

GPS Receiver Module

FST-UE1528M

UBX-G8020-KT Single Chip

Version 1.1
2019/04/10



[www. Fourstech.com](http://www.Fourstech.com)

▶ Revision History

Revision	Description of change	Revision date	APPR.
VER1.0	Initial Release	Apr-21-2015	ywkim
VER1.1	- GPS Chipset변경 - UBX-G7020-KT ->UBX-G8020-KT	Apr-10-2019	ywkim

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1 Introduction

1.1 General Description

The FST-UE1528M is the latest generation of low power GPS receiver Module from FourStech. It's a highly integrated GPS receiver offering high performance and wide range applications. FST-UE528M receiver module designed to receive the L1 band signal 1575.42 MHz.

1.2 Feature Highlights

- Low power, Fast standby mode
- Single Supply Voltage(3.3V)
- Integrated 0.5ppm TCXO
- UART Support 9,600bps baud rate
- 72 channels Ublox 7 Engine
- Hybrid GPS/SBAS engine (WAAS, EGNOS, QSZZ)
- Anti-jamming technology
- Removes in-band jammers up to 80dB-Hz
- Navigate down to -163 dBm
- Faster acquisition with AssistNow Autonomous
- Support standard NMEA-0183 and binary protocol
- RoHS Compliant
- ARM7TDMI-S Technologies
- GPS Week rollover : 2015-10-18 ~ 2035-06-02
- Small size 22 x 46 x 10mm

1.3 Applications

- Telematics equipment
- Marine navigation application
- Mobile Phone and Handheld GPS receiver application
- Ideal for PDA, Pocket PC and other computing devices at GPS application

2 Specification

2.1 Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Unit
VCC	Supply Voltage	0	6.0	V
VBAT	Input back_Up Battery	0	5	V
ESD	ESD Rating	-	2	KV
TSTG	Storage Temperature Range	-40	+85	°C
Humidity		-	95	%

Note : Absolute maximum ratings are stress ratings only, and functional operation at the maximums is not guaranteed. Stress beyond the limits specified in this table may affect device

reliability or cause permanent damage to the device.

For functional operating conditions, please refer to the operating conditions tables as follow.

2.2 Operating Conditions

Symbol	Parameter	Min	Typ	Max	Unit
VCC	Supply Voltage	3.0	3.3	5.5	V
VBAT	Voltage Back_up battery	1.4	3.1	3.3	V
ViH	I/O input high level	0.7x3.0	-	3.3	V
ViL	I/O input low level	-0.4	-	0.45	V
VoH	I/O output high level	0.7x3.0	-	3.0	V
VoL	I/O output low level			0.4	V
Temperature	With battery	-20	-	+60	°C
*Temperature	Without battery	-30	-	+85	°C

2.3 DC Electrical Characteristics

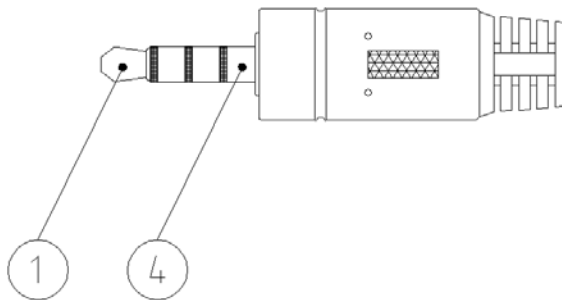
	Parameter	Min	Typ	Max	Unit
Power Consumption (With LNA)	Average Acquisition	-	42	-	mA
	Average Tracking (Max performance Mode)	-	40	-	mA
	V_BackUp	-	15	-	uA

3 General & Performance Specification

Parameter	Description	Specification
Receiver Type	L1 Band	1575.42MHz
Sensitivity	Tracking	-166dBm
	Cold starts	-148dBm
	Hot starts	-157dBm
Time To First Fix	Cold start (autonomous)	29sec
	Warm start (autonomous)	26sec
	Hot start (autonomous)	<1S
Accuracy	Position	2.5m CEP
	SBAS	2.0m CEP
Operation Limits	Velocity	500m/s
	Altitude	50,000m
Serial Interface	1 UART	9,600bps Full Duplex
Protocol Message	NMEA-0183	Version 4.0 With WGS-84
LNA	Gain	20dB±1dB
	Noise Figure	Less than 0.65dB
Antenna Type	Active antenna	Patch or Linear
	Centerfrequency	1575.42MHz
	Polarization	RHCP
	Impedance	50Ω

5 Pin Assignment

Pin Number	Name	I/O	Description
1	VCC	I	Supply Voltage dc 3.3V
2	TXD	O	Serial data output (GPS to Host)
3	RXD	I	Serial data input (Host to GPS)
4	GND	-	GND



VCC(+3.3V DC power Input)

This is the main DC power supply input pin. IT provides voltage to module.

TXD (GPS to Host)

This is the main transmitting NMEA data and is used to programming download or debug port. NMEA Format 9,600 Baud rate.

RXD (Host to GPS)

This is the UART receiver port of the module. It is used to receive software commands and If you want you can change Baud rate, Static Hold, assistnow autonomous...

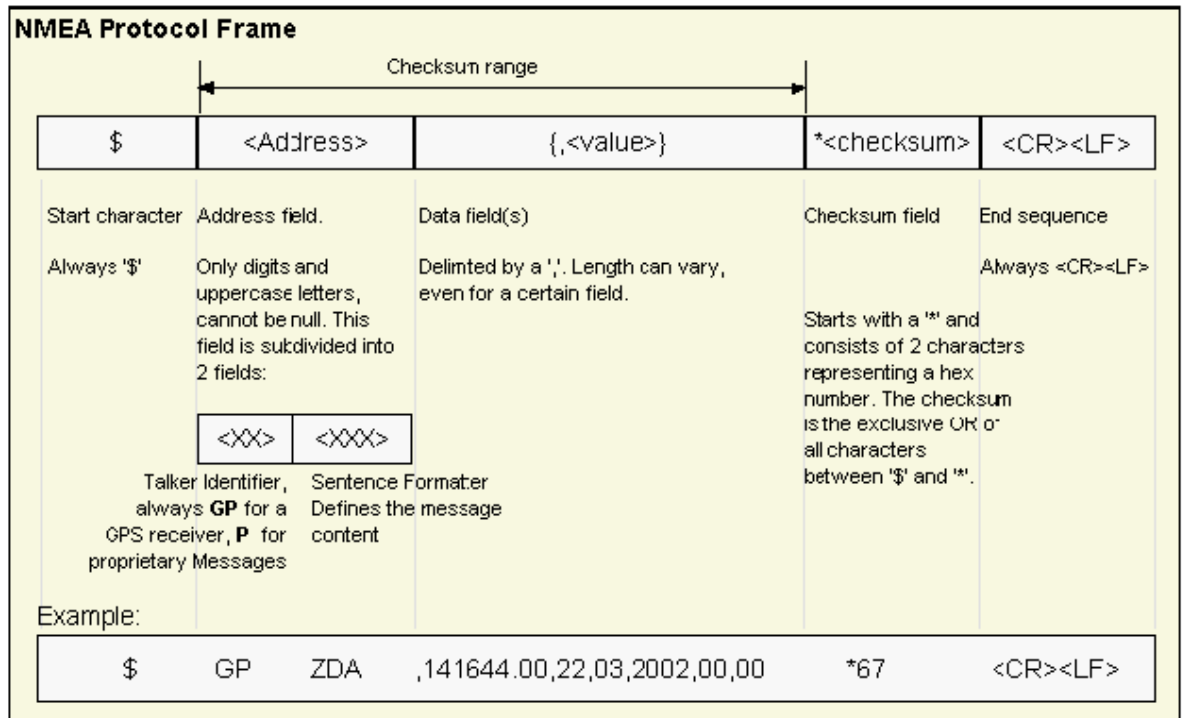
GND

GND provides the ground.

6 S/W – NMEA Protocol

6.1 NMEA 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.

6.2 NMEA Message 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	
21	UBX,00	0xF1 0x00	Lat/Long Position Data
23	UBX,03	0xF1 0x03	Satellite Status
25	UBX,04	0xF1 0x04	Time of Day and Clock Information
27	UBX,40	0xF1 0x40	Set NMEA message output rate
28	UBX,41	0xF1 0x41	Set Protocols and Baudrate
26	UBX	0xF1 0x40	Poll a PUBX message
NMEA Standard Messages		Standard Messages	
18	DTM	0xF0 0x0A	Datum Reference
17	GBS	0xF0 0x09	GNSS Satellite Fault Detection
7	GGA	0xF0 0x00	Global positioning system fix data
9	GLL	0xF0 0x01	Latitude and longitude, with time of position fix and status
19	GPQ	0xF0 0x40	Poll message
14	GRS	0xF0 0x06	GNSS Range Residuals
10	GSA	0xF0 0x02	GPS DOP and Active Satellites
15	GST	0xF0 0x07	GNSS Pseudo Range Error Statistics
11	GSV	0xF0 0x03	GPS Satellites in View
12	RMC	0xF0 0x04	Recommended Minimum data
20	TXT	0xF0 0x41	Text Transmission
13	VTG	0xF0 0x05	Course over ground and Ground speed
16	ZDA	0xF0 0x08	Time and Date

GGA

Message	GGA		
Description	Global positioning system fix data		
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.ss	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	-	EW 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

GLL

Message	GLL		
Description	Latitude and longitude, with time of position fix and status		
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,hmmss.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

GSA

Message	GSA		
Description	GPS DOP and Active Satellites		
Type	Output Message		
Comment	- 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

GSV

Message	GSV		
Description	GPS Satellites in View		
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. There are up to 4 messages used as indicated in the first field NoMsg.		
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

RMC

Message	RMC		
Description	Recommended Minimum data		
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

VTG

Message	VTG		
Description	Course over ground and Ground speed		
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

GRS

Message	GRS		
Description	GNSS Range Residuals		
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:

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

Example:

```
$GPRGS,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	\$GPRGS	string	\$GPRGS	-	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.

GST

Message	GST		
Description	GNSS Pseudo Range Error Statistics		
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

ZDA

Message	ZDA		
Description	Time and Date		
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.ss	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

GBS

Message	GBS		
Description	GNSS Satellite Fault Detection		
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 stddev 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:

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

Example:

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

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

Field No.	Example	Format	Name	Unit	Description
0	\$GPGGBS	string	\$GPGGBS	-	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

DTM

Message	DTM		
Description	Datum Reference		
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

GPQ

Message	GPQ		
Description	Poll message		
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

TXT

Message	TXT		
Description	Text Transmission		
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
```

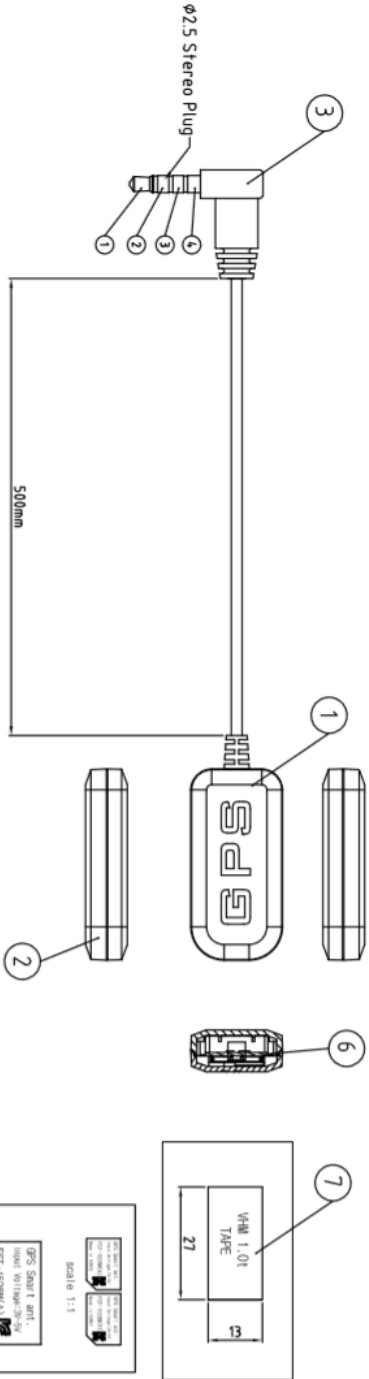
Field No.	Example	Format	Name	Unit	Description
0	\$GPTXT	string	\$GPTXT	-	Message ID, TXT protocol header
1	01	numeric	xx	-	Total number of messages in this transmission, 01..99
2	01	numeric	yy	-	Message number in this transmission, range 01..xx
3	02	numeric	zz	-	Text identifier, u-blox GPS receivers 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

7. GPS NMEA DATA (Exam.)

```
02:26:03 $GPRMC,022603.00,A,3731.33764,N,12646.00657,E,0.110,,190418,,,D*75
02:26:03 $GPVTG,T,M,0.110,N,0.204,K,D*20
02:26:03 $GPGGA,022603.00,3731.33764,N,12646.00657,E,2,05,2.10,205.3,M,18.0,M,,0000*51
02:26:03 $GPGSA,A,3,32,26,14,31,16,,,,,3.82,2.10,3.19*06
02:26:03 $GPGSV,3,1,10,04,77,260,,14,74,168,39,16,30,232,30,23,,,20*4E
02:26:03 $GPGSV,3,2,10,26,61,246,37,29,,,24,31,68,014,28,32,44,155,39*4A
02:26:03 $GPGSV,3,3,10,42,43,152,35,50,43,152,35*7B
02:26:03 $GPGLL,3731.33764,N,12646.00657,E,022603.00,A,D*69
02:26:04 $GPRMC,022604.00,A,3731.34877,N,12646.01132,E,0.033,,190418,,,D*7D
02:26:04 $GPVTG,T,M,0.033,N,0.062,K,D*22
02:26:04 $GPGGA,022604.00,3731.34877,N,12646.01132,E,2,05,2.10,182.1,M,18.0,M,,0000*57
02:26:04 $GPGSA,A,3,32,26,14,31,16,,,,,3.82,2.10,3.19*06
02:26:04 $GPGSV,3,1,10,04,77,260,,14,74,168,39,16,30,232,29,23,,,18*4D
02:26:04 $GPGSV,3,2,10,26,61,246,37,29,,,23,31,68,014,28,32,44,155,39*4D
02:26:04 $GPGSV,3,3,10,42,43,152,34,50,43,152,35*7A
02:26:04 $GPGLL,3731.34877,N,12646.01132,E,022604.00,A,D*61
02:26:05 $GPRMC,022605.00,A,3731.35465,N,12646.01383,E,0.557,,190418,,,D*7D
02:26:05 $GPVTG,T,M,0.557,N,1.031,K,D*22
02:26:05 $GPGGA,022605.00,3731.35465,N,12646.01383,E,2,05,2.10,169.5,M,18.0,M,,0000*51
02:26:05 $GPGSA,A,3,32,26,14,31,16,,,,,3.82,2.10,3.19*06
02:26:05 $GPGSV,3,1,10,04,77,260,,14,74,168,39,16,30,232,29,23,,,14*41
02:26:05 $GPGSV,3,2,10,26,61,246,37,29,,,23,31,68,014,28,32,44,155,39*4D
02:26:05 $GPGSV,3,3,10,42,43,152,34,50,43,152,35*7A
02:26:05 $GPGLL,3731.35465,N,12646.01383,E,022605.00,A,D*66
02:26:06 $GPRMC,022606.00,A,3731.35815,N,12646.01535,E,0.221,,190418,,,D*78
02:26:06 $GPVTG,T,M,0.221,N,0.409,K,D*2A
02:26:06 $GPGGA,022606.00,3731.35815,N,12646.01535,E,2,05,2.10,161.9,M,18.0,M,,0000*56
02:26:06 $GPGSA,A,3,32,26,14,31,16,,,,,3.82,2.10,3.19*06
02:26:06 $GPGSV,3,1,10,04,77,260,,14,74,168,39,16,30,232,29,23,,,12*47
02:26:06 $GPGSV,3,2,10,26,61,246,37,29,,,23,31,68,014,28,32,44,155,39*4D
02:26:06 $GPGSV,3,3,10,42,43,152,34,50,43,152,35*7A
02:26:06 $GPGLL,3731.35815,N,12646.01535,E,022606.00,A,D*65
02:26:07 $GPRMC,022607.00,A,3731.36037,N,12646.01633,E,0.423,,190418,,,D*73
02:26:07 $GPVTG,T,M,0.423,N,0.784,K,D*28
02:26:07 $GPGGA,022607.00,3731.36037,N,12646.01633,E,2,05,2.10,156.9,M,18.0,M,,0000*5D
02:26:07 $GPGSA,A,3,32,26,14,31,16,,,,,3.82,2.10,3.19*06
02:26:07 $GPGSV,3,1,11,04,77,260,,14,74,168,39,16,30,232,29,19,,,20*4E
02:26:07 $GPGSV,3,2,11,23,,,10,26,61,246,37,29,,,22,31,68,014,28*77
02:26:07 $GPGSV,3,3,11,32,44,155,39,42,43,152,34,50,43,152,34*40
02:26:07 $GPGLL,3731.36037,N,12646.01633,E,022607.00,A,D*6A
```

8. Dimension

FST-UE1528M



# Pin Map 8 TYPE	
1	VCC
2	TX
3	RX
4	GND

1	VCC
2	TXD
3	RXD
4	GND

Code List	CODE	Remark
1500mm	AWG28-4C	외관 Ø2.7

Note

1. 도면상의 모든 치수는 조립 후 치수임.
2. 변형 및 찍힘, 굽힘, 도금 불량등 외관 결점이 없을 것.

AMEND	Mark	Date	Revision

7	TAFC-011	GLUE- TAPE	1	VHM 101	27*13
6	FST-UE100SM	PCB-ASS'Y	1	-	-
5	-	CONNECTOR(I)	1	125051S	연호전자
4	-	CONNECTOR(H)	1	12505HS-04	연호전자
3	CBFS-050	Ø2.5 Right Angle-CABLE	1	AWG-28-4C	500mm
2	COFS-019	CASE-BOTTOM	1	PC-BLACK	
1	COFS-018	CASE-TOP	1	PC-BLACK	
No	Part No	Description	Q'ty	Material	Remark
Tolerances					
Decimals . * .01 . * .005 Angles ±1° √					
Designed By	Checked By	Approved By	Model No.	FST-UE1528M	
			Model Name	GPS SMART ENGINE	
			Part No.	FST-UE1528M	
			Part Name	FST-UE1528M	
H.C.Kim		H.C.Kim			
16.01.05		16.01.05			
Scale: 1/1	Unit: mm				
		Four S Tech		Speedy Steps, Steady Success	Rev. 0

FCC Information to User

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution

Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Compliance Information : This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

“CAUTION : Exposure to Radio Frequency Radiation.

Antenna shall be mounted in such a manner to minimize the potential for human contact during normal operation. The antenna should not be contacted during operation to avoid the possibility of exceeding the FCC radio frequency exposure limit.