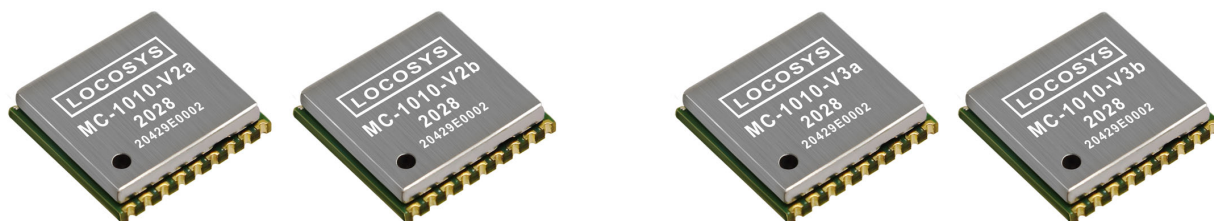| Product name	Description	Version
MC-1010-Vxx	Dual-frequency multi-constellation GNSS positioning module	1.0

1   Introduction

LOCOSYS MC-1010-Vxx series are high-performance dual-band GNSS positioning modules that are capable of tracking all global civil navigation systems. They adopt 12 nm process and integrate efficient power management architecture to perform low power and high sensitivity. Besides, concurrent reception of L1 and L5 band signals mitigates the multipath delay and achieves sub-meter position accuracy.

The modules support hybrid ephemeris prediction to achieve faster cold start. One is self-generated ephemeris prediction (called EASY) that is no need of both network assistance and host CPU's intervention. This is valid for up to 3 days and updates automatically from time to time when GNSS module is powered on and satellites are available. The other is server-generated ephemeris prediction (called EPO) that gets from an internet server. This is valid for up to 14 days. Both ephemeris predictions are stored in the on-board flash memory and perform a cold start time less than 15 seconds.

MC-1010-V3x with the active antenna can comply with the sensitivity specification contained in AIS 140 standard. It is the best solution to those customers that design tracking applications in compliance with AIS 140.

2   Features

- Support GPS, GLONASS, GALILEO, BEIDOU, QZSS and NAVIC
- Capable of SBAS (WAAS, EGNOS, MSAS, GAGAN) and QZSS SLAS
- Support 135-channel GNSS
- Ultra low power consumption (option)
- Fast TTFF at low signal level
- Free hybrid ephemeris prediction to achieve faster cold start
- Up to 10 Hz update rate
- ±10ns high accuracy time pulse (PPS)
- Support Linux and Android OS driver
- Protocol support binary output
- IATF 16949 quality control
- Small form factor 10.1 x 9.7 x 2.2 mm
- SMD type with stamp holes; RoHS compliant

3 Application

- Personal positioning and navigation
- Automotive navigation
- Autonomous Vehicle (ex: AVN/T-BOX/HUD)
- Marine navigation
- Fleet management
- Unmanned Aerial Vehicles
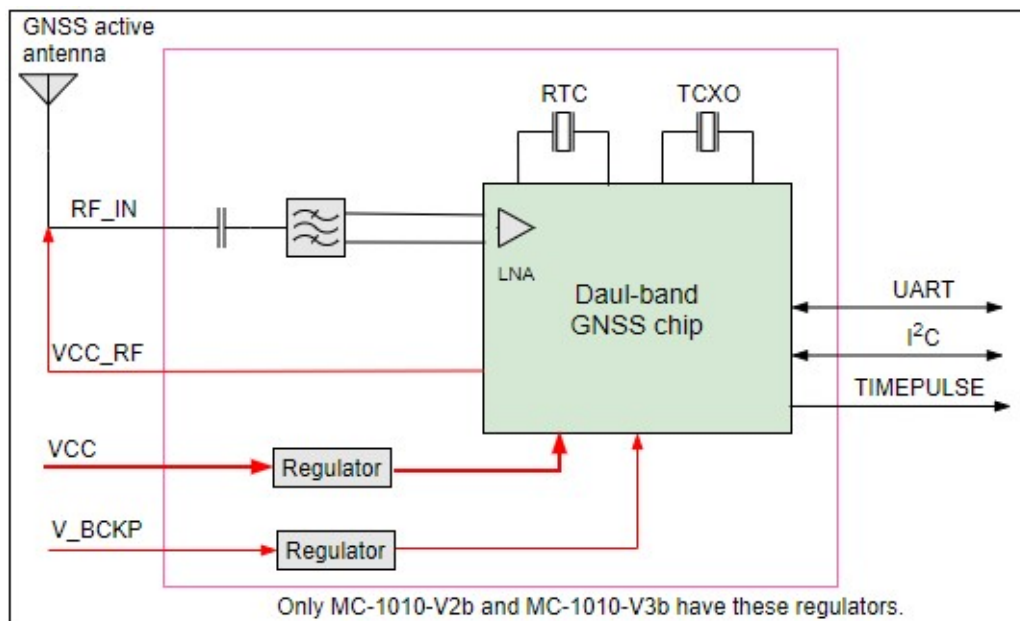- Hand-Held Device
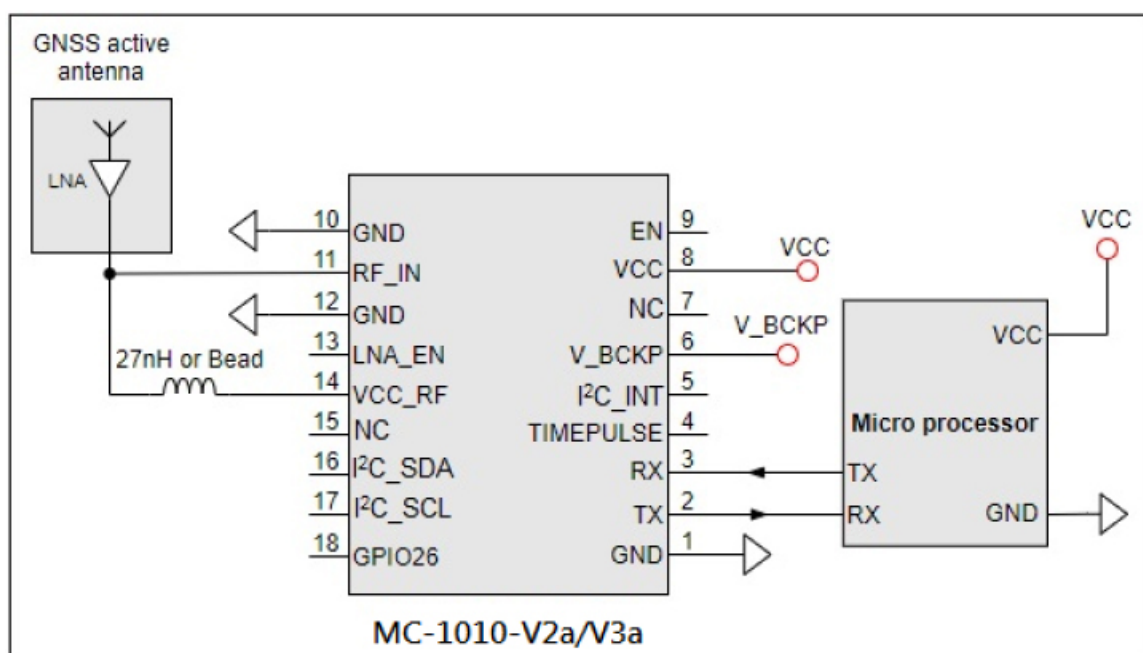- Tracker

Fig 3-1 System block diagram

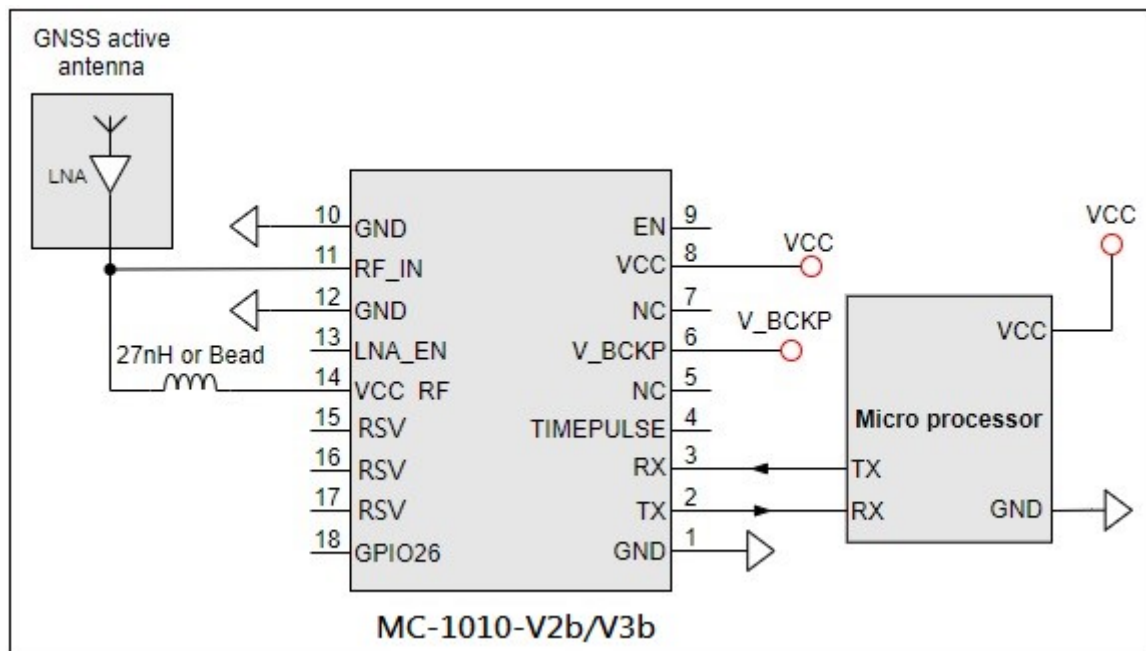Fig 3-2 Typical application circuit that uses an active antenna for MC-1010-Vxa (1.8V) Series

Fig 3-3 Typical application circuit that uses an active antenna for MC-1010-Vxb (3.3V) Series

Note: MC-1010-V3x with the active antenna can comply with the sensitivity specification contained in AIS 140 standard.

4 Product marking and ordering information

4.1 Product marking

The marking of the module is engraved on the metal shielding that has product information, such as LOCOSYS logo, product name and manufacturing date.

4.2 Ordering information

Product name	Description	Remark
MC-1010-V2a	Dual-frequency multi-constellation GNSS positioning module	1.8V GPS/QZSS: L1 C/A, L5C GLONASS: L1OF GALILEO: E1, E5a BEIDOU: B1I, B2a
MC-1010-V2b	Dual-frequency multi-constellation GNSS positioning module	**3.3V** GPS/QZSS: L1 C/A, L5C GLONASS: L1OF GALILEO: E1, E5a BEIDOU: B1I, B2a
MC-1010-V3a	Dual-frequency multi-constellation GNSS positioning module	1.8V GPS/QZSS: L1 C/A GLONASS: L1OF GALILEO: E1 BEIDOU: B1I IRNSS (NAVIC): L5.
MC-1010-V3b	Dual-frequency multi-constellation GNSS positioning module	**3.3V** GPS/QZSS: L1 C/A GLONASS: L1OF GALILEO: E1 BEIDOU: B1I IRNSS (NAVIC): L5

5 GNSS receiver

Frequency	MC-1010-V2a MC-1010-V2b	GPS/QZSS: L1 C/A, L5C GLONASS: L1OF GALILEO: E1, E5a BEIDOU: B1I, B2a
	MC-1010-V3a MC-1010-V3b	GPS/QZSS: L1 C/A GLONASS: L1OF GALILEO: E1 BEIDOU: B1I IRNSS (NAVIC): L5
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)	1s (typical)
	Cold Start (Open Sky)	28s (typical) without AGPS
		< 15s (typical) with AGPS (ephemeris prediction)
Position Accuracy	MC-1010-V2a MC-1010-V2b	Autonomous: 1.5m (CEP) [1]
	MC-1010-V3a MC-1010-V3b	Autonomous: 2.5m (CEP)
Max. Altitude	< 18,000 m	
Max. Velocity	< 500m/s	
Protocol Support [2]	NMEA 0183 ver. 4.1	115200 bps [3], 8 data bits, no parity, 1 stop bits (default) 1Hz: GGA, GLL, GSA, GSV, RMC, VTG, GST

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

Note 2: The module protocol support binary output, if customers want to the product to support it, please contact us in advance.

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