

Product name	Description	Version
RTK-1010	Dual-frequency multi-constellation GNSS RTK module	0.7



## 1 Introduction

The RTK-1010 is a high-performance dual-band GNSS RTK module that designed for applications requiring centimeter level positioning accuracy. It adopts 12 nm process and integrate efficient power management architecture to perform low power and high sensitivity. The module supports concurrent reception of GPS, GLONASS, BeiDou, GALILEO, and QZSS to improve the availability and reliability of RTK solution even in the harsh environment.

## 2 Features

- Dual-frequency and multi-constellation RTK positioning solution
- Support GPS, GLONASS, GALILEO, BEIDOU and QZSS
- Capable of SBAS (WAAS, EGNOS, MSAS, GAGAN)
- Support 135-channel GNSS
- Low power consumption
- Fast TTFF at low signal level
- Up to 10 Hz update rate
- Small form factor 10.1 x 9.7 x 2.2 mm
- SMD type with stamp holes; RoHS compliant
- IATF 16949 quality control

## 3 Application

- Precision Agriculture
- AGV Robotics
- V2X / ETC / 5G Station
- Structural / Land Monitoring
- Offshore / Marine Application

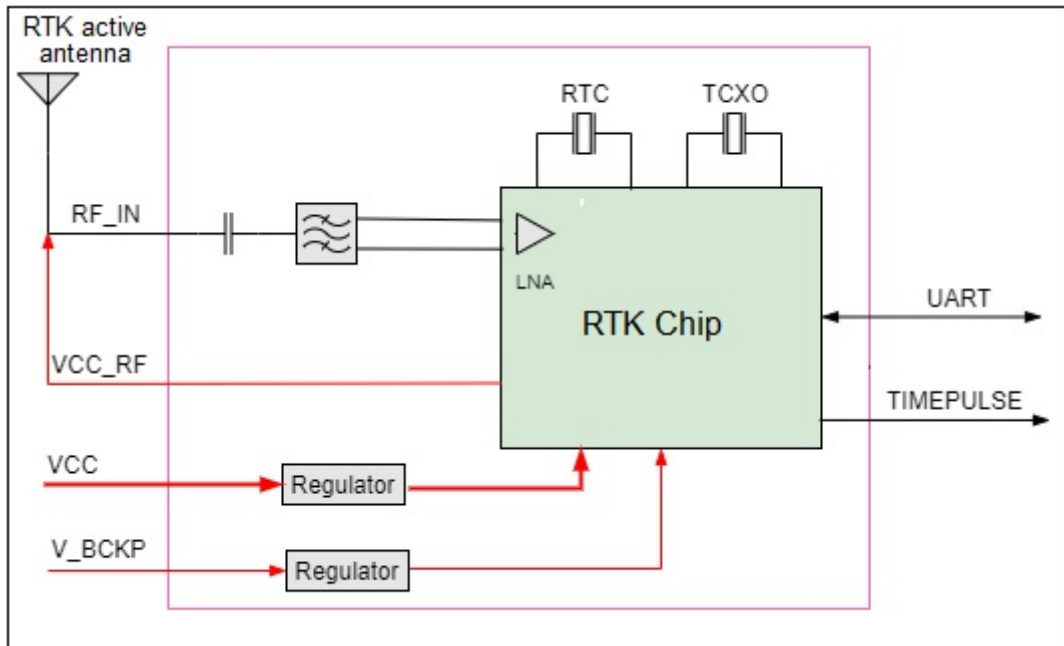


Fig 3-1 System block diagram.

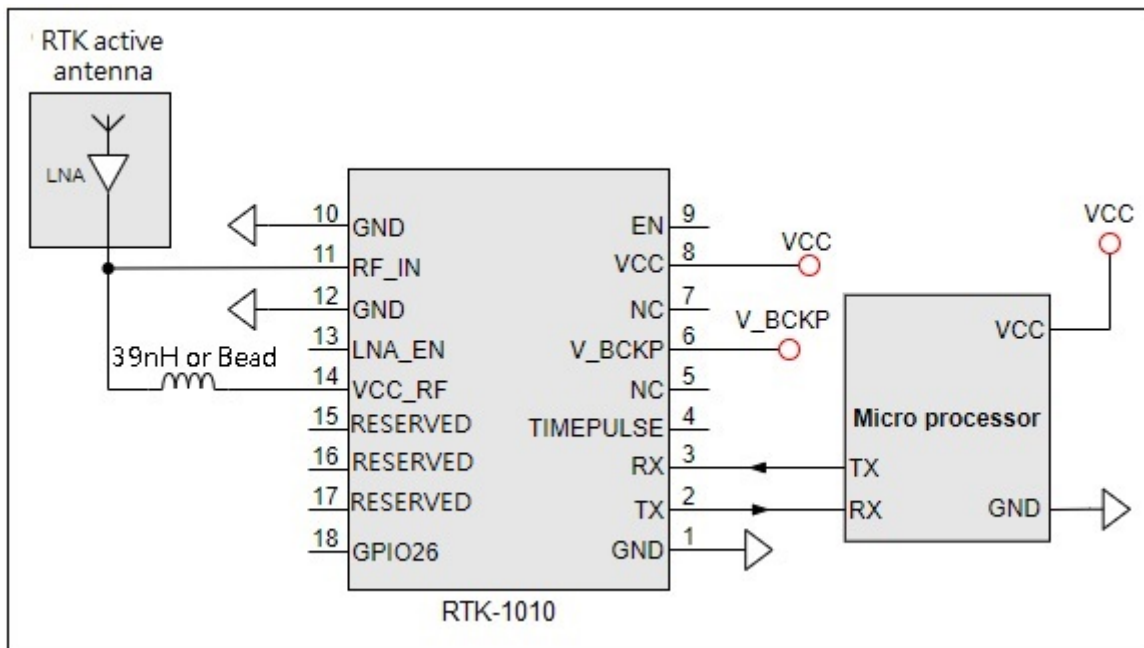


Fig 3-2 Typical application circuit that uses an active antenna.

4 GNSS receiver

Frequency	GPS/QZSS: L1 C/A, L5C GLONASS: L1OF GALILEO: E1, E5a BEIDOU: B1I, B2a	
Channels	Support 135 channels	
Update rate	1Hz default, up to 10Hz	
Sensitivity	Tracking	-165dBm (with external LNA)
	Cold start	-148dBm (with external LNA)
Acquisition Time	Cold start (open sky)	28s (typical)
	RTK Convergence time	< 10s (typical; after 3D fix)
Position Accuracy <sup>(1)</sup>	Autonomous	< 1.5m CEP
	RTK <sup>(2)</sup>	0.01m + 1ppm (Horizontal)
Max. Altitude	< 18,000 m	
Max. Velocity	< 500 m/s	
Protocol Support	NMEA 0183 ver. 4.1	115200 bps <sup>(3)</sup> , 8 data bits, no parity, 1 stop bits (default) 1Hz : GGA, GLL, RMC 0.2Hz : GSA,GSV
	Raw data	115200 bps, RTCM V3.3, message type 1005, 1074, 1084, 1094, 1114, 1124

Note 1: Open sky, dual band, demonstrated with a good external LNA.

Note 2: CEP, 24hr static.

Note 3: Both baud rate output message rate are configurable to be factory default.

6 Pin assignment and descriptions



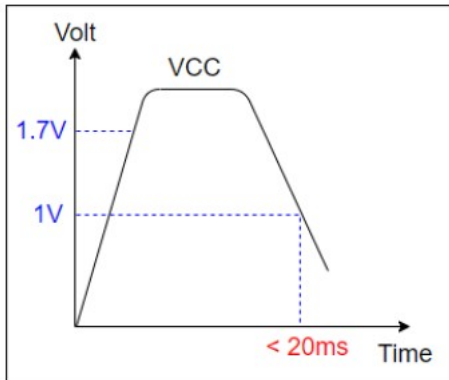
Table 6-1 Pin descriptions

Pin #	Name	Type	Description	Note
1	GND	P	Ground	
2	TX	O	Serial output	
3	RX	I	Serial input	
4	TIMEPULSE	O	Time pulse (PPS, default 100 ms pulse/sec when GNSS fix is available)	
5	NC		Not connect	
6	V_BCKP	P	Backup battery input. It is recommended to connect a backup supply voltage to V_BCKP in order to enable warm and hot start features. Moreover, V_BCKP is a must of the system running. If no backup power is available, connect V_BCKP to the main power supply (VCC).	
7	NC		Not connect	
8	VCC	P	DC supply input. Must be clean and stable.	1
9	EN	I	Enable the module, high active. Internal 10K ohm pull-up resistor to 1.8V. Setting this pin to low will disable “hot start” function, i.e. boot from “cold start” . Leave unconnected if not used.	
10	GND	P	Ground	
11	RF_IN	I	GNSS RF signal input The overall gain of the active antenna must be between 8dB	

			~ 25dB.	
12	GND	P	Ground	
13	LNA_EN	O	Output pin to control the external LNA. High active.	
14	VCC_RF	O	Output voltage for the active antenna	2
15	RESERVED	I	Leave this pin floating	
16	RESERVED	I/O	Leave this pin floating	
17	RESERVED	I/O	Leave this pin floating	
18	GPIO26	I/O	General purpose I/O	

<Note>

1. If an abnormal input voltage as shown in the figure below is input, even if the correct voltage is input again later, the module may not work until V\_BCKP pin is re-powered.



2. VCC\_RF is controlled by EN pin (pin 9).