Product name	Description	Version
RTK-1722-DR	High precision dead reckoning module	0.3

1 Introduction

LOCOSYS RTK-1722-DR is a dual-frequency multi-constellation GNSS module providing RTK high precision and sensor fusion solution. It not only supports GPS, GLONASS, GALILEO, BEIDOU and QZSS, but also has inertial sensors (3-axis accelerometers and 3-axis gyros) to provide dead reckoning. It will detect if there is an odometer connection or vehicle speed input, and then automatically operate in ADR or UDR mode.

Raw data of the inertial sensors and vehicle's altitude including pitch, roll and heading angles can be output for the driver behavior analysis. For example, the internet connected vehicles can automatically send emergency calls (e.g., E-Call) for help based on the vehicle's altitude. No requirement of installation orientation and automatic calibration function make it easy to use. With these features, RTK-1722-DR can reduce position errors in multipath environment and continue to work where GNSS signals are poor or not available, such as tunnels and indoor parking lots, as well as deliver seamless navigation.

2 Features

- Dual-frequency and multi-constellation RTK and dead reckoning.
- Support GPS, GLONASS, GALILEO, BEIDOU and QZSS
- Capable of SBAS (WAAS, EGNOS, MSAS, GAGAN)
- Support 135-channel GNSS
- Up to 10 Hz update rate
- Built-in MEMS sensor (3-axis gyroscope and 3-axis accelerometer)
- No requirement for installation orientation
- Auto detect and operate in ADR or UDR mode
- Support odometer (wheel-tick pulse) and forward/reverse signal input
- Support vehicle speed input from UART port
- Small form factor 17 x 22 x 2.2 mm
- SMD type with stamp holes; RoHS compliant

3 Application

- Automotive navigation

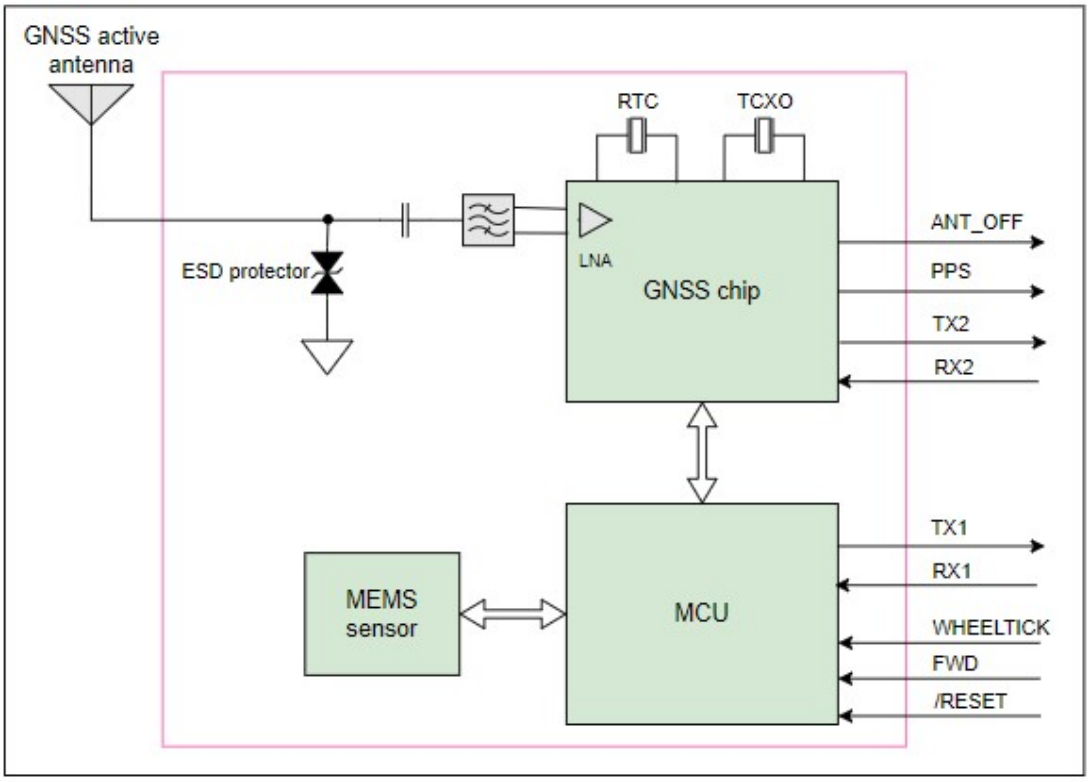

Fig 3-1 System block diagram.

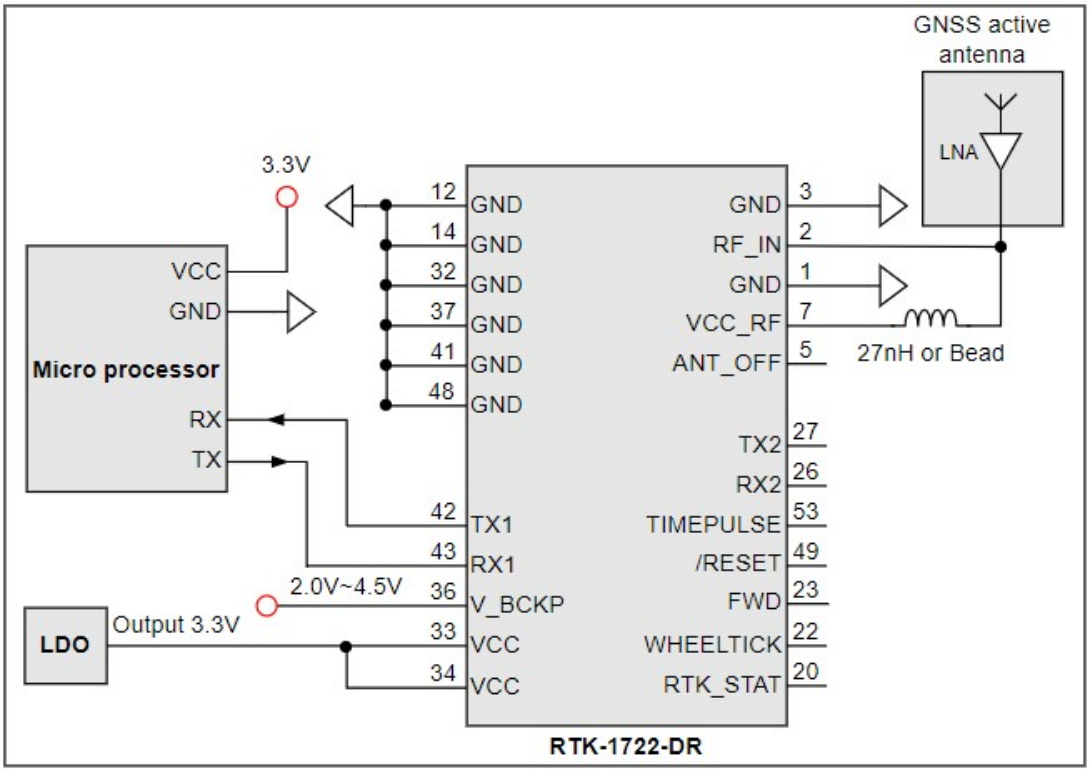

Fig 3-2 Typical application circuit

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	Hot start (Open Sky)	2s (typical)
	Cold Start (Open Sky)	28s (typical)
Position Accuracy	Autonomous	1.5m CEP (1)
	RTK	1cm + 1ppm (horizontal) CEP (1) 1.5cm + 1ppm (vertical) CEP (1)
	ADR mode	CEP ≤ 2% of distance travelled without GNSS (2)
	UDR mode	CEP ≤ 10% of distance travelled without GNSS (2)
Max. Altitude	< 18,000 m	
Max. Velocity	< 500 m/s	
Protocol Support	115200 bps (3), 8 data bits, no parity, 1 stop bits (default)	
	NMEA 0183 ver. 4.1	1Hz: GSA, GSV, GGA, RMC, GST, PLSVD, PINVMINR, PINVMSLOPE, PINVMATTIT
	RTCM V3.3	Message type 1005, 1074, 1084, 1094, 1114, 1124

<Note>

1. 24hr, static, open sky, demonstrated with good dual-frequency active antennas.
2. Test condition: after calibration, drive at 30 km/h for 60 seconds without GNSS signals.
3. Both baud rate and output message rate are configurable to be factory default.