

RAK1910 WisBlock GNSS Location Module Datasheet

Overview

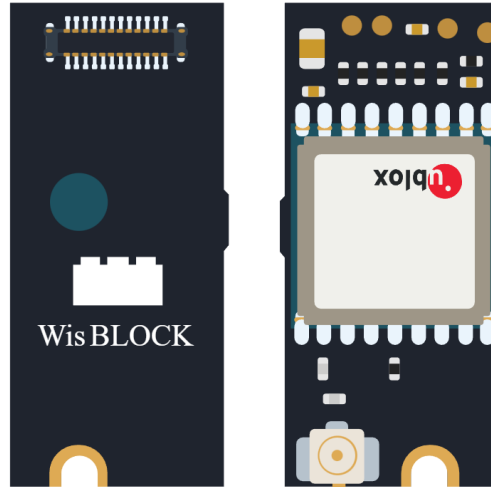


Figure 1: RAK1910 WisBlock GNSS Location Module

Description

The RAK1910 WisBlock GNSS Location Module module, part of the RAK Wireless Wisblock series, is a u-blox MAX-7Q GNSS (GPS, GLONASS, QZSS, and SBAS) module. This module features exceptional performance, high sensitivity, and minimal acquisition time, which makes it suitable for low-power IoT solutions. The RAK1910 positioning module is a GNSS receiver. It receives and tracks the GPS (including SBAS and QZSS) and the GLONASS signals. QZSS and SBAS signals (by default) can be received concurrently with GPS signals.

Features

- **Voltage Supply:** 3.3 V
- **Current Consumption:** 15 uA to 22 mA
- **Chipset:** u-Blox MAX-7Q
- High accuracy of 2.5 m
- **Update rate:** 10 Hz
- **Velocity accuracy:** 0.1 m/s
- **Heading accuracy:** 0.5 degrees
- Fast location fix. 29 sec from cold start to first fix. 1 sec from hot start
- GPS and GLONASS satellite support
- **Module size:** 10 x 23 mm

Specifications

Overview

Mounting

Figure 2 shows the mounting mechanism of the RAK12001 module on a [WisBlock Base](#) board. The RAK12001 module can be mounted on the slots: **A, E, F**.

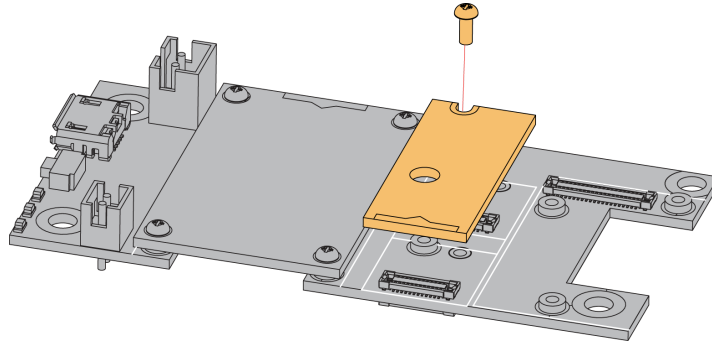


Figure 2: RAK1910 WisBlock GNSS Location Module Mounting

Hardware

The hardware specification is categorized into six parts. It shows the chipset of the module and discusses the pinouts, sensors, and the corresponding functions and diagrams. It also covers the electrical and mechanical parameters that include the tabular data of the functionalities and standard values of the RAK1910 WisBlock GNSS Location Module.

Chipset

Vendor	Part number
u-Blox	MAX-7Q

Pin Definition

The RAK1910 WisBlock GNSS Location Module comprises a standard WisBlock connector. The WisBlock connector allows the RAK1910 module to be mounted to a WisBlock Base board. The pin order of the connector and the pinout definition is shown in **Figure 3**.

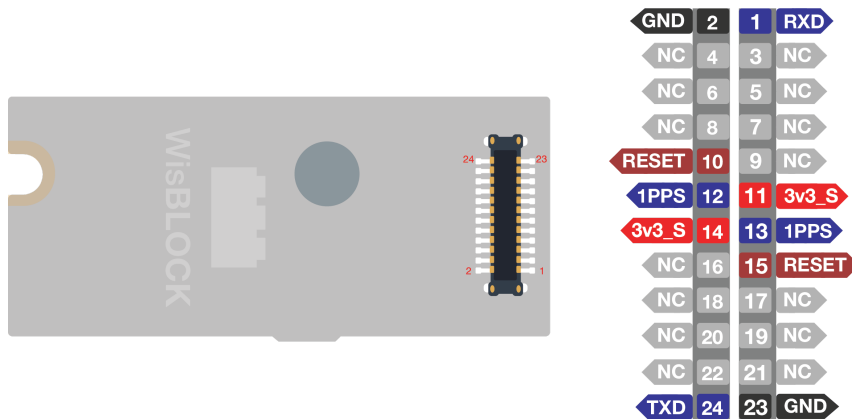


Figure 3: RAK1910 WisBlock GNSS Location Module Pinout Diagram

NOTE

- Only the **UART**-related pins, **1PPS** pin, **RESET** pin, **VDD**, and **GND** are connected to this module.
- The RAK1910 module can be installed in the Slot A only.

If a 24-pin WisBlock Sensor connector is used, the IO used for the output pulse depends on what slot the module is plugged in. The following table shows the default IO used for different slots:

SLOT A	SLOT E	SLOT F
WB_IO1	WB_IO4	WB_IO6

Sensors

GNSS Sensor

Parameter	Specification		
	56 Channels u-blox 7 engine		
Receiver Type	GPS/QZSS L1C/A		
	SBAS: WAAS, EGNOS, MSAS		
Time-To -First-Fix		MAX-7QW	MAX-7C
	Cold Start	29s	30s
	Warm Start	28s	28s
	Hot Start	1s	1s
	Aided Starts	5s	5s
Sensitivity		MAX-7QW	MAX-7C
	Tracking & Navigation	-161 dBm	-160 dBm
	Reacquisition	-160 dBm	-160 dBm
	Cold Start	-148 dBm	-147 dBm
	Warm Start	-148 dBm	-148 dBm
	Hot Start	-156 dBm	-155 dBm
Horizontal Position Accuracy	Autonomous	2.5 m	
	SBAS	2.0 m	

Electrical Characteristics

Recommended Operating Conditions

Symbol	Description	Min.	Nom.	Max.	Unit
V _{DD}	Power supply for the module	2.7	3.3	3.6	V
I _{BCKP}	Backup battery current	-	15	-	uA
I _{CC}	Acquisition	-	22	-	mA

Symbol	Description	Min.	Nom.	Max.	Unit
I _{cc}	Tracking	-	17.5	-	mA

Mechanical Characteristics

Board Dimensions

Figure 3 shows the dimensions and the mechanic drawing of the RAK1910 module.

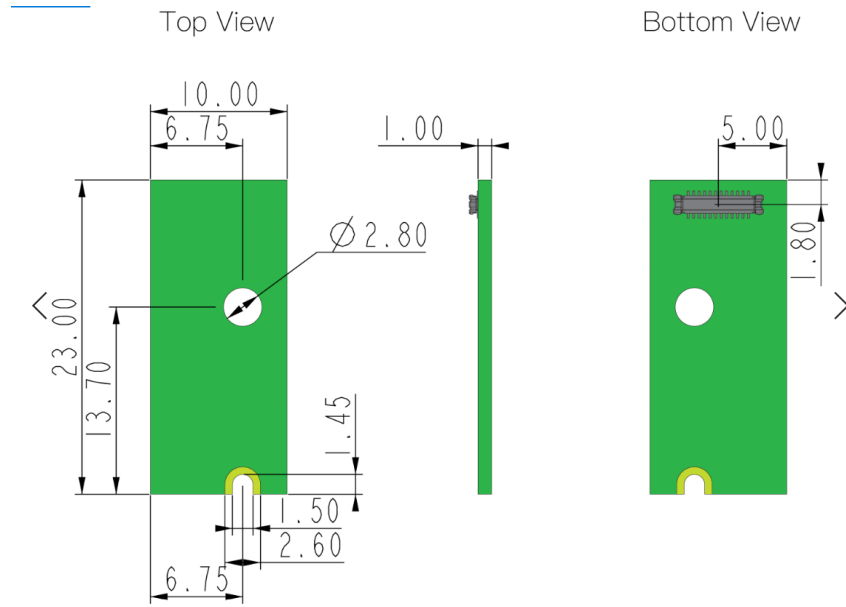


Figure 4: RAK1910 WisBlock GNSS Location Module Mechanic Drawing

WisConnector PCB Layout

REV	LOCATIONS	DESCRIPTION	DATE	REVISER	APPD

Electrical
 Current Rating: 0.3A AC(rms)/DC
 Voltage Rating: 60V AC(rms)/DC
 Contact Resistance: 90 m Ω Max
 Insulation Resistance: 100 M Ω MIN
 Withstanding Voltage: 150V AC r.m.s
 Temperature Range—Operating: -55°C~+85°C
 Material and Plating
 Housing: LCP(UL 94V-0)
 Contact Pin: Phosphor Bronze
 Plating: Gold Plated

Circuits (n)	Part No.	Dimensions(in/mm)		
		A	B	C
24	FBB04004-M24S1XX3K6M	.260(6.60)	.236(6.00)	.173(4.40)
30	FBB04004-M30S1XX3K6M	.307(7.80)	.283(7.20)	.220(5.60)
34	FBB04004-M34S1XX3K6M	.339(8.60)	.315(8.00)	.252(6.40)
40	FBB04004-M40S1XX3K6M	.386(9.80)	.362(9.20)	.299(7.60)

Ordering Information
 FBB 040 04 — M XX S 1 XX 3 K6 M
 1 2 3 4 5 6 7 8 9 10 11

1 Category FBB—Board To Board	2 Series Number 040—Pitch0.4mm	3 Distinction No. 04	4 Type M—Male	5 Circuits XX	6 Entry Angle S—180° Vertical
7 Plating 1—Gold Plated	8 Thickness of Plating 00—Gold Flash 04—4 μ	9 Material—Resin 3—LCP	10 Color—Resin K6—Black	11 Packaging M—Reel	

Recommended P.C.Board Layout

GENERAL TOLERANCES (UNLESS SPECIFIED)	APPROVE BY	DATE	PART NO.	TEM NO.
X \pm .012(0.30)	FRANK	26/SEP/13	FBB04004-MXXS1XX3K6M	FBB04004-M
X \pm 5°	CHECKED BY	DATE	TITLE	REV 0
X.X \pm .008(0.20)	CHERRY	26/SEP/13	Board to Board	SHEET NO. 1/1
X.XX \pm .006(0.15)	DRAWN BY	DATE	Pitch 0.4mm 180° Vertical (SMT)	
X.XXX \pm .004(0.10)	JACOB	26/SEP/13	THIS DRAWING CONTAINS INFORMATION THAT IS PROPRIETARY TO TXGA INDUSTRIAL ELECTRONICS(S.Z)CO.,LTD AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION	

THIRD ANGLE PROJECTION
 DESIGN UNITS: Inch (metric)
 SCALE: 5:1
 SIZE: A4

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Figure 5: WisConnector PCB footprint and recommendations

Schematic Diagram

Figure 5 shows the schematic of the RAK1910 module.

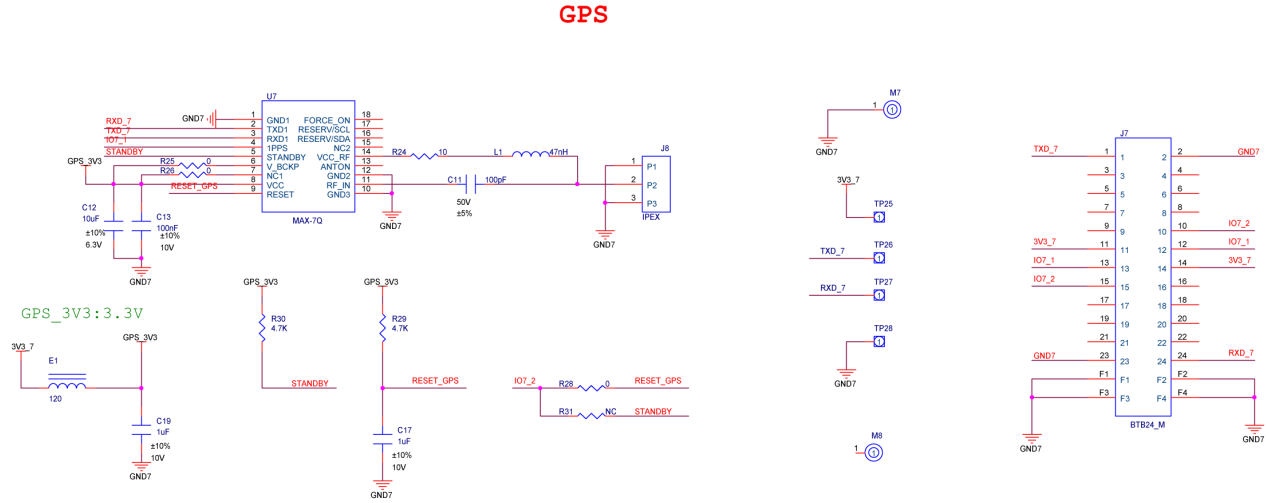


Figure 6: RAK1910 WisBlock GNSS Location Module Schematic