



AP10-H



Accurate
positioning

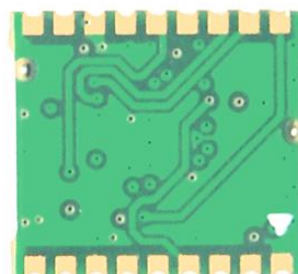
22°39'48.37"N 114°02'10.91"E



JS-AP10-H

PRODUCT SPECIFICATION

Data Sheet



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Change History of Revision

[illegible]

1 Functional description

1.1 Overview

The AP10-H uses a Single frequency multi-mode solution with low power consumption and low cost. It is multi-GNSS(GPS ,QZSS, SBAS, BDS, Galileo). Integrated multi-band multi-system GNSS RF baseband. This newly designed architecture allows the microcontroller to achieve sub-meter position accuracy without the need for calibration data from the ground enhancement station, with higher sensitivity, greater immunity to interference and multipath performance. It is very robust in the environment.

1.2 Product features

- Build on high performance GNSS single chip
- Default 1Hz navigation update rate
- Configurable peripheral IO pins
- Low power consumption
- Single supply with wide voltage range
- Up to 10Hz navigation update rate
- Supports GPS ,QZSS, SBAS, BDS , Galileo simultaneously by firmware support
- Supports AGPS
- Integrated TCXO, LNA, SAW, RTC
- Compact size(10.5mm x 9.7mm x 2.3mm±0.3mm) suitable for space-sensitive application
- Support standard NMEA 0183 V4.00 /V4.10 protocol

1.3 Performance

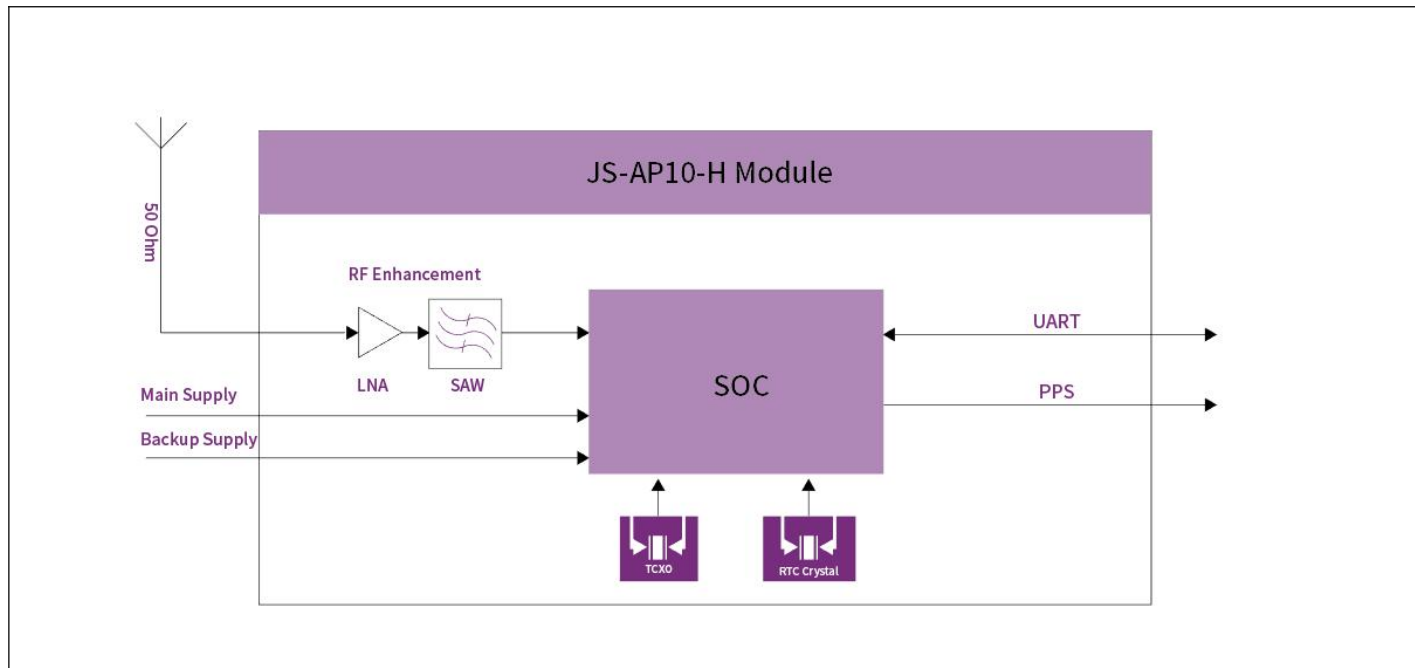
Parameter	Specification
Receiver type	■GPS L1C/A ■Galileo E1B/C ■BDS B1I B1C ■SBAS L1C/A ■QZSS L1C/A
Sensitivity	Tracking & Navigation -162dBm Reacquisition -159dBm Cold Start -148dBm
Time-To-First-Fix ¹	Cold Start 28 s Hot Start 1 s
Horizontal position accuracy ²	GNSS 2.5 m CEP SBAS 2.0 m CEP D-GNSS 1.0m CEP
Accuracy of time pulse signal	RMS 25ns
Velocity accuracy ³	GNSS 0.1 m/s CEP SBAS 0.05 m/s D-GNSS 0.05m/s
Operational limits ⁴	Dynamics ≤ 4 g Altitude 18000 m Velocity 515 m/s
Baud rate	9600 ~ 460800 bps, (Default 9600bps)
Max navigation update rate	10 Hz (Default 1Hz)

¹ All satellites at ≥-130dBm

² Open sky, 24 hours static, ≥-130dBm, > 6SVs, CEP 50%

- 3 50% @ 30m/s dynamic operation
- 4 Assuming Airborne < 4 g platform

1.4 Block Diagram



1.5 Serial Communication Interfaces

1.5.1 UART

HD8120 series has 3 Universal Asynchronous Receiver/Transmitter (UART) interfaces. The features of each UART include:

- Two channels with full duplex operation
- Range: 9600 bps~460800 bps the default baud rate is 9600 bps
- Programmable serial interface
- Support ISO/IEC 7816
- Hardware flow control signals shared for UART0

1.6 Time Synchronization Interfaces

1.6.1 PPS

An extremely accurate time pulse signal "Pulse Per Second" (PPS) generated by GNSS can be output to designated pin. It is useful in many timing applications. The pulse interval can be adjusted by changing internal parameters.

1.7 Protocols

Protocol	Type
NMEA 0183 V4.00/V4.10	Input/output, ASCII

1.8 Antenna

The AP10-H module are designed for use with passive and active antennas.

Parameter	Specification
Active antenna recommendations	Minimum gain 15 dB (to compensate signal loss in RF cable)
	Maximum gain 30 dB
	Maximum noise figure 1.5 dB

1.9 Product Application

- UAV
- Automotive application
- AVL and Location-Based services
- Marine navigation, fleet management
- Handheld GPS receiver application
- Intelligent logistics scheduling
- Personnel protective
- Ideal for PDA, pocket PC
- Car navigation and tracking
- Intelligent robot

2 Pin definitions

2.1 Pin assignment

TOP View

10	GND	RESET	9
11	RF_IN	VCC	8
12	GND	NC	7
13	NC	V_backup	6
14	VCC_RF	NC	5
15	NC	1PPS	4
16	NC	RXD	3
17	NC	TXD	2
18	NC	GND	1

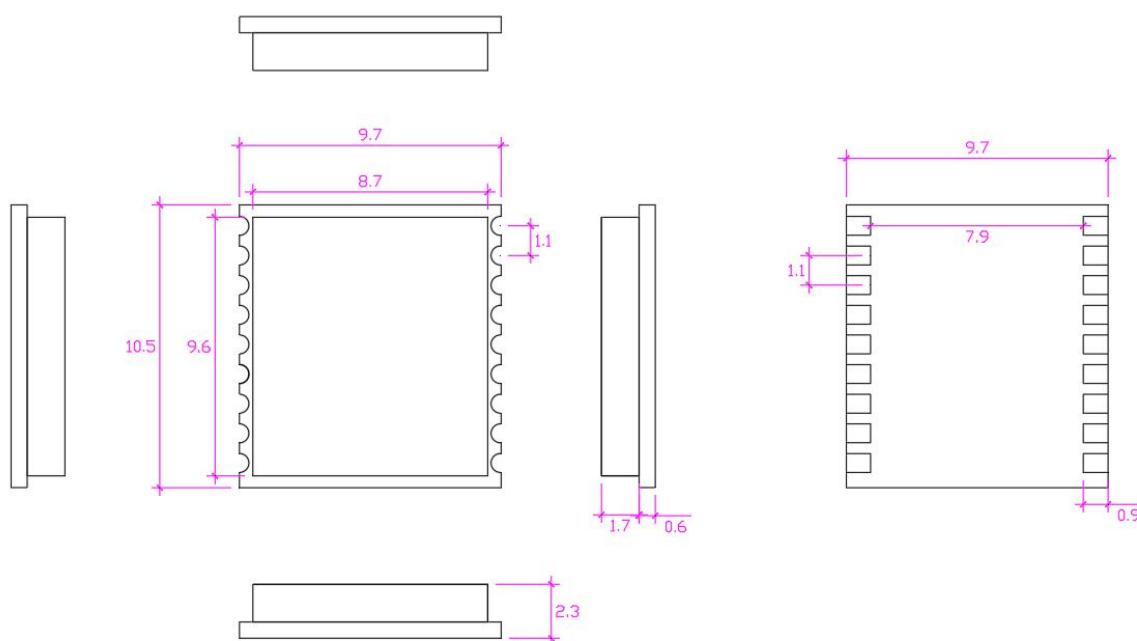
No.	Name	I/O	Description
1,10,12	GND	G	Ground
2	TXD	O	TTL Output (keep open if not used)
3	RXD	I	TTL Input (keep open if not used)
4	1PPS	O	Time Pulse (keep open if not used)
6	V_backup	I	Backup voltage supply
5,7,13,15,16,17,18	NC	--	NC (keep open if not used)
8	VCC	P	Main Supply
9	RESET	O	RESET_N (Active low, keep open if not used)
11	RF_IN	I	GNSS Signal Input
14	VCC_RF	O	Output Voltage RF section (keep open if not used)

✋₁ Some function require custom firmware, please contact us

3 Electrical specifications

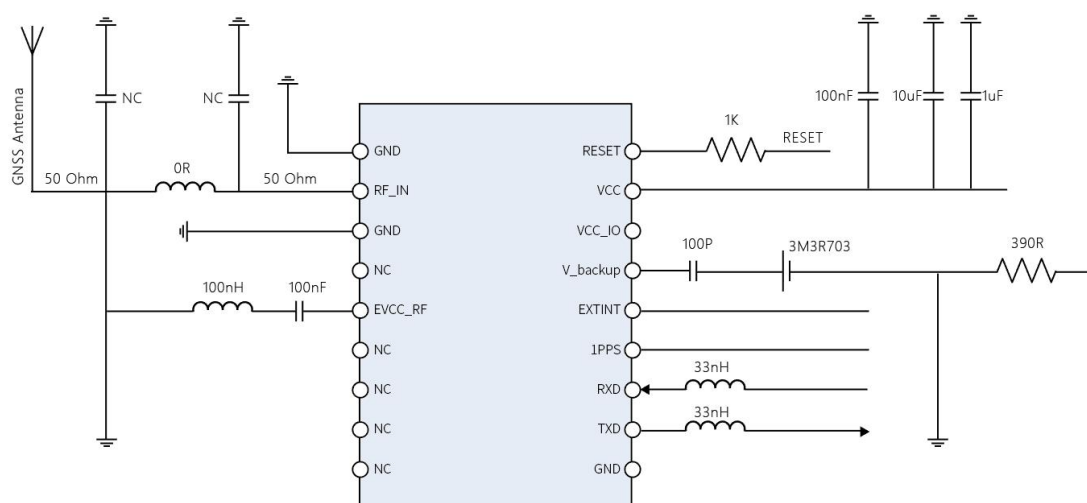
Parameter	Symbol	Min	Type	Max	Units
Power supply voltage	VCC	1.8	3.3	3.6	V
Average supply current	Acquisition	20@3.3V	22@3.3V	24@3.3V	mA
	Tracking	18@3.3V	20@3.3V	22@3.3V	mA
Backup battery voltage	V_BACK	1.6	3.3	3.6	V
Backup battery current	I_BACK		12uA@3.3V		uA
Digital IO voltage	Div	1.8		3.6	V
Storage temperature	Tstg	-40		85	°C
Operating temperature	Topr	-40		85	°C
Humidity				95	%

4 Mechanical specifications



units: mm dimension error:±0.3mm

5 Application Circuit



6 RoHS

This product is RoHS compliance

7 Recommended Reflow Profile (If need)

7.1 GNSS module before the SMT note:

- 7.1.1 When customers Open stencil must be sure the hole bigger to the GNSS module plate, please press 1 to 1 and 0.7 mm is widened to open outward, the thickness of 0.12 mm.
- 7.1.2 Can't get the GNSS module bare hands when needs, must we wear the gloves and static ring.
- 7.1.3 The furnace temperature according to the size of the customer the main board, generally like to stick on a tablet standard temperature of 250 + - 5, can do 260 + - 5.

7.2 Storage and use GNSS module control should pay attention to the following matters:

- 7.2.1 Storage life: 12 months. Storage conditions: <40°C. Relative humidity: <90%R.H.

7.2.2 After this bag is opened, devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing must be.

7.2.3 Check the humidity card: stored at $\leq 20\%RH$. If: 30%~40%(pink) or greater than 40%(red). Labeling module has moisture absorption.

7.2.4 Mounted within 168 hours at factory conditions of: $t \leq 30^{\circ}C$, $\leq 60\%R.H$.

7.2.5 Once opened, the preservation of life in the workshop is 168 hours.

7.3 If baking is required, devices may be baked for:

7.3.1 Modules must be to remove module moisture problem.

7.3.2 Baking temperature: $125^{\circ}C$, 8 hours.

7.3.3 After baking, put the proper amount of desiccant to seal packages.

7.4 The actual number of module vacuum packing which is based on the actual number of packages to the customer requirements.

7.5 Module reel packaging items as follows.

7.5.1 Storage life: 12 months. Storage conditions: $< 40^{\circ}C$. Relative humidity: $< 90\%R.H$.

7.5.2 Module apart packing after 168 hours, To launch patch need to bake, to remove the module hygroscopic, baking temperature conditions: $125^{\circ}C$, 8 hours.

7.5.3 The actual number of module reel packing which is based on the actual number of packages to the customer requirements.

7.6 Module pallet packaging items as follows:

7.6.1 Storage life: 3 months. Storage conditions: $< 40^{\circ}C$. Relative humidity: $< 90\%R.H$.

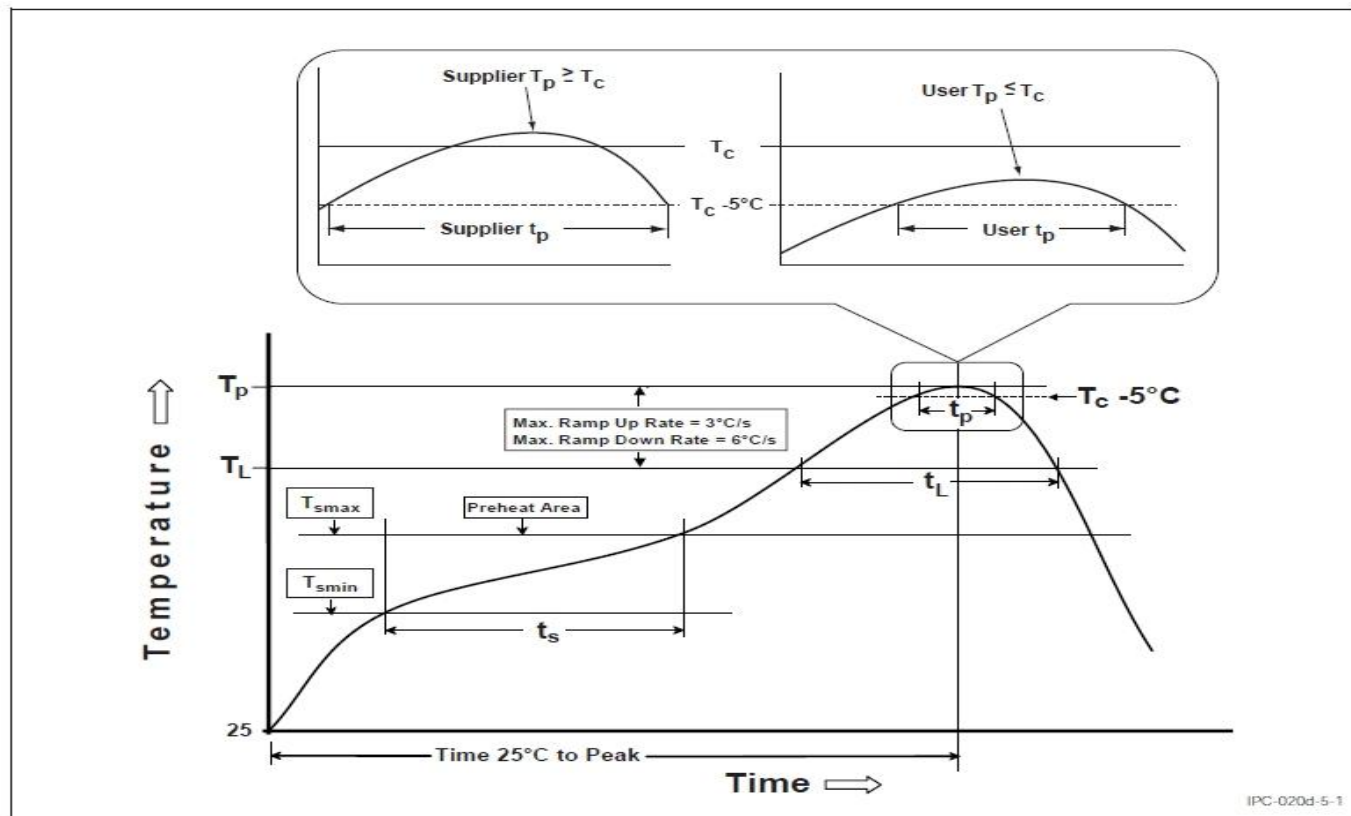
7.6.2 Module if not used within 48 hours, before launching the need for baking, baking temperature: $125^{\circ}C$, 8 hours.

7.6.3 Pallet packaging each plate is 100 PCS. The actual number of module pallet packing which is based on the actual number of packages to the customer requirements.

7.6.4 Pb-Free Process-Classification Temperatures(T_a)

Package Thickness	Volume mm^3 < 350	Volume mm^3 350 - 2000	Volume mm^3 > 2000
< 1.6 mm	$260^{\circ}C$	$260^{\circ}C$	$260^{\circ}C$
1.6mm - 25 mm	$260^{\circ}C$	$250^{\circ}C$	$245^{\circ}C$
> 2.5 mm	$250^{\circ}C$	$245^{\circ}C$	$245^{\circ}C$

7.6.5 temperature curve



Profile Feature	Pb-Free Assembly
Preheat/Soak	150 °C
Temperature Min (T _{smin})	200 °C
Temperature Max (T _{smax})	60-120 seconds
Time (t _s) from (T _{smin} to T _{smax})	
Ramp-down rate (T _L to T _p)	3 °C/second max.
Liquidous temperature (T _L)	217 °C
Time (t _L) maintained above T _L	60-150 seconds
Peak package body temperature	For users T _p must not exceed the Classification temp in Table 7.6.4 For users T _p must not exceed the Classification temp in Table 7.6.4
Time(t _p)* within 5 °C of the specified classification temperature (T _c), see Figure 7.6.5	30* seconds

Ramp-down rate (to T)	6 °C/ second max.
Time 25 °C to peak temperature	8 minutes max
*Tolerance for peak profile temperature (T _P) is defined as a supplier minimum and a user maximum.	

