

| Product Name | Description | Version |
|--------------|--|---------|
| HAWK A1 | Dual-frequency multi-constellation GNSS receiver | 0.3 |



1 Introduction

HAWK A1 is dual-frequency GNSS receiver designed for Pixhawk(PX4)-based platform UAV. The receiver is capable of concurrently tracking all global civil navigation systems, including GPS, GLONASS, GALILEO, BEIDOU and QZSS. It acquires both L1 and L5 signals at a time while providing the sub-meter position accuracy.

The built-in lightweight helical antenna not only enhances GNSS positioning stability, but also increases the flight time of the drone. The fast Time-To-First-Fix, GNSS convergence, superior sensitivity, low power consumption make it a better choice for Pixhawk(PX4)-based platform UAV.

2 Features

- Concurrent reception of L1 and L5 band signals
- Support GPS, GLONASS, BEIDOU, GALILEO, QZSS
- Capable of SBAS (WAAS, EGNOS, MSAS, GAGAN)
- Support 135-channel GNSS
- Fast TTFF at low signal level
- Free hybrid ephemeris prediction to achieve faster cold start
- Default 5Hz, up to 10 Hz update rate*
- Build-in super capacitor to reserve system data for rapid satellite acquisition
- Three LED indicator for Power, PPS and Data transmit

*Note: SBAS support 5Hz only.

3 Application

- Unmanned aerial vehicle (UAV) positioning and navigation

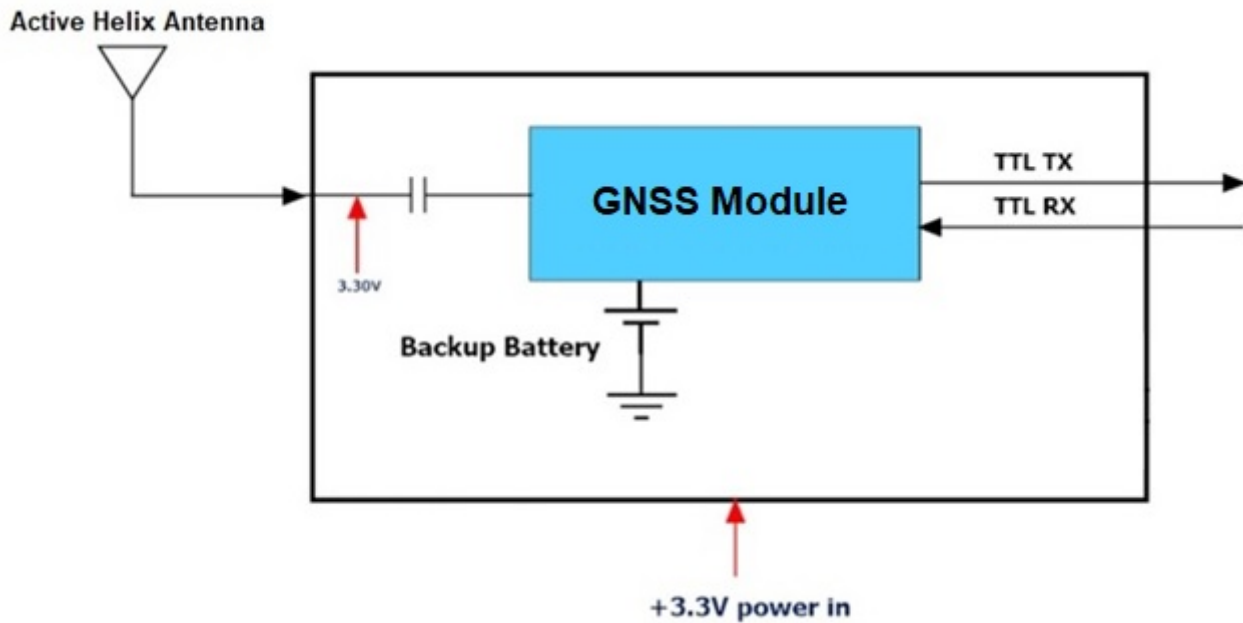


Fig 3-1 System block diagram

4 Pin assignment and LED description



| No | Name | Description |
|-------|-----------|-------------------------------------|
| LED 1 | TX LED | Green, GNSS data transmit indicator |
| LED 2 | Power LED | Red, Power indicator |
| LED 3 | PPS LED | Blue, PPS indicator |

| Pin No | Name | Type | Description |
|--------|----------|------|---|
| 1 | VCC | P | DC supply voltage 3.3V ~ 5.0V input |
| 2 | GNSS_RX | I/O | Receive Data Input |
| 3 | GNSS_TX | I/O | Transmit Data Output |
| 4 | GNSS_PPS | O | GNSS pulse per second, 100ms pulse width, 1.8V DC |
| 5 | NC | | NC |
| 6 | NC | | NC |
| 7 | I2C_CLK | I/O | Magnetometer's I2C serial clock |
| 8 | I2C_DAT | I/O | Magnetometer's I2C serial data |
| 9 | GND | P | Ground |

4.1 Cable pin assignment



| NO | Pin No | Name | Type | Description |
|----|--------|---------|------|--|
| 1 | Red | VCC | P | Red, DC supply voltage 3.3V ~ 5.0V input |
| 2 | Green | GNSS_RX | I/O | Green, Receive Data Input |
| 3 | Yellow | GNSS_TX | I/O | Yellow, Transmit Data Output |
| 4 | NC | | | |
| 5 | NC | | | |
| 6 | Black | GND | P | Black, Ground |

5 GNSS receiver

| | | |
|------------------|--|--|
| Frequency | GPS/QZSS: L1 C/A, L5C GLONASS: L1OF BEIDOU: B1I, B2a GALILEO: E1, E5a | |
| Channels | Support 135 channels | |
| Update rate | 5Hz default, up to 10Hz | |
| Acquisition Time | Hot start (Open Sky) | 2s (typical) |
| | Cold Start (Open Sky) | 28s (typical) without AGPS |
| PPS | 100ms pulse width, 1.8Vdc | |
| Datum | WGS-84 (default) | |
| Max. Altitude | < 18,000 m | |
| Max. Velocity | < 500 m/s | |
| Protocol Support | UBX | 230400 bps, 8 data bits, no parity, 1 stop bits (default) 5Hz: UBX-NAV-PVT, UBX-NAV-DOP 1Hz: UBX-NAV-TIMEGPS |

6 DC & Temperature characteristics

6.1 DC Electrical characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Units |
|------------------------------|-----------------|----------------------|------|---------------------|-------|
| Input voltage | V _{CC} | 3.3 | 3.3 | 5.0 | V |
| Input current ⁽¹⁾ | I _{CC} | | 67 | 87 | mA |
| High Level Input Voltage | V _{IH} | 0.7*V _{CC} | | V _{CC} | V |
| Low Level Input Voltage | V _{IL} | 0 | | 0.2*V _{CC} | V |
| High Level Output Voltage | V _{OH} | V _{CC} -0.4 | | | V |
| Low Level Output Voltage | V _{OL} | | | 0.4 | V |
| High Level Output Current | I _{OH} | | 4 | | mA |
| Low Level Output Current | I _{OL} | | 4 | | mA |

Note 1: Measured when position fix (1Hz) is available, the function of self-generated ephemeris prediction is inactive.

6.2 Temperature characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Units |
|-----------------------|------------------|------|------|------|-------|
| Operating Temperature | T _{opr} | -20 | - | 60 | °C |
| Storage Temperature | T _{stg} | -20 | - | 65 | °C |

Note: The operating and storage temperature of the built-in micro battery are -20 ~ +60 °C.

7 Mechanical specification



8 Ordering information

| Product name | Description | Remark |
|----------------|--|--|
| HAWK A1 | Dual-frequency multi-constellation GNSS receiver | GPS/QZSS: L1 C/A, L5C GLONASS: L1OF GALILEO: E1, E5a BEIDOU: B1I, B2a |

9 Suggesting mounting area



10 Packing information: Receiver + Helix antenna +Connector



Document change list

Revision 0.1

- Preliminary release on December 27, 2021.

Revision 0.2 (April 11, 2022)

- Remove product of LU23031-V2e.

Revision 0.3 (September 1, 2022)

- Revised product from LU23031-V2 to HAWK A1.