M10578-A2, M10578-A3,

M20048-1, M20050-1

MTK NMEA Sentence Output

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1. Talker Sentence Format

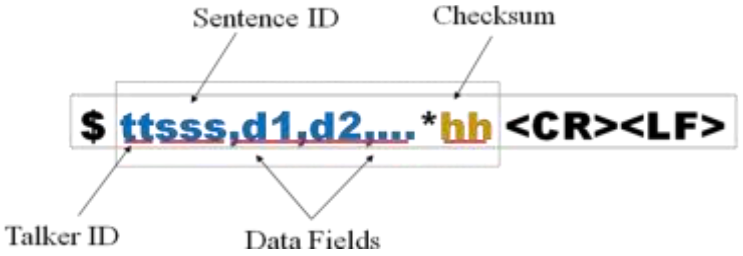

Table.1 *Sentence ID Description*

Sentence ID	Description
GGA	Global Positioning System Fix Data
GLL	Geographic Position, Latitude and Longitude
GSA	GNSS DOP and Active Satellites
GSV	GNSS Satellites In View
RMC	Recommended Minimum Specific GNSS Data
VTG	Course Over Ground & Ground Speed
ZDA	GNSS Time & Date

Table.2 *Talker ID Description*

Talker ID	Description
GP	GPS
GL	GLONASS
BD	Beidou
GA	Galileo
GN	Multi-GNSS

Table.3 *Talker ID display in different GNSS System (for NMEA 0183 3.01 version)*

Talker ID	GPS Only	Beidou Only	GLONASS Only	Galileo Only	GPS + GLONASS	GPS + Beidou	GPS + Galileo	GPS + GLONASS + Galileo
GGA	GP	BD	GL	GA	GN	GN	GN	GN
RMC								
GLL								
VTG								
GSA					GP + GL	GP + BD	GP + GA	GP + GA + GL
GSV					GP + GL	GP + BD	GP + GA	GP + GA + GL
ZDA					GN	GN	GN	GN

Table.4 *Talker ID display in different GNSS System (for NMEA 0183 4.10 version)*

Talker ID	GPS Only	Beidou Only	GLONASS Only	Galileo Only	GPS + GLONASS	GPS + Beidou	GPS + Galileo	GPS + GLONASS + Galileo
GGA	GP	BD	GL	GA	GN	GN	GN	GN
RMC								
GLL								
VTG								
GSA								
GSV					GP + GL	GP + BD	GP + GA	GP + GA + GL
ZDA					GN	GN	GN	GN

2. NMEA sentence

GGA - Global Positioning System Fix Data

$--GGA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>

		Max Character number
hhmmss.sss	UTC of position	10
llll.llll,a	Latitude - N/S	11
yyyyy.yyyy,a	Longitude - E/W	12
x	GPS Quality indicator	1
xx	Number of satellites in use, 00-26, may be different from the number in view	2
x.xx	Horizontal dilution of precision	4
xxxxx.x,M	Altitude re: mean-sea-level (geoid), meters	9
xxx.x,M	Geoidal separation, meters	7
xxxx	Age of Differential GPS data	4
xxxx	Differential reference station ID, 0000-1023	4

GLL - Geographic Position, Latitude and Longitude

$--GLL,llll.ll,a,yyyyy.yy,a,hhmmss.ss,A,a*hh<CR><LF>

		Max Character number
llll.llll,a	Latitude - N/S	11
yyyyy.yyyy,a	Longitude - E/W	12
hhmmss.sss	UTC of position	10
A	Status A = Data valid/V = Data not valid	1
A	Mode Indicator	1

GSA - GNSS DOP and Active Satellites

$--GSA,a,x,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,x.x,x.x,x.x,h*hh<CR><LF>

		Max Character number
a	Mode: M = Manual, forced to operate in 2D or 3D mode A = Automatic, allowed to automatically switch 2D/3D	1
x	Mode: 1 = Fix not available, 2 = 2D, 3 = 3D	1
xx	ID numbers1 of satellites used in solution	3 * 12
xx.xx	PDOP	5
xx.xx	HDOP	5
xx.xx	VDOP	5
h	GNSS System ID (1:GPS, 2:GLONASS, 3:GALILEO, 4:Beidou) (Only support in NMEA 4.10 format)	1

GSV – GNSS Satellites In View

$--GSV,x,x,xx,xx,xx,xxx,xx,……..,xx,xx,xxx,xx,h*hh<CR><LF>

		Max Character number
x	Total number of sentences	1
x	Sentence number	1
xx	Total number of satellites in view	2
xx	Satellite ID number	3
xx	Elevation, degrees, 90o maximum	2
xxx	Azimuth, degrees True, 000 to 359	3
xx	SNR (C/No) 00-99 dB-Hz, null when not tracking	2
h	Signal ID (Only support in NMEA 4.10 format)	1

RMC – Recommended Minimum Specific GNSS Data

$--RMC,hhmmss.ss,A,llll.ll,a,yyyyy.yy,a,x.x,x.x,xxxxxx,x.x,a,a,a*hh<CR><LF>

		Max Character number
hhmmss.sss	UTC of position fix	10
A	Status A = Data valid, V = Navigation receiver warning	1
llll.llll,a	Latitude - N/S	11
yyyyy.yyyy,a	Longitude - E/W	12
xxxx.xx	Speed over ground, knots	7
xxx.xx	Course Over Ground, degrees True	6
xxxxxx	Date: ddmmyy	6
,a	Magnetic variation, degrees E/W1	2

a	Mode Indicator	1
a	Navigational Status (Only support in NMEA 4.10 format)	1

VTG – Course Over Ground & Ground Speed

$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a*hh<CR><LF>

		Max Character number
xxx.xx,T	Course over ground, degrees True	8
,M	Course over ground, degrees Magnetic	2
xxxx.xx,N	Speed over ground, knots	9
xxxx.xx,K	Speed over ground, km/hr	9
a	Mode Indicator	1

ZDA – GNSS Time & Date

$ --ZDA,hhmmss.ss,xx,xx,xxxx,xx,xx *hh<CR><LF>

		Max Character number
hhmmss.sss	UTC of position fix	10
xx	Day, 01 to 31, UTC	2
xx	Month, 01 to12	2
xxxx	Year	4
xx	Local zone hours	3
xx	Local zone minutes	3

3. SVID in MTK NMEA sentence

Satellite System	PRN numbers	NMEA SVID (MTK)	NMEA SVID (Spec v4.10)	Total	Used	Reserved
GPS	1 ~ 32	1 ~ 32	1 ~ 32	32	1 ~ 32 (32)	N/A (0)
WAAS	120 ~ 138	33 ~ 51 (SBAS)	33 ~ 64	32	33 ~ 51 (19)	52 ~ 64 (13)
GLONASS	1 ~ 24	65 ~ 88	65 ~ 99	35	65 ~ 88 (24)	89 ~ 99 (11)
GALILEO	1 ~ 50	1 ~ 30	1 ~ 36	36	1 ~ 30 (30)	31 ~ 36 (6)
BEIDOU	1~30	1 ~ 30	N/A	30	1 ~ 30 (30)	N/A (0)
QZSS	183 ~ 187 193 ~ 197	193 ~ 195	N/A	5	193 ~ 195 (3)	196 ~ 197 (2)

4. MTK Proprietary Sentence

TXT – Antenna detection sentence

When antenna is short connection, it will output:
$GPTXT,01,01,02,ANTSTATUS=SHORT*6D<CR><LF>

When antenna connection is ok, it will output:
$GPTXT,01,01,02,ANTSTATUS=OK*3B<CR><LF>

When antenna is open connection, it will output:
$GPTXT,01,01,02,ANTSTATUS=OPEN*2B<CR><LF>

EPE – Accuracy estimate sentence

$ --EPE,xx.xx,xx.xx *hh<CR><LF>

		Max Character number
xx.xx	Horizontal accuracy estimate (m)	5
xx.xx	Vertical accuracy estimate (m)	5

GST – GNSS Pseudorange Error Statistics

$ --GST, hhmmss.sss,x.x,x.x,x.x,x.x,x.x,x.x,x.x,x.x *hh<CR><LF>

		Max Character number
hhmmss.sss	UTC of position	10
x.x	RMS value of the standard deviation of the range inputs to the navigation process. Range inputs include pseudoranges & DGNSS corrections.	5
x.x	Standard deviation of semi-major axis of error ellipse(meter)	5
x.x	Standard deviation of semi-minor axis of error ellipse(meter)	5
x.x	Orientation of semi-major axis of error ellipse (degrees from true north)	5
x.x	Standard deviation of latitude error (meters)	5
x.x	Standard deviation of longitude error (meters)	5
x.x	Standard deviation of altitude error (meters)	5

GRS – GNSS Range Residuals

$ --GRS, hhmmss.sss,x,x.x,…….,x.x *hh<CR><LF>

		Max Character number
hhmmss.sss	UTC of position	10
x	Mode: 0 = residuals were used to calculate the position given in the matching GGA or GNS sentence. 1 = residuals were recomputed after the GGA or GNS position was computed.	1
x.x	Range residuals in meters for satellites used in the navigation solution.	5*12

GBS – GNSS satellite fault detection (RAIM support)

$ --GBS, hhmmss.sss,x.x,x.x.x.x,x,x.x,x.x,x.x,h,h *hh<CR><LF>

		Max Character number
hhmmss.sss	UTC of position	10
x.x	Estimated accuracy in north-south direction (meter)	5
x.x	Estimated accuracy in east-west direction (meter)	5
x.x	Estimated accuracy of vertical height (meter)	5
x	ID number of most likely failed satellites	1
x.x	Probability of missed detection for most likely failed satellite	5
x.x	Estimate of bias in meters on most likely failed satellite	5
x.x	Standard deviation of bias estimation	5
h	GNSS System ID	1
h	GNSS Signal ID	1

Table.5 *GNSS Identification Table - GBS*

System	System ID	Satellite ID	Signal ID	Signal Channel
GPS	1(GP)	1-99 1-32 are served for GPS 33-64 is reserved for SBAS 65-99 is undefined	0	All Signals
			1	L1 C/A
			2	L1 P(Y)
			3	L1 M
GLONASS	2(GL)	1-99 33-64 is reserved for SBAS 65-99 is reserved for GLONASS	0	All Signals
			1	G1 C/A
			2	G1 P
GALILEO	3(GA)	1-36 is reserved for Galileo Sats 37-64 is reserved for Galileo SBAS 65-99 is undefined	0	All Signals
			1	E5a
			2	E5b
			3	E5 a+b

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