Product Name	Description	Version
HAWK R1	Dual-frequency multi-constellation RTK receiver	0.2
HAWK R2	Dual-frequency multi-constellation RTK receiver with e-compass	

1 Introduction

HAWK R1、R2 both are dual-frequency RTK 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 centimeter-level RTK positioning accuracy.

The built-in lightweight helical antenna not only enhances RTK positioning stability, but also increases the flight time of the drone. The fast Time-To-First-Fix, RTK 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
- HAWK R2 integrated with e-compass module (3-axis magnetometer)

*Note: SBAS support 5Hz only.

3 Application

- Unmanned aerial vehicle (UAV) positioning and navigation

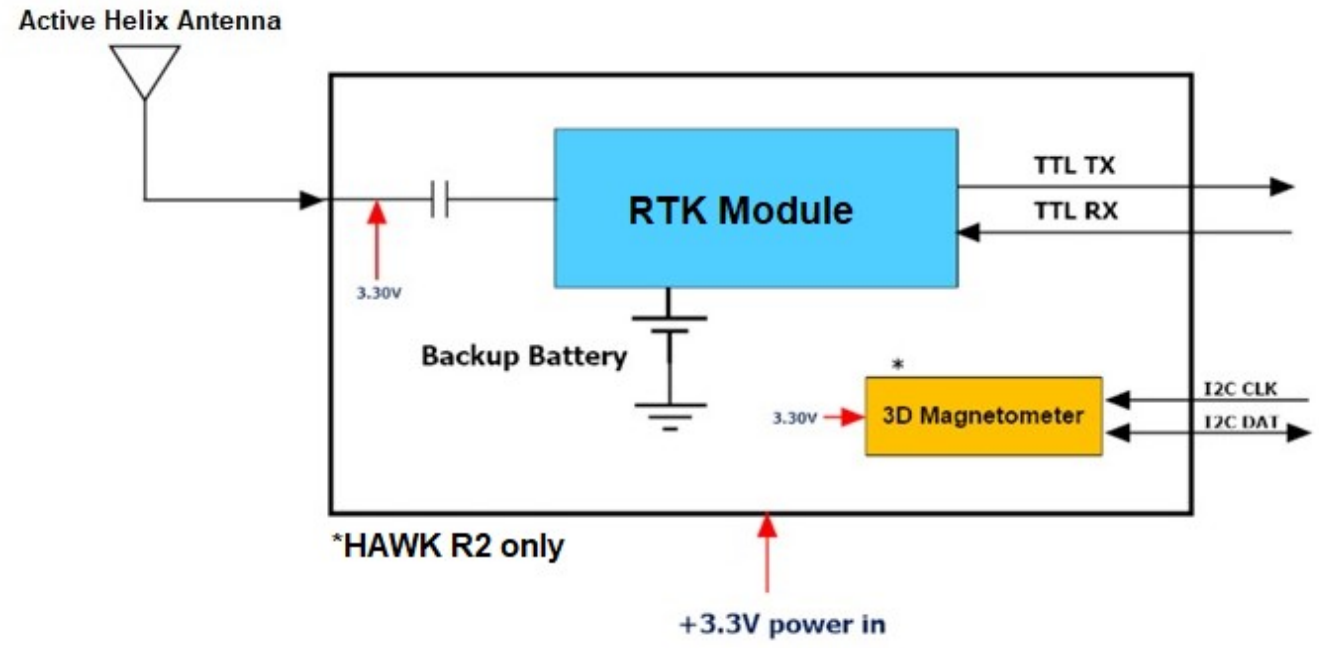

Fig 3-1 System block diagram of HAWK R1、HAWK R2

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

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	White	I2C_CLK	I/O	White, Magnetometer's I2C serial clock
5	Blue	I2C_DAT	I/O	Blue, Magnetometer's I2C serial data
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	Vcc	3.3	3.3	5.0	V
Input current(1)	Icc		67	87	mA
High Level Input Voltage	V_{IH}	0.7*Vcc		Vcc	V
Low Level Input Voltage	V_{IL}	0		0.2*Vcc	V
High Level Output Voltage	V_{OH}	Vcc-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	Topr	-20	-	60	℃
Storage Temperature	Tstg	-20	-	65	℃

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

7 Mechanical specification

8 Ordering information

Product name	Description	Remark
HAWK R1	Dual-frequency multi-constellation RTK receiver	GPS/QZSS: L1 C/A, L5C GLONASS: L1OF GALILEO: E1, E5a BEIDOU: B1I, B2a
HAWK R2	Dual-frequency multi-constellation RTK receiver with e-compass	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

Note: **HAWK R1** (include Cable 1)

HAWK R2 (include Cable 2)