SPK-GPS-GS407A

GPS module Spec
Datasheet





Module Number List

No	Module	Note
603725G,	UBX_6 + SL1206	1. TTL(UART) Mode for your design 2. USB Mode for your design

Add：10F,NO.510,SEC.5,CHUNG HSIAO E. RD, TAIPEI, TAIWAN
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Performance

Parameter	Specification	
1. Chip Set	uBlox 6	
2. Antenna	Sarantel SL1206 Frequency: 1575.42Mhz Gain: +24 dBic Beamwidth: > 120 Degrees Noise Figure: 1.2 dB	
3. Receiver Type	50 Channel GPS L1 frequency, C/A Code GALILEO Open Service L1 frequency	
4. Time to First Fix	Cold Start (Autonomous) Warm Start (Autonomous) Hot Start (Autonomous) Aided Starts	29s 29s <1s <1s
5. Sensitivity	Tracking & Navigation Reacquisition Cold Start (Autonomous)	<-160dBm <-160dBm <-144dBm
6. Horizontal Position	Autonomous SBAS	<2.5m <2.0m
7. Accuracy of Timepulse Signal	RMS 99%	30ns <60ns
8. Max Navigation Update Rate		4Hz
9. Velocity Accuracy	0.1m/s	0.1m/s
10. Heading Accuracy	0.5 degrees	0.5degress
11. Dynamics	Weight	<15g
12. Power	3.3V +- 5% DC input , < 50mVpp	
13. Interface	Baud Rate Level Connector Type: 100SH-06P	9600 TTL
14. Environmental	Operating Temp	-10”50 ℃
15. Flash	Size	4Mbit
16. AGPS	Support uBlox AssistNow	

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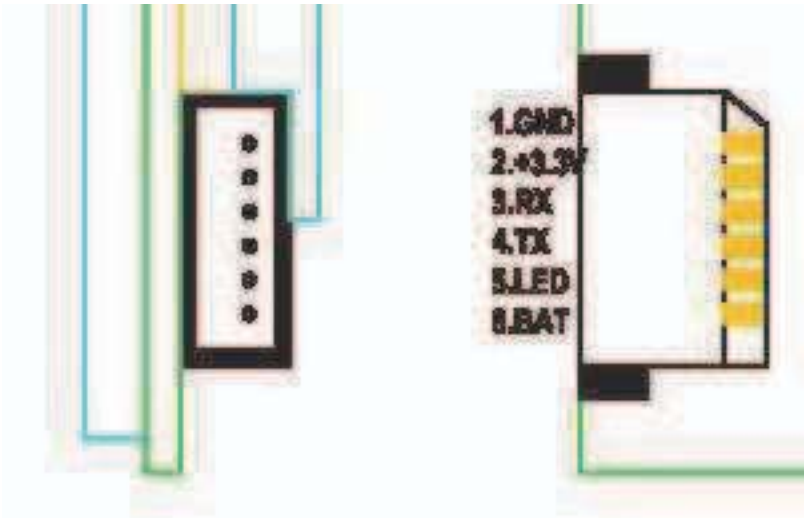
Connector Pin Define



NO	Name	I/O	Note
1	GND		Ground
2	VCC		Power Input, DC+3.3V~5.5V
3	RX (DM)	0	RX (input), D-(USB Mode)
4	TX (DP)	1	TX (output), D+(USB Mode)
5	LED		LED Status Lighting
6	V_BAT		Backup Battery power input, for data backup

1 I/O defines for module.

2 BATTERY input range DC +1.4 ~ 3.6V

3 GPS receivers require a stable power supply, avoid ripple on **VIN** (<50mVpp)

4 LED indicator for GPS fix or not fix

4.1 LED OFF. . . ...Receiver switch off
4.1 LED ON . . . . .No fix, Signal searching
4.2 LED Flashing.....Position Fixed

5 Connector Type

5.1 On Module => 100SH-06P

5.2 On Device => 100SH-T

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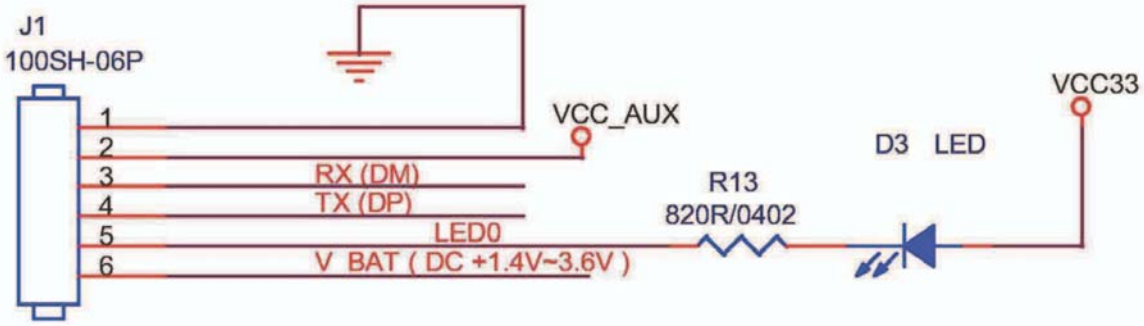
Reference Circuit Design



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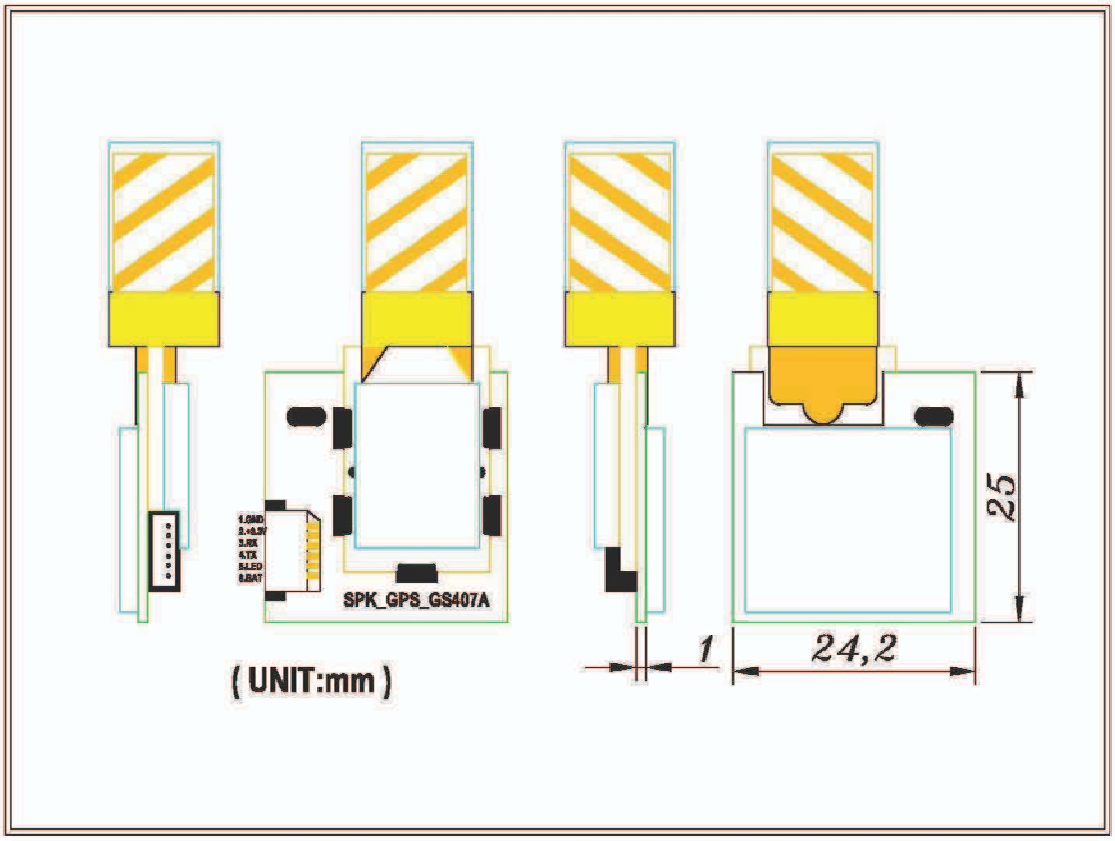
Drawing

+ -



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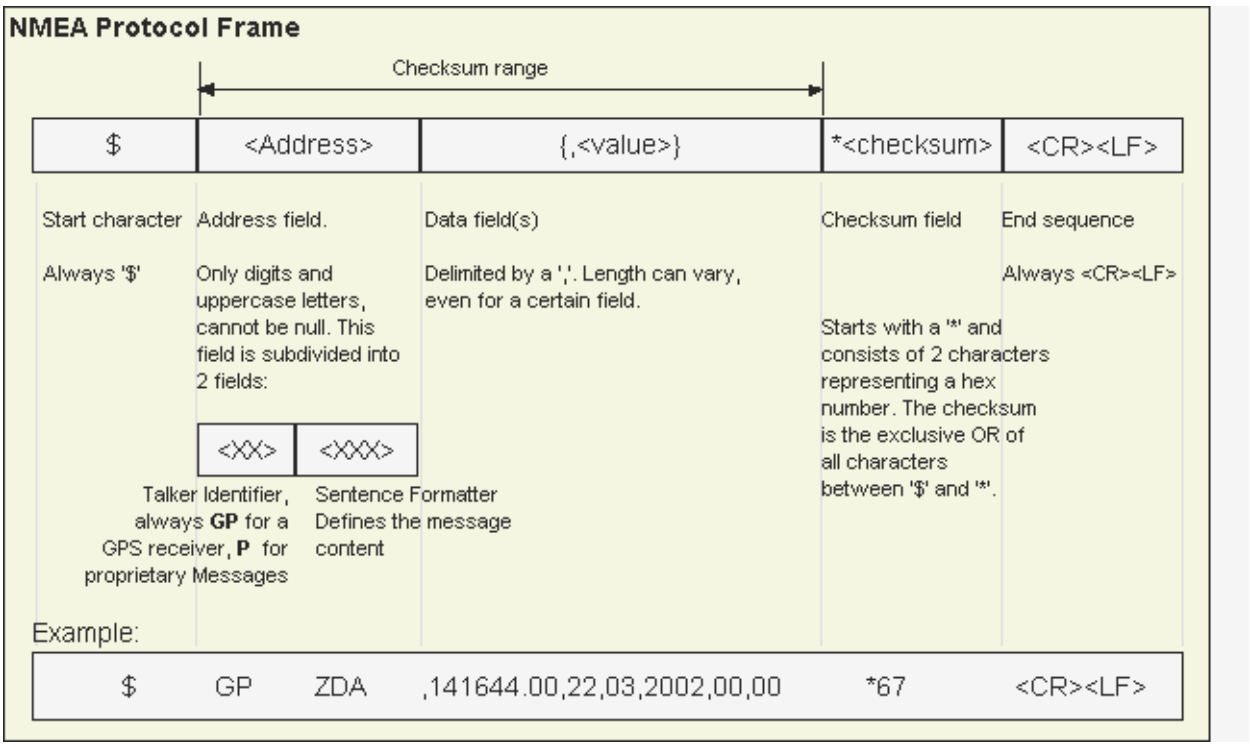
NMEA Protocol

16 Protocol Overview

NMEA messages sent by the GPS receiver are based on NMEA 0183 Version 2.3. The following picture shows the structure of a NMEA protocol message.



For further information on the NMEA Standard please refer to *NMEA 0183 Standard For Interfacing Marine Electronic Devices*, Version 2.30, March 1, 1998. See http://www.nmea.org/ for ordering instructions.

The NMEA standard allows for proprietary, manufacturer-specific messages to be added. These shall be marked with a manufacturer mnemonic. The mnemonic assigned to u-blox is UBX and is used for all non-standard messages. These proprietary NMEA messages therefore have the address field set to PUBX. The first data field in a PUBX message identifies the message number with two digits.

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17 Latitude and Longitude Format

According to the NMEA Standard, Latitude and Longitude are output in the format Degrees, Minutes and (Decimal) Fractions of Minutes. To convert to Degrees and Fractions of Degrees, or Degrees, Minutes, Seconds and Fractions of seconds, the 'Minutes' and 'Fractional Minutes' parts need to be converted. In other words: If the GPS Receiver reports a Latitude of 4717.112671 North and Longitude of 00833.914843 East, this is

Latitude 47 Degrees, 17.112671 Minutes

Longitude 8 Degrees, 33.914843 Minutes

or

Latitude 47 Degrees, 17 Minutes, 6.76026 Seconds

Longitude 8 Degrees, 33 Minutes, 54.89058 Seconds

or

Latitude 47.28521118 Degrees

Longitude 8.56524738 Degrees

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18 Position Fix Flags in NMEA Mode

The following list shows how u-blox implements the NMEA protocol, and the conditions determining how flags are set in version 2.3 and above.

NMEA Message: Field	*No position fix (at power-up, after losing satellite lock)*	*Valid position fix with GPS, but user limits exceeded*	*Valid dead reckoning fix, but user limits exceeded*	*Dead reckoning (linear extrapolation, ADR with external sensors, or map matching)*	*2D position fix*	*3D position fix*	*combined GPS/SFDR position fix (ADR with external sensors)*
GLL, RMC: Status	V	V	V	A	A	A	A
	A=Data VALID, V=Data Invalid (Navigation Receiver Warning)						
GGA: Quality Indicator	0	0	6	6	1 / 2	1 / 2	1 / 2
	0=Fix not available/invalid, 1=GPS SPS Mode, Fix valid, 2=Differential GPS, SPS Mode, Fix Valid, 6=Estimated/Dead Reckoning						
GSA: Nav Mode	1	1	2	2	2	3	3
	1=Fix Not available, 2=2D Fix, 3=3D Fix						
GLL, RMC, VTG, GNS: Mode Indicator	N	N	E	E	A / D	A / D	A / D
	N=No Fix, A=Autonomous GNSS Fix, D=Differential GNSS Fix, E=Estimated/Dead Reckoning Fix						
UBX GPSFixOK	0	0	0	1	1	1	1
UBX GPSFix	0	>1	1	1	2	3	4

The following list shows how u-blox implements the NMEA protocol, and the conditions determining how flags are set in version 2.2 and below.

NMEA Message: Field	*No position fix (at power-up, after losing satellite lock*	*Valid position fix with GPS, but user limits exceeded*	*Valid dead reckoning fix, but user limits exceeded*	*Dead reckoning (linear extrapolation, ADR with external sensors, or map matching)*	*2D position fix*	*3D position fix*	*combined GPS/SFDR position fix (ADR with external sensors)*
GLL, RMC: Status	V	V	V	A	A	A	A
	A=Data VALID, V=Data Invalid (Navigation Receiver Warning)						
GGA: Quality Indicator	0	0	1	1	1 / 2	1 / 2	1 / 2
	0=Fix not available/invalid, 1=GPS SPS Mode, Fix valid, 2=Differential GPS, SPS Mode, Fix Valid						
GSA: Nav Mode	1	1	2	2	2	3	3
	1=Fix Not available, 2=2D Fix, 3=3D Fix						
GLL, RMC, VTG: Mode Indicator. This field is not output by this NMEA version.							
GNS: This message is not defined in this NMEA version.							
UBX GPSFixOK	0	0	0	1	1	1	1
UBX GPSFix	0	>1	1	1	2	3	4

By default the receiver will not output invalid data. In such cases, it will output empty fields.

- A valid position fix is reported as follows:

```
$GPGLL,4717.11634,N,00833.91297,E,124923.00,A,A*6E
```

- An invalid position fix (but time valid) is reported as follows:

```
$GPGLL,,,,,124924.00,V,N*42
```

- If Time is unknown (e.g. during a cold-start):

```
$GPGLL,,,,,,V,N*64
```

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An exception from the above default are dead reckoning fixes, which are also output when invalid (user limits exceeded).

In Antaris firmware versions older than 3.0, the receiver did output invalid data and marked it with the 'Invalid/Valid' Flags. If required, this function can still be enabled in later firmware versions,using the UBX protocol message CFG-NMEA.

Differing from the NMEA standard, u-blox reports valid dead reckoning fixes with user limits met (not exceeded) as valid (A) instead of invalid (V).

19 NMEA Messages Overview

When configuring NMEA messages using the UBX protocol message CFG-MSG, the Class/Ids shown in the table shall be used.

Page	*Mnemonic*	*Cls/ID*	*Description*
	NMEA Proprietary Messages		**Proprietary Messages**
67	**UBX,00**	0xF1 0x00	Poll a PUBX,00 message
68	**UBX,00**	0xF1 0x00	Lat/Long Position Data
70	**UBX,03**	0xF1 0x03	Poll a PUBX,03 message
71	**UBX,03**	0xF1 0x03	Satellite Status
73	**UBX,04**	0xF1 0x04	Poll a PUBX,04 message
74	**UBX,04**	0xF1 0x04	Time of Day and Clock Information
75	**UBX,05**	0xF1 0x05	Poll a PUBX,05 message
76	**UBX,05**	0xF1 0x05	Lat/Long Position Data
78	**UBX,06**	0xF1 0x06	Poll a PUBX,06 message
79	**UBX,06**	0xF1 0x06	Lat/Long Position Data
81	**UBX,40**	0xF1 0x40	Poll a PUBX,40 message
82	**UBX,40**	0xF1 0x40	Set NMEA message output rate
83	**UBX,41**	0xF1 0x41	Poll a PUBX,41 message
84	**UBX,41**	0xF1 0x41	Set Protocols and Baudrate
	NMEA Standard Messages		**Standard Messages**
54	**DTM**	0xF0 0x0A	Datum Reference
55	**GBS**	0xF0 0x09	GNSS Satellite Fault Detection
56	**GGA**	0xF0 0x00	Global positioning system fix data
57	**GLL**	0xF0 0x01	Latitude and longitude, with time of position fix and status
58	**GPQ**	0xF0 0x40	Poll message
59	**GRS**	0xF0 0x06	GNSS Range Residuals
60	**GSA**	0xF0 0x02	GNSS DOP and Active Satellites
61	**GST**	0xF0 0x07	GNSS Pseudo Range Error Statistics
62	**GSV**	0xF0 0x03	GNSS Satellites in View
63	**RMC**	0xF0 0x04	Recommended Minimum data
64	**TXT**	0xF0 0x41	Text Transmission

NMEA Messages Overview continued

Page	*Mnemonic*	*Cls/ID*	*Description*
65	**VTG**	0xF0 0x05	Course over ground and Ground speed
66	**ZDA**	0xF0 0x08	Time and Date

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20 Standard Messages

Standard Messages : i.e. Messages as defined in the NMEA Standard.

20.1 DTM

Message	**DTM**		
Description	**Datum Reference**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	This message gives the difference between the currently selected Datum, and the reference Datum. If the currently configured Datum is not WGS84 or WGS72, then the field **LLL** will be set to 999, and the field **LSD** is set to a variable-length string, representing the Name of the Datum. The list of supported datums can be found in CFG-DAT. The reference Datum can not be changed and is always set to WGS84.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x0A	11	

Message Structure:

```
$GPDTM,LLL,LSD,lat,N/S,lon,E/W,alt,RRR*cs<CR><LF>
```

Example:

```
$GPDTM,W84,,0.0,N,0.0,E,0.0,W84*6F
$GPDTM,W72,,0.00,S,0.01,W,-2.8,W84*4F
$GPDTM,999,CH95,0.08,N,0.07,E,-47.7,W84*1C
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$GPDTM	string	$GPDTM	-	Message ID, DTM protocol header
1	W72	string	LLL	-	Local Datum Code, W84 = WGS84, W72 = WGS72, 999 = user defined
2	-	string	LSD	-	Local Datum Subdivision Code, This field outputs the currently selected Datum as a string (see also note above).
3	0.08	numeric	lat	minutes	Offset in Latitude
4	S	character	NS	-	North/South indicator
5	0.07	numeric	lon	minutes	Offset in Longitude
6	E	character	EW	-	East/West indicator
7	-2.8	numeric	alt	m	Offset in altitude
8	W84	string	RRR	-	Reference Datum Code, W84 = WGS 84. This is the only supported Reference datum.
9	*67	hexadecimal	cs	-	Checksum
10	-	character	<CR><LF>	-	Carriage Return and Line Feed

20.2 GBS

Message	**GBS**		
Description	**GNSS Satellite Fault Detection**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	This message outputs the results of the Receiver Autonomous Integrity Monitoring Algorithm (RAIM). • The fields **errlat**, **errlon** and **erralt** output the standard deviation of the position calculation, using all satellites which pass the RAIM test successfully. • The fields **errlat**, **errlon** and **erralt** are only output if the RAIM process passed successfully (i.e. no or successful Edits happened). These fields are never output if 4 or fewer satellites are used for the navigation calculation (because - in this case - integrity can not be determined by the receiver autonomously) • The fields **prob**, **bias** and **stdev** are only output if at least one satellite failed in the RAIM test. If more than one satellites fail the RAIM test, only the information for the worst satellite is output in this message.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x09	11	

Message Structure:

```
$GPGBS,hhmmss.ss,errlat,errlon,erralt,svid,prob,bias,stddev*cs<CR><LF>
```

Example:

```
$GPGBS,235503.00,1.6,1.4,3.2,,,,*40

$GPGBS,235458.00,1.4,1.3,3.1,03,,-21.4,3.8*5B
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$GPGBS	string	$GPGBS	-	Message ID, GBS protocol header
1	235503.00	hhmmss.sss	hhmmss.ss	-	UTC Time, Time to which this RAIM sentence belongs
2	1.6	numeric	errlat	m	Expected error in latitude
3	1.4	numeric	errlon	m	Expected error in longitude
4	3.2	numeric	erralt	m	Expected error in altitude
5	03	numeric	svid	-	Satellite ID of most likely failed satellite
6	-	numeric	prob	-	Probability of missed detection, no supported (empty)
7	-21.4	numeric	bias	m	Estimate on most likely failed satellite (a priori residual)
8	3.8	numeric	stddev	m	Standard deviation of estimated bias
9	*40	hexadecimal	cs	-	Checksum
10	-	character	<CR><LF>	-	Carriage Return and Line Feed

20.3 GGA

Message	**GGA**		
Description	**Global positioning system fix data**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	**The output of this message is dependent on the currently selected datum (Default: WGS84)** Time and position, together with GPS fixing related data (number of satellites in use, and the resulting HDOP, age of differential data if in use, etc.).		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x00	17	

Message Structure:

```
$GPGGA,hhmmss.ss,Latitude,N,Longitude,E,FS,NoSV,HDOP,msl,m,Altref,m,DiffAge,DiffStation*cs<CR><LF>
```

Example:

```
$GPGGA,092725.00,4717.11399,N,00833.91590,E,1,8,1.01,499.6,M,48.0,M,,0*5B
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$GPGGA	string	$GPGGA	-	Message ID, GGA protocol header
1	092725.00	hhmmss.sss	hhmmss.ss	-	UTC Time, Current time
2	4717.11399	ddmm.mmmm	Latitude	-	Latitude, Degrees + minutes, see Format description
3	N	character	N	-	N/S Indicator, N=north or S=south
4	00833.91590	dddmm.mmmm	Longitude	-	Longitude, Degrees + minutes, see Format description
5	E	character	E	-	E/W indicator, E=east or W=west
6	1	digit	FS	-	Position Fix Status Indicator, See Table below and Position Fix Flags description
7	8	numeric	NoSV	-	Satellites Used, Range 0 to 12
8	1.01	numeric	HDOP	-	HDOP, Horizontal Dilution of Precision
9	499.6	numeric	msl	m	MSL Altitude
10	M	character	uMsl	-	Units, Meters (fixed field)
11	48.0	numeric	Altref	m	Geoid Separation
12	M	character	uSep	-	Units, Meters (fixed field)
13	-	numeric	DiffAge	s	Age of Differential Corrections, Blank (Null) fields when DGPS is not used
14	0	numeric	DiffStation	-	Diff. Reference Station ID
15	*5B	hexadecimal	cs	-	Checksum
16	-	character	<CR><LF>	-	Carriage Return and Line Feed

Table Fix Status

Fix Status	*Description, see also Position Fix Flags description*
0	No Fix / Invalid
1	Standard GPS (2D/3D)
2	Differential GPS
6	Estimated (DR) Fix

20.4 GLL

Message	**GLL**		
Description	**Latitude and longitude, with time of position fix and status**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	**The output of this message is dependent on the currently selected datum (Default: WGS84)** -		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x01	(9) or (10)	

Message Structure:

```
$GPGLL,Latitude,N,Longitude,E,hhmmss.ss,Valid,Mode*cs<CR><LF>
```

Example:

```
$GPGLL,4717.11364,N,00833.91565,E,092321.00,A,A*60
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$GPGLL	string	`$GPGLL`	-	Message ID, GLL protocol header
1	4717.11364	ddmm.mmmm	`Latitude`	-	Latitude, Degrees + minutes, see Format description
2	N	character	`N`	-	N/S Indicator, hemisphere N=north or S=south
3	00833.91565	dddmm.mmmm	`Longitude`	-	Longitude, Degrees + minutes, see Format description
4	E	character	`E`	-	E/W indicator, E=east or W=west
5	092321.00	hhmmss.sss	`hhmmss.ss`	-	UTC Time, Current time
6	A	character	`Valid`	-	V = Data invalid or receiver warning, A = Data valid. See Position Fix Flags description
Start of optional block					
7	A	character	`Mode`	-	Positioning Mode, see Position Fix Flags description
End of optional block					
7	*60	hexadecimal	`cs`	-	Checksum
8	-	character	`<CR><LF>`	-	Carriage Return and Line Feed

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20.5 GPQ

Message	**GPQ**		
Description	**Poll message**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Input Message		
Comment	Polls a standard NMEA message.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x40	4	

Message Structure:

```
$xxGPQ,sid*cs<CR><LF>
```

Example:

```
$EIGPQ,RMC*3A
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$EIGPQ	string	$xxGPQ	-	Message ID, GPQ protocol header, xx = talker identifier
1	RMC	string	sid	-	Sentence identifier
2	*3A	hexadecimal	cs	-	Checksum
3	-	character	<CR><LF>	-	Carriage Return and Line Feed

20.6 GRS

Message	**GRS**		
Description	**GNSS Range Residuals**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	**This messages relates to associated GGA and GSA messages.** If less than 12 SVs are available, the remaining fields are output empty. If more than 12 SVs are used, only the residuals of the first 12 SVs are output, in order to remain consistent with the NMEA standard.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x06	17	

Message Structure:

```
$GPGRS,hhmmss.ss, mode {,residual}*cs<CR><LF>
```

Example:

```
$GPGRS,082632.00,1,0.54,0.83,1.00,1.02,-2.12,2.64,-0.71,-1.18,0.25,,,*70
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$GPGRS	string	$GPGRS	-	Message ID, GRS protocol header
1	082632.00	hhmmss.sss	hhmmss.ss	-	UTC Time, Time of associated position fix
2	1	digit	mode	-	Mode (see table below), u-blox receivers will always output Mode 1 residuals
Start of repeated block (12 times)					
3 + 1*N	0.54	numeric	residual	m	Range residuals for SVs used in navigation. The SV order matches the order from the GSA sentence.
End of repeated block					
15	*70	hexadecimal	cs	-	Checksum
16	-	character	<CR><LF>	-	Carriage Return and Line Feed

Table Mode

Mode	*Description*
0	Residuals were used to calculate the position given in the matching GGA sentence.
1	Residuals were recomputed after the GGA position was computed.

20.7 GSA

Message	**GSA**		
Description	**GNSS DOP and Active Satellites**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	The GPS receiver operating mode, satellites used for navigation, and DOP values. • If less than 12 SVs are used for navigation, the remaining fields are left empty. If more than 12 SVs are used for navigation, only the IDs of the first 12 are output. • The SV Numbers (Fields 'Sv') are in the range of 1 to 32 for GPS satellites, and 33 to 64 for SBAS satellites (33 = SBAS PRN 120, 34 = SBAS PRN 121, and so on)		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x02	20	

Message Structure:

```
$GPGSA,Smode,FS{,sv},PDOP,HDOP,VDOP*cs<CR><LF>
```

Example:

```
$GPGSA,A,3,23,29,07,08,09,18,26,28,,,,,1.94,1.18,1.54*0D
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$GPGSA	string	$GPGSA	-	Message ID, GSA protocol header
1	A	character	Smode	-	Smode, see first table below
2	3	digit	FS	-	Fix status, see second table below and Position Fix Flags description
Start of repeated block (12 times)					
3 + 1*N	29	numeric	sv	-	Satellite number
End of repeated block					
15	1.94	numeric	PDOP	-	Position dilution of precision
16	1.18	numeric	HDOP	-	Horizontal dilution of precision
17	1.54	numeric	VDOP	-	Vertical dilution of precision
18	*0D	hexadecimal	cs	-	Checksum
19	-	character	<CR><LF>	-	Carriage Return and Line Feed

Table Smode

Smode	*Description*
M	Manual - forced to operate in 2D or 3D mode
A	Allowed to automatically switch 2D/3D mode

Table Fix Status

Fix Status	*Description, see also Position Fix Flags description*
1	Fix not available
2	2D Fix
3	3D Fix

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20.8 GST

Message	**GST**		
Description	**GNSS Pseudo Range Error Statistics**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	-		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x07	11	

Message Structure:

```
$GPGST,hhmmss.ss,range_rms,std_major,std_minor,hdg,std_lat,std_long,std_alt*cs<CR><LF>
```

Example:

```
$GPGST,082356.00,1.8,,,,1.7,1.3,2.2*7E
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$GPGST	string	$GPGST	-	Message ID, GST protocol header
1	082356.00	hhmmss.sss	hhmmss.ss	-	UTC Time, Time of associated position fix
2	1.8	numeric	range_rms	m	RMS value of the standard deviation of the ranges
3	-	numeric	std_major	m	Standard deviation of semi-major axis, not supported (empty)
4	-	numeric	std_minor	m	Standard deviation of semi-minor axis, not supported (empty)
5	-	numeric	hdg	degrees	Orientation of semi-major axis, not supported (empty)
6	1.7	numeric	std_lat	m	Standard deviation of latitude, error in meters
7	1.3	numeric	std_long	m	Standard deviation of longitude, error in meters
8	2.2	numeric	std_alt	m	Standard deviation of altitude, error in meters
9	*7E	hexadecimal	cs	-	Checksum
10	-	character	<CR><LF>	-	Carriage Return and Line Feed

20.9 GSV

Message	**GSV**		
Description	**GNSS Satellites in View**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	The number of satellites in view, together with each PRN (SV ID), elevation and azimuth, and C/No (Signal/Noise Ratio) value. Only four satellite details are transmitted in one message.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x03	7..16	

Message Structure:

```
$GPGSV,NoMsg,MsgNo,NoSv,{,sv,elv,az,cno}*cs<CR><LF>
```

Example:

```
$GPGSV,3,1,10,23,38,230,44,29,71,156,47,07,29,116,41,08,09,081,36*7F
$GPGSV,3,2,10,10,07,189,,05,05,220,,09,34,274,42,18,25,309,44*72
$GPGSV,3,3,10,26,82,187,47,28,43,056,46*77
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$GPGSV	string	$GPGSV	-	Message ID, GSV protocol header
1	3	digit	NoMsg	-	Number of messages, total number of GPGSV messages being output
2	1	digit	MsgNo	-	Number of this message
3	10	numeric	NoSv	-	Satellites in View
Start of repeated block (1..4 times)					
4 + 4*N	23	numeric	sv	-	Satellite ID
5 + 4*N	38	numeric	elv	degrees	Elevation, range 0..90
6 + 4*N	230	numeric	az	degrees	Azimuth, range 0..359
7 + 4*N	44	numeric	cno	dBHz	C/N0, range 0..99, null when not tracking
End of repeated block					
5..16	*7F	hexadecimal	cs	-	Checksum
6..16	-	character	<CR><LF>	-	Carriage Return and Line Feed

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20.10 RMC

Message	**RMC**		
Description	**Recommended Minimum data**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	**The output of this message is dependent on the currently selected datum (Default: WGS84)** The Recommended Minimum sentence defined by NMEA for GPS/Transit system data.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x04	15	

Message Structure:

```
$GPRMC,hhmmss,status,latitude,N,longitude,E,spd,cog,ddmmyy,mv,mvE,mode*cs<CR><LF>
```

Example:

```
$GPRMC,083559.00,A,4717.11437,N,00833.91522,E,0.004,77.52,091202,,,A*57
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$GPRMC	string	$GPRMC	-	Message ID, RMC protocol header
1	083559.00	hhmmss.sss	hhmmss.ss	-	UTC Time, Time of position fix
2	A	character	Status	-	Status, V = Navigation receiver warning, A = Data valid, see Position Fix Flags description
3	4717.11437	ddmm.mmmm	Latitude	-	Latitude, Degrees + minutes, see Format description
4	N	character	N	-	N/S Indicator, hemisphere N=north or S=south
5	00833.91522	dddmm.mmmm	Longitude	-	Longitude, Degrees + minutes, see Format description
6	E	character	E	-	E/W indicator, E=east or W=west
7	0.004	numeric	Spd	knots	Speed over ground
8	77.52	numeric	Cog	degrees	Course over ground
9	091202	ddmmyy	date	-	Date in day, month, year format
10	-	numeric	mv	degrees	Magnetic variation value, not being output by receiver
11	-	character	mvE	-	Magnetic variation E/W indicator, not being output by receiver
12	-	character	mode	-	Mode Indicator, see Position Fix Flags description
13	*57	hexadecimal	cs	-	Checksum
14	-	character	<CR><LF>	-	Carriage Return and Line Feed

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20.11 TXT

Message	**TXT**		
Description	**Text Transmission**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	**This message is not configured through CFG-MSG, but instead through CFG-INF.** This message outputs various information on the receiver, such as power-up screen, software version etc. This message can be configured using UBX Protocol message CFG-INF		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x41	7	

Message Structure:

```
$GPTXT,xx,yy,zz,ascii data*cs<CR><LF>
```

Example:

```
$GPTXT,01,01,02,u-blox ag - www.u-blox.com*50
$GPTXT,01,01,02,ANTARIS ATR0620 HW 00000040*67
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$GPTXT	string	$GPTXT	-	Message ID, TXT protocol header
1	01	numeric	xx	-	Total number of messages in this transmission, 01..99
2	01	numeric	yy	-	Message number in this transmission, range 01..xx
3	02	numeric	zz	-	Text identifier, u-blox GPS receivers specify the severity of the message with this number. - 00 = ERROR - 01 = WARNING - 02 = NOTICE - 07 = USER
4	www.u-blox.com	string	string	-	Any ASCII text
5	*67	hexadecimal	cs	-	Checksum
6	-	character	<CR><LF>	-	Carriage Return and Line Feed

20.12 VTG

Message	**VTG**		
Description	**Course over ground and Ground speed**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	Velocity is given as Course over Ground (COG) and Speed over Ground (SOG).		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x05	12	

Message Structure:

```
$GPVTG,cogt,T,cogm,M,sog,N,kph,K,mode*cs<CR><LF>
```

Example:

```
$GPVTG,77.52,T,,M,0.004,N,0.008,K,A*06
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$GPVTG	string	$GPVTG	-	Message ID, VTG protocol header
1	77.52	numeric	cogt	degrees	Course over ground (true)
2	T	character	T	-	Fixed field: true
3	-	numeric	cogm	degrees	Course over ground (magnetic), not output
4	M	character	M	-	Fixed field: magnetic
5	0.004	numeric	sog	knots	Speed over ground
6	N	character	N	-	Fixed field: knots
7	0.008	numeric	kph	km/h	Speed over ground
8	K	character	K	-	Fixed field: kilometers per hour
9	A	character	mode	-	Mode Indicator, see Position Fix Flags description
10	*06	hexadecimal	cs	-	Checksum
11	-	character	<CR><LF>	-	Carriage Return and Line Feed

20.13 ZDA

Message	**ZDA**		
Description	**Time and Date**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	-		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF0 0x08	9	

Message Structure:

```
$GPZDA,hhmmss.ss,day,month,year,ltzh,ltzn*cs<CR><LF>
```

Example:

```
$GPZDA,082710.00,16,09,2002,00,00*64
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$GPZDA	string	$GPZDA	-	Message ID, ZDA protocol header
1	082710.00	hhmmss.sss	hhmmss.ss	-	UTC Time
2	16	dd	day	day	UTC time: day, 01..31
3	09	mm	month	month	UTC time: month, 01..12
4	2002	yyyy	year	year	UTC time: 4 digit year
5	00	-xx	ltzh	-	Local zone hours, not supported (fixed to 00)
6	00	zz	ltzn	-	Local zone minutes, not supported (fixed to 00)
7	*64	hexadecimal	cs	-	Checksum
8	-	character	<CR><LF>	-	Carriage Return and Line Feed

21 Proprietary Messages

Proprietary Messages : i.e. Messages defined by u-blox.

21.1 UBX,00

Message	**UBX,00**		
Description	**Poll a PUBX,00 message**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Input Message		
Comment	A PUBX,00 message is polled by sending the PUBX,00 message without any data fields.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x00	4	

Message Structure:

```
$PUBX,00*33<CR><LF>
```

Example:

```
$PUBX,00*33
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	00	numeric	MsgID	-	Set to 00 to poll a PUBX,00 message
2	*33	hexadecimal	cs	-	Checksum
3	-	character	<CR><LF>	-	Carriage Return and Line Feed

21.2 UBX,00

Message	**UBX,00**		
Description	**Lat/Long Position Data**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	**The output of this message is dependent on the currently selected datum (Default: WGS84)** This message contains position solution data. The datum selection may be changed using the message CFG-DAT.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x00	23	

Message Structure:

```
$PUBX,00,hhmmss.ss,Latitude,N,Longitude,E,AltRef,NavStat,Hacc,Vacc,SOG,COG,Vvel,ageC,HDOP,VDOP,TDOP
,GU,RU,DR,*cs<CR><LF>
```

Example:

```
$PUBX,00,081350.00,4717.113210,N,00833.915187,E,546.589,G3,2.1,2.0,0.007,77.52,0.007,,0.92,1.19,0.7
7,9,0,0*5F
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	00	numeric	ID	-	Proprietary message identifier: 00
2	081350.00	hhmmss.sss	hhmmss.ss	-	UTC Time, Current time
3	4717.113210	ddmm.mmmm	Latitude	-	Latitude, Degrees + minutes, see Format description
4	N	character	N	-	N/S Indicator, N=north or S=south
5	00833.915187	dddmm.mmmm	Longitude	-	Longitude, Degrees + minutes, see Format description
6	E	character	E	-	E/W indicator, E=east or W=west
7	546.589	numeric	AltRef	m	Altitude above user datum ellipsoid.
8	G3	string	NavStat	-	Navigation Status, See Table below
9	2.1	numeric	Hacc	m	Horizontal accuracy estimate.
10	2.0	numeric	Vacc	m	Vertical accuracy estimate.
11	0.007	numeric	SOG	km/h	Speed over ground
12	77.52	numeric	COG	degrees	Course over ground
13	0.007	numeric	Vvel	m/s	Vertical velocity, positive=downwards
14	-	numeric	ageC	s	Age of most recent DGPS corrections, empty = none available
15	0.92	numeric	HDOP	-	HDOP, Horizontal Dilution of Precision
16	1.19	numeric	VDOP	-	VDOP, Vertical Dilution of Precision
17	0.77	numeric	TDOP	-	TDOP, Time Dilution of Precision
18	9	numeric	GU	-	Number of GPS satellites used in the navigation solution

UBX,00 continued

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
19	0	numeric	RU	-	Number of GLONASS satellites used in the navigation solution
20	0	numeric	DR	-	DR used
21	*5B	hexadecimal	CS	-	Checksum
22	-	character	<CR><LF>	-	Carriage Return and Line Feed

Table Navigation Status

Navigation Status	*Description*
NF	No Fix
DR	Dead reckoning only solution
G2	Stand alone 2D solution
G3	Stand alone 3D solution
D2	Differential 2D solution
D3	Differential 3D solution
RK	Combined GPS + dead reckoning solution
TT	Time only solution

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Message	**UBX,03**		
Description	**Poll a PUBX,03 message**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Input Message		
Comment	A PUBX,03 message is polled by sending the PUBX,03 message without any data fields.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x03	4	

Message Structure:

```
$PUBX,03*30<CR><LF>
```

Example:

```
$PUBX,03*30
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	03	numeric	MsgID	-	Set to 03 to poll a PUBX,03 message
2	*30	hexadecimal	cs	-	Checksum
3	-	character	<CR><LF>	-	Carriage Return and Line Feed

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Message	**UBX,03**		
Description	**Satellite Status**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	The PUBX,03 message contains satellite status information.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x03	5 + 6*GT	

Message Structure:

```
$PUBX,03,GT{,SVID,s,AZM,EL,SN,LK},*cs<CR><LF>
```

Example:

```
$PUBX,03,11,23,-,,,45,010,29,-,,,46,013,07,-,,,42,015,08,U,067,31,42,025,10,U,195,33,46,026,18,U,32
6,08,39,026,17,-,,,32,015,26,U,306,66,48,025,27,U,073,10,36,026,28,U,089,61,46,024,15,-,,,39,014*0D
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	03	numeric	ID	-	Proprietary message identifier: 03
2	11	numeric	GT	-	Number of GPS satellites tracked
Start of repeated block (GT times)					
3 + 6*N	23	numeric	SVID	-	Satellite PRN number
4 + 6*N	-	character	s	-	Satellite status, see table below
5 + 6*N	-	numeric	AZM	degrees	Satellite azimuth, range 000..359
6 + 6*N	-	numeric	EL	degrees	Satellite elevation, range 00..90
7 + 6*N	45	numeric	SN	dBHz	Signal to noise ratio, range 00..55
8 + 6*N	010	numeric	LK	s	Satellite carrier lock time, range 00..64 0 = code lock only 64 = lock for 64 seconds or more
End of repeated block					
3 + 6*GT	*0D	hexadecimal	cs	-	Checksum
4 + 6*GT	-	character	<CR><LF>	-	Carriage Return and Line Feed

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Table Satellite Status

Satellite Status	*Description*
-	Not used
U	Used in solution
e	Ephemeris available, but not used for navigation

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21.5 UBX,04

Message	**UBX,04**		
Description	**Poll a PUBX,04 message**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Input Message		
Comment	A PUBX,04 message is polled by sending the PUBX,04 message without any data fields.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x04	4	

Message Structure:

```
$PUBX,04*37<CR><LF>
```

Example:

```
$PUBX,04*37
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	04	numeric	MsgID	-	Set to 04 to poll a PUBX,04 message
2	*37	hexadecimal	cs	-	Checksum
3	-	character	<CR><LF>	-	Carriage Return and Line Feed

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Message	**UBX,04**		
Description	**Time of Day and Clock Information**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Output Message		
Comment	-		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x04	12	

Message Structure:

```
$PUBX,04,hhmmss.ss,ddmmyy,UTC_TOW,UTC_WNO,LEAP_SEC,Clk_B,Clk_D,PG,*cs<CR><LF>
```

Example:

```
$PUBX,04,073731.00,091202,113851.00,1196,15D,1930035,-2660.664,43,*3C
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	04	numeric	ID	-	Proprietary message identifier: 04
2	073731.00	hhmmss.sss	hhmmss.ss	-	UTC Time, Current time in hour, minutes, seconds
3	091202	ddmmyy	ddmmyy	-	UTC Date, day, month, year format
4	113851.00	numeric	UTC_TOW	s	UTC Time of Week
5	1196	numeric	UTC_WNO	-	UTC week number, continues beyond 1023
6	15D	numeric/text	LEAP_SEC	s	Before FW 7.01: reserved. FW 7.01 and above: Leap seconds, The number is marked with a 'D' if the value is the firmware default value (15 for FW 7.00). If the value is not marked it has been received from a satellite.
7	1930035	numeric	Clk_B	ns	Receiver clock bias
8	-2660.664	numeric	Clk_D	ns/s	Receiver clock drift
9	43	numeric	PG	ns	Timepulse Granularity, The quantization error of the Timepulse pin
10	*3C	hexadecimal	cs	-	Checksum
11	-	character	<CR><LF>	-	Carriage Return and Line Feed

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21.7 UBX,05

Message	**UBX,05**		
Description	**Poll a PUBX,05 message**		
Firmware	Supported on u-blox 6 firmware version 6.00 (**only available with premium feature in SFDR products**).		
Type	Input Message		
Comment	A PUBX,05 message is polled by sending the PUBX,05 message without any data fields.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x05	4	

Message Structure:

```
$PUBX,05*36<CR><LF>
```

Example:

```
$PUBX,05*36
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	05	numeric	MsgID	-	Set to 05 to poll a PUBX,05 message
2	*36	hexadecimal	cs	-	Checksum
3	-	character	<CR><LF>	-	Carriage Return and Line Feed

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Message	**UBX,05**		
Description	**Lat/Long Position Data**		
Firmware	Supported on u-blox 6 firmware version 6.00 (**only available with premium feature in SFDR products**).		
Type	Output Message		
Comment	**This message is only provided for backwards compatibility and should not be utilized for future designs.** -		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x05	19	

Message Structure:

```
$PUBX,05,,*cs<CR><LF>
```

Example:

```
$PUBX,06,,0*5F
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	05	numeric	ID	-	Proprietary message identifier: 05
2	1346	numeric	pulses	-	Number of pulses in last time period [0-9999]
3	1000	numeric	period	ms	Duration of last time period [0-9999]
4	32424	numeric	gyroMean	-	Uncorrected average Gyro value in last period [0-65535]
5	17.8	numeric	temperature	℃	Temperature
6	F	character	direction	-	Forward(F)/Backward(B) Indicator
7	3	numeric	pulseScaleCS	-	Calibration status of speed pulse scale factor (see table below)
8	2	numeric	gyroScaleCS	-	Calibration status of gyroscope scale factor (see table below)
9	3	numeric	gyroBiasCS	-	Calibration status of gyroscope bias (see table below)
10	0.0171	numeric	pulseScale	-	Current scale factor of speed pulse
11	0.00323	numeric	gyroBias	rad/s	Current gyroscope bias
12	0.998	numeric	gyroScale	-	Current gyroscope scale factor
13	94	numeric	pulseScaleAcc	%	Accuracy of speed pulse scale factor in percentage of initial value
14	98	numeric	gyroBiasAcc	%	Accuracy of gyroscope bias in percentage of initial value
15	97	numeric	gyroScaleAcc	%	Accuracy of gyroscope scale factor in percentage of initial value

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UBX,05 continued

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
16	0F	hexadecimal	measUsed	-	Measurements used (see table below)
17	*0D	hexadecimal	cs	-	Checksum
18	-	character	<CR><LF>	-	Carriage Return and Line Feed

Table Sensor Calibration Status

Sensor Calibration Status	*Description*
0	no calibration
1	calibrating
2	coarse calibration
3	fine calibration

Table Measurements used

Measurements used	*Description*
Bit 0	Speed pulse used
Bit 1	forward/backward signal used
Bit 2	Gyroscope used
Bit 3	Temperature used
Bit 4	GPS position used
Bit 5	GPS velocity used
Bit 6	Inconsitency with the gyroscope sensor input detected. Sensor Fusion temporarily disabled. GPS-only data being output.
Bit 7	Inconsitency with the speed pulse sensor input detected. Sensor Fusion temporarily disabled. GPS-only data being output.

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21.9 UBX,06

Message	**UBX,06**		
Description	**Poll a PUBX,06 message**		
Firmware	Supported on u-blox 6 firmware version 6.00 (**only available with premium feature in SFDR products**).		
Type	Input Message		
Comment	A PUBX,06 message is polled by sending the PUBX,06 message without any data fields.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x06	4	

Message Structure:

```
$PUBX,06*35<CR><LF>
```

Example:

```
$PUBX,06*35
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	06	numeric	MsgID	-	Set to 06 to poll a PUBX,06 message
2	*35	hexadecimal	cs	-	Checksum
3	-	character	<CR><LF>	-	Carriage Return and Line Feed

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Message	**UBX,06**		
Description	**Lat/Long Position Data**		
Firmware	Supported on u-blox 6 firmware version 6.00 (**only available with premium feature in SFDR products**).		
Type	Output Message		
Comment	**This message is only provided for backwards compatibility and should not be utilized for future designs.** -		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x06	23	

Message Structure:

```
$PUBX,06,hhmmss.ss,Latitude,N,Longitude,E,AltRef,NavStat,Hacc,Vacc,SOG,COG,Vvel,ageC,HDOP,VDOP,TDOP
,GU,RU,DR,*cs<CR><LF>
```

Example:

```
$PUBX,06,081350.00,4717.113210,N,00833.915187,E,546.589,G3,2.1,2.0,0.007,77.52,0.007,,0.92,1.19,0.7
7,9,0,0*5F
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	06	numeric	ID	-	Proprietary message identifier: 06
2	081350.00	hhmmss.sss	hhmmss.ss	-	UTC Time, Current time
3	4717.113210	ddmm.mmmm	Latitude	-	Latitude, Degrees + minutes, see Format description
4	N	character	N	-	N/S Indicator, N=north or S=south
5	00833.915187	dddmm.mmmm	Longitude	-	Longitude, Degrees + minutes, see Format description
6	E	character	E	-	E/W indicator, E=east or W=west
7	546.589	numeric	AltRef	m	Altitude above user datum ellipsoid.
8	G3	string	NavStat	-	Navigation Status, See Table below
9	2.1	numeric	Hacc	m	Horizontal accuracy estimate.
10	2.0	numeric	Vacc	m	Vertical accuracy estimate.
11	0.007	numeric	SOG	km/h	Speed over ground
12	77.52	numeric	COG	degrees	Course over ground
13	0.007	numeric	Vvel	m/s	Vertical velocity, positive=downwards
14	-	numeric	ageC	s	Age of most recent DGPS corrections, empty = none available
15	0.92	numeric	HDOP	-	HDOP, Horizontal Dilution of Precision
16	1.19	numeric	VDOP	-	VDOP, Vertical Dilution of Precision
17	0.77	numeric	TDOP	-	TDOP, Time Dilution of Precision
18	9	numeric	GU	-	Number of GPS satellites used in the navigation solution

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UBX,06 continued

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
19	0	numeric	RU	-	Number of GLONASS satellites used in the navigation solution
20	0	numeric	reserved	-	
21	*0D	hexadecimal	cs	-	Checksum
22	-	character	<CR><LF>	-	Carriage Return and Line Feed

Table Navigation Status

Navigation Status	*Description*
NF	No Fix
DR	Dead reckoning only solution
G2	Stand alone 2D solution
G3	Stand alone 3D solution
D2	Differential 2D solution
D3	Differential 3D solution
RK	Combined GPS + dead reckoning solution
TT	Time only solution

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21.11 UBX,40

Message	**UBX,40**		
Description	**Poll a PUBX,40 message**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 6.02.		
Type	Input Message		
Comment	A PUBX,40 message is polled by sending the PUBX,40 message without any data fields.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x40	4	

Message Structure:

```
$PUBX,40*37<CR><LF>
```

Example:

```
$PUBX,40*37
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	40	numeric	MsgID	-	Set to 40 to poll a PUBX,40 message
2	*37	hexadecimal	cs	-	Checksum
3	-	character	<CR><LF>	-	Carriage Return and Line Feed

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Message	**UBX,40**		
Description	**Set NMEA message output rate**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 6.02.		
Type	Set Message		
Comment	Set/Get message rate configuration (s) to/from the receiver. • Send rate is relative to the event a message is registered on. For example, if the rate of a navigation message is set to 2, the message is sent every second navigation solution.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x40	11	

Message Structure:

```
$PUBX,40,msgId,rddc,rus1,rus2,rusb,rspi,reserved*cs<CR><LF>
```

Example:

```
$PUBX,40,GLL,1,0,0,0,0,0*5D
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	40	numeric	ID	-	Proprietary message identifier
2	GLL	string	MsgId	-	NMEA message identifier
3	1	numeric	rddc	cycles	output rate on DDC - 0 disables that message from being output on this port - 1 means that this message is output every epoch
4	1	numeric	rus1	cycles	output rate on USART 1 - 0 disables that message from being output on this port - 1 means that this message is output every epoch
5	1	numeric	rus2	cycles	output rate on USART 2 - 0 disables that message from being output on this port - 1 means that this message is output every epoch
6	1	numeric	rusb	cycles	output rate on USB - 0 disables that message from being output on this port - 1 means that this message is output every epoch
7	1	numeric	rspi	cycles	output rate on SPI - 0 disables that message from being output on this port - 1 means that this message is output every epoch
8	0	numeric	reserved	-	Reserved, Always fill with 0
9	*5D	hexadecimal	cs	-	Checksum
10	-	character	<CR><LF>	-	Carriage Return and Line Feed

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21.13 UBX,41

Message	**UBX,41**		
Description	**Poll a PUBX,41 message**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Input Message		
Comment	A PUBX,41 message is polled by sending the PUBX,41 message without any data fields.		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x41	4	

Message Structure:

```
$PUBX,41*36<CR><LF>
```

Example:

```
$PUBX,41*36
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	41	numeric	MsgID	-	Set to 41 to poll a PUBX,41 message
2	*36	hexadecimal	cs	-	Checksum
3	-	character	<CR><LF>	-	Carriage Return and Line Feed

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Message	**UBX,41**		
Description	**Set Protocols and Baudrate**		
Firmware	Supported on u-blox 6 from firmware version 6.00 up to version 7.03.		
Type	Set Message		
Comment	-		
Message Info	*ID for CFG-MSG*	*Number of fields*	
	0xF1 0x41	9	

Message Structure:

```
$PUBX,41,portId,inProto,outProto,baudrate,autobauding*cs<CR><LF>
```

Example:

```
$PUBX,41,1,0007,0003,19200,0*25
```

Field No.	*Example*	*Format*	*Name*	*Unit*	*Description*
0	$PUBX	string	$PUBX	-	Message ID, UBX protocol header, proprietary sentence
1	41	numeric	ID	-	Proprietary message identifier
2	1	numeric	portID	-	ID of communication port, for a list of port IDs see CFG-PRT.
3	0007	hexadecimal	inProto	-	Input protocol mask. Bitmask, specifying which protocols(s) are allowed for input. For details see corresponding field in CFG-PRT.
4	0003	hexadecimal	outProto	-	Output protocol mask. Bitmask, specifying which protocols(s) are allowed for input. For details see corresponding field in CFG-PRT.
5	19200	numeric	baudrate	bits/s	Baudrate
6	0	numeric	autobauding	-	Autobauding: 1=enable, 0=disable (not supported on u-blox 5, set to 0)
7	*25	hexadecimal	cs	-	Checksum
8	-	character	<CR><LF>	-	Carriage Return and Line Feed

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