

AscenKorea Inc.

High Precision GPS AKNB

Revision: V 1.0



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AscenKorea Inc.

Rm. 710, 7F, Halla Sigma Valley B/D, Gasandigital 2Ro 53, Geumcheon-gu, Seoul, Korea

Tel: +82 02 858 7810 Fax: +82 02 858 7813/ www.AscenKorea.com /sales@ascen.co.kr

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1. Highlights and Features

- ◆ High precision
 - Single Point L1 1.5M RMS
 - SBAS 0.7M RMS
 - DGPS 0.5m
- ◆ 14L1 channels, 2 of these are SBAS channels
- ◆ Fast reacquisition < 1.0 s L1 (typical)
- ◆ Low power consumption
- ◆ Position output update rate 1Hz (default), 10Hz(Optional)
- ◆ Log set for maximum customization
- ◆ Outputs to Indicate LEDs(Power, Battery, GPS, Bluetooth)
- ◆ Bluetooth version 2.1 support (Class 2 : 20m)
- ◆ WiFi : IEEE 802.11 b/g
- ◆ Serial Output, Bluetooth/WiFi Output convertibility

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1.1 Switch Function

Switch	SW Type	Function	Description & Note
Power	Tact	Power On/Off	Press for 1~2 seconds
Mode	Tact	Serial only or Bluetooth	Press for 1 second

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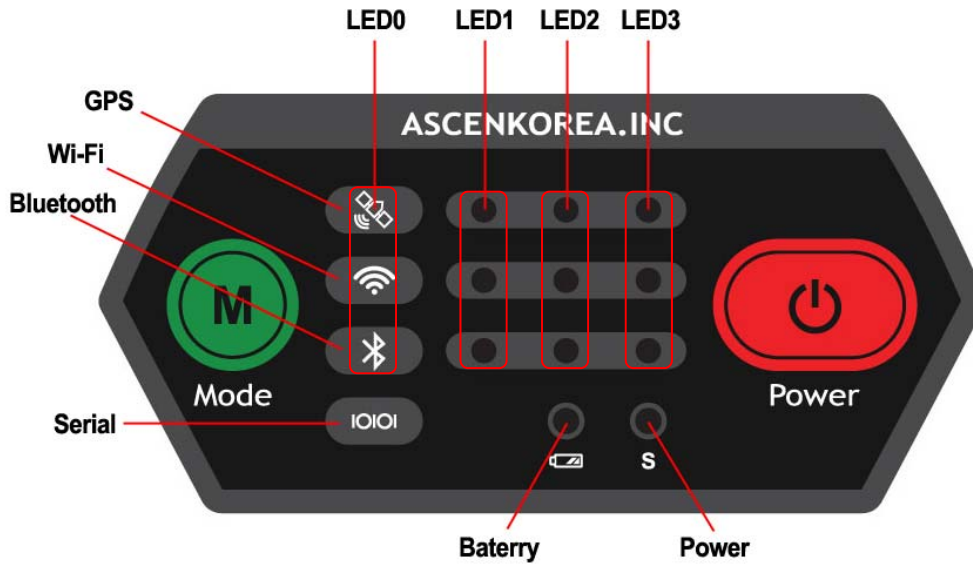
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1.2 LED Indicator



	4 Green LEDs				Description
	LED0	LED1	LED2	LED3	
GPS Status	Off	Off	Off	Off	GPS Power Off
	On	Off	Off	Off	GPS On – Not Fixed
	On	On	Off	Off	GPS Fixed – 2D/3D
	On	Off	On	Off	C/A differential GPS
	On	Off	Off	On	SBAS
		On	On	On	On
	4 White LEDs				Description
	LED0	LED1	LED2	LED3	
WiFi Status	Off	Off	Off	Off	WiFi Power Off
	On	Off	Off	Off	WiFi On – Not connected
	On	On	Off	Off	Connected – Weak RSSI
	On	On	On	Off	Connected – Normal RSSI
	On	On	On	On	Connected – Strong RSSI
		On	On	On	On

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1.2 LED Indicator(continued)

Bluetooth Status	4 Blue LEDs				Description 
	LED0	LED0	LED0	LED0	
	Off	Off	Off	Off	Bluetooth Power Off
	On	Off	Off	Off	Bluetooth On – Not connected
	On	On	Off	Off	Connected – Weak RSSI
	On	On	On	Off	Connected – Normal RSSI
	On	On	On	On	Connected – Strong RSSI
Serial Status	1 Yellow LED				Description 
	Off				Serial Off.
	On				Serial On
Battery Status	1 Red LED / 1 Green LED		Description 		
	RED	GREEN			
	Off	Off		Power Off (Power Cable disconnected)	
	On	Off		Power On(Power Cable disconnected) Full Charged(Power Cable connected)	
	On	On		Charging(Power Cable connected)	
	Off	Blink		Low battery (Power Cable disconnected)	
Power Status	1 Yellow LED				Description 
	On				Power On
	Blink				Before Power Off
	Off				After Power Off

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2. Pin Assignment

GPS Receiver Data(female)

Pin	Name	I/O	Description & Note
1	TX(TTL)	O	Serial Data Output for NMEA output
2	RX(TTL)	I	Serial Data input
3	NC	-	Not used
4	NC	-	Not used
5	NC	-	Not used
6	NC	-	Not used
7	GND	PI	Ground

GPS Receiver Power(female - for DC Power input)

Pin	Name	I/O	Description & Note
1	VCC	PI	Main DC power input(5 VDC) (MAX 5.25 VDC)
2	GND	PI	Ground
3	VCC	PI	Main DC power input(5 VDC) (MAX 5.25 VDC)
4	GND	PI	Ground

PC Dsub9 Cable(Female) - Default

Pin	Name	I/O	Description & Note
1	NC	-	Not used
2	RX(TTL)	O	Serial Data Output for NMEA output
3	TX(TTL)	I	Serial Data input
4	NC	-	Not used
5	GND	PI	Ground
6	NC	-	Not used
7	NC	-	Not used
8	NC	-	Not used
9	NC	-	Not used

USB A Type(for DC Power input) - Option

Pin	Name	I/O	Description & Note
1	VCC	PI	Main DC power input(5 VDC) (MAX 5.25 VDC)
2	NC	-	Not used
3	NC	-	Not used
4	GND	PI	Ground

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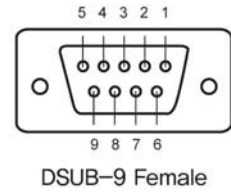
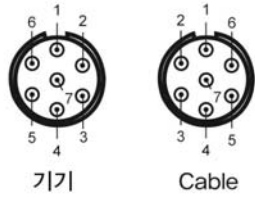
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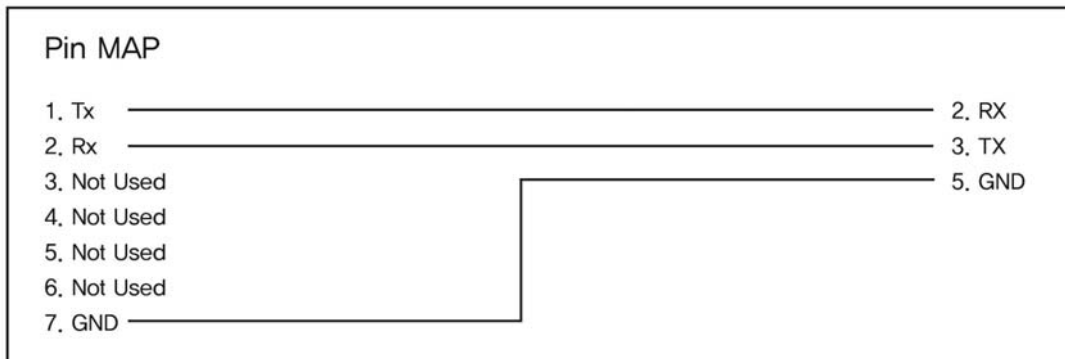
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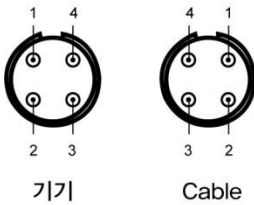
1. Data Cable



DATA CABLE



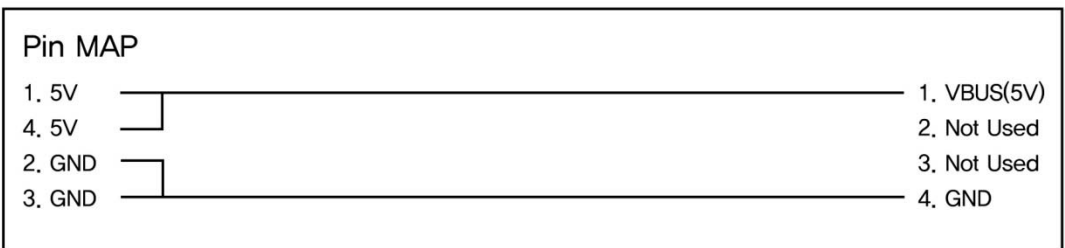
2. Power Cable



USB A Plug



전원 CABLE



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2.1 Description of I/O Pin

2.1.1 Module Data Female

TX, Pin1

Serial Data Output for NMEA output

RX, Pin2

Serial Data Input

NC, Pin (3, 4, 5, 6)

Not used

GND, Pin7

Ground

2.1.2 Module Power Female

VCC, PIN 1

5 VDC(MAX 5.25 VDC)

Allowable Input Voltage Ripple 100 mV p-p (max.)

GND, PIN 2

Ground

VCC, PIN 3

5 VDC(MAX 5.25 VDC)

Allowable Input Voltage Ripple 100 mV p-p (max.)

GND, PIN 4

Ground

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2.1.3 PC Dsub9 (Female)

NC, Pin(1, 4, 6, 7, 8, 9)

Not used

RX, Pin2

PC RX / GPS TX : TTL Serial Data Output for NMEA output

TX, Pin3

PC TX / GPS RX : TTL Serial Data Input

GND, Pin5

Ground

3. Dimension



Main Device Dimension : W 116 x H 116 x T61 [mm]

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4. Specification List

Parameter	Description
Frequency	L1, 1575.42MHz
Channel	14 channels
Time To First Fix ¹	Hot: 45 s (Almanac and recent ephemeris saved, and approximate position and time entered) Cold: 75 s (No almanac or ephemeris and no approximate position or time)
Position Accuracy ^a	Single Point L1 1.5M RMS SBAS 0.7M RMS
Velocity Accuracy	0.05m/s RMS
Timing Accuracy ^b	20ns RMS
Altitude	Maximum 18,000m (60,000 feet)
Velocity	Maximum 515m/s (1000 knots)
Update Rate	1Hz (default), 10 Hz output rates(Optional)
Baud Rate	9600 bps (default)
DGPS	SBAS(MSAS):Enable(Default), RTCM
Power Supply	VCC : 5V (Max 5.25V) Allowable Input Voltage Ripple 100 mV p-p (max.)
Current Consumption	0.46 W
Working Temperature	-10 °C to +60 °C (Operating) -40 °C to +80 °C (Storage)
Dimension	116 x 116 x 61 mm
Weight	378g

a. Typical values. Performance specifications are subject to GPS system characteristics, U.S. DOD operational degradation, ionospheric and tropospheric conditions, satellite geometry, baseline length and multipath effects

b. Time accuracy does not include biases due to RF or antenna delay.

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5. Protocols

NMEA Output Sentence

Table-1 lists each of the NMEA output

Table-1: NMEA Output Sentence	
Option	Description
GGA	Time, position and fix type data.
RMC	Time, date, position, course and speed data. Recommended Minimum Navigation Information.
VTG	Course and speed information relative to the ground.
GSA	GPS receiver operating mode, active satellites used in the position solution and DOP values.
GSV	The number of GPS satellites in view satellite ID numbers, elevation, azimuth, and SNR values.

GGA—Global Positioning System Fixed Data. Time, Position and fix related data

Table-2 contains the values for the following example :

\$GPGGA,064951.00,2307.1256167,N,12016.4438725,E,1,08,0.95,39.90,M,17.80,M,,*65

Table-2: GGA Data Format			
Name	Example	Units	Description
Message ID	\$GPGGA		GGA protocol header
UTC Time	064951.00		hhmmss.ss
Latitude	2307.1256167		ddmm.mmmmmmm
N/S Indicator	N		N=north or S=south
Longitude	12016.4438725		dddmm.mmmmmmm
E/W Indicator	E		E=east or W=west
Position Fix Indicator	1		See Table-3
Satellites Used	08		Range 00 to 14
HDOP	0.95		Horizontal Dilution of Precision
MSL Altitude	39.90	meters	Antenna Altitude above/below mean-sea-level
Units	M	meters	Units of antenna altitude
Geoidal Separation	17.80	meters	
Units	M	meters	Units of geoid separation
Age of Diff. Corr.		second	Null fields when DGPS is not used
Stn ID			Differential base station ID, 0000-1023
Checksum	*65		
<CR> <LF>			End of message termination

Table-3: Position Fix Indicator	
Value	Description
0	Fix not available
1	GPS fix
2	C/A differential GPS
9	SBAS

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RMC—Recommended Minimum Navigation Information

Table-4 contains the values for the following example :

\$GPRMC,064951.00,A,2307.1256218,N,12016.4438672,E,0.041,165.4,260406,,E,A*55

Table-4: RMC Data Format			
Name	Example	Units	Description
Message ID	\$GPRMC		RMC protocol header
UTC Time	064951.00		hhmmss.ss
Status	A		A=data valid or V=data not valid
Latitude	2307.1256218		ddmm.mmmmmmm
N/S Indicator	N		N=north or S=south
Longitude	12016.4438672		dddmm.mmmmmmm
E/W Indicator	E		E=east or W=west
Speed over Ground	0.041	knots	
Course over Ground	165.4	degrees	True
Date	260406		ddmmyy
Magnetic Variation		degrees	
Variation Indicator	E		E=east or W=west
Mode	A		A= Autonomous mode D= Differential mode E= Estimated mode
Checksum	*55		
<CR> <LF>			End of message termination

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VTG—Course and speed information relative to the ground

Table-5 contains the values for the following example:

```
$GPVTG,114.990,T,114.990,M,0.041,N,0.076,K,A*37
```

Table-5: VTG Data Format			
Name	Example	Units	Description
Message ID	\$GPVTG		VTG protocol header
Course	114.990	degrees	Measured heading
Reference	T		True
Course	114.990	degrees	Measured heading
Reference	M		
Speed	0.041	knots	Measured horizontal speed
Units	N		Knots
Speed	0.076	km/hr	Measured horizontal speed
Units	K		Kilometers per hour
Mode	A		A= Autonomous mode D= Differential mode E= Estimated mode
Checksum	*06		
<CR> <LF>			End of message termination

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GSV—GNSS Satellites in View

Table-6 contains the values for the following example :

\$GPGSV,3,1,09,29,36,029,42,21,46,314,43,26,44,020,43,15,21,321,39*7D

\$GPGSV,3,2,09,18,26,314,40,09,57,170,44,06,20,229,37,10,26,084,37*77

\$GPGSV,3,3,09,07,,,26*73

Table-9: GSV Data Format			
Name	Example	Units	Description
Message ID	\$GPGSV		GSV protocol header
Number of Messages	3		Range 1 to 3 <i>(Depending on the number of satellites tracked, multiple messages of GSV data may be required.)</i>
Message Number1	1		Range 1 to 3
Satellites in View	09		
Satellite ID	29		Channel 1 (Range 1 to 32)
Elevation	36	degrees	Channel 1 (Maximum 90)
Azimuth	029	degrees	Channel 1 (True, Range 0 to 359)
SNR (C/No)	42	dBHz	Range 0 to 99, (null when not tracking)
....
Satellite ID	15		Channel 4 (Range 1 to 32)
Elevation	21	degrees	Channel 4 (Maximum 90)
Azimuth	321	degrees	Channel 4 (True, Range 0 to 359)
SNR (C/No)	39	dBHz	Range 0 to 99, (null when not tracking)
Checksum	*7D		
<CR> <LF>			End of message termination

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GSA—GNSS DOP and Active Satellites

Table-7 contains the values for the following example :

\$GPGSA,M,3,29,21,26,15,18,09,06,10,,,,,2.5,1.3,2.1*00

Table-4: GSA Data Format			
Name	Example	Units	Description
Message ID	\$GPGSA		GSA protocol header
Mode 1	M		See Table-8
Mode 2	3		See Table-9
Satellite Used	29		SV on Channel 1
Satellite Used	21		SV on Channel 2
....
Satellite Used			SV on Channel 12
PDOP	2.5		Position Dilution of Precision
HDOP	1.3		Horizontal Dilution of Precision
VDOP	2.1		Vertical Dilution of Precision
Checksum	*00		
<CR> <LF>			End of message termination

Table-8: Mode 1	
Value	Description
M	Manual—forced to operate in 2D or 3D mode
A	2D Automatic—allowed to automatically switch 2D/3D

Table-9: Mode 2	
Value	Description
1	Fix not available
2	2D (< 4 SVs used)
3	3D (≥ 4 SVs used)

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6. Active Antenna (Internal Antenna)

ANTENNA ELEMENT	
Center Frequency	1588MHz ±3 MHz
Polarization	R.H.C.P.
Axial Ratio	3.0 dB Max
Impedance	50 Ω
LOW NOISE AMPLIFIRE	
Frequency	1575MHz ±2 MHz
VSWR@1575MHz	2.0 : 1
Impedance	50 Ω
LNA Gain	25dB ±2dB
Noise Figure	2.0dB Max[Typical 1.5dB]
Filter Band Attenuation	15dB @Fo ±50 MHz
Voltage	DC 2.8~3.6V
Current	20mA (max)
MECHANICAL	
Height	103mm
Width	φ110mm
Connector	N Type , TNC
Mounting	Bracket
ENVIROMENTAL	
Operating Temp.	-40 °C ~ +85 °C

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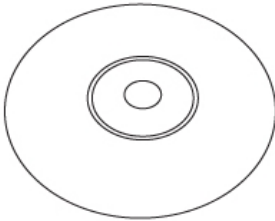
7. Accessories

1. Data cable



기기 Cable Cable length 2m Dsub9:Female(암)

2. CD ROM



3.Charger & Power Cable



기기 Cable Cable length 2m USB A Plug

8. Contact

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 Rm. 710, 7F, Halla Sigma Velley B/D, Gasandigital 2Ro 53,
 Geumcheon-gu, Seoul, Korea

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