Datasheet

AscenKorea Inc.

GPS-631A Datasheet

Revision: V1.0

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Title:	**AscenKorea GPS631A Datasheet**
Subtitle:	**GPS 631A**
Type:	**Datasheet**

Revision	Date	Description
V1.0	2017-01-13	First Release (by Kevin Kim)
V1.1	2017-11-20	modify image (Kevin Kim)

Table of Contents

1. Functional Description

1.1 Overview

- Over 2 million effective correlators
- Down to 1 s acquisition time
- Cold start acquisition sensitivity of -148 dBm and -162 dBm tracking sensitivity
- Supports GPS, QZSS and SBAS (WAAS, EGNOS, MSAS) reception

  and is ready for Galileo
- Supports u-blox' AssistNow Online

  / AssistNow Offline A-GPS services and is OMA SUPL compliant
- Supports u-blox' AssistNow Autonomous (no connectivity required)
- Supports data logging
- Green (RoHS compliant and no antimony or halogenated flame retardants)
- RS-232 interface

Applications

- Asset Tracking
- Health and fitness
- Cellular handset
- Tablet computers
- Other location-aware consumer devices

1.2 GNSS Performance

- Horizontal positioning accuracy (CEP, 50%, 24 hours static, -130 dBm, > 6 SVs)

  Autonomous < 2.5 m

  SBAS < 2.0 m

- Velocity accuracy (50% @ 30m/s)

  Speed <0.01 m/s

  Heading <0.5°

- Time to First Fix(@ -130 dBm)

  Hot start < 1s

  Warm start < 28s

  Cold start < 29s

- Sensitivity

  Tracking & Navigation -162 dBm

  Reacquisition -160 dBm

  Cold Start -148 dBm

  Warm Start -148 dBm

  Hot Start -156 dBm

- Receiver

56-channel u-blox 7 engine

GPS L1C/A, SBAS L1C/A, QZSS L1C/A, Galileo E1B/C

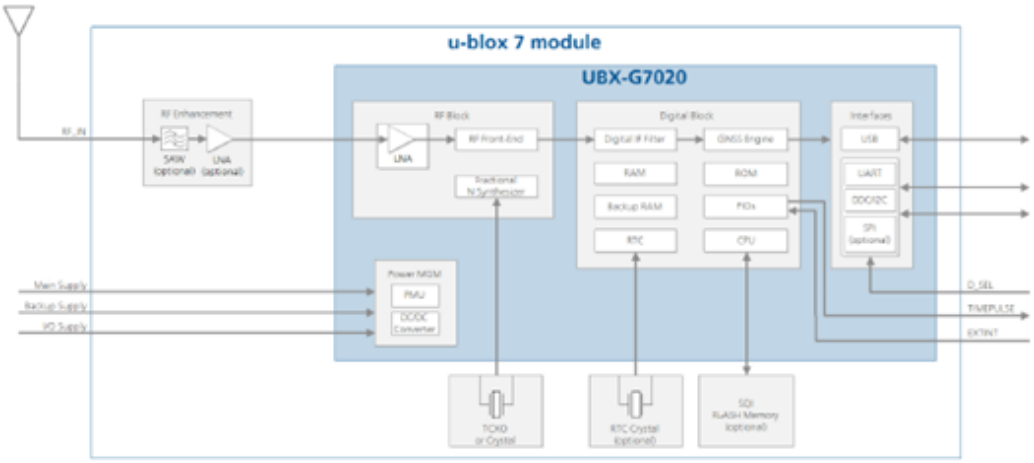
(Ready to support Galileo E1B/C when available)

Maximum altitude < 50,000 m

velocity < 500 m/s

dynamics < 4g

1.3 Block Diagram

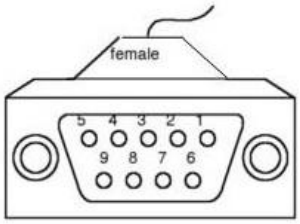


2. Specifications

2.1 Mechanical Dimension

Dimension: (Unit: mm)

Dimension	46(L)*33(W)*17.3(H)mm
Cable Length	2m



[D-Sub 9pinType]

Pin	Description
1	VCC
2	RX(RS-232)
3	TX(RS232)
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

2.2 Electrical Characteristics

◆ Absolute Maximum Ratings

Parameter	Min	Max	Unit
DC Supply Voltage(VCC)	-0.5	6.0	V
I/O pin voltage	-15	15	V
RF input power	-	15	dBm
Storage Temperature	-40	85	℃

◆ Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
Main Supply Voltage(VCC)	3.3	5	5.5	V
Operating Temperature	-40	-	+85	℃

◆ Current Usage

Parameter	Min	Typ	Max	Unit
Peak acquisition current	-	115	-	mA
Average acquisition current	-	53	-	mA
Average tracking current	-	43	-	mA
Shutdown current	-	37	-	uA

◆ I/O Port

Parameter	Min	Typ	Max	Unit
TX Voltage Swing	±5.0	±5.4	-	V
RX Voltage Range	-15	-	+15	V
RX Threshold LOW	0.6	1.2	-	V
RX Threshold HIGN	-	1.5	2.4	V

3. NMEA Protocol

Output Messages

Messages	Description
GGA	Global positioning system fix data
GLL	Latitude and longitude, with time of position fix and status
GSA	GNSS DOP and Active Satellites
GSV	GNSS Satellites in View
RMC	Recommended Minimum data
VTG	Course over ground and Ground speed

GGA — Global Positioning System Fixed Data

```
$xxGGA,time,lat,NS,long,EW,quality,numSV,HDOP,alt,M,sep,M,diffAge,diffStation*cs<CR><LF>
```

Example:

```
$GPGGA,092725.00,4717.11399,N,00833.91590,E,1,08,1.01,499.6,M,48.0,M,,*5B
```

Field No.	*Name*	*Unit*	*Format*	*Example*	*Description*
0	xxGGA	-	string	$GPGGA	GGA Message ID (xx = current Talker ID)
1	time	-	hhmmss.ss	092725.00	UTC time, see note on UTC representation
2	lat	-	ddmm.mmmmm	4717.11399	Latitude (degrees & minutes), see format description
3	NS	-	character	N	North/South indicator
4	long	-	dddmm.mmmmm	00833.91590	Longitude (degrees & minutes), see format description
5	EW	-	character	E	East/West indicator
6	quality	-	digit	1	Quality indicator for position fix, see table below and position fix flags description
7	numSV	-	numeric	08	Number of satellites used (range: 0-12)
8	HDOP	-	numeric	1.01	Horizontal Dilution of Precision
9	alt	m	numeric	499.6	Altitude above mean sea level
10	uAlt	-	character	M	Altitude units: meters (fixed field)
11	sep	m	numeric	48.0	Geoid separation: difference between geoid and mean sea level
12	uSep	-	character	M	Separation units: meters (fixed field)
13	diffAge	s	numeric	-	Age of differential corrections (blank when DGPS is not used)
14	diffStation	-	numeric	-	ID of station providing differential corrections (blank when DGPS is not used)
15	cs	-	hexadecimal	*5B	Checksum
16	<CR><LF>	-	character	-	Carriage return and line feed

Table Quality Indicator

Quality Indicator	*Description, see also position fix flags description*
0	No Fix / Invalid
1	Standard GPS (2D/3D)
2	Differential GPS
6	Estimated (DR) Fix

GLL — Latitude and longitude, with time of position fix and staus

```
$xxGLL,lat,NS,long,EW,time,status,posMode*cs<CR><LF>
```

Example:

```
$GPGLL,4717.11364,N,00833.91565,E,092321.00,A,A*60
```

Field No.	*Name*	*Unit*	*Format*	*Example*	*Description*
0	xxGLL	-	string	$GPGLL	GLL Message ID (xx = current Talker ID)
1	lat	-	ddmm.mmmmm	4717.11364	Latitude (degrees & minutes), see format description
2	NS	-	character	N	North/South indicator
3	long	-	dddmm.mmmmm	00833.91565	Longitude (degrees & minutes), see format description
4	EW	-	character	E	East/West indicator
5	time	-	hhmmss.ss	092321.00	UTC time, see note on UTC representation
6	status	-	character	A	V = Data invalid or receiver warning, A = Data valid. See position fix flags description.
7	posMode	-	character	A	Positioning mode, see position fix flags description. **NMEA v2.3 and above only**
8	cs	-	hexadecimal	*60	Checksum
9	<CR><LF>	-	character	-	Carriage return and line feed

GSA — GNSS DOP and Active Satellites

```
$xxGSA,opMode,navMode{,sv},PDOP,HDOP,VDOP,systemId*cs<CR><LF>
```

Example:

```
$GPGSA,A,3,23,29,07,08,09,18,26,28,,,,,1.94,1.18,1.54,1*0D
```

Field No.	*Name*	*Unit*	*Format*	*Example*	*Description*
0	xxGSA	-	string	$GPGSA	GSA Message ID (xx = current Talker ID)
1	opMode	-	character	A	Operation mode, see first table below
2	navMode	-	digit	3	Navigation mode, see second table below and position fix flags description
Start of repeated block (12 times)					
3 + 1*N	sv	-	numeric	29	Satellite number
End of repeated block					
15	PDOP	-	numeric	1.94	Position dilution of precision
16	HDOP	-	numeric	1.18	Horizontal dilution of precision
17	VDOP	-	numeric	1.54	Vertical dilution of precision
18	systemId	-	numeric	1	NMEA defined GNSS System ID **NMEA v4.1 and above only**
19	cs	-	hexadecimal	*0D	Checksum
20	<CR><LF>	-	character	-	Carriage return and line feed

Table Operation Mode

Operation Mode	*Description*
M	Manually set to operate in 2D or 3D mode
A	Automatically switching between 2D or 3D mode

Table Navigation Mode

Navigation Mode	*Description, see also position fix flags description*
1	Fix not available
2	2D Fix
3	3D Fix

GSV — GNSS Satellites in View

```
$xxGSV,numMsg,msgNum,numSV,{,sv,elv,az,cno},signalId*cs<CR><LF>
```

Example:

```
$GPGSV,3,1,10,23,38,230,44,29,71,156,47,07,29,116,41,08,09,081,36,0*7F
$GPGSV,3,2,10,10,07,189,,05,05,220,,09,34,274,42,18,25,309,44,0*72
$GPGSV,3,3,10,26,82,187,47,28,43,056,46,0*77
```

Field No.	*Name*	*Unit*	*Format*	*Example*	*Description*
0	xxGSV	-	string	$GPGSV	GSV Message ID (xx = GSV Talker ID)
1	numMsg	-	digit	3	Number of messages, total number of GSV messages being output
2	msgNum	-	digit	1	Number of this message
3	numSV	-	numeric	10	Number of satellites in view
Start of repeated block (1..4 times)					
4 + 4*N	sv	-	numeric	23	Satellite ID
5 + 4*N	elv	deg	numeric	38	Elevation (range 0-90)
6 + 4*N	az	deg	numeric	230	Azimuth, (range 0-359)
7 + 4*N	cno	dBHz	numeric	44	Signal strength (C/N0, range 0-99), blank when not tracking
End of repeated block					
5..16	signalId	-	numeric	0	NMEA defined GNSS Signal ID (0 = All signals) **NMEA v4.1 and above only**
6..16	cs	-	hexadecimal	*7F	Checksum
7..16	<CR><LF>	-	character	-	Carriage return and line feed

RMC — Recommended Minimum Specific GNSS Data

```
$xxRMC,time,status,lat,NS,long,EW,spd,cog,date,mv,mvEW,posMode,navStatus*cs<CR><LF>
```

Example:

```
$GPRMC,083559.00,A,4717.11437,N,00833.91522,E,0.004,77.52,091202,,,A,V*57
```

Field No.	*Name*	*Unit*	*Format*	*Example*	*Description*
0	xxRMC	-	string	$GPRMC	RMC Message ID (xx = current Talker ID)
1	time	-	hhmmss.ss	083559.00	UTC time, see note on UTC representation
2	status	-	character	A	Status, V = Navigation receiver warning, A = Data valid, see position fix flags description
3	lat	-	ddmm.mmmmm	4717.11437	Latitude (degrees & minutes), see format description
4	NS	-	character	N	North/South indicator
5	long	-	dddmm.mmmmm	00833.91522	Longitude (degrees & minutes), see format description
6	EW	-	character	E	East/West indicator
7	spd	knots	numeric	0.004	Speed over ground
8	cog	degrees	numeric	77.52	Course over ground
9	date	-	ddmmyy	091202	Date in day, month, year format, see note on UTC representation
10	mv	degrees	numeric	-	Magnetic variation value (blank - not supported)
11	mvEW	-	character	-	Magnetic variation E/W indicator (blank - not supported)
12	posMode	-	character	-	Mode Indicator, see position fix flags description **NMEA v2.3 and above only**
13	navStatus	-	character	V	Navigational status indicator (V = Equipment is not providing navigational status information) **NMEA v4.1 and above only**
14	cs	-	hexadecimal	*57	Checksum
15	<CR><LF>	-	character	-	Carriage return and line feed

VTG — Course over ground and Ground speed

```
$xxVTG,cogt,T,cogm,M,knots,N,kph,K,posMode*cs<CR><LF>
```

Example:

```
$GPVTG,77.52,T,,M,0.004,N,0.008,K,A*06
```

Field No.	*Name*	*Unit*	*Format*	*Example*	*Description*
0	xxVTG	-	string	$GPVTG	VTG Message ID (xx = current Talker ID)
1	cogt	degrees	numeric	77.52	Course over ground (true)
2	T	-	character	T	Fixed field: true
3	cogm	degrees	numeric	-	Course over ground (magnetic), not output
4	M	-	character	M	Fixed field: magnetic
5	knots	knots	numeric	0.004	Speed over ground
6	N	-	character	N	Fixed field: knots
7	kph	km/h	numeric	0.008	Speed over ground
8	K	-	character	K	Fixed field: kilometers per hour
9	posMode	-	character	A	Mode Indicator, see position fix flags description **NMEA v2.3 and above only**
10	cs	-	hexadecimal	*06	Checksum
11	<CR><LF>	-	character	-	Carriage return and line feed

4. Contact

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