GPS Output frames

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$GPRMC,143516.00,A,3004.22381,N,03120.92697,E,0.186,,130224,,,A*73<CR><LF>
$GPVTG,,T,,M,0.186,N,0.344,K,A*2F<CR><LF>
$GPGGA,143516.00,3004.22381,N,03120.92697,E,1,08,1.52,144.4,M,15.3,M,,*5A<CR><LF>
$GPGSA,A,3,25,29,28,18,23,31,26,05,,,,,2.59,1.52,2.09*0C<CR><LF>
$GPGSV,3,1,10,05,36,081,21,12,30,126,,18,58,229,36,20,16,046,*7A<CR><LF>
$GPGSV,3,2,10,23,11,179,18,25,64,125,16,26,16,316,23,28,37,265,43*74<CR><LF>
$GPGSV,3,3,10,29,57,004,17,31,28,295,31*77<CR><LF>
$GPGLL,3004.22381,N,03120.92697,E,143516.00,A,A*63<CR><LF>
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GPGGA Example:

$GPGGA,170241.00,3401.21189,N,11824.67797,W,1,06,2.14,71.6,M,-32.9,M,,*57

Field Description:

Position	Field Name	Example Data	Description
0	Sentence Type Identifier	$GPGGA	GGA protocol header
1	Time	170241	17:02:41 UTC
2	Latitude	3401.21189	ddmm.mmmm format, converts to 34.020196 or 34d 1' 12.706" N
3	Latitude Hemisphere	N	N = North, S = South
4	Longitude	11824.67797	dddmm.mmmm format, converts to -118.41129833 or 118d 24' 48673" W
5	Longitude Hemisphere	W	W = West, E = East
6	- 0 = Invalid - 1 = GPS fix - 2 = DGPS fix	1	Data is from a GPS fix
7	Number of Satellites	06	6 Satellites are in view
8	Horizontal Dilution of Precision (HDOP)	2.14	Relative accuracy of horizontal position
9	Altitude	71.6	71.6 meters above mean sea level
10	Altitude Units	M	M = meters
11	Height of geoid above WGS84 ellipsoid	-32.9	-32.9 meters
12	Height of geoid above WGS84 ellipsoid Units	M	M = meters
13	Time since last DGPS update	blank	No last update
14	DGPS reference station id	blank	No station id
15	Checksum	*57	Used by program to check for transmission errors

GPGLL Example:

$GPGLL, 3723.2475, N, 12158.3416, W, 161229.487, A, A*41

Field Description:

Position	Field Name	Example	Description
0	Message ID	$GPGLL	GLL protocol header
1	Latitude	3723.2475	ddmm.mmmm
2	N/S indicator	N	N =North or S = south
3	Longitude	12158.3416	dddmm.mmmm
4	E/W indicator	W	E =East or W = West
5	UTC time	161229.487	hhmmss.sss
6	Status	A	A = data valid or V = data not valid
7	Mode	A	A =Autonomous , D =DGPS, E =DR (This field is only present in NMEA version 3.0)
8	Checksum	*41	
8	<CR><LF>		End of message termination

GPVTG Example:

$GPVTG, 309.62, T, ,M, 0.13, N, 0.2, K, A*23

Field Description:

Position	Field Name	Example	Description
0	Message ID	$GPVTG	VTG protocol header
1	Course	309.62	Degrees
2	Reference	T	True
3	Course	blank	Degrees
4	Reference	M	Magnetic
5	Speed	0.13	Knots, measured horizontal speed
6	Units	N	Knots
7	Speed	0.2	Km/Hr, measured horizontal speed
8	Units	K	Kilometers per hour
9	Mode	A	A = Autonomous, D = DGPS, E = DR
10	Checksum	*23	
11	<CR><LF>		End of message termination

GPRMC Example:

$GPRMC, 161229.487, A, 3723.2475, N, 12158.3416, W, 0.13, 309.62, 120598, , *10

Field Description:

Position	Field Name	Example	Description
0	Message ID	$GPRMC	RMC Protocol Header
1	UTC time	161229.487	hhmmss.sss
2	Status	A	A = data valid or V = data not valid
3	Latitude	3723.2475	ddmm.mmmm
4	N/S indicator	N	N = North or S = South
5	Longitude	12158.3416	dddmm.mmmm
6	E/W indicator	W	E = East or W = West
7	Speed over ground	0.13	Knots
8	Course over ground	309.62	Degrees
9	Date	120598	ddmmyy
10	Magnetic Variation		Degrees (E= East or W = West)
11	Mode	A	A = Autonomous, D = DGPS, E =DR
12	Checksum	*10	
13	<CR><LF>		End of message termination

GPGSA Example:

$GPGSA,M,3,17,02,30,04,05,10,09,06,31,12,,,1.2,0.8,0.9*35

Position	Field Name	Example	Description
0	Message ID	$GPGSA	GSA Protocol Header
1	Mode	M	M=Manual, forced to operate in 2D or 3D, A=Automatic, 3D/2D
2	Fix Quality	3	- 0 = Invalid - 1 = GPS fix - 2 = DGPS fix
3	PRN of Satellite Vehicle	17	Pseudo-random noise (PRN) sequence (a.k.a Gold code) of the satellite. You can think of the PRN as a code that uniquely identifies a particular satellite.
4	PRN of Satellite Vehicle	02	See description at row 3
5	PRN of Satellite Vehicle	30	See description at row 3
6	PRN of Satellite Vehicle	04	See description at row 3
7	PRN of Satellite Vehicle	05	See description at row 3
8	PRN of Satellite Vehicle	10	See description at row 3
9	PRN of Satellite Vehicle	09	See description at row 3
10	PRN of Satellite Vehicle	06	See description at row 3
11	PRN of Satellite Vehicle	31	See description at row 3
12	PRN of Satellite Vehicle	12	See description at row 3
13	PRN of Satellite Vehicle	blank	See description at row 3
14	PRN of Satellite Vehicle	blank	See description at row 3
15	Position Dilution of Precision (PDOP	1.2	The 3D Position Dilution of Precision (PDOP)
16	Horizontal Dilution of Precision (HDOP)	0.8	Dilution of Precision
17	Vertical Dilution of Precision (VDOP)	0.9*35	Dilution of Precision
	<CR><LF>		End of message termination

GPGSV Example:

$GPGSV,3,1,11,18,87,050,48,22,56,250,49,21,55,122,49,03,40,284,47*78

Position	Field Name	Example	Description
0	Message ID	$GPGSV	GSV Protocol Header
1	number message	3	Total number of messages (1-9)
2	Message number	1	Total number of messages of this type in this cycle
3	Number of satellites	11	Total number of satellites in view
4	Satellite #1 PRN Number	18	Pseudo-random noise (PRN) sequence of the satellite. GPS = 1 to 32 Galileo = 1 to 36 Beidou = 1 to 63 NAVIC = 1 to 14 QZSS = 1 to 10 SBAS = 33 to 64 (add 87 for PRN#s) GLO = 65 to 96 1
5	Elevation	87	Elevation in degrees, 90 maximum
6	Azimuth	050	Azimuth, degrees from true north, 000 to 359
7	SNR	48	SNR, 00-99 dB (null when not tracking)
8	Satellite #2 PRN Number	22	Information about second SV, same as fields 4-7
9	Elevation	56	Information about second SV, same as fields 4-7
10	Azimuth	250	Information about second SV, same as fields 4-7
11	SNR	49	Information about second SV, same as fields 4-7
12	Satellite #3 PRN Number	21	Information about third SV, same as fields 4-7
13	Elevation	55	Information about third SV, same as fields 4-7
14	Azimuth	122	Information about third SV, same as fields 4-7
15	SNR	49	Information about third SV, same as fields 4-7
16	Satellite #4 PRN Number	03	Information about fourth SV, same as fields 4-7
17	Elevation	40	Information about fourth SV, same as fields 4-7
18	Azimuth	284	Information about fourth SV, same as fields 4-7

19	SNR	47	Information about fourth SV, same as fields 4-7
20	Checksum	*78	