NMEA format specifications

GPS related formats

1.1 **GGA - Global Positioning System Fix Data**

Time, Position and fix related data for a GPS receiver. 3 4 5 6 7 8 10 | 12 13 14 1 -GGA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hhField Number: 1) Universal Time Coordinated (UTC) 2) Latitude 3) N or S (North or South) 4) Longitude 5) E or W (East or West) 6) GPS Quality Indicator, 0 - fix not available, 1 - GPS fix, 2 - Differential GPS fix 7) Number of satellites in view, 00 - 12 8) Horizontal Dilution of precision 9) Antenna Altitude above/below mean-sea-level (geoid) 10) Units of antenna altitude, meters 11) Geoidal separation, the difference between the WGS-84 earth ellipsoid and mean-sea-level (geoid), "-" means mean-sea-level below ellipsoid 12) Units of geoidal separation, meters 13) Age of differential GPS data, time in seconds since last SC104 type 1 or 9 update, null field when DGPS is not used

GSA - GPS DOP and active satellites

1 2 3 14 15 16 17 18

14) Differential reference station ID, 0000-1023

Field Number:

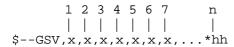
15) Checksum

1.2

- 1) Selection mode
- 2) Mode
- 3) ID of 1st satellite used for fix
- 4) ID of 2nd satellite used for fix

- 14) ID of 12th satellite used for fix
- 15) PDOP in meters
- 16) HDOP in meters
- 17) VDOP in meters
- 18) checksum

1.3 **GSV - Satellites in view**



- 1) total number of messages
- 2) message number
- 3) satellites in view
- 4) satellite number
- 5) elevation in degrees

- 6) azimuth in degrees to true
- 7) SNR in dB

more satellite infos like 4)-7)

n) checksum

2 LORAN-C related formats

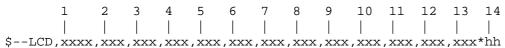
2.1 GLC - Geographic Position, Loran-C



Field Number:

- 1) GRI Microseconds/10
- 2) Master TOA Microseconds
- 3) Master TOA Signal Status
- 4) Time Difference 1 Microseconds
- 5) Time Difference 1 Signal Status
- 6) Time Difference 2 Microseconds
- 7) Time Difference 2 Signal Status
- 8) Time Difference 3 Microseconds
- 9) Time Difference 3 Signal Status
- 10) Time Difference 4 Microseconds
- 11) Time Difference 4 Signal Status
- 12) Time Difference 5 Microseconds
- 13) Time Difference 5 Signal Status
- 14) Checksum

2.2 LCD - Loran-C Signal Data



- 1) GRI Microseconds/10
- 2) Master Relative SNR
- 3) Master Relative ECD
- 4) Time Difference 1 Microseconds
- 5) Time Difference 1 Signal Status
- 6) Time Difference 2 Microseconds
- 7) Time Difference 2 Signal Status
- 8) Time Difference 3 Microseconds
- 9) Time Difference 3 Signal Status
- 10) Time Difference 4 Microseconds
- 11) Time Difference 4 Signal Status
- 12) Time Difference 5 Microseconds
- 13) Time Difference 5 Signal Status
- 14) Checksum

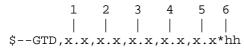
3 General formats

3.1 GLL - Geographic Position - Latitude/Longitude

Field Number:

- 1) Latitude
- 2) N or S (North or South)
- 3) Longitude
- 4) E or W (East or West)
- 5) Universal Time Coordinated (UTC)
- 6) Status A Data Valid, V Data Invalid
- 7) Checksum

3.2 GTD - Geographic Location in Time Differences



Field Number:

- 1) time difference
- 2) time difference
- 3) time difference
- 4) time difference
- 5) time difference
- n) checksum

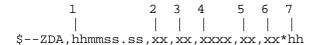
3.3 XTE - Cross-Track Error, Measured

Field Number:

- 1) Status
 - V = LORAN-C Blink or SNR warning
 - V = general warning flag or other navigation systems when a reliable fix is not available
- 2) Status
 - V = Loran-C Cycle Lock warning flag
 - A = OK or not used
- 3) Cross Track Error Magnitude
- 4) Direction to steer, L or R
- 5) Cross Track Units, N = Nautical Miles
- 6) Checksum

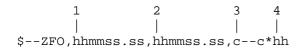
3.4 ZDA - Time & Date

UTC, day, month, year and local time zone



- 1) Local zone minutes description, same sign as local hours
- 2) Local zone description, 00 to +- 13 hours
- 3) Year
- 4) Month, 01 to 12
- 5) Day, 01 to 31
- 6) Universal Time Coordinated (UTC)
- 7) Checksum

3.5 ZFO - UTC & Time from origin Waypoint



- 1) Universal Time Coordinated (UTC)
- 2) Elapsed Time
- 3) Origin Waypoint ID
- 4) Checksum