PX1125DP-02

L1/L5 Sub-meter Accuracy GNSS Dead Reckoning Receiver

Features

- GPS L1/L5, GAL E1/E5a, BDS B1I/B2a reception
- QZSS L1/L5, SBAS L1 reception
- Sub-meter CEP accuracy
- 3-axis accelerometer & gyroscope
- Barometric pressure sensor altitude sensing
- 100% coverage
- Continuous position fix in tunnels
- Automatic sensor calibration
- 230 Channel receiver
- Perform 16 million time-frequency hypothesis testing per second
- Open sky hot start 1 sec
- Open sky cold start 29 sec
- Operating temperature -40 ~ +85ºC
- RoHS compliant

Applications

- Automotive Navigation

The PX1125DP-02 GNSS Dead-Reckoning receiver module combines sub-meter accuracy GNSS position data, gyroscope data (measuring turning angle), and optional odometer data (measuring distance traveled) to formulate position solution. This enables accurate navigation solution in poor signal environment or signal blocked area such as inside tunnels. The PX1125DP-02 is ideal for 4-wheel vehicle applications requiring accurate continuous navigation with 100% availability.

PX1125DP-02 can operate in Automotive Dead Reckoning (**ADR**) mode if the vehicle wheel-tick odometer signal is connected; or operate in Odometer-less Dead Reckoning (**ODR**) mode if the odometer signal is not connected. The barometric pressure sensor provides superior performance differentiating floor levels in stacked highway and multi-story parking garage.

The Extended Kalman Filter algorithm combines GNSS and sensor data with weighting function dependent on GNSS signal quality. In poor signal reception area and multipath environment, the position error is reduced by dead reckoning.

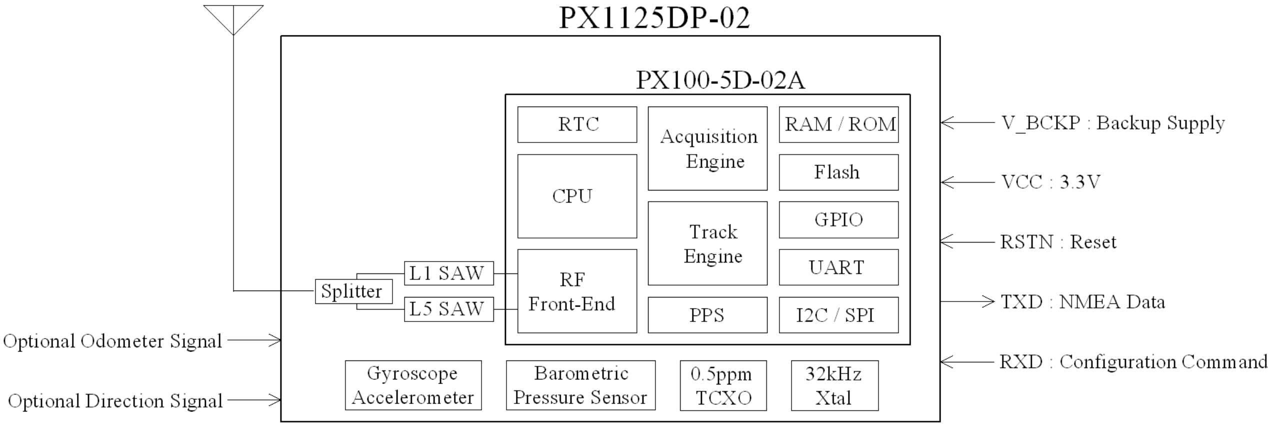
The PX1125DP-02 with dead-reckoning feature, position is output as soon as power is applied to the module without the need of getting GPS/GNSS position fix.

The receiver is suitable for navigation and tracking systems that require high performance continuous positioning and velocity data.

TECHNICAL SPECIFICATIONS

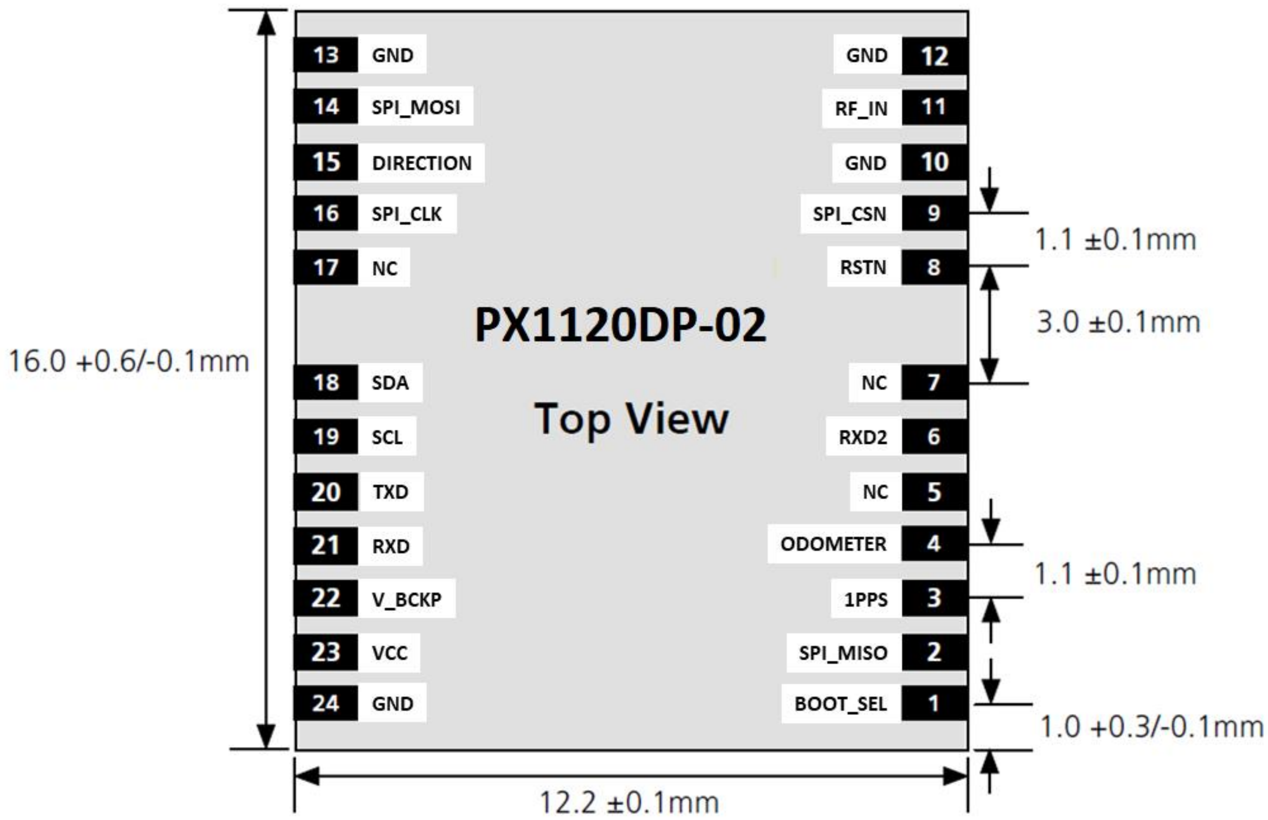
Receiver Type	230-channel PHOENIX engine GPS/QZSS L1/L5, Galileo E1/E5a, Beidou B1I/B2a, SBAS L1 receiver
Accuracy	Position better than 1m CEP Velocity 0.1m/sec Time 10ns
Startup Time	1 second hot start under open sky 28 second warm-start under open sky (average) 29 second cold-start under open sky (average)
Reacquisition	1s
Sensitivity	-147dBm cold-start -158dBm re-acquisition -162dBm tracking
Update Rate	1 / 2 / 4 / 8 / 10 Hz
Operational Limits	Altitude < 18,000m and velocity < 515m/s
Serial Interface	3.3V LVTTL level
Protocol	NMEA-0183 V4.1, SkyTraq binary, 115200 baud, 8, N, 1
Datum	Default WGS-84 User definable
Input Voltage	3.3V +/- 10%
Input Current	Acquisition 115mA @ 3.3V, Tracking 100mA @ 3.3V
Dimension	16.0mm L x 12.2mm W x 2.9mm H
Weight:	2g
Operating Temperature	-40°C ~ +85°C
Storage Temperature	-55 ~ +100°C
Humidity	5% ~ 95%

BLOCK DIAGRAM



Module block schematic

INTERFACE

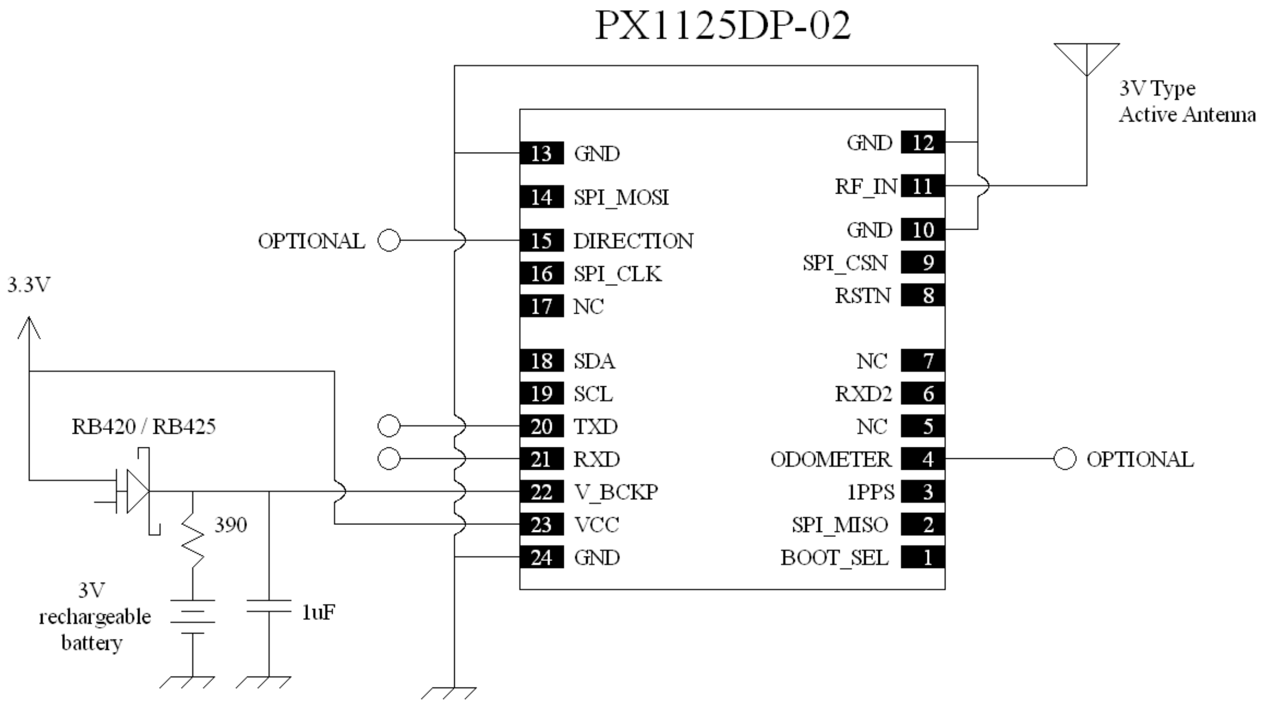


PINOUT DESCRIPTION

Pin No.	Name	Description
1	BOOT_SEL	No connection for normal use. Pull-low for loading firmware into empty or corrupted Flash memory from ROM mode.
2	SPI_MISO	No connection for normal use.
3	1PPS	One-pulse-per-second (1PPS) time mark output, 3V LVTTL. The rising edge synchronized to UTC second when getting 3D position fix. The pulse duration is 100msec at rate of 1 Hz.
4	ODOMETER	Optional car speed pulse input, frequency < 4kHz.
5	NC	No connection
6	RXD2	No connection for normal use.
7	NC	No connection
8	RSTN	External reset (active low). Can be left unconnected if unused.
9	SPI_CSN	No connection for normal use.
10	GND	Ground
11	RF_IN	RF input with 3.3V active antenna bias voltage
12	GND	Ground
13	GND	Ground
14	SPI_MOSI	No connection for normal use.

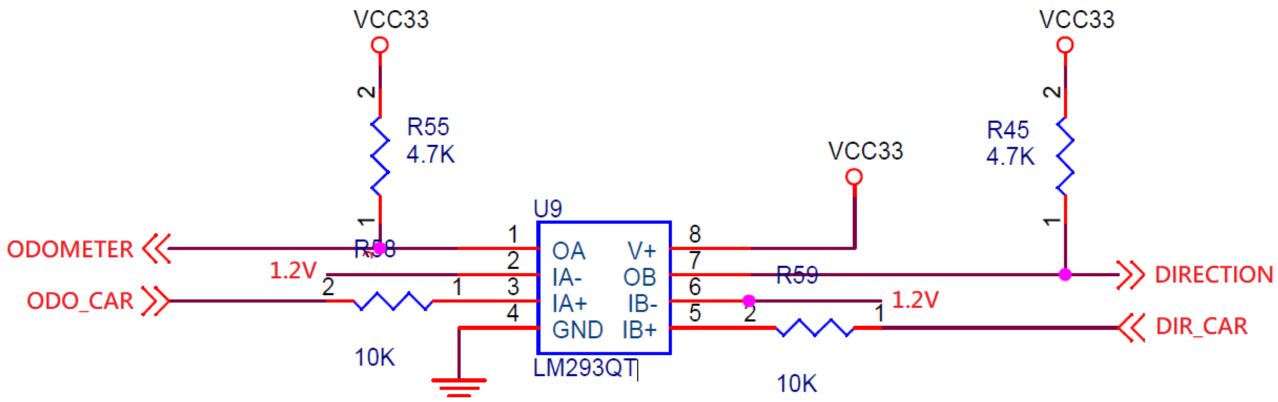
15	DIRECTION	Optional forward (LOW) or reverse direction (HIGH) input from vehicle.
16	SPI_CLK	No connection for normal use.
17	NC	No connection
18	SDA	No connection for normal use.
19	SCL	No connection for normal use.
20	TXD	1st UART serial data output, 3.3V LVTTL. This UART output is normally used for sending position, time and velocity information from the receiver in NMEA-0183 format. When idle, this pin output HIGH.
21	RXD	1st UART serial data input, 3.3V LVTTL. This UART input is normally for sending commands or information to the receiver in SkyTraq binary protocol. In the idle condition, this pin should be driven HIGH. If the driving circuitry is powered independently of PX1125DP-02, ensure that this pin is not driven to HIGH when primary power to PX1125DP-02 is removed.
22	V_BCKP	Backup supply voltage for internal RTC and backup SRAM, 1.3V ~ 3.6V. V_BCKP must be applied whenever VCC is applied. This pin should be powered continuously to minimize the startup time and for keeping DR calibration data. If VCC and V_BCKP are both removed, the receiver will be in factory default mode upon power up, all user configuration and calibrated DR parameters are lost.
23	VCC	Main 3.3V DC supply input
24	GND	Digital ground

APPLICATION CIRCUIT



Automotive Dead-Reckoning (ADR)

For ADR type of application where vehicle odometer wheel-tick pulse signal is available, connect pin-4 ODOMETER to the wheel-tick signal through appropriate level shifter such that the wheel-tick signal level is within range of LVTTL (0V ~ 3.3V). Similarly connect pin-15 DIRECTION to the vehicle forward/reverse signal. For ADR applications that has no forward/reverse indication signal, simply ground the DIRECTION input. Below is a level shifter example circuitry.

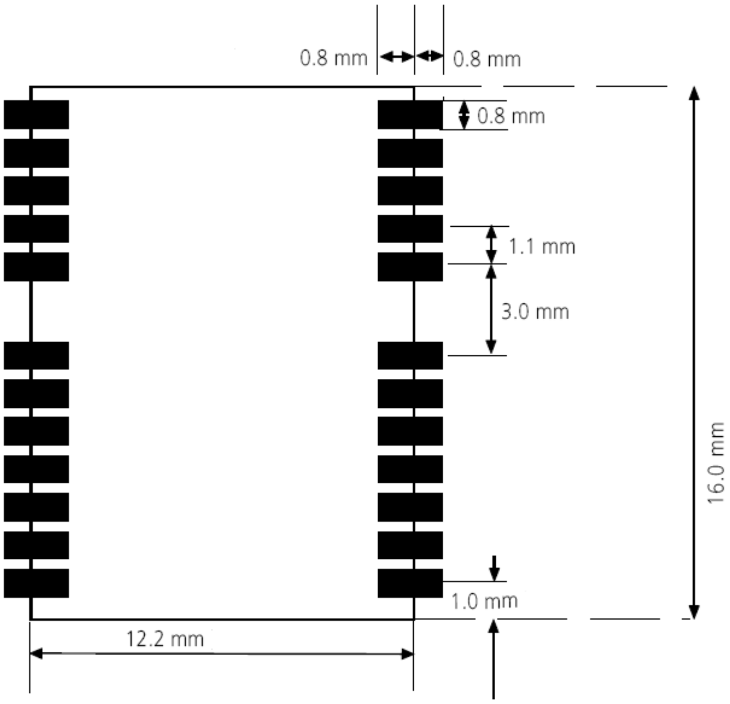


Odometer-less Dead-Reckoning (ODR)

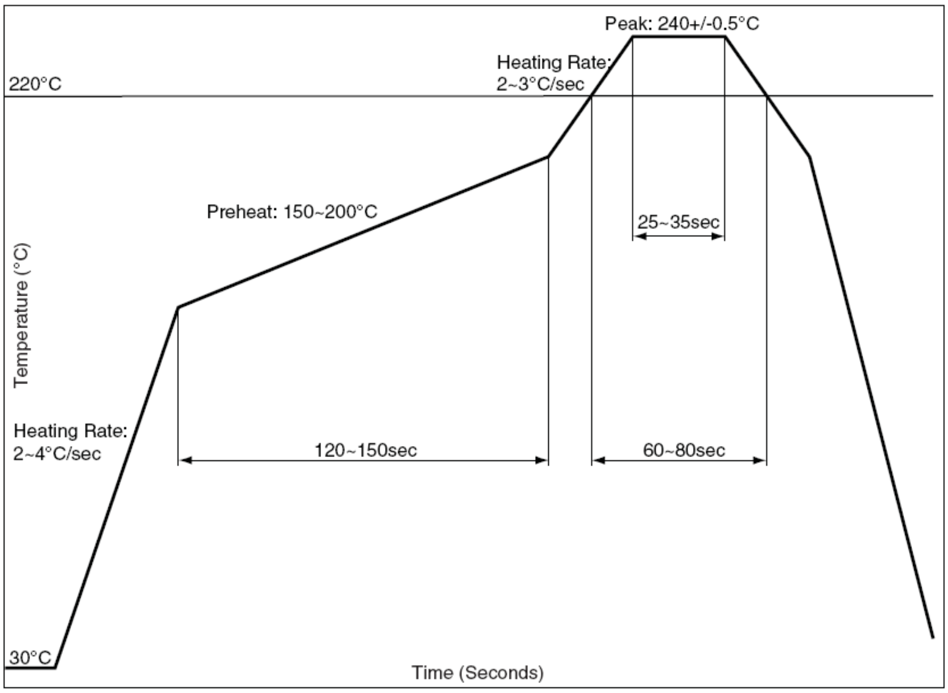
If the vehicle odometer wheel-tick pulse signal is not available, then PX1125DP-02 can operate in odometer-less dead-reckoning mode without the need of external connection to ODOMETER and DIRECTION pins.

When changing between ADR and ODR mode of operation, cold start command should be issued, or the V_BCKP power should be removed such that internal DR state will be cleared and PX1125DP-02 will re-do DR calibration.

RECOMMANDED FOOTPRINT



RECOMMANDED REFLOW PROFILE



The reflow profile shown above should not be exceeded, since excessive temperatures or transport times during reflow can damage the module. Cooling temperature fall rate: max 3°C / sec

ELECTRICAL SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS

Parameter	Minimum	Maximum	Condition
Supply Voltage (VCC)	-0.5	3.6	Volt
Backup Battery Voltage (V_BCKP)	-0.5	3.6	Volt
Input Pin Voltage	-0.5	VCC+0.5	Volt
Input Power at RF_IN		+5	dBm
Storage Temperature	-55	+100	degC

OPERATING CONDITIONS

Parameter	Min	Typ	Max	Unit
Supply Voltage (VCC)	3.0	3.3	3.6	Volt
Acquisition Current (exclude active antenna current)		115		mA
Tracking Current (exclude active antenna current)		100		mA
Backup Voltage (V_BCKP)	1.3		3.6	Volt
Backup Current (VCC voltage applied)		54		uA
Backup Current (VCC voltage off)		13		uA
Output Low Voltage			0.4	Volt
Output HIGH Voltage	2.4			Volt
Input LOW Voltage			0.8	Volt
Input HIGH Voltage	2			Volt
Input LOW Current	-10		10	uA
Input HIGH Current	-10		10	uA
RF Input Impedance (RF_IN)		50		Ohm

POWER SUPPLY REQUIREMENT

PX1125DP-02 requires a stable power supply, avoid ripple on VCC pin (<50mVpp). Power supply noise can affect the receiver's sensitivity. Bypass capacitors should be placed close to the module VCC pin, with values adjusted depending on the amount and type of noise present on the supply line.

BACKUP SUPPLY

The purpose of backup supply voltage pin (V_BCKP) is to keep the SRAM memory and the RTC powered when the module is powered down. This enables the module to have a faster time-to-first-fix when the module is powered on again. DR calibration data is also kept in this SRAM. If V_BCKP is not maintained when main power is removed, the receiver will need to go through auto calibration process before DR could take effect every time it's powered on. The backup current drain is less than 35µA. In normal powered on state, the internal processor access the SRAM and current drain is higher in active mode

ANTENNA CONSIDERATIONS

To have sub-meter accuracy good quality active antenna covering L1 frequency band (1559MHz ~ 1577MHz) and L5 frequency band (1166MHz ~ 1187MHz) need to be used. Antenna with gain of 25 ~ 40 dB and noise figure less than 2dB can be used.

CALIBRATION of DR

PX1125DP-02 performs calibration of gyro bias and odometer scale automatically using GNSS. Customer is not required to perform calibration at installation.

For product testing or benchmarking, the following procedure steps can achieve efficient calibration quickly after a short period of time:

1. Find a open sky place.

2. Start PX1125DP-02 and stand still for 60 seconds until position fix is achieved.

3. Drive straight for 500m at speed of at least 40km/hr.

4. For next 3 minutes, drive straight and make at least 360-deg turns (either two 90-degrees left turns and right turns, or four left turns, or four right turns) then drive straight for at least another 300m.

NMEA Output Description

The output protocol supports NMEA-0183 standard. The implemented messages include GGA, GLL, GSA, GSV, VTG, RMC, and ZDA messages. The NMEA message output has the following sentence structure:

$aaccc,c–c*hh<CR><LF>

The detail of the sentence structure is explained in Table 1.

Table 1: The NMEA sentence structure

character	HEX	Description
"$"	24	Start of sentence.
Aaccc		Address field. "aa" is the talker identifier. "ccc" identifies the sentence type.
","	2C	Field delimiter.
C–c		Data sentence block.
"*"	2A	Checksum delimiter.
Hh		Checksum field.
<CR><LF>	0D0A	Ending of sentence. (carriage return, line feed)

Table 2: Overview of SkyTraq receiver's NMEA messages

$GPGGA	Time, position, and fix related data of the GPS receiver.
$GNGLL	Position, time and fix status.
$GNGSA	Used to represent the ID's of satellites which are used for position fix. When GPS satellites are used for position fix, $GNGSA sentence is output with system ID 1. When GLONASS satellites are used for position fix, $GNGSA sentence is output with system ID 2. When Galileo satellites are used for position fix, $GNGSA sentence is output with system ID 3. When BDS satellites are used for position fix, $GNGSA sentence is output with system ID 4.
$GPGSV **$GLGSV** **$GAGSV** **$GBGSV**	Satellite information about elevation, azimuth and CNR, $GPGSV is used for GPS satellites, while $GLGSV is used for GLONASS satellites, while $GAGSV is used for GALILEO satellites, while $GBGSV is used for BEIDOU satellites.
$GNRMC	Time, date, position, course and speed data.
$GNVTG	Course and speed relative to the ground.
$GNZDA	UTC, day, month and year and time zone.

The formats of the supported NMEA messages are described as follows:

GGA – Global Positioning System Fix Data

Time, position and fix related data for a GPS receiver.

Structure:

$GPGGA,hhmmss.sss,ddmm.mmmmm,a,dddmm.mmmmm,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10 11 12 13

Example:

$GPGGA,092151.000,2447.08723,N,12100.52174,E,1,31,0.4,101.5,M,19.6,M,,0000*53<CR><LF>

Field	Name	Example	Description
1	UTC Time	092151.000	UTC of position in hhmmss.sss format, (000000.000 ~ 235959.999)
2	Latitude	2447.08723	Latitude in ddmm.mmmm mformat Leading zeros transmitted
3	N/S Indicator	N	Latitude hemisphere indicator, ‘N’ = North, ‘S’ = South
4	Longitude	12100.52174	Longitude in dddmm.mmmmm format Leading zeros transmitted
5	E/W Indicator	E	Longitude hemisphere indicator, ‘E’ = East, ‘W’ = West
6	Quality Indicator	1	GPS quality indicator 0: position fix unavailable 1: valid position fix, SPS mode 2: valid position fix, differential GPS mode 3: GPS PPS Mode, fix valid 4: Real Time Kinematic. System used in RTK mode with fixed integers 5: Float RTK. Satellite system used in RTK mode., floating integers 6: Estimated (dead reckoning) Mode 7: Manual Input Mode 8: Simulator Mode
7	Satellites Used	31	Number of satellites in use, (00 ~ 12)
8	HDOP	0.4	Horizontal dilution of precision, (0.0 ~ 99.9)
9	Altitude	101.5	mean sea level (geoid), (-9999.9 ~ 17999.9)
10	Geoidal Separation	19.6	Geoidal separation in meters
11	Age pf Differential GPS data		Age of Differential GPS data NULL when DGPS not used
12	DGPS Station ID	0000	Differential reference station ID, 0000 ~ 1023
13	Checksum	53	

GLL – Latitude/Longitude

Latitude and longitude of current position, time, and status.

Structure:

$GNGLL,ddmm.mmmmm,a,dddmm.mmmmm,a,hhmmss.sss,A,a*hh<CR><LF>

1 2 3 4 5 6 7 8

Example:

$GNGLL,2447.08723,N,12100.52174,E,092151.000,A,A*45<CR><LF>

Field	Name	Example	Description
1	Latitude	2447.08723	Latitude in ddmm.mmmmm format Leading zeros transmitted
2	N/S Indicator	N	Latitude hemisphere indicator ‘N’ = North ‘S’ = South
3	Longitude	12100.52174	Longitude in dddmm.mmmmm format Leading zeros transmitted
4	E/W Indicator	E	Longitude hemisphere indicator ‘E’ = East ‘W’ = West
5	UTC Time	092151.000	UTC time in hhmmss.sss format (000000.000 ~ 235959.999)
6	Status	A	Status, ‘A’ = Data valid, ‘V’ = Data not valid
7	Mode Indicator	A	Mode indicator ‘A’ = Autonomous mode ‘D’ = Differential mode ‘E’ = Estimated (dead reckoning) mode ‘M’ = Manual input mode ‘S’ = Simulator mode ‘N’ = Data not valid
8	Checksum	45	

GSA – GNSS DOP and Active Satellites

GNSS receiver operating mode, satellites used in the navigation solution reported by the GGA or GNS sentence and DOP values.

Structure:

$GNGSA,A,x,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,x.x,x.x,x.x,x*hh<CR><LF>
1 2 3 3 3 3 3 3 3 3 3 3 3 3 4 5 6 7 8

Example:

$GNGSA,A,3,05,06,13,15,19,20,29,30,,,,,0.7,0.4,0.6,1*33<CR><LF>
$GNGSA,A,3,03,07,08,13,15,,,,,,,,0.7,0.4,0.6,3*3C<CR><LF>
$GNGSA,A,3,04,07,09,10,11,13,14,16,27,28,33,34,0.7,0.4,0.6,4*32<CR><LF>
$GNGSA,A,3,38,39,40,41,42,43,,,,,,,0.7,0.4,0.6,4*30<CR><LF>

Field	Name	Example	Description
1	Mode	A	Mode 'M' = Manual, forced to operate in 2D or 3D mode 'A' = Automatic, allowed to automatically switch 2D/3D
2	Mode	3	Fix type 1 = Fix not available 2 = 2D 3 = 3D
3	Satellite used 1~12	05, 06, 13, 15, 19, 20, 29, 30,	01 ~ 32 are for GPS; 33 ~ 64 are for WAAS (PRN minus 87); 193 ~ 197 are for QZSS; 65 ~ 88 are for GLONASS (GL PRN) ; 01 ~ 36 are for GALILEO (GA PRN); 01 ~ 37 are for BDS (BD PRN). GPS, GLONASS, GALILEO and BDS satellites are differentiated by the GNSS system ID in table 3. Maximally 12 satellites are included in each GSA sentence.
4	PDOP	0.7	Position dilution of precision (0.0 to 99.9)
5	HDOP	0.4	Horizontal dilution of precision (0.0 to 99.9)
6	VDOP	0.6	Vertical dilution of precision (0.0 to 99.9)
7	GNSS System ID	1	GNSS system ID* 1 = GPS 2 = GLONASS 3 = GALILEO 4 = BDS 5 = IRNSS
8	Checksum	33	

*GNSS System ID identifies the GNSS system ID according to Table 3.

Table 3: GNSS Identification Table for GSA, GSV

System	System ID (Talker)	Signal ID	Signal Name
GPS	1 (GP)	0	All signals
		1	L1 C/A
		2	L1 P(Y)
		3	L1C
		4	L2 P(Y)
		5	L2C-M
		6	L2C-L
		7	L5-I
		8	L5-Q
GLONASS	2 (GL)	0	All signals
		1	G1 C/A
		2	G1P
		3	G2 C/A
		4	GLONASS (M) G2P
GALILEO	3 (GA)	0	All signals
		1	E5a
		2	E5b
		3	E5 a+b
		4	E6-A
		5	E6-BC
		6	L1-A
		7	L1-BC
BDS	4 (BD)	0	All signals
		1	B1
		2	B2A
		3	B2
		4	B3
		5	B1C
IRNSS	5 (GI)	0	All signals
		4	L5

GSV – GNSS Satellites in View

Number of satellites (SV) in view, satellite ID numbers, elevation, azimuth, and SNR value. Four satellites maximum per transmission.

Structure:

```
$GPGSV,x,x,xx,xx,xx,xxx,xx,…,xx,xx,xxx,xx,x *hh<CR><LF>
       1 2 3  4  5  6   7    4  5  6   7  8   9
```

Example:

```
$GPGSV,2,1,08,05,46,285,46,06,43,077,44,20,41,286,44,13,38,184,44,1*6B<CR><LF>
$GPGSV,2,2,08,19,27,153,41,15,13,210,40,30,12,114,38,29,08,323,38,1*67<CR><LF>
$GPGSV,1,1,02,06,43,077,47,30,12,114,40,8*6D<CR><LF>
$GAGSV,2,1,06,08,78,171,46,15,60,067,45,13,42,334,43,03,41,044,43,7*70<CR><LF>
$GAGSV,2,2,06,07,27,210,41,14,05,146,36,7*77<CR><LF>
$GAGSV,2,1,06,08,78,171,47,15,60,067,47,13,42,334,44,03,41,044,44,1*75<CR><LF>
$GAGSV,2,2,06,07,27,210,42,14,05,146,38,1*7C<CR><LF>
$GBGSV,5,1,18,33,73,339,49,43,64,133,49,28,58,327,49,38,53,353,46,1*74<CR><LF>
$GBGSV,5,2,18,14,51,027,45,13,44,332,44,16,38,176,44,04,38,117,42,1*7F<CR><LF>
$GBGSV,5,3,18,41,38,242,47,11,37,135,44,39,36,184,44,10,30,224,39,1*7D<CR><LF>
$GBGSV,5,4,18,40,29,210,42,42,27,038,43,07,22,195,39,09,21,189,39,1*7B<CR><LF>
$GBGSV,5,5,18,34,14,138,40,27,07,320,40,1*74<CR><LF>
$GBGSV,3,1,10,33,73,339,48,43,64,133,47,28,58,327,46,38,53,353,45,5*7D<CR><LF>
$GBGSV,3,2,10,41,38,242,45,39,36,184,43,40,29,210,40,42,27,038,41,5*79<CR><LF>
$GBGSV,3,3,10,34,14,138,38,27,07,320,35,5*75<CR><LF>
```

Field	Name	Example	Description
1	Number of message	2	Total number of GSV messages to be transmitted (1-5)
2	Sequence number	1	Sequence number of current GSV message
3	Satellites in view	08	Total number of satellites in view (00 ~ 20)
4	Satellite ID	05	01 ~ 32 are for GPS; 33 ~ 64 are for WAAS (PRN minus 87); 193 ~ 197 are for QZSS; 65 ~ 88 are for GLONASS (GL PRN) ; 01 ~ 36 are for GALILEO (GA PRN); 01 ~ 37 are for BDS (BD PRN). GPS, GLONASS, GALILEO and BDS satellites are differentiated by the GNSS system ID in table 3. Maximally 4 satellites are included in each GSV sentence.
5	Elevation	46	Satellite elevation in degrees, (00 ~ 90)
6	Azimuth	285	Satellite azimuth angle in degrees, (000 ~ 359)
7	SNR	46	C/No in dB (00 ~ 99) Null when not tracking
8	GNSS System ID	1	Signal ID*
9	Checksum	6B	

*GNSS Signal ID identifies the GNSS signal name according to Table 3.

RMC – Recommended Minimum Specific GNSS Data

Time, date, position, course and speed data provided by a GNSS navigation receiver.

Structure:

$GNRMC,hhmmss.sss,A,dddmm.mmmmm,a,dddmm.mmmmm,a,x.x,x.x,ddmmyy,,,a,a*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10 11 12

Example:

$GNRMC,092151.000,A,2447.08723,N,12100.52174,E,000.0,000.0,110621,,,A,V*0D<CR><LF>

Field	Name	Example	Description
1	UTC time	092151.000	UTC time in hhmmss.sss format (000000.00 ~ 235959.999)
2	Status	A	Status 'V' = Navigation receiver warning 'A' = Data Valid
3	Latitude	2447.08723	Latitude in dddmm.mmmmm format Leading zeros transmitted
4	N/S indicator	N	Latitude hemisphere indicator 'N' = North 'S' = South
5	Longitude	12100.52174	Longitude in dddmm.mmmmm format Leading zeros transmitted
6	E/W Indicator	E	Longitude hemisphere indicator 'E' = East 'W' = West
7	Speed over ground	000.0	Speed over ground in knots (000.0 ~ 999.9)
8	Course over ground	000.0	Course over ground in degrees (000.0 ~ 359.9)
9	UTC Date	110621	UTC date of position fix, ddmmyy format
10	Mode indicator	A	Mode indicator 'A' = Autonomous mode 'D' = Differential mode 'E' = Estimated (dead reckoning) mode 'F' = Float RTK. Satellite system used in RTK mode, floating integers 'M' = Manual Input Mode 'N' = Data not valid 'P' = Precise 'R' = Real Time Kinematic. System used in RTK mode with fixed integers 'S' = Simulator Mode
11	Navigation status	V	Navigation status indicator according to IEC61108 requirement on 'Navigational (or Failure) warnings and status indicators'. 'S' = Safe 'C' = Caution 'U' = Unsafe 'V' = Navigation status not valid, equipment is not providing navigation status indicator.
12	checksum	0D	

VTG – Course Over Ground and Ground Speed
The actual course and speed relative to the ground.

Structure:
GNVTG,x.x,T,,M,x.x,N,x.x,K,a*hh<CR><LF>
1 2 3 4 5

Example:
$GNVTG,000.0,T,,M,000.0,N,000.0,K,A*13<CR><LF>

Field	Name	Example	Description
1	Course	000.0	True course over ground in degrees (000.0 ~ 359.9)
2	Speed	000.0	Speed over ground in knots (000.0 ~ 999.9)
3	Speed	000.0	Speed over ground in kilometers per hour (000.0 ~ 1800.0)
4	Mode	A	Mode indicator ‘A’ = Autonomous mode ‘D’ = Differential mode ‘E’ = Estimated (dead reckoning) mode ‘M’ = Manual input mode ‘N’ = Data not valid ‘P’ = Precise ‘S’ = Simulator mode
5	Checksum	13	

ZDA – TIME AND DATE
UTC, day, month, year and local time zone

Structure:
$GNZDA,hhmmss.sss,xx,xx,xxxx,xx,xx*hh<CR><LF>
1 2 3 4 5 6 7

Example:
$GNZDA,092151.000,11,06,2021,00,00*41<CR><LF>

Field	Name	Example	Units	Description
1	UTC time	092151.000		UTC time in hhmmss.sss format (000000.00 ~ 235959.999)
2	UTC Day	11		UTC time: day (01 ~ 31)
3	UTC Month	06		UTC time: month (01 ~ 12)
4	UTC Year	2021		UTC time: year (4 digit format)
5	Local zone hour	00		Local zone hours (00 ~ +/- 13)
6	Local zone minutes	00		Local zone minutes (00 ~59)
7	Checksum	41		Checksum

STI,20 Dead Reckoning Status message

Structure:
PSTI,xx,x,x,x,xx,x,x,x,xxx.xx,xx.xx,xx.xx,x.xx*xx<CR><LF>
1 2 34 5 67 8 9 10 11 12 13

Example:
$PSTI,20,1,1,1,32,A,0,1,821.95,20.73,-13.45,6.63*40<CR><LF>

Field No.	Example	Format	Unit	Description
1	20	numeric	-	Proprietary message identifier: 20
2	1	numeric	-	DR Calibration Status 1: calibrated 0: not calibrated
3	1	numeric	-	Gyro Calibrate Status 1: calibrated 0: not calibrated
4	1	numeric	-	Sensor input available 1: available 0: not available
5	32	numeric	Pulse	ADR: odometer pulse count ODR: 0
6	A	character	-	Position Mode indicator: A=GPS fix, N = Data not valid, E = Estimated(dead reckoning) mode
7	0	numeric	-	Backward Status ADR 1: activated, moving backward 0: normal, moving forward ODR 0
8	1	numeric	-	Antenna detection (Reserved) 1: antenna available 0: antenna not available
9	821.95	numeric	0.002V	Z-axis gyro bias
10	20.73	numeric	cm/pulse	ADR: odometer scaling factor ODR: 100
11	-13.45	numeric	Deg/sec	Z-axis rotation rate
12	6.63	numeric	m	ADR: distance moved per second ODR: 0
13	40	hexadecimal	-	Checksum

ORDERING INFORMATION

Model Name	Description
PX1125DP-02	GNSS Dead Reckoning receiver module with additional barometric pressure sensor for superior altitude sensing performance

Revision History

Revision	Date	Description
1	April 20, 2022	Initial release