

SAHXXX series GPS Module

NMEA Protocol Reference Manual

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General Format

NMEA 0183 messages use the ASCII character set and have a defined format. Each message begins with a \$ (hex 0x24) and end with a carriage return and line feed (hex 0x0D 0x0A, represented as <CR><LF>). Each message consists of one or more fields of ASCII letters and numbers, separated by commas. After the last field, and before the <CR><LF> can be an optional checksum consisting of an asterisk (*, hex 0x2A) followed by two ASCII characters representing the hexadecimal value of the checksum. The checksum is computed as the exclusive OR of all characters between the \$ and * characters.

Table 1 lists each of the NMEA output messages specifically developed and defined by SiRF for use within SiRF GPS Module.

❖ NMEA-0183 Output message

NMEA record	Description
GGA	Global positioning system fixed data
GLL	Geographic position- latitude/longitude
GSA	GNSS DOP and active view
GSV	GNSS satellites in view
RMC	Recommended minimum specific GNSS data
VTG	Course over ground and ground speed

GGA--Global positioning system fixed data

\$GPGGA,hhmmss.dd,xxmm.dddd,<N/S>,yyymm.dddd,<E/W>,v,ss,d.d,h.h,M,g.g,M,a.a,xxxx*hh<CR><LF>

hhmmss.ddd	UTC time of the fix. hh = hours. mm = minutes. ss = seconds. ddd = decimal part of seconds.
xxmm.dddd	Latitude coordinate. xx = degrees. mm = minutes. dddd = decimal part of minutes.
<N/S>	Character denoting either N = North or S =South.
yyymm.dddd	Longitude coordinate. yyy = degrees. mm = minutes. dddd = decimal part of minutes.
<E/W>	Character denoting either E = East or W = West.
v	Fix valid indicator 0 = Fix not valid 1 = Fix is valid
ss	Number of satellites used in position fix, 00-12. Notice: Fixed length field of two letters.
d.d	HDOP – Horizontal Dilution Of Precision.
h.h	Altitude (mean-sea-level, geoid)

M	Letter M.
g.g	Difference between the WGS-84 reference ellipsoid surface and the mean-sea-level altitude.
M	Letter M.
a.a	NULL (not implemented)
xxxx	NULL (not implemented)
*hh	Check sum
<CR><LF>	End

Example :

\$GPGGA,084053.39,6016.3051,N,02458.3735,E,0,00,0.0,46.6,M,18.2,M,,*5D

GSA--Geographic position- latitude/longitude

\$GPGSA,a,b,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,p.p,h.h,v.v*hh<CR><LF>

a	Mode: M = Manual, forced to operate in 2D or 3D mode. A = Automatic, allowed to automatically switch 2D/3D.
b	Mode: 1 = Fix not available, 2 = 2D, 3 = 3D,
xx	ID (PRN) numbers of GPS satellites used in solution
p.p	PDOP
h.h	HDOP
v.v	VDOP
*hh	Check sum
<CR><LF>	End

Example :

\$GPGSA,A,3,06,10,15,16,21,25,30,,,,,2.1,1.2,1.8*38

GSV--GNSS satellites in view

\$GPGSV,n,m,ss,xx,ee,aaa,cn,,,,,,,,,xx,ee,aaa,cn*hh<CR><LF>

n	Total number of messages, 1 to 9
m	Message number, 1 to 9
ss	Total number of satellites in view
xx	Satellite ID (PRN) number
ee	Satellite elevation, degrees 90 max
aaa	Satellite azimuth, degrees True, 000 to 359
cn	Signal-to-noise ration (C/No) 00-99 dB-Hz. Value of zero means that the satellite is predicted to be on the visible sky but it isn't being tracked.
*hh	Check sum
<CR><LF>	End

Example :

\$GPGSV,4,1,14,03,66,207,50,08,09,322,44,11,01,266,42,14,00,155,00*79

\$GPGSV,4,2,14,15,41,088,48,17,21,083,44,18,57,087,51,21,57,173,50*78

\$GPGSV,4,3,14,22,05,203,00,23,52,074,49,26,17,028,44,27,00,300,00*79

\$GPGSV,4,4,14,28,32,243,00,31,48,286,00*70

RMC--Recommended minimum specific GNSS data

\$GPRMC,hhmmss.ddd,S,xxmm.ddd,<N/S>,yyymm.ddd,<E/W>,s.s,h.h,ddmm
yy,d.d,<E/W>,M*hh<CR><LF>

hhmmss.ddd	UTC time of the fix. hh = hours. mm = minutes. ss = seconds. ddd = decimal part of seconds.
S	Status indicator A = valid V = invalid
xxmm.ddd	Latitude coordinate. xx = degrees. mm = minutes. ddd = decimal part of minutes.
<N/S>	Character denoting either N = North or S = South.
yyymm.ddd	Longitude coordinate. yyy = degrees. mm = minutes. ddd = decimal part of minutes.
<E/W>	Character denoting either E = East or W = West.
s.s	Speed in knots.
h.h	Heading.
ddmmyy	UTC Date of the fix. dd = day of month mm = month yy = year
d.d	Magnetic variation in degrees, i.e. difference between geometrical and magnetic north direction.
<E/W>	Letter denoting direction of magnetic variation. Either E = East or W = West.
M	Mode indicator A=autonomous N=data not valid
*hh	Check sum
<CR><LF>	End

Example :

\$GPRMC,095035.91,A,6016.3066,N,02458.3832,E,1.08,210.6,131204,6.1,E,A
*0A

GLL--Geographic position-latitude/longitude

\$GPGLL,xxmm.dddd,<N/S>,yyymm.dddd,<E/W>,hhmss.dd,S,M*hh<CR><LF>

xxmm.dddd	Latitude coordinate. xx = degrees. mm = minutes. dddd = decimal part of minutes.
<N/S>	Character denoting either N = North or S =South.
yyymm.dddd	Longitude coordinate. yyy = degrees. mm = minutes. dddd = decimal part of minutes.
<E/W>	Character denoting either E = East or W = West.
hhmss.dd	UTC time of the fix. hh = hours. mm = minutes. ss = seconds. ddd = decimal part of seconds.
S	Status indicator A = valid V = invalid
M	Mode indicator A=autonomous N=data not valid
*hh	Check sum
<CR><LF>	End

Example :

\$GPGLL,6016.3073,N,02458.3817,E,090110.10,A,A*61

VTG--Course over ground and ground speed

\$GPVTG,h.h,T,m.m,M,s.s,N,s.s,K,M*hh<CR><LF>

h.h	Heading in degrees.
T	Letter 'T' denoting True heading in degrees.
m.m	Magnetic heading in degrees.
M	Letter 'M' denoting Magnetic heading in degrees.
s.s	Speed in knots.
N	Letter 'N' denoting speed in knots.
s.s	Speed, km/h.
K	Letter 'K' denoting speed in km/h.
M	Mode indicator A=autonomous N=data not valid
*hh	Check sum
<CR><LF>	End

Example :

\$GPVTG,202.6,T,208.7,M,0.38,N,0.7,K,A*0D