.113 USE: Enable/disable particular GNSS Satellite tracking

$PASHS,s1,USE,[n(d2)],s3[*cc]

Enable/disable tracking particular GNSS Satellite(s). To stop/resume whole system tracking/usage, apply command with omitted d2 parameter:

$PASHS,s1,USE,,s3[*cc]

Parameter	Description	Range
s1	GNSS type	GPS, GLO, GAL, SBA, QZS, BDS
d2	Satellite PRN	GPS: 1-32 GLO: 1-24 GAL: 1-30 SBA: 1-39,40-44 QZS: 1-5 BDS: 1-30
s3	Tracking status (default is ON)	ON,OFF
*cc	Checksum	

The command is working as following. Once some Sat is set to OFF:

- Its tracking (if it was tracked) immediately stops
- It is excluded from the list of Sats for search/acquisition

Once some Sat is set to ON, it is added to the list of Sats for Search/acquisition

Sequential applying OFF and ON setting for the same Sat does not guarantee it will be restored very fast for tracking.

Query command: $PASHQ,PAR

See also:

Example:

Disable GPS PRN17 tracking:

```
$PASHS,GPS,USE,17,OFF
```

Enable GAL PRN17, PRM21 tracking:

```
$PASHS,GAL,USE,17,21,ON
```

Disable QZS tracking:

```
$PASHS,QZS,USE,,OFF
```

3.1.114 WFI,DEL: Delete a recorded WiFi network

$PASHS,WFI,DEL,d[*cc]

Delete a WiFi network from the list of recorded network, where d is the index returned by the command $PASHQ,WFI,LST.

If d=999, all the network are deleted.

Query command: None

See also: $PASHQ,WFI,LST

Example:

Delete the 2d network:

```
$PASHS,WFI,DEL,2
```

Delete all the networks:

```
$PASHS,WFI,DEL,999
```

3.1.115 WFI,NET: Connect a WiFi network

$PASHS,WFI,NET,s1,s2,[s3],[d4],[s5],[s6,s7][*cc]

Connect to a WiFi network.

When a WiFi network is connected, it is automatically added to the list of recorded network.

When the network is connected, the following command is returned: **$PASHR,WFI,OK*cc**

When it is not possible to connect the network, the following command is returned: **$PASHR,WFI,FAIL*cc**

$PASHS,WFI,NET,OFF[*cc]

Disconnect the current WiFi network.

Parameter	Description	Range
s1	OFF: disconnect the current network Way to select the WiFi network: SCN: use the index in scanned network list ($PASHQ,WFI,SCN) LST: use the index in recorded network list ($PASHQ,WFI,LST	OFF, SCN, LST, SSI

	SSI: use the SSID	
s2	If s1=SCN: Index in scanned network ($PASHQ,WFI,SCN) If s1=LST: Index in scanned network ($PASHQ,WFI,LST) If s1=SSI: Network SSID	Up to 32 characters
s3	Connection type MAN: manual connection AUT: automatic connection	MAN,AUT
d4	Security type: 0: open network 1: key 2: login/password 3: key (WEP)	0-2
s5	Network key	Up to 255 character
s6	Network login	Up to 255 character
s7	Network password	Up to 255 character
*cc	Checksum	

Query command: $PASHQ,WFI

See also: $PASHS,WFI,DEL; $PASHQ,WFI,SCN; $PASHQ,WFI,LST

Example:

Connect the network 2 in list of scanned network:

```
$PASHS,WFI,NET,SCN,2,AUT,1,jjhj254skhje32
$PASHR,ACK*3D
$PASHR,WFI,OK (answer)
```

Connect the network 3 in list of recorded network:

```
$PASHS,WFI,NET,LST,3,MAN,1,jjhj254skhje32
$PASHR,ACK*3D
$PASHR,WFI,OK (answer)
```

Connect the network 4 in list of recorded network (open network):

```
$PASHS,WFI,NET,LST,4,MAN,0
$PASHR,ACK*3D
$PASHR,WFI,OK (answer)
```

Connect the network DaVinci:

```
$PASHS,WFI,NET,SSI,DaVinci,AUT,2,,trimble,jh256:L25
$PASHR,ACK*3D
$PASHR,WFI,OK (answer)
```

Connect an already used network:

```
$PASHS,WFI,NET,LST,2
$PASHR,ACK*3D
$PASHR,WFI,OK (answer)
```

Disconnect the network:

```
$PASHS,WFI,NET,OFF
```

3.1.116 WFI,OFF: Disable WiFi

$PASHS,WFI,OFF[*cc]

This command disables the WiFi module. By default, the WiFi module is OFF.

Query command: $PASHQ,WFI

See also: $PASHS,WFI,ON; $PASHS,WFI,SCN; $PASHS,WFI,NET

Example:

```
$PASHS,WFI,OFF
```

3.1.117 WFI,ON: Enable WiFi

$PASHS,WFI,ON[*cc]

This command enables the WiFi module. By default, the WiFi module is OFF.

This command returns $PASHR,ACK immediately and it returns $PASHR,WFI,OK when the WiFi is ready to be used.

If a network is visible and recorded as 'automatic connection', the receiver automatically connects the network.

Query command: $PASHQ,WFI

See also: $PASHS,WFI,OFF; $PASHS,WFI,SCN; $PASHS,WFI,NET; $PASHQ,WFI,SCN

Example:

```
$PASHS,WFI,ON
```

3.1.118 WFI,PAR: WiFi parameters

$PASHS,WFI,PAR[PWR,s1][,DHP,s2][,ADD,s3][,MSK,s4][,GTW,s5][,DN1,s6][,DN2,s7][*cc]

Set the WiFi parameters. These parameter are stored permanently in the receiver and are not modified by the command $PASHS,RST and $PASHS,INI.

Parameter	Description	Range	Default
PWR,s1	Power mode AUT: automatic power on at start up MAN: not automatic power on at start up	AUT,MAN	MAN
DHP,s2	DHCP mode: 0: Disabled 1: Enabled	0,1	1
ADD,s3	IP address when s1=0	0.0.0.0-255.255.255.255	192.168.0.1
MSK,s4	Sub network mask when s1=0	0.0.0.0-255.255.255.255	255.255.255.0
GTW,s5	Gateway IP address when s1=0	0.0.0.0-255.255.255.255	255.255.255.255
DN1,s6	DNS 1 IP address when s1=0	0.0.0.0-255.255.255.255	255.255.255.255
DN2,s7	DNS 2 IP address when s1=0	0.0.0.0-255.255.255.255	255.255.255.255

*cc	Checksum		

Query command: $PASHQ,WFI

See also: $PASHS,WFI,ON; $PASHS,WFI,OFF

Example:

WiFi configuration with DHCP:
```
$PASHS,WFI,PAR,DHP,1
```

WiFi configuration without DHCP:
```
$PASHS,WFI,PAR,DHP,0,ADD,10.20.2.28,MSK,255.255.255.0,
GTW,10.20.2.1,DN1,134.20.2.16,DN2,134.20.2.3
```

3.1.119 WFI,SCN: Scan WiFi networks

$PASHS,WFI,SCN[*cc]

This command scans the WiFi networks.

If command answers $PASHR,ACK*cc if the WiFi module is ON, and it answers $PASHR,NAK*cc if the WiFi module is OFF.

It answers $PASHR,WFI,OK*cc when the scan is complete.

Query command: $PASHQ,WFI,SCN

See also: $PASHS,WFI,ON; $PASHS,WFI,OFF; $PASHS,WFI,NET

Example:

```
$PASHS,WFI,SCN
```

3.1.120 ZDA: Date and time

$PASHS,ZDA,m1,d2,d3,d4[*cc]

Set the date and time.

Parameter	Description	Range
m1	UTC time (hhmmss.ss)	000000.00-235959.99
d2	Current day	01-31
d3	Current month	01-12
d4	Current year	1980-9999

*cc	Checksum	NA

Query command: $PASHQ,ZDA

See also:

Example:

```
$PASHS,ZDA,151145.00,13,06,2007
```

3.2 Query commands

3.2.1 ALR: Query the alarms

$PASHQ,ALR[,d][*cc]

This command queries all the alarms of the receiver. The alarm level can be set to filter the alarms.

Parameter	Description	Range
d	Alarm level 0: high, medium and low 1: high and medium only 2: high only	1
*cc	Checksum	

The ALR messages are in the form below:

$PASHR,ALR,d1,d2,c3,s4,d5,s6*cc

Parameter	Description	Range
d1	Alarm code	0-255
d2	Alarm sub-code	0-255
c3	Stream ID: Serial port: **A** USB serial port: **B**	SP80: **A,B,C,D,E,I,P,Q,M,S**

	Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q** Internal memory: **M** SD Card: **S**	
s4	Category	BLUETOOTH INPUT MEMORY MODEM NETWORK OTHER POWER PVT RADIO WIFI
d5	Level 0: low 1: medium 2: high	0-2
s6	Description	
*cc	Checksum	

The SP80 alarms are described in the table below:

Category	ID	Level	Label	Causes

See also: $PASHS,NME

Example:

```
$PASHQ,ALR
$PASHR,ALR,45,0,C,GSM,2,”PIN code invalid”*AC
$PASHR,ALR,70,0,,SYSTEM,2,”Low battery”*AC
```

3.2.2 ALR,EML: Send alarms by email

$PASHQ,ALR,EML[*cc]

Query the parameters for sending alarms by email.

The response message is in the form:

$PASHR,ALR,EML,d1[,d2,...,d6]*cc

Parameter	Description	Range
d1	Notification level: 0: no notification 1: standard notification 2: full notification	0-2
d2…d6	Index in phone number directory See $PASHS,EML,DIR	1-10
*cc	Checksum	

See also: $PASHS,ALR,EML

Example:

$PASHQ,ALR,EML
$PASHR,ALR,EML,1,2,4*5E

3.2.3 ALR,SMS: Send alarms by SMS

$PASHQ,ALR,SMS[*cc]

Query the parameters for sending alarms by SMS.

The response message is in the form:

$PASHR,ALR,SMS,d1[,d2,...,d6]*cc

Parameter	Description	Range
d1	Notification level: 0: no notification 1: standard notification 2: full notification	0-2
d2…d6	Index in phone number directory See $PASHS,PHN,DIR	1-10
*cc	Checksum	

See also: $PASHS,ALR,SMS

Example:

$PASHQ,ALR,SMS
$PASHR,ALR,SMS,1,2,4*5E

3.2.4 ANH: Antenna height

$PASHQ,ANH[*cc]

Query the antenna height.

The response message is in the form:

$PASHR,ANH,f1,c2*cc

Parameter	Description	Range
f1	Antenna height	0-6.553m 6.553-99.999m
c2	Type of antenna height:	V, S

	V: Vertical measurement S: Slant measurement	
*cc	Checksum	

See also: $PASHQ,ANR

Example:

$PASHQ,ANH
$PASHR,ANH,2.000,V*49 (vertical, 2m)

$PASHQ,ANH
$PASHR,ANH,1.543,S*4D (slant, 1.543m)

3.2.5 ANP,OUT: Reduction raw data to specific antenna name

$PASHQ,ANP,OUT[*cc]

Query the antenna name raw data are adjusted.

The response message is in the form below:

$PASHR,ANP,OUT,s1*cc

Parameter	Description	Range
s1	Name of the antenna NONE=disable the antenna reduction	Up to 31 chars
*cc	Checksum	

See also: $PASHS,ANP,OUT

Example:

$PASHQ,ANP,OUT
$PASHR,ANP,OUT,ADVNULLANTENNA*5A

3.2.6 ANP,OWN: Antenna name of own receiver

$PASHQ,ANP,OWN[*cc]

Query the antenna name of own receiver.

The response message is in the form below:

$PASHR,ANP,OWN,s1[,s2[,s3]]*cc

Parameter	Description	Range
s1	Name of the antenna	Up to 31 chars
s2	Serial number	Up to 31 chars
d3	Antenna setup ID	0-255
*cc	Checksum	

See also: $PASHS,ANP,OWN

Example:

```
$PASHQ,ANP,OWN
$PASHR,ANP,OWN,SPP91564_1,,0*4F
```

3.2.7 ANP,REF: Antenna name of reference receiver

$PASHQ,ANP,REF[*cc]

Query the antenna name of reference receiver.

The response message is in the form below:

$PASHR,ANP,REF,s1*cc

Parameter	Description	Range
s1	Name of the antenna	Up to 31 chars
*cc	Checksum	

See also: $PASHS,ANP,REF

Example:

$PASHQ,ANP,REF
$PASHR,ANP,REF,MAG111406*5A

3.2.8 ANP,RCV: Antenna name and offsets of received reference receiver

$PASHQ,ANP,RCV[*cc]

Query the antenna name and offset of the received reference receiver.

The response message is in the form shown below:

$PASHR,ANP,RCV,s1,f2,f3,f4,f5,f6,f7*cc

Parameter	Description
s1	Antenna name. NONE when no received antenna.
f2	L1 North Offset in mm
f3	L1 East Offset in mm
f4	L1 Up Offset in mm
f5	L2 North Offset in mm
f6	L2 East Offset in mm
f7	L2 Up Offset in mm
*cc	Checksum

See also:

Example:

$PASHQ,ANP,RCV
$PASHR,ANP,RCV,ASH802147,-2.00,0.70,103.00,-3.4,-2.2,103.80*09

3.2.9 ANR: Antenna reduction mode

$PASHQ,ANR[*cc]

Query the antenna reduction mode.

The response message is in the form:

$PASHR,ANR,s1*cc

Parameter	Description	Range
s1	Antenna reduction mode: **OFF** or **PC1**: the position is the position of the L1 phase center **ON** or **SPT**: the position is the position of the ground mark **ARP**: the position is the position of the antenna reference point.	OFF, ON, ARP, SPT, PC1
*cc	Checksum	

See also: $PASHQ,ANH

Example:

$PASHQ,ANR
$PASHR,ANR,ON*04

3.2.10 ANT: Antenna height

$PASHQ,ANT[*cc]

Query the antenna height.

The response message is in the form:

$PASHR,ANT,f1,f2,f3*cc

Parameter	Description	Range
f1	Antenna slant height: height measured between the ground mark and the SHMP.	0-6.553m 6.553-99.999m
f2	Antenna radius	0-6.553m
f3	Antenna vertical offset: ▪ Difference between the SHMP and the ARP if	±0-6.553m

	the slant height and radius are not null ▪ Difference between the ground mark and the ARP if radius or slant are null.	6.553-99.999m
*cc	Checksum	

See also: $PASHQ,ANR; $PASHQ,ANH

Example:

$PASHQ,ANT
$PASHR,ANT,0,0,2.000*49 (vertical, 2m)

$PASHQ,ANT
$PASHR,ANT,1.543,0.095,-0.023*4D (slant, 1.543m)

3.2.11 ATH: Anti-theft parameters

$PASHQ,ATH[*cc]

Query the anti-theft parameters.

The response message is in the form:

$PASHR,ATH,s1[,s2,SMS,d3,...,d7,EML,d8,...,d12,MSG,s13,s14,s15]*cc

Parameter	Description	Range
s1	Anti-theft mode OFF: disabled ON: enabled ALR: enabled and alert is raised	ON,OFF,ALR
s2	Password (if mode is OFF)	Up to 64 characters
d3…d7	Phone number indexes (if mode is OFF) Empty if not defined	1-10
d8…d12	Email address indexes (if mode is OFF) Empty if not defined	1-10
s13	First line of the message	Up to 12 characters
s14	Second line of the message	Up to 12 characters

s15	Third line of the message	Up to 12 characters
*cc	Checksum	

See also: $PASHS,ATH,ON; $PASHS,ATH,OFF; $PASHS,ATH,PWD; $PASHS,ATH,EML; $PASHS,ATH,SMS; $PASHS,ATH,MSG

Example:

$PASHQ,ATH
$PASHR,ATH,OFF,jkkjUy873kl,SMS,1,2,3,4,5,EML,1,2,3,4,5,MSG,ANTITHEFT,ALARM,IS ON*5E

$PASHQ,ATH
$PASHR,ATH,ON

3.2.12 ATH,LEN: Anti-theft distance

$PASHQ,ATH,LEN[*cc]

Query the distance which set off the anti-theft alarm.

The response message is in the form:

$PASHR,ATH,LEN,d*cc

Parameter	Description	Range
d	Distance in meters which set off the anti-theft alarm	1-1000
*cc	Checksum	

See also: $PASHS,ATH,LEN;

Example:

$PASHQ,ATH,LEN
$PASHR,ATH,LEN,100*5E

3.2.13 ATL: Debug data recording

$PASHQ,ATL[*cc]

Query the status of the ATL data recording.

The response message is in the form:

$PASHR,ATL,s1,d2,c3,f4,d5*cc

Parameter	Description	Range
s1	ON: enable ATL data recording (no record after power cycle) OFF: disable ATL data recording AUT: enable ATL data recording (still record after power cycle)	ON, OFF, AUT
d2	▪ Output port (empty if no output) Serial port: **A** USB serial port: **B** Bluetooth port : **C** ▪ TCP/IP port : **I**	A,B,C,I
c3	Recording status: R: the receiver is recording ATL data S: the receiver is not recording ATL data	R,S
f4	Output rate in second	0.05, 0.1, 0.2, 0.5, **1**
d5	Configuration index	0,1
*cc	Checksum	

See also: $PASHS,ATL;

Example:
ATL is OFF:
$PASHQ,ATL
$PASHR,ATL,OFF,,S,1,0*2C

ATL is ON and the ATL file is being recorded:
$PASHQ,ATL
$PASHR,ATL,ON,,R,1,0*4F

ATL is ON but the ATL file is not being recorded for any reasons (no SD Card, no USB memory, etc…):
$PASHQ,ATL
$PASHR,ATL,ON,,S,1,0

ATL is output on port A:
$PASHQ,ATL
$PASHR,ATL,OFF,A,S,1,0

3.2.14 BDS: BEIDOU tracking status

$PASHQ,BDS[*cc]

Query the BEIDOU tracking status.

$PASHR,BDS,s*cc

The response message is in the form shown below:

Parameter	Description	Range
s	ON: track and use the BEIDOU satellites OFF: do not track the BEIDOU satellites	ON,OFF
*cc	Checksum	

See also: $PASHS,BDS

Example:

$PASHQ,BDS
$PASHR,BDS,ON*1D

3.2.15 BEEP: Beeper state

$PASHQ,BEEP[*cc]

Query the current state of the beeper.

The response message is in the form:

$PASHR,BEEP,s1,d2*cc

Parameter	Description	Range
s1	ON: beeper enabled OFF: beeper disabled	ON, OFF

d2	Timeout in second 0=no timeout	0-99
*cc	Checksum	

See also: $PASHS,BEEP

Example:

$PASHQ,BEEP
$PASHR,BEEP,OFF,0*05

3.2.16 BKL: Backlight setup

$PASHQ,BKL[*cc]

Query the current state of the backlight.

The response message is in the form:

$PASHR,BKL,d1*cc

Parameter	Description	Range
d1	Timeout in minutes 0=no timeout (the backlight is always on)	0-1440
*cc	Checksum	

See also: $PASHS,BKL

Example:

$PASHQ,BKL
$PASHR,BKL,10*05

3.2.17 BTH: Bluetooth settings

$PASHQ,BTH[*cc]

Query the Bluetooth settings.

The response message is in the form:

$PASHR,BTH,s1,s2,s3,s4*cc

Parameter	Description	Range
s1	Bluetooth address (xx:xx:xx:xx:xx:xx)	17 characters
s2	Bluetooth name	Up to 64 characters
s3	PIN code	Up to 16 digits -1: no pin code
s4	Bluetooth state	ON,OFF
*cc	Checksum	

See also: $PASHS,BTH,NAME; $PASHS,BTH,PIN; $PASHS,BTH,ON; $PASHS,BTH,OFF

Example:

$PASHQ,BTH
$PASHR,BTH,00:07:80:83:91:86,PM_743109,-1,ON*68

3.2.18 CPD,ANT: Received base antenna height

$PASHQ,CPD,ANT[*cc]

Query the antenna parameters of the base received by the rover.

The return message is in the form below:

$PASHR,CPD,ANT,f1,f2,f3,m4,f5*cc

Parameter	Description	Range
f1	Antenna height in meters	0-99.999
f2	Antenna radius in meters (obsolete, always empty)	0-9.9999
f3	Vertical offset in meters(obsolete, always empty)	0-99.999
m4	Horizontal azimuth in degrees, minutes (dddmm.mm) (obsolete, always empty)	0-35959.99

f5	Horizontal distance in meters (obsolete, always empty)	0-99.999
*cc	Checksum	

When the receiver has not received any antenna height, all the fields are empty.

The parameters f2,f3,m4,f5 are obsolete since the SP80 does not support differential messages with slant height measurement.

See also: $PASHQ,CPD,POS

Example:

$PASHQ,CPD,ANT
$PASHR,CPD,ANT,2.000,,,,*56

$PASHQ,CPD,ANT
$PASHR,CPD,ANT,,,,,*78

3.2.1 CPD,BAS: RTK moving base mode

$PASHQ,CPD,BAS[*cc]

This command queries RTK moving base mode.

The response message is in the form below:

$PASHR,CPD,BAS,d1,d2*cc

Parameter	Description	Range
d	RTK base mode: 0: Assume static base 1: Assume moving base	0-1
*cc	Checksum	

See also: $PASHS,CPD,BAS

Example:

$PASHQ,CPD,BAS
$PASHR,CPD,BAS,0*4D

3.2.2 CPD,MOD: Receiver mode

$PASHQ,CPD,MOD[*cc]

This command queries the receiver mode.

The response message is in the form below:

$PASHR,CPD,MOD,s*cc

Parameter	Description	Range
s	Receiver mode: - BAS: BASE mode - ROV: ROVER mode - ANY: every mode allowed	SP80: ANY, BAS, ROV
*cc	Checksum	

See also: $PASHS,CPD,MOD

Example:

$PASHQ,CPD,MOD
$PASHR,MOD,BAS*2B

$PASHQ,CPD,MOD
$PASHR,MOD,ROV*2B

3.2.3 CPD,NET: RTK network operation mode

$PASHQ,CPD,NET[*cc]

This command queries RTK network operation mode.

The response message is in the form below:

$PASHR,CPD,NET,d1,d2*cc

Parameter	Description	Range
d1	RTK network operation mode for GPS: Default is **1**. ▪ 0: Ignoring network GPS corrections ▪ **1**: Applying network FKP/MAC/NRM GPS data when available and healthy, and ignoring them	0-1

	if not healthy	
d2	RTK network operation mode for GLONASS: Default is **1**. ▪ **0**: Ignoring network GLONASS corrections ▪ 1: Applying network FKP/MAC/NRM GLO data when available and healthy, and ignoring them if not healthy	0-1
*cc	Checksum	

See also: $PASHS,CPD,NET

Example:

$PASHQ,CPD,NET
$PASHR,CPD,NET,1,0*4D

3.2.4 CPD,POS: Received base position

$PASHQ,CPD,POS[*cc]

This command queries the received ARP base position.

The coordinate system depends on the command $PASHS,PGS.

The fields are empty if no base position is received (in rover mode).

The response message is in the form:

$PASHR,CPD,POS,m1,c2,m3,c4,f5*cc

Parameter	Description	Range
m1	Latitude in degrees, decimal minutes (ddmm.mmmmmm)	0-90
c2	North (N) or South (S)	N,S
m3	Longitudes in degrees, decimal minutes (dddmm.mmmmmm)	0-180
c4	East (E) or West (W)	E,W
f5	Height in meters	±0-9999.9999
*cc	Checksum	

See also: $PASHQ,CPD,ANT;

Example:

$PASHQ,CPD,POS
$PASHR,CPD,POS,4717.959483,N,00130.500968,W,70.229*59

$PASHQ,CPD,POS
$PASHR,CPD,POS,,,,,*6F

3.2.5 CPD,VRS: VRS assumption mode

$PASHQ,CPD,VRS[*cc]

This command queries VRS operation mode.

The response message is in the form below:

$PASHR,CPD,VRS,d*cc

Parameter	Description	Range
d	VRS assumption mode: ▪ 0: Automatic detection ▪ 1: Compulsory VRS mode ▪ 2: Never transit to VRS mode	0-2
*cc	Checksum	

See also: $PASHS,CPD,VRS

Example:

$PASHQ,CPD,VRS
$PASHR,CPD,VRS,1*45

3.2.6 CTS: Hardware handshake protocol

$PASHQ,CTS[,s1][*cc]

Query the RTS/CTS (handshaking) protocol status.

In the SP80, if the port is not specified, the command returns the status of the port A.

The response is in the form shown below:

$PASHR,CTS,s2*cc

Parameter	Description	Range
s1	Port	SP80: **A**

s2	RTS/CTS handshaking	ON, OFF
*cc	Checksum	

See also: $PASHS,CTS; $PASHQ,PRT; $PASHQ,MDP

Example:
$PASHQ,CTS
$PASHR,CTS,ON*1D

$PASHQ,CTS,B
$PASHR,CTS,OFF*1D

3.2.7 DDM: Differential decoder message

$PASHQ,DDM[*cc]

Query differential decoder message.

DDM stands for Differential Decoder Message and it is generated for each decoded differential message from each port differential decoder listens to. It can be considered as an extended ACK for each decoded message.

The DDM response message is in the form below:

$PASHR,DDM,c1,s2,s3,d4,s5,f6,f7,s8*cc

Parameter	Description	Range
c1	Receiver port corrections enter	A,B,C,D,E,I,P,Q,Z
s2	Message transport	RT2, RT3, CMR, or ATM
s3	Message number/identifier	e.g. 1004 for RT3, RNX for ATM etc.
d4	Decoded messages counter	0…9999
s5	Base ID	
f6	Time tag (in sec) from decoded message	
f7	Age of corrections in seconds	
s8	Attribute	Up to 60 characters
*cc	Checksum	

Notes:

1) Corrections can come from more than single receiver port.
2) Parameter d4 is the counter of decoded messages modulo 10000 which is incremented each time new message is decoded. Each receiver port has its own counter. Counters for all ports are initialized by 0 after $PASHS,RST or $PASHS,INI commands issued. The counter is very useful to check if some DDM messages were lost during output.
3) The field s5 may be empty if base ID is not available for given message.
4) No PGS setting is applied to this message. Parameter f6 is time tag (in sec) from decoded message. Regardless original time tag presentation, in DDM message is it output as GPS time within GPS week. For example RTCM-3 MT 1012 time tag (referring to GLONASS time) will be transformed to GPS time tag in DDM message. Other example is RTCM-2 MT 18 time tag: it is originally presented by modulo 3600 seconds, but in DDM message it will appear as complete time tag. If message has no time tag (e.g. RT3 1005) then this field is empty.
5) Age of corrections is the difference (in sec) between receiver time at the end of decoding process and decoded message time tag. If message has no time tag (e.g. RT3 1005) then this field is empty.
6) Parameter s8 is some vital attributes of given message which are presented by a number of characters possibly delimited by / (slash). It can be empty. The length of this field cannot be more than 60 characters. Unlike all other fields, this field is not intended for automatic parsing.
7) Being set to periodical output by the $PASHS,NME,DDM command this message is independent of the NMEA period. It is output each time as new differential message is decoded.

See also: $PASHS,NME;

Example:

```
$PASHQ,DDM
$PASHR,DDM,D,RT3,1004,5,4095,1,*49
```

3.2.8 DDS: Differential decoder status

$PASHQ,DDS[*cc]

Query differential message status.

The DDS response message is in the form below:

$PASHR,DDS,d1,m2,d3,c4,s5,c6,d7,d8,d9,d10,d11,f12,f13,d14,n(d15,f16,f17)*cc

Parameter	Description	Range
d1	Differential decoder number 0 is the first decoder	0-2
m2	GNSS (output) time tag	000000.00-235959.99
d3	The number of decoded messages since last stream change (see table below)	0-127
c4	Port correction are listen to	A,B,C,D,E,I,P,Q,Z
s5	Protocol detected (empty no data)	RT2,RT3,CMR,ATM
d6	Time window in second 0 means not defined or just initialized 255 means greater than 255	0-255
d7	Estimated overall data link quality/availability percentage Empty if not defined	0-100
d8	Deselected info percentage Empty if not defined	0-100
d9	CRC percentage Empty if not defined	0-100
d10	Std of latency in ms	0-16383
d11	Mean latency in ms	0-16383
f12	Mean epoch interval in s	0.00-163.86
f13	Min epoch interval in s	0.00-20.47
d14	The number (n) of different messages detected since last stream change	0-63

d15	Messages types	RT2: 1-63 RT3: 1001-4094 CMR: 0(obs), 1(loc), 2(desc), 3(glo), 12(cmr+), 20(glo encrypted) ATM: 0-15
f16	Last message intervals in seconds	0.000-1023.000
f17	Ages of last message in seconds	0.000-1023.000
*cc	Checksum	

Please see below the meaning of indicator d3:

Reported Indicator (i=d3)	***Formulae***	***Range of Counters***
0-23	i	$0 \leq count < 24$
24-47	$i \cdot 2 - 24$	$24 \leq count < 72$
48-71	$i \cdot 4 - 120$	$72 \leq count < 168$
72-95	$i \cdot 8 - 408$	$168 \leq count < 360$
96-119	$i \cdot 16 - 1176$	$360 \leq count < 744$
120-126	$i \cdot 32 - 3096$	$744 \leq count < 936$
127	---	$count \geq 936$

See also: $PASHS,NME;

Example:

$PASHQ,DDS

```
$PASHR,DDS,1,140235.33,A,RT3,200,100,0,100,5,50,1.05,1.00,3,1004,1.000,0
.500,1005,30.000,18.000,1006,30.000,18.000*49
```

3.2.9 DIF,PRT: Port for incoming differential corrections

$PASHQ,DIF,PRT[*cc]

Query the port for incoming differential corrections.

The response message is in the form:

$PASHR,DIF,PRT,c1,s2*cc

$PASHR,DIF,PRT,OFF*cc

$PASHR,DIF,PRT,ALL

Parameter	Description	Range
c1	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q** Virtual port: **Z** (see ATOM DAT EXT)	SP80: **A,B,C,D,E,I,P,Q,Z**
s2	Protocol ALL: any protocol is expected ATM: ATOM CMR: CMR or CMR+ RT2: RTCM v2.3 RT3: RTCM v3.0, 3.1, 3.2	ALL, ATM, CMR, RT2, RT3
*cc	Checksum	

See also:

Example:

$PASHQ,DIF,PRT
$PASHR,DIF,PRT,A,ALL*79

$PASHQ,DIF,PRT
$PASHR,DIF,PRT,ALL*28

$PASHQ,DIF,PRT
$PASHR,DIF,PRT,OFF*4D

3.2.10 DIF,SBA: Source of SBAS corrections to use

$PASHQ,DIF,SBA[*cc]

Query source of SBAS corrections to use.

The response message is in the form:

$PASHR,DIF,SBA,s*cc

Parameter	Description	Range
s	Specification of used source: ALL: use all available data OFF: do not use any SBAS corrections	ALL,OFF
*cc	Checksum	

See also:

Example:

$PASHQ,DIF,SBA
$PASHR,DIF,SBA,ALL*79

$PASHQ,DIF,SBA
$PASHR,DIF,SBA,OFF*4D

3.2.11 DIP: Direct IP parameters

$PASHQ,DIP[,c6] [*cc]

Query the parameters used for a direct IP connection.

When c6 is omitted, it returns the Direct IP settings for the port defined by the last command $PASHS,DIP,PAR sent.

The response is in the form shown below. The answer contains the IP address or the host name, depending of what was set by the command $PASHS,DIP.

$PASHR,DIP,RIP,s1,PRT,d2[,LGN,s3,PWD,s4],IPP,c6,STS,d7*cc

Parameter	Description	Range
s1	IP address (xxx.xxx.xxx.xxx) or host name	Up to 32 characters
d2	Port number	0-65535
s3	User name (optional)	Up to 32 characters
s4	Password (optional)	Up to 32 characters
c6	Internet port used to connect the server: **P**: TCP/IP stream 1 **Q**: TCP/IP stream 2	P,Q
d7	Status: 0: not connected 1: connected	0,1
*cc	Checksum	

See also:

Example:

$PASHQ,DIP
$PASHR,DIP,RIP,192.65.54.1,PRT,80,IPP,P,STS,1

$PASHQ,DIP
$PASHR,DIP,RIP,www.ashtech.com,PRT,8080,IPP,Q,STS,0

3.2.12 DRI: Data recording interval

$PASHQ,DRI[*cc]

Query the recording interval of the raw data.

The response message is in the form:

$PASHR,DRI,f*cc

Parameter	Description	Range
f	Recording interval	0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120, 180, 240, 300, 360, 600, 720, 900, 1200, 1800, 3600 sec
*cc	Checksum	

This command returns the output rate of ATOM RNX and PVT messages on port M if internal memory is selected or on port S if SD Card memory is selected (see $PASHS,MEM)

See also: $PASHS,DRI;$PASHQ,REC;$PASHS,MEM

Example:

$PASHQ,DRI
$PASHR,DRI,1.00*18

3.2.13 DSY: Daisy chain

$PASHQ,DSY[*cc]

Query the daisy chain settings.

The response message is in the form:

$PASHR,DSY,OFF*cc

$PASHR,DSY,c1,c2*cc

Parameter	Description	Range
c1	Source port: Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D**	SP80: **A,B,C,D,E,I,P,Q**

	Modem CSD: **E** TCP/IP stream: **I, P, Q**	
c2	Destination port: Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q**	SP80: **A,B,C,D,E,I,P,Q**
*cc	Checksum	

See also: $PASHS,DSY

Example:

$PASHQ,DSY
$PASHR,DSY,A,B,0

3.2.14 DTM: Datum Reference

$PASHQ,DTM[*cc]

Query the DTM message.

The DTM response message is in the form:

$GPDTM,s1,,f2,c3,f4,c5,f6,s7*cc

Parameter	Description	Range
s1	Local datum code W84 means WGS84 999 means computed with parameters received from the RTCM3.1 stream	W84,999

f2	Latitude offset in minutes	0-59.999999
c3	Direction of latitude	N,S
f4	Longitude offset in minutes	0-59.999999
c5	Direction of longitude	E,W
f6	Altitude offset in meters	±0-99.999
s7	Reference datum code	W84
*cc	Checksum	

See also: $PASHS,NME

Example:

$PASHQ,DTM
$GPDTM,999,2.324525,N,1.499476,W,1.365,W84*61

3.2.15 DYN: Receiver dynamics

$PASHQ,DYN[*cc]

Query the receiver dynamic.

The response message is in the form:

$PASHR,DYN,d*cc

Parameter	Description	Range
d	Dynamic. One of the following values: ▪ 1: Static ▪ 2: Quasi-static ▪ 3: Walking ▪ 4: Ship ▪ 5: Automobile ▪ 6: Aircraft ▪ 7: Unlimited ▪ 8: Adaptive (default) ▪ 9: User-defined	1-9
*cc	Checksum	

See also: $PASHS,DYN

Example:

$PASHQ,DYN
$PASHR,DYN,8*33

3.2.16 ELM: Elevation mask

$PASHQ,ELM[*cc]

Query the elevation mask for raw data recording, raw data outputting and base station.

The ELM response is in the form below:

$PASHR,ELM,d1*cc

Parameter	Description	Range
d1	Elevation mask	0-90 degrees
*cc	Checksum	

See also: $PASHS,ELM; $PASHQ,PEM

Example:

$PASHQ,ELM
$PASHR,ELM,5*29

3.2.17 EML,DIR: Query email address directory

$PASHQ,EML,DIR[,d][*cc]

Query the email addresses recorded in the email directory, where **d** is the index in the directory. If **d** is omitted, it returns all the email addresses.

The command returns one or 10 messages in the form below:

$PASHR,EML,DIR,d1,d2[,d3]*cc

Parameter	Description	Range
d1	Number of email addresses	1,10
d2	Index in the directory	1-10
d3	Email address	Up to 64 characters
*cc	Checksum	

See also: $PASHS,EML,DIR

Example:

```
$PASHQ,EML,DIR
$PASHR,EML,DIR,10,1,jean_dupont@trimble.com
$PASHR,EML,DIR,10,2,john_smith@trimble.com
$PASHR,EML,DIR,10,3
$PASHR,EML,DIR,10,4,elmut_klein@trimble.com
$PASHR,EML,DIR,10,5
$PASHR,EML,DIR,10,6
$PASHR,EML,DIR,10,7
$PASHR,EML,DIR,10,8
$PASHR,EML,DIR,10,9
$PASHR,EML,DIR,10,10

$PASHQ,EML,DIR,4
$PASHR,EML,DIR,1,4,elmut_klein@trimble.com
```

3.2.18 EML: Email settings

$PASHQ,EML[*cc]

Query the email settings.

The response message is in the form:

$PASHR,EML,SMT=s1,PRT=s2,USR=s3,PWD=s4,SND=s5*cc

Parameter	Description	Range
s1	SMTP Server address or hostname	Up to 32 characters
d2	SMTP Port Number	0-65535

s3	Username	Up to 32 characters
s4	Password	Up to 32 characters
s5	Sender Email address	Up to 64 characters
*cc	Checksum	

See also: $PASHS,EML,PAR; $PASHS,EML,TST

Example:

```
$PASHQ,EML
$PASHR,EML,SMT=smtp.gmail.com,PRT=25,USR=gmail,PWD=gmail,SND=no-reply@SP80.com
```

3.2.19 FIL,CUR: Query the current G-File being recorded

$PASHQ,FIL,CUR[*cc]

Query the current G-File being recorded by the receiver.

The command returns a message in the form below:

$PASHR,FIL,CUR,s1,d2,s3,s4,d5*cc

If there is no file being recorded, it returns:

$PASHR,FIL,CUR,NONE*cc

Parameter	Description	Range
s1	File name (including the path)	Up to 255 characters
d2	Size in bytes	0-134217728
s3	Date (ddmmyyyy)	
s4	Time (hhmmss)	000000-235959
d5	Memory location 0: Internal memory (NAND flash)	0-1

	1: SD Card	
*cc	Checksum	

See also: $PASHS,REC; $PASHS,MEM;

Example:

$PASHQ,FIL,CUR
$PASHR,FIL,CUR,GazerA09.123,1769897,14032009,130850,0

$PASHQ,FIL,CUR
$PASHR,FIL,CUR,NONE

3.2.20 FIL,LST: Query the list of files

$PASHQ,FIL,LST[,d1][,s2][*cc]

Query the list of files in the receiver, where **d1** is the memory type (0 for internal memory and 1 for SD Card) and **s2** is the path name. If **d1** is omitted, it returns the list of files for the current memory (see $PASHS,MEM).

Parameter	Description	Range
d1	0: internal memory (user data partition) 1: SD Card 3: internal memory (log file partition)	0,1,3
s2	Path name	
*cc	Checksum	

The command returns d1 messages in the form below:

$PASHR,FIL,LST,d1,d2,s3,d4,s5,s6[,c7]*cc

Parameter	Description	Range
d1	Number of files	
d2	File index	
s3	File name or directory name	Up to 255 characters
d4	Size in bytes (empty if directory)	0-134217728
s5	Date (ddmmyyyy)	
s6	Time (hhmmss)	000000-235959
c7	c7 is D when s3 is a directory	D
*cc	Checksum	

See also: $PASHS,REC; $PASHS,MEM; $PASHQ,FIL,STS

Example:

```
$PASHQ,FIL,LST
$PASHR,FIL,LST,4,0,GazerA09.123,1769897,14032009,130850
$PASHR,FIL,LST,4,1,GazerB09.123,1769876,10032009,110952
$PASHR,FIL,LST,4,2,GazerC09.123,1769787,01032009,181856
$PASHR,FIL,LST,4,3,GazerD09.123,1769787,01032009,181856

$PASHQ,FIL,LST,1
$PASHR,FIL,LST,5,0,2009,,14032009,130850,D
$PASHR,FIL,LST,5,1,GazerA09.123,1769897,14032009,130850
$PASHR,FIL,LST,5,2,GazerB09.123,1769876,10032009,110952
$PASHR,FIL,LST,5,3,GazerC09.123,1769787,01032009,181856
$PASHR,FIL,LST,5,4,GazerD09.123,1769787,01032009,181856

$PASHQ,FIL,LST,1,2009/125
$PASHR,FIL,LST,4,0,GazerA09.123,1769897,14032009,130850
$PASHR,FIL,LST,4,1,GazerB09.123,1769876,10032009,110952
$PASHR,FIL,LST,4,2,GazerC09.123,1769787,01032009,181856
$PASHR,FIL,LST,4,3,GazerD09.123,1769787,01032009,181856
```

3.2.21 FIL,STS: Query the memory status

$PASHQ,FIL,STS[,d1][*cc]

Query the status of the memory, where **d1** is the memory type (0 for internal memory and 1 for SD Card). If **d1** is omitted, it returns the status of the current memory (see $PASHS,MEM).

Parameter	Description	Range
d1	0: internal memory (user data partition) 1: SD Card 3: internal memory (log file partition)	0,1,3
*cc	Checksum	

The command returns d1 messages in the form below:

$PASHR,FIL,STS,d1,d2,d3*cc

Parameter	Description	Range
d1	0: internal memory (user data partition) 1: SD Card 3: internal memory (log file partition)	0,1,3
d2	Total memory size in bytes 0 if memory not available	
d3	Free memory size in bytes 0 if memory not available	
*cc	Checksum	

See also: $PASHS,REC; $PASHS,MEM; $PASHQ,FIL,LST

Example:

$PASHQ,FIL,STS,1
$PASHR,FIL,STS,1,14032009,130850

$PASHQ,FIL,STS,1 (no SD Card)
$PASHR,FIL,STS,1,0,0

3.2.22 GAL: GALILEO tracking status

$PASHQ,GAL[*cc]

Query the GALILEO tracking status.

$PASHR,GAL,s*cc

The response message is in the form shown below:

Parameter	Description	Range
s	ON: track and use GALILEO satellites **OFF**: do not track GALILEO satellites	ON,OFF
*cc	Checksum	

See also: $PASHS,GAL

Example:

$PASHQ,GAL
$PASHR,GAL,ON*1D

3.2.23 GBS: GNSS Satellite Fault Detection

$PASHQ,GBS[*cc]

Query the GBS message.

The GBS response message is in the form:

$--GBS,m1,f2,f3,f4,d5,f6,f7,f8,h9,h10*cc

If only GPS satellites are used in the solution, the message **$GPGBS** is sent.

If only GLONASS satellites are used in the solution, the message **$GLGBS** is sent.

If only BEIDOU satellites are used in the solution, the message **$GBGBS** is sent.

If several types of satellite (GPS, SBAS, GLONASS, QZSS, BEIDOU) are used in the solution, the message **$GNGBS** is sent.

Parameter	Description	Range
m1	UTC time (hhmmss.ss)	000000.00-235959.99

f2	Expected error in latitude (meters)	0.0-99.9
f3	Expected error in longitude (meters)	0.0-99.9
f4	Expected error in altitude (meters)	0.0-99.9
d5	ID number of most likely failed satellite	GPS: 1-32 SBAS: 33-64 GLONASS: 65-96 GALILEO: 97-128 BEIDOU: 129-160 QZSS: 193-202
f6	Probability of missed detection for most likely failed satellite	0.00-1.00
f7	Estimate of bias in meters on most likely failed satellite	0.0-99.9
f8	Standard deviation of bias estimate	0.0-99.9
h9	GNSS System ID (see table below)	0-F
h10	GNSS Signal ID (see table below)	0-F
*cc	Checksum	

System	System ID	Signal ID	Signal Channel
GPS	1	0	All signals
		1	L1 C/A
		2	L1 P(Y)
		3	L1 M
		4	L2 P(Y)
		5	L2C-M
		6	LC2-L

		7	L5-I
		8	L5-Q
		9-F	Reserved
GLONASS	2	0	All signals
		1	G1 C/A
		2	G1 P
		3	G2 C/A
		4	GLONASS (M) G2 P
		5-F	Reserved
GALILEO	3	0	All signals
		1	E5a
		2	E5b
		3	E5 a+b
		4	E6-A
		5	E6-BC
		6	L1-A
		7	L1-BC
		8-F	Reserved
RESERVED	4 to F		

See also: $PASHS,NME

Example:

$PASHQ,GBS

```
$GNGBS,150909.80,0.2,0.2,0.5,,,,*56
```

3.2.24 GGA: GNSS position message

$PASHQ,GGA[*cc]

Query the GGA message.

If no position is computed, the message will be output but the position related fields would be empty.

The GGA response message is in the form:

$GPGGA,m1,m2,c3,m4,c5,d6,d7,f8,f9,M,f10,M,f11,d12*cc

Parameter	Description	Range
m1	Current UTC time of position (hhmmss.ss)	000000.00-235959.99
m2	Latitude of position (ddmm.mmmmmmm)	0-90 0-59.9999999
c3	Direction of latitude	N,S
m4	Longitude of position (dddmm.mmmmmmm)	0-180 0-59.9999999
c5	Direction of longitude	E,W
d6	Position type: 0: Position not available or invalid 1: Autonomous position 2: RTCM code differential (or SBAS differential)[1] 3: Not used 4: RTK fixed 5: RTK float 9: SBAS differential[1]	0-5,9
d7	Number of GNSS satellites being used in the position computation	3-26
f8	HDOP	0-99.9

f9	Altitude above the mean sea level	±99999.999
M	Altitude unit M=meters	M
f10	Geoidal separation in meters	±999.999
M	Geoidal separation unit M=meters	M
f11	Age of differential corrections (second)	0-999
d12	Base station ID	0-4095
*cc	Checksum	

(1): The position mode for SBAS differential is 2 or 9 depending on the command $PASHS,NPT

See also: $PASHS,NME

Example:

$PASHQ,GGA
$GPGGA,131745.00,4717.960847,N,00130.499476,W,4,10,0.8,35.655,M,47.290,M,3.0,1000*61

3.2.25 GLL: Geographic position - Latitude/Longitude

$PASHQ,GLL[*cc]

Query the GLL message.

The GLL response message is in the form:

$GPGLL,m1,c2,m3,c4,m5,c6,c7*cc

Parameter	Description	Range
m1	Latitude of position (ddmm.mmmmmmm)	0-90 0-59.9999999
c2	Direction of latitude	N,S
m3	Longitude of position (dddmm.mmmmmmm)	0-180 0-59.9999999

c4	Direction of longitude	E,W
m5	Current UTC time of position (hhmmss.ss)	000000.00-235959.99
c6	Status: A= data valid, V=data not valid	A,V
c7	Mode indicator A: Autonomous mode D: differential mode N : data not valid	A,D,N
*cc	Checksum	

See also: $PASHS,NME

Example:

$PASHQ,GLL
$GPGLL,4717.960853,N,00130.499473,W,132331.00,A,D*7D

3.2.26 GLO: GLONASS tracking status

$PASHQ,GLO[*cc]

Query the GLONASS tracking status.

The response message is in the form shown below:

$PASHR,GLO,s*cc

Parameter	Description	Range
s	ON: track and use the GLONASS satellites OFF: do not track the GLONASS satellites	ON,OFF
*cc	Checksum	

See also: $PASHS,GLO

Example:

$PASHQ,GLO
$PASHR,GLO,ON*1D

3.2.27 GL1/GL2/GL5/GL6: Tracking signals of different bands

$PASHQ,GL1[*cc]

$PASHQ,GL2[*cc]

$PASHQ,GL5[*cc]

$PASHQ,GL6[*cc]

Query the tracking signal status.

The response message is in the form shown below:

$PASHR,GL1,s1*cc

$PASHR,GL2,s2*cc

$PASHR,GL5,s5*cc

$PASHR,GL6,s6*cc

Parameter	Description	Range
s1	**ON**: track and use the L1 GNSS signals OFF: do not track the L1 GNSS signals	**ON**,OFF Hardcoded to ON
s2	**ON**: track and use the L2 GNSS signals OFF: do not track the L2 GNSS signals	**ON**,OFF
s5	**ON**: track and use the L5 GNSS signals OFF: do not track the L5 GNSS signals	**ON**,OFF
s6	**ON**: track and use the L6 GNSS signals OFF: do not track the L6 GNSS signals	**ON**,OFF Can be postponed for future
*cc	Checksum	

See also: $PASHS,GL1; $PASHS,GL2; $PASHS,GL5; $PASHS,GL6

Example:

$PASHQ,GL5

```
$PASHR,GL5,ON*1D
```

3.2.28 GMP: GNSS Map Projection Fix Data

$PASHQ,GMP[*cc]

Query the GMP message.

If no projected position is computed, the message will be output but the position related fields would be empty.

The GMP response message is in the form:

$--GMP,m1,s2,s3,f4,f5,s6,d7,f8,f9,f10,f11,d12*cc

If only GPS satellites are used in the solution, the message **$GPGMP** is sent.

If only GLONASS satellites are used in the solution, the message **$GLGMP** is sent.

If only BEIDOU satellites are used in the solution, the message **$GBGMP** is sent.

If several types of satellite (GPS, SBAS, GLONASS, BEIDOU) are used in the solution, the message **$GNGMP** is sent.

Parameter	Description	Range
m1	Current UTC time of position (hhmmss.ss)	000000.00-235959.99
s2	Map projection identification RTCM3.1 – message 1024: **LOC** : local coordinate system RTCM3.1 – message 1025, 1026 or 1027: **TM**: Transverse Mercator **TMS** : Transverse Mercator (South Orientated) **LCC1SP** : Lambert Conic Conformal (1SP) **LCC2SP** : Lambert Conic Conformal (2SP)	LOC, TM, TMS, LCC1SP, LCC2SP, LCCW, CS, OM, OS, MC, PS, DS

	LCCW : Lambert Conic Conformal (West Orientated) **CS** : Cassini-Soldner **OM** : Oblique Mercator **OS** : Oblique Stereographic **MC** : Mercator **PS** : Polar Stereographic **DS** : Double Stereographic	
s3	Map zone RTCM3.1 : empty	
f4	X (Northern) component of grid (or local) coordinates in meter	±999999999.999
f5	Y (Eastern) component of grid (or local) coordinates in meter	±999999999.999
s6	Mode indicator N : No fix A : Autonomous D : Differential R : Fixed RTK F : Float RTK	N,A,D,R,F
d7	Number of GNSS satellites being used in the position computation	3-26
f8	HDOP	0-99.9
f9	Altitude above the mean sea level or local altitude, in meter	±99999.999
f10	Geoidal separation in meters	±999.999
f11	Age of differential corrections (second)	0-999.9

d12	Base station ID	0-4095
*cc	Checksum	

See also: $PASHS,NME

Example:

$PASHQ,GMP
$GPGMP,131745.00,LOC,,45823.25,25332.3,R,14,0.8,35.655,47.290,1.0,1000*61

3.2.29 GNS: GNSS Fix Data

$PASHQ,GNS[*cc]

Query the GNS message.

If no position is computed, the message will be output but the position related fields would be empty.

The GNS response message is in the form:

$--GNS,m1,m2,c3,m4,c5,s6,d7,f8,f9,f10,f11,d12*cc

If the receiver is configured in GPS mode only, then the message header is $GPGNS.

If the receiver is configured in GLONAS mode only, then the message header is $GLGNS.

If the receiver is configured in BEIDOU mode only, then the message header is $GBGNS.

If the receiver is configured with several GNSS constellations, then the message header is $GNGNS.

Parameter	Description	Range
m1	Current UTC time of position (hhmmss.ss)	000000.00-235959.99
m2	Latitude of position (ddmm.mmmmmmm)	0-90 0-59.9999999
c3	Direction of latitude	N,S
m4	Longitude of position (dddmm.mmmmmmm)	0-180

		0-59.9999999
c5	Direction of longitude	E,W
s6	Mode indicator (1 character by constellation): N: No fix A: Autonomous position D: Differential R: RTK Fixed F: RTK Float	N,A,D,R,F
d7	Number of GNSS satellites being used in the position computation	3-26
f8	HDOP	0-99.9
f9	Altitude above the mean sea level	±99999.999
f10	Geoidal separation in meters	±999.999
f11	Age of differential corrections (second)	0-999
d12	Base station ID (RTCM only)	0-4095
*cc	Checksum	

See also: $PASHS,NME

Example:

$PASHQ,GNS
$GNGNS,131745.00,4717.960847,N,00130.499476,W,RR,10,0.8,35.655,47.290,3.0,1000*61

3.2.30 GPS: GPS tracking status

$PASHQ,GPS[*cc]

Query the GPS tracking status.

The response message is in the form shown below:

$PASHR,GPS,s*cc

Parameter	Description	Range
s	ON: track and use the GPS satellites OFF: do not track the GPS satellites	ON,OFF
*cc	Checksum	

See also: $PASHS,GPS

Example:

$PASHQ,GPS
$PASHR,GPS,ON*1D

3.2.31 GRS: GNSS Range Residuals

$PASHQ,GRS[*cc]

Query satellite range residual. The message is not output unless position is being computed.

The GRS response message is in the form:

$--GRS,m1,d2,n(f3)*cc

If only GPS satellites are used in the solution, the message **$GPGRS** is sent.

If only GLONASS satellites are used in the solution, the message **$GLGRS** is sent.

If only BEIDOU satellites are used in the solution, the message **$GBGRS** is sent.

If several types of satellite (GPS, SBAS, GLONASS, QZSS, BEIDOU) are used in the solution, the message **$GNGRS** is sent.

Parameter	Description	Range
m1	Current UTC time of GGA position (hhmmss.ss)	000000.00-235959.99
d2	Mode used to compute range residuals.	Always 1

n	Number of satellites used in the position solution	
f3	Range residuals for satellite used in position computation. Order of residuals matches order of satellites in GSA message	±999.99
*cc	Checksum	

See also: $PASHS,NME

Example:

$PASHQ,GRS (GPS only)
$GPGRS,140925.00,1,1.60,-0.56,-1.52,0.88,-0.90,-0.20,-0.52*54

$PASHQ,GRS (GPS-GLONASS)
$GNGRS,141003.50,1,1.14,-0.48,0.26,0.20,-0.94,-0.28,-1.18*61
$GNGRS,141003.50,1,-0.20*4F

3.2.32 GSA: GNSS DOP and Active Satellites

$PASHQ,GSA[*cc]

Query DOP and active satellites.

The response message is in the form:

$--GSA,c1,d2,d3,d4,d5,d6,d7,d8,d9,d10,d11,d12,d13,d14,f15,f16,f17*cc

If only GPS satellites are used in the solution, than the line **$GPGSA** is sent.

If only GLONASS satellites are used in the solution, than the line **$GLGSA** is sent.

If only BEIDOU satellites are used in the solution, than the line **$GBGSA** is sent.

If several types of satellite (GPS, SBAS, GLONASS, BEIDOU) are used in the solution, one message **$GNGSA** is sent for each constellation. In this case, the PDOP, HDOP and VDOP are the same in all messages.

Parameter	Description	Range
c1	Mode: M: manual A: automatic	A
d2	Mode: 1: fix not available	1-3

	2: 2D 3: 3D	
d3-d14	Satellites used in solutions (empty for unused channel)	GPS: 1-32 GLONASS: 65-96 SBAS: 33-64 GALILEO: 97-128 QZSS: 193-202 BEIDOU: 129-160
f15	PDOP	0-9.9
f16	HDOP	0-9.9
f17	VDOP	0-9.9
*cc	Checksum	

See also: $PASHS,NME

Example:

```
$PASHQ,GSA
$GNGSA,A,3,20,11,13,23,17,04,31,,,,,,1.6,0.9,1.3*21
$GNGSA,A,3,81,83,68,,,,,,,,,,1.6,0.9,1.3*2C
```

3.2.33 GST: GNSS Pseudo-range Error Statistics

$PASHQ,GST[*cc]

Query the GST message.

The GST response message is in the form:

$--GST,m1,f2,f3,f4,f5,f6,f7,f8*cc

If only GPS satellites are used in the solution, the message **$GPGST** is sent.

If only GLONASS satellites are used in the solution, the message **$GLGST** is sent.

If several types of satellite (GPS, SBAS, GLONASS, QZSS, BEIDOU) are used in the solution, the message **$GNGST** is sent.

Parameter	Description	Range

m1	UTC time (hhmmss.ss)	000000.00-235959.99
f2	RMS value of standard deviation of range inputs (included DGNSS corrections)	0.000-999.999
f3	Standard deviation of semi-major axis of error ellipse (meters)	0.000-999.999
f4	Standard deviation of semi-minor axis of error ellipse (meters)	0.000-999.999
f5	Orientation of semi-major axis of error ellipse (degrees from true north)	0 to 180
f6	Standard deviation of latitude error (meters)	0.000-999.999
f7	Standard deviation of longitude error (meters)	0.000-999.999
f8	Standard deviation of altitude error (meters)	0.000-999.999
*cc	Checksum	

See also: $PASHS,NME

Example:

$PASHQ,GST
$GNGST,145623.50,,,,,0.023,0.023,0.029*40

3.2.34 GSV: GNSS Satellites in View

$PASHQ,GSV[*cc]

Query satellites in view.

The GSV response message is in the form:

$--GSV,d1,d2,d3,n(d4,d5,d6,d7)*cc

where n is maximum 4. If more than 4 satellites are tracked, a second message is sent, then a 3rd if more than 8 SVs are tracked.

The GPS satellite are sent in the messages $GPGSV.

The GLONASS satellites are sent in the message $GLGSV.

The GALILEO satellites are sent in the message $GAGSV.

The SBAS satellites are sent in the message $GSGSV.

The QZSS satellites are sent in the message $GQGSV.

The BEIDOU satellites are sent in the message $GBGSV.

Parameter	Description	Range
d1	Total number of messages	1-4
d2	Message number	1-4
d3	Total number of satellites in view	0-16
d4	Satellite PRN	GPS: 1-32 SBAS : 33-64 GLONASS : 65-96 GALILEO: 97-128 QZSS: 193-202 BEIDOU: 129-160
d5	Elevation in degrees	00-90
d6	Azimuth in degrees	000-359
d7	SNR in dB-Hz	30-60
*cc	Checksum	

The GPS PRN number is d4.

The EGNOS PRN number is d4 plus 87

The GLONASS slot number is d4 minus 64.

The GALILEO PRN number is d4 minus 96.

The QZSS PRN number is d4 minus 192.

The BEIDOU PRN number is d4 minus 128.

See also: $PASHS,NME

Example:

$PASHQ,GSV

```
$GPGSV,4,1,16,03,57,138,50,06,45,130,47,07,00,266,,08,08,296,37*7F
```

```
$GPGSV,4,2,16,11,27,270,43,14,15,110,38,16,05,174,35,18,16,044,39*77
$GPGSV,4,3,16,19,85,316,51,22,45,064,48,24,58,264,51,28,13,324,39*7B
$GPGSV,4,4,16,32,19,196,37,33,34,200,40,37,31,150,,39,29,146,39*76
$GLGSV,3,1,09,65,17,190,38,71,48,048,49,72,62,150,53,77,02,246,36*67
$GLGSV,3,2,09,78,16,292,,79,11,346,37,86,37,108,47,87,73,008,53*62
$GLGSV,3,3,09,88,26,310,46*58
```

3.2.35 LCS: Enable/Disable local coordinate system

$PASHQ,LCS[*cc]

Query the local coordinate system status.

$PASHR,LCS,s*cc

The response message is in the form shown below:

Parameter	Description	Range
s	ON: local coordinate system enabled when available OFF: coordinate system is WGS84	ON,OFF
*cc	Checksum	

See also: $PASHS,LCS

Example:

$PASHQ,LCS
$PASHR,LCS,ON*09

3.2.36 LCS,OUT: Output RTCM coordinate system messages

$PASHQ,LCS,OUT[*cc]

Query the output mode for the RTCM coordinate system messages

The response message is in the form:

$PASHR,LCS,OUT,s1,c2*cc

Parameter	Description	Range
s1	ON: output received RTCM messages OFF: does not output received RTCM messages	ON,OFF
c2	Output port Serial port: **A** Bluetooth port: **C**	SP80: **A,C**
*cc	Checksum	

See also: $PASHS,LCS,OUT

Example:

$PASHQ,LCS,OUT
$PASHR,LCS,OUT,ON,C*05

3.2.37 LOG: Query log files

$PASHQ,LOG[,d][*cc]

Query a log file. The parameter d is the file index (see $PASHQ,LOG,LST). Without the parameter d, it returns the current log file.

The command messages in the form below:

Date: 2009-08-04

Maximum size: 1 Mb Duration: 20 days

hh:mm:ss: <message 1>

hh:mm:ss: <message 2>

...

hh:mm:ss: <message n>

See also: $PASHS,LOG,PAR; $PASHS,LOG,DEL; $PASHQ,LST

Example:

```
$PASHQ,LOG
Date: 2009-04-08
Maximum size: 1 Mb Duration: 20 days
14:12:34: connect server,stream=I1,port=1001,IP=12.34.87.22
14:15:33: connect client,stream=I2,IP=23.33.43.12,port=7721
15:36:12: disconnect server,stream=I1,port=1001,IP=12.34.87.22
```

3.2.38 LOG,LST: Query the list of log files

$PASHQ,LOG,LST[*cc]

Query the list of log files in the receiver.

The command returns d1 messages in the form below:

$PASHR,LOG,LST,d1,d2,s3,d4*cc

Parameter	Description	Range
d1	Number of files	
d2	File index	
s3	Name	Up to 255 characters
d4	Size in bytes	0-134217728
*cc	Checksum	

See also: $PASHS,LOG,PAR; $PASHS,LOG,DEL

Example:

```
$PASHQ,LOG,LST
$PASHR,LOG,LST,4,0,20090408.log,1769897
$PASHR,LOG,LST,4,1,20090407.log,1769876
$PASHR,LOG,LST,4,2,20090406.log,1769787
$PASHR,LOG,LST,4,3,20090405.log,1769787
```

3.2.39 LOG,PAR: Log files settings

$PASHQ,LOG,PAR[*cc]

Query the log files settings.

The response message is in the form:

$PASHR,LOG,s1,d2,d3*cc

Parameter	Description	Range
s1	ON: enable log files OFF: disable log files	ON,OFF
d2	Maximum size in MBytes	1-90
d3	Duration in days before removing a log file	1-100
*cc	Checksum	

See also: $PASHS,LOG,PAR

Example:

```
$PASHQ,LOG,PAR
$PASHR,LOG,OFF,1,20*0F
```

3.2.40 MDM: modem state and parameter

$PASHQ,MDM[*cc]

Query the modem state and parameters.

The MDM response message is in the form below:

$PASHR,MDM,c1,d2,s3,PWR=s4,PIN=s5,PTC=d6,CBS=d7,APN=s8,LGN=s9,PWD=s10,

,PHN=s11,ADL=c12,RNO=d13,MOD=s14,NET=d15*cc

Parameter	Description	Range
c1	Modem port	**E**
d2	Modem baud rate	9
s3	Modem state	OFF, ON, INIT, DIALING, ONLINE, NONE
PWR=s4	Power mode: AUT: automatic MAN: manual	AUT,MAN
PIN=s5	PIN code	4-8 digits
PTC=d6	Protocol: 0: CSD 1: GPRS (PSD)	0-1
CBS=d7	CSD mode: 0: V.32 9600 bauds 1: V.110 9600 bauds ISDN	0-1
APN=s8	Access point name (GPRS)	Up to 32 characters
LGN=s9	Login (GPRS)	Up to 32 characters
PWD=s10	Password (GPRS)	Up to 32 characters
PHN=s11	Phone number (CSD)	Up to 20 digits
ADL=c12	Auto-dial mode	Y,N
RNO=d13	Maximum number of re-dial (CSD)	0-15
MOD=s14	Modem model (empty if not known)	Centurion PHS8
NET=d15	0: Automatic (2G or 3G) 1: Force to 2G	0-1
*cc	Checksum	

See also: $PASHS,MDM; $PASHQ,MDM,STS; $PASHS,NTR; $PASHS,DIP; $PASHS,MDM,DAL

Example:

```
$PASHQ,MDM
$PASHR,MDM,E,9,ONLINE,PWR=MAN,PIN=,PTC=1,CBS=1,APN=a2bouygtel.com,LGN=,P
WD=,PHN=,ADL=Y,RNO=2,MOD=Centurion PHS8,NET=1*47
```

3.2.41 MDM,STS: Modem status

$PASHQ,MDM,STS[*cc]

Query the modem status.

The response is in the form shown below:

$PASHR,MDM,STS,s1,s2,s3,d4[*cc]

Parameter	Description	Range
s1	Modem state NONE means that option [Z] MODEM is not valid.	OFF, ON, INIT, DIALING, ONLINE, NONE
s2	Network name currently used	
s3	Network type (2G or 3G) currently used	2G,3G
d4	Signal level -1 means that the signal level is unavailable	-1;0-100
*cc	Checksum	

See also: $PASHQ,MDM

Example:

```
$PASHQ,MDM,STS
$PASHR,MDM,STS,INIT,"Orange F",2G,60*77
```

3.2.42 MEM: Memory storage location

$PASHQ,MEM[*cc]

Query the memory storage location.

The response message is in the form:

$PASHR,MEM,d*cc

Parameter	Description	Range
d	0: Internal memory 1: SD Card	0,1
*cc	Checksum	

See also: $PASHS,MEM;

Example:

$PASHQ,MEM
$PASHR,MEM,0*2D

3.2.43 NPT: NMEA position type for SBAS differential

$PASHQ,NPT[*cc]

Query the position type returned by NMEA-like and NMEA messages for SBAS differential position.

The response message is in the form below:

$PASHR,NPT,d1,d2*cc

Parameter	Description	Range	Default
d1	For NMEA-like messages (POS, VCT): ▪ 0: Position type is 1 for SBAS differential ▪ 1: Position type is 9 for SBAS differential	0-1	0
d2	For NMEA messages (GGA) : ▪ 0: Position type is 2 for SBAS differential ▪ 1: Position type is 9 for SBAS differential	0-1	0
*cc	Checksum		

See also: $PASHS,NPT

Example:

$PASHQ,NPT
$PASHR,NPT,1,0*4D

3.2.44 NTR: NTRIP settings

$PASHQ,NTR[,c6][*cc]

Query the NTRIP settings.

When c6 is omitted, it returns the NTRIP settings for the port defined by the last command $PASHS,NTR,PAR sent.

The response message is in the form:

$PASHR,NTR,ADD=s1,PRT=d2,LGN=s3,PWD=s4 ,TYP=d5,IPP=c6*cc

Parameter	Description	Range
s1	IP address or host name of the caster	Up to 32 characters
d2	Port number of the caster	0-65535
s3	Login	Up to 32 characters
s4	Password	Up to 32 characters
d5	Type 0: Client 1: Server	0-1
c6	Internet port used to connect the caster: **P**: TCP/IP stream 1 **Q**: TCP/IP stream 2	P,Q
*cc	Checksum	

See also: $PASHS,NTR,PAR; $PASHQ,NTR,TBL

Example:

$PASHQ,NTR
$PASHR,NTR,ADD=192.34.76.1,PRT=2100,LGN=Magellan,PWD=u6huz8,TYP=0

3.2.45 NTR,MTP: Connected mount point

$PASHQ,NTR,MTP[,c1][*cc]

Query the current NTRIP mount point.

When c1 is omitted, it returns the NTRIP mount point for the port defined by the last command $PASHS,NTR,PAR sent.

The response message is in the form:

$PASHR,NTR,MTP,s2*cc

Parameter	Description	Range
c1	Internet port used to connect the caster: **P**: TCP/IP stream 1 **Q**: TCP/IP stream 2	**P**,**Q**
s2	NTRIP mount point OFF means that there is no connected mount point.	Up to 100 characters OFF
*cc	Checksum	

See also: $PASHS,NTR,MTP

Example:

$PASHQ,NTR,MTP
$PASHR,NTR,MTP,NAN2

3.2.46 NTR,TBL: Source table

$PASHQ,NTR,TBL[*cc]

Query the source table saved in the receiver.

The source table corresponds to the last command $PASHS,NTR,LOD sent.

The response message is in the form:

$PASHR,NTR,TBL

SOURCETABLE 200 OK

<source table as specified in the NTRIP standard>

ENDSOURCETABLE

See also: $PASHS,NTR,LOD; $PASHS,NTR,PAR; $PASHS,NTR,MTP

Example:

$PASHQ,NTR,TBL
$PASHR,NTR,TBL

```
SOURCETABLE 200 OK
Content-Type: text/plain
Content-Length: 7864
CAS;129.217.182.51;80;ICD;BKG;0;GER;51.5;7.5;Trial Broadcaster
NET;GREF;BKG;B;N;http://igs.ifag.de/GREF.htm;none;denise.dettmering@bkg.
bund.de;none
NET;IGS-
IGLOS;BKG;B;N;http://igscb.jpl.nasa.gov/projects/rtwg/;none;denise.dettm
ering@bkg.bund.de;none
STR;FFMJ2;Frankfurt;RTCM
2.0;1(1),3(19),16(59);0;GPS;GREF;GER;50.12;8.68;0;1;GPSNet
V1.9;none;N;N;560;Demo
STR;FFMJ1;Frankfurt;RTCM
2.1;3(19),16(59),18(1),19(1);2;GPS;GREF;GER;50.09;8.66;0;0;GPSNet
V1.9;none;N;N;2800;Demo
STR;FFMJ0;Frankfurt;RAW;Compact(1);2;GPS+GLO;IGS-
IGLOS;GER;50.09;8.66;0;0;Javad Legacy E;none;N;N;3600;Demo
STR;LEIJ0;Leipzig;RAW;Compact(1);2;GPS+GLO;IGS-
IGLOS;GER;51.33;12.37;0;0;Javad Legacy E;none;B;N;3600;none
STR;WTZJ0;Wettzell;RAW;Compact(1);2;GPS+GLO;IGS-
IGLOS;GER;49.13;12.88;0;0;Javad Legacy E;none;B;N;3600;none
STR;HELJ0;Helgoland;RAW;Compact(1);2;GPS+GLO;IGS-
IGLOS;GER;54.18;7.88;0;0;Javad Legacy E;none;B;N;3600;none
STR;TITZ0;Titz;RAW;Compact(1);2;GPS+GLO;IGS-
IGLOS;GER;51.00;6.42;0;0;Javad Legacy E;none;B;N;3600;none
STR;HUEG0;Huegelheim;RAW;Compact(1);2;GPS+GLO;IGS-
IGLOS;GER;47.82;7.62;0;0;Javad Legacy E;none;B;N;3600;none
STR;DREJ0;Dresden;RAW;Compact(1);2;GPS+GLO;IGS-
IGLOS;GER;51.05;13.73;0;0;Javad Legacy E;none;B;N;3600;none
STR;SASS0;Sassnitz;RAW;Compact(1);2;GPS+GLO;IGS-
IGLOS;GER;54.51;13.64;0;0;Javad Legacy E;none;B;N;3600;none
STR;KARJ0;Karlsruhe;RAW;Compact(1);2;GPS+GLO;IGS-
IGLOS;GER;49.01;8.41;0;0;Javad Legacy E;none;B;N;3600;none
STR;WILH0;Wilhelmshaven;RTCM
2.0;1(1),3(19),16(59);0;GPS;GREF;GER;53.52;8.10;0;1;GPSNet
V1.9;none;B;N;560;VRS
ENDSOURCETABLE
```

3.2.47 OCC: Occupation

$PASHQ,OCC[*cc]

Query the occupation state and parameters.

The OCC response is in the form below:

$PASHR,OCC,d1,d2[,s3,s4]*cc

Parameter	Description	Range
d1	Occupation type: 0: static 1: quasi-static 2: dynamic 4: kinematic bar of 20cm (obsolete)	0-2
d2	Occupation state: 0: In progress 1: No occupation	0-1
s3	Occupation name	Up to 255 characters
s4	Occupation description	Up to 255 characters
*cc	Checksum	

See also: $PASHS,OCC

Example:

$PASHQ,OCC
$PASHR,OCC,0,0,SIT01,description (Static occupation in progress)

$PASHQ,OCC
$PASHR,OCC,2,1 (no occupation)

3.2.48 OPTION: Options

$PASHQ,OPTION[*cc]

Query the available options of the SP80

The response is in the form below:

$PASHR,OPTION,s1,s2,h3*cc

There is 1 line per valid option. The first line contains the serial number.

Parameter	Description	Range
s1	Option ID. See below.	
s2	Option label	
H3	Unlock code (hexadecimal)	Up to 13 characters
*cc	Checksum	

The options available are the followings:

ID	Label	SP80	Description
@1	GEOFENCING_WW	SP80	Allows working worldwide
@2	GEOGENFING_CHINA	SP80	Allows working in China
@3	GEOFENCING_JAPAN	SP80	Allows working in Japan
@4	GEOFENCING_BRAZIL	SP80	Allows working in Brazil
@5	GEOFENCING_N_AMERICA	SP80	Allows working in North America
@6	GEOFENCING_L_AMERICA	SP80	Allows working in Latin America
@7	GEOFENCING_RUSSIA	SP80	Allows working in Russia
@8	GEOFENCING_INDIA	SP80	Allows working in India
@9	GEOFENCING_TURKEY	SP80	Allows working in Turkey
N	GPS	SP80	Allows the tracking of GPS, SBAS and QZSS satellites
G	GLONASS	SP80	Allows tracking of GLONASS satellites

O	GALILEO	SP80	Allows the tracking of GALILEO satellites
B	BEIDOU	SP80	Allows the tracking of BEIDOU satellites
X	L1TRACKING[1]	SP80	Allows the tracking of the following signals: -GPS L1 -GLONASS G1 -GALILEO E1 -BEIDOU B1 (phase 2)
Y	L2TRACKING	SP80	Allows the tracking of the following signals: -GPS L2 -GLONASS G2
Q	L5TRACKING	SP80	Allows the tracking of the following signals: - GPS L5 - GLONASS L3 - GALILEO E5a - GALILEO E5b - BEIDOU B2
T	L6TRACKING[1]	SP80	Allows the tracking of the following signals: -GALILEO E6 -BEIDOU B3
2	2HZ	SP80	Allows output rate up to 2Hz for position and raw data
W	20HZ	SP80	Allows output rate up to 20Hz for position and raw data
Z	100HZ[1]	SP80	Allows output rate up to 100Hz for position and raw data
J	RTKROVER	SP80	Allows RTK computation [J] option shall allow the receiver to compute a Flying RTK solution, a RTK solution, a RTK with Moving base solution and an External Heading solution
K	RTKBASE	SP80	Allows generation of the following differential messages: RTCM2.3/RTCM3.0/CMR/CMR+/ATOM messages Differential messages for Standard DGPS are not linked to this option and must be always enabled
F	FLYINGRTK	SP80	Allows Flying RTK computation
I	RAIM	SP80	Allows the output of RAIM related messages
A	ATTITUDE		Allows full attitude computation
M	MODEM	SP80	Allows using the GPRS modem
U	WIFI	SP80	Allows using the WiFi module
R	RECORD	SP80	Allows data recording in memory

(1): The X,W,T and L are reserved only. They have no impact on the receiver. The option Z is equivalent to option W.

See also: $PASHS,OPTION

Example:

```
$PASHQ,OPTION
$PASHR,OPTION,0,SERIAL NUMBER,200751223*7A
$PASHR,OPTION,K,RTKBASE,6756975c71766*36
$PASHR,OPTION,G,GLONASS,6756945714671*7B
```

3.2.49 OUT: Suspend/resume periodic messages

$PASHQ,OUT[,c1][*cc]

Query the periodic message status for a specified port.

If c1 is omitted, it returns the status for the current port.

The response is in the form shown below:

$PASHR,OUT,c1,s2[*cc

Parameter	Description	Range
c1	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q** Internal memory: **M** SD Card: **S**	SP80: **A,B,C,D,E,I,P,Q,M,S**
s2	ON: the periodic messages are enabled OFF: the periodic messages are suspended	ON,OFF
*cc	Checksum	

See also: $PASHS,OUT

Example:

$PASHQ,OUT,A
$PASHR,OUT,A,ON*55

$PASHQ,OUT
$PASHR,OUT,C,ON*55

3.2.50 PAR: Receiver parameters

$PASHQ,PAR,[s1][*cc]

Query general receiver parameters. This query shows the status of most of the general receiver parameters.

Parameter	Description	Range
s1	Data message	See table below
*cc	Checksum	

Data	Description
STA	Status information
RCV	Receiver settings
RTK	RTK and ARROW settings
3DF	3D Attitude
INP	Input information
OUT	Output information
PRT	Port information
MEM	Memory information
RDP	Radio information

MDM	Modem information
NET	Network

If s1 is omitted it is equivalent to STA, RCV, RTK, 3DF, INP, OUT, PRT, MEM, RDP, MDM and NET queries entered in series.

The response message is in a user readable form. A typical response messages might be:

```
$PASHQ,PAR,STA
==============================+================================
 STATUS INFORMATION           |
------------------------------|
 STORED POSITION              | 5539.380104,N,03731.554854,E,270.416 COMPUTED      Computed position
 DATE [dd.mm.yyyy]            | 05.09.2008
 UTC TIME [hhmmss.ms]         | 083017.00
 GPS TIME SCALE               | 1495:462631000
 GLO TIME SCALE               | 10475:41417000
 SVS TRACKED                  | 18 (GPS:10 SBA:2 GLO:6 GAL:0 QZS:0 BDS:0)
 SVS USED                     | 13 (GPS:9 SBA:0 GLO:4 GAL:0 QZS:0 BDS:0)
 SOLUTION STATUS              | 1                                                  $PASHQ,POS
 EXTERNAL ANTENNA STATUS      | UNKNOWN
==============================+================================

$PASHQ,PAR,RCV
==============================+================================
 COMMON SETTINGS:             |
------------------------------|
 RECEIVER                     | SPECTRA SP80                                       $PASHQ,RCP,OWN
 VERSION                      |                                                    $PASHQ,RID
 REFERENCE CLOCK              | INTERNAL                                           $PASHS,REF
 GNSS CONFIGURATION           | DSL L1,ON L2,ON L5,ON L6,ON                        $PASHS,GFG
 GPS ALLOWED TO TRACK         | ON,1C,2LW YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY         $PASHS,GPS
 GLO ALLOWED TO TRACK         | ON YYYYYYYYYYYYYYYYYYYYYYY                         $PASHS,GLO
 SBA ALLOWED TO TRACK         | ON YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY    $PASHS,SBA
 GAL ALLOWED TO TRACK         | ON YYYYYYYYYYYYYYYYYYYYYYYYYYYYYY                  $PASHS,GAL
 QZS ALLOWED TO TRACK         | ON YYYYY                                           $PASHS,QZS
 BDS ALLOWED TO TRACK         | ON YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY                $PASHS,BDS
 PRIMARY GNSS SYSTEM          | GPS                                                $PASHS,PGS
 INTERNAL UPDATE PERIOD [msec]| 20                                                 $PASHS,POP
 CHANNELS-SVS ASSIGNMENT      | AUT
 DYNAMIC                      | ADAPTIVE                                           $PASHS,DYN
 USER DYNAMIC PARAMETERS      | 100000.0,100.0,100000.0,100.0                      $PASHS,UDP
 CLOCK STEERING               | ON                                                 $PASHS,UTS
 OUTPUT ADJUSTMENT TO ANTENNA |                                                    $PASHS,ANP,OUT
 ANTENNA REDUCTION (TO)       | ON                                                 $PASHS,ANR
 CODE CORRELATOR MODE         | STROBE CORRELATOR                                  Always STROBE
 CODE SMOOTHING INTERVAL [sec]| 100,600,1800                                       Always100,600,1800
 ADJUST GLONASS BIASES        | OFF                                                $PASHS,AGB
 POSITION ELEVATION MASK [deg]| 05                                                 $PASHS,PEM
 MAX SVS in PVT               | 99                                                 $PASHS,SVM
 OUTPUT POSITION TYPE (UP TO) | RTK                                                $PASHS,TOP
 VECTOR DATA OUTPUT MODE      | FAST                                               $PASHS,VEC
 PPS PERIOD [sec]             | 10                                                 $PASHS,PPS
 PPS OFFSET [msec]            | 100                                                $PASHS,PPS
 PPS SYNCHRONIZED EDGE        | RISING                                             $PASHS,PPS
 EVENT MARKER EDGE            | RISING                                             $PASHS,PHE
------------------------------+--------------------------------
 DIFF GENERATOR SETTINGS:     |
------------------------------|
 CUR ANTENNA NAME             | SPP91654_1                                         $PASHQ,ANP,OWN
 OWN RECEIVER NAME            | SPECTRA SP80                                       $PASHQ,RCP,OWN
 SITE NAME                    | ????
 TEXT MESSAGE                 | SPECTRA SP80                                       $PASHS,MSG
 REFERENCE POSITION TYPE      | MOVING                                             $PASHS,CPD,BAS
 ANTENNA SLANT [m]            | 0.000                                              $PASHS,ANT
 ANTENNA RADIUS [m]           | 0.099                                              $PASHS,ANT
 ANTENNA VERTICAL OFFSET [m]  | 0.030                                              $PASHS,ANT
 ANTENNA HEIGHT [m]           | 0.000                                              $PASHS,ANT
```

ANTENNA HORIZ. AZIMUTH [deg]	0.000	$PASHS,ANT
ANTENNA HORIZ. OFFSET [m]	0.000	$PASHS,ANT
TEMPERATURE [degree]	????	$PASHS,MET
PRESSURE [mBar]	????	$PASHS,MET
RELATIVE HUMIDITY [%]	????	$PASHS,MET
OBSERVATION OUTPUT MASKING:		
BY ELEVATION [deg]	5,5/05,05	??
BY SNR [dBHz]	28,28/00,00	$PASHS,SOM
BY TRACKING TIME [sec]	10,10/00,00	$PASHS,SOM
BY NAVIGATION DATA	ON,OFF/OFF,OFF	$PASHS,SOM
BY CHANNEL WARNINGS	ON,OFF/OFF,OFF	$PASHS,SOM

$PASHQ,PAR,RTK

RTK1 SETTINGS:		
OPERATION MODE	ON	$PASHS,CPD,AFP
AMB. FIXING RELIABILITY	99.0	$PASHS,CPD,NET
PROTOCOLS ALLOWED	ALL	$PASHS,CPD,VRS
NETWORK USAGE GPS:GLO	1:1	$PASHS,CPD,FST
VRS ASSUMPTION	0	$PASHS,CPD,MOD
FAST RTK MODE	ON	$PASHS,CPD,MOD
MOVING BASE MODE	0	$PASHS,CPD,MOD
STREAM ID	A	$PASHS,ANP,REF
REFERENCE ANTENNA NAME		$PASHS,RCP,REF
REFERENCE RECEIVER NAME		$PASHS,CPD,REM
ARROW1 SETTINGS:		
ARROW MODE	OFF	$PASHS,CPD,ARR,MOD
ARROW BASELINE LENGTH [m]	0.000	$PASHS,CPD,ARR,MOD
ARROW HEADING OFFSET [deg]	0.000	$PASHS,CPD,ARR,LEN
ARROW ELEVATION OFFSET [deg]	0.000	$PASHS,CPD,ARR,OFS
ARROW MAX ELEVATION [deg]	15	$PASHS,CPD,ARR,OFS
ARROW BASELINE LEN SIGMA [m]	0.010	$PASHS,CPD,ARR,PAR
		$PASHS,CPD,ARR,PAR
RTK2 SETTINGS:		
OPERATION MODE	SAM (5)	
AMB. FIXING RELIABILITY	99.0	
PROTOCOLS ALLOWED	ALL	
NETWORK USAGE GPS:GLO	1:1	
VRS ASSUMPTION	0	
MOVING BASE MODE	0	
STREAM ID	A	
REFERENCE ANTENNA NAME		
REFERENCE RECEIVER NAME		
ARROW2 SETTINGS:		
ARROW MODE	OFF	
ARROW BASELINE LENGTH [m]	0.000	
ARROW HEADING OFFSET [deg]	0.000	
ARROW ELEVATION OFFSET [deg]	0.000	
ARROW MAX ELEVATION [deg]	15	
ARROW BASELINE LEN SIGMA [m]	0.010	
RTK3 SETTINGS:		
OPERATION MODE	SAM (6)	
AMB. FIXING RELIABILITY	99.0	
PROTOCOLS ALLOWED	ALL	
NETWORK USAGE GPS:GLO	1:1	
VRS ASSUMPTION	0	
MOVING BASE MODE	0	
STREAM ID	A	
REFERENCE ANTENNA NAME		

```
 REFERENCE RECEIVER NAME      |
------------------------------+---------------------------------
 ARROW3 SETTINGS:             |
------------------------------|
 ARROW MODE                   | OFF
 ARROW BASELINE LENGTH [m]    | 0.000
 ARROW HEADING OFFSET [deg]   | 0.000
 ARROW ELEVATION OFFSET [deg] | 0.000
 ARROW MAX ELEVATION [deg]    | 15
 ARROW BASELINE LEN SIGMA [m] | 0.010
==============================+=================================
```

```
$PASHQ,PAR,3DF
==============================+=================================
 3D ATTITUDE STATUS           |
------------------------------|
 SOLUTION STATUS              | -
 CALIBRATION STATUS           | NOT CALIBRATED
------------------------------+---------------------------------
 3D ATTITUDE SETTINGS         |
------------------------------|
 OPERATION MODE               | OFF
 MAX TT UPDATE RATE [Hz]      | 10
 THE NUMBER OF LINES          | 2
 HEADING ANGLE OFFSET [deg]   | 0.00
 PITCH ANGLE OFFSET [deg]     | 0.00
 ROLL ANGLE OFFSET [deg]      | 0.00
----------- LINE-1 -----------|
 RTK ENGINE                   | RTK2
 XYZ COMPONENTS [m]           |
 CALIBRATED COMPONENTS [m]    |
------ RTK2 ARROW SETUP ------|
 MAX. ELEV. DEVIATION [deg]   | 15
----------- LINE-2 -----------|
 RTK ENGINE                   | RTK3
 XYZ COMPONENTS [m]           |
 CALIBRATED COMPONENTS [m]    |
------ RTK3 ARROW SETUP ------|
 MAX. ELEV. DEVIATION [deg]   | 15
==============================+=================================
```

```
$PASHQ,PAR,INP
==============================+=================================
 INPUT INFORMATION            |
------------------------------|
 DIFF.DECODER 1 SOURCE        | ALL,ALL
 DIFF.DECODER 2 SOURCE        | OFF
 DIFF.DECODER 3 SOURCE        | OFF
 DIFF.DECODER 4 SOURCE        | OFF
 PORTS                        | A:9 G:9 M:0 S:0
==============================+=================================
```

```
$PASHQ,PAR,OUT
==============================+=================================
 OUTPUT INFORMATION           |
------------------------------|
 PORTS                        | A:9,NTV G:9,NTV M:0,NTV,OFF S:0,NTV,OFF
 VIRTUAL PORTS                | -
 ATL                          | OFF
------------------------------+---------------------------------
 PERIODIC OUTPUT              |
------------------------------|
NME: OCC
A:   OFF
G:   001
M:   OFF
S:   OFF
ATM: PVT NAV DAT RNX ATR EVT
A:   OFF OFF OFF OFF OFF OFF
G:   OFF OFF OFF OFF OFF OFF
M:   001 ON  ON  001 ON  ON
S:   001 ON  ON  001 ON  ON
RT3: - SUSPENDED
RT2: - SUSPENDED
```

```
CMR: - SUSPENDED
RAW: -
GUI: 0
A:   OFF
G:   001
M:   OFF
S:   OFF
```

```
$PASHQ,PAR,PRT
```

PORT SETTINGS:		
PORT A	9 (115200bds), RTS/CTS OFF	$PASHS,PRT/CTS
PORT B (USB SERIAL PORT)	9 (115200bds)	
PORT C (BLUETOOTH)	NAME: SP_520000 PIN:	$PASHS,BTH
PORT D (INTERNAL RADIO)	7 (38400bds)	$PASHS,PRT

```
$PASHQ,PAR,MEM
```

MEMORY INFORMATION:		
CURRENT MEMORY	INTERNAL	$PASHS,MEM
INTERNAL SIZE (bytes)	17731584	$PASHQ,FIL,STS
INTERNAL USED (bytes)	568320 (3%)	$PASHQ,FIL,STS
EXTERNAL SIZE (bytes)	507109376	$PASHQ,FIL,STS
EXTERNAL USED (bytes)	362863616 (72%)	$PASHQ,FIL,STS
RECORD STATUS	NO	$PASHS,REC

```
$PASHQ,PAR,RDP
```

INTERNAL RADIO:		
TYPE	PDL	$PASHQ,RDP,TYP
POWER	ON	$PASHS,RDP
POWER MODE	AUTOMATIC	$PASHS,RDP,PAR
CHANNEL	2	$PASHS,RDP,PAR
PROTOCOL	TRANSPARENT	$PASHQ,RDP,CHT
AIR LINK SPEED (bds)	9600	$PASHS,RDP,PAR
SENSITIVITY	MEDIUM	$PASHS,RDP,PAR
SCRAMBLER	OFF	$PASHS,RDP,PAR
FEC	OFF	$PASHS,RDP,PAR
MODULATION	GMSK	$PASHS,RDP,PAR
CURRENT POWER	100mW	$PASHS,RDP,PAR
CHANNEL 0	RX:445.1000 TX:445.2000	$PASHS,RDP,CHT
CHANNEL 1	RX:446.1000 TX:446.2000	$PASHQ,RDP,CHT
CHANNEL 2	RX:447.1000 TX:447.2000	$PASHQ,RDP,CHT
EXTERNAL RADIO:		
PORT	A	$PASHS,RDP,TYP
TYPE	PDL	$PASHS,RDP,TYP
CHANNEL	2	$PASHS,RDP,PAR
PROTOCOL	TRANSPARENT	$PASHS,RDP,PAR
AIR LINK SPEED (bds)	9600	$PASHS,RDP,PAR
SCRAMBLER	OFF	$PASHS,RDP,PAR
FEC	OFF	$PASHS,RDP,PAR
MODULATION	GMSK	$PASHS,RDP,PAR
CURRENT POWER	100mW	$PASHS,RDP,PAR
CHANNEL 0	RX:445.1000 TX:445.2000	$PASHQ,RDP,CHT
CHANNEL 1	RX:446.1000 TX:446.2000	$PASHQ,RDP,CHT
CHANNEL 2	RX:447.1000 TX:447.2000	$PASHQ,RDP,CHT

```
$PASHQ,PAR,MDM
```

MODEM:		
STATUS	ONLINE	$PASHQ,MDM
POWER MODE	AUTOMATIC	$PASHS,MDM,PAR
PIN CODE	12345	$PASHS,MDM,PAR
BAND	900/1800	$PASHS,MDM,PAR
PROTOCOL	GPRS	$PASHS,MDM,PAR

```
 CSD MODE                     | V.32                                | $PASHS,MDM,PAR
 APN                          | a2bouygtel.com                      | $PASHS,MDM,PAR
 APN LOGIN                    |                                     | $PASHS,MDM,PAR
 APN PASSWORD                 |                                     | $PASHS,MDM,PAR
 IP PROTOCOL                  | TCP                                 | $PASHS,MDM,PAR
 PHONE NUMBER                 | 0228093800                          | $PASHS,MDM,PAR
 AUTO-CONNECT                 | ON                                  | $PASHS,MDM,PAR
 MAX REDIAL                   | 2                                   | $PASHS,MDM,PAR
 LEVEL                        | 60                                  | $PASHQ,MDM,LVL
 WATCHDOG TIMEOUT (minutes)   | 0                                   | $PASHS,MWD
 MODEL                        | Q26 Extreme                         | $PASHQ,MDM
 NETWORK                      | Automatic (3G)                      | $PASHS,MDM,PAR
==============================+=====================================
$PASHQ,PAR,NET
==============================+=====================================
DIRECT IP - ETHERNET (P):     |
------------------------------|
 STATUS                       | NOT CONNECTED                       | $PASHS,DIP
 ADDRESS                      | 187.26.85.10                        | $PASHS,DIP
 PORT                         | 2101                                | $PASHS,DIP
 LOGIN                        | Ashtech                             | $PASHS,DIP
 PASSWORD                     | ****                                | $PASHS,DIP
------------------------------+-------------------------------------
DIRECT IP - ETHERNET (Q):     |
------------------------------|
 STATUS                       | NOT CONNECTED                       | $PASHS,DIP
 ADDRESS                      | 187.26.85.10                        | $PASHS,DIP
 PORT                         | 2101                                | $PASHS,DIP
 LOGIN                        | Ashtech                             | $PASHS,DIP
 PASSWORD                     | ****                                | $PASHS,DIP
------------------------------+-------------------------------------
NTRIP - ETHERNET (P):         |
------------------------------|
 STATUS                       | CONNECTED                           | $PASHS,NTR
 ADDRESS                      | 187.26.85.11                        | $PASHS,NTR
 PORT                         | 2101                                | $PASHS,NTR
 LOGIN                        | Ashtech                             | $PASHS,NTR
 PASSWORD                     | ****                                | $PASHS,NTR
 MODE                         | SERVER                              | $PASHS,NTR
 MOUNT POINT                  | NAN5                                | $PASHS,NTR,MTP
------------------------------+-------------------------------------
 NTRIP - ETHERNET (Q):        |
------------------------------|
 STATUS                       | CONNECTED                           | $PASHS,NTR
 ADDRESS                      | 187.26.85.11                        | $PASHS,NTR
 PORT                         | 2101                                | $PASHS,NTR
 LOGIN                        | Ashtech                             | $PASHS,NTR
 PASSWORD                     | ****                                | $PASHS,NTR
 MODE                         | SERVER                              | $PASHS,NTR
 MOUNT POINT                  | NAN6                                | $PASHS,NTR,MTP
==============================+=====================================
```

In the response to $PASHQ,PAR,OUT the messages which are output to the corresponding port are marked as described in the table below:

Data	Description
OFF	The message is not output to the port
ON	The output interval is not set by command

	(the message is output with the default interval)
.05, .10, .20, .50, 001, 002 … 999	The output interval set by command

3.2.51 PEM: Position elevation mask

$PASHQ,PEM

Query the elevation mask for position computation.

The PEM response is in the form below:

$PASHR,PEM,d1*cc

Parameter	Description	Range
d1	Position elevation mask	0-90 degrees
*cc	Checksum	

See also: $PASHS,PEM; $PASHQ,ELM

Example:

$PASHQ,PEM
$PASHR,PEM,5*35

3.2.52 PGS: Primary GNSS System

$PASHQ,PGS[*cc]

Query the primary GNSS System.

The response message is in the form below:

$PASHR,PGS,s*cc

Parameter	Description	Range
s	Primary GNSS System: ▪ GPS: GPS System ▪ GLO: GLONASS System ▪ BDS: BEIDOU System	GPS,GLO,BDS
*cc	Checksum	

See also: $PASHS,PGS

Example:

```
$PASHQ,PGS
$PASHR,PGS,GPS*4D
```

3.2.53 PHN,DIR: Query phone number directory

$PASHQ,PHN,DIR[,d][*cc]

Query the phone numbers recorded in the phone number directory, where **d** is the index in the directory. If **d** is omitted, it returns all the phone numbers.

The command returns one or 10 messages in the form below:

$PASHR,PHN,DIR,d1,d2[,s3]*cc

Parameter	Description	Range
d1	Number of phone numbers	1,10
d2	Index in the directory	1-10
s3	Phone number	Up to 20 digits
*cc	Checksum	

See also: $PASHS,PHN,DIR

Example:

```
$PASHQ,PHN,DIR
$PASHR,PHN,DIR,10,1,0256328954
$PASHR,PHN,DIR,10,2,0256328955
$PASHR,PHN,DIR,10,3
$PASHR,PHN,DIR,10,4,0256328956
$PASHR,PHN,DIR,10,5,0256328957
$PASHR,PHN,DIR,10,6
$PASHR,PHN,DIR,10,7,0256328958
$PASHR,PHN,DIR,10,8
$PASHR,PHN,DIR,10,9
$PASHR,PHN,DIR,10,10
```

$PASHQ,PHN,DIR,4
$PASHR,PHN,DIR,1,4,0256328956

3.2.54 POP: Internal measurement and PVT update rate

$PASHQ,POP[*cc]

Query the internal measurement and PVT update rate.

The response is in the form shown below:

$PASHR,POP,d*cc

Parameter	Description	Range
d	Measurement internal update rate in Hz.	1,2,5,10,20,50,100
*cc	Checksum	

See also: $PASHS,POP;

Example:
$PASHQ,POP
$PASHR,POP,10*16

3.2.55 POS: Position

$PASHQ,POS[*cc]

Query position message.

The POS response message is in the form below:

$PASHR,POS,d1,d2,m3,m4,c5,m6,c7,f8,f9,f10,f11,f12,f13,f14,f15,f16,s17*cc

Parameter	Description	Range
d1	Position mode 0: Autonomous position 1: RTCM code differential (or SBAS differential)[1] 2: RTK float 3: RTK fixed	0-3,9

	9: SBAS differential[1]	
d2	Number of satellite used in position fix	0-26
m3	Current UTC time of position fix (hhmmss.ss)	000000.00-235959.99
m4	Latitude of position (ddmm.mmmmmmm)	0-90 degrees 00-59.9999999 minutes
c5	Latitude sector	N, S
m6	Longitude of position (dddmm.mmmmmmm)	0-180 degrees 00-59.9999999 minutes
c7	Longitude sector	E,W
f8	Altitude above the WGS84 ellipsoid	±9999.000
f9	Age of differential corrections (second)	0-999.9
f10	True track/course over ground in degrees	0-359.9
f11	Speed over ground in knots	0-999.999
f12	Vertical velocity in decimeters per second	±999.999
f13	PDOP	0-99.9
f14	HDOP	0-99.9
f15	VDOP	0-99.9
f16	TDOP	0-99.9
s17	Reserved	
*cc	Checksum	

(1): The position mode for SBAS differential is 1 or 9 depending on the command $PASHS,NPT

See also: $PASHS,NME; $PASHS,NPT

Example:

$PASHQ,POS

```
$PASHR,POS,3,10,151858.00,4717.960848,N,00130.499487,W,82.972,,0.0,0.0,-
0.0,2.0,1.1,1.7,1.3,G010*49
```

3.2.56 POS,REF: Base position

$PASHQ,POS,REF[*cc]

It queries the base position (ARP) entered by the user.

The coordinate system depends on the command $PASHS,PGS.

The fields are empty if the base position is not set or if the moving base is enabled.

The response message is in the form:

$PASHR,POS,REF,m1,c2,m3,c4,f5*cc

Parameter	Description	Range
m1	Latitude in degrees, decimal minutes (ddmm.mmmmmm)	0-90
c2	North (N) or South (S)	N,S
m3	Longitudes in degrees, decimal minutes (dddmm.mmmmmm)	0-180
c4	East (E) or West (W)	E,W
f5	Height in meters	±0-9999.9999
*cc	Checksum	

See also: $PASHS,POS;

Example:

$PASHQ,POS,REF
$PASHR,POS,REF,4717.959483,N,00130.500968,W,70.229*59

$PASHQ,POS,REF
$PASHR,POS,REF,,,,,*69

3.2.57 PRT: Baud rate of the current port

$PASHQ,PRT[,c1][*cc]

Query the name and the baud rate setting for the connected communication port.

If the parameter c1 is sent in the query message, the baud rate setting for the port c1 is returned.

The response is in the form shown below:

$PASHR,PRT,c1,d2*cc

Parameter	Description	Range
c1	Port	SP80: **A,B,C,D,I**
d2	Baud rate code	0-12 (see table below)
*cc	Checksum	

The meaning of the code d2 is the following:

Code	Baud rate	Code	Baud rate	Code	Baud rate	Code	Baud rate
2	1200	6	19200	10	230400	13	1428571
3	2400	7	38400	11	460800	14	2500000
4	4800	8	57600	12	921600	15	5000000
5	9600	9	115200				

See also: $PASHS,PRT; $PASHQ,CTS;

Example:

$PASHQ,PRT,A
$PASHR,PRT,A,6*55

3.2.58 PWR: Power status

$PASHQ,PWR[*cc]

Query the power status of the receiver.

The response is in the form shown below:

$PASHR,PWR,d1,[f2],[f3],[d4],[d5],[f6],[d7],[d8],d9*cc

Parameter	Description	Range
d1	Power source: 0: Internal battery A (Left battery) 1: Internal battery B (Right battery) 2: External DC	0-2
f2	Level of the internal battery A in Volt	0.0-12.0
f3	Level of the internal battery B in Volt	0.0-12.0
d4	Level of the internal battery A in percentage	0-100
d5	Level of the internal battery B in percentage	0-100
f6	Level of the external DC in Volt	0.0-30.0
d7	Battery A charging status: 0: Charging 1: Discharging 2: Fully charged 3: Fully discharged 4: Usable	0-4
d8	Battery B charging status: 0: Charging 1: Discharging 2: Fully charged 3: Fully discharged 4: Usable	0-4
d9	Internal temperature in Celsius	
*cc	Checksum	

The SP80 cannot charge its internal batteries when it is on so the charging status (field d7 and d8) is never 0 (charging).

The field f2, d4 and d7 are empty if there is no internal battery A.

The field f3, d5 and d8 are empty if there is no internal battery B.

The filed f6 is empty if there is no external power supply.

The field f2 and d4 are empty when the status of the internal battery A is charging.

The field f3 and d5 are empty when the status of the internal battery B is charging.

See also: $PASHS,NME;PWR

Example:

$PASHQ,PWR
$PASHR,PWR,0,11.5,12.0,90,100,,1,2,44*0D

3.2.59 QZS: QZSS tracking status

$PASHQ,QZS[*cc]

Query the QZSS tracking status.

$PASHR,QZS,s*cc

The response message is in the form shown below:

Parameter	Description	Range
s	ON: track and use QZSS satellites **OFF**: do not track QZSS satellites	ON,OFF
*cc	Checksum	

See also: $PASHS,QZS

Example:

$PASHQ,QZS
$PASHR,QZS,ON*1D

3.2.60 RCP,OWN: Receiver name

$PASHQ,RCP,OWN[*cc]

Query the receiver name.

The response message is in the form shown below:

$PASHR,RCP,OWN,s*cc

Parameter	Description	Range
s	Receiver name	SP80: SPECTRA SP80
*cc	Checksum	

See also:

Example:

$PASHQ,RCP,OWN
$PASHR,RCP,OWN,SPECTRA SP80*5B

3.2.61 RCP,REF: Reference receiver name

$PASHQ,RCP,REF[*cc]

Query the reference receiver name.

The response message is in the form shown below:

$PASHR,RCP,REF,s1*cc

Parameter	Description
s1	Receiver name
*cc	Checksum

See also: $PASHS,RCP,REF

Example:

$PASHQ,RCP,REF
$PASHR,RCP,REF,ASHTECH*09

3.2.62 RCS: Recording status

$PASHQ,RCS[*cc]

Query the recording status.

The response message is in the form shown below:

$PASHR,RCS,c1,d2,d3,d4,f5,f6,f7,d8,d9)*cc

Parameter	Description	Range
c1	**Y**: The receiver is recording data, and will record data after next power cycle. **N**: The receiver is not recording data, and will not record data after next power cycle. **S**: The receiver is not recording data, but will record data after next power cycle. **R**: The receiver is recording data, but will not record data after next power cycle.	Y,N,S,R
d2	Memory location 0: Internal memory 1: SD Card	0-1
s3	File name	Up to 255 character
d4	Recording interval in second	0.05-960
d5	Occupation type: 0: static 1: quasi-static 2: dynamic	0-2
d6	Occupation state: 0: In progress 1: No occupation	0-1
s7	Occupation name	Up to 255 characters
*cc	Checksum	

See also: $PASHS,NME

Example:

$PASHQ,RCS (record in progress at 1s with occupation P1)
$PASHR,RCS,Y,0,G1235A13.25,1,1,0,P1*2A

```
$PASHQ,RCS(record in progress at 10Hz with no occupation)
$PASHR,RCS,Y,0,G1235A13.25,0.1,2,1,*5F

$PASHQ,RCS(no record)
$PASHR,RCS,N,0,,0.1,2,1,*5F
```

3.2.63 RDP,CHT: Channel table

$PASHQ,RDP,CHT,c1[*cc]

Query the radio settings, where c1 is the port A for the external radio or the port D for the internal radio.

The response is in the form shown below:

$PASHR,RDP,CHT,s1,d2,n(d3,f4,f5)*cc

If the channel table doesn't exist, then the response is:

$PASHR,RDP,CHT,s1,0

Parameter	Description	Range
s1	Type of radio: **NONE**: no radio **PDL**: - Pacific Crest **PDL HPB** (Port A,B,F) - Pacific Crest **PDL LPB** (Port A,B,F) **ADL**: - Pacific Crest **ADL Vantage** (Port A,B,F) - Pacific Crest **ADL Vantage Pro** (Port A,B,F) **XDL:** - Pacific Crest **XDL Micro** (Port D) - Pacific Crest **XDL Rover** (Port A)	PDL, ADL, XDL, NONE
d2	Total available channels	PDL: 0-16 ADL: 0-32 XDL: 0-32

d3	Channel index	PDL: 0-15 ADL: 1-32 XDL: 1-32
f4	Receive frequency	410-470 MHz
f5	Transmit frequency	410-470 MHz
n	Loop times for this data set	n=d2
*cc	Checksum	

See also: $PASHS,RDP,TYP; $PASHQ,RDP,PAR;

Examples:

$PASHQ,RDP,CHT,D
$PASHR,RDP,CHT,XDL,7,1,446.7750,446.7750,2,444.1000,444.1000,3,445.1000,445.1000,4,446.1000,446.1000,5,447.1000,447.1000,6,448.1000,448.1000,7,449.1000,449.1000*35

$PASHQ,RDP,CHT,A
$PASHR,RDP,CHT,NONE,0*7B

3.2.64 RDP,LVL: Radio reception level

$PASHQ,RDP,LVL,c[*cc]

Query the radio reception level, where c is the port of the radio (A or D).

The response is in the form shown below:

$PASHR,RDP,LVL,d1*cc

Parameter	Description	Range
d1	Level in dBm	
*cc	Checksum	

See also: $PASHS,RDP,PAR; $PASHS,RDP,TYP

Example:

Internal Radio XDL:
$PASHQ,RDP,LVL,D
$PASHR,RDP,LVL,D,-100*24

3.2.65 RDP,PAR: Radio parameters

$PASHQ,RDP,PAR,c1[*cc]

Query the radio settings, where c1 is the port A,B or F for the external radio or the port D for the internal radio.

The response is in the form shown below:

$PASHR,RDP,PAR,c1,s2,s3,c4,s5,c6,c7,s8,f9,f10,c11,s12,s13,,c15,c16,s17,s18,s19,d20,d21*cc

Parameter	Description	Range
c1	Serial port	SP80: **A,D** SPx: **A,B,D,F**
s2	Type of radio: **UNKNOWN**: auto-detection **NONE**: no radio **PDL**: - Pacific Crest **PDL HPB** (Port A,B,F) - Pacific Crest **PDL LPB** (Port A,B,F) **ADL**: - Pacific Crest **ADL Vantage** (Port A,B,F) - Pacific Crest **ADL Vantage Pro** (Port A,B,F) **XDL:** - Pacific Crest **XDL Micro** (Port D) - Pacific Crest **XDL Rover** (Port A)	UNKNOWN, PDL, ADL, XDL, NONE
s3	Radio state (port D only)	ON, OFF

c4	Channel	PDL: 0 to 15 ADL: 1 to 32 XDL: 1 to 32
s5	Power management (port D only): - AUT: automatic - MAN: manual	AUT, MAN
c6	Protocol for PDL radio only: - 0: transparent - 1: TRIMTALK - 2: DSNP Protocol for ADL, XDL radios only: - 0: transparent (w EOT time-out) - 1: TrimTalk 450S - 2: not used - 3: SATEL - 4: TrimMarkII/IIe - 5: TT450S (HW) - 6: TRIMMARK3 - 7: Transparent FST - 8: U-Link	0-7
c7	Air link speed	4800, 8000, 9600, 16000, 19200
s8	Sensitivity	LOW, MED, HIG, OFF
f9	RX frequency	410-470MHz
f10	TX frequency	410-470MHz
c11	Channel spacing in KHz	12.5, 25
s12	RF band in MHz	410-430,430-450,450-470,430-473
s13	FW Version	
f14	Not used	
c15	Scrambler: - 0: Scrambler off - 1: Scrambler on	0,1
c16	Forward error correction (PDL and ADL only): - 0: FEC off - 1: FEC on	0,1

s17	Output power in mW or W (ADL, LFE and LFA only)	ADL Foundation: 100mW,500mW ADL Vantage: 100mW,500mW,1W,2W,4W ADL Vantage Pro: 2W-35W XDL: 500mW,2W
s18	Maximum output power in mW or W	100mW,500mW,1W,2W,4W,35W
s19	Modulation format	4FSK, GMSK
d20	Model ID for ADL radios: - 0: ADL RXO - 1: ADL Foundation - 2: ADL Vantage - 3: ADL Vantage Pro - 4: XDL (ADL Micro)	0-4
d21	Current output power (index) (ADL and XDL only) Output Power for ADL Foundation: - 0: 100mW - 1: 500mW - 2: 1W Output Power for ADL Vantage: - 0: 100mW - 1: 500mW - 2: 1W - 3: 2W - 4: 4W Output Power for ADL Vantage Pro: - 0: Level 1 (2W) - 1: Level 2 - 2: Level 3	ADL Foundation: 0-2 ADL Vantage: 0-4 ADL Vantage Pro: 0-4 XDL: 0,2

	- 3: Level 4 - 4: Level 5 See the command $PASHQ,RDP,PWR to see the power in Watt. Output Power for XDL micro: - 0: 500mW - 1: 1W (not supported) - 2: 2W	
*cc	Checksum	

See also: $PASHS,RDP,PAR; $PASHS,RDP,TYP; $PASHQ,RDP,PWR

Example:

Internal Radio PDL:
$PASHQ,RDP,PAR,D
$PASHR,RDP,PAR,D,XDL,ON,4,AUT,2,4800,MED,447.1000,447.1000,25.0,430-450,V02.53,,0,0,500mW,GMSK,4,0*24

3.2.66 RDP,PWR: Radio Power Table

$PASHQ,RDP,PWR,c1[*cc]

Query the radio power table, where c1 is the port A for the external radio or the port D for the internal radio.

The response is in the form shown below:

$PASHR,RDP,PWR,s1,d2,n(d3,f4)*cc

If the power table doesn't exist, then the response is:

$PASHR,RDP,PWR,s1,0

Parameter	Description	Range
s1	Type of radio: **NONE**: no radio	ADL, XDL,NONE

	ADL: - Pacific Crest **ADL Vantage** (Port A) - Pacific Crest **ADL Vantage Pro** (Port A) **XDL:** - Pacific Crest **XDL Micro** (Port D) - Pacific Crest **XDL Rover** (Port A)	
d2	Total available channels	ADL: 1-5 XDL: 1-3
d3	Channel index	ADL: 0-4 XDL: 0-2
f4	Power in Watt	0.1-35
n	Loop times for this data set	n=d2
*cc	Checksum	

See also: $PASHS,RDP,TYP; $PASHQ,RDP,PAR;

Examples:

$PASHQ,RDP,PWR,A
$PASHR,RDP,PWR,ADL,5,0,2,1,8,2,16,3,25,4,35*35

$PASHQ,RDP,PWR,A
$PASHR,RDP,PWR,NONE,0*7B

3.2.67 RDP,TYP: Radio type

$PASHQ,RDP,TYP,c1[*cc]

Query the type of radio, where c1 is the port A for the external radio or the port D for the internal radio.

The response is in the form shown below:

$PASHR,RDP,TYP,c1,s2*cc

Parameter	Description	Range

c1	Port	**A,D**
s2	Type of radio: **NONE**: no radio **PDL**: - Pacific Crest **PDL HPB** (Port A) - Pacific Crest **PDL LPB** (Port A) **ADL**: - Pacific Crest **ADL Vantage** (Port A) - Pacific Crest **ADL Vantage Pro** (Port A) **XDL:** - Pacific Crest **XDL Micro** (Port D) - Pacific Crest **XDL Rover** (Port A)	NONE, PDL, ADL, XDL
*cc	Checksum	

See also: $PASHS,RDP,TYP

Example:

$PASHQ,RDP,TYP,A
$PASHR,RDP,TYP,A,ADL*44

$PASHQ,RDP,TYP,D
$PASHR,RDP,TYP,D,XDL*5F

3.2.68 REC: Raw data recording

$PASHQ,REC[*cc]

Query the raw data recording mode.

The response is in the form shown below:

$PASHR,REC,c*cc

Parameter	Description	Range

c	Y: The receiver is recording data, and will record data after next power cycle. N: The receiver is not recording data, and will not record data after next power cycle. S: The receiver is not recording data, but will record data after next power cycle. R: The receiver is recording data, but will not record data after next power cycle.	Y, N, S, R
*cc	Checksum	

See also: $PASHS,REC

Example:

$PASHQ,REC
$PASHR,REC,N*42

3.2.69 RID: Receiver identification

$PASHQ,RID[*cc]

Query the receiver identification.

The response is in the form shown below:

$PASHR,RID,s1,s2,s3,s4,s5,s6,s7*cc

Parameter	Description	Range
s1	Product name	SP80
s2	Firmware version x.y for official version x.y.z for non-official version	d.d d.d.d
s3	Version date	dd/mm/yyyy
s4	Expiration date (it indicates the end of warranty period)	dd/mm/yyyy
s5	Receiver options When an option is valid, a letter is displayed, else a dash	29 characters

	is displayed. See the command $PASHS,OPTION for option list. The complete list is the following: @123456789NGOBXYQT2WZJKFILMUR	
s6	Part number	91564
s7	Serial number: YYWWMXXXXX YY is the production year-1960 WW is the production week M is the manufacturing site ("A" will be used for prototypes) XXXXX is the incremental number in the week	10 char string
*cc	Checksum	

Notes: When the version is not official, the receiver works normally only during 90 days after the version date. After this date, only the following commands are accepted: $PASHQ,RID; $PASHQ,VERSION; $PASHQ,ALR; $PASHQ,LOG

See also: $PASHQ,VERSION

Example:

SP80 official version:
$PASHQ,RID
```
$PASHR,RID,SP80,1.2,15/10/2013,15/02/2014,@123456789NGOBXYQT2WZJKFILMUR,
91564,5331M00010*37
```

SP80 non-official version:
$PASHQ,RID
```
$PASHR,RID,SP80,1.2.25,18/06/2013,15/02/2014,@1--------NGOBXYQT—ZJK-
ILMUR,91564,5331M00010*1A
```

3.2.70 RMC: Recommended Minimum Specific GNSS Data

$PASHQ,RMC[*cc]

Query recommended minimum GPS/transit message.

The return message is in the form:

$GPRMC,m1,c2,m3,c4,m5,c6,f7,f8,d9,f10,c11,c12*cc

Parameter	Description	Range

m1	UTC time of the position fix (hhmmss.ss)	000000.00-235959.99
c2	Status A=data valid V=navigation receiver warning	A,V
m3	Latitude (ddmm.mmmmmmm)	00-90 00.000000-59.9999999
c4	Latitude direction	N,S
m5	Longitude (dddmm.mmmmmmm)	000-180 00.000000-59.9999999
c6	Longitude direction	E,W
f7	Speed over ground, knots	000.0-999.9
f8	Course over ground, degrees true	000.0-359.9
d9	Date, ddmmyy	010100-311299
f10	Magnetic variation, degrees	0.0-99.9
c11	Direction of variation	E,W
c12	Mode indicator A=Autonomous mode D=Differential mode N=Data not valid	A,D,N
*cc	Checksum	

See also: $PASHS,NME

Example:

$PASHQ,RMC
$GPRMC,160324.50,A,4717.959275,N,00130.500805,W,0.0,0.0,250208,1.9,W,A*3D

3.2.71 SAT: Satellites Status

$PASHQ,SAT[*cc]

Query satellite status.

This command becomes obsolete in SP80. Instead please use messages SGP, SGL, SGA, SSB, SQZ, SBD.

The response message is in the form shown below:

$PASHR,SAT,d1,n(d2,d3,d4,f5,c6)*cc

Parameter	Description	Range
d1	Number of satellites locked	1-57
d2	SV PRN number	GPS: 1-32 SBAS : 33-51 GLONASS : 65-88 GALILEO: 97-126 QZSS: 193-197
d3	SV azimuth in degrees	0-359
d4	SV elevation angle in degrees	0-90
f5	SV signal/noise in dB.Hz	30.0-60.0
c6	SV used in position computation U: used Other character: not used	A-Z
*cc	Checksum	

The GPS PRN number is d2.

The EGNOS PRN number is d2 plus 87

The GLONASS slot number is d2 minus 64.

The GALILEO PRN number is d2 minus 96.

The QZSS PRN number is d2 minus 192.

See also: $PASHS,NME

Example:

$PASHQ,SAT
```
$PASHR,SAT,13,20,092,32,44.0,U,13,206,78,50.0,U,23,056,55,48.0,U,33,198,
34,44.0,-
,17,218,13,42.0,U,25,152,34,38.0,U,04,276,65,50.0,U,02,308,31,48.0,U,77,
052,37,48.0,U,84,294,33,48.0,U,83,234,23,48.0,U,78,124,42,46.0,U,68,034,
65,48.0,U*35
```

3.2.72 SBA: SBAS tracking status

$PASHQ,SBA[*cc]

Query the SBAS tracking status.

$PASHR,SBA,s*cc

The response message is in the form shown below:

Parameter	Description	Range
s	ON: track and use the SBAS satellites OFF: do not track the SBAS satellites	ON,OFF
*cc	Checksum	

See also: $PASHS,SBA

Example:

$PASHQ,SBA
```
$PASHR,SBA,ON*09
```

3.2.73 SBD: BEIDOU Satellites Status

$PASHQ,SBD[*cc]

Query BEIDOU satellite status.

The response message is in the form shown below:

$PASHR,SBD,d1,n(d2,d3,d4,f5,f6,f7,c8,c9)*cc

Parameter	Description	Range
d1	Number of visible satellites	0-36
d2	SV PRN number	1-36
d3	SV azimuth in degrees	0-359
d4	SV elevation angle in degrees	0-90
f5	SV B1 signal/noise in dB.Hz	0.0-60.0
f6	SV B2 signal/noise in dB.Hz	0.0-60.0
f7	Empty field	
c8	Satellite usage status (see below)	
c9	Satellite correcting status (see below)	
*cc	Checksum	

The fields f5,f6,f7 are empty if the corresponding signal is not tracked.

The table below contains the values for the satellite usage status:

Usage state	Description
-	Sat is not tracked
U	Used by PVT
E	No navigation data for this satellite
M	Sat below elevation mask
H	SV is marked unhealthy in ephemeris
V	Computed coordinates of SV are invalid
I	SV is disabled by a command
B	URA in ephemeris is not acceptable
Z	SV is unhealthy by almanac
L	Too low SNR
G	Suspicious as ghost sat
K	Too many Sats for PVT, so this one was deselected
X	Other cause

The table below contains the values for the satellite correcting status:

Correcting state	Description
-	Sat is not tracked
N or M	Sat is not corrected
W	SBAS corrected
C	DGPS corrected
S	L1 RTK corrected
D	L1&L2 RTK corrected
T	Reserved
	Unknown correcting status

See also: $PASHS,NME

Example:

$PASHQ,SBD
$PASHR,SBD,13,20,092,32,44.0,35.0,,2,4,…

3.2.74 SGA: GALILEO Satellites Status

$PASHQ,SGA[*cc]

Query GALILEO satellite status.

The response message is in the form shown below:

$PASHR,SGA,d1,n(d2,d3,d4,f5,,f7,c8,c9)*cc

Parameter	Description	Range
d1	Number of visible satellites	0-36
d2	SV PRN number	1-36
d3	SV azimuth in degrees	0-359
d4	SV elevation angle in degrees	0-90
f5	SV E1 signal/noise in dB.Hz	0.0-60.0

f6	SV E5b signal/noise in dB.Hz	0.0-60.0
f7	SV E5a signal/noise in dB.Hz	0.0-60.0
c8	Satellite usage status (see below)	
c9	Satellite correcting status (see below)	
*cc	Checksum	

The fields f5,f6,f7 are empty if the corresponding signal is not tracked.

The table below contains the values for the satellite usage status:

Usage state	Description
-	Sat is not tracked
U	Used by PVT
E	No navigation data for this satellite
M	Sat below elevation mask
H	SV is marked unhealthy in ephemeris
V	Computed coordinates of SV are invalid
I	SV is disabled by a command
B	URA in ephemeris is not acceptable
Z	SV is unhealthy by almanac
L	Too low SNR
G	Suspicious as ghost sat
K	Too many Sats for PVT, so this one was deselected
X	Other cause

The table below contains the values for the satellite correcting status:

Correcting state	Description
-	Sat is not tracked
N or M	Sat is not corrected
W	SBAS corrected
C	DGPS corrected
S	L1 RTK corrected

D	L1&L2 RTK corrected
T	Reserved
	Unknown correcting status

See also: $PASHS,NME

Example:

$PASHQ,SGA
$PASHR,SGA,2,128,092,32,44.0,,35.0,2,4,…

3.2.75 SGL: GLONASS Satellites Status

$PASHQ,SGL[*cc]

Query GLONASS satellite status.

The response message is in the form shown below:

$PASHR,SGL,d1,n(d2,d3,d4,f5,f6,,c8,c9)*cc

Parameter	Description	Range
d1	Number of visible satellites	0-24
d2	SV PRN number	1-24
d3	SV azimuth in degrees	0-359
d4	SV elevation angle in degrees	0-90
f5	SV L1 signal/noise in dB.Hz	0.0-60.0
f6	SV L2 signal/noise in dB.Hz	0.0-60.0
f7	Empty field	
c8	Satellite usage status (see below)	
c9	Satellite correcting status (see below)	
*cc	Checksum	

The fields f5,f6,f7 are empty if the corresponding signal is not tracked.

The table below contains the values for the satellite usage status:

Usage state	Description
-	Sat is not tracked
U	Used by PVT
E	No navigation data for this satellite
M	Sat below elevation mask
H	SV is marked unhealthy in ephemeris
V	Computed coordinates of SV are invalid
I	SV is disabled by a command
B	URA in ephemeris is not acceptable
Z	SV is unhealthy by almanac
L	Too low SNR
G	Suspicious as ghost sat
K	Too many Sats for PVT, so this one was deselected
X	Other cause

The table below contains the values for the satellite correcting status:

Correcting state	Description
-	Sat is not tracked
N or M	Sat is not corrected
W	SBAS corrected
C	DGPS corrected
S	L1 RTK corrected
D	L1&L2 RTK corrected
T	Reserved
	Unknown correcting status

See also: $PASHS,NME

Example:

$PASHQ,SGL
$PASHR,SGL,13,20,092,32,44.0,35.0,,2,4,…

3.2.76 SGP: GPS Satellites Status

$PASHQ,SGP[*cc]

Query GPS satellite status.

The response message is in the form shown below:

$PASHR,SGP,d1,n(d2,d3,d4,f5,f6,f7,c8,c9)*cc

Parameter	Description	Range
d1	Number of visible satellites	0-63
d2	SV PRN number	1-63
d3	SV azimuth in degrees	0-359
d4	SV elevation angle in degrees	0-90
f5	SV L1 signal/noise in dB.Hz	0.0-60.0
f6	SV L2 signal/noise in dB.Hz	0.0-60.0
f7	SV L5 signal/noise in dB.Hz	0.0-60.0
c8	Satellite usage status (see below)	
c9	Satellite correcting status (see below)	
*cc	Checksum	

The fields f5,f6,f7 are empty if the corresponding signal is not tracked.

The table below contains the values for the satellite usage status:

Usage state	Description
-	Sat is not tracked
U	Used by PVT
E	No navigation data for this satellite
M	Sat below elevation mask
H	SV is marked unhealthy in ephemeris
V	Computed coordinates of SV are invalid

I	SV is disabled by a command
B	URA in ephemeris is not acceptable
Z	SV is unhealthy by almanac
L	Too low SNR
G	Suspicious as ghost sat
K	Too many Sats for PVT, so this one was deselected
X	Other cause

The table below contains the values for the satellite correcting status:

Correcting state	Description
-	Sat is not tracked
N or M	Sat is not corrected
W	SBAS corrected
C	DGPS corrected
S	L1 RTK corrected
D	L1&L2 RTK corrected
T	Reserved
	Unknown correcting status

See also: $PASHS,NME

Example:

$PASHQ,SGP
$PASHR,SGP,13,20,092,32,44.0,35.0,,2,4,…

3.2.77 SQZ: QZSS Satellites Status

$PASHQ,SQZ[*cc]

Query QZSS satellite status.

The response message is in the form shown below:

$PASHR,SQZ,d1,n(d2,d3,d4,f5,f6,f7,c8,c9)*cc

Parameter	Description	Range

d1	Number of visible satellites	0-5
d2	SV PRN number	1-5
d3	SV azimuth in degrees	0-359
d4	SV elevation angle in degrees	0-90
f5	SV L1 signal/noise in dB.Hz	0.0-60.0
f6	SV L2 signal/noise in dB.Hz	0.0-60.0
f7	SV L5 signal/noise in dB.Hz	0.0-60.0
c8	Satellite usage status (see below)	
c9	Satellite correcting status (see below)	
*cc	Checksum	

QZSS L1 SAIF tracking status is not reported here.

The fields f5,f6,f7 are empty if the corresponding signal is not tracked.

The table below contains the values for the satellite usage status:

Usage state	Description
-	Sat is not tracked
U	Used by PVT
E	No navigation data for this satellite
M	Sat below elevation mask
H	SV is marked unhealthy in ephemeris
V	Computed coordinates of SV are invalid
I	SV is disabled by a command
B	URA in ephemeris is not acceptable
Z	SV is unhealthy by almanac
L	Too low SNR
G	Suspicious as ghost sat
K	Too many Sats for PVT, so this one was deselected
X	Other cause

The table below contains the values for the satellite correcting status:

Correcting state	Description
-	Sat is not tracked
N or M	Sat is not corrected
W	SBAS corrected
C	DGPS corrected
S	L1 RTK corrected
D	L1&L2 RTK corrected
T	Reserved
	Unknown correcting status

See also: $PASHS,NME

Example:

$PASHQ,SQZ
$PASHR,SQZ,13,20,092,32,44.0,35.0,,2,4,…

3.2.78 SSB: SBAS Satellites Status

$PASHQ,SSB[*cc]

Query SBAS satellite status.

The response message is in the form shown below:

$PASHR,SSB,d1,n(d2,d3,d4,f5,,f7,c8,c9)*cc

Parameter	Description	Range
d1	Number of visible satellites	1-44
d2	SV PRN number	1-39,40-44
d3	SV azimuth in degrees	0-359
d4	SV elevation angle in degrees	0-90
f5	SV L1 signal/noise in dB.Hz	0.0-60.0
f6	Empty field	
f7	SV L5 signal/noise in dB.Hz	0.0-60.0

c8	Satellite usage status (see below)	
c9	Satellite correcting status (see below)	
*cc	Checksum	

The fields f5,f6,f7 are empty if the corresponding signal is not tracked.

QZSS L1 SAIF tracking status is reported here and corresponds to numbers 40-44.

The table below contains the values for the satellite usage status:

Usage state	Description
-	Sat is not tracked
U	Used by PVT
E	No navigation data for this satellite
M	Sat below elevation mask
H	SV is marked unhealthy in ephemeris
V	Computed coordinates of SV are invalid
I	SV is disabled by a command
B	URA in ephemeris is not acceptable
Z	SV is unhealthy by almanac
L	Too low SNR
G	Suspicious as ghost sat
K	Too many Sats for PVT, so this one was deselected
X	Other cause

The table below contains the values for the satellite correcting status:

Correcting state	Description
-	Sat is not tracked
N or M	Sat is not corrected
W	SBAS corrected
C	DGPS corrected
S	L1 RTK corrected
D	L1&L2 RTK corrected
T	Reserved

	Unknown correcting status

See also: $PASHS,NME

Example:

$PASHQ,SSB
$PASHR,SSB,13,20,092,32,44.0,35.0,,2,4,…

3.2.79 SIT: Site name

$PASHQ,SIT

Query the site name.

The response message is in the form shown below:

$PASHR,SIT,s*cc

See also: $PASHS,SIT

Example:

$PASHQ,SIT
$PASHR,SIT,SITE*1D

3.2.80 SPY: Spy mode

$PASHQ,SPY[*cc]

Query the spy mode settings.

The response message is in the form:

$PASHR,SPY,OFF*cc

$PASHR,SPY,c1,c2*cc

Parameter	Description	Range
c1	Source port:	SP80: **A,B,C,D,E,I,P,Q**

	Serial port: **A** USB serial port: **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q**	
c2	Destination port: Serial port: **A** USB serial port : **B** Bluetooth port: **C** Internal Radio: **D** Modem CSD: **E** TCP/IP stream: **I, P, Q** Internal memory: **M** SD Card: **S**	SP80: **A,B,C,D,E,I,P,Q,M,S**
*cc	Checksum	

See also: $PASHS,SPY

Example:

$PASHQ,SPY
$PASHR,SPY,A,B,0

3.2.81 STI : Station ID

$PASHQ,STI[*cc]

Query the station ID that the receiver broadcasts in the differential data.

The response message is in the form shown below:

$PASHR,STI,d*cc

Parameter	Description	Range
s	Station ID	0-4095
*cc	Checksum	NA

See also: $PASHS,STI

Example:

$PASHQ,STI
$PASHR,STI,817*29

3.2.82 TCP: TCP/IP server settings

$PASHQ,TCP[*cc]

Query the settings of the TCP/IP server.

The response message is in the form:

$PASHR,TCP,MOD=s1,LGN=s2,PWD=s3,ADD=s4 ,PRT=d5*cc

Parameter	Description	Range
s1	TCP/IP connection mode: ▪ 0: disabled ▪ 1: enabled with authentication ▪ 2: enabled without authentication The default mode is 2.	0-2
s2	Login	Up to 32 characters
s3	Password	Up to 32 characters
s4	IP address	0.0.0.0- 255.255.255.255
d5	Port number	0-655535
*cc	Checksum	

See also: $PASHS,TCP,PAR;

Example:

$PASHQ,TCP
$PASHR,TCP,MOD=1,LGN=spectra,PWD=u6huz8,ADD=192.34.76.1,PRT=8888

3.2.83 TCP,RTE: TCP/IP route

$PASHQ,TCP,RTE[*cc]

Query the physical port used for the TCP/IP connections.

The response message is in the form:

$PASHR,TCP,RTE,d1,n(c2,s3)*cc

Parameter	Description	Range
d1	Number of TCP/IP port	3
c2	TCP/IP port	I,P,Q
s3	Route: AUT: automatique (default) MDM: GPRS modem WIF: Wifi ETH : Ethernet (not supported in SP80)	AUT,MDM,WIF,ETH
*cc	Checksum	

See also: $PASHS,TCP,RTE;

Example:

$PASHQ,TCP,RTE
$PASHR,TCP,RTE,3,I,AUT,P,MDM,Q,WFI

3.2.84 THS: True heading and status

$PASHQ,THS[*cc]

Query the THS message.

The THS response message is in the form:

$GPTHS,f1,c2*cc

Parameter	Description	Range
f1	Heading in degrees	000.00-359.99
c2	Mode indicator A=Autonomous E=Estimated (dead reckoning) M=Manual input S=Simulator V=Data not valid (including standby)	A,E,M,S,V
*cc	Checksum	

See also: $PASHS,NME

Example:

$PASHQ,THS
$GPTHS,123.56,A*61

3.2.85 UDP: User defined dynamic model parameters

$PASHQ,UDP[*cc]

Query the user defined parameters for dynamic model.

The response message is in the form:

$PASHR,UDP,f1,f2,f3,f4*cc

Parameter	Description	Range	Default
f1	Maximum expected horizontal velocity in m/s.	0-100000	100000
f2	Maximum expected horizontal acceleration in m/s/s.	0-100	100
f3	Maximum expected vertical velocity in m/s.	0-100000	100000
f4	Maximum expected vertical acceleration in m/s/s.	0-100	100
*cc	Checksum		

See also: $PASHS,DYN; $PASHS,UDP

Example:

```
$PASHQ,UDP
$PASHR,UDP,10,1,2,0.5*1D
```

3.2.86 UNT: Unit on display

$PASHQ,UNT[*cc]

Query the unit used to display the coordinates.

The response message is in the form:

$PASHR,UNT,s*cc

Parameter	Description	Range
d	Unit. One of the following values: M: Meter F: US Survey Feet IF: International Feet	M,F,IF
*cc	Checksum	

See also: $PASHS,UNT

Example:

$PASHQ,UNT
$PASHR,UNT,M*33

3.2.87 VCT: Vector and accuracy

$PASHQ,VCT[*cc]

Query the VCT message.

The content of this message is the same as the VEC message which was generated by the following receivers: ProMark500, ProMark800, ProFlex500, ProFlex800, ProMark200/220.

The VCT response message is in the form:

$PASHR,VCT,c1,d2,m3,f4,f5,f6,f7,f8,f9,f10,f11,f12,d13,d14*cc

Parameter	Description	Range
c1	Position mode 0: Autonomous position 1: RTCM code differential (or SBAS differential)[1] 2: RTK float 3: RTK fixed 9: SBAS differential[1]	0-3,9
d2	Number of SVs used in position computation	3-26
m3	UTC time (hhmmss.ss)	000000.00-235959.99
f4	Delta antenna position ECEF X coordinate (meters)	±99999.999
f5	Delta antenna position ECEF Y coordinate (meters)	±99999.999
f6	Delta antenna position ECEF Z coordinate (meters)	±9999.999
f7	Standard deviation X coordinate (latitude)	99.999
f8	Standard deviation Y coordinate (longitude)	99.999
f9	Standard deviation Z coordinate (height)	99.999

f10	Correlation XY	±9.999999
f11	Correlation XZ	±9.999999
f12	Correlation YZ	±9.999999
d13	Base station ID (same as GGA)	0-4095
d14	Baseline coordinate frame ID 0: XYZ 1: ENU centered on rover (not supported) 2: ENU centered on base (not supported)	0
*cc	Checksum	

(1): The position mode for SBAS differential is 1 or 9 depending on the command $PASHS,NPT

The vector (f4,f5,f6) is expressed in ECEF and the quality matrix (f7 to f12) is expressed in latitude, longitude, height.

See also: $PASHS,NME; $PASHS,NPT

Example:

$PASHQ,VCT

```
$PASHR,VCT,3,09,130924.00,-37.683,55.081,-
17.925,0.016,0.012,0.026,0.234765,
0.098765,0.098763,0001*71
```

3.2.88 VEC: Baseline vector

$PASHQ,VEC[*cc]

Query baseline vector.

The response message is in the form shown below:

$PASHR,VEC,m1,d2,d3,d4,d5,d6,d7,d8,f9,d10,f11,d12,f13,f14,f15,f16,f17,f18,f19,f20,f21*cc

Parameter	Description	Range	
m1	UTS time (format: hhmmss.ss)	000000.00-235959.99	X
d2	Source of base coordinates	0: No base, 1: Computed base, 2: Received base, 3: Entered base See note 1.	
d3	Type of baseline estimate	0: No baseline, 1: TT RTK estimate, 2: Fast RTK estimate	
d4	Baseline reset flag	0: Updated estimate, >0: Initialized estimate	
d5	Internal RTK ambiguity flag	0: Float ambiguity, 1:Fixed ambiguity	X
d6	Number of SVs ready for use in RTK processing (L1 portion) on rover side.	0-99	
d7	Number of SVs received from the base.	0-99	
d8	Number of SVs used in the baseline computation (L1 portion). In VEC, FST mode, refers to the last Time Tagged epoch. Does not generally equal to that reported in POS message.	0-99	X
f9	Age of last received base data, in seconds	Full range of the real	
d10	Overall baseline estimate latency, milliseconds	Full range of the int	X
f11	Interval of base L1 carrier data interpolation to rover time tag	Full range of the real	
d12	Coordinate frame flag defining the meaning of	Only choice 1 is supported which refers	

	the next 6 fields.	to ENU centered on rover	
f13	1st (East) component of baseline, in meters.	Full range of the real	X
f14	2nd (North) component of baseline, in meters.	Full range of the real	X
f15	3rd (Up) component of baseline, in meters.	Full range of the real	X
f16	RMS error for x1 component, in meters.	Full range of the real	X
f17	RMS error for x2 component, in meters.	Full range of the real	X
f18	RMS error for x3 component, in meters.	Full range of the real	X
f19	Scaled norm of L1 carrier residuals, in meters (empty or 0 if carriers were not processed).	Full range of the real	
f20	Scaled norm of L1 code residuals, in meters (empty or 0 if codes were not processed).	Full range of the real	
f21	Internal ambiguity ratio (empty or 0 if the ambiguity search is not called).	Full range of the real	
*cc	Checksum		

Baseline is base->rover baseline.

Sign X in the last column means obligatory output for each epoch. All other fields can be not generated for fractional seconds.

The message is prepared to be obsolete later. Please do not test it in scope of SP80 as not needed.

See also: $PASHS,NME;

Example:

$PASHQ,VEC

```
$PASHR,VEC,152027.00,2,2,0,0,25,20,20,1.0,5,1.0,1,41.400,6.722,-
1.238,0.0191,0.0224,0.0404,0.0010,0.395,0.349*10
```

3.2.89 VERSION: Firmware version

$PASHQ,VERSION[*cc]

Display all firmware versions, including radio and modem.

See also: $PASHQ,RID

Example:

Typical answer for a **SP80**:

```
$PASHQ,VERSION
VERSION: 1.0.40

VERSION DATE: 10/12/2013

EXPIRATION DATE: 10/12/2015

SL: 0.37 (API: 0.23)

PVT: LP60V27

DSP: LC60V27

XL1: 1.0

BL1: 1.21

OS2: 2.6.37 #646 PREEMPT 3/12/2013

XL2: 1.0

BL2: 1.21

BT: 7.2.31

PMU: V3.Q

HWID: 9dca23207931

GSM: PHS8-P VER: 02.003 IMEI: 359998041082589

Internal Radio: XDL V01.06(2)
```

3.2.90 VTG: Course Over Ground and Ground Speed

$PASHQ,VTG[*cc]

Query velocity/course.

The response message is in the form shown below:

$GPVTG,f1,T,f2,M,f3,N,f4,K,c5*cc

Parameter	Description	Range
f1	COG (Course Over Ground) true north	000.00-359.99
T	COG orientation T=true north	T
f2	COG magnetic north	000.00-359.99
M	COG orientation M=magnetic north	M
f3	SOG (Speed Over Ground)	000.00-999.999
N	SOG units N=knots	N
f4	SOG (Speed Over Ground)	000.00-999.999
K	SOG units K=km/h	K
c5	Mode indicator A=Autonomous mode D=Differential mode N=Data not valid	A,D,N
*cc	Checksum	

See also: $PASHS,NME

Example:

$PASHQ,VTG
$GPVTG,128.00,T,129.92,M,0.170,N,0.310,K,A*2D

3.2.91 WFI: WiFi settings

$PASHQ,WFI[*cc]

Query the WiFi settings.

The response message is in the form:

$PASHR,WFI,s1,d2,s3,s4,s5,PWR=s6,DHP=d7,ADD=s8,MSK=s9,GTW=s10,DN1=s11,DN2=s12*cc

Parameter	Description	Range
s1	WiFi module state NONE means that the Wifi option is not valid	ON, OFF, NONE
d2	WiFi state connection 0: not connected 1: connected	0,1
s3	SSID (empty when not connected)	Up to 32 characters
s4	MAC address (xx:xx:xx:xx:xx:xx)	17 character
s5	Current IP address	0.0.0.0-255.255.255.255
PWR=s6	Power mode AUT: automatic power on at start up MAN: not automatic power on at start up	AUT,MAN
DHP=d7	DHCP mode: 0: Disabled 1: Enabled	0,1
ADD=s8	IP address	0.0.0.0-255.255.255.255
MSK=s9	Sub network mask	0.0.0.0-255.255.255.255
GTW=s10	Gateway IP address	0.0.0.0-255.255.255.255
DN1=s11	DNS 1 IP address	0.0.0.0-255.255.255.255
DN2=s12	DNS 1 IP address	0.0.0.0-255.255.255.255
*cc	Checksum	

The parameters s7, s8, s9, s10, s11 are the network parameters used when the DHCP mode is disabled.

See also: $PASHS,WFI,ON; $PASHS,WFI,OFF; $PASHS,WFI,PAR

Example:

$PASHQ,WFI
$PASHR,WFI,ON,1,MyBox,02:03:04:85:06:07,10.20.2.74,DHP=1,ADD=10.20.2.28,
MSK=255.255.255.0,GTW=10.20.2.1,DN1=134.20.2.16,DN2=134.20.2.3*47

3.2.92 WFI,LST: Query the list of recorded WiFi networks

$PASHQ,WFI,LST[*cc]

Query the list of the networks which were already connected.

The command returns d1 messages in the form below:

$PASHR,WFI,LST,d1,d2,s3,d4,d5,s6*cc

Parameter	Description	Range
d1	Number of networks	
d2	Network index	
s3	SSID	Up to 32 characters
d4	Security type: 0: unknown 1: open 2: WEP 3: WPA-Personal or WAP-PSK 4: WPA2-Personal or WPA2-PSK 5: WPA/WPA2-PSK or WPA/WPA2-PSK 6: WPA-Entreprise or WPA-802.1X or WPA 7: WPA2-Entreprise or WPA2-802.1X or WPA2 8: WPA/WPA2-Entreprise or WPA/WPA2-802.1X or WPA/WPA2	0-8

d5	Signal strength	0-5
s6	Connection type MAN: manual connection AUT: automatic connection	AUT,MAN
d7	Connection status 0: not connected 1: connected	0-1
*cc	Checksum	

See also: $PASHS,WFI,SCN; $PASHQ,WFI,SCN; $PASHS,WFI,NET; $PASHS,WFI,DEL

Example:

```
$PASHQ,WFI,LST
$PASHR,WFI,LST,4,0,network1,1,1,MAN,0
$PASHR,WFI,LST,4,1,network2,1,2,AUT,1
$PASHR,WFI,LST,4,2,network3,1,2,MAN,0
$PASHR,WFI,LST,4,3,network4,1,3,MAN,0

$PASHQ,WFI,LST
$PASHR,WFI,LST,0
```

3.2.93 WFI,SCN: Query the list of scanned WiFi networks

$PASHQ,WFI,SCN[*cc]

Query the list of the networks which was scanned with the command $PASHS,WFI,SCN.

The command returns d1 messages in the form below:

$PASHR,WFI,SCN,d1,d2,s3,d4,d5*cc

Parameter	Description	Range
d1	Number of networks	

d2	Network index	
s3	SSID	Up to 32 characters
d4	Security type: 0: unknown 1: open 2: WEP 3: WPA-Personal or WAP-PSK 4: WPA2-Personal or WPA2-PSK 5: WPA/WPA2-PSK or WPA/WPA2-PSK 6: WPA-Entreprise or WPA-802.1X or WPA 7: WPA2-Entreprise or WPA2-802.1X or WPA2 8: WPA/WPA2-Entreprise or WPA/WPA2-802.1X or WPA/WPA2	0-8
d5	Signal strength	0-5
d6	Connection status 0: not connected 1: connected	0-1
*cc	Checksum	

See also: $PASHS,WFI,SCN

Example:

$PASHQ,WFI,SCN
$PASHR,WFI,SCN,4,0,network1,1,1,0
$PASHR,WFI,SCN,4,1,network2,1,2,0
$PASHR,WFI,SCN,4,2,network3,1,2,0
$PASHR,WFI,SCN,4,3,network4,1,3,0

$PASHQ,WFI,SCN
$PASHR,WFI,SCN,0

3.2.94 ZDA: Date and time

$PASHQ,ZDA[*cc]

Query the time and date.

The response is in the form shown below:

$GPZDA,m1,d2,d3,d4,d5,d6*cc

Parameter	Description	Range
m1	UTC time (hhmmss.ss)	000000.00-235959.99
d2	Current day	01-31
d3	Current month	01-12
d4	Current year	0000-9999
d5	Local zone offset from UTC time (hour)	-13 to +13
d6	Local zone offset from UTC time (minutes)	00-59
*cc	Checksum	

See also: $PASHS,ZDA; $PASHS,NME

Example:

```
$PASHQ,ZDA
$GPZDA,162256.27,25,02,2008,+00,00*43
```